



# CMD231C3

## 2-6 GHz Driver Amplifier

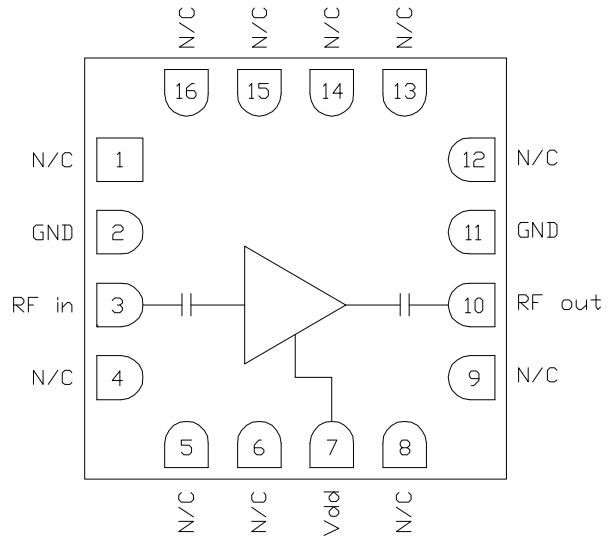
### Features

- ▶ High gain
- ▶ Single positive supply voltage
- ▶ Low current consumption
- ▶ Pb-free RoHs compliant 3x3 QFN package

### Description

The CMD231C3 is a wideband GaAs MMIC driver amplifier housed in a leadless 3x3 mm surface mount package. The CMD231C3 is ideally suited for military, space and communications systems where small size and high linearity are needed. At 4 GHz the device delivers greater than 14.5 dB of gain with a corresponding output 1 dB compression point of +13.5 dBm and an output IP3 of 23.5 dBm. The CMD231C3 is a 50 ohm matched design which eliminates the need for external DC blocks and RF port matching.

### Functional Block Diagram



### Electrical Performance - $V_{dd} = 3.0\text{ V to }8.0\text{ V}$ , $T_A = 25\text{ }^\circ\text{C}$ , $F=4\text{ GHz}$

Parameter	Min	Typ	Max	Units
Frequency Range	2 - 6			GHz
Gain		14.5		dB
Input Return Loss		15		dB
Output Return Loss		10		dB
Output P1dB		13.5		dBm
Output IP3		23.5		dBm
Supply Current		45		mA

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## 2-6 GHz Driver Amplifier

### Specifications

#### Absolute Maximum Ratings

Parameter	Rating
Drain Voltage, V <sub>dd</sub>	9 V
RF Input Power	+20 dBm
Channel Temperature, T <sub>ch</sub>	150 °C
Power Dissipation, P <sub>diss</sub>	919 mW
Thermal Resistance	70.7 °C/W
Operating Temperature	-55 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 <sub>dd</sub>	3.0	5.0	8.0	V
I <sub>dd</sub>		45		mA

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

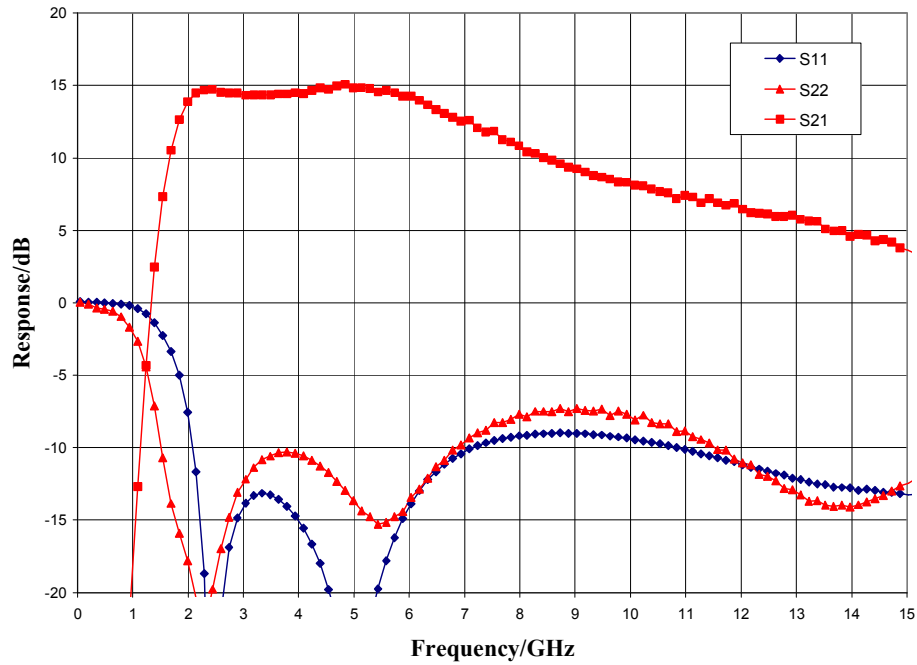
#### Electrical Specifications, V<sub>dd</sub> = 3.0 V to 8.0 V, T<sub>A</sub> = 25 °C

