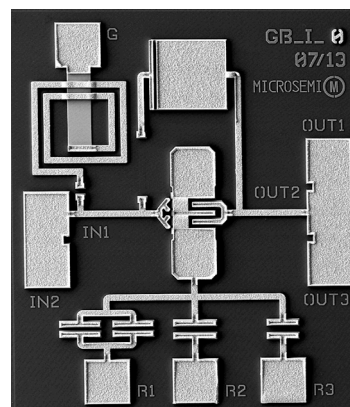


DC-14GHz, Power-Selectable Wideband Amplifier

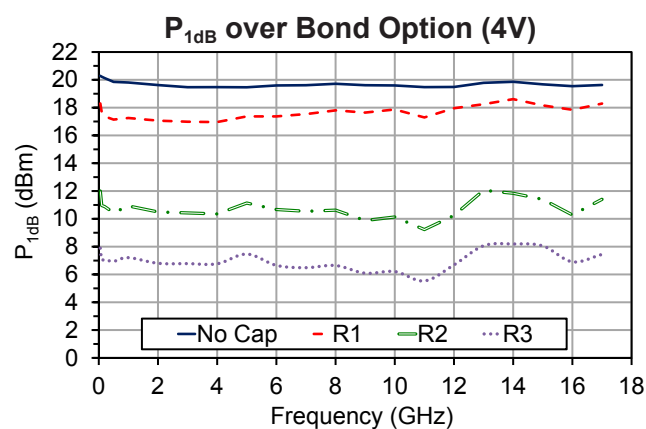
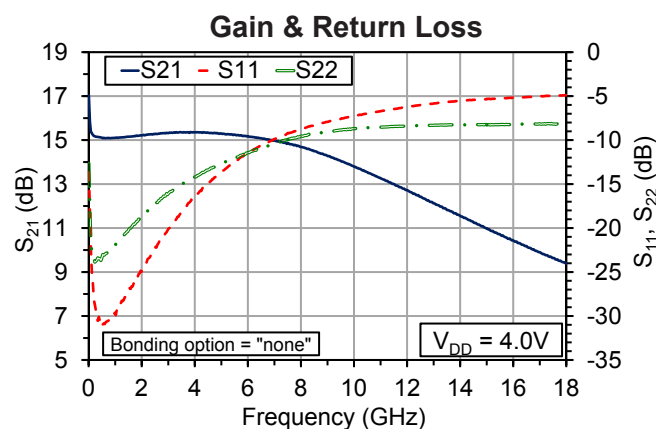
Features

- Power-selectable from 7 to 19dBm P_{1dB} and 15-21dBm P_{3dB} by choosing bond option
- $< \pm 0.5$ dB P_{1dB} flatness across the band
- Gain varies < 1 dB from -40°C to $+85^{\circ}\text{C}$
- Gain of 11-15dB and ~ 29 dBm OIP3 at the highest power option
- Self-biased with single positive supply
- Input and Output matched to 50Ω
- 0.76mm x 0.66mm x 0.1mm die size



Applications

- Instrumentation
- Electronic warfare
- Microwave communications
- Radar



RF Specifications (CW, Typical Device, RF Probe): $T_A = 25^{\circ}\text{C}$, $V_{DD} = 4V^1$

Bond Option	ID	Gain	P_{1dB}	OIP3
None	80	14	19	29
R1 to Ground	45	13	17	27
R2 to Ground	24	11	11	21
R3 to Ground	15	10	7	17

¹ Device is intended for small-signal applications only

Table 1: Absolute Maximum Ratings, Not Simultaneous

Parameter	Value	Units
Drain Voltage (V_{DD})	+4.5	V
Input Power (P_{IN})	+19	dBm
Operating Channel Temperature	175 ²	°C
Operating Ambient Temperature (T_A)	-55 to +85	°C
Storage Temperature	-65 to 150	°C
Thermal Resistance, Channel to Die Backside	175	°C/W



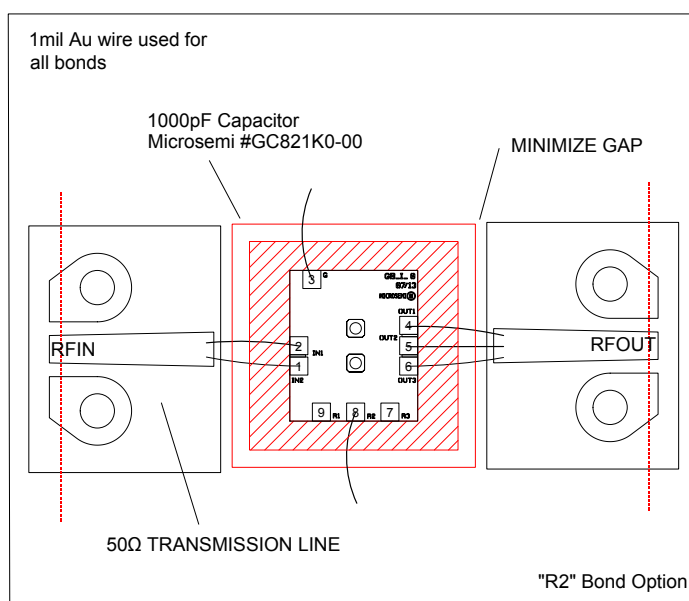
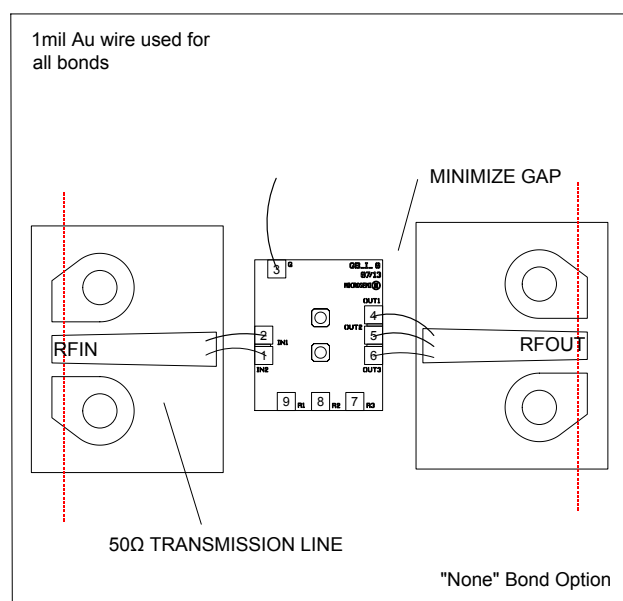
Caution, ESD
Sensitive Device

