

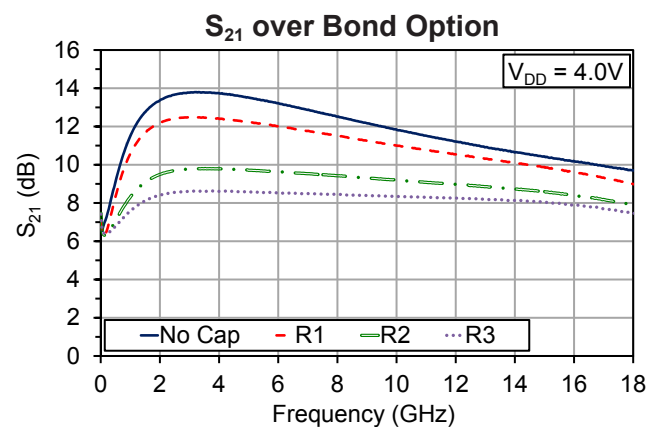
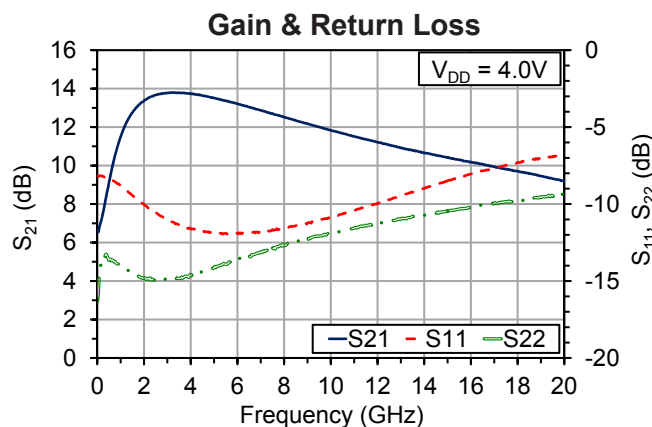
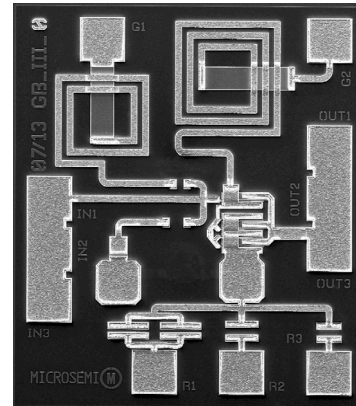
2-16GHz, Power-Selectable Wideband Amplifier

Features

- Power-selectable from 7 to 18dBm P_{1dB} by choosing bond option
- Gain varies <1.2dB from -40°C to +85°C
- Gain of ~10-14dB and ~28dBm 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): $T_A = 25^\circ C$, $V_{DD} = 4V^1$

Bond Option	ID	Gain	P1dB	OIP3
None	95	11.5	18.0	26.0
R1 to Ground	65	10.8	15.5	23.5 est
R2 to Ground	36	9.0	7.5	15.5 est
R3 to Ground	23	8.0	5.5	13.5 est

¹ Device is intended for small-signal applications only

Table 1: Absolute Maximum Ratings, Not Simultaneous

Parameter	Value	Units
Drain Voltage (V_D)	+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	150	°C/W



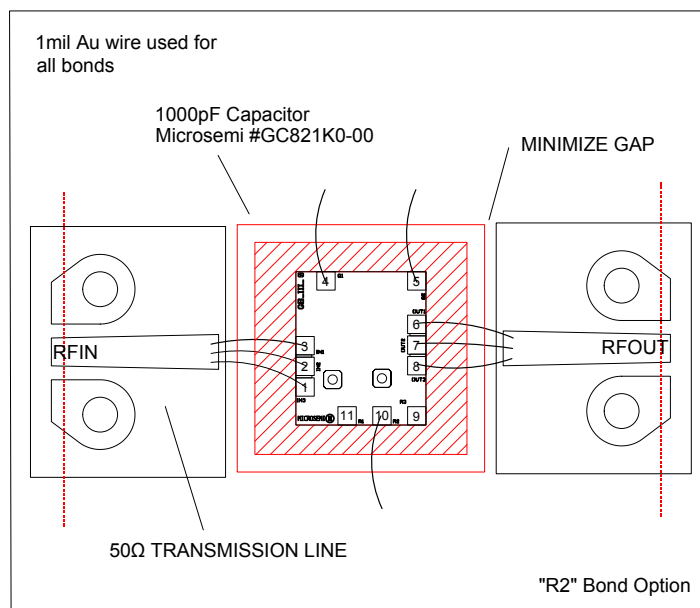
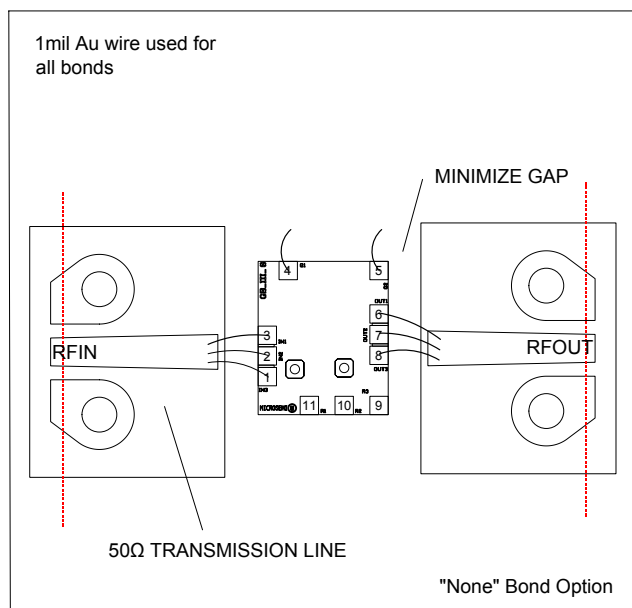
Caution, ESD Sensitive Device

