



CMD315C4

4-10 GHz Driver Amplifier

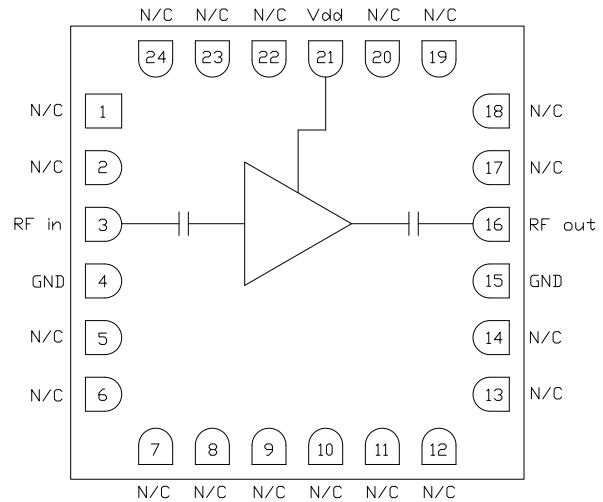
Features

- ▶ High output power
- ▶ High linearity
- ▶ Single positive bias
- ▶ Low current consumption
- ▶ Pb-free RoHs compliant 4x4 mm SMT package

Description

The CMD315C4 is a GaAs MMIC driver amplifier housed in a leadless surface mount package. The CMD315C4 is ideally suited for complex communications systems where small size and high linearity are needed. The device delivers 19.5 dB of gain with a corresponding output 1 dB compression point of 21 dBm and an output IP3 of 33 dBm at 8 GHz. The CMD315C4 is a 50 ohm matched design which eliminates the need for external DC blocks and RF port matching.

Functional Block Diagram



Electrical Performance - $V_{dd} = 5.0\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$, $F = 8\text{ GHz}$

Parameter	Min	Typ	Max	Units
Frequency Range	4 - 10			GHz
Gain		19.5		dB
Noise Figure		5.5		dB
Input Return Loss		10		dB
Output Return Loss		15		dB
Output P1dB		21		dBm
Output IP3		33		dBm
Supply Current		143		mA

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Specifications

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage, V _{dd}	6 V
RF Input Power	+20 dBm
Channel Temperature, T _{ch}	150 °C
Power Dissipation, P _{diss}	802 mW
Thermal Resistance, Θ_{JC}	81 °C/W
Operating Temperature	-40 to 85 °C
Storage Temperature	-55 to 150 °C

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

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
V _{dd}	3.0	5.0	5.5	V
I _{dd}		143		mA

Electrical performance is measured at specific test conditions. Electrical specifications are not guaranteed over all recommended operating conditions.

