



MMIC DIE

# Wideband Amplifier

## PMA3-15453-D+

50Ω 15 to 45 GHz High Dynamic Range

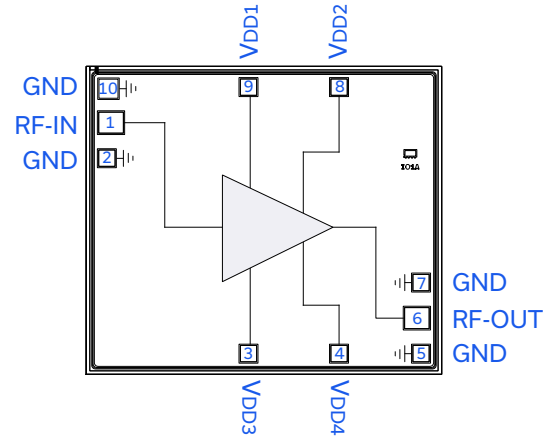
### THE BIG DEAL

- Low Noise Figure, Typ. 3.6 dB
- High OIP3, Typ. +24 dBm
- P1dB, Typ. +17 dBm
- +5V Supply Voltage

### APPLICATIONS

- Test & Measurement Equipment
- 5G mmWave and Back Haul Radio Systems
- Satellite Communications
- Radar, EW, and ECM Defense systems

### FUNCTIONAL DIAGRAM



SEE ORDERING INFORMATION ON THE LAST PAGE

### PRODUCT OVERVIEW

The PMA3-15453-D+ is a wideband, low noise MMIC amplifier with a unique combination of high dynamic range and low noise figure over a very broad bandwidth making it ideal for use in a wide variety of transmitter and receiver applications. The device operates from a +5V supply voltage, and is matched to 50 Ohm. The PMA3-15453-D+ die utilizes pHEMT technology and is suitable for chip and wire assemblies.

### KEY FEATURES

Features	Advantages
Low Noise Figure, Typ. 3.6 dB	Enables lower system noise figure performance.
High Dynamic Range OIP3, Typ. +24 dBm P1dB, Typ. +17 dBm	Offers low noise figure with correspondingly high P1dB and OIP3 enables flexibility to achieve systems performance with multiple device cascade signal chains
Unpackaged Die	Enables integration into hybrid chip and wire assemblies

REV. OR  
ECO-018177  
PMA3-15453-D+  
MCL NY  
230613





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## ELECTRICAL SPECIFICATIONS<sup>1</sup> AT +25°C, V<sub>DD</sub> = +5V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		15		45	GHz
Gain	15		18.9		dB
	20		17.5		
	30		16.1		
	40		14.4		
	45		11.2		
Output Power at 1 dB Compression (P1dB)	15		+11.8		dBm
	20		+13.4		
	30		+16.9		
	40		+14.2		
	45		+11.1		
Output Third-Order Intercept (P <sub>OUT</sub> = -5 dBm/Tone)	15		+21		dBm
	20		+23		
	30		+25		
	40		+25		
	45		+25		
Input Return Loss	15		17		dB
	20		11		
	30		13		
	40		11		
	45		15		
Output Return Loss	15		11		dB
	20		11		
	30		11		
	40		13		
	45		15		
Isolation	15-45		40		dB
Noise Figure	15		2.7		dB
	20		2.7		
	30		3.4		
	40		4.2		
	45		5.1		
Device Operating Voltage (V <sub>DD</sub> )		+4.75	+5.0	+5.25	V
Device Operating Current (I <sub>DD</sub> ) <sup>2</sup>			128		mA
DC Current Variation vs. Temperature <sup>3</sup>			19.23		μA/°C
DC Current Variation vs. Voltage <sup>4</sup>			0.03		mA/mV

1. Tested in Mini-Circuits Die Characterization Test Board. See Figure 2. Trace and connector losses are de-embedded. Specifications include the effect of bond wires.

2. Current at P<sub>IN</sub> = -25 dBm. Increases to 139 mA at P1dB.

3. ((Current at +85°C - Current at -45°C) / (+130°C)).

4. ((Current at +5.25 V mA) - (Current at +4.75 V in mA)) / ((+5.25V - +4.75V) \* 1000 mA/mV).



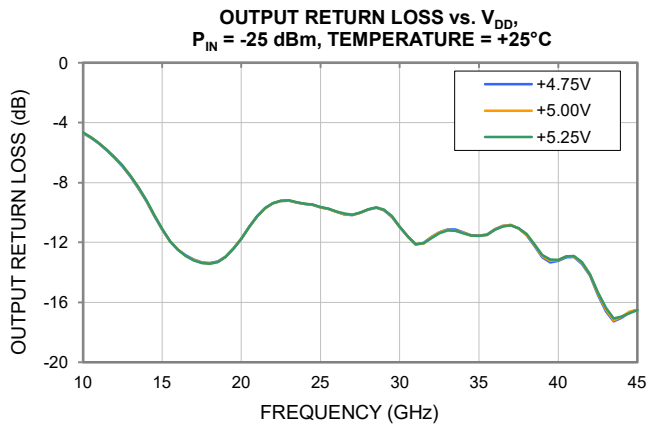
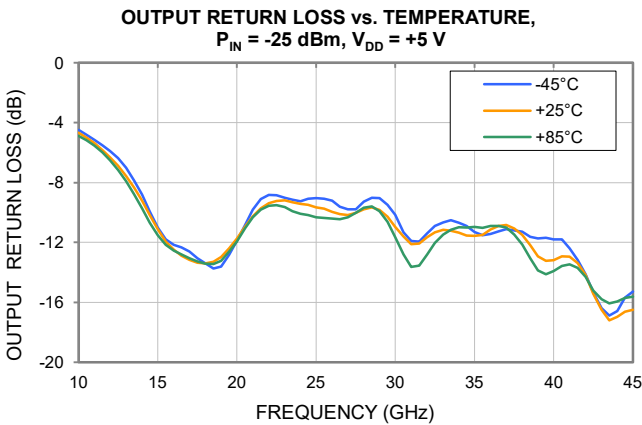
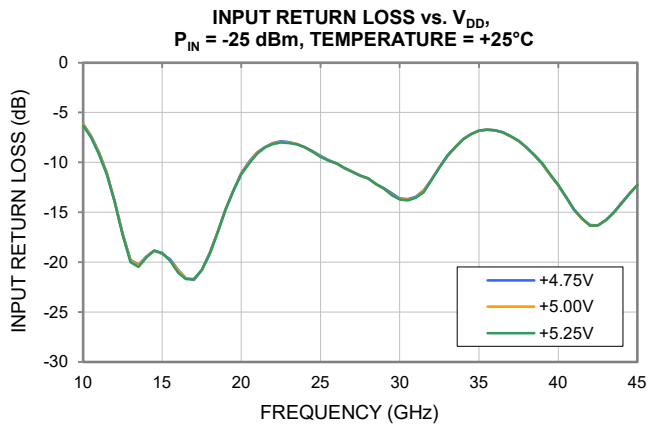
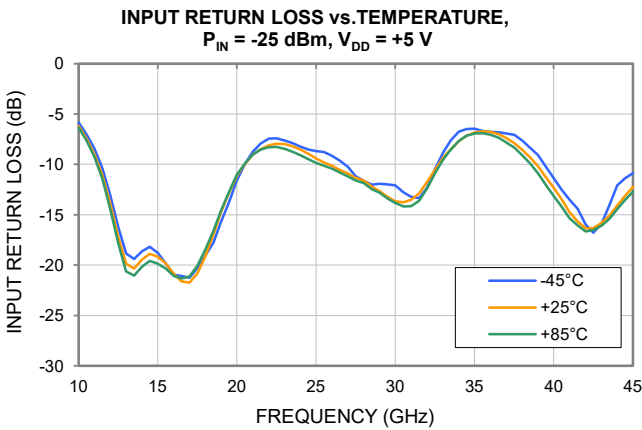
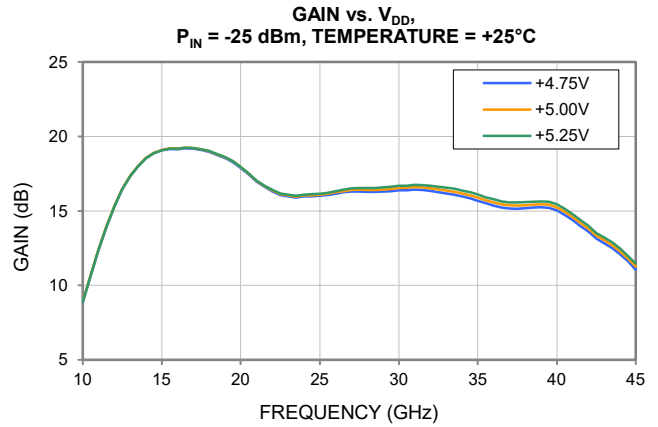
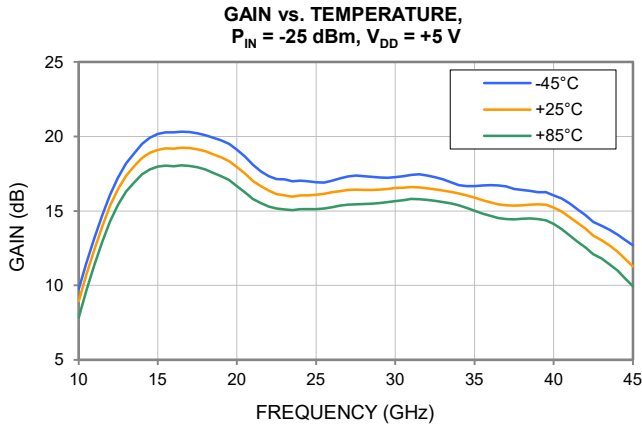


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## TYPICAL PERFORMANCE GRAPHS



