



CMD191C4

4-10 GHz Driver Amplifier

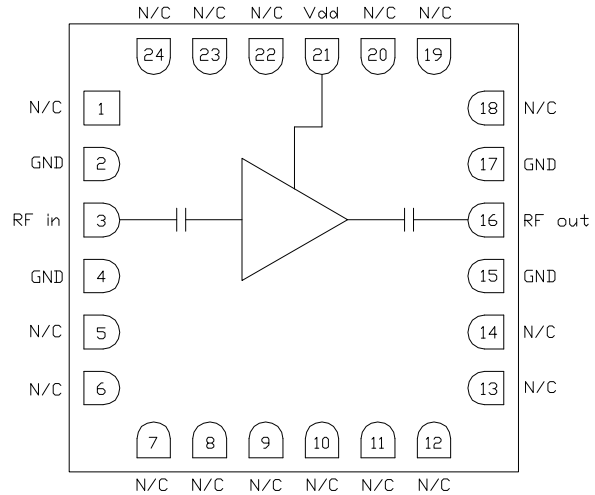
Features

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

Description

The CMD191C4 is a GaAs MMIC driver amplifier housed in a leadless surface mount package. The CMD191C4 is ideally suited for complex communications systems where small size and high linearity are needed. The device delivers 20 dB of gain with a corresponding output 1 dB compression point of greater than +21 dBm. The CMD191C4 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		20		dB
Noise Figure		5		dB
Input Return Loss		12		dB
Output Return Loss		10		dB
Output P1dB		21.5		dBm
Output IP3		30		dBm
Supply Current ($V_{dd}=5 \text{ V}$)		123		mA

ver 1.5 0419

Specifications

Absolute Maximum Ratings

Parameter	Rating
Drain Voltage, V _{dd}	5.5 V
RF Input Power	+23 dBm
Channel Temperature, T _{ch}	150 °C
Power Dissipation, P _{diss}	775 mW
Thermal Resistance, Θ_{JC}	83.9 °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}	4.5	5.0	5.5	V
I _{dd}		123		mA

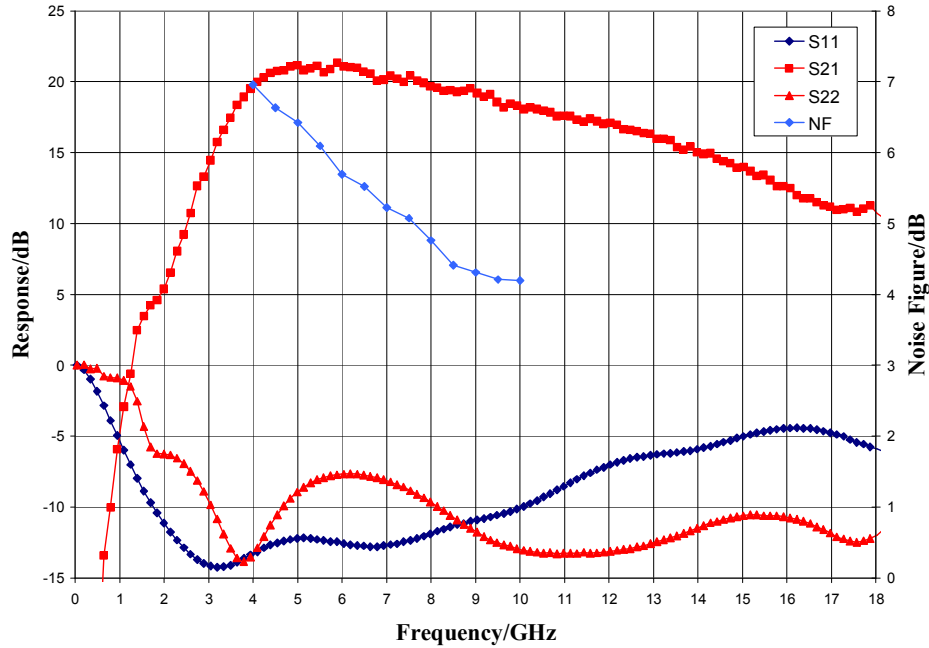
Electrical performance is measured at specific test conditions. Electrical specifications are not guaranteed over all recommended operating conditions.

