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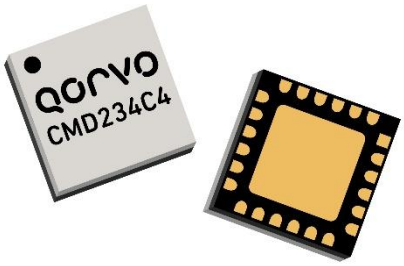
CMD234C4

CMD234C4

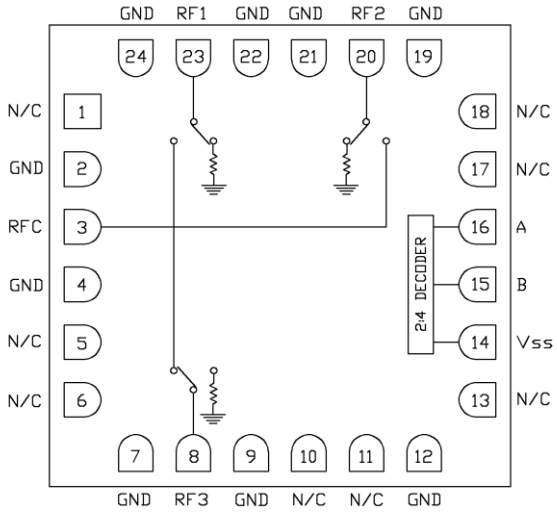
DC-18 GHz SP3T Non-reflective Switch

Product Overview

The CMD234C4 is a broadband MMIC SP3T switch housed in a leadless 4x4 mm surface mount package. The CMD234C4 covers DC to 18 GHz and offers a low insertion loss of 2 dB and high isolation of 42 dB at 10 GHz. The switch also includes an on board binary decoder circuit which reduces the number of required logic control lines from three to two. The CMD234C4 operates using complementary control voltage logic lines of 0/-5 V and consumes little DC current.



Functional Block Diagram



Key Features

- Low Loss Broadband Performance
- High Isolation
- Non-Reflective Design
- Integrated 2:4 TTL Decoder
- Pb-Free RoHs Compliant 4x4 SMT Package

Ordering Information

Part No.	Description
CMD234C4	DC-18 GHz SP3T Non-reflective Switch, 100 Piece 7” Reel
CMD234C4-EVB	Evaluation Board

Electrical Performance (V_{ctl} = 0/-5 V, V_{ss} = -5 V, T_A = 25 °C, F = 10 GHz)

Parameter	Min	Typ	Max	Units
Frequency Range		DC - 18		GHz
Insertion Loss		2.0		dB
Isolation		42		dB
Return Loss - On State		12		dB
Return Loss RF1, RF2, RF3 - Off State		8		dB
Input P0.1dB		23		dBm
Switching Speed		66		ns

Absolute Maximum Ratings

Parameter	Rating
RF Input Power	+27 dBm
Bias Voltage (V_{ss})	-7 V
Control Voltage Range (A, B)	+0.5 V to -7.5 V
Channel Temperature, Tch	150 °C
Thermal Resistance, θ_{JC}	122.23 °C/W
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 150 °C

Exceeding any one or combination of the maximum ratings may cause permanent damage to the device.

Bias Voltage & Current

V_{ss} Range = -5.0V ± 10%		
V_{ss} (V)	I_{ss} (Typ) (mA)	I_{ss} (Max) (mA)
-5	4.5	8.0