Parameter	Min	Typ	Max	Units
Frequency Range		2 - 6		GHz
Gain	11.5	14.5	18	dB
Noise Figure		4.5		dB
Input Return Loss		15		dB
Output Return Loss		10		dB
Output P <sub>1dB</sub>	11	13.5		dBm
Output IP <sub>3</sub>		23.5		dBm
Supply Current	30	45	60	mA
Gain Temperature Coefficient		0.015		dB/°C
Noise Figure Temperature Coefficient		0.01		dB/°C

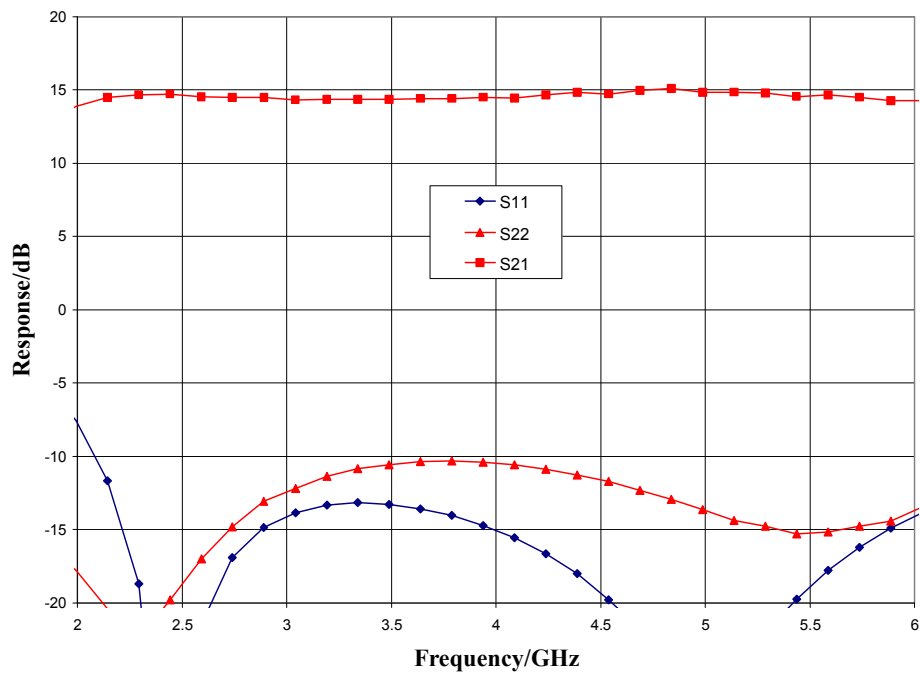
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### Typical Performance

**Broadband Performance,  $V_{dd} = 8.0$  V,  $I_{dd} = 45$  mA,  $T_A = 25$  °C**



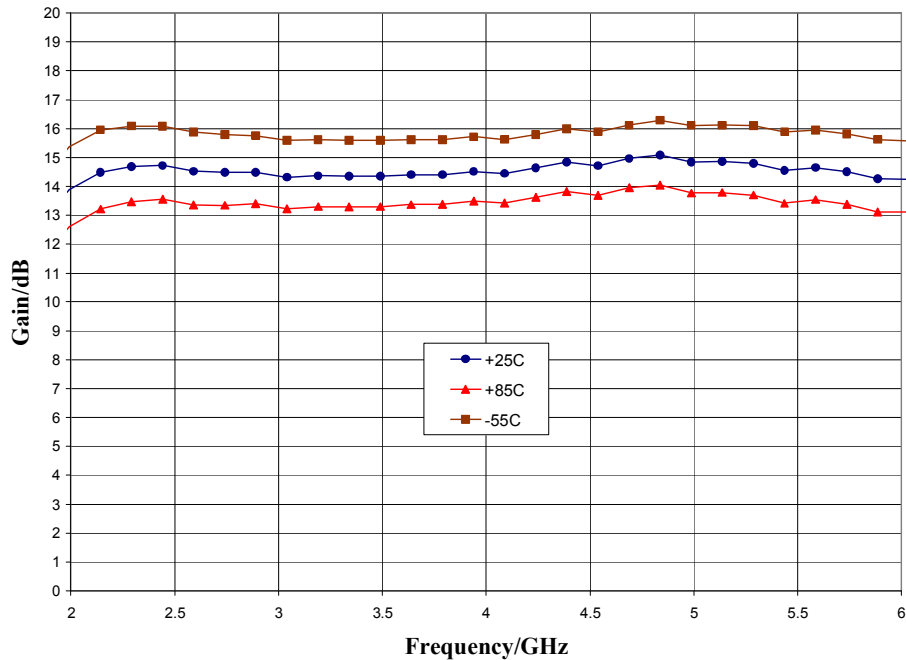
**Narrow-band Performance,  $V_{dd} = 8.0$  V,  $I_{dd} = 45$  mA,  $T_A = 25$  °C**