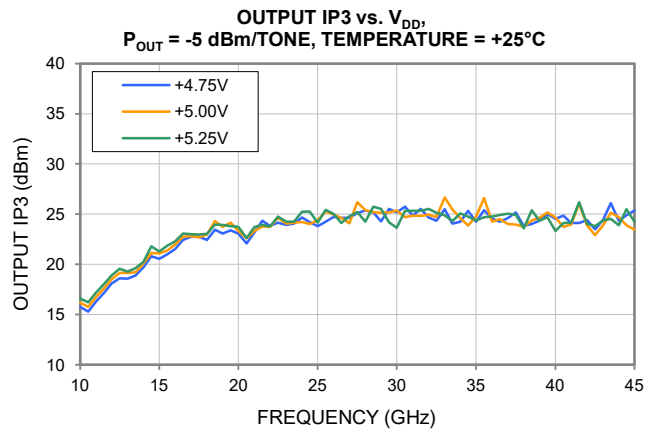
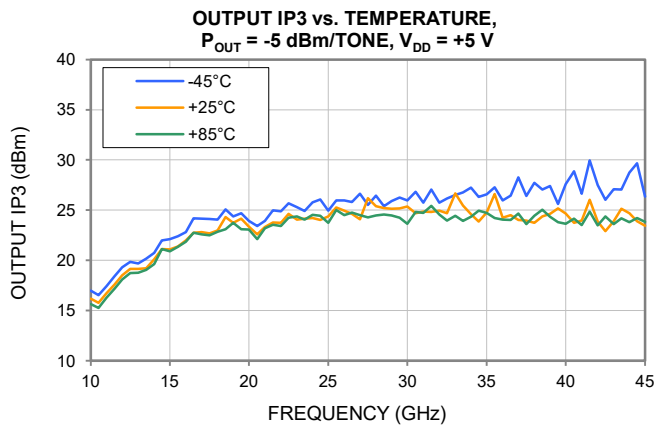
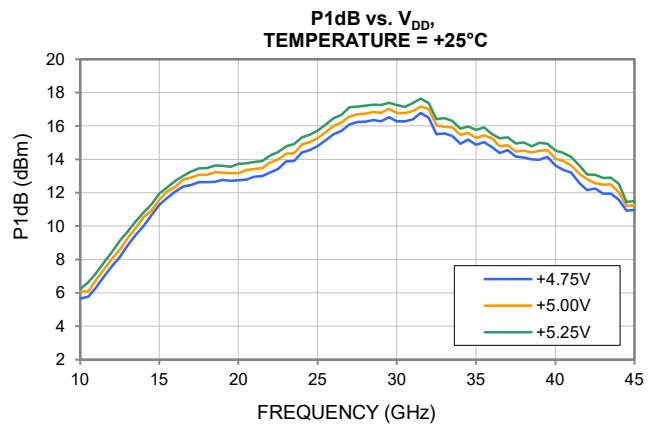
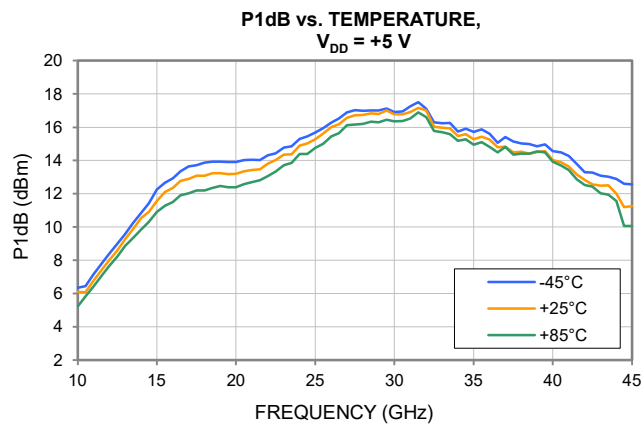
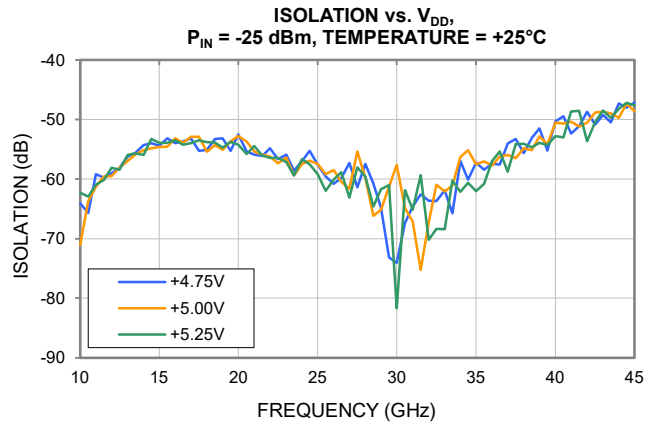
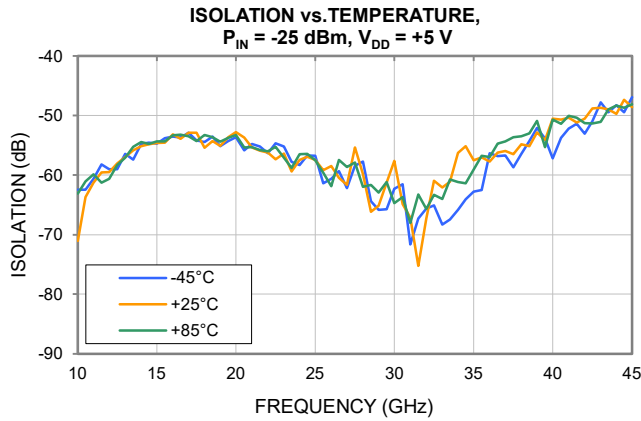


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## TYPICAL PERFORMANCE GRAPHS



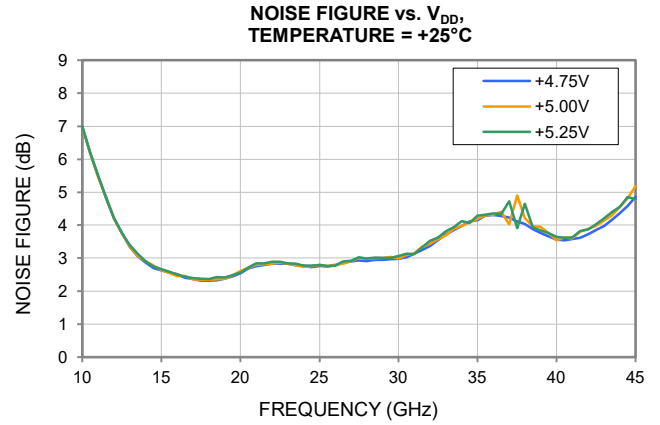
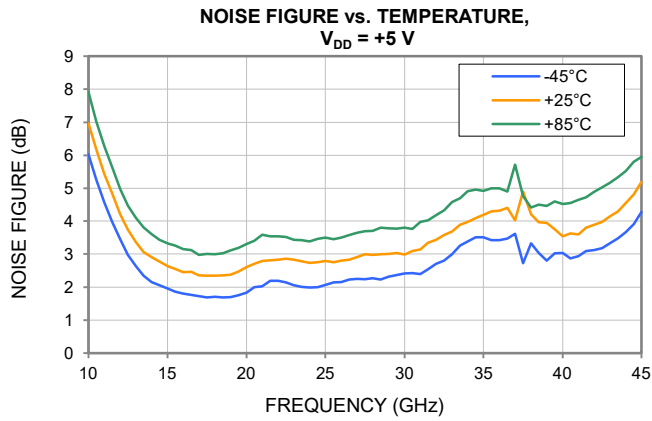


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## TYPICAL PERFORMANCE GRAPHS





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## ABSOLUTE MAXIMUM RATINGS<sup>5</sup>

Parameter	Ratings
Operating Temperature	-45 °C to +85 °C
Storage Temperature <sup>6</sup>	+20° C to +35 °C
Junction Temperature <sup>7</sup>	+150 °C
Total Power Dissipation	1.62 W
RF Input Power (CW), V <sub>DD</sub> = +5V	+23 dBm
DC Voltage at V <sub>DD1</sub> , V <sub>DD2</sub> , V <sub>DD3</sub> , V <sub>DD4</sub>	+10 V

5. Permanent damage may occur if any of these limits are exceeded. Maximum ratings are not intended for continuous normal operation.

6. For die shipped in Gel-Pak see ENV-80 (limited by packaging).

7. Peak temperature on Top of Die.

6. For die shipped in Gel-Pak see ENV-80 (limited by packaging)

## THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance ( $\Theta_{jc}$ ) <sup>8</sup>	32.2 °C/W

8.  $\Theta_{jc}$  = (Hot Spot Temperature on Die - Temperature at Ground Lead)/Dissipated Power

## ESD RATING<sup>9</sup>

	Class	Voltage Range	Reference Standard
Human Body Model (HBM)	1A	250V to < 500V	ANSI/ESDA/JEDEC JS-001-2017



ESD HANDLING PRECAUTION: This device is designed to be Class 1A for HBM. Static charges may easily produce potentials higher than this with improper handling and can discharge into DUT and damage it. As a preventive measure Industry standard ESD handling precautions should be used at all times to protect the device from ESD damage.

9. Tested in 3x3mm 12-lead QFN-Style Package



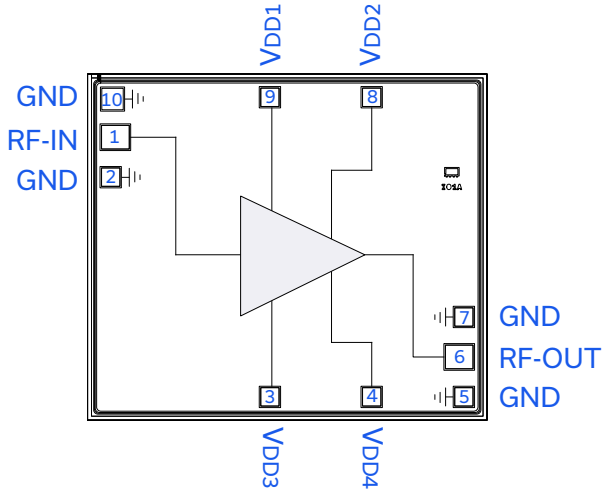


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## FUNCTIONAL DIAGRAM

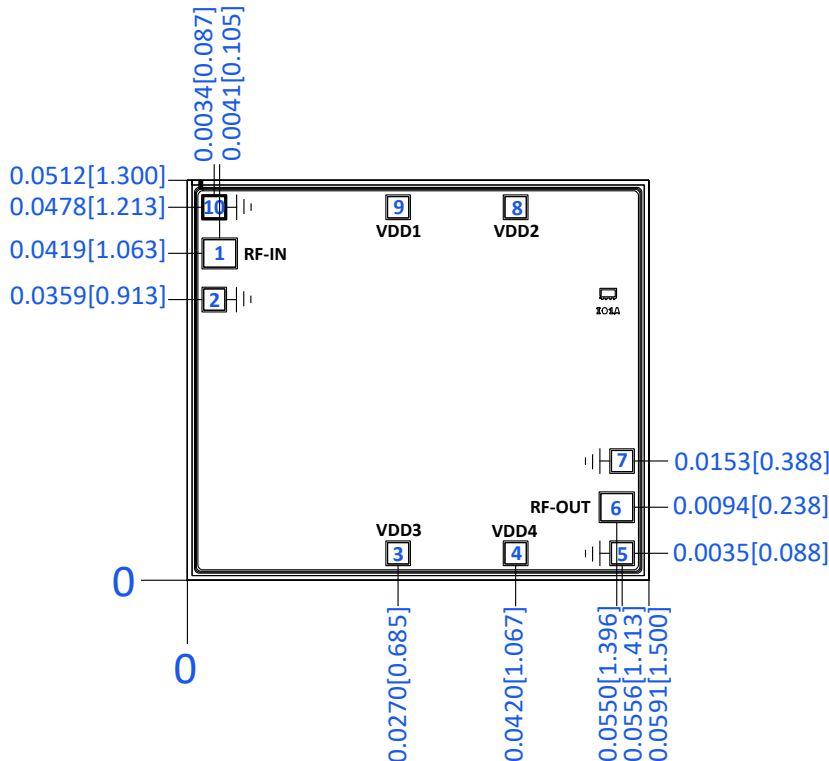


## PAD DESCRIPTION

Function	Pad #	Application Description (Refer to Figure 1)
RF-IN	1	RF Input Port
RF-OUT	6	RF Output Port
V <sub>DD1</sub>	9	Voltage Input Port 1
V <sub>DD2</sub>	8	Voltage Input Port 2
V <sub>DD3</sub>	3	Voltage Input Port 3
V <sub>DD4</sub>	4	Voltage Input Port 4
GND	2, 5, 7, 10	Connected to die backside through vias. Bond wires to ground are optional

Figure 1. PMA3-15453-D+ Functional Diagram

## DIE OUTLINE: inches [mm], Typical



## DIMENSIONS: inches [mm], Typical

Die Size	0.0591 x 0.0512 [1.500 x 1.300]
Die Thickness	0.0039 [0.100]
Bond Pad Sizes:	
Pads 2-5, 7-10	0.0027 x 0.0027 [0.069 x 0.069]
Pad 1 & 6	0.0041 x 0.0035 [0.104 x 0.089]
Plating (Pads & Bottom of Die)	Gold

