

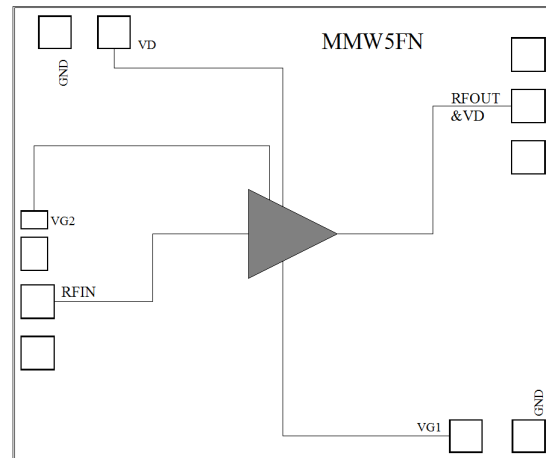
Features

- Frequency: DC-67GHz
- Small Signal Gain: 13.5dB Typical
- Gain Flatness: ± 1.0 dB Typical
- Noise Figure: 2.5dB Typical
- P1dB: 16dBm Typical
- Psat: 19dBm Typical
- Supply Voltage:
VD = +4.5V, VG1 = -1.7V
- Input/Output: 50 Ω
- Die Size: 1.58 x 1.33 x 0.05mm

Typical Applications

- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

Functional Block Diagram



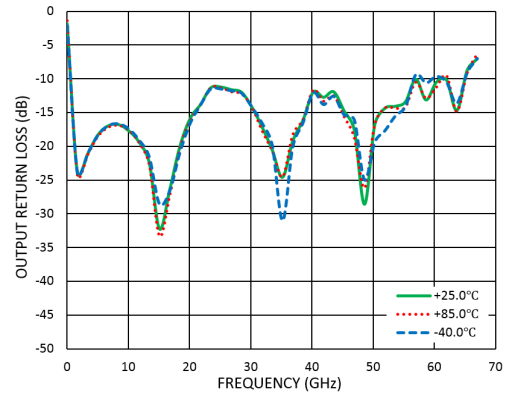
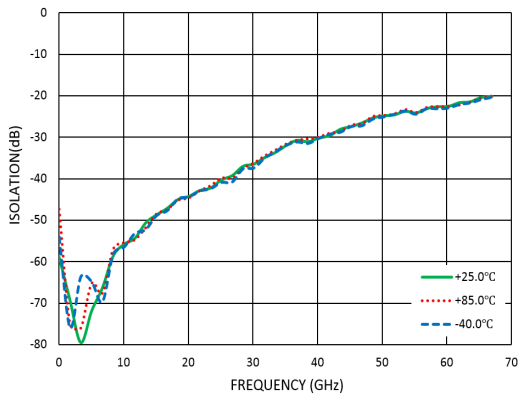
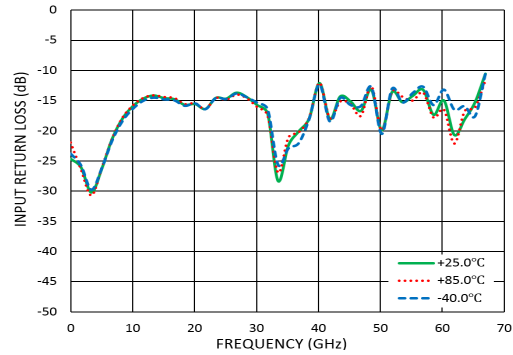
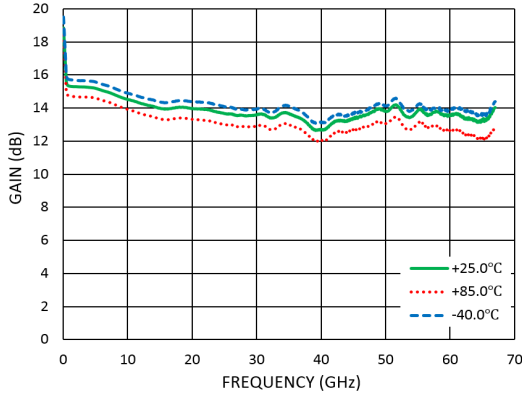
Electrical Specifications

