

# DATA SHEET : CKRF6176XS03

## 50Ω TERMINATION TYPE HIGH POWER SPDT SWITCH



### Features

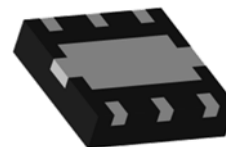
- Control voltage :  
 $VC(H) = 1.8 \text{ to } 5.0 \text{ V (3.0V TYP.)}$   
 $VC(L) = -0.2 \text{ to } 0.2 \text{ V (0V TYP.)}$
- Low Insertion Loss :  
 $Lins1 = 0.45 \text{ dB TYP. @ } f = 2.3 \text{ to } 2.7 \text{ GHz}$   
 $Lins2 = 0.50 \text{ dB TYP. @ } f = 3.3 \text{ to } 3.8 \text{ GHz}$   
 $Lins3 = 0.55 \text{ dB TYP. @ } f = 4.9 \text{ to } 5.85 \text{ GHz}$
- High Isolation :  
 $ISL1 = 30 \text{ dB TYP. @ } f = 2.3 \text{ to } 2.7 \text{ GHz}$   
 $ISL2 = 25 \text{ dB TYP. @ } f = 3.3 \text{ to } 3.8 \text{ GHz}$   
 $ISL3 = 22 \text{ dB TYP. @ } f = 4.9 \text{ to } 5.85 \text{ GHz}$
- Handling power :  
 $Pin(0.5dB) = +37.5 \text{ dBm TYP.}$   
 $@VC(H) = 3.0 \text{ V, } VC(L) = 0 \text{ V}$

### Package

- 6-pin Thin SON (XS03) Package  
 $(1.5 \text{ mm} \times 1.5 \text{ mm} \times 0.37 \text{ mm})$

### Description

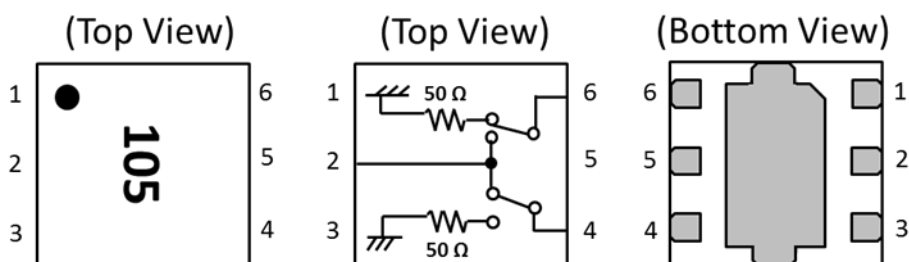
- The CKRF6176XS03 is a pHEMT GaAs MMIC 50Ω termination type high power SPDT (Single Pole Double Throw) switch which was developed for WiMAX, WiFi.



### Applications

- WiMAX and wireless LAN, etc.  
 (IEEE 802.11 a/b/g/n/ac)

### Pin Configuration and Internal Block Diagram



Pin No.	Pin Name
1	VC1
2	RF1
3	VC2
4	RF2
5	GND
6	RF1

Remark Exposed pad : GND

### Ordering Information

Part Number	Order Number	Package	Marking	Supplying Form
CKRF6176XS03-C2	CKRF6176XS03-C2	6-pin plastic TSON (XS03) Package (Pb-Free)	105	<ul style="list-style-type: none"> <li>• Embossed tape 8 mm wide</li> <li>• Pin 1, 6 face the perforation side of the tape</li> <li>• Qty 10 kpcs/reel</li> </ul>

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### Absolute Maximum Ratings

(T<sub>A</sub>=+25°C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 <sup>Note 1</sup>	V
Input Power (ON Port)	P <sub>in</sub>	+38 <sup>Note 2</sup>	dBm
Input Power (OFF Port)	P <sub>in(OFF)</sub>	+20	dBm
Operating Ambient Temperature	T <sub>A</sub>	-45~+85	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

