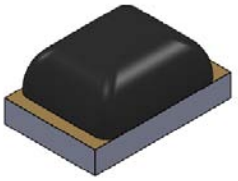
MHV500-18-1 Silicon Hyperabrupt Tuning Varactor Data Sheet

Rev A

Features

- Large capacitance ratio: 2.5 minimum
- High quality factor: 2600 typical
- Small surface mount package: 0.060 in (L) x 0.040 in (W) x 0.050 in (H)
- RoHS Compliant



Applications

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

Description

The Aeroflex/Metelics MHV500-18-1 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 MHV500-18-1 is packaged in an epoxy-encapsulated surface mount package, 0.060 in (L) x 0.040 in (W) x 0.030 in (H).

This rugged device is capable of reliable operation in all military, commercial and industrial applications. The MHV500-18-1 is RoHS compliant.

Contact the factory for other package styles.

AEROFLEX METELICS
ISO 9001:2008
TEL: 603-641-3800 • metelics-sales@aeroflex.com • www.aeroflex.com/metelics

Environmental Capabilities

The MHV500-18-1 silicon hyperabrupt tuning varactor is capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

ESD Rating

As are all semiconductor devices, tuning varactors are susceptible to damage from ESD events. Proper ESD prevention procedures should be followed. The ESD rating for this device is Class 0 (HBM).

Electrical Specifications

= 25 ºC (unless otherwise noted)

Parameter	Symbol	Test Conditions	Minimum Value	Typical Value	Maximum Value	Units
Reverse Breakdown Voltage		= 10 µA	22			V
Total Capacitance		f = 1 MHz = 0 V = 4 V = 20 V	 2.45 0.90 0.33	 2.75 1.00 0.40	 2.95 1.10 0.50	 pF pF pF
Capacitance Ratio	/	f = 1 MHz	2.5		5.5	
Quality Factor	Q	f = 50 MHz, = 4 V		2600		
Reverse Leakage Current		= 17.6 V			50	nA

Absolute Maximum Ratings

= 25 ºC (Unless otherwise noted)

Parameter	Conditions	Absolute Maximum Value
Reverse DC Voltage		22 V
Forward Current		50 mA
Operating Temperature		-55 ºC to 150 ºC
Storage Temperature		-65 ºC to 200 ºC
Assembly Temperature	t = 10 s	260 ºC

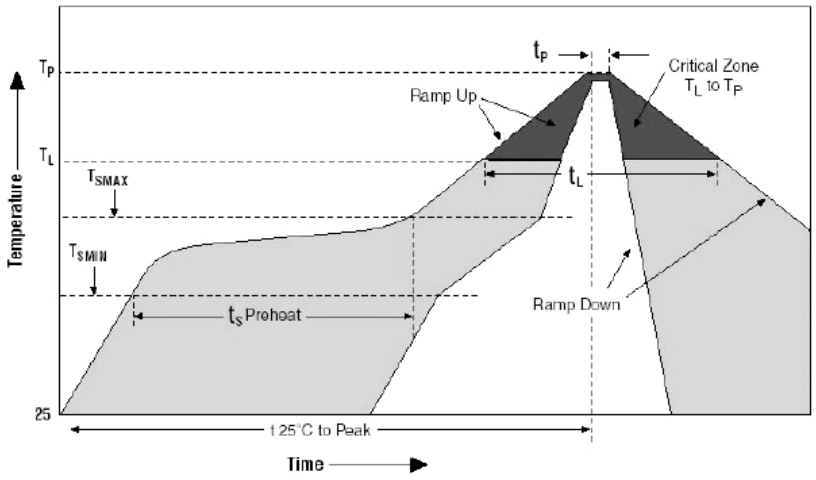
Assembly Instructions

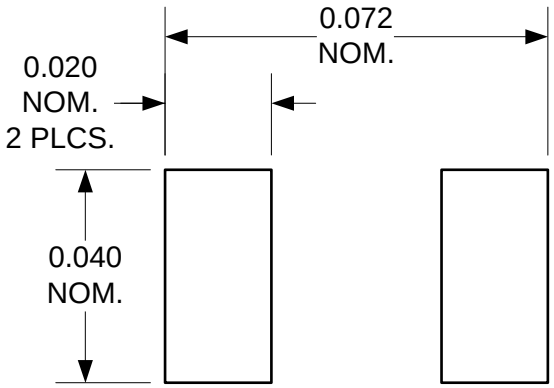
MHV500-18-1 silicon hyperabrupt tuning varactor diodes may be placed onto circuit boards with pick and place manufacturing equipment from tape-reel. The devices are attached to the circuit using conventional solder re-flow or wave soldering procedures with RoHS type or Sn60 /Pb40 type solders. The recommended time-temperature profiles are shown below.