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

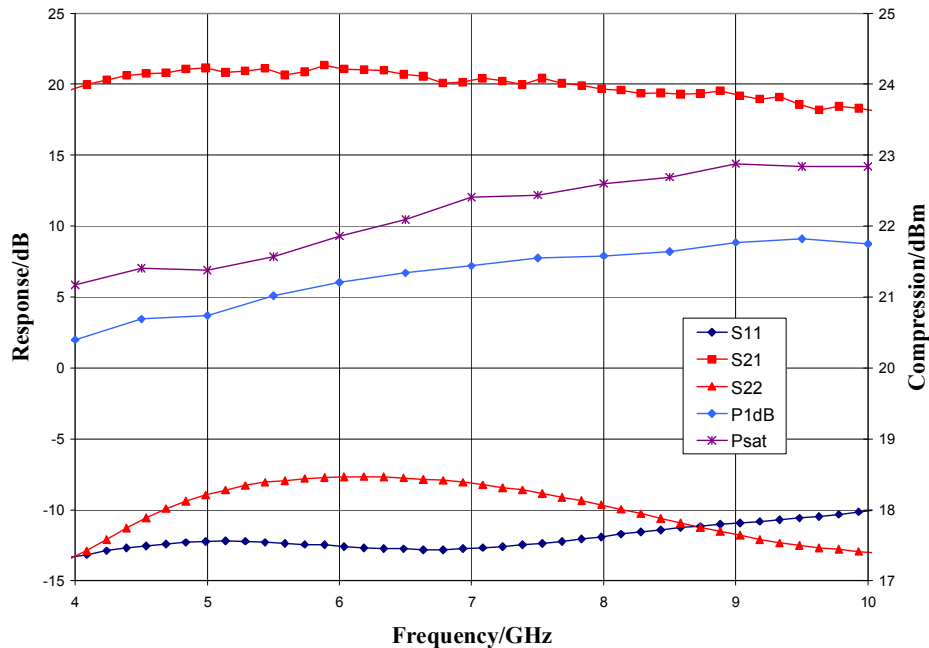
Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	4 - 7			7 - 10			GHz
Gain	17	20	24	16	19	23	dB
Noise Figure		6			4.5		dB
Input Return Loss		13			11		dB
Output Return Loss		8			10		dB
Output P1dB	18.5	21		19.5	21.5		dBm
Output IP3		29			30		dBm
Supply Current	100	123	150	100	123	150	mA
Gain Temperature Coefficient		0.012			0.012		dB/°C

Typical Performance

Broadband Performance, $V_{dd} = 5.0\text{ V}$, $I_{dd} = 123\text{ mA}$, $T_A = 25\text{ }^\circ\text{C}$



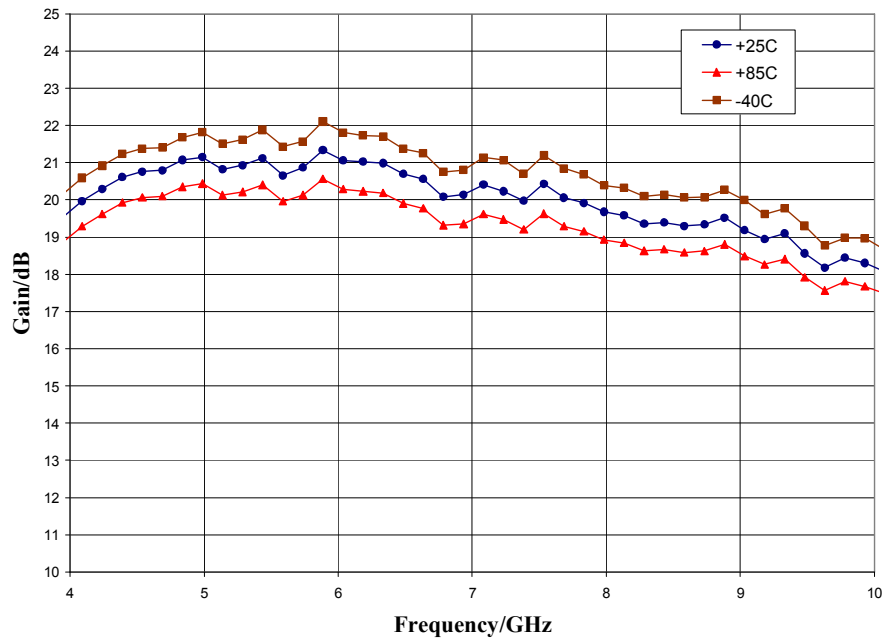
Narrow-band Performance, $V_{dd} = 5.0\text{ V}$, $I_{dd} = 123\text{ mA}$, $T_A = 25\text{ }^\circ\text{C}$