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	95	135	mA

RF Probe Measurement Set-Up With Reference Planes³



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

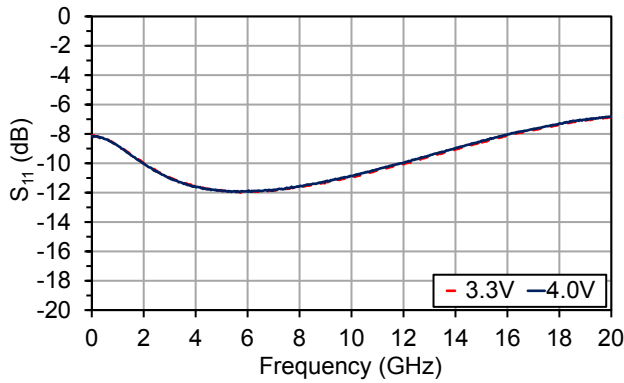
To use the "R1", "R2" or "R3" bonding options, mount the die on top of a capacitor to float the source and bond the appropriate pad to ground.

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

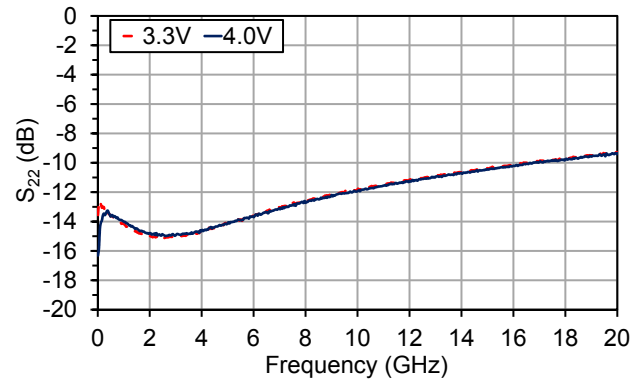
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

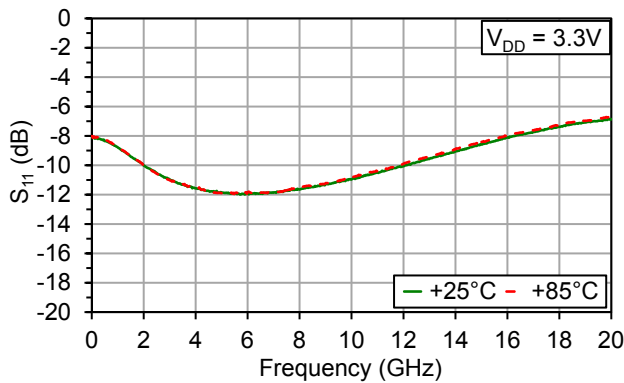
S_{11} Over V_{DD}



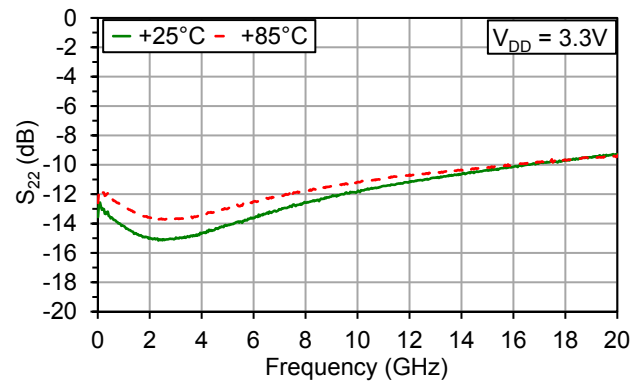
S_{22} Over V_{DD}



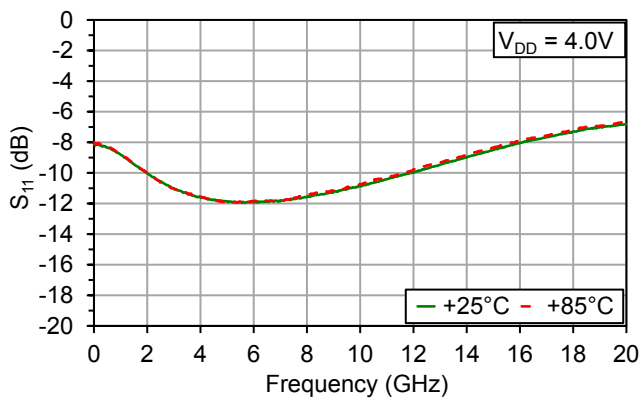
S_{11} Over Temperature, $V_{DD} = 3.3V$



