

# KS105-53

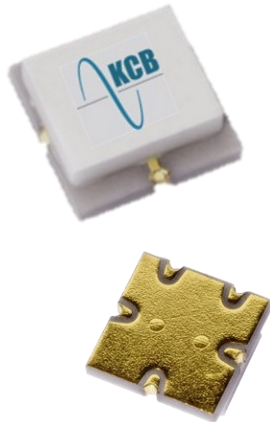
SP4T 20W Switch

0.02 – 3 GHz



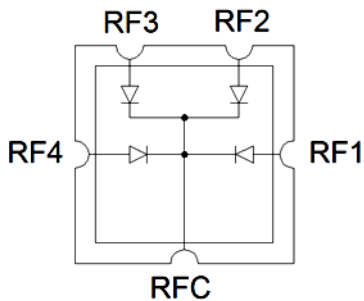
## DESCRIPTION

The KS105-53 is a common cathode SP4T 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 moderate 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 PIN Diode Design**
- ✓ **Broadband operation from 0.02 – 3.0 GHz**
- ✓ **Surface Mount 5mm QFN-style Leadless Package**
- ✓ **Rugged Aluminum Nitride Carrier with Thick Copper Traces**



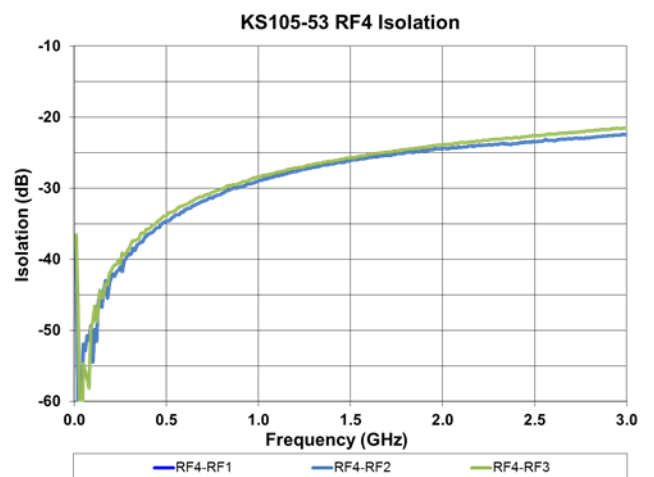
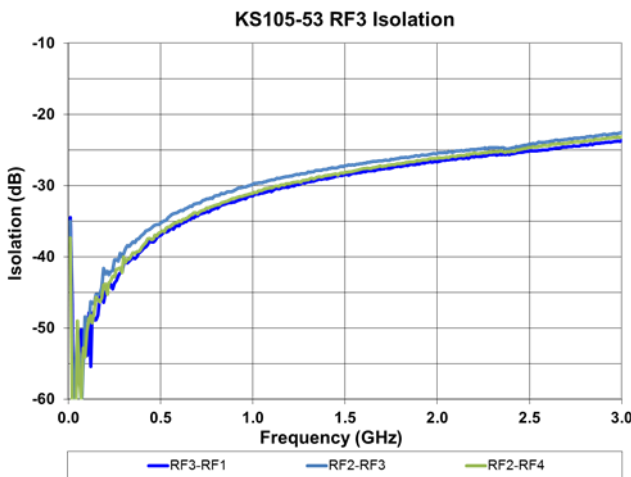
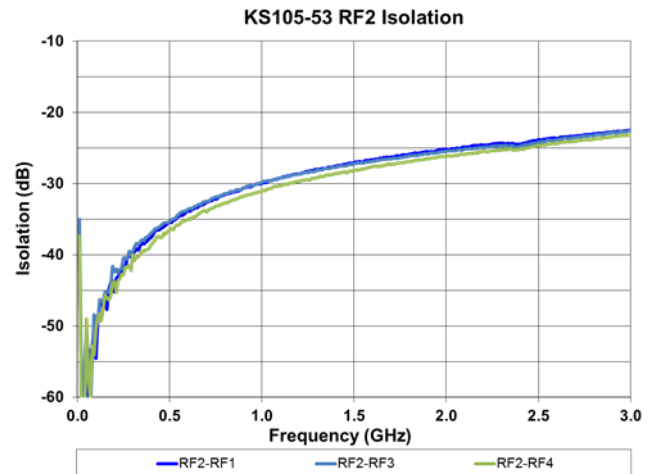
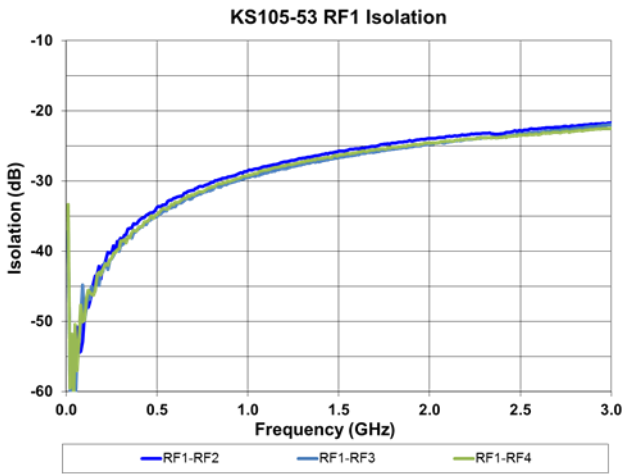
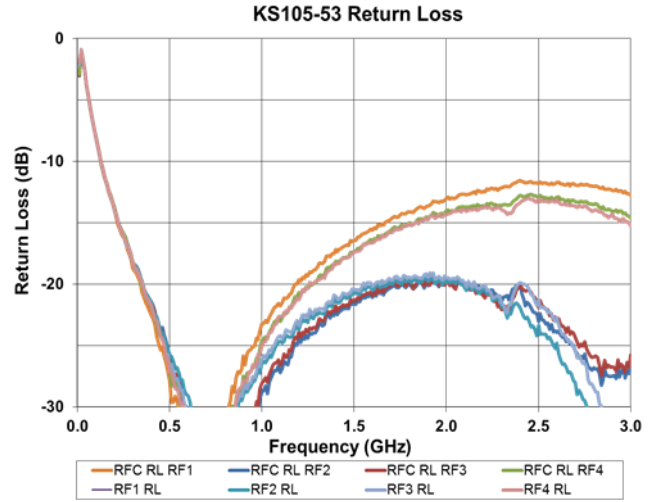
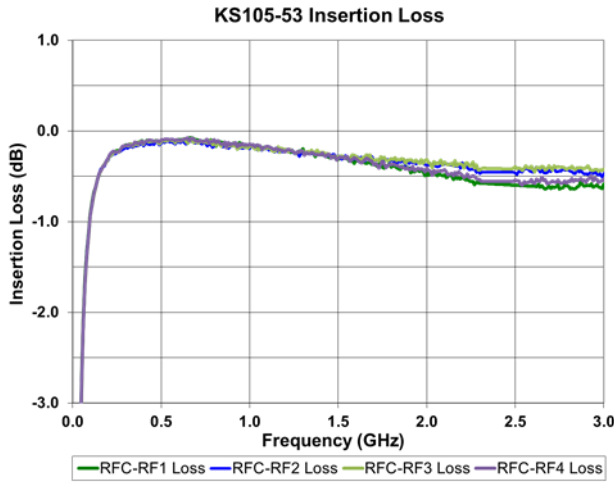
## APPLICATIONS

