



# RF SWITCH

## CG2409X3

### High Power SPDT RF Switch

#### DESCRIPTION

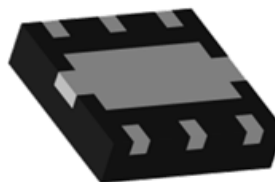
- The CG2409X3 is a GaAs MMIC high power SPDT (Single Pole Double Throw) switch which was designed for WiMAX and Wireless LAN applications

#### 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:  
 $L_{ins1} = 0.45 \text{ dB TYP. @ } f = 2.5 \text{ GHz}$   
 $L_{ins2} = 0.55 \text{ dB TYP. @ } f = 3.8 \text{ GHz}$   
 $L_{ins3} = 0.60 \text{ dB TYP. @ } f = 6.0 \text{ GHz}$
- High Isolation:  
 $ISL1 = 27 \text{ dB TYP. @ } f = 2.5 \text{ GHz}$   
 $ISL2 = 27 \text{ dB TYP. @ } f = 3.8 \text{ GHz}$   
 $ISL2 = 27 \text{ dB TYP. @ } f = 6.0 \text{ GHz}$
- Power Handling:  
 $P_{in}(0.1\text{dB}) = +37.5 \text{ dBm TYP. @ } f = 2.5 \text{ GHz,}$   
 $VC(H) = 3.0 \text{ V, } VC(L) = 0 \text{ V}$

#### PACKAGE

- 6-pin XSON Package  
(1.5mm x 1.5mm x 0.37mm)



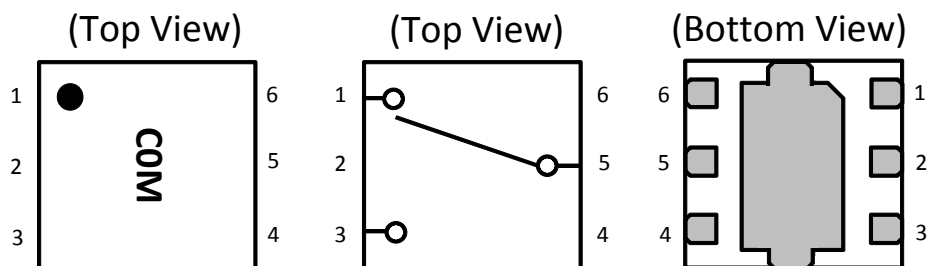
#### APPLICATIONS

- WiMAX and wireless LAN  
(IEEE802.11a/b/g/n/ac)

#### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CG2409X3	CG2409X3-C2	6-pin plastic TSON (Pb-Free)	C0M	<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>MOQ 10 kpcs/reel</li> </ul>
CG2409X3-EVAL	CG2409X3-EVAL			<ul style="list-style-type: none"> <li>Evaluation Board with DC block capacitors, power supply bypass capacitors, and RF and DC connectors</li> <li>MOQ 1</li> </ul>

## PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM



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

**Remark** Exposed pad : GND

## TRUTH TABLE

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

## ABSOLUTE MAXIMUM RATINGS

(TA = +25°C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 <sup>Note 1</sup>	V
Input Power	Pin	+38.0 <sup>Note 2</sup>	dBm
Operating Ambient Temperature	T <sub>A</sub>	-45~+85	°C
Storage Temperature	T <sub>stg</sub>	-55~+150	°C

**Note** 1.  $|VC1 - VC2| \leq 6.0V$   
 2.  $3.0V \leq |VC1 - VC2| \leq 5.0V$

## RECOMMENDED OPERATING RANGE

(TA = +25°C, unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f	0.05	-	6.0	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

## ELECTRICAL CHARACTERISTICS

(TA=+25°C, VC(H)=3.0V, VC(L)=0V, Zo=50Ω, DC Block Capacitance=8pF, unless otherwise specified)

