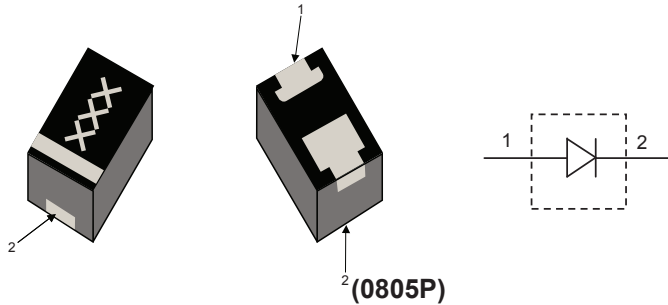


MSWSE-040-10

PIN Diode Series Switch Element



Description

A broadband, high linearity, medium power series switch element in a 2.0 X 1.3 mm QFN package. This device is designed for WiMax, Wibro, WLAN, TD-SCDMA and other wireless infrastructure applications. It is also suited for 0.1 ~ 3 GHz applications with up to 40 watts of power.

Features

- Supports up to 40 watts power when cold switched
- Low Insertion Loss 0.25 dB typical up to 2.7 GHz
- Medium Isolation 11 dB typical up to 2.7 GHz

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

SYMBOL	TEST CONDITIONS		MIN	TYPICAL	MAX	UNITS
V_{BR}	$I_R = 10\ \mu\text{A}$		250	-	-	V
V_F	$I_F = 50\ \text{mA}$		-	900	-	mV
C_J	$V_R = 50\ \text{V}$	$F = 1\ \text{MHz}$	-	0.12	-	pF
R_S	$I_F = 10\ \text{mA}$	$F = 500\ \text{MHz}$	-	2.0	-	Ω
R_S	$I_F = 50\ \text{mA}$	$F = 500\ \text{MHz}$	-	0.6	1.4	Ω
τ	$I_F = 10\ \text{mA}$	$I_R = 6\ \text{mA}\ 50\%$	-	700	-	nsec
W	I - Layer		-	40	-	μm
IL	$I_F = 50\ \text{mA}$	$F = 2.025\ \text{GHz}$	-	0.12	0.20	dB
		$F = 2.3 \sim 2.7\ \text{GHz}$	-	0.25	0.35	dB
IRL	$I_F = 50\ \text{mA}$	$F = 2.025\ \text{GHz}$	15	25	-	dB
		$F = 2.3 \sim 2.7\ \text{GHz}$	15	20	-	dB
Iso	$V_R = 10\ \text{V}$	$F = 2.025\ \text{GHz}$	10	14	-	dB
		$F = 2.3 \sim 2.7\ \text{GHz}$	9	11	-	dB

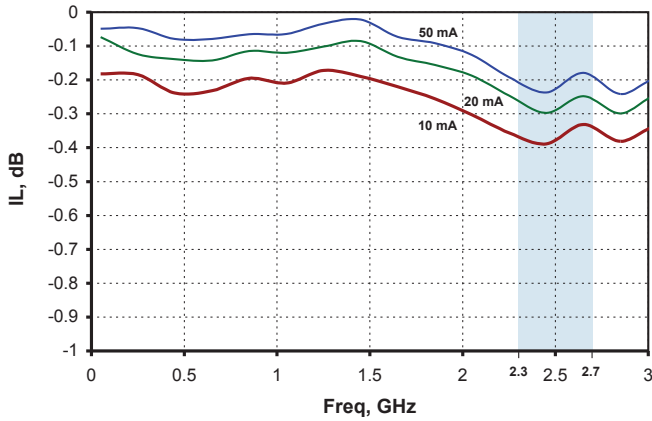
Absolute Maximum Ratings

RATING	LIMITS	UNITS
V_R	250	V
I_F	100	mA
θ_{JC}	20	$^\circ\text{C}/\text{W}$
T_J	+175	$^\circ\text{C}$
T_{STG}	-65 to +150	$^\circ\text{C}$
T_{SOLDER}	+260 $^\circ\text{C}$ per JEDEC J-STD-20C	

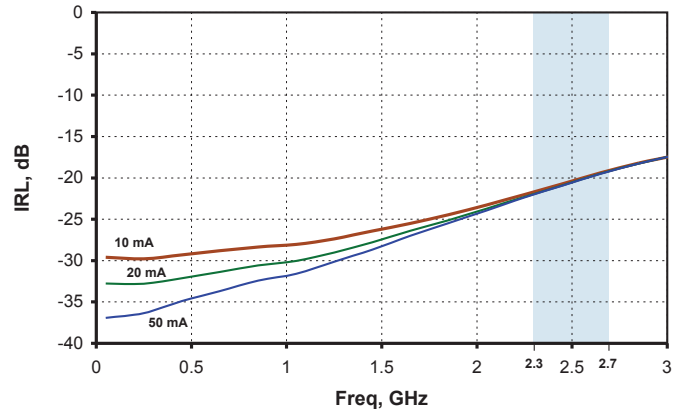


Typical RF Performance at $T_A = 25\text{ }^\circ\text{C}$, $Z_o = 50\ \Omega$, Small Signal
(Unless Otherwise Specified)

