

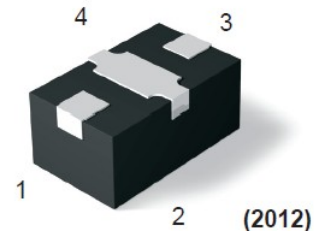
### Features

- Supports up to 20 W Power when Cold Switched
- Low Insertion Loss: 0.25 dB to 2.7 GHz
- High Isolation: 31 dB to 2.7 GHz
- RoHS\* Compliant

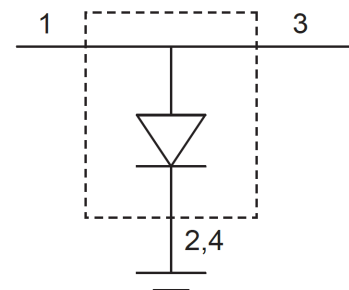
### Description

A broadband, high linearity, medium power shunt switch element in a 1.9 x 1.1 mm DFN package.

This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 6 GHz applications with up to 20 watts of power.



### Pin Out / Schematic



### Ordering Information

Part Number	Package
MSWSH-020-30	3000 piece reel

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

Parameter	Test Conditions	Units	Min.	Typ.	Max.
Breakdown Voltage ( $V_B$ )	$I_R = 10 \mu\text{A}$	V	100	—	—
Junction Capacitance ( $C_J$ )	$V_R = 10 \text{ V}$ , 1 MHz	pF	—	0.13	—
Series Resistance ( $R_S$ )	$I_F = 50 \text{ mA}$ , 500 MHz	$\Omega$	—	0.6	0.9
I-Region (W)	I-Layer	$\mu\text{m}$	—	15	—
Insertion Loss ( $I_L$ )	$V_R = 10 \text{ V}$ 2.3 - 2.7 GHz 6.0 GHz	dB	—	0.25 0.35	0.35 0.45
Isolation ( $I_{SO}$ )	$I_F = 50 \text{ mA}$ 2.3 - 2.7 GHz 6.0 GHz	dB	26 25	31 27	—
Input Return Loss ( $R_L$ )	$V_R = 10 \text{ V}$ 2.3 - 2.7 GHz 6.0 GHz	dB	15 10	19 14	—
Minority Carrier Lifetime ( $T_L$ )	$I_F = 10 \text{ mA}$ , $I_R = 10 \text{ mA}$ , @ 50%	ns	—	600	—

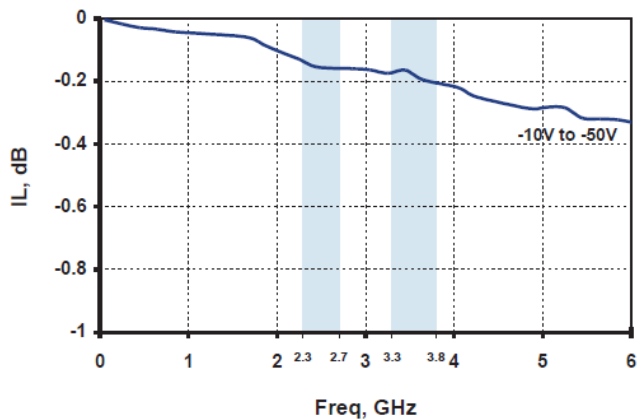
1 \* Restrictions on Hazardous Substances, European Union Directive 2011/65/EU.

### Absolute Maximum Ratings

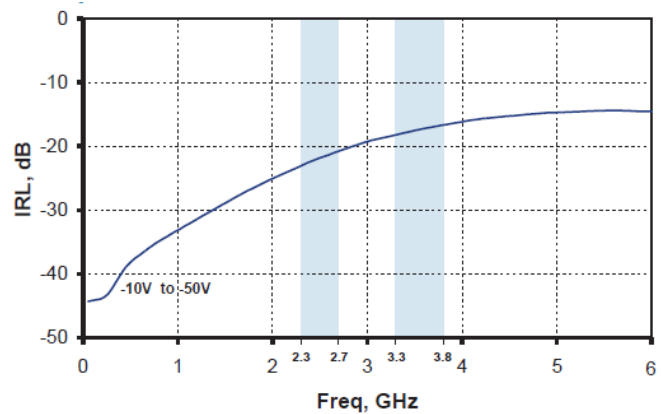
Parameter	Absolute Maximum
Breakdown Voltage	100 V
Forward Current	100 mA
Thermal Resistance	30°C/W
Junction Temperature	+175°C
Storage Temperature	-65°C to +150°C
Assembly Temperature	+260°C Per JEDEC STD-J-20C