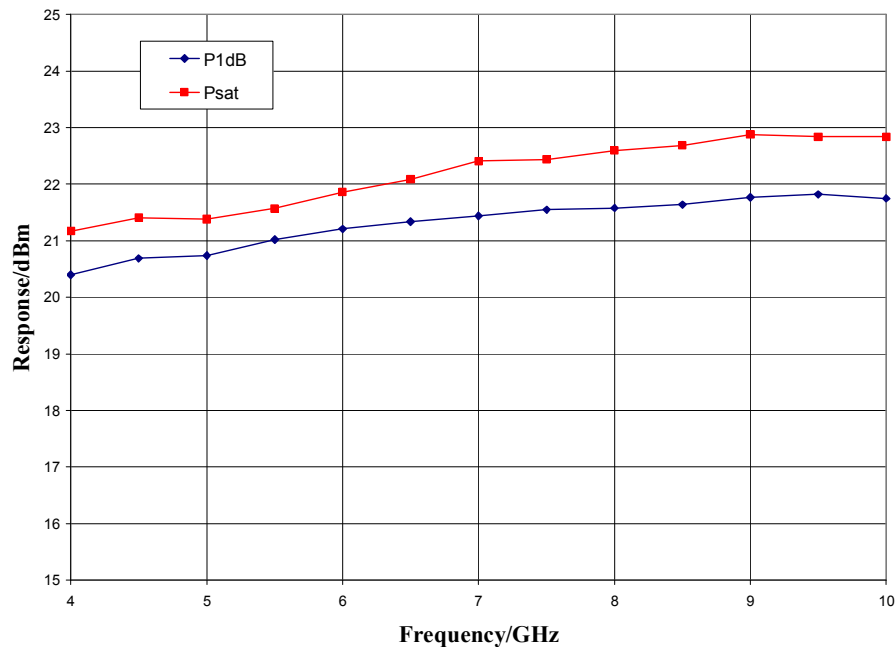
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Typical Performance

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



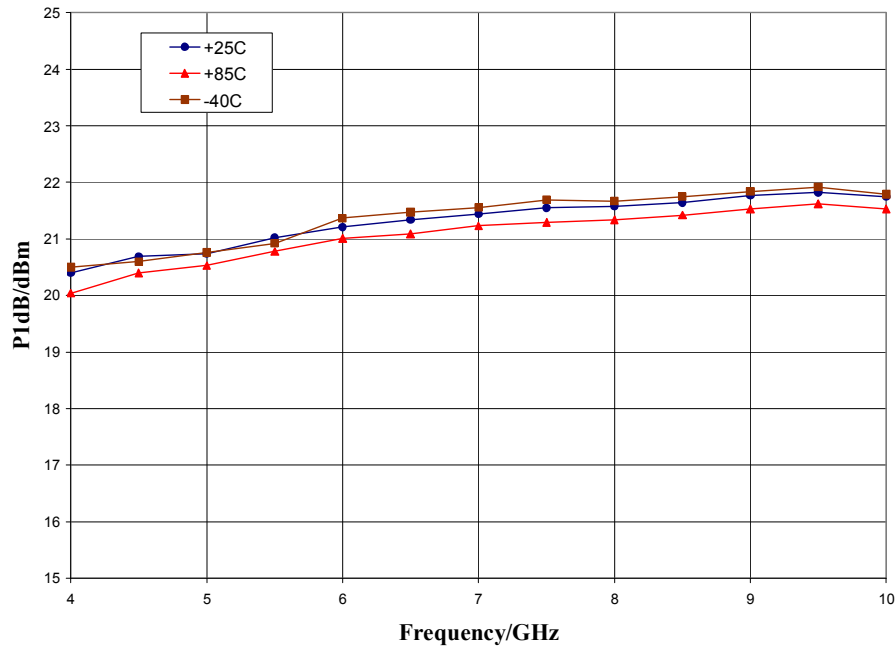
Output Power, $V_{dd} = 5.0\text{ V}$, $I_{dd} = 123\text{ mA}$, $T_A = 25\text{ }^\circ\text{C}$



