

MLP7131-23-001 Limiter PIN Diode

Datasheet

Features

- Low Series Resistance for High Isolation
- Low Capacitance for Low Insertion Loss and High Isolation: $C_{T6} < 0.25$ pF
- RoHS Compliant
- Nominal I Layer Width: $W = 2$ μ m
- Compact Surface Mount Package

Applications

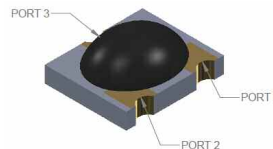
- The MLP7131-23-001 Limiter PIN Diode is designed to be used in receiver protection applications.

Description

The MLP7131-23-001 device has one limiter diode in -001 configuration. The limiter diode used in MLP7131-23-001 has low series resistance, low junction capacitance and is packaged in a surface mount, low-parasitic ceramic carrier with an epoxy globtop. This limiter diode is manufactured using Aeroflex/Metelics proprietary diode process for excellent performance and high reliability.

The 2 μ m nominal I layer width of each diode produces a threshold level of 7 dBm nominal, for demanding receiver protection applications. The low series resistance and low total capacitance of this limiter diode produces excellent isolation and insertion loss in shunt configuration in receiver protection applications.

MLP7131-23-001 is a rugged device, capable of reliable operation in military, commercial and industrial applications. The device is RoHS compliant.



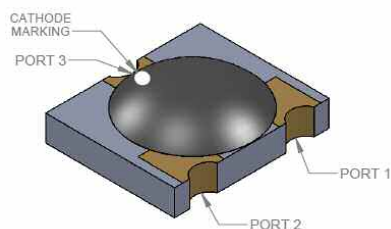
Environmental Capabilities

The MLP7131-23-001 is capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

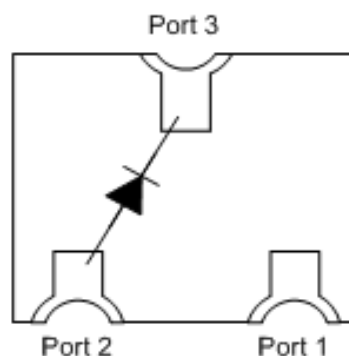
ESD and Moisture Sensitivity Level Rating

As are all semiconductors, limiter PIN diodes are susceptible to damage from ESD events. Proper ESD prevention procedures should be followed. The ESD rating for this device is Class 0 (HBM). The moisture sensitivity level (MSL) rating for this part is MSL 1.

Pin Out



Schematic



Electrical Specifications

$T_A = 25^\circ\text{C}$, Electrical specifications are per diode (Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Minimum Value	Typical Value	Maximum Value	Units
Breakdown Voltage	V_B	$I_R = 10\ \mu\text{A}$	15		30	V
Forward Voltage	V_F	$I_F = 100\ \text{mA}$			1.1	V
Total Capacitance (note 1)	C_T	$V_R = 6\ \text{V}, f = 1\ \text{MHz}$			0.25	pF
Series Resistance (note 2)	R_{S10}	$I_F = 10\ \text{mA}, f = 500\ \text{MHz}$		1.5		Ω
Minority Carrier Lifetime	T_L	50% control to 90% output voltage, $I_F = 10\ \text{mA}$, $I_R = 6\ \text{mA}, f = 1\ \text{kHz}$		5		ns
Thermal Resistance	θ_{JC}				80	$^\circ\text{C/W}$
I-layer Thickness	W			2		μm

Notes:

- 1 Total capacitance (C_T) is the sum of the diode junction capacitance (C_J) and the package capacitance (C_{PKG}).
- 2 Series resistance (R_S) is measured using HP 4291 Impedance Analyzer.

Absolute Maximum Ratings

$T_{CASE} = +25^\circ\text{C}$ (Unless Otherwise Noted)

Parameter	Conditions	Absolute Maximum Value
Operating Temperature		- 65 $^\circ\text{C}$ to 125 $^\circ\text{C}$
Storage Temperature		- 65 $^\circ\text{C}$ to 150 $^\circ\text{C}$
Junction Temperature		175 $^\circ\text{C}$
Assembly Temperature	$t = 10\ \text{s}$	260 $^\circ\text{C}$
Forward DC Current		150 mA
Reverse DC Voltage		30 V
Forward DC Voltage	$I_F = 150\ \text{mA}$	1.3 V
Peak RF Input Power	Pulse width = 1 μs , duty cycle = 1%	50 dBm
CW Input Power		33 dBm

