Let Performance Drive

CMD195C3

DC-18 GHz SPDT Non-reflective Switch

Features

- Positive gain slope
- High isolation
- Non-reflective design
- Pb-free RoHs compliant 3x3 SMT package

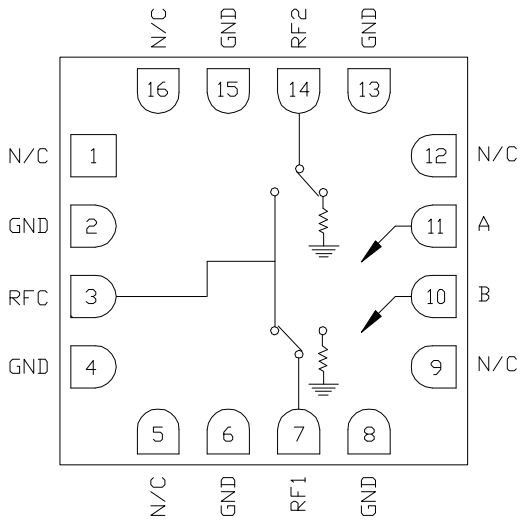
Applications

- Microwave radio and VSAT
- Telecom infrastructure
- Test instrumentation
- Military end-use

Description

The CMD195C3 is a broadband MMIC SPDT switch housed in a leadless 3x3 mm surface mount package. The CMD195C3 covers DC to 18 GHz and offers a low insertion loss of 2 dB and high isolation of 37 dB as well as positive gain slope. The positive gain slope feature allows for several switches to be cascaded together without the need for gain equalization circuitry. The CMD195C3 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 = 18 GHz

Parameter	Min	Typ	Max	Units
Frequency Range		DC - 18		GHz
Insertion Loss		2		dB
Isolation		37		dB
Return Loss - On State		13		dB
Return Loss RF1, RF2 - Off State		11		dB
Input P1dB		25		dBm
Switching Speed		1.8		ns

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1 Park Drive Unit 12 Westford, MA 01886 Phone (978) 467-4290 Fax (978) 467-4294
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Specifications

Absolute Maximum Ratings

Parameter	Rating
RF Input Power	+27 dBm
Control Voltage Range (A,B)	+0.5V to -7.5V
Channel Temperature, Tch	150 °C
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 150 °C

Operation of this device outside the maximum ratings may cause permanent damage.

Control Voltages

State	Bias Condition
Low	0 to -0.5V @ 1 uA Typ
High	-5V @ 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	On	Off
Low	High	Off	On

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

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	DC - 12			12 - 18			GHz
Insertion Loss		2.4	2.8		2.0	2.4	dB
Isolation	40	45		32	37		dB
Return Loss - On State		13			15		dB
Return Loss - RF1, 2 - Off State		17			12		dB
Input P1dB		25			25		dBm
Input IP3		38			40		dBm
Switching Speed		1.8			1.8		ns

