

## L, S-band High Power SPDT RF Switch

### DESCRIPTION

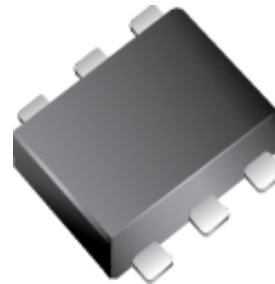
- The CG2415M6 is a pHEMT GaAs MMIC high power SPDT (Single Pole Double Throw) switch which was developed for dual-band wireless LAN.

### FEATURES

- Control voltage :  
VC(H) = 1.8 to 5.3 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 = 0.5 to 2.0 GHz  
L<sub>ins2</sub> = 0.35 dB TYP. @ f = 2.0 to 2.5 GHz  
L<sub>ins3</sub> = 0.40 dB TYP. @ f = 2.5 to 3.8 GHz  
L<sub>ins4</sub> = 0.45 dB TYP. @ f = 3.8 to 6.0 GHz
- High isolation :  
ISL1 = 32 dB TYP. @ f = 0.5 to 2.0 GHz  
ISL2 = 32 dB TYP. @ f = 2.0 to 2.5 GHz  
ISL3 = 32 dB TYP. @ f = 2.5 to 3.8 GHz  
ISL4 = 26 dB TYP. @ f = 3.8 to 6.0 GHz
- Power handling :  
P<sub>in(0.5dB)</sub> = +34 dBm TYP  
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)



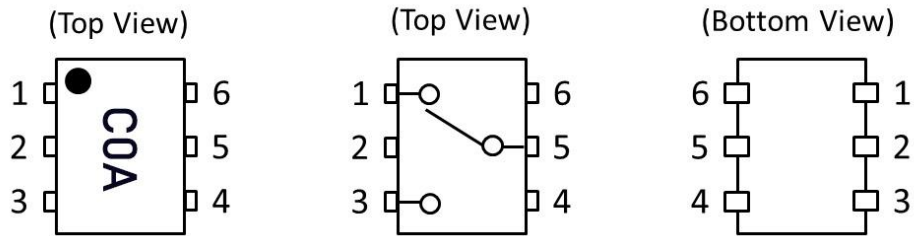
### APPLICATIONS

- Dual-band wireless LAN (IEEE 802.11 a/b/g/n/ac)

### ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CG2415M6	CG2415M6-C2	6-pin lead-less mini mold package (Pb-Free)	C0A	<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>
CG2415M6-EVAL	CG2415M6-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
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	P <sub>in</sub>	+34.5 <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.  $|VC1 - VC2| \leq 6.0 \text{ V}$
  2.  $3.0\text{V} \leq |VC1 - VC2| \leq 5.0\text{V}$

## RECOMMENDED OPERATING RANGE

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

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f	0.5	-	6.0	GHz
Switch Control Voltage (H)	VC(H)	+1.8	+3.0	+5.3	V
Switch Control Voltage (L)	VC(L)	-0.2	0	+0.2	V