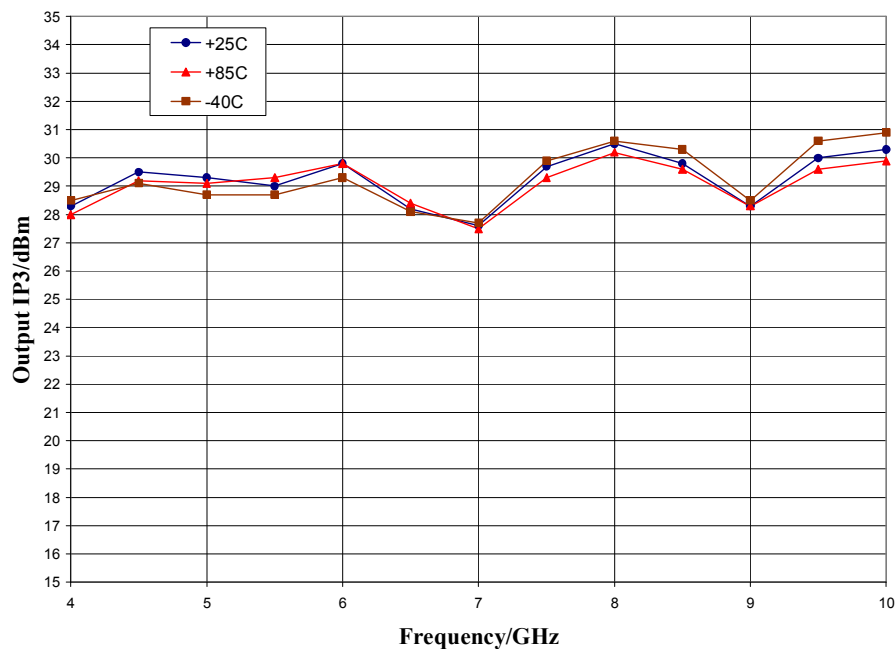
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Typical Performance

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



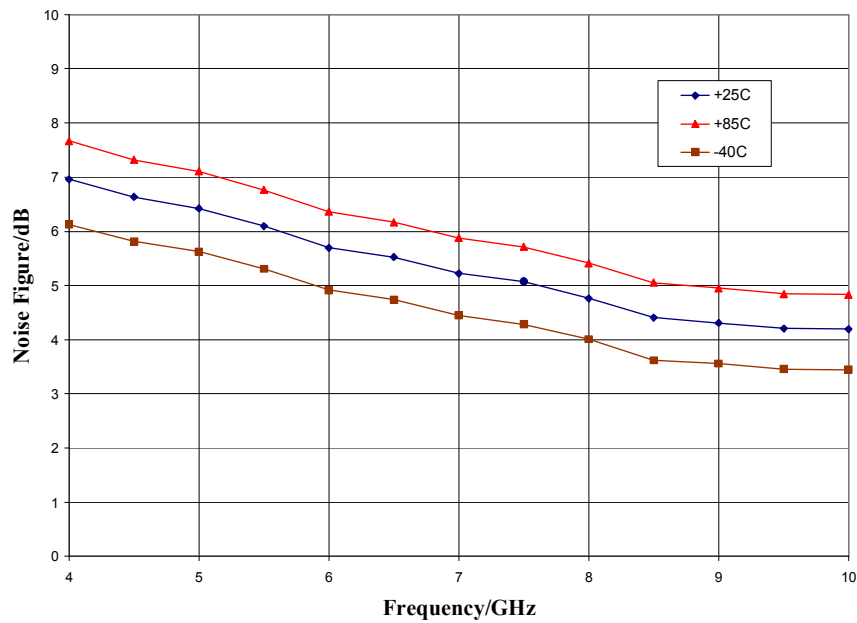
Output IP3 vs. Temperature, $V_{dd} = 5.0\text{ V}$