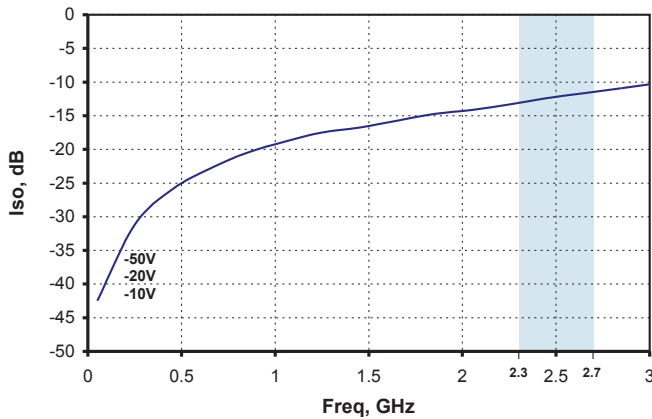
Insertion Loss



Input Return Loss

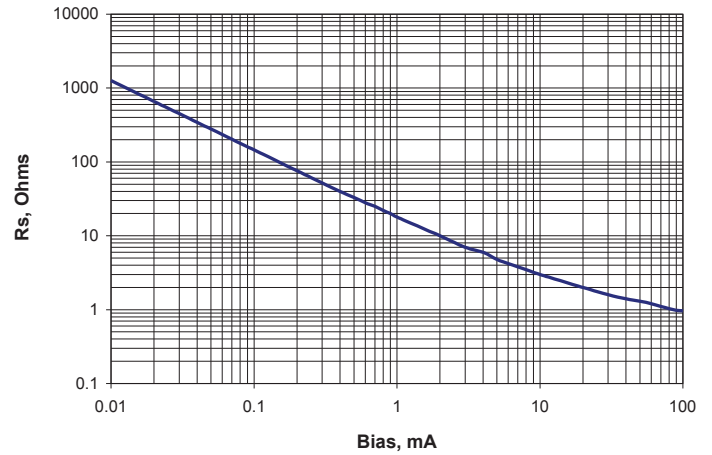


Isolation



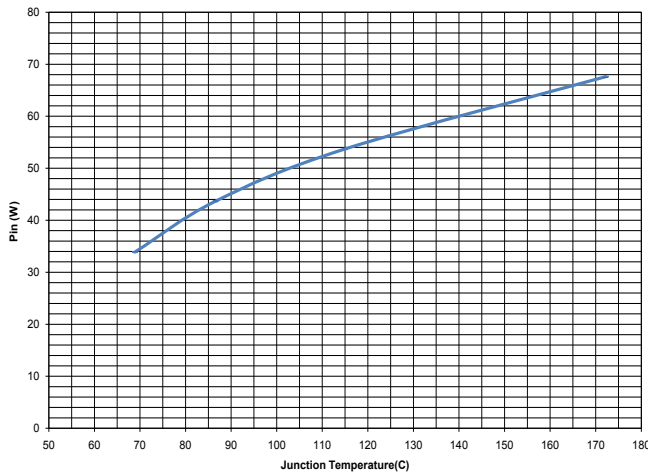
Series Resistance vs. Current

(Freq = 500 MHz)

