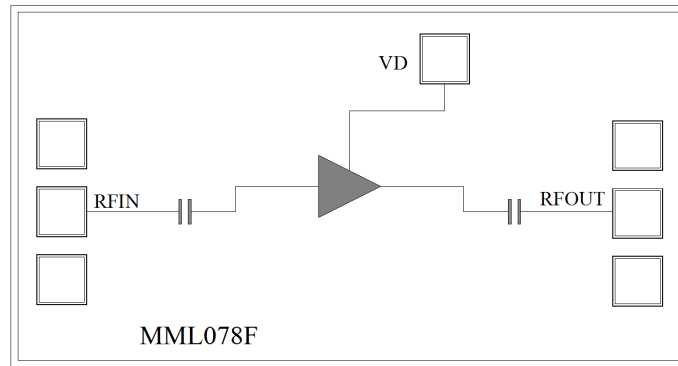




### Features

- Single Biasing Voltage (Self Biased)
- Ultra Low Current 16mA
- Frequency: 20-44GHz
- Small Signal Gain: 15dB Typical
- Gain Flatness:  $\pm 2.0$ dB Typical
- Noise Figure: 2.0dB Typical
- P1dB: 6.0dBm Typical
- Power Supply: +5V@16mA
- Input/Output: 50 $\Omega$
- Chip Size: 1.5 x 0.8 x 0.1mm

### Functional Block Diagram



### Typical Applications

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

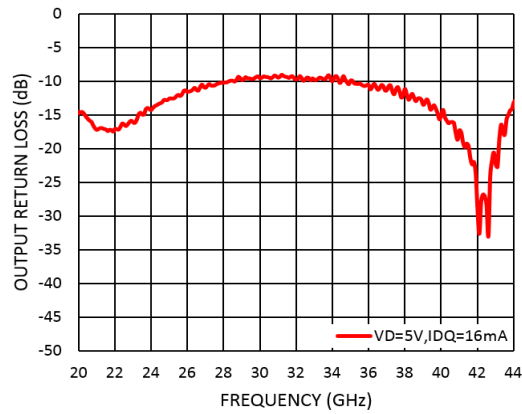
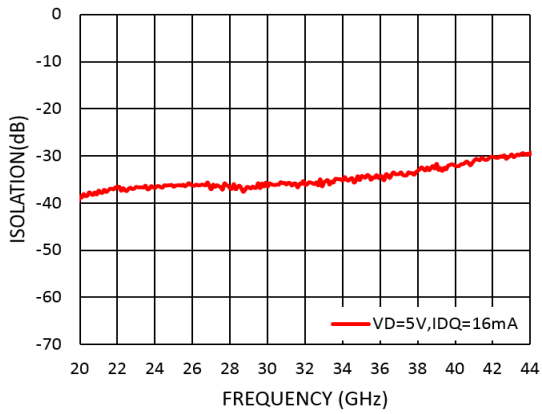
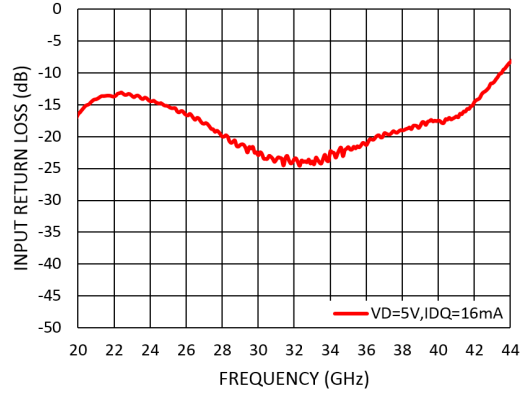
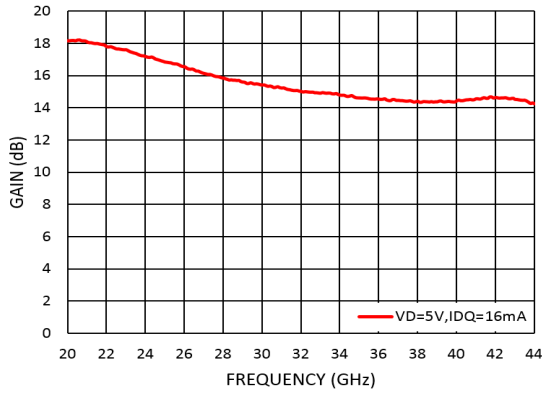
### Electrical Specifications

