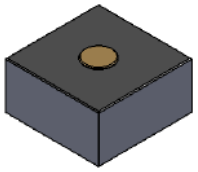
MHV5xx-11 Series

Silicon Hyperabrupt Tuning Varactor Diodes

Rev. V1

Features

- All EPI Mesa Construction
- High Reliability
- High Quality Factor
- Glass Passivation
- RoHS* Compliant



Description

The MHV5xx-11 series of silicon hyperabrupt tuning varactor diodes offer 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. This unpackaged die, is nominally 0.010 in (L) x 0.010 in (W) x 0.005 in (H). This rugged device is capable of reliable operation in all military, commercial and industrial applications. Contact the factory for other package styles.

The MHV5xx-11 is ideally suited for voltage controlled filters, analog voltage controlled phase shifters and voltage controlled oscillators.

Environmental Capabilities

The MHV5xx5-11 silicon hyperabrupt junction varactor diodes are capable of meeting the environmental requirements of MIL-STD-750 and MIL-STD-883.

ESD & 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 these devices is Class 0 (HBM).

Electrical Specifications: T_A = +25°C

Part Number	Junction Capacitance (C_J) (pF)									Ratio		Q
	0 V, 1 MHZ			4 V, 1 MHz			20 V, 1 MHz			C_J4 / C_J20		—
	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Max.	Typ.
MHV500-11	2.25	2.5	2.75	0.70	0.80	0.90	0.13	0.2	0.30	3.0	5.5	2600
MHV501-11	2.8	3.1	3.4	0.90	1.0	1.1	0.16	0.24	0.36	3.0	5.5	2500
MHV502-11	3.3	3.7	4.1	0.98	1.2	1.32	0.18	0.28	0.44	3.0	5.5	2400
MHV503-11	4.2	4.7	5.2	1.35	1.5	1.65	0.24	0.36	0.55	3.0	5.0	2300
MHV504-11	5.0	5.6	6.2	1.63	1.8	1.98	0.30	0.43	0.66	3.0	5.5	2200
MHV505-11	6.1	6.8	7.5	1.98	2.2	2.42	0.36	0.52	0.80	3.0	5.5	2000
MHV506-11	7.2	8.4	9.2	2.43	2.7	2.97	0.44	0.64	1.0	3.0	5.5	1800
MHV507-11	9.0	10.0	11.0	2.97	3.3	3.63	0.54	0.78	1.21	3.0	5.5	1500
MHV508-11	10.8	12.0	13.2	3.51	2.9	4.29	0.64	0.93	1.43	3.0	5.5	1200
MHV509-11	13.1	14.6	16.1	4.23	4.7	5.17	0.77	1.12	1.72	3.0	5.5	1000
MHV510-11	15.7	17.4	19.1	5.04	5.6	6.16	0.91	1.33	2.05	3.0	5.5	800
MHV511-11	18.9	21.0	23.1	6.12	6.8	7.48	1.11	1.62	2.5	3.0	5.5	700
MHV512-11	22.9	25.4	28.0	7.38	8.2	9.02	1.34	1.95	3.0	3.0	5.5	650
MHV513-11	27.9	31.0	34.1	9.0	10.0	11.0	1.64	2.38	3.67	3.0	5.5	600

* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

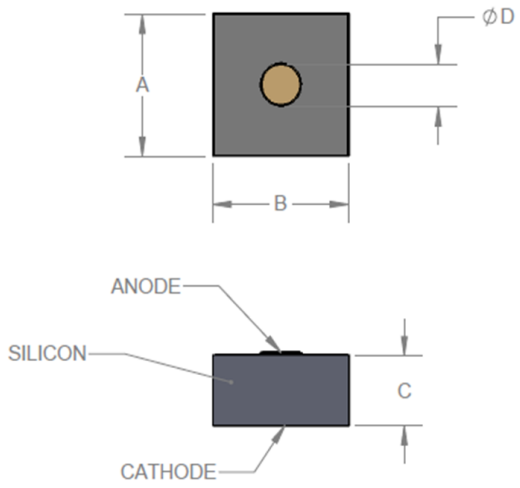
Absolute Maximum Ratings[1,2]

Parameter	Absolute Maximum
Minimum Voltage Breakdown	22 V
Maximum Leakage Current	50 nA
Operating Temperature	-55°C to +150°C
Storage Temperature	-65°C to +200°C

Assembly Instructions

Die attach of MHV5xx-11 silicon hyperabrupt tuning varactor diode chips may be accomplished with conductive epoxy or a eutectic solder such as Au(80%)/Sn(20%) or Au(88%)/Ge(12%). Electrical connection to the cathode may be made with a Au wire or ribbon, utilizing thermo compression or thermosonic bonding. Care should be exercised to not employ excessive pressure or ultrasonic energy while wire/ribbon bonding to avoid physical damage to the die.

Outline Drawing - CS11



Dimensions (inches)

Dimension	Min.	Nom.	Max.
A	0.016	0.018	0.020
B	0.016	0.018	0.020
C	0.006	0.010	0.012
D	—	0.010	—