RF SWITCH

CG2163X3

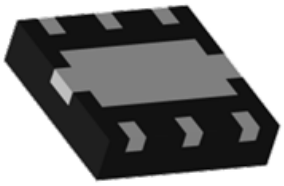
Broadband SPDT RF Switch

DESCRIPTION

- The CG2163X3 is a GaAs MMIC SPDT(Single Pole Double Throw) switch which was developed for 2.4 GHz and 6 GHz dual-band wireless LAN

PACKAGE

- 6-pin Thin SON Package (XS03) (1.5mm x 1.5mm x 0.37mm)



FEATURES

- Control voltage :
  VC(H) = 1.8 to 5.0 V (3.0V TYP.)
  VC(L) = -0.2 to 0.2 V (0V TYP.)
- Low insertion loss :
  $L_{ins}1$ = 0.40 dB TYP. @ f = 2.4 to 2.5 GHz
  $L_{ins}2$ = 0.50 dB TYP. @ f = 4.9 to 6.0 GHz
- High isolation :
  ISL1 = 40 dB TYP. @ f = 2.4 to 2.5 GHz
  ISL2 = 31 dB TYP. @ f = 4.9 to 6.0 GHz
- Power handling :
  $P_{in(1db)}$ = +33 dBm TYP. @ f = 2.5 GHz
  VC(H) = 3.0 V, VC(L) = 0 V
  $P_{in(1db)}$ = +32 dBm TYP. @ f = 6.0 GHz,
  VC(H) = 3.0 V, VC(L) = 0 V

APPLICATIONS

- Dual-band wireless LAN (IEEE802.11a/b/g/n/ac)

ORDERING INFORMATION

Part Number	Order Number	Package	Marking	Description
CG2163X3	CG2163X3-C2	6-pin plastic TSON (Pb-Free)	C06	• Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • MOQ 10 kpcs/reel
CG2163X3-EVAL	CG2163X3-EVAL			• Evaluation Board with DC block capacitors, power supply bypass capacitors, and RF and DC connectors • MOQ 1

This document is subject to change without notice.
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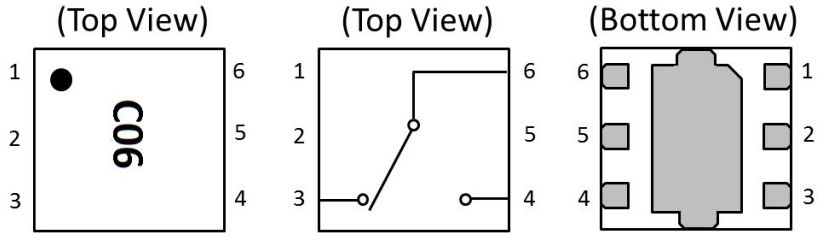
PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM



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

Remark Exposed pad : GND

TRUTH TABLE

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

ABSOLUTE MAXIMUM RATINGS

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

Parameter	Symbol	Rating	Unit
Control Voltage	VC	6.0 Note 1	V
Input Power	Pin	+33.5 Note 2	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

RECOMMENDED OPERATING RANGE

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

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f1	2.4	-	2.5	GHz
	f2	4.9	-	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

(T_A=+25°C, VC(H)=3.0V, VC(L)=0V, Zo=50Ω, DC Block Capacitance=4pF, unless otherwise specified)