Figure 2. PMA3-15453-D+ Die Outline



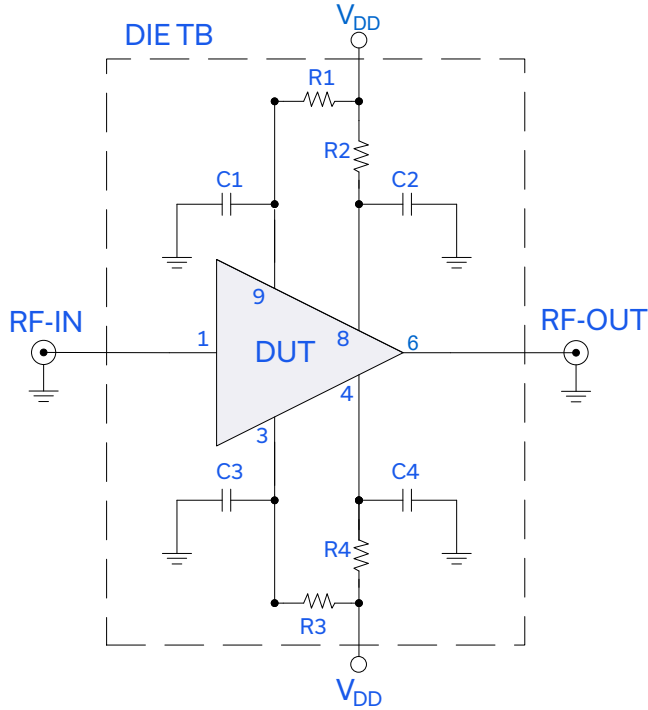


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## CHARACTERIZATION AND APPLICATION CIRCUIT



### Electrical Parameters and Conditions

1. Gain and Return Loss:  $P_{IN} = -25$  dBm
2. Output IP3 (OIP3): Two tones, spaced 1 MHz apart, -5 dBm/ tone at output.
3.  $V_{DD} = +5V$

Figure 3. PMA3-15453-D+ Characterization and Application Circuit

Component	Value	Size	Part Number	Manufacturer
R1, R3	39 Ω	0603	SG73P1JTDD39R0F	KOA
R2, R4	24 Ω	0603	SG73S1JTDD24R0F	KOA
C1, C2, C3, C4	100 pF	0402	GRM1555C1H101JA01D	Murata





### ASSEMBLY DIAGRAM

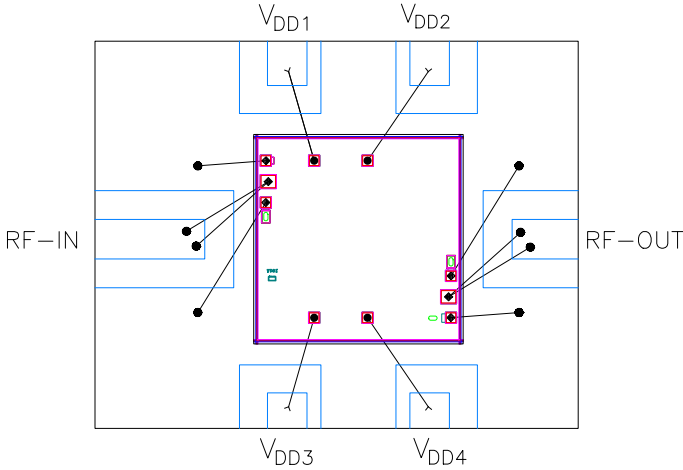



Figure 4. PMA3-15453-D+ Assembly Diagram

Refer to the table in Figure 3. for more details on the passive components

- Bond wire diameter: 1 mil
- Bond wire lengths from Die Pad to PCB at RF-IN & RF-OUT ports:  $26 \pm 2$  mils
- Typical Gap from Die edge to PCB edge: 3 mils
- PCB thickness and material: 6.6 mil Rogers RO4350B (Thickness: 1 oz copper on each side).

### ASSEMBLY AND HANDLING PROCEDURE

1. Storage  
Die should be stored in a dry nitrogen purged desiccator or equivalent.
2.  ESD Precautions  
MMIC pHEMT amplifier die are susceptible to electrostatic and mechanical damage. Die are supplied in anti-static protected material, which should be opened only in clean room conditions at an appropriately grounded anti-static workstation.
3. Die Handling and Attachment  
Devices require careful handling using tools appropriate for manipulating semiconductor chips. It is recommended to handle the chips along the edges with a custom designed collet. The surface of the chips have exposed air bridges and should not be touched with a vacuum collet, tweezers or fingers. The die mounting surface must be clean and flat. Using conductive silver-filled epoxy, apply sufficient adhesive to meet the required bond line thickness, fillet height and coverage around the total periphery of the device. The recommended epoxy is Ablestik 84-1 LMISR4 or equivalent. Parts should be cured in a nitrogen-filled atmosphere per manufacturer's recommended cure profile.
4. Wire Bonding  
Openings in the surface passivation above the gold bond pads are provided to allow wire bonding to the die. Thermosonic bonding is recommended with minimized ultrasonic content. Bond force, time, ultrasonic power and temperature are all critical parameters. The suggested interconnect is pure gold, 1 mil diameter wire. Bonds are recommended to be made from the bond pads on the die to the package or substrate. All bond wire length and bond wire height should be kept as short as possible, unless specified by design, to minimize performance degradation due to undesirable series inductance.



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ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASH BOARD [CLICK HERE](#)

<b>Performance Data</b>	Table Graphs S-Parameter (S2P Files) Data Set (.zip file)								
<b>Case Style</b>	Die								
<b>RoHs Status</b>	Compliant								
<b>Die Ordering and Packaging Information</b>	<table> <tr> <td>Quantity, Package</td> <td>Model No.</td> </tr> <tr> <td>Gel - Pak: 5, 10, 50, 100 KGD*</td> <td>PMA3-15453-DG+</td> </tr> <tr> <td>Medium†, Partial wafer: KGD*&lt;928</td> <td>PMA3-15453-DP+</td> </tr> <tr> <td>Full wafer†</td> <td>PMA3-15453-DF+</td> </tr> </table> <p>†Available upon request contact sales representative. Refer to <a href="#">AN-60-067</a></p>	Quantity, Package	Model No.	Gel - Pak: 5, 10, 50, 100 KGD*	PMA3-15453-DG+	Medium†, Partial wafer: KGD*<928	PMA3-15453-DP+	Full wafer†	PMA3-15453-DF+
Quantity, Package	Model No.								
Gel - Pak: 5, 10, 50, 100 KGD*	PMA3-15453-DG+								
Medium†, Partial wafer: KGD*<928	PMA3-15453-DP+								
Full wafer†	PMA3-15453-DF+								
<b>Die Marking</b>	IO1A								
<b>Environmental Ratings</b>	ENV80								

\* Known Good Die ("KGD") means that the die in question have been subjected to Mini-Circuits DC test performance criteria and measurement instructions and that the parametric data of such die fall within a predefined range. While DC testing is not definitive, it does provide a higher degree of confidence that die are capable of meeting typical RF electrical parameters specified by Mini-Circuits.

Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
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*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +4.75 V, I<sub>DD</sub> = 122mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10.0	8.9	64.0	6.1	4.7	160.7	0.8	15.8	5.7	7.0
10.5	10.7	65.7	7.4	5.0	177.0	0.8	15.3	5.8	6.2
11.0	12.4	59.1	8.9	5.4	76.6	0.8	16.3	6.3	5.5
11.5	13.9	59.8	11.0	5.8	75.9	0.8	17.1	7.0	4.8
12.0	15.3	59.0	13.8	6.3	64.2	0.8	18.1	7.6	4.2
12.5	16.4	58.1	17.1	6.9	54.4	0.8	18.6	8.1	3.8
13.0	17.3	56.2	19.8	7.6	41.2	0.8	18.6	8.8	3.3
13.5	18.0	55.6	20.3	8.4	37.1	0.9	18.9	9.5	3.1
14.0	18.5	54.3	19.4	9.3	30.7	0.9	19.7	10.0	2.9
14.5	18.9	54.0	18.9	10.2	29.3	0.9	20.8	10.6	2.7
15.0	19.1	54.4	19.2	11.1	30.7	0.9	20.6	11.3	2.6
15.5	19.2	53.1	19.7	11.9	26.8	0.9	21.0	11.7	2.6
16.0	19.1	54.0	20.8	12.5	30.0	1.0	21.5	12.1	2.5
16.5	19.2	53.7	21.6	12.9	29.1	1.0	22.4	12.4	2.4
17.0	19.2	53.2	21.8	13.1	27.8	1.0	22.7	12.5	2.4
17.5	19.1	55.2	20.8	13.3	35.8	1.0	22.8	12.6	2.3
18.0	19.0	55.1	19.0	13.4	36.0	1.0	22.4	12.6	2.3
18.5	18.7	53.3	16.9	13.3	29.8	1.0	23.5	12.7	2.3
19.0	18.5	53.1	14.7	13.0	29.6	1.0	23.1	12.8	2.4
19.5	18.3	55.2	12.8	12.4	37.9	1.0	23.4	12.7	2.4
20.0	17.9	52.5	11.1	11.8	27.9	1.0	23.1	12.7	2.5
20.5	17.4	55.3	9.9	10.9	39.0	1.0	22.1	12.8	2.7
21.0	17.0	55.9	9.0	10.2	41.9	1.0	23.2	13.0	2.8
21.5	16.6	56.1	8.4	9.7	43.3	1.0	24.3	13.0	2.8
22.0	16.3	54.8	8.1	9.4	37.6	1.0	23.8	13.2	2.8
22.5	16.1	56.7	7.9	9.2	47.5	1.0	24.2	13.4	2.8
23.0	16.0	55.9	8.0	9.2	44.4	1.0	23.9	13.9	2.8
23.5	15.9	58.6	8.2	9.3	62.0	1.0	24.1	13.9	2.8
24.0	16.0	56.9	8.5	9.4	52.1	1.0	24.7	14.4	2.8
24.5	16.0	55.3	8.9	9.5	43.8	1.0	24.2	14.6	2.7
25.0	16.0	57.6	9.4	9.7	58.4	1.0	23.8	14.8	2.8
25.5	16.1	59.5	9.8	9.8	73.8	1.0	24.2	15.1	2.7
26.0	16.1	60.8	10.1	10.0	86.0	1.0	24.7	15.5	2.8
26.5	16.2	59.9	10.6	10.1	77.4	1.0	24.6	15.7	2.9
27.0	16.3	57.3	10.9	10.2	57.7	1.0	24.6	16.1	2.9
27.5	16.3	61.4	11.3	10.0	93.0	1.0	25.1	16.2	2.9
28.0	16.3	57.5	11.6	9.8	59.2	1.0	25.4	16.3	2.9
28.5	16.3	60.7	12.2	9.7	86.8	0.9	25.2	16.3	2.9
29.0	16.3	64.8	12.6	9.9	141.5	0.9	24.3	16.3	3.0
29.5	16.3	73.1	13.1	10.3	374.7	1.0	25.5	16.5	3.0
30.0	16.4	74.1	13.6	11.0	423.0	1.0	25.2	16.3	3.0
30.5	16.4	67.4	13.7	11.6	199.1	1.0	25.8	16.3	3.0
31.0	16.4	64.6	13.5	12.1	146.2	1.0	24.8	16.4	3.1
31.5	16.4	62.6	12.8	12.0	115.4	1.0	25.5	16.8	3.3
32.0	16.3	63.6	11.7	11.6	129.6	1.0	24.6	16.5	3.4
32.5	16.2	63.7	10.5	11.3	130.1	1.0	24.3	15.5	3.6
33.0	16.2	61.9	9.3	11.1	104.3	1.0	25.5	15.6	3.7
33.5	16.1	65.8	8.4	11.1	161.2	1.1	24.1	15.4	3.9
34.0	16.0	57.0	7.7	11.3	58.4	1.1	24.2	14.9	4.0
34.5	15.8	60.1	7.1	11.5	82.9	1.1	25.3	15.2	4.1
35.0	15.7	57.2	6.8	11.5	59.8	1.1	24.2	14.9	4.2
35.5	15.5	58.4	6.7	11.5	68.9	1.1	25.4	15.0	4.3
36.0	15.3	57.4	6.8	11.1	62.2	1.1	24.5	14.7	4.3
36.5	15.2	57.6	7.0	10.9	65.0	1.1	24.2	14.4	4.3
37.0	15.1	54.0	7.4	10.8	44.5	1.1	24.6	14.6	4.2
37.5	15.1	53.3	7.9	11.1	42.4	1.1	25.2	14.2	4.1
38.0	15.2	55.6	8.5	11.5	57.9	1.1	23.8	14.1	4.0
38.5	15.2	53.1	9.3	12.2	45.3	1.1	24.0	14.0	3.9
39.0	15.2	51.5	10.2	13.0	39.3	1.0	24.3	14.0	3.8
39.5	15.2	55.2	11.3	13.3	62.6	1.0	25.0	14.2	3.7
40.0	15.0	50.3	12.3	13.2	37.2	1.0	24.5	13.6	3.6
40.5	14.7	49.5	13.5	13.0	35.5	1.0	24.8	13.3	3.5
41.0	14.4	52.4	14.8	13.0	52.5	1.0	24.1	13.2	3.6
41.5	14.0	51.1	15.7	13.4	48.3	1.0	24.1	12.6	3.6
42.0	13.6	48.7	16.3	14.2	38.9	1.0	24.4	12.2	3.7
42.5	13.1	50.8	16.3	15.5	52.6	1.0	23.5	12.2	3.9
43.0	12.8	49.2	15.8	16.6	45.2	1.0	24.4	11.9	4.0
43.5	12.5	50.5	15.0	17.3	54.1	1.0	26.1	11.9	4.2
44.0	12.1	47.3	14.0	17.0	38.7	1.0	24.3	11.6	4.4
44.5	11.6	48.0	13.1	16.7	43.7	1.0	24.9	10.9	4.6
45.0	11.1	47.1	12.3	16.5	41.4	1.0	25.4	11.0	4.9

