RF SWITCH

CG2164X3

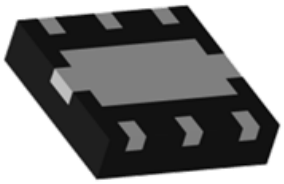
Dual-Band Wireless DPDT RF Switch

DESCRIPTION

- The CG2164X3 is a GaAs MMIC DPDT (Double Pole Double Throw) switch for 2.5 GHz and 6 GHz dual-band wireless LAN applications

PACKAGE

- 6-pin TSON Package
  (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} = 0.50 dB TYP. @ f = 2.5 GHz
  L_{ins} = 0.60 dB TYP. @ f = 6.0 GHz
- High Isolation:
  ISL = 23 dB TYP. @ f = 2.5 GHz
  ISL = 15 dB TYP. @ f = 6.0 GHz
- Power Handling:
  P_{in}(0.5dB) = +32 dBm TYP. @ f = 2.5 GHz,
  VC(H) = 3.0 V, VC(L) = 0 V
  P_{in}(0.5dB) = +30 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
CG2164X3	CG2164X3-C2	6-pin plastic TSON (Pb-Free)	C0N	• Embossed tape 8 mm wide • Pin 1, 6 face the perforation side of the tape • MOQ 10 kpcs/reel
CG2164X3-EVAL	CG2164X3-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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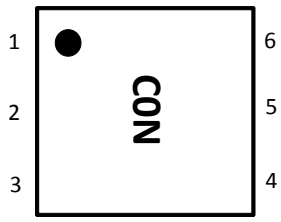
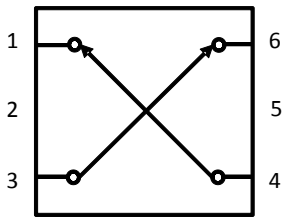
CDS-0033-06 (Issue E)

PIN CONFIGURATION AND INTERNAL BLOCK DIAGRAM

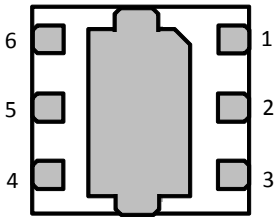
(Top View)



(Top View)



(Bottom View)



Pin No.	Pin Name
1	ANT2
2	VC2
3	RX
4	TX
5	VC1
6	ANT1

Remark Exposed pad : GND

TRUTH TABLE

VC1	VC2	ANT1-TX	ANT1-RX	ANT2-TX	ANT2-RX
High	Low	OFF	ON	ON	OFF
Low	High	ON	OFF	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
	$P_{in}2$	+26 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 f ≧ 0.5GHz
3. 3.0V≦|VC1 – VC2|≦5.0V f ≧ 0.05GHz

RECOMMENDED OPERATING RANGE

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

Parameter	Symbol	MIN.	TYP.	MAX.	Unit
Operating Frequency	f	0.05	-	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 1

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

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
Insertion Loss	Lins1	f = 0.05 to 0.5 GHz Note1	-	0.40	0.65	dB
	Lins2	f = 0.5 to 1.0 GHz Note1	-	0.45	0.70	dB
	Lins3	f = 1.0 to 2.0 GHz Note1	-	0.50	0.75	dB
	Lins4	f = 2.0 to 2.5 GHz	-	0.50	0.75	dB
	Lins5	f = 2.5 to 4.9 GHz	-	0.55	0.90	dB
	Lins6	f = 4.9 to 6.0 GHz	-	0.60	1.00	dB
Isolation (ANT to TX, RX)	ISL1	f = 0.05 to 0.5 GHz Note1	32	35	-	dB
	ISL2	f = 0.5 to 1.0 GHz Note1	26	29	-	dB
	ISL3	f = 1.0 to 2.0 GHz Note1	21	24	-	dB
	ISL4	f = 2.0 to 2.5 GHz	20	23	-	dB
	ISL5	f = 2.5 to 4.9 GHz	13	16	-	dB
	ISL6	f = 4.9 to 6.0 GHz	12	15	-	dB
Isolation (ANT1 to ANT2, TX to RX)	ISL7	f = 0.05 to 0.5 GHz Note1	34	37	-	dB
	ISL8	f = 0.5 to 1.0 GHz Note1	27	30	-	dB
	ISL9	f = 1.0 to 2.0 GHz Note1	22	25	-	dB
	ISL10	f = 2.0 to 2.5 GHz	22	25	-	dB
	ISL11	f = 2.5 to 4.9 GHz	15	18	-	dB
	ISL12	f = 4.9 to 6.0 GHz	15	18	-	dB
Return Loss	RL1	f = 0.05 to 2.0 GHz Note1	-	20	-	dB
	RL2	f = 2.0 to 6.0 GHz	-	15	-	dB
0.5 dB Loss Compression Input Power Note2	$P_{in(0.5dB)}$	f = 0.05 GHz	-	+24.5	-	dBm
		f = 0.5 to 1.0 GHz	-	+31	-	dBm
		f = 2.4 to 2.5 GHz	-	+32	-	dBm
		f = 4.9 to 6.0 GHz	-	+30	-	dBm