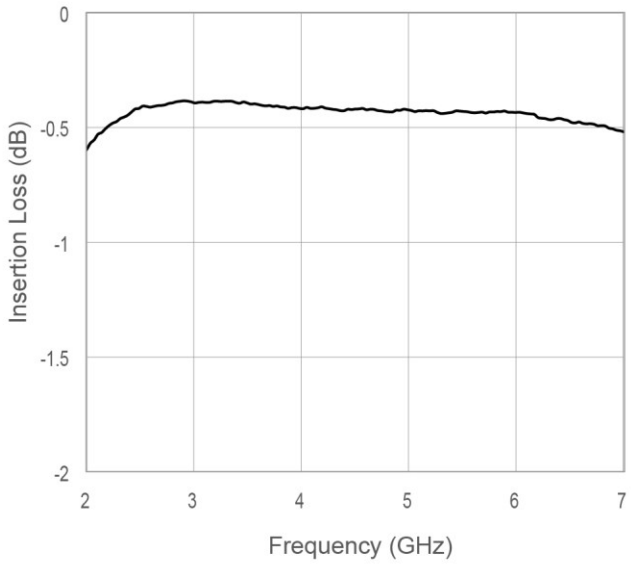
Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	$L_{ins}1$	f = 2.4 to 2.5 GHz	-	0.40	0.60	dB
	$L_{ins}2$	f = 4.9 to 6.0 GHz	-	0.50	0.80	dB
Isolation	ISL1	f = 2.4 to 2.5 GHz	37	40	-	dB
	ISL2	f = 4.9 to 6.0 GHz	28	31	-	dB
Return Loss	RL1	f = 2.4 to 2.5 GHz	-	15	-	dB
	RL2	f = 4.9 to 6.0 GHz	-	15	-	dB
1 dB Compression Point **Note**	$P_{in(1dB)}$	f = 2.4 to 2.5 GHz, VC(H)=1.8V, VC(L)=0V	-	+29	-	dBm
		f = 2.4 to 2.5 GHz, VC(H)=3.0V, VC(L)=0V	-	+33	-	dBm
		f = 4.9 to 6.0 GHz, VC(H)=1.8V, VC(L)=0V	-	+26	-	dBm
		f = 4.9 to 6.0 GHz VC(H)=3.0V, VC(L)=0V	-	+32	-	dBm
3rd Order Input Intercept Point	IIP_3	f = 2.5GHz 2-tone 5MHz Spacing	-	+55	-	dBm
Error Vector Magnitude	EVM	802.11a, 64QAM, 54Mbps Pin≤ + 22dBm	-	2.5	-	%
		802.11g, 64QAM, 54Mbps Pin≤ + 25dBm	-	2.5	-	%
Switch Control Speed	t_{sw}	50% CTL to 90/10%	-	80	-	ns
Switch Control Current	I_{cont}	RF None	-	2	-	μA

Note $Pin_{(1dB)}$ is the measured input power level when the insertion loss increases 1dB more than that of the linear range.

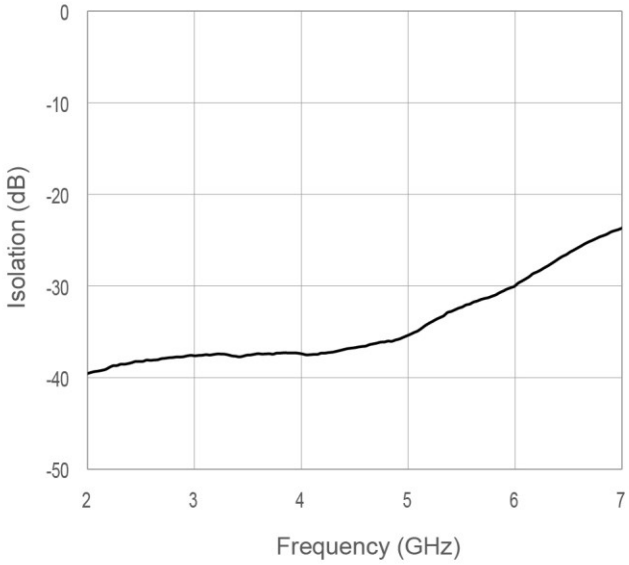
TYPICAL CHARACTERISTICS

(VC(H)=3V, VC(L)=0V, T_A = +25˚C, DC Block Capacitance=4pF, through board loss is subtracted in insertion loss data)