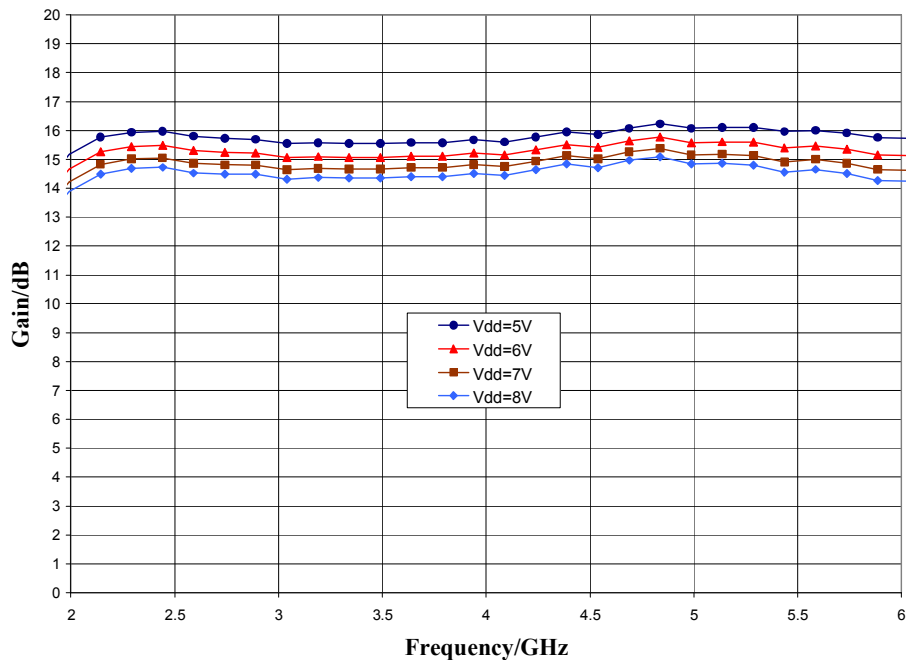
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### Typical Performance

Gain vs. Temperature,  $V_{dd} = 8.0\text{ V}$



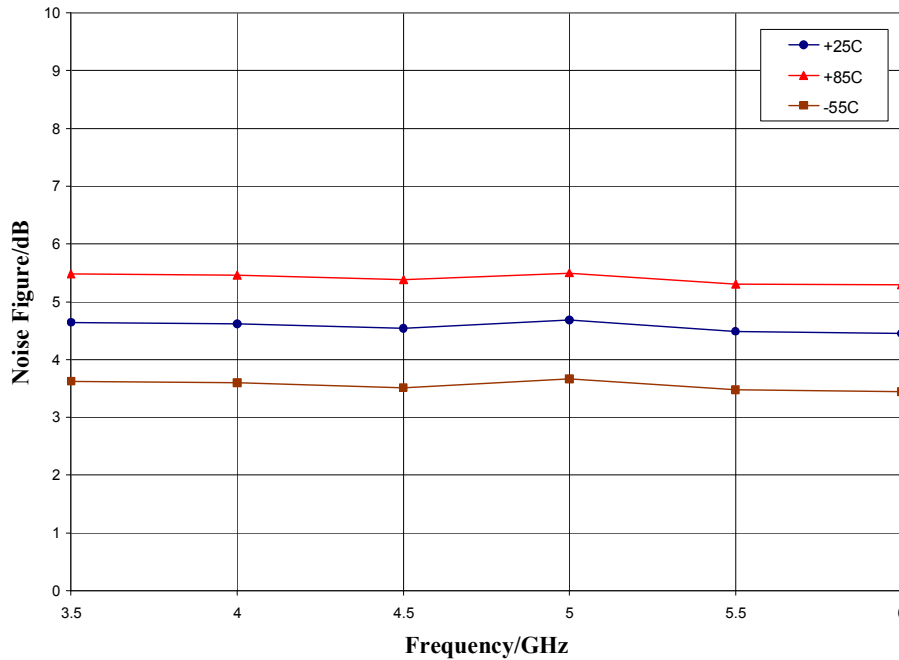
Gain vs. Supply Voltage,  $T_A = 25\text{ }^\circ\text{C}$