### Typical Performance Curves

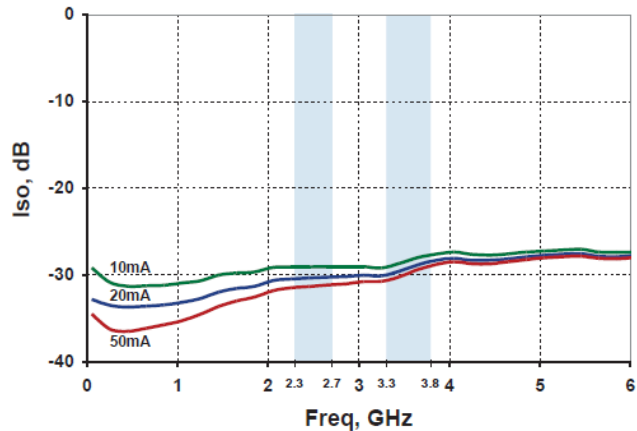
**Insertion Loss**



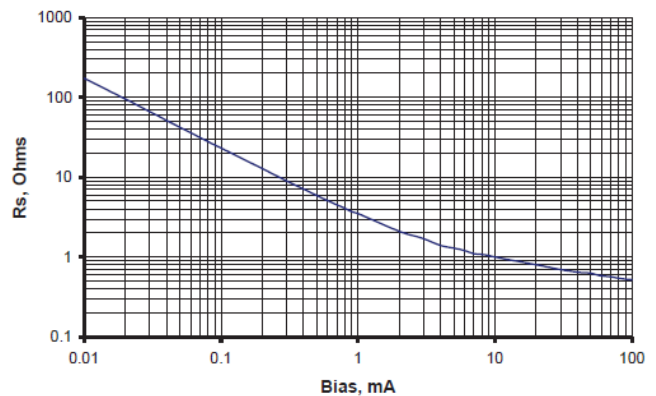
**Input Return Loss**



**Isolation**



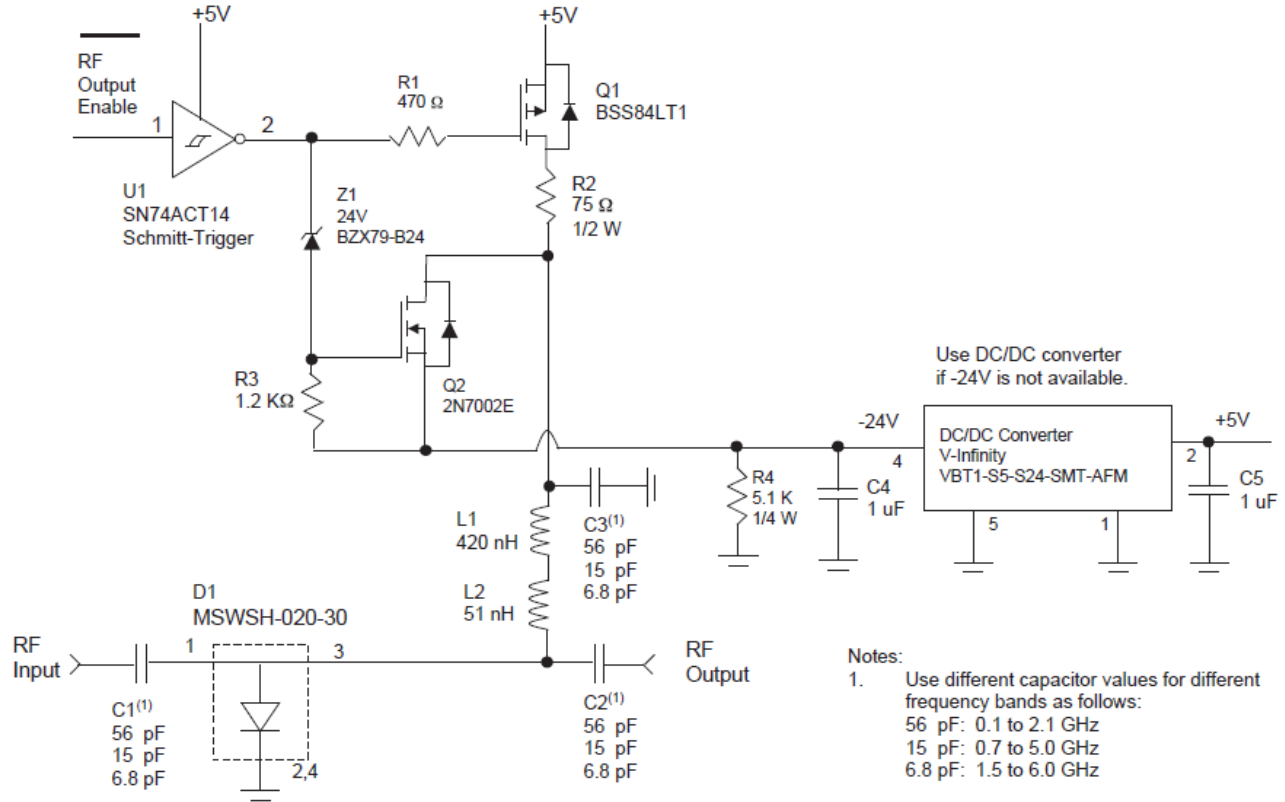
**Series Resistance vs. Current, 500 MHz**



