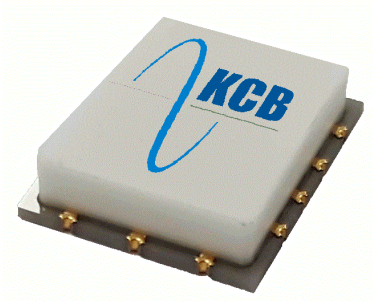
KS102-55

Switch, SPDT
0.225 – 3.5 GHz
100W

KCB SOLUTIONS
THE HIGHEST STANDARD IN RF



DESCRIPTION

The KS102-55 is a common anode SPDT PIN switch that offers high power handling and low insertion loss in a compact surface mount package. Built on a highly thermally conductive Aluminum Nitride (AlN) substrate, this switch is ideal for high performance commercial and military applications where low loss combined with high adjacent port isolation is required. In addition, the thick copper under metal provides superior loss performance as well as higher bias current handling than traditional metallization schemes. High power diodes have been chosen to provide the optimum blend of loss, isolation and harmonic performance.

FEATURES

- ✓ High Power Series-Shunt PIN Diode Design
- ✓ Broadband operation from 0.225 – 3.5 GHz
- ✓ Surface Mount 8mm x 7mm QFN-style Leadless Package
- ✓ Rugged Aluminum Nitride Carrier with Thick Copper Traces
- ✓ ROHS Compliant

RoHS COMPLIANT

APPLICATIONS

- ✓ Microwave Radios
- ✓ Military Radios
- ✓ VSAT
- ✓ Telecom Infrastructure
- ✓ Test Equipment

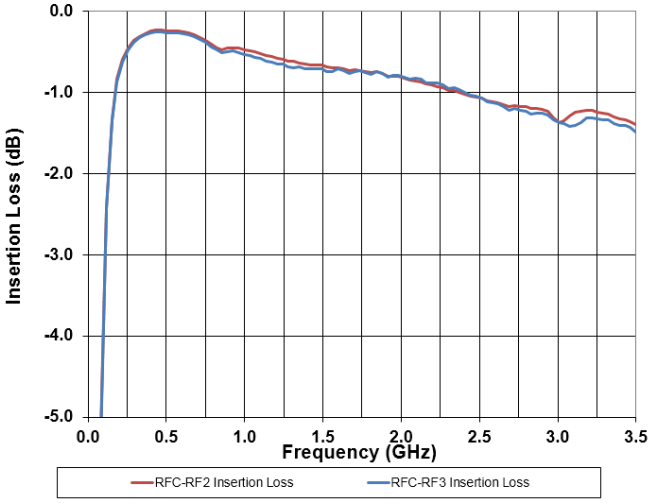
ELECTRICAL CHARACTERISTICS (+25˚C)[1]

Parameter	Symbol	Conditions	Min	Typical	Max	Units
Insertion Loss	IL	0.225 – 1.0 GHz		0.25	0.4	dB
		1.0 – 2.0 GHz		0.40	0.6	dB
		2.0 – 2.6 GHz		0.45	0.8	dB
		2.6 – 3.5 GHz		1.20	1.5	dB
Isolation	ISO	0.225 – 1.0 GHz	38	45		dB
		1.0 – 2.0 GHz	28	35		dB
		2.0 – 2.6 GHz	23	26		dB
		2.6 – 3.5 GHz	20	23		dB
Return Loss Input	|S11|/ |S22|	0.225 – 2.0 GHz	14	18		dB
		2.0 – 2.6 GHz	12	15		dB
		2.6 – 3.5 GHz	10	12		dB
Switching Speed				50		dB