Drain Current vs. Drain Voltage

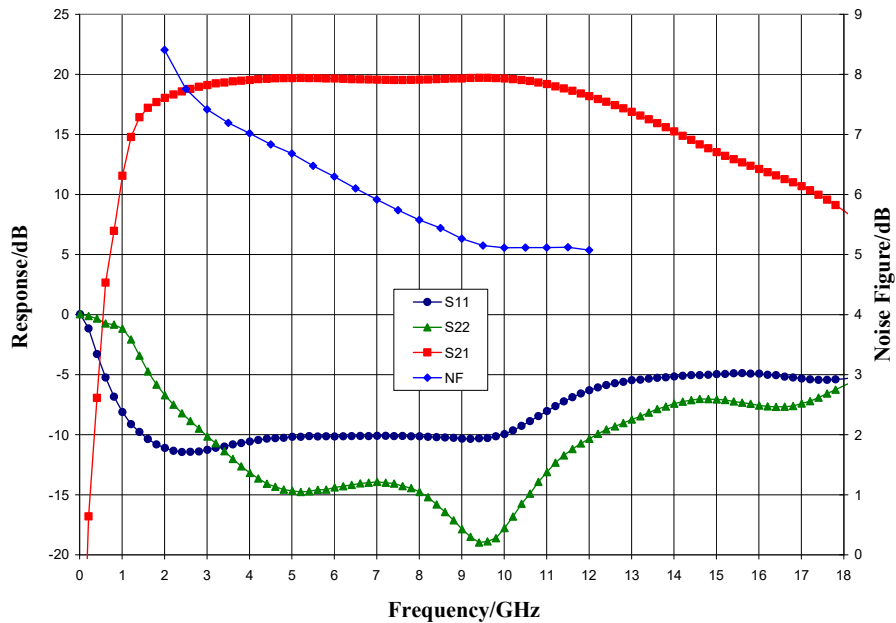
V _{dd} (V)	I _{dd} (mA)
3.0	80
5.0	143

Electrical Specifications - V_{dd} = 5.0 V, T_A = 25 °C

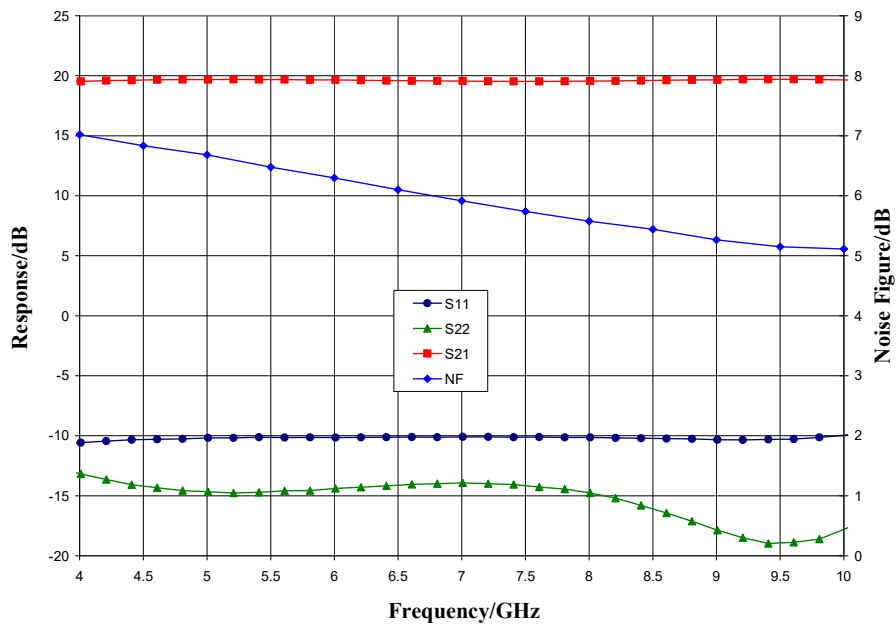
Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	4 - 7			7 - 10			GHz
Gain	16.5	19.5		16.5	19.5		dB
Noise Figure		6.5			5.5		dB
Input Return Loss		10			10		dB
Output Return Loss		14			16		dB
Output P1dB	18	21		18	21		dBm
Output IP3		33.5			32.5		dBm
Supply Current	100	143	185	100	143	185	mA
Gain Temperature Coefficient		0.019			0.019		dB/°C

Typical Performance

Broadband Performance, $V_{dd} = 5.0\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$



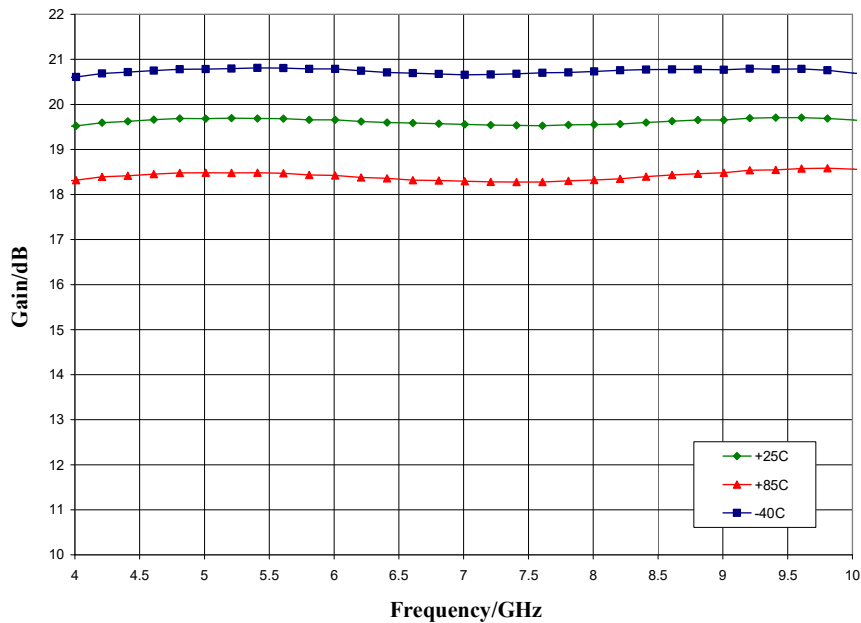
Narrow-band Performance, $V_{dd} = 5.0\text{ V}$, $T_A = 25\text{ }^\circ\text{C}$



