

## L, S-band Medium Power SPDT Switch

### DESCRIPTION

- The CG2214M6 is a pHEMT GaAs SPDT (Single Pole Double Throw) switch. This device can operate from 0.05 to 3.0 GHz, having low insertion loss and high isolation.

### FEATURES

- Control voltage :  
VC(H) = 1.8 to 5.0 V (3.0 V TYP.)  
VC(L) = -0.2 to 0.2 V (0 V TYP.)
- Low insertion loss :  
L<sub>ins1</sub> = 0.30 dB TYP. @ f = 0.05 to 0.5 GHz  
L<sub>ins2</sub> = 0.30 dB TYP. @ f = 0.5 to 1.0 GHz  
L<sub>ins3</sub> = 0.30 dB TYP. @ f = 1.0 to 2.0 GHz  
L<sub>ins4</sub> = 0.35 dB TYP. @ f = 2.0 to 2.5 GHz  
L<sub>ins5</sub> = 0.35 dB TYP. @ f = 2.5 to 3.0 GHz
- High isolation :  
ISL1 = 38 dB TYP. @ f = 0.05 to 0.5 GHz  
ISL2 = 32 dB TYP. @ f = 0.5 to 1.0 GHz  
ISL3 = 27 dB TYP. @ f = 1.0 to 2.0 GHz  
ISL4 = 25 dB TYP. @ f = 2.0 to 2.5 GHz  
ISL5 = 23 dB TYP. @ f = 2.5 to 3.0 GHz
- Power handling :  
P<sub>in</sub>(0.5dB) = +32 dBm TYP. @ f = 3.0 GHz  
VC(H) = 3.0 V, VC(L) = 0 V

### PACKAGE

- 6-pin lead-less mini mold package (1.5mm x 1.1mm x 0.55mm)



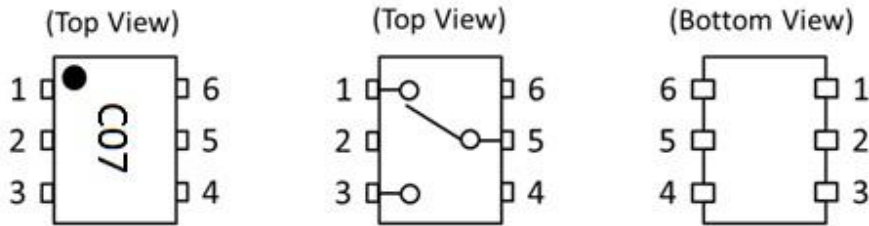
### APPLICATIONS

- Wireless LAN (IEEE 802.11 b/g/n/ac)
- Bluetooth

### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CG2214M6	CG2214M6-C2	6-pin lead-less mini mold package (Pb-Free)	C07	<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 9 kpcs/reel</li> </ul>
CG2214M6-EVAL	CG2214M6-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

## TRUTH TABLE

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

## ABSOLUTE MAXIMUM RATINGS

( $T_A = +25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 <sup>Note 1</sup>	V
Input Power	$P_{in}$	+33 <sup>Note 2</sup>	dBm
Operating Ambient Temperature	$T_A$	-45 ~ +85	$^\circ\text{C}$
Storage Temperature	$T_{stg}$	-55 ~ +150	$^\circ\text{C}$

- Note**
- $|VC1 - VC2| \leq 6.0 \text{ V}$
  - $3.0\text{V} \leq |VC1 - VC2| \leq 5.0 \text{ V}, f \geq 0.5 \text{ GHz}$

## RECOMMENDED OPERATING RANGE

( $T_A = +25^\circ\text{C}$ , unless otherwise specified)

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f	0.05	-	3.0	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) = 3.0 V, VC(L) = 0 V, Zo = 50 Ω, DC Block Capacitance = 56 pF, unless otherwise specified)

