PIN Diode

NEW

MMP7062-19-1 Datasheet

AEROFLEX
A passion for performance.

Features

- Low Series Resistance for Low Insertion Loss and High Isolation: $R_S < 1.2\ \Omega$
- Low Junction Capacitance for Low Insertion Loss and High Isolation: $C_J < 0.1$ pF
- Low Thermal Resistance: < 45 ºC/W
- Available in Several Package Styles
- RoHS Compliant

LEAD FREE
RoHS COMPLIANT

Applications

- Fast switching, moderate power switches

Description

The MMP7062-19-1 PIN diode is a fast switching, low series resistance, low capacitance PIN diode packaged in a surface mount ceramic carrier package. This diode is also available as a chip or in several other package styles. It is manufactured using Aeroflex / Metelics proven diode fabrication process which optimizes diode characteristics for optimal electrical performance and excellent reliability. The low junction capacitance and series resistance of the MMP7062-19-1 combine to produce outstanding insertion loss, isolation and switching time.

The MMP7062-19-1 PIN Diode is designed to be used in moderate peak and average power switch applications which require low switching time. It performs exceptionally well from VHF through microwave frequencies. The low thermal resistance (< 45 ºC/W typical) of the MMP7062-19-1 enables the device to safely handle moderately high power signals in high frequency switching applications.

This rugged device is capable of reliable operation in all military, commercial and industrial applications. The device is RoHS compliant.

Environmental Capabilities

The MMP7062-19-1 PIN diode is capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

ESD Rating

As are all semiconductors, PIN Diodes are susceptible to damage from ESD events. Proper ESD prevention procedures should be followed. The ESD rating for this device is Class 1A (HBM). The MMP7062-10-1 Pin Diode is MSL 1.

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MMP7062-19-1 Electrical Specifications

T_A = 25 °C (unless otherwise noted)

Parameter	Symbol	Test Conditions	Minimum Value	Typical Value	Maximum Value	Units
Breakdown Voltage	V_B	I_R = 10 µA	250	- - -	- - -	V
Reverse Leakage Current	I_R	V_R = 100 V	- - -	20	100	nA
Forward Voltage	VF	I_F = 100 mA	- - -	0.95	1.2	V
Series Resistance (note 1)	R_{S1}	I_F = 1 mA, f = 100 MHz	15	- - -	- - -	Ω
	R_{S10}	I_F = 10 mA, f = 100 MHz	- - -	- - -	6	Ω
	R_{S100}	I_F = 100 mA, f = 100 MHz	- - -	- - -	1.2	Ω
Junction Capacitance (note 2)	C_J	VR = 50 V, f = 1 MHz	- - -	- - -	0.1	pF
Minority Carrier Lifetime	T_L	50% control to 90 % output voltage, I_F = 10 mA, I_R = 6 mA, f = 1 kHz	- - -	1	- - -	µs
I Layer Thickness	W		- - -	70	- - -	µm
CW Thermal Resistance	θ_{JC}	I_H = 2.5 A, I_L = 10 mA	- - -	45	60	°C/W
Package Capacitance	C_{PKG}	CS19-1	- - -	0.09	- - -	pF
Package Inductance	L_{PKG}	CS19-1	- - -	0.35	- - -	nH

Notes:

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

Absolute Maximum Ratings

T_A = 25 °C (unless otherwise noted)

Parameter	Conditions	Absolute Maximum Value
Forward DC Current		150 mA
Reverse DC Voltage		250 V
Forward DC Voltage	I_F = 150 mA	1.3 V
Operating Temperature		-65 °C to 125 °C
Storage Temperature		-65 °C to 150 °C
Junction Temperature		175 °C
Assembly Temperature	t = 10 s	260 °C
Total Dissipated Power	Infinite heat sink, T_{case} = 25 °C. Derate power linearly from 750 mW @ 85 °C to 0 W @ 175 °C	750 mW