² MTTF ~ 10⁷ hours at $T_{channel} = 175^{\circ}\text{C}$. Device is intended for small-signal applications only
Note: Bare die is non-hermetic; recommend to use in an environmentally sealed package.

Table 2: Specifications (CW, 100% Test): $T_A = 25^{\circ}\text{C}$, $V_{DD} = 4\text{V}$

Parameter	Min	Typ	Max	Units
I_{DD} , bond option = "none"	45	80	115	mA

RF Probe Measurement Set-Up With Reference Planes³



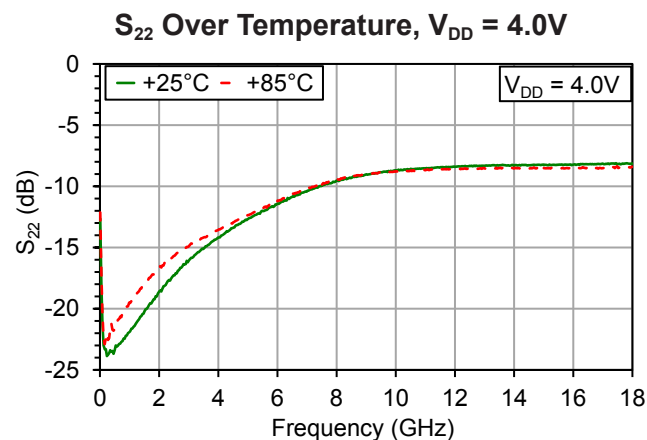
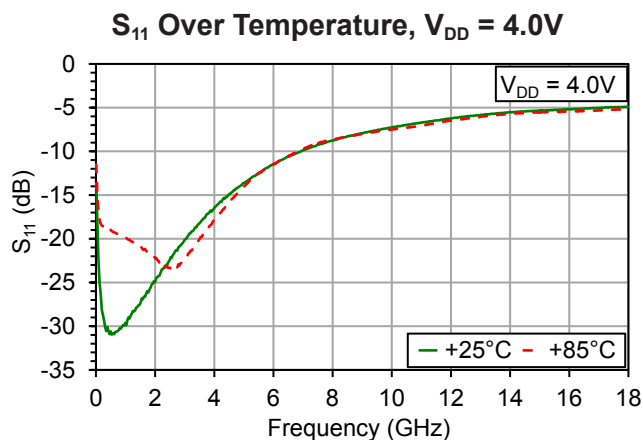
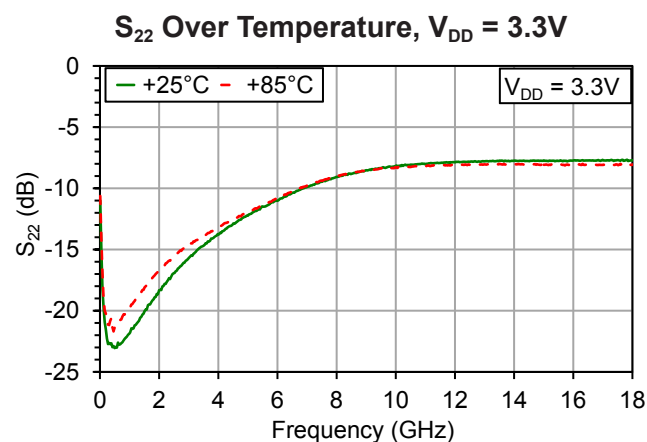
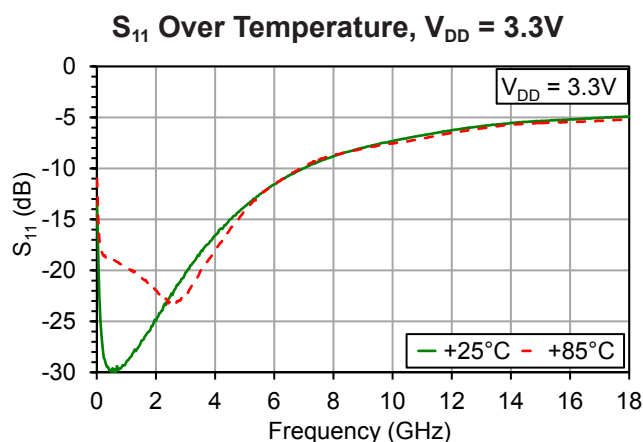
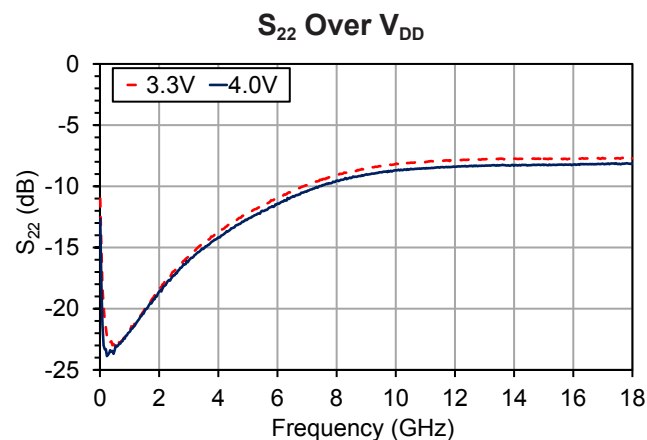
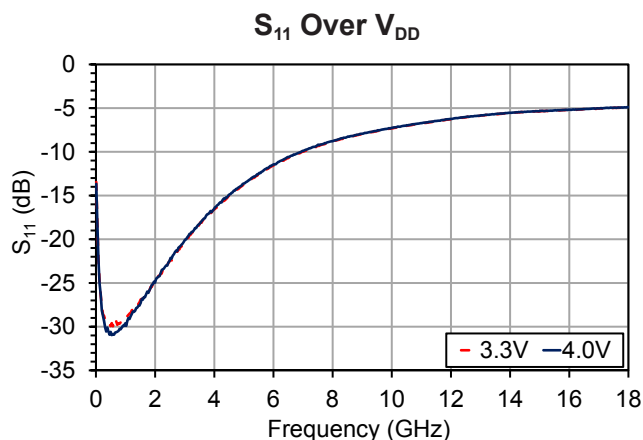
To use the "none" bonding option, attach the die directly to the baseplate.