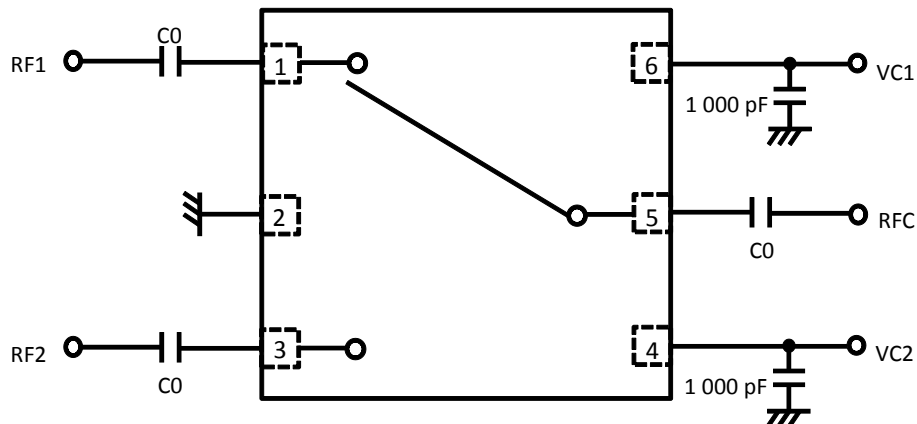
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	Lins1	f = 0.05 to 0.5 GHz <sup>Note 1</sup>	-	0.30	0.50	dB
	Lins2	f = 0.5 to 1.0 GHz <sup>Note 2</sup>	-	0.35	0.55	dB
	Lins3	f = 1.0 to 2.0 GHz <sup>Note 2</sup>	-	0.40	0.60	dB
	Lins4	f = 2.0 to 2.5 GHz	-	0.45	0.65	dB
	Lins5	f = 2.5 to 3.0 GHz	-	0.50	0.70	dB
	Lins6	f = 3.0 to 3.8 GHz	-	0.55	0.80	dB
	Lins7	f = 3.8 to 6.0 GHz	-	0.60	0.90	dB
Isolation	ISL1	f = 0.05 to 0.5 GHz <sup>Note 1</sup>	27	30	-	dB
	ISL2	f = 0.5 to 1.0 GHz <sup>Note 2</sup>	27	30	-	dB
	ISL3	f = 1.0 to 2.0 GHz <sup>Note 2</sup>	24	27	-	dB
	ISL4	f = 2.0 to 2.5 GHz	24	27	-	dB
	ISL5	f = 2.5 to 3.0 GHz	24	27	-	dB
	ISL6	f = 3.0 to 3.8 GHz	24	27	-	dB
	ISL7	f = 3.8 to 6.0 GHz	24	27	-	dB
Return Loss	RL1	f = 0.05 to 0.5 GHz <sup>Note 1</sup>	15	20	-	dB
	RL2	f = 0.5 to 2.0 GHz <sup>Note 2</sup>	15	20	-	dB
	RL3	f = 2.0 to 3.8 GHz	15	20	-	dB
	RL4	f = 3.8 to 6.0 GHz	15	20	-	dB
0.1 dB Loss Compression Input Power <sup>Note 3</sup>	P <sub>in(0.1dB)</sub>	f = 2.5 GHz	-	+37.5	-	dBm
2nd Harmonics	2f <sub>0</sub>	f = 2.5 GHz, P <sub>in</sub> =+30dBm	-	75	-	dBc
3rd Harmonics	3f <sub>0</sub>	f = 2.5 GHz, P <sub>in</sub> =+30dBm	-	75	-	dBc
Input 3rd Order Intercept Point	IIP3	f = 2.5GHz 2-tone 1MHz Spacing		+60		dBm
Switch Control Speed	tsw	50% CTL to 90/10% RF	-	100	-	ns
Switch Control Current	Icont	Non RF	-	5	-	μA

**Note 1** DC block capacitance = 1,000pF at f=0.05 to 0.5 GHz

**Note 2** DC block capacitance = 56pF at f=0.5 to 2.0 GHz

**Note 3** P<sub>in(0.1dB)</sub> is the measured input power level when the insertion loss increases 0.1dB more than that of the linear range.

