



Let Performance Drive

# CMD185P3

## 4-8 GHz Low Noise Amplifier



### Features

- ▶ Ultra low noise figure
- ▶ High gain broadband performance
- ▶ Single supply voltage: +4.0 V @ 75 mA
- ▶ Pb-free RoHs compliant 3x3 QFN package

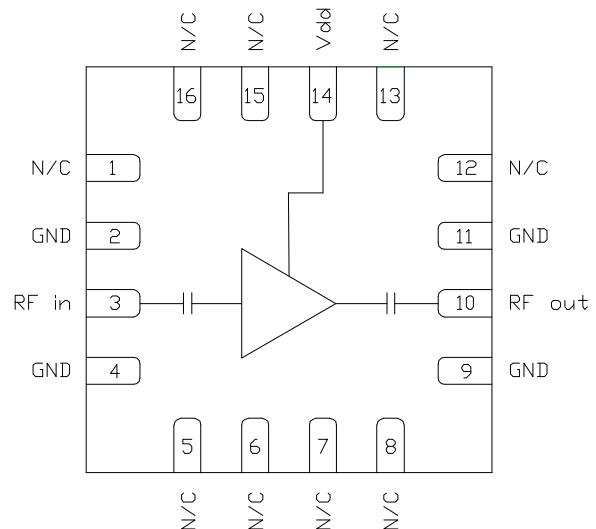
### Applications

- ▶ Point-to-point radios
- ▶ Point-to-multi-point radios
- ▶ Military end-use
- ▶ Test instrumentation

### Description

The CMD185P3 is a broadband MMIC low noise amplifier housed in a leadless 3x3 mm plastic surface mount package. The CMD185P3 is ideally suited for EW and communications systems where small size and low power consumption are needed. The broadband device delivers greater than 15 dB of gain with a corresponding output 1 dB compression point of +15 dBm and a noise figure of 1.9 dB. The CMD185P3 is a 50 ohm matched design eliminating the need for external DC blocks and RF port matching. The CMD185P3 amplifier is the perfect alternative to costly hybrid amplifiers.

### Functional Block Diagram



### Electrical Performance - $V_{dd} = 4.0 \text{ V}$ , $T_A = 25 \text{ }^\circ\text{C}$ , $F = 6 \text{ GHz}$

Parameter	Min	Typ	Max	Units
Frequency Range	4 - 8			GHz
Gain		15.5		dB
Noise Figure		1.9		dB
Input Return Loss		10		dB
Output Return Loss		17		dB
Output P1dB		15		dBm
Supply Current		75		mA

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### Specifications

#### Absolute Maximum Ratings

Parameter	Rating
Drain Voltage, Vdd	5 V
RF Input Power	+20 dBm
Channel Temperature, Tch	150 °C
Power Dissipation, Pdiss	529 mW
Thermal Resistance	123 °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
Vdd	2.0	4.0	5.0	V
Idd		75		mA

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

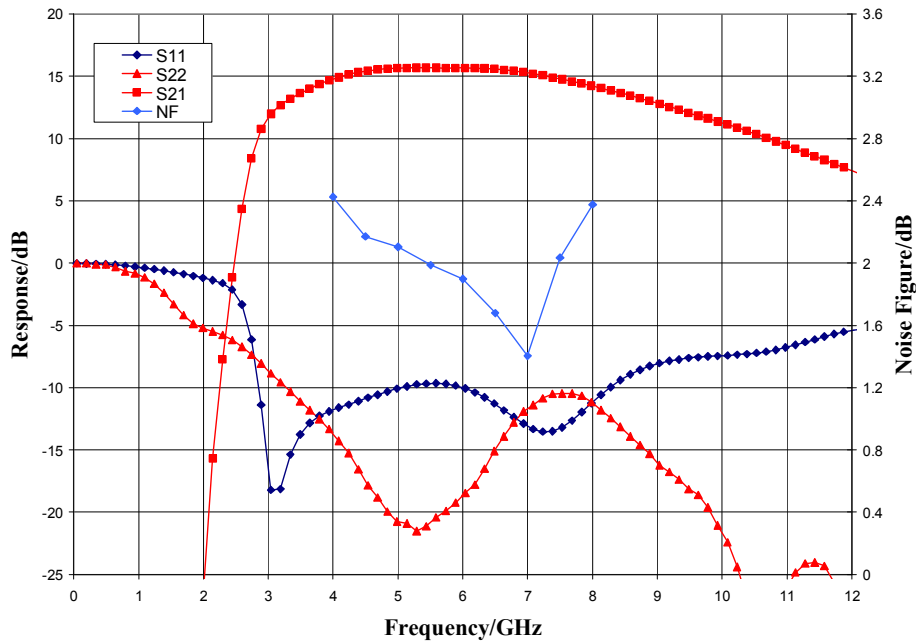
#### Electrical Specifications - $V_{dd} = 4.0$ V, $T_A = 25$ °C

