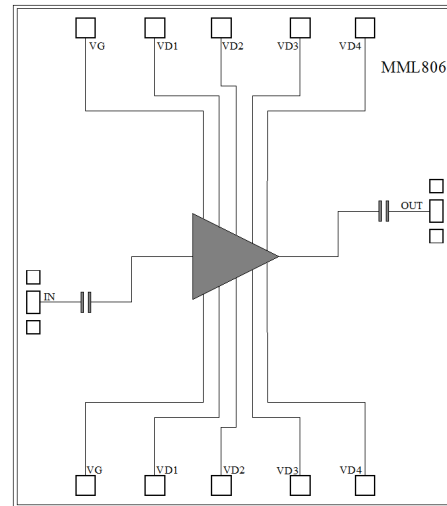


**Features**

- Frequency: 45-90GHz
- Small Signal Gain: 15dB Typical
- Gain Flatness:  $\pm 2.0$ dB Typical
- Noise Figure: 5.5dB Typical
- P1dB: 12dBm Typical
- Power Supply:  
VD=+4V@71mA, VG=-0.5V
- Input/Output: 50 $\Omega$
- Chip Size: 1.766 x 2.0 x 0.05mm

**Typical Applications**

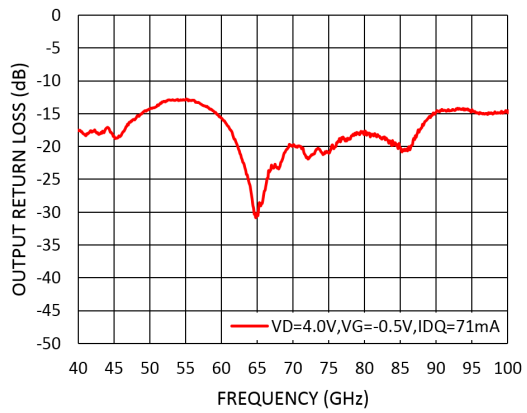
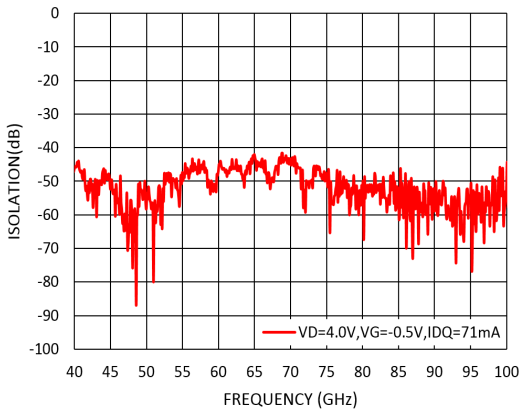
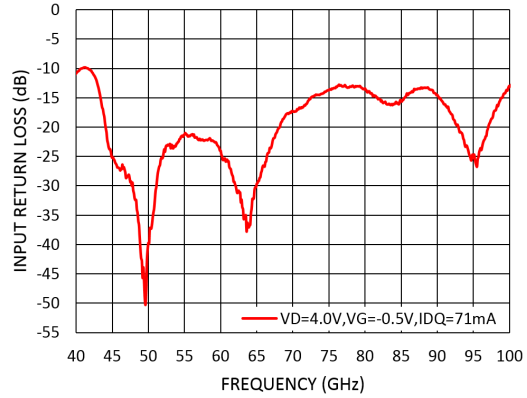
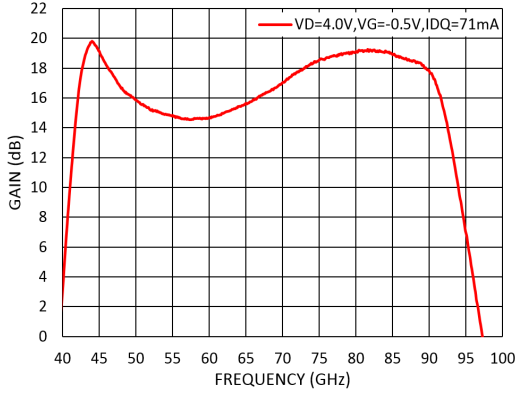
- Test Instrumentation
- Microwave Radio & VSAT
- Military & Space
- Telecom Infrastructure
- Fiber Optics

**Functional Block Diagram**

**Electrical Specifications**
**TA = +25°C, VD = +4V, VG=-0.5V, IDD = 71mA Typical**

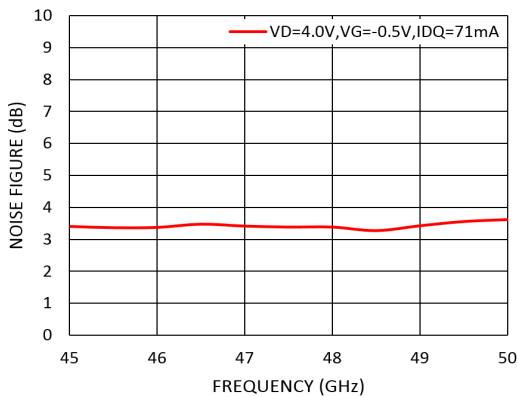
Parameters	Min.	Typ.	Max.	Min.	Typ.	Max.	Units
Frequency	45-70			70-90			GHz
Small Signal Gain	14	14.5		16	18		dB
Gain Flatness		$\pm 1.0$			$\pm 1.0$		dB
Noise Figure		5.5			6.5		dB
P1dB - Output 1dB Compression		11			13		dBm
Psat - Saturated Output Power		13			16		dBm
OIP3 - Output Third Order Intercept		20			22		dBm
Input Return Loss		-18			-13		dB
Output Return Loss		-13			-18		dB



