

# KS113-52

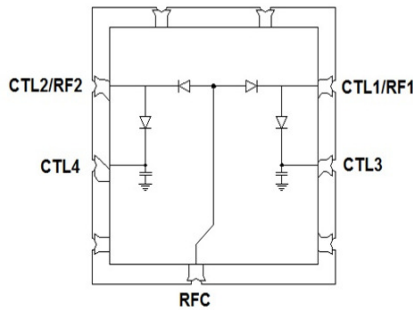
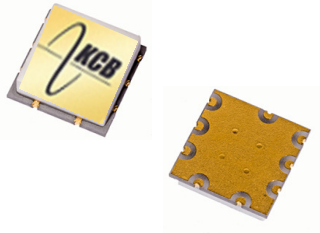
SPDT 50W SWITCH

0.02 – 2.0 GHz



## DESCRIPTION

The KS113-52 is a 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 0.02 – 2.0 GHz
- ✓ Surface Mount 7mm QFN-style Leadless Package
- ✓ Rugged Aluminum Nitride Carrier with Thick Copper Traces

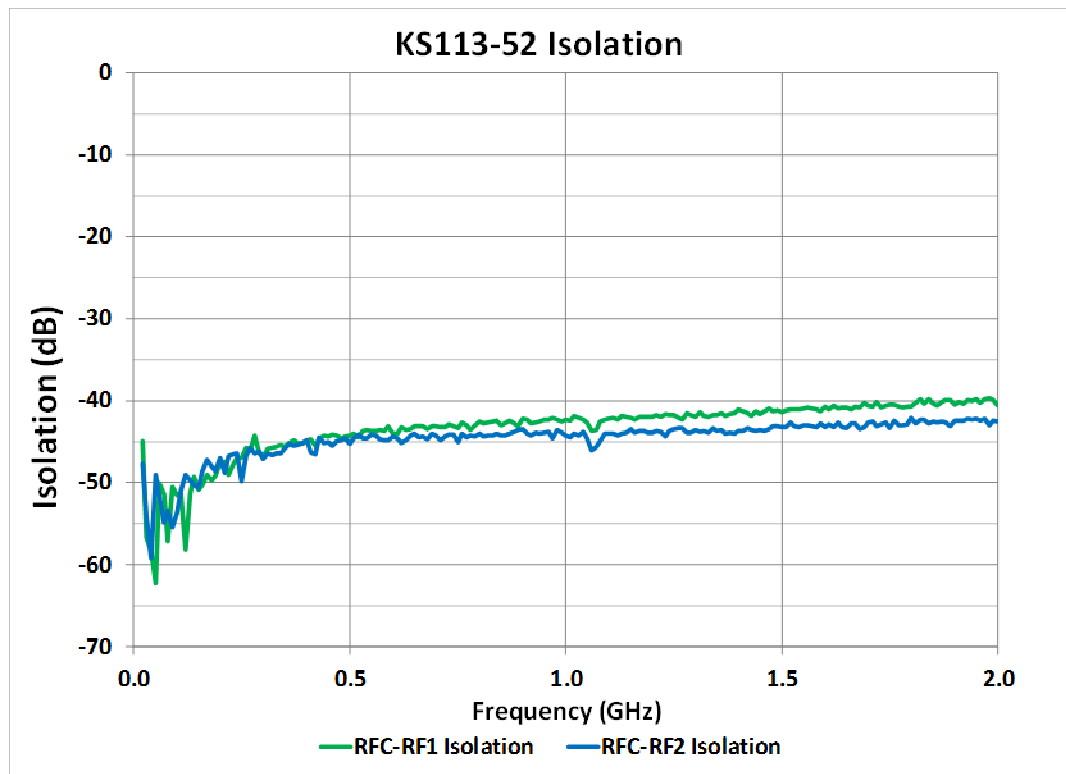
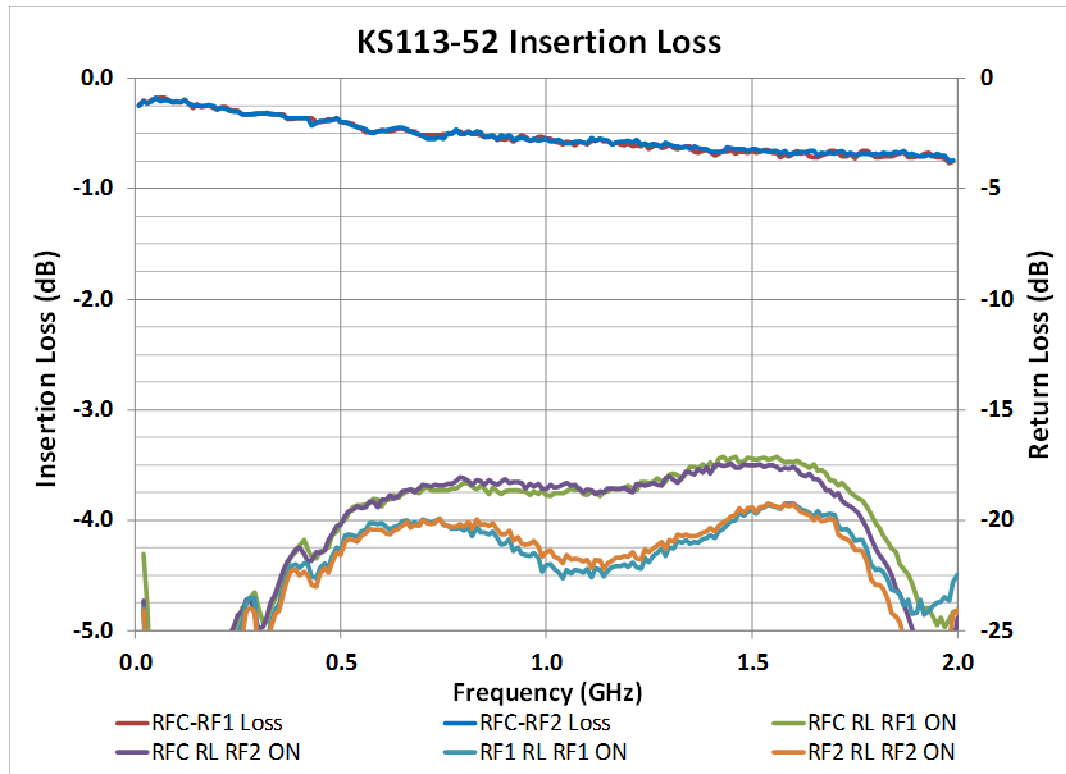
## APPLICATIONS