Parameter	Min	Typ	Max	Min	Typ	Max	Units
Frequency Range	4 - 6			6 - 8			GHz
Gain	13.5	15.5	17.5	13	15	17.5	dB
Noise Figure		2	2.8		1.5	2.7	dB
Input Return Loss		10			13		dB
Output Return Loss		18			13		dB
Output P1dB		14			16.5		dBm
Output IP3		28			29.5		dBm
Supply Current	53	75	97	53	75	97	mA
Gain Temperature Coefficient		0.009			0.009		dB/°C
Noise Figure Temperature Coefficient		0.009			0.009		dB/°C

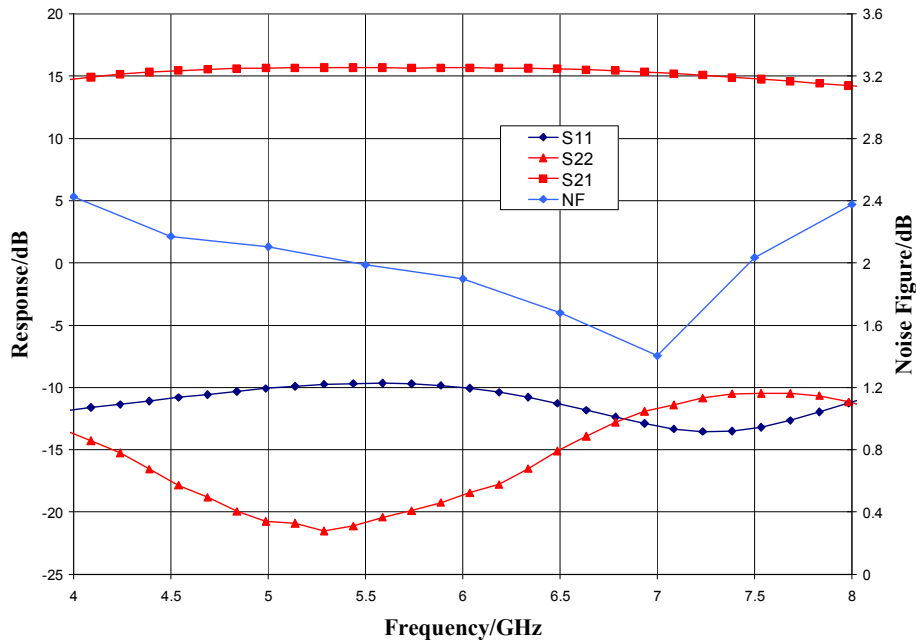
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### Typical Performance

Broadband Performance,  $V_{dd} = 4.0 \text{ V}$ ,  $I_{dd} = 75 \text{ mA}$ ,  $T_A = 25 \text{ }^\circ\text{C}$