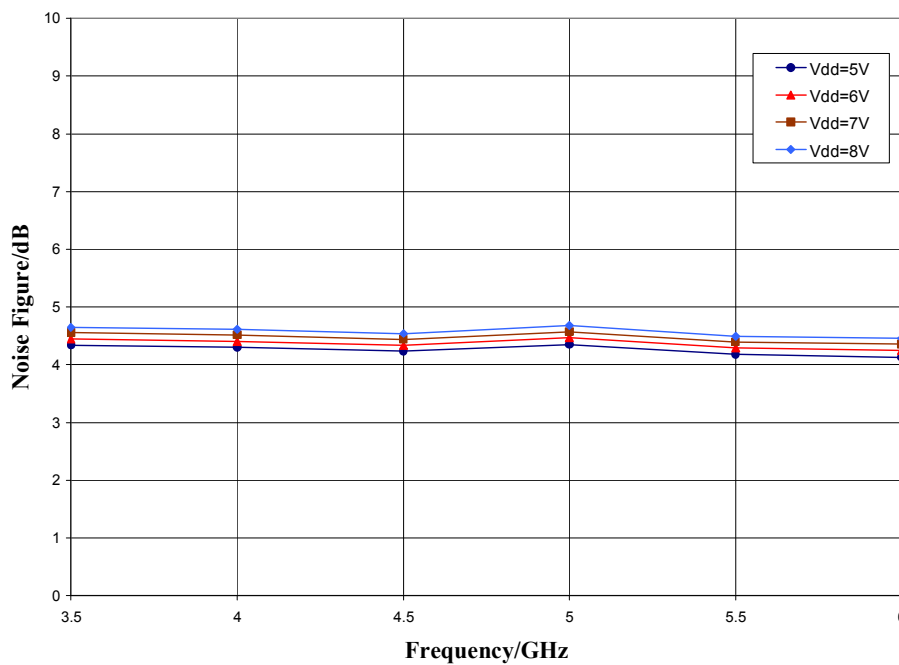
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### Typical Performance

Noise Figure vs. Temperature,  $V_{dd} = 8.0\text{ V}$



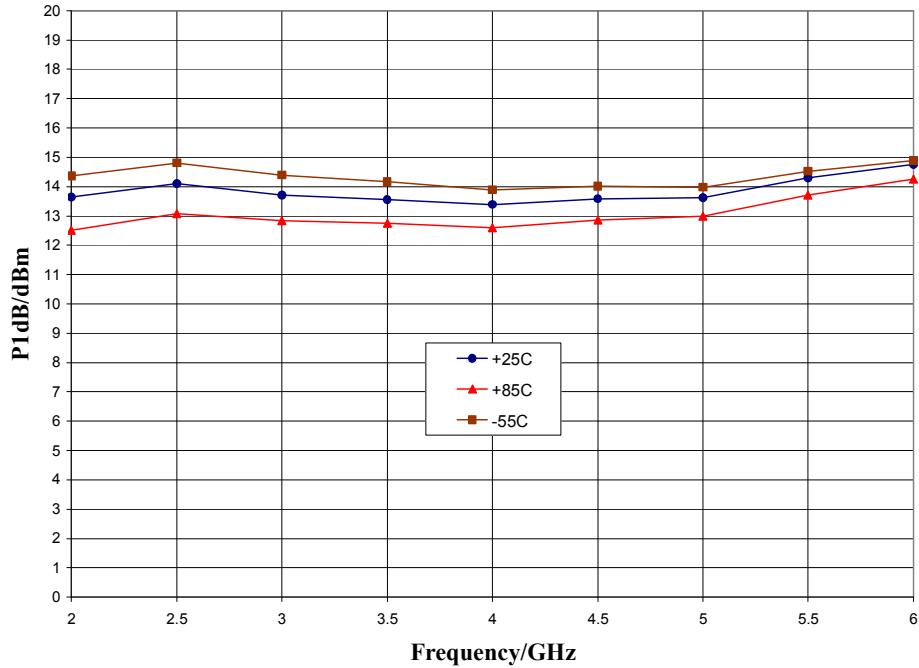
Noise Figure vs. Supply Voltage,  $T_A = 25\text{ }^\circ\text{C}$



