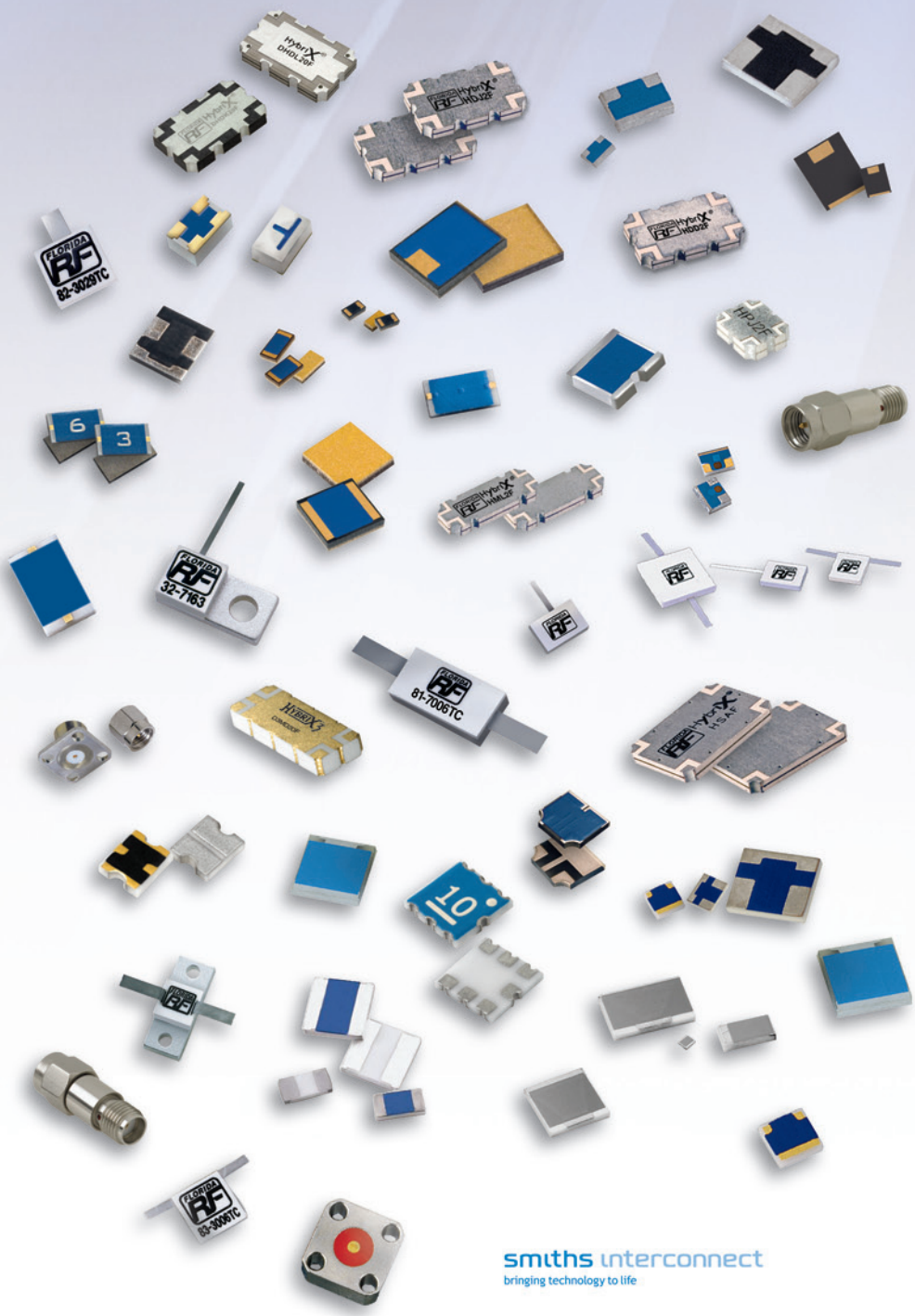
EMC Technology

FLORIDA RF Labs

MICROWAVE COMPONENTS CATALOG

- Thermopad®s
- Fixed Attenuators
- Terminations
- Resistors
- Diamond Rf™ Resistives
- HybriX® Couplers and Signal Distribution
- Innovative Solutions
- Legacy Products



smiths interconnect
bringing technology to life

WHO WE ARE

We are the world leader in passive temperature variable and fixed attenuators from DC through Q band, featuring our patented Thermopad® line of products .

We are one of the top two suppliers of RF/MW terminations and resistors, including our proprietary Diamond Rf™ Resistives and Smart Detector products.

We are a recognized leader in signal distribution components featuring our HybriX® line of 3 dB hybrid and directional couplers, Doupler™ combiners, power dividers & RF cross-overs.

We are a best-in-class, international leader in RF/MW cable assemblies led by our Lab-Flex® low-loss line of flexible cables for high-reliability, aerospace, test and specialty applications.

Our businesses are based on:

- Extraordinary customer service
- Custom engineered solutions and application specific designs
- Unique technologies
- High-reliability testing
- Tighter tolerances

Leadership that strives to really know our customers' needs and expectations.

Two centers of excellence to meet our customers' needs –

- Design, prototyping & mid-volume manufacturing in Florida
- Mid-to-high volume production in our 200+ employee facility in Costa Rica

We continue to expand our portfolio of great new products.

Customer Service!

Design Service!

Technical Service!

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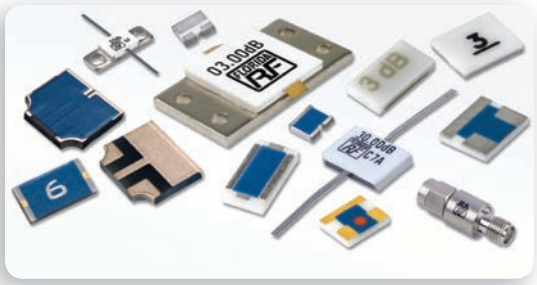
bringing technology to life



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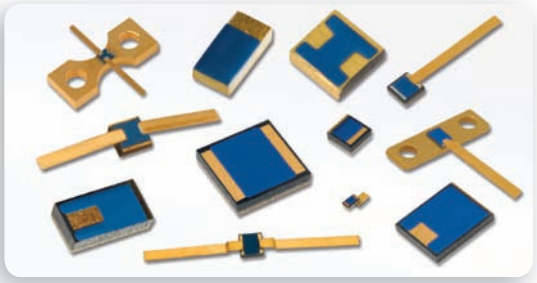

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Features

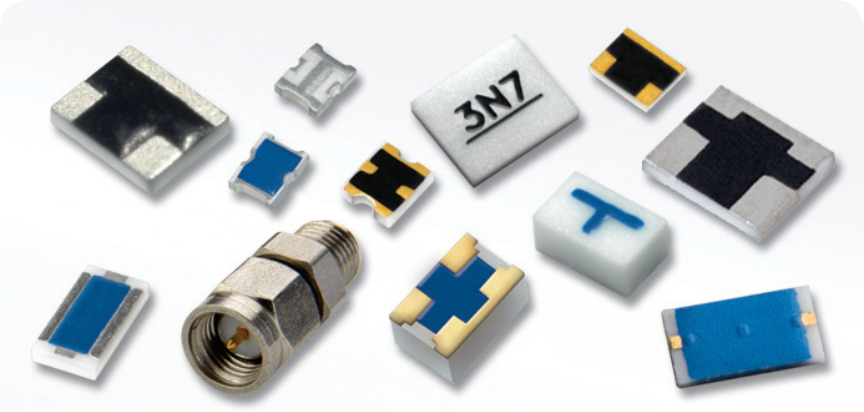
- Frequency Ranges from DC to 50 GHz
- Attenuation Values from 1 to 10 dB
- Negative and Positive Temperature Coefficients of Attenuation (TCA) Available
- Power Handling Up to 2 Watts
- Space and Military Qualified
- Surface Mount Packaging
- Wire Bondable Connections Available
- Impedance 50 and 75 Ohms
- RoHS Compliant Option Available

Benefits

- Small Footprint
- Zero Distortion
- Totally Passive
- Power Handling up to 2 Watts
- Several Metallization Options Available
- Tailored Response to Variations Over Temperature
- Requires no DC power.

Applications

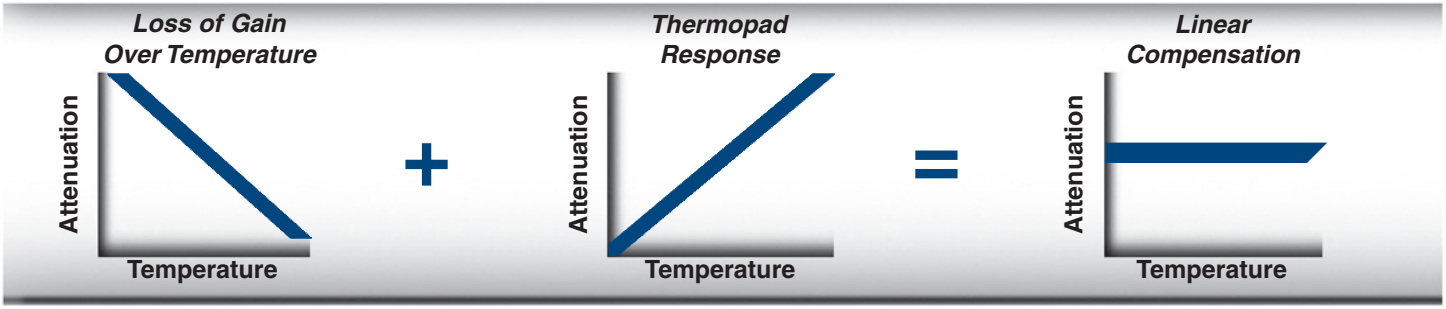
- Power Amplifiers
- Military
- Mixers
- Satellite Communication
- Gain Blocks
- MMIC Amplifiers
- Directional Couplers
- Diode Detectors
- Broadcast (TV and Radio)



The Thermopad® is a totally passive, surface mountable temperature variable attenuator. It requires no bias or control voltages and does not generate signal distortion. The Thermopad can be used in place of a standard chip attenuator to combine level setting and temperature compensation in a single chip design. This will reduce component count, increase reliability, and lower system costs.

Quick Selector Chart

Series	Frequency (GHz)	Power (Watts)	Footprint mm [inches]		Page
TVA	DC - 6	2.0	3.68 x 3.10	[0.145 x 0.122]	5
MTVA	DC - 18	0.2	1.90 x 1.52	[0.075 x 0.060]	6
WTVA	DC - 20	0.1	1.78 x 1.52	[0.070 x 0.060]	7
KTVA	16 - 36	0.1	3.05 x 1.65	[0.120 x 0.065]	8
QTVA	36 - 50	0.2	3.05 x 1.65	[0.120 x 0.065]	9
AN3	DC - 4	2.0	3.68 x 3.10	[0.145 x 0.122]	11
AN5	DC - 6	0.2	1.90 x 1.52	[0.075 x 0.060]	10
AN7	DC - 6	0.1	2.03 x 1.27	[0.080 x 0.050]	10
AN11	DC - 6	0.1	1.14 x 0.64	[0.045 x 0.025]	10
ETVA	DC - 3	2.0	4.06 x 3.68	[0.160 x 0.145]	13
CTVA (75Ω)	DC - 2	2.0	3.68 x 3.10	[0.145 x 0.122]	12
HTVA	DC - 20	0.2	1.40 x 1.40	[0.055 x 0.055]	12
Coax TVA	DC - 6	2.0	7.92 x 19.05	[0.312 x 0.750]	14
HRTVA	DC - 6	2.0	3.68 x 3.10	[0.145 x 0.122]	15
HRMTVA	DC - 18	0.2	1.91 x 1.52	[0.075 x 0.060]	16

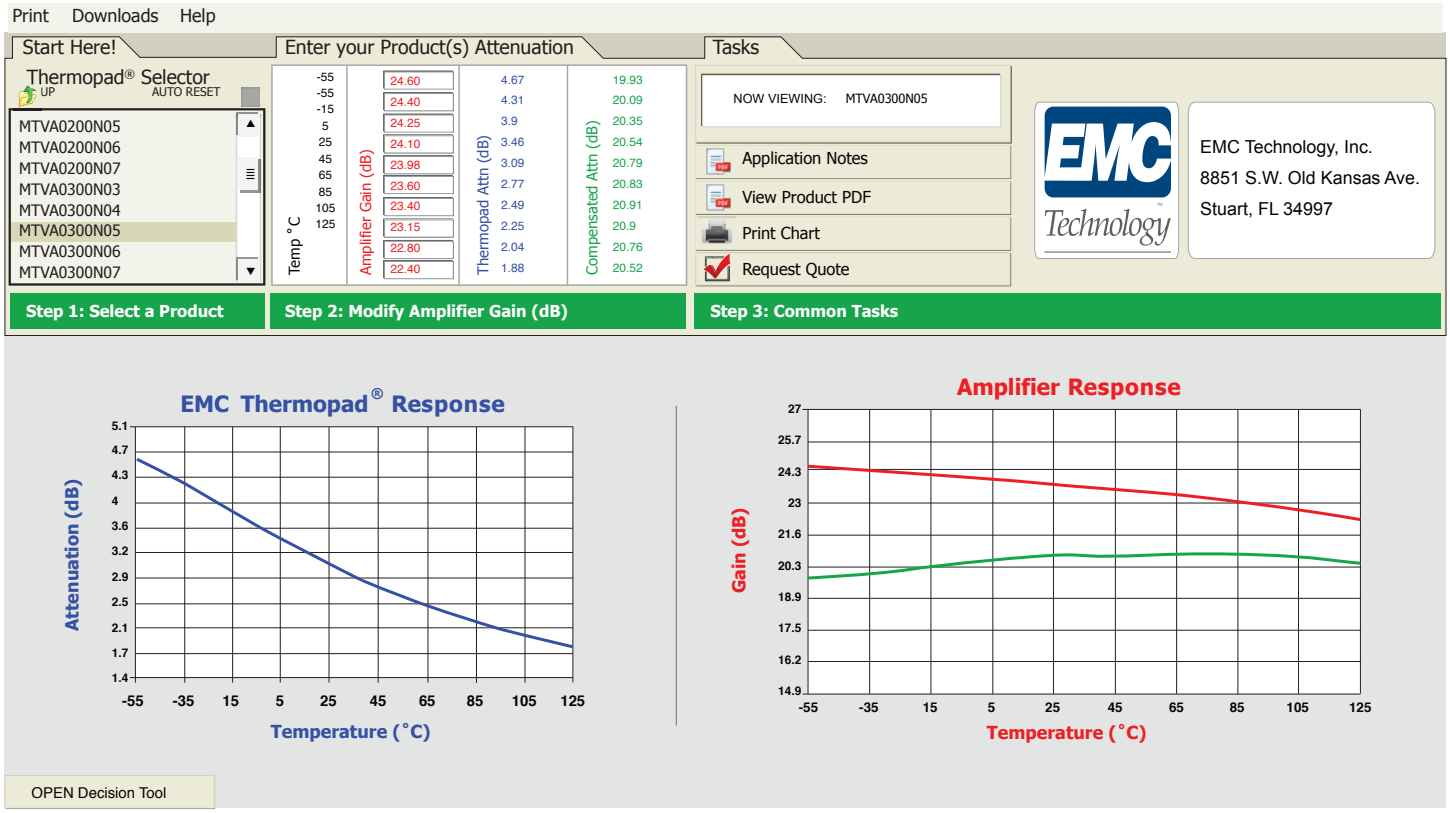


- Small Footprint
- Surface Mountable
- Contributes No Signal Distortion
- Totally Passive
- Power Handling up to 2 Watts
- Several Metallization and Packaging Options Available
- Tailored Response to Cancel Amplifier Gain Variations Over Temperature
- Requires no DC Power

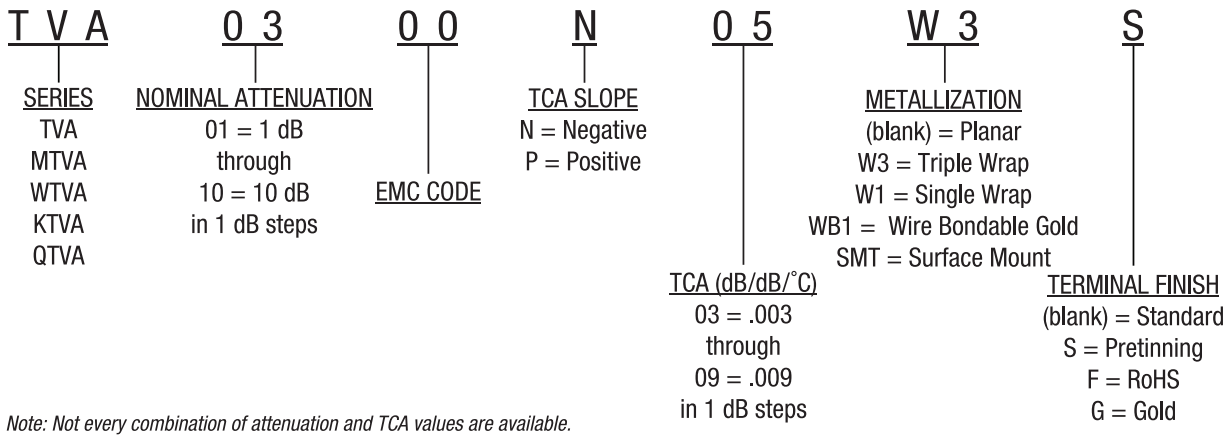
The Thermopad® is a totally passive absorptive microwave attenuator, which provides power dissipation that varies with temperature. The device can be used in any application that requires a known amount of attenuation change for a particular temperature shift. This is particularly useful for preventing gain loss over temperature in various amplifier applications.

In applications from DC - 50 GHz, EMC's Thermopad is the ideal temperature compensation solution for cost, size, performance, and reliability. The Thermopad can replace closed loop temperature compensation circuits with a single chip device requiring no bias or active control. Since the Thermopad produces no signal distortion it excels in applications involving multiple tones and complex modulation schemes such as cellular base station applications and radar. In high reliability, military, and spacecraft applications the Thermopad reduces system complexity and cost.

Thermopad® Selector Tool



Part Numbering Code



Note: Not every combination of attenuation and TCA values are available.

Metallization Options

Planar (no code) Planar device for flip chip mounting offers the best RF performance and lowest cost.

Triple Wrap (W3) Metallization wraps around input, output, and ground terminals. Permits inspectable solder fillets when flip chip mounting.

Surface Mount (SMT) Metallization wraps around input, output, and ground terminals. For a true surface mount technology. (WTVA and TS09 series only). Or flip chip surface mount. (KFA, KTVA, QFA and QTVA)

Single Wrap (W1) Metallization wraps around ground terminal only. Full backside metallization.

Pretinned (S) Pretinning (with 60/40 solder) improves solderability (available on all of the above options except Option G and KTVA).

RoHS (F) RoHS compliant option (excludes WB1, G, and S metallization options).

Single Wrap (WB1) Metallization wraps around ground terminal only. Full backside metallization. Input and output terminals have gold metallization for wire bonding (MTVA series only).

Double Wrap (WB2) Metallization wraps around ground terminal only on 2 sides. Full backside metallization. Input and output terminals have gold metallization for wire bonding (WTVA and TS09 series only).

Gold (G) Planar device with gold metallization. Typically used for wire bonding (TVA, MTVA and HTVA series only).

Note: KTVA bondable unit backside ground metallization is platinum silver. Input and output terminals have gold metallization for wire bonding.

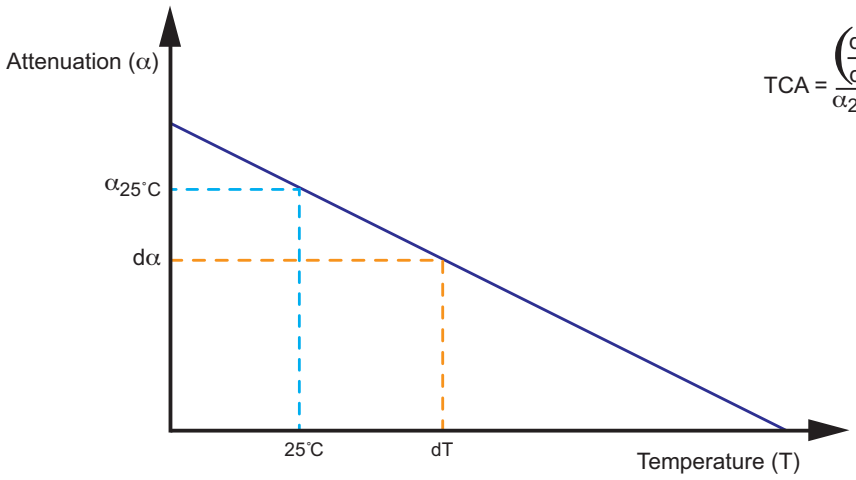
Attenuator Selector Chart

FOOT PRINT	1512 3.68 X 3.10mm [0.145 x 0.122]	1615 4.06 X 3.68mm [0.160 x 0.145]	0706 1.78 X 1.52mm [0.070 x 0.060]	0805 2.03 X 1.27mm [0.080 x 0.050]	0806 1.91 X 1.52 mm [0.075 x 0.060]	1206 3.05 X 1.65mm [0.120 x 0.065]
THERMOPAD®	TVA	ETVA	WTVA	AN7	MTVA/AN5	KTVA/QTVA
FIXED	TS03	TS03	TS09	TS07	TS05	KFA/QFA

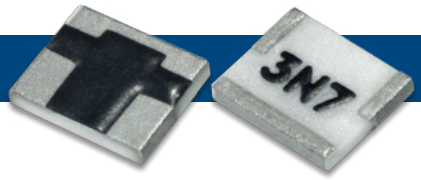
Thermopad® Temperature Shift Reference Chart (Attenuation Shift in dB per 10˚C)

	TCA* dB/dB/ ºC	Attenuation at 25ºC									
		1 dB	2 dB	3 dB	4 dB	5 dB	6 dB	7 dB	8 dB	9 dB	10 dB
Negative Temperature Compensation	-0.003	-0.03	-0.06	-0.09	-0.12	-0.15	-0.18	-0.21	-0.24	-0.27	-0.30
	-0.004	-0.04	-0.08	-0.12	-0.16	-0.20	-0.24	-0.28	-0.32	-0.36	-0.40
	-0.005	-0.05	-0.10	-0.15	-0.20	-0.25	-0.30	-0.35	-0.40	-0.45	-0.50
	-0.006	-0.06	-0.12	-0.18	-0.24	-0.30	-0.36	-0.42	-0.48	-0.54	-0.60
	-0.007	-0.07	-0.14	-0.21	-0.28	-0.35	-0.42	-0.49	-0.56	-0.63	-0.70
	-0.009	-0.09	-0.18	-0.27	-0.36	-0.45	-0.54	-0.63	-0.72	-0.81	-0.80
	-0.010	-0.10	-0.20	-0.30	-0.40	-0.50	-0.60	For configurations not listed please contact our Sales Department at +1 772-286-9300 or 800-544-5594			
	-0.011	-0.11	-0.22	-0.33	-0.44	-0.55	-0.66				
	-0.012	-0.12	-0.24	-0.36	-0.48	-0.60	-0.72				
	-0.013	-0.13	-0.26	-0.39	-0.52	-0.65	-0.78				
	-0.014	-0.14	-0.28	-0.42	-0.56	-0.70	-0.84				
	-0.015	-0.15	-0.30	-0.45	-0.60	-0.75	-0.90				
	-0.016	-0.16	-0.32	-0.48	-0.64	-0.80	-0.96				
Positive Temperature Compensation	0.003	0.03	0.06	0.09	0.12	0.15	0.18				
	0.005	0.05	0.10	0.15	0.20	0.25	0.30				
	0.006	0.06	0.12	0.18	0.24	0.30	0.36				
	0.007	0.07	0.14	0.21	0.28	0.35	0.42				
	0.008	0.08	0.16	0.24	0.32	0.40	0.48				
	0.009	0.09	0.18	0.27	0.36	0.45	0.54				

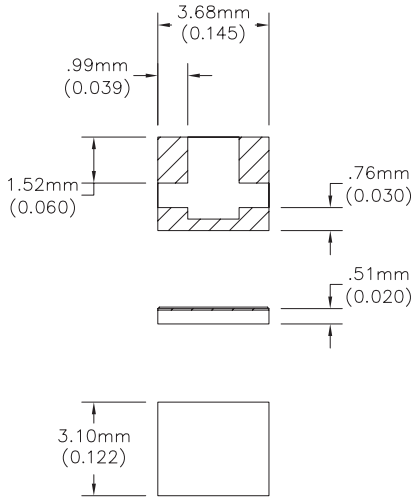
*TCA is temperature coefficient of attenuation and is calculated using the following equation:



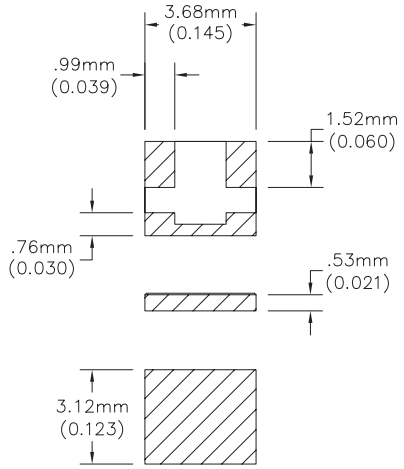
$$TCA = \frac{\left(\frac{d\alpha}{dT}\right)}{\alpha_{25^\circ C}} \text{ dB/dB/˚C}$$



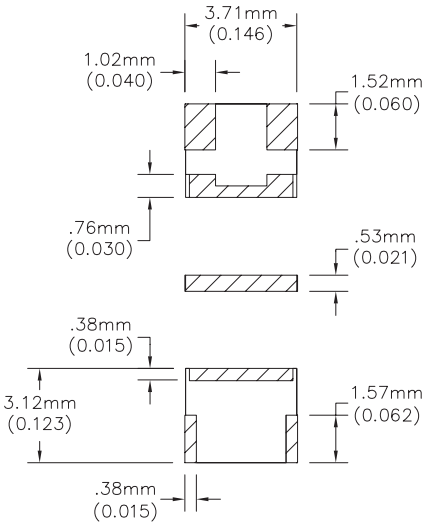
TVA Planar Series



TVA Single Wrap Series



TVA Triple Wrap Series

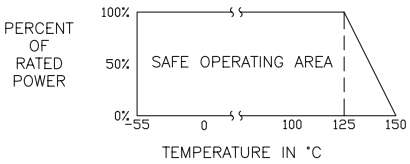


EMC Technology's TVA Thermopad®s are microwave absorptive attenuators which provide power dissipation that varies with temperature and operate in frequency ranges from DC to 6 GHz. This surface mount, temperature variable attenuator requires no bias or control voltages and generates zero distortion. This product is available with various metallization styles and plating options including gold for wire bonding applications, RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing. It is available in both negative and positive shifting temperature slopes.

Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/˚C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish Gold and Wire Bondable Options Available

Power Rating and Derating



Part Numbering Code

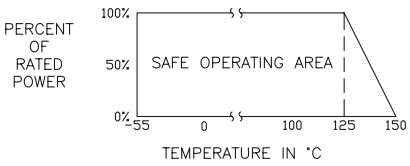
T V A	0 3	0 0	N	0 5	W 3	S
SERIES TVA	NOMINAL ATTENUATION 01 = 1 dB through 10 = 10 dB	EMC CODE	TCA SLOPE N = Negative P = Positive	TCA (dB/dB/˚C) 03 = .003 through 09 = .009	METALLIZATION (blank) = Planar W3 = Triple Wrap W1 = Single Wrap WB1 = Wire Bondable Gold	TERMINAL FINISH (blank) = Standard S = Pretinning F = RoHS G = Gold

EMC Technology's MTVA Thermopad®s are microwave absorptive attenuators which offer a smaller physical size with increased frequency range. The series operates DC to 18 GHz. The MTVA version of the Thermopad also offers wire bondable terminals for use with alternative high frequency attachment methods and space applications. This product is available with various metallization styles and plating options including RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing

Specifications

Size	1.52mm x 1.91mm [0.060in x 0.075in]
Impedance	50 Ohms
Frequency Range	Planar DC to 18 GHz W Series DC to 12.4 GHz
TCA Tolerance	±0.001 dB/dB/˚C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish Gold and Wire Bondable Options Available

Power Rating and Derating



Part Numbering Code

M T V A — SERIES: MTVA

0 3 — NOMINAL ATTENUATION: 01 = 1 dB through 09 = 9 dB

0 0 — EMC CODE

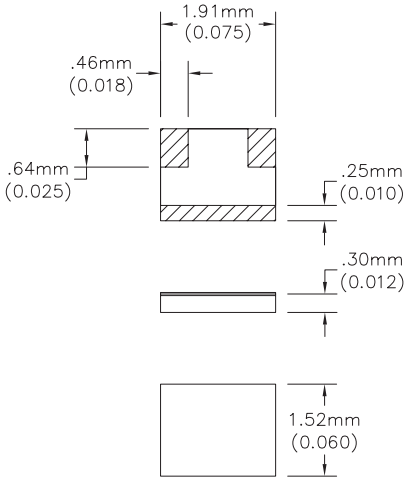
N — TCA SLOPE: N = Negative, P = Positive

0 5 — TCA (dB/dB/˚C): 03 = .003 through 09 = .009

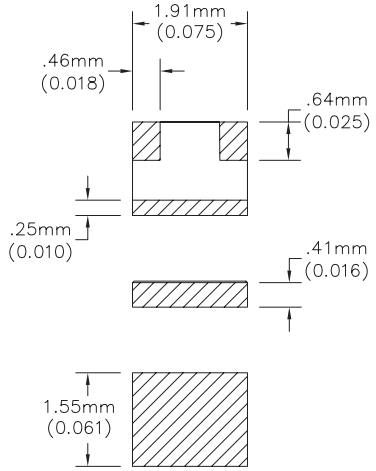
W 3 — METALLIZATION: (blank) = Planar, W3 = Triple Wrap, W1 = Single Wrap, WB1 = Wire Bondable Gold

S — TERMINAL FINISH: (blank) = Standard, S = Pretinning, F = RoHS, G = Gold

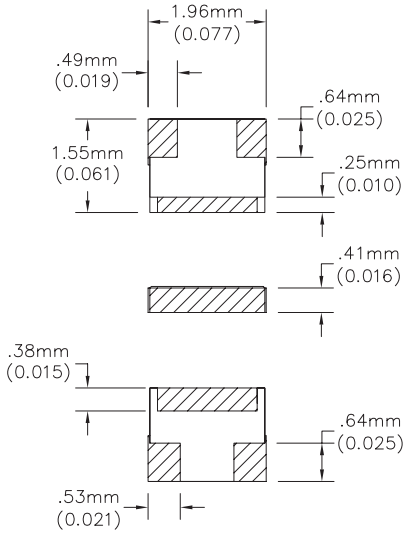
MTVA Planar Series

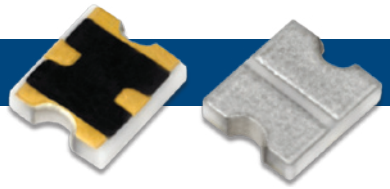


MTVA Single Wrap Series

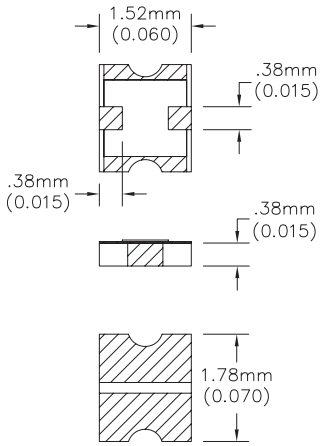


MTVA Triple Wrap Series

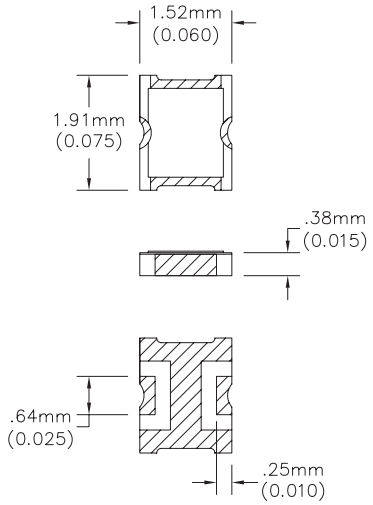




WTVA Double Wrap Wire Bond Series



WTVA Surface Mount Series

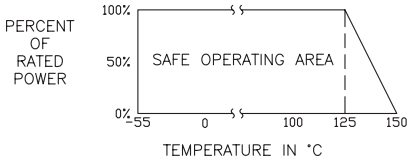


The WTVA is EMC's wide band temperature variable attenuator. This product provides a good linear shift from DC to 20 GHz and from -55˚C to +125˚C. EMC Technology's Thermopads® are microwave absorptive attenuators which provide power dissipation that varies with temperature. They are used to correct gain variations in amplifiers and other active components which tend to have gain anomalies over temperature. The WB2 style uses thick film gold wire bondable terminals. The SMTF style is a RoHS compliant surface mount configuration. The WTVA is the preferred version of EMC's Thermopad for use in satellite communications, broadband EW applications, and for high frequency and broadband amplifiers.

Specifications

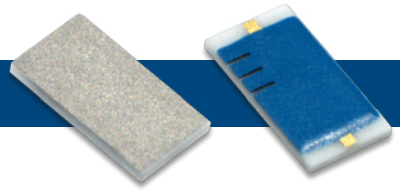
Size	1.52mm x 1.78mm [0.060in x 0.070in]
Impedance	50 Ohms
Frequency Range	DC to 20 GHz
TCA Tolerance	±0.001 dB/dB/˚C
VSWR (Typical)	1.25:1 Max DC-10 GHZ @ 25°C 1.45:1 Max 10-20 GHZ @ 25°C
Power Rating	200 Milliwatts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Wire Bondable or Lead Free Finish

Power Rating and Derating



Part Numbering Code

W T V A	0 3	0 0	N	0 5	S M T	F
SERIES WTVA	NOMINAL ATTENUATION 01 = 1 dB through 06 = 6 dB	EMC CODE	TCA SLOPE N = Negative P = Positive	TCA (dB/dB/˚C) 03 = .003 through 07 = .007	METALLIZATION SMT = Surface Mount WB2 = Wire Bondable Gold	TERMINAL FINISH (blank) = Standard S = Pretinning F = RoHS

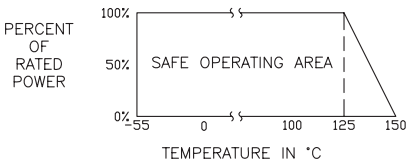


EMC Technology's KTVA high frequency Thermopads® are ideal for millimeter-wave amplifiers. KTVA is capable of handling 200 milliwatts input power and available in wire bondable and surface mount packages. Standard narrowband versions cover specific segments in K and Ka bands. An optimized broadband version operating from 16 to 36 GHz is also available. KTVA design also offers custom frequency band responses for narrow band applications with improved VSWR performance and attenuation accuracy. This product is space qualified and has flight history for those requiring pre-qualified heritage.

Specifications

Size	3.05mm x 1.65mm [0.120in x 0.065in]
Impedance	50 Ohms
Frequency Range	16 to 36 GHz
TCA Tolerance	±0.001 dB/dB/˚C
VSWR (Typical)	1.35 Typical
Power Rating	200 Milliwatts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Bondable Gold or Lead Free Finish

Power Rating and Derating



Part Numbering Code

K T V A — SERIES: KTVA

0 3 — NOMINAL ATTENUATION: 02 = 2 dB through 06 = 6 dB

0 0 — EMC CODE

N — TCA SLOPE: N = Negative

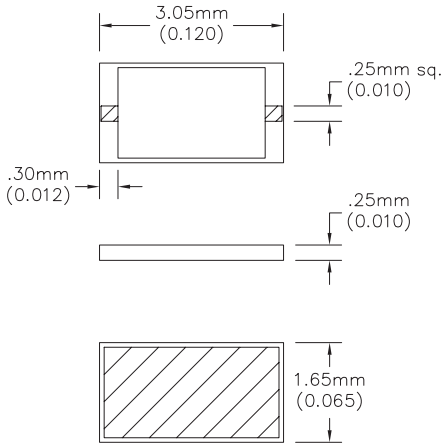
0 5 — TCA (dB/dB/˚C): 05 = .005, 06 = .006, 07 = .007

2 — FREQUENCY RANGE: 1 = 16-21 GHz, 2 = 19-32 GHz, 3 = 27-31 GHz, 4 = 34-36 GHz, 5 = 16-36 GHz

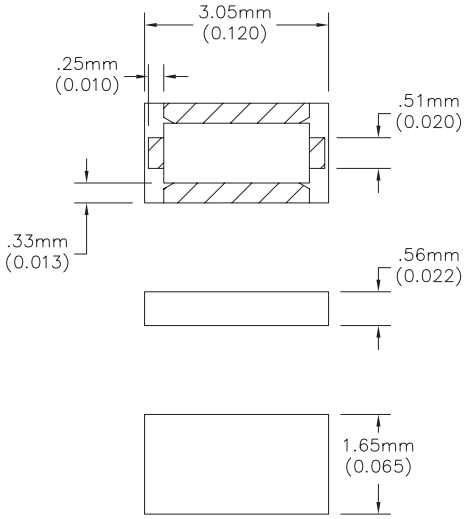
S M T — METALLIZATION: SMT = Surface Mount, (Blank) = Wire Bondable Gold

F — TERMINAL FINISH: F = RoHS

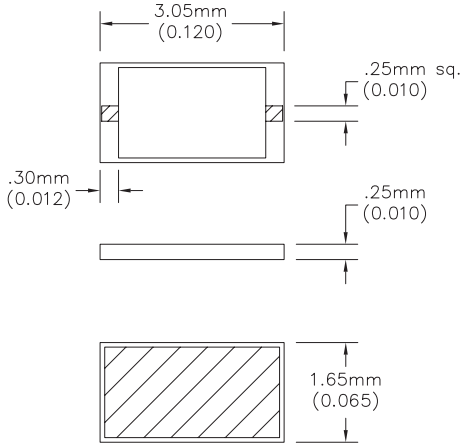
KTVA Wire Bond Series



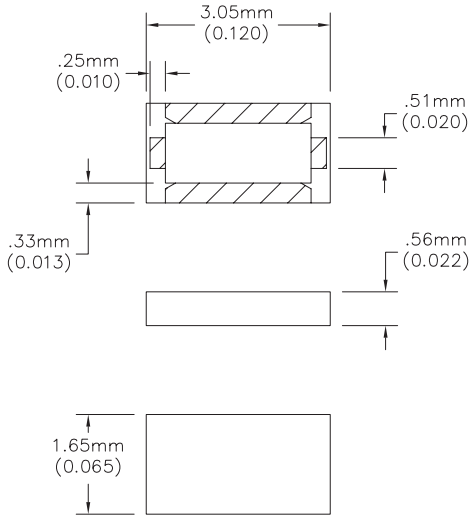
KTVA Surface Mount Series



QTVA Wire Bond Series



QTVA Surface Mount Series

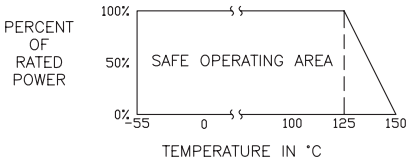


EMC Technology's QTVA high frequency Thermopads® are ideal for millimeter wave amplifiers. QTVA is capable of handling 200 milliwatts input power and available in wire bondable and surface mount packages. The devices feature optimized broadband response from 36 to 50 GHz. QTVA design also offers custom frequency band responses for narrow band applications with improved VSWR performance and attenuation accuracy.

Specifications

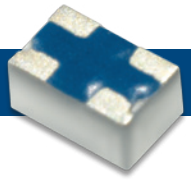
Size	3.05mm x 1.65mm [0.120in x 0.065in]
Impedance	50 Ohms
Frequency Range	36 to 50 GHz
TCA Tolerance	±0.001 dB/dB/˚C
VSWR (Typical)	1.35 Typical
Power Rating	200 Milliwatts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Bondable Gold or Lead Free Finish

Power Rating and Derating



Part Numbering Code

Q T V A	0 3	N	0 3	0	S M T	F
SERIES: QTVA	NOMINAL ATTENUATION: 02 = 2 dB through 10 = 10 dB	TCA SLOPE: N = Negative	TCA (dB/dB/˚C): 03 = 003, 05 = 005, 07 = 007	FREQUENCY RANGE: 0 = 36-50 GHz	STYLE: SMT = Surface Mount, (Blank) = Wire Bond Gold	TERMINAL FINISH: RoHS

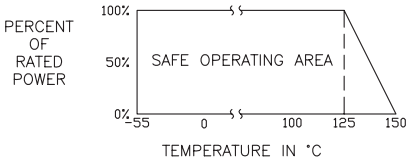


The AN11, 7 and 5 series of temperature variable attenuators offers a cost effective passive temperature compensation solution for the commercial wireless industry. The series operates DC to 6 GHz. These products are sold on 1000 piece reels for high volume applications. Plating options include RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing. This product is packaged in 1000 piece reels for high volume applications.

Specifications

Size	AN11	1.14mm x 0.64mm [0.045in x 0.025in]
	AN7	2.03mm x 1.27mm [0.080in x 0.050in]
	AN5	1.91mm x 1.52mm [0.075in x 0.060in]
Impedance	50 Ohms	
Frequency Range	DC to 6 GHz	
TCA Tolerance	±0.001 dB/dB/°C	
VSWR (Typical)	1.30 @ 1 GHz	
Power Rating	200 Milliwatts	
Operating Temperature	-55°C to 150°C	
Substrate	Alumina	
Resistive Material	Thick Film	
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.	

Power Rating and Derating



Part Numbering Code

A N 5 – X N X F

SERIES
AN5
AN7
AN11

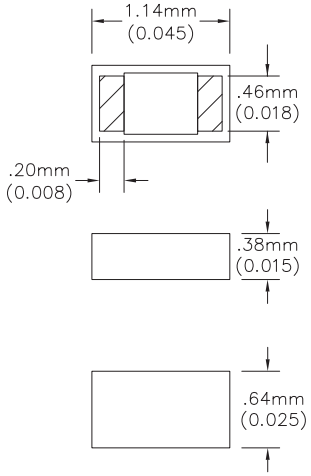
NOMINAL ATTENUATION
1 = 1 dB
through
10 = 10 dB

TCA SLOPE
N = Negative

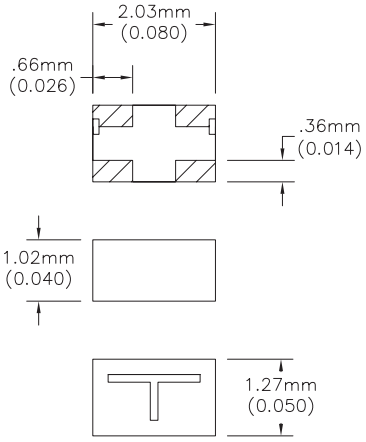
TCA (dB/dB/°C)
3 = .003
4 = .004
5 = .005
6 = .006
7 = .007
9 = .009

TERMINAL FINISH
(blank) = Standard
S = Pretinning
F = RoHS

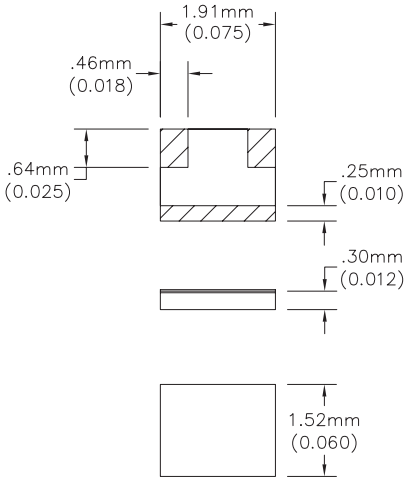
AN11 Planar Series

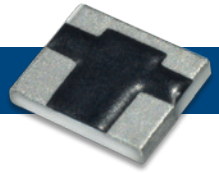


AN7 Planar Series

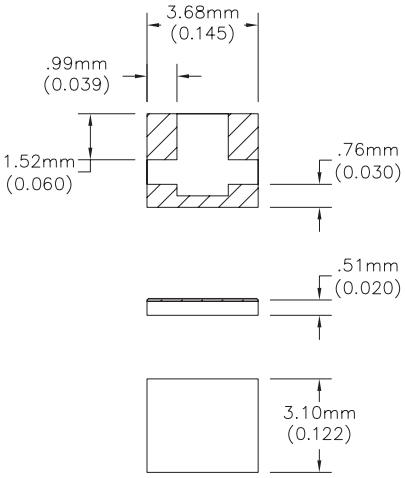


AN5 Planar Series

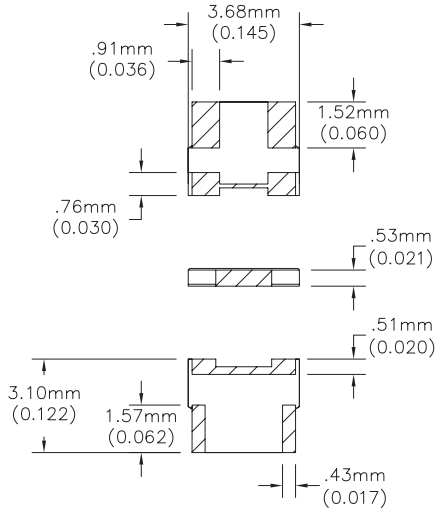




AN3 Planar Series



AN3 Triple Wrap Series

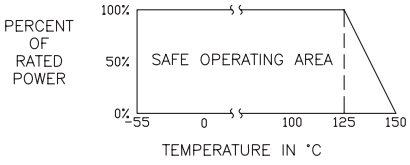


The AN3 series of temperature variable attenuators offers a cost effective passive temperature compensation solution for the commercial wireless industry. The series operates DC to 4 GHz. And is available with 2 metallization styles, planar and triple wrap. Plating options include RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder finish or 60/40 solder fused finish for easy reflow processing. This product is packged in 1000 piece reels for high volume applications.

Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	DC to 4 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

Power Rating and Derating



Part Numbering Code

A N 3 – X N X F

SERIES
AN3

NOMINAL ATTENUATION
1 = 1 dB
through
10 = 10 dB

TCA SLOPE
N = Negative

TCA (dB/dB/°C)
3 = .003
4 = .004
5 = .005
6 = .006
7 = .007
9 = .009

METALLIZATION
(blank) = Planar
W3 = Triple Wrap

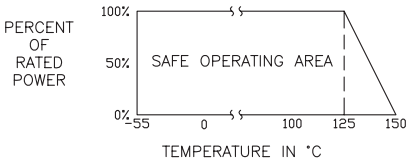
TERMINAL FINISH
(blank) = Standard
S = Pretinning
F = RoHS

HTVA Thermopads® are microwave absorptive attenuators which operate in ultra-broadband applications from DC to 20 GHz and offer a smaller 0.55” x 0.55” chip size. Thermopads reduce component count, increase reliability and reduce costs.

Specifications

Size	1.40 mm x 1.40 mm [0.055 in x 0.055 in]
Impedance	50 Ohms
Frequency Range	DC to 20 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Bondable Gold

Power Rating and Derating

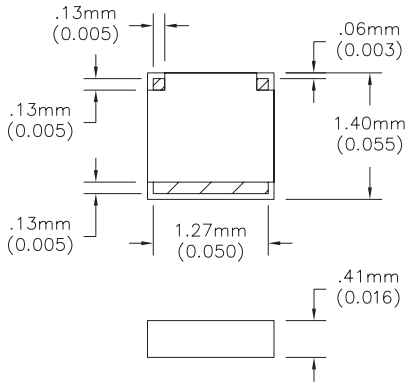


CTVA Thermopad® is a 75 ohm version of the standard temperature variable attenuator. It can be used in 75 ohm applications where variable dissipated power is required over temperature. This product is available with planar and triple wrap metallization styles. Available plating options include RoHS compliant silver over nickel finish, 60/40 low-temperature solder plating, and 60/40 solder fused finish.

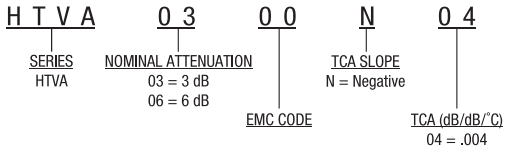
Specifications

Size	3.10 mm x 3.68 mm [0.122 in x 0.145 in]
Impedance	75 Ohms
Frequency Range	DC to 4 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.25 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

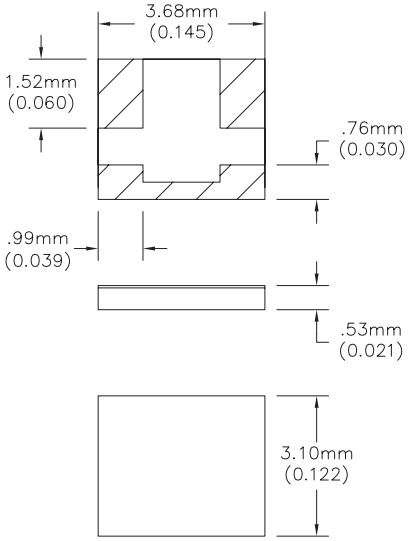
HTVA Planar Series



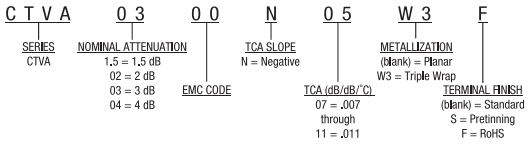
Part Numbering Code

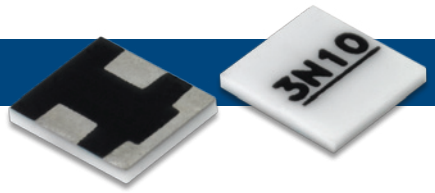


CTVA Planar Series



Part Numbering Code

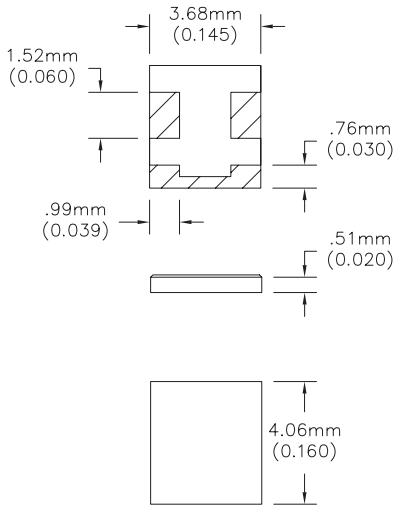




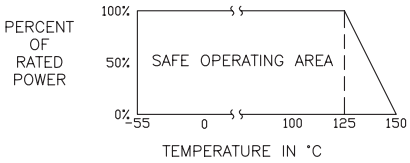
ETVA (3.0 GHz)

Extended Shift Thermopad®

ETVA Planar Series



Power Rating and Derating



ETVA Thermopads® are microwave absorptive attenuators which provide power dissipation that varies with temperature and operate in frequency ranges from DC to 3 GHz. The ETVA features higher temperature coefficient of attenuation, therefore allowing for greater gain variation compensation. This surface mount, temperature variable attenuator requires no bias or control voltages and generates zero distortion. This product is available with various metallization styles and plating options including RoHS compliant lead free silver over nickel plating, 60/40 low temperature solder plating or 60/40 solder fused finish for easy reflow processing.

Specifications

Size	4.06 mm x 3.68 mm [0.160 in x 0.145 in]
Impedance	50 Ohms
Frequency Range	DC to 3 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plate or Lead Free Finish.

Part Numbering Code

E T V A	0 3	0 0	N	0 5	S
SERIES ETVA	NOMINAL ATTENUATION 03 = 3 dB through 06 = 6 dB	EMC CODE	TCA SLOPE N = Negative	TCA (dB/dB/°C) 10 = .010 through 16 = .016	TERMINAL FINISH (blank) = Standard S = Pretinning F = RoHS

EMC Technology offers the popular temperature variable attenuator in a coaxial package. The coaxial Thermopad offers the same benefits as the standard temperature variable attenuator with the added benefit of a SMA plug to SMA jack interface.

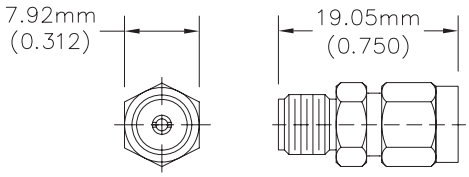
Specifications

Size	19.05 mm x 7.92 mm [0.750 in x 0.312 in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.35 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Plated Thick Film
Body and Nut	Stainless Steel
Contact	Beryllium Copper
Dielectric	Tetraflouroethylene
Interface	SMA Male/SMA Female
Body	Passivated

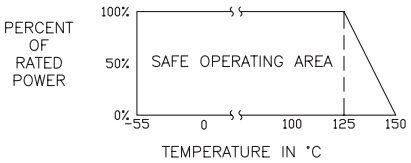
Part Numbering Code

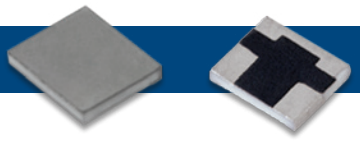
42TVA	03	00	N	05	F
SERIES 42TVA	NOMINAL ATTENUATION 01 = 1 dB through 10 = 10 dB	EMC CODE	TCA SLOPE N = Negative P = Positve	TCA (dB/dB/°C) 03 = .003 through 09 = .009	TERMINAL FINISH (blank) = Standard F = RoHS

Coaxial Series

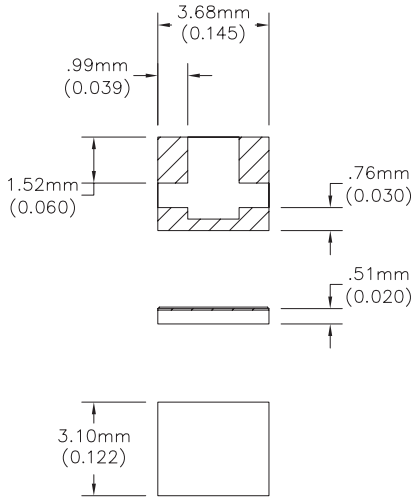


Power Rating and Derating

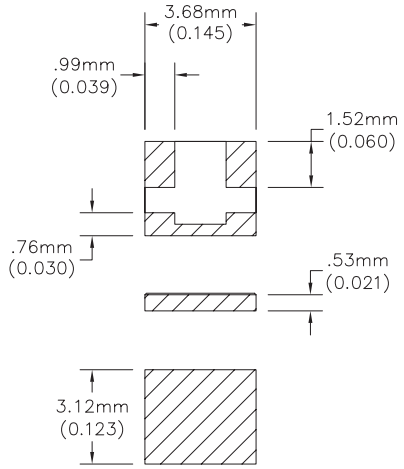




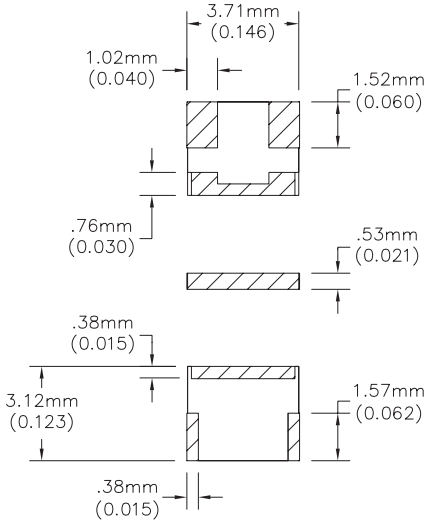
HRT Planar Series



HRT Single Wrap Series



HRT Triple Wrap Series

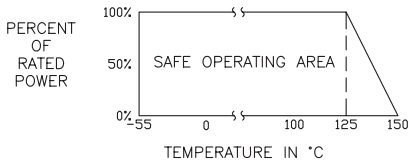


EMC's Thermopad®, temperature variable attenuator, is S-Level qualified for high reliability applications. As a completely passive temperature compensation solution, Thermopad offers the benefits of reduced system complexity and improved overall reliability, which are critical for space and military applications. The HR series of the TVA is optimized for DC to 6 GHz operation and may be ordered with group A, B, or C testing based on Mil-PRF-55342.

Specifications

Size	3.10mm x 3.68mm [0.122 in x 0.145 in]
Impedance	50 Ohms
Frequency Range	DC to 6 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	2.0 Watts
Operating Temperature	-55 °C to 150 °C
Substrate	Alumina
Resistive Material	Thick film
Terminal Material	Thick film, Nickel Barrier with Solder Plated Finish

Power Rating and Derating



Part Numbering Code

Ordering Information

H R T	0 3	0 A	N	0 5	W 3	S
SERIES HRT	NOMINAL ATTENUATION 01 = 1 dB through 10 = 10 dB	TESTING 0A = Group A 0B = Group B 0C = Group C	TCA SLOPE N = Negative P = Positive	TCA (dB/dB/°C) 03 = .003 through 09 = .009	METALLIZATION (blank) = Planar W3 = Triple Wrap W1 = Single Wrap G = Gold Metallization WB1 = Wire Bondable Gold	TERMINAL FINISH (blank) = Standard S = Pretinning F = RoHS (not available on WB1 or G)

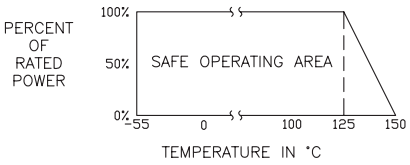
See page 105 for test plan.

EMC's miniature size Thermopad®, temperature variable attenuator, is S-Level qualified for high reliability applications. As a completely passive temperature compensation solution, Thermopad offers the benefits of reduced system complexity and improved overall reliability, which are critical for space and military applications. The HR series of the MTVA is optimized for DC to 18 GHz operation and may be ordered with group A, B, or C testing based on Mil-PRF-55342.

Specifications

Size	1.52 mm x 1.91 mm [0.060 in x 0.075 in]
Impedance	50 Ohms
Frequency Range	DC to 18 GHz
TCA Tolerance	±0.001 dB/dB/°C
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	200 Milliwatts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated Finish

Power Rating and Derating



Part Numbering Code

H R M — SERIES: HRM

0 3 — NOMINAL ATTENUATION: 01 = 1 dB through 09 = 9 dB

0 A — TESTING: 0A = Group A, 0B = Group B, 0C = Group C

N — TCA SLOPE: N = Negative

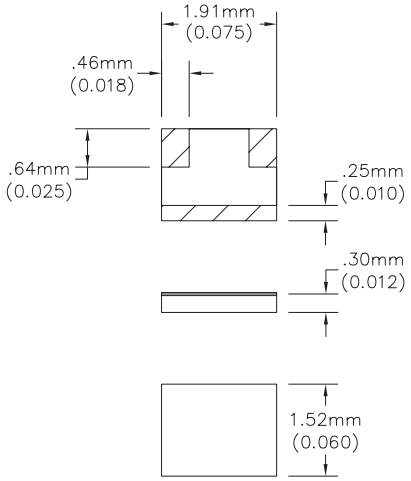
0 5 — TCA (dB/dB/˚C): 03 = .003 through 09 = .009

W 3 — METALLIZATION: (blank) = Planar, W3 = Triple Wrap, W1 = Single Wrap, WB1 = Wire Bondable Gold

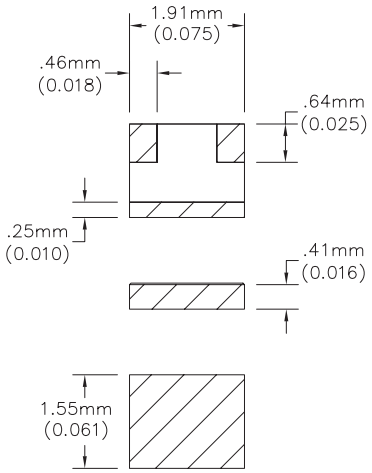
S — TERMINAL FINISH: (blank) = Standard, S = Pretinning, F = RoHS, G = Gold Metallization Not available on WB1

See page 105 for test plan.

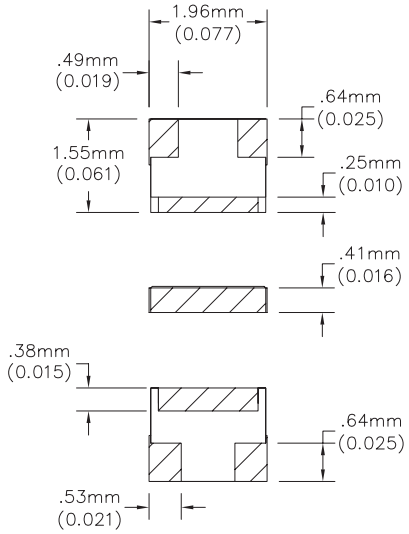
HRM Planar Series



HRM Single Wrap Series



HRM Triple Wrap Series



Features

- Substrates - BeO, AlN, Alumina and CVD Diamond
- Commercial and High Reliability Product Lines
- Frequency Range from DC to 50 GHz
- Attenuation Values from 0 to 30 dB
- Space and Military Qualified
- Surface Mount, Wire-Bondable and Coaxial Configurations

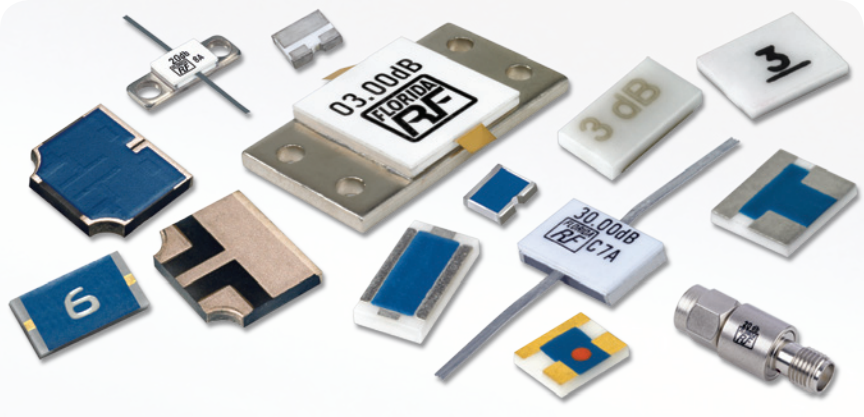
Benefits

- Small Footprint
- Totally Passive
- Power Handling up to 400 Watts
- Several Metallization Options Available, Including a RoHS Compliant Version

Applications

- Circulators
- High Power Amplifiers
- Receivers
- Filters
- Isolators
- Signal Sampling
- Interstage Isolation
- Impedance Matching

For our **CVD Diamond Attenuators** *see* **Diamond Rf™ Resistives** *on pages 67 to 76*

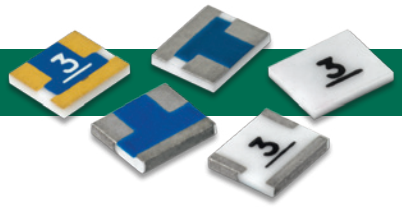


We are the world leader in fixed attenuators from DC through Q band. Fixed attenuators are available in 0.1 to 400 watt versions, covering DC to 50 GHz applications and offered in 0 to 30 dB values. Our attenuators are available in many package styles including chip, tab & cover, flange and coaxial models for use in both low and high power applications. These products are available in standard commercial product as well as high reliability versions.

Quick Selector Chart

Series	Frequency (GHz)	Power (Watts)	Footprint mm [inches]		Page
TS02	DC - 2.5	4	6.22 x 6.22	[0.245 x 0.245]	24
TS03	DC - 12.4	2	3.10 x 3.68	[0.122 x 0.145]	18
TS04	DC - 6.0	1	3.18 x 2.54	[0.125 x 0.100]	23
TS05	DC - 18.0	0.1	1.52 x 1.91	[0.060 x 0.075]	19
TS07	DC - 6.0	0.1	2.03 x 1.27	[0.080 x 0.050]	23
TS09	DC - 20.0	0.2	1.78 x 1.52	[0.070 x 0.060]	22
KFA	16.0 - 36.0	0.2	3.05 x 1.65	[0.120 x 0.065]	20
QFA	36.0 - 50.0	0.2	3.05 x 1.65	[0.120 x 0.065]	21
HPCA	DC - 2.5	20	6.22 x 6.22	[0.245 x 0.245]	25
83 Chip	DC - 18.0	120*	Various	Various	26-27
Tab & Cover	DC - 4.0	250*	Various	Various	28-30
Flange	DC - 4.0	400*	Various	Various	31-33
42 Coaxial	DC - 18.0	2	Various	Various	36
HR03	DC - 12.4	2	3.10 x 3.68	[0.122 x 0.145]	35
HR05	DC - 18.0	0.1	1.52 x 1.91	[0.060 x 0.075]	34

* *Maximum Power*

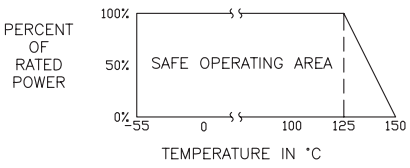


EMC Technology's TS03 chip attenuators have a rated input power of 2 watts with attenuation values from 0 dB to 20 dB and work from DC to 12.4 GHz. These chip devices are available with several metallization styles and plating options including RoHS compliant lead free silver over nickel finish, solder plate, or fused solder finish for easy reflow processing.

Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	Planar Series DC to 12.4 GHz W Series DC to 8 GHz
VSWR (Typical)	1.30
Power Rating	2.0 Watts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated or RoHS, Gold and Wire Bondable Options Available

Power Rating and Derating



Part Numbering Code

T S | 0 | 3 | 2 0 | W 3 | S

CHIP ATTENUATOR
TS = Standard
HR = High Reliabilty Testing
TT = Available in 1/2 dB steps

TOP PLATE
0 = No Top Plate

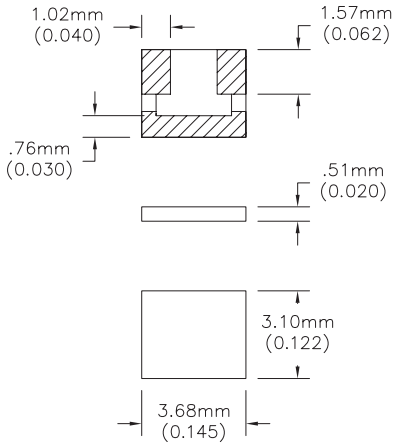
CHIP SIZE
3 = .122 x .145

ATTENUATION VALUE
in whole dB steps
(00 through 20)

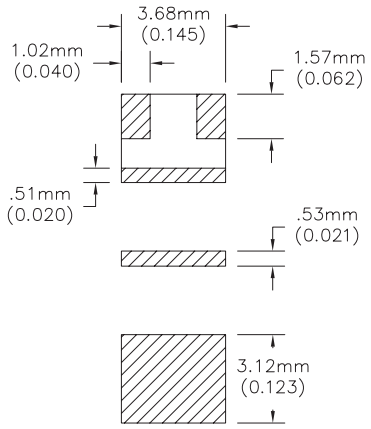
OPTIONS
W1 = Wrap-around Ground
W3 = Wrap-around, All Terms
WB1 = Wrap-around Wire Bondable

TERMINAL FINISH
(blank) = Standard
S = Pretinning
F = RoHS
G = Gold

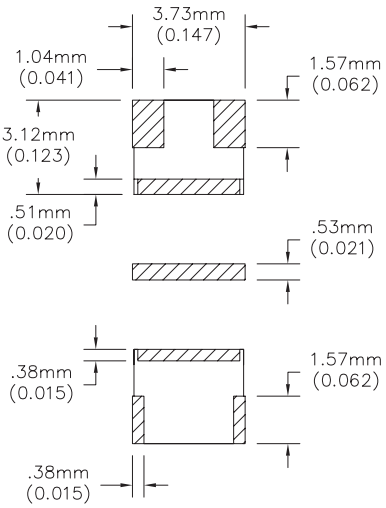
TS03 Planar Series

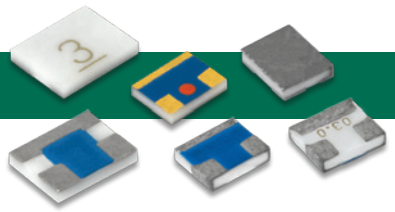


TS03 Single Wrap Series

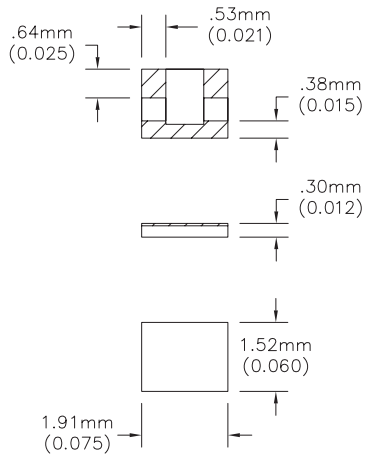


TS03 Triple Wrap Series

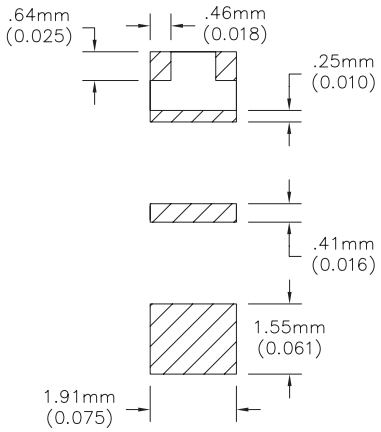




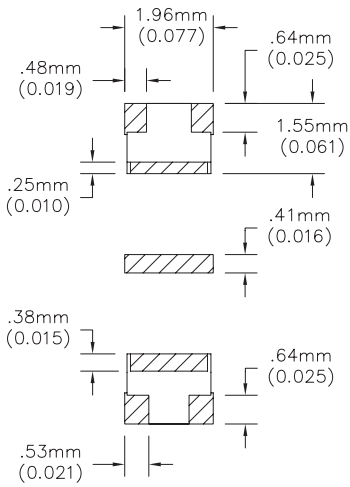
TS05 Planar Series



TS05 Single Wrap Series



TS05 Triple Wrap Series

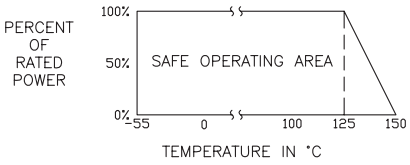


EMC Technology's TS05 series chip attenuators feature DC - 18 GHz operating frequency range with power handling capability of 100 milliwatts. Standard attenuation values range from 0 to 20 dB. These chip devices are available with several metallization styles and plating options including RoHS compliant lead free silver over nickel finish, solder plate, or fused solder finish for easy reflow processing.

Specifications

Size	1.52mm x 1.91mm [0.060in x 0.075in]
Impedance	50 Ohms
Frequency Range	Planar Series DC to 18 GHz W Series DC to 12.4 GHz
VSWR (Typical)	1.30
Power Rating	100 Milliwaitts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thin Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated or RoHS, Gold and Wire Bondable options available

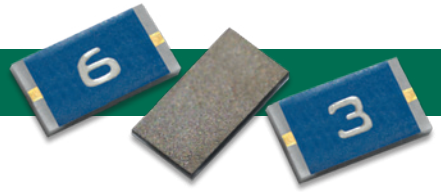
Power Rating and Derating



Part Numbering Code

T S — 0 — 5 — 2 0 — W 3 — S

- T S — CHIP ATTENUATOR: TS = Standard; HR = High Reliabilty Testing; TT = Available in 1/2 dB steps
- 0 — TOP PLATE: 0 = No Top Plate
- 5 — CHIP SIZE: 5 = .060 x .075
- 2 0 — ATTENUATION VALUE: in whole dB steps (00 through 20)
- W 3 — OPTIONS: (blank) = Planar; W1 = Wrap-around Ground; W3 = Wrap-around, All Terms; WB1 = Wrap-around Wire Bondable
- S — TERMINAL FINISH: (blank) = Standard; S = Pretinning; F = RoHS; G = Gold

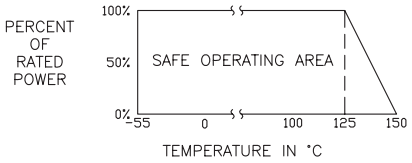


EMC Technology's KFA series fixed attenuators are footprint-compatible with KTVA and operate from 16 to 36 GHz. Standard attenuation values from 1 to 10 dB are available. The KFA is also available for high-reliability applications under the HRKFA part number with Group A, B and C testing according to Mil-PRF-55342. This attenuator is available with wire-bondable gold terminals and a platinum silver, solder attachable ground plane.

Specifications

Size	3.05mm x 1.65mm [0.120in x 0.065]
Impedance	50 Ohms
Frequency Range	16 to 36 GHz
VSWR (Typical)	1.35
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thin Film
Terminal Material	Thick Film, Bondable Gold or Lead Free Finish

Power Rating and Derating

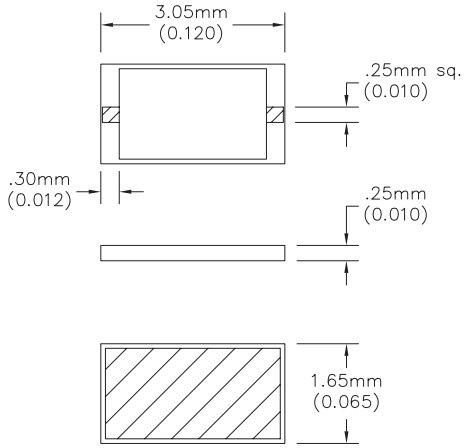


Part Numbering Code

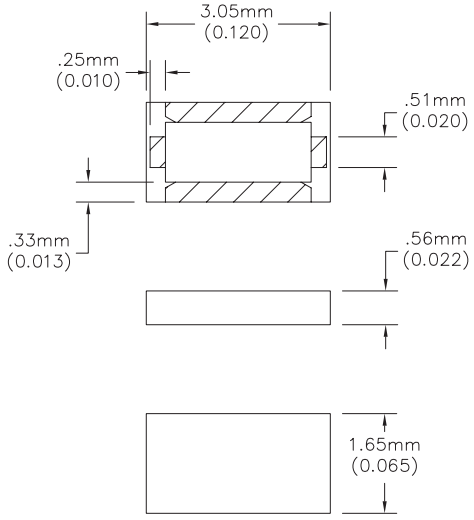
K F A — XX.00 — – — 5 — S M T — F

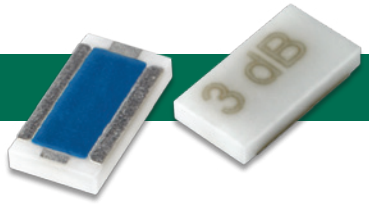
- **SERIES**
- **ATTENUATION VALUE** (00 - 10 dB)
- **FREQUENCY RANGE** 5 = 16 - 36 GHz
- **OPTIONS** (blank) = Wire Bondable; SMT = Surface Mount
- **FINISH** RoHS

KFA Wire Bond Series

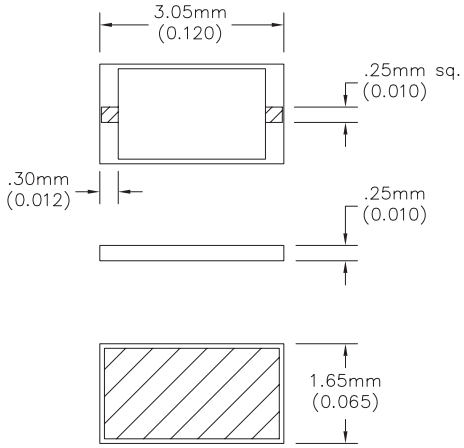


KFA Surface Mount Series

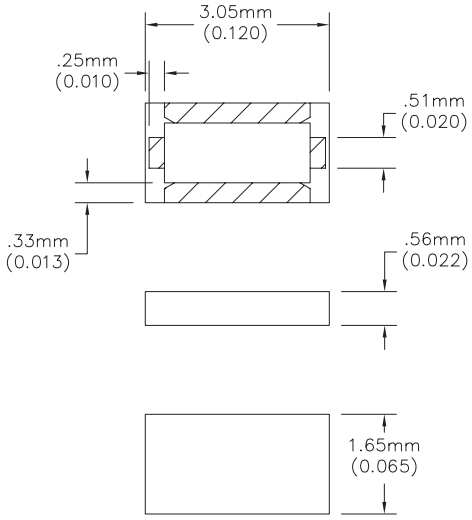




QFA Wire Bond Series



QFA Surface Mount Series

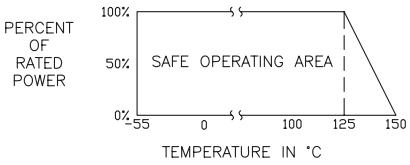


The QFA series offers passive fixed attenuation from 36 to 50 GHz. Being passive in nature, there is no signal distortion, phase shift or time delay. The attenuator structure is internally tuned for optimum performance beyond Ka band, with the added benefit of being a truly symmetrical, bidirectional attenuator. The QFA is available in surface mount packaging The QFA was developed to address commercialization of point-to-point radio, high frequency transceivers, and phased array radar. The device comes in two styles, microstrip and coplanar, with excellent frequency response from 36 through 50 GHz and is available in designs of 0 to 10dB. The QFA handles 200 milliwatts of input power and has a small 1206 footprint. All values are available in RoHS versions and all can be supplied on tape and reel for high volume pick and place applications.

Specifications

Size	3.05mm x 1.65mm [0.120in x 0.065in]
Impedance	50 Ohms
Frequency Range	36 to 50 GHz
VSWR (Typical)	1.35
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thin Film
Terminal Material	Thick Film, Bondable Gold or Lead Free

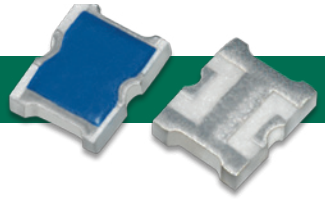
Power Rating and Derating



Part Numbering Code

Q F A — X X — 0 — X — S M T — F

- XX: ATTENUATION VALUE
- X: FREQUENCY RANGE
  - 4 = 36 - 40 GHz
  - 5 = 40 - 50 GHz
- SMT: Surface Mount
- F: FINISH
  - ROHS
  - (leave blank for SnPb)

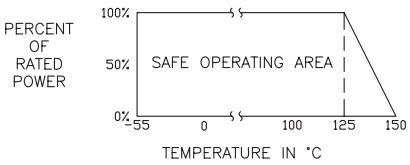


EMC Technology's TS09 chip attenuators offer rated input power of 200 milliwatts with attenuation values from 0 dB to 10 dB at DC - 20 GHz. This product is available with various metallization styles and plating options including RoHS compliant silver over nickel, solder plated tin/lead, solder fused for easy reflow processing. The WB2 style uses thick film wire-bondable gold terminals.

Specifications

Size	1.52mm x 1.78mm [0.060in x 0.070in]
Impedance	50 Ohms
Frequency Range	DC to 20 GHz
VSWR (Typical)	1.40
Power Rating	200 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Bondable Gold or Lead Free

Power Rating and Derating

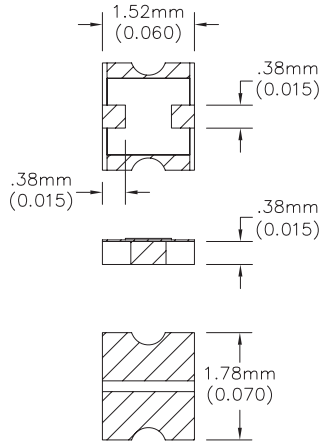


Part Numbering Code

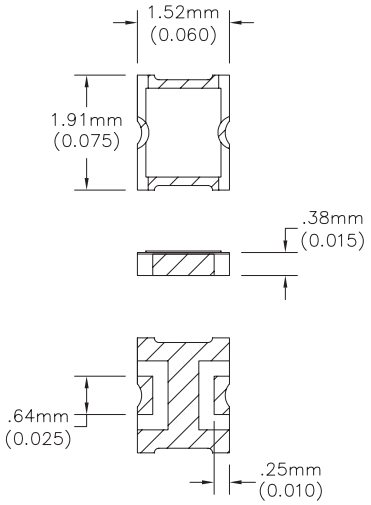
T S — 0 — 9 — 1 0 — S M T — F

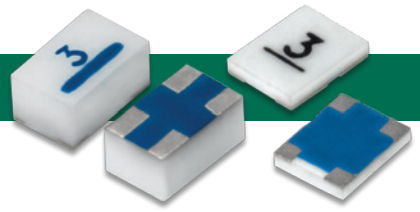
- T S: IP ATTENUATOR; 'S = Standard
- 0: TOP PLATE; 0 = No Top Plate
- 9: CHIP SIZE; 9 = .075 x .060
- 1 0: ATTENUATION VALUE; in whole dB steps (00 through 10)
- S M T: OPTIONS; SMT = Wrap-around, All Terms; WB2 = Wire Bondable Gold
- F: TERMINAL FINISH; (blank) = Standard, S = Pretinning, F = RoHS

TS09 Double Wrap Wire Bond Series

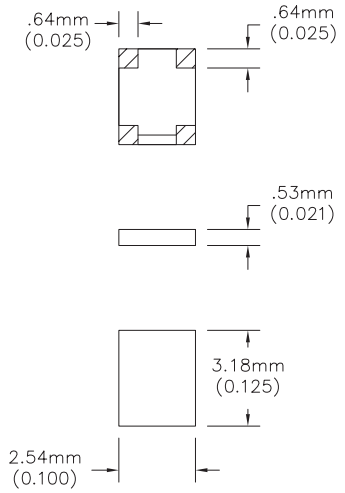


TS09 Surface Mount Series

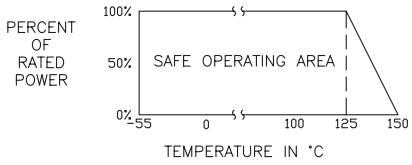




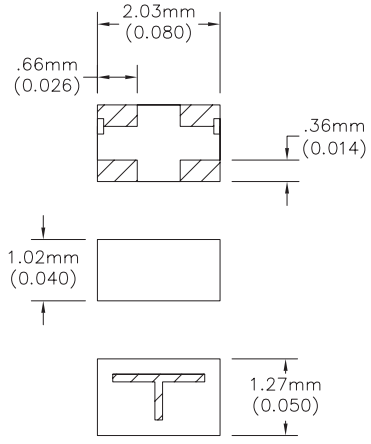
TS04 Planar Series



Power Rating and Derating



TS07 Planar Series



The TS04 series chip attenuators are designed for operation in commercial wireless spectrum and perform optimally in narrow band applications with low input power requirements up to 1 watt. Plating options include RoHS compliant lead free silver over nickel finish, SN62 solder plating or fused solder finish for easy reflow processing.

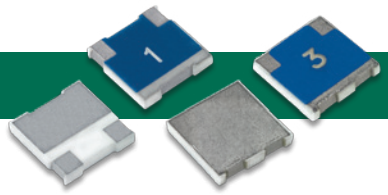
Specifications

Specifications	TS04	TS07
Size	3.18mm x 2.54mm [0.125in x 0.100in]	2.03mm x 1.27mm [0.080in x 0.050in]
Impedance	50 Ohms	50 Ohms
Frequency Range	DC to 6 GHz	DC to 6 GHz
VSWR (Typical)	1.35	1.5
Power Rating	1.0 Watts	100 Milliwatts
Operating Temperature	-55°C to 150°C	-55°C to 150°C
Substrate	Alumina	Alumina
Resistive Material	Thick Film	Thick Film
Terminal Material	Thick Film, Nickel Barrier, Solder Plated or RoHS,	Thick Film, Lead Free Finish

The TS07XX(F) is an SMT fixed attenuator and is suitable for all Telecom and WiMax applications. This conveniently sized 0805 chip attenuator has excellent frequency response from DC to 6 GHz. The TS07 series is available in attenuation values of 0 through 10 dB in one dB increments and operates within a temperature range of -55 to +125 ºC. This cost effective attenuator can handle 100 milliwatts of input power and is packaged on 1,000 piece reels for high volume, pick and place assembly. All values are RoHS compliant.

Part Numbering Code

T S	0	4/7	1 0	S
CHIP ATTENUATOR TS = Standard	TOP PLATE 0 = No Top Plate	CHIP SIZE 4 = .100 x .125 7 = .080 x .050	ATTENUATION VALUE in whole dB steps (00 through 10 - TS04 & TS07) (20 = 20dB - TS04 only)	TERMINAL FINISH (blank) = Standard S = Pretinning F = RoHS

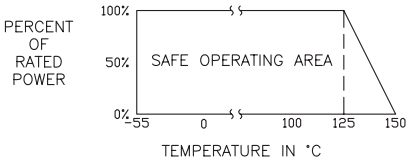


The TS02 chip attenuators have a rated input power of 4 watts with attenuation values from 0 dB to 10 dB and 20 dB with a working frequency range from DC to 2.5 GHz. These chip devices are available with the popular triple wrap metallization style. Plating options include RoHS compliant lead free silver over nickel finish, solder plate, and fused solder finish.

Specifications

Size	6.22mm x 6.22mm [0.245in x 0.245in]
Impedance	50 Ohms
Frequency Range	DC to 2.5 GHz
VSWR (Typical)	1.30
Power Rating	4 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier, Solder Plated or Lead Free

Power Rating and Derating

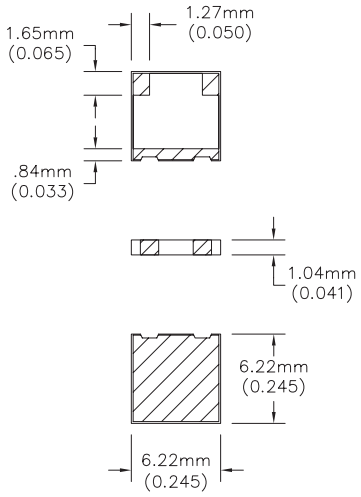


Part Numbering Code

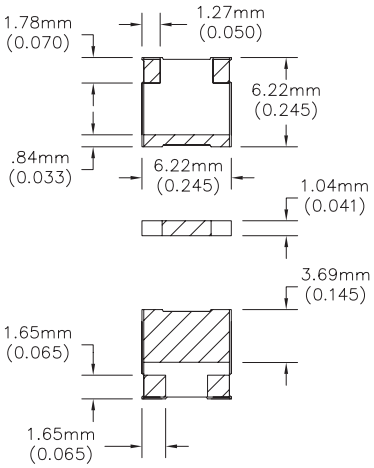
T S | 0 | 2 | 2 0 | W 3 | S

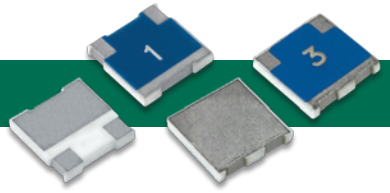
- T S — CHIP ATTENUATOR: TS = Standard
- 0 — TOP PLATE: 0 = No Top Plate
- 2 — CHIP SIZE: 2 = .250 x .250
- 2 0 — ATTENUATION VALUE: in whole dB steps (00 through 20)
- W 3 — OPTIONS: W3 = Wrap-around, All Terms
- S — TERMINAL FINISH: (blank) = Standard, S = Pretinning, F = RoHS

TS02 Single Wrap Series

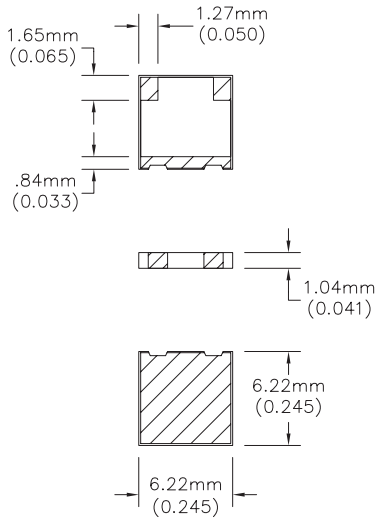


TS02 Triple Wrap Series

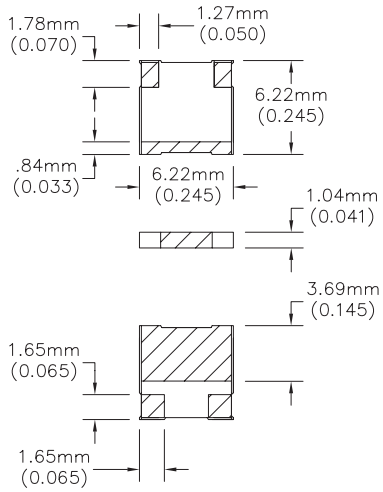




HPCA Single Wrap Series



HPCA Triple Wrap Series

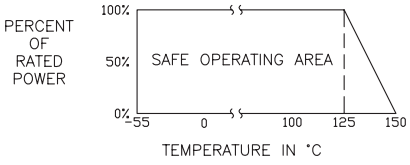


The HPCA high power chip attenuators are manufactured using thick film process and offer input power of 20 watts with attenuation values from 0 dB to 20 dB. They are designed to work from DC to 2.5 Ghz. These chip devices are available with triple wrap and single wrap metallization styles and include solder finish, fused solder and RoHS compliant lead-free silver over nickel finish.

Specifications

Size	6.22mm x 6.22mm [0.245in x 0.245in]
Impedance	50 Ohms
Frequency Range	DC to 2.5 GHz
VSWR (Typical)	1.35
Power Rating	20 Watts
Operating Temperature	-55°C to 150°C
Substrate	BeO
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier, Solder Plated or Lead Free

Power Rating and Derating



Part Numbering Code

H P C A — 5 4 — 1 0 . 0 0 — W 3 — S

CHIP ATTENUATOR
HPCA = High Power Chip Attenuator

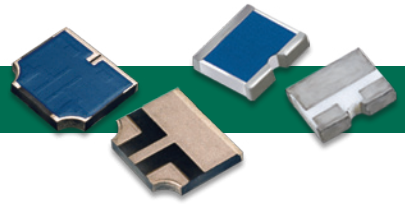
CHIP SIZE
54 = .250 x .250

ATTENUATION VALUE
in whole dB steps
(00 through 20)

INTERNAL CODE

OPTIONS
W1 = Wrap-around Ground
W3 = Wrap-around, All Terms

TERMINAL FINISH
(blank) = Standard
S = Pretinning
F = RoHS



Part Numbering Code

8 3 – 7 0 2 7 – 1 0 . 0 0 F

STYLE
8 = Chip / Power Pak

TYPE
3 = Attenuator

PLATING OPTION
– = Tin Lead[1/]
A = Silver Nickel
B = Silver Copper
M = Non-Magnetic
P = Low-PIM

SUBSTRATE MATERIAL
7 = Aluminum Nitride
8 = Alumina
3 = Beryllium Oxide

DESCRIPTION
Random Numbers

ATTENUATION
Value in dB

RoHS Compliant

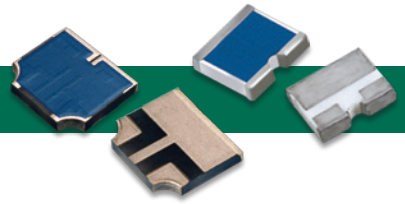
[1/] *Not RoHS Compliant*

Product Information Table

Power	Frequency	VSWR	L		W		H		Part Series #	Figure #
	GHz	Max:1	mm [inches]							
5	3.0	1.50	4.44	[0.175]	5.08	[0.200]	1.02	[0.040]	83 3995*	1
7	3.0	1.35	5.97	[0.235]	2.87	[0.113]	0.64	[0.025]	83 8054*	3
10	3.0	1.50	6.35	[0.250]	6.35	[0.250]	1.02	[0.040]	83 7999*	1
10	2.0	1.35	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	83 7014*	3
10	3.0	1.50	6.35	[0.250]	6.35	[0.250]	1.02	[0.040]	83 3999*	1
20	3.0	1.50	9.53	[0.375]	9.53	[0.375]	1.02	[0.040]	83 7027*	1
20	6.0	1.40	5.08	[0.200]	4.45	[0.175]	0.64	[0.025]	83 7044*	1
25	2.0	1.40	9.53	[0.375]	9.53	[0.375]	1.02	[0.040]	83 3998*	1
75	2.4	1.25	7.62	[0.250]	6.35	[0.250]	1.02	[0.040]	83 7012* /2	3
120	2.4	1.20	5.84	[0.230]	8.89	[0.350]	1.02	[0.040]	83 7026*	2

** is a place holder. See part number configurations to complete the part number.*

/2 only available in 30dB



The 83 series surface mount chip attenuators are designed for direct installation on printed circuit boards and manufactured using thin film process. Edge metallization on two sides forms the solder fillets for stronger attachment, easier inspection, and increased heat removal area. The devices are available in Alumina, Aluminum Nitride (AlN) or BeO. RoHS-compliant versions are available.