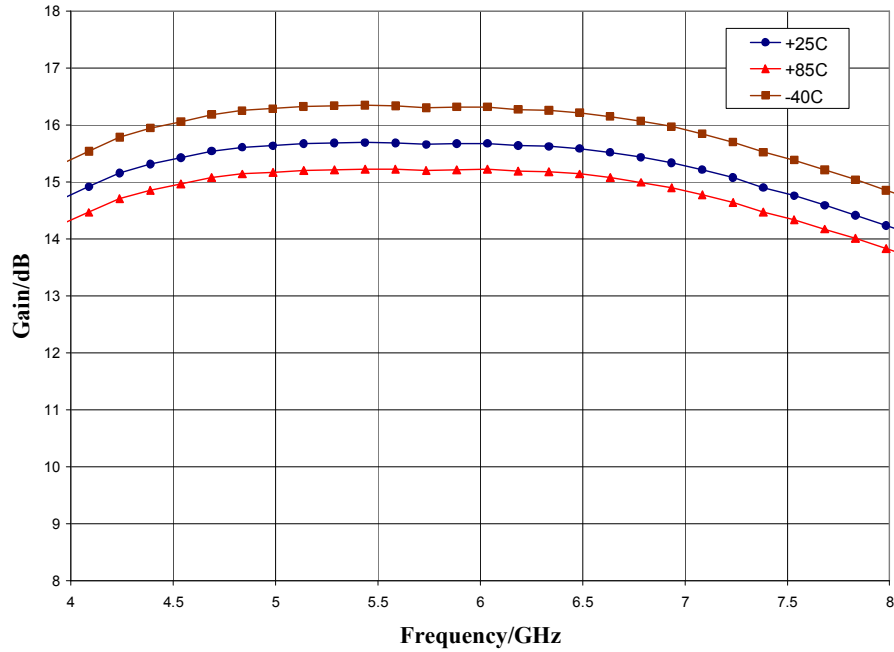
Narrow-band Performance,  $V_{dd} = 4.0 \text{ V}$ ,  $I_{dd} = 75 \text{ mA}$ ,  $T_A = 25 \text{ }^\circ\text{C}$



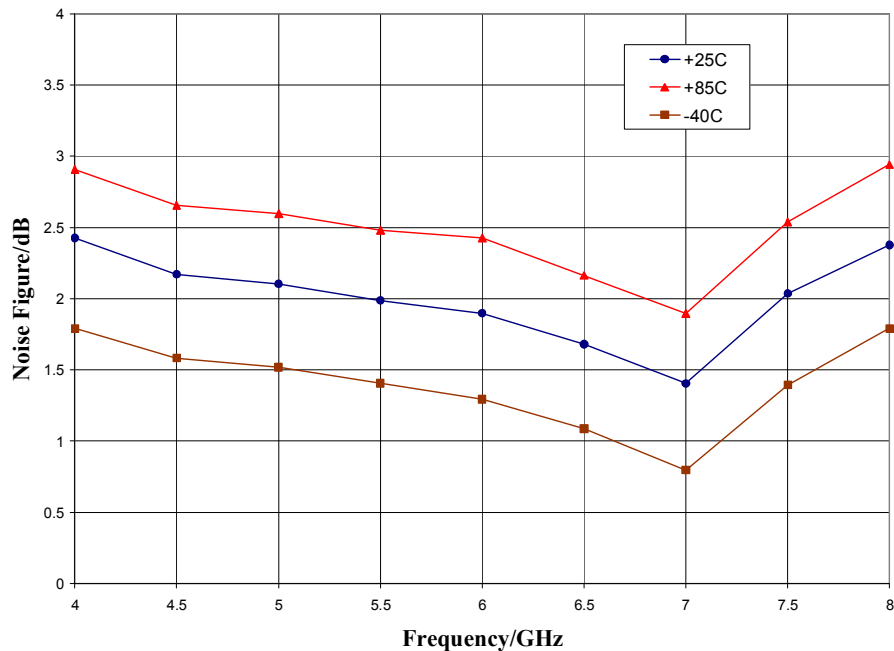
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### Typical Performance