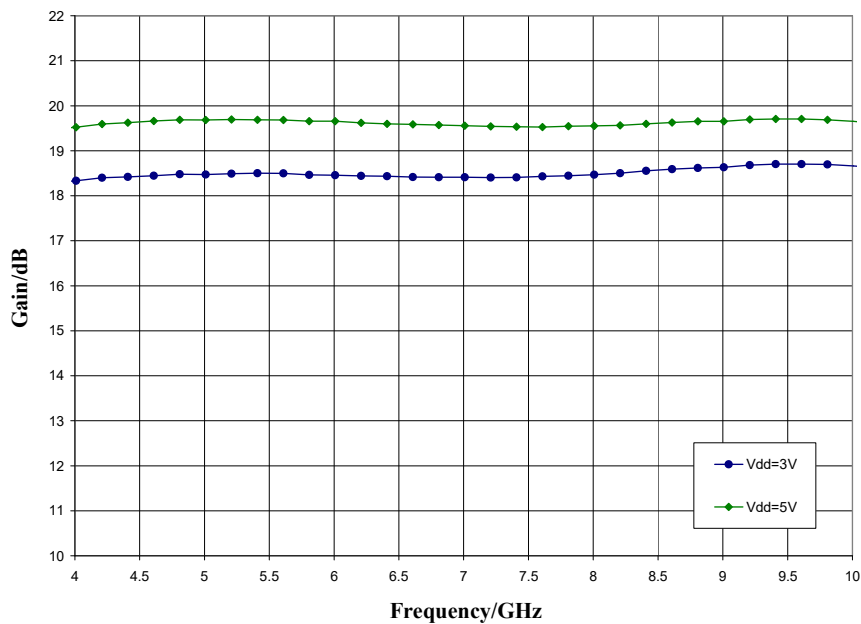
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Typical Performance