To use the "R1", "R2" or "R3" bonding options, mount the die on top of a capacitor to float the source and bond the appropriate pad to ground.

³ Reference planes are the same for S-parameter files downloadable on www.microsemi.com/mmics

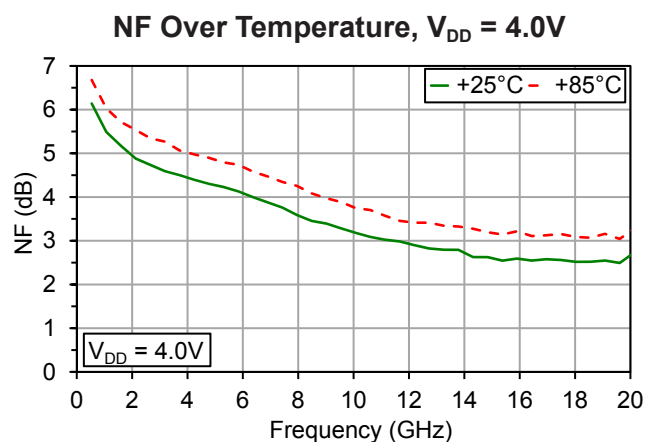
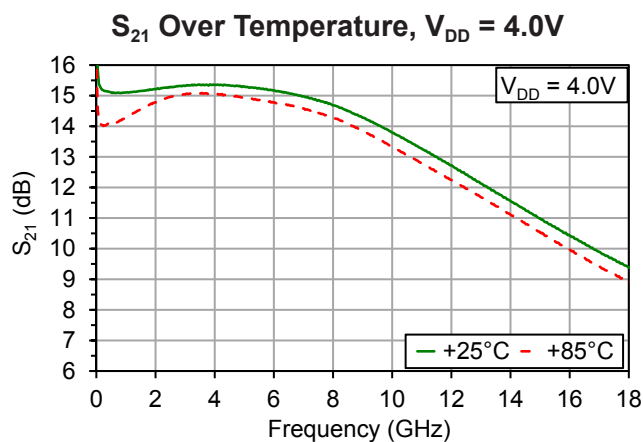
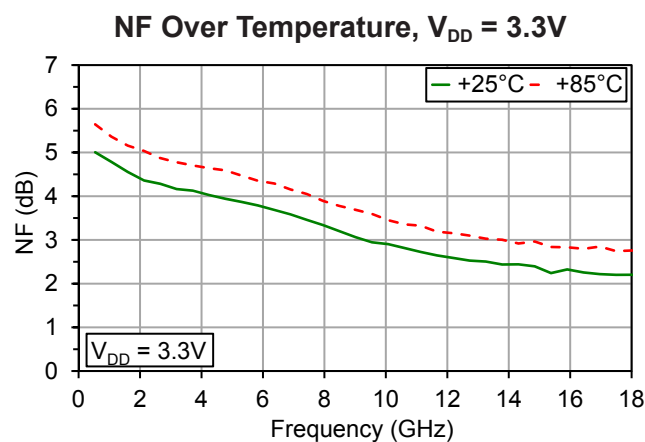
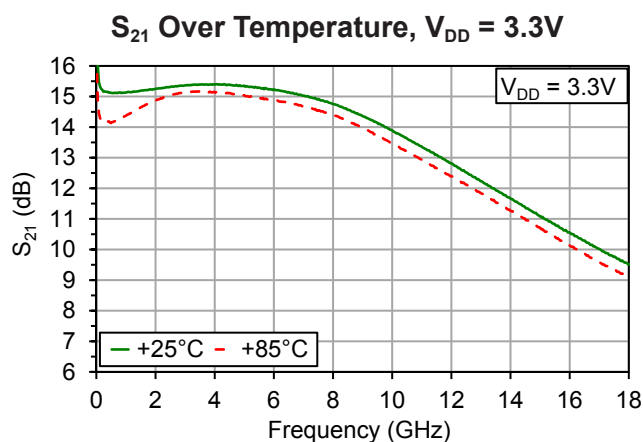
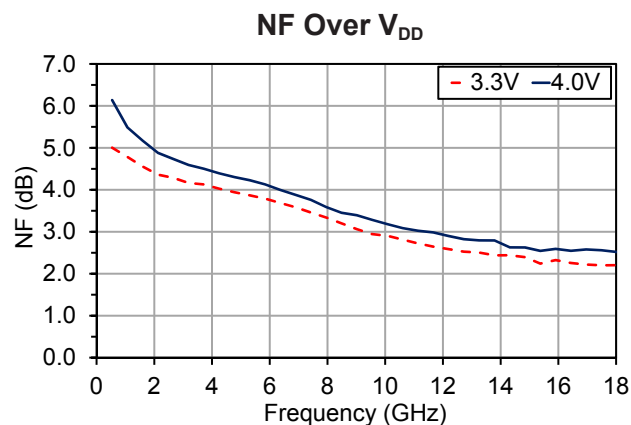
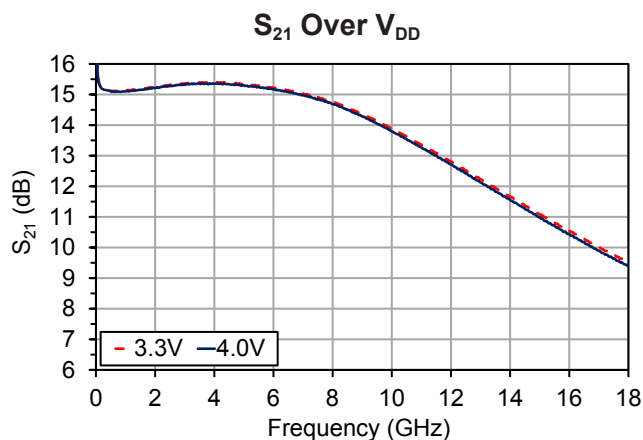
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted



Typical Performance, RF Probe

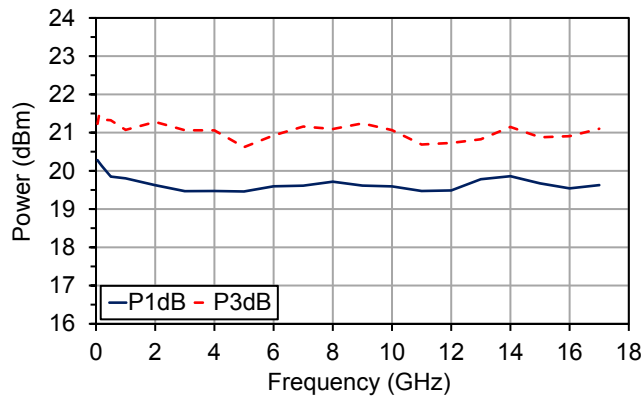
$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted



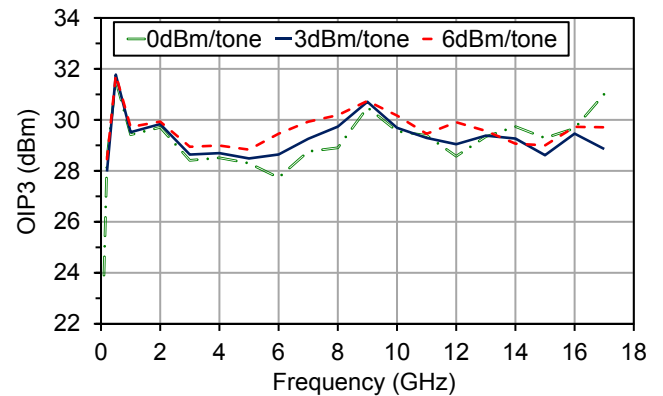
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

