CMD215

DC-40 GHz SPDT Reflective Switch

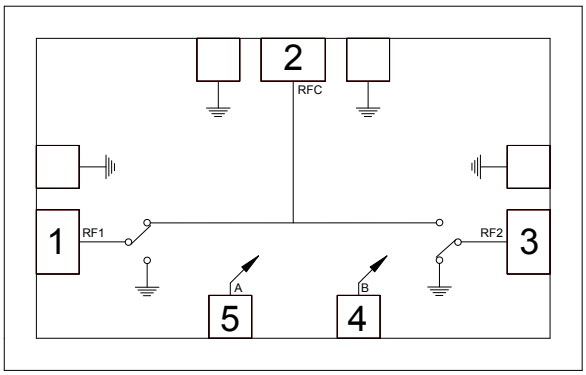
Features

- Broadband performance
- Low loss
- High isolation
- Fast switching speed
- Small die size

Description

The CMD215 is a general purpose broadband high isolation reflective MMIC SPDT switch in die form. Covering DC to 40 GHz, the CMD215 features a low insertion loss of 2.3 dB and high isolation of 36 dB at 20 GHz. The CMD215 operates using complementary control voltage logic lines of 0/-5 V and requires no bias supply.

Functional Block Diagram



Electrical Performance - V_{ctl} = 0/-5 V, T_A = 25 °C, F = 20 GHz

Parameter	Min	Typ	Max	Units
Frequency Range		DC - 40		GHz
Insertion Loss		2.3		dB
Isolation		36		dB
Return Loss - On State		16		dB
Input P1dB		19		dBm
Input P0.1dB		17		dBm
Input IP3		30		dBm
Switching Speed		4		ns

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Specifications

Absolute Maximum Ratings

Parameter	Rating
RF Input Power	+25 dBm
Control Voltage Range (A,B)	+0.5V to -7.5V
Channel Temperature, Tch	150 °C
Operating Temperature	-55 to 85 °C
Storage Temperature	-55 to 150 °C
Thermal Resistance, Θ_{JC} (insertion loss state)	236 °C/W

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

Control Voltages

State	Bias Condition
Low	0 to -0.5V @ 1 uA Typ
High	-3V @ 1 uA Typ to -7V @ 6 uA Typ

Truth Table

Control Input		Signal Path State	
A	B	RFC to RF1	RFC to RF2
High	Low	Off	On
Low	High	On	Off

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

Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	DC - 18			18 - 26			26 - 40			GHz
Insertion Loss		2	2.4		2	2.6		3	3.6	dB
Isolation	38	45		30	36		31	37		dB
Return Loss - On State		13			14			10		dB
Input P1dB		17			20			22		dBm
Input P0.1dB		15			17			20		dBm
Input IP3		29			31			32		dBm
Switching Speed		4			4			4		ns