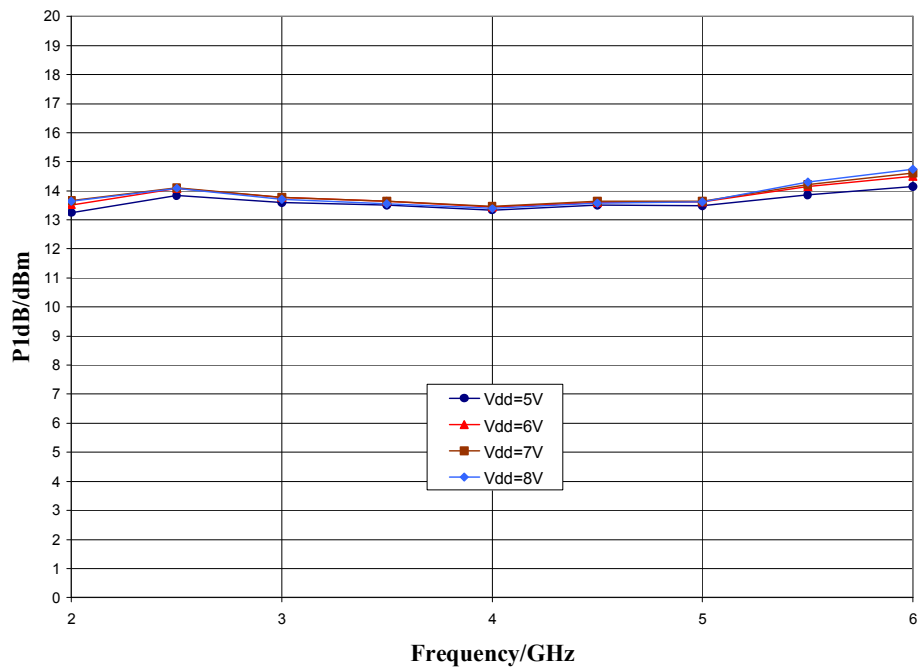
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### Typical Performance

**P1dB vs. Temperature,  $V_{dd} = 8.0\text{ V}$**



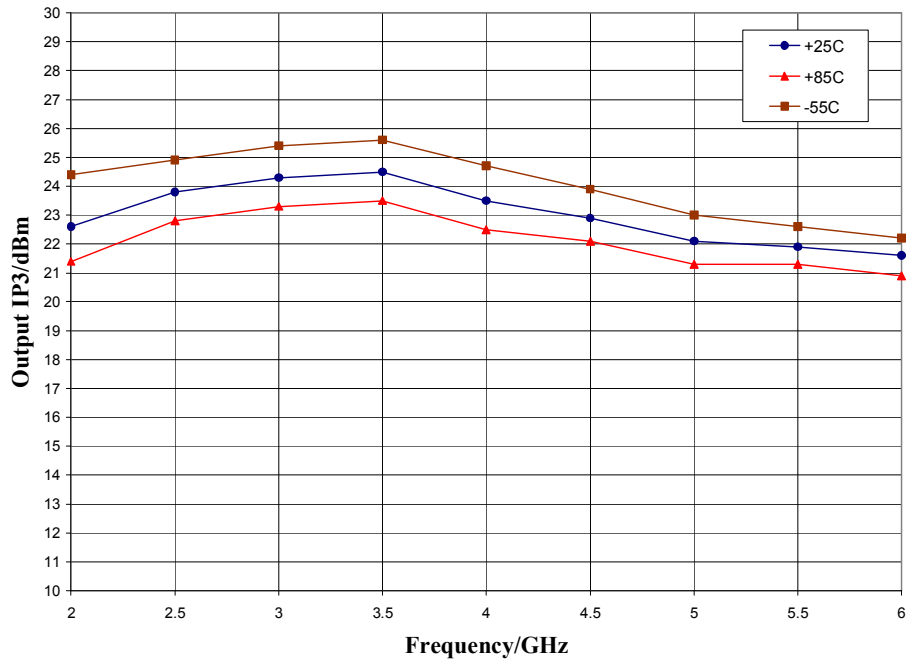
**P1dB vs. Supply Voltage,  $T_A = 25\text{ }^\circ\text{C}$**



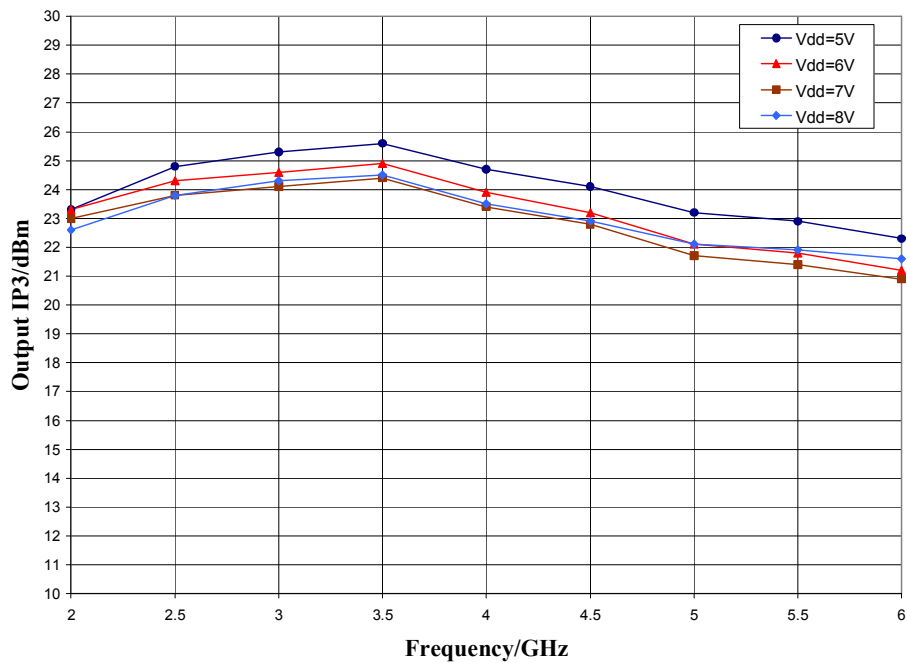
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### Typical Performance