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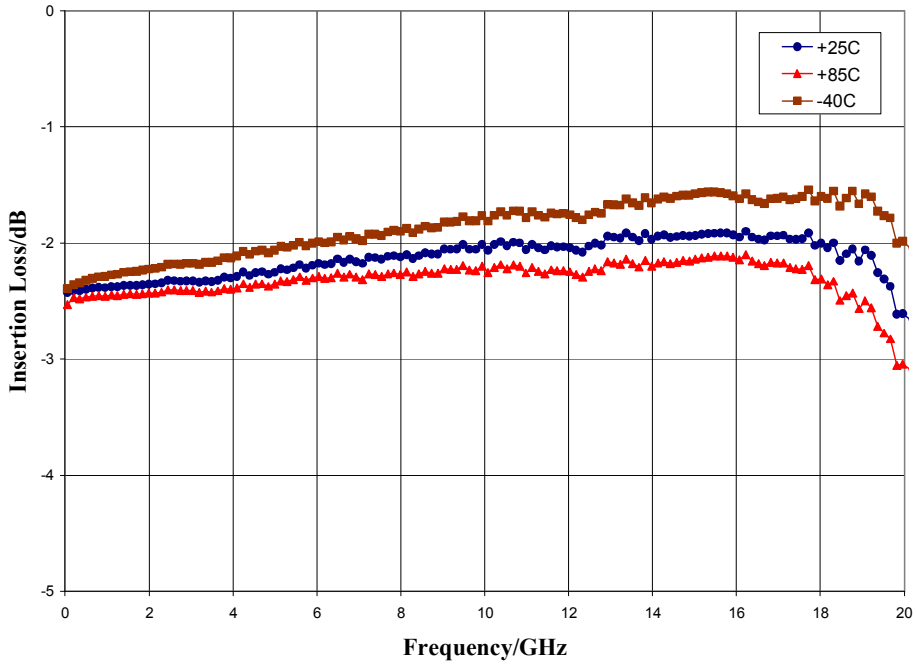
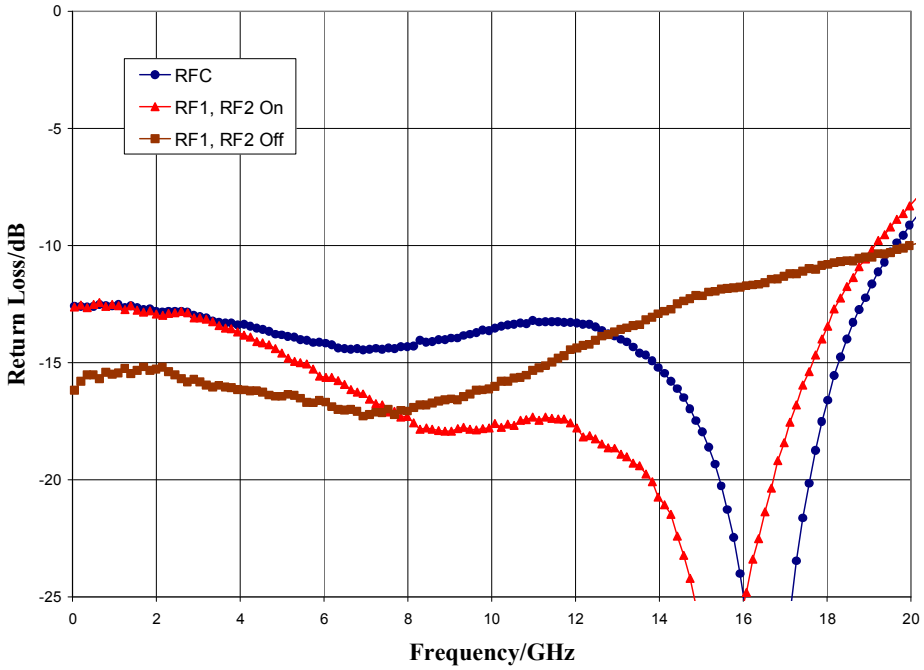
Typical Performance

