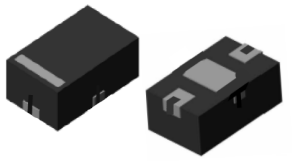
PIN Diode Shunt Switch Element

MSWSH-020-30
Rev. V3

Features

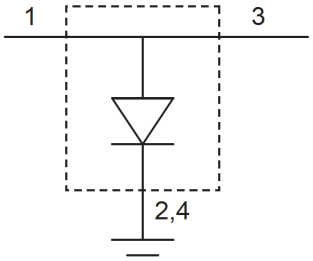
- Supports up to 20 W Power when Cold Switched
- Low Insertion Loss: 0.25 dB to 2.7 GHz
- High Isolation: 31 dB to 2.7 GHz
- RoHS* Compliant



Applications

- WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure

Pin Out / Schematic



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.

Electrical Specifications: T_A = +25°C

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

Ordering Information

Part Number	Package
MSWSH-020-30	500 piece reel

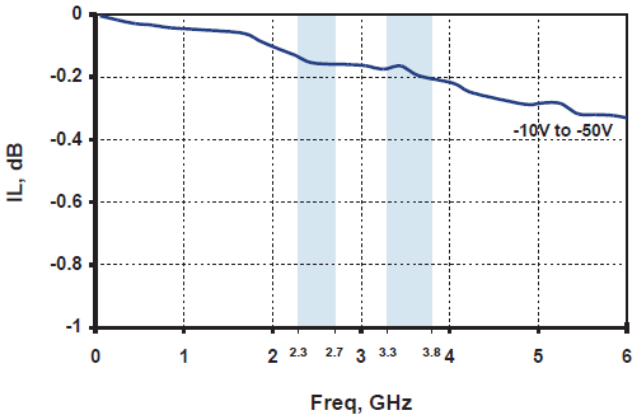
* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

Absolute Maximum Ratings

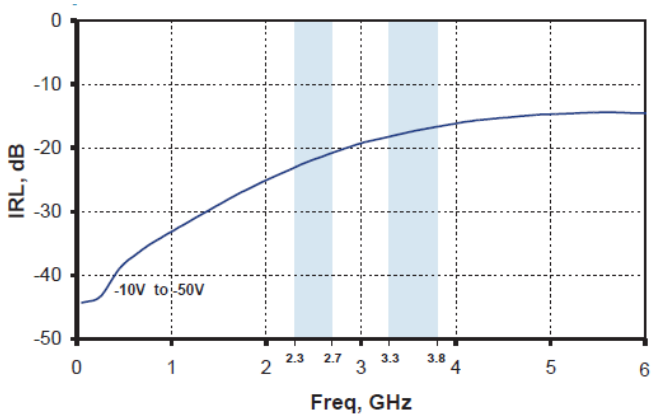
Parameter	Absolute Maximum
Breakdown Voltage	100 V
Forward Current	100 mA
Thermal Resistance	30°C/W
Junction Temperature	+175°C
Storage Temperature	-65°C to +150°C
Assembly Temperature	+260°C Per JEDEC STD-J-20C

