RF SWITCH

CG2415M6

L, S-band High Power SPDT RF Switch

DESCRIPTION

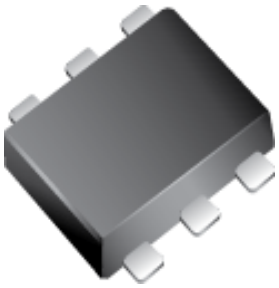
- The CG2415M6 is a pHEMT GaAs MMIC high power SPDT (Single Pole Double Throw) switch which was developed for dual-band wireless LAN.

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 :
  $L_{ins}1$ = 0.30 dB TYP. @ f = 0.5 to 2.0 GHz
  $L_{ins}2$ = 0.35 dB TYP. @ f = 2.0 to 2.5 GHz
  $L_{ins}3$ = 0.40 dB TYP. @ f = 2.5 to 3.8 GHz
  $L_{ins}4$ = 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 :
  $P_{in(0.5dB)}$ = +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

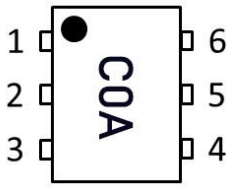
- Dual-band wireless LAN (IEEE 802.11 a/b/g/n/ac)

ORDERING INFORMATION

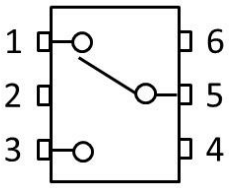
Part Number	Order Number	Package	Marking	Description
CG2415M6	CG2415M6-C2	6-pin lead-less mini mold package (Pb-Free)	C0A	• Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • MOQ 9 kpcs/reel
CG2415M6-EVAL	CG2415M6-EVAL			• Evaluation Board with DC block capacitors, power supply bypass capacitors, and RF and DC connectors • MOQ 1

PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM

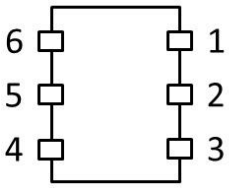
(Top View)



(Top View)



(Bottom View)



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

(T_A = +25˚C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 Note 1	V
Input Power	P_{in}	+34.5 Note 2	dBm
Operating Ambient Temperature	T_A	-45 ~ +85	˚C
Storage Temperature	T_{stg}	-55 ~ +150	˚C

Note 1. |VC1 - VC2| ≦ 6.0 V
2. 3.0V ≦ |VC1 – VC2| ≦ 5.0V

RECOMMENDED OPERATING RANGE

(T_A = +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

(T_A = +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	$L_{INS}1$	f=0.5 to 2.0 GHz Note 1	-	0.30	0.50	dB
	$L_{INS}2$	f=2.0 to 2.5 GHz	-	0.35	0.55	dB
	$L_{INS}3$	f=2.5 to 3.8.0GHz	-	0.40	0.60	dB
	$L_{INS}4$	f=3.8 to 6.0GHz	-	0.45	0.70	dB
Isolation	ISL1	f=0.5 to 2.0 GHz Note 1	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 Note 1	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 **Note 2**	$P_{in(0.1dB)}$	f=0.5 to 2.0GHz Note1	-	+32	-	dBm
		f=2.0 to 6.0GHz	-	+31	-	dBm
		f=0.5 to 6.0GHz Note1 VC(H)=5.0V	-	+35	-	dBm
0.5dB Loss Compression Input Power **Note 3**	$P_{in(0.5dB)}$	f=0.5 to 2.0GHz Note1	-	+34	-	dBm
		f=2.0 to 6.0GHz	-	+34	-	dBm
2nd Harmonics	2f0	f=2.5GHz, P_{in}=+20dBm	-	-90	-	dBc
		f=6.0GHz, P_{in}=+20dBm	-	-90	-	dBc
3rd Harmonics	3f0	f=2.5GHz, P_{in}=+20dBm	-	-90	-	dBc
		f=6.0GHz, P_{in}=+20dBm	-	-90	-	dBc
3rd Order Input Intercept Point	IIP_3	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. $P_{in(0.1dB)}$ is the measured input power level when the insertion loss increases 0.1dB more than that of the linear range.