*Typical Performance Data*

**NOTE: Use PDF Bookmarks to view DATA at required conditions**

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5 V, I<sub>DD</sub> = 130mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10.0	8.9	71.0	6.2	4.7	357.2	0.8	16.2	6.1	7.0
10.5	10.7	63.7	7.4	5.0	140.4	0.8	15.8	6.1	6.2
11.0	12.4	61.3	9.0	5.4	97.3	0.8	16.7	6.8	5.4
11.5	14.0	59.5	11.1	5.8	73.4	0.8	17.6	7.4	4.8
12.0	15.3	59.5	13.8	6.3	67.7	0.8	18.5	8.0	4.2
12.5	16.5	58.1	17.1	6.9	53.7	0.8	19.2	8.6	3.7
13.0	17.4	57.0	19.9	7.6	44.7	0.8	19.1	9.3	3.4
13.5	18.0	55.8	20.3	8.3	37.9	0.9	19.2	9.9	3.1
14.0	18.6	55.2	19.4	9.2	33.9	0.9	20.1	10.6	2.9
14.5	18.9	54.8	18.8	10.2	32.1	0.9	21.1	10.9	2.8
15.0	19.1	54.6	19.1	11.1	31.4	0.9	21.1	11.6	2.6
15.5	19.2	54.6	19.8	11.9	31.4	0.9	21.4	12.1	2.6
16.0	19.2	53.1	20.8	12.5	27.1	1.0	22.0	12.3	2.5
16.5	19.2	53.9	21.6	12.9	29.7	1.0	22.8	12.8	2.5
17.0	19.2	52.9	21.7	13.2	26.7	1.0	22.8	12.9	2.4
17.5	19.1	52.9	20.8	13.4	27.2	1.0	22.7	13.1	2.3
18.0	19.0	55.5	19.1	13.4	37.2	1.0	23.0	13.1	2.3
18.5	18.8	54.3	16.9	13.3	33.2	1.0	24.3	13.2	2.4
19.0	18.6	55.1	14.7	13.0	36.8	1.0	23.7	13.2	2.4
19.5	18.3	53.6	12.8	12.4	31.3	1.0	24.1	13.2	2.5
20.0	17.9	52.8	11.1	11.8	28.8	1.0	23.3	13.2	2.6
20.5	17.5	53.7	9.9	10.9	32.0	1.0	22.6	13.4	2.7
21.0	17.0	55.4	9.0	10.3	39.4	1.0	23.3	13.4	2.8
21.5	16.7	55.9	8.5	9.7	42.1	1.0	23.8	13.5	2.8
22.0	16.4	56.2	8.1	9.4	44.1	1.0	23.7	13.8	2.8
22.5	16.1	57.4	7.9	9.2	51.2	1.0	24.6	14.0	2.9
23.0	16.0	56.4	8.0	9.2	46.5	1.0	24.1	14.4	2.8
23.5	16.0	59.4	8.2	9.3	67.7	1.0	24.2	14.4	2.8
24.0	16.0	57.5	8.5	9.4	55.0	1.0	24.2	14.9	2.7
24.5	16.1	56.9	8.9	9.5	52.5	1.0	24.0	15.0	2.8
25.0	16.1	57.4	9.4	9.7	57.0	1.0	24.4	15.3	2.8
25.5	16.1	59.1	9.8	9.7	70.0	1.0	25.2	15.6	2.8
26.0	16.2	58.5	10.1	9.9	64.9	1.0	24.9	16.0	2.8
26.5	16.3	60.5	10.6	10.1	81.9	1.0	24.6	16.2	2.8
27.0	16.4	61.7	10.9	10.2	94.4	1.0	24.1	16.6	2.9
27.5	16.4	55.4	11.3	10.0	46.0	1.0	26.2	16.7	3.0
28.0	16.4	59.9	11.6	9.8	77.0	1.0	25.4	16.7	3.0
28.5	16.4	66.2	12.2	9.7	160.7	0.9	25.2	16.8	3.0
29.0	16.4	65.1	12.6	9.8	143.6	0.9	25.2	16.8	3.0
29.5	16.5	61.2	13.2	10.3	93.6	0.9	25.2	17.0	3.0
30.0	16.5	57.6	13.7	11.0	62.7	1.0	25.4	16.8	3.0
30.5	16.5	64.9	13.8	11.6	146.8	1.0	24.7	16.8	3.1
31.0	16.6	67.1	13.5	12.1	191.5	1.0	24.9	16.9	3.1
31.5	16.6	75.3	12.9	12.1	488.8	1.0	24.8	17.2	3.3
32.0	16.5	67.3	11.7	11.6	194.8	1.0	24.9	17.0	3.4
32.5	16.4	61.0	10.5	11.3	92.6	1.0	24.7	16.0	3.6
33.0	16.4	62.1	9.3	11.2	103.9	1.0	26.7	16.0	3.7
33.5	16.3	61.1	8.5	11.2	92.3	1.1	25.5	15.9	3.9
34.0	16.2	56.3	7.7	11.4	52.4	1.1	24.6	15.5	4.0
34.5	16.1	55.1	7.2	11.5	45.9	1.1	23.9	15.6	4.1
35.0	15.9	57.5	6.8	11.6	60.2	1.1	24.8	15.3	4.2
35.5	15.7	57.0	6.7	11.5	57.7	1.1	26.6	15.4	4.3
36.0	15.6	57.7	6.8	11.1	63.1	1.1	24.3	15.3	4.3
36.5	15.4	56.2	7.0	10.9	54.3	1.1	24.5	14.8	4.4
37.0	15.4	56.0	7.4	10.8	54.4	1.1	24.1	14.8	4.0
37.5	15.3	56.5	7.9	11.1	60.2	1.1	24.0	14.5	4.9
38.0	15.4	54.8	8.5	11.5	51.5	1.1	23.8	14.5	4.2
38.5	15.4	55.1	9.3	12.2	55.9	1.1	24.3	14.4	4.0
39.0	15.4	52.8	10.2	12.9	44.8	1.0	24.6	14.5	3.9
39.5	15.4	54.1	11.3	13.2	53.8	1.0	25.2	14.6	3.8
40.0	15.2	50.6	12.3	13.2	37.4	1.0	24.7	14.0	3.5
40.5	14.9	50.7	13.5	12.9	39.9	1.0	23.8	13.9	3.6
41.0	14.6	50.3	14.8	13.0	40.6	1.0	24.0	13.6	3.6
41.5	14.2	51.2	15.7	13.4	47.5	1.0	26.1	13.1	3.8
42.0	13.8	50.5	16.4	14.2	46.9	1.0	23.9	12.8	3.9
42.5	13.3	48.8	16.3	15.4	40.7	1.0	22.9	12.6	4.0
43.0	13.0	48.7	15.8	16.5	41.6	1.0	23.9	12.5	4.1
43.5	12.7	49.0	15.1	17.2	44.4	1.0	25.2	12.5	4.3
44.0	12.3	49.7	14.1	17.0	50.1	1.0	24.7	12.0	4.5
44.5	11.8	47.4	13.1	16.6	39.7	1.0	23.9	11.2	4.8
45.0	11.3	48.6	12.2	16.5	47.9	1.0	23.5	11.2	5.2