- Note**
1. |VC1 - VC2| ≤ 6.0V
  2. 3.0V ≤ |VC1 - VC2| ≤ 5.0V

### Recommended Operating Range

(T<sub>A</sub>=+25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f1	2.3	-	2.7	GHz
	f2	3.3	-	3.8	GHz
	f3	4.9	-	5.85	GHz
Switch Control Voltage (H)	VC(H)	+1.8	+3.0	+5.0	V
Switch Control Voltage (L)	VC(L)	-0.2	0	+0.2	V

### Truth Table

VC1	VC2	RFC-RF1	RFC-RF2
High	Low	ON	OFF
Low	High	OFF	ON

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### Electrical Characteristics 1

( $T_A=+25^{\circ}\text{C}$ ,  $V_C(H)=3.0\text{V}$ ,  $V_C(L)=0\text{V}$ ,  $Z_0=50\Omega$ , DC Block Capacitance=8pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	Lins1	f = 2.3 to 2.7 GHz	-	0.45	0.60	dB
	Lins2	f = 3.3 to 3.8 GHz	-	0.50	0.65	dB
	Lins3	f = 4.9 to 5.85 GHz	-	0.55	0.75	dB
Isolation (RFC-OFF Port)	ISL1	f = 2.3 to 2.7 GHz	27	30	-	dB
	ISL2	f = 3.3 to 3.8 GHz	22	25	-	dB
	ISL3	f = 4.9 to 5.85 GHz	19	22	-	dB
Isolation (RF2-RF1)	ISL4	f = 2.3 to 2.7 GHz	23	26	-	dB
	ISL5	f = 3.3 to 3.8 GHz	20	23	-	dB
	ISL6	f = 4.9 to 5.85 GHz	17	20	-	dB
Input Return Loss	RLin1	f = 2.3 to 2.7 GHz	12	17	-	dB
	RLin2	f = 3.3 to 3.8 GHz	12	17	-	dB
	RLin3	f = 4.9 to 5.85 GHz	12	17	-	dB
Output Return Loss	RLout1	f = 2.3 to 2.7 GHz	12	17	-	dB
	RLout2	f = 3.3 to 3.8 GHz	12	17	-	dB
	RLout3	f = 4.9 to 5.85 GHz	12	17	-	dB
Unused Port Return Loss	URL1	f = 2.3 to 2.7 GHz	12	17	-	dB
	URL2	f = 3.3 to 3.8 GHz	12	17	-	dB
	URL3	f = 4.9 to 5.85 GHz	12	17	-	dB
0.5 dB Loss Compression Input Power <b>Note</b>	Pin(0.5 dB)	f = 2.3 to 2.7 GHz	+35.5	+37.5	-	dBm
		f = 3.3 to 3.8 GHz	+35.5	+37.5	-	dBm
		f = 4.9 to 5.85 GHz	+35.5	+37.5	-	dBm
Error Vector Magnitude	EVM	802.11a, 64QAM, 54Mbps, Pin $\leq$ +25dBm	-	0.5	-	%
		802.11g, 64QAM, 54Mbps, Pin $\leq$ +25dBm	-	0.5	-	%
		802.11ac, 256QAM, MCS9, 80MHz, Pin $\leq$ +25dBm	-	0.5	-	%
Switch Control Current	Icont	RF None	-	16	30	$\mu\text{A}$
Switch Control Speed	tsw	50% CTL to 90/10% RF	-	100	250	ns

**Note** Pin(0.5dB) is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range.

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### Electrical Characteristics 2