Gain vs. Temperature, $V_{dd} = 5.0\text{ V}$

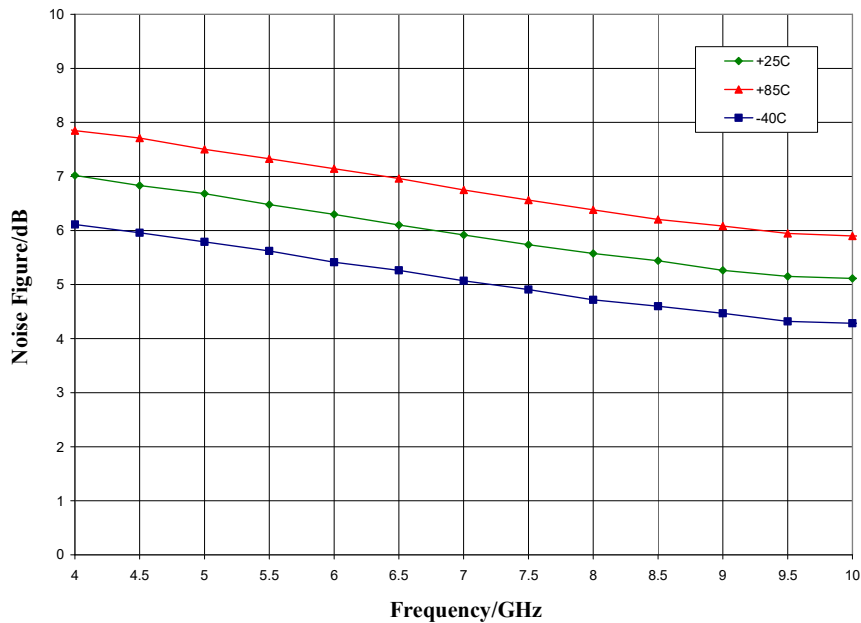


Gain vs. V_{dd} , $T_A = 25\text{ }^\circ\text{C}$

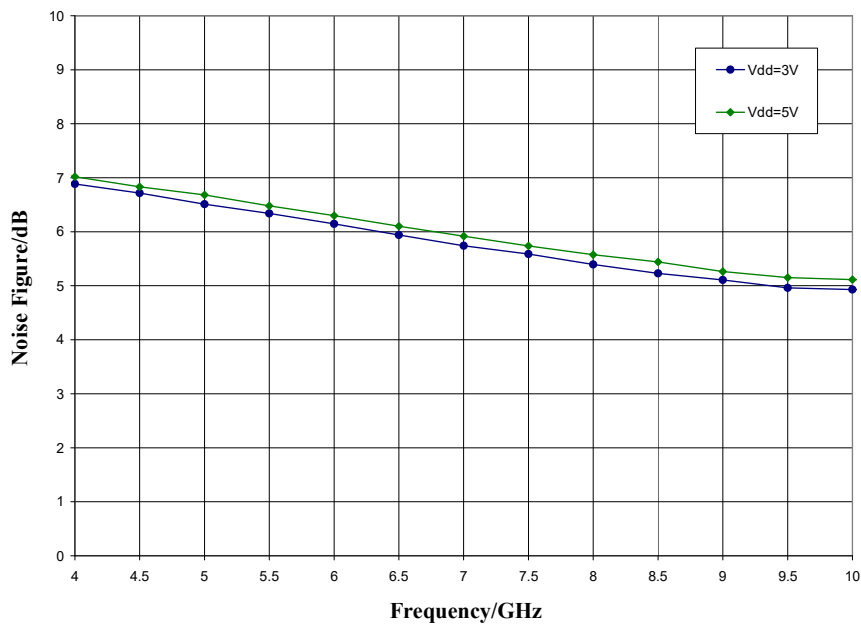


Typical Performance

Noise Figure vs. Temperature, $V_{dd} = 5.0 \text{ V}$

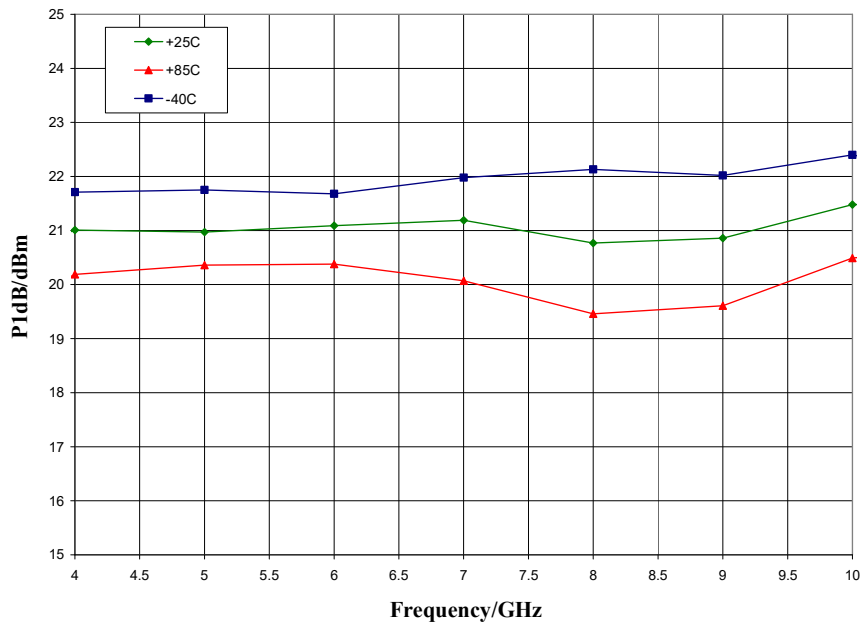


Noise Figure vs. V_{dd} , $T_A = 25 \text{ }^\circ\text{C}$

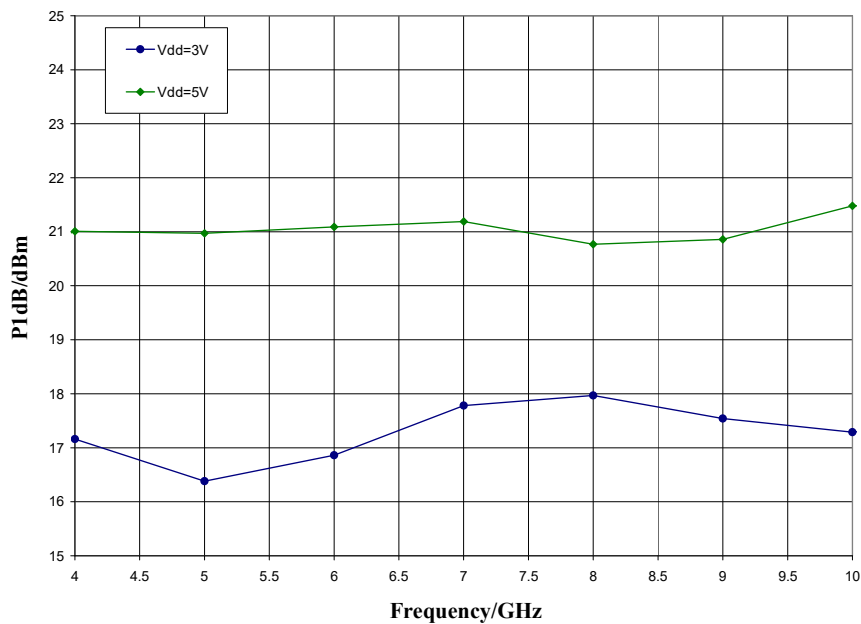