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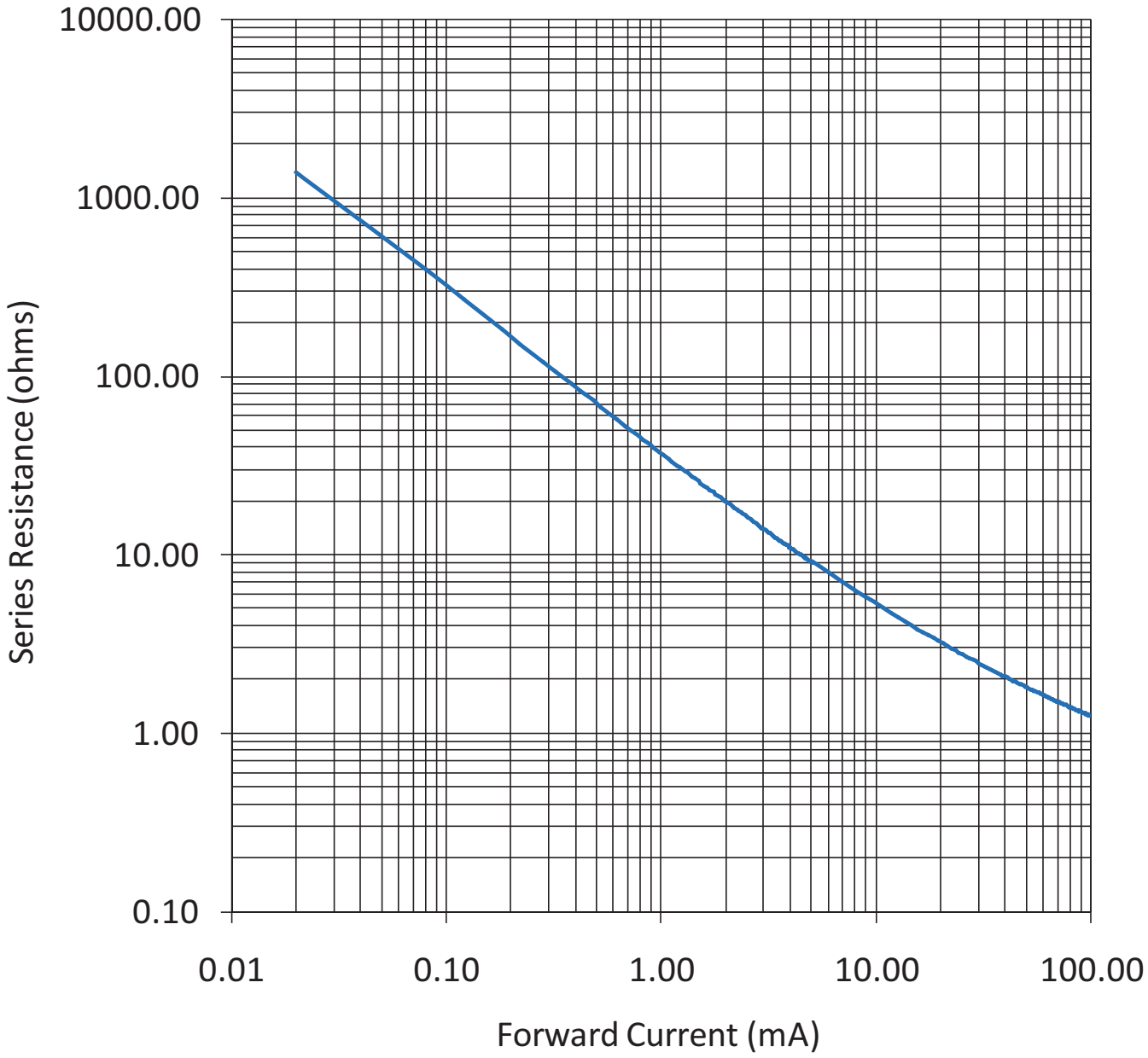
MMP7062-19-1 Typical Performance

T_A = 25 ºC (unless otherwise noted)



Series Resistance vs. Forward Current, f = 100 MHz

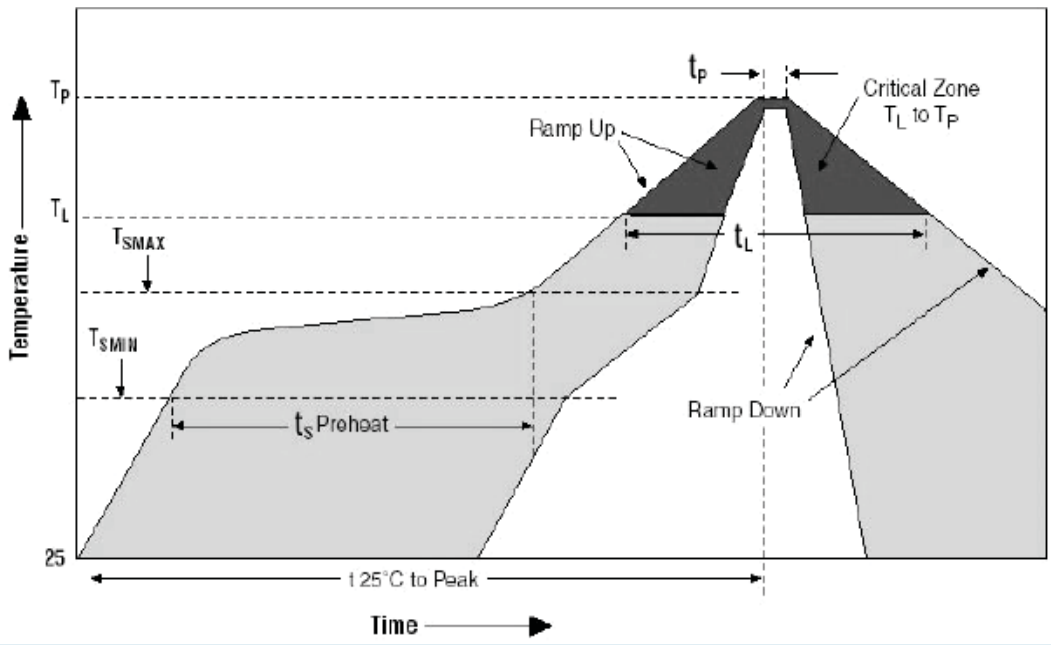
Assembly Instructions

MMP7062-19-1 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 Sn60 / Pb40 type solders per Table 1 and Graph 1 Time-Temperature recommended profile.