## ELECTRICAL CHARACTERISTICS 1

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

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Insertion Loss	L <sub>INS1</sub>	f=0.5 to 2.0 GHz <b>Note 1</b>	-	0.30	0.50	dB
	L <sub>INS2</sub>	f=2.0 to 2.5 GHz	-	0.35	0.55	dB
	L <sub>INS3</sub>	f=2.5 to 3.8.0GHz	-	0.40	0.60	dB
	L <sub>INS4</sub>	f=3.8 to 6.0GHz	-	0.45	0.70	dB
Isolation	ISL1	f=0.5 to 2.0 GHz <b>Note 1</b>	29	32	-	dB
	ISL2	f=2.0 to 2.5 GHz	29	32	-	dB
	ISL3	f=2.5 to 3.8.0GHz	29	32	-	dB
	ISL4	f=3.8 to 6.0GHz	23	26	-	dB
Return Loss	RL1	f=0.5 to 2.0GHz <b>Note 1</b>	15	20	-	dB
	RL2	f=2.0 to 2.5GHz	15	20	-	dB
	RL3	f=2.5 to 6.0GHz	10	15	-	dB
0.1dB Loss Compression Input Power <b>Note 2</b>	P <sub>in(0.1dB)</sub>	f=0.5 to 2.0GHz <b>Note1</b>	-	+32	-	dBm
		f=2.0 to 6.0GHz	-	+31	-	dBm
		f=0.5 to 6.0GHz <b>Note1</b> VC(H)=5.0V	-	+35	-	dBm
0.5dB Loss Compression Input Power <b>Note 3</b>	P <sub>in(0.5dB)</sub>	f=0.5 to 2.0GHz <b>Note1</b>	-	+34	-	dBm
		f=2.0 to 6.0GHz	-	+34	-	dBm
2nd Harmonics	2f <sub>0</sub>	f=2.5GHz, P <sub>in</sub> =+20dBm	-	-90	-	dBc
		f=6.0GHz, P <sub>in</sub> =+20dBm	-	-90	-	dBc
3rd Harmonics	3f <sub>0</sub>	f=2.5GHz, P <sub>in</sub> =+20dBm	-	-90	-	dBc
		f=6.0GHz, P <sub>in</sub> =+20dBm	-	-90	-	dBc
3rd Order Input Intercept Point	IIP <sub>3</sub>	f=2.5GHz, 2-tone 1MHz Spacing	-	60	-	dBm

**Note 1.** DC block capacitance = 56 pF at f = 0.5 to 2.0 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

## ELECTRICAL CHARACTERISTICS 2

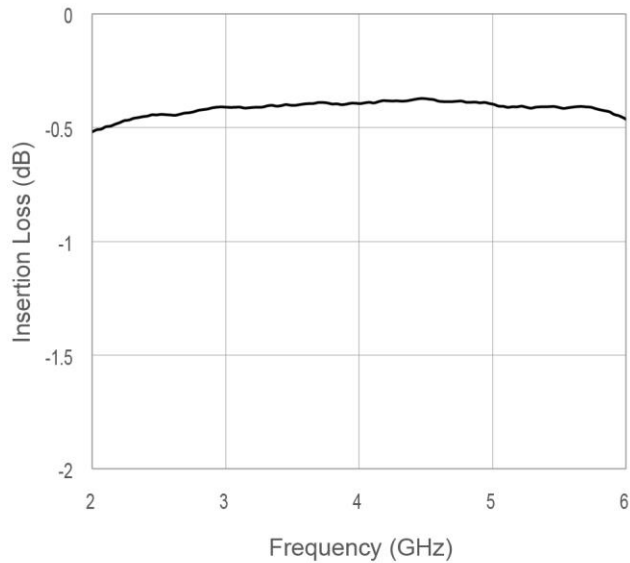
(TA = +25°C, VC(H) = 3.0 V, VC(L) = 0 V, Zo = 50 Ω, DC Block Capacitance = 8 pF, unless otherwise specified)

Error Vector Magnitude	EVM	802.11a, 64QAM, 54Mbps, Pin≤+25dBm	-	0.5	-	%
		802.11g, 64QAM, 54Mbps, Pin≤+25dBm	-	0.5	-	%
		802.11ac, 256QAM, MCS9, 80MHz, Pin≤+25dBm	-	0.5	-	%
Switch Control Current	I <sub>CONT</sub>	RF none	-	2	10	uA
Switching Speed	t <sub>SW</sub>	50% CTL to 90/10% RF	-	100	250	ns