Typical Performance

P1dB vs. Temperature, $V_{dd} = 5.0\text{ V}$

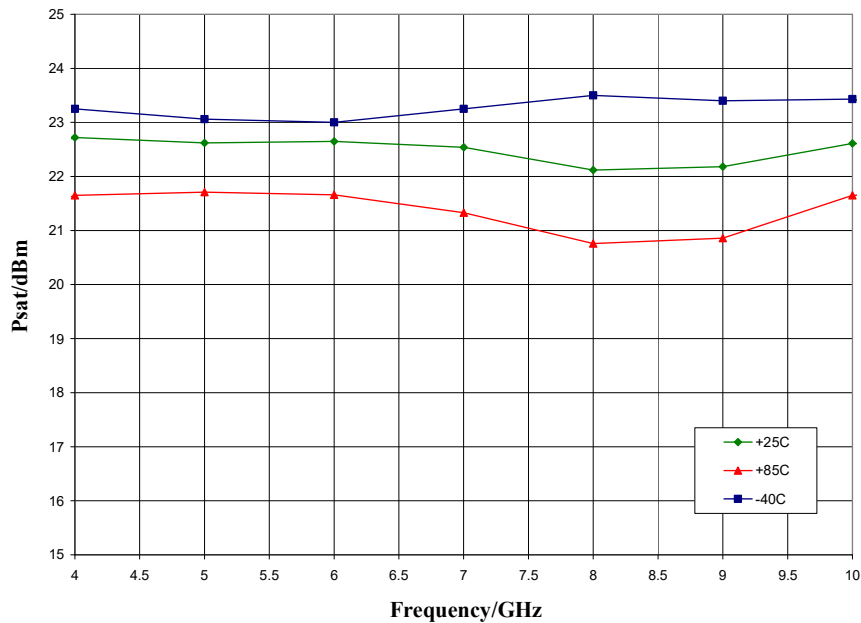


P1dB vs. V_{dd} , $T_A = 25\text{ }^\circ\text{C}$

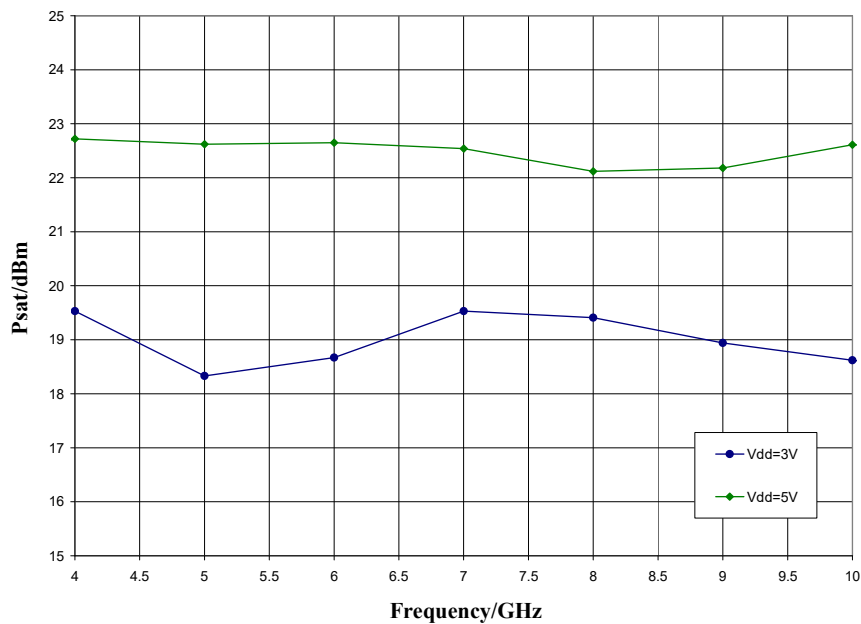


Typical Performance

Psat vs. Temperature, $V_{dd} = 5.0\text{ V}$



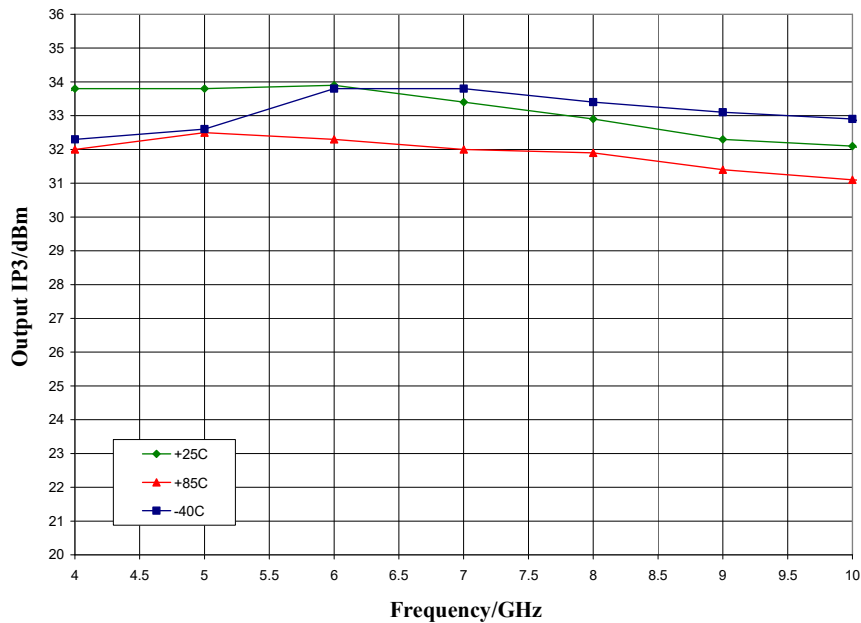
Psat vs. V_{dd} , $T_A = 25\text{ }^\circ\text{C}$