Specifications

Impedance	50 Ohms
Frequency Range	DC to 18 GHz
VSWR (Typical)	1.30
Power Rating	5 - 120 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina, BeO and AlN
Resistive Material	Thin Film
Terminal Material	Thick Film, Nickel Barrier, Solder Plated or RoHS, Gold and Wire Bondable Options Available

Figure 1

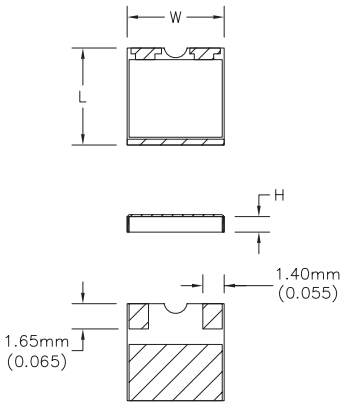


Figure 2

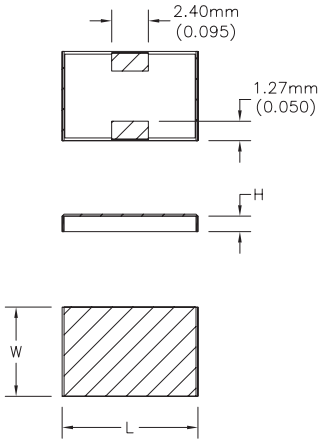
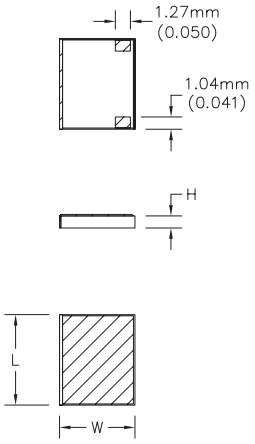
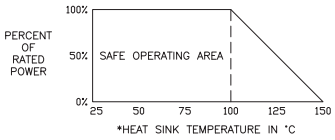


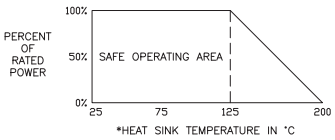
Figure 3



Power Rating and Derating



Alternative Derating Available Upon Request



**The heat sink is defined as the surface that the Component is attached to, ie. chassis or printed circuit board.*

Part Numbering Code

8 3 – 7 0 0 6 T C – 2 0 . 0 0 F

STYLE
8 = Chip / Power Pak

TYPE
3 = Attenuator

PLATING OPTION
– = Tin Lead[1/]
A = Silver Nickel
B = Silver Copper

SUBSTRATE MATERIAL
7 = Aluminum Nitride
8 = Alumina
1 = Beryllium Oxide

DESCRIPTION
Random Numbers

MOUNTING
TC = Tab & Cover

ATTENUATION
Value in dB

RoHS Compliant

[1/] *Not RoHS Compliant*

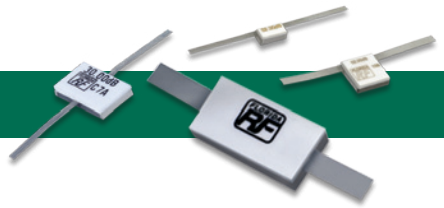
Product Information Table

Power	Freq	VSWR	Substrate	L		W		H		I		Part Number*	Figure #
	GHz	Max		mm [inches]									
10	4.0	1.35	BeO	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	1.02	[0.040]	83 3005TC*	1
20	4.0	1.50	BeO	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	1.52	[0.060]	83 1001TC*	1
50	2.5	1.40	BeO	9.53	[0.375]	9.53	[0.375]	2.16	[0.085]	1.52	[0.060]	83 3021TC*	1
50	2.0	1.25	BeO	6.35	[0.250]	9.53	[0.375]	1.02	[0.040]	1.02	[0.040]	83 1996TC* /2	3
70	2.8	1.25	AlN	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	1.02	[0.040]	83 7009TC* /1	1
70	2.0	1.35	BeO	9.53	[0.375]	9.53	[0.375]	2.16	[0.085]	1.52	[0.060]	83 3997TC* /2	4
75	2.0	1.20	AlN	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	1.02	[0.040]	83 7011TC* /1 /2	2
100	2.3	1.20	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	83 7023TC*	5
100	2.3	1.15	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	83 7017TC*	6
100	3.0	1.30	AlN	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	1.02	[0.040]	83 7006TC*	5
100	0.8	1.25	BeO	12.70	[0.500]	12.70	[0.500]	2.16	[0.085]	1.52	[0.060]	83 1003TC*	1
150	2.2	1.40	AlN	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	1.02	[0.040]	83 7034TC*	6
150	3.0	1.30	AlN	7.62	[0.300]	11.43	[0.450]	1.91	[0.075]	1.02	[0.040]	83 7008TC* /1 /2	3
150	2.0	1.30	BeO	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	1.02	[0.040]	83 3016TC* /1 /2	5
150	1.0	1.50	BeO	9.53	[0.375]	9.53	[0.375]	2.16	[0.085]	1.52	[0.060]	83 3006TC* /1 /2	1
250	1.0	1.25	BeO	12.70	[0.500]	12.70	[0.500]	2.16	[0.085]	1.52	[0.060]	83 3994TC* /1 /2	4

** is a place holder. See part number configurations to complete the part number.*

/1 only available in 20dB

/2 only available in 30dB



83 Series Tab & Cover

Power Pack Attenuator

Figure 1

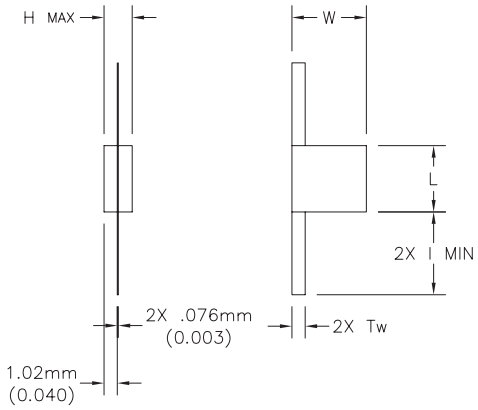
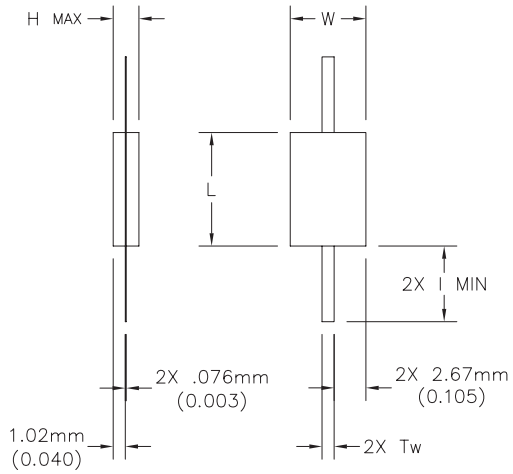


Figure 2



Tab & Cover devices are flangeless with protective ceramic covers and tab contacts, offering the highest performance available of any package style component. They are designed for direct solder attachment to a heat sink for excellent heat transfer. The tab and cover attenuators have attenuation range from 1 dB to 30 dB. Typical attenuation tolerance for values between 1-10 db is +/- 0.5 dB and 11-30 dB is +/- 1.0 dB (may vary for certain products please refer to drawing). All devices are made compliant to RoHS.

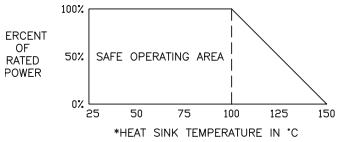
Features

- Substrates - BeO, AlN, and Alumina
- Highest Performance
- Direct Attachment
- Attenuation Values from 0 to 30 dB
- Single Tab and Double Tab Configurations
- Many Finishes Available

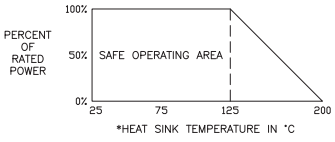
Specifications

Impedance	50 Ohms
Frequency Range	DC to 4 GHz
Attenuation Accuracy	±0.5 dB
VSWR (Typical)	1.30 @ 1 GHz
Power Rating	10 - 250 Watts
Operating Temperature	-55°C to 150°C
Substrate	Alumina, BeO or AlN
Resistive Material	Thin Film
Tab Contact	Different Finishes Available

Power Rating and Derating



Alternative Derating Available Upon Request



**The heat sink is defined as the surface that the Component is attached to, ie. chassis or printed circuit board.*

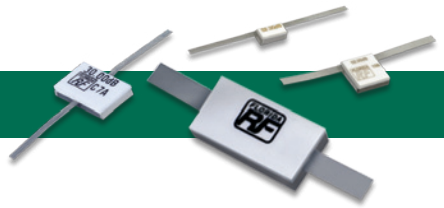


Figure 3

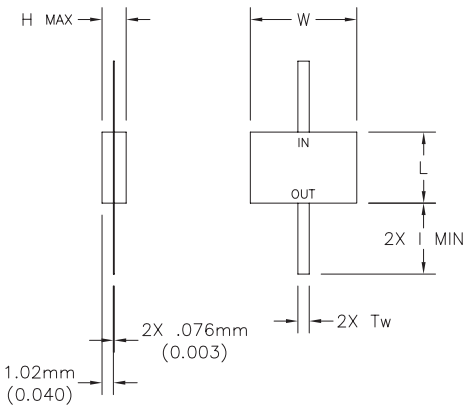


Figure 4

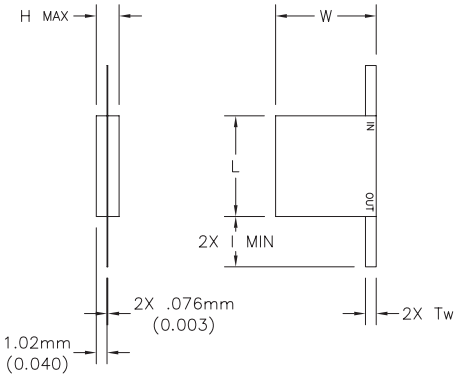


Figure 5

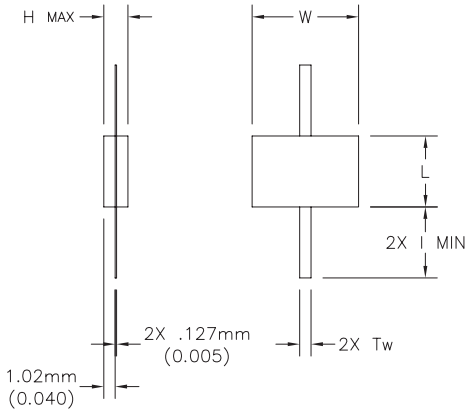
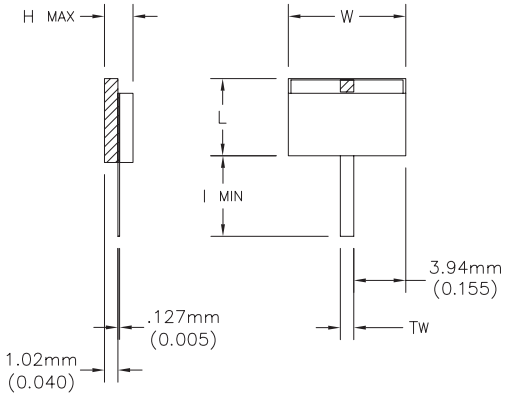


Figure 6



Part Numbering Code

3	3	–	7	X X X – X X . X X	F
STYLE 3 = High Power Flange	TYPE 3 = Attenuator	PLATING OPTION – = Tin Lead[1/] A = Silver Nickel B = Silver Copper	SUBSTRATE MATERIAL 7 = Aluminum Nitride 1 = Beryllium Oxide	DESCRIPTION Random Numbers ATTENUATION Value in dB	RoHS Compliant

[1/] *Not RoHS Compliant*

Product Information Table

Power	Freq	VSWR	Substrate	L		W		H		TW		Part Number*	Figure #
	GHz	Max		mm [inches]									
10	2.7	1.15	AlN	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	33 7003*	1
10	0.9	1.25	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	33 1041*	1
10	4.0	1.35	BeO	5.08	[0.200]	12.70	[0.500]	3.81	[0.150]	1.02	[0.040]	33 1017*	2
10	4.0	1.35	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	33 1005*	1
20	4.0	1.50	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.52	[0.060]	33 1001*	3
50	2.5	1.40	BeO	9.53	[0.375]	24.77	[0.975]	5.33	[0.210]	1.52	[0.060]	33 1021*	4
50	2.0	1.40	AlN	9.53	[0.375]	24.77	[0.975]	5.33	[0.210]	1.50	[0.059]	33 7002* /1	4
50	2.0	1.40	AlN	9.53	[0.375]	24.77	[0.975]	5.33	[0.210]	1.52	[0.060]	33 7001* /1	4
50	1.0	1.20	BeO	9.53	[0.375]	24.77	[0.975]	5.33	[0.210]	1.52	[0.060]	33 1002*	4
75	2.2	1.20	AlN	9.53	[0.375]	22.10	[0.870]	3.81	[0.150]	1.02	[0.040]	33 7005*	5
75	1.0	1.30	BeO	9.53	[0.375]	22.10	[0.870]	3.81	[0.150]	1.02	[0.040]	33 1009*	5
100	2.5	1.20	AlN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	33 7023*	7
100	3.0	1.30	AlN	6.48	[0.255]	20.83	[0.820]	4.06	[0.160]	1.02	[0.040]	33 7004*	8
100	0.8	1.25	BeO	12.70	[0.500]	31.75	[1.250]	5.33	[0.210]	1.52	[0.060]	33 1003*	6
100	2.5	1.20	AlN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	33 7023*	7
125	2.0	1.30	AlN	9.53	[0.375]	22.23	[0.875]	4.32	[0.170]	1.02	[0.040]	33 7006*	5
150	1.0	1.50	BeO	9.53	[0.375]	24.77	[0.975]	5.33	[0.210]	1.52	[0.060]	33 1006*	4
200	0.5	1.50	BeO	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	6.35	[0.250]	33 1004*	9
250	1.0	1.25	BeO	12.70	[0.500]	31.75	[1.250]	5.33	[0.210]	1.52	[0.060]	33 1042* /2	6
250	1.0	1.25	BeO	12.70	[0.500]	31.75	[1.250]	5.33	[0.210]	1.52	[0.060]	33 1052*	6
400	1.0	1.30	BeO	12.70	[0.500]	31.75	[1.250]	5.33	[0.210]	1.52	[0.060]	33 1050*	10

** is a place holder. See part number configurations to complete the part number.*

/1 only available in 20 dB

/2 only available in 30 dB

"I min" dimension = 3.18 mm [0.125]

33 Series Flange

High Power Attenuator

Figure 1

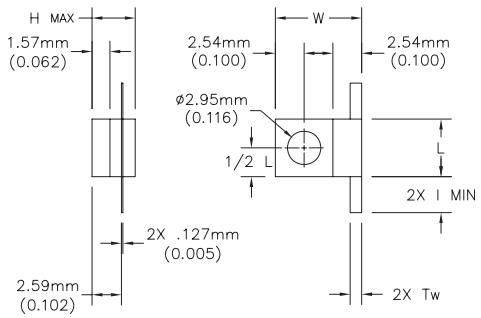
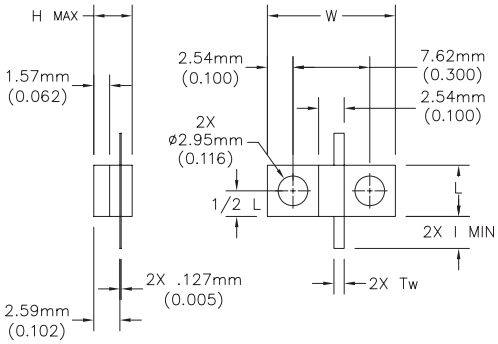


Figure 2

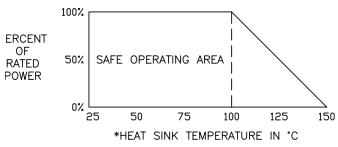


High power flange mount components offer high performance and the convenience of bolt-on installation. Flange attenuators have an attenuation range from 1 to 30 dB. Typical attenuation tolerance for values between 1-10 dB is +/- 0.5 dB and between 11-30 dB is +/- 1.0 dB (may vary for certain products, please refer to drawing). Maximum power rating of up to 400 watts can be achieved on a single device. All devices can be made RoHS compliant and available in Aluminum Nitride (AlN) or BeO.

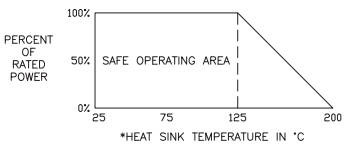
Specifications

Impedance	50 Ohms
Frequency Range	DC to 4 GHz
VSWR (Typical)	1.30
Power Rating	10 to 400 Watts
Operating Temperature	-55°C to 150°C
Substrate	BeO or AlN
Resistive Material	Nichrome
Tab Contact	Different Finishes Available
Cover	Alumina
Flange	Copper, Nickel Plated

Power Rating and Derating



Alternative Derating Available Upon Request



**The heat sink is defined as the surface that the Component is attached to, ie. chassis or printed circuit board.*

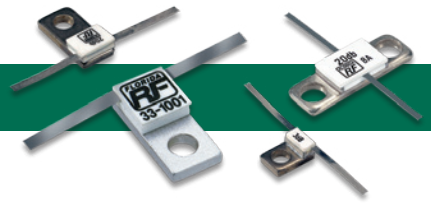


Figure 3

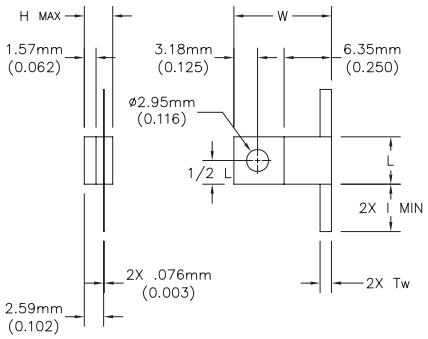


Figure 4

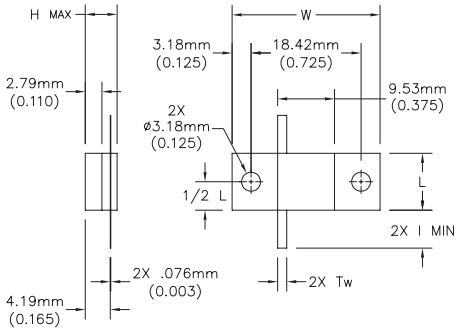


Figure 5

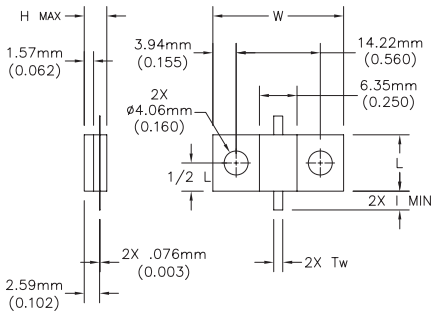


Figure 6

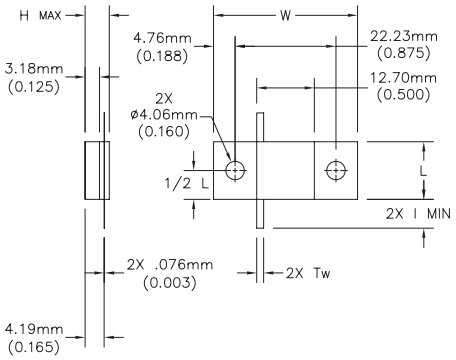


Figure 7

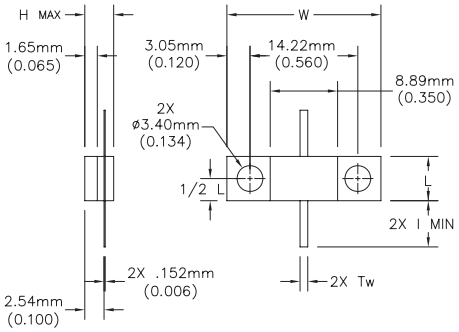


Figure 8

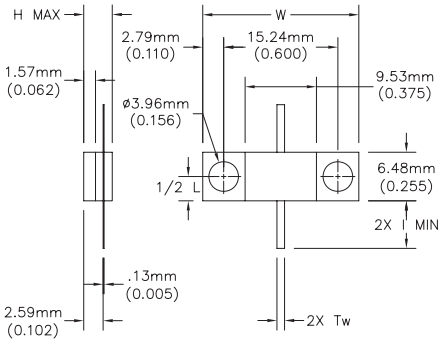


Figure 9

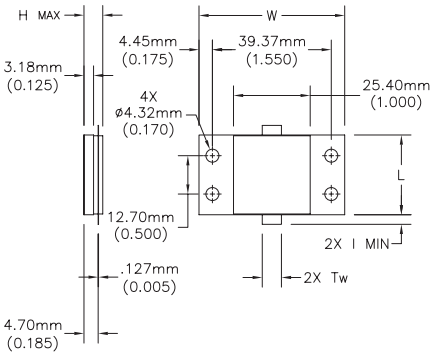
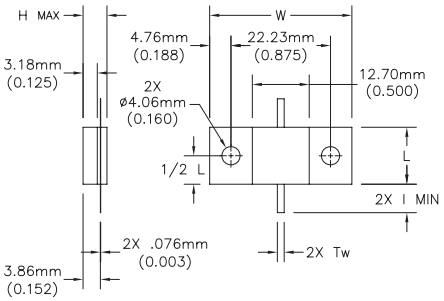
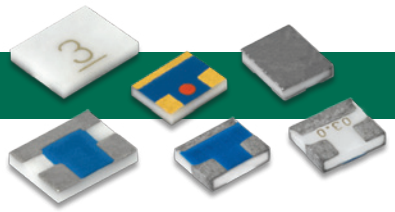


Figure 10



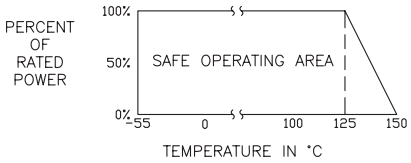


EMC Technology's miniature size attenuators with extended broadband frequency operation from DC to 18 GHz are available tested per Mil-PRF-55342 for high reliability applications. Simply choose the testing level you require by selecting Group A, B, or C. The product is rated for 100 milliwatts of input power with attenuation values from 0 dB to 20 dB. The space-approved thin film tantalum nitride (TaN) resistive elements offer superior electrical performance and mechanical integrity. The devices are shipped in serialized waffle packaging with tested samples marked and packaged separately and includes serialized test data.

Specifications

Size	1.52mm x 1.91mm [0.060in x 0.075in]
Impedance	50 Ohms
Frequency Range	Planar Series DC to 18 GHz W Series DC to 12.4 GHz
VSWR (Typical)	1.30
Power Rating	100 Milliwatts
Operating Temperature	-55°C to 150°C
Substrate	Alumina
Resistive Material	Thin Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated or RoHS, Gold and Wire Bondable options available

Power Rating and Derating



Part Numbering Code

H R — CHIP ATTENUATOR
HR = High Reliabilty Series

0 — TOP PLATE
0 = No Top Plate

5 — CHIP SIZE
5 = .060 x .075

2 0 — ATTENUATION VALUE
in whole dB steps
(00 through 20)

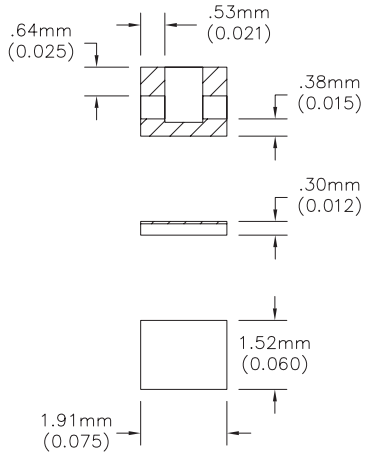
A — TESTING
A = Group A
B = Group B
C = Group C

W 3 — OPTIONS
(blank) = Planar
W1 = Wrap-around Ground
W3 = Wrap-around, All Terms
WB1 = Wrap-around Wire Bondable

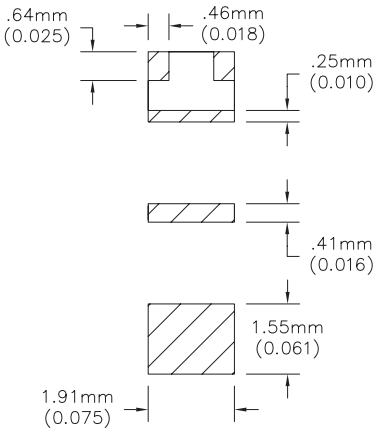
S — TERMINAL FINISH
(blank) = Standard
S = Pretinning
F = RoHS
G = Gold

See page 105 for test plan.

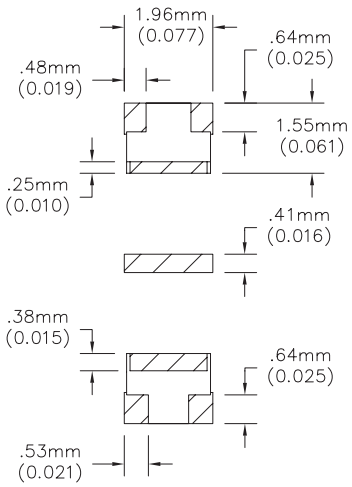
HR05 Planar Series

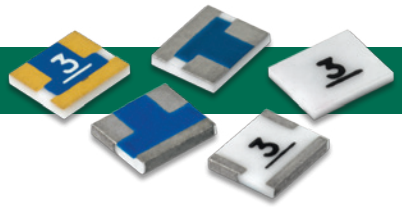


HR05 Single Wrap Series

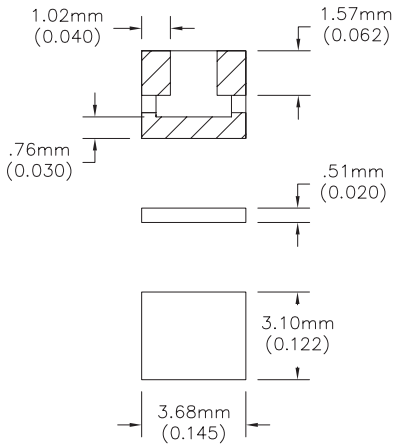


HR05 Triple Wrap Series

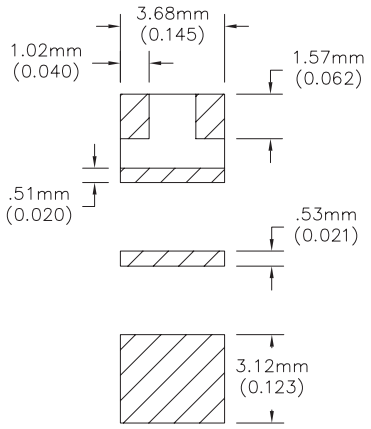




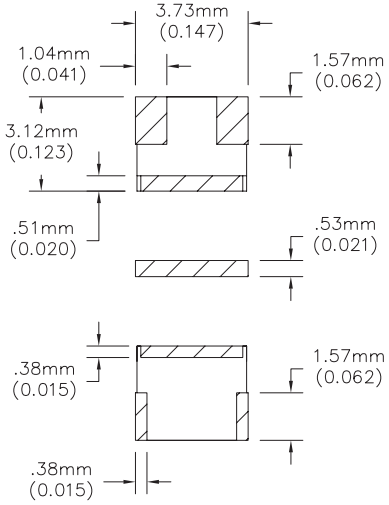
HR03 Planar Series



HR03 Single Wrap Series



HR03 Triple Wrap Series

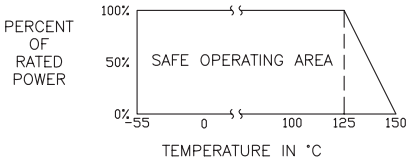


EMC Technology's attenuators are available tested per Mil-PRF-55342 for high reliability applications. Simply choose the testing level you require by selecting Group A, B, or C. The product is rated for 2 watts input power with attenuation values from 0 dB to 20 dB and a maximum operating frequency of 12.4 GHz. The space-approved thin film tantalum nitride (TaN) resistive elements offer superior electrical performance and mechanical integrity. The devices are shipped in serialized waffle packaging with tested samples marked and packaged separately and includes serialized test data.

Specifications

Size	3.10mm x 3.68mm [0.122in x 0.145in]
Impedance	50 Ohms
Frequency Range	Planar Series DC to 12.4 GHz W Series DC to 8 GHz
VSWR (Typical)	1.30
Power Rating	2.0 Watts
Operating Temperature	-55˚C to 150˚C
Substrate	Alumina
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier with Solder Plated or RoHS, Gold and Wire Bondable Options Available

Power Rating and Derating

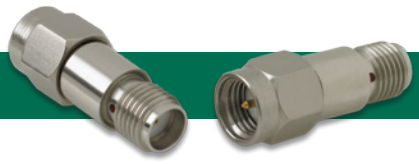


Part Numbering Code

H R | 0 | 3 | 2 0 | A | W 3 | S

- **CHIP ATTENUATOR**: HR = High Reliabilty Series
- **TOP PLATE**: 0 = No Top Plate
- **CHIP SIZE**: 3 = .122 x .145
- **ATTENUATION VALUE**: in whole dB steps (00 through 20)
- **TESTING**: A = Group A; B = Group B; C = Group C
- **OPTIONS**: (blank) = Planar; W1 = Wrap-around Ground; W3 = Wrap-around, All Terms; WB1 = Wrap-around Wire Bondable
- **TERMINAL FINISH**: (blank) = Standard; S = Pretinning; F = RoHS; G = Gold

See page 105 for test plan.

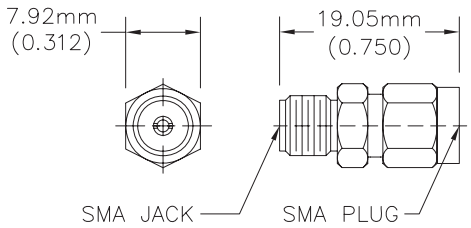


Our line of precision coaxial attenuators are usable for applications with up to 2 watts of input power. The rugged construction of the device ensures reliability and uninterrupted high performance. The standard connector is SMA M/F with other connectors available upon request.

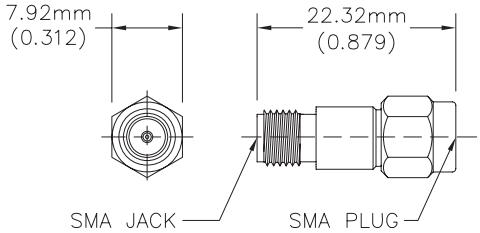
Features

- Rugged Construction
- Excellent Performance
- Value Pricing
- Subsystem Connector Interface
- SMA

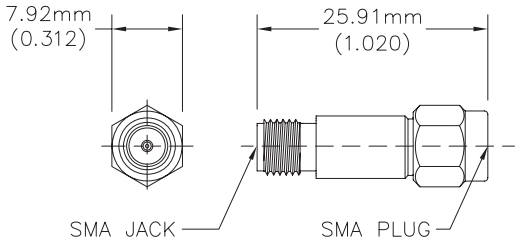
42 Series



42W Series 0-12 dB



42W Series 13-20, 30 dB



Specifications

Specifications	42 Series	42W Series
Impedance	50 Ohms	50 Ohms
Frequency Range	DC to 12.4 GHz	DC to 18 GHz
VSWR (Typical)	1.30	1.25
Power Rating	2 Watts	2 Watts
Operating Temperature	-55°C to 150°C	-55°C to 150°C
Pins	Beryllium Copper, Gold Plated	Beryllium Copper, Gold Plated
Body & Nut	Stainless Steel, Passivated	Stainless Steel, Passivated
SMA Interface	Male/Female	Male/Female

Part Numbering Code

4 2	W	X X.0 0	F
STYLE	FREQUENCY	ATTENUATION	
42 = Coaxial Attenuator	(blank) = DC to 12.4 GHz W = DC to 18.0 GHz	(00 - 20 dB)	(blank) = Standard F = RoHS

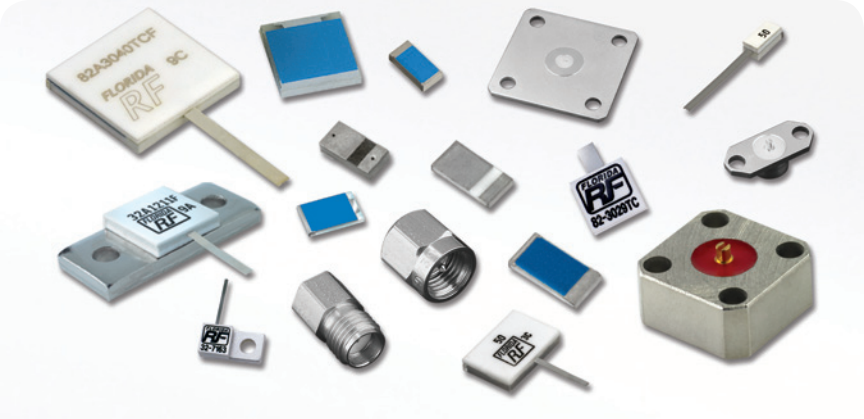
Features

- Frequency Range from DC to 26 GHz
- Power Handling up to 1000 Watts
- BeO, ALN, Alumina or CVD Diamond Substrates
- Telecom Tuned Circuit Designs Available
- Tin/Lead, Lead Free, or Solder Fused Plated
- Tape and Reel Packaging Available
- High Reliability Versions Available
- Tab & Cover, Flange-Mounted, Threaded, Stripline Flange, Pill, Coaxial Remote (CRT), Surface Mount and Wire-Bondable
- S-Parameter Data Available

Applications

- Broadcast (TV and Radio)
- High Power Amplifier
- High Power Filters
- Instrumentation
- Isolators
- Military
- Remote Termination
- Satellite Communication
- Splitters/ Combiners

For our **CVD Diamond Terminations** *see* **Diamond Rf™ Resistives** *on pages 67 to 76*

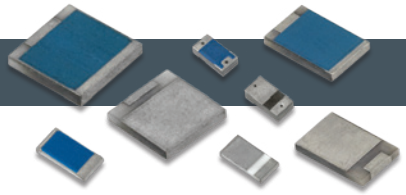


We offer a full line of high power RF terminations including styles such as: chip, tab & cover, flange-mounted coaxial, SMA, stripline flange, surface mount and wire-bondable. Our tuned circuit chip designs deliver the lowest VSWR, while extending frequency ranges for broadband applications. Some devices are capable of handling power up to 1KW and frequencies up to 26.5 GHz. Our products are offered in different substrates such as: Alumina, BeO, AlN and CVD diamond.

Quick Selector Chart

Style	Frequency (GHz)	Power (Watts)	Page
Chip SMT Series	DC - 4	10 - 150	38-39
Chip CT Series	DC - 26.5	2 - 250	40-41
Tab & Cover 82 Series	DC - 18	10 - 500	42-43
Flange 32 Series	DC - 18	10 - 800	44-49
Flange 5 Series	DC - 2	10 - 250	44-49
Stripline Flange 8 Series	DC - 26.6	1 - 75	50-52
Coaxial (Soldered) 12 Series	DC - 26.6	0.5	53-54
Coaxial (Solderless) 41 Series	DC - 18	2	53-54
Smart Detector	DC - 6	1.1	55

**Maximum Power*

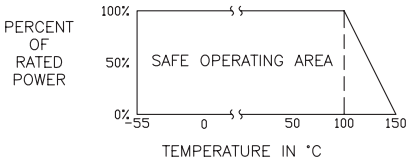


We offer a wide selection of SMT chip terminations handling input power levels up to 250W and covering frequency ranges up to 4 GHz. Using EMC's patented asymmetrical wrap geometry, the thermal dissipation of the surface mount termination is improved by increasing the solderable grounding area. This eliminates the need for bolt down heat sinks and tabs, thereby reducing assembly costs.

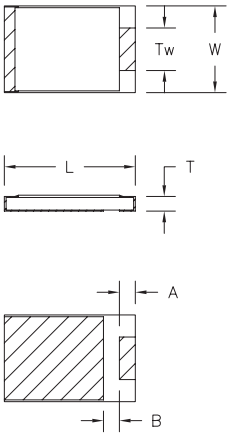
Specifications

Impedance	50 Ohms
Frequency Range	DC to 4 GHz
Power Rating	100% @ 100 °C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier, Solder or no lead Silver Plated Finish

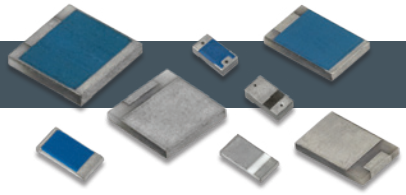
Power Rating and Derating



SMT



For A, B and Tw dimensions see data sheet on website.



Part Numbering Code

S M T — STYLE
SMT = Surface Mount

3 7 — LENGTH
12 = 0.12"
20 = 0.20"
25 = 0.245"
37 = 0.37"

2 5 — WIDTH
06 = 0.06"
10 = 0.10"
25 = 0.245"
37 = 0.37"

0 1 — OPTION
(blank) = Standard
T = Tuned
XX = Alternative Ground Plane

A L N — SUBSTRATE MATERIAL
(blank) = Beryllium Oxide
ALN = Aluminum Nitride
A = Alumina

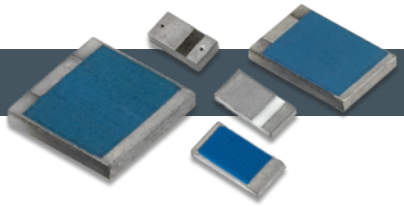
2 — TOLERANCE
(blank) = 5%
2 = 2%
1 = 1%

F — PRETINNING
(blank) = Standard
S = Pretinning
F = RoHS Compliant

Power	Frequency	VSWR	Substrate	L		W		T		Part Series #
Watt	GHz	Max:1		mm [inches]						
10	2.0	1.25	AIN	3.04	[0.120]	1.52	[0.060]	0.68	[0.027]	SMT1206 *ALN
10	3.0	1.25	Alumina	5.08	[0.200]	2.54	[0.100]	0.64	[0.025]	SMT2010*A
15	3.0	1.25	Alumina	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	SMT2525*A
20	4.0	1.20	AIN	5.08	[0.200]	2.54	[0.100]	0.64	[0.025]	SMT2010TALN
20	2.0	1.25	AIN	5.08	[0.200]	2.54	[0.100]	1.04	[0.041]	SMT2010*ALN
20	3.0	1.25	Alumina	9.40	[0.370]	6.35	[0.250]	0.64	[0.025]	SMT3725*A
25	3.0	1.25	Alumina	9.53	[0.375]	9.52	[0.375]	0.64	[0.025]	SMT3737*A
30	2.0	1.25	BeO	5.08	[0.200]	2.54	[0.100]	1.04	[0.041]	SMT2010
60	2.0	1.25	AIN	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	SMT2525*ALN
60	2.7	1.15	AIN	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	SMT2525TALNF
75	2.0	1.25	BeO	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	SMT2525
80	2.7	1.15	AIN	9.53	[0.375]	6.35	[0.250]	1.04	[0.041]	SMT3725TALN
80	2.0	1.25	AIN	9.53	[0.375]	6.35	[0.250]	1.04	[0.041]	SMT3725*ALN
100	2.7	1.15	AIN	9.40	[0.372]	9.40	[0.372]	1.30	[0.051]	SMT3737TALN
100	2.0	1.25	AIN	9.40	[0.372]	9.40	[0.372]	1.30	[0.051]	SMT3737*ALN
125	2.0	1.25	BeO	9.53	[0.375]	6.35	[0.250]	1.04	[0.041]	SMT3725
150	2.0	1.25	BeO	9.40	[0.372]	9.40	[0.372]	1.30	[0.051]	SMT3737
150	4.0	1.20	AIN	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	SMT252503ALN2F

“F” suffix (RoHS) is not available with Pretinning (“S” suffix)

"*" Is a place holder. See part number configurations to complete the part number

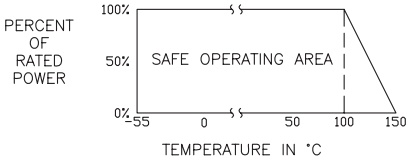


Our high power chip terminations are available in both thick film and thin film resistor designs, offering you flexibility needed to match the correct part more closely to your specific application. Many designs have been optimized for RF performance and so will minimize the variability of capacitive reactance. Localized hot spots associated with trimming have been virtually eliminated. Reduced variation means your circuit performs so consistently that in most cases no external tuning is required.

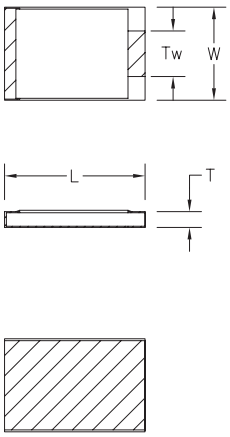
Specifications

Impedance	50 Ohms
Frequency Range	DC to 26.5 GHz
Power Rating	100% @ 100°C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thick Film
Terminal Material	Thick Film, Nickel Barrier, Solder, Silver (RoHS) or Gold

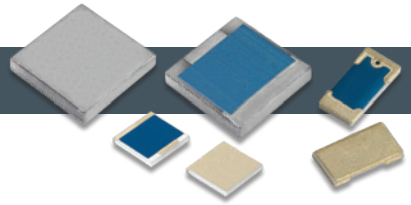
Power Rating and Derating



CT



For Tw dimensions see data sheet on website.



Part Numbering Code

C T — TYPE: CT = Chip Termination

3 7 — LENGTH: See Table

2 5 — WIDTH: See Table

PERFORMANCE: (blank) = Standard; T = Telecom Tuned

A L N — SUBSTRATE MATERIAL: (blank) = Beryllium Oxide; ALN = Aluminum Nitride; A = Alumina

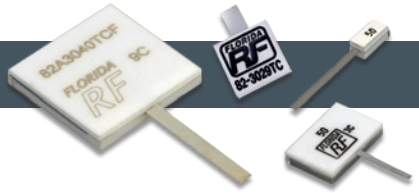
S — PRETINNING: (blank) = Standard; S = Pretinning; F = RoHS; G = Gold

Note: Not every combination of size is available.
Other ohms values available upon request. Please contact our Sales department.
"F" and "G" suffixes not available with pretinning ("S" suffix).

Power	Frequency	VSWR	Substrate	L		W		T		Part Series #
Watt	GHz	Max:1		mm [inches]						
1	26.50	1.35	BeO	1.02	[0.040]	0.51	[0.020]	0.28	[0.011]	CT0402
2	2.50	1.25	Alumina	2.54	[0.100]	1.27	[0.050]	.028	[0.011]	CT1005*A
5	2.00	1.25	Alumina	5.08	[0.200]	2.54	[0.100]	1.04	[0.041]	CT2010*A
10	4.00	1.25	BeO	1.27	[0.050]	1.27	[0.050]	0.28	[0.011]	CT0505
10	2.00	1.25	BeO	3.05	[0.120]	1.53	[0.060]	0.64	[0.025]	CT1206
15	4.00	1.25	BeO	2.54	[0.100]	1.27	[0.050]	0.28	[0.011]	CT1005
15	4.00	1.10	AlN	2.54	[0.100]	1.27	[0.050]	0.28	[0.011]	CT1005TALN
15	4.00	1.25	AlN	3.05	[0.120]	1.53	[0.060]	0.64	[0.025]	CT1206*ALN
20	4.00	1.25	BeO	5.08	[0.200]	2.54	[0.100]	1.04	[0.041]	CT2010
20	4.00	1.25	AlN	5.08	[0.200]	2.54	[0.100]	1.04	[0.041]	CT2010*ALN
20	2.00	1.25	Alumina	4.57	[0.180]	8.89	[0.350]	0.64	[0.025]	CT1835*A
30	4.00	1.25	AlN	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	CT2525*ALN
50	4.00	1.25	BeO	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	CT2525
80	4.00	1.25	AlN	5.82	[0.230]	8.89	[0.350]	1.04	[0.041]	CT2335*ALN
90	2.00	1.30	Alumina	5.82	[0.230]	8.89	[0.350]	0.38	[0.015]	CT2335*A
100	4.00	1.25	BeO	5.82	[0.230]	8.89	[0.350]	1.04	[0.041]	CT2335
100	2.50	1.30	AlN	6.35	[0.250]	6.35	[0.250]	1.04	[0.041]	CT2525TALN
120	3.00	1.10	AlN	5.82	[0.230]	8.89	[0.350]	1.04	[0.041]	CT2335TALN
150	2.00	1.25	AlN	9.40	[0.370]	6.35	[0.250]	1.04	[0.041]	CT3725*ALN
150	2.00	1.25	BeO	9.40	[0.370]	6.35	[0.250]	1.04	[0.041]	CT3725
150	2.00	1.25	BeO	9.40	[0.370]	6.35	[0.250]	1.04	[0.041]	CT3725F
200	2.00	1.20	AlN	9.53	[0.375]	9.52	[0.375]	1.30	[0.051]	CT3737TALN
250	2.00	1.35	BeO	9.53	[0.375]	9.52	[0.375]	1.30	[0.051]	CT3737

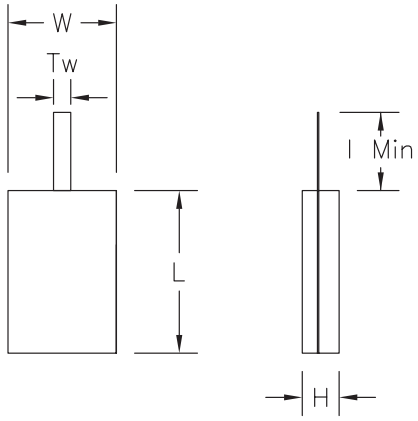
Power ratings are based on 100°C heat sink, except for CT2335A, which is 85°C

"*" is a place holder. See part number configurations to complete the part number



Tab and cover terminations are flangeless devices with protective ceramic covers and tab contacts, offering the highest performance available of any style of component. They are designed for direct solder attachment to a heat sink or circuit board (thermal vias required) for excellent heat transfer. These devices deliver excellent VSWR over a broad frequency band. The frequency ranges from DC to 18 GHz. The power rating ranges from 10 to 500 watts. Optional lead forming is available on most designs.