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5.25 V, I<sub>DD</sub> = 137mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
10.0	8.9	62.3	6.3	4.7	132.3	0.8	16.6	6.2	7.0
10.5	10.7	62.9	7.5	5.0	129.6	0.8	16.2	6.6	6.2
11.0	12.4	60.9	9.2	5.4	94.4	0.8	17.2	7.2	5.5
11.5	13.9	60.1	11.2	5.8	79.2	0.8	18.0	7.8	4.8
12.0	15.3	58.1	13.9	6.3	58.1	0.8	18.9	8.4	4.2
12.5	16.4	58.4	17.2	6.9	55.9	0.8	19.6	9.1	3.8
13.0	17.3	56.0	20.0	7.5	39.9	0.8	19.3	9.7	3.4
13.5	18.0	55.7	20.5	8.3	37.3	0.9	19.6	10.3	3.1
14.0	18.5	56.0	19.5	9.2	37.4	0.9	20.3	10.8	2.9
14.5	18.9	53.3	18.8	10.1	27.0	0.9	21.8	11.3	2.7
15.0	19.1	53.9	19.1	11.1	29.0	0.9	21.3	11.9	2.7
15.5	19.2	53.9	19.9	11.9	29.2	0.9	21.9	12.3	2.6
16.0	19.2	53.5	21.0	12.5	28.2	1.0	22.3	12.7	2.5
16.5	19.2	54.2	21.7	12.9	30.8	1.0	23.1	13.0	2.4
17.0	19.2	54.0	21.7	13.2	30.2	1.0	23.0	13.3	2.4
17.5	19.1	53.5	20.8	13.4	29.1	1.0	23.0	13.5	2.4
18.0	19.0	53.8	19.2	13.4	30.8	1.0	23.0	13.5	2.4
18.5	18.8	53.9	17.0	13.3	31.7	1.0	24.0	13.6	2.4
19.0	18.6	54.7	14.7	13.0	35.3	1.0	23.9	13.6	2.4
19.5	18.3	53.7	12.8	12.4	31.7	1.0	23.8	13.6	2.5
20.0	17.9	54.2	11.2	11.8	33.9	1.0	23.8	13.7	2.6
20.5	17.5	55.8	10.0	10.9	40.7	1.0	22.6	13.8	2.7
21.0	17.0	54.5	9.1	10.3	35.5	1.0	23.7	13.8	2.8
21.5	16.7	56.1	8.5	9.7	42.9	1.0	23.9	13.9	2.8
22.0	16.4	56.4	8.1	9.4	45.0	1.0	23.8	14.2	2.9
22.5	16.2	56.5	8.0	9.2	46.2	1.0	24.8	14.4	2.9
23.0	16.1	57.1	8.1	9.2	50.7	1.0	24.3	14.8	2.8
23.5	16.0	59.4	8.2	9.3	67.5	1.0	24.3	14.9	2.8
24.0	16.1	56.6	8.5	9.4	49.7	1.0	25.2	15.3	2.8
24.5	16.1	57.5	8.9	9.5	55.7	1.0	25.3	15.5	2.8
25.0	16.2	59.1	9.5	9.6	68.8	1.0	24.1	15.7	2.8
25.5	16.2	62.0	9.9	9.7	96.3	1.0	25.4	16.1	2.8
26.0	16.3	60.1	10.1	9.9	77.5	1.0	25.0	16.5	2.8
26.5	16.4	58.9	10.5	10.1	67.5	1.0	24.1	16.6	2.9
27.0	16.5	63.1	10.9	10.1	110.3	1.0	24.8	17.1	2.9
27.5	16.5	58.0	11.3	10.0	61.5	1.0	25.2	17.2	3.0
28.0	16.5	59.6	11.6	9.8	73.3	1.0	24.3	17.2	3.0
28.5	16.5	64.6	12.2	9.7	132.4	0.9	25.7	17.3	3.0
29.0	16.6	61.7	12.6	9.8	95.3	0.9	25.5	17.2	3.0
29.5	16.6	61.0	13.3	10.2	89.9	0.9	24.2	17.4	3.0
30.0	16.7	81.7	13.7	10.9	988.4	1.0	23.6	17.2	3.1
30.5	16.7	61.9	13.8	11.6	102.1	1.0	25.4	17.1	3.1
31.0	16.8	65.2	13.6	12.1	149.6	1.0	25.3	17.4	3.1
31.5	16.7	59.3	13.0	12.0	76.6	1.0	25.3	17.6	3.3
32.0	16.7	70.2	11.8	11.7	265.9	1.0	25.5	17.4	3.5
32.5	16.6	68.3	10.5	11.4	212.4	1.0	25.1	16.4	3.6
33.0	16.6	68.4	9.3	11.2	211.5	1.0	24.9	16.5	3.8
33.5	16.5	60.2	8.5	11.2	81.5	1.1	24.3	16.3	3.9
34.0	16.4	62.1	7.7	11.4	100.6	1.1	25.1	15.8	4.1
34.5	16.3	60.6	7.1	11.5	84.3	1.1	24.8	16.0	4.1
35.0	16.1	62.1	6.8	11.6	99.0	1.1	24.4	15.8	4.3
35.5	15.9	60.7	6.7	11.5	86.2	1.1	24.7	15.9	4.3
36.0	15.8	57.0	6.8	11.2	56.7	1.1	24.8	15.5	4.4
36.5	15.6	55.4	7.0	11.0	48.0	1.1	24.9	15.3	4.3
37.0	15.6	58.7	7.4	10.8	73.0	1.1	25.1	15.3	4.7
37.5	15.6	54.1	7.8	11.0	44.3	1.1	24.9	15.0	3.9
38.0	15.6	54.1	8.5	11.4	46.2	1.1	23.6	15.0	4.6
38.5	15.6	54.6	9.3	12.1	51.6	1.0	25.4	14.8	3.9
39.0	15.6	53.9	10.1	12.9	49.6	1.0	24.3	15.0	3.8
39.5	15.6	54.3	11.2	13.1	53.6	1.0	24.7	14.9	3.8
40.0	15.4	52.8	12.3	13.2	47.3	1.0	23.3	14.5	3.6
40.5	15.1	53.0	13.5	12.9	50.9	1.0	24.1	14.4	3.6
41.0	14.8	48.6	14.7	12.9	32.6	1.0	24.1	14.1	3.6
41.5	14.4	48.5	15.6	13.3	34.2	1.0	26.2	13.7	3.8
42.0	14.0	53.6	16.4	14.1	65.5	1.0	24.0	13.1	3.9
42.5	13.5	50.4	16.3	15.3	47.8	1.0	23.8	13.1	4.0
43.0	13.2	48.5	15.8	16.4	39.8	1.0	24.3	12.9	4.2
43.5	12.9	49.7	15.1	17.1	47.3	1.0	24.5	12.9	4.4
44.0	12.5	48.2	14.1	16.9	41.1	1.0	23.9	12.5	4.6
44.5	12.0	47.2	13.2	16.7	38.1	1.0	25.5	11.4	4.8
45.0	11.5	47.6	12.3	16.5	41.9	1.0	24.2	11.5	4.8

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +4.75 V, I<sub>DD</sub> = 121mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10.0	9.6	68.5	5.8	4.5	230.4	0.8	16.5	5.8	5.9
10.5	11.4	63.0	7.0	4.8	112.5	0.8	16.0	5.9	5.2
11.0	13.1	61.6	8.4	5.2	88.3	0.8	16.9	6.5	4.6
11.5	14.6	59.7	10.4	5.5	65.3	0.8	17.9	7.2	4.0
12.0	16.0	60.9	13.0	5.9	69.1	0.8	18.8	7.8	3.4
12.5	17.2	61.3	16.1	6.4	67.6	0.8	19.4	8.4	3.0
13.0	18.1	56.4	18.8	7.0	36.3	0.8	19.3	9.1	2.6
13.5	18.8	54.9	19.4	7.9	29.5	0.8	19.8	9.6	2.3
14.0	19.4	54.9	18.7	8.8	28.6	0.9	20.5	10.4	2.1
14.5	19.8	54.5	18.2	9.9	26.8	0.9	21.7	11.0	2.0
15.0	20.1	54.2	18.8	11.0	26.0	0.9	21.4	11.8	1.9
15.5	20.2	54.2	19.8	11.8	26.0	0.9	21.8	12.2	1.9
16.0	20.2	53.3	20.9	12.2	24.0	0.9	22.3	12.5	1.7
16.5	20.2	53.8	21.2	12.4	25.5	0.9	23.5	12.9	1.7
17.0	20.2	53.6	21.4	12.7	25.0	1.0	23.8	13.0	1.7
17.5	20.1	52.2	20.5	13.1	21.7	1.0	23.0	13.2	1.7
18.0	20.0	53.3	19.2	13.4	25.0	1.0	23.2	13.3	1.7
18.5	19.8	54.2	17.8	13.6	28.6	1.0	24.1	13.3	1.6
19.0	19.6	54.3	15.8	13.5	29.0	1.0	24.0	13.3	1.7
19.5	19.4	53.2	13.7	12.7	25.9	1.0	24.9	13.3	1.8
20.0	19.0	54.1	11.6	11.9	28.6	1.0	24.0	13.3	1.9
20.5	18.6	54.5	10.0	10.9	30.3	1.0	22.5	13.4	1.9
21.0	18.0	54.2	8.8	9.9	29.2	1.0	24.0	13.4	2.1
21.5	17.6	55.9	8.0	9.2	35.3	1.0	24.7	13.5	2.2
22.0	17.3	54.8	7.5	8.9	31.3	1.0	24.7	13.7	2.2
22.5	17.1	55.8	7.4	8.9	36.2	1.0	24.9	13.8	2.1
23.0	17.0	53.9	7.6	9.0	29.9	1.0	24.9	14.2	2.0
23.5	16.9	58.8	7.9	9.1	54.0	1.0	24.8	14.3	2.0
24.0	16.9	58.2	8.2	9.2	51.2	1.0	25.4	14.8	2.0
24.5	16.9	56.5	8.5	9.1	42.9	1.0	25.0	14.8	2.0
25.0	16.8	57.6	8.7	9.1	49.4	1.0	24.9	15.1	2.0
25.5	16.8	61.7	8.8	9.2	79.2	1.0	25.4	15.3	2.1
26.0	16.9	62.5	9.2	9.3	87.9	1.0	26.3	15.8	2.1
26.5	17.1	60.1	9.7	9.6	67.6	1.0	25.7	16.0	2.2
27.0	17.2	57.9	10.2	9.8	52.9	1.0	26.5	16.4	2.2
27.5	17.2	55.3	11.2	9.8	39.5	1.0	26.6	16.5	2.2
28.0	17.2	63.6	11.6	9.3	102.0	0.9	25.2	16.5	2.1
28.5	17.1	62.3	12.0	9.1	88.4	0.9	25.0	16.5	2.2
29.0	17.1	60.7	12.0	9.1	74.3	0.9	26.2	16.5	2.3
29.5	17.1	59.3	12.1	9.5	64.2	0.9	27.1	16.6	2.3
30.0	17.1	62.8	12.2	10.2	98.2	1.0	24.9	16.4	2.4
30.5	17.2	64.3	12.8	11.2	119.8	1.0	26.3	16.5	2.5
31.0	17.3	63.0	13.2	11.9	104.6	1.0	26.8	16.7	2.4
31.5	17.3	65.5	13.2	11.9	139.9	1.0	25.6	17.0	2.5
32.0	17.2	69.4	12.2	11.4	216.8	1.0	26.5	16.7	2.6
32.5	17.1	84.1	10.5	10.9	1152.7	1.0	25.5	15.8	2.8
33.0	16.9	63.1	8.9	10.7	100.6	1.0	27.7	15.8	2.9
33.5	16.8	68.5	7.7	10.6	182.0	1.1	26.9	15.7	3.2
34.0	16.6	63.8	6.8	10.8	104.0	1.1	27.1	15.2	3.3
34.5	16.5	65.8	6.5	11.0	131.5	1.1	27.6	15.4	3.4
35.0	16.5	60.4	6.5	11.3	71.3	1.1	27.9	15.2	3.4
35.5	16.5	61.4	6.7	11.5	81.2	1.1	28.7	15.4	3.4
36.0	16.5	59.5	6.8	11.4	65.8	1.1	26.9	15.2	3.3
36.5	16.5	58.3	6.8	11.2	58.0	1.1	26.1	14.7	3.2
37.0	16.4	54.6	6.9	11.0	38.8	1.1	26.3	15.0	3.5
37.5	16.3	55.8	7.1	11.1	45.4	1.1	26.1	14.6	3.1
38.0	16.2	56.5	7.7	11.3	51.2	1.1	26.6	14.7	3.6
38.5	16.2	55.2	8.4	11.7	46.2	1.1	25.9	14.5	3.0
39.0	16.1	53.9	9.1	12.0	40.9	1.1	26.4	14.5	2.9
39.5	16.1	55.2	10.3	12.0	49.4	1.0	29.3	14.5	2.8
40.0	15.9	51.9	11.4	12.0	35.0	1.0	27.8	14.1	2.7
40.5	15.7	51.5	12.5	11.9	35.1	1.0	26.6	14.1	2.8
41.0	15.3	54.5	13.6	12.3	52.0	1.0	27.8	13.9	2.9
41.5	14.9	52.4	14.4	13.0	43.4	1.0	25.9	13.4	3.1
42.0	14.5	50.1	15.9	14.0	35.8	1.0	28.6	12.8	3.0
42.5	14.1	51.6	16.7	15.3	45.0	1.0	25.9	12.9	3.1
43.0	13.8	51.9	15.9	16.5	48.4	1.0	27.2	12.6	3.3
43.5	13.6	49.3	14.2	17.1	36.7	1.0	29.0	12.6	3.4
44.0	13.3	49.1	12.2	16.8	36.4	1.0	27.0	12.2	3.6
44.5	12.9	47.9	11.5	15.9	33.0	1.0	26.0	11.9	3.8
45.0	12.5	47.9	11.0	15.6	34.1	1.1	27.2	12.1	3.9