TA = +25°C, VD = +5V, IDD = 16mA Typical

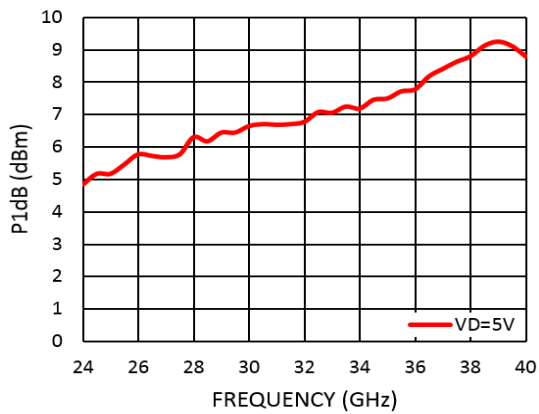
Parameters	Min.	Typ.	Max.	Units
Frequency	20		44	GHz
Small Signal Gain	13.5	15		dB
Gain Flatness		$\pm 2.0$		dB
Noise Figure		1.8	3.0	dB
P1dB - Output 1dB Compression	4	6		dBm
Psat - Saturated Output Power		8		dBm
OIP3 - Output Third Order Intercept		16		dBm
Input Return Loss		-12		dB
Output Return Loss		-10		dB



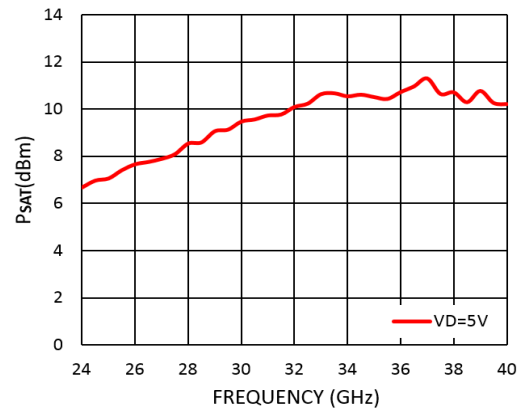
### Measurement Plots: S-parameters

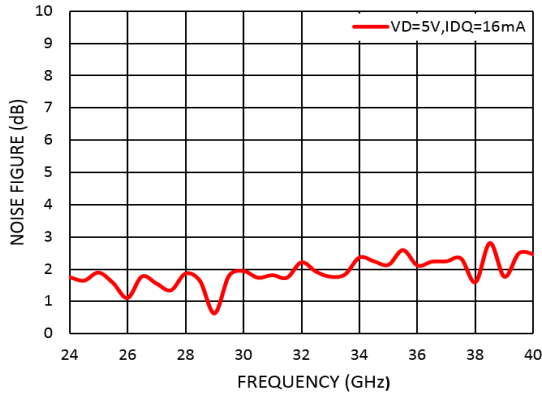


### Measurement Plots: P1dB



### Measurement Plots: PSAT



**Measurement Plots: Noise Figure**

**Absolute Maximum Ratings**

Drain Bias Voltage (VD)	<b>+7V</b>
RF Input Power (RFIN)@(+5V)	<b>+10dBm</b>
Channel Temperature	<b>175°C</b>
Continuous P <sub>diss</sub> (T = 85 °C) (derate 1.6mW/°C above 85 °C)	<b>0.14W</b>
Thermal Resistance (channel to die bottom)	<b>60°C/W</b>
Operating Temperature	<b>-55°C to +85 °C</b>
Storage Temperature	<b>-65°C to +150 °C</b>