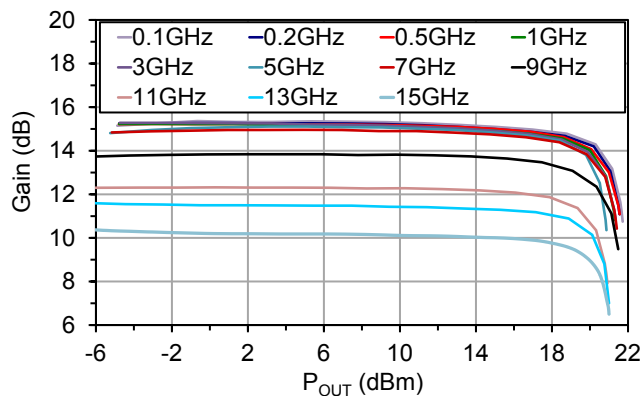
P_{1dB} & P_{3dB}



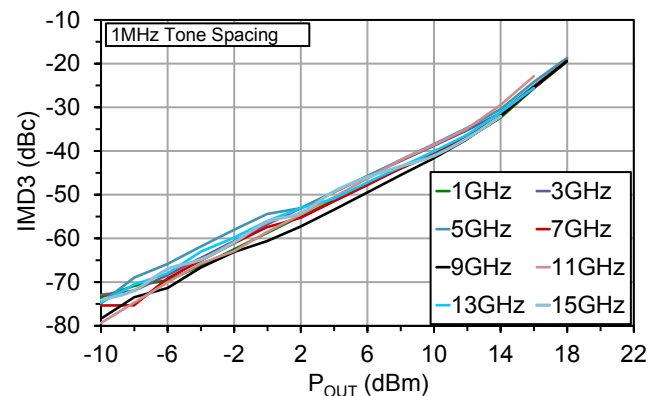
OIP3 Over P_{OUT}



Power Sweep



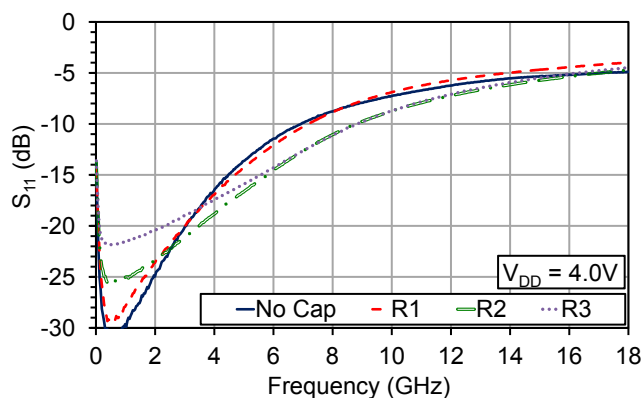
IMD3 Sweep



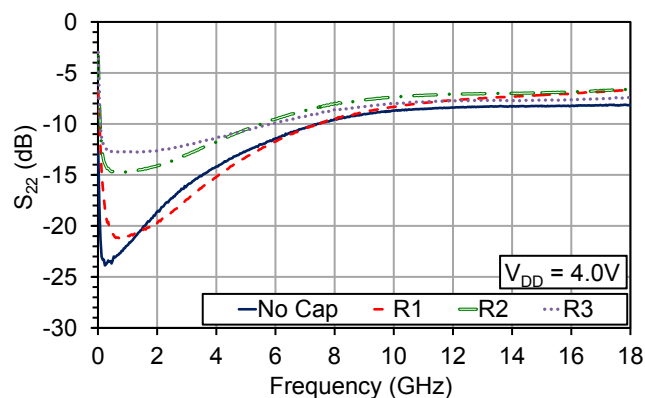
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, performance over bond option