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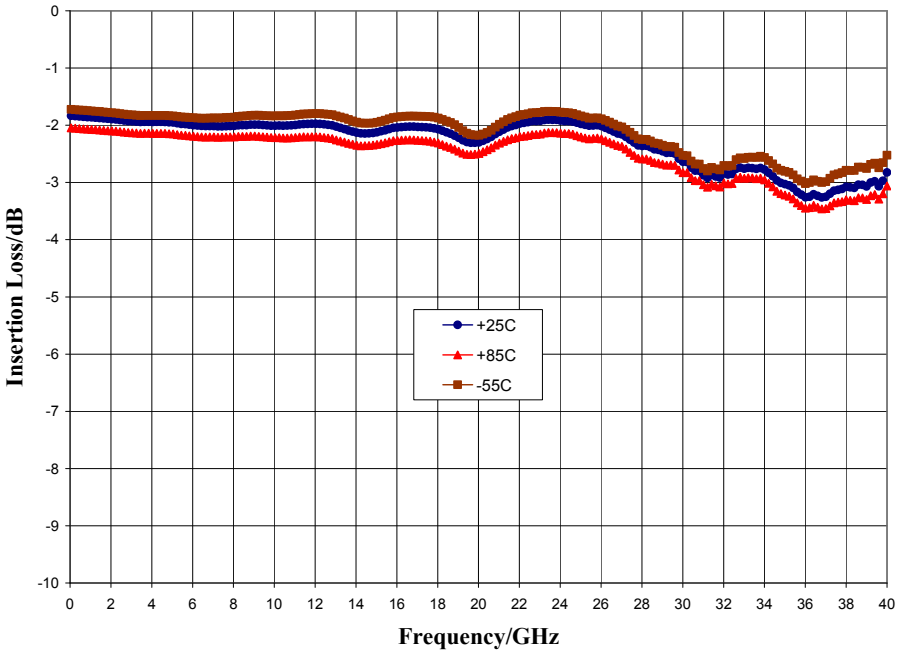
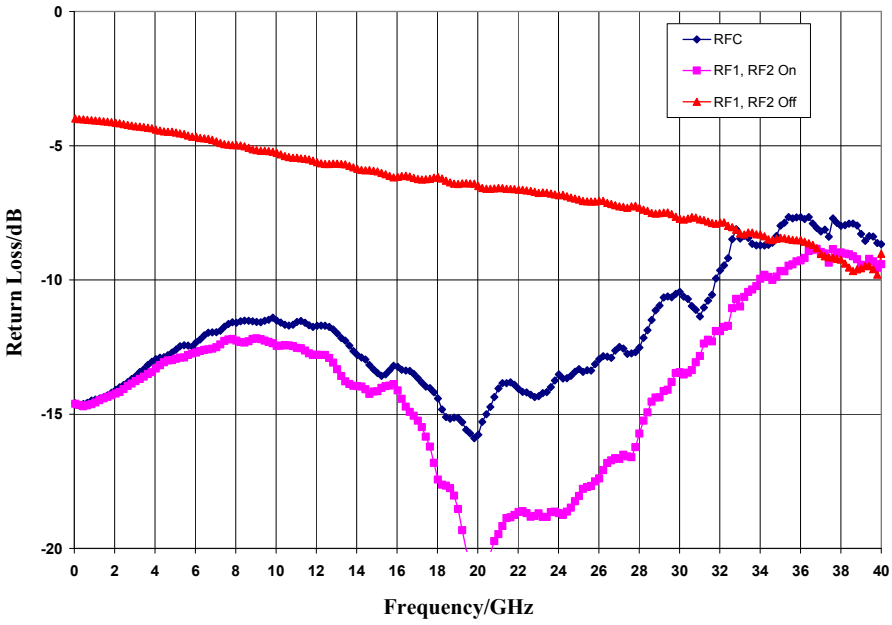
Typical Performance