Insertion Loss vs. Temperature



Return Loss



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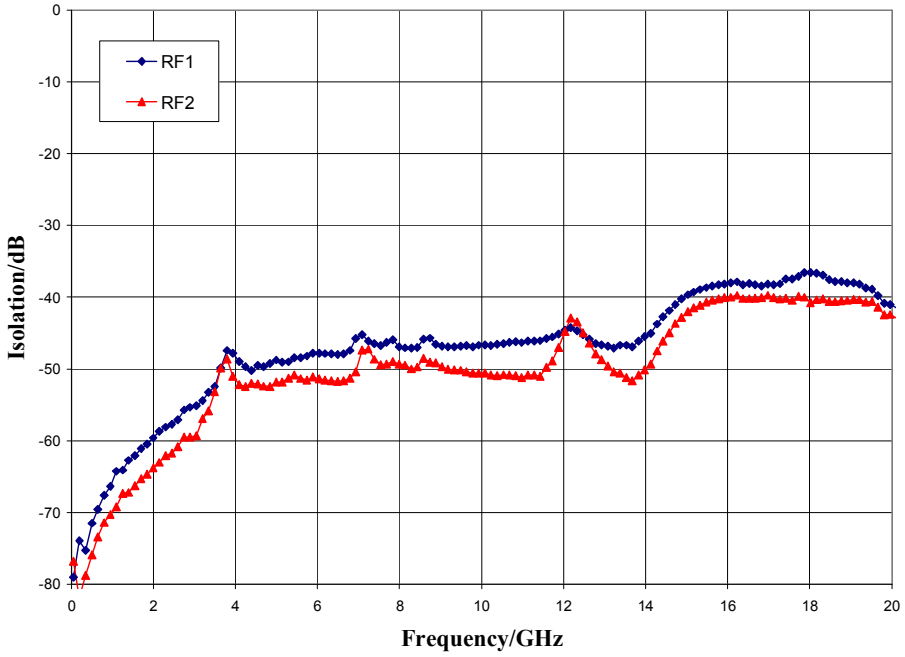
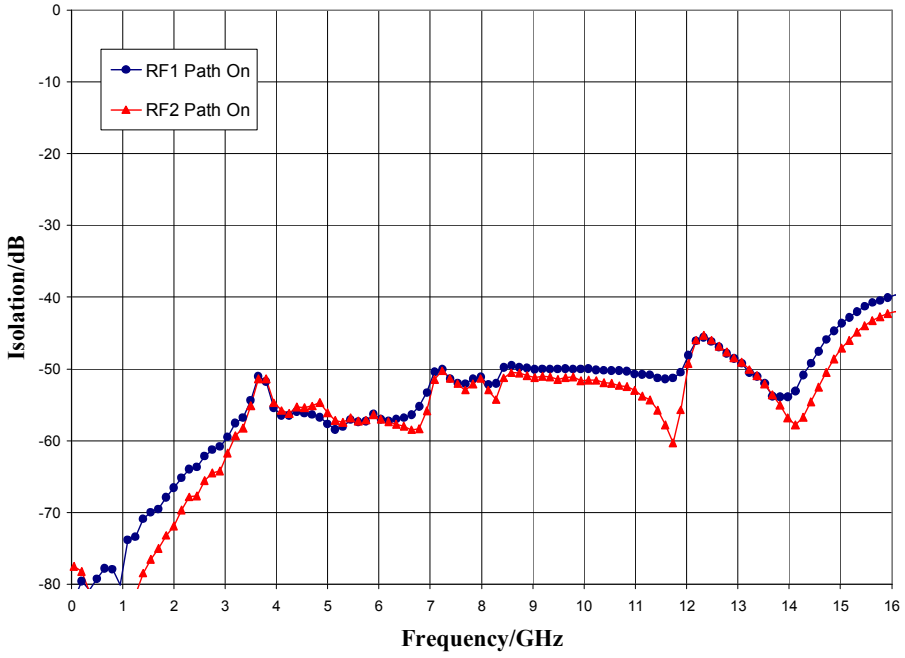
Typical Performance