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

## ELECTRICAL CHARACTERISTICS (+25 C)

Parameter	Conditions	Min	Typical	Max	Units
Insertion Loss	0.02 – 1.0 GHz		0.2	0.4	dB
	1.0 – 2.0 GHz		0.3	0.6	dB
	2.0 – 3.0 GHz		0.5	0.8	dB
Isolation	0.02 – 1.0 GHz	26	35		dB
	1.0 – 2.0 GHz	22	27		dB
	2.0 – 3.0 GHz	20	23		dB
Return Loss (I/O)	0.02 – 1.0 GHz		25	20	dB
	1.0 – 2.0 GHz		15	12	dB
	2.0 – 3.0 GHz		13	10	dB

TYPICAL PERFORMANCE (+25°C)

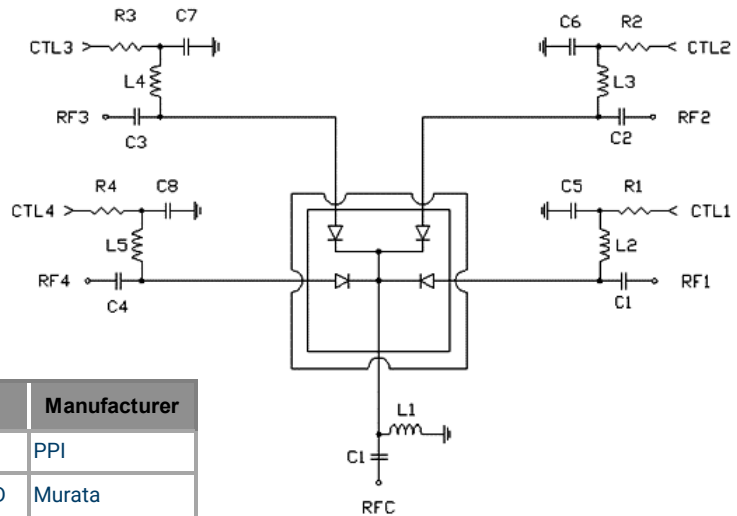
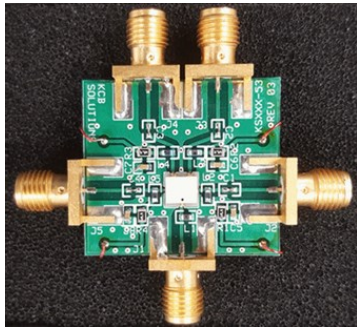