Typical Performance Curves

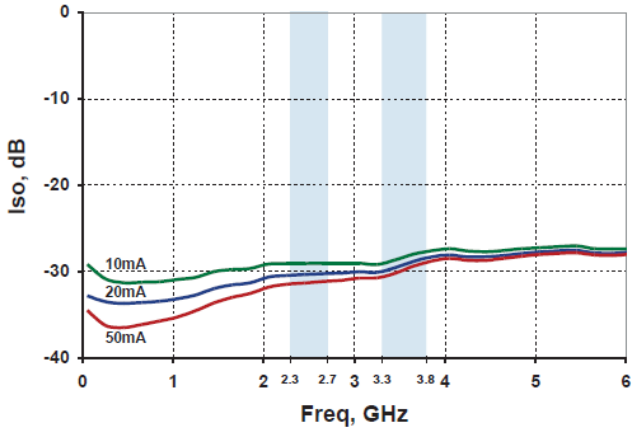
Insertion Loss



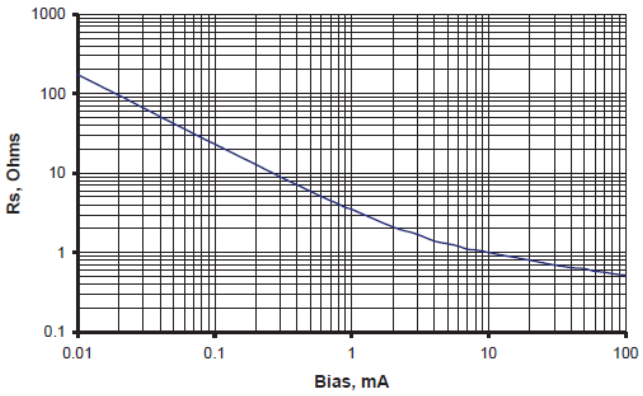
Input Return Loss



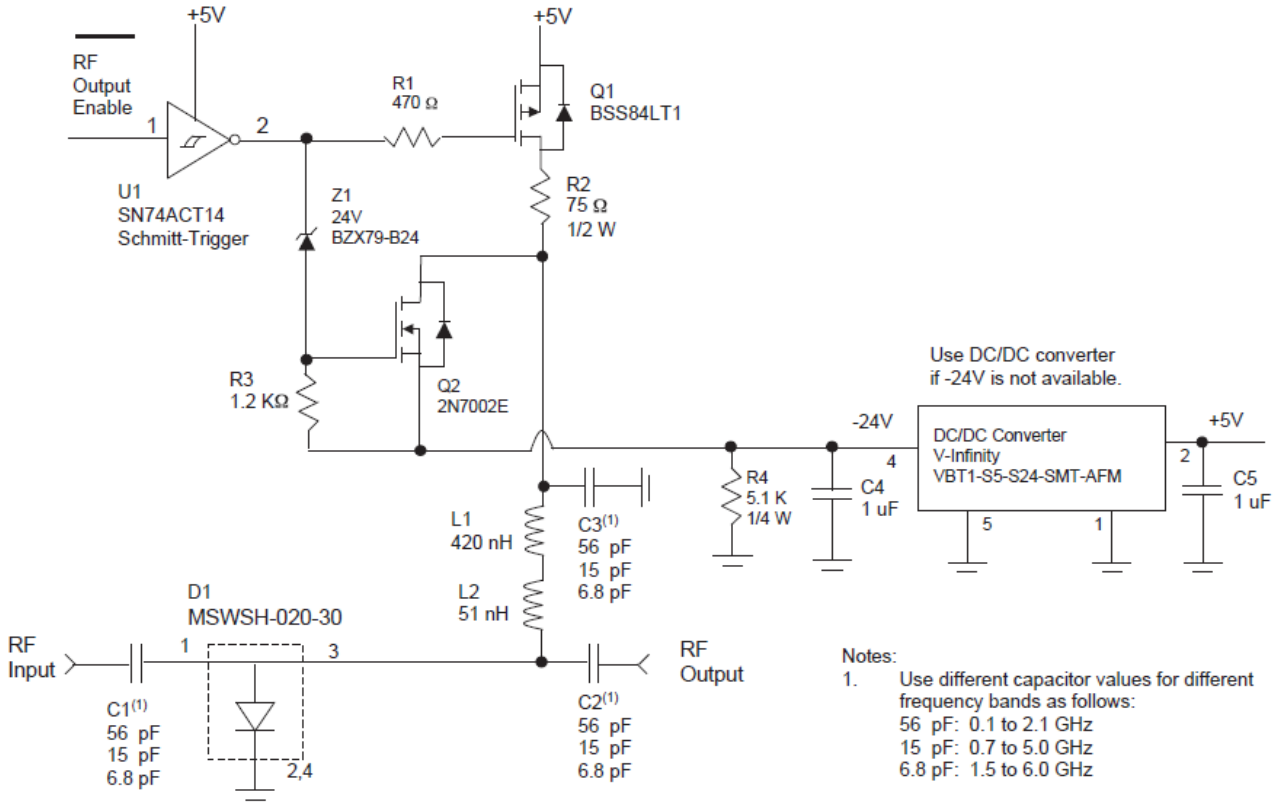
Isolation



Series Resistance vs. Current, 500 MHz



Bias Schematic (0.1 - 6 GHz)