**Typical Supply Current vs. VD**

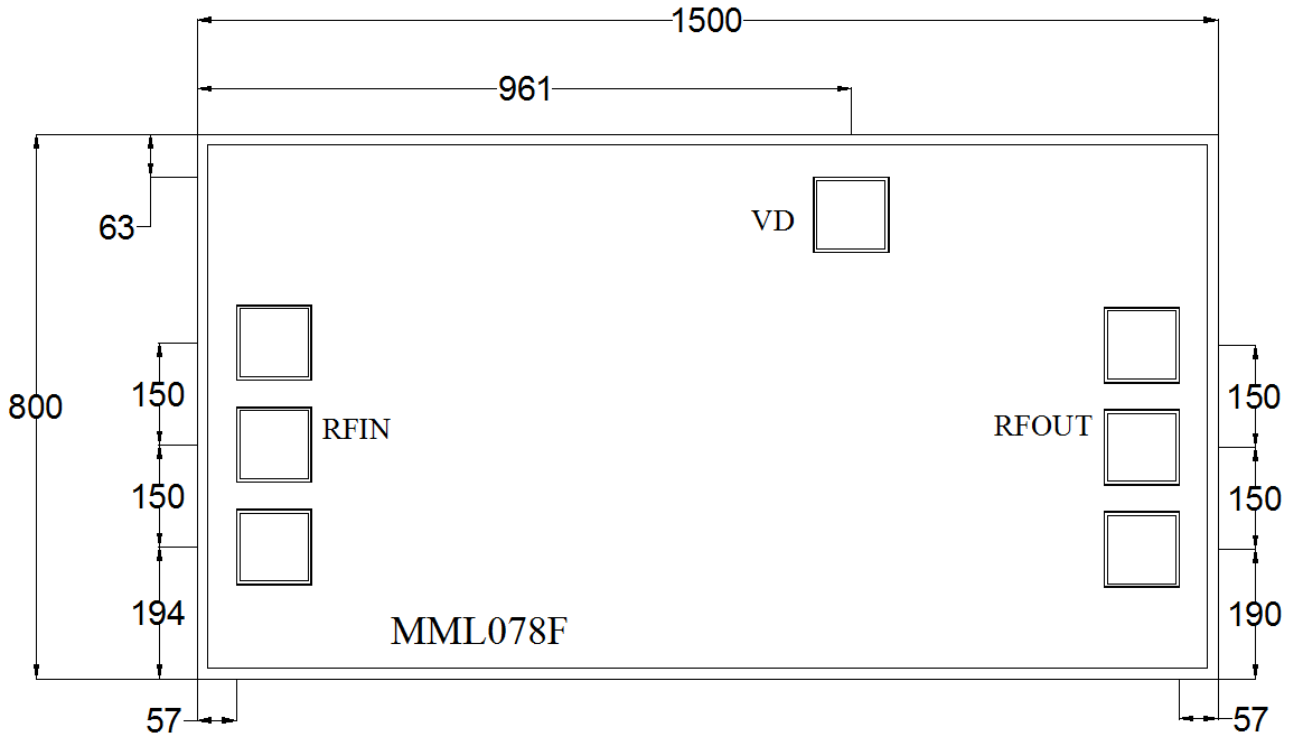
VD (V)	IDD (mA)
<b>+5</b>	<b>16</b>



**ELECTROSTATIC SENSITIVE DEVICE  
OBSERVE HANDLING PRECAUTIONS**



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



**Notes:**

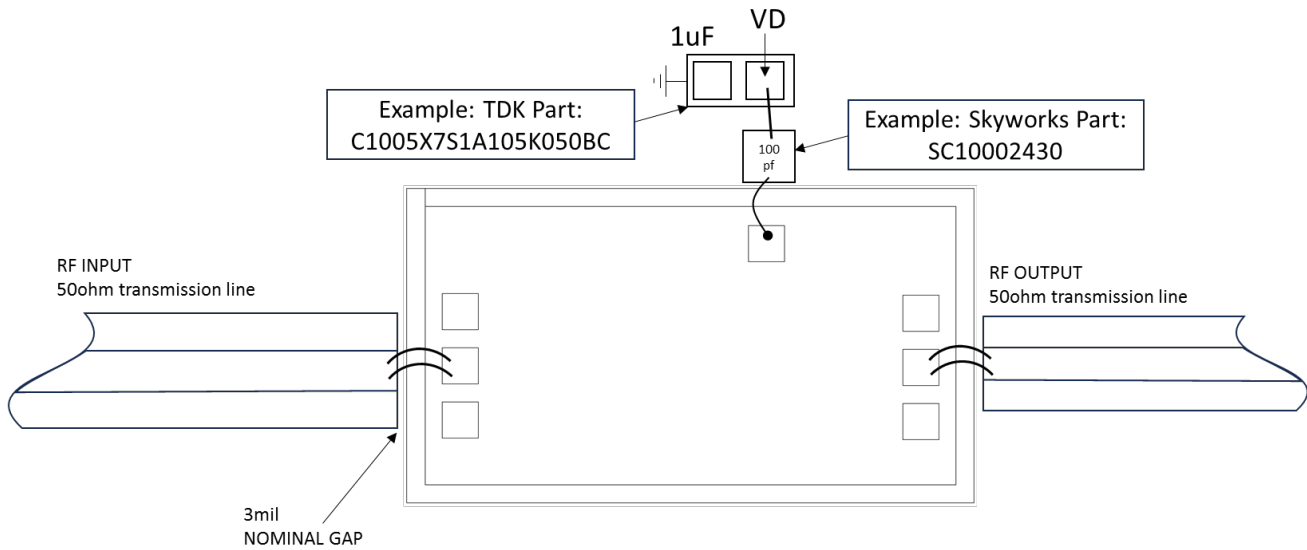
1. Die thickness: 100 $\mu\text{m}$
2. DC bond pad is 100\*100 $\mu\text{m}^2$
3. RF IN/OUT bond pad is 100\*100 $\mu\text{m}^2$
4. Bond pad metalization: Gold
5. Backside metalization: Gold