Output IP3 vs. Temperature,  $V_{dd} = 8.0\text{ V}$



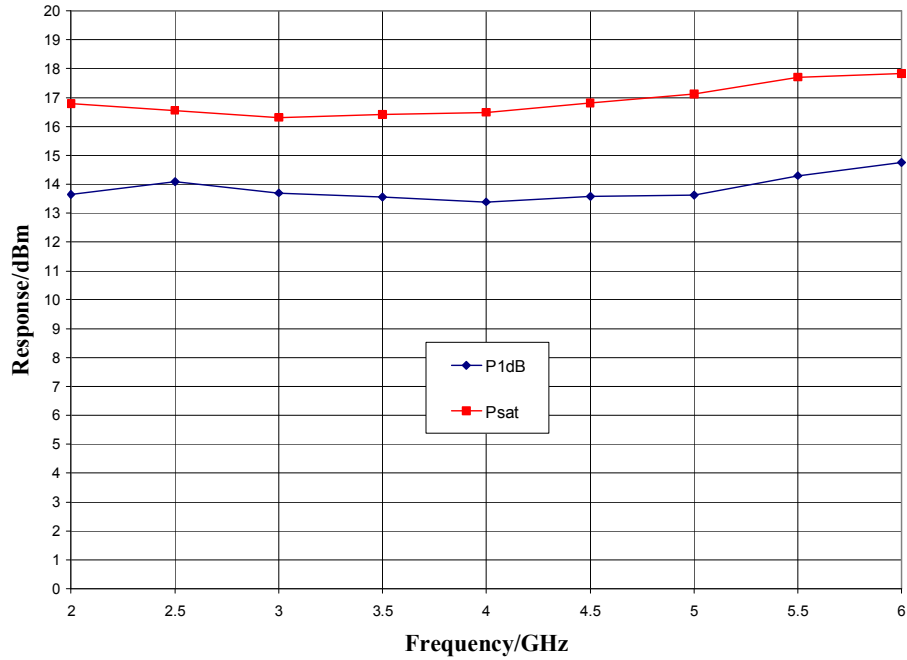
Output IP3 vs. Supply Voltage,  $T_A = 25\text{ }^\circ\text{C}$



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### Typical Performance

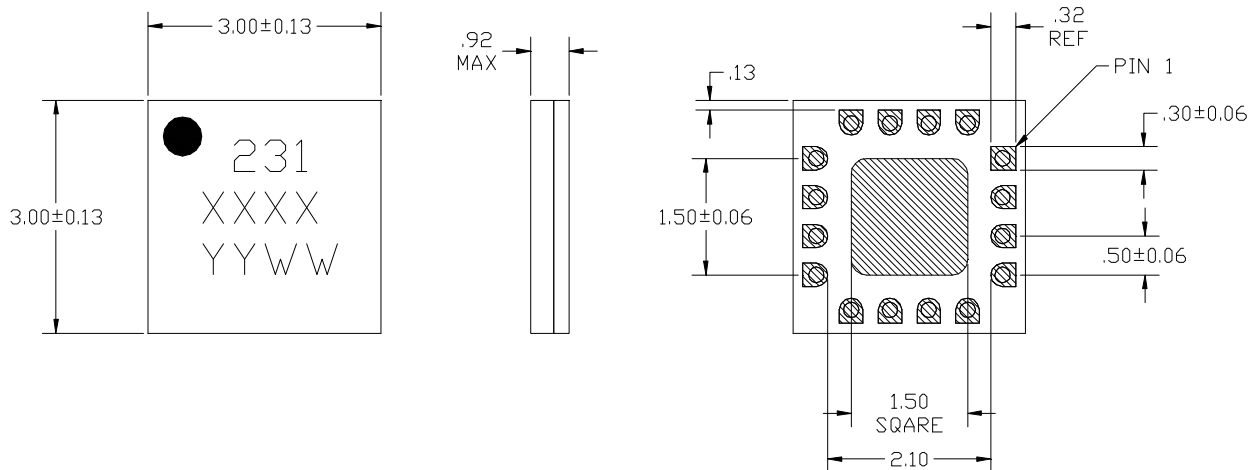
Output Power,  $V_{dd} = 8.0\text{ V}$ ,  $T_A = 25\text{ }^\circ\text{C}$





