RF SWITCH

CG2179M2

L, S-band Medium Power SPDT Switch

DESCRIPTION

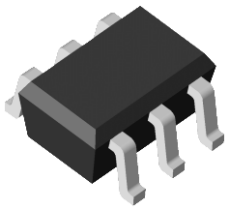
- The CG2179M2 is a pHEMT GaAs SPDT (Single Pole Double Throw) switch. This device can operate from 0.05 GHz to 3.0GHz, having low insertion loss and high isolation.

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 = 0.05 to 0.5 GHz
  $L_{ins}2$ = 0.30 dB TYP. @ f = 0.5 to 1.0 GHz
  $L_{ins}3$ = 0.40 dB TYP. @ f = 1.0 to 2.0 GHz
  $L_{ins}4$ = 0.45 dB TYP. @ f = 2.0 to 2.5 GHz
  $L_{ins}5$ = 0.45 dB TYP. @ f = 2.5 to 3.0 GHz
- High isolation :
  ISL1 = 39 dB TYP. @ f = 0.05 to 0.5 GHz
  ISL2 = 33 dB TYP. @ f = 0.5 to 1.0 GHz
  ISL3 = 27 dB TYP. @ f = 1.0 to 2.0 GHz
  ISL4 = 26 dB TYP. @ f = 2.0 to 2.5 GHz
  ISL5 = 23 dB TYP. @ f = 2.5 to 3.0 GHz
- Power handling :
  $P_{in(0.5dB)}$ = +32 dBm TYP. @ f = 3.0 GHz,
  VC(H) = 3.0 V, VC(L) = 0 V

PACKAGE

- 6-pin mini mold Package
  (2.0mm x 1.25mm x 0.9mm)



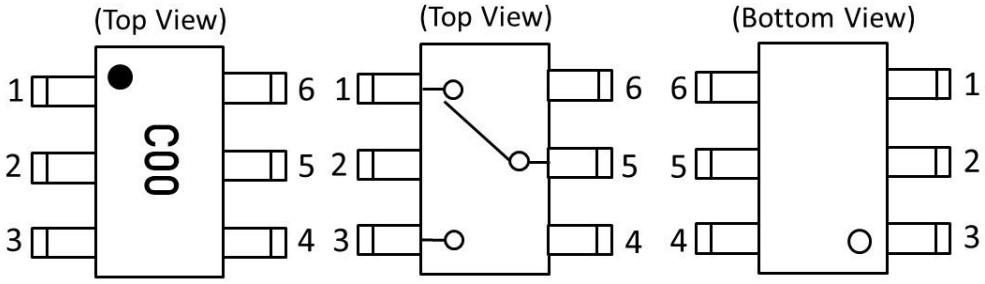
APPLICATIONS

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

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CG2179M2	CG2179M2-C4	6-pin mini mold package (Pb-Free)	C00	• Embossed tape 8 mm wide • Pin 4, 5, 6 face the perforation side of the tape • MOQ 10 kpcs/reel
CG2179M2-EVAL	CG2179M2-EVAL			• Evaluation Board with DC block capacitors, power supply bypass capacitors, and RF and DC connectors • MOQ 1

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˚C, unless otherwise specified)

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 Note 1	V
Input Power	$P_{in}1$	+33 Note 2	dBm
	$P_{in}2$	+29 Note 3	dBm
Operating Ambient Temperature	T_A	-45 ~ +85	˚C
Storage Temperature	T_{stg}	-55 ~ +150	˚C

Note 1. |VC1 - VC2| ≦ 6.0V
2. 3.0V ≦ |VC1 – VC2| ≦ 5.0V, 0.4GHz≦f
3. 3.0V ≦ |VC1 – VC2| ≦ 5.0V, 0.05GHz≦f≦0.4GHz

RECOMMENDED OPERATING RANGE

(T_A = +25˚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	+5.3	V
Switch Control Voltage (L)	VC(L)	-0.2	0	+0.2	V