Table 1: Time-Temperature Profile for Sn 60/Pb40 or RoHS Type Solders

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average ramp-up rate (T_L to T_P)	3°C/second maximum	3°C/second maximum
Preheat - Temperature Minimum (T_{SMIN}) - Temperature Maximum (T_{SMAX}) - Time (Minimum to maximum) (t_S)	 100°C 150°C 60-120 seconds	 150°C 200°C 60-180 seconds
T_{SMAX} to T_L - Ramp-up Rate	 	 3°C/second maximum
Time Maintained above: - Temperature (T_L) - Time (t_L)	 183°C 60-150 seconds	 217°C 60-150 seconds
Peak Temperature (T_P)	225 +0 / -5°C	260 +0/-5°C
Time within 5°C of actual Peak Temperature (T_P)	10-30 seconds	20-40 seconds
Ramp-down Rate	6°C/second maximum	6°C/second maximum
Time 25°C to Peak Temperature	6 minutes maximum	8 minutes maximum

Graph1: Solder Re-Flow Time-Temperature Function



Document No. DS15087 Rev.A, ECN 12402
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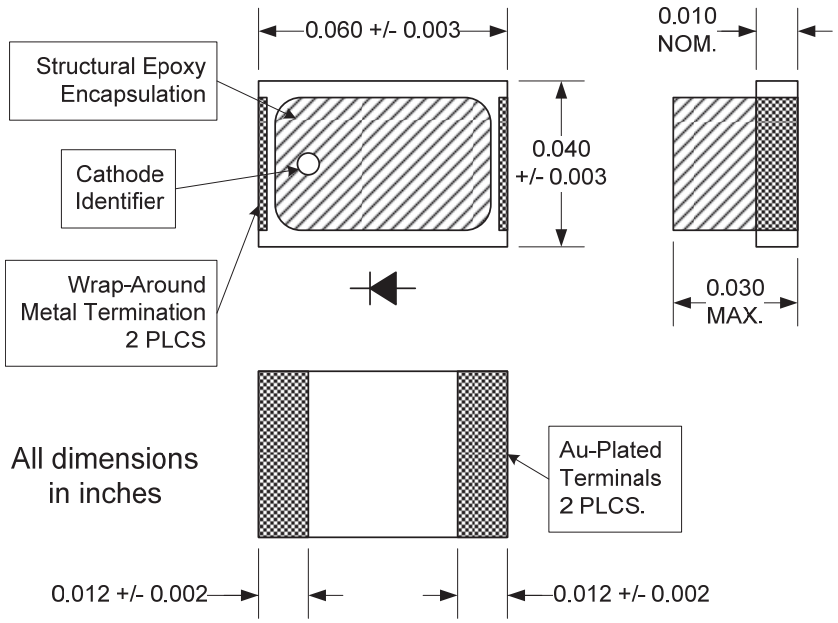
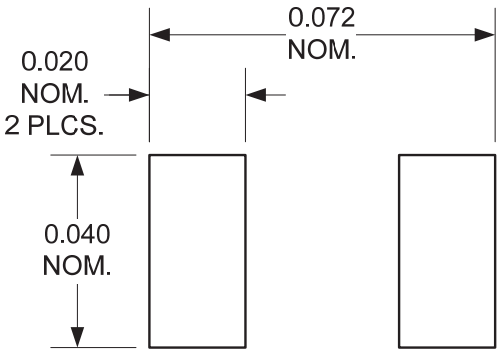
Case Style, CS19-1 Outline Drawing



1. Ceramic carrier is alumina (Al_2O_3)
2. Metal terminals composed of electrolytic Au over electrolytic Ni.

Suggested PCB Pad Layout – CS19-1



All dimensions in inches.

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MMP7062-19-1 PIN Diode

Part Number Ordering Information:

Part Number	Description	Packaging
MMP7062-19-1-R	PIN Diode	Tape-Reel Packaging (Quantity = 3,000)
MMP7062-19-1-W	PIN Diode	Waffle Pack (Quantity = 100)

Aeroflex / Metelics, Inc.

54 Grenier Field Road, Londonderry, NH 03053
Tel: (603) 641-3800
Sales: (888) 641-SEMI (7364)
Fax: (603)-641-3500

975 Stewart Drive, Sunnyvale, CA 94085
Tel: (408) 737-8181
Fax: (408) 733-7645

www.aeroflex.com/metelics ***metelics-sales@aeroflex.com***

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