Gain vs. Temperature,  $V_{dd} = 4.0\text{ V}$



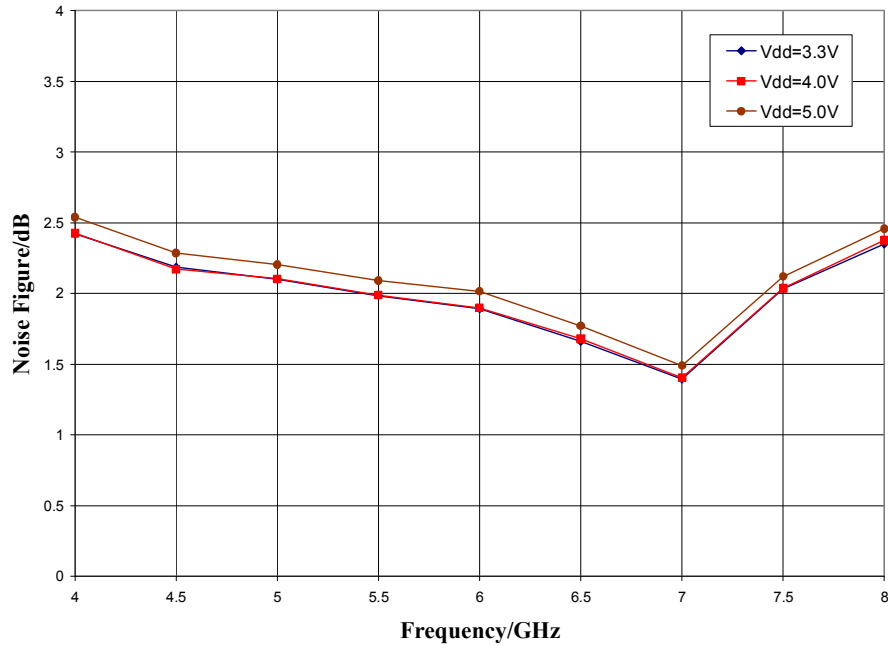
Noise Figure vs. Temperature,  $V_{dd} = 4.0\text{ V}$



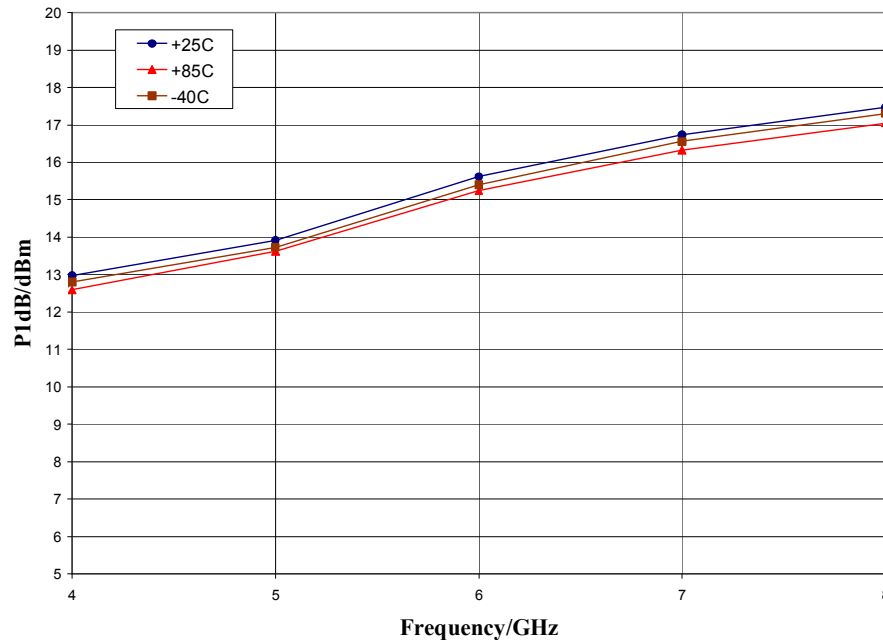
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### Typical Performance

Noise Figure,  $V_{dd} = 3.3\text{ V}, 4.0\text{V}, 5.0\text{V}, T_A = 25\text{ }^\circ\text{C}$