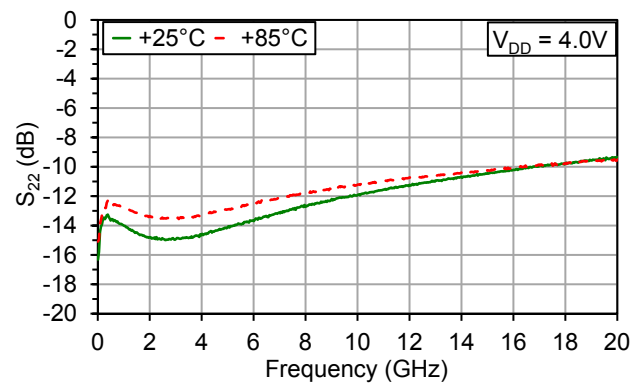
S_{22} Over Temperature, $V_{DD} = 3.3V$



S_{11} Over Temperature, $V_{DD} = 4.0V$



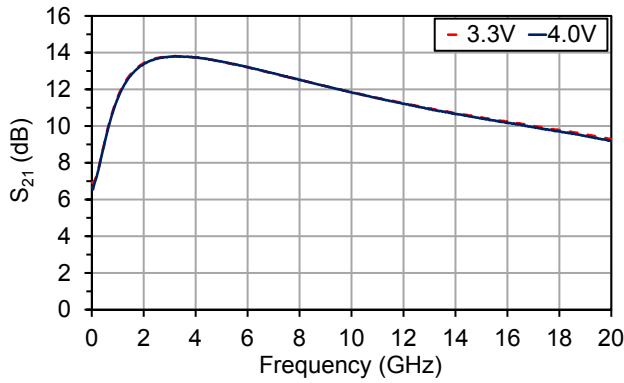
S_{22} Over Temperature, $V_{DD} = 4.0V$



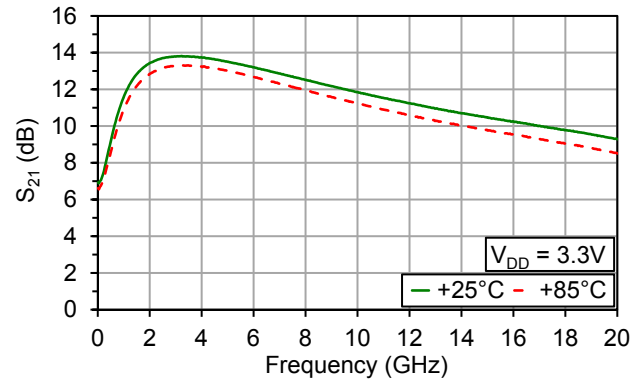
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

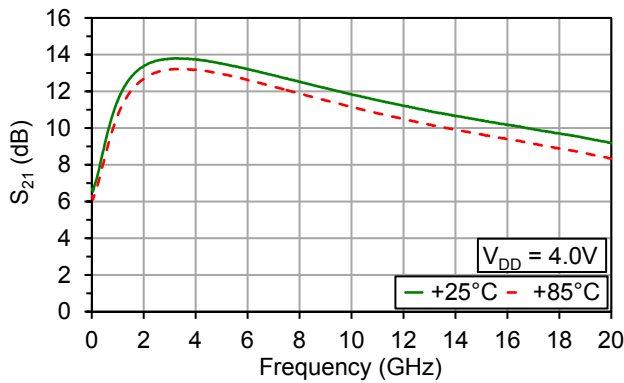
S_{21} Over V_{DD}



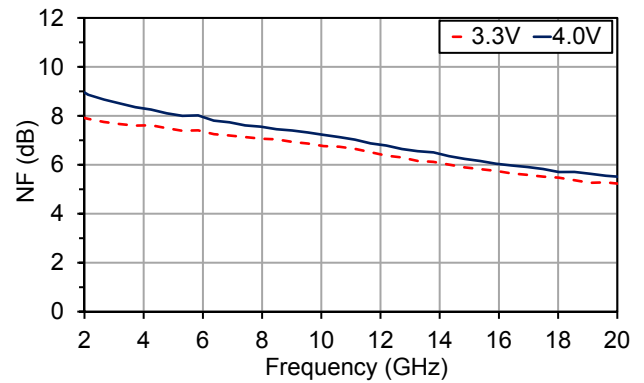
S_{21} Over Temperature, $V_{DD} = 3.3V$



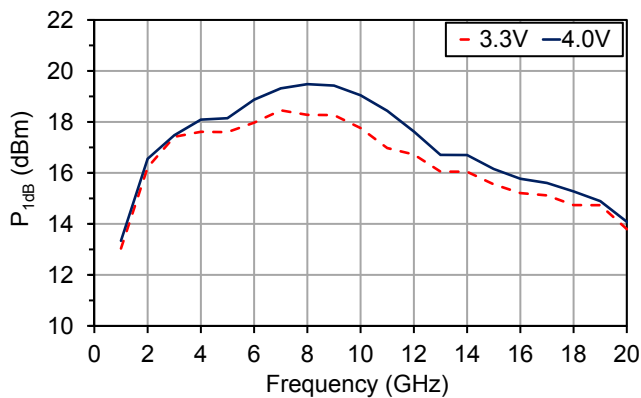
S_{21} Over Temperature, $V_{DD} = 4.0V$