### Measurement Plots: S-parameters



### Measurement Plots: Noise Figure



**Absolute Maximum Ratings**

Drain Bias Voltage (VD)	+4.5V
Gate Bias Voltage (VG)	-2V to 0V
RF Input Power (RFIN)@(+4V)	+15dBm
Channel Temperature	175°C
Continuous P <sub>diss</sub> (T = 85 °C) (derate 3.9mW/°C above 85 °C)	0.35W
Thermal Resistance (channel to die bottom)	66°C/W
Operating Temperature	-55°C to +85 °C
Storage Temperature	-65°C to +150 °C

**Typical Supply Current vs. VD,VG**

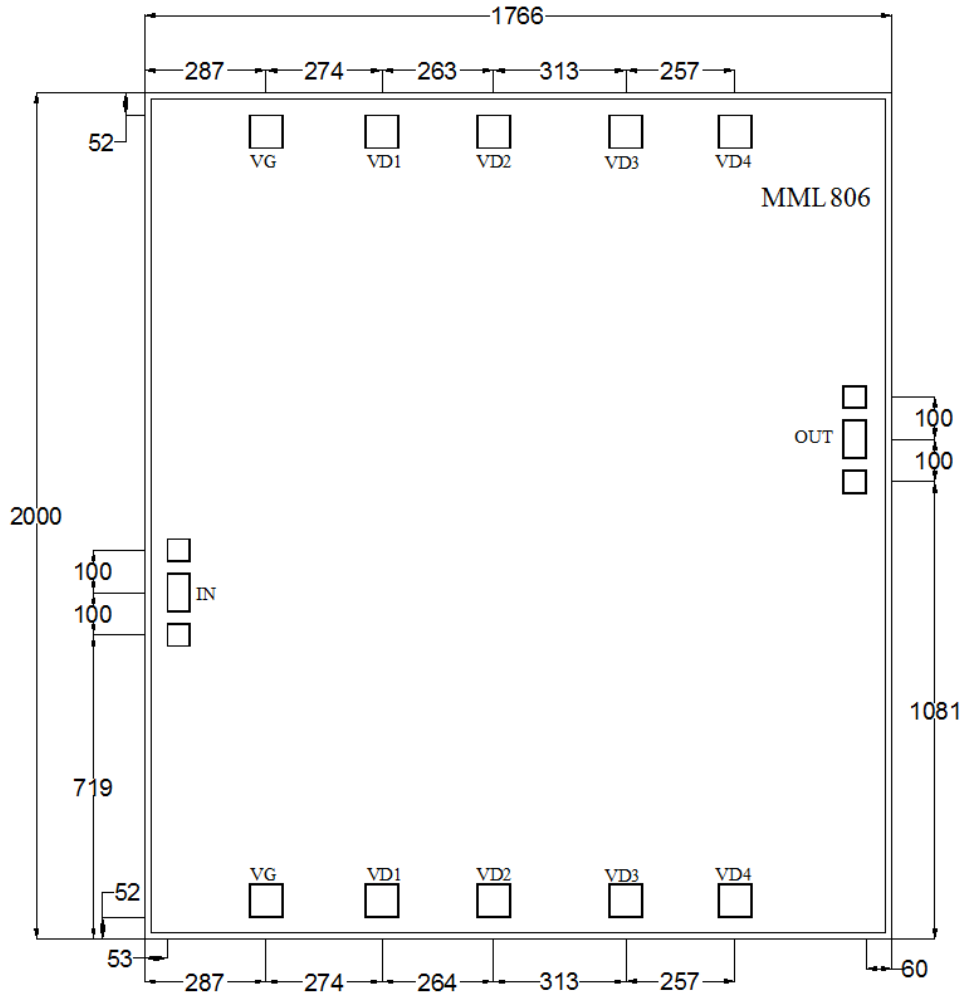
VD (V)	VG (V)	IDD (mA)
+4	-0.5	71



ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS



**Outline Drawing:**  
All Dimensions in  $\mu\text{m}$

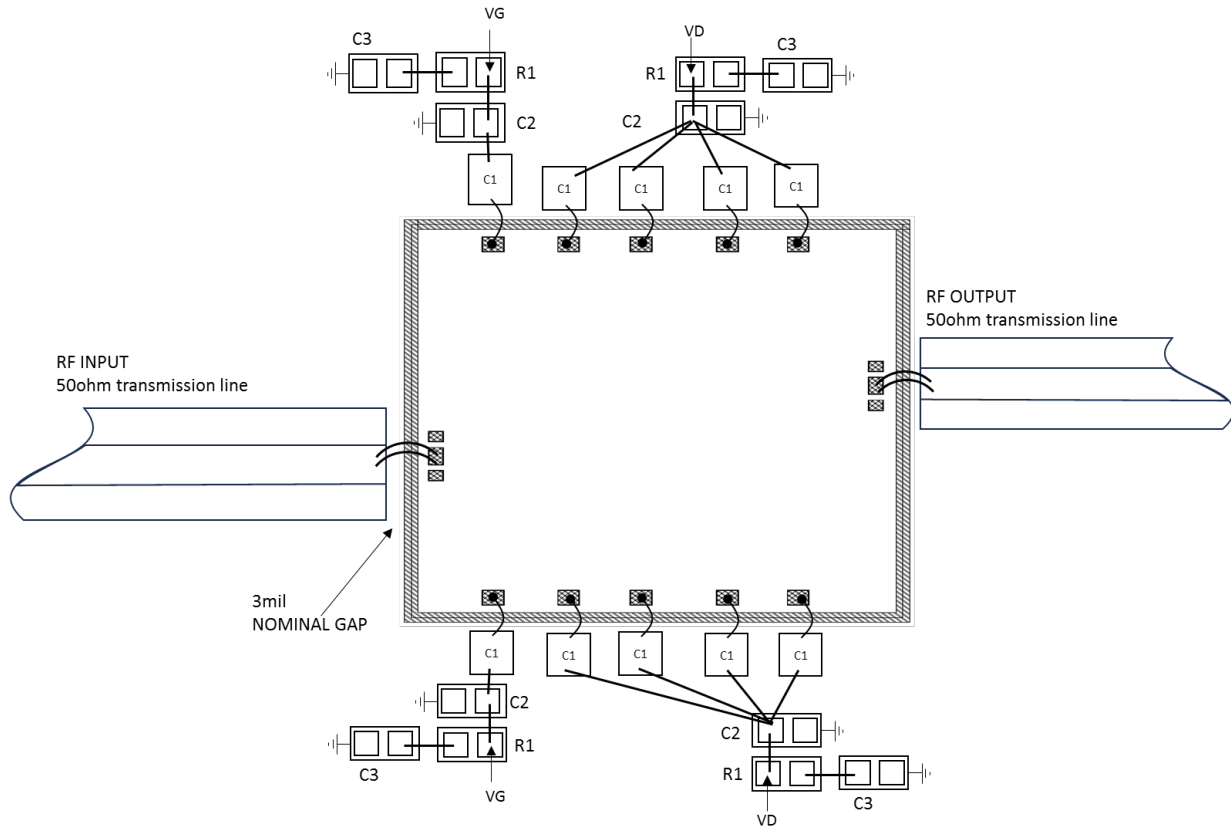


**Notes:**

1. Die thickness: 50 $\mu\text{m}$
2. VD bond pad is 75\*75 $\mu\text{m}^2$
3. VG bond pad is 75\*75 $\mu\text{m}^2$
4. RF IN/OUT bond pad is 50\*86 $\mu\text{m}^2$
5. Bond pad metalization: Gold
6. Backside metalization: Gold

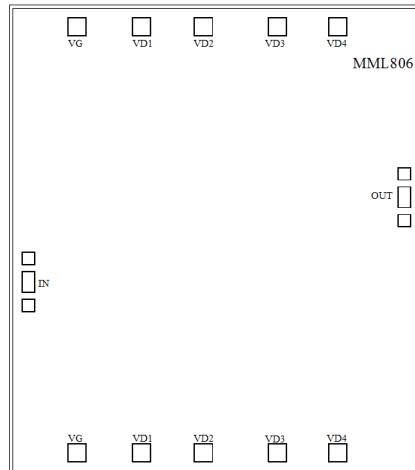


### Assembly Drawing



Item	Description
C1	100pF Example: Presidio Part: MVB3030X103M2H5C1
C2	0.01μF Example: TDK Part: C1005X7R1H103K050BB (0402)
C3	0.1μF Example: Murata Electronics Part: GRM033Z71C104KE14D (0201)
R1	10Ω Example: Yageo Part: RC0201FR-0710RP

No	Function	Description
1	RF IN	RF signal input terminal; no blocking capacitor required.
2	RF OUT	RF signal output terminal; no blocking capacitor required.
3	VD	Drain Biases for the Amplifier.
4	VG	Gate Biases for the Amplifier.
5	Die Bottom	Die bottom must be connected to RF and dc ground.



## Biasing and Operation

### Turn ON procedure:

1. Connect GND to RF and dc ground.
2. Set the gate bias voltages, VG to -2V.
3. Set the drain bias voltages VD to +4V .
4. Increase the gate bias voltages to achieve a quiescent supply current of 71 mA.
5. Apply RF signal.

### Turn OFF procedure:

1. Turn off the RF signal.
2. Decrease the gate bias voltages, VG to -2V 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.