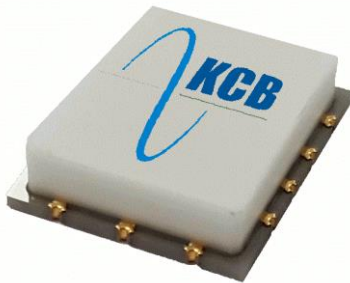


# KS106-55

Switch, SP3T  
0.225 – 3.0 GHz  
100W

## DESCRIPTION

The KS106-55 is a common anode SP3T 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 GHz
- ✓ Surface Mount 8mm x 7mm QFN-style Leadless Package
- ✓ Rugged Aluminum Nitride Carrier with Thick Copper Traces
- ✓ ROHS Compliant



## APPLICATIONS

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

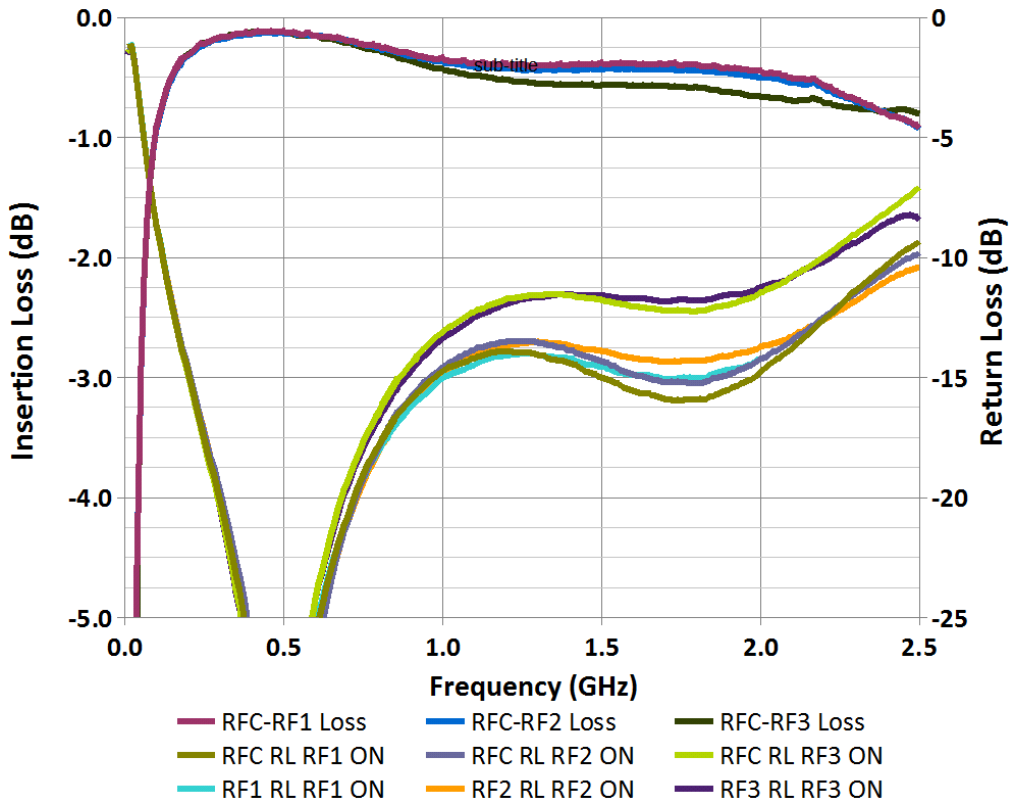
## ELECTRICAL CHARACTERISTICS (+25°C)<sup>1</sup>

Parameter	Symbol	Conditions	Min	Typical	Max	Units	
Insertion Loss	IL	0.225 – 1.0 GHz		0.30	0.6	dB	
		1.0 – 2.0 GHz		0.50	0.9	dB	
		2.0 – 2.6 GHz			0.80	1.2	dB
		2.6 – 3.0 GHz			1.50	2.0	dB
Isolation	ISO	0.225 – 1.0 GHz	38	45		dB	
		1.0 – 2.0 GHz	28	35		dB	
		2.0 – 2.6 GHz	25	26		dB	
		2.6 – 3.0 GHz	20	23		dB	
Return Loss Input	S11 /  S22	0.225 – 1.0 GHz	17	18		dB	
		1.0 – 2.0 GHz	14	15		dB	
		2.0 – 2.6 GHz	12.5	15		dB	
		2.6 – 3.0 GHz	8	9		dB	
Switching Speed				50		dB	