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

Profile Feature	SnPb Solder Assembly	Pb-Free Solder Assembly
Average Ramp-Up Rate (to)	3 ºC/second maximum	3 ºC/second maximum
Pre-heat Temperature Min ( ) Temperature Max ( ) Time (min to max)( )	 100 ºC 150 ºC 60 – 120 seconds	 150 ºC 200 ºC 60 – 180 seconds
to Ramp-Up Rate		 3 ºC/second maximum
Time Maintained Above Temperature ( ) Time ( )	 183 ºC 60 – 150 seconds	 217 ºC 60 – 150 seconds
Peak temperature ( )	225 +0/-5 ºC	260 +0/-5 ºC
Time Within 5 ºC of Actual Peak Temperature ( )	10 – 30 seconds	20 – 40 seconds
Ramp-Down Rate	6 ºC/second maximum	6 ºC/second maximum
Time 25 ºC to Peak Temperature	6 minutes maximum	8 minutes maximum

Solder Re-Flow Time-Temperature Profile

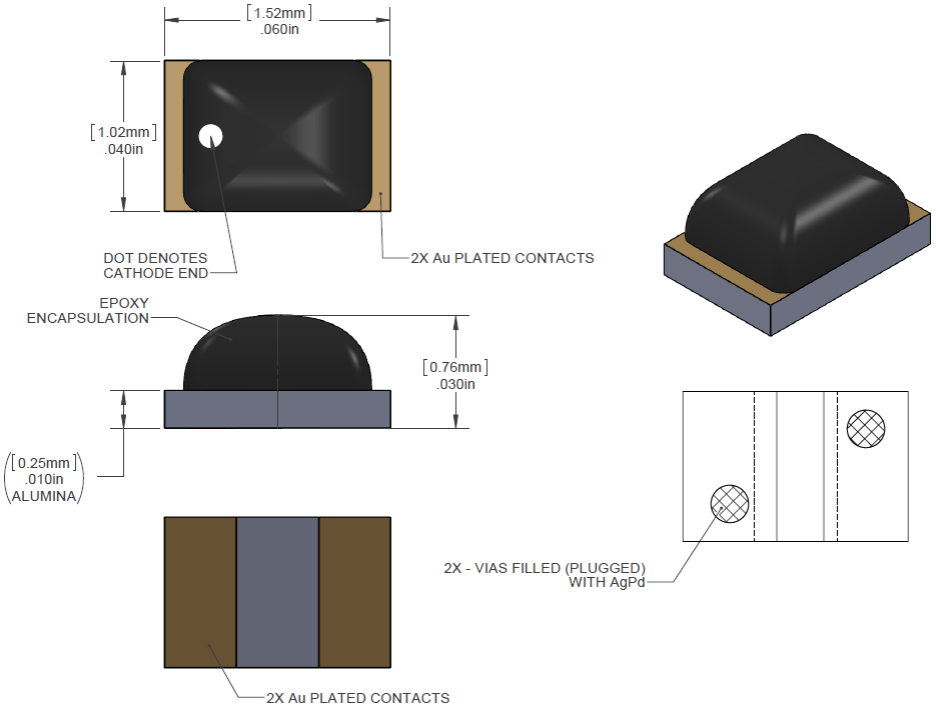




All dimensions in inches.

Suggested PCB Pad Layout – CS18-1

Case Style CS18-1 Outline



Part Number Ordering Information

Part Number	Description	Packaging
MHV500-18-1-R	Si Hyperabrupt Tuning Varactor Diode	Tape-Reel Packaging (Quantity = 3,000)
MHV500-18-1-W	Si Hyperabrupt Tuning Varactor Diode	Waffle Pack (Quantity = 100)

Contact the factory for other packaging options.

East Coast Operations
Aeroflex / Metelics
54 Grenier Field Road
Londonderry , NH 03053 [USA]
Phone: (603) 641-3800
Toll Free: (888) 641-SEMI (7364)
Fax: (603) 641-3500