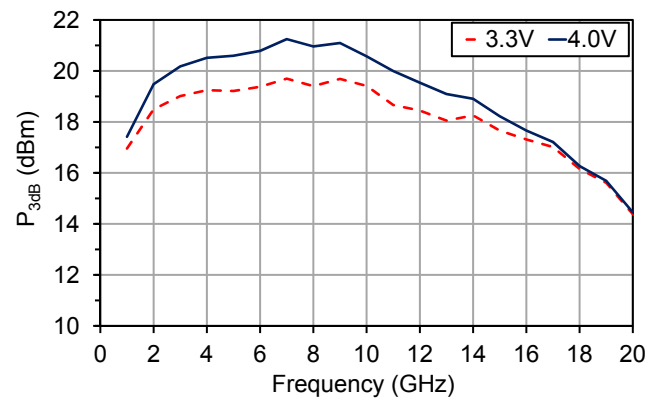
NF Over V_{DD}



P_{1dB} Over V_{DD}



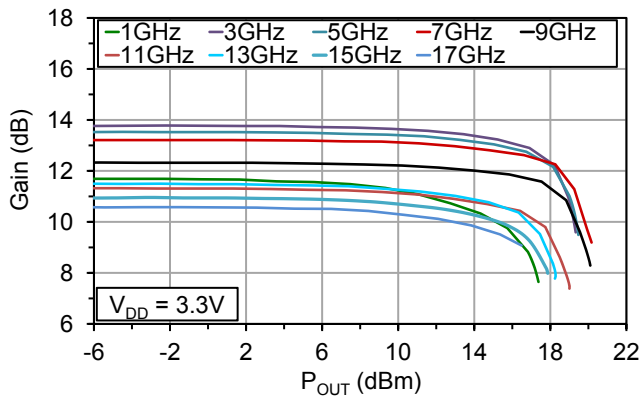
P_{3dB} Over V_{DD}



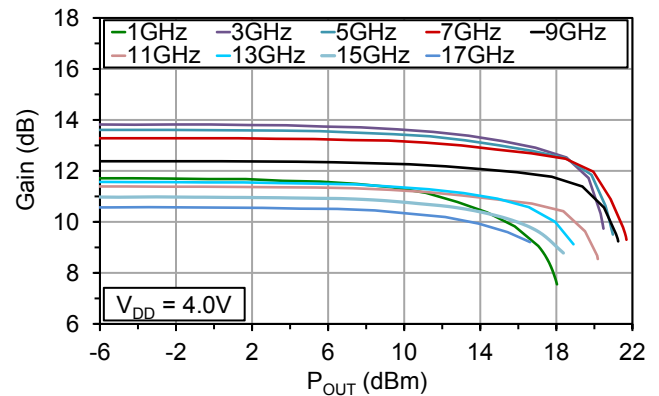
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