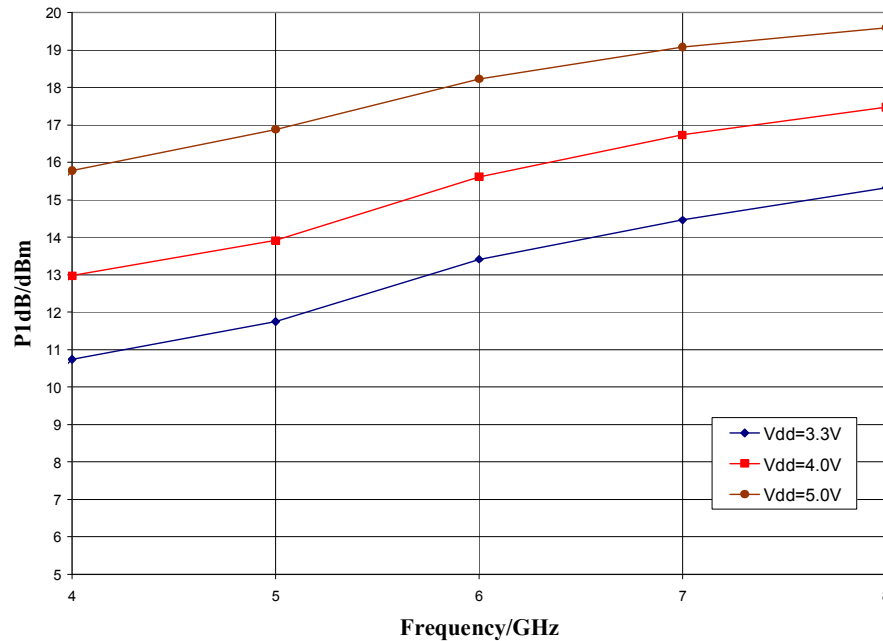
P1dB vs. Temperature,  $V_{dd} = 4.0\text{ V}$



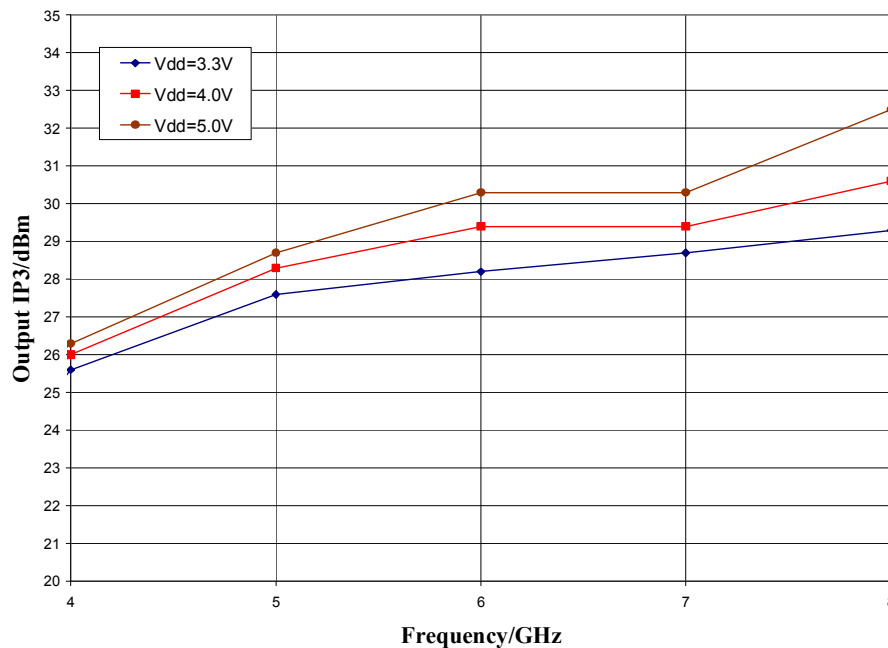
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### Typical Performance

**P1dB,  $V_{dd} = 3.3\text{V}, 4.0\text{V}, 5.0\text{V}, T_A = 25\text{ }^\circ\text{C}$**



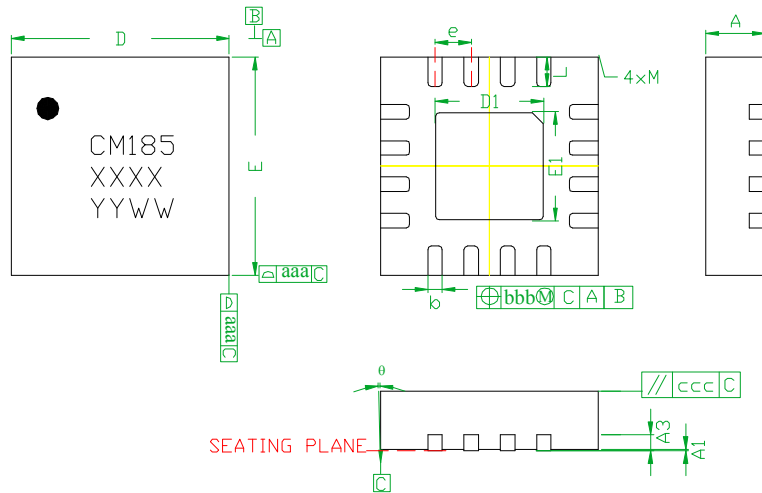
**Output IP3,  $V_{dd} = 3.3\text{V}, 4.0\text{V}, 5.0\text{V}, T_A = 25\text{ }^\circ\text{C}$**



