

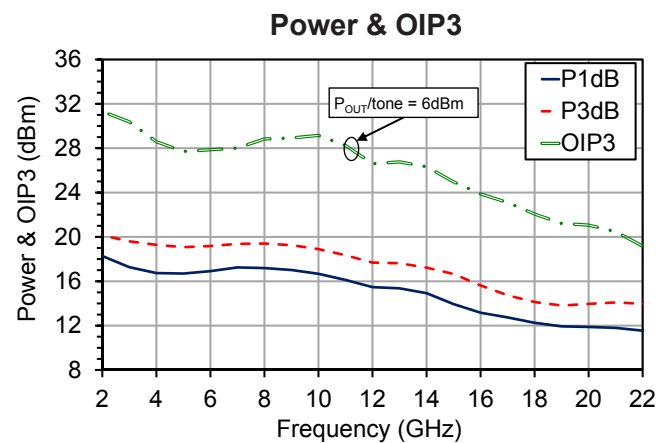
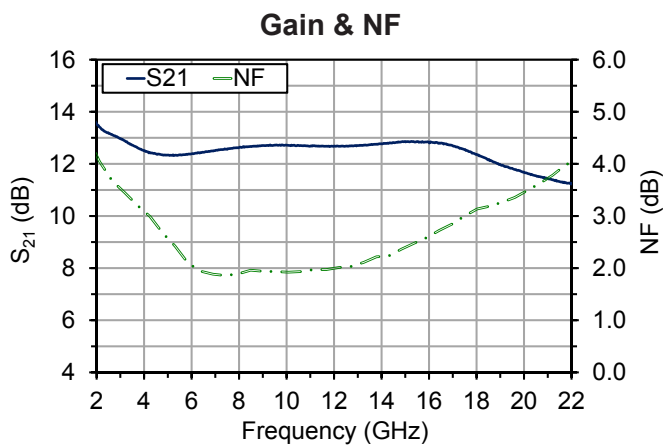
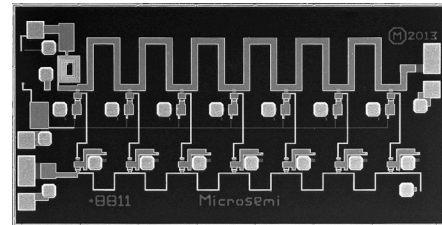
## 2-20GHz, 12.5dB Gain Low-Noise Wideband Distributed Amplifier

### Features

- >16.5dBm  $P_{1dB}$  with 1.9dB NF and 12.5dB gain at 10GHz
- <2dB NF from 6-12GHz
- Single supply voltage of +8V @ 50mA
- Input and Output matched to 50Ω
- 1.5mm x 2.82mm x 0.1mm die size

### Applications

- Instrumentation
- Electronic warfare
- Microwave communications
- Radar



**Typical Performance (CW, Typical Device, RF Probe):**  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 8\text{V}$

Parameter	Min	Typ	Max	Units
Frequency	2	-	22	GHz
Small Signal Gain	11.3	-	13.5	dB
Noise Figure	1.9	2.5	4.0	dB
Output Power, $P_{1dB}$	12	14	18	dBm
Output Power, $P_{3dB}$	14	18	20	dBm
Output IP3	19	26	31	dBm
Drain Current		50		mA

**Table 1: Absolute Maximum Ratings, Not Simultaneous**

Parameter	Rating	Units
Drain Voltage ( $V_D$ )	+9	V
Input Power ( $P_{IN}$ )	24	dBm
Channel Temperature ( $T_C$ )	150 <sup>1</sup>	°C
Operating Ambient Temperature ( $T_A$ )	-55 to +85	°C
Storage Temperature	-65 to +150	°C
Thermal Resistance, Channel to Die Backside	40	°C/W