Note1 DC block capacitance = 1,000pF at f=0.05 to 2.0GHz

Note2 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

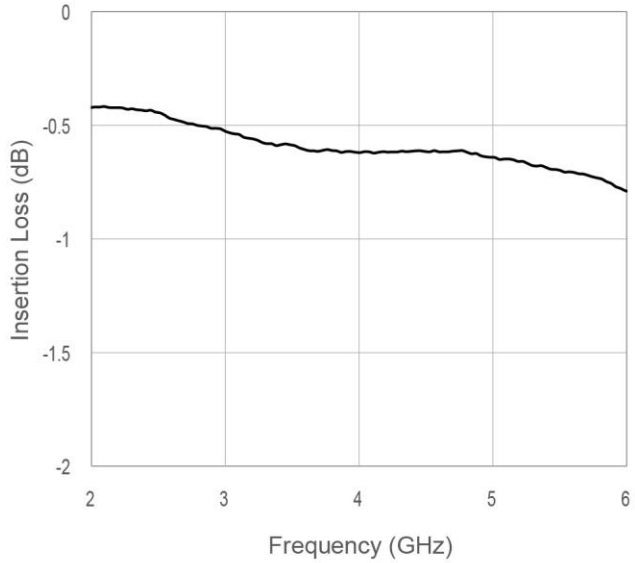
(TA=+25℃, VC(H)=3.0V, VC(L)=0V, Zo=50Ω, DC Block Capacitance=8pF, unless otherwise specified)

Parameter	Symbol	Test Conditions	MIN.	TYP.	MAX.	Unit
2nd Harmonics	2f0	f = 2.5 GHz, P_{in}=+20dBm	-	85	-	dBc
		f = 6.0 GHz, P_{in}=+20dBm	-	80	-	dBc
3rd Harmonics	3f0	f = 2.5 GHz, P_{in}=+20dBm	-	85	-	dBc
		f = 6.0 GHz, P_{in}=+20dBm	-	85	-	dBc
3rd Order Input Intercept Point	IIP3	f = 2.5GHz 2-tone 1MHz Spacing	-	+55	-	dBm
Error Vector Magnitude	EVM	802.11a, 64QAM, 54Mbps, Pin≦+24.5dBm	-	2.5	-	%
		802.11g, 64QAM, 54Mbps, Pin≦+25dBm	-	2.5	-	%
Switch Control Speed	tsw	50% CTL to 90/10%	-	30	-	ns
Switch Control Current	Icont	Non RF	-	2	-	μA