TC



"I min" dimension = 3.18 mm [0.125]

Specifications

Impedance	50 Ohms
Resistance Range	10 to 300 Ohms
Frequency Range	DC to 18 GHz
Power Rating	100% @ 100°C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C*
Substrate	BeO, AlN or Alumina
Resistor	Thin Film
Tab Contact	Beryllium Copper, Tin or Silver Plated
Cover	Alumina
Solderable Ground Plane	See Plating Option

**100°C is referenced at the heat sink*

Part Numbering Code

8 — STYLE
8 = Chip/Power Pak

2 — TYPE
2 = Termination

A — PLATING OPTION
– = Tin Lead /1
A = Silver Nickel
B = Silver Copper
M = Non-magnetic
P = Low PIM

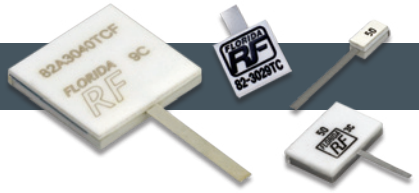
7 — SUBSTRATE MATERIAL
7 = Aluminum Nitride
8 = Alumina
3 = Beryllium Oxide

1 7 6 — DESCRIPTIONS
Random Numbers

T C — MOUNTING
TC = Tab & Cover

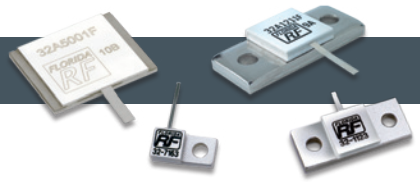
F
RoHS Compliant

/1 Not RoHS Compliant



Power	Frequency	VSWR	Substrate	L		W		H		TW		Part Series #
Watt	GHz	Max:1		mm [inches]								
10	2.0	1.180	AlN	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	0.76	[0.030]	82 7166TC
10	3.0	1.250	AlN	5.08	[0.200]	2.54	[0.100]	2.29	[0.090]	1.02	[0.040]	82 7025TC
10	4.0	1.350	AlN	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	2.54	[0.100]	82 7017TC
10	20.0	1.500	BeO	2.54	[0.100]	5.08	[0.200]	2.29	[0.090]	0.76	[0.030]	82 3056TC
10	18.0	1.650	BeO	2.54	[0.100]	5.08	[0.200]	2.29	[0.090]	1.02	[0.040]	82 3045TC
10	10.0	1.400	BeO	5.08	[0.200]	2.54	[0.100]	2.03	[0.080]	1.02	[0.040]	82 3033TC
10	4.0	1.350	BeO	5.08	[0.200]	2.54	[0.100]	2.29	[0.090]	1.02	[0.040]	82 3001TC
10	4.0	1.350	AlN	5.08	[0.200]	2.54	[0.100]	2.29	[0.090]	2.54	[0.100]	82 7017TC
20	4.0	1.350	BeO	6.35	[0.250]	6.35	[0.250]	2.67	[0.105]	1.52	[0.060]	82 3012TC
30	2.5	1.200	AlN	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	1.02	[0.040]	82 7004TC
30	2.5	1.200	BeO	3.05	[0.120]	1.53	[0.060]	2.16	[0.085]	0.76	[0.030]	82 3055TC
30	1.0	1.500	BeO	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	82 3019TC
30	4.0	1.200	BeO	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	1.52	[0.060]	82 3005TC
40	2.0	1.200	AlN	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	0.76	[0.030]	82 7030TC
40	6.0	1.200	BeO	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	1.02	[0.040]	82 3039TC
40	6.0	1.300	BeO	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	82 3030TC
60	4.0	1.200	AlN	6.35	[0.250]	9.52	[0.375]	2.16	[0.085]	0.76	[0.030]	82 7150TC
60	6.0	1.200	BeO	6.35	[0.250]	9.52	[0.375]	2.16	[0.085]	1.52	[0.060]	82 3032TC
60	2.0	1.350	BeO	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	1.52	[0.060]	82 3003TC
100	4.0	1.200	AlN	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	0.76	[0.030]	82 7163TC
100	1.0	1.100	AlN	6.35	[0.250]	9.52	[0.375]	2.16	[0.085]	1.02	[0.040]	82 7005TC
100	6.0	1.300	BeO	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	82 3038TC
120	2.0	1.200	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	0.76	[0.030]	82 7187TC
120	2.0	1.150	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	0.76	[0.030]	82 7176TC
120	2.0	1.100	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	0.76	[0.030]	82 7015TC
120	2.0	1.100	BeO	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	1.02	[0.040]	82 3031TC
120	2.0	1.100	AlN	5.84	[0.230]	8.89	[0.350]	2.16	[0.085]	0.76	[0.030]	82 7187TC
125	2.7	1.100	AlN	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	1.52	[0.060]	82 7013TC
150	2.0	1.150	AlN	9.52	[0.375]	6.35	[0.250]	2.16	[0.085]	0.76	[0.030]	82 7172TC
150	2.0	1.150	AlN	9.52	[0.375]	6.35	[0.250]	2.16	[0.085]	1.02	[0.040]	82 7002TC
150	4.0	1.350	BeO	8.89	[0.350]	5.84	[0.230]	2.16	[0.085]	1.02	[0.040]	82 3051TC
150	4.0	1.350	BeO	6.35	[0.250]	9.52	[0.375]	2.16	[0.085]	1.02	[0.040]	82 3023TC
150	1.0	1.350	BeO	6.35	[0.250]	9.52	[0.375]	2.16	[0.085]	3.05	[0.120]	82 3006TC
150	2.0	1.100	AlN	9.52	[0.375]	6.35	[0.250]	2.16	[0.085]	0.76	[0.030]	82 7172TC
250	2.0	1.500	AlN	9.52	[0.375]	9.52	[0.375]	2.16	[0.085]	1.02	[0.040]	82 7001TC
250	2.0	1.150	BeO	9.52	[0.375]	9.52	[0.375]	2.16	[0.085]	0.76	[0.030]	82 3029TC
250	1.0	1.350	BeO	9.52	[0.375]	9.52	[0.375]	2.16	[0.085]	0.76	[0.030]	82 3008TC
500	1.5	1.350	BeO	12.7	[0.500]	12.70	[0.500]	2.03	[0.080]	1.52	[0.060]	82 3040TC

Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.



Florida RF Labs & EMC Technology offers the widest selection of flange mount terminations worldwide. High power flange mount components offer excellent performance and the convenience of bolt-in installation. The flanged mounted devices deliver power ratings up to 1000 watts and frequency ranges from DC to 18 GHz. The packages are available in single hole, double hole and fourhole flange configurations. Tab strain relief is available on all configurations.

We also have a line of flange terminations that offers the lowest Passive *Intermodulation* (PIM) distortion in the market and which are 100% tested to guarantee the highest performance.

Optional lead forming is available.

All devices with the “32” prefix have thin film resistor elements while the part numbers beginning with “5” have thick film resistors.

Specifications

Impedance	50 Ohms
Resistance Range	10 to 250 Ohms
Frequency Range	DC to 18 GHz
Power Rating	100% to 100°C*
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistor	Thick or Thin Film
Tab Contact	Beryllium Copper, Tin or Silver Plated
Cover	Alumina
Mounting Flange	Copper, Nickel Plated

**100˚C is referenced at the heat sink*

Part Numbering Code

3 — STYLE: 3 = High Power Flange

2 — TYPE: 2 = Termination

– — PLATING OPTION: – = Tin Lead; A = Silver Nickel**; B = Silver Copper**; M = Non-magnetic**; P = Low PIM**

7 — SUBSTRATE MATERIAL: 7 = AlN (Aluminum Nitride)

1 7 2 — DESCRIPTIONS: Random Numbers

F — RoHS Compliant

5 — STYLE: Flange Termination

3 0 9 — DESCRIPTIONS: Random Numbers

L — TAB ORIENTATION: (blank) = Right; L = Left; T = Center

Figure 1L

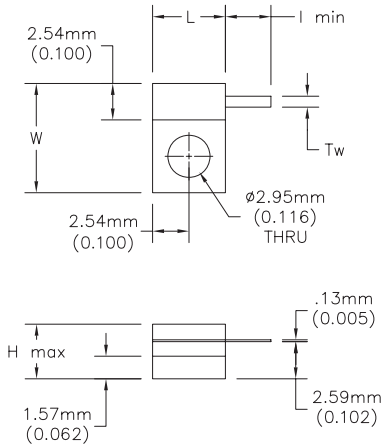


Figure 1C

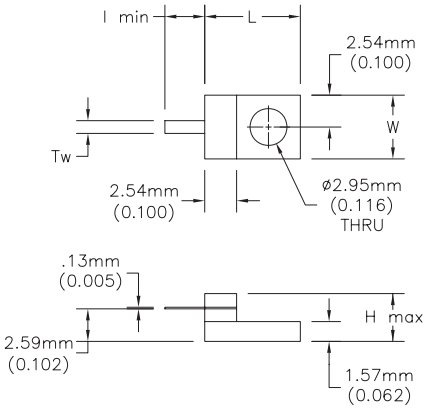
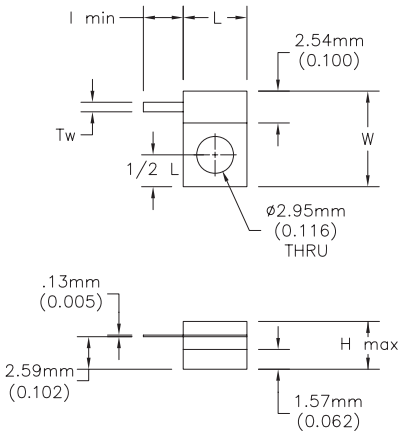


Figure 1R



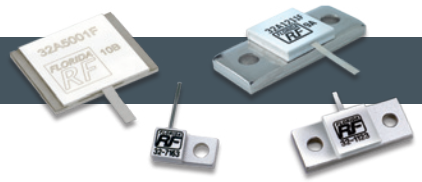


Figure 2L

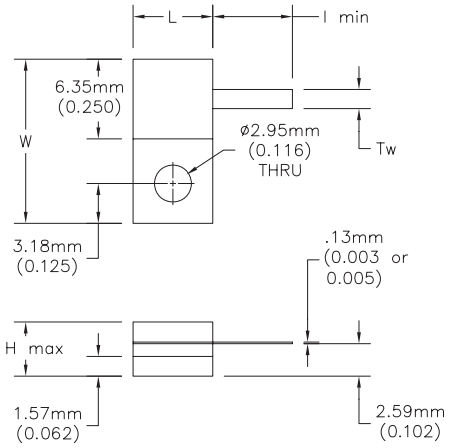


Figure 2C

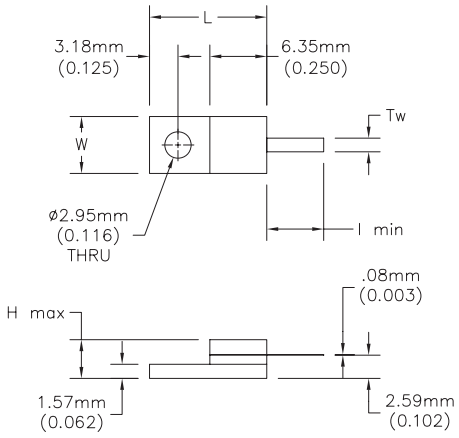


Figure 2R

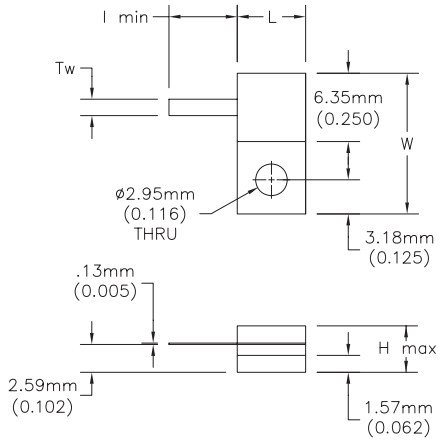


Figure 3

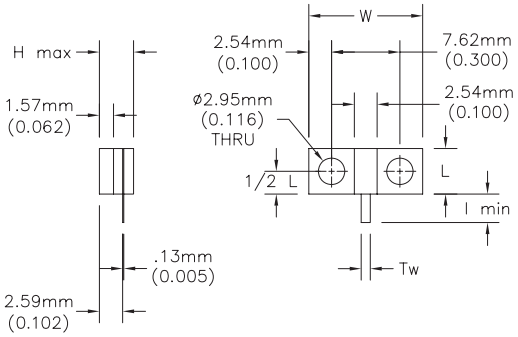


Figure 4

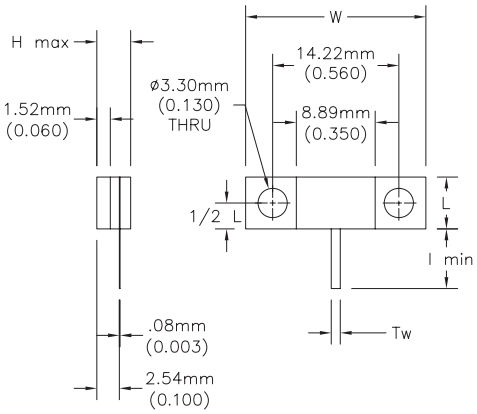
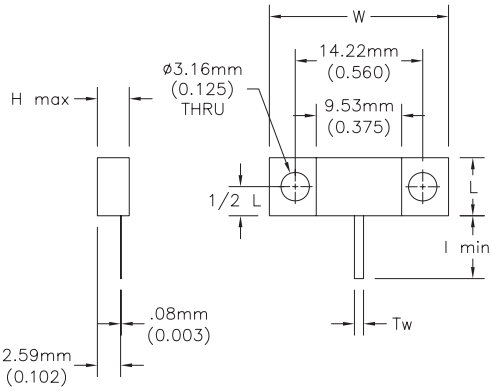


Figure 5



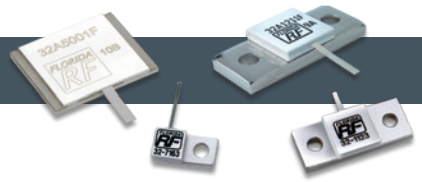


Figure 6

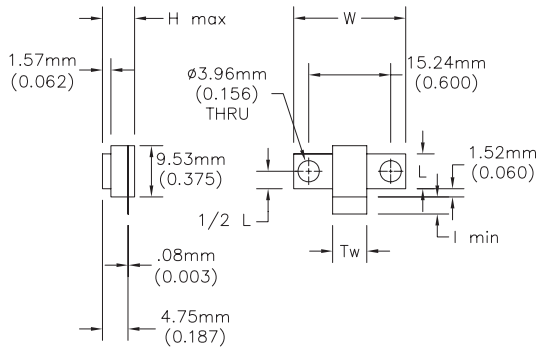


Figure 7

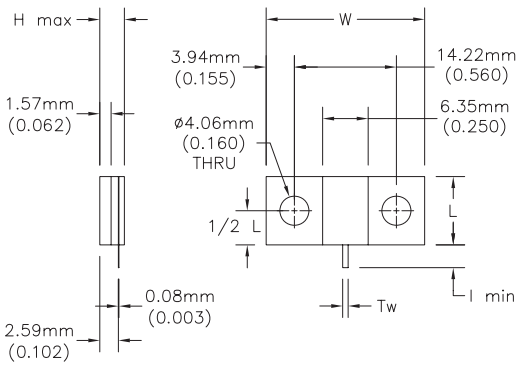


Figure 8

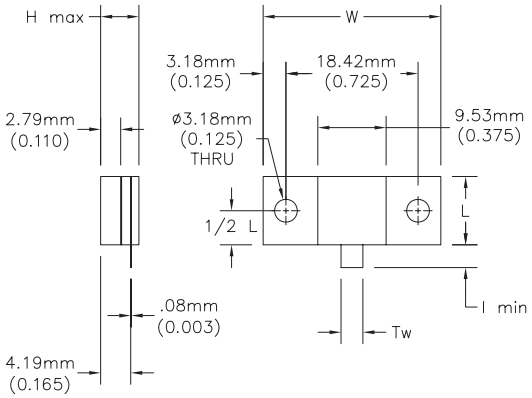


Figure 9

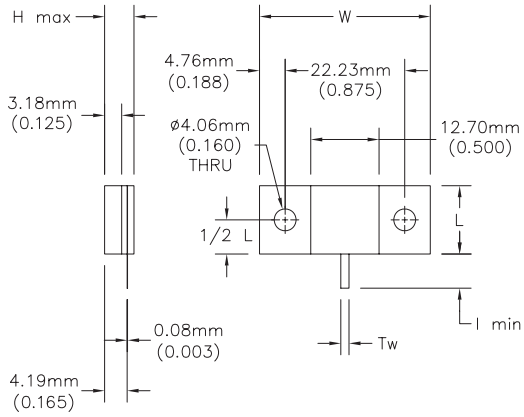


Figure 10

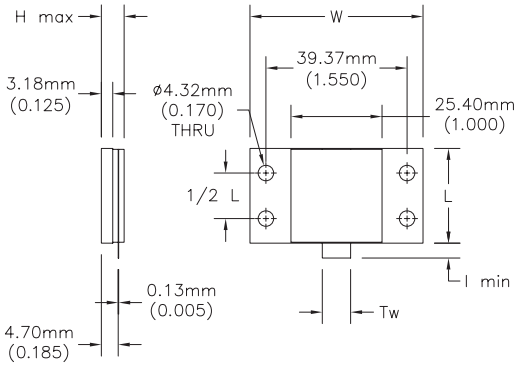
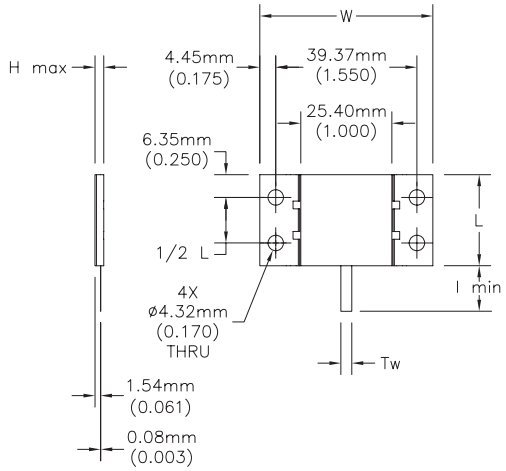
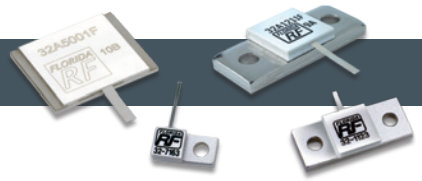


Figure 11

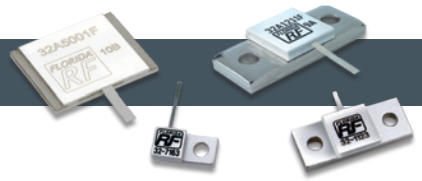




Power	Frequency	VSWR	Substrate	L		W		H		TW		Mounting Direction	Part Series #	Figure #
Watt	GHz	Max:1		mm [inches]										
10	2.00	1.10	AlN	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	0.76	[0.030]	Left	32 7166*	1L
10	18.00	1.60	AlN	7.62	[0.300]	5.08	[0.200]	3.81	[0.150]	0.76	[0.030]	Center	32 7024*	1C
10	4.00	1.25	AlN	7.62	[0.300]	5.08	[0.200]	3.81	[0.150]	1.02	[0.040]	Center	32 7017*	1C
10	2.00	1.10	AlN	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	0.76	[0.030]	Right	32 7006*	1R
10	6.00	1.25	BeO	7.62	[0.300]	5.08	[0.200]	3.81	[0.150]	1.02	[0.040]	Center	32 1198*	1C
10	18.00	1.50	BeO	7.62	[0.300]	5.08	[0.200]	3.81	[0.150]	1.02	[0.040]	Center	32 1137*	1C
10	10.00	1.40	BeO	5.08	[0.200]	7.62	[0.300]	3.56	[0.140]	1.02	[0.040]	Right	32 1111*	1R
10	10.00	1.40	BeO	5.08	[0.200]	12.7	[0.500]	3.81	[0.150]	1.02	[0.040]	Center	32 1069*	3
10	10.00	1.40	BeO	5.08	[0.200]	7.62	[0.300]	3.56	[0.140]	1.02	[0.040]	Left	32 1068*	1L
10	6.40	1.25	BeO	5.08	[0.200]	12.7	[0.500]	3.81	[0.150]	1.02	[0.040]	Center	32 1045*	3
10	6.40	1.35	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	Left	32 1042*	1L
10	4.00	1.35	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	Right	32 1041*	1R
10	4.00	1.35	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	Left	32 1006*	1L
10	4.00	1.35	BeO	5.08	[0.200]	12.7	[0.500]	3.81	[0.150]	1.02	[0.040]	2 Hole	32-1008*	3
10	4.00	1.35	BeO	7.62	[0.300]	5.08	[0.200]	4.06	[0.160]	1.02	[0.040]	Right	5317*	1L
10	4.00	1.35	BeO	7.62	[0.300]	5.08	[0.200]	4.06	[0.160]	1.02	[0.040]	Left	5317L	1R
10	4.00	1.35	BeO	12.70	[0.500]	5.08	[0.200]	4.06	[0.160]	1.02	[0.040]	Right	5323*	3
20	2.00	1.20	BeO	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	1.02	[0.040]	Right	32 1177*	1R
20	2.00	1.35	BeO	6.35	[0.250]	13.08	[0.515]	4.32	[0.170]	1.52	[0.060]	Right	32 1031*	2R
20	2.00	1.35	BeO	6.35	[0.250]	13.08	[0.515]	4.32	[0.170]	1.52	[0.060]	Left	32 1001*	2L
20	2.00	1.35	BeO	13.08	[0.515]	6.35	[0.250]	4.32	[0.170]	1.52	[0.060]	Center	32 1014*	2C
25	4.00	1.30	BeO	12.70	[0.500]	6.48	[0.255]	4.32	[0.170]	1.65	[0.065]	Right	5309*	2L
25	4.00	1.30	BeO	12.70	[0.500]	6.48	[0.255]	4.32	[0.170]	1.65	[0.065]	Left	5309L	2R
25	4.00	1.30	BeO	6.48	[0.255]	12.7	[0.500]	4.32	[0.170]	1.65	[0.065]	Center	5309T	2C
25	2.00	1.35	BeO	13.08	[0.515]	6.35	[0.250]	4.06	[0.160]	1.52	[0.060]	Right	5325*	2L
25	2.00	1.35	BeO	6.35	[0.250]	13.08	[0.515]	4.32	[0.170]	1.52	[0.060]	Center	5325T	2C
30	4.00	1.20	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Right	32 1060*	2R
30	4.00	1.25	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.52	[0.060]	Right	32 1051*	2R
30	4.00	1.20	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Right	32 1039*	2R
30	4.00	1.25	BeO	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	1.52	[0.060]	Center	32 1035*	2C
30	4.00	1.25	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Left	32 1034*	2L
30	4.00	1.25	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.52	[0.060]	Left	32 1050*	2L
30	4.00	1.25	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.52	[0.060]	Right	32 1051*	2R
40	8.40	1.30	BeO	13.08	[0.515]	6.35	[0.250]	3.05	[0.120]	1.02	[0.040]	Center	32 1070*	2C
40	8.40	1.30	BeO	6.35	[0.250]	13.08	[0.515]	3.05	[0.120]	1.02	[0.040]	Right	32 1047*	2R
40	8.40	1.30	BeO	6.35	[0.250]	13.08	[0.515]	3.05	[0.120]	1.02	[0.040]	Left	32 1046*	2L
40	6.00	1.30	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1007*	4
50	14.50	1.35	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.02	[0.040]	Left	32 1200*	2L

Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.

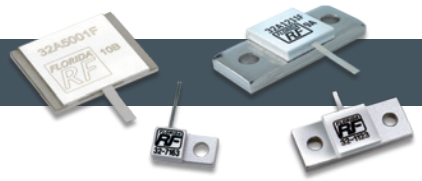
"*" is a place holder. See part number configurations to complete the part number



Power	Frequency	VSWR	Substrate	L		W		H		TW		Mounting Direction	Part Series #	Figure #
Watt	GHz	Max:1		mm [inches]										
60	4.00	1.20	AIN	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	0.76	[0.030]	Center	32 7150*	5
60	4.00	1.25	AIN	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	0.76	[0.030]	Left	32 7008*	2L
60	1.50	1.20	BeO	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	1.52	[0.060]	2 Hole	32 1170*	2C
60	1.50	1.20	BeO	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	1.52	[0.060]	2 Hole	32 1168*	5
60	2.00	1.35	BeO	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	1.52	[0.060]	Center	32 1138*	2C
60	6.00	1.20	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.02	[0.040]	Left	32 1121*	2L
60	6.00	1.20	BeO	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	1.02	[0.040]	Right	32 1117*	2R
60	4.00	1.50	BeO	5.84	[0.230]	20.32	[0.800]	3.68	[0.145]	1.02	[0.040]	Center	32 1032*	4
60	6.00	1.35	BeO	5.84	[0.230]	20.32	[0.800]	3.68	[0.145]	1.02	[0.040]	2 Hole	32 1022*	4
60	6.00	1.20	BeO	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	1.52	[0.060]	Center	32 1036*	5
60	6.00	1.20	BeO	13.08	[0.515]	6.35	[0.250]	3.81	[0.150]	1.02	[0.040]	Center	32 1122*	2C
75	2.40	1.30	BeO	9.52	[0.375]	22.10	[0.870]	5.08	[0.200]	1.52	[0.060]	2 Hole	32 1074*	7
75	1.50	1.40	BeO	9.52	[0.375]	20.83	[0.820]	5.97	[0.235]	6.35	[0.250]	Center	32 1002*	6
100	4.00	1.20	AIN	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	0.76	[0.030]	Center	32 7165*	2C
100	4.00	1.20	AIN	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	0.76	[0.030]	Right	32 7164*	2R
100	4.00	1.20	AIN	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	0.76	[0.030]	Left	32 7163*	2L
100	6.00	1.30	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Right	32 1158*	2R
100	6.00	1.30	BeO	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	1.52	[0.060]	Center	32 1157*	2C
100	6.00	1.30	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Left	32 1156*	2L
100	6.00	1.30	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1055*	4
100	2.30	1.30	BeO	9.52	[0.375]	24.76	[0.975]	5.21	[0.205]	1.52	[0.060]	2 Hole	32 1016*	8
100	4.00	1.20	AIN	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	0.76	[0.030]	Left	32 7163*	2L
100	6.00	1.30	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1055*	4
100	6.00	1.30	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Left	32 1156*	2L
100	4.00	1.20	AIN	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	0.76	[0.030]	Right	32 7164*	2R
100	4.00	1.20	AIN	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	0.76	[0.030]	Center	32 7165*	2C
100	4.00	1.25	BeO	20.32	[0.800]	5.84	[0.230]	4.06	[0.160]	1.02	[0.040]	Right	5653*	4
100	4.00	1.25	AiN	20.32	[0.800]	5.84	[0.230]	4.06	[0.160]	1.02	[0.040]	2 Hole	5653ALN	4
110	2.00	1.25	AIN	1.91	[0.075]	22.10	[0.870]	3.48	[0.137]	1.02	[0.040]	2 Hole	32P7197*	7
120	2.00	1.20	AIN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	0.76	[0.030]	Center	32 7187*	4
120	2.00	1.10	AIN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	0.76	[0.030]	2 hole	32 7176*	4
120	2.00	1.20	AIN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	0.76	[0.030]	2 Hole	32 7025*	4
120	2.40	1.25	AIN	6.48	[0.255]	20.83	[0.820]	4.06	[0.160]	2.54	[0.100]	2 Hole	32 7022*	6
120	2.00	1.10	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Right	32 1162*	2R
120	2.00	1.10	BeO	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	1.52	[0.060]	Center	32 1161*	2C
120	2.00	1.10	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Left	32 1160*	2L
120	2.00	1.10	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	Center	32 1058*	4
120	2.00	1.20	AIN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	0.76	[0.030]	2 Hole	32 7025*	4

Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.

"*" is a place holder. See part number configurations to complete the part number



Power	Frequency	VSWR	Substrate	L		W		H		TW		Mounting Direction	Part Series #	Figure #
Watt	GHz	Max:1		mm [inches]										
120	2.00	1.10	BeO	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	1.52	[0.060]	Left	32 1160*	2L
120	2.00	1.20	AlN	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	0.76	[0.030]	Center	32 7187*	4
125	3.00	1.20	AlN	13.08	[0.515]	6.35	[0.250]	3.56	[0.140]	1.52	[0.060]	Center	32 7012*	2C
125	2.00	1.25	AlN	22.22	[0.875]	9.52	[0.375]	4.31	[0.170]	0.76	[0.120]	2 Hole	5307ALN	7
150	2.00	1.15	AlN	9.52	[0.375]	22.10	[0.870]	3.43	[0.135]	0.76	[0.030]	2 Hole	32 7172*	7
150	2.00	1.15	AlN	9.52	[0.375]	22.10	[0.870]	3.43	[0.135]	0.76	[0.030]	2 Hole	32 7023*	7
150	1.00	1.08	AlN	9.52	[0.375]	22.10	[0.870]	3.43	[0.135]	0.76	[0.120]	2 Hole	32 7018*	7
150	4.00	1.35	BeO	9.52	[0.375]	22.10	[0.870]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1184*	7
150	4.00	1.35	BeO	9.52	[0.375]	22.10	[0.870]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1026*	7
150	1.00	1.35	BeO	9.52	[0.375]	22.10	[0.870]	3.81	[0.150]	0.76	[0.120]	2 Hole	32-1003*	7
150	2.00	1.25	BeO	22.22	[0.875]	9.52	[0.375]	4.32	[0.170]	0.76	[0.120]	Right	5307*	7
150	2.00	1.25	BeO	22.22	[0.875]	9.52	[0.375]	4.06	[0.160]	0.76	[0.120]	Right	5657*	7
200	1.00	1.20	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1201*	4
200	2.00	1.20	BeO	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	1.02	[0.040]	2 Hole	32 1196*	4
250	2.70	1.30	AlN	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	0.76	[0.120]	2 Hole	32 7037*	8
250	2.00	1.50	AlN	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	1.02	[0.040]	2 Hole	32 7001*	8
250	2.00	1.15	BeO	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	1.52	[0.060]	2 Hole	32 1191*	8
250	2.00	1.15	BeO	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	0.76	[0.120]	Center	32 1037*	8
250	1.00	1.35	BeO	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	0.76	[0.120]	2 Hole	32 1004*	2L
250	1.00	1.05	AlN	9.52	[0.375]	24.76	[0.975]	5.33	[0.210]	0.76	[0.120]	2 Hole	32 7191*	8
250	2.00	1.25	BeO	24.76	[0.975]	9.52	[0.375]	5.21	[0.205]	0.76	[0.120]	2 Hole	5659*	8
350	2.00	1.55	BeO	12.70	[0.500]	31.75	[1.250]	5.46	[0.215]	1.52	[0.060]	2 Hole	32 1123*	9
400	1.00	1.20	BeO	26.42	[1.040]	48.26	[1.900]	6.35	[0.250]	1.52	[0.060]	4 Hole	32 1017*	10
500	2.00	1.25	BeO	12.70	[0.500]	31.75	[1.250]	0.22	[5.460]	1.52	[0.060]	Center	32 1209*	9
500	1.00	1.00	BeO	12.70	[0.500]	31.75	[1.250]	0.24	[5.970]	1.52	[0.060]	Center	32 1212*	9
800	0.50	1.30	BeO	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	6.35	[0.250]	4 Hole	32 1199*	10
800	0.50	1.50	BeO	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	6.35	[0.250]	4 Hole	32 1005*	10
800	0.50	1.10	AlN	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	6.35	[0.250]	4 Hole	32M7200*	10
1000	0.90	1.20	BeO	25.40	[1.000]	48.26	[1.900]	3.18	[0.125]	3.05	[0.120]	Center	32 5001*	11

Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.

"*" is a place holder. See part number configurations to complete the part number

Our Stripline flange terminations are ideal for coaxial isolator applications. Many designs feature a solderless construction. The resistive rod element is staked into the case, forming a highly reliable compression fit. The result is a superior electrical performance which is unaffected by subsequent high temperature manufacturing processes. Many of these products are space-qualified and can be tested for high reliability applications.

Note: Part numbers beginning with “8” offer the solderless construction.

Specifications

Impedance	50 Ohms +/-5%
Connections	Type N, SMA, SSMA, TNC
Frequency Range	DC to 26.6 GHz
Power Rating	100% @ 100°C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Substrates	BeO or Alumina
Resistive Element	Thin Film
Body	Aluminum with Chromate Finish
Tab or Socket Contact	Beryllium Copper, Gold Plated per MIL-G-45204
Slot Contact	Brass, Gold Plated per SAE AMS 2422

Part Numbering Code

8 — STYLE
8 = Flange Load

X X — DESCRIPTIONS
Random Numbers

X — CONTACT TYPE
1 = .028" slot
2 = .013" slot
3 = .023" slot
4 = .053" x .025" x .005" tab
5 = .053" x .050" x .005" tab

Figure 1 - 843X Series

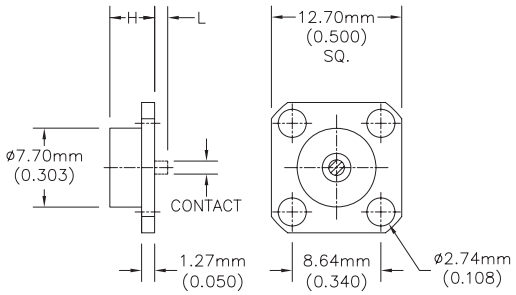


Figure 2 - 811X Series

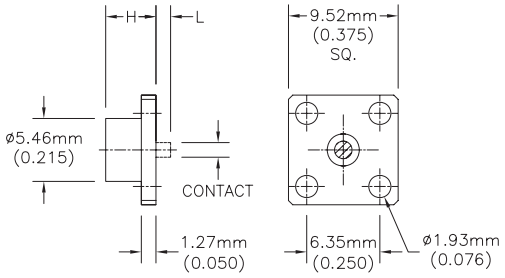
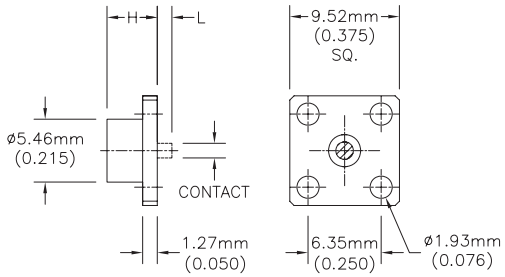


Figure 3 - 846X Series



For contact information please refer to Part Numbering Code for Contact Types.

Figure 4 - 841X and 842X Series

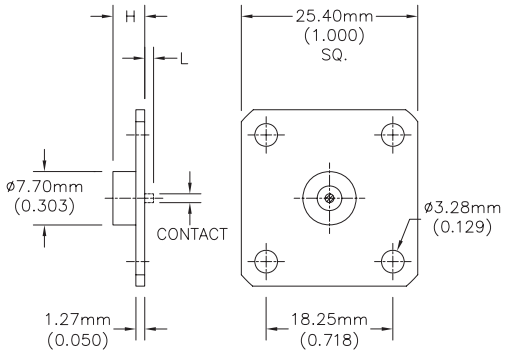


Figure 5 - 812X Series

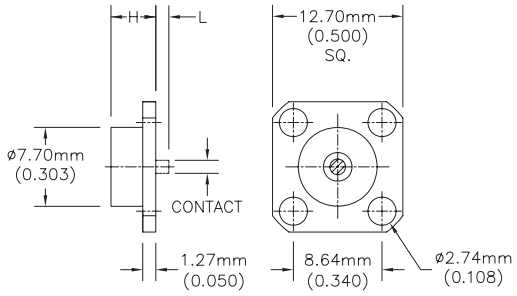


Figure 6 - 823X and 827X Series

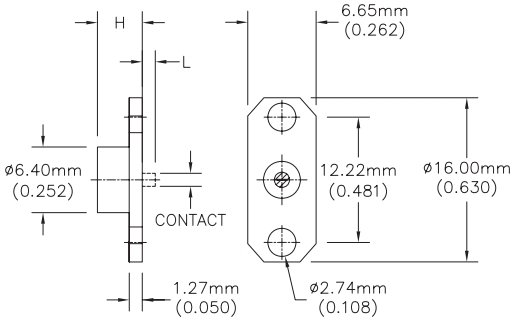


Figure 7 - 8482 and 8485 Series

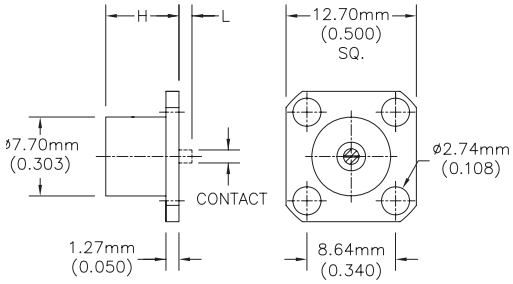


Figure 8 - 8487 and 8488 Series

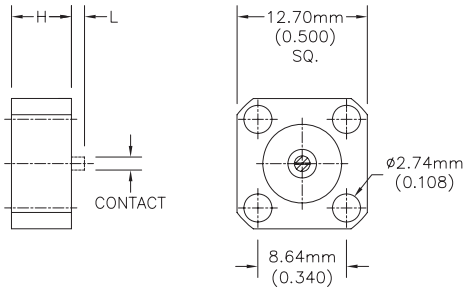
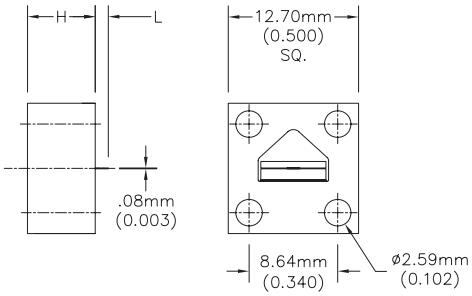


Figure 9 - 8750 Series



For contact information please refer to Part Numbering Code for Contact Types.

Power	Freq	VSWR	Substrate	Component H		Contact L		Mounting	Part Series #	Figure #
Watt	GHz	Max:1		mm [inches]						
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8431	1
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8432	1
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8433	1
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8434	1
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8435	1
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8111	2
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8462	3
1	12.0	1.20	Alumina	4.57	[0.180]	1.35	[0.053]	4-hole	8415	4
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8121	5
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8113	2
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8115	2
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8122	5
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8124	5
1	26.5	1.20	BeO	4.37	[0.172]	1.35	[0.053]	4-hole	8125	5
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	2-hole	8231	6
1	12.0	1.20	Alumina	4.57	[0.180]	1.35	[0.053]	4-hole	8413	4
1	12.0	1.20	Alumina	4.57	[0.180]	1.35	[0.053]	4-hole	8411	4
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8464	3
1	18.0	1.30	Alumina	4.37	[0.172]	1.35	[0.053]	4-hole	8465	3
10	12.0	1.25	BeO	4.57	[0.180]	1.35	[0.053]	4-hole	8425	4
10	18.0	1.40	BeO	4.37	[0.172]	1.35	[0.053]	2-hole	8275	6
10	12.0	1.25	BeO	4.57	[0.180]	1.35	[0.053]	4-hole	8421	4
25	14.5	1.50	BeO	7.14	[0.281]	1.35	[0.053]	4-hole	8482	7
25	14.5	1.50	BeO	7.14	[0.281]	1.35	[0.053]	4-hole	8485	7
25	14.5	1.50	BeO	7.14	[0.230]	1.35	[0.053]	4-hole	8487	8
25	14.5	1.50	BeO	7.14	[0.230]	1.35	[0.053]	4-hole	8488	8
75	5.0	1.50	BeO	6.35	[0.260]	1.27 min	[0.050] min	4-hole	8750	9

Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width. Please call for your specific application.

"*" except where L and W are noted

Figure 1 - SMA Plug/Male

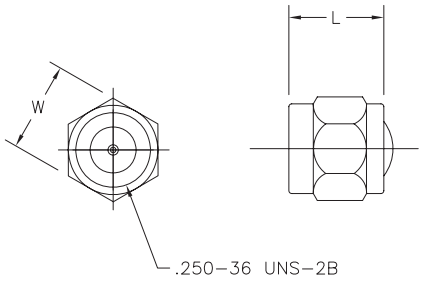
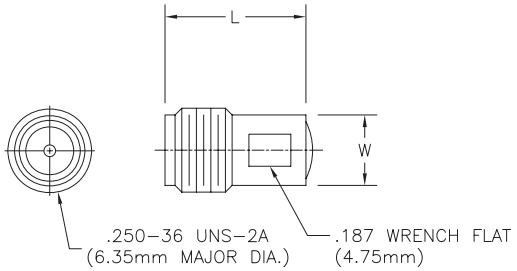


Figure 2 - SMA Jack/Female



Florida RF Labs/EMC Technology has a complete series of SMA, 3.5 mm and 2.9 mm interface compatible coaxial terminations. Some designs are specifically suited for narrow or wide band applications. These terminations have low VSWR, and operate at frequencies from DC to 26.5 GHz. They are ideal for both laboratory measurements and system use.

Part number designs beginning with “41” feature solderless construction while the part numbers with the “12” prefix use a soldered construction.

Specifications

Impedance	50 Ohms
Connector	SMA, 3.5mm, 2.9mm
Frequency Range	DC to 26.5 GHz
Power	0.5 to 3 Watts
Power Rating	100% @ 100°C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistor	Thin Film
Substrate	BeO or Alumina
Body & Coupling Nut Material	Stainless Steel
Body & Coupling Nut Finish	Passivated
Contact	Beryllium Copper
Contact Finish	Gold

Part Numbering Code

1	2	–	0	0 0 1	F
STYLE	TYPE		POWER	DESCRIPTION	FINISH
1 = Coaxial	2 = Termination		0 = Low	Random Numbers	F = RoHS Compliant

4 1 X X	P	C	D
SERIES	OPTION	OPTION	OPTION
	P = Plug J = Jack	C = Chain LC = Low Cost	Data

Power Rating	Substrate	Freq	VSWR	L		W		Part Series #	Figure #
Watt		Max	Max:1	mm [inches]					
0.5	Alumina	6.0	1.10	8.89	[0.350]	7.92	[0.312]	12-0007*	1
0.5	Alumina	12.4	1.17	13.33	[0.525]	7.92	[0.312]	12-0005*	1
0.5	Alumina	12.4	1.17	13.33	[0.525]	7.92	[0.312]	12-0006*	1
1.0	Alumina	18.0	1.15	8.89	[0.350]	7.92	[0.312]	12-0001*	1
1.0	Alumina	26.5	1.10	8.89	[0.350]	7.92	[0.312]	12-0002*	1
1.0	Alumina	26.5	1.18	8.89	[0.350]	7.92	[0.312]	12-0003*	1
1.0	Alumina	18.0	1.30	8.89	[0.350]	7.92	[0.312]	12-0008*	1
1.0	Alumina	2.0	1.10	8.89	[0.350]	7.92	[0.312]	12-0028*	1
1.0	Alumina	18.0	1.15	13.33	[0.525]	7.92	[0.312]	12-0101*	2
1.0	Alumina	26.5	1.10	13.33	[0.525]	7.92	[0.312]	12-0102*	2
1.0	Alumina	26.5	1.18	13.33	[0.525]	7.92	[0.312]	12-0103*	2
1.0	Alumina	18.0	1.25	8.38	[0.330]	7.92	[0.312]	4112P	1
1.0	Alumina	2.5	1.05	8.38	[0.330]	7.92	[0.312]	4112PLC	1
1.0	Alumina	18.0	1.15	8.38	[0.330]	7.92	[0.312]	4113P	1
1.0	Alumina	18.0	1.10	8.38	[0.330]	7.92	[0.312]	4113PCD	1
2.0	Alumina	18.0	1.15	12.70	[0.500]	7.92	[0.312]	4111P	1
2.0	Alumina	18.0	1.10	12.70	[0.500]	7.92	[0.312]	4111PCD	1
3.0	BeO	18.0	1.20	13.33	[0.525]	7.92	[0.312]	12-0009*	1

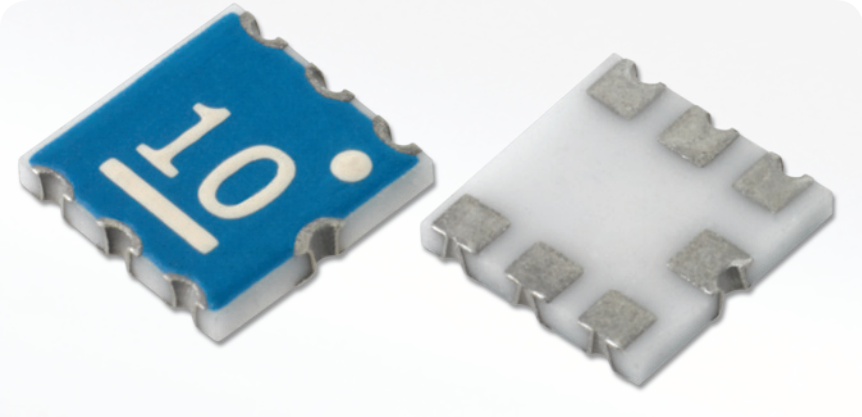
Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width.