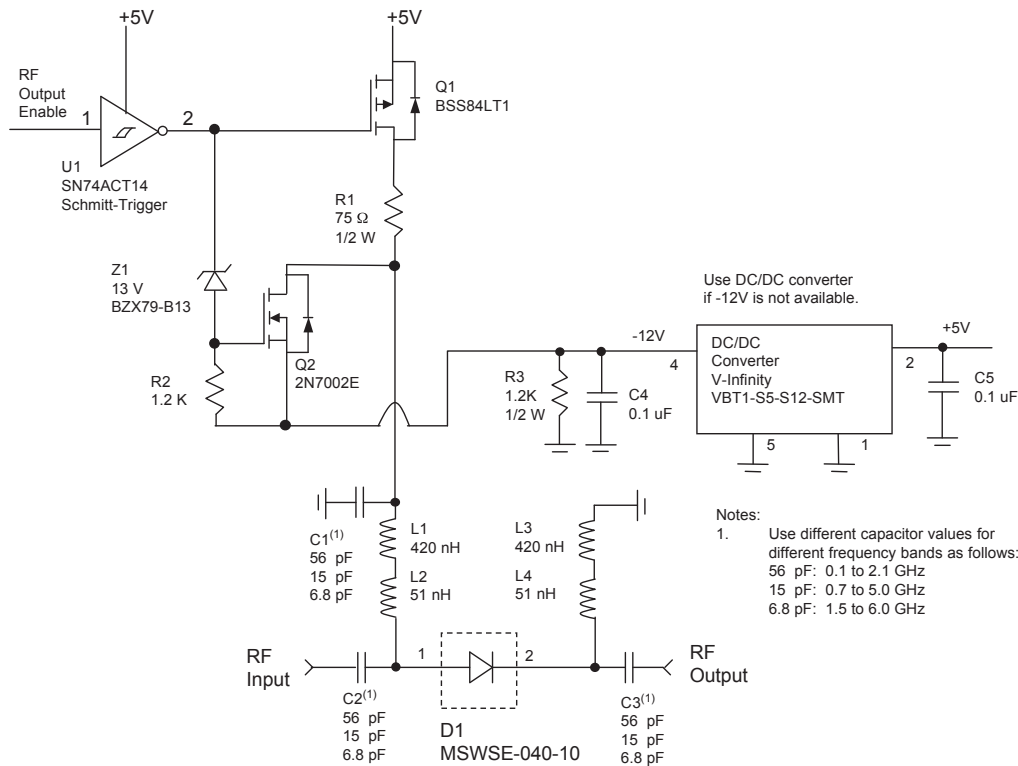


Junction Temperature vs Power with the Backside of Board maintained @ 25°C

Board thickness 62 mils



Bias Schematic (0.1 to 3 GHz)



Parts List

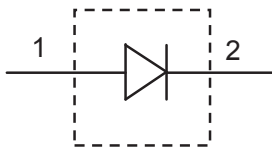
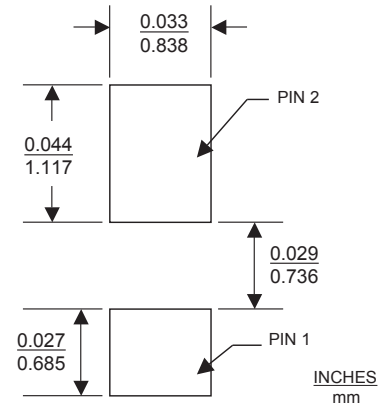
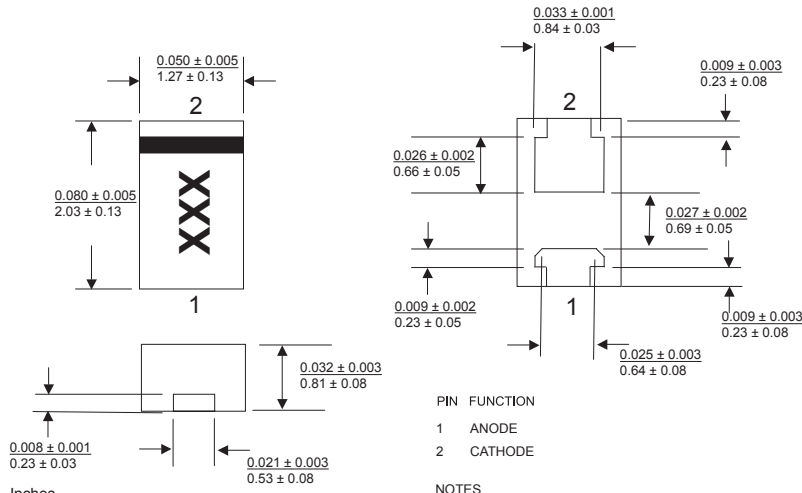
COMPONENT	DESCRIPTION	MANUFACTURE	P/N
R1	75Ω, 1/2W, 1210 chip resistor	KOA Speer	RK73B2ETTD750J
R2	1.2KΩ, 1/10W, 603 chip resistor	KOA Speer	RK73B1JT2D122J
R3	1.2KΩ, 1/2W, 1210 chip resistor	KOA Speer	RK73B2ETTD122J
C1,C2,C3 ⁽¹⁾	56pF, 250VDC Capacitor, 0603 pkg	ATC	ATC600S560JT250XT
C1,C2,C3 ⁽¹⁾	15pF, 250VDC Capacitor, 0603 pkg	ATC	ATC600S150JT250XT
C1,C2,C3 ⁽¹⁾	6.8pF, 250VDC Capacitor, 0603 pkg	ATC	ATC600S6R8JT250XT
C4,C5	0.1 uF, 50VDC Capacitor, 0805 pkg	ATC	ATC0805XR7104KT2AT
L1,L3	420nH, 340mA, 700MHz SRF Inductor	Coilcraft	0402AF-421XJLW
L2,L4	51nH, 330mA, 2.3GHz SRF, Inductor	Coilcraft	0402HP-51NXJLW
Q1	50V, 130mA, P-Channel MOSFET	ON SEMI	BSS84LT1
Q2	60V, 310mA, N-Channel MOSFET	ON SEMI	2N7002E
U1	Hex Schmitt-Trigger TTL Inverter	Texas Instruments	SN74ACT14
Z1	13V, 2%, 500mW Zener Diode	Philips	BZX79-B13
DC1	1W, 5V to 12V DC/DC Converter	V-Infinity	VBT1-S5-S12-SMT-AFM
D1	PIN Diode Series Switch in 0805 pkg	Aeroflex-Metelics	MSWSE-040-10

Notes:

- 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

Package Outline (0805P) and Electrical Schematic

PCB Layout



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