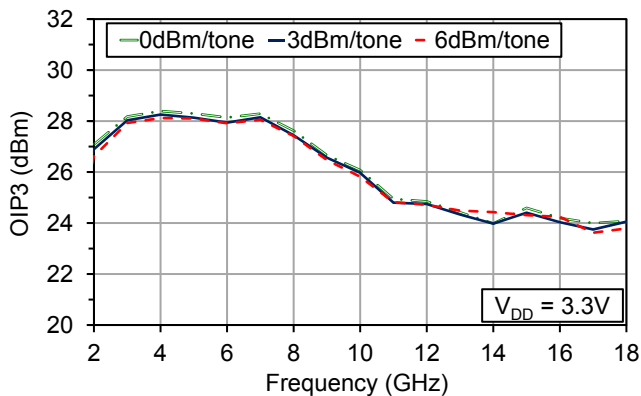
Power Sweep



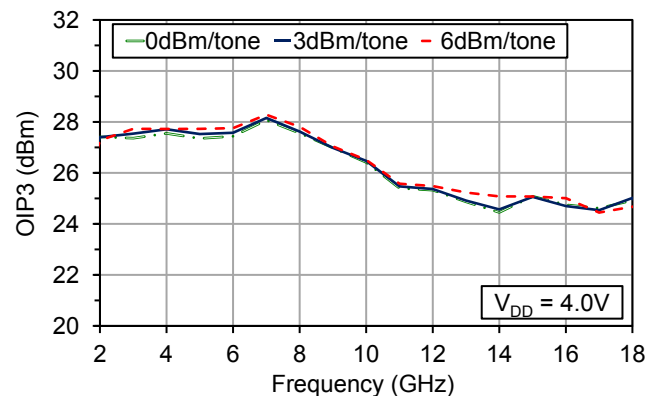
Power Sweep



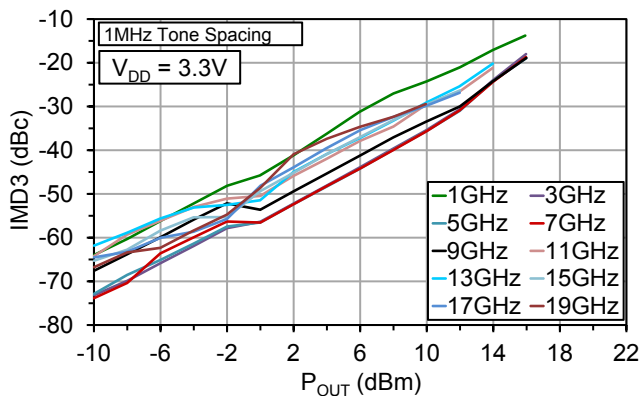
OIP3 Over P_{OUT}



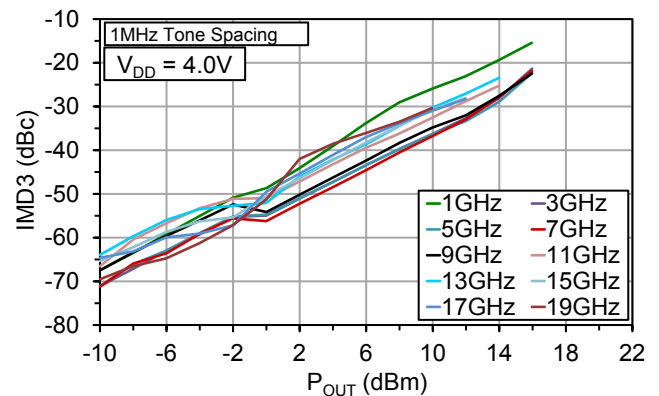
OIP3 Over P_{OUT}



IMD3 Sweep



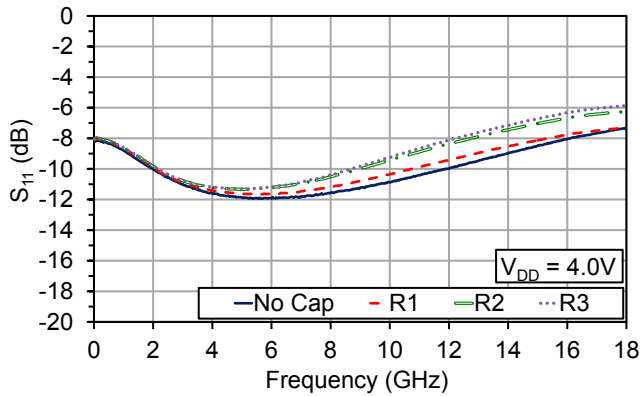
IMD3 Sweep



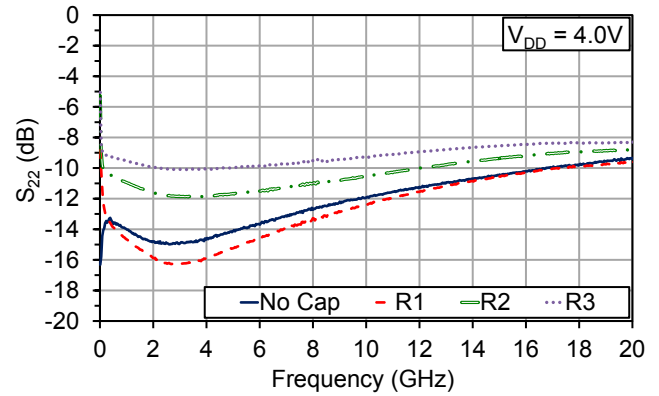
Typical Performance, RF Probe

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, performance over bond option