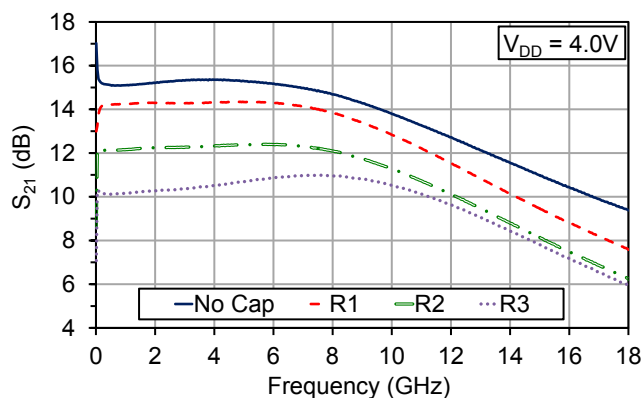
S_{11} Over Bonding Option



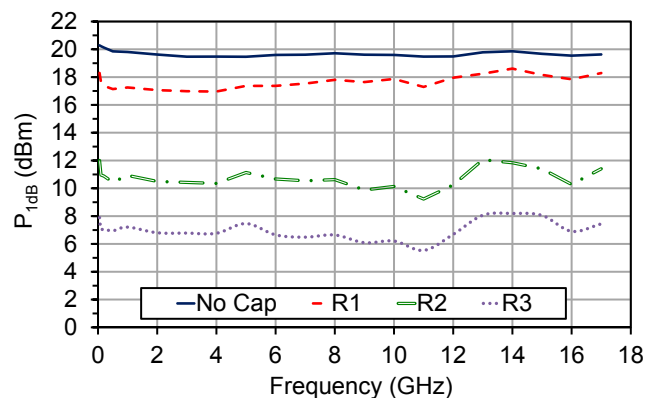
S_{22} Over Bonding Option



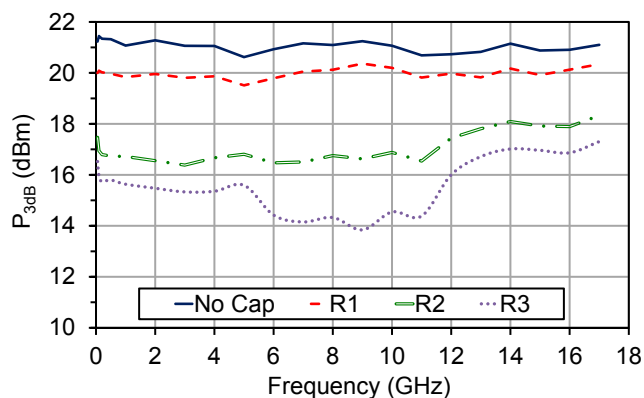
S_{21} Over Bonding Option



P_{1dB} Over Bonding Option