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

## ELECTRICAL CHARACTERISTICS (+25°C)

Parameter	Conditions	Min	Typical	Max	Units
Insertion Loss	0.02 – 0.5 GHz		0.03	0.5	dB
	0.5 – 1.0 GHz		0.50	0.75	dB
	1.0 – 2.0 GHz		0.75	1.0	dB
Isolation	0.02 – 2.0 GHz	38	45		dB
Return Loss	0.02 – 0.5 GHz		20.8	17.7	dB
	0.5 – 1.0 GHz		17.7	15.6	dB
	1.0 – 2.0 GHz		17.7	15.6	dB

TYPICAL PERFORMANCE (+25°C)



# KS113-52 | SPDT 50W SWITCH .02 – 2 GHz

## TRUTH TABLE/CONTROL VOLTAGES

ICTL = 20mA – 100mA , VCTL = 25V – 100V)

CTL1	CTL2	CTL3	CTL4	RFC-RF1	RFC-RF2
-ICTL	+VRB	+VRB	-ICTL	Low Loss	Isolation
+VRB	-ICTL	-ICTL	+VRB	Isolation	Low Loss

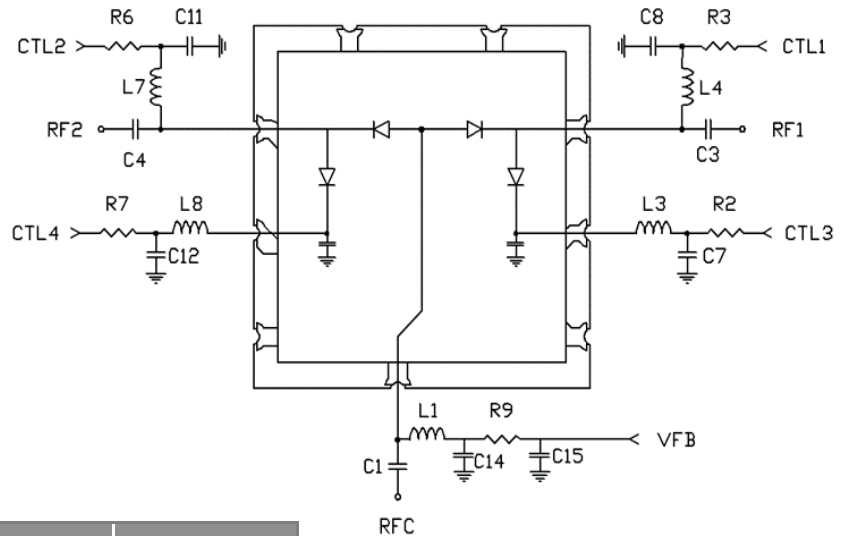
### Truth Table Notes:

1. ICTL = 20mA – 100mA bias current is recommended for low loss performance.
3. VRB must be greater than the worst case RF voltage excursion to maintain a reverse bias on the series diode.