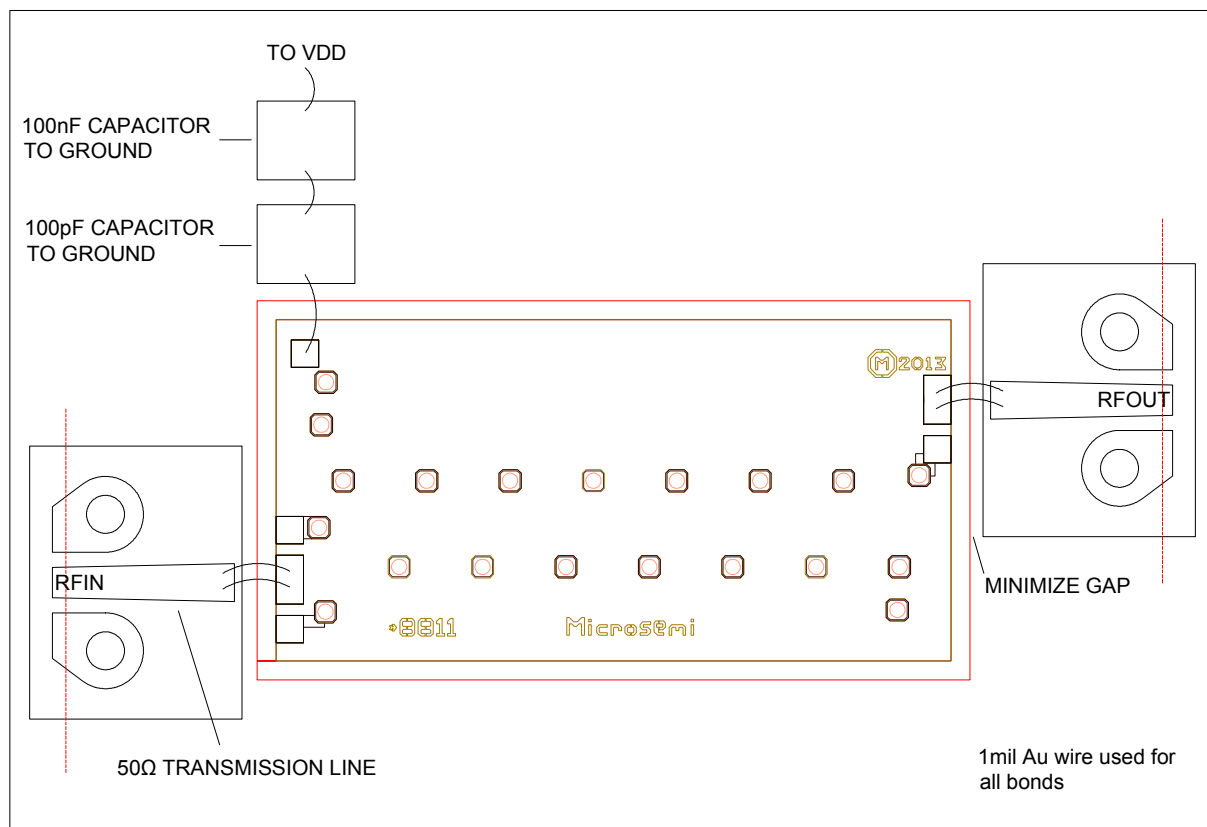
<sup>1</sup> MTTF > 10<sup>8</sup> hours at  $T_C = 150^\circ\text{C}$ 


Caution, ESD Sensitive Device

**Table 2: Specifications (CW, 100% Test):  $T_A = 25^\circ\text{C}$ ,  $V_{DD} = 8\text{V}$** 

Parameter		Min	Max	Units
$I_{DD}$	-	-	105	mA
Small Signal Gain	20GHz	9.5	-	dB
Output Power, $P_{1dB}$	20GHz	9.0	-	dBm

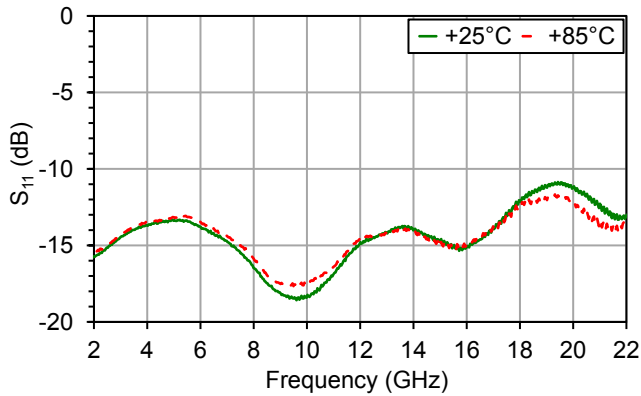
## RF Probe Measurement Set-Up With Reference Planes<sup>2</sup>


<sup>2</sup> Reference planes are the same for S-parameter files downloadable on [www.microsemi.com/mmics](http://www.microsemi.com/mmics)