TA = +25°C, VD = +4.5V, VG1 = -1.7V IDD = 80mA Typical

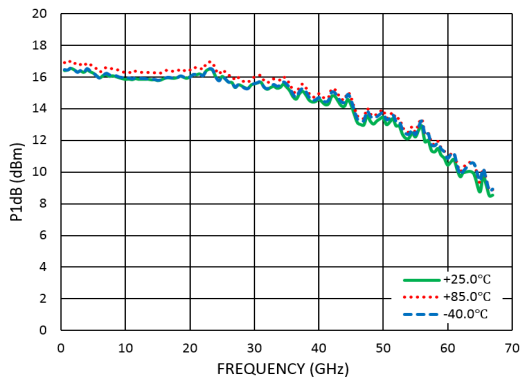
Parameters	Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency	DC		20	20		40	40		67	GHz
Small Signal Gain	13	14.5		12	13.5		12	13.5		dB
Gain Flatness		± 1.0			± 0.5			± 0.5		dB
Noise Figure		2.5			3.0			4.5		dB
P1dB - Output 1dB Compression	14.5	16		13.5	15		7	12		dBm
Psat - Saturated Output Power		19			17			14		dBm
OIP3 - Output Third Order Intercept		26			25			22		dBm
Input Return Loss		-15			-15			-13		dB
Output Return Loss		-16			-12			-10		dB



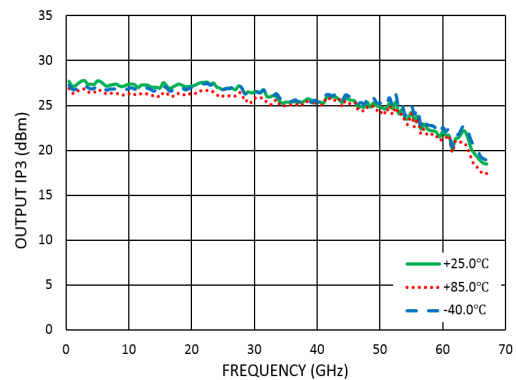
Measurement Plots: S-parameters

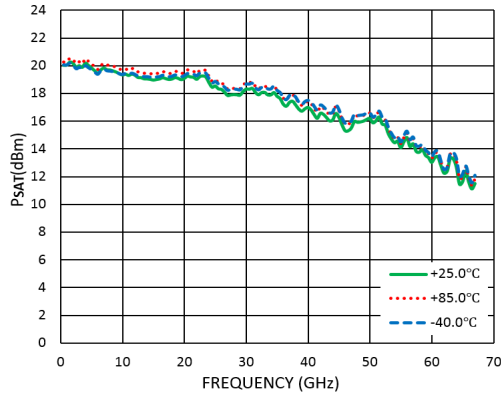
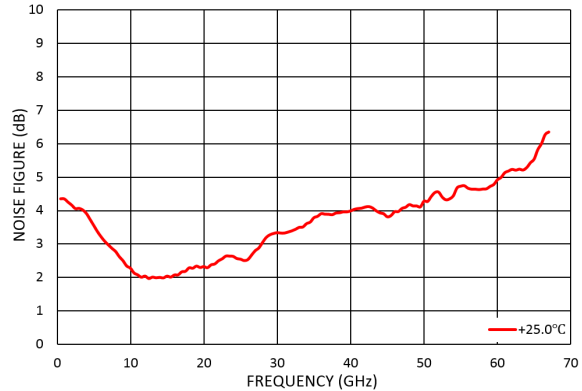