3. $P_{in(0.5dB)}$ is the measured input power level when the insertion loss increases 0.5dB more than that of the linear range

ELECTRICAL CHARACTERISTICS 2

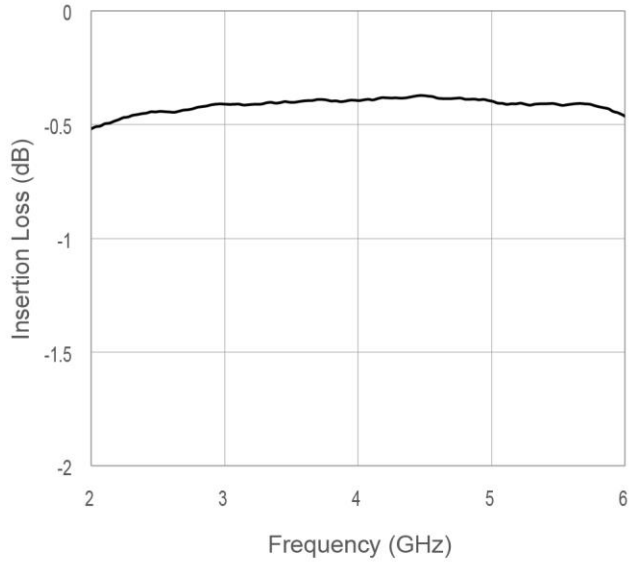
(T_A = +25˚C, VC(H) = 3.0 V, VC(L) = 0 V, Zo = 50 Ω, DC Block Capacitance = 8 pF, unless otherwise specified)

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_{CONT}	RF none	-	2	10	uA
Switching Speed	t_{SW}	50% CTL to 90/10% RF	-	100	250	ns

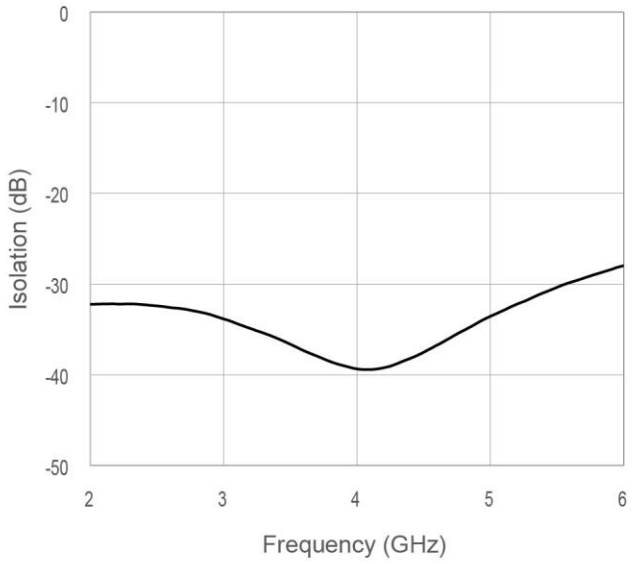
TYPICAL CHARACTERISTICS

(VC(H)=3V, VC(L)=0V, T_A = +25˚C, DC Block Capacitance=8pF, through board loss is subtracted in insertion loss data)