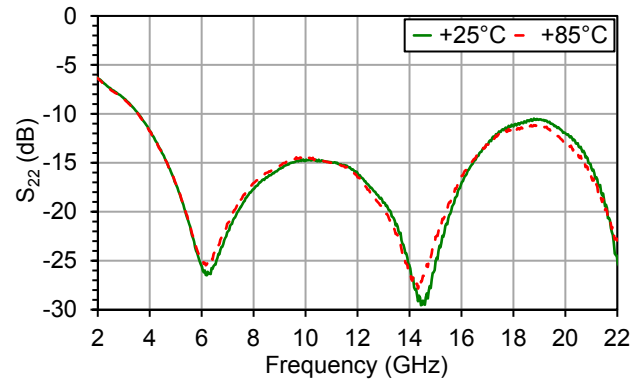
## Typical Performance, RF Probe

$V_{DD} = 8V$ ,  $I_{DD} = 50mA$ ,  $T_A = 25^\circ C$  unless otherwise noted

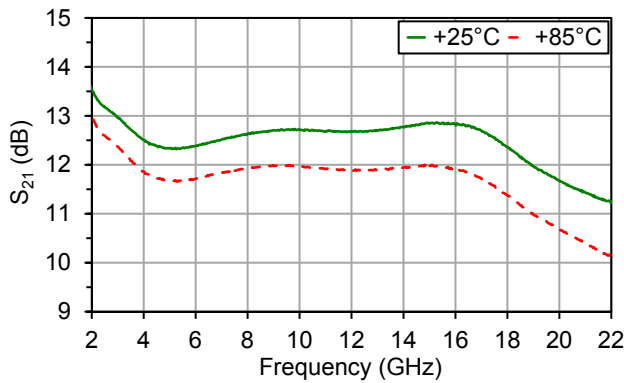
### $S_{11}$ Over Temperature



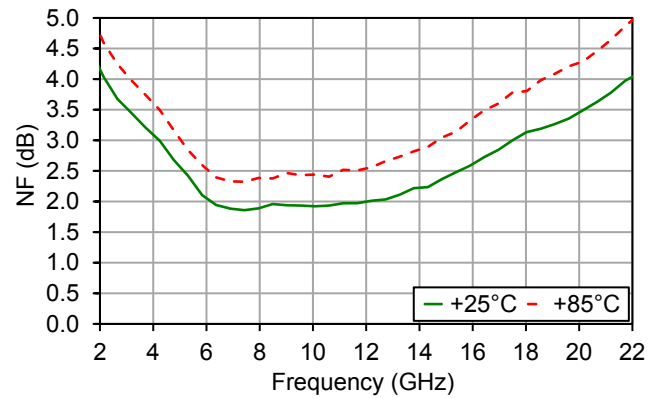
### $S_{22}$ Over Temperature



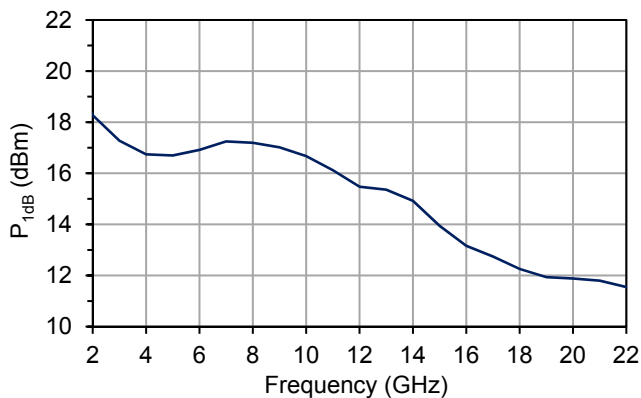