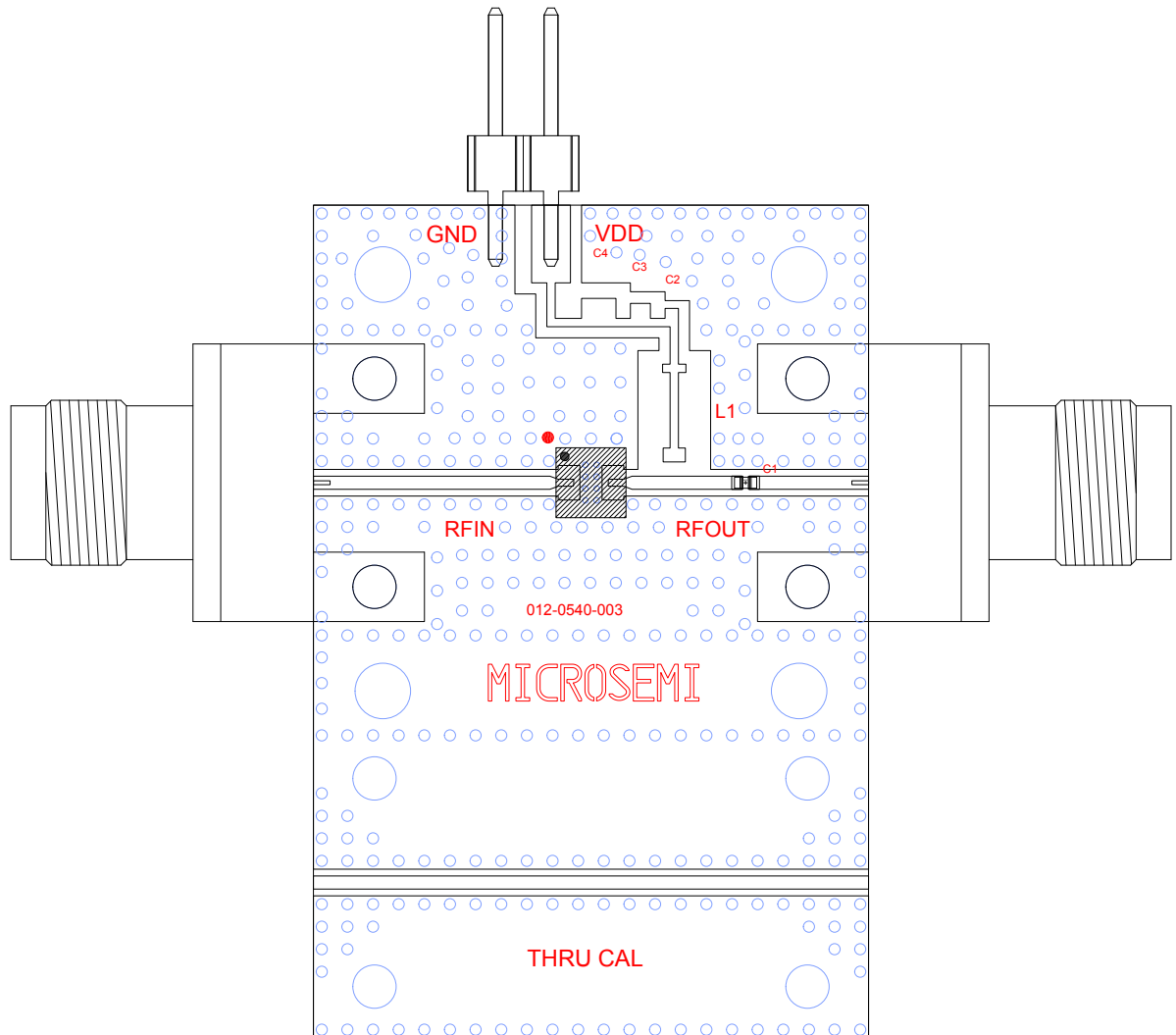


P_{3dB} Over Bonding Option



Connectorized Test Fixture

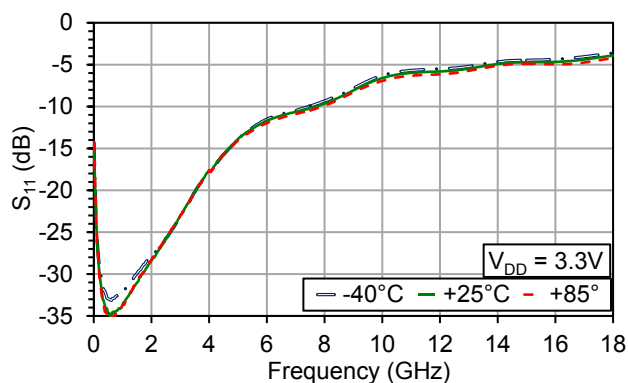
With SMK 2.92mm Connectors



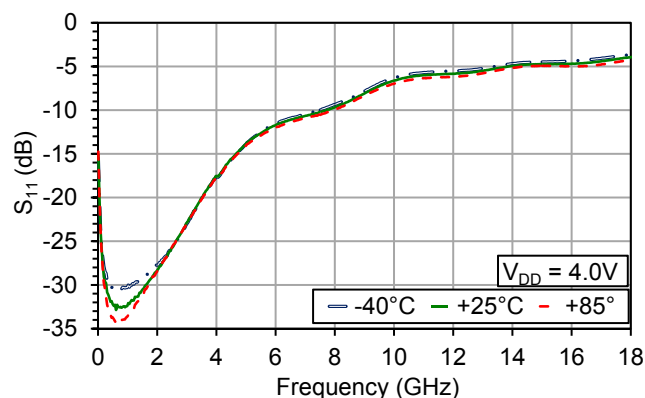
Typical Performance, Connectorized Test Fixture