### Mechanical Information

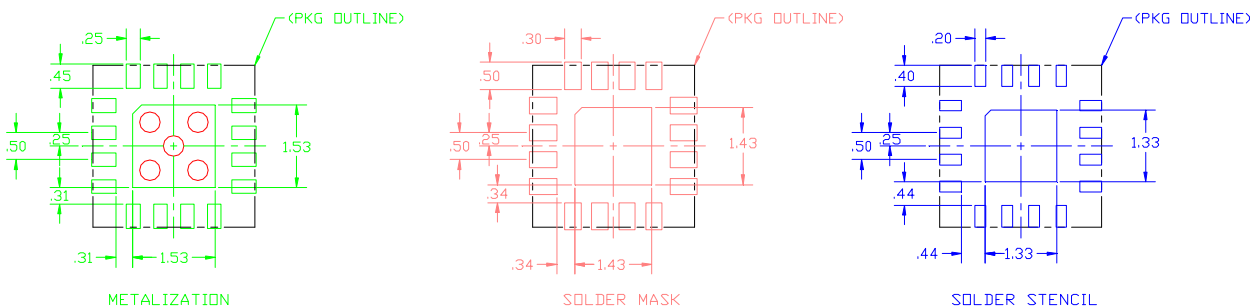
#### Package Information and Dimensions



#### NOTES:

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

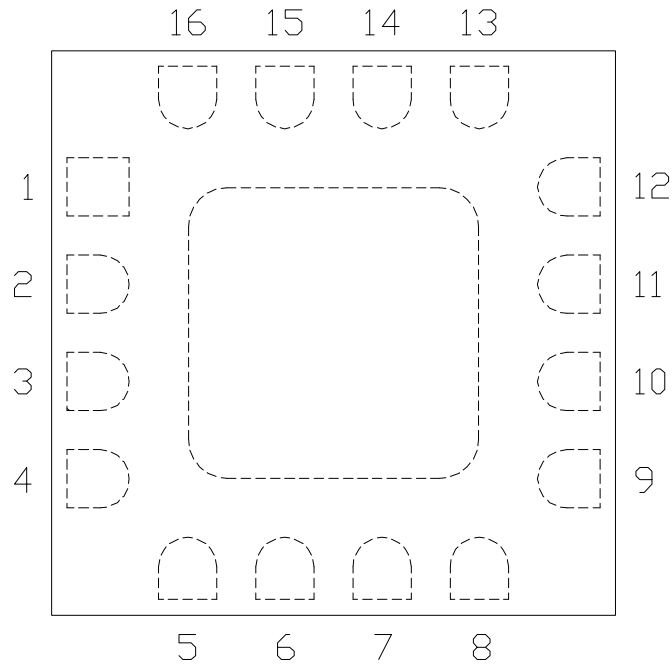
#### Recommended PCB Land Pattern




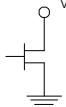


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### Pin Description

#### Pin Diagram



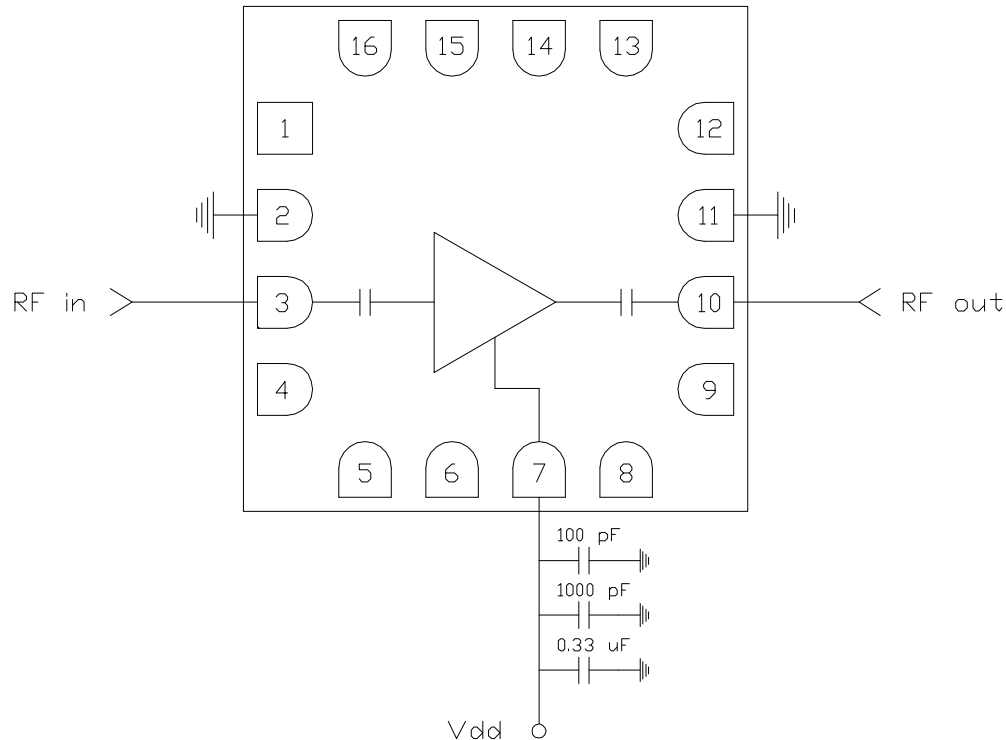
#### Functional Description

Pin	Function	Description	Schematic
1, 4-6, 8, 9, 12-16	N/C	No connection required. These pins may be connected to RF/DC ground.	
3	RF in	DC blocked and 50 ohm matched	
7	Vdd	Power supply voltage Decoupling and bypass caps required	
10	RF out	DC blocked and 50 ohm matched	
2, 11 and die paddle	Ground	Connect to RF / DC ground	

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### Applications Information

