

## Silicon PIN Diode Switch Element

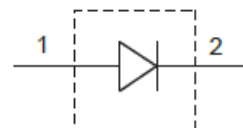
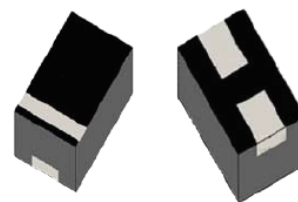
Rev. V1

## Features

- Small Size (50 x 30 mils)
- Broadband Performance up to 1 GHz
- Supports up to 20 W Power
- Low Insertion Loss, 0.05 dB up to 1 GHz
- Cost effective choice for switch applications
- RoHS\* Compliant

## Description

The MSWSE-020-05 is a SPST PIN diode switch element designed for medium incident power applications, up to 20 W CW. It has low insertion loss and medium isolation below 0.5 GHz.



0503 (Molded Plastic DFN Package)

Electrical Specifications:  $T_A = +25^\circ\text{C}$ 

Parameter	Test Conditions	Min.	Typ.	Max.	Units
Breakdown Voltage	$I_R = 10 \mu\text{A}$	250	—	—	V
Forward Voltage	$I_F = 50 \text{ mA}$	—	850	950	mV
Junction Capacitance	$V_R = -50 \text{ V}$ , 1 MHz	—	0.53	0.65	pF
Total Capacitance	$V_R = -50 \text{ V}$ , 1 MHz	—	0.55	—	pF
Series Resistance	$I_F = 10 \text{ mA}$ , 500 MHz $I_F = 100 \text{ mA}$ , 500 MHz	—	0.3 0.1	0.5 0.3	$\Omega$
Lifetime	$I_F = 10 \text{ mA}$ , $I_R = 6 \text{ mA}$ , 50%	—	600	1000	ns
I-Region	I-Layer	—	15	—	$\mu\text{m}$
Insertion Loss	$I_F = 50 \text{ mA}$ , 1 GHz	—	15.00 0.05	— 0.15	dB
Return Loss	$I_F = 50 \text{ mA}$ , 0.5 GHz $I_F = 50 \text{ mA}$ , 1.0 GHz	35 —	40 38	—	dB
Isolation	$V_R = 50 \text{ V}$ , 0.5 GHz $V_R = 50 \text{ V}$ , 1.0 GHz	11 —	14 8	—	dB

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

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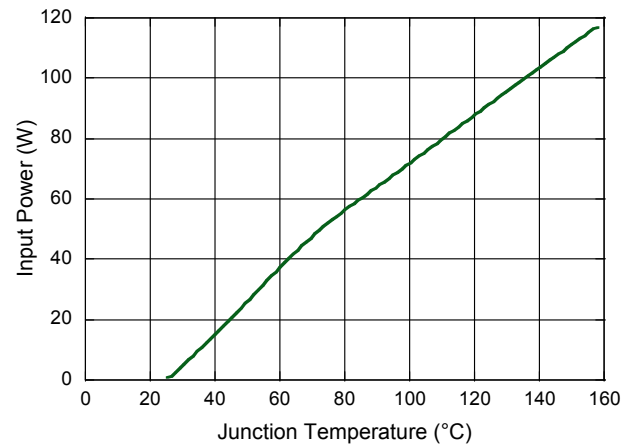
Rev. V1

### Absolute Maximum Ratings<sup>1,2</sup>

Parameter	Absolute Maximum
Breakdown Voltage	250 V
Forward Current	500 mA
Thermal Resistance	15°C/W
Junction Temperature	+175°C
Storage Temperature	-55°C to +150°C
Solder Temperature	+260°C per JEDEC STD-J-20C

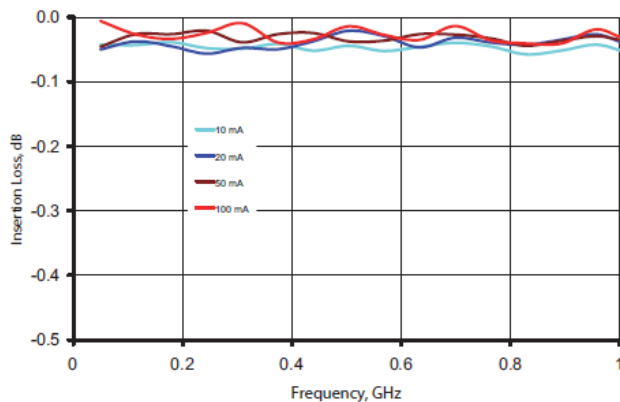
1. Exceeding any one or combination of these limits may cause permanent damage to this device.
2. MACOM does not recommend sustained operation near these survivability limits.