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5 V, I<sub>DD</sub> = 129mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
10.0	9.7	62.5	5.9	4.5	113.9	0.8	17.0	6.3	6.0
10.5	11.5	62.5	7.0	4.8	104.8	0.8	16.5	6.5	5.3
11.0	13.2	60.6	8.4	5.1	77.7	0.8	17.4	7.1	4.6
11.5	14.7	58.2	10.4	5.5	54.3	0.8	18.4	7.8	4.0
12.0	16.1	59.0	13.0	5.9	54.8	0.8	19.3	8.4	3.5
12.5	17.2	59.0	16.1	6.4	51.5	0.8	19.8	9.0	3.0
13.0	18.2	56.5	18.8	7.0	36.3	0.8	19.7	9.6	2.6
13.5	18.8	57.4	19.4	7.8	39.1	0.8	20.2	10.3	2.3
14.0	19.5	54.7	18.6	8.8	27.8	0.9	20.7	10.9	2.2
14.5	19.9	54.5	18.2	9.9	26.8	0.9	22.0	11.4	2.1
15.0	20.2	54.7	18.8	11.0	27.3	0.9	22.1	12.2	2.0
15.5	20.3	53.8	19.8	11.8	24.8	0.9	22.4	12.7	1.9
16.0	20.3	53.5	20.9	12.2	24.4	0.9	22.8	12.9	1.8
16.5	20.3	53.7	21.1	12.3	24.7	0.9	24.2	13.4	1.8
17.0	20.3	52.9	21.3	12.6	22.8	1.0	24.2	13.6	1.7
17.5	20.2	54.2	20.3	13.1	26.9	1.0	24.1	13.7	1.7
18.0	20.1	54.5	19.0	13.4	28.4	1.0	24.1	13.9	1.7
18.5	19.9	53.5	17.8	13.8	26.1	1.0	25.1	13.9	1.7
19.0	19.7	55.1	15.7	13.6	31.7	1.0	24.4	13.9	1.7
19.5	19.5	54.3	13.7	12.8	28.9	1.0	24.7	13.9	1.8
20.0	19.1	53.6	11.6	11.9	27.0	1.0	23.9	13.9	1.8
20.5	18.7	55.8	9.9	10.8	34.7	1.0	23.4	14.0	2.0
21.0	18.1	54.8	8.8	9.8	30.7	1.0	23.9	14.0	2.0
21.5	17.7	55.2	7.9	9.1	32.1	1.0	25.0	14.0	2.2
22.0	17.3	56.3	7.5	8.8	36.9	1.0	24.9	14.3	2.2
22.5	17.1	54.6	7.4	8.9	31.2	1.0	25.7	14.4	2.1
23.0	17.1	55.2	7.6	9.0	34.1	1.0	25.3	14.8	2.1
23.5	17.0	57.8	7.9	9.1	47.4	1.0	24.9	14.8	2.0
24.0	17.0	58.3	8.2	9.2	51.4	1.0	25.8	15.3	2.0
24.5	17.0	56.7	8.5	9.1	43.3	1.0	26.1	15.5	2.0
25.0	16.9	56.8	8.7	9.0	44.1	1.0	24.9	15.7	2.1
25.5	16.9	61.4	8.8	9.1	75.5	1.0	26.0	15.9	2.1
26.0	17.0	60.6	9.2	9.2	69.7	1.0	26.0	16.3	2.2
26.5	17.2	59.3	9.6	9.6	60.6	1.0	25.8	16.5	2.2
27.0	17.3	62.2	10.2	9.8	84.6	1.0	26.6	16.9	2.2
27.5	17.4	58.4	11.2	9.8	55.7	1.0	25.5	17.0	2.2
28.0	17.3	57.8	11.6	9.3	51.4	0.9	26.5	17.0	2.3
28.5	17.3	64.4	12.0	9.0	110.6	0.9	25.4	17.0	2.2
29.0	17.2	65.9	11.9	9.0	132.0	0.9	25.9	17.0	2.3
29.5	17.2	65.8	12.0	9.5	132.9	0.9	26.2	17.1	2.4
30.0	17.3	62.3	12.1	10.2	90.8	1.0	26.0	16.9	2.4
30.5	17.3	61.6	12.8	11.3	85.8	1.0	26.8	17.0	2.4
31.0	17.4	71.6	13.2	11.9	276.7	1.0	25.7	17.2	2.4
31.5	17.4	67.3	13.4	11.9	169.1	1.0	27.1	17.5	2.5
32.0	17.4	65.6	12.3	11.4	137.5	1.0	25.7	17.1	2.7
32.5	17.3	65.1	10.5	10.9	126.3	1.0	26.2	16.3	2.8
33.0	17.1	68.3	8.8	10.7	178.4	1.0	26.5	16.2	3.0
33.5	16.9	67.5	7.6	10.5	158.2	1.1	26.8	16.3	3.3
34.0	16.7	65.9	6.7	10.7	128.9	1.1	27.2	15.7	3.4
34.5	16.7	64.1	6.5	10.9	104.8	1.1	26.3	15.9	3.5
35.0	16.7	62.8	6.5	11.3	91.3	1.1	26.6	15.7	3.5
35.5	16.7	62.5	6.7	11.5	90.5	1.1	27.3	15.9	3.4
36.0	16.7	56.3	6.8	11.4	44.8	1.1	26.0	15.6	3.4
36.5	16.7	56.8	6.8	11.3	47.9	1.1	26.4	15.1	3.5
37.0	16.6	56.7	6.9	11.1	48.2	1.1	28.3	15.4	3.6
37.5	16.5	58.7	7.1	11.2	62.3	1.1	26.4	15.1	2.7
38.0	16.4	56.5	7.6	11.3	50.1	1.1	27.7	15.0	3.3
38.5	16.3	54.3	8.4	11.6	40.5	1.1	27.1	15.0	3.0
39.0	16.3	52.1	9.0	11.7	32.6	1.0	27.4	14.9	2.8
39.5	16.2	53.9	10.3	11.7	41.5	1.0	25.6	15.0	3.0
40.0	16.1	57.2	11.3	11.8	63.2	1.0	27.6	14.6	3.0
40.5	15.8	53.7	12.5	11.8	44.3	1.0	28.9	14.5	2.9
41.0	15.5	52.2	13.5	12.4	39.3	1.0	26.7	14.3	2.9
41.5	15.1	51.4	14.4	13.2	38.1	1.0	30.0	13.8	3.1
42.0	14.7	53.1	15.9	14.1	49.1	1.0	27.5	13.3	3.1
42.5	14.2	50.9	16.8	15.3	41.0	1.0	26.0	13.3	3.2
43.0	14.0	47.8	15.8	16.4	29.7	1.0	27.1	13.1	3.3
43.5	13.7	49.5	14.1	16.9	36.6	1.0	27.1	13.0	3.5
44.0	13.4	48.3	12.1	16.6	32.5	1.0	28.7	12.9	3.7
44.5	13.1	49.5	11.4	15.7	38.5	1.0	29.7	12.6	3.9
45.0	12.7	46.9	10.9	15.3	29.8	1.0	26.3	12.6	4.3

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5.25 V, I<sub>DD</sub> = 137mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)	K	Measure	(dBm)	(dBm)	(dB)
10.0	9.8	66.7	5.9	4.5	182.3	0.8	17.6	6.8	6.1
10.5	11.6	67.4	7.0	4.8	181.4	0.8	17.1	7.1	5.2
11.0	13.3	60.1	8.4	5.1	72.2	0.8	18.0	7.6	4.6
11.5	14.8	60.2	10.4	5.5	67.9	0.8	18.9	8.2	4.0
12.0	16.2	57.3	13.0	5.9	44.8	0.8	19.7	8.8	3.5
12.5	17.3	57.6	16.1	6.4	43.3	0.8	20.1	9.4	3.0
13.0	18.2	56.6	18.8	7.0	36.3	0.8	20.1	10.2	2.7
13.5	18.9	56.4	19.3	7.8	34.8	0.8	20.6	10.7	2.4
14.0	19.5	55.4	18.6	8.8	29.8	0.9	21.0	11.3	2.2
14.5	20.0	54.4	18.2	9.9	26.3	0.9	22.8	11.8	2.1
15.0	20.2	53.8	18.8	11.0	24.4	0.9	22.0	12.7	2.0
15.5	20.3	53.9	19.8	11.8	24.8	0.9	22.5	13.1	1.9
16.0	20.3	54.3	20.9	12.1	26.3	0.9	23.0	13.3	1.8
16.5	20.4	54.3	21.0	12.3	26.5	0.9	23.6	13.8	1.8
17.0	20.4	53.6	21.2	12.6	24.7	1.0	24.2	14.1	1.7
17.5	20.3	53.2	20.1	13.0	23.9	1.0	23.8	14.3	1.7
18.0	20.1	53.1	18.9	13.4	24.1	1.0	23.8	14.3	1.7
18.5	19.9	54.1	17.7	13.8	27.7	1.0	24.7	14.4	1.7
19.0	19.8	54.1	15.7	13.7	28.0	1.0	24.0	14.5	1.8
19.5	19.6	54.2	13.7	12.8	28.6	1.0	24.9	14.4	1.8
20.0	19.2	54.5	11.6	11.9	29.6	1.0	24.3	14.4	1.9
20.5	18.7	56.5	9.9	10.8	37.2	1.0	23.1	14.5	2.0
21.0	18.2	55.6	8.7	9.8	33.4	1.0	24.4	14.5	2.1
21.5	17.7	55.8	7.9	9.1	34.3	1.0	25.5	14.6	2.2
22.0	17.4	55.3	7.4	8.8	32.6	1.0	24.8	14.8	2.2
22.5	17.2	56.4	7.4	8.8	38.0	1.0	25.8	15.0	2.2
23.0	17.2	56.3	7.6	9.0	38.3	1.0	25.0	15.4	2.1
23.5	17.1	58.1	7.9	9.2	49.0	1.0	25.1	15.4	2.1
24.0	17.1	58.0	8.2	9.2	48.9	1.0	25.2	15.9	2.1
24.5	17.1	57.0	8.5	9.1	44.0	1.0	25.9	15.9	2.0
25.0	17.0	57.2	8.7	9.0	45.9	1.0	25.7	16.2	2.1
25.5	17.0	61.2	8.7	9.1	72.6	1.0	26.5	16.4	2.2
26.0	17.1	61.6	9.1	9.2	76.5	1.0	26.5	16.8	2.2
26.5	17.3	59.1	9.6	9.6	58.1	1.0	25.9	17.1	2.3
27.0	17.4	58.3	10.2	9.8	53.7	1.0	25.5	17.5	2.3
27.5	17.5	64.9	11.2	9.8	115.2	1.0	27.1	17.5	2.3
28.0	17.5	62.1	11.6	9.2	83.7	0.9	25.4	17.5	2.2
28.5	17.4	63.7	12.0	9.0	100.4	0.9	25.9	17.5	2.3
29.0	17.4	66.8	11.9	9.0	145.2	0.9	25.8	17.5	2.4
29.5	17.4	60.8	11.9	9.4	73.7	0.9	25.6	17.6	2.4
30.0	17.4	58.2	12.0	10.1	55.7	1.0	27.3	17.4	2.5
30.5	17.5	62.2	12.7	11.3	90.7	1.0	26.0	17.4	2.6
31.0	17.6	61.0	13.3	12.0	79.8	1.0	27.1	17.7	2.5
31.5	17.6	60.0	13.4	12.0	71.2	1.0	27.9	18.0	2.6
32.0	17.5	58.9	12.4	11.4	62.5	1.0	27.7	17.6	2.7
32.5	17.4	76.4	10.5	10.9	456.2	1.0	25.3	16.7	2.9
33.0	17.3	74.1	8.8	10.7	340.7	1.0	24.8	16.7	3.1
33.5	17.1	62.9	7.5	10.5	91.0	1.1	26.3	16.7	3.3
34.0	16.9	59.0	6.7	10.7	57.4	1.1	26.4	16.1	3.5
34.5	16.8	60.5	6.5	10.9	67.7	1.1	25.7	16.3	3.6
35.0	16.8	62.3	6.5	11.3	84.3	1.1	26.7	16.1	3.6
35.5	16.9	60.6	6.7	11.5	71.3	1.1	27.4	16.3	3.5
36.0	16.9	61.5	6.8	11.5	79.6	1.1	26.6	16.0	3.5
36.5	16.9	56.4	6.8	11.3	44.9	1.1	25.9	15.5	3.2
37.0	16.8	58.3	6.9	11.1	56.8	1.1	26.5	15.9	3.5
37.5	16.6	58.8	7.0	11.2	61.8	1.1	28.6	15.4	3.2
38.0	16.6	58.6	7.6	11.2	62.2	1.1	25.7	15.4	3.1
38.5	16.5	54.7	8.3	11.5	41.4	1.1	27.0	15.3	3.1
39.0	16.4	54.1	9.0	11.6	39.9	1.0	26.2	15.2	2.8
39.5	16.4	56.4	10.2	11.5	54.4	1.0	27.3	15.4	2.9
40.0	16.2	56.3	11.3	11.7	55.9	1.0	26.0	15.0	3.0
40.5	16.0	50.0	12.5	11.7	28.3	1.0	26.8	15.0	2.9
41.0	15.7	53.2	13.6	12.4	43.4	1.0	27.0	14.8	3.0
41.5	15.2	52.2	14.4	13.2	41.1	1.0	27.9	14.3	3.2
42.0	14.8	51.5	16.0	14.2	40.6	1.0	27.6	13.8	3.3
42.5	14.4	52.6	16.9	15.4	48.7	1.0	25.4	13.8	3.3
43.0	14.1	52.5	15.8	16.3	50.0	1.0	27.4	13.6	3.5
43.5	13.9	50.2	14.0	16.8	39.2	1.0	24.9	13.5	3.5
44.0	13.6	49.3	12.0	16.4	35.8	1.0	25.4	13.2	3.8
44.5	13.2	48.4	11.3	15.5	33.4	1.0	26.5	12.8	3.9
45.0	12.8	49.1	10.8	15.2	37.7	1.0	27.1	13.2	4.3