#### Application Circuit



#### Biasing and Operation

The CMD231C3 is biased with a single positive drain supply. Performance is optimized when the drain voltage is set between +5.0 V and +8.0V.

Turn ON procedure:

1. Apply drain voltage  $V_{dd}$  and set to +8 V

Turn OFF procedure:

1. Turn off drain voltage  $V_{dd}$

RF power can be applied at any time.

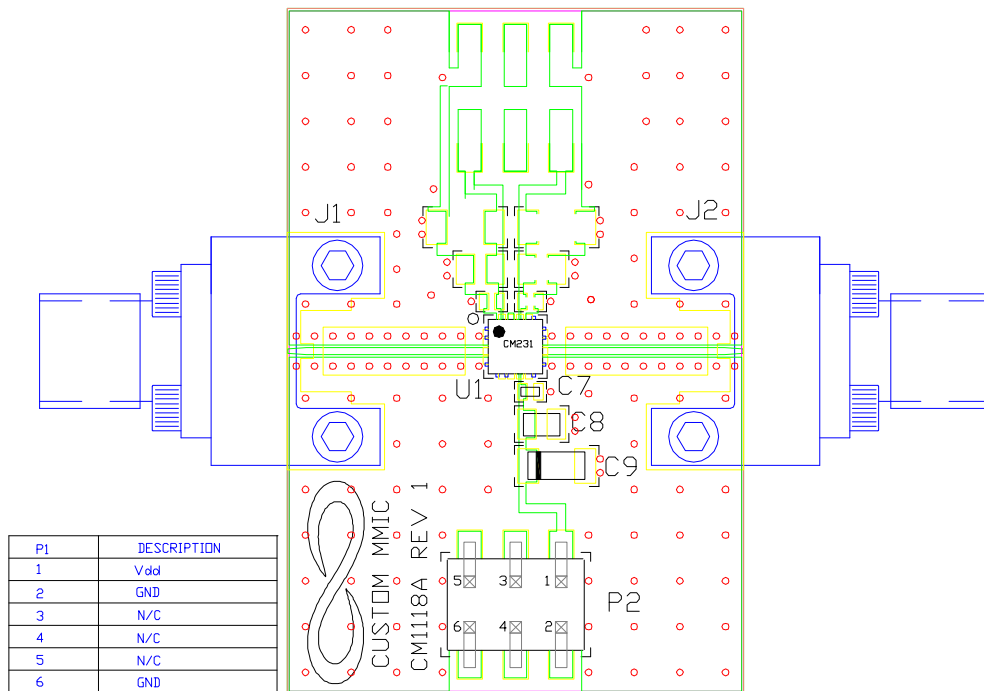
**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

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### Applications Information

#### Evaluation Board

The circuit board shown has been developed for optimized assembly at 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		SMA End Launch Connector
P2		6 Pin Header
C9	0.33 $\mu$ F	Capacitor, Tantalum
C8	1000 pF	Capacitor, 0603
C7	100 pF	Capacitor, 0402
U1		CMD231C3 Low Noise Amplifier
PCB		CM118A Evaluation PCB

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