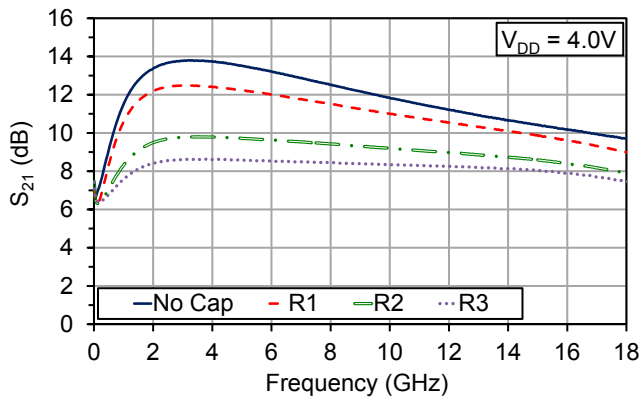
S_{11} Over Bonding Option



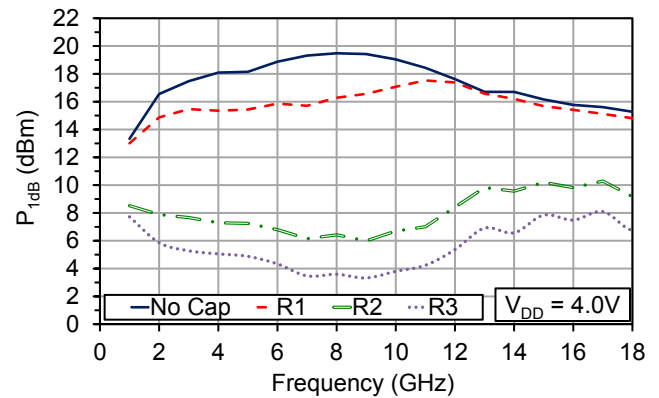
S_{22} Over Bonding Option



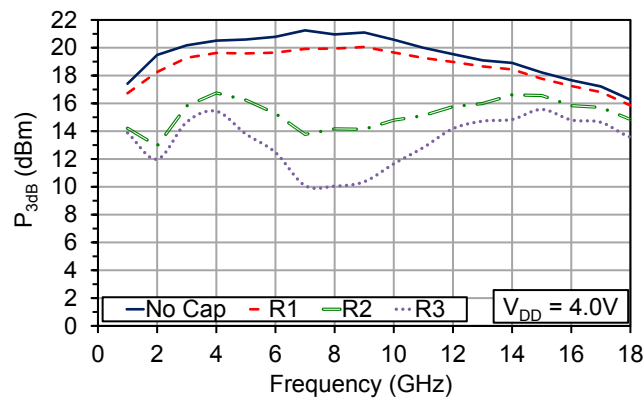
S_{21} Over Bonding Option



P_{1dB} Over Bonding Option