### $S_{21}$ Over Temperature



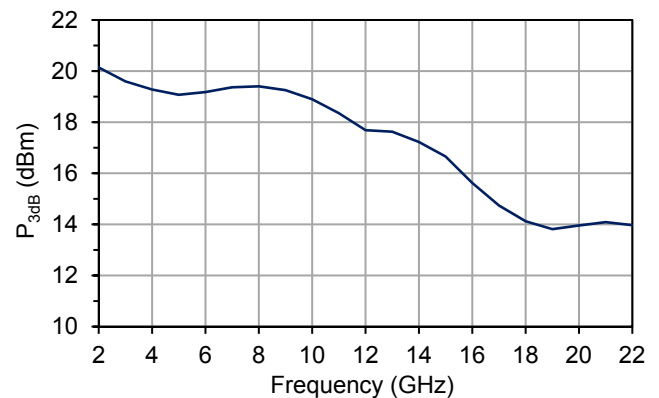
### NF Over Temperature



### $P_{1dB}$ Over Frequency



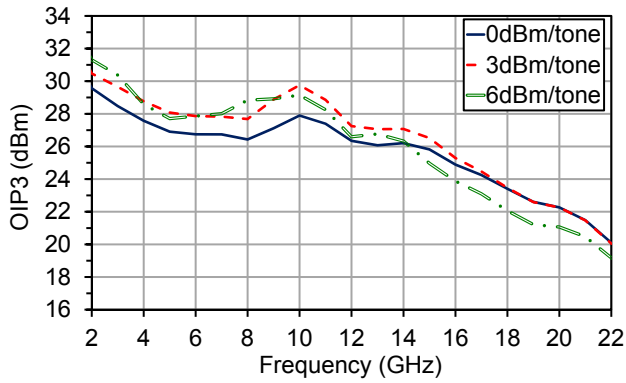
### $P_{3dB}$ Over Frequency



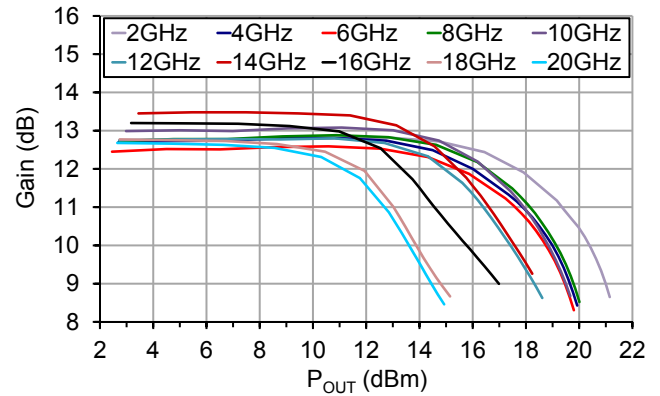
## Typical Performance, RF Probe

$V_{DD} = 8V, I_{DD} = 50mA, T_A = 25^\circ C$  unless otherwise noted