Please call for your specific application

"*" is a place holder. See part number configurations to complete the part number.

Features

- Completely Passive Single-Chip Solution
- True RMS Power Detection Independent of Modulation
- Wide Dynamic Range
- Linear Response
- No Added Intermodulation
- ESD Resistant
- Reduced Design Complexity and Component Count

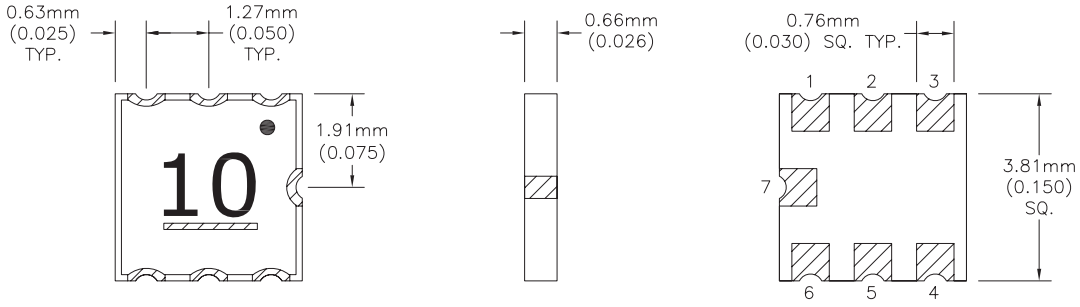


Applications

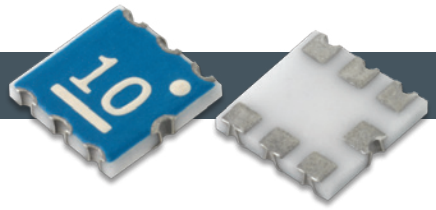
- Amplifiers
- Broadcast Transmitters
- Built-in Test Equipment
- Local Oscillator Monitor
- Base Transceiver Stations
- VSWR Meters
- Satellite Communications

EMC Technology's Smart Detector is a power sensing termination ideal for True RMS RF power measurement. Smart Detector is a passive device that responds to the heating effects of absorbed RF energy. This single-chip power detection solution offers many advantages and is easy to implement compared to diode detectors.

Power Sensing Termination



Freq	VSWR	Output Slope	Response Time	Output Linearity	Input Power	Finish	Model #
GHz	x:1 Max	mV/W	ms	Max	W Max		
DC - 6 GHz	1.25	280 - 320	3	± 5%	1.1	Tin-Lead	PST-10-A-1
						Silver/Nickel	PST-10-A-1F
						Silver/Copper	PST-10-M-1F



Inside Smart Detector

The basic building block of Smart Detector is a thermistor bridge. RF energy entering the device would result in a differential voltage (pin 6 & pin 4) proportional to the input power.

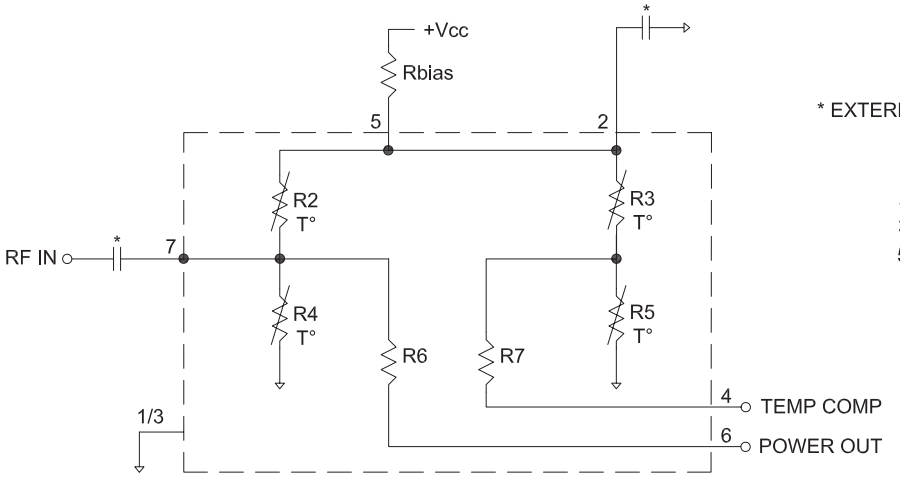
In addition to being a completely passive solution, Smart Detector also features internal temperature compensation. This allows for a streamlined circuit design with a reliable and consistent power detection solution that is unaffected by changes in operating temperature.

Using Smart Detector with HybriX® Couplers or Doupler™

Smart Detector is the ideal power detection solution complementing HybriX® directional couplers or Doupler™. This passive device introduces no additional intermodulation to the RF path. Combining with the space-saving benefit of Doupler™, the small footprint and simple implementation of Smart Detector allows for compact and efficient board layout.

In commercial wireless applications, the broadband response (DC - 6 GHz) of Smart Detector covers all 3G and 4G spectrum, makes it the ideal power detection solution for platform designs.

Smart Detector Schematic

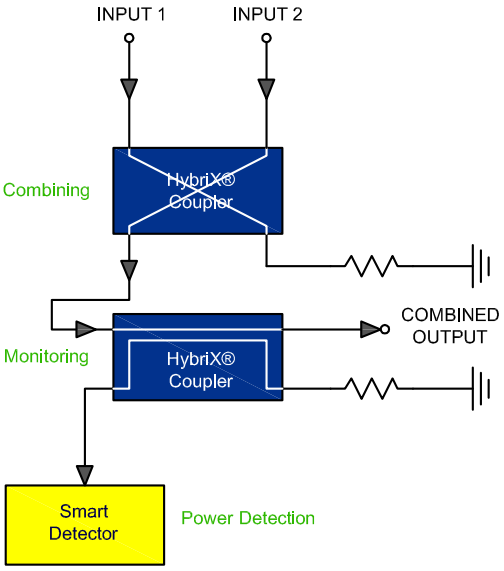


* EXTERNAL CAPACITOR REQUIRED

Vcc	Rbias
2.5 V	0 Ohms
3.3 V	62 Ohms
5.0 V	150 Ohms

Smart Detector	Active Diode Detector
Single chip solution.	Multi-device circuit.
Passive device; No distortion.	Active device; Distortion is a typical issue.
High power handling usable in transmit path.	Attenuation is needed for power reduction.
Internal temperature compensation.	External temperature compensation is required.
Lower cost; easy to implement.	Expensive; Complex implementation.
ESD resistant.	Vulnerable to ESD.

Typical Implementation of Smart Detector



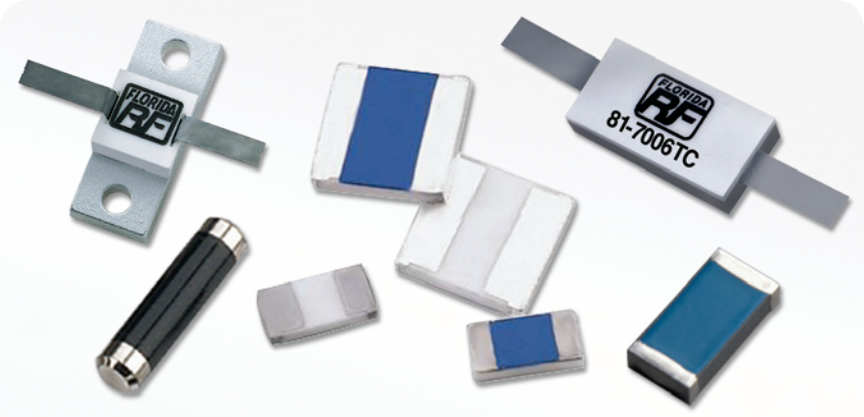
Features

- Lead Free, RoHS Compliant Option Available
- Low Capacitance
- Mounting - Surface Mount, Tab & Cover, Flange, and Rod
- Power Levels: 0.05 to 800 Watts
- 50 and 100 Ohms Standard
- Tight Resistance Tolerance - ±5%, ±2%, and ±1% Available
- Tuned Circuit
- Available in AlN, BeO, or Alumina
- Substrate Thicknesses of .015" to .120" Available
- Rod Diameters of .020" to .375"
- Custom Tab Forming Available
- Resistance Ranges from 3 to 400 Ohms
- Small Footprint and Low profile

Applications

- Base Stations
- Broadcast (TV and Radio)
- High Power Amplifier
- Instrumentation
- Military
- Radar System
- Satellite Communications
- Splitters/Combiners
- Voltage Dropping Resistor
- Wilkinson Dividers

For our **CVD Diamond Resistors** *see* **Diamond Rf™ Resistives** *on pages 67 to 76*



EMC Technology & Florida RF Labs offer low and high power RF resistors including surface mount chips, tab & cover chips, flange mounted and rod types. These resistors are available with Alumina, AlN, BeO and CVD substrate materials. Some devices use a tuned circuit design to minimize parasitic capacitance across their usable frequency bands. Most devices are available in a wide range of resistance values, typically from 1 ohm to 1,000 ohms.

Choose from a variety of metallization finishes for easy mounting to a heat sink or directly to a printed circuit board. Typical finishes include: Lead-free, RoHS compliant plating (silver or gold), solder finish with Sn60 Pb40 or solder fused finish with Sn60 Pb40 depending upon package type. Select from bulk, tape & reel, or waffle packaging, again, depending upon resistor package style.

Quick Selector Chart

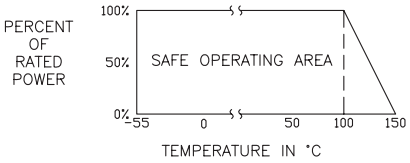
Mounting Style	Power (Watts)	Page
Surface Mount Chip	800	58-59
Tab & Cover	500	60-61
Flange	800	62-64
Rod	40	65-66

Surface mount chip resistors are available in three different terminal styles for either RF or DC applications, such as bias voltage dropping or heaters. Terminal Style A has a full backside metallization for direct attachment to a heat sink or an item to be heated. Terminal Style B has wrap-around divider for low power SMT applications. Terminal Style C has a split ground that allows it be mounted as a resistor or termination. This style provides a larger ground area for increased heat dissipation and is an excellent choice for high power SMT applications.

Specifications

Standard Resistance	50 & 100 Ohms ±5%
Resistance Range	3 to 400 Ohms
Power	2 to 800 Watts
Power Rating	100% @ 100°C
Derates to	0% @ 150°C
Operating Temperature	-55°C to 150°C
Substrate	BeO, AlN or Alumina
Resistive Element	Thin or Thick Film
Solderable Terminals	See Plating Option
Environment	Meets applicable sections of MIL-PRF-55342

Power Rating and Derating



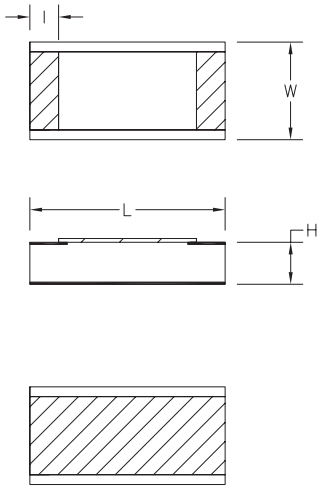
Part Numbering Code

8 1 A 7 042 – 100 – 5 F

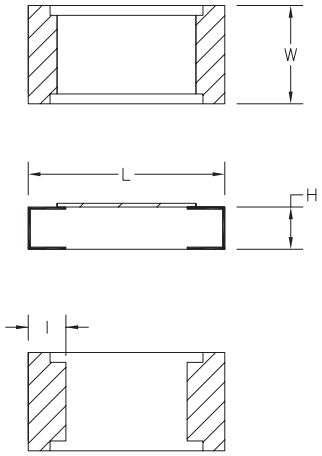
- **8** — STYLE: 8 = Chip / Power Pak
- **1** — TYPE: 1 = Resistor
- **A** — PLATING OPTION: – = Tin Lead [1], A = Silver Nickel, B = Silver Copper, M = Non-magnetic
- **7** — SUBSTRATE MATERIAL: 7 = Aluminum Nitride, 8 = Alumina, 3 = Beryllium Oxide
- **042** — DESCRIPTIONS: Random Numbers
- **–** — (blank) = Style C, A = Style A, B = Style B
- **100** — RESISTANCE: Value in ohms
- **–** — – = Tin / Lead, (blank) = RoHS Compliant
- **5** — TOLERANCE: 1 = 1%, 2 = 2%, 5 = 5%, 10 = 10%
- **F** — RoHS Compliant

[1] *Not RoHS Compliant*

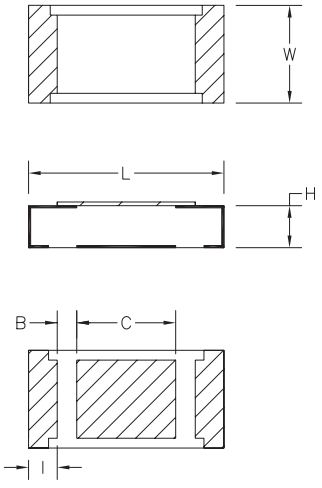
Style A



Style B



Style C

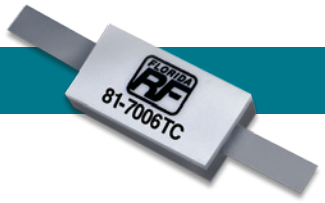


Power	Resistance	Substrate	Capacitance	L		W		H		Part Series #
Watt	Range			mm [inches]						
2	10-250	Alumina	0.10	3.05	[0.120]	1.52	[0.060]	0.38	[0.015]	81 8004B*
5	25-200	Alumina	0.10	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 8002B*
5	25-200	AlN	0.27	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 7001B*
5	2.5-200	BeO	0.80	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 3001B*
6	5-150	BeO	/1	5.08	[0.200]	5.08	[0.200]	1.02	[0.040]	81 3002Bv
8	3-200	BeO	0.66	6.35	[0.250]	6.35	[0.250]	1.57	[0.062]	81 3012B*
8	5 to 75	BeO	0.85	5.84	[0.230]	8.89	[0.350]	1.02	[0.040]	81 3005B*
8	3-200	BeO	1.00	6.35	[0.250]	6.35	[0.250]	1.02	[0.040]	81 3003B*
10	10-300	AlN	/1	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 7031*
10	15-400	BeO	0.10	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 3031*
10	7-250	BeO	1.33	9.53	[0.375]	6.35	[0.250]	1.02	[0.040]	81 3006B*
10	5-200	BeO	0.80	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 3001A*
10	10-300	AlN	0.10	5.08	[0.200]	2.54	[0.100]	1.02	[0.040]	81 7031
12	5-250	BeO	1.64	9.53	[0.375]	9.53	[0.375]	1.02	[0.040]	81 3008B*
15	5-150	BeO	/1	5.08	[0.200]	5.08	[0.200]	1.02	[0.040]	81 3002A*
20	15-300	AlN	1.50	9.53	[0.375]	6.35	[0.250]	1.02	[0.040]	81 7042
20	5 to 75	BeO	6.00	6.35	[0.250]	6.35	[0.250]	1.02	[0.040]	81 3039*
20	7-250	BeO	1.50	9.53	[0.375]	6.35	[0.250]	1.02	[0.040]	81 3032*
30	5-120	BeO	0.85	5.84	[0.230]	8.89	[0.350]	1.02	[0.040]	81 3005A*
50	5-200	AlN	/1	9.53	[0.375]	9.53	[0.375]	1.02	[0.040]	81 7028*
50	10-400	BeO	1.35	17.78	[0.700]	8.89	[0.350]	1.52	[0.060]	81 3036*
50	5-120	BeO	1.00	6.35	[0.250]	6.35	[0.250]	1.02	[0.040]	81 3003A*
100	12-400	BeO	4.48	25.40	[1.000]	25.40	[1.000]	1.52	[0.060]	81 3011B*
150	7-250	BeO	1.33	9.53	[0.375]	6.35	[0.250]	1.02	[0.040]	81 3006A*
250	5-200	BeO	/1	9.53	[0.375]	9.53	[0.375]	1.02	[0.040]	81 3028*
800	12-400	BeO	4.48	25.40	[1.000]	25.40	[1.000]	1.52	[0.060]	81 3011A*

/1 Varies by resistance value within the range. Call the Sales department for more information.

"*" is a place holder. See part number configurations to complete the part number.

For I, B and C dimensions see data sheet on website.

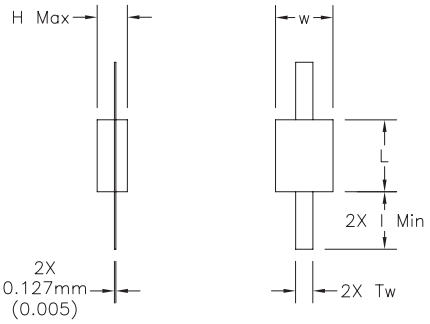


Florida RF Labs Tab & Cover resistors are ideal for mounting directly to a heat sink or onto a circuit board. The resistors are available with BeO, Aluminum Nitride (AlN) or Alumina substrates. These devices have standard resistance values of 50 & 100 ohms, however, are available in many non-standard values as well. The power rating ranges from 10 to 500 watts. Applications include Wilkinson divider/combiner that require low capacitance to ground. Packaging options are tray or tape & reel. All devices are available RoHS compliant.

Specifications

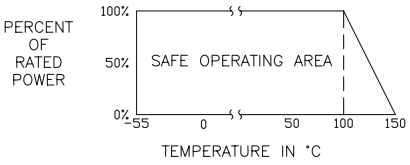
Standard Resistance	50 & 100 Ohms ±5%
Resistance Range	5 to 400 Ohms
Power	10 to 500 Watts
Power Rating	100% @ 100°C
Derates to	0% @ 150°C
Operating Temperature	-55°C to 150°C
Substrate	BeO, AlN or Alumina
Resistor	Thin Film
Tab Contact	Beryllium copper
Cover	Alumina
Ground Plane	Plated Thick Film

81-Series Tab & Cover



For “I min” and Tw dimensions see data sheet on website.

Power Rating and Derating

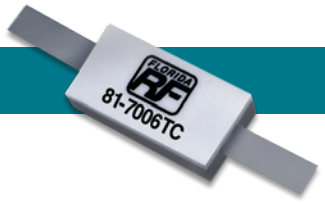


Part Numbering Code

8 1 – 7 0 0 8 T C – 1 0 0 – 5 F

- 8 — STYLE: 8 = Chip/Power Pak
- 1 — TYPE: 1 = Resistor
- – — PLATING OPTION: – = Tin Lead /1, A = Silver Nickel, B = Silver Copper, M = Non-magnetic
- 7 — SUBSTRATE MATERIAL: 7 = Aluminum Nitride, 8 = Alumina, 3 = Beryllium Oxide
- 0 0 8 T C — DESCRIPTIONS: Random Numbers
- 1 0 0 — RESISTANCE: Value in ohms
- – — (blank) = RoHS Compliant, – = Tin/Lead
- 5 — TOLERANCE: 1 = 1%, 2 = 2%, 5 = 5%, 10 = 10%
- F — RoHS Compliant

/1 *Not RoHS Compliant*



Power	Resistance	Substrate	Capacitance	L		W		H		Part Series #
Watt	Range			mm [inches]						
10	10-250	AlN	0.57	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	81 7008TC /1
10	10-250	AlN	/5	5.08	[0.200]	2.54	[0.100]	2.16	[0.085]	81 7006TC /2
10	5-200	BeO	0.80	5.08	[0.200]	2.54	[0.100]	2.29	[0.090]	81 3001TC*
15	5-150	BeO	1.00	5.08	[0.200]	5.08	[0.200]	2.16	[0.085]	81 3002TC*
20	3-250	BeO	1.00	6.35	[0.250]	6.35	[0.250]	2.67	[0.105]	81 3012TC*
30	10-400	BeO	0.50	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	81 3034TC*
40	10-250	AlN	0.52	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	81 7108TC /3
40	10-250	AlN	0.25	5.84	[0.250]	8.89	{0.350]	2.16	[0.085]	81 7107TC /4
40	9-300	BeO	0.50	6.35	[0.250]	8.89	{0.350]	2.16	[0.085]	81 3035TC*
50	5-200	AlN	0.45	6.35	[0.250]	9.53	[0.375]	2.16	[0.085]	81 7109TC*
50	5-120	BeO	1.00	6.35	[0.250]	6.35	[0.250]	2.16	[0.085]	81 3003TC*
60	5-200	BeO	0.70	6.35	[0.250]	9.53	[0.375]	1.02	[0.040]	81 3033TC*
100	14-250	AlN	1.50	9.53	[0.375]	6.35	[0.250]	2.16	[0.085]	81 7043TC
150	7-250	AlN	1.38	9.53	[0.375]	6.35	[0.250]	2.16	[0.085]	81 7021TC*
150	12-400	BeO	0.50	9.53	[0.375]	6.35	[0.250]	2.67	[0.105]	81 3075TC*
150	7-250	BeO	1.33	9.53	[0.375]	6.35	[0.250]	2.16	[0.085]	81 3006TC*
200	10-250	AlN	1.40	9.53	[0.375]	9.53	[0.375]	2.16	[0.085]	81 7110TC*
250	10-350	BeO	1.00	9.53	[0.375]	9.53	[0.375]	2.67	[0.105]	81 3076TC*
250	5-250	BeO	1.64	9.53	[0.375]	9.53	[0.375]	2.16	[0.085]	81 3008TC*
400	5-200	BeO	3.25	12.70	[0.500]	12.70	[0.500]	2.16	[0.085]	81 3074TC*
500	10-400	BeO	1.50	12.70	[0.500]	12.70	[0.500]	2.16	[0.085]	81 3123TC*
500	10-400	BeO	1.50	12.70	[0.500]	12.70	[0.500]	1.02	[0.040]	81 3027TC*

/1 & /2 Slightly different specifications

/3 & /4 Slightly different body size and lead length

"*" is a place holder. See part number configuration to complete the part number.

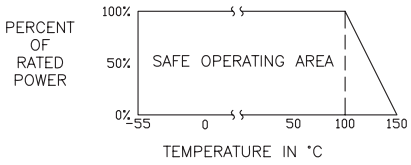
Peak power is typically 10 times the max power rating with a 1% duty cycle and 100 microsecond pulse width. Capacitance is parallel and measured to 2.7 GHz. For a complete part number, include resistance and tolerance as described above in ordering information. Please call the factory for specific applications.

Flange resistors are excellent for mounting directly to heat sinks for improved heat dissipation. The devices are available in single, double and four hole flange mounting styles. These devices have standard resistance values of 50 & 100 ohms, however most designs are available in non-standard values as well. The flange resistors are offered in power ratings ranging from 10 to 1000 watts. Many designs are available in both BeO and Aluminum Nitride (AlN) substrates. The Florida RF Labs designs, (31-XXXX), traditionally have a thin film resistor while the EMC Technology designs, (5XXX), use a thick film resistor.

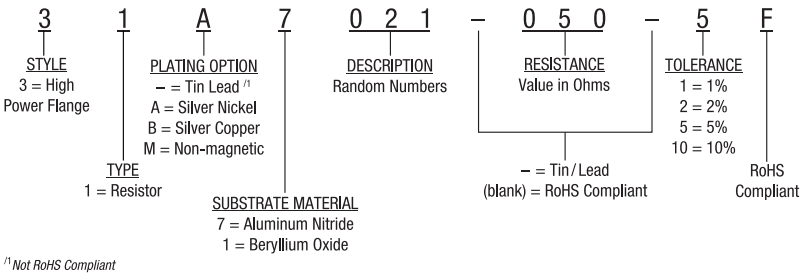
Specifications

Standard Resistance	50 & 100 Ohms ±5%
Resistance Range	4 to 400 Ohms
Power	10 to 800 Watts
Power Rating	100% @ 100°C
Derates to	0% @ 150°C
Operating Temperature	-55°C to 150°C
Substrate	BeO or AlN
Resistor	Thin or Thick Film
Tab Contact	Beryllium Copper
Cover	Alumina
Mounting Flange	Copper, Nickel Plated

Power Rating and Derating



Part Numbering Code



/1 *Not RoHS Compliant*

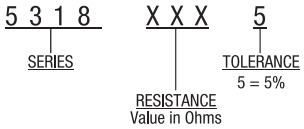


Figure 1

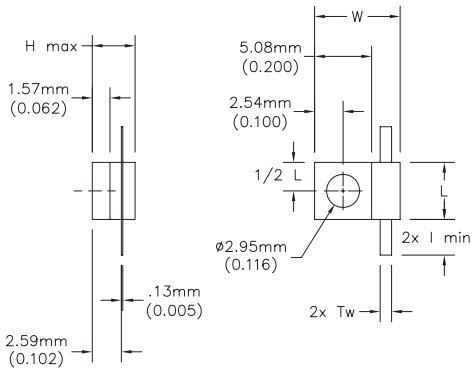


Figure 1

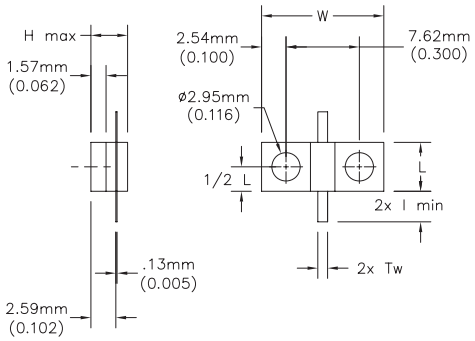


Figure 1

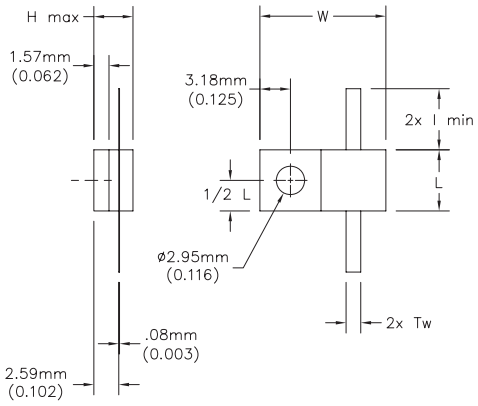


Figure 4

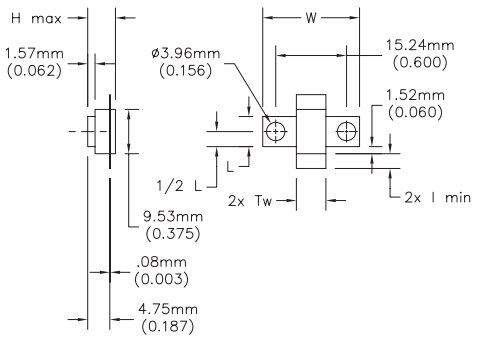


Figure 5

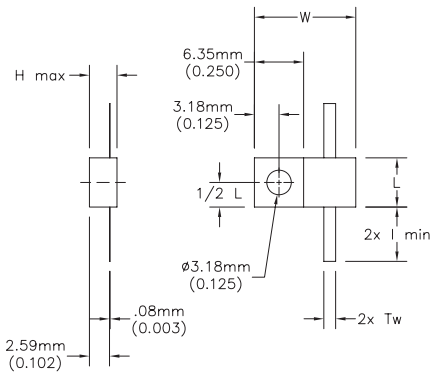


Figure 6

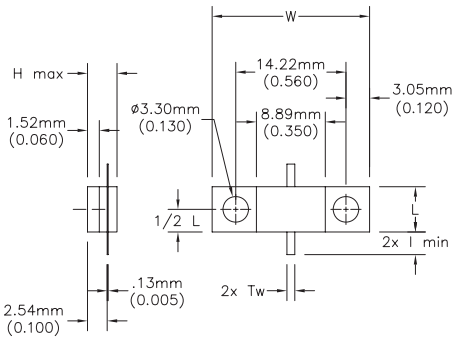


Figure 7

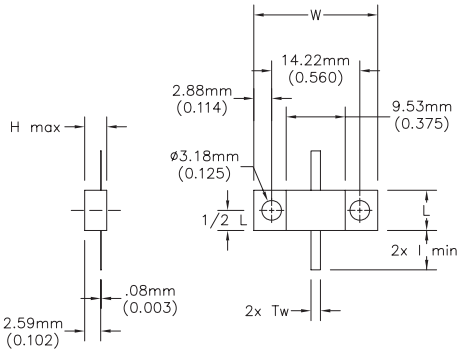


Figure 8

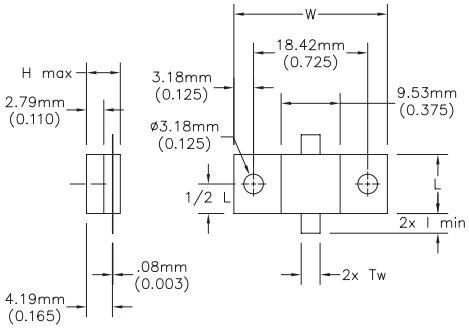


Figure 9

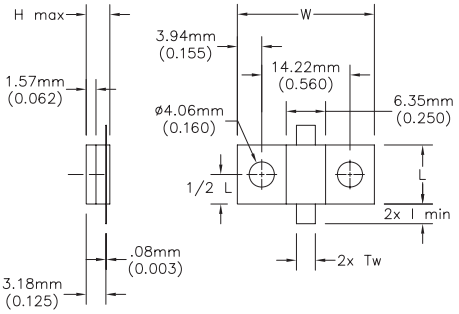


Figure 10

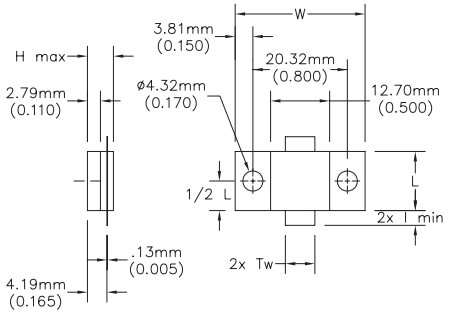


Figure 11

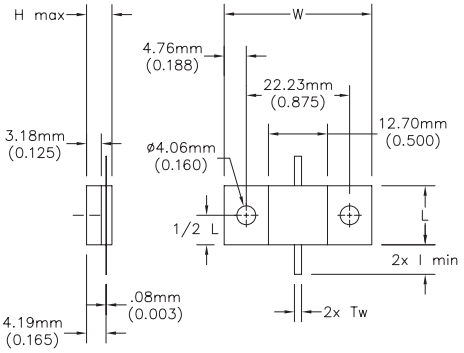
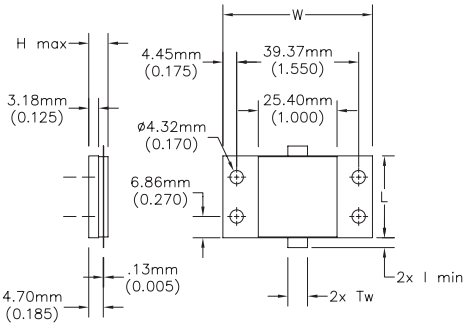


Figure 12

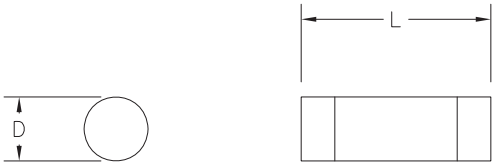


Power	Resistance	Substrate	Capacitance	L		W		H		Part Series #	Figure #
Watt	Range			mm [inches]							
10	5-200	BeO	0.80	5.08	[0.200]	12.70	[0.500]	3.81	[0.150]	31 1008*	2
10	5-200	BeO	0.80	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	31 1006*	1
10	25-250	BeO	1.30	7.62	[0.300]	5.08	[0.200]	4.06	[0.160]	5318 XXX,5	1
20	10-250	AlN	0.80	5.08	[0.200]	12.70	[0.500]	3.81	[0.150]	31 7008*	1
20	10-250	AlN	0.57	5.08	[0.200]	7.62	[0.300]	3.81	[0.150]	31 7006*	1
20	10-400	BeO	0.20	6.35	[0.250]	13.08	[0.515]	4.32	[0.170]	31 1094*	3
20	10-150	BeO	1.00	6.35	[0.250]	20.83	[0.820]	5.97	[0.235]	31 1010*	7
20	3-250	BeO	0.60	6.35	[0.250]	13.08	[0.515]	4.06	[0.160]	31 1009*	3
20	3-250	BeO	0.60	6.35	[0.250]	13.08	[0.515]	4.06	[0.160]	31 1001*	3
25	25-250	BeO	2.50	12.70	[0.500]	6.48	[0.255]	4.32	[0.170]	5310 XXX,5	2
25	25-250	BeO	2.00	13.08	[0.515]	6.35	[0.250]	4.06	[0.160]	5326 XXX,5	2
30	10-400	BeO	0.50	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	31 1034*	5
40	5-300	AlN	0.80	6.35	[0.250]	13.08	[0.515]	3.81	[0.150]	31 7108*	3
40	10-250	AlN	0.25	5.84	[0.250]	20.32	[0.800]	3.81	[0.150]	31 7107*	6
40	10-400	BeO	0.50	6.35	[0.250]	13.08	[0.515]	3.56	[0.140]	31 1089*	3
40	9-300	BeO	0.50	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	31 1035*	6
40	9-300	BeO	0.50	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	31 1007*	6
40	25-250	BeO	3.40	20.32	[0.800]	5.84	[0.230]	4.06	[0.160]	5654 XXX,5	6
50	5-300	AlN	0.45	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	31 7109*	7
60	5-200	BeO	0.70	6.48	[0.255]	19.99	[0.787]	3.56	[0.140]	31 1033*	7
75	7-250	BeO	0.50	9.53	[0.375]	20.83	[0.820]	5.97	[0.235]	31 1002*	4
150	7-250	AlN	2.25	9.53	[0.375]	22.10	[0.870]	4.32	[0.170]	31 7021*	9
150	12-400	BeO	0.50	9.53	[0.375]	22.10	[0.870]	4.32	[0.170]	31 1075*	9
150	7-1000	BeO	0.80	9.53	[0.375]	22.10	[0.870]	4.32	[0.170]	31 1021v	9
150	7-250	BeO	1.33	9.53	[0.375]	22.10	[0.870]	3.81	[0.150]	31 1003*	9
150	5-600	BeO	/1	5.84	[0.230]	20.32	[0.800]	3.81	[0.150]	31 1086*	9
150	25-250	BeO	3.80	22.23	[0.875]	9.53	[0.375]	4.32	[0.170]	5308 XXX,5	9
200	10-350	AlN	1.40	9.53	[0.375]	24.77	[0.975]	5.46	[0.215]	31 7110*	8
250	10-350	BeO	1.00	9.53	[0.375]	24.77	[0.975]	5.46	[0.215]	31 1098*	8 /2
250	10-350	BeO	1.00	9.53	[0.375]	24.77	[0.975]	5.46	[0.215]	31 1076*	8
250	5-150	BeO	2.00	24.77	[0.975]	9.53	[0.375]	7.11	[0.280]	31 1059	8
250	5-250	BeO	1.64	9.53	[0.375]	24.77	[0.975]	5.46	[0.215]	31 1004*	8
250	25-250	BeO	4.30	24.77	[0.975]	9.53	[0.375]	5.21	[0.205]	5660 XXX,5	8
400	5-200	BeO	3.25	12.70	[0.500]	27.94	[1.100]	5.59	[0.220]	31 1074*	10
500	10-400	BeO	1.50	12.70	[0.500]	31.75	[1.250]	5.46	[0.215]	31 1123*	11
750	10-400	BeO	4.50	26.42	[1.040]	48.26	[1.900]	6.35	[0.250]	31 1054*	12
800	12-400	BeO	4.48	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	31 1005*	12
800	7-175	BeO	1.00	26.42	[1.040]	48.26	[1.900]	6.22	[0.245]	31 1099*	12

/1 Varies by resistance value within the range. Call the Sales department for more information.

/2 Formed Tabs

Rod

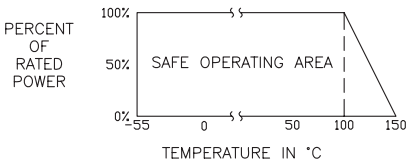


Rod resistors are typically used in wideband high performance coaxial terminations. They feature thin film resistance elements trimmed without kerfs for stable, high frequency characteristics. The high temperature protective coating protects the film during assembly operations. In applications where one end of the rod resistor is soldered directly to the heat sink, power handling as much as 10 times its rated power may be achieved.

Terminations constructed with our rod resistors, when designed properly, will yield a maximum VSWR of 1.05:1 at 4 GHz and 1.1:1 at 12 GHz.

Standard resistance range:10-250 ohms with tolerances of 1%, 2% and 5%.

Power Rating and Derating



Specifications

Standard Resistance	50 & 100 Ohms
Resistance Range	3 to 400 Ohms
Power	0.05 to 40 Watts
Power Rating	100% @ 100˚C
Derates to	0% @ 150˚C
Operating Temperature	-55˚C to 150˚C
Substrate	BeO, AlN or Alumina
Resistive Element	Thin Film
Solderable Terminals	See Plating Option

Part Numbering Code

R 080 – 187 B 2 – 100 – 5

- R — STYLE: R = Rod Resistor Solder Tinned; GR = Gold Terminal; SR = Silver Terminal; NR = Nickel Terminal
- 080 — ROD DIAMETER in mils
- 187 — ROD LENGTH in mils
- B — SUBSTRATE MATERIAL: A = Alumina; B = Beryllium Oxide
- 2 — STYLE: (blank) = Figure 1; 2 = Figure
- 100 — RESISTANCE Value in ohms
- 5 — TOLERANCE: 1 = 1%; 2 = 2%; 5 = 5%; 10 = 10%

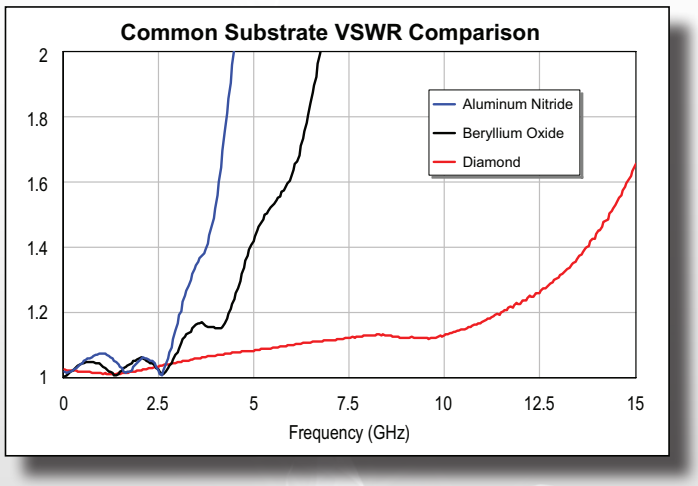
TR M 4 – 12 _ XXX , 5

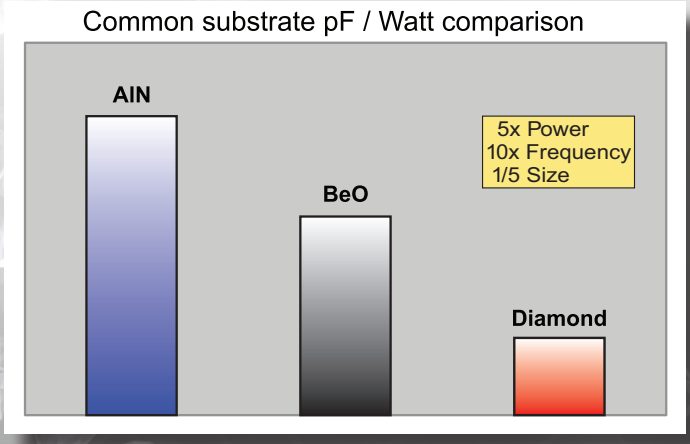
- TR — SERIES
- M — SUBSTRATE MATERIAL: M = Alumina; P = Beryllium Oxide
- 4 — DIAMETERS: 4 = 0.040; 6 = 0.060; 8 = 0.080
- 12 — LENGTH: 12 = 0.125; 18 = 0.187
- _ — TERMINAL FINISH: (blank) = Standard; S = Pretinned
- XXX — RESISTANCE Value in Ohms
- 5 — TOLERANCE: 1 = 1%; 2 = 2%; 5 = 5%

Power	Substrate	L		D		Part Series #
Watt		mm [inches]				
0.05	Alumina	3.18	[0.125]	0.76	[0.030]	R030-125A
0.05	Alumina	3.18	[0.125]	0.51	[0.020]	R020-125A
0.10	Alumina	3.18	[0.125]	1.02	[0.040]	R040-125A
0.12	Alumina	3.18	[0.125]	1.52	[0.060]	R060-125A
0.15	Alumina	4.75	[0.187]	1.52	[0.060]	R060-187A
0.50	Alumina	12.70	[0.500]	3.18	[0.125]	R125-500A2
0.50	Alumina	12.70	[0.500]	3.18	[0.125]	R125-500A
0.50	Alumina	6.35	[0.250]	3.18	[0.125]	R125-250A
1	BeO	4.75	[0.187]	1.52	[0.060]	R060-187B
1	BeO	3.18	[0.125]	1.52	[0.060]	R060-125B
1	Alumina	3.18	[0.125]	1.02	[0.040]	TRM 4-12
2	Alumina	3.18	[0.125]	1.52	[0.060]	TRM 6-12
2	Alumina	4.75	[0.187]	1.52	[0.060]	TRM 6-18
2	BeO	3.18	[0.125]	1.02	[0.040]	TRP 4-12
3	BeO	4.75	[0.187]	2.03	[0.080]	R080-187B
4	Alumina	4.75	[0.187]	2.03	[0.080]	TRM 8-18
5	BeO	6.35	[0.250]	3.18	[0.125]	R125-250B
10	BeO	12.70	[0.500]	3.18	[0.125]	R125-500B
10	BeO	3.18	[0.125]	1.52	[0.060]	TRP 6-12
10	BeO	4.75	[0.187]	1.52	[0.060]	TRP 6-18
20	BeO	4.75	[0.187]	2.03	[0.080]	TRP 8-18
40	BeO	19.05	[0.750]	9.53	[0.375]	R375-750B

Diamond is the best thermal conductor on earth. Combined with a low dielectric constant, it is an excellent RF dielectric material for high-frequency applications in which thermal performance is equally critical.

By applying cutting-edge thin film process and extensive millimeter wave design experience, EMC Technology has created a high-performance line of resistive components. The resulting products, our Diamond Rf™ resistors, terminations, and attenuators, are significantly reduced in size and unparalleled in average and peak power handling.



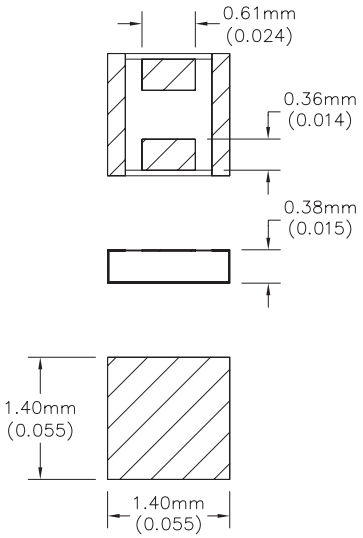


Quick Selector Chart

Series	Page
Diamond Attenuators	68
Diamond Resistors	71
Diamond Terminations	74

EMC Technology offers a line of CVD Diamond chip attenuators with extremely high power ratings. With operating frequency of DC to 26.5 GHz, these products are ideal for military and space applications because of their high power handling capability, broad frequency response and small footprint. The CA0505D are manufactured using all thin film construction. The gold finish on terminals is both wire-bondable and solderable. Standard chip and high reliability tested versions per Mil-PRF-55342 are available. Select from tape and reel or waffle packaging. These products are lead free, RoHS compliant and S-level approved. Standard available values are 1 through 10, 20, and 30 dB.

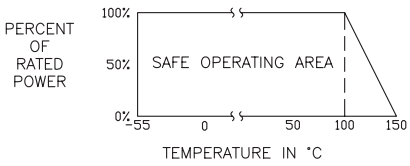
CA0505D



Specifications

Nominal Impedance	50 Ohms
Frequency Range	DC to 26.5 GHz
Attenuation Values	1 thru 10, 20 and 30 dB
Power Rating	20 Watts
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Terminal Material	Thin Film, Gold Solderable or Bondable Finish

Power Rating and Derating



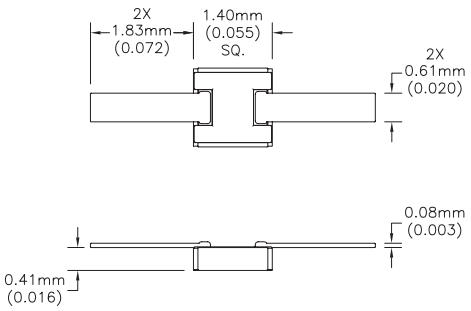
Attenuation Accuracy (dB)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	+ 0.25	+ 0.30	+ 0.50	+ 0.70
1 - 3	± 0.25	± 0.30	± 0.50	± 0.50
4 - 6	± 0.25	± 0.30	± 0.50	± 0.75
7 - 10	± 0.25	± 0.30	± 0.50	± 1.00
20	± 0.50	± 0.50	± 0.75	± 1.00
30	± 0.50	± 0.50	± 1.00	± 1.50

VSWR (Max)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	1.25	1.30	1.40	1.50
1-10	1.25	1.30	1.40	1.50
20	1.25	1.30	1.40	1.50
30	1.25	1.30	1.40	1.50

Part Numbering Code

C A	0 5	0 5	D	X X
TYPE	LENGTH	WIDTH	SUBSTRATE	dB VALUE
CA = Chip Attenuator	05 = 0.05"	05 = 0.05"	Diamond	01 - 10 00 -30

CA0505D T

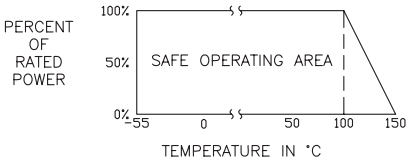


EMC Technology offers a line of CVD Diamond chip attenuators with extreme high power ratings. With operating frequency of DC to 26.5 GHz, these products are ideal for military and space applications because of their high power handling capability, broad frequency response and small footprint. The CA0505D T are manufactured using all thin film construction and have a thin film gold terminations. These units have a gold plated copper tab for ease of installation. Standard chip and high reliability tested versions per Mil-PRF-55342 are available. Select from tape and reel or waffle packaging. These products are lead free, RoHS compliant and S-level approved. Standard available values are 0 through 10, 20, and 30 dB.