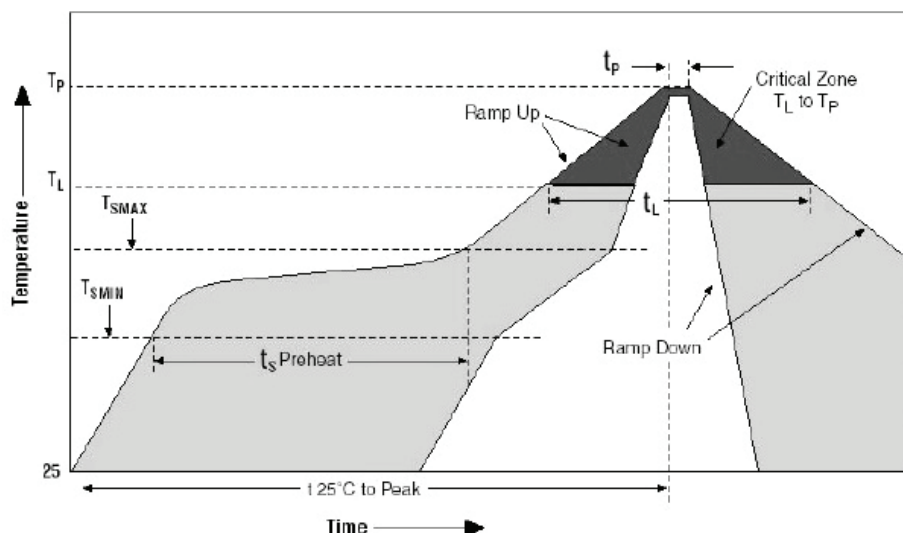
Assembly Instructions

PIN diodes may be placed onto circuit boards with pick and place manufacturing equipment from tape-reel. The devices are attached to the circuit using conventional solder re-flow or wave soldering procedures with RoHS type or Sn 60 / Pb 40 type solders.

Table 1. Time-Temperature Profile for Sn60/Pb40 or RoHS Type Solders

Profile Feature	SnPb Solder Assembly	Pb-Free Solder Assembly
Average Ramp-Up Rate (T_L to T_P)	3°C /second maximum	3°C /second maximum
Preheat: - Temperature Min (T_{SMIN}) - Temperature Max (T_{SMAX}) - Time (min to max)(t_s)	100°C 150°C 60-120 s	150°C 200°C 60-180 s
T_{SMAX} to T_L - Ramp-Up Rate		3°C/s maximum
Time Maintained Above: - Temperature (T_L) - Time (t_L)	183°C 60-150 s	217°C 60-150 s
Peak temperature (T_P)	225 +0/-5°C	260 +0/-5°C
Time Within 5°C of Actual Peak Temperature (t_p)	10 – 30 s	20 – 40 s
Ramp-Down Rate	6°C /s maximum	6°C /s maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

Figure 1. Solder Re-Flow Time-Temperature Profile

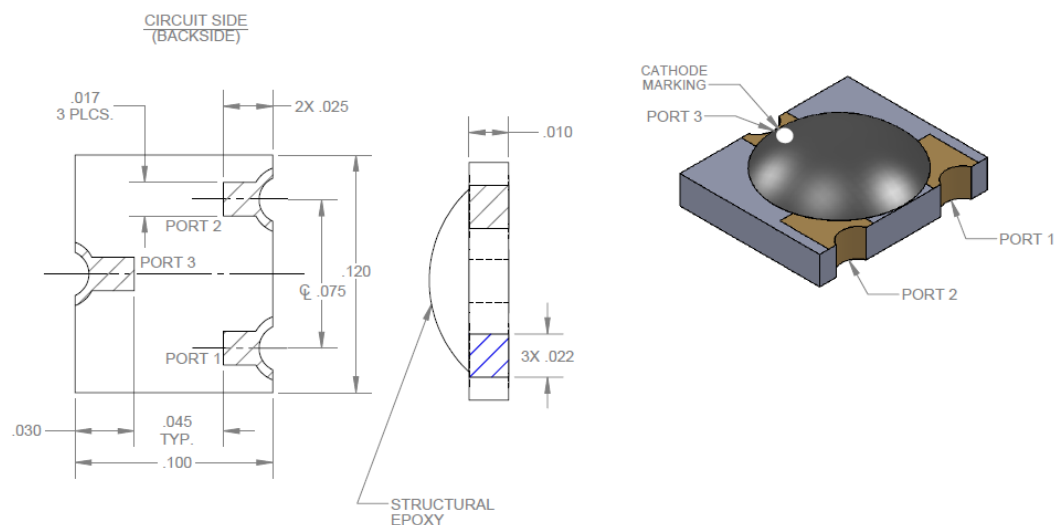


MLP7131-23-001

Limiter PIN Diode



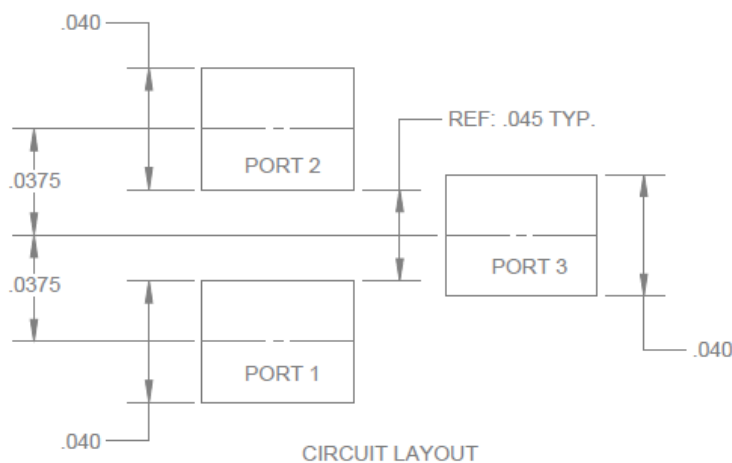
Outline - Case Style 23 (CS23)



Notes:

1. All dimensions in inches
2. Material : Alumina 99.6%
3. Metal terminals composed of electrolytic Au over electrolytic Ni.

CS23 Suggested Footprint



Part Number Ordering Information

Part Number	Description	Packaging
MLP7131-23-001-W	Limiter PIN diodes in CS23 SMT package	Waffle Pack (Quantity = 400 per pack)
MLP7131-23-001-R	Limiter PIN diodes in CS 23 SMT package	Tape and Reel (Quantity = 3000 per Reel)

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