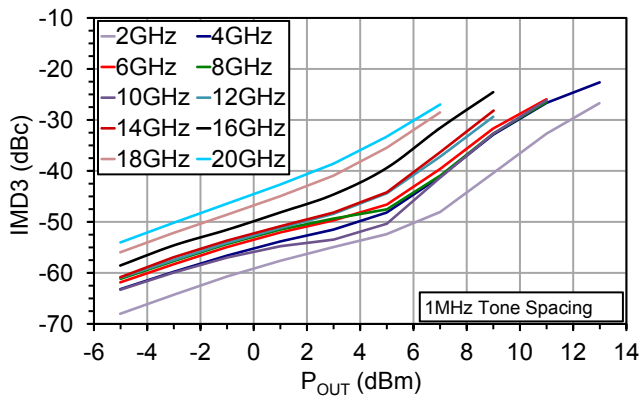
**OIP3 Over  $P_{OUT}$**



**Power Sweep**

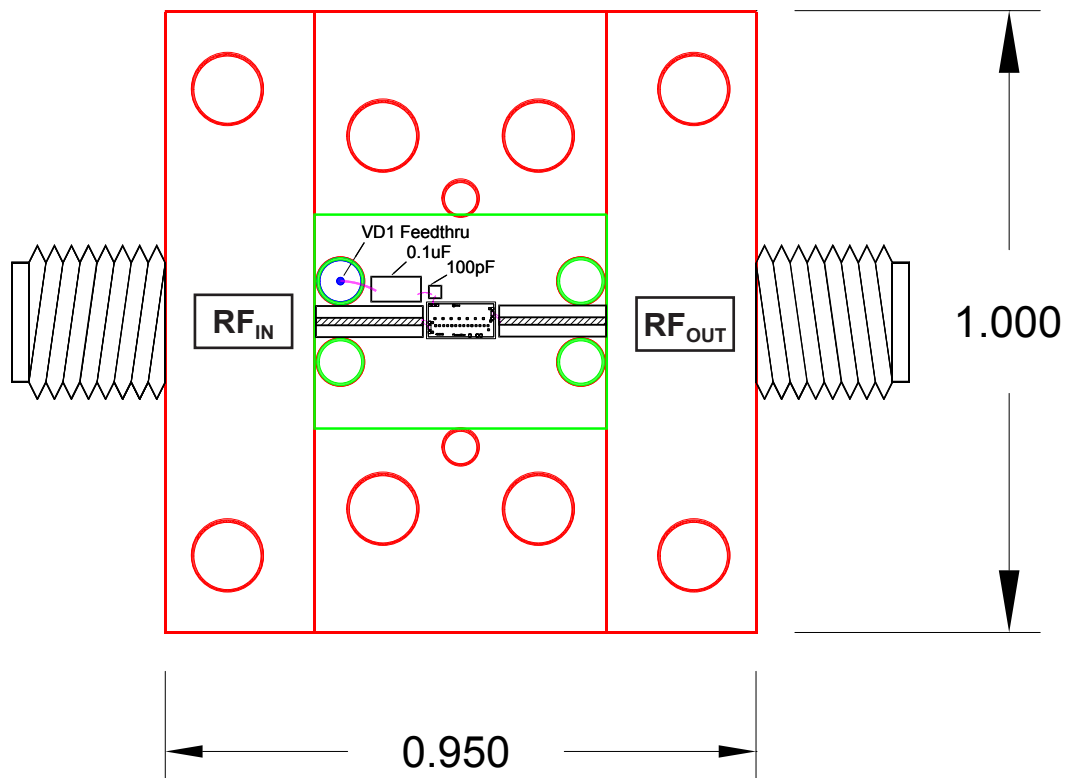


**IMD3 Sweep**



## Connectorized Test Fixture

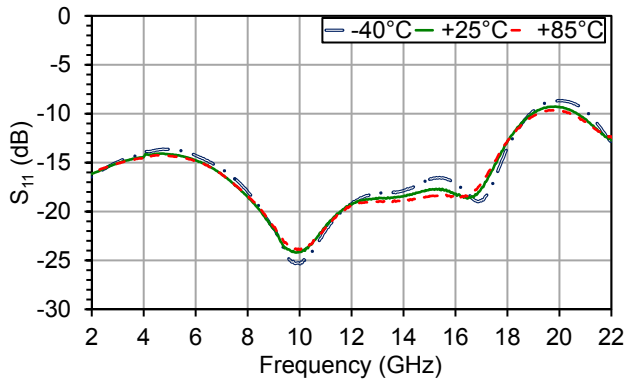
With SMK 2.92mm Connectors



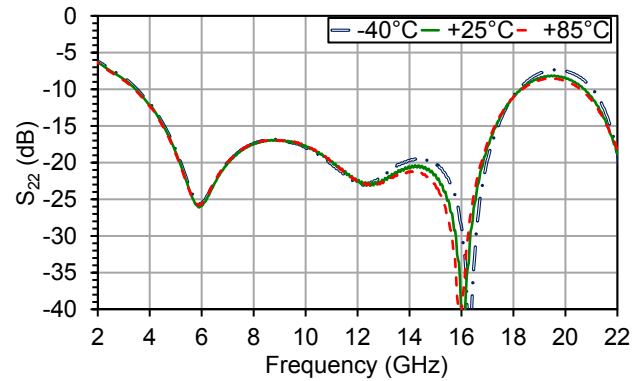
## Typical Performance, Connectorized Test Fixture