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### Mechanical Information

### Package Information and Dimensions

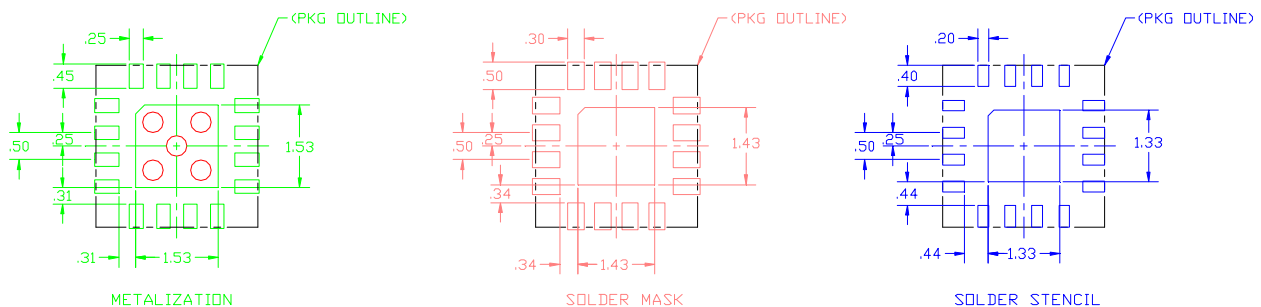


SYMBOLS	DIMENSIONS IN MILLIMETERS		
	MIN	NOM	MAX
A	0.80	0.90	1.00
A1	0	0.02	0.05
A3	---	0.25REF.	---
b	0.18	0.23	0.30
D	2.85	3.00	3.15
D1	---	1.5BSC	---
E	2.85	3.00	3.15
E1	---	1.5BSC	---
e	---	0.50BSC	---
L	0.30	0.40	0.50
theta	0	---	12
aaa	---	0.25	---
bbb	---	0.10	---
ccc	---	0.10	---
M	---	---	0.05

#### NOTES:

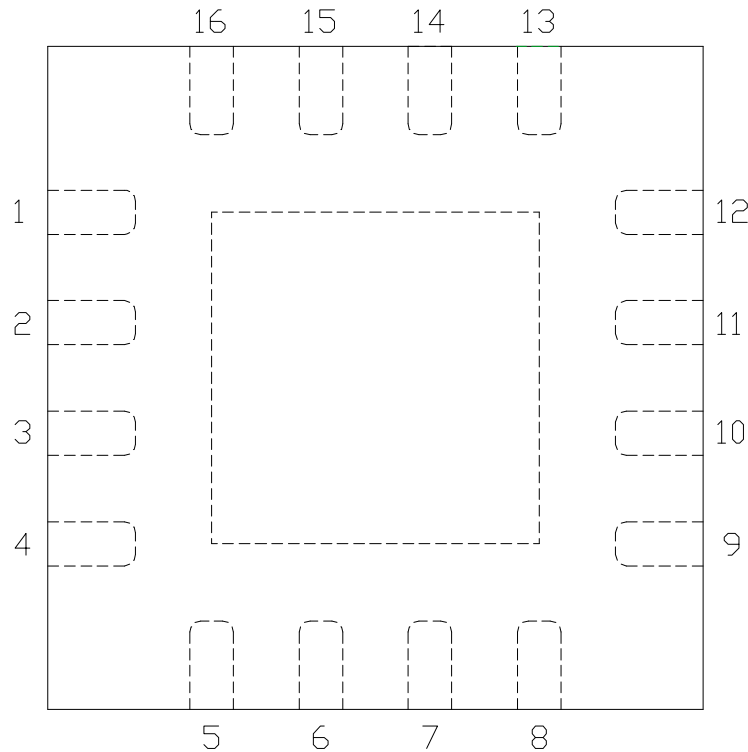
1. DIMENSIONS ARE IN MILLIMETERS
2. RoHS COMPLIANT MOLD COMPOUND
3. LEADFRAME MATERIAL: COPPER ALLOY
4. LEAD FINISH: 100% MATTE Sn
5. INDICATED DIMENSION/TOLERANCE APPLIES TO LEADS AND EXPOSED PAD