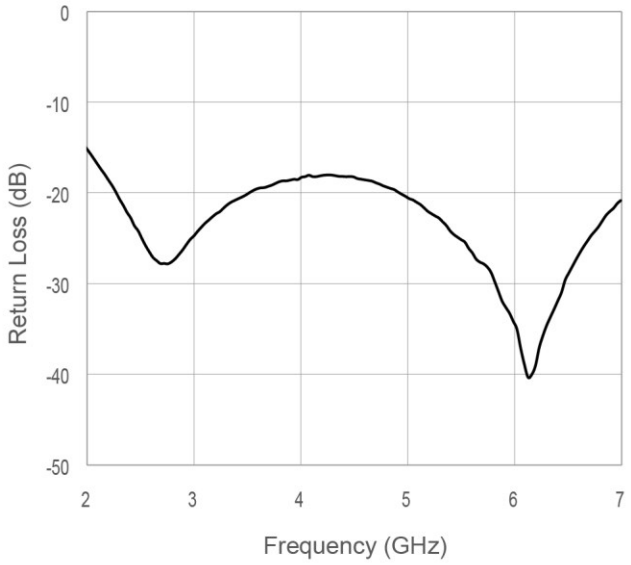
Typical Insertion Loss vs. Frequency



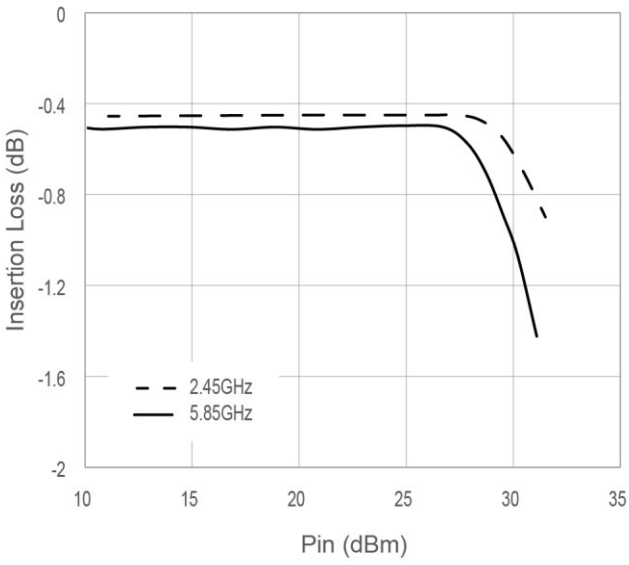
Typical Isolation vs. Frequency



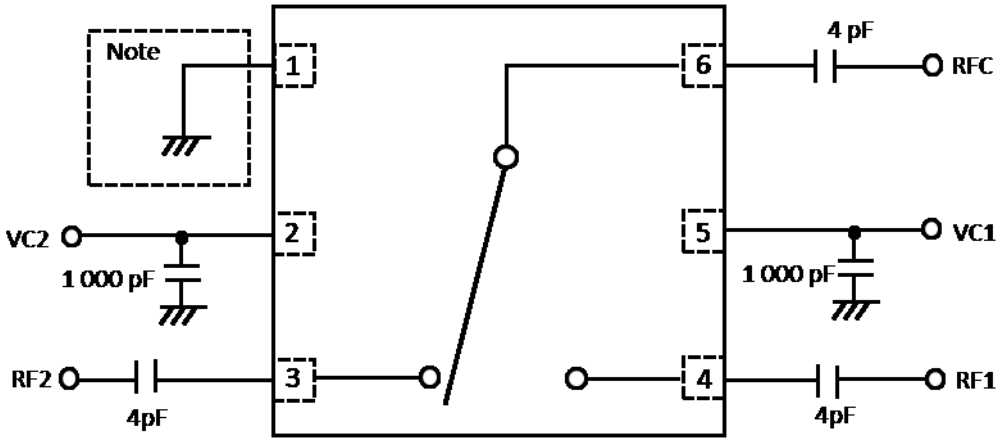
Typical Return Loss vs. Frequency



Typical Insertion Loss vs. Input Power



EVALUATION CIRCUIT

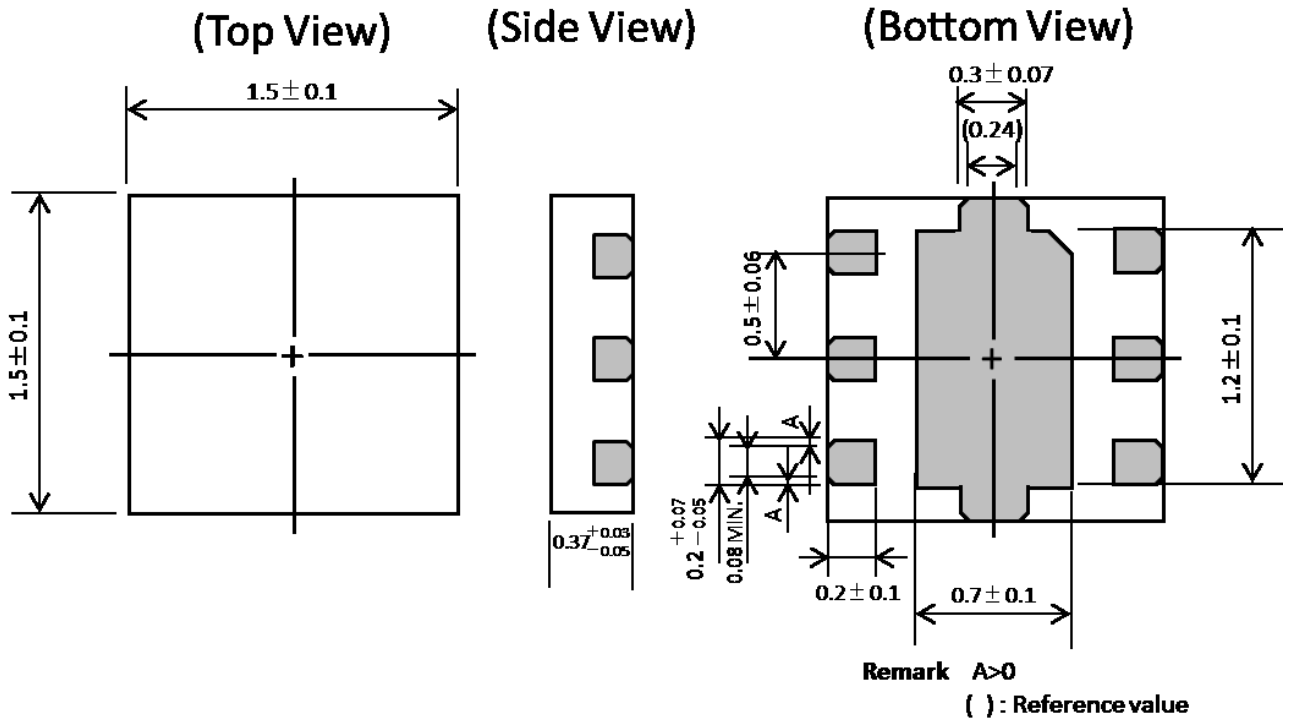


Note: It is recommended to connect the pin directly to the ground, or not to connect the pin to anything.

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 TSON (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-0015-03 (Issue A) February 17, 2016	Initial datasheet	N/A
CDS-0015-03 (Issue B) March 11, 2016	Added Eval Board ordering information	1
CDS-0015-03 (Issue C) March 15, 2016	Updated “Note” definition	3
CDS-0015-03 (Issue D) April 4, 2016	Updated Marking information	1, 2
CDS-0015-03 (Issue E) May 9, 2016	Correction to Truth Table: VC1 and VC2	2
CDS-0015-03 (Issue F) August 11, 2016	Removed “preliminary”	All
CDS-0015-03 (Issue G) January 10, 2017	Revised Electrical Characteristics table Added “Recommended Soldering Conditions” section	3, 5
CDS-0015-06 (Issue H) August 04, 2017	Added Error Vector Magnitude parameter to Electrical Characteristics table Added Typical Characteristics graphs section Revised Evaluation Circuit and added Note	3, 4 ,5

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