ELECTRICAL CHARACTERISTICS 1

(T_A = +25°C, VC(H) = 3.0V, VC(L) = 0V, Zo = 50Ω, DC Block Capacitance = 56pF, unless otherwise specified)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Insertion Loss	$L_{INS}1$	f=0.05 to 0.5GHz Note 1	-	0.30	0.50	dB
	$L_{INS}2$	f=0.5 to 1.0GHz	-	0.30	0.50	dB
	$L_{INS}3$	f=1.0 to 2.0GHz	-	0.40	0.60	dB
	$L_{INS}4$	f=2.0 to 2.5GHz	-	0.45	0.65	dB
	$L_{INS}5$	f=2.5 to 3.0GHz	-	0.45	0.65	dB
Isolation	ISL1	f=0.05 to 0.5GHz Note 1	36	39	-	dB
	ISL2	f=0.5 to 1.0GHz	30	33	-	dB
	ISL3	f=1.0 to 2.0GHz	23	27	-	dB
	ISL4	f=2.0 to 2.5GHz	22	26	-	dB
	ISL5	f=2.5 to 3.0GHz	21	24	-	dB
Return Loss	RL	f=0.05 to 3.0GHz Note 1	15	20	-	dB
0.1dB Loss Compression Input Power **Note 2**	$P_{in(0.1dB)}$	f=0.05~0.5GHz Note 1	-	+26	-	dBm
		f=0.5~3.0GHz	-	+30	-	dBm
0.5dB Loss Compression Input Power **Note 3**	$P_{in(0.5dB)}$	f=0.05~0.5GHz Note 1	-	+28.5	-	dBm
		f=0.5~3.0GHz	-	+32	-	dBm
2nd Harmonics	2f0	f=3.0GHz, P_{in}=+20dBm	-	-85	-	dBc
3rd Harmonics	3f0	f=3.0GHz, P_{in}=+20dBm	-	-85	-	dBc
3rd Order Input Intercept Point	IIP_3	f=2.5GHz, 2-tone 1MHz Spacing	-	+58	-	dBm
Error Vector Magnitude	EVM	802.11g, 64QAM, 54Mbps Pin≦+25dBm	-	2.5	-	%
Switch Control Current	I_{CONT}	RF none	-	1	10	uA
Switching Speed	t_{SW}	50% CTL to 90/10% RF	-	50	-	ns

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

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) = 1.8V, VC(L) = 0V, Zo = 50Ω, DC Block Capacitance = 56pF, unless otherwise specified)

Parameter	Symbol	Condition	MIN.	TYP.	MAX.	Unit
Insertion Loss	$L_{INS}1$	f=0.05 to 0.5GHz Note 1	-	0.30	0.50	dB
	$L_{INS}2$	f=0.5 to 1.0GHz	-	0.30	0.50	dB
	$L_{INS}3$	f=1.0 to 2.0GHz	-	0.40	0.60	dB
	$L_{INS}4$	f=2.0 to 2.5GHz	-	0.45	0.65	dB
	$L_{INS}5$	f=2.5 to 3.0GHz	-	0.45	0.65	dB
Isolation	ISL1	f=0.05 to 0.5GHz Note 1	36	39	-	dB
	ISL2	f=0.5 to 1.0GHz	30	33	-	dB
	ISL3	f=1.0 to 2.0GHz	23	27	-	dB
	ISL4	f=2.0 to 2.5GHz	22	26	-	dB
	ISL5	f=2.5 to 3.0GHz	21	24	-	dB
Return Loss	RL	f=0.05 to 3.0GHz Note 1	15	20	-	dB
0.1dB Loss Compression Input Power **Note 2**	$P_{in(0.1dB)}$	f=0.05~0.5GHz Note 1	-	+19	-	dBm
		f=0.5~3.0GHz	-	+23	-	dBm
0.5dB Loss Compression Input Power **Note 3**	$P_{in(0.5dB)}$	f=0.05~0.5GHz Note 1	-	+22	-	dBm
		f=0.5~3.0GHz	-	+26	-	dBm
Switch Control Current	I_{CONT}	RF none	-	1	10	uA
Switching Speed	t_{SW}	50% CTL to 90/10% RF	-	50	-	ns

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

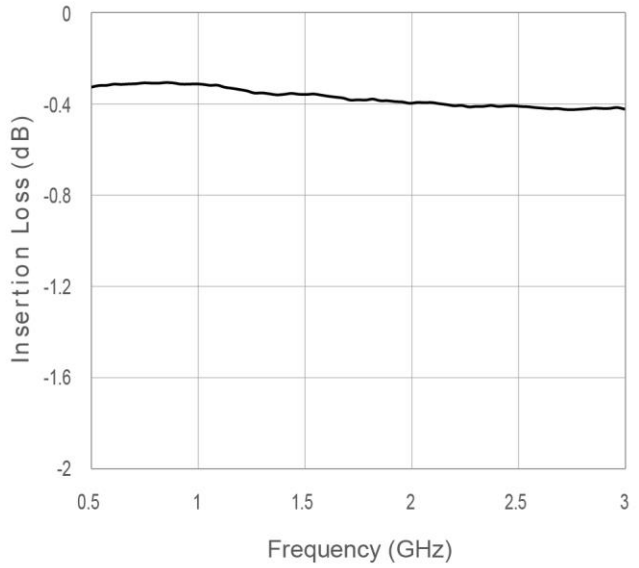
2. $P_{in(0.1dB)}$ is the measured input power level when the insertion loss increases 0.1dB more than that of the linear range.