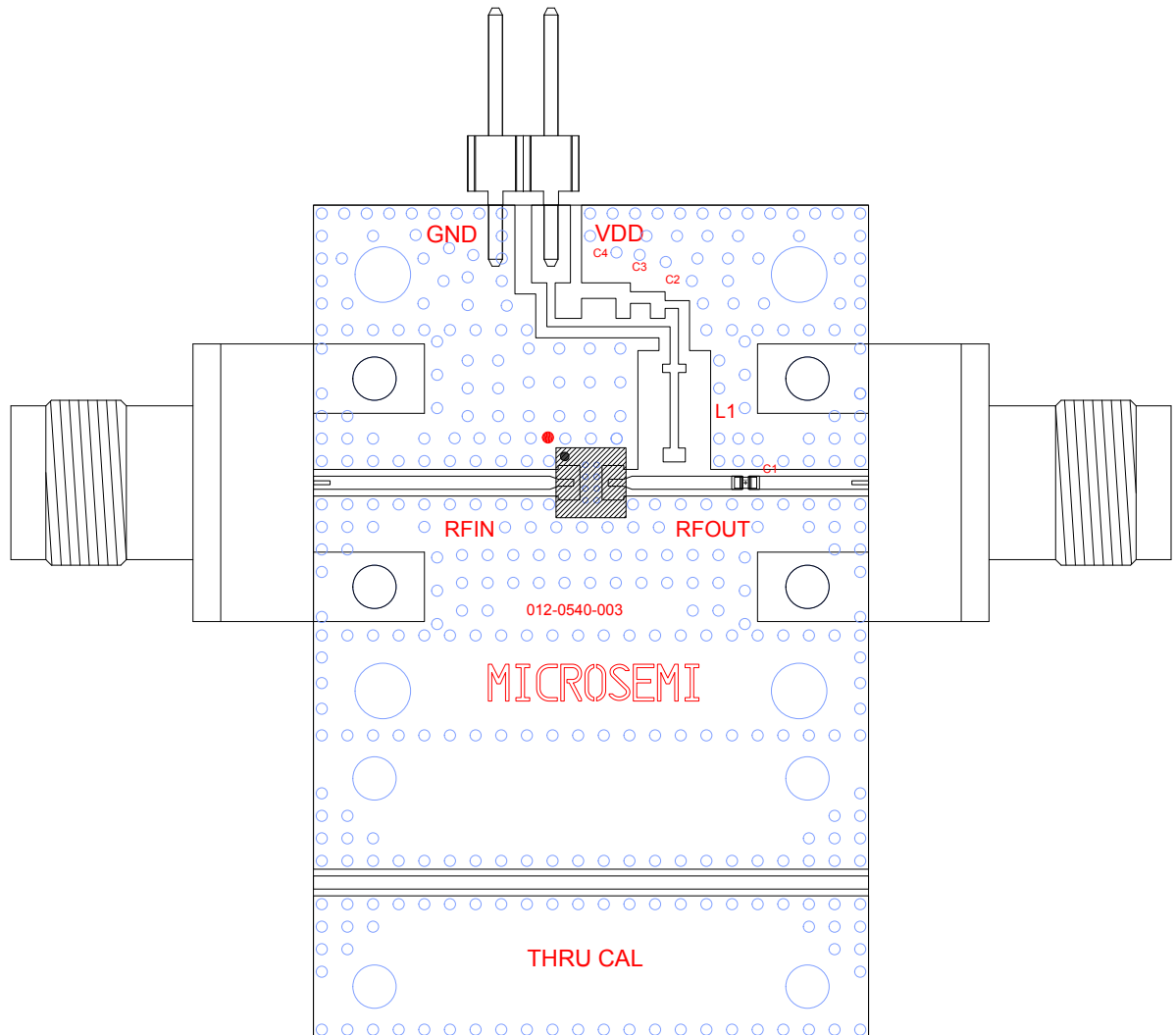


P_{3dB} Over Bonding Option



Connectorized Test Fixture

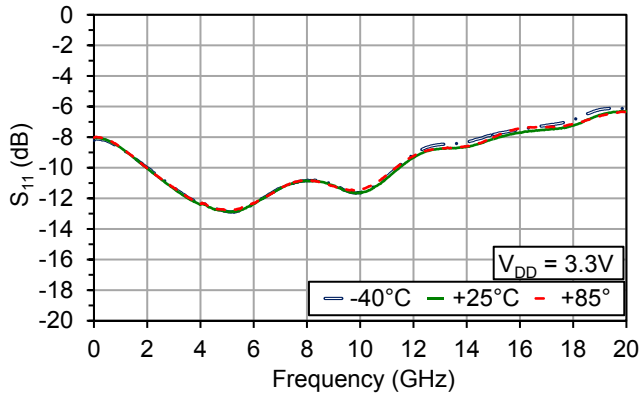
With SMK 2.92mm Connectors



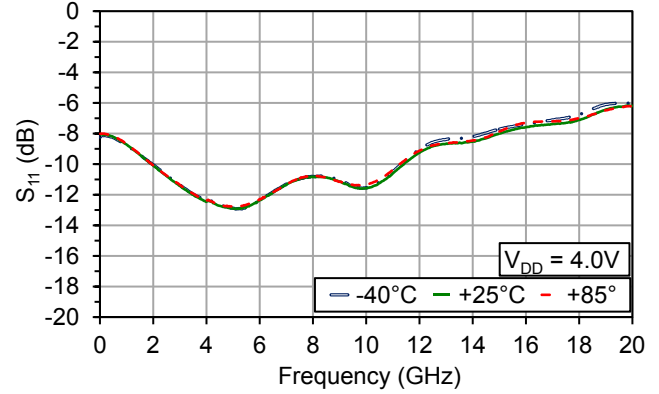
Typical Performance, Connectorized Test Fixture