Insertion Loss vs. Temperature



Return Loss



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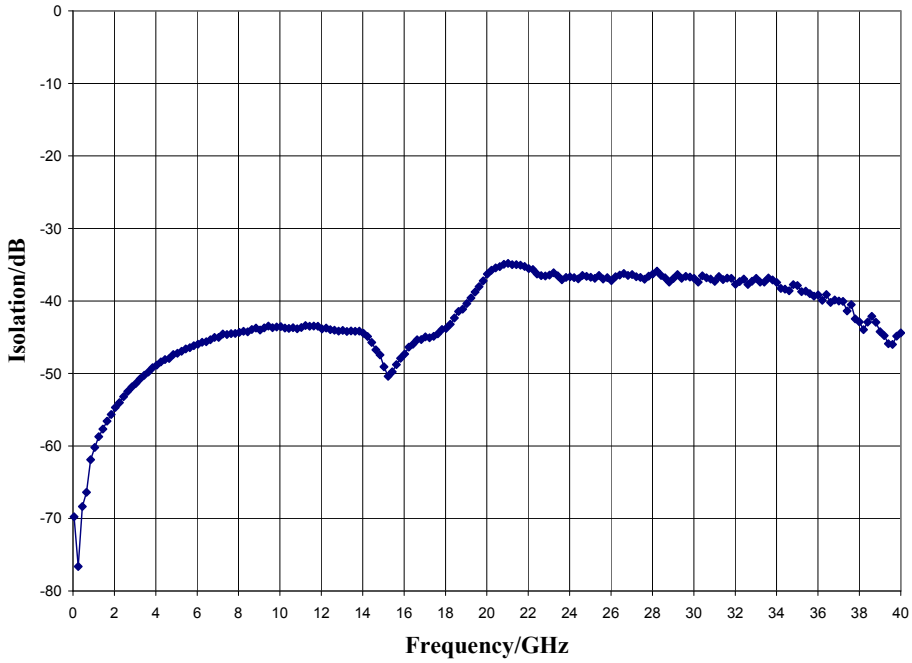
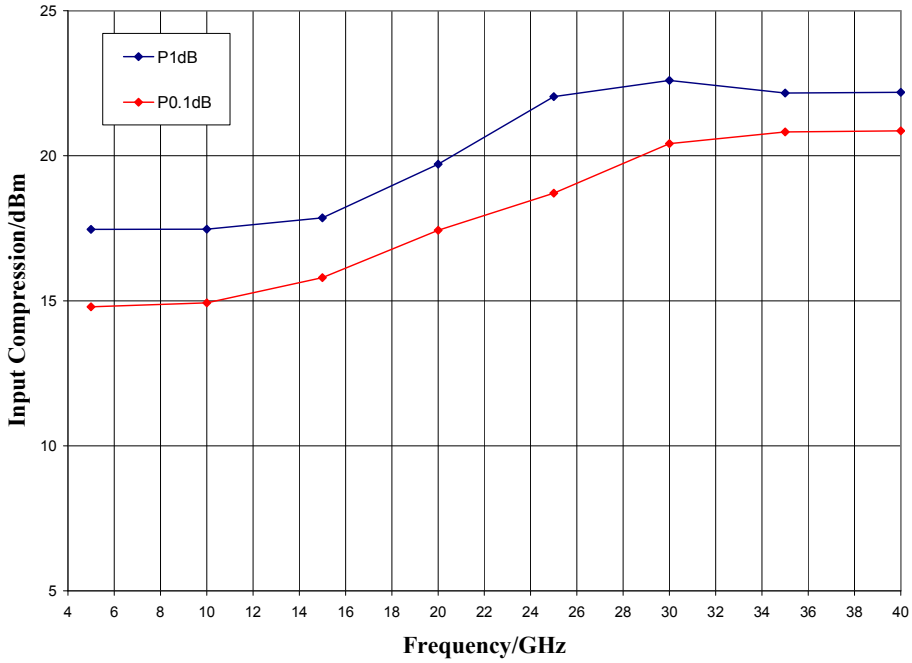
Typical Performance

Isolation Between Ports RFC and RF1/RF2



Input P1dB and P0.1dB Compression Point



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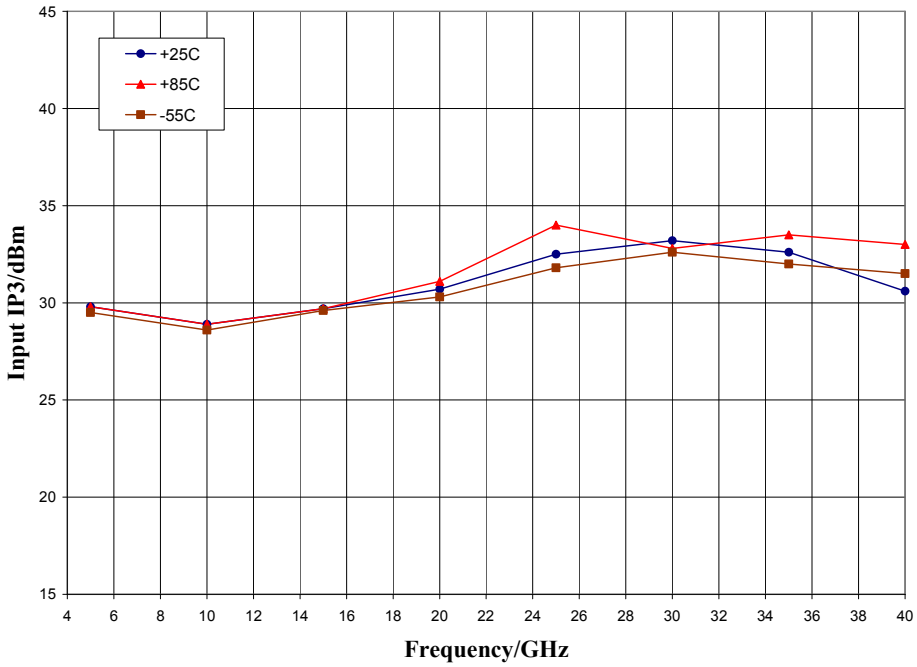
Typical Performance