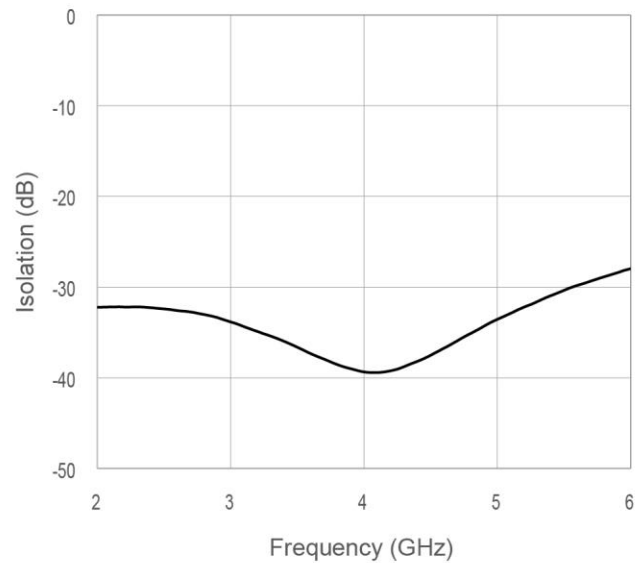
## TYPICAL CHARACTERISTICS

(VC(H)=3V, VC(L)=0V, T<sub>A</sub> = +25°C, DC Block Capacitance=8pF, through board loss is subtracted in insertion loss data)

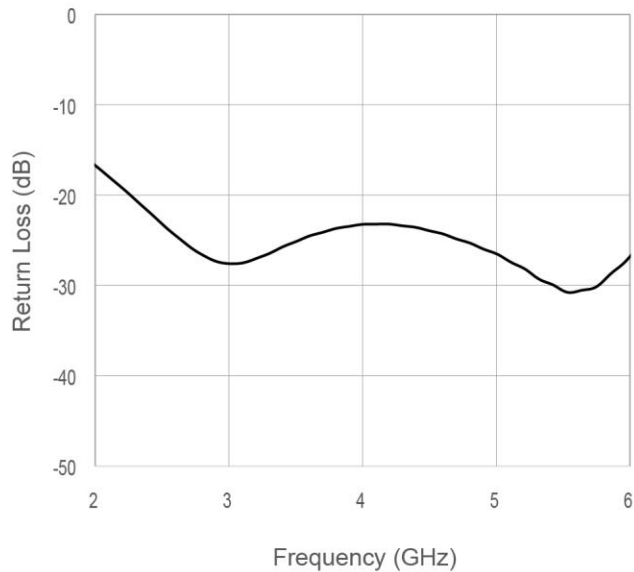
### Typical Insertion Loss vs. Frequency