### Recommended PCB Land Pattern


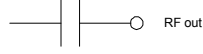
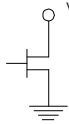



### Pin Description

#### Pin Diagram



#### Functional Description

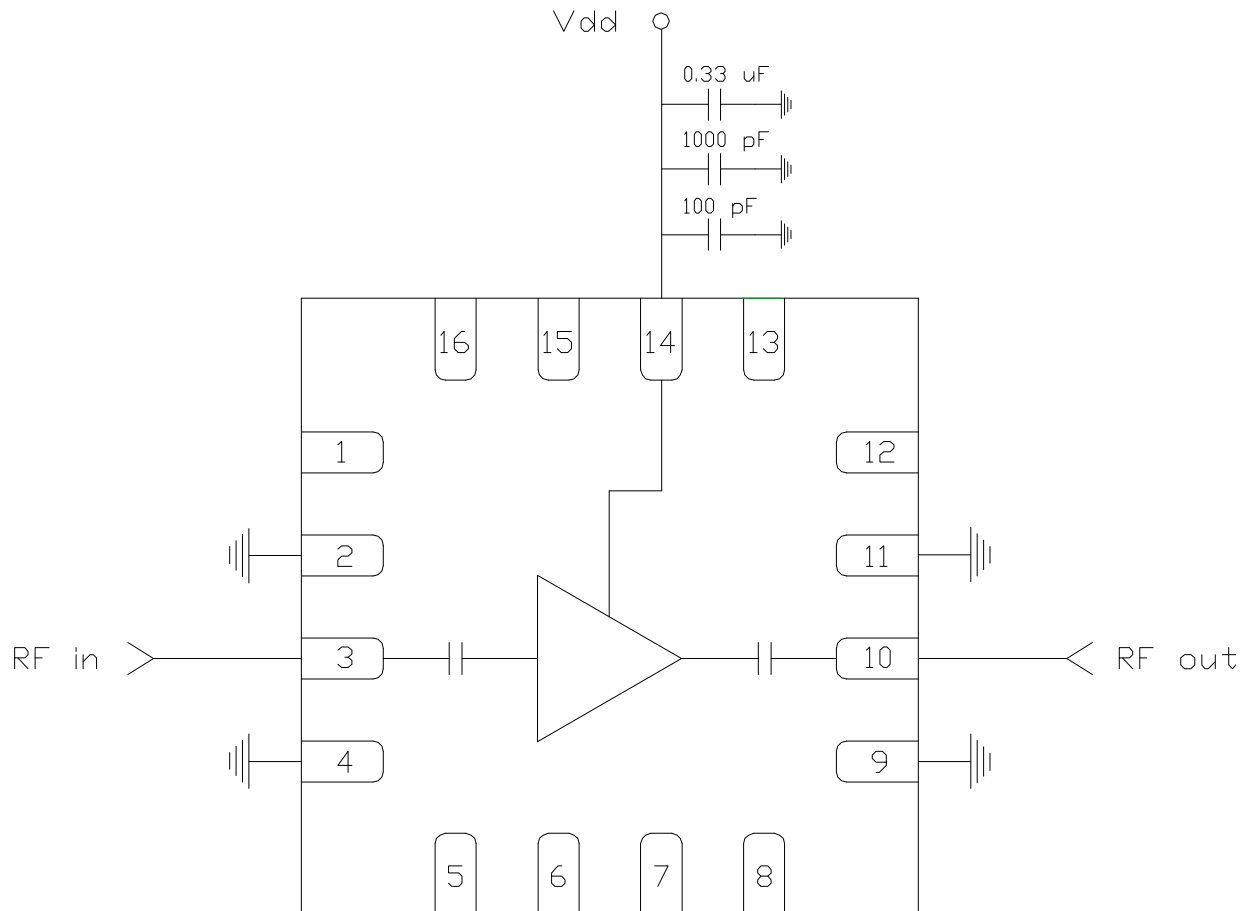
Pin	Function	Description	Schematic
3	RF in	DC blocked and 50 ohm matched	
10	RF out	DC blocked and 50 ohm matched	
14	Vdd	Power supply voltage Decoupling and bypass caps required	
2,4,9,11 and die paddle	Ground	Connect to RF / DC ground	