TTL/CMOS Control Voltages

State	Bias Condition
Low	-1V to 0V @ 0.5 mA Typ
High	-7V to -3V @ 1 uA Typ

Truth Table

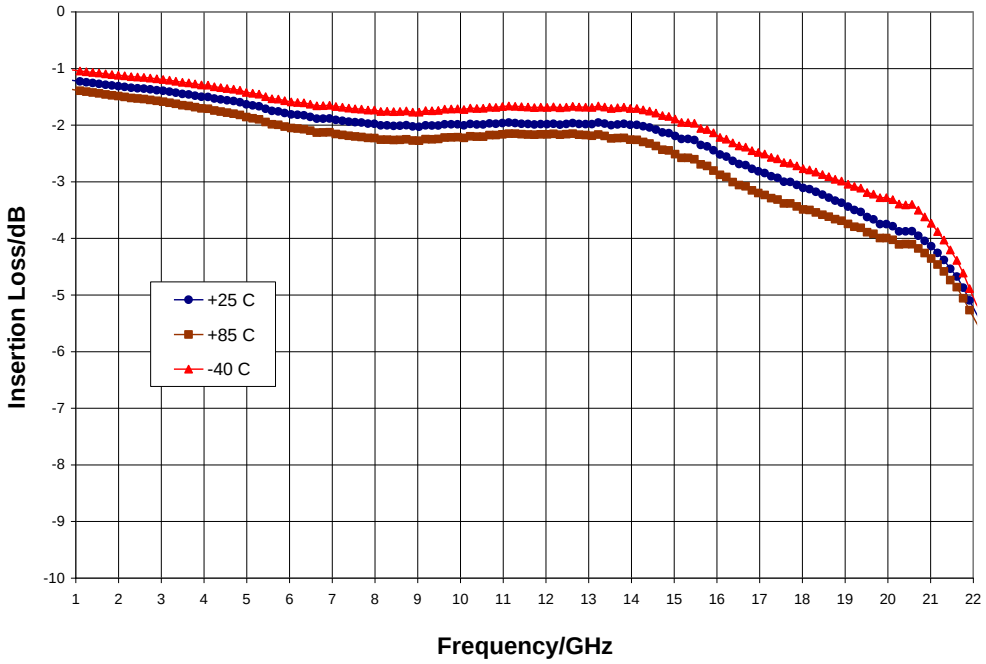
Control Input		Signal Path State
A	B	RFC to:
High	High	RF3
Low	High	RF2
High	Low	RF1
Low	Low	All Off

Electrical Specifications (V_{ctl} = 0/-5 V, V_{ss} = -5 V T_A = 25 °C)

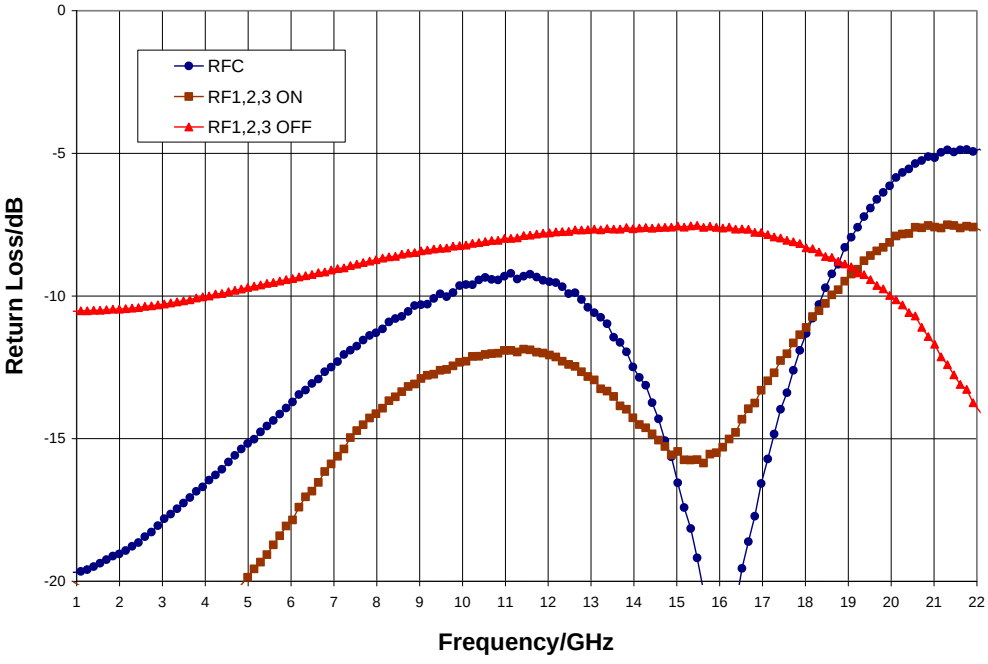
Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range		DC - 6			DC - 14			DC - 18		GHz
Insertion Loss		2	2.4		2	2.4		3	3.5	dB
Isolation	50	55		35	40		35	40		dB
Return Loss - On State		17			12			12		dB
Return Loss - Off State		9			7			7		dB
Input P0.1dB		18			16			15		dBm
Input IP3		38			38			38		dBm
Switching Speed		66			66			66		ns