Isolation Between Ports RFC and RF1/RF2



Isolation Between Ports RF1 and RF2



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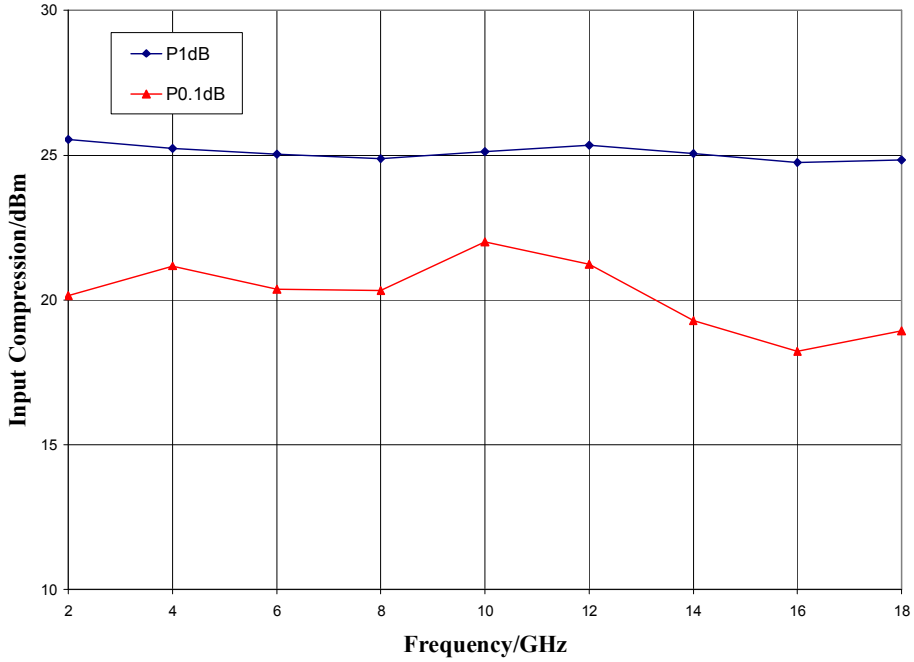
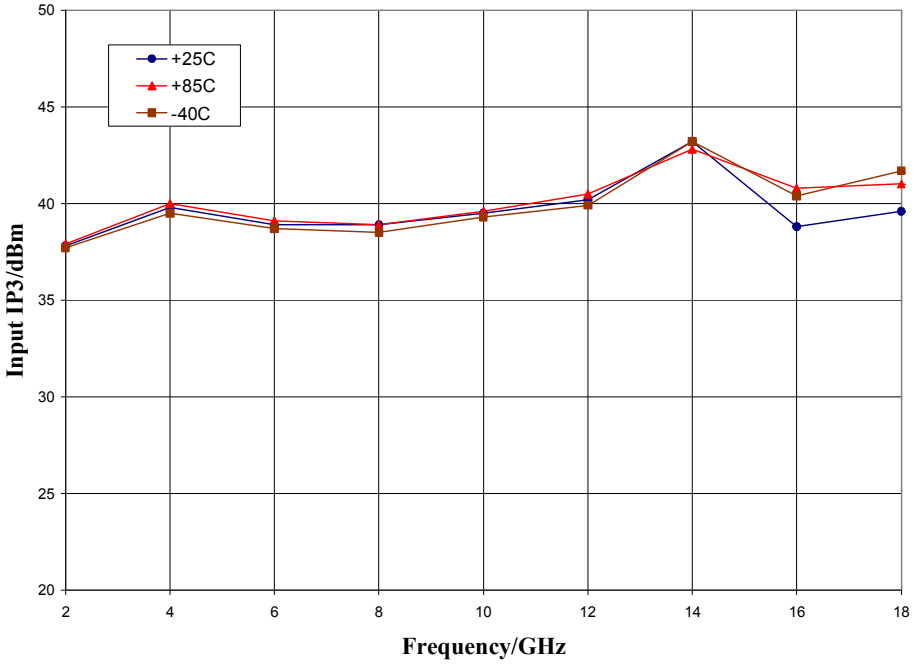
Typical Performance