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

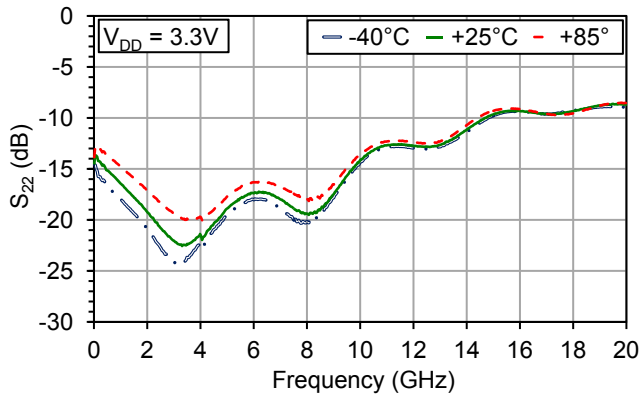
S_{11} Over Temperature



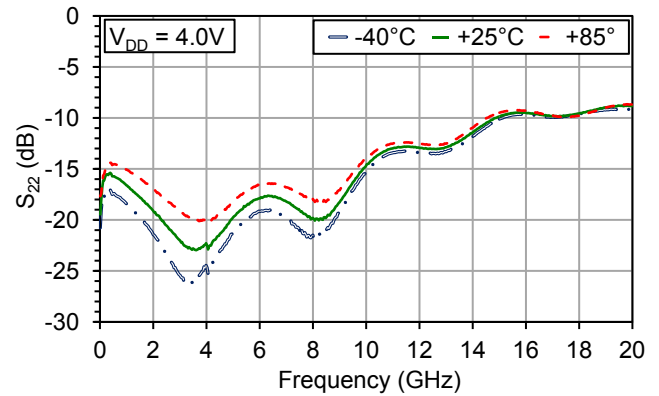
S_{11} Over Temperature



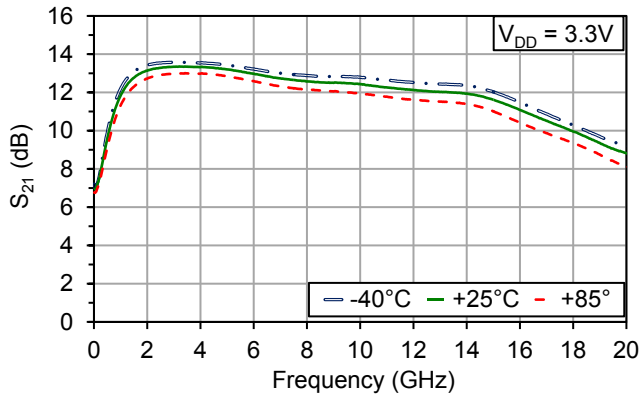
S_{22} Over Temperature



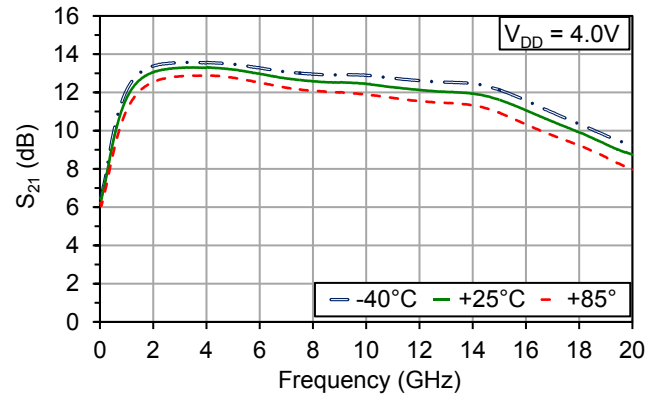
S_{22} Over Temperature



S_{21} Over Temperature



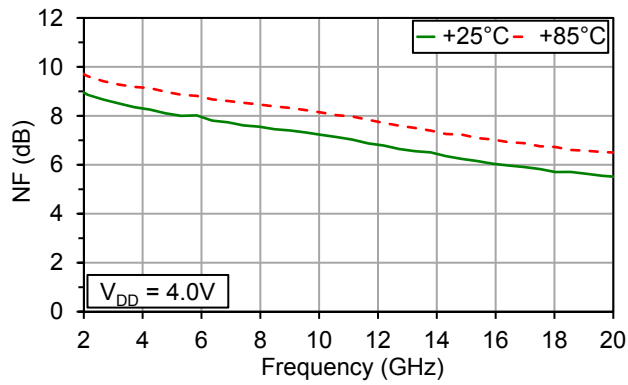
S_{21} Over Temperature



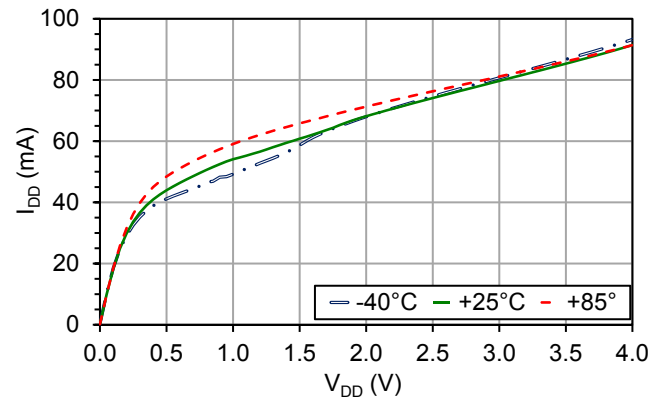
Typical Performance, Connectorized Test Fixture

$V_{DD} = 4V$, $I_{DD} = 95mA$, $T_A = 25^\circ C$, bond option = "none" unless otherwise noted

NF Over Temperature



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).
 See Page 2 for example bonding configurations.

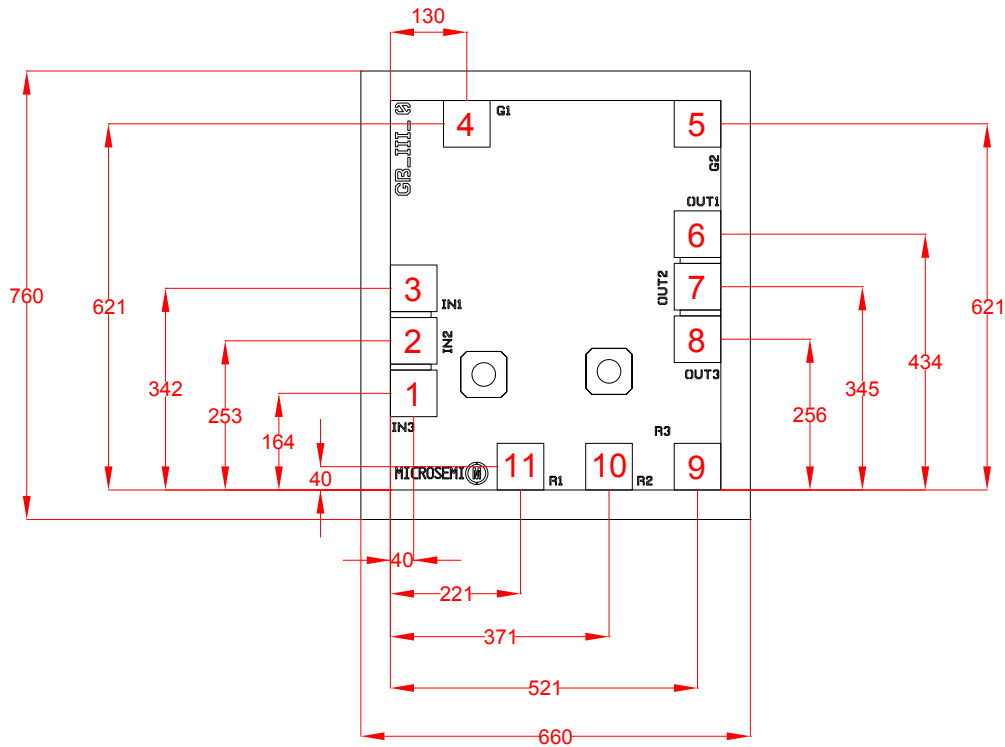


Table 3: Pad Descriptions

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

Biasing

MMA017AA is a self-biased device with a single positive supply. Apply V_{DD} to RF_{OUT} .

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