Typical Performance

Insertion Loss vs. Temperature

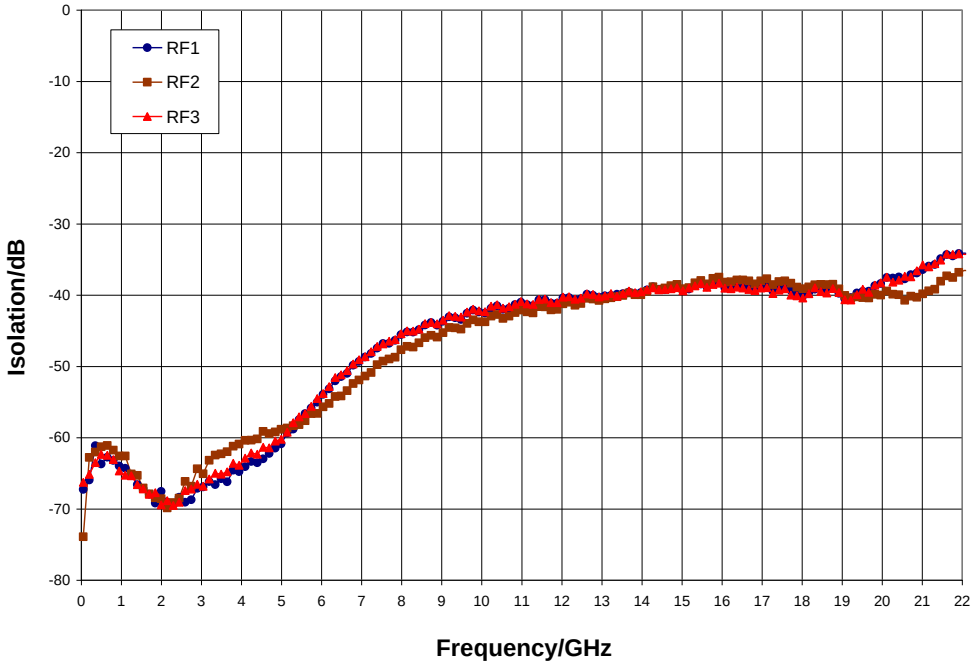


Return Losses

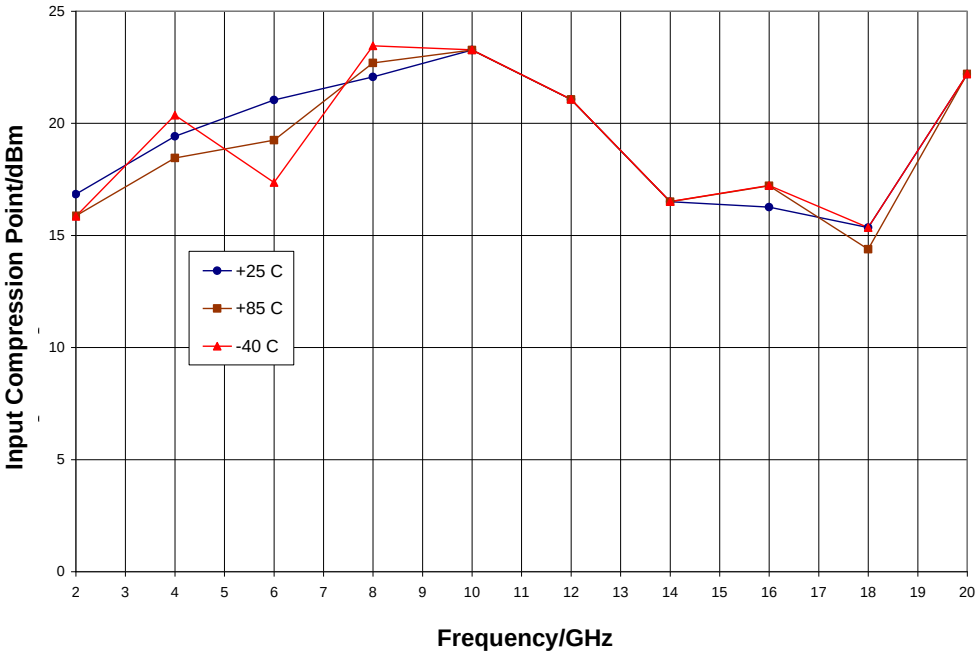