*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +4.75 V, I<sub>DD</sub> = 121mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
10.0	7.7	65.0	6.3	4.9	211.4	0.8	15.2	5.1	7.9
10.5	9.6	61.3	7.6	5.1	124.6	0.8	14.8	5.4	7.0
11.0	11.3	59.3	9.2	5.5	90.5	0.8	15.8	6.0	6.2
11.5	12.9	61.6	11.4	6.0	107.9	0.8	16.8	6.7	5.6
12.0	14.3	58.9	14.3	6.5	72.9	0.8	17.7	7.3	5.0
12.5	15.4	59.1	17.8	7.2	70.2	0.8	18.3	7.8	4.5
13.0	16.2	56.8	20.6	7.9	51.1	0.8	18.3	8.5	4.1
13.5	16.9	57.1	21.0	8.8	50.8	0.9	18.6	9.1	3.8
14.0	17.4	54.7	20.2	9.8	37.7	0.9	19.3	9.6	3.6
14.5	17.7	54.6	19.6	10.7	36.4	0.9	20.7	10.0	3.5
15.0	17.9	55.1	19.9	11.5	38.6	0.9	20.6	10.6	3.3
15.5	18.0	54.0	20.3	12.1	34.3	0.9	20.9	11.0	3.2
16.0	17.9	54.1	21.0	12.5	35.1	1.0	21.5	11.2	3.1
16.5	18.0	53.6	21.3	12.7	33.1	1.0	22.3	11.6	3.1
17.0	18.0	54.1	21.2	13.0	35.4	1.0	22.4	11.8	3.0
17.5	17.9	53.6	20.0	13.2	34.3	1.0	22.5	11.9	3.0
18.0	17.7	53.3	18.4	13.4	33.9	1.0	22.3	11.9	3.0
18.5	17.5	53.2	16.6	13.4	34.1	1.0	23.5	12.1	3.0
19.0	17.3	54.4	14.6	13.2	39.9	1.0	23.3	12.2	3.1
19.5	17.0	56.5	12.7	12.6	51.0	1.0	23.1	12.1	3.1
20.0	16.6	55.5	11.0	11.9	46.2	1.0	22.2	12.1	3.3
20.5	16.2	55.4	9.8	11.0	45.7	1.0	21.8	12.2	3.4
21.0	15.7	54.6	9.0	10.3	41.9	1.0	22.7	12.4	3.5
21.5	15.4	55.9	8.5	9.8	49.1	1.0	24.0	12.5	3.5
22.0	15.2	54.9	8.3	9.5	43.9	1.0	22.8	12.8	3.5
22.5	15.1	57.3	8.2	9.5	58.9	1.0	24.0	13.0	3.5
23.0	15.0	55.8	8.4	9.6	50.7	1.0	23.3	13.4	3.4
23.5	15.0	58.1	8.7	9.9	68.5	1.0	23.8	13.5	3.4
24.0	15.0	56.3	9.1	10.1	56.3	1.0	24.6	13.9	3.4
24.5	15.0	56.0	9.4	10.1	55.9	1.0	24.4	14.1	3.4
25.0	15.0	59.0	9.8	10.3	79.6	1.0	23.6	14.4	3.4
25.5	15.1	58.1	10.1	10.3	72.1	1.0	24.3	14.7	3.5
26.0	15.1	60.4	10.4	10.4	94.0	1.0	24.4	15.0	3.5
26.5	15.2	57.1	10.8	10.4	64.5	1.0	24.1	15.2	3.5
27.0	15.3	57.6	11.1	10.4	68.2	1.0	24.6	15.7	3.6
27.5	15.3	60.3	11.6	10.1	92.9	1.0	24.5	15.7	3.7
28.0	15.3	59.2	11.9	9.7	81.5	1.0	25.1	15.8	3.7
28.5	15.4	63.6	12.4	9.6	137.3	0.9	24.7	15.9	3.7
29.0	15.4	66.3	12.8	9.9	189.6	0.9	24.0	15.9	3.7
29.5	15.4	63.6	13.3	10.6	141.5	1.0	25.5	16.1	3.7
30.0	15.5	62.7	13.8	11.6	129.5	1.0	24.1	16.0	3.7
30.5	15.6	64.4	14.1	12.7	160.5	1.0	24.6	16.0	3.8
31.0	15.6	64.5	14.0	13.6	163.9	1.0	24.6	16.1	3.9
31.5	15.6	60.4	13.5	13.5	102.6	1.0	24.2	16.4	4.0
32.0	15.6	58.8	12.2	12.7	84.6	1.0	24.0	16.1	4.2
32.5	15.5	75.6	10.8	12.0	576.1	1.0	24.1	15.4	4.3
33.0	15.4	61.6	9.5	11.4	112.8	1.0	24.2	15.3	4.4
33.5	15.3	64.1	8.5	11.1	148.1	1.1	26.2	15.3	4.7
34.0	15.2	57.7	7.7	11.0	70.1	1.1	23.7	14.8	4.8
34.5	15.0	59.9	7.2	11.0	90.1	1.1	24.2	15.0	4.9
35.0	14.8	56.9	6.9	11.0	64.0	1.1	24.6	14.7	4.9
35.5	14.6	54.2	6.9	11.0	47.8	1.1	25.1	14.9	4.9
36.0	14.5	54.1	7.0	10.9	48.3	1.1	24.2	14.6	4.9
36.5	14.3	56.1	7.3	10.9	62.8	1.1	24.4	14.3	4.9
37.0	14.3	54.9	7.8	11.0	56.7	1.1	23.8	14.3	4.7
37.5	14.2	53.7	8.3	11.5	51.3	1.1	24.2	14.1	4.6
38.0	14.3	53.2	9.0	12.1	50.8	1.1	24.8	14.2	4.4
38.5	14.3	51.7	9.9	13.0	44.8	1.0	24.1	14.0	4.5
39.0	14.3	51.5	10.8	13.8	45.6	1.0	24.0	14.1	4.1
39.5	14.2	54.5	12.0	14.1	67.0	1.0	24.4	14.1	4.3
40.0	13.9	54.4	13.0	14.0	69.6	1.0	25.9	13.5	4.4
40.5	13.6	51.0	14.3	13.6	49.4	1.0	24.4	13.3	4.5
41.0	13.2	50.3	15.4	13.6	48.3	1.0	24.1	13.0	4.6
41.5	12.7	48.1	16.1	13.8	39.8	1.0	24.5	12.5	4.7
42.0	12.3	50.4	16.6	14.5	54.4	1.0	23.5	12.1	4.9
42.5	11.9	48.3	16.6	15.3	45.2	1.0	22.8	12.1	5.0
43.0	11.6	49.3	16.0	15.9	52.6	1.0	24.1	11.8	5.1
43.5	11.2	49.0	15.3	16.1	52.6	1.0	24.4	11.7	5.3
44.0	10.8	49.1	14.3	15.9	55.6	1.0	24.6	11.3	5.5
44.5	10.3	47.6	13.5	15.7	48.8	1.0	23.5	9.8	5.7
45.0	9.7	47.5	12.7	15.5	50.9	1.0	23.6	9.8	6.3