$V_{DD} = 8V$ ,  $I_{DD} = 50mA$ ,  $T_A = 25^\circ C$  unless otherwise noted

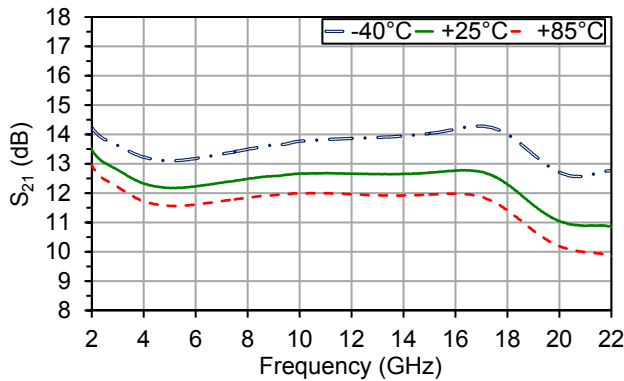
### $S_{11}$ Over Temperature



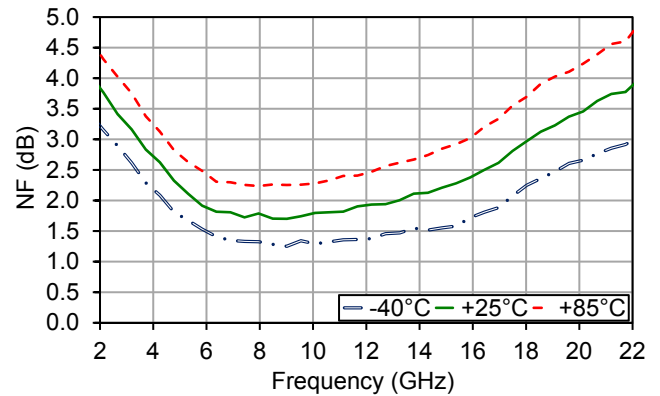
### $S_{22}$ Over Temperature



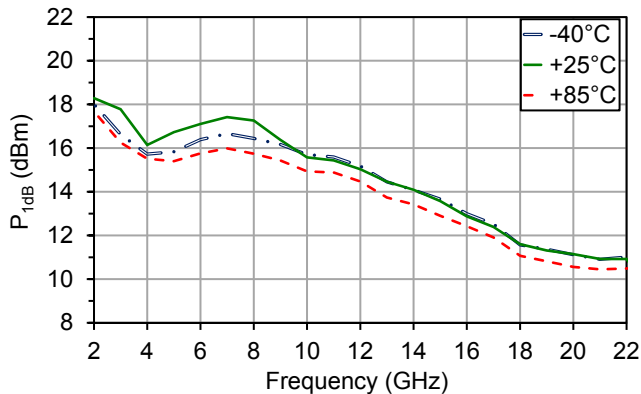
### $S_{21}$ Over Temperature



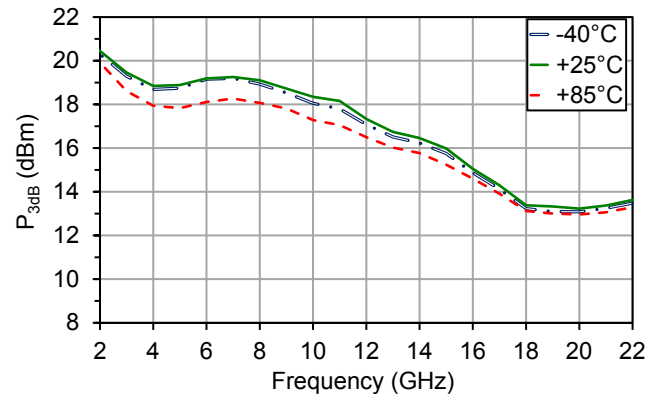
### NF Over Temperature



### $P_{1dB}$ Over Temperature



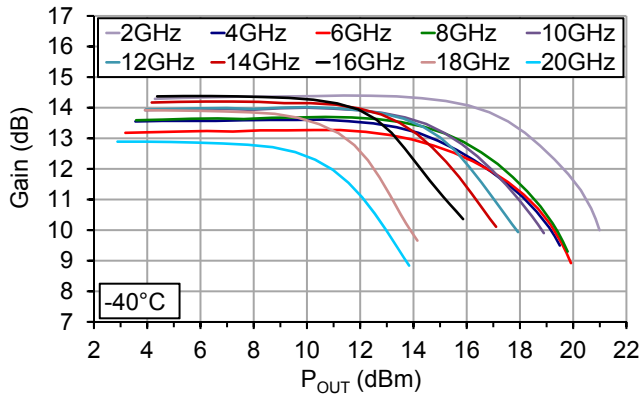
### $P_{3dB}$ Over Temperature



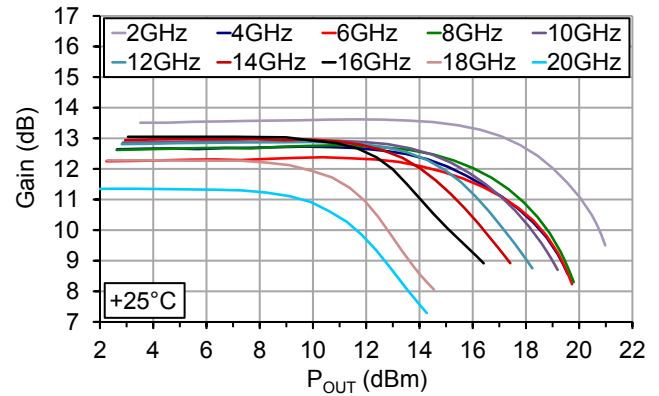
# Typical Performance, Connectorized Test Fixture