Measurement Plots: P1dB



Measurement Plots: OIP3



Measurement Plots: PsAT

Measurement Plots: Noise Figure

Absolute Maximum Ratings

Drain Bias Voltage (VD)	+7V
Gate Bias Voltages(VG)	-4V to 0.5V
RF Input Power (RFIN)@(+4.5V)	+20dBm
Channel Temperature	175 °C
Continuous Pdiss (T = 85 °C) (derate 7.8mW/°C above 85 °C)	0.7W
Thermal Resistance (channel to die bottom)	50°C/W
Operating Temperature	-55°C to +85 °C
Storage Temperature	-65°C to +150 °C

Typical Supply Current vs. VD,VG

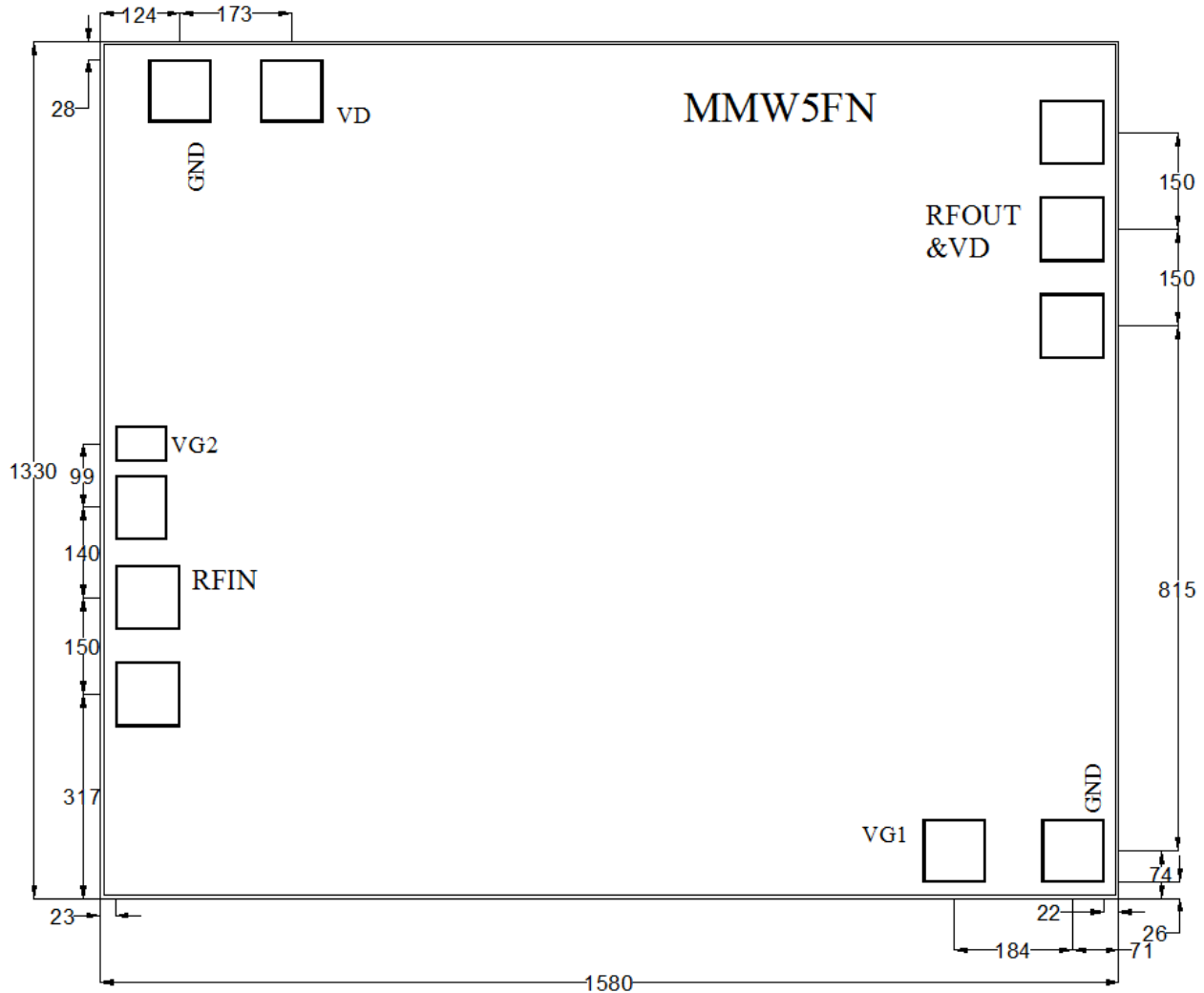
VD (V)	VG1 (V)	VG2 (V)	IDD (mA)
4.5	-1.7	N/A	80