## PIN Diode Shunt Switch Element

Rev. V1

### Bias Schematic (0.1 - 6 GHz)



### Parts List

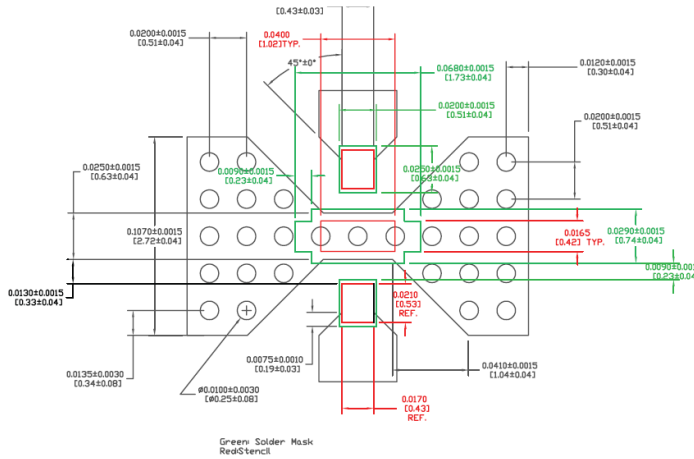
Component	Description	Manufacture	Manufacture Part #
R1	470 Ω, 1/10 W, 0603 chip resistor	KOA Speer	RK73B1JTDD471J
R2	75 Ω, 1/2 W, 1210 chip resistor	KOA Speer	RK73B2ETDD750J
R3	1.2 KΩ, 1/10 W, 0603 chip resistor	KOA Speer	RK73B1JTDD122J
R4	5.1 KΩ, 1/4 W, 1206 chip resistor	KOA Speer	RK73B2BTDD512J
C1,C2,C3 <sup>1</sup>	56 pF, 250 VDC Capacitor, 0603 pkg	ATC	ATC600S560JT250XT
C1,C2,C3 <sup>1</sup>	15 pF, 250 VDC Capacitor, 0603 pkg	ATC	ATC600S150JT250XT
C1,C2,C3 <sup>1</sup>	6.8 pF, 250 VDC Capacitor, 0603 pkg	ATC	ATC600S6R8JT250XT
C4,C5	1 μF, 50 WVDC Capacitor, 1206 pkg	ATC	ATC1206Z5U105MT2AT
L1	420 nH, 340 mA, 700 MHz SRF Inductor	Coilcraft	0402AF-421XJLW
L2	51 nH, 330 mA, 2.3 GHz SRF, Inductor	Coilcraft	0402HP-51NXJLW
Q1	50 V, 130 mA, P-Channel MOSFET	ON SEMI	BSS84LT1
Q2	60 V, 310 mA, N-Channel MOSFET	ON SEMI	2N7002E
U1	Hex Schmitt-Trigger TTL Inverter	Texas Instruments	SN74ACT14
Z1	24 V, 2%, 500 mW Zener Diode	Philips	BZX79-B24
DC1	1 W, 5 V to 24 V DC/DC Converter	V-Infinity	VBT1-S5-S24-SMT-AFM