( $T_A=+25^{\circ}\text{C}$ ,  $V_C(H)=1.8\text{V}$ ,  $V_C(L)=0\text{V}$ ,  $Z_0=50\Omega$ , DC Block Capacitance=8pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	Lins1	f = 2.3 to 2.7 GHz	-	0.45	0.60	dB
	Lins2	f = 3.3 to 3.8 GHz	-	0.50	0.65	dB
	Lins3	f = 4.9 to 5.85 GHz	-	0.55	0.75	dB
Isolation (RFC-OFF Port)	ISL1	f = 2.3 to 2.7 GHz	27	30	-	dB
	ISL2	f = 3.3 to 3.8 GHz	22	25	-	dB
	ISL3	f = 4.9 to 5.85 GHz	19	22	-	dB
Isolation (RF2-RF1)	ISL4	f = 2.3 to 2.7 GHz	23	26	-	dB
	ISL5	f = 3.3 to 3.8 GHz	20	23	-	dB
	ISL6	f = 4.9 to 5.85 GHz	17	20	-	dB
Input Return Loss	RLin1	f = 2.3 to 2.7 GHz	12	17	-	dB
	RLin2	f = 3.3 to 3.8 GHz	12	17	-	dB
	RLin3	f = 4.9 to 5.85 GHz	12	17	-	dB
Output Return Loss	RLout1	f = 2.3 to 2.7 GHz	12	17	-	dB
	RLout2	f = 3.3 to 3.8 GHz	12	17	-	dB
	RLout3	f = 4.9 to 5.85 GHz	12	17	-	dB
Unused Port Return Loss	URL1	f = 2.3 to 2.7 GHz	12	17	-	dB
	URL2	f = 3.3 to 3.8 GHz	12	17	-	dB
	URL3	f = 4.9 to 5.85 GHz	12	17	-	dB
0.5 dB Loss Compression Input Power <b>Note</b>	Pin(0.5 dB)	f = 2.3 to 2.7 GHz	+35.5	+37.5	-	dBm
		f = 3.3 to 3.8 GHz	+34.0	+36.0	-	dBm
		f = 4.9 to 5.85 GHz	+34.0	+36.0	-	dBm
Switch Control Current	Icont	RF None	-	12	24	μA
Switch Control Speed	tsw	50% CTL to 90/10% RF	-	250	500	ns

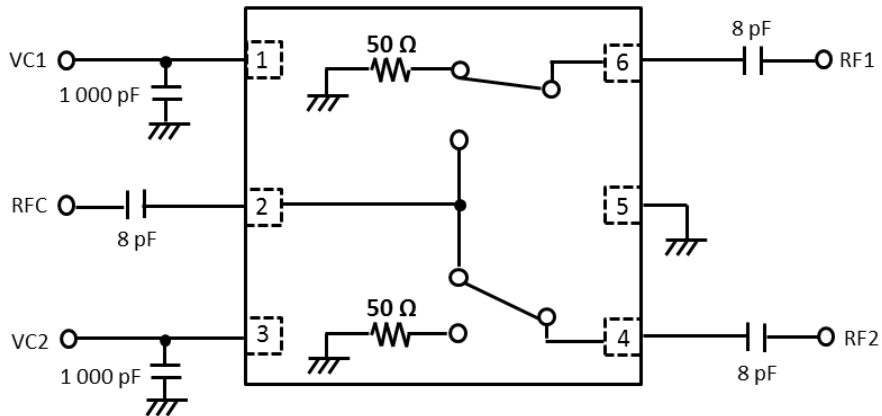
**Note** Pin(0.5dB) is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range.

