

MHV507-19-1 Si Hyperabrupt Varactor Diode

Datasheet

Features

- High capacitance ratio : 3.0 Minimum
- High quality factor : 1500 Typical
- Compact surface mount package
- Ultra-thin termination plating to combat embrittlement
- RoHS compliant



Applications

- Voltage controlled filters
- Analog voltage controlled phase shifters
- Voltage controlled oscillators

Description

The Aeroflex/Metelics MHV507-19-1 silicon hyperabrupt tuning varactor offers a large change in junction capacitance over a small tuning voltage range. It is a mesa device with an epitaxially-deposited cathode layer for low series resistance and high quality factor. The die is passivated with a high-reliability glass passivation for very fast settling time. The MHV507-19-1 is packaged in an epoxy-encapsulated surface mount package.

The MHV507-19-1 silicon hyperabrupt junction varactor diode complies with the RoHS requirements.

Environmental Capabilities

The MHV507-19-1 silicon hyperabrupt junction varactor diode is durable and capable of reliably operating in military, commercial, and industrial environments. The device is compatible with pick-and-place assembly and is available in tape and reel. The MHV507-19-1 silicon hyperabrupt junction varactor diode is capable of meeting the environmental requirements of MIL-STD-750

ESD and Moisture Sensitivity Level Rating

As are all semiconductors, silicon hyperabrupt tuning varactor diode 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.



Electrical Specifications

$T_A = 25^\circ\text{C}$ (Unless Otherwise Noted)

Parameter	Symbol	Test Conditions	Minimum Value	Typical Value	Maximum Value	Units
Breakdown Voltage	V_B	$I_R = 10 \mu\text{A}$	22			V
Reverse Leakage Current	I_R	$V_R = 20 \text{ V}$			50	nA
Total Capacitance	C_T	$f = 1 \text{ MHz}$				
		$V_R = 0 \text{ V},$	9.2	10.2	11.2	pF
		$V_R = 4 \text{ V},$	3.2	3.5	3.8	pF
		$V_R = 20 \text{ V},$	0.75	1.0	1.4	pF
Capacitance Ratio		$V_R = 4 \text{ V to } V_R = 20 \text{ V},$ $f = 1 \text{ MHz}$	3.0		5.5	
Quality Factor	Q_4	$V_R = 4.0 \text{ V}, f = 50 \text{ MHz}$		1500		

Absolute Maximum Ratings

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

Parameter	Conditions	Absolute Maximum Value
Operating Temperature		- 55 °C to 85 °C
Storage Temperature		- 55 °C to 100 °C
Assembly Temperature	$t = 10 \text{ s}$	260 °C
Forward DC Current		50 mA
Reverse DC Voltage		22 V

MHV507-19-1 Si Hyperabrupt Varactor Diode



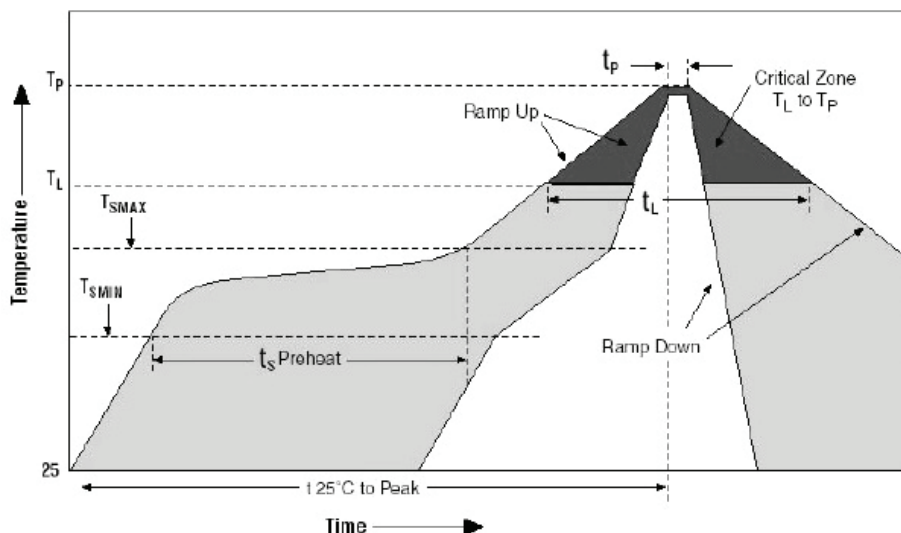
Assembly Instructions

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.