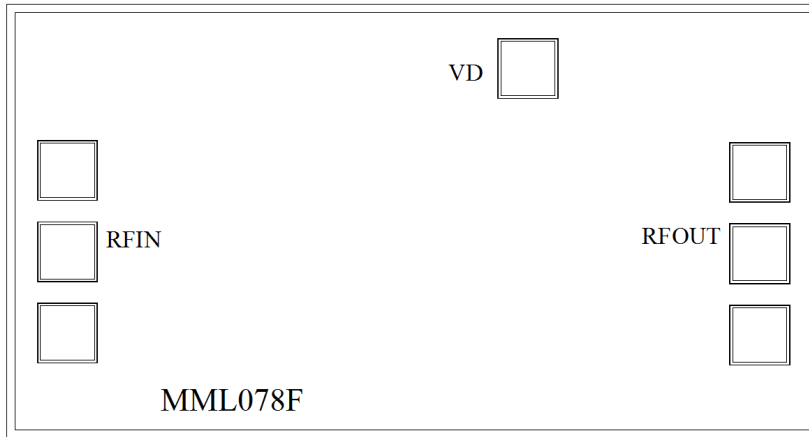
## Assembly Drawing

MML078F

GaAs Low Noise Amplifier MMIC 20 - 44GHz



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. External bypass capacitors of 1μf and 100pf are required for these pads.
4	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. Apply positive drain voltage  $V_D$  and set to +5V .
3. Apply RF signal.

### Turn OFF procedure:

1. Turn off the RF signal.
2. Turn off the positive drain voltage  $V_D$ .

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