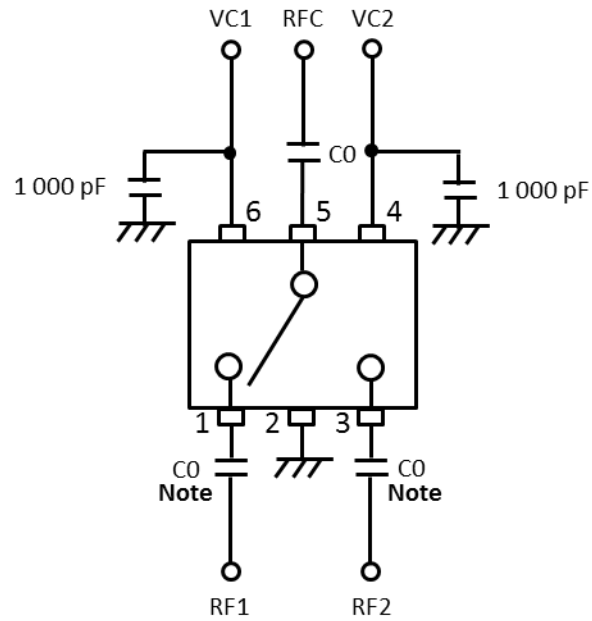
Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Insertion Loss	L <sub>INS1</sub>	f=0.05 to 0.5GHz <sup>Note 1</sup>	-	0.30	0.50	dB
	L <sub>INS2</sub>	f=0.5 to 1.0GHz	-	0.30	0.50	dB
	L <sub>INS3</sub>	f=1.0 to 2.0GHz	-	0.30	0.50	dB
	L <sub>INS4</sub>	f=2.0 to 2.5GHz	-	0.35	0.55	dB
	L <sub>INS5</sub>	f=2.5 to 3.0GHz	-	0.35	0.55	dB
Isolation	ISL1	f=0.05 to 0.5GHz <sup>Note 1</sup>	35	38	-	dB
	ISL2	f=0.5 to 1.0GHz	29	32	-	dB
	ISL3	f=1.0 to 2.0GHz	24	27	-	dB
	ISL4	f=2.0 to 2.5GHz	22	25	-	dB
	ISL5	f=2.5 to 3.0GHz	20	23	-	dB
Return Loss	RL1	f=0.05 to 0.5GHz <sup>Note 1</sup>	15	20	-	dB
	RL2	f=0.5 to 3.0GHz	15	20	-	dB
0.1dB Loss Compression Input Power <b>Note 2</b>	P <sub>in(0.1dB)</sub>	f=3.0GHz, VC(H)=1.8V, VC(L)=0V	-	+23	-	dBm
		f=3.0GHz, VC(H)=3.0V, VC(L)=0V	-	+30	-	dBm
0.5dB Loss Compression Input Power <b>Note 3</b>	P <sub>in(0.5dB)</sub>	f=3.0GHz, VC(H)=1.8V, VC(L)=0V	-	+26	-	dBm
		f=3.0GHz, VC(H)=3.0V, VC(L)=0V	-	+32	-	dBm
2nd Harmonics	2f <sub>0</sub>	f=3.0GHz, P <sub>in</sub> =+20dBm	-	-85	-	dBc
3rd Harmonics	3f <sub>0</sub>	f=3.0GHz, P <sub>in</sub> =+20dBm	-	-85	-	dBc
3rd Order Input Intercept Point	IIP <sub>3</sub>	f=2.5GHz, 2-tone 1MHz Spacing	-	+58	-	dBm
Switch Control Current	I <sub>CONT</sub>	RF none	-	1	10	uA
Switching Speed	t <sub>SW</sub>	50% CTL to 90/10% RF	-	50	-	ns

**Note 1.** DC block capacitance = 1000 pF at f = 0.05 to 0.5 GHz

2. 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.

3. P<sub>in(0.5dB)</sub> is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range

## EVALUATION CIRCUIT

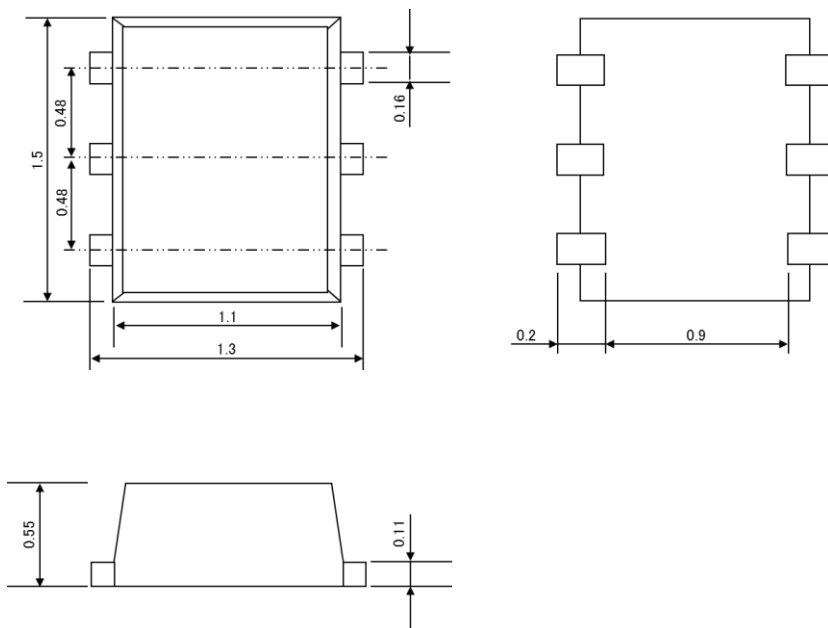


**Note** C0 : 0.05 to 0.5 GHz 1000pF  
: 0.5 to 3.0 GHz 56pF

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 lead-less mini mold package (Unit: mm)



## RECOMMENDED SOLDERING CONDITIONS

Recommended Soldering Conditions are available on CEL's [Part Summary page](#) under Associated Documents

## REVISION HISTORY

Version	Change to current version	Page(s)
CDS-0021-01 (Issue A) February 17, 2016	Initial datasheet	N/A
CDS-0021-02 (Issue B) March 29, 2016	Added Eval Board ordering information Updated marking information	1, 2
CDS-0021-03 (Issue C) April 20, 2016	Updated Features section	1
CDS-0021-03 (Issue D) August 11, 2016	Removed "preliminary"	All
CDS-0025-01 (Issue A) September 14, 2016	Revise CDS No. CDS-0021-03 to CDS-0025-01	N/A
CDS-0025-01 (Issue B) January 11, 2017	Revised Electrical Characteristics table Added "Recommended Soldering Conditions" section	3, 5

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