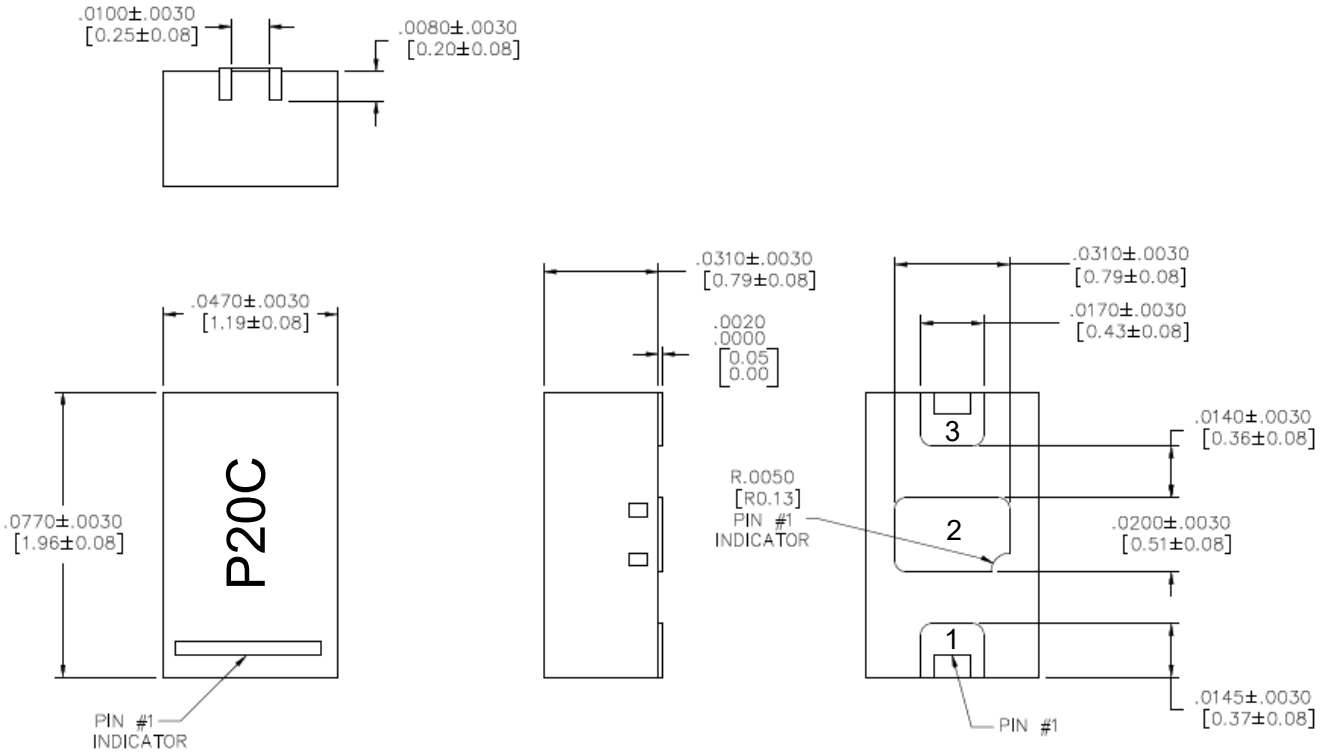
Parts List

Component	Description	Manufacture	Manufacture Part #
R1	470 Ω, 1/10 W, 0603 chip resistor	KOA Speer	RK73B1JTTD471J
R2	75 Ω, 1/2 W, 1210 chip resistor	KOA Speer	RK73B2ETTD750J
R3	1.2 KΩ, 1/10 W, 0603 chip resistor	KOA Speer	RK73B1JTTD122J
R4	5.1 KΩ, 1/4 W, 1206 chip resistor	KOA Speer	RK73B2BTTD512J
C1,C2,C3[1]	56 pF, 250 VDC Capacitor, 0603 pkg	ATC	ATC600S560JT250XT
C1,C2,C3[1]	15 pF, 250 VDC Capacitor, 0603 pkg	ATC	ATC600S150JT250XT
C1,C2,C3[1]	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