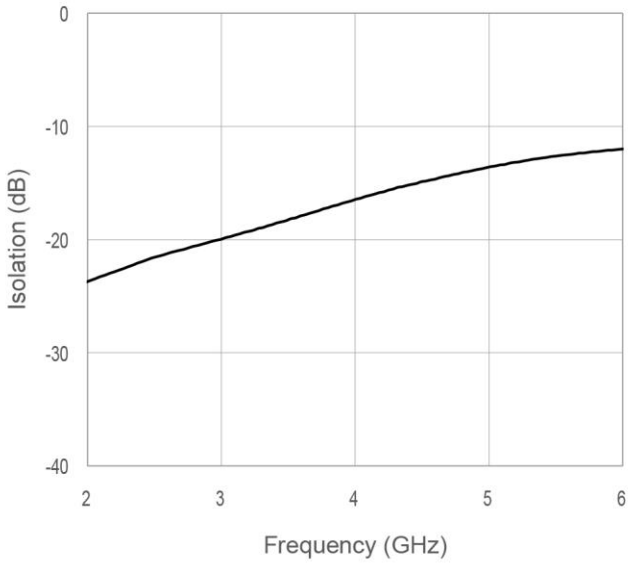
TYPICAL CHARACTERISTICS

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

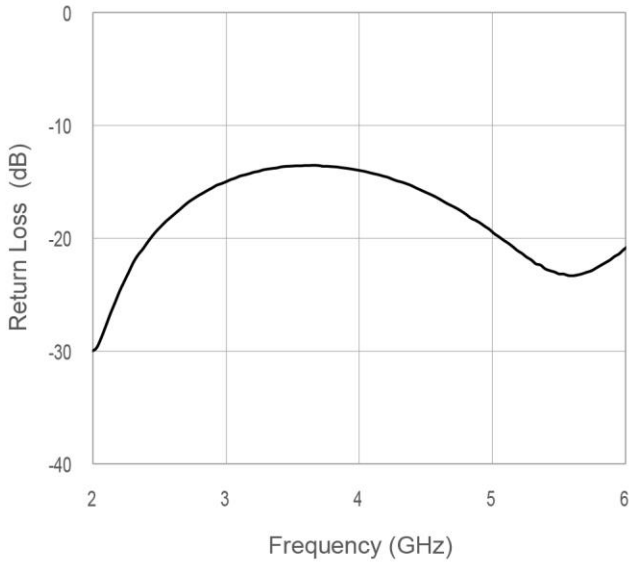
Typical Insertion Loss vs. Frequency



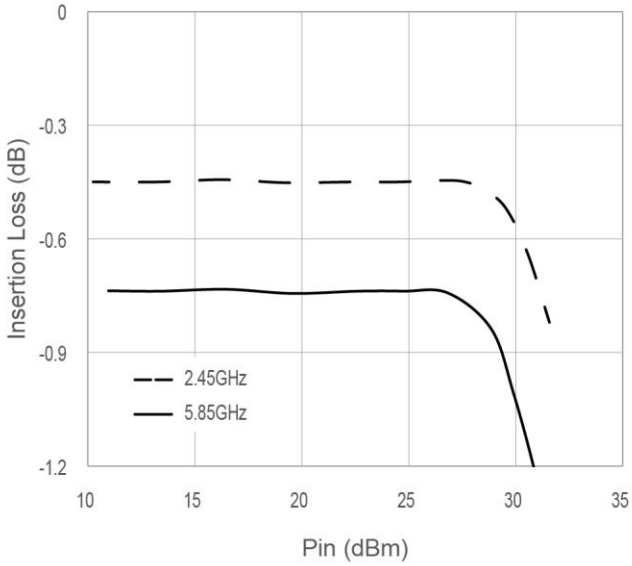
Typical Isolation vs. Frequency



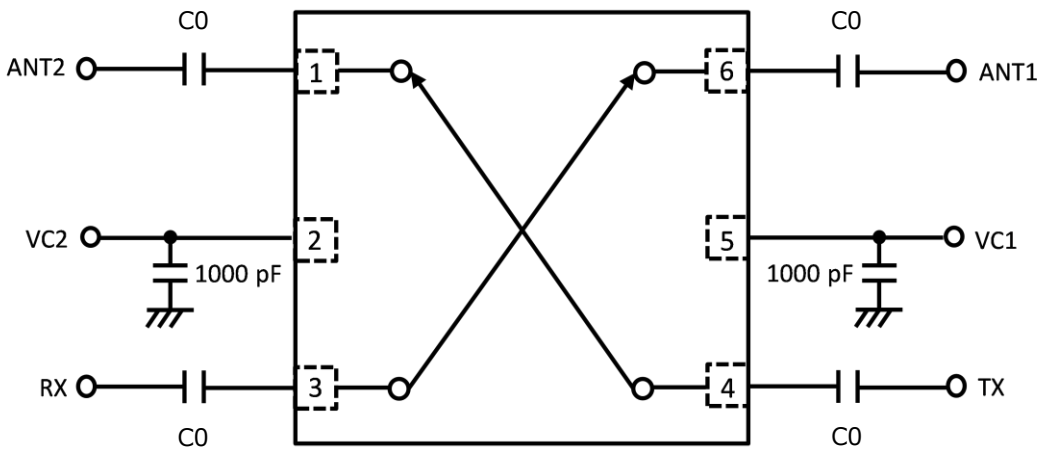
Typical Return Loss vs. Frequency



Typical Insertion Loss vs. Input Power



EVALUATION CIRCUIT

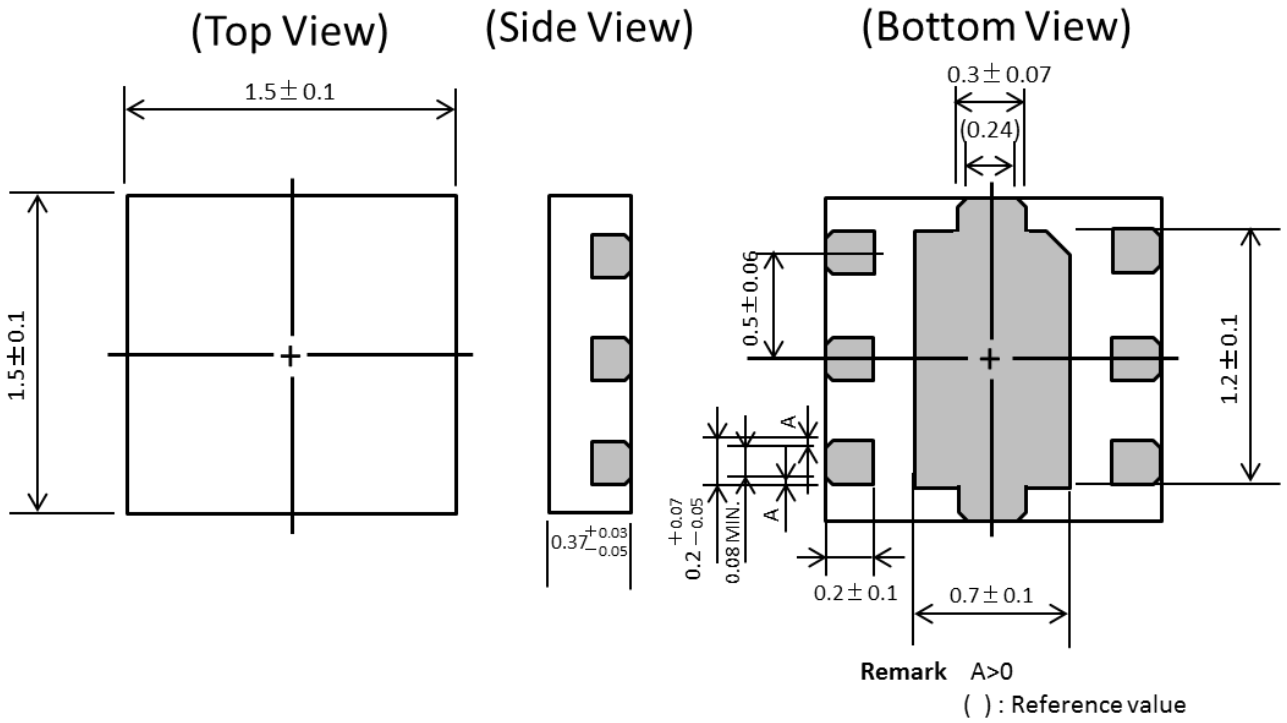


Note C0 : 0.05 to 2.0 GHz 1,000pF
2.0 to 6.0 GHz 8pF

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.

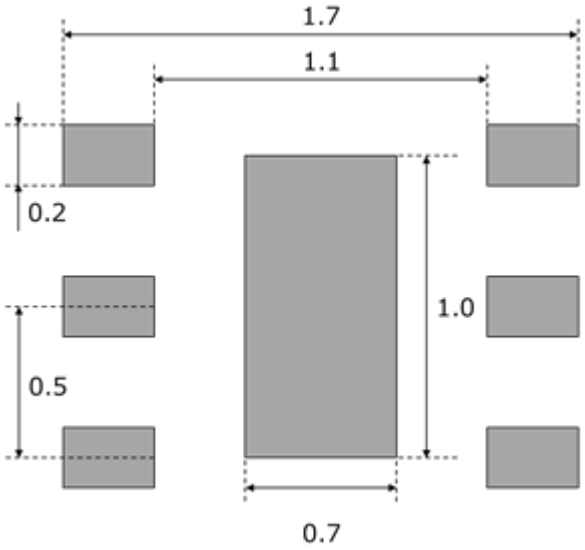
PACKAGE DIMENSIONS

6-pin Plastic TSON (Unit: mm)



PCB Layout Footprint

6-pin TSON (Unit: mm)



The PCB Layout Footprint In this document Is for reference only.

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-0033-01 (Issue A) September 14, 2016	Preliminary datasheet	N/A
CDS-0033-02 (Issue B) December 27, 2016	Revised Electrical Characteristics table Added “Recommended Soldering Conditions” section	3, 5
CDS-0033-03 (Issue C) March 20, 2017	Initial Datasheet. Revised Electrical Characteristics table	3
CDS-0033-05 (Issue D) August 28, 2017	Updated Characteristics tables and added Error Vector Magnitude Added “Typical Characteristics” graphs section Updated Evaluation Circuit diagram	3, 4, 5, 6
CDS-0033-06 (Issue E) October 25, 2017	Added PCB Layout Footprint	7

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