Specifications

Nominal Impedance	50 Ohms
Frequency Range	DC to 26.5 GHz
Attenuation Values	0 thru 10, 20 and 30 dB
Power Rating	20 Watts
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Terminal Material	Thin Film, Gold Solderable or Bondable Finish
Tab	Copper, gold plated

Power Rating and Derating

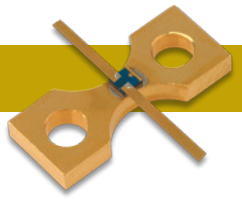


Attenuation Accuracy (dB)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	+ 0.25	+ 0.30	+ 0.50	+ 0.70
1 - 3	± 0.25	± 0.30	± 0.50	± 0.50
4 - 6	± 0.25	± 0.30	± 0.50	± 0.75
7 - 10	± 0.25	± 0.30	± 0.50	± 1.00
20	± 0.50	± 0.50	± 0.75	± 1.00
30	± 0.50	± 0.50	± 1.00	± 1.50

VSWR (Max)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	1.25	1.30	1.40	1.50
1-10	1.25	1.30	1.40	1.50
20	1.25	1.30	1.40	1.50
30	1.25	1.30	1.40	1.50

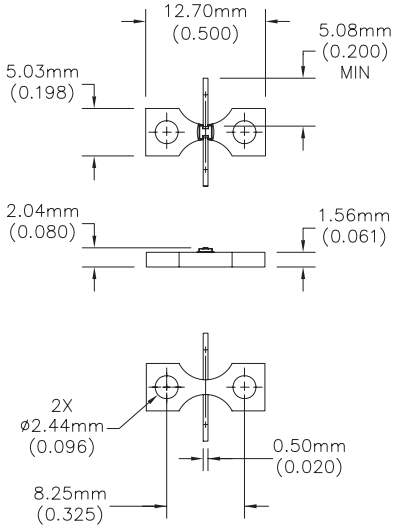
Part Numbering Code

C A	0 5	0 5	D	X X	F T
TYPE	LENGTH	WIDTH	SUBSTRATE	dB VALUE	MOUNTING
CA = Chip Attenuator	05 = 0.05"	05 = 0.05"	Diamond	01 - 10	(blank) = Chip FT = Flange & Tab T = Tab



EMC Technology offers a line of CVD Diamond chip attenuators with extreme high power ratings. With operating frequency of DC to 26.5 GHz, these products are ideal for military and space applications because of their high power handling capability, broad frequency response and small footprint. The CA0505D FT is manufactured using all thin film construction with gold finish. These units are equipped with a gold plated copper tab and integrated heat sink for ease of installation. Standard chip and high reliability tested versions per MIL-PRF-55342 are available. Select from tape and reel or waffle packaging. These products are lead free, RoHS compliant and S-level approved. Standard available values are 1 through 10, 20 and 30 dB.

CA0505D FT



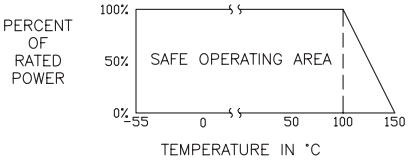
Specifications

Nominal Impedance	50 Ohms
Frequency Range	DC to 26.5 GHz
Attenuation Values	1 thru 10, 20 and 30 dB
Power Rating	20 Watts
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Terminal Material	Thin Film, Gold Solderable or Bondable Finish
Tab	Copper, gold plated
Heat Sink	Copper, gold plated

Attenuation Accuracy (dB)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	+ 0.25	+ 0.30	+ 0.50	+ 0.70
1 – 3	± 0.25	± 0.30	± 0.50	± 0.50
4 – 6	± 0.25	± 0.30	± 0.50	± 0.75
7 - 10	± 0.25	± 0.30	± 0.50	± 1.00
20	± 0.50	± 0.50	± 0.75	± 1.00
30	± 0.50	± 0.50	± 1.00	± 1.50

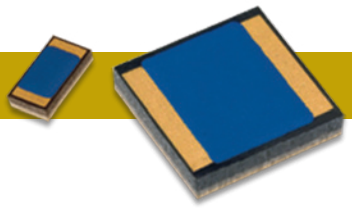
VSWR (Max)				
dB VALUE	DC - 8 GHz	8 -12.4 GHz	12.4 - 18 GHz	18 - 26.5 GHz
0	1.25	1.30	1.40	1.50
1-10	1.25	1.30	1.40	1.50
20	1.25	1.30	1.40	1.50
30	1.25	1.30	1.40	1.50

Power Rating and Derating

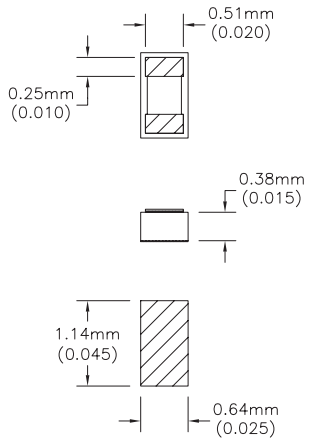


Part Numbering Code

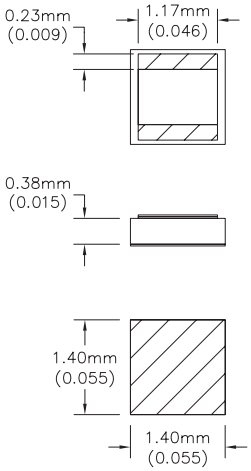
C A	0 5	0 5	D	X X	F T
TYPE	LENGTH	WIDTH	SUBSTRATE	dB VALUE	MOUNTING
CA = Chip Attenuator	05 = 0.05"	05 = 0.05"	Diamond	01 - 10	(blank) = Chip FT = Flange & Tab T = Tab



CR0402D



CR0505D

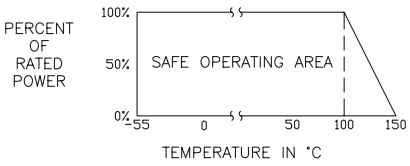


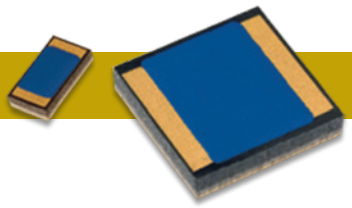
EMC Technology surface mount (CR) chip resistors with extreme high power ratings may be used in applications from DC to 30.0 GHz and are ideal for military and space applications because of their high power capability, broad frequency response and small, light-weight size. They are manufactured using all thin film construction and have a thin film gold finish that is both wire bondable and solderable. Because of their total thin film construction they are ideal for peak power applications. Standard chip and high reliability tested versions per Mil-PRF-55342 are also available. Select from tape and reel, bulk, or waffle packaging. These products are lead free, RoHS complaint and S-level approved. Standard available values are 50 & 100 ohms. Contact us directly for non-standard resistance values.

Specifications

Resistance Values	Part Series	50 and 100 Ohms +/-5%
Frequency Range	CR0402D/W2	DC to 30 GHz
	CR0505D	DC - 18.0 GHz
	CR0603D	DC - 18.0 GHz
	CR1010D	DC - 18.0 GHz
Power Rating	CR0402D/W2	20 Watts
	CR0505D	50 Watts
	CR0603D	50 Watts
	CR1010D	125 Watts
Typical Capacitance	CR0402D/W2	0.09pF
	CR0505D	0.1pF
	CR0603D	0.19pF
	CR1010D	0.3pF
Operating Temperature	All	-55 °C to 150 °C
Resistive Material	All	Thin Film
Terminal Material	All	Thin Film, Gold Solderable or Bondable Finish

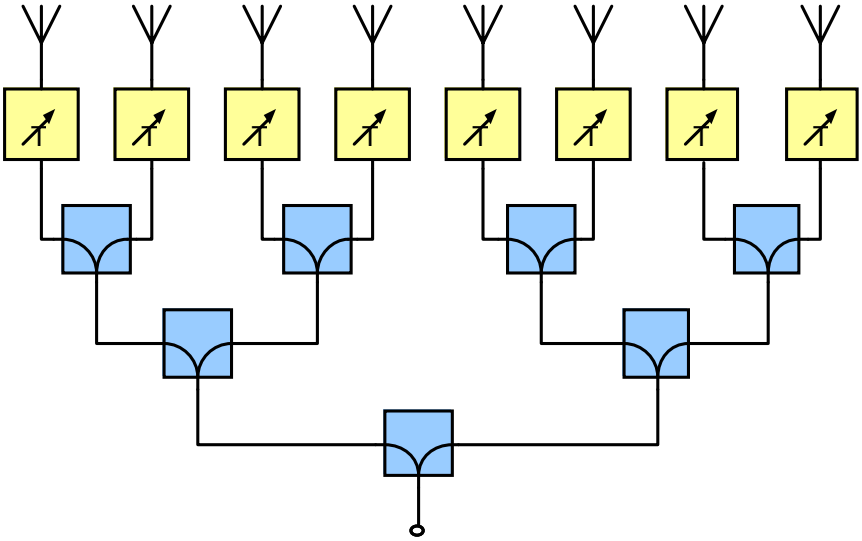
Power Rating and Derating





Reduce the Size and Weight of Phased Array Radar Feed Network Easily

Corporate-feed networks in phased array radars have benefited from the small footprint, high power handling, and excellent high-frequency characteristics of Diamond Rf resistors. The use of Diamond Rf resistors such as CR0505D, in place of the traditionally larger components, has significantly reduced the size and weight of the feed network without compromising power handling and thermal performance.

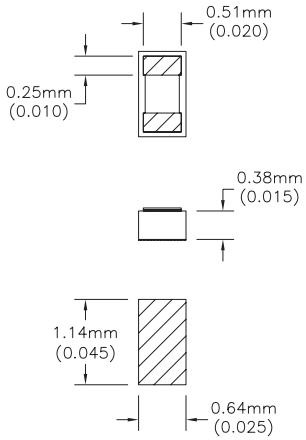


Part Numbering Code

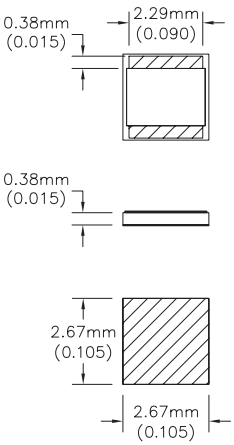
C R	1 0	1 0	D	5 0 , 5	W 2
TYPE	LENGTH	WIDTH	SUBSTRATE MATERIAL	OHMS / TOLERANCE	
CR = Chip Resistor	04 = 0.04" 05 = 0.05" 06 = 0.06" 10 = 0.10"	02 = 0.02" 05 = 0.05" 03 = 0.03" 10 = 0.10"	D = CVD Diamond	50 = 50 OHMS 100 = 100 OHMS 5 = 5%	(blank) = Chip Only W2 = Double Wrap

Note: Other ohms values available on request. Please contact our Sales department.

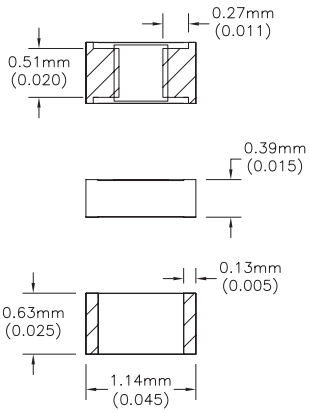
CR0603D



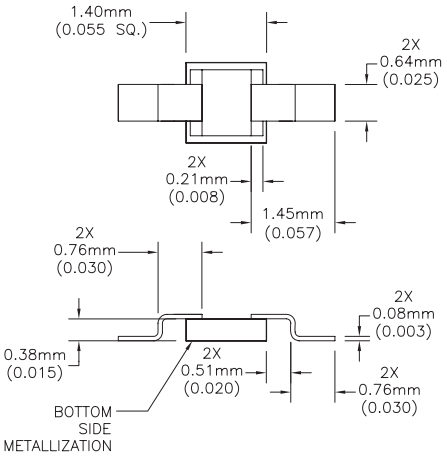
CR1010D



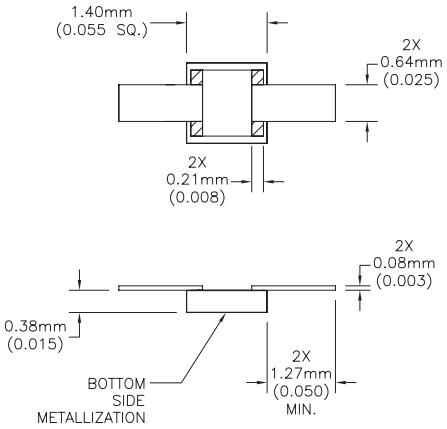
CR0402D W2



CR0505DTB



CR0505DT2

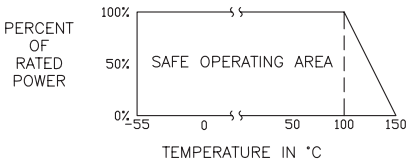


CVD Diamond surface mount (CR) chip resistors with extreme high power ratings. These resistors may be used in applications from DC to 30.0 GHz and are ideal for military and space applications because of their high power capability, broad frequency response and small, light-weight size. These terminations are available in easy to mount double wrap and tab mount units. They are manufactured using all thin film construction and have a pure thin film gold finish that is both wire bondable and solderable. They can be supplied with or without solderable tabs.

Specifications

Resistance Values	50 and 100 Ohms +/-5%
Frequency Range	30.0 GHz
Power Rating	50 Watts
Typical Capacitance	0.1pF
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Terminal Material	Thin Film, Gold Solderable or Bondable Finish
Tab	Copper, Gold Plated

Power Rating and Derating



Part Numbering Code

C R	1 0	1 0	D	5 0 , 5	T B
TYPE	LENGTH	WIDTH	SUBSTRATE MATERIAL	OHMS / TOLERANCE	
CR = Chip Resistor	04 = 0.04" 05 = 0.05" 06 = 0.06" 10 = 0.10"	02 = 0.02" 05 = 0.05" 03 = 0.03" 10 = 0.10"	D = CVD Diamond	50 = 50 OHMS 100 = 100 OHMS TOLERANCE 5 = 5%	(blank) = Chip Only T2 = Tabs TB = Tabs Bent

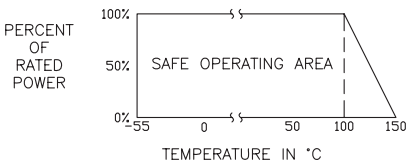
Note: Other ohm values available on request. Please contact our Sales department.

Our exclusive line of CVD Diamond chip terminations offers a unique combination of extreme high power ratings in very small packages. These terminations may be used in applications from DC to 28.0 GHz and are ideal for military and space applications because of their high power capability and small, light-weight package size. The terminations are manufactured using all thin film construction and have a gold finish that is both wire bondable and solderable. This total thin film construction also makes them ideal for peak power applications. High reliability tested versions per Mil-PRF-55342 are also available. Select from tape and reel, bulk, or waffle packaging. These products are also lead free, RoHS compliant and S-level approved.

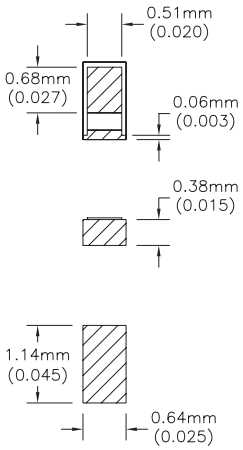
Specifications

Impedance	Part Series	50 Ohms +/-5%
Frequency Range	CT0402D	DC to 8 GHz
	CT0505D	DC to 20 GHz
	CT0603D	DC to 28 GHz
	CT1310D	DC to 14 GHz
Power Rating	CT0402D	10 Watts
	CT0505D	50 Watts
	CT0603D	50 Watts
	CT1310D	150 Watts
VSWR	All	1.6:1 Max
Operating Temperature	All	-55 °C to 150 °C
Resistive Material	All	Thin Film
Terminal Material	All	Thin Film, Gold Solderable or Bondable Finish

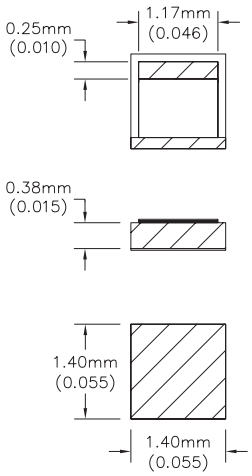
Power Rating and Derating



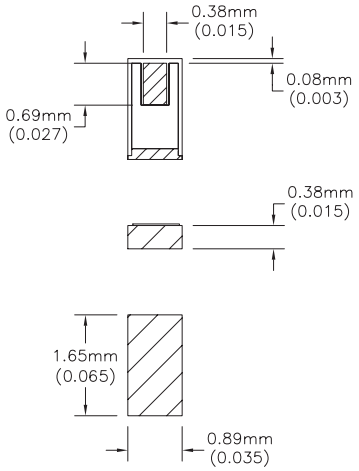
CT0402D



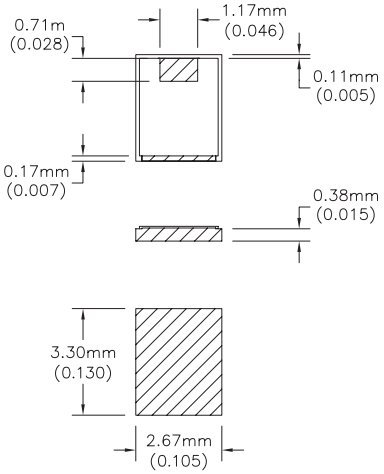
CT0505D



CT0603D



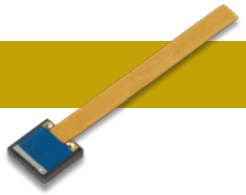
CT1310D



Part Numbering Code

C T	1 3	1 0	D
TYPE	LENGTH	WIDTH	SUBSTRATE
CT = Chip Terminations	04 = 0.04”	02 = 0.02”	D = CVD Diamond
	05 = 0.05"	03 = 0.03"	
	06 = 0.06”	05 = 0.05”	
	13 = 0.13"	10 = 0.10"	

Note: Not every combination of size is available.



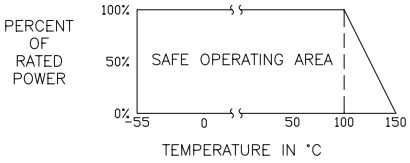
Our exclusive line of CVD Diamond chip terminations offers a unique combination of extreme high power ratings in very small packages. These terminations may be used in applications from DC to 26.5 GHz and are ideal for military and space applications because of their high power capability, broad frequency response and small, light-weight package size. These terminations are available in easy to mount tab and flange mount units.

They are ideal for peak power applications. They are manufactured using all thin film construction and have a pure thin film gold finish that is both wire bondable and solderable. They can be supplied with or without solderable tabs. High reliability tested versions per MIL-PRF-55342 are also available. These products are lead free, RoHS compliant and S-level approved. They also meet NASA out-gassing requirements for space applications.

Specifications

Impedance	50 Ohms +/-5%
Frequency Range	DC to 20 GHz
Power Rating	50 - 150 Watts
VSWR	1.6:1 Max
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Terminal Material	Thin Film, Gold Solderable or Bondable Finish
Tab	Copper, gold plated
Heat sink [HT only]	Copper, gold plated

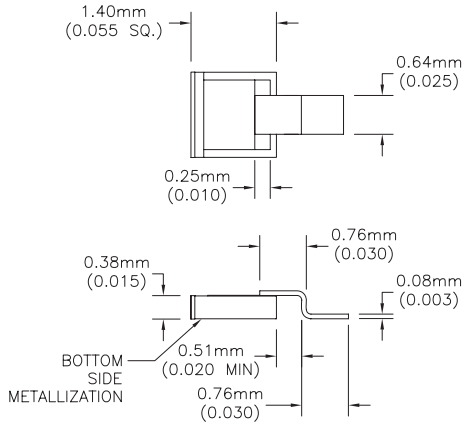
Power Rating and Derating



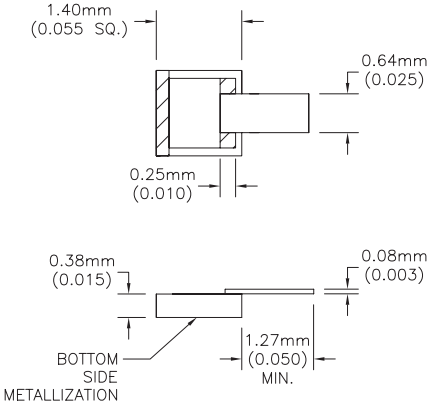
Part Numbering Code

C T	0 5	0 5	D	H T
TYPE	LENGTH	WIDTH	SUBSTRATE	
CT = Chip Terminations	05 = 0.05" 13 = 0.13"	05 = 0.05" 10 = 0.10"	D = CVD Diamond	(blank) = Chip Only T = Input Tab HT = Heat Sink and Tab TB = Tab Bent

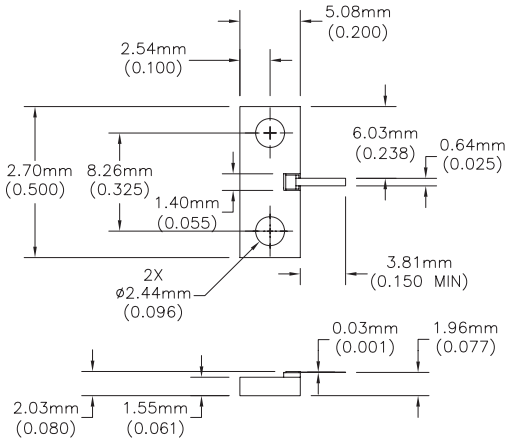
CT0505DTB



CT0505DT



CT0505DHT



Features

- Frequency Ranges from 48 MHz to 18 GHz.
- Surface Mountable
- Very Small Footprints (6 mm x 3mm Available)
- High Power Handling (up to 500 W)
- Low Insertion Loss
- Excellent Isolation and VSWR
- 90° Quadrature
- LTCC, Multilayered PTFE, or Alumina Construction
- Non-magnetic Products Available
- RoHS Compliant
- Tape and Reel Packaging

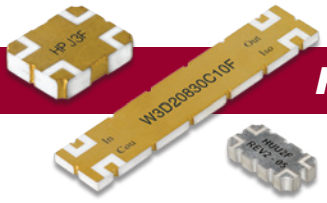
Applications

- W-CDMA, UMTS, WiMAX, and LTE Base Stations
- MRI and Spectroscopy
- Combiners and Splitters
- Duplexers
- Matched Phase Shifter
- Mixers
- Modulators
- Narrow Band GPS
- Signal Distribution Nodes

Florida RF Labs HybriX® 3 dB Hybrid Couplers are made for applications which require high isolation and low insertion loss. They are surface mountable and packaged in tape and reels. HybriX® Hybrid Couplers have a small footprint, low profile, and are RoHS compliant.

Quick Selector Chart

Frequency (MHz)	Applications	Part Number	Power (Watts)	Dimensions (mm)
380 - 470	TETRA	HDC3F	200	14.22 x 8.89
470 - 860	Broadcast	HLB3F	500	34.04 x 17.02
700 - 1000	LTE-FDD, GSM, Public Safety	HPD3F	80	6.35 x 5.08
		HPT3F	150	6.35 x 5.08
1200 - 1700	GPS, LTE-FDD	HPG3F	80	6.35 x 5.08
1700 - 2200	LTE, PCS, AWS, GSM-1800, UMTS	HPK2F	100	6.35 x 5.08
		HDL3F	200	14.22 x 8.89
2300 - 2700	WiMAX, LTE-TDD	HPP2F	35	6.35 x 5.08
		HDP3F	200	14.22 x 8.89
3300 - 3900	WiMAX, LTE	HPR2F	60	6.35 x 5.08
		HDR3F	200	14.22 x 8.89
8000 - 12000	PTP, Radar, Satellite	HPX2F	20	6.35 x 5.08
15000 - 18500	PTP, Radar, Satellite	HN05W03F	50	4.44 x 4.44



Part Numbering Code - HybriX® 3 dB Hybrid

H	P	K	2	F
H = Hybrid	SIZE See Table 1	FREQUENCY See Table 2	FAMILY CODE See Table 3	RoHS Compliant

Part Numbering Code - Wideband HybriX® 3 dB Hybrid

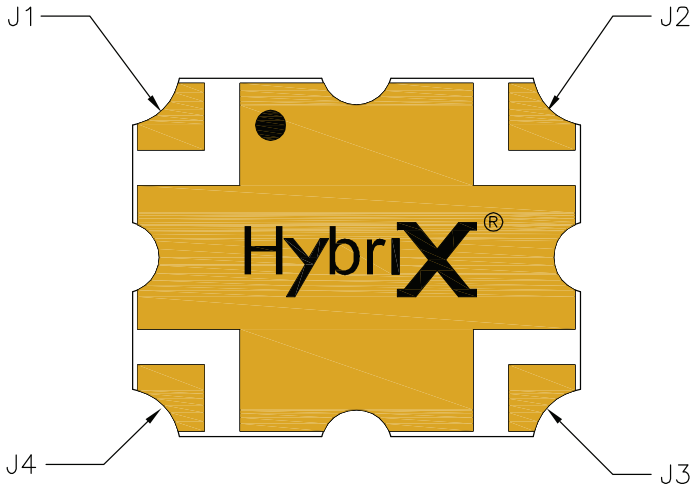
W	H	0 8	2 5	F
W = Wideband PTFE W3 = Wideband LTCC	H = Hybrid	Start Frequency (x0.1 GHz)	End Frequency (x0.1 GHz)	RoHS Compliant

Table 1: Size Code		
A	25.40 x 12.70 mm	1.000 x 0.500 in
S	16.51 x 12.19 mm	0.650 x 0.480 in
M	14.22 x 5.08 mm	0.560 x 0.200 in
D	14.22 x 8.89 mm	0.560 x 0.350 in
L	34.04 x 17.02 mm	1.340 x 0.670 in
P	6.35 x 5.08 mm	0.250 x 0.200 in
F	6.00 x 3.00 mm	0.236 x 0.118 in
E	25.40 x 25.40 mm	1.000 x 1.000 in
U	10.16 x 5.08 mm	0.400 x 0.200 in

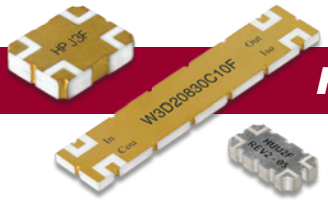
Table 2: Frequency Codes (GHz)			
A	0.15 - 0.25	M	2.0 - 2.5
B	0.47 - 0.86	N	2.0 - 2.7
C	0.38 - 0.52	O	2.4 - 2.8
D	0.81 - 0.96	P	2.3 - 2.7
E	1.0 - 2.0	Q	2.7 - 3.2
F	0.96 - 1.22	R	3.4 - 3.6
G	1.4 - 1.7	S	2.0 - 4.0
H	1.5 - 2.0	T	0.69 - 0.91
I	4.3 - 4.7	U	5.0 - 6.0
J	1.7 - 2.0	V	0.7 - 1.0
K	1.9 - 2.2	W	15.0 - 18.0
L	2.0 - 2.3	Y	18.0 - 27.0

Table 3: Family Codes	
(blank)	Multi-layer PTFE with Internal Vias
2	Multi-layer PTFE with Castellated Vias
3	HYBRIX3 LTCC with Castellated Vias
3T	HYBRIX3 LTCC with Castellated Vias; Enhanced Performance

Pin Configuration



J1	J2	J3	J4
Input	Isolated	Out, 90°	Coupled, 0°
Isolated	Input	Coupled, 0°	Output, 90°
Output, 90°	Coupled, 0°	Input	Isolated
Coupled, 0°	Output, 90°	Isolated	Input



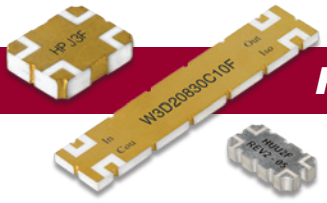
HybriX® 3 dB Hybrid Couplers

Product Information

Frequency	L	W	H	Isolation	Insertion Loss	VSWR	Amplitude Balance	Phase Balance	Average Power*	Core Material	Model Number
GHz	mm [inches]			dB Min	dB Max	Max:1	dB Max	deg Max	Watts CW		
.048 - .084	50.80 [2.000]	38.10 [1.500]	4.47 [.176]	20	0.20	1.20	± 0.25	± 2.00	300	PTFE	HG064M2F
.059 - .069	14.22 [.560]	8.89 [.350]	2.01 [.079]	20	1.00	1.30	± 0.10	± 2.00	10	LTCC	HD064M3F
.123 - .133	14.22 [.560]	8.89 [.350]	2.01 [.079]	20	0.80	1.35	± 0.20	± 2.00	10	LTCC	HD128M3F
.123 - .133	25.40 [1.000]	25.40 [1.000]	1.98 [.078]	28	0.23	1.10	± 0.10	± 1.00	300	PTFE	HE128MF
.180 - .210	25.40 [1.000]	25.40 [1.000]	1.91 [.075]	20	0.30	1.20	± 0.30	± 3.00	200	LTCC	HAA3F
.380 - .520	14.22 [.560]	8.89 [.350]	1.91 [.075]	20	0.30	1.20	± 0.15	± 3.00	200	LTCC	HDC3F
.470 - .860	16.51 [.650]	12.19 [.480]	1.80 [.071]	19	0.25	1.30	± 0.40	± 2.00	200	PTFE	HSBF
.470 - .860	34.04 [1.340]	17.02 [.670]	2.49 [.098]	18	0.30	1.30	± 0.50	± 3.00	500	LTCC	HLB3F
.500 - 2.60	45.00 [1.772]	10.00 [.394]	2.49 [.098]	18	0.50	1.30	± 0.60	± 5.00	100	LTCC	W3H0526F
.620 - .900	6.35 [.250]	5.08 [.200]	1.91 [.075]	23	0.18	1.15	± 0.25	± 3.00	150	LTCC	HPT3F
.800 - 1.00	6.35 [.250]	5.08 [.200]	1.91 [.075]	18	0.40	1.35	± 0.30	± 3.00	80	LTCC	HPD3F
.800 - 3.00	50.00 [1.969]	10.00 [.394]	2.49 [.098]	18	0.50	1.30	± 0.70	± 5.00	100	LTCC	W3H0830F
.811 - 1.00	14.22 [.560]	8.89 [.350]	1.91 [.075]	26	0.15	1.15	± 0.30	± 2.00	200	PTFE	HDDF
.815 - .960	25.40 [1.000]	12.70 [.500]	2.49 [.098]	21	0.12	1.20	± 0.30	± 3.00	300	LTCC	HAD3F
1.00 - 2.00	14.22 [.560]	8.89 [.350]	1.30 [.051]	20	0.20	1.20	± 0.55	± 2.00	200	PTFE	HDE
1.20 - 1.70	6.35 [.250]	5.08 [.200]	1.50 [.059]	20	0.25	1.20	± 0.30	± 3.00	80	LTCC	HPG3F
1.70 - 2.00	25.40 [1.000]	12.70 [.500]	2.49 [.098]	21	0.12	1.20	± 0.30	± 3.00	300	LTCC	HAJ3F
1.70 - 2.00	14.22 [.560]	8.89 [.350]	1.91 [.075]	25	0.15	1.20	± 0.15	± 3.00	200	LTCC	HDJ3F
1.70 - 2.00	14.22 [.560]	5.08 [.200]	1.85 [.073]	25	0.12	1.14	± 0.20	± 2.00	100	PTFE	HMJ2F
1.70 - 2.00	6.35 [.250]	5.08 [.200]	1.27 [.050]	23	0.15	1.15	± 0.22	± 3.00	180	LTCC	HPJ3TF
1.70 - 2.40	6.35 [.250]	5.08 [.200]	1.85 [.073]	23	0.20	1.20	± 0.30	± 3.00	100	PTFE	HPK2F
2.00 - 2.30	14.22 [.560]	8.89 [.350]	1.91 [.075]	25	0.15	1.20	± 0.15	± 3.00	200	LTCC	HDL3F
2.00 - 2.30	14.22 [.560]	5.08 [.200]	1.88 [.074]	25	0.11	1.12	± 0.20	± 2.00	100	PTFE	HML2F
2.10 - 2.40	6.00 [.236]	3.00 [.118]	1.00 [.039]	20	0.50	1.20	± 0.25	± 3.00	20	LTCC	HFL3F
2.00 - 6.00	25.00 [.984]	7.00 [.276]	2.49 [.098]	13	1.00	1.67	± 0.60	± 5.00	100	LTCC	W3H2060F
2.30 - 2.70	25.40 [1.000]	12.70 [.500]	2.49 [.098]	20	0.12	1.20	± 0.30	± 3.00	300	LTCC	HAP3F
2.30 - 2.70	14.22 [.560]	8.89 [.350]	1.91 [.075]	25	0.13	1.20	± 0.15	± 3.00	200	LTCC	HDP3F
2.30 - 2.70	14.22 [.560]	5.08 [.200]	1.88 [.074]	23	0.11	1.17	± 0.15	± 2.00	80	PTFE	HMP2F
2.30 - 2.70	6.35 [.250]	5.08 [.200]	1.85 [.073]	23	0.21	1.23	± 0.30	± 3.00	35	PTFE	HPP2F
2.30 - 2.70	6.00 [.236]	3.00 [.118]	1.50 [.059]	20	0.50	1.20	± 0.25	± 3.00	20	LTCC	HFP3F
2.40 - 2.80	6.35 [.250]	5.08 [.200]	1.50 [.059]	20	0.20	1.20	± 0.30	± 3.00	80	LTCC	HPO3F
2.70 - 3.20	6.35 [.250]	5.08 [.200]	1.85 [.073]	23	0.18	1.15	± 0.20	± 3.00	50	PTFE	HPQ2F
2.70 - 3.50	14.22 [.560]	5.08 [.200]	1.40 [.055]	24	0.20	1.25	± 0.40	± 3.00	200	PTFE	HMR2F
3.00 - 4.50	6.35 [.250]	5.08 [.200]	1.42 [.056]	24	0.18	1.15	± 0.40	± 3.00	60	PTFE	HPR2F
3.40 - 3.60	14.22 [.560]	8.89 [.350]	1.91 [.075]	25	0.15	1.20	± 0.15	± 3.00	200	LTCC	HDR3F
4.30 - 4.70	6.35 [.250]	5.08 [.200]	1.50 [.059]	14	0.60	1.60	± 0.30	± 3.00	80	LTCC	HPI3F
5.00 - 6.00	10.16 [.400]	5.08 [.200]	1.88 [.074]	25	0.22	1.18	± 0.25	± 3.00	25	PTFE	HUU2F
8.00 - 12.00	6.35 [.250]	5.08 [.200]	1.42 [.056]	18	0.50	1.45	± 0.40	± 6.00	20	PTFE	HPX2F
15.00 - 18.50	4.44 [.175]	4.44 [.175]	0.38 [.015]	18	0.70	1.50	± 0.60	± 10.00	50	Alumina	HN05W03F

** at 85 °C Operating Temperature*

Shading = Optimized for Cellular Applications



HYBRIX® HYBRID COUPLER CROSS REFERENCE CHART

FREQUENCY (GHz)	SIZE (MM)	SIZE (IN)	POWER (W)[1]	HybriX PTFE	HYBRIX3 LTCC	ANAREN
0.048 - 0.084	50.80 x 38.10	2.00 x 1.50	300	HG064M2F		
0.059 - 0.069	14.22 x 8.89	0.56 x 0.35	10		HD064M3F	
0.123 - 0.133	25.40 x 25.40	1.00 x 1.00	300	HE128MF		
	14.22 x 8.89	0.56 x 1.00	10		HD128M3F	
0.293 - 0.303	25.40 x 25.40	1.00 x 1.00	300	HE298MF		
0.380 - 0.520	16.51 x 12.19	0.65 x 0.48	200	HSAF		11303-3
	14.22 x 8.89	0.56 x 0.35	200		HDC3F	
0.400 - 0.500	25.40 x 25.40	1.00 x 1.00	300	HE450MF		
0.410 - 0.480	16.51 x 12.19	0.65 x 0.48	200			XC0450L-03S
	14.22 x 8.89	0.56 x 0.35	45			XC0450A-03S
0.470 - 0.860	34.04 x 17.02	1.34 x 0.67	500	HLB2F		
	16.51 x 12.19	0.65 x 0.48	200	HSBF		1F1304-3
0.620 - 0.900	6.35 x 5.08	0.25 x 0.20	180		HPT3F	X3C07P1-03
0.800 - 1.000	14.22 x 8.89	0.56 x 0.35	200	HDDF	HDD3F	XC0900A-03S
	14.22 x 5.08	0.56 x 0.20	100	HMD2F		XC0900E-03S
	6.35 x 5.08	0.25 x 0.20	200		HPD3TF	X3C09P2-03
	6.35 x 5.08	0.25 x 0.20	80		HPD3F	X3C09P1-03
1.000 - 2.000	14.22 x 8.89	0.56 x 0.35	200	HDE		11305-3S
1.200 - 1.700	14.22 x 8.89	0.56 x 0.35	100			1E1305-3
	6.35 x 5.08	0.25 x 0.20	80		HPG3F	XC1400P-03S
1.700 - 2.000	14.22 x 8.89	0.56 x 0.35	200	HDJ2F		XC1900A-03S
	14.22 x 5.08	0.56 x 0.20	100	HMJ2F	HMJ3F	XC1900E-03S
	6.35 x 5.08	0.25 x 0.20	200		HPJ3TF	X3C19P2-03
	6.35 x 5.08	0.25 x 0.20	100	HPK2F		X3C19P1-03
2.000 - 2.300	25.40 x 12.70	1.00 x 0.50	300		HAL3F	S03B2150N3
	14.22 x 8.89	0.56 x 0.35	200		HDL3F	XC2100A-03S
	14.22 x 5.08	0.56 x 0.20	100	HML2F	HML3F	XC2100E-03S
	6.35 x 5.08	0.25 x 0.20	200		HPL3TF	
	6.35 x 5.08	0.25 x 0.20	100	HPK2F	HPL3F	X3C21P1-03
2.000 - 4.000	14.22 x 8.89	0.56 x 0.35	60			11306-3S
2.100 - 2.400	6.00 x 3.00	0.24 x 0.12	20		HFL3F	
2.300 - 2.700	25.40 x 12.70	1.00 x 0.50	300		HAP3F	
	14.22 x 8.89	0.56 x 0.35	200		HDP3F	XC2500A-03S
	14.22 x 5.08	0.56 x 0.20	80	HMP2F		XC2500E-03S
	6.35 x 5.08	0.25 x 0.20	35	HPP2F		1P603S
2.700 - 3.200	6.35 x 5.08	0.25 x 0.20	50	HPQ2F		
3.000 - 4.500	6.35 x 5.08	0.25 x 0.20	60	HPR2F		XC3500P-03S
3.600 - 6.400	6.35 x 5.08	0.25 x 0.20	50	HPU2F		
5.000 - 6.000	10.16 x 5.08	0.40 x 0.20	25	HUU2F		1M803S
8.000 - 12.000	6.35 x 5.08	0.25 x 0.20	20	HPX2F		

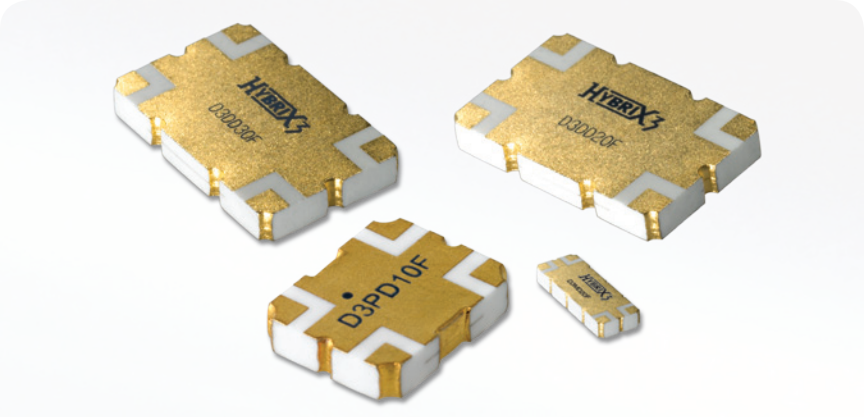
1: Power rating pertains only to HybriX® couplers. Anaren products may not be specified to handle same level of power.

Features

- Frequency Ranges from 180 MHz to 18 GHz.
- Surface Mountable
- Very Small Footprints (6 mm x 3mm Available)
- High Power Handling
- Low Insertion Loss
- Excellent Directivity and VSWR
- Internally Terminated Models Available
- LTCC, Multilayered PTFE, or Alumina Construction
- Non-magnetic Products Available
- RoHS Compliant
- Tape and Reel Packaging

Applications

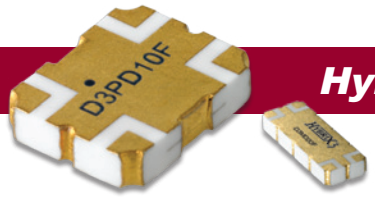
- W-CDMA, UMTS, WiMAX, and LTE Base Stations
- Power Monitors
- Reflectometers
- Hybrid Amplifiers



Florida RF Labs Hybrix® Directional Couplers are made for applications which require high directivity and low insertion loss. They are surface mountable and available in tape and reel packaging. Hybrix® Directional Couplers have a small footprint, low profile, and are RoHS compliant.