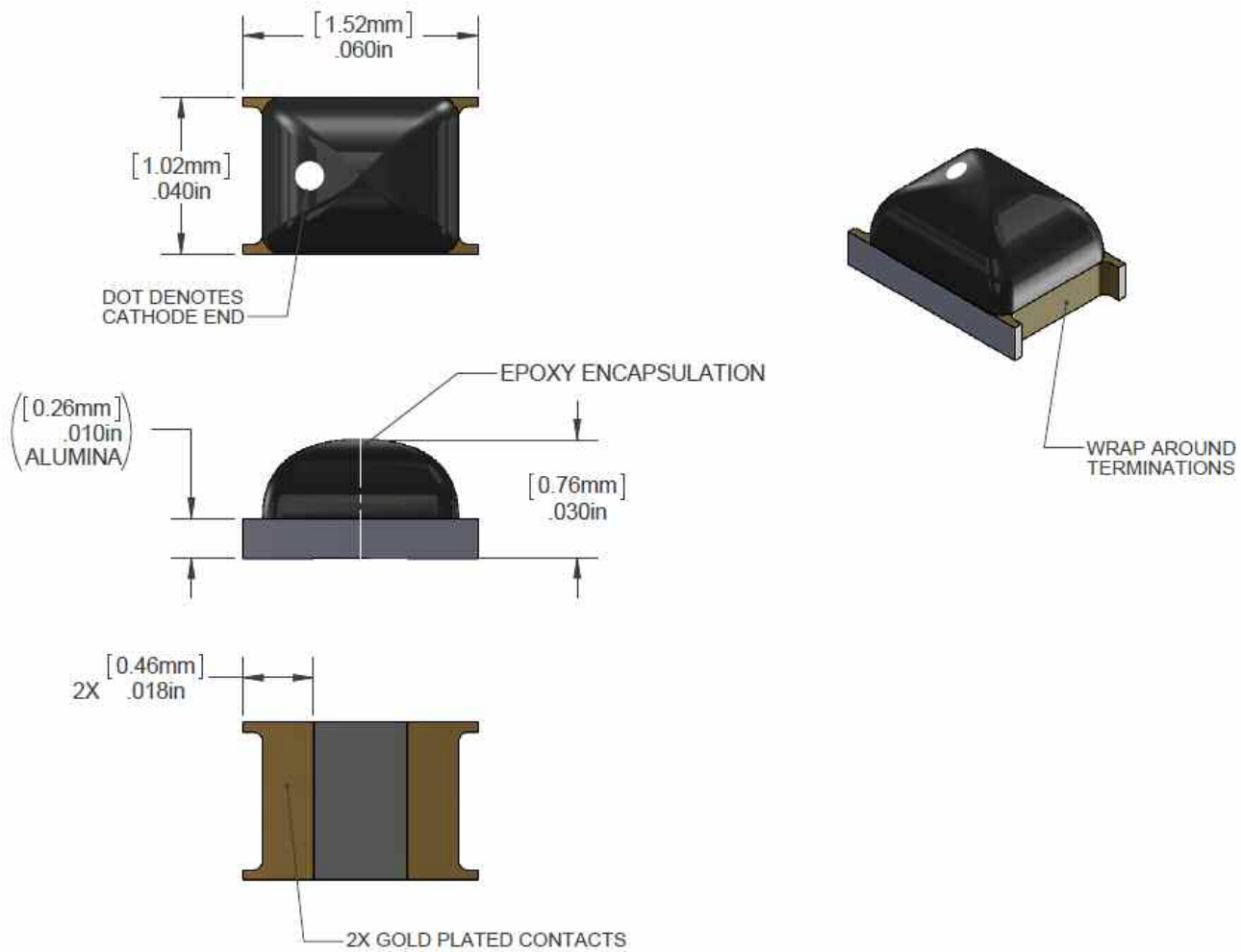
Table 1. Time-Temperature Profile for Sn60/Pb40 or RoHS Type Solders

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})	100°C	150°C
- Temperature Max (T_{SMAX})	150°C	200°C
- Time (min to max)(t_s)	60-120 s	60-180 s
T_{SMAX} to T_L		
- Ramp-Up Rate		3°C/s maximum
Time Maintained Above:		
- Temperature (T_L)	183°C	217°C
- Time (t_L)	60-150 s	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



Outline - Case Style CS19-1



Notes:

1. All dimensions in inches [mm].
2. Ceramic carrier is alumina (Al_2O_3).
3. Metal terminals composed of electrolytic Au over electrolytic Ni.

Part Number Ordering Information

Part Number	Description
MHV507-19-1-W	Waffle Pack (Quantity = 100 per pack)
MHV507-19-1-R	Tape-Reel Packaging (Quantity = 3000 Maximum)

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

Aeroflex / Metelics, Inc. reserves the right to make changes to any products and services herein at any time without notice. Consult Aeroflex or an authorized sales representative to verify that the information in this data sheet is current before using this product. Aeroflex does not assume any responsibility or liability arising out of the application or use of any product or service described herein, except as expressly agreed to in writing by Aeroflex; nor does the purchase, lease, or use of a product or service from Aeroflex convey a license under any patent rights, copyrights, trademark rights, or any other of the intellectual rights of Aeroflex or of third parties.

Copyright 2012 Aeroflex / Metelics. All rights reserved.

ISO 9001:2008 certified companies



Our passion for performance is defined by three attributes represented by these three icons: solution-minded, performance-driven and customer-focused.