$V_{DD} = 8V, I_{DD} = 50mA, T_A = 25^\circ C$  unless otherwise noted

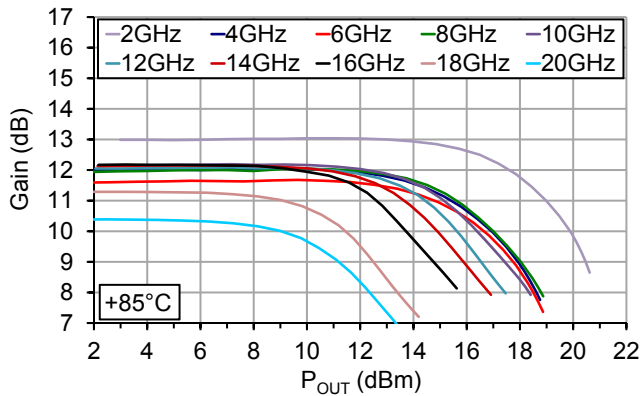
**Power Sweep, -40°C**



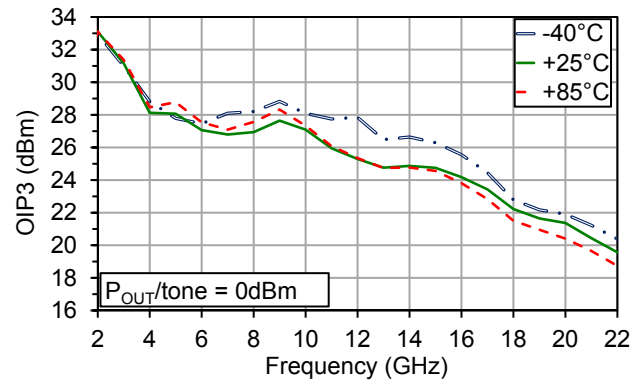
**Power Sweep, +25°C**



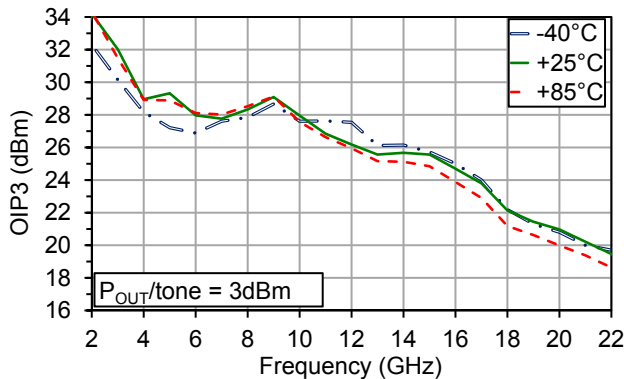
**Power Sweep, +85°C**



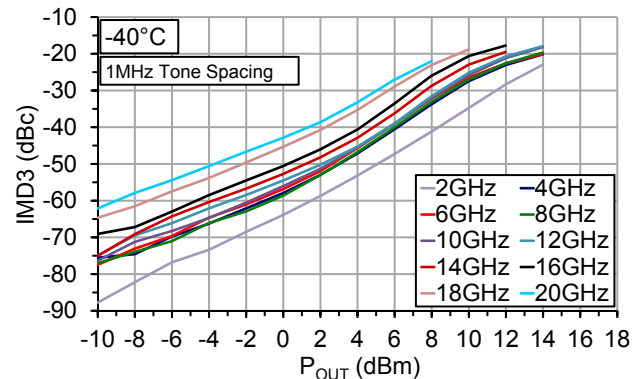
**OIP3, 0dBm/tone**



**OIP3, 3dBm/tone**



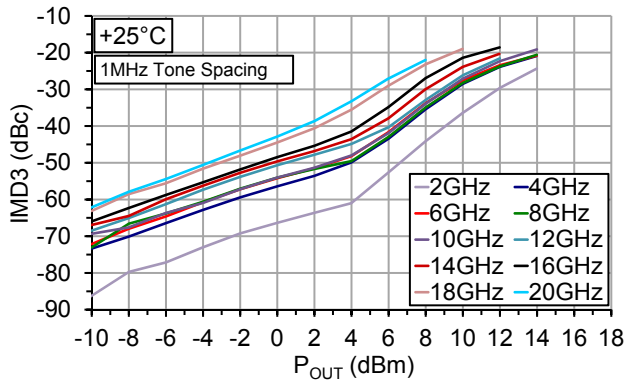
**IMD3 Sweep, -40°C**



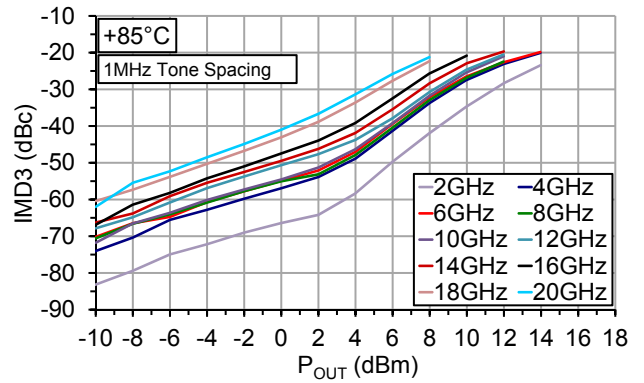
## Typical Performance, Connectorized Test Fixture

$V_{DD} = 8V$ ,  $I_{DD} = 50mA$ ,  $T_A = 25^\circ C$  unless otherwise noted

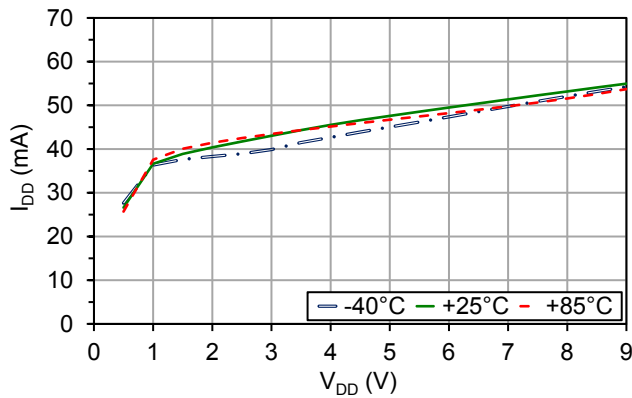
**IMD3 Sweep, +25°C, 1MHz Tone Spacing**