Input Third Order Intercept Point



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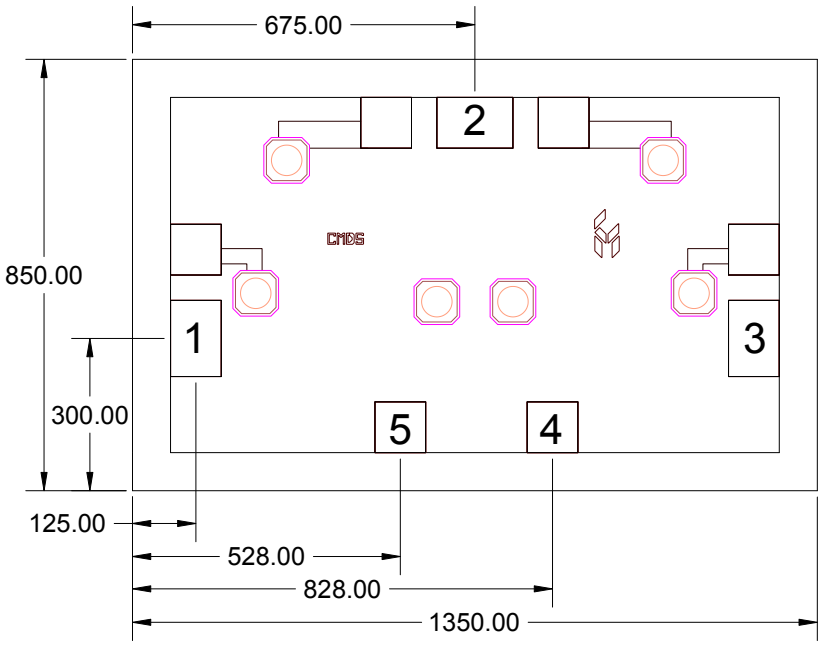
Mechanical Information

Die Outline (all dimensions in microns)



Notes:

1. No connection required for unlabeled pads
2. Backside is RF and DC ground
3. Backside and bond pad metal: Gold
4. Die is 85 microns thick
5. DC bond pads (4, 5) are 100 x 100 microns
6. RF bond pads (1, 2, 3) are 100 x 150 microns