Location	Value	Part Number	Manufacturer
C1,C3,C4	1000pF, 250V	C1608NP02E102J080AA	TDK
C14,C15,C7,C8,C11,C12	47pF, 250V	600S470JT250XT	ATC
R9,R3,R6	22 Ohms, 1/4W	ERJ-PA3F22R0V	Panasonic
R7,R2	4.7K Ohms, 3W	35224K7JT	TE Connectivity
L1,L3,L4,L7,L8	180 nH	0603HP-R18XGLW	Coilcraft

## SCHEMATIC

(0.05–2 GHz, 50W Operation)



## APPLICATION TRUTH TABLE/ CONTROL VOLTAGES

(VRB = +100V, ICTL = 50 mA, VFB = +3.3V)

CTL1	CTL2	CTL3	CTL4	RFC-RF1	RFC-RF2
0V	+100V	+100V	0V	Loss	Isolation
+100V	0V	0V	+100V	Isolation	Loss



**Electrostatic Sensitive Device. Proper ESD precaution should be used when handling device.**

### Schematic Notes:

1. CTL1-CTL4 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.



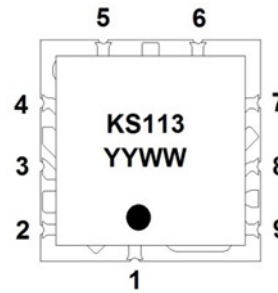
## ABSOLUTE MAXIMUM RATINGS

Characteristic	Min.	Max.	Units
Control Voltage Low (Vc = "0") (VCTL)	-250	+250	Volts
RF Input Power		50	W <sup>(1)</sup>
Storage Temperature	-55	+150	°C
Operating Temperature	-55	+85	°C
Control Current		200	mA
Operating Frequency	0.02	2.0	GHz

### Notes:

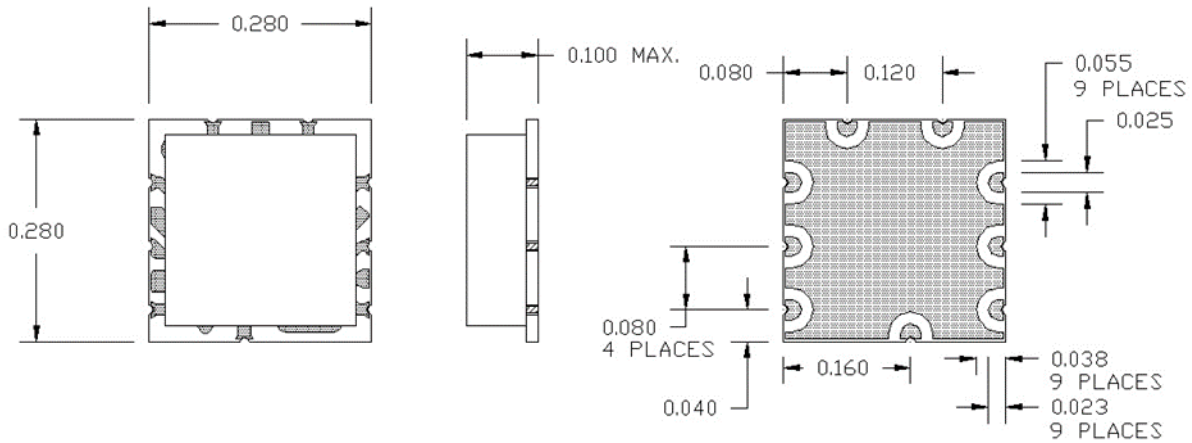
1. Max Base Plate Temp = +85°C. For temperatures above +85°C derate linearly to +150°C using  $P_{max} = 115.38 - 0.769 \cdot T_{mb}$

## PINOUT

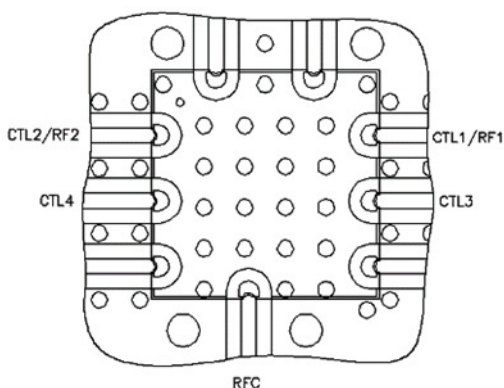


1	RFC
2	GND
3	CTL4
4	RF2/CTL2
5	GND
6	GND
7	RF1/CTL1
8	CTL3
9	GND

## OUTLINE DRAWING



## RECOMMENDED SOLDER LAYOUT



### Notes:

1. Maximum reflow temperature: 265°C
2. Ground all unused ports.
3. Trace widths for Rogers® R04003C material with 0.008" ground plane spacing.
4. DXF file available upon request.
5. Contact KCB Solutions for further guidance on device placement and attachment.