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

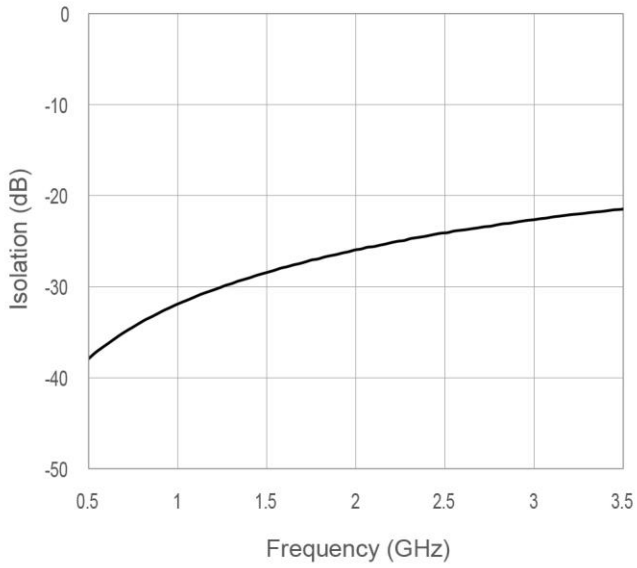
TYPICAL CHARACTERISTICS

(Vc(H)=3V, Vc(L)=0V, TA= +25˚C, DC Block Capacitance=56pF, through board loss is subtracted in insertion loss data)