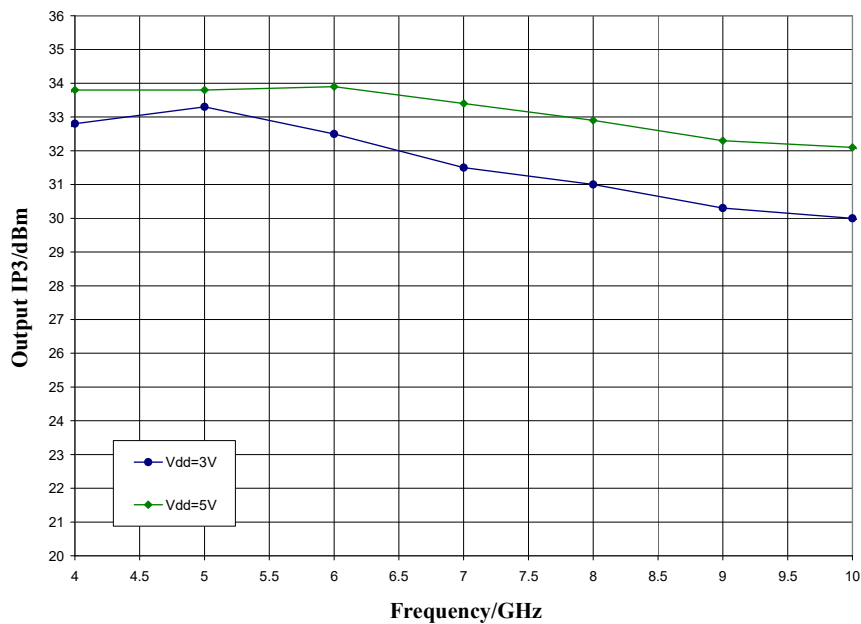
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Typical Performance

Output IP3 vs. Temperature, $V_{dd} = 5.0\text{ V}$

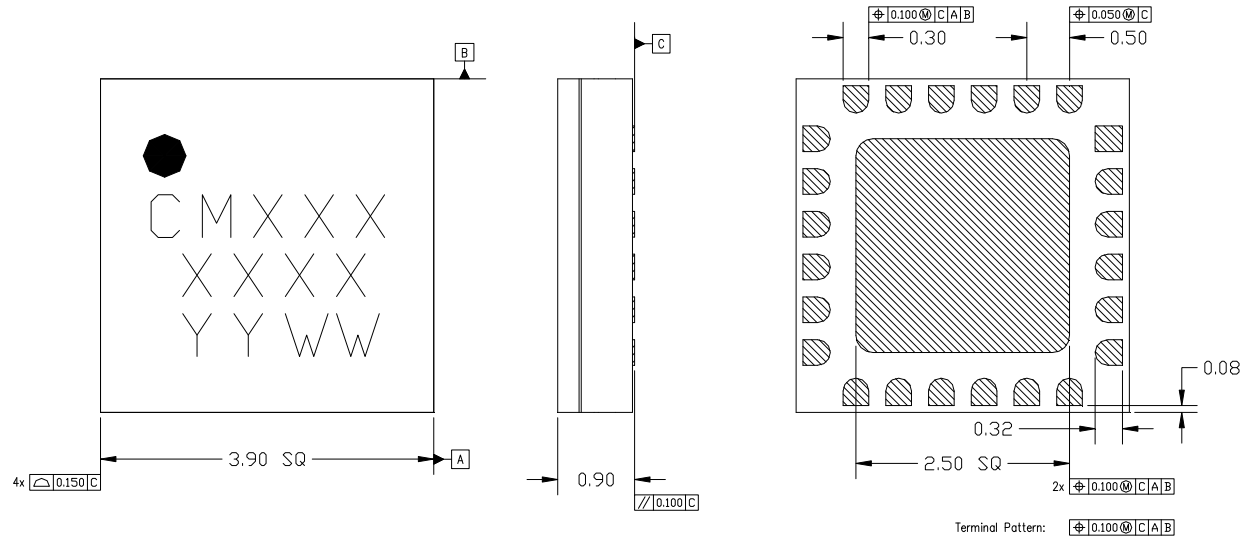


Output IP3 vs. V_{dd} , $T_A = 25\text{ }^\circ\text{C}$



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: CMD191C4 SHALL BE MARKED AS CM191
 - 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