Quick Selector Chart

Frequency (MHz)	Applications	Part Number	Power (Watts)	Dimensions (mm)
700 - 1000	LTE-FDD, GSM, Public Safety	D3PVxxF	180	6.35 x 5.08
		D3MDxxF	230	14.22 x 5.08
1200 - 1700	GPS, LTE-FDD	D3DGxxF	200	14.22 x 8.89
1700 - 2300	LTE, PCS, AWS, GSM-1800, UMTS	D3PJxxF	80	6.35 x 5.08
		D3PLxxF	80	6.35 x 5.08
		D3DJxxF	200	14.22 x 8.89
		D3DLxxF	200	14.22 x 8.89
2300 - 2700	WiMAX, LTE-TDD	D3PPxxF	80	6.35 x 5.08
		D3DPxxF	200	14.22 x 8.89
3300 - 3900	WiMAX, LTE	D3PRxxF	80	6.35 x 5.08
		D3DRxxF	200	14.22 x 8.89
5000 - 6000	WiMAX, WLAN	D3FUxxF	20	6.00 x 3.00
15000 - 18500	PTP, Radar, Satellite	DN05W20F	50	4.44 x 4.44



Part Numbering Code - HybriX® Directional - LTCC

D	3	D	L	2 0	F
D = Directional	LTCC	Size See Table 1	Frequency See Table 2	Coupling	RoHS Compliant

Part Numbering Code - HybriX® - Directional PTFE & Alumina

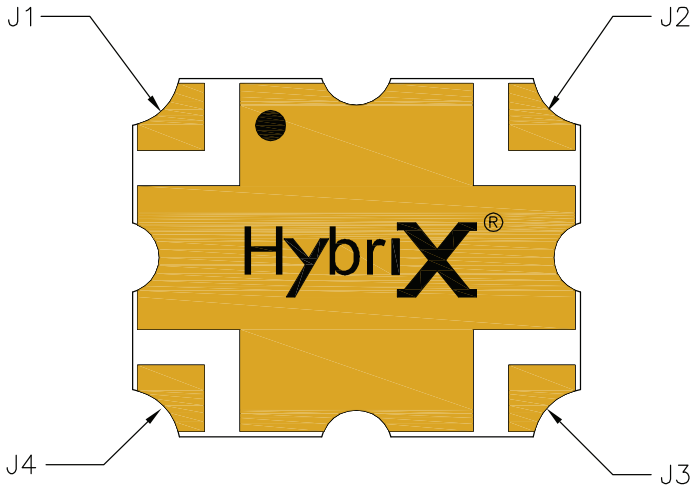
DN	1 5	D	1 0	F
Family See Table 3	Power (x 10 Watt)	Frequency See Table 2	Coupling	RoHS Compliant

Table 1: Size Code		
A	25.40 x 12.70 mm	1.000 x 0.500 in
S	16.51 x 12.19 mm	0.650 x 0.480 in
M	14.22 x 5.08 mm	0.560 x 0.200 in
D	14.22 x 8.89 mm	0.560 x 0.350 in
L	34.04 x 17.02 mm	1.340 x 0.670 in
P	6.35 x 5.08 mm	0.250 x 0.200 in
F	6.00 x 3.00 mm	0.236 x 0.118 in
E	25.40 x 25.40 mm	1.000 x 1.000 in
U	10.16 x 5.08 mm	0.400 x 0.200 in

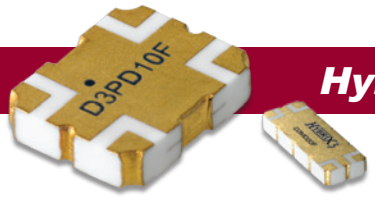
Table 2: Frequency Codes (GHz)			
A	0.15 - 0.25	M	2.0 - 2.5
B	0.47 - 0.86	N	2.0 - 2.7
C	0.38 - 0.52	O	2.4 - 2.8
D	0.81 - 0.96	P	2.3 - 2.7
E	1.0 - 2.0	Q	2.7 - 3.2
F	0.96 - 1.22	R	3.4 - 3.6
G	1.4 - 1.7	S	2.0 - 4.0
H	1.5 - 2.0	T	0.69 - 0.91
I	4.3 - 4.7	U	5.0 - 6.0
J	1.7 - 2.0	V	0.7 - 1.0
K	1.9 - 2.2	W	15.0 - 18.0
L	2.0 - 2.3	Y	18.0 - 27.0

Table 3: Family Codes	
D	Directional, PTFE
DN	Directional, No Internal Termination
DS	Directional, with Internal Termination

Pin Configuration



J1	J2	J3	J4
Input	Outut	Isolated	Coupled
Output	Input	Coupled	Isolated
Isolated	Coupled	Input	Output
Coupled	Isolated	Output	Input



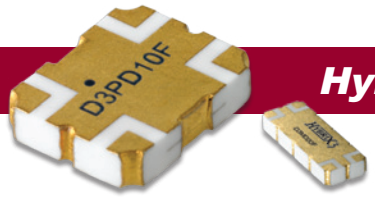
HybriX® Directional Couplers

Product Information

Frequency	L	W	H	Coupling	Directivity	Insertion Loss	VSWR	Average Power*	Core Material	Model Number
GHz	mm [inches]			dB	dB Min	dB Max	Max:1	Watts CW		
.180 - .210	25.40 [1.000]	12.70 [.500]	1.90 [.075]	30 ± 1.0	18.00	0.30	1.20	200	LTCC	D3AA30F
.700 - 1.00	14.22 [.560]	5.08 [.200]	1.90 [.075]	20 ± 1.0	23.00	0.08	1.12	230	LTCC	D3MD20F
.700 - 1.00	14.22 [.560]	8.89 [.350]	0.64 [.025]	20 ± 1.0	16.00	0.25	1.20	150	Alumina	DS15D20
.700 - 1.00	6.35 [.250]	5.08 [.200]	1.50 [.059]	30 ± 1.5	20.00	0.10	1.15	180	LTCC	D3PV30F
.815 - .960	14.22 [.560]	8.89 [.350]	1.90 [.075]	5 ± 0.35	21.00	0.19	1.20	200	LTCC	D3DD05F
.815 - .960	6.35 [.250]	5.08 [.200]	1.60 [.063]	5 ± 0.50	18.00	0.40	1.30	80	LTCC	D3PD05F
.815 - .960	14.22 [.560]	8.89 [.350]	0.64 [.025]	10 ± 0.50	18.00	0.25	1.17	150	Alumina	DS15D10
.815 - .960	6.35 [.250]	5.08 [.200]	1.30 [.051]	10 ± 1.0	15.00	0.30	1.30	80	LTCC	D3PD10F
.815 - .960	14.22 [.560]	8.89 [.350]	1.90 [.075]	20 ± 0.60	23.00	0.15	1.15	200	LTCC	D3DD20F
.815 - .960	14.22 [.560]	8.89 [.350]	1.90 [.075]	30 ± 1.5	18.00	0.20	1.20	200	LTCC	D3DD30F
.815 - .960	6.35 [.250]	5.08 [.200]	1.50 [.059]	20 ± 1.0	20.00	0.30	1.20	80	LTCC	D3PD20F
.960 - 1.00	6.35 [.250]	5.08 [.200]	1.90 [.075]	5 ± 0.40	20.00	0.35	1.20	80	LTCC	D3PF05F
1.00 - 2.00	14.22 [.560]	8.89 [.350]	2.59 [.102]	20 ± 1.50	18.00	0.27	1.20	160	PTFE	D2DE20F
1.20 - 1.70	6.35 [.250]	5.08 [.200]	1.50 [.059]	5 ± 0.40	17.00	0.30	1.20	80	LTCC	D3PG05F
1.20 - 1.70	14.22 [.560]	8.89 [.350]	1.90 [.075]	30 ± 1.5	20.00	0.20	1.20	200	LTCC	D3DG30F
1.70 - 2.00	14.22 [.560]	8.89 [.350]	1.90 [.075]	10 ± 0.60	23.00	0.15	1.15	200	LTCC	D3DJ10F
1.70 - 2.00	6.35 [.250]	5.08 [.200]	1.00 [.039]	10 ± 1.0	20.00	0.20	1.20	80	LTCC	D3PJ10F
1.70 - 2.00	14.22 [.560]	8.89 [.350]	1.90 [.075]	20 ± 0.60	23.00	0.15	1.15	200	LTCC	D3DJ20F
1.70 - 2.00	6.35 [.250]	5.08 [.200]	1.00 [.039]	20 ± 0.60	18.00	0.20	1.20	80	LTCC	D3PJ20F
2.00 - 2.30	14.22 [.560]	8.89 [.350]	1.90 [.075]	5 ± 0.20	21.00	0.15	1.20	200	LTCC	D3DL05F
2.00 - 2.30	6.35 [.250]	5.08 [.200]	1.50 [.059]	5 ± 0.30	21.00	0.15	1.22	200	LTCC	D3PL05F
2.00 - 2.30	14.22 [.560]	8.89 [.350]	1.90 [.075]	10 ± 0.60	23.00	0.15	1.15	200	LTCC	D3DL10F
2.00 - 2.30	6.35 [.250]	5.08 [.200]	1.00 [.039]	10 ± 1.0	20.00	0.20	1.20	80	LTCC	D3PL10F
2.00 - 2.30	14.22 [.560]	8.89 [.350]	1.90 [.075]	20 ± 1.0	23.00	0.15	1.15	200	LTCC	D3DL20F
2.00 - 2.30	6.35 [.250]	5.08 [.200]	1.00 [.039]	20 ± 1.0	18.00	0.20	1.20	80	LTCC	D3PL20F
2.00 - 2.30	14.22 [.560]	8.89 [.350]	2.00 [.079]	30 ± 1.5	20.00	0.20	1.20	200	LTCC	D3DL30F
2.10 - 2.40	6.00 [.236]	3.00 [.118]	1.00 [.039]	10 ± 0.80	20.00	0.50	1.20	20	LTCC	D3FL10F
2.30 - 2.70	14.22 [.560]	8.89 [.350]	1.90 [.075]	5 ± 0.25	20.00	0.15	1.20	200	LTCC	D3DP05F
2.30 - 2.70	14.22 [.560]	8.89 [.350]	1.90 [.075]	10 ± 1.0	20.00	0.20	1.20	200	LTCC	D3DP10F
2.30 - 2.70	6.35 [.250]	5.08 [.200]	1.00 [.039]	20 ± 1.0	20.00	0.20	1.20	80	LTCC	D3PP20F
2.30 - 2.70	14.22 [.560]	8.89 [.350]	2.00 [.079]	30 ± 1.5	18.00	0.20	1.20	200	LTCC	D3DP30F
2.30 - 2.70	6.35 [.250]	5.08 [.200]	1.00 [.039]	30 ± 1.0	18.00	0.20	1.20	80	LTCC	D3PP30F
2.40 - 2.80	14.22 [.560]	5.08 [.200]	1.90 [.075]	10 ± 1.0	20.00	0.20	1.20	100	LTCC	D3MO10F
2.40 - 2.80	6.35 [.250]	5.08 [.200]	1.00 [.039]	10 ± 1.0	20.00	0.20	1.20	80	LTCC	D3PO10F
3.40 - 3.60	14.22 [.560]	8.89 [.350]	1.90 [.075]	5 ± 0.25	20.00	0.15	1.15	200	LTCC	D3DR05F
3.40 - 3.60	6.35 [.250]	5.08 [.200]	1.00 [.039]	10 ± 1.0	18.00	0.20	1.20	80	LTCC	D3PR10F
3.40 - 3.60	6.35 [.250]	5.08 [.200]	1.00 [.039]	20 ± 1.0	20.00	0.22	1.20	80	LTCC	D3PR20F
5.00 - 6.00	6.00 [.236]	3.00 [.118]	1.00 [.039]	20 ± 0.75	14.00	0.50	1.40	20	LTCC	D3FU20F
15.00 - 18.50	4.44 [.175]	4.44 [.175]	0.38 [.015]	20 ± 1.5	12.00	0.60	1.60	50	Alumina	DN05W20F

** at 85 ºC Operating Temperature*

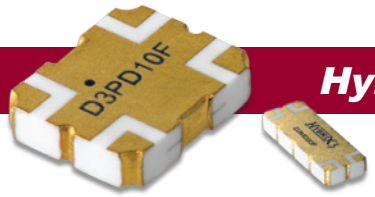
Shading = Optimized for Cellular Applications



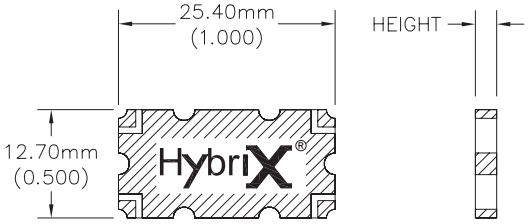
HYBRIX® DIRECTIONAL COUPLER CROSS REFERENCE CHART

FREQUENCY (GHz)	SIZE (MM)	SIZE (IN)	POWER (W)[1]	HYBRIX3 LTCC[2]	ANAREN
0.180 - 0.210	25.40 x 12.70	1.00 x 0.50	200	D3AAxxF	11302-xx
0.225 - 0.400	25.40 x 25.40	1.00 x 1.00	250		
	16.51 x 12.19	0.65 x 0.48	125		
0.700 - 1.000	14.22 x 5.08	0.56 x 0.20	230	D3MDxxF	X3C09E2-xx
	6.35 x 5.08	0.25 x 0.20	225	D3PVxxF	X3C09P2-xx
0.815 - 0.960	14.22 x 8.89	0.56 x 0.35	200	D3DDxxF	XC0900A-xxS
	6.35 x 5.08	0.25 x 0.20	80	D3PDxxF	XC0900P-xxS
1.000 - 2.000	14.22 x 8.89	0.56 x 0.35	60		11305-xx
	14.22 x 8.89	0.56 x 0.35	160		XC1500A-xxS
1.200 - 1.700	14.22 x 8.89	0.56 x 0.35	200	D3DGxxF	
	14.22 x 5.08	0.56 x 0.20	100	D3MGxxF	
	6.35 x 5.08	0.25 x 0.20	80	D3PGxxF	
1.700 - 2.000	14.22 x 8.89	0.56 x 0.35	200	D3DJxxF	XC1900A-xxS
	14.22 x 5.08	0.56 x 0.20	100	D3MJxxF	XC1900E-xxS
					X3C19E2-xx
	6.35 x 5.08	0.25 x 0.20	80	D3PJxxF	X3C19P1-xx
					1P5xxS
2.000 - 2.300	14.22 x 8.89	0.56 x 0.35	200	D3DLxxF	XC2100A-xxS
	14.22 x 5.08	0.56 x 0.20	165		XC2100E-xxS
	6.35 x 5.08	0.25 x 0.20	80	D3PLxxF	JP5xxS
2.000 - 3.000	25.40 x 12.70	1.00 x 0.50	450		
2.300 - 2.700	14.22 x 8.89	0.56 x 0.35	200	D3DPxxF	
	14.22 x 5.08	0.56 x 0.20	145		XC2500E-xxS
	6.35 x 5.08	0.25 x 0.20	80	D3PPxxF	1P6xxS
3.400 - 3.600	14.22 x 8.89	0.56 x 0.35	200	D3DRxxF	1A1307-xx
	10.16 x 5.08	0.40 x 0.20	80		XC3500M-xxS
	6.35 x 5.08	0.25 x 0.20	80	D3PRxxF	XC3500P-xxS
4.300 - 4.700	6.35 x 5.08	0.25 x 0.20	80	D3PIxxF	
5.000 - 6.000	6.00 x 3.00	0.24 x 0.12	20	D3FUxxF	
	10.16 x 5.08	0.40 x 0.20	15		1M8xxS

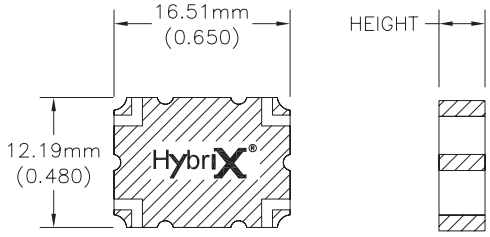
1: Power rating pertains only to HybriX® couplers. Anaren products may not be specified to handle same level of power.
2: xx = coupling value. Typical coupling values for Hybrix® directional couplers are 5, 10, 20, and 30 dB.



A Size



S Size



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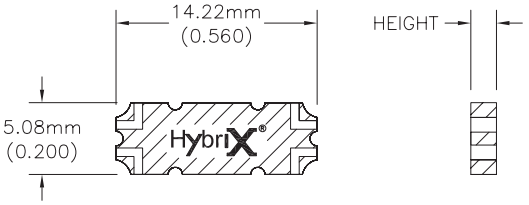
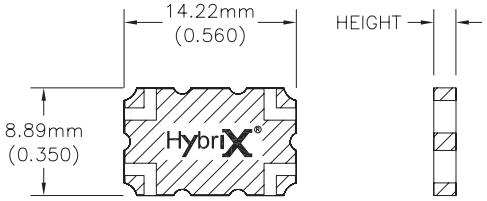


D Size



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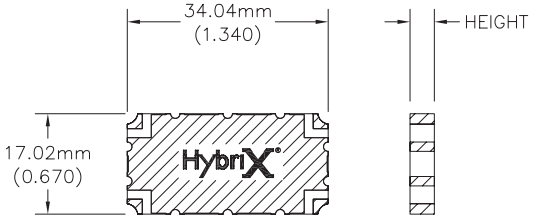

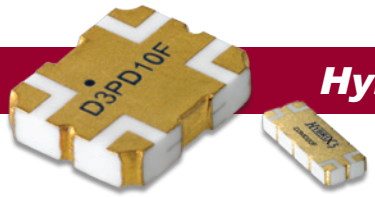

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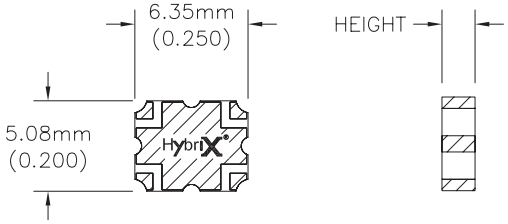
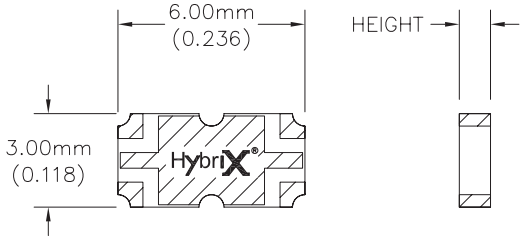
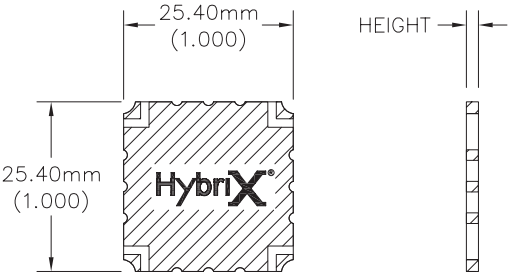


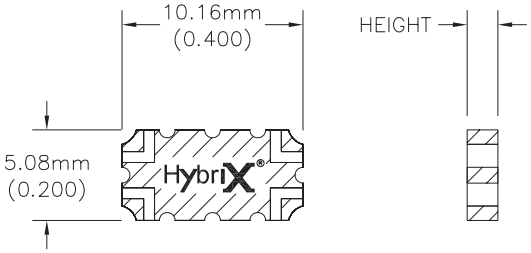
F Size



E Size

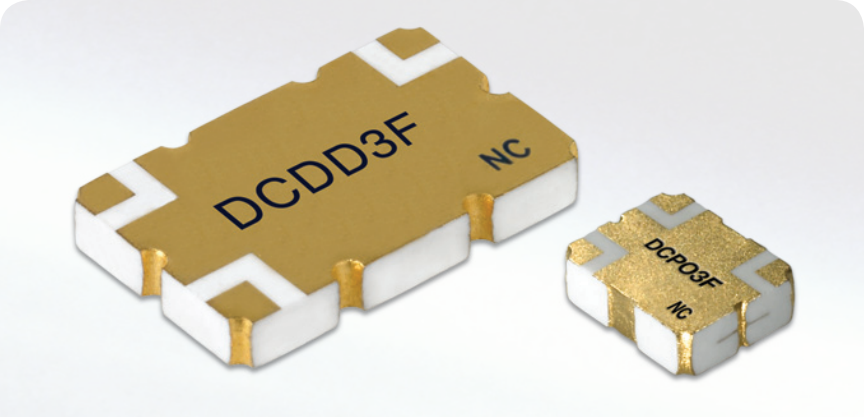


U Size



Features

- Products available for 3G and 4G bands
- Surface Mountable
- Very Small Footprints
- High Power Handling
- Low Insertion Loss
- LTCC or Alumina Construction
- RoHS Compliant
- Tape and Reel Packaging



Applications

- Doherty Amplifiers
- High Peak-Average Ratio 3G/4G Systems
- Impedance Transformer

Our Doherty Combiners offer high performance in a surface mount package. These low-profile Doherty Combiners handle up to 200 watt of CW power and provide a size reduction compared to Microstrip PCB solutions while maintaining low insertion loss and excellent amplitude balance.

Table 1: Frequency Codes (GHz)			
A	0.15 - 0.25	M	2.0 - 2.5
B	0.47 - 0.86	N	2.0 - 2.7
C	0.38 - 0.52	O	2.4 - 2.8
D	0.81 - 0.96	P	2.3 - 2.7
E	1.0 - 2.0	Q	2.7 - 3.2
F	0.96 - 1.22	R	3.4 - 3.6
G	1.4 - 1.7	S	2.0 - 4.0
H	1.5 - 2.0	T	0.69 - 0.91
I	4.3 - 4.7	U	5.0 - 6.0
J	1.7 - 2.0	V	0.7 - 1.0
K	1.9 - 2.2	W	15.0 - 18.0
L	2.0 - 2.3	Y	18.0 - 27.0

Part Numbering Code

D C	D	T	3	F
SERIES Doherty Combiner	SIZE D = 14.22 x 8.89 (0.56 x 0.35) P = 6.35 x 5.08 (0.25 x 0.20)	FREQUENCY See Table 1	SUBSTRATE MATERIAL 1 = Alumina 3 = LTCC	RoHS Compliant

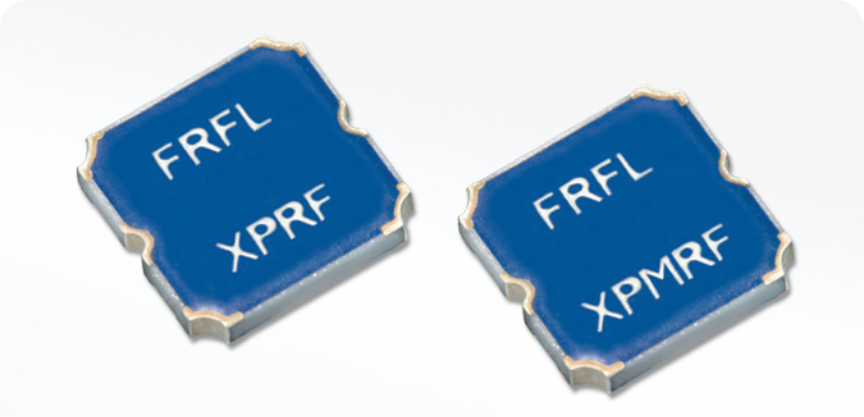
Product Information Table

Frequency	L	W	H	Insertion Loss	Amplitude Balance	VSWR	Average Power*	Core Material	Model Number
GHz	mm [inches]			dB Max	dB Max	Max:1	Watts CW		
.690 - .815	14.22 [.560]	8.89 [.350]	1.90 [.075]	0.20	± 0.30	1.22	200	LTCC	DCDT3F
.815 - .960	14.22 [.560]	8.89 [.350]	1.90 [.075]	0.20	± 0.30	1.22	200	LTCC	DCDD3F
1.800 - 2.300	14.22 [.560]	8.89 [.350]	1.90 [.075]	0.20	± 0.30	1.22	200	LTCC	DCDK3F
2.400 - 2.800	6.35 [.250]	5.08 [.200]	1.50 [.059]	0.20	± 0.30	1.22	200	LTCC	DCPO3F

* *at 85 ºC Operating Temperature*

Features

- Excellent Wideband Performance
- Surface Mountable
- Very Low Insertion Loss
- High Power Handling
- High Isolation
- Alumina Construction
- RoHS Compliant
- Tape and Reel Packaging

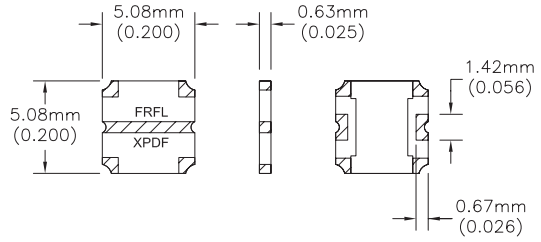


Applications

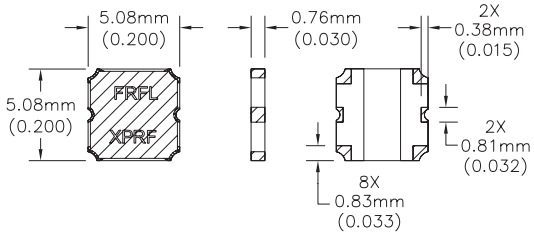
- RF / DC Paths Crossing
- RF / RF Paths Crossing

A surface-mount crossover is used when a RF signal must cross a DC line or another RF transmission line. The device provides an easy-to-implement and cost-efficient alternative to RF coaxial cables and multilayer boards. Florida RF Labs' SMT crossovers are packaged in tape and reel and ready for pick-and-place assembly.

XPDF



XPRF



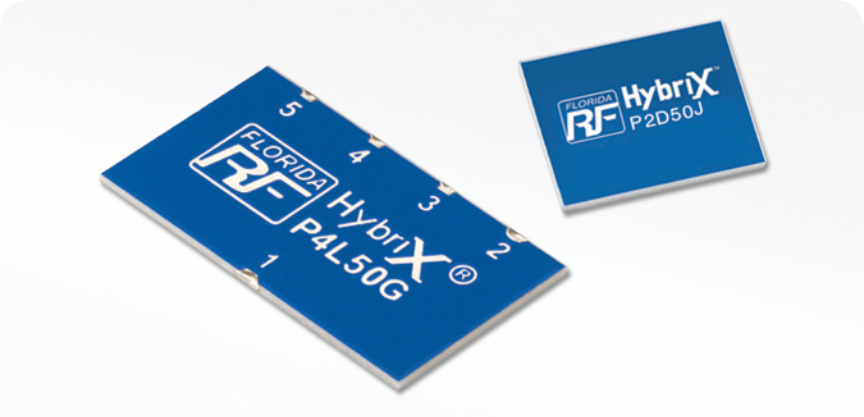
Product Information Table

Frequency	L		W		H		Crossover Type	Insertion Loss	Isolation	VSWR	Average Power*	Material	Model Number
GHz	mm [inches]							dB Max	dB Min	Max:1	Watts CW		
DC - 4 GHz	5.08	[.200]	5.08	[.200]	.64	[.025]	RF - DC	0.05	N/A	1.10	30	Alumina	XPDF
DC - 7 GHz	5.08	[.200]	5.08	[.200]	.64	[.025]	RF - RF	0.05	40	1.10	200	Alumina	XPRF
DC - 7 GHz	5.08	[.200]	5.08	[.200]	.64	[.025]	RF - RF	0.05	40	1.10	200	Alumina	XPMRF

** at 85 ºC Operating Temperature*

Features

- Products available for 3G and 4G bands
- Surface Mountable
- Small Footprints
- High Power Handling
- Low Insertion Loss
- Excellent Isolation and Low VSWR
- Alumina Construction
- RoHS Compliant
- Tape and Reel Packaging



Applications

- LTE, AWS, UMTS, GSM, and PCS Base Stations
- Broadcast
- Antenna Feed Network
- Modulators
- Signal Distribution Nodes
- Combiners and Splitters

Florida RF Labs® Wilkinson Power Dividers are high power in-phase devices capable of combining and dividing 2-, 3-, and 4-way signals. The devices provide excellent isolation and low VSWR in a small surface-mount package. Products are available for 3G and 4G wireless systems.

Table 1: Frequency Codes (GHz)

A	0.15 - 0.25	L	2.0 - 2.3
B	0.47 - 0.86	M	2.0 - 2.5
C	0.38 - 0.52	N	2.0 - 2.7
D	0.81 - 0.96	O	2.4 - 2.8
E	1.0 - 2.0	P	2.3 - 2.7
F	0.96 - 1.22	Q	2.7 - 3.2
G	1.4 - 1.7	R	3.4 - 3.6
H	1.5 - 2.0	S	2.0 - 4.0
I	4.3 - 4.7	T	0.69 - 0.91
J	1.7 - 2.0	U	5.0 - 6.0
K	1.9 - 2.2	V	0.7 - 1.0

Part Numbering Code

P — SERIES: P = Power Divider

3 — DIVISION: 2 = 2-way, 3 = 3-way, 4 = 4-way

S — SIZE: D = 14.22 x 8.89 (0.560 x 0.350); S = 16.51 x 12.20 (0.650 x 0.480); L = 22.10 x 12.19 (0.870 x 0.480)

3 5 — POWER (Watts)

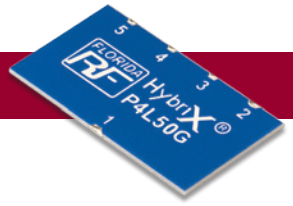
J — FREQUENCY: See Table 1

Note: All catalog number combinations may not be available. Check with our Sales department before ordering.

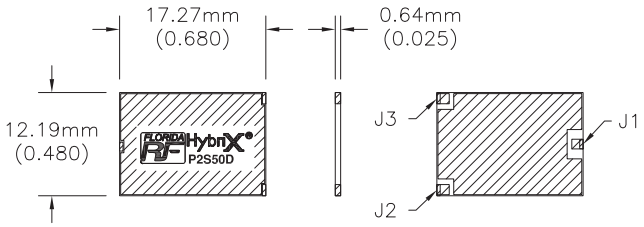
Product Information Table

Division	Frequency	L	W	H	Isolation	Insertion Loss	Input VSWR	Output VSWR	Phase Balance	Average Power*	Model Number
	GHz	mm [inches]			dB Min	dB Max	Max:1	Max:1	deg Max	Watts CW	
2	0.80 - 1.00	16.51 [.650]	12.19 [.480]	0.64 [.025]	16.00	0.30	1.40	1.30	± 2.00	50	P2S50D
2	1.70 - 2.00	14.22 [.560]	8.89 [.350]	0.64 [.025]	20.00	0.30	1.40	1.30	± 2.00	50	P2D50J
3	1.70 - 2.00	16.51 [.650]	12.19 [.480]	0.64 [.025]	19.00	0.30	1.40	1.40	± 7.00	35	P3S35J
3	2.00 - 2.40	16.51 [.650]	12.19 [.480]	0.64 [.025]	16.00	0.30	1.40	1.50	± 8.00	35	P3S35L
4	1.30 - 2.00	22.86 [.900]	12.19 [.480]	0.51 [.020]	13.00	0.70	1.25	1.20	± 7.00	50	P4L50G

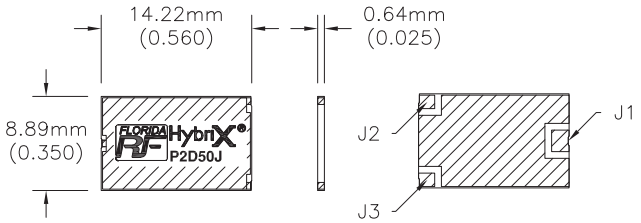
** at 85 °C Operating Temperature*



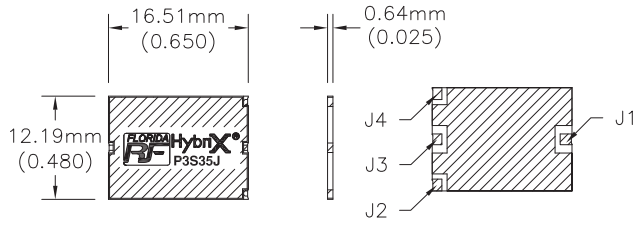
P2S50D



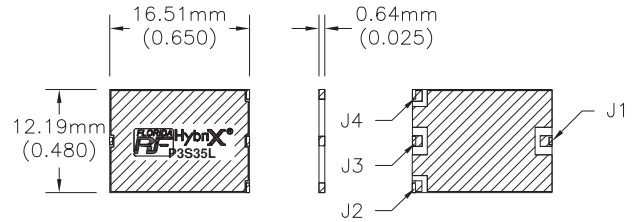
P2D50J



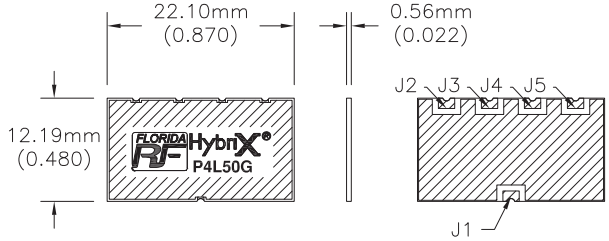
P3S35J



P3S35L

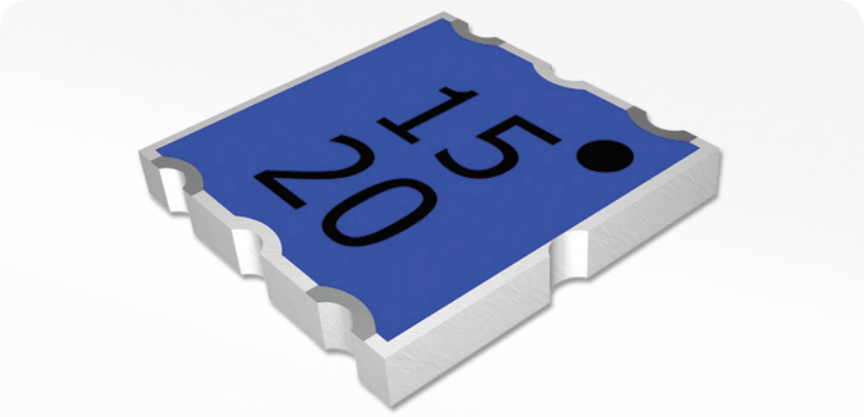


P4L50G



Features

- Excellent Wideband Performance
- Surface Mountable
- Wide Sampling Output Range
- Optional Built-in Output Attenuator
- High Power Handling
- Alumina Construction
- RoHS Compliant
- Tape and Reel Packaging



Applications

- Base Stations
- Instrumentation
- Power Monitors
- Switch Network
- Antenna Feed

Florida RF Labs offers high-performance power samplers in a low-profile surface mount package. Also known as resistive couplers and power tap-off, these devices are an easy-to-implement power sampling solution. Compared to on-board tap-off circuits utilizing discrete resistors, the power samplers offer many advantages including compact footprint, repeatable performance, and reduced BOM.

Part Numbering Code

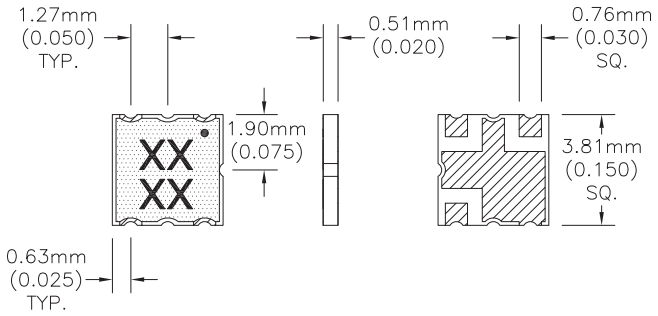
S X U X X X X 3 F

OUTPUT ATTENUATION
00 = None
15 = 1.5 dB
20 = 2.0 dB

SAMPLING OUTPUT
10 = -10 dB
20 = -20 dB
30 = -30 dB

ROHS Compliance

Mechanical Outlines



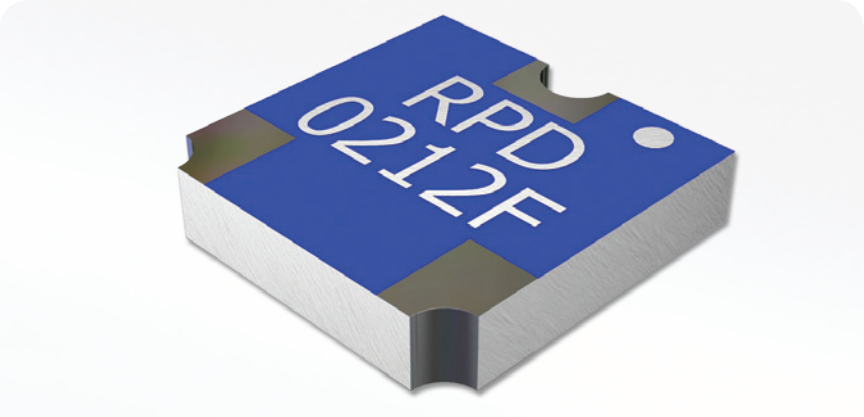
Product Information Table

Frequency	L	W	H	Sampling Output	Output Attenuation	VSWR	Power Handling*	Model Number
GHz	mm [inches]			dB	dB	Typical:1	Watts CW	
DC - 4 GHz	3.81 [.150]	3.81 [.150]	.51 [.020]	-20	0	1.3	50	SXU00203F
DC - 4 GHz	3.81 [.150]	3.81 [.150]	.51 [.020]	-30	0	1.3	50	SXU00303F
DC - 4 GHz	3.81 [.150]	3.81 [.150]	.51 [.020]	-20	1.5	1.3	2	SXU15203F
DC - 4 GHz	3.81 [.150]	3.81 [.150]	.51 [.020]	-30	1.5	1.3	2	SXU15303F

* *at 85 °C Operating Temperature*

Features

- Excellent Wideband Performance
- Surface Mountable
- Power Division up to 12 Ways
- Highly Repeatable Performance
- High Thermal Performance
- Robust Construction
- RoHS Compliant
- Tape and Reel Packaging



Applications

- Base Stations
- Instrumentation
- BITE
- Power Monitors
- Antenna Feed

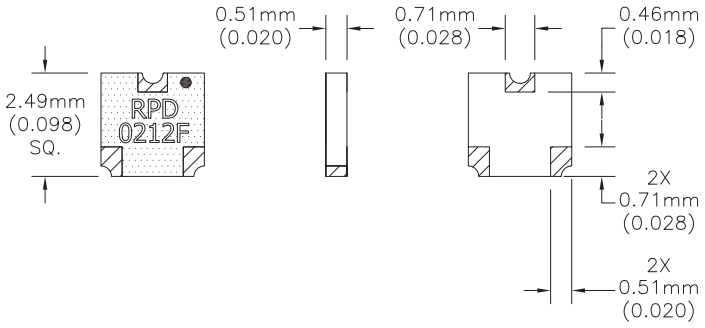
Florida RF Labs' Resistive Power Dividers provides a repeatable power dividing solution and simplifies thermal management compared to on-board design using discrete resistors. Power division up to 12 ways is available. These devices feature a robust construction on alumina substrate and are compatible with pick-and-place assembly.

Part Numbering Code

R P D X X X X F

- X X: NO. OF DIVISION
  - 02 = 2-way
  - 04 = 4-way
  - 08 = 8-way
- X X: FREQUENCY RANGE
  - 12 = DC-12 GHz
- F: ROHS Compliance

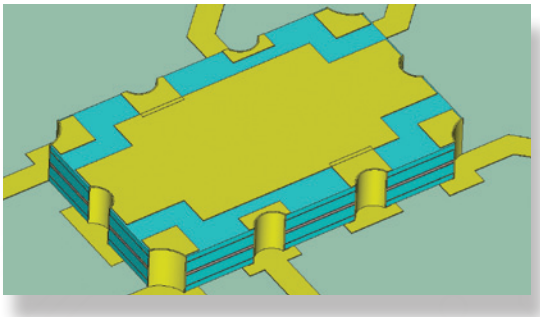
Mechanical Outlines



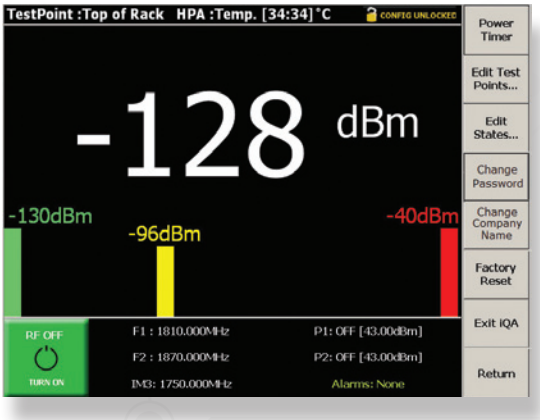
Product Information Table

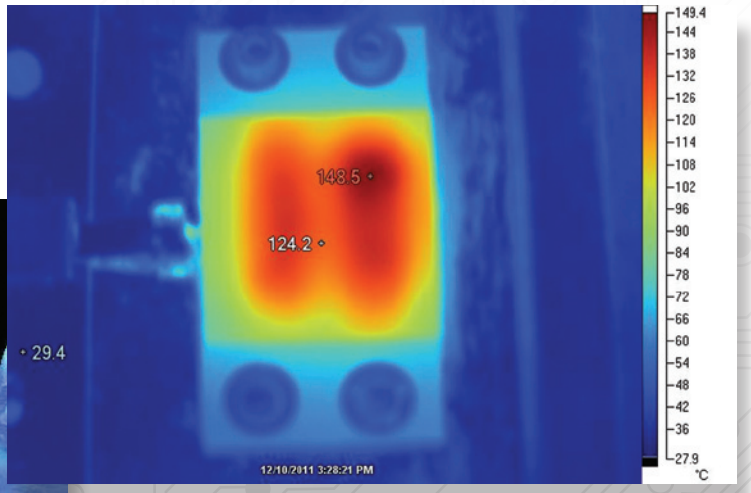
Frequency	L	W	H	No. of Division	Nominal Output	VSWR	Power Handling*	Model Number
GHz	mm [inches]				dB	Typical:1	Watts CW	
DC – 12 GHz	2.49 [.098]	2.49 [.098]	.51 [.020]	2	-6	1.3	1	RPD0212F
DC – 12 GHz	2.49 [.098]	2.49 [.098]	.51 [.020]	4	-12	1.3	1	RPD0412F

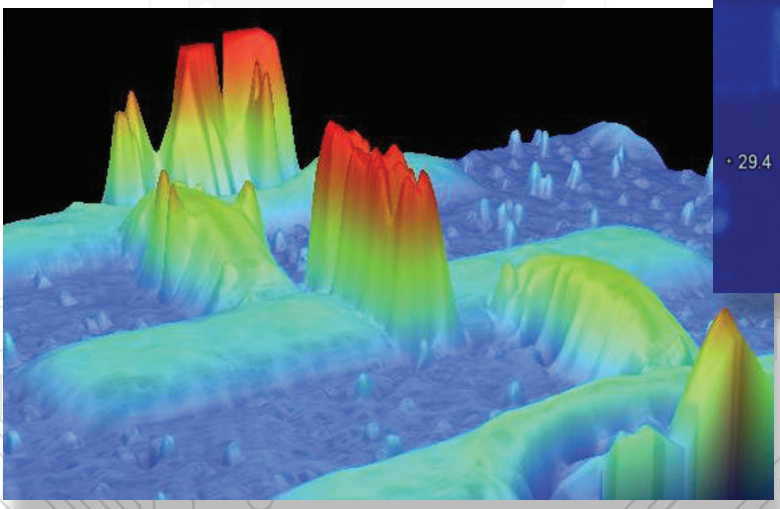
* *at 85 ºC Operating Temperature*



EMC Technology and Florida RF Labs have over 75 years of combined solution based sales and engineering. From the companies inceptions we have been solving customer's problems with innovative products. The many patents and protected IP have driven our company to the head of the global market place. Innovations like the Thermopad®, Diamond Rf™ and HybriX® product lines are a few examples of our successes. In the following pages are new and innovative products that address today's cutting edge market needs. In listening to our customers we continue to strive for smaller package size, better performance, reduce component count, market specific products and create more cost effective solutions. Please contact us if you have a special issue that requires an engineered solution.

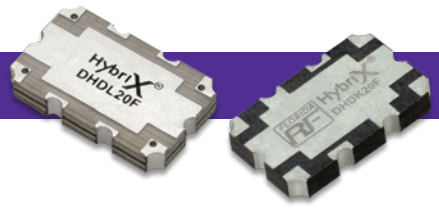






Quick Selector Chart

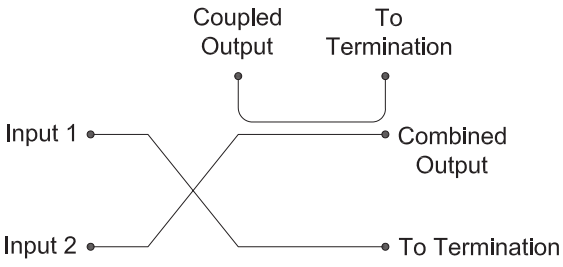
Series	Page
Doupler	94
Low PIM	96
Non-magnetic	98



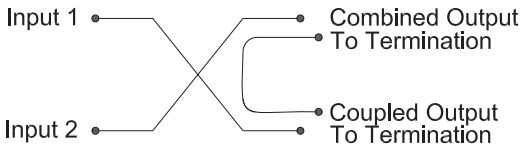
The **DOUPLER™** Combines & Samples in a Single Package with Half the Loss!

This innovative component integrates a hybrid coupler and directional coupler in one simple SMT package. The Doupler™ contains a directional coupler in parallel with the hybrid combiner. This unique design reduces insertion loss by half and saves valuable PCB space compared to the conventional approach, in which hybrid coupler and directional coupler are cascaded in the transmission path.

The Doupler™ is constructed with the latest advanced PTFE materials which ensure high mechanical integrity and compatibility with all common PCB materials.