Typical Performance

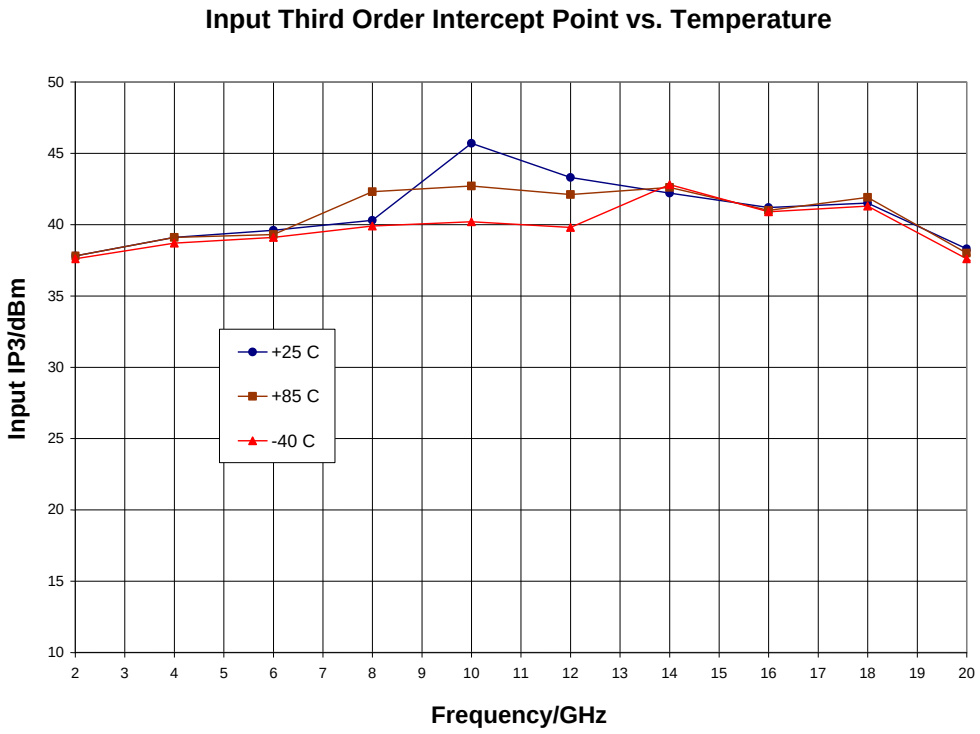
Isolation Between Ports RFC and RF1/RF2/RF3