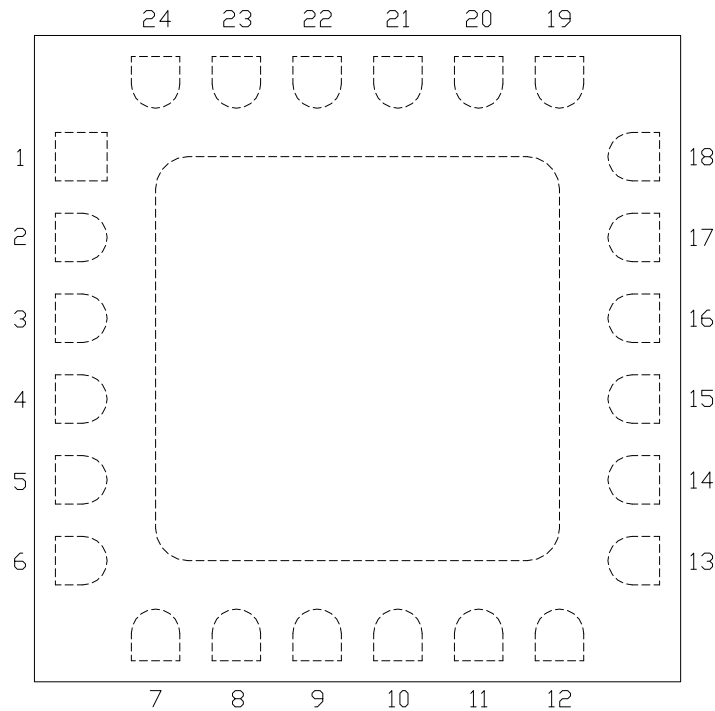
Custom MMIC recommends that the user develop the land pattern that will provide the best design for proper solder reflow and device attach for their specific application. Please review Custom MMIC Application Note AN 105 for a recommended land pattern approach.

Recommended Solder Reflow Profile



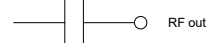
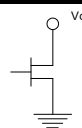
Custom MMIC Design Services recommends screen printing with belt furnace reflow to ensure proper solder reflow and device attach. Please review Custom MMIC Application Note AN 102 for a recommended solder reflow profile.