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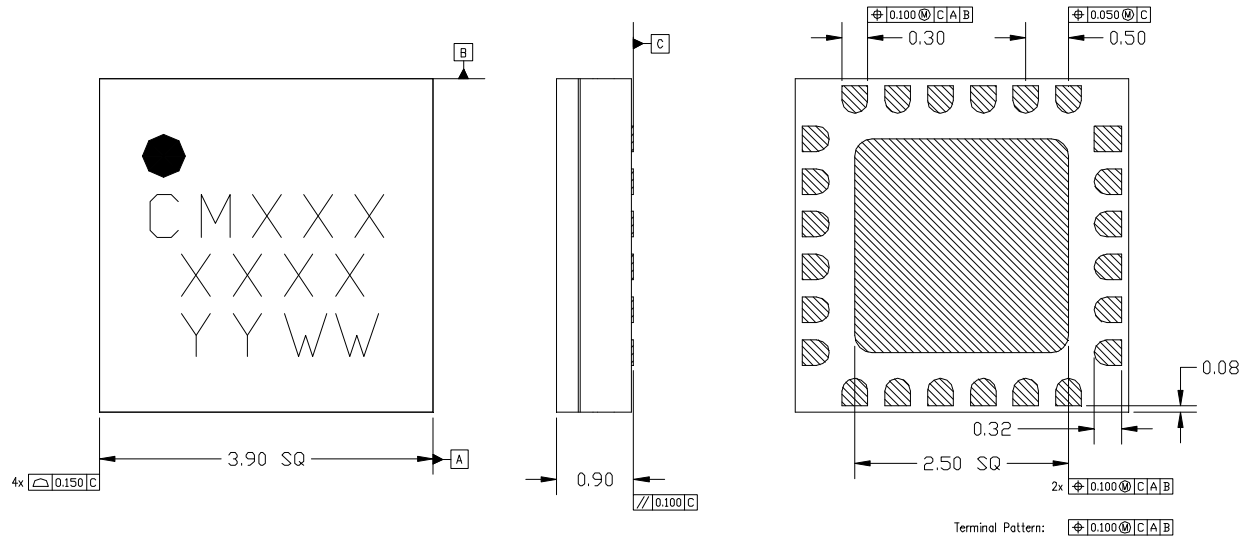
Typical Performance

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



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

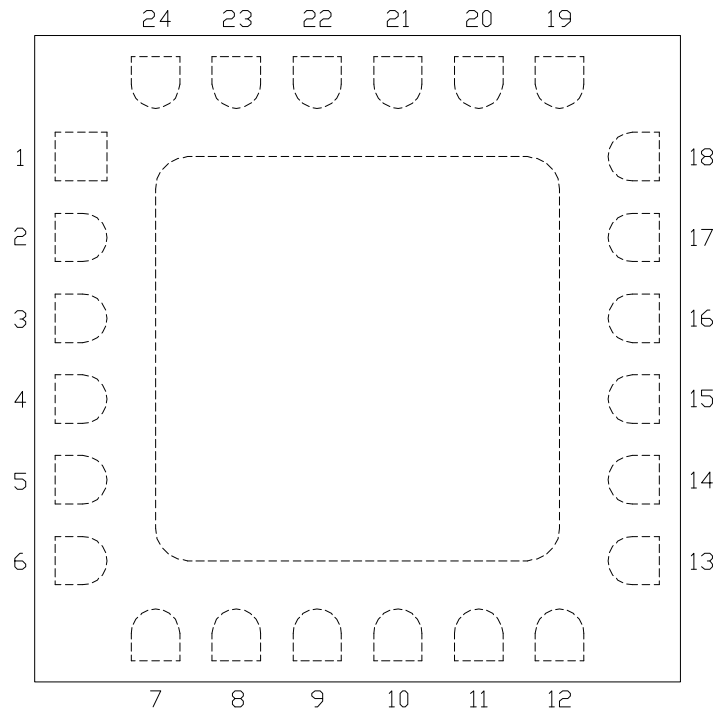
Custom MMIC Design Services recommends that the user develop the land pattern that will provide the best design for proper solder reflow and device attach for their specific application. Please review Custom MMIC Application Note AN 105 for a recommended land pattern approach.