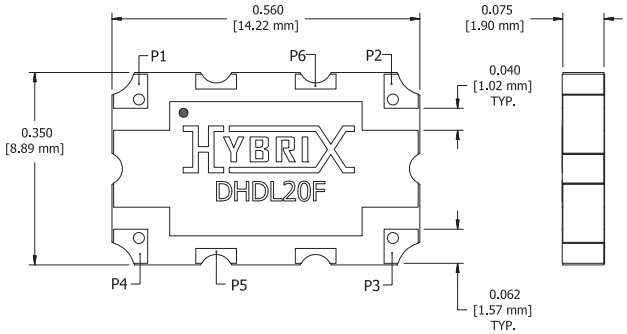


Previous Implementation

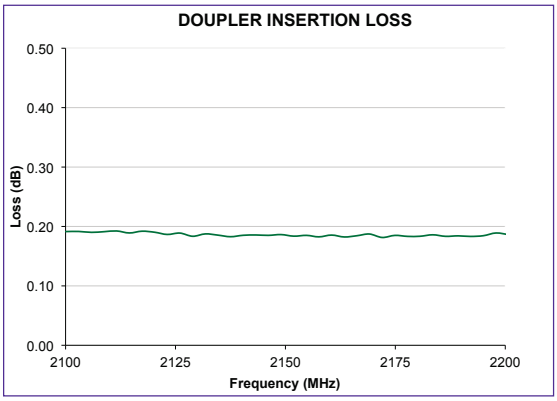


Doupler™ Implementation

MECHANICAL OUTLINE



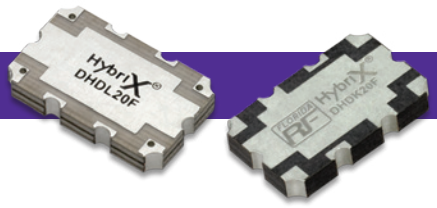
DOUPLER INSERTION LOSS



TYPICAL IN-BAND PERFORMANCE				
Insertion Loss	**Power Handling**	**Amplitude Balance**	**Directivity**	**VSWR**
0.20 dB	200 W	± 0.15 dB	20 dB	1.25:1

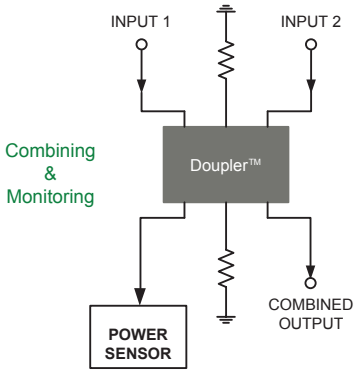
Doupler™ Part Number	Frequency	Architecture	
		Power Combining	Power Monitoring
DHDK20F	1800 - 2000 MHz	3-dB Hybrid	20-dB Directional
DHDD30F	925 - 960 MHz	3-dB Hybrid	30-dB Directional
DHDT30F	869 - 894 MHz	3-dB Hybrid	30-dB Directional
DHDV30F	700 - 800 MHz	3-dB Hybrid	30-dB Directional
DDDP30F	2500 - 2700 MHz	Doherty Combiner	30-dB Directional

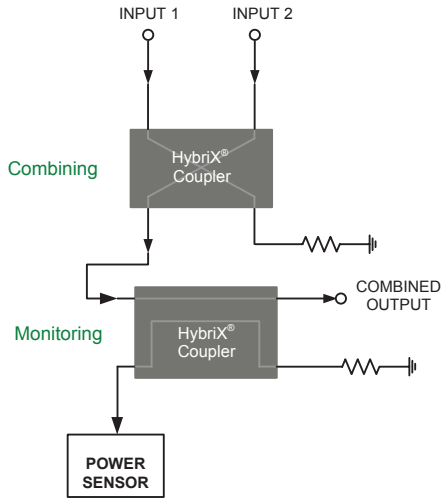
Doupler™ Part Number	Frequency	Architecture	
		Power Combining	Power Monitoring
DDDP20F	2500 - 2700 MHz	Doherty Combiner	20-dB Directional
DDDL30F	2110 - 2170 MHz	Doherty Combiner	30-dB Directional
DDDL20F	1805 - 1880 MHz	Doherty Combiner	20-dB Directional
DDDV30F	700 - 800 MHz	Doherty Combiner	30-dB Directional



There is a **DOUPLER™** for Every Wireless Platform

The Doupler is an ideal component for streamlined power amplifiers, base station radios, remote radio heads, tower-mount boosters, and front end modules



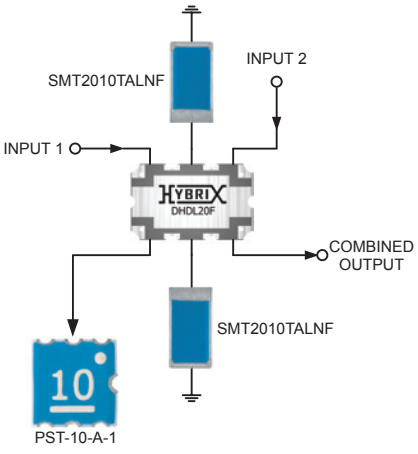


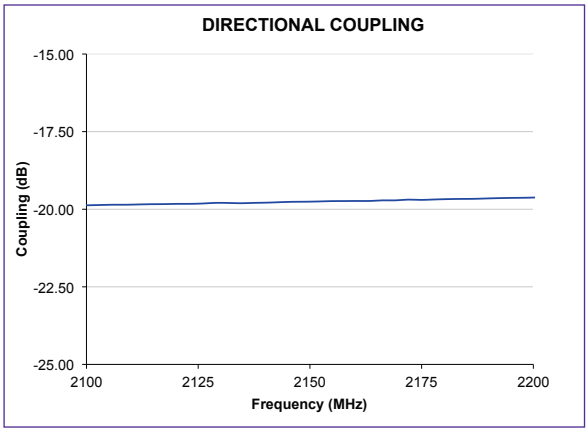
Advantages:

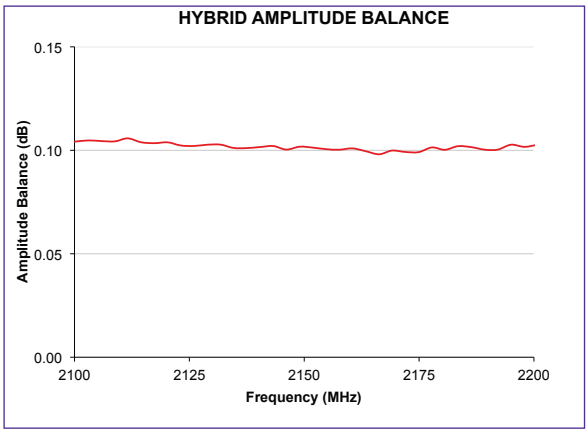
- Half the insertion loss
- Save valuable PCB space
- Single chip; eliminates impedance mismatch
- Streamlined PCB layout and simplified thermal management
- Reduce component count in BOM

Limitations:

- Higher insertion loss
- Consume more valuable PCB space
- Impedance matching issues due to multiple components
- Complex PCB layout and thermal management





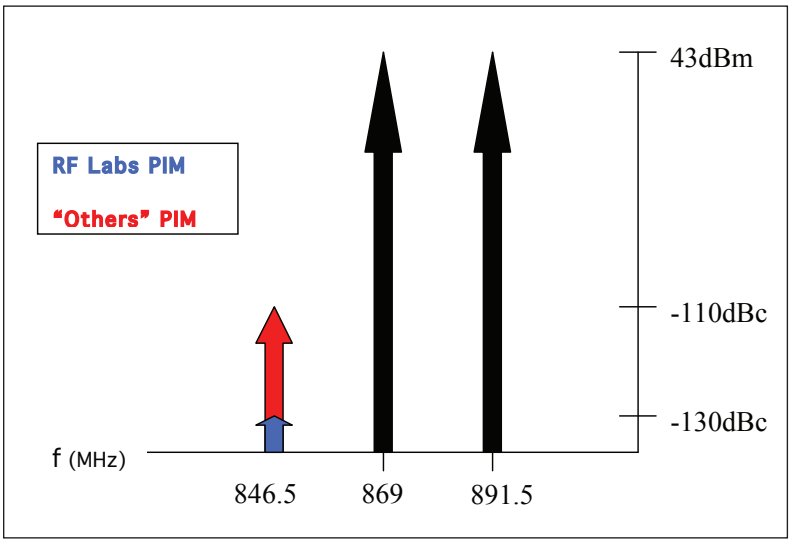


Typical 2.1 GHz 200 W Doupler Implementation

- Low-loss, space-saving benefits of Doupler
- Compact high-performance resistive products
- Completely passive power sensing solution

The **ONLY LOW PASSIVE INTERMODULATION**

Resistive Solutions in the World



PIM matters! High PIM results in:

- Desensitized receivers
- Reduced cell capacity
- Increased inter-cell interference
- More equipment → Higher CAPEX

Florida RF Labs' Low PIM solution:

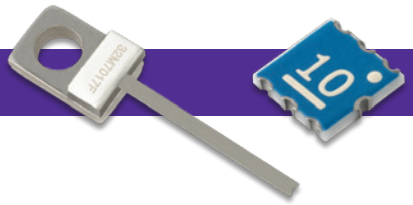
- Low PIM terminations (as low as -130dBc)
- Internally tuned for excellent VSWR
- 100% PIM tested
- Drop-in replacement for common footprints
- Integrated copper heat sink
- High power handling
- Proven performance in real-world applications
- >10 dBc better than competitors' parts

Applications:

- 3G/4G Power Amplifiers
- Filters and Combiners
- Duplexers and Multiplexers
- Tower Mounted Antennas and Electronics
- Linearizing Networks
- Isolators and Circulators

FLORIDA RF LABS LOW PIM TERMINATIONS							
Part Number	Power (W)	Frequency	PIM (dBc) NOTE	VSWR (x:1)	Footprint mm	Configuration	Chip Material
32P7037F	250	DC – 2.7 GHz	-115.5	1.30	24.77 x 9.53	Flange Mount	AlN
32P7196F	60	DC – 2.0 GHz	-127.0	1.25	22.10 x 9.53	Flange Mount	AlN
32P7197F	110	DC – 2.5 GHz	-127.0	1.20	22.10 x 9.53	Flange Mount	AlN
32P7198F	150	DC – 2.3 GHz	-123.0	1.20	22.10 x 9.53	Flange Mount	AlN
32P7201F	150	DC – 2.2 GHz	-123.0	1.25	22.10 x 9.53	Flange Mount	AlN

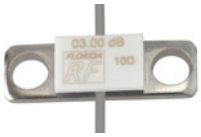
NOTE - With 2 x 43 dBm input



NON-MAGNETIC, HIGH POWER RESISTIVE COMPONENTS FOR MRI MARKET

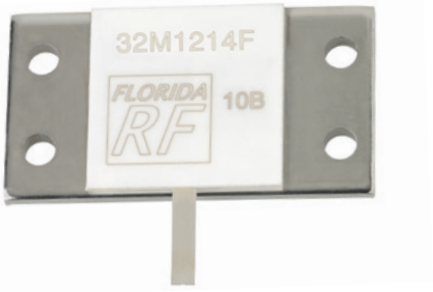
5 W

10 W



100 W

250 W



1000 W

Resistors, Terminations & Attenuators

- For applications with higher average power requirements
- If it's in our catalog, we can make it non-magnetic

Ordering Information

3	1	M	1	0 0 1	0 5 0	F
STYLE	TYPE	PLATING OPTION	SUBSTRATE MATERIAL	DESCRIPTIONS	VALUE	RoHS
3 = High Power Flange 8 = Chip/Power Pack	1 = Resistor 2 = Termination 3 = Attenuator	M = Non-magnetic	1 = BeO (Berylium Oxide) 7 = AlN (Aluminum Nitride)	Random Numbers	Blank = Termination XXX = Resistor (ohms) XX.XX = Attenuator (dB)	Compliant

Smart Detector

- Power sensing termination designed to measure true RMS power with built in temperature compensation
- Replaces active diode detectors

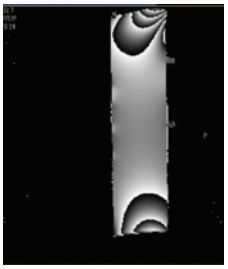
PST-10-M-1F Specifications	
Frequency Range	DC- 6 GHz
Output Slope	400 mV/W
Max Input Power	1 Watt
VSWR	1.25:1
Operating Temperature	-55 deg. C to + 125 deg. C
Substrate	Alumina

NON-MAGNETIC, SIGNAL DISTRIBUTION PRODUCTS FOR MRI MARKET

100% Tested for Magnetism - RoHS compliant

Couplers

- Available in a low profile, SMD package for applications at 1.5T, 3T, 7T and 9.4T
- Excellent repeatability
- Reduced size over lumped elements design
- No tuning required
- Improve system reliability
- Excellent amplitude balance
- Available for transmit and receive circuits
- Excellent peak power



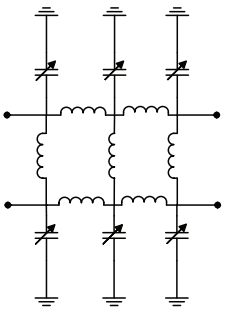
3T Phantom no signature

Same Phantom magnetic signature

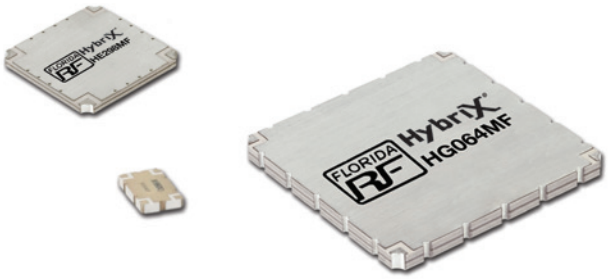
HybriX® Couplers

Part Number	Frequency [MHz]	Power Rating [watts]	Amplitude Balance [+/-dB max]	Insertion loss [dB Max]	Size [in]
HG064M2F	60-68	300	0.25	0.20	2.000 x 1.500
HD064M3F	59-69	10	0.10	1.00	0.560 x 0.350
HE128MF	123-133	300	0.10	0.23	1.000 x 1.000
HD128M3F	123-133	10	0.20	0.80	0.560 x 0.350
HE298MF	293-303	300	0.10	0.17	1.000 x 1.000
HE450M2F	400-500	300	0.40	0.20	1.000 x 1.000

Conventional Lumped Element Approach



Surface-Mount Non-Magnetic Couplers



Get rid of caps & coils!

Crossovers

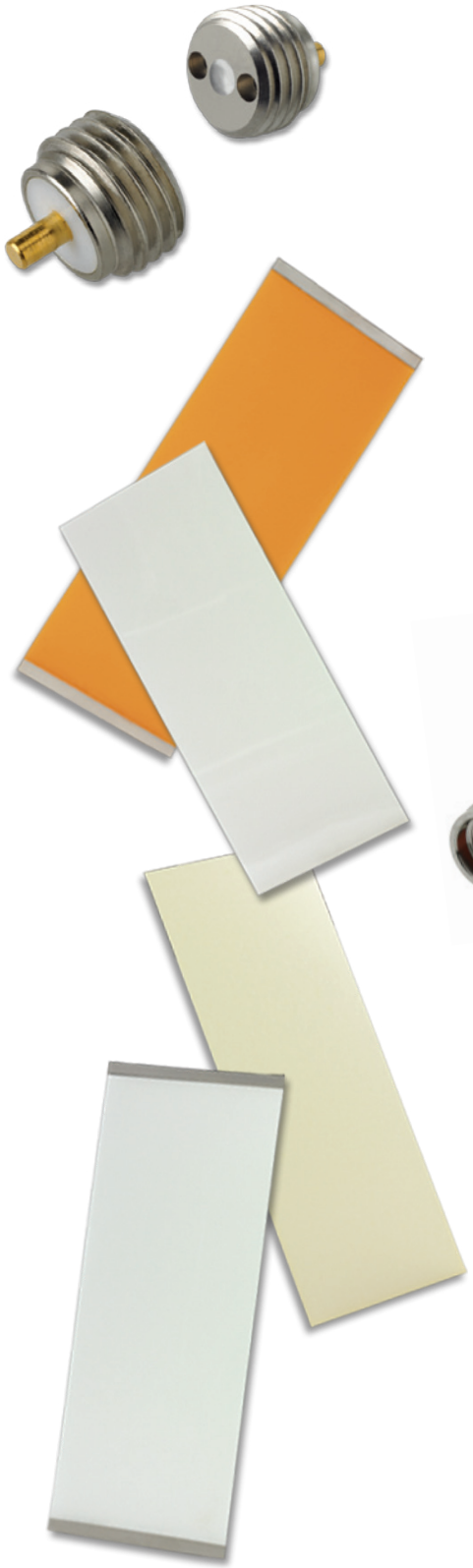
Used as bridges to connect circuit traces that must jump over another:

- Eliminate jumpers and multilayer boards
- Reduce system complexity
- High Isolation

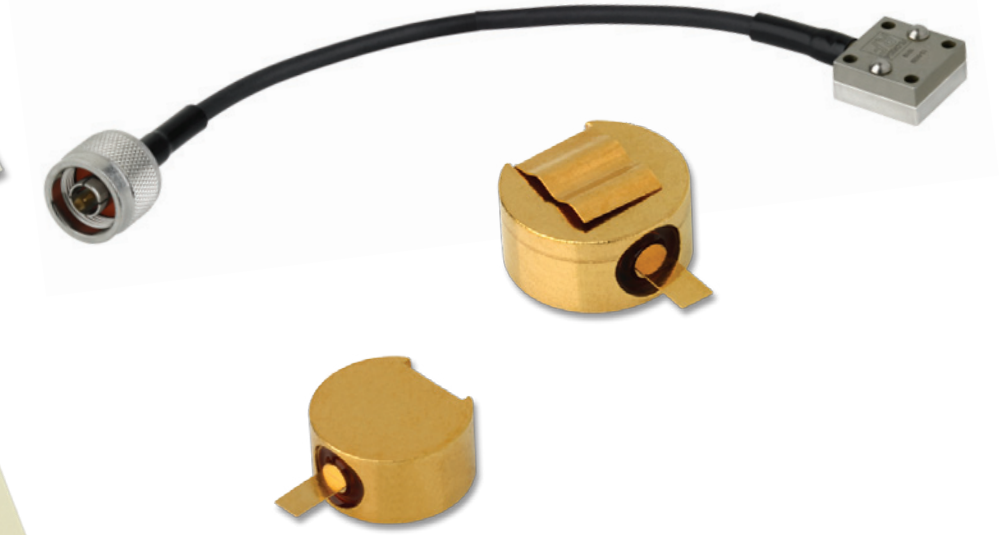
Our products show no distortion in MRI Environments

HybriX® Crossover

Part Number	Frequency [MHz]	Power Rating [watts]	IL [dB]	Isolation	Size [in]
XPMRF	DC-7000	200	0.05	40	0.200 x 0.200
XFMRF	DC-10000	10	0.005	50	0.126 x 0.100



EMC Technology and Florida RF Labs continue to offer legacy products for our customers to support existing designs and older programs. This section contains products that have reached maturity and still have relevance to our customers. In the following pages you will find popular products that have survived the test of time. Coaxial switch terminations, coaxial remote terminations, pill terminations and film cards that are still available as standard product lines. If you do not see a product that you are searching for in this section please visit our web site at emc-rflabs.com or contact our sales department at sales@emc-rflabs.com (772) 286-9300.



Quick Selector Chart

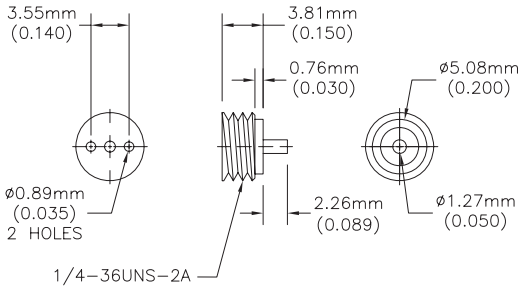
Series	Page
Coaxial Switch Terminations	100
Coaxial Remote Terminations	101
Pill Terminations	102
Film Cards	103

The coaxial termination line also includes a line of coaxial switch terminations (sometimes referred to as 'Flush Mount Terminations') that are designed to maximize power in a small size. These devices are well suited for applications where size and weight saving are a consideration. The coaxial switch termination utilizes a female SMA thread for connection to circuits. The contacts are designed for repeatable and continuous connections with the circuit contact.

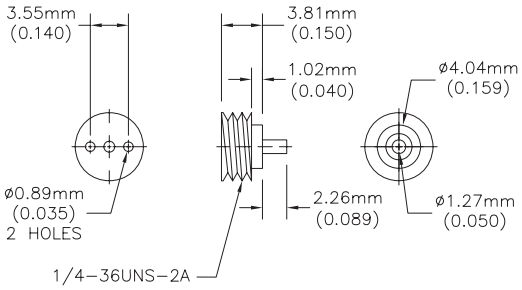
Specifications

Impedance	50 Ohms +/-5%
Connector	SMA Female , 3.5mm, 2.9mm
Frequency Range	DC to 18 Ghz
VSWR	1.3 Max
Power	1 to 3 Watts
Power Rating	100% @ 100°C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistor	Thin Film
Substrate	BeO or Alumina
Body	Stainless Steel or Brass (4920)
Body Finish	Passivated or Nickel Plated (4920)
Contact	Beryllium Copper
Contact Finish	Gold

Model 4910 - 1 Watt



Model 4915 - 5 Watts



Part Numbering Code

4 9 X X

STYLE

49 = Coaxial Termination

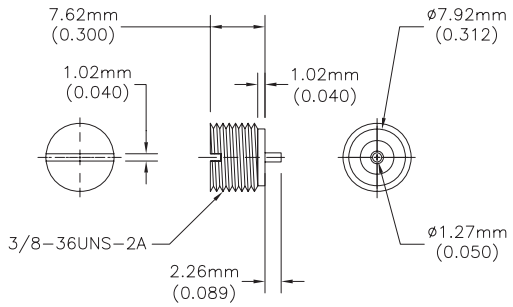
POWER

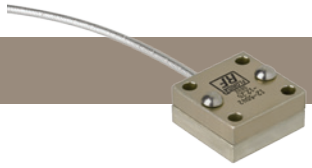
10 = 1 Watt

15 = 5 Watts

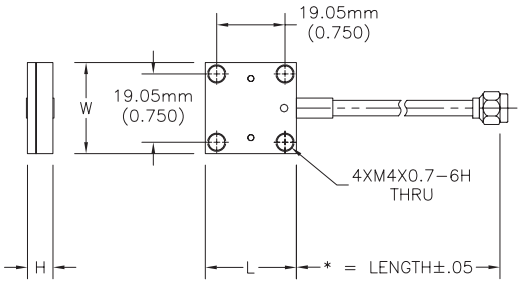
20 = 10 Watts

Model 4920 - 10 Watts



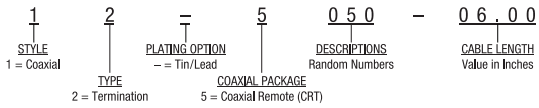


12 Series CRT



* LENGTH VARIES BY CUSTOMER SPECIFICATIONS.

Part Numbering Code



For applications where a high power termination is required to be remotely located, the series Coaxial Remote Terminations feature integral coaxial cable inputs. They also offer ultra low VSWR. These devices decrease the number of interconnections in your system at reduced cost over a discrete cable and termination or attenuator approach.

Specifications

Resistance	50 Ohms +/-5%
Cable Length	4 to 28 inches
Power	20 to 500 Watts
Frequency Range	DC to 6 GHz
Power Rating	100% @ 100°C at the heatsink
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Standard Connectors	SMA and Type N*
Substrates	BeO or AlN
Resistive Element	Thin Film
Housing Base	Aluminum, Tri-Metal Plated
Housing Cover Cable	Aluminum, Iridited
Cable	Braided Jacket, Hand-Formable *
Coaxial Connector	SMA Male Connector *
Connector Body	Stainless Steel, Gold Plated
Center Contact	Copper Weld, Silver Plated
Coupling Nut	Stainless Steel, Passivated

** Other cables, & connector types available upon request. Also Polyolefin (shrink tubing) jacket*

Power	Frequency	VSWR	Substrate	L		W		H		Part Series #
Watt	GHz	Max		mm [inches]						
20	10.0	1.35	BeO	10.16	[0.400]	12.70	[0.500]	8.51	[0.335]	12-5028
60	2.0	1.08	AlN	22.00	[0.866]	22.00	[0.866]	10.16	[0.400]	12-5042
60	8.0	1.35	BeO	15.24	[0.600]	17.78	[0.700]	7.62	[0.300]	12-5032
60	5.0	1.40	BeO	22.00	[0.866]	22.00	[0.866]	10.16	[0.400]	12-5007
150	2.0	1.10	AlN	22.00	[0.866]	22.00	[0.866]	10.16	[0.400]	12-5050
150	2.0	1.20	BeO	24.49	[0.964]	24.49	[0.964]	10.16	[0.400]	12-5049
150	2.0	1.20	BeO	22.00	[0.866]	22.00	[0.866]	10.16	[0.400]	12-5029
150	2.0	1.10	BeO	15.24	[0.600]	17.78	[0.700]	8.89	[0.350]	12-5021
150	2.0	1.40	BeO	24.49	[0.964]	24.49	[0.964]	10.16	[0.400]	12-5014
150	2.0	1.10	BeO	22.00	[0.866]	22.00	[0.866]	10.16	[0.400]	12-5013
150	2.0	1.10	BeO	24.49	[0.964]	24.49	[0.964]	10.16	[0.400]	12-5012
150	2.0	1.10	BeO	24.49	[0.964]	24.49	[0.964]	10.16	[0.400]	12-5005
250	2.0	1.08	BeO	25.40	[1.000]	25.40	[1.000]	7.11	[0.280]	12-5051
500	2.5	1.20	BeO	25.40	[1.000]	25.40	[1.000]	7.11	[0.280]	12-5061

Power ratings are based on 100°C heat sink, except for CT2335A, which is 85°C

"*" is a place holder for cable length in inches.

Our Stripline Pill Terminations are available in several different ground plane spacings and solderless construction. The resistive rod element is staked into the case forming a highly reliable compression fit. The result is a superior product which is unaffected by subsequent high temperature manufacturing processes.

Specifications

Impedance	50 Ohms +/-5%
Frequency Range	DC to 26.5 Ghz
VSWR	1.30 Max
Power Rating	100% to 125 °C
Derates to	0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film

Part Numbering Code

11 – 125 – T

STYLE
11 = Flat Body
12 = Double Spring
13 = Single Spring

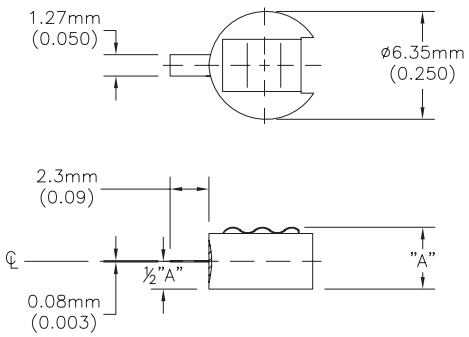
HEIGHT
125 = .125 in
250 = .250 in

POWER RATING
T = 1 Watt
TP = 3 Watt

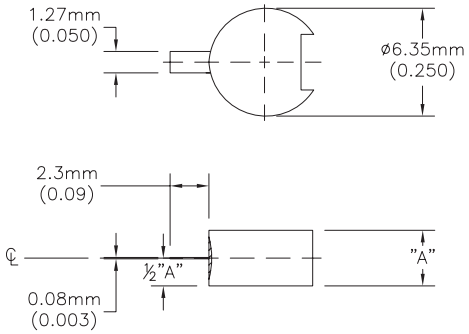
Power Watt @ 25° C	Spring	Maximum Peak Power (W)*	"A" Thickness		Figure #	Part Series #
			mm	[inches]		
1	None	100	0.1250	[3.18]	1	11-125-T
1	None	100	0.2500	[6.35]	1	11-250-T
1	Double	100	0.1250	[3.18]	2	12-125-T
1	Double	100	0.2500	[6.35]	2	12-250-T
1	Single	100	0.1250	[3.18]	3	13-125-T
1	Single	100	0.2500	[6.35]	3	13-250-T
3	None	100	0.1250	[3.18]	1	11-125-TP
3	None	100	0.2500	[6.35]	1	11-250-TP
3	Double	100	0.1250	[3.18]	2	12-125-TP
3	Double	100	0.2500	[6.35]	2	12-250-TP
3	Single	100	0.1250	[3.18]	3	13-125-TP
3	Single	100	0.2500	[6.35]	3	13-250-TP

* Peak power based on 100ms pulse width and 0.1% duty cycle

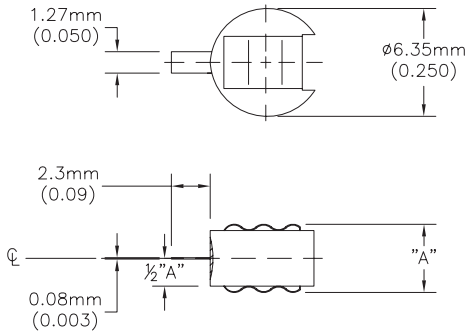
Pill - Single Spring

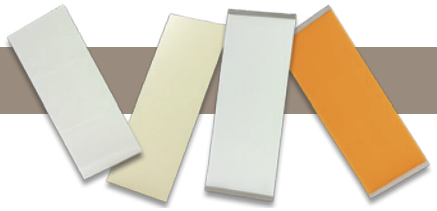


Pill - Flat Body (No Spring)

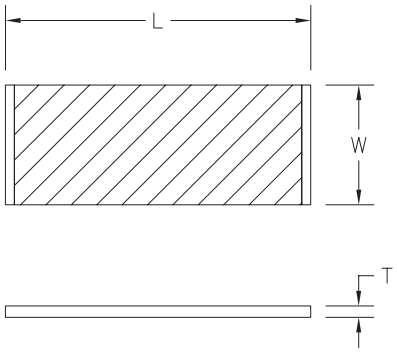


Pill - Double Spring





Film Card



We offer a complete line of standard and custom wave-guide attenuator elements. Deposition of thin film metallization on a glass substrate with an optical grade finish produces an extremely stable resistive film. A protective coating is evaporated over the resistive film to prevent oxidation. Controlled processes throughout produce guaranteed repeatability.

Film cards are available in four materials: Fiberglass, Mylar®, Kapton® or Mica. They feature a surface resistance range of 25 to 1k ohm per square and power handling up to 8 watts. Applications include: Waveguide Elements, Crystal Detector Protection, Directional Coupler Termination and Mode Suppression in Cavity Filters.

Contact the Sales Department for custom design requirements.

Mylar® and Kapton® are registered trademarks of E. I. du Pont de Nemours and Company.

Part Numbering Code

73	–	0160	–	100
STYLE 73 = Film Card		DESCRIPTIONS Random Numbers		RESISTANCE Value in Ohms

General Specifications

Resistance Range	25 to 1k Ohms/Square
Standard Tolerance	10%
Dielectric	3.3 @ 60Hz
Max Surface Temperature	150 °C (Fiberglass is 130 °C)
Power Rating	100% @ 125 °C, 0% @ 150 °C
Operating Temperature	-55 °C to 150 °C
Resistive Material	Thin Film
Substrates	Fiberglass, Mylar®, Kapton®, Mica
Fiberglass Dielectric	4.8 @ 1 MHz
Mylar® Dielectric	3.3 @ 60 MHz
Kapton® Dielectric	3.9 @ 1Hz
Mica Dielectric	6.0 @ 1Hz

Substrate	L		W		T		Part Series #
	mm [inches]						
Fiberglass	304.80	[12.000]	127.00	[5.000]	0.25	[0.010]	73-0160
Fiberglass	304.80	[12.000]	127.00	[5.000]	0.64	[0.025]	73-0161
Fiberglass	304.80	[12.000]	127.00	[5.000]	0.81	[0.032]	73-0162
Fiberglass	304.80	[12.000]	127.00	[5.000]	1.57	[0.062]	73-0163
Kapton®	304.80	[12.000]	127.00	[5.000]	0.05	[0.002]	73-0167
Kapton®	304.80	[12.000]	127.00	[5.000]	0.13	[0.005]	73-0168
Mica	127.00	[5.000]	50.80	[2.000]	0.05	[0.002]	73-0154
Mica	127.00	[5.000]	50.80	[2.000]	0.08	[0.003]	73-0155
Mica	127.00	[5.000]	50.80	[2.000]	0.13	[0.005]	73-0156
Mylar®	304.80	[12.000]	127.00	[5.000]	0.03	[0.001]	73-0157
Mylar®	304.80	[12.000]	127.00	[5.000]	0.13	[0.005]	73-0158
Mylar®	304.80	[12.000]	127.00	[5.000]	0.01	[0.010]	73-0159
Mylar®	304.80	[12.000]	127.00	[5.000]	0.05	[0.002]	73-0166

Notes

Additional RF Component Testing Available:

Stability of Attenuation After:
- Temperature Change
- Thermal Shock
- Vibration
- Shock
- Moisture Resistance
- Peak Power
- Salt Spray

Sensitivity of Attenuation After:
- Change in Input Power
- Change in Frequency
- Change in Temperature

Vibration and Shock Testing

Moisture Resistance

Peak Power

Salt Spray

Barometric Pressure

Outgassing

Endurance

Resistance to Bonding Exposure

Low Temperature Operation

Short Term Overload

High Temperature Exposure

Solderable Mounting Integrity

Bondable Mounting Integrity

Resistance to Solvents

Gross and Fine Leak Detection

Multipaction Testing

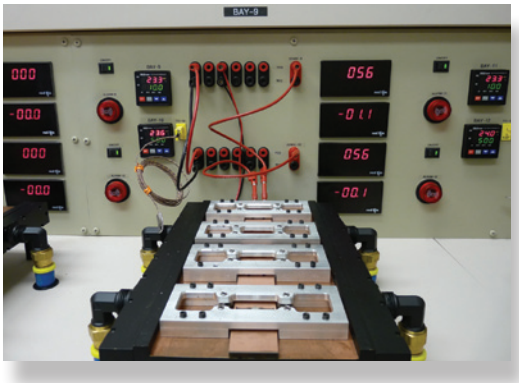
Radiographic Inspection

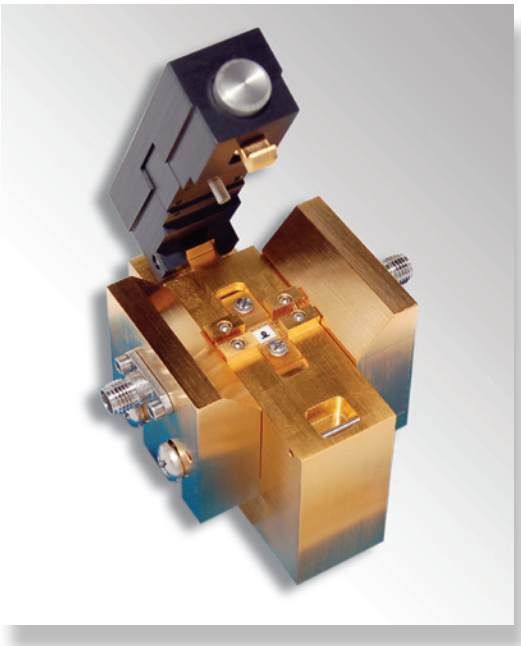
First Article Inspection

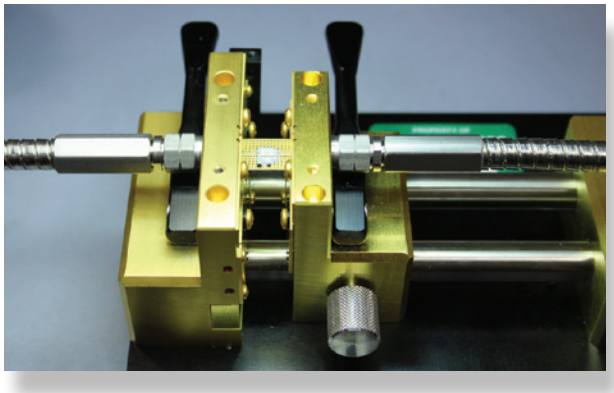
Pre-Cap Inspection

Source Inspection

Other testing services are available upon request.







GROUP A TESTING AND INSPECTION (100% of the lot)

Pre-cap Visual Inspection
- Conductor Metallization Defects
- Resistor Defects
- Substrate Defects
- Foreign Material

Visual Mechanical Inspection

Electrical Inspections
- Electrical Performance
- Thermal Shock
- Electrical Performance
- Burn-In [100% 168 hours at input power]
- Final RF Test
- Percent Defective Allowable (PDA)
- Temperature Coefficient of Attenuation

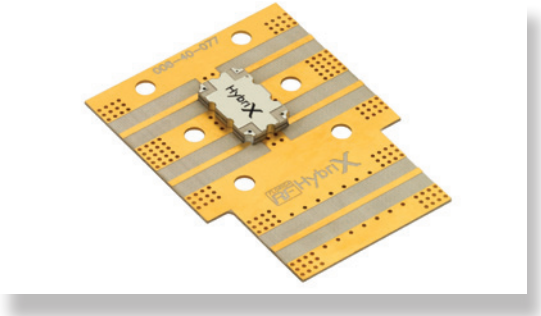
GROUP B TESTING AND INSPECTION (Sample)

Subgroup 1 (sample)
- Low Temperature Operation
- Electrical Performance
- High Temperature Bake
- Visual Mechanical Inspection
- Electrical Performance
- Termination Adhesion (Planar, W1, W3 only)
- Bondability (WB1 and G only)
- Termination Solderability (Planar, W1, W3, T3 and T3S only)
- Terminal Lead Strength (T3 and T3S only)

Subgroup 2 (sample)
- Electrical Performance
- Life Test. Sample units for 1000 hours at the maximum input power specified
- Electrical Performance

GROUP C TESTING AND INSPECTION (Sample)

- Electrical Performance
- Load Life. Burn-in units at 125°C for duration of 1000 hours at maximum input power specified.
- Electrical Performance
- Data Review and Data Pack



EMC Technology & Florida RF Labs offer Engineering Design Kits and Product Kits that are ideal for designers who need fast, convenient and accurate products for microwave circuits. Below is a list of our most popular kits. In addition evaluation boards are available for many of our products. Please contact the Sales Department if you have an application that requires a custom kit or an evaluation board.

Engineering Design Kits

TVA Kit 35 of each of 15 TVA's of various dB and TCA values

MTVA Kit 35 of each of 14 MTVA's and 2 HTVA's of various dB and TCA values

K-Band Kit 10 of each of 5 KTVA's and 11 KFA's of various dB and TCA values

TS03 Kit 25 of each of 1 to 10 dB, 12, 14, 16, 18, and 20 dB

TS05 Kit 25 of each of 1 to 10 dB, 12, 14, 16, 18, and 20 dB

TS05 Triple Wrap Kit 25 of each of 1 to 10 dB, 12, 14, 16, 18, and 20 dB

TS07 Kit 25 of each of 0 to 3, 6 and 10 dB

CVD Diamond Kit 3 of each of 12 styles of terminations and resistors

HybriX®3 Kit 10 of each of 4 styles hybrid and 4 styles directional LTCC couplers

Product Kits

TS03 Kit 5 of each of 1 to 10 dB values - planar terminal style

TS03 Triple Wrap Kit 5 of each of 1 to 10 dB values - triple wrap terminal style

TS05 Kit 5 of each of 1 to 10 dB values - planar terminal style

TS05 Triple Wrap Kit 5 of each of 1 to 10 dB values triple wrap terminal style

TS05 Triple Wrap, Solder Terminal Kit 5 of each of 1 to 10dB values - triple wrap, solder terminal style

TS05 Gold Terminal Kit 5 of each of 1 to 10 dB values - gold terminal style

TS05 Wire Bond Gold Kit 5 of each of 1 to 10 dB values - wire bond gold style

TS07 Kit 25 of each of 0, 3, 6, 10 dB values - planar terminal style

TS09 Kit 5 of each of 0, 3, 6, 10 dB - surface mount style

WTVA Kit 5 of each of 5 WTVA 2-6 dB and - 006 TCA values - wire bond gold style

WTVA Kit 5 of each of 4 WTVASMTF 3-6 dB and -007 TCA values - surface mount style

Custom Kits

AN7-Custom Kit 25 of 5 stocked AN7 Planar of customers choice

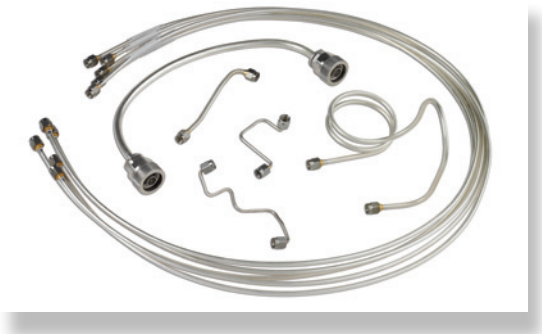
MTVAS-Custom Kit 25 of 12 stocked MTVA Planar of customers choice

MTVAW3-Custom Kit 25 of 12 stocked MTVA Triple Wrap of customers choice

TS03 Triple Wrap Custom Kit 25 of 12 stocked TS03 Triple Wrap of customers choice

Lab-Flex® Cable Assemblies

A complete line of specialized cables that offer high velocity, low loss dielectrics that provide up to 40% less loss than conventional cable types. Custom braids provide superior mechanical strength and shielding greater than 90 dB. All connectors have all stainless steel construction and are also watertight. Assemblies are available with various protective coverings for use in the most demanding environments. These cost-effective, high performance cables are available with most standard connector interfaces for use up to 50 GHz and in a stranded center conductor version Lab-Flex®S.



Semi-Rigid Cable Assemblies

Semi-Rigid cable offers the best shielding performance of all cables offered. They are typically formed to customer specifications and are ready to install. Space-qualified cables can be manufactured, tested and documented to your specifications. Unformed assemblies can be provided for final shaping at the installation site (proper forming tools are required.) Low loss versions are also available. These can be supplied with either copper or aluminum jackets. Pre-conditioning is standard. Popular outer diameters are: .047", .085", and .141". Others available upon request.

Conformable® Cable Assemblies

The Conformable® BJ cable family offers the option of a hand-formable replacement to semi-rigid cable with only a slight isolation and insertion loss penalty. Florida RF Labs' hand-formable assemblies include a metal foil under the copper-tin composite shield for added connector attachment strength and improved isolation. Available in .047", .085" and .141" diameters. Additional protective jackets can also be supplied as needed.

Standard RG Flexible Cable Assemblies

This group of cables includes familiar RG cables that have been superseded with MIL-C-17 numbers and alternative custom cables with improved electrical performance over standard M17 versions. All military cables supplied by Florida RF Labs are purchased to the MIL-C-17 specification and no longer carry the RG designation. For example, RG316 has been replaced by M17/113-RG316.

Specialty Cable Assemblies

The Specialty Family of cables includes a variety of unique application products. It includes the Mini Flex types which are flexible alternatives to semi-rigid & semi-flexible cables. Also included is our K-Jumper, which is a cost-effective/high frequency interconnect assembly. A new addition to this group is our ASR series of high performance VNA test port assemblies suitable for test applications up to 50 GHz.

Please visit emc-rflabs.com for details on all our cable assembly options.

Conformable® is a registered trademark of Belden

Other Smiths Interconnect businesses serving similar markets with technically differentiated electronic and radio frequency products that connect, protect and control critical systems include:

Kaelus

Formed by the business combination of Summitek Instruments, Allrizon Communications, Triasx Pty Ltd and the commercial division of TRAK Microwave Ltd, Kaelus designs and manufactures a diverse range of innovative RF and microwave solutions for the wireless telecommunications sector

Lorch Microwave

Leading manufacturer of custom RF and microwave filters, components and assemblies used in high performance military, commercial and industrial applications

Millitech

Specializes in the design, engineering and manufacturing of millimeter wave components, assemblies, sub-systems and fully integrated systems for applications in satellite communications, radiometry, radar and remote sensing

Protection Businesses

PolyPhaser, Transtector Systems, DOWIN and RO Associates are industry leaders in design, manufacturing and consulting of power and signal integrity solutions used to protect communications systems and critical electronics from lightning and power anomalies.

Radio Waves

Offers a diverse range of high quality microwave and broadband wireless antennas that assure optimum network performance

TECOM Industries

Designs and builds custom antennas and antenna systems for the defense, commercial wireless, and satellite communications markets

TRAK Microwave Corp. and TRAK Microwave, Ltd.

Offer RF and microwave multi-function assemblies, frequency source products, signal control devices, ferrites, and time and frequency systems for military, space and commercial applications

In addition, they supply passive RF and microwave components and sub-assemblies particularly isolators, circulators, filters and combiners

1x xxx	Pill Termination	**102**
12 xxxx	Coaxial Remote Termination	**101**
31 xxxx	Flange Resistor	**62**
32 xxxx	Flange Termination	**50**
33 xxxx	Flange Fixed Attenuators	**31**
41xx	Coaxial Termination	**100**
42 xxx	Coaxial Fixed Attenuator	**34**
42TVAxxxxxxx	Coaxial Temperature Variable Attenuator	**14**
49xx	Coaxial Switch Termination	**100**
31 xxxx5xxx	Flange Resistor	**62**
32 xxxx5xxx	Flange Termination	**32**
73 xxxx	Film Card	**103**
8xxx	Stripline Flange Termination	**50**
81 xxxx	Chip Resistor	**58**
81 xxxxTC	Tab & Cover Resistor	**60**
82 xxxxTC	Tab & Cover Termination	**42**
83 xxxx	Chip Fixed Attenuators	**18**
83 xxxxTC	Tab & Cover Fixed Attenuators	**28**
ANx	Temperature Variable Attenuator	**10**
CAxxxxD	Diamond Fixed Attenuator	**68**
CRxxxxD	Diamond Resistor	**71**
CTxxxx	High Power Chip Termination	**74**
CTxxxxD	Diamond Termination	**74**
CTVA	Coaxial Temperature Variable Attenuators	**14**
Dxxxxx	Doupler	**94**
Dxxxxx	Directional Couplers	**81**

DCxxxx	Doherty Combiners	**87**
DDxxxx	Doupler with Doherty Combiner	**87**
DHxxxx	Doupler with Hybrid Combiner	**87**
ETVA	Extended Shift Temperature Variable Attenuator	**13**
Hxxxx	Hybrid Couplers	**77**
HPCA	High Power Chip Fixed Attenuator	**25**
HR0x	High Reliability Chip Fixed Attenuator	**35**
HRMTVA	High Reliability Mini Temperature Variable Attenuator	**16**
HRTVA	High Reliability Temperature Variable Attenuator	**15**
KFA	K Band Fixed Attenuator	**20**
KTVA	K Band Temperature Variable Attenuator	**8**
MTVA	Mini Temperature Variable Attenuator	**6**
Pxxxxx	Power Dividers	**89**
PST-x-x-x	Smart Detector	**91**
QFA	Q Band Fixed Attenuator	**21**
QTVA	Q Band Temperature Variable Attenuator	**9**
RPDxxxx	Resistive Power Dividers	**92**
Rxxx-xxxx	Rod Resistor	**65**
SMTxxxxx	Surface Mount Termination	**38**
SXUxxx	Power Samplers	**91**
TRx x-xx	Rod Resistor	**65**
TS0x	Chip Fixed Attenuators	**22**
TVA	Temperature Variable Attenuator	**5**
WTVA	Wideband Temperature Variable Attenuator	**7**
W3xxxxx	Wideband Couplers	**81**
Xxxxx	Crossovers	**88**

Florida RF Labs & EMC Technology, a Smiths Interconnect company, is an internationally recognized leader in the development and manufacturer of thin and thick film RF and Microwave resistive components, featuring the Thermopad® brand of compensated attenuators, signal distribution products featuring the HybriX® brand of ultra low loss SMT hybrids and couplers, and high performance RF cable assemblies featuring the Lab-Flex® brand of low loss, flexible cable assemblies. We have serviced the Telecom, Wireless, Broadcast, Medical, Space, Aerospace, Military, Test and Measurement, and Automotive market segments for over 80 years combined.

Stuart, FL, USA

Smiths Interconnect is a leader in technically differentiated electronic and radio frequency products that connect, protect and control critical systems for the wireless telecommunications, aerospace, defence, space, medical, rail, test and industrial markets. It is part of Smiths Group, a global leader in applying advanced technologies for markets in threat and contraband detection, energy, medical devices, communications and engineered components. Smiths Group employs over 23,000 people in more than 50 countries.

Heredia, Costa Rica

EMC Technology & Florida RF Labs is the industry benchmark and sets quality standards in our serviceable markets with extensive design, manufacturing, inspection, testing and quality assurance programs. We are certified to AS 9100, ISO 9001, ISO 14001 and OSHAS18001.

EMC Technology Cage Code 24602
Florida RF Labs Cage Code 2Y194

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bringing technology to life

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