$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

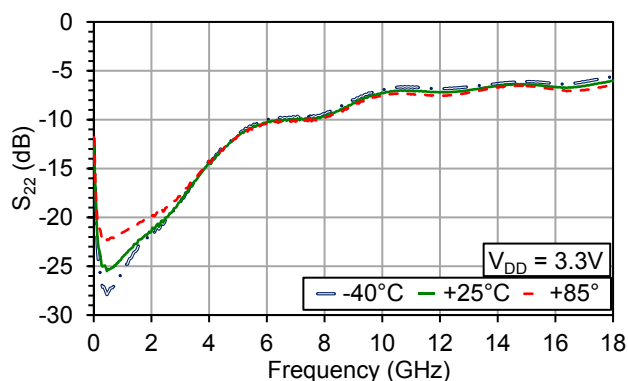
S_{11} Over Temperature



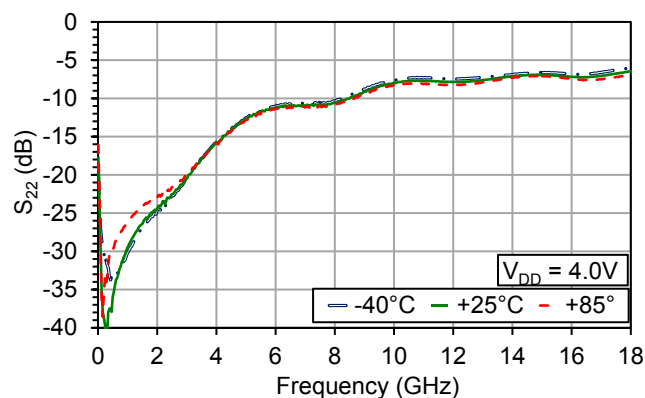
S_{11} Over Temperature



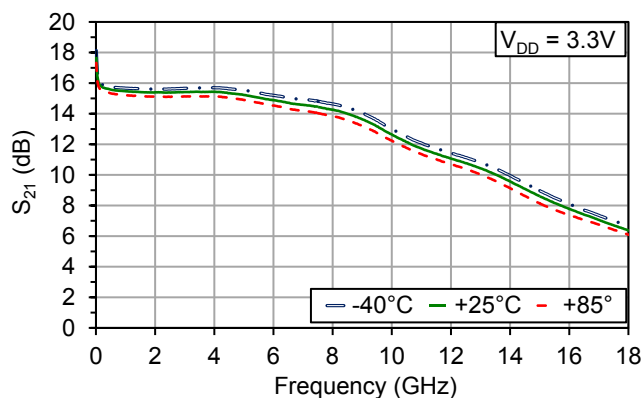
S_{22} Over Temperature



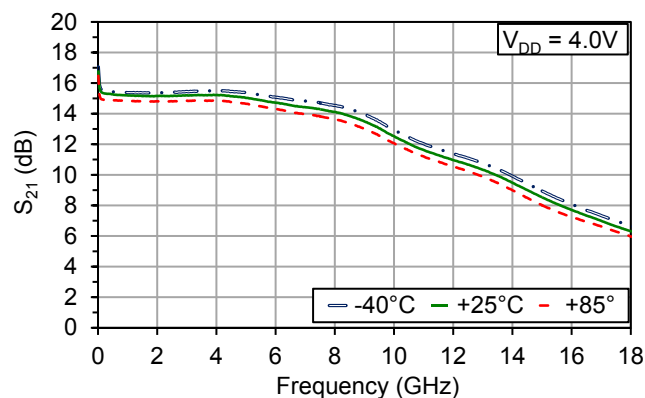
S_{22} Over Temperature



S_{21} Over Temperature



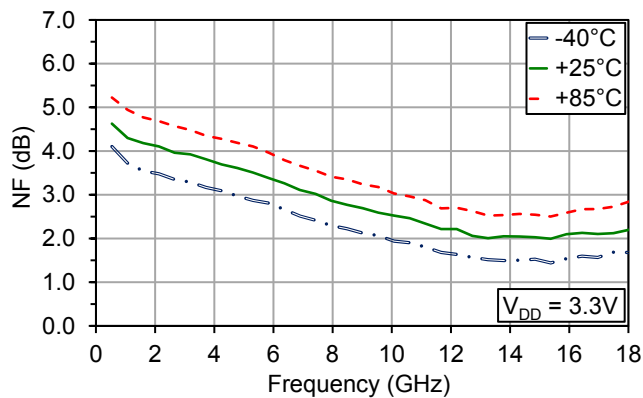
S_{21} Over Temperature



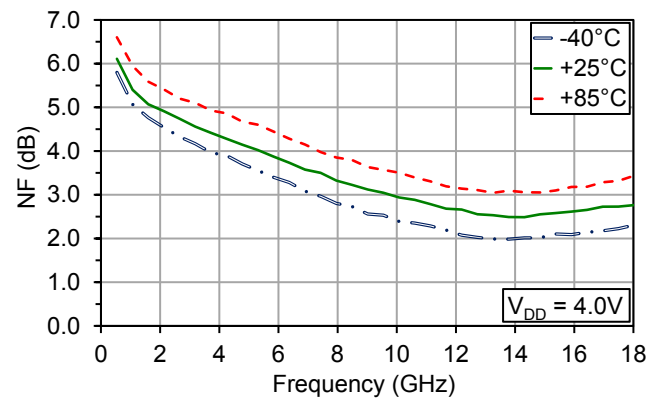
Typical Performance, Connectorized Test Fixture

$V_{DD} = 4V$, $I_{DD} = 80mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

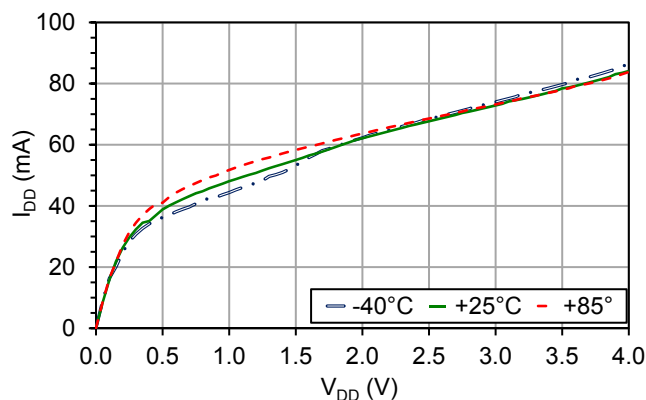