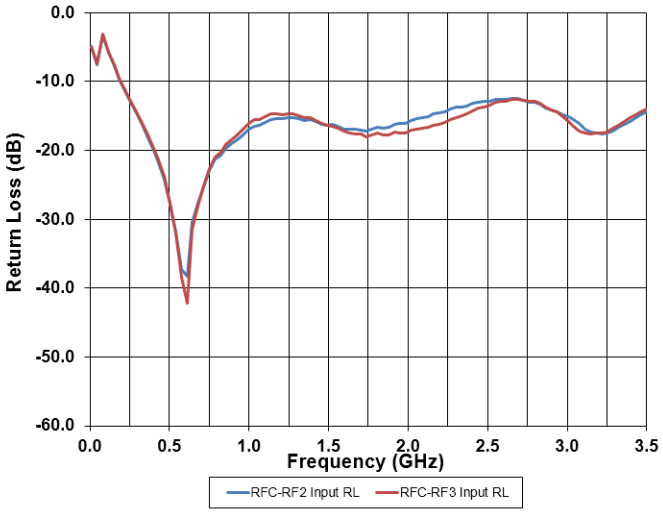
1. All electrical characteristics are measured at +25˚C at a minimum.

TYPICAL PERFORMANCE (+25 °C)

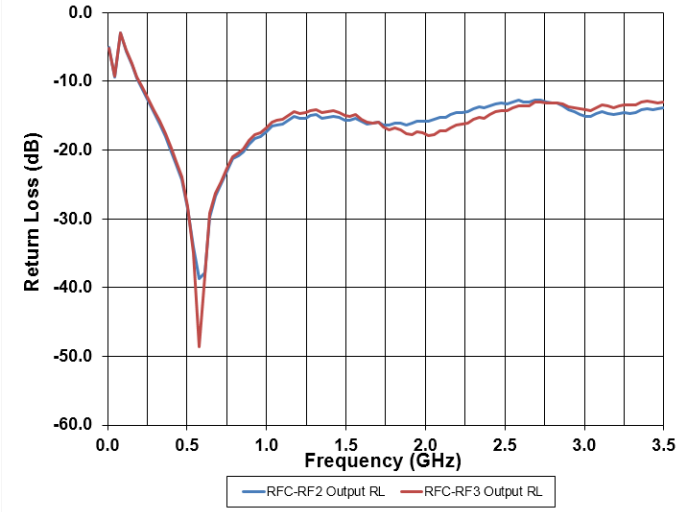
Insertion Loss vs Frequency



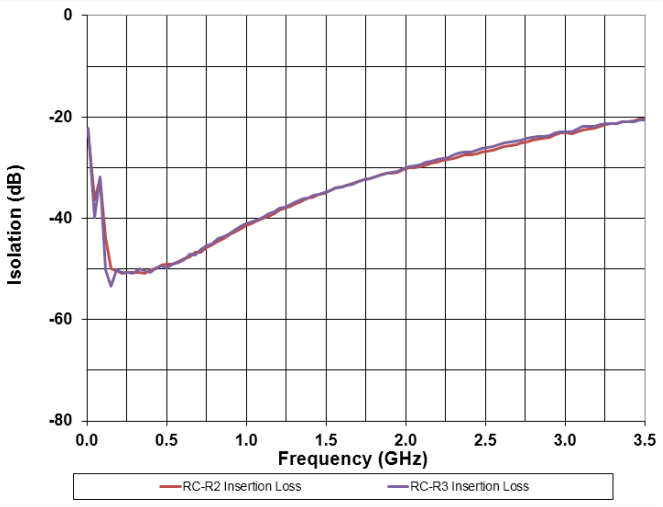
Input Return Loss vs Frequency



Output Return Loss vs Frequency



Isolation vs Frequency



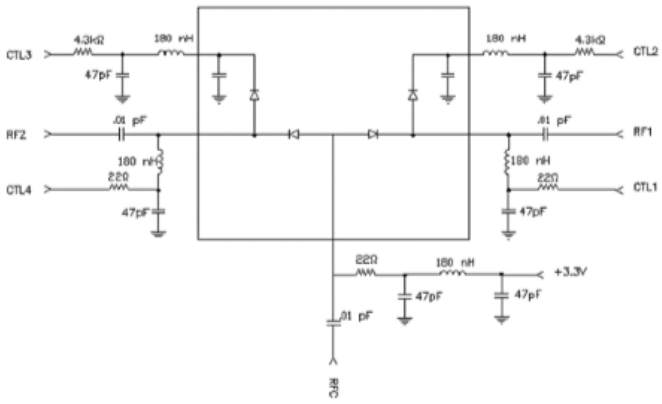
TRUTH TABLE

CTL3	CTL4	CTL5	CTL6	RF Path
$-I_{CTL}$	V_{RB}	$-I_{CTL}$	V_{RB}	RFC—RF2
V_{RB}	$-I_{CTL}$	V_{RB}	$-I_{CTL}$	RFC—RF3

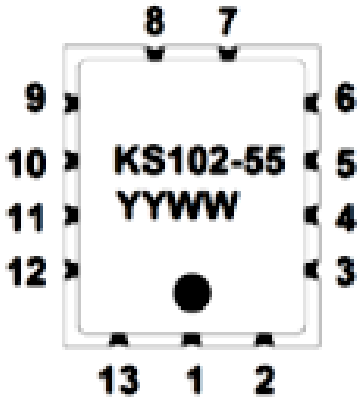
Schematic Notes:

1. CTL3-CTL6 should be chosen to maintain reverse bias through peak RF voltage excursions during the OFF state and to maintain proper forward bias current (ICTL) during ON state. See truth table.
2. DC blocking capacitors on RF lines should be large enough to provide low loss at the lowest operating frequency.
3. All inductors should be large enough to provide high impedances at the lowest operating frequency.
4. Bypass capacitors should be large enough to adequately filter supply noise from DC control lines

SCHEMATIC



DEVICE MARKING/PIN OUT:



PIN	Designation	PIN	Designation
1	RFC	8	CTL5
2	GND	9	RF3/CTL6
3	GND	10	GND
4	GND	11	GND
5	GND	12	GND
6	RF2/CTL3	13	GND
7	CTL4		

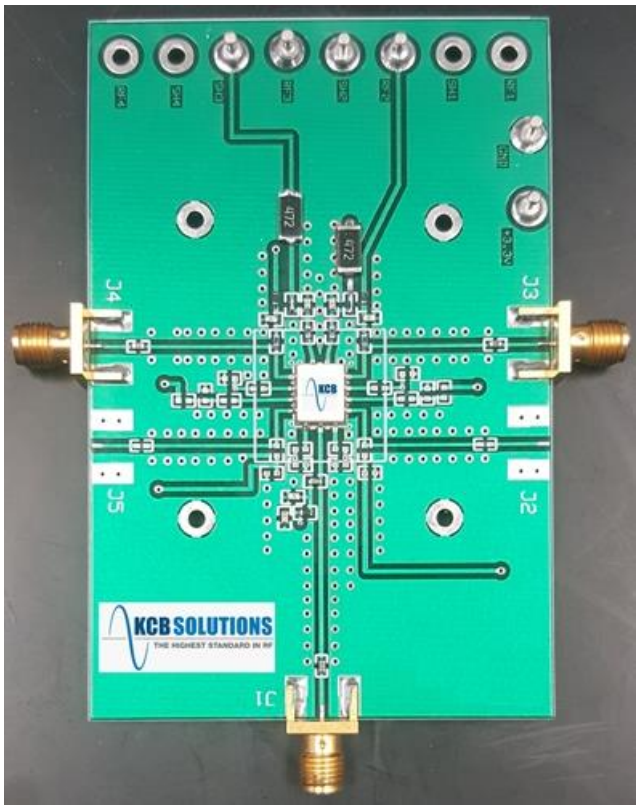
PACKAGE NOTES:

- Lid: Ceramic
- Base: Aluminum Nitride
- Termination Finish: Gold over Nickel

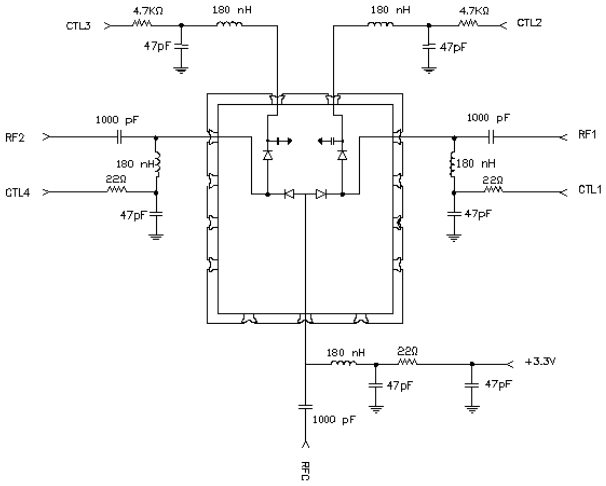
ADDITIONAL NOTES:

- Maximum reflow temperature: 265°C
- External blocking capacitors required on all RF ports

EVALUATION PCB:



EVALUATION SCHEMATIC:



Location	Value	Part Number	Manufacturer
C1,C3,C4,C5	1000pF, 250V	C1608NP02E102J080AA	TDK
C6,C7,C10—C15	47pF, 250V	600S470JT250XT	ATC
R3,R5—R7	22 Ohms, 1/4W	ERJ-PA3F22R0V	Panasonic
R9—R11	4.7K Ohms, 3W	35224K7JT	TE Connectivity
L1—L9	180 nH	0603HP-R18XGLW	Coilcraft

EVALUATION PCB TRUTH TABLE:

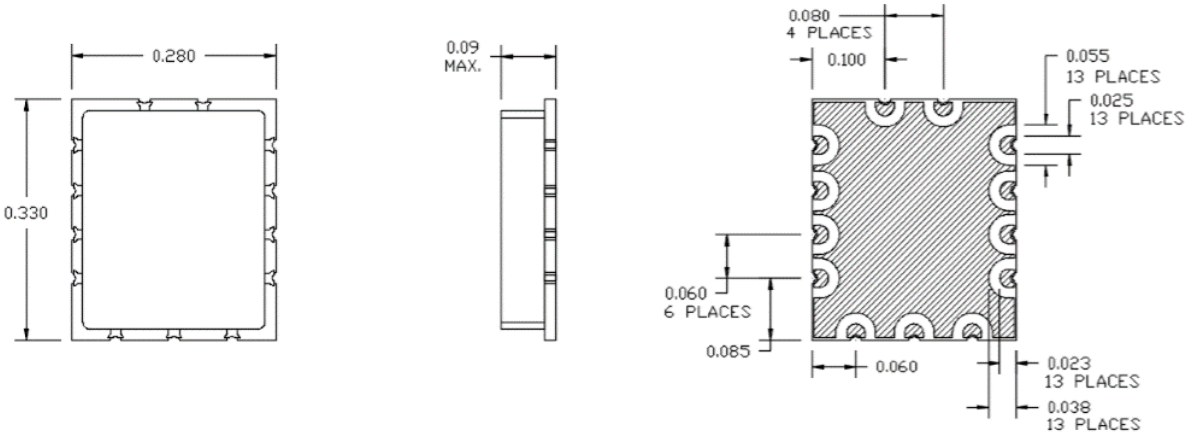
CTL3	CTL4	CTL5	CTL6	RF Path
GND	V_{CTL}	GND	V_{CTL}	RFC—RF2
V_{CTL}	GND	V_{CTL}	GND	RFC—RF3

ABSOLUTE MAXIMUM RATINGS

Characteristic	Min.	Max.	Units
Control Voltage (VCTL)	0	250	V
RF Input Power		100	W
Storage Temperature	-65	+150	˚C
Operating Temperature	-55	+85	˚C
Control Current (ICTL)		100	mA
Operating Frequency	0.225	3.5	GHz

1. Unit shall survive operation without damage over the temperature range but not tested.

OUTLINE:



RECOMMENDED SOLDER LAYOUT:

Notes:

1. Use SN-63 solder
2. Flooded ground plane in area outside device leads
3. Add ground vias under part and between corner leads

Contact KCB Solutions for further guidance on device placement and attachment