Recommended Solder Reflow Profile




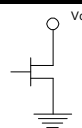
Custom MMIC Design Services recommends screen printing with belt furnace reflow to ensure proper solder reflow and device attach. Please review Custom MMIC Application Note AN 102 for a recommended solder reflow profile.

Pin Description

Pin Diagram

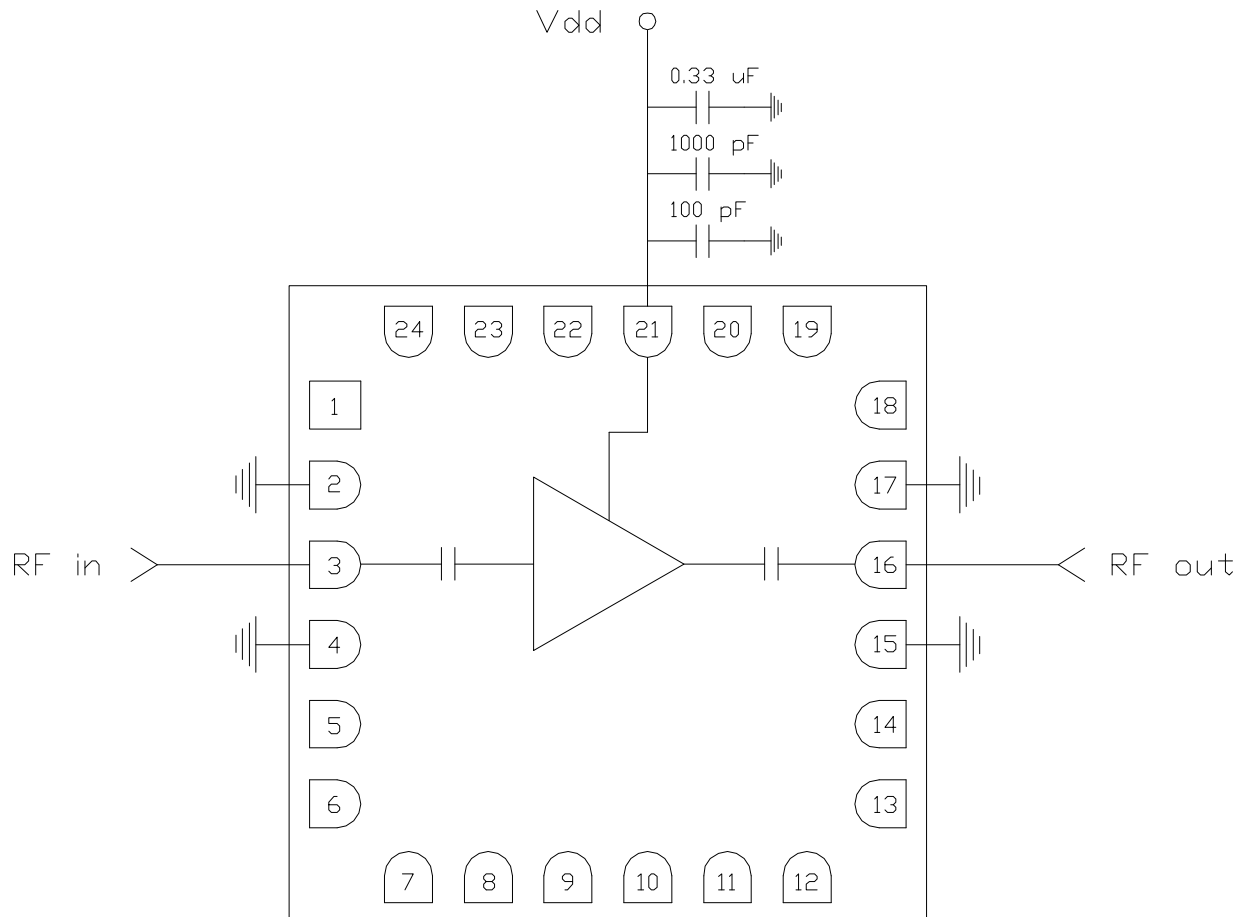


Functional Description

Pad	Function	Description	Schematic
1, 5-14, 18-20, 22-24	N/C	No connection required. These pins may be connected to RF/DC ground.	
2,4,15,17 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	