NF Over Temperature



NF Over Temperature



DC, I_{DD}



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).
See Page 2 for example bonding configurations.

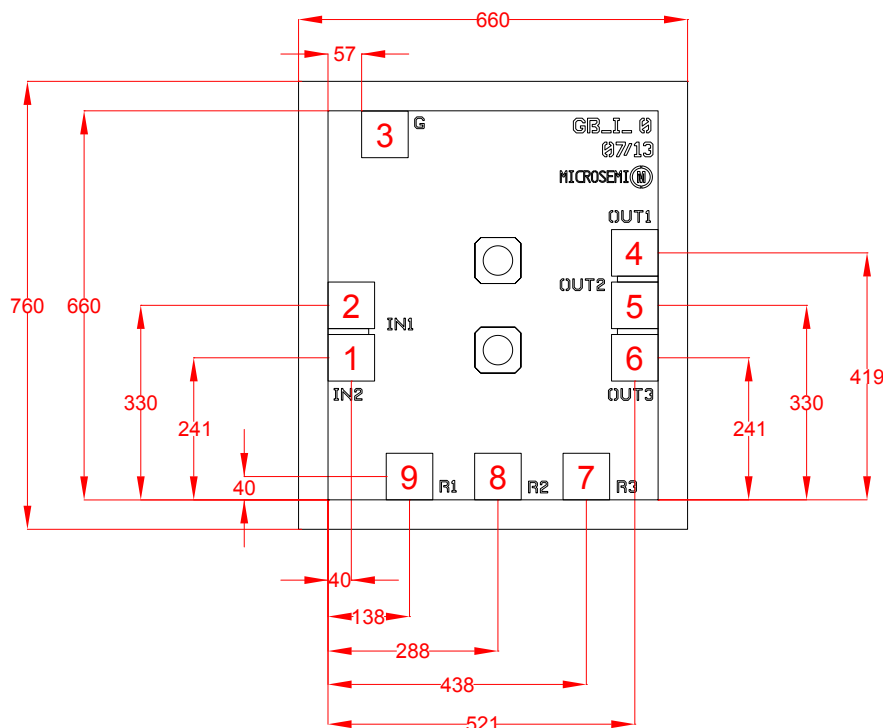


Table 3: Pad Descriptions

Pad #	Description	Pad Dimensions (μm)
1, 2	RF _{IN} , DC coupled	75 x 75
3, 4, 5	RF _{OUT} , DC coupled	75 x 75
6	R3 bond option	75 x 75
7	R2 bond option	75 x 75
8	R1 bond option	75 x 75
Die Backside	Refer to bonding option on page 2	-

Biasing

MMA015AA is a self-biased device with a single positive supply. Apply V_{DD} to RF_{OUT}.

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