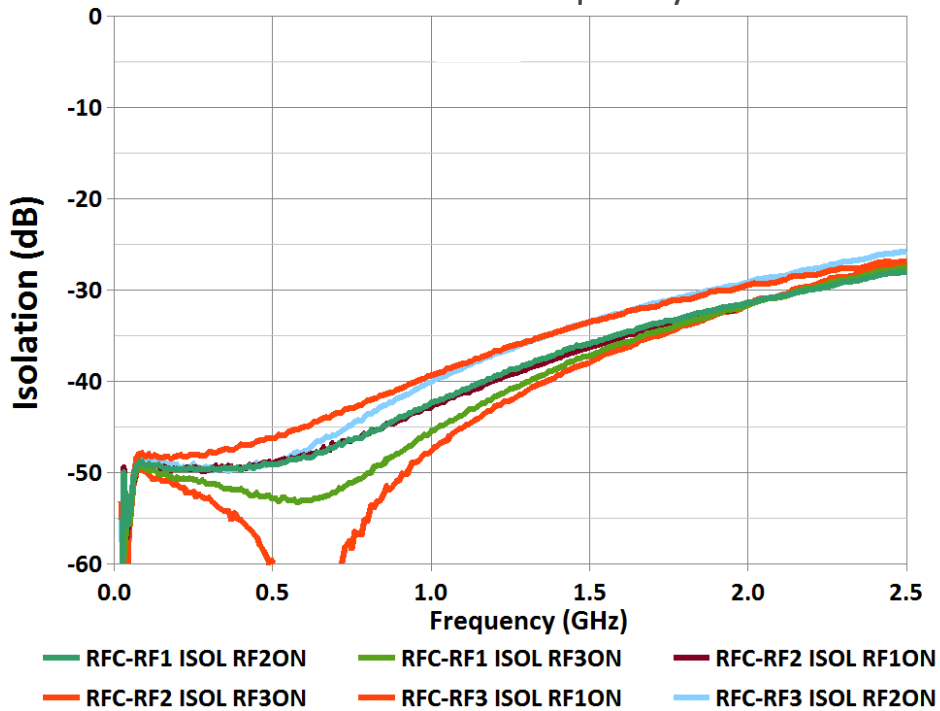
1. All electrical characteristics are measured at +25°C at a minimum.

TYPICAL PERFORMANCE (+25 °C)

Insertion Loss and Return Loss vs Frequency



Isolation vs Frequency

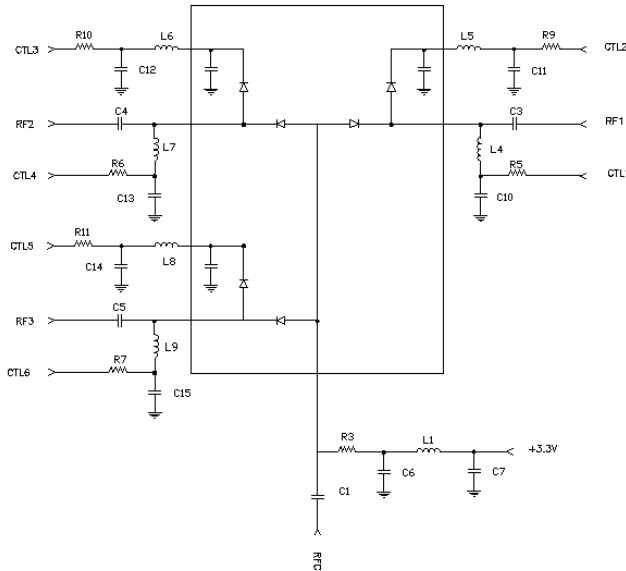


# KS106-55 | Switch, SP3T

## TRUTH TABLE

CTL1	CTL2	CTL3	CTL4	CTL5	CTL6	RFC-RF1	RFC-RF2	RFC-RF3
$-I_{CTL}$	$V_{RB}$	$-I_{CTL}$	$V_{RB}$	$-I_{CTL}$	$V_{RB}$	Loss	Isolation	Isolation
$V_{RB}$	$-I_{CTL}$	$V_{RB}$	$-I_{CTL}$	$-I_{CTL}$	$V_{RB}$	Isolation	Loss	Isolation
$V_{RB}$	$-I_{CTL}$	$-I_{CTL}$	$V_{RB}$	$V_{RB}$	$-I_{CTL}$	Isolation	Isolation	Loss

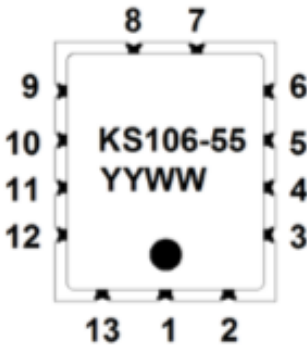
## SCHEMATIC



### Schematic Notes:

1. CTL1-CTL6 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

## DEVICE MARKING/PIN OUT:



PIN	Designation	PIN	Designation
1	RFC	8	CTL5
2	GND	9	RF3/CTL6
3	GND	10	GND
4	GND	11	CTL7
5	GND	12	RF4/CTL8
6	RF2/CTL3	13	GND
7	CTL4		