## EVALUATION CIRCUIT

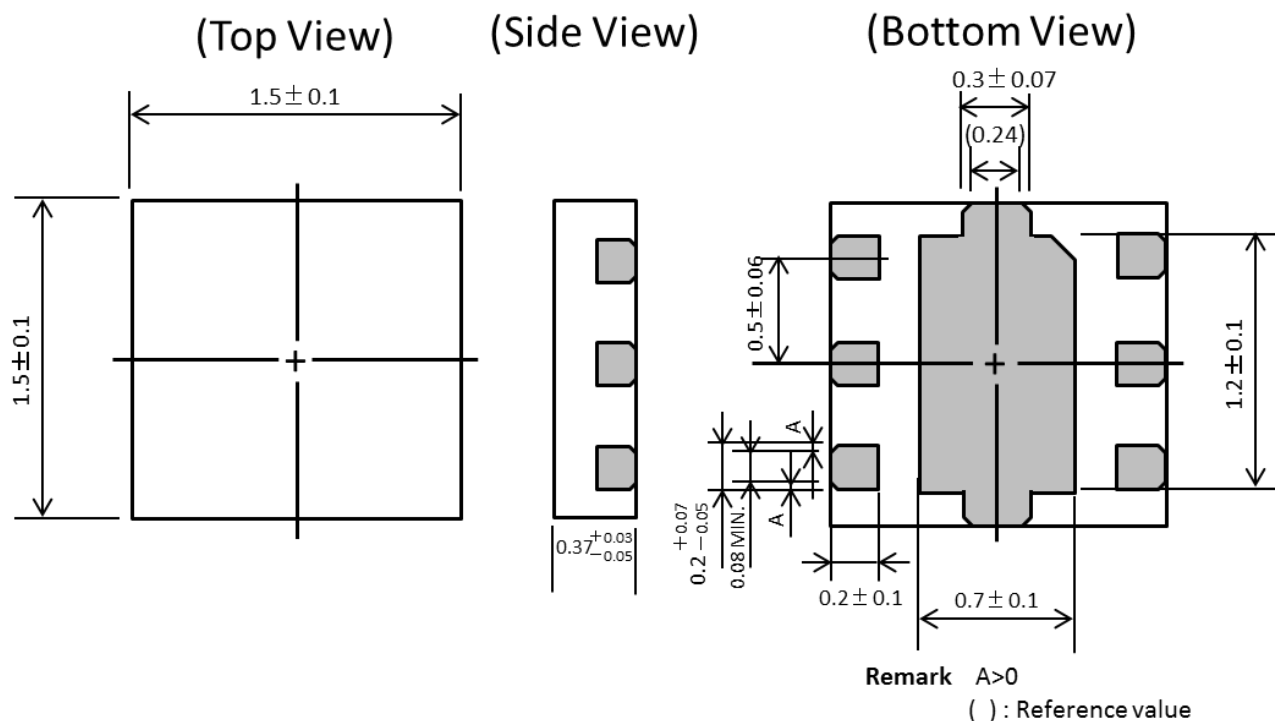


**Note** C0 : 0.05 to 0.5 GHz 1,000pF  
: 0.5 to 2.0 GHz 56pF  
: 2.5 to 6.0 GHz 8pF

The application circuits and their parameters are for reference only and are not intended for use in actual designs.  
DC Blocking Capacitors are required at all RF ports.

## PACKAGE DIMENSIONS

6-pin Plastic TSON (Unit: mm)



**REVISION HISTORY**

Version	Change to current version	Page(s)
CDS-0031-01 (Issue A) September 14, 2016	Preliminary datasheet	N/A

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- Do not chemically make gas or powder with this product.
- When discarding this product, please obey the laws of your country.
- Do not lick the product or in any way allow it to enter the mouth.

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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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