1. Use different capacitor values for different frequency bands as follows:  
56 pF: 0.1 to 2.1 GHz  
15 pF: 0.7 to 5.0 GHz  
6.8 pF: 1.5 to 6.0 GHz

## PIN Diode Shunt Switch Element

Rev. V1

### Printed Circuit Board Layout

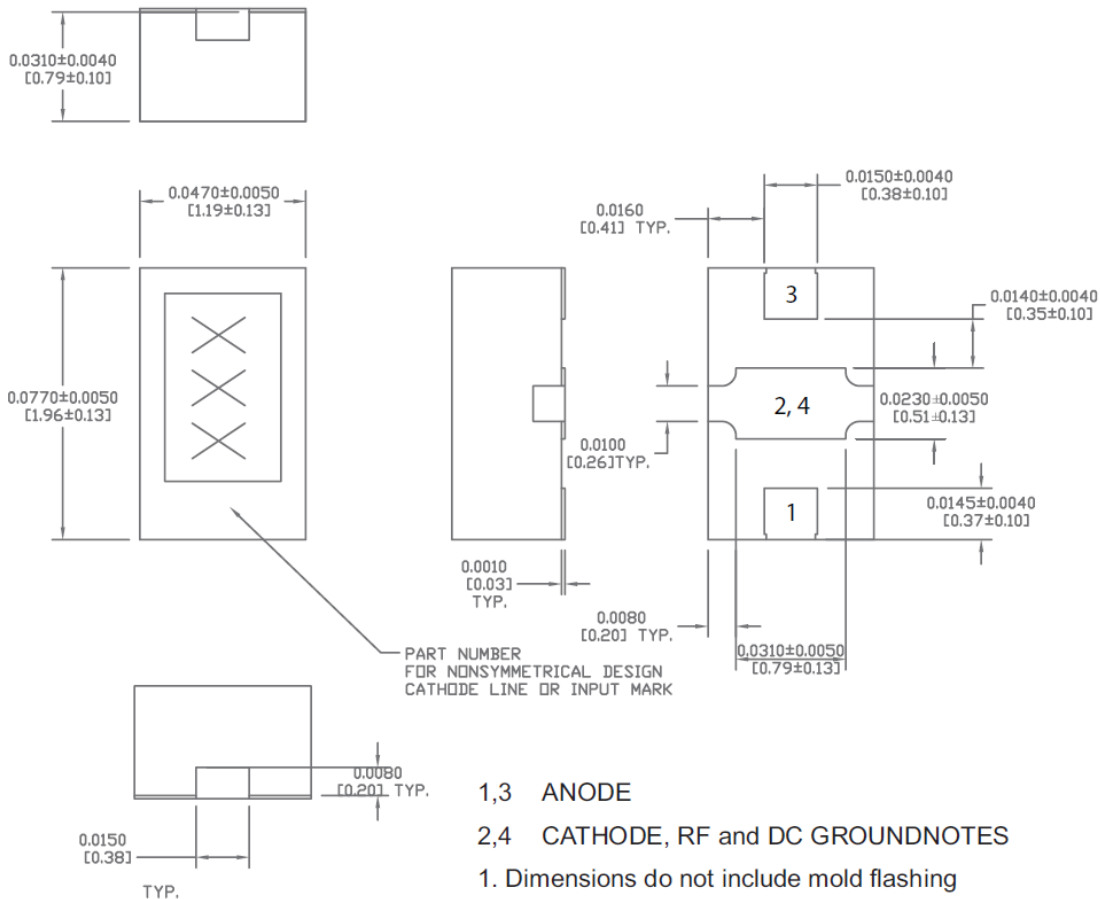


NOTE: If possible, use copper filled vias underneath pin 2 and 4 for better thermals; otherwise, use vias that are plated through, filled and plated over.

Solder mask should provide a 60 um clearance between copper pad and soldermask. Rounded pkg pads should have matching rounded solder mask openings.

Use circles or squares for the thermal land stencil such that only get 50% to 80% solder paste coverage.

### Outline (2012)



- 1,3 ANODE
- 2,4 CATHODE, RF and DC GROUNDNOTES
- 1. Dimensions do not include mold flashing
- 2. Burrs and dumber shall not exceed 0.002" per surface.
- 3. Lead co-planarity is 0.003" max

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