## PACKAGE NOTES:

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

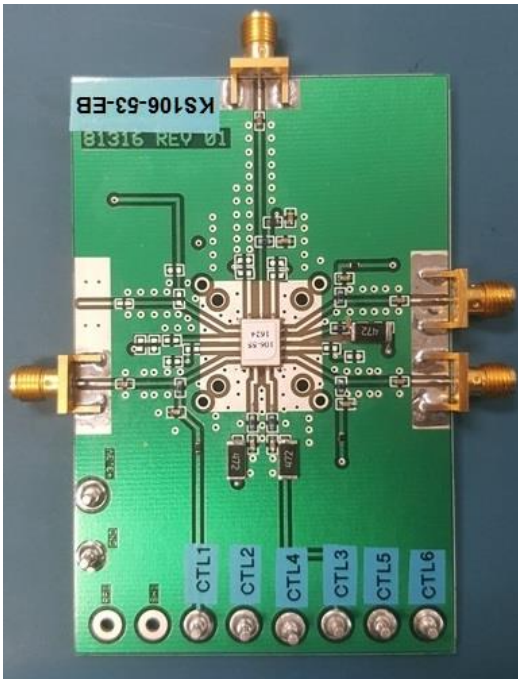
## ADDITIONAL NOTES:

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

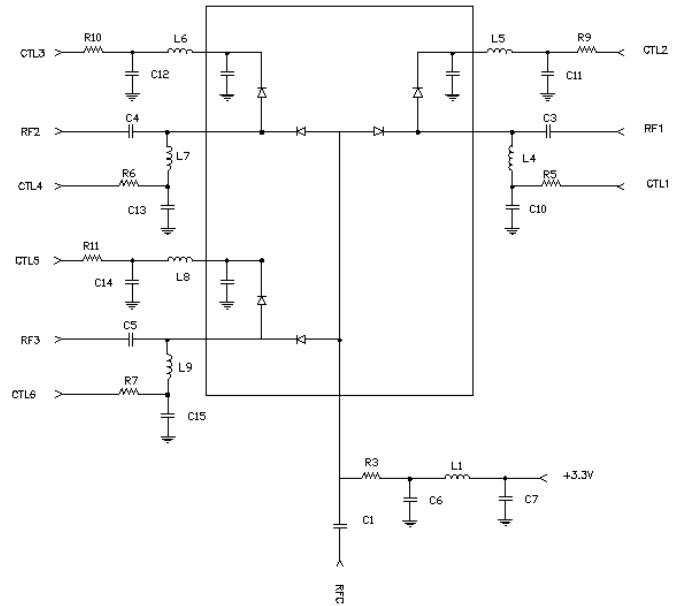


# KS106-55 | Switch, SP3T

## 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:

CTL1	CTL2	CTL3	CTL4	CTL5	CTL6	RFC-RF1	RFC-RF2	RFC-RF3
GND	V <sub>CTL</sub>	GND	V <sub>CTL</sub>	GND	V <sub>CTL</sub>	Loss	Isolation	Isolation
V <sub>CTL</sub>	GND	V <sub>CTL</sub>	GND	GND	V <sub>CTL</sub>	Isolation	Loss	Isolation
V <sub>CTL</sub>	GND	GND	V <sub>CTL</sub>	V <sub>CTL</sub>	GND	Isolation	Isolation	Loss

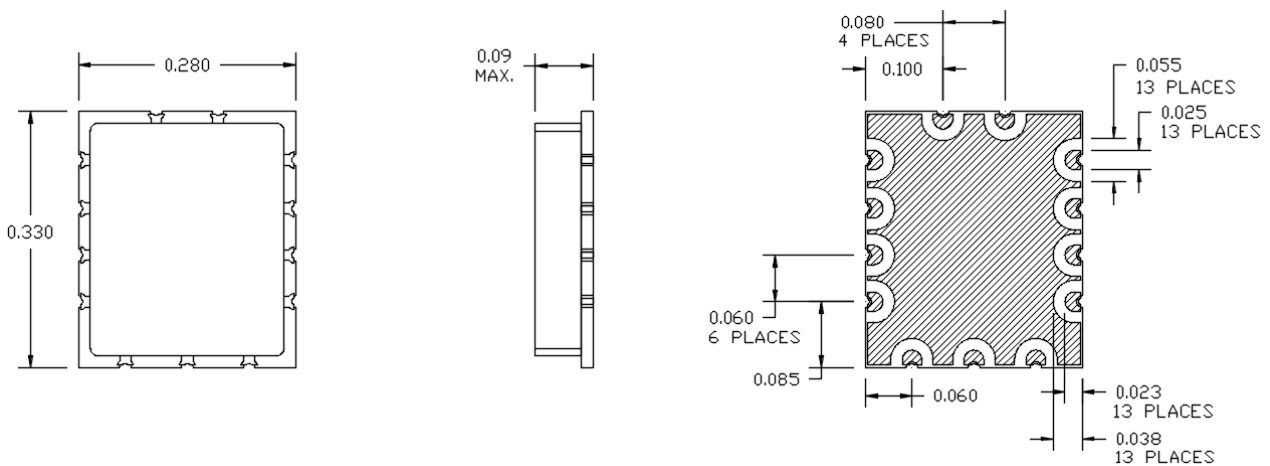
# KS106-55 | Switch, SP3T

## 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