## TRUTH TABLE/CONTROL CONDITIONS

( $V_{RB} = -25 - -60 V$ ,  $I_{CTL} = 30 - 100 mA$ )

CTL1	CTL2	CTL3	CTL4	RFC-RF1	RFC-RF2	RFC-RF3	RFC-RF4
+ $I_{CTL}$	$V_{RB}$	$V_{RB}$	$V_{RB}$	Loss	Isolation	Isolation	Isolation
$V_{RB}$	+ $I_{CTL}$	$V_{RB}$	$V_{RB}$	Isolation	Loss	Isolation	Isolation
$V_{RB}$	$V_{RB}$	+ $I_{CTL}$	$V_{RB}$	Isolation	Isolation	Loss	Isolation
$V_{RB}$	$V_{RB}$	$V_{RB}$	+ $I_{CTL}$	Isolation	Isolation	Isolation	Loss

## APPLICATION BOARD/SCHEMATIC



Location	Value	Part Number	Manufacturer
C1-C4	0.1uF, 16V	0201BB104KW160	PPI
C5-C8	1000pF, 250V	GRM188BR72E102KW07D	Murata
R1 - R4	49 Ohms, 1/8W	ERJ6ENF49R9V	Panasonic
L1-L5	180 nH	0603CS-R18XJE	Coilcraft

## TRUTH TABLE/CONTROL CONDITIONS

( $V_{RB} = -60V$ ,  $I_{CTL} = 45 mA$ )

CTL1	CTL2	CTL3	CTL4	RFC-RF1	RFC-RF2	RFC-RF3	RFC-RF4
+2.3V	-60V	-60V	-60V	Loss	Isolation	Isolation	Isolation
-60V	+2.3V	-60V	-60V	Isolation	Loss	Isolation	Isolation
-60V	-60V	+2.3V	-60V	Isolation	Isolation	Loss	Isolation
-60V	-60V	-60V	+2.3V	Isolation	Isolation	Isolation	Loss



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

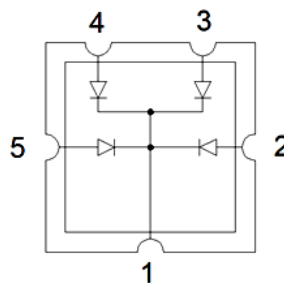
## SCHEMATIC NOTES:

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 ( $I_{CTL}$ ) 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 (Vctl)	-200	0.7	Volts
RF Input Power		20	W <sup>(1)</sup>
Storage Temperature	-65	+150	°C
Operating Temperature	-55	+85	°C
Control Current		150	mA
Operating Frequency	0.02	3.00	GHz

## PINOUT



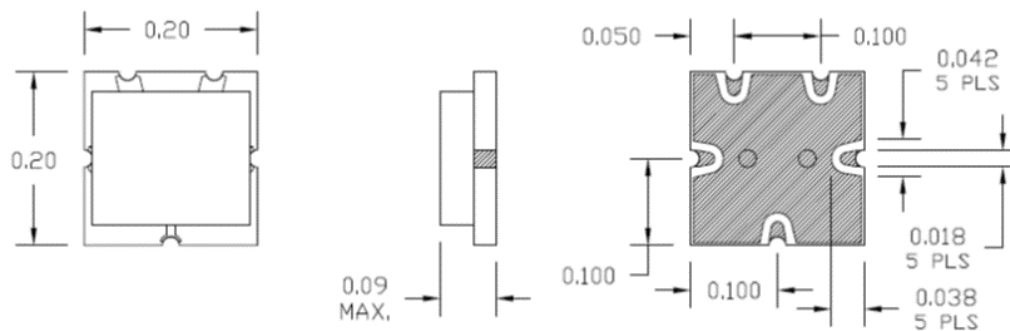
1	RFC
2	RF1/CTL1
3	RF2/CTL2
4	RF3/CTL3
5	RF4/CTL4

### Notes:

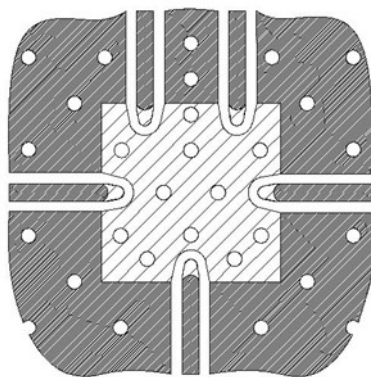
1. Max Base Plate Temp = +85°C. For temperatures above +85°C derate linearly to +150°C using  $P_{max} = 115.38 - 0.769 \cdot T_{amb}$

## OUTLINE DRAWING

Dimensions are shown in inches.



## RECOMMENDED SOLDER LAYOUT



### Notes:

1. Flood ground plane in area outside device leads
2. Add ground vias under part and between corner leads

Contact KCB Solutions for further guidance on device placement and attachment