Input P1dB and P0.1dB Compression Point



Input Third Order Intercept Point



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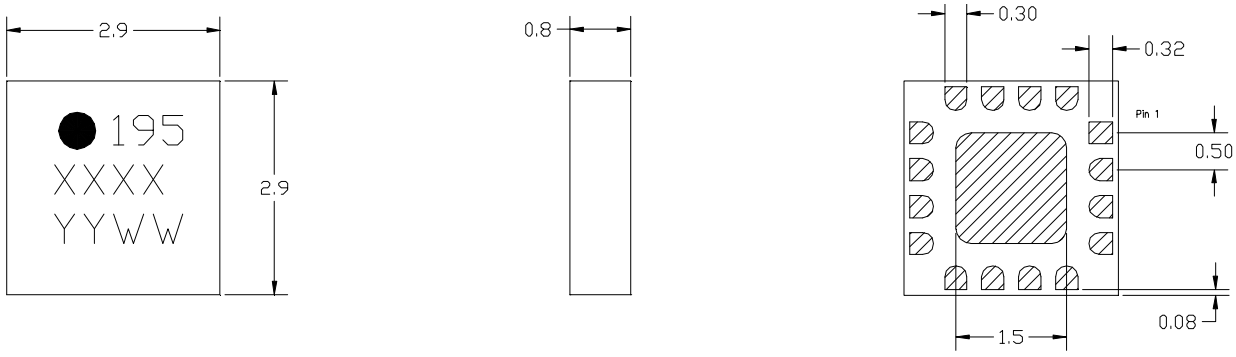
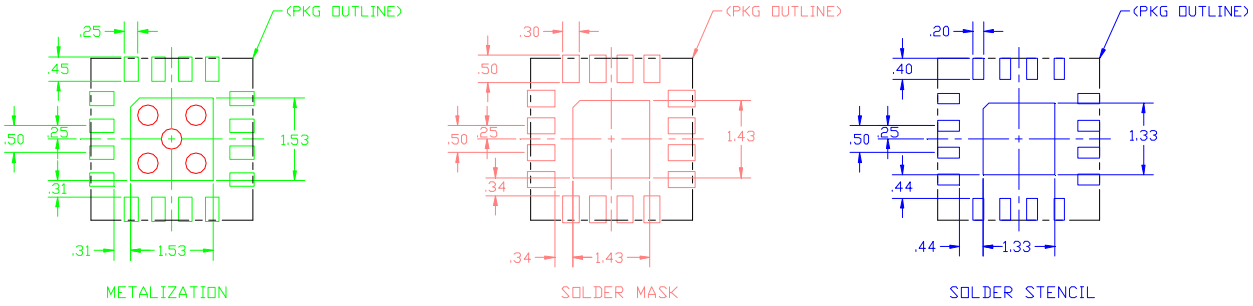
Mechanical Information

Package Information and Dimensions



NOTES:
1. DIMENSIONS ARE IN MILLIMETERS
2. MATERIAL: BLACK ALUMINA
3. LEAD FINISH: 30-80 MICROINCHES GOLD OVER 50 MICROINCHES NICKEL.
4. ALTERNATE PIN #1 IDENTIFIER IS SINGLE SQUARE PAD.

Recommended PCB Land Pattern



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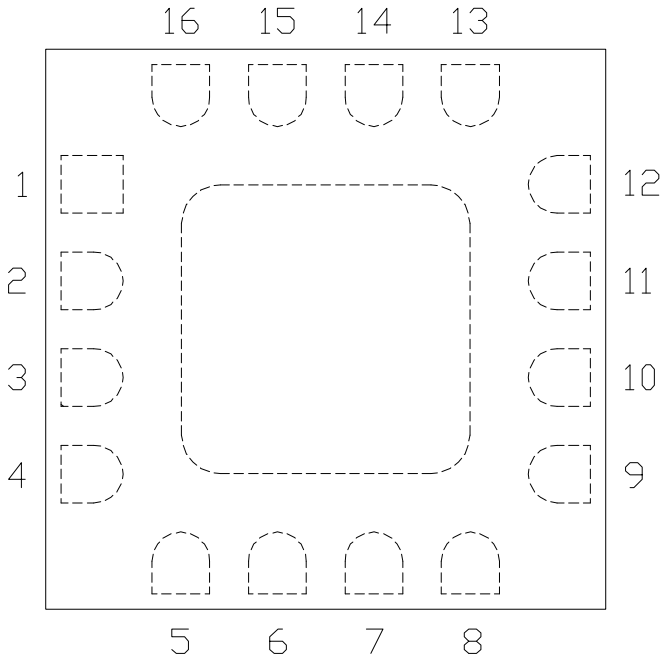
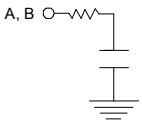
Pin Description

Pin Diagram



Functional Description

Pin	Function	Description	Schematic
1,5,9,12,16	N/C	No connection required. These pins may be connected to RF/DC ground	
2,4,6,8,13,15 and die paddle	Ground	Connect to RF / DC ground	
3,7,14	RFC, RF1, RF2	These pins are DC coupled and matched to 50 Ohm. Blocking capacitors are required if RF line potential is not equal to 0V	
10	CTLB	See truth table and control voltage table	
11	CTLA	See truth table and control voltage table	