Input P0.1dB Compression Point vs. Temperature

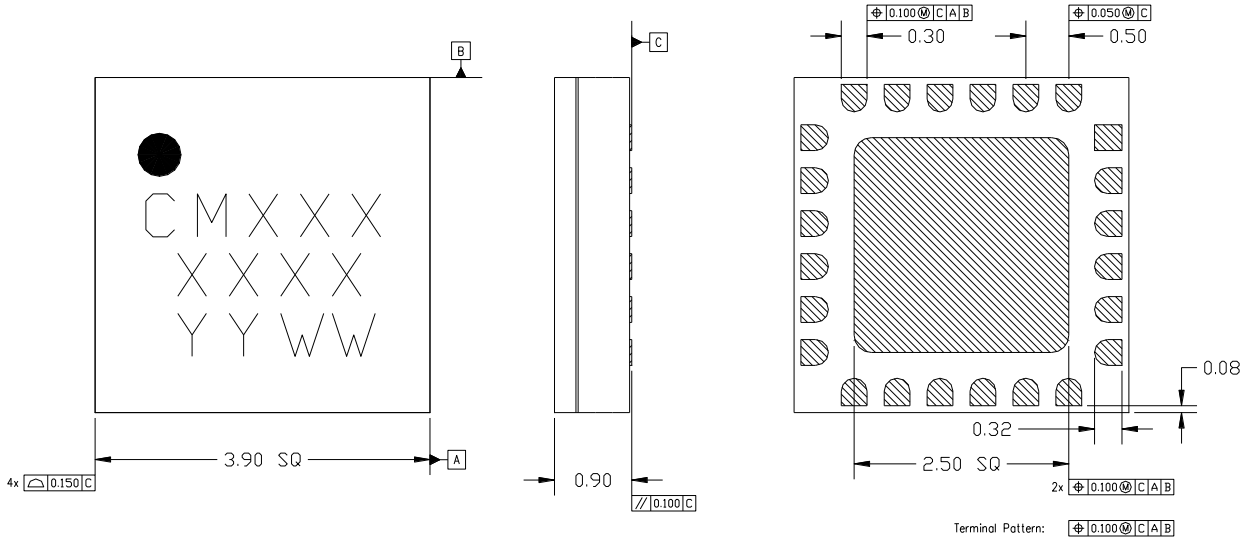


Typical Performance



Mechanical Information

Package Information and Dimensions



Notes:

1. All dimensions shown in mm.
2. Material: Black alumina
3. Lead finish:
   - 3.1. Ni: 8.89um max 1.27um min
   - 3.2. Pd: 0.17um max, 0.07um min
   - 3.3. Au: 0.254um max, 0.03um min
4. Marking
   - 4.1. Line 1: Part number
     - 4.1.1. Example: CMD234C4 shall be marked as CM234
   - 4.2. Line 2: Lot number
   - 4.3. Line 3: Date code - Last 2 digits of the year of manufacture followed by a 2 digit week code
5. Alternate pin #1 identifier is a single square pad
6. Alternate die paddle may have chamfered corners

Recommended PCB Land Pattern

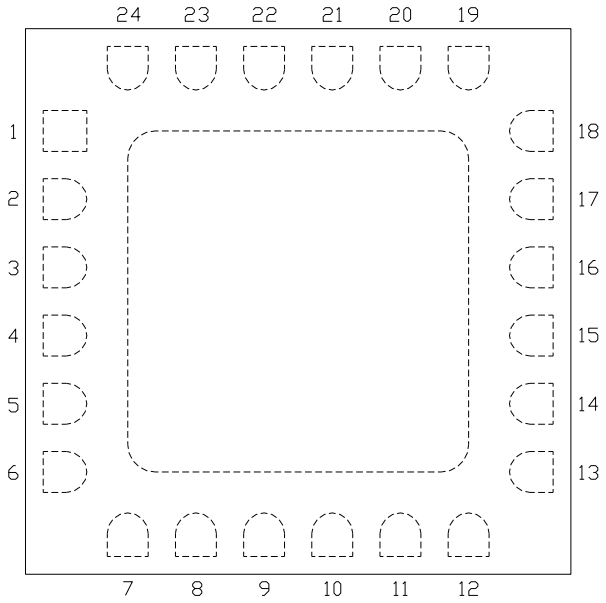
Qorvo recommends that the user develop the land pattern that will provide the best design for proper solder reflow and device attach for their specific application. Please review Qorvo Application Note AN 105 for a recommended land pattern approach.