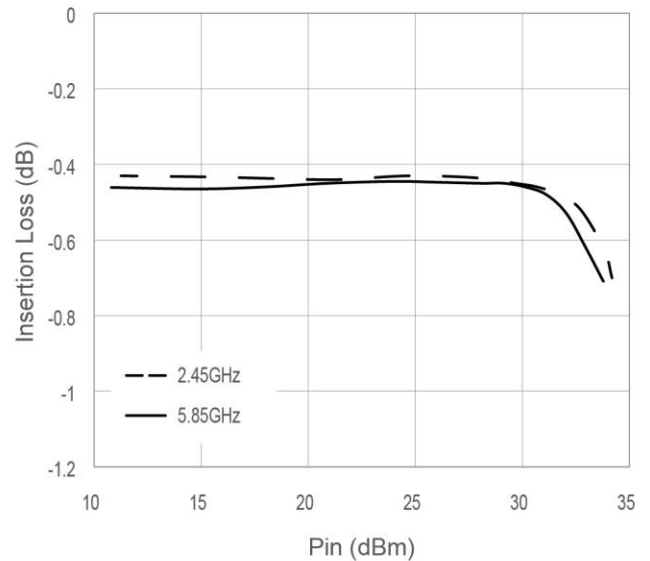
### Typical Isolation vs. Frequency



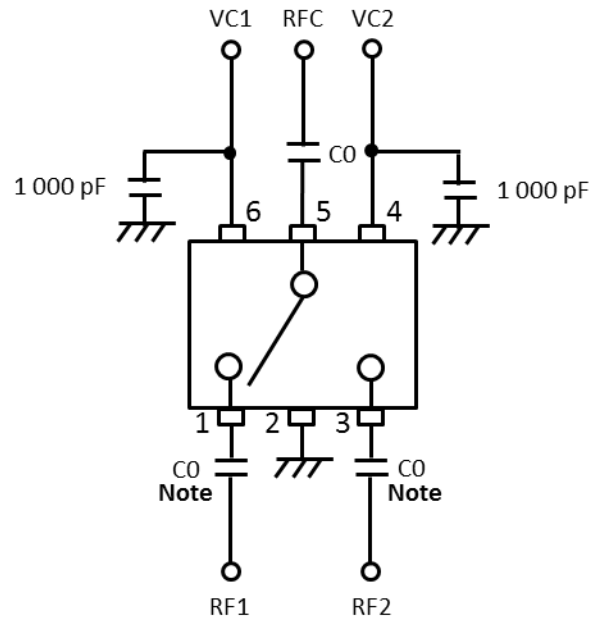
### Typical Return Loss vs. Frequency



### Typical Insertion Loss vs. Input Power



## EVALUATION CIRCUIT

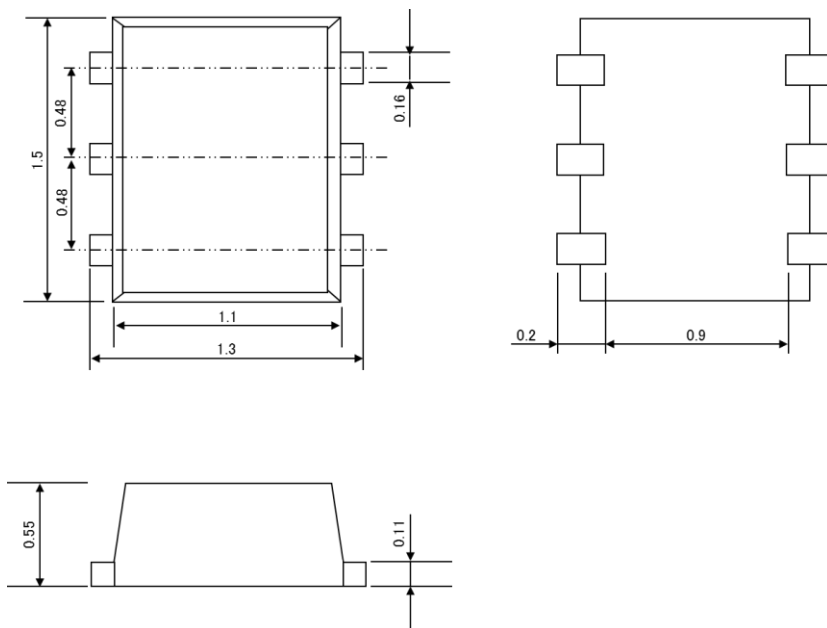


**Note** C0 : 0.5 to 2.0 GHz 56pF  
: 2.0 to 6.0 GHz 8pF

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 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-0022-01 (Issue A) February 17, 2016	Initial datasheet	N/A
CDS-0022-02 (Issue B) March 11, 2016	Added Eval Board ordering information	1
CDS-0022-02 (Issue C) March 16, 2016	Added Package Photo	1
CDS-0022-02 (Issue D) April 4, 2016	Updated marking information and MOQ	1,2
CDS-0022-02 (Issue E) August 11, 2016	Removed "preliminary"	All
CDS-0022-02 (Issue F) January 11, 2017	Revised Electrical Characteristics table Added "Recommended Soldering Conditions" section	3, 5
CDS-0022-04 (Issue G) September 15, 2017	Updated Characteristics tables and added Error Vector Magnitude Added "Typical Characteristics" graphs section	3, 4, 5



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