Applications Information

Application Circuit



Biasing and Operation

The CMD191C4 is biased with a single 5.0 V positive drain supply.

RF power can be applied at any time.

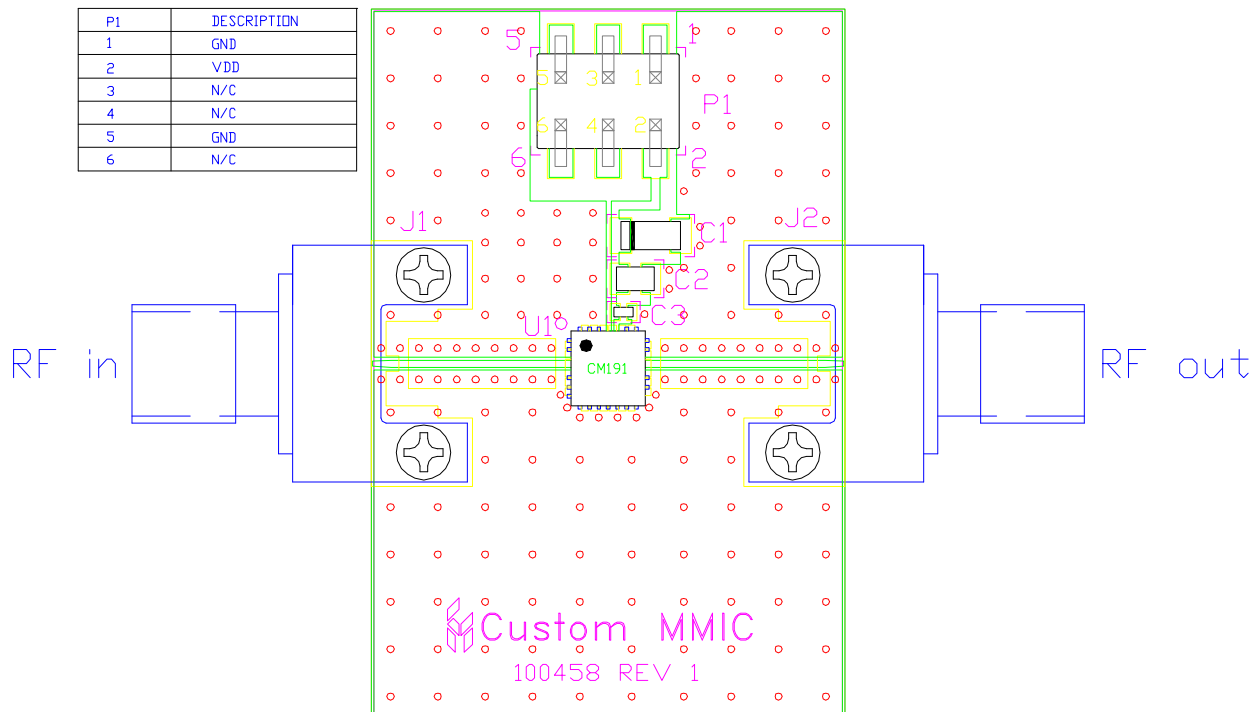
GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.

ver 1.5 0419

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
P1		6 Pin Header
C1	0.33 μ F	Capacitor, Tantalum
C2	1000 pF	Capacitor, 0603
C3	100 pF	Capacitor, 0402
U1		CMD191C4 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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