**ELECTROSTATIC SENSITIVE DEVICE
OBSERVE HANDLING PRECAUTIONS**



Outline Drawing: All Dimensions in μm

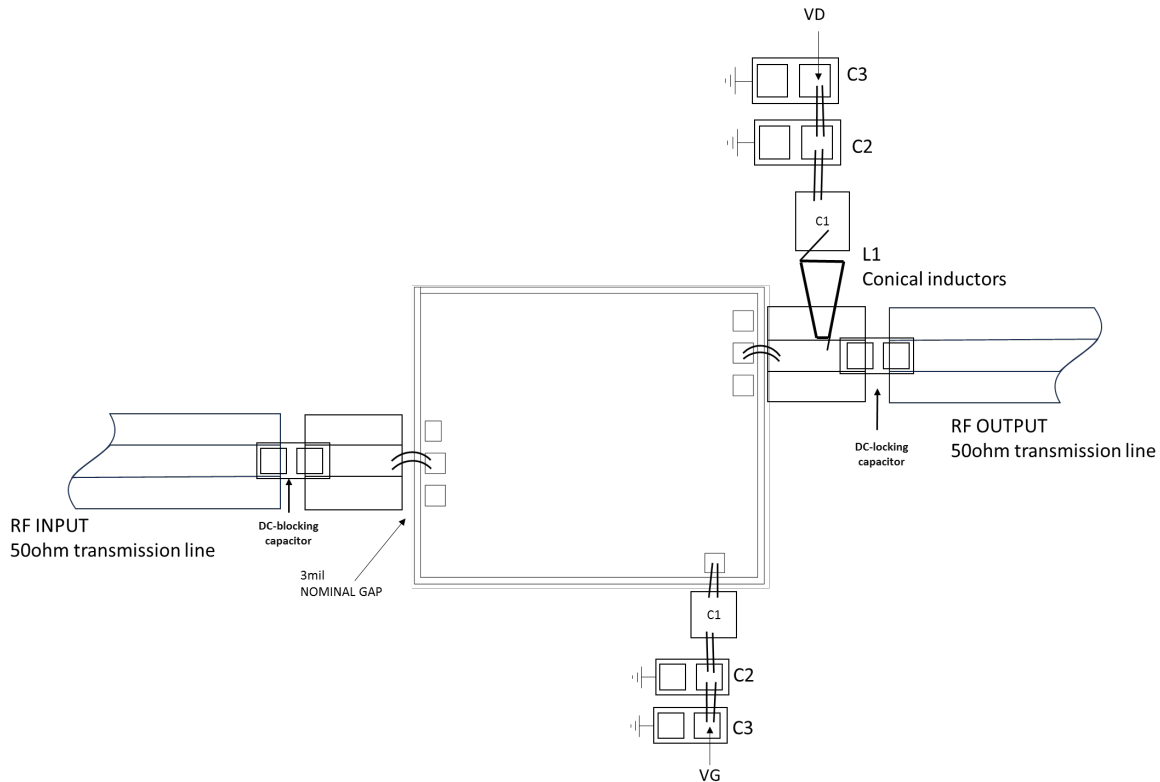


Notes:

1. Die thickness: 50 μm
2. VG1 bond pad is 92*92 μm^2
3. RF IN/OUT bond pad is 95*95 μm^2
4. Bond pad metalization: Gold
5. Backside metalization: Gold