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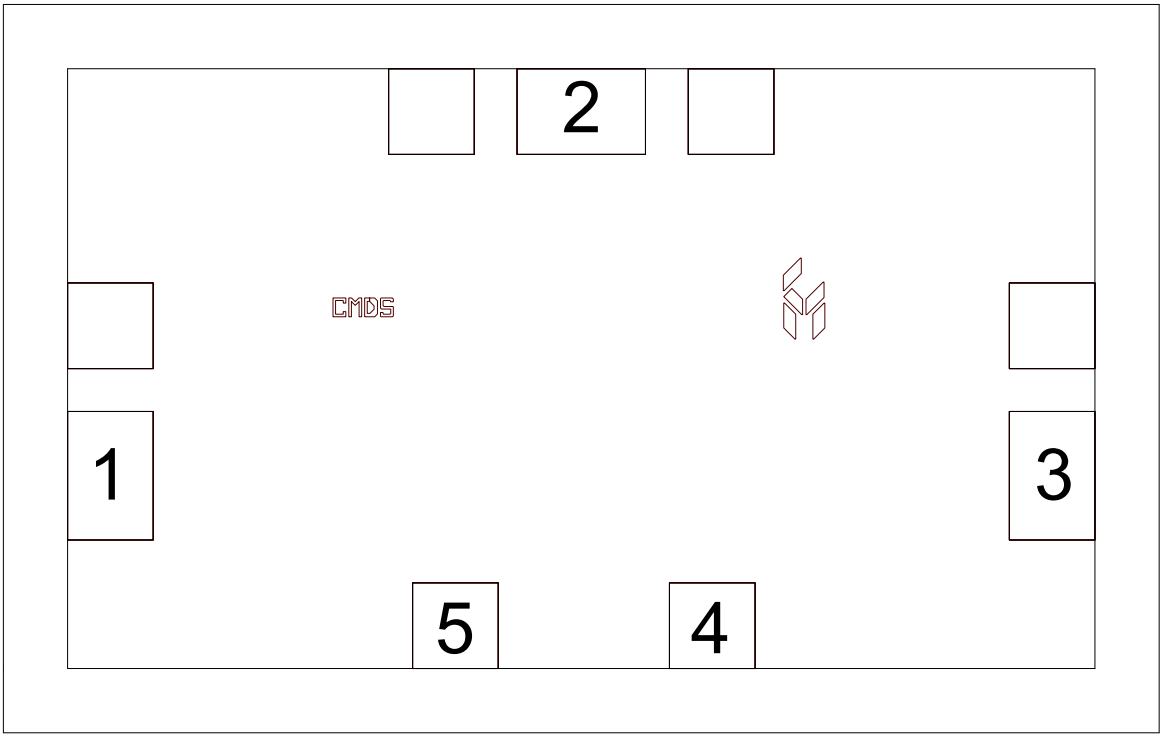
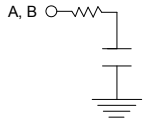
Pad Description

Pad Diagram



Functional Description

Pin	Function	Description	Schematic
1, 2, 3	RF1, RFC, RF2	These pins are DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V	
4	CTRLB	See truth table and control voltage table	
5	CTRLA	See truth table and control voltage table	
Backside	Ground	Connect to RF / DC ground	

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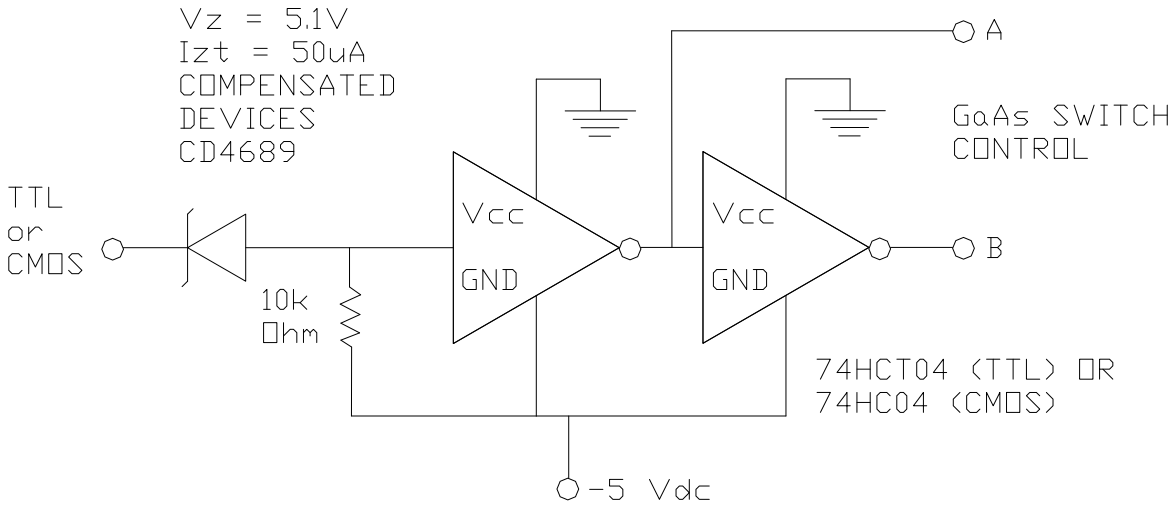
Applications Information

Suggested Driver Circuit



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

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