Printed Circuit Board Layout

Outline (2012)

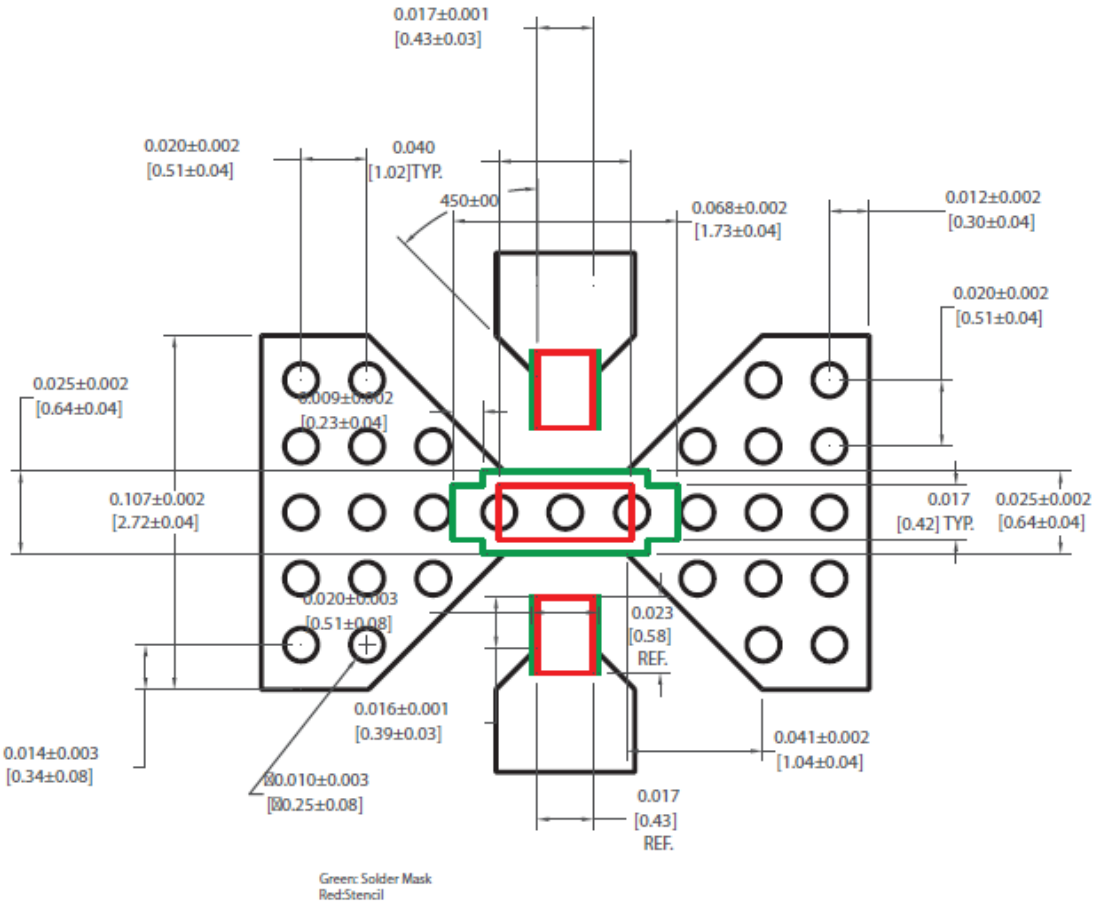


All dimensions shown as in [mm].
Bottom Terminal Plating: NiPdAu
Lead Frame Material: 8 mil Copper

1, 3 ANODE

2 CATHODE

Printed Circuit Board Layout



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

Solder mask should provide a 60 µm 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.

Mouser Electronics

Authorized Distributor

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