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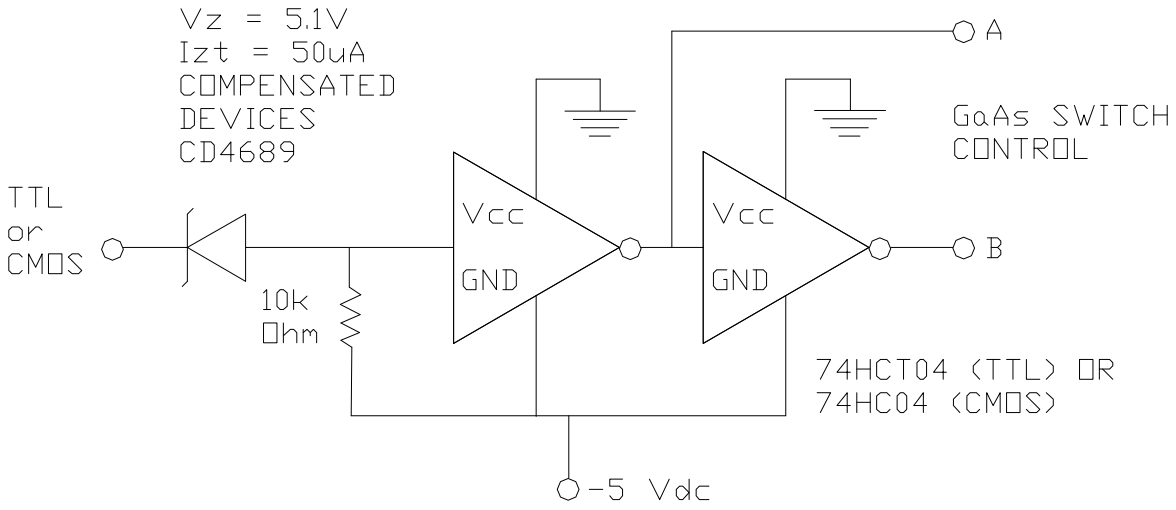
Applications Information

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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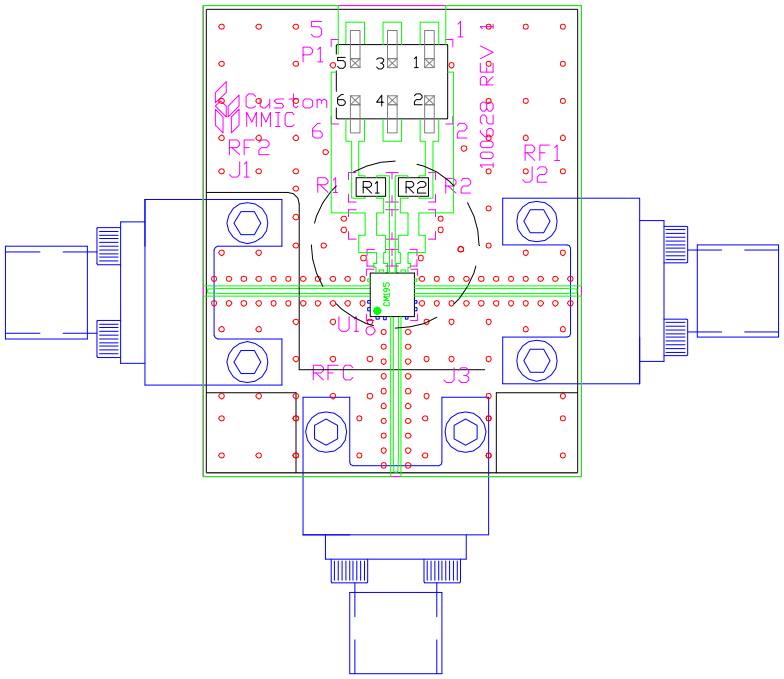
Applications Information

Evaluation Board

The circuit board shown has been developed for optimized assembly at CMDS. 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, J2, J3		SMA End Launch Connector
P1		6 Pin Header
R1, R2	100 Ω	Resistor, 0805
U1		CMD195C3 SPDT Switch
PCB		100628 Evaluation PCB

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