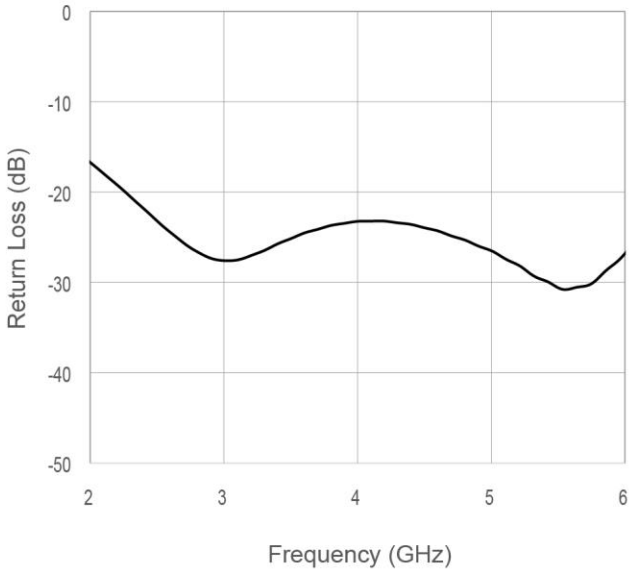
Typical Insertion Loss vs. Frequency



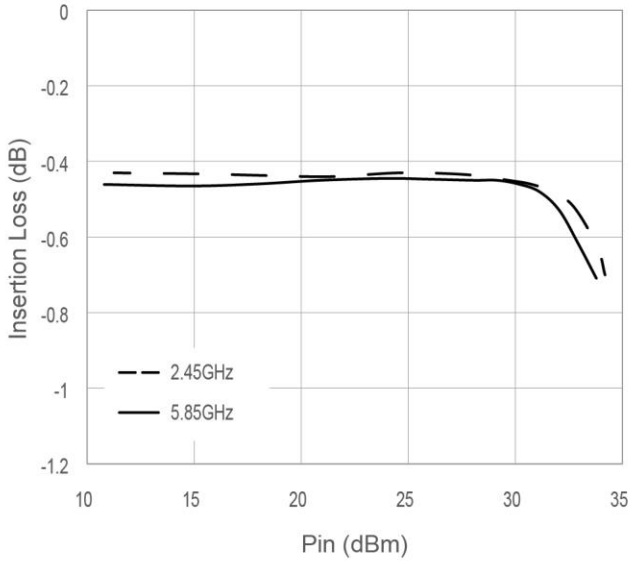
Typical Isolation vs. Frequency



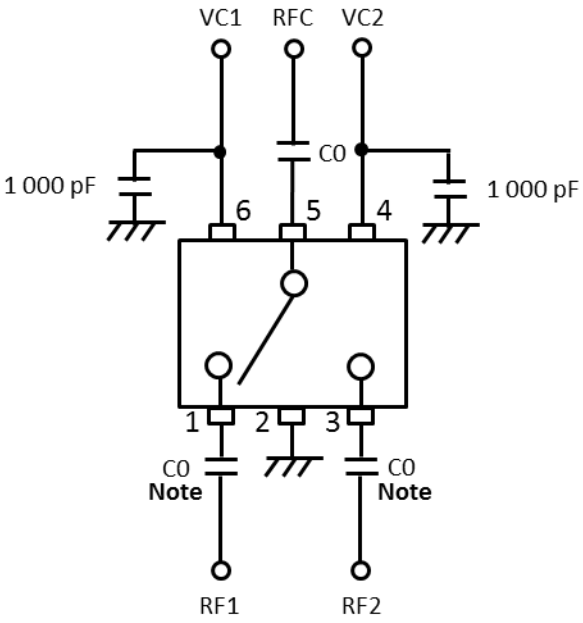
Typical Return Loss vs. Frequency



Typical Insertion Loss vs. Input Power



EVALUATION CIRCUIT

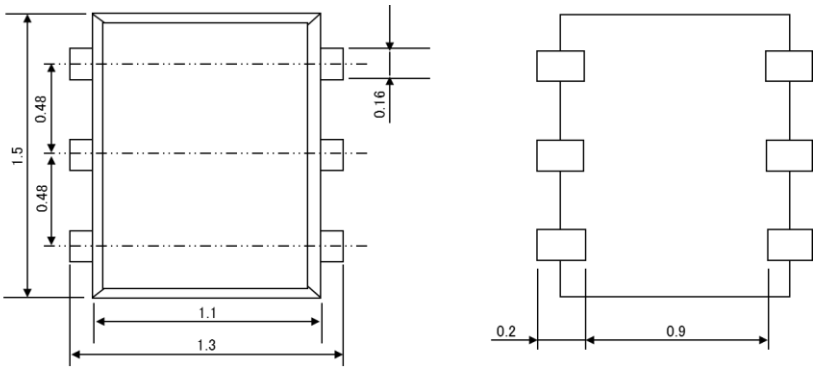


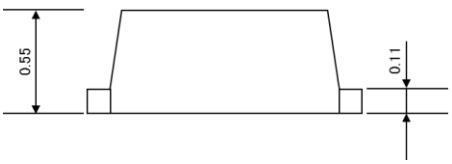
Note C0 : 0.5 to 2.0 GHz 56pF
: 2.0 to 6.0 GHz 8pF

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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