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### Applications Information

#### Application Circuit



#### Biasing and Operation

The CMD185P3 is biased with a single 4.0 V positive drain supply.

RF power can be applied at any time.

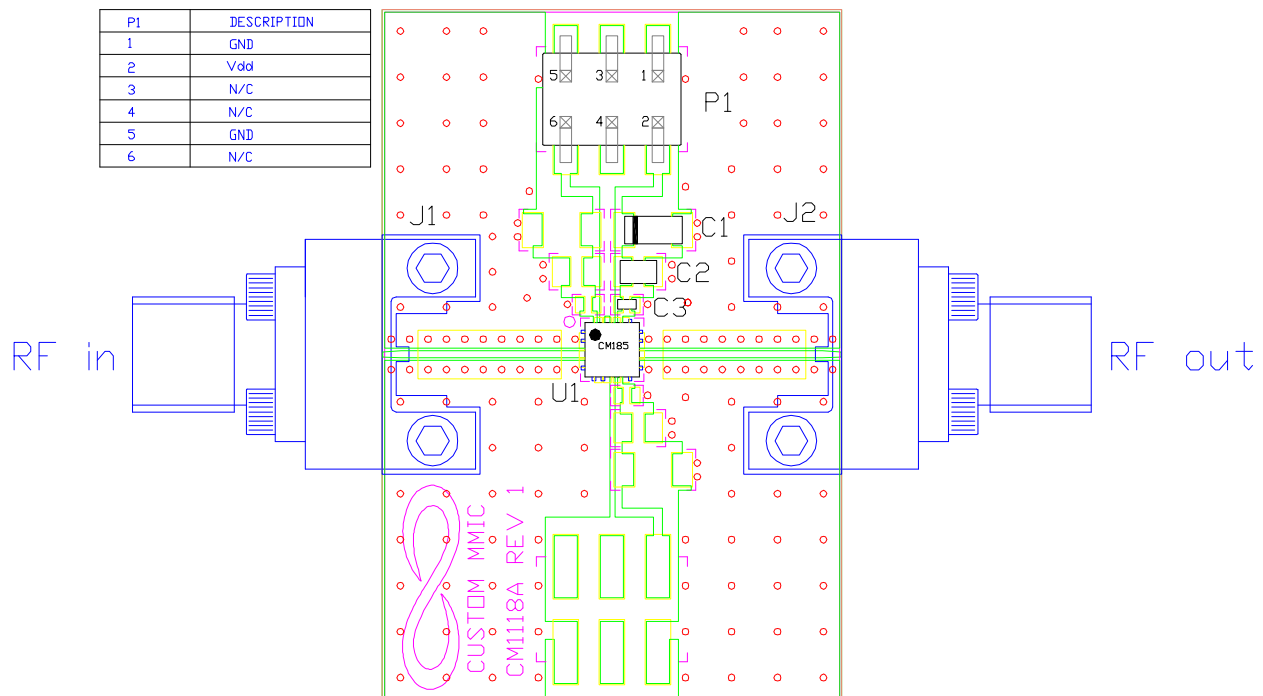
**GaAs MMIC devices are susceptible to damage from Electrostatic Discharge. Proper precautions should be observed during handling, assembly and test.**

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### Applications Information

#### Evaluation Board

The circuit board shown has been developed for optimized assembly at 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		2.4 mm End Launch Connector
P1		10 Pin Header
C1	0.33 $\mu$ F	Capacitor, Tantalum
C2	1000 pF	Capacitor, 0603
C3	100 pF	Capacitor, 0402
U1		CMD185P3 Low Noise Amplifier
PCB		CM1118A Evaluation PCB

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