Recommended Solder Reflow Profile

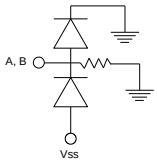
Qorvo recommends screen printing with belt furnace reflow to ensure proper solder reflow and device attach. Please review Qorvo Application Note AN 102 for a recommended solder reflow profile.

Pin Description

Pin Diagram



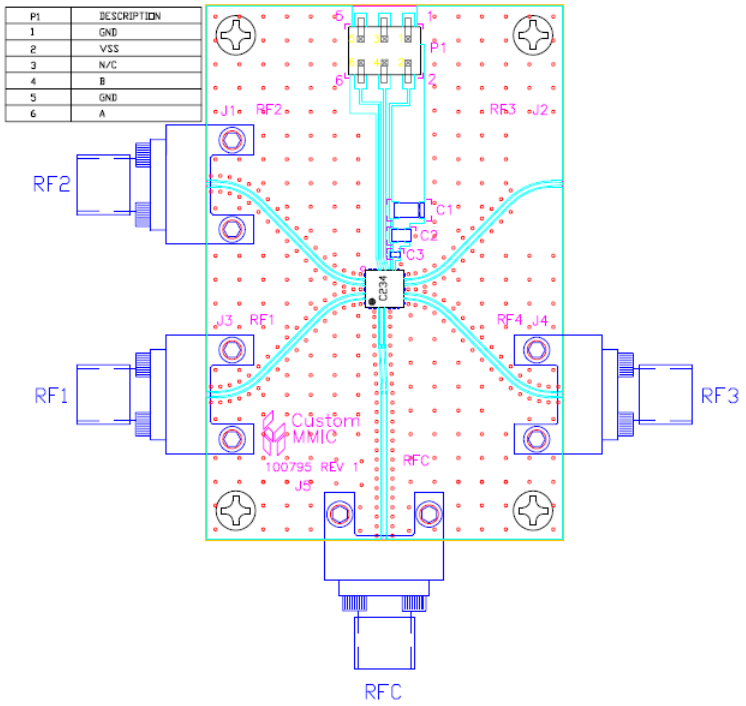
Functional Description

Pin	Function	Description	Schematic
1, 5, 6, 10, 11, 13, 17, 18	N/C	No connection required These pins may be connected to RF / DC ground	
2, 4, 7, 9, 12, 19, 21, 22, 24 and die paddle	Ground	Connect to RF / DC ground	
3, 8, 20, 23	RFC, RF3, RF2, RF1	These pins are DC coupled and matched to 50 ohm Blocking capacitors are required if RF line potential is not equal to 0 V	
14	V_{ss}	Power supply voltage	
15	CTLB	See truth table and control voltage table	
16	CTLA	See truth table and control voltage table	

Applications Information

Evaluation Board

The circuit board shown has been developed for optimized assembly at Qorvo. A sufficient number of via holes should be used to connect the top and bottom ground planes. As surface mount processes vary, careful process development is recommended.



Bill of Material

Designator	Value	Description
J1 - J5		SMA End Launch Connector
P1		6 Pin Header
C1	0.33 µF	Capacitor, Tantalum
C2	1000 pF	Capacitor, 0603
C3	100 pF	Capacitor, 0402
U1		CMD234C4 SP3T Switch
PCB		100795 Evaluation PCB

GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 1A	ESDA / JEDEC JS-001-2012
MSL – Moisture Sensitivity Level	Level 1	JEDEC standard IPC/JEDEC J-STD-020



Caution!
ESD-Sensitive Device

RoHS Compliance

This part is compliant with 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment) as amended by Directive 2015/863/EU.

This product also has the following attributes:

- Lead Free
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free
- Halogen Free
- PFOS Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

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