Pin Description

Pin Diagram



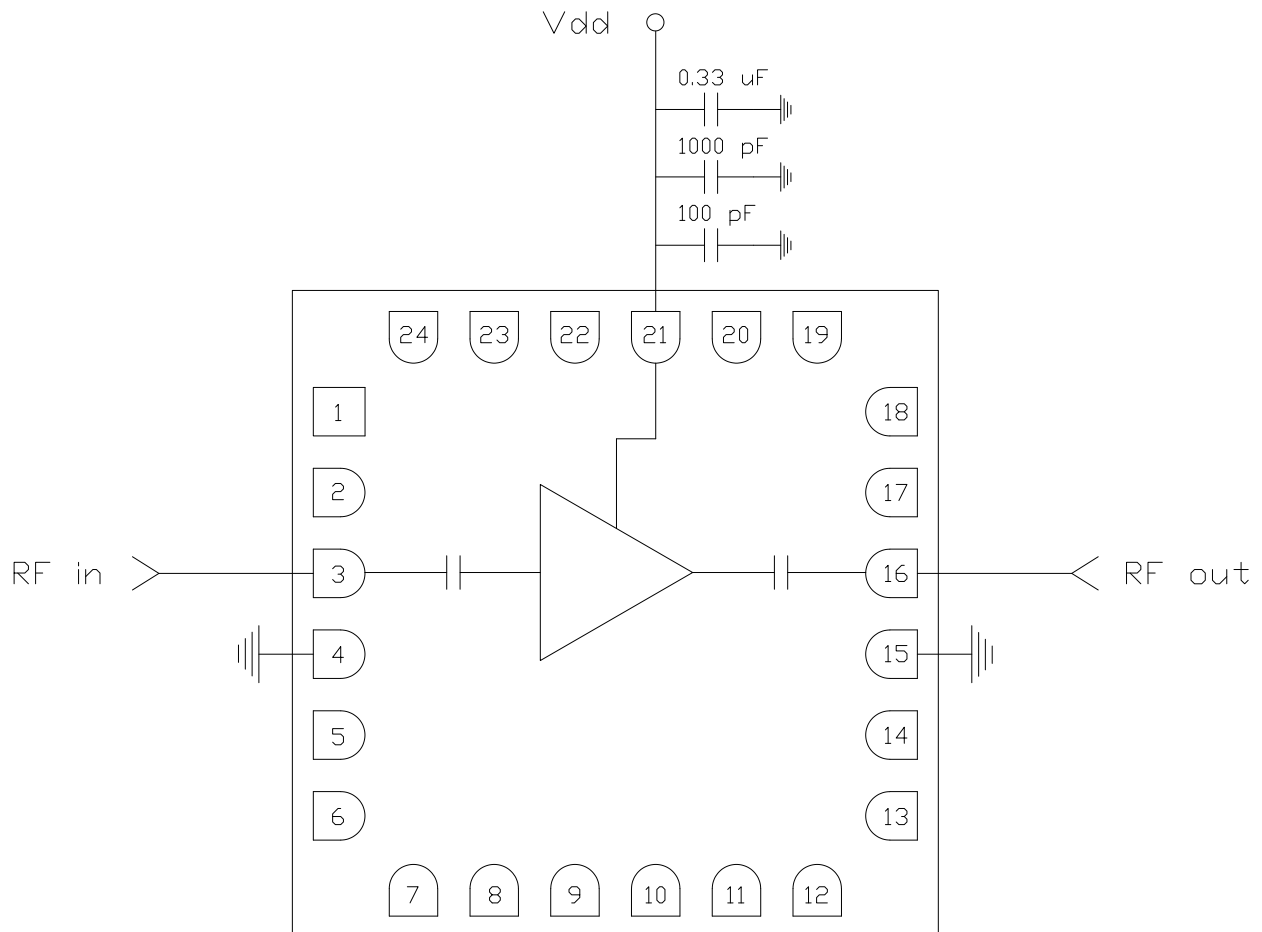
Functional Description

Pad	Function	Description	Schematic
1,2,5-14, 17-20, 22-24	N/C	No connection required. These pins may be connected to RF/DC ground.	
4,15 and die paddle	Ground	Connect to RF / DC ground	
3	RF in	DC blocked and 50 ohm matched	
16	RF out	DC blocked and 50 ohm matched	
21	Vdd	Power supply voltage Decoupling and bypass caps required	

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Applications Information

Application Circuit



Biasing and Operation

The CMD315C4 is biased with a single 5.0 V positive drain supply.

RF power can be applied at any time.

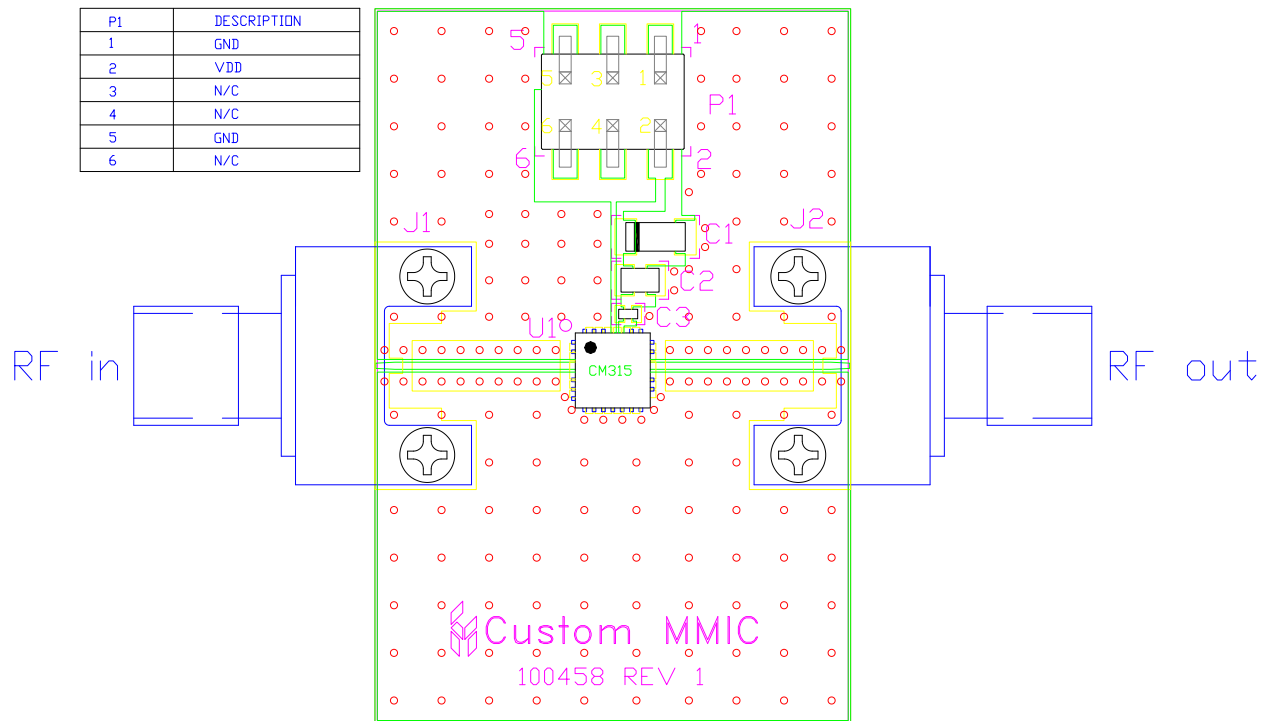
GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

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Applications Information

Evaluation Board

The circuit board shown has been developed for optimized assembly at Custom MMIC. 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		SMA End Launch Connector
P1		6 Pin Header
C1	0.33 μ F	Capacitor, Tantalum
C2	1000 pF	Capacitor, 0603
C3	100 pF	Capacitor, 0402
U1		CMD315C4 Driver Amplifier
PCB		100458 Evaluation PCB

Please note, All information contained in this data sheet is subject to change without notice.

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