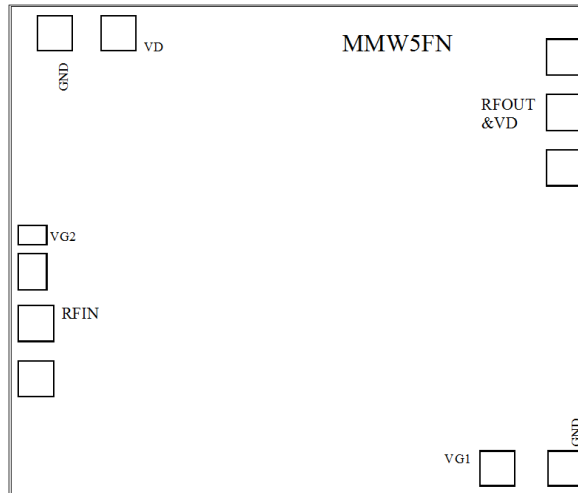


Assembly Drawing



Item	Description	Item	Description
DC-blocking capacitor	0.1 μ F Example: Passiveplus Part: 0402BB104KW500	C3	4.7 μ F Example: TDK Part: C1608X5R1A475K080AC (0603)
C1	100pF Example: Skyworks Part: SC10002430	L1	2.0 μ H Example: Atceramics Part:506WLC2R0KG250B
C2	0.01 μ F Example: TDK Part: C1005X7R1H103K050BB (0402)		

No.	Mnemonic	Description
1	RF IN	Signal input terminal, connected to 50 Ω circuit; blocking capacitor required.
2	RF OUT	Signal output terminal, connected to 50 Ω circuit; blocking capacitor required; external DC biasing network required; drain current provided.
3	VD	Drain Biases for the Amplifier. External bypass capacitors of 4.7 μ f and 0.01 μ f and 100 pf are required for these pads.
4	VG1	Amplifier Gate Controls. External bypass capacitors of 4.7 μ f and 0.01 μ f and 100 pf are required for these pads. ESD protection diodes are included and turn on below -4V.
5	VG2	N/A
6	Die Bottom	Die bottom must be connected to RF and dc ground.



Biassing and Operation

Turn ON procedure:

1. Connect GND to RF and dc ground.
2. Set the gate bias voltages, VG1 to -4V.
3. Set the drain bias voltages VD to +4.5V .
4. Increase the gate bias voltages to achieve a quiescent supply current of 80mA.
5. Apply RF signal.

Turn OFF procedure:

1. Turn off the RF signal.
2. Decrease the gate bias voltages, VG1 to -4V to achieve a $I_{DQ} = 0$ mA (approximately).
3. Decrease the drain bias voltages to 0 V.
4. Increase the all gate bias voltages to 0 V.

Miller MMIC Inc. All rights reserved

Miller MMIC, Inc. holds exclusive rights to the information presented in its Data Sheet and any accompanying materials. As a premier supplier of cutting-edge RF solutions, Miller MMIC has made this information easily accessible to its clients.

Although Miller MMIC believes the information provided in its Data Sheet to be trustworthy, the company does not offer any guarantees as to its accuracy. Therefore, Miller MMIC bears no responsibility for the use of this information. It is worth mentioning that the information within the Data Sheet may be altered without prior notification.

Customers are encouraged to obtain and verify the most recent and pertinent information before placing any orders for Miller MMIC products. The information in the Data Sheet does not confer, either explicitly or implicitly, any rights or licenses with regards to patents or other forms of intellectual property to any third party.

The information provided in the Data Sheet, or its utilization, does not bestow any patent rights, licenses, or other forms of intellectual property rights to any individual or entity, whether in regards to the information itself or anything described by such information. Furthermore, Miller MMIC products are not intended for use as critical components in applications where failure could result in severe injury or death, such as medical or life-saving equipment, or life-sustaining applications, or in any situation where failure could cause serious personal injury or death.