**IMD3 Sweep, +85°C, 1MHz Tone Spacing**



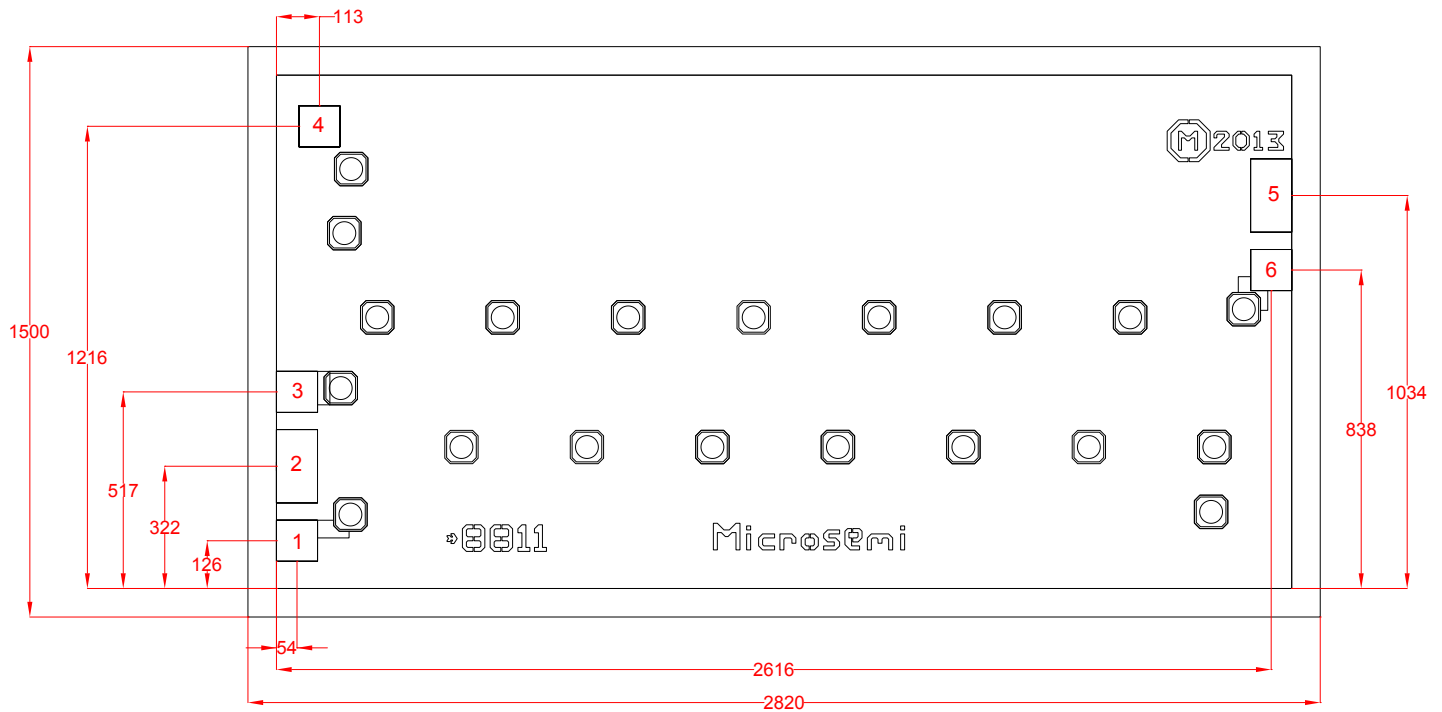
**DC**





**Chip layout showing pad locations.**

All dimensions are in microns. Die thickness is 100 microns. Backside metal is gold, bond pad metal is gold. Refer to Die Handling Application Note MM-APP-0001 (visit [www.microsemi.com/mmics](http://www.microsemi.com/mmics)).


**Table 3: Pad Descriptions**

Pad #	Description	Pad Dimensions ( $\mu\text{m}$ )
1, 3, 6	Ground	100 x 100
2	$\text{RF}_{\text{IN}}$ , AC Coupled	100 x 190
5	$\text{RF}_{\text{OUT}}$ , AC Coupled	100 x 190
4	$V_{\text{DD}}$	100 x 100

**Biasing**

MMA003AA is a self-biased device with single positive supply. Apply  $V_{\text{DD}}$  to pad 4.

---

Information contained in this document is proprietary to Microsemi. This document may not be modified in any way without the express written consent of Microsemi. Product processing does not necessarily include testing of all parameters. Microsemi reserves the right to change the configuration and performance of the product and to discontinue product at any time.

---

**Microsemi Corporate Headquarters**

One Enterprise, Aliso Viejo CA 92656 USA  
Within the USA: +1 (949) 380-6100  
Sales: +1 (949) 380-6136  
Fax: +1 (949) 215-4996

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for communications, defense and security, aerospace, and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs, and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; security technologies and scalable anti-tamper products; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, Calif. and has approximately 3,400 employees globally. Learn more at [www.microsemi.com](http://www.microsemi.com).

---

© 2014 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.