### Junction Temperature vs. Input Power $T_A = 25^\circ\text{C}$ , 1.3 GHz, mounted on heatsink

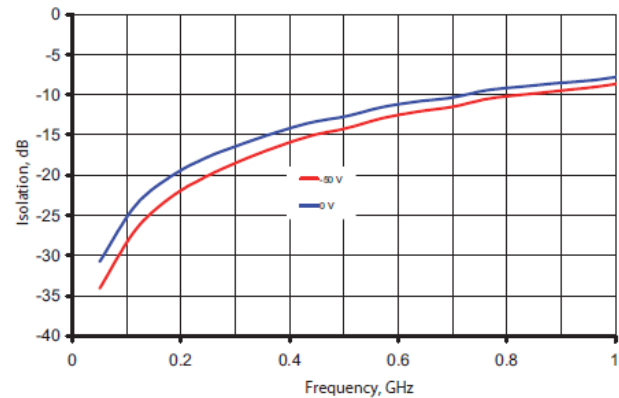


### Typical RF Performance Curves @ +25°C

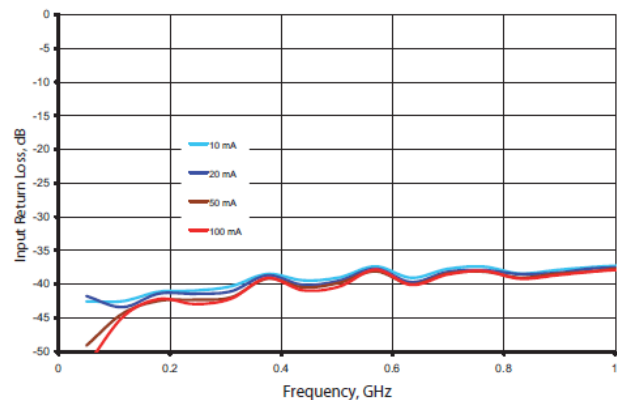
#### Insertion Loss



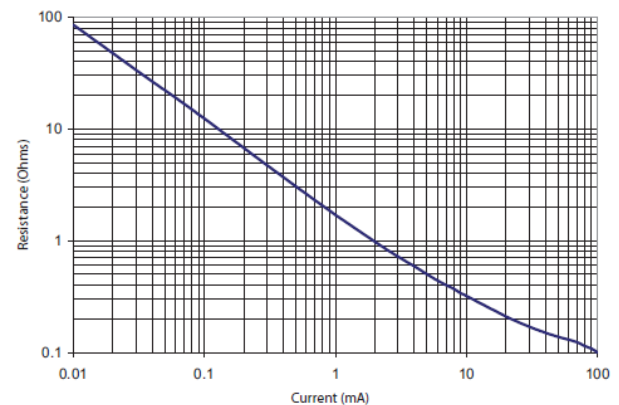
#### Isolation



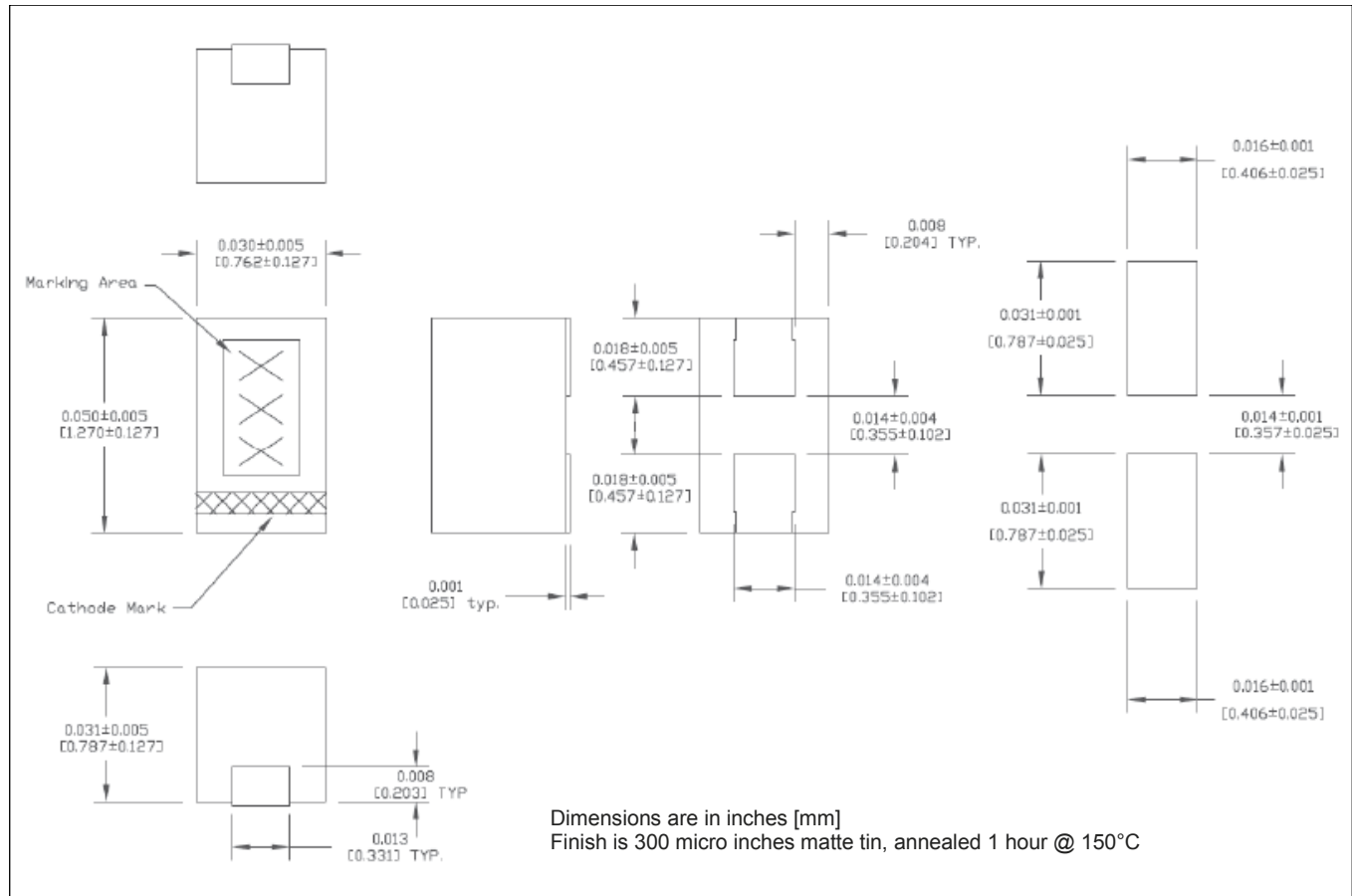
#### Input Return Loss



#### Series Resistance vs. Current



### Package Outline (0503) & PCB Layout



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