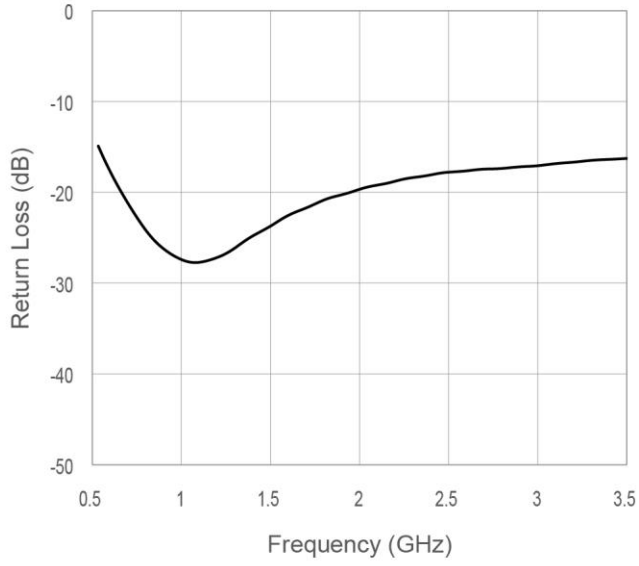
Typical Insertion Loss vs. Frequency



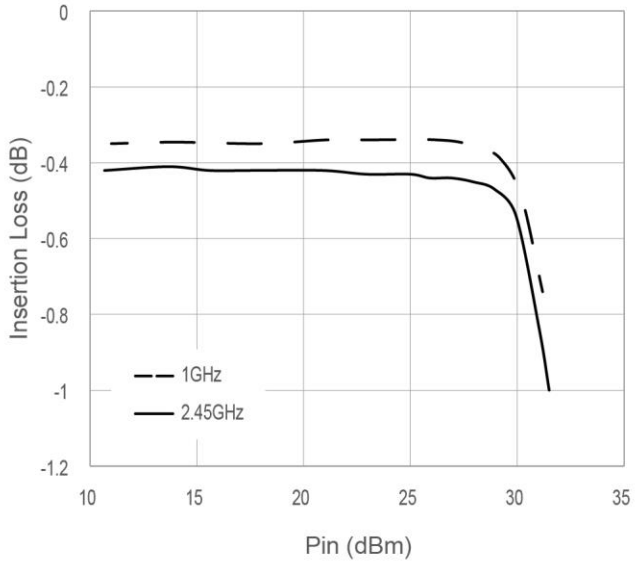
Typical Isolation vs. Frequency



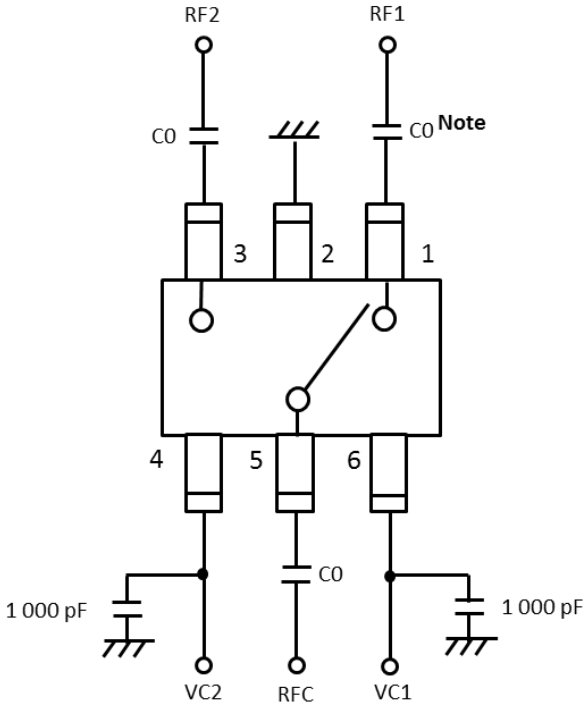
Typical Return Loss vs. Frequency



Typical Insertion Loss vs. Input Power



EVALUATION CIRCUIT

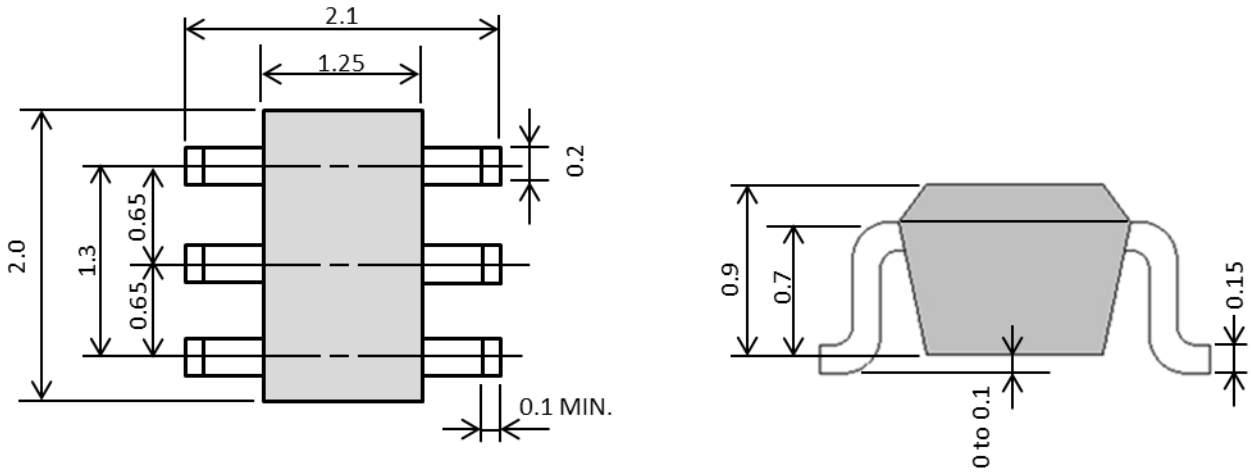


Note C0 : 0.05 to 0.5 GHz 1000pF
: 0.4 to 3.0 GHz 56pF

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 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-0008-03 (Issue A) February 17, 2016	Initial datasheet	N/A
CDS-0008-03 (Issue B) March 24, 2016	Added Eval Board ordering information Updated Marking information	1, 2
CDS-0008-03 (Issue C) August 11, 2016	Removed “Preliminary”	All
CDS-0008-03 (Issue D) January 11, 2017	Revised Electrical Characteristics table Added “Recommended Soldering Conditions” section	3, 5
CDS-0008-03 (Issue E) May 24, 2017	Updated Evaluation Circuit output pinouts - switched RF1 and RF2	4
CDS-0008-04 (Issue F) June 13, 2017	Added power handling @0.05GHz to 0.5GHz Added absolute maximum rating @0.05GHz≦f≦0.4GHz Revised recommended operating switch control voltage Updated Electrical Characteristics table and added a second Electrical characteristics table on page 4	1,2,3,4
CDS-0008-05 (Issue G) June 20, 2017	Added Error Vector Magnitude parameter to Electrical Characteristics table 1	3
CDS-0008-06 (Issue H) August 29, 2017	Updated Applications section Added “Typical Characteristics” graphs section	1, 5

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