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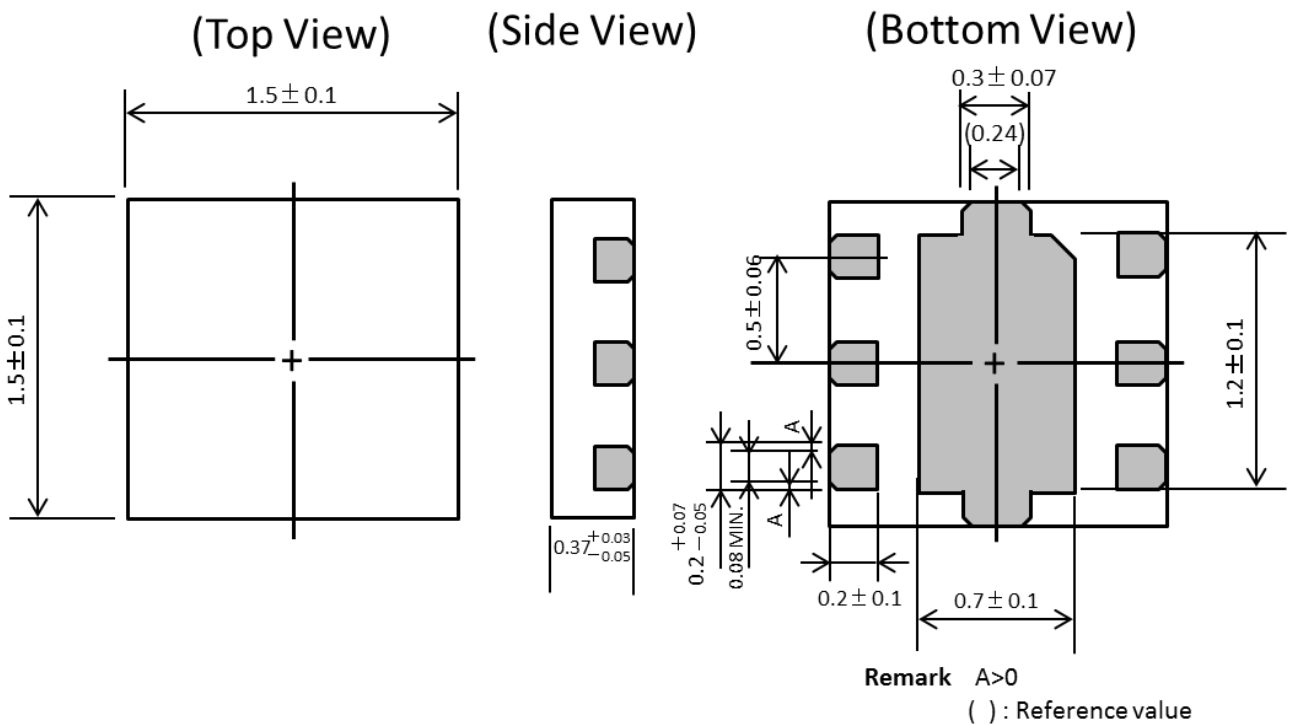
### Evaluation Circuit



The application circuits and their parameters are for reference only and are not intended for use in actual design-ins. This device is used it is necessary to use DC Block Capacitance.

### Package Dimensions

6-pin TSON (Unit : mm)



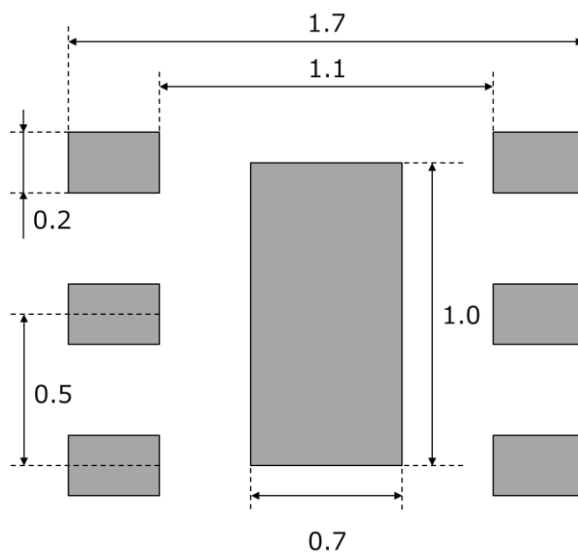
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### PCB Layout Footprint

6-pin TSON (Unit : mm)



The PCB Layout Footprint in this document is for reference only.

[CAUTION]

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- Do not dispose in fire or break up this product.
- Do not chemically make gas or powder with this product.
- When discard this product, please obey the law of your country.
- Do not lick the product or in any way allow it to enter the mouth.

[CAUTION]

Although this device is designed to be as robust as possible, ESD (Electrostatic Discharge) can damage this device. This device must be protected at all times from ESD. Static charges may easily produce potentials of several kilovolts on the human body or equipment, which can discharge without detection. Industry-standard ESD precautions should be used at all times.

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