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5 V, I<sub>DD</sub> = 128mA @ Temperature = +25°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
10.0	7.8	63.1	6.4	4.9	169.3	0.8	15.6	5.2	7.9
10.5	9.7	61.1	7.6	5.2	120.5	0.8	15.3	5.8	7.0
11.0	11.4	59.9	9.2	5.5	95.6	0.8	16.3	6.4	6.3
11.5	12.9	61.3	11.4	6.0	102.8	0.8	17.2	7.1	5.6
12.0	14.3	60.6	14.3	6.5	88.3	0.8	18.1	7.7	5.0
12.5	15.4	58.3	17.8	7.1	63.4	0.8	18.7	8.2	4.5
13.0	16.3	57.1	20.6	7.9	52.4	0.8	18.8	8.9	4.1
13.5	16.9	55.2	21.0	8.8	40.8	0.9	19.1	9.3	3.8
14.0	17.4	54.5	20.1	9.7	36.2	0.9	19.6	9.8	3.6
14.5	17.8	54.7	19.6	10.7	36.8	0.9	21.1	10.3	3.4
15.0	18.0	54.4	19.9	11.5	35.2	0.9	20.9	10.9	3.3
15.5	18.0	54.4	20.3	12.1	35.4	0.9	21.3	11.3	3.3
16.0	18.0	53.4	21.0	12.5	31.9	1.0	21.9	11.5	3.2
16.5	18.1	53.2	21.3	12.8	31.6	1.0	22.7	11.9	3.1
17.0	18.0	53.5	21.1	13.0	32.9	1.0	22.6	12.0	3.0
17.5	17.9	54.3	20.0	13.3	36.7	1.0	22.5	12.2	3.0
18.0	17.8	53.3	18.4	13.4	33.4	1.0	22.9	12.2	3.0
18.5	17.6	53.7	16.6	13.4	35.8	1.0	23.1	12.4	3.0
19.0	17.3	54.4	14.5	13.2	39.6	1.0	23.7	12.5	3.1
19.5	17.1	53.8	12.7	12.6	37.3	1.0	23.1	12.4	3.2
20.0	16.7	53.3	11.0	11.9	35.4	1.0	23.1	12.4	3.3
20.5	16.2	55.4	9.9	11.1	45.2	1.0	22.1	12.6	3.4
21.0	15.8	55.3	9.0	10.3	45.3	1.0	23.2	12.7	3.6
21.5	15.5	55.8	8.5	9.8	47.9	1.0	23.5	12.8	3.5
22.0	15.3	56.0	8.3	9.5	49.7	1.0	23.4	13.1	3.5
22.5	15.2	55.3	8.2	9.5	46.4	1.0	24.3	13.3	3.5
23.0	15.1	57.1	8.5	9.6	58.8	1.0	24.4	13.7	3.4
23.5	15.1	58.8	8.8	9.9	73.8	1.0	24.1	13.9	3.4
24.0	15.1	56.5	9.1	10.1	57.4	1.0	24.5	14.4	3.4
24.5	15.1	56.5	9.5	10.2	58.1	1.0	24.5	14.4	3.5
25.0	15.1	57.5	9.8	10.3	66.4	1.0	23.8	14.7	3.5
25.5	15.2	59.6	10.1	10.4	85.2	1.0	25.0	15.0	3.5
26.0	15.2	61.8	10.4	10.4	110.0	1.0	24.5	15.4	3.5
26.5	15.3	57.4	10.8	10.4	66.3	1.0	24.8	15.6	3.6
27.0	15.4	58.6	11.2	10.3	76.0	1.0	24.5	16.1	3.7
27.5	15.4	57.9	11.6	10.0	69.5	1.0	24.3	16.1	3.7
28.0	15.5	62.0	11.9	9.7	111.3	1.0	24.5	16.2	3.7
28.5	15.5	61.6	12.4	9.6	107.6	0.9	24.6	16.3	3.8
29.0	15.5	63.0	12.8	9.9	126.7	0.9	24.5	16.3	3.8
29.5	15.6	61.2	13.4	10.6	105.1	1.0	24.3	16.4	3.8
30.0	15.7	64.7	13.8	11.6	160.9	1.0	23.6	16.3	3.8
30.5	15.7	63.7	14.2	12.8	146.2	1.0	24.8	16.4	3.8
31.0	15.8	68.1	14.1	13.6	242.6	1.0	24.7	16.5	4.0
31.5	15.8	63.2	13.6	13.6	139.6	1.0	25.4	16.9	4.0
32.0	15.7	65.7	12.4	12.8	184.0	1.0	24.6	16.6	4.2
32.5	15.7	63.3	10.9	12.0	137.8	1.0	24.0	15.8	4.3
33.0	15.6	64.0	9.5	11.5	146.6	1.0	24.4	15.7	4.6
33.5	15.5	60.7	8.5	11.2	98.6	1.1	23.9	15.6	4.7
34.0	15.4	61.1	7.7	11.0	102.3	1.1	24.3	15.2	4.9
34.5	15.2	61.4	7.2	11.0	104.9	1.1	24.9	15.3	5.0
35.0	15.0	59.0	6.9	11.0	80.2	1.1	24.7	14.9	4.9
35.5	14.8	56.8	6.9	11.0	62.8	1.1	24.2	15.1	5.0
36.0	14.7	56.9	7.1	10.9	65.3	1.1	24.1	14.8	5.0
36.5	14.5	54.7	7.3	10.9	52.0	1.1	24.0	14.5	4.9
37.0	14.4	54.4	7.8	11.0	51.9	1.1	24.6	14.8	5.7
37.5	14.4	53.6	8.3	11.5	49.8	1.1	23.6	14.4	4.8
38.0	14.5	53.5	9.1	12.1	51.3	1.1	24.5	14.4	4.4
38.5	14.5	53.0	9.9	13.0	50.9	1.0	25.0	14.4	4.5
39.0	14.4	50.9	10.8	13.9	41.7	1.0	24.3	14.5	4.5
39.5	14.4	55.3	12.0	14.1	71.8	1.0	23.8	14.5	4.6
40.0	14.1	50.7	13.1	13.9	44.4	1.0	23.6	13.9	4.5
40.5	13.8	51.4	14.2	13.6	50.5	1.0	24.2	13.7	4.5
41.0	13.3	50.1	15.3	13.5	45.9	1.0	23.5	13.4	4.6
41.5	12.9	50.4	16.1	13.7	50.3	1.0	24.9	12.9	4.7
42.0	12.5	51.3	16.6	14.3	59.2	1.0	23.5	12.5	4.9
42.5	12.1	51.3	16.5	15.2	62.8	1.0	24.4	12.4	5.0
43.0	11.8	51.1	16.1	15.8	63.0	1.0	23.6	12.0	5.2
43.5	11.4	49.0	15.4	16.1	51.5	1.0	24.2	11.9	5.3
44.0	11.0	48.3	14.4	15.9	49.7	1.0	23.8	11.6	5.5
44.5	10.5	48.7	13.5	15.7	54.4	1.0	24.2	10.1	5.8
45.0	9.9	48.1	12.7	15.6	53.7	1.0	23.8	10.1	5.9

*Typical Performance Data*

**Definitions:**

Input Return Loss = -S11 (dB)

Gain(Power Gain) = S21 (dB)

Reverse Isolation = -S12 (dB)

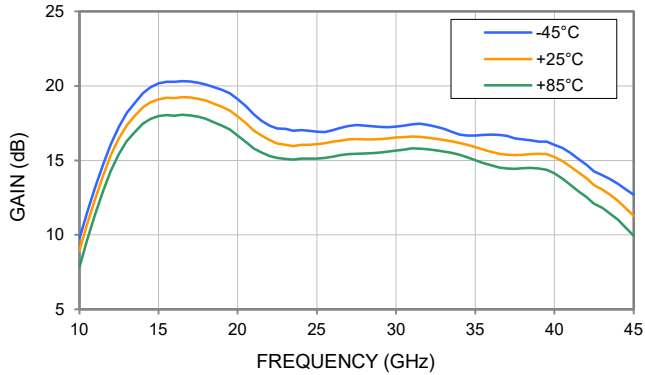
Output Return Loss = -S22 (dB)

TEST CONDITIONS: V<sub>DD</sub> = +5 V, I<sub>DD</sub> = 136mA @ Temperature = +25°C

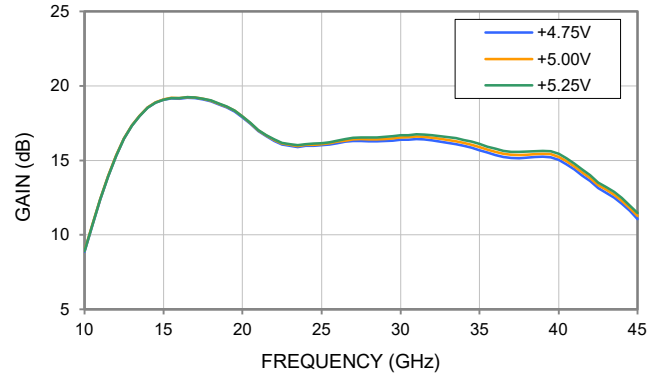
FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	Stability		IP-3 Output	1dB Comp. Output	Noise Figure
					K	Measure			
(GHz)	(dB)	(dB)	(dB)	(dB)			(dBm)	(dBm)	(dB)
10.0	7.9	62.0	6.4	4.9	147.7	0.8	16.0	5.6	7.9
10.5	9.7	62.9	7.6	5.2	147.2	0.8	15.7	6.0	7.0
11.0	11.5	62.9	9.2	5.5	134.7	0.8	16.7	6.5	6.3
11.5	13.0	61.0	11.4	6.0	99.3	0.8	17.5	7.3	5.6
12.0	14.4	57.8	14.3	6.5	63.2	0.8	18.5	7.9	5.0
12.5	15.5	58.0	17.7	7.1	60.9	0.8	19.1	8.4	4.5
13.0	16.4	57.3	20.5	7.9	53.4	0.8	19.1	9.1	4.1
13.5	17.0	55.0	20.9	8.7	39.6	0.9	19.5	9.6	3.8
14.0	17.5	55.1	20.0	9.7	38.5	0.9	20.2	10.1	3.6
14.5	17.8	55.7	19.5	10.7	40.8	0.9	21.3	10.5	3.4
15.0	18.0	53.8	19.8	11.5	32.8	0.9	21.0	11.1	3.3
15.5	18.1	53.4	20.2	12.2	31.5	0.9	21.6	11.5	3.3
16.0	18.1	54.0	21.0	12.6	34.1	1.0	22.3	11.7	3.2
16.5	18.1	54.7	21.3	12.8	37.0	1.0	23.5	12.0	3.1
17.0	18.1	54.0	21.1	13.1	34.8	1.0	23.3	12.2	3.0
17.5	18.0	54.1	20.0	13.3	35.8	1.0	22.8	12.4	3.0
18.0	17.9	54.9	18.4	13.5	40.2	1.0	23.1	12.4	3.0
18.5	17.6	54.1	16.5	13.5	37.3	1.0	23.5	12.6	3.0
19.0	17.4	54.1	14.5	13.3	38.1	1.0	23.2	12.7	3.1
19.5	17.1	54.3	12.7	12.7	39.2	1.0	23.8	12.6	3.2
20.0	16.7	55.2	11.0	12.0	43.6	1.0	23.5	12.8	3.3
20.5	16.3	55.6	9.8	11.1	46.3	1.0	22.3	12.8	3.4
21.0	15.9	55.7	9.0	10.4	47.1	1.0	23.6	13.0	3.4
21.5	15.6	56.0	8.5	9.8	48.4	1.0	24.7	13.1	3.5
22.0	15.4	56.8	8.3	9.5	54.1	1.0	23.6	13.3	3.5
22.5	15.2	55.7	8.2	9.5	48.5	1.0	24.1	13.6	3.5
23.0	15.2	56.5	8.5	9.7	54.4	1.0	24.2	14.1	3.5
23.5	15.2	58.8	8.8	9.9	72.6	1.0	23.8	14.1	3.5
24.0	15.2	56.5	9.1	10.1	56.5	1.0	25.0	14.7	3.5
24.5	15.2	55.9	9.5	10.2	53.6	1.0	24.9	14.8	3.4
25.0	15.2	59.6	9.8	10.3	83.4	1.0	23.8	15.1	3.5
25.5	15.3	60.9	10.1	10.4	97.5	1.0	24.4	15.4	3.5
26.0	15.4	59.0	10.4	10.4	78.8	1.0	24.7	15.8	3.5
26.5	15.5	60.2	10.8	10.4	89.6	1.0	24.3	16.0	3.6
27.0	15.5	58.4	11.1	10.3	73.0	1.0	24.6	16.5	3.6
27.5	15.6	64.1	11.5	10.0	140.6	1.0	24.2	16.5	3.7
28.0	15.6	67.2	11.9	9.7	199.8	0.9	24.6	16.5	3.7
28.5	15.6	68.2	12.4	9.6	224.6	0.9	24.3	16.7	3.7
29.0	15.7	60.2	12.8	9.9	90.2	0.9	25.2	16.7	3.8
29.5	15.7	61.0	13.3	10.6	100.6	1.0	25.0	16.9	3.7
30.0	15.8	65.4	13.9	11.6	171.7	1.0	24.6	16.7	3.8
30.5	15.9	68.6	14.2	12.8	253.0	1.0	25.4	16.7	3.8
31.0	16.0	62.7	14.2	13.7	128.4	1.0	24.0	16.9	3.9
31.5	16.0	64.5	13.7	13.6	158.3	1.0	26.2	17.1	4.0
32.0	15.9	63.9	12.4	12.9	145.7	1.0	25.4	16.9	4.2
32.5	15.9	67.5	10.9	12.1	219.0	1.0	24.5	16.1	4.4
33.0	15.8	60.3	9.5	11.5	93.1	1.0	25.3	16.1	4.6
33.5	15.7	61.5	8.5	11.2	106.0	1.1	24.3	16.0	4.7
34.0	15.6	57.0	7.6	11.0	61.7	1.1	24.3	15.4	4.8
34.5	15.4	60.6	7.2	11.0	93.6	1.1	25.2	15.6	5.0
35.0	15.2	57.3	6.9	11.0	64.2	1.1	24.3	15.3	5.0
35.5	15.0	56.1	6.9	11.0	56.8	1.1	24.5	15.4	5.0
36.0	14.9	59.9	7.0	10.9	89.8	1.1	24.6	15.2	5.0
36.5	14.7	56.8	7.3	10.9	64.3	1.1	24.6	14.8	5.0
37.0	14.7	55.1	7.8	11.0	55.3	1.1	24.0	15.0	4.9
37.5	14.6	58.1	8.3	11.5	81.2	1.1	22.9	14.6	4.7
38.0	14.7	52.1	9.0	12.1	42.5	1.1	24.4	14.8	4.6
38.5	14.7	50.6	10.0	13.1	37.8	1.0	24.2	14.6	4.5
39.0	14.7	53.8	10.9	13.8	57.0	1.0	24.0	14.8	4.5
39.5	14.6	51.6	12.0	14.1	45.9	1.0	24.0	14.7	4.5
40.0	14.3	51.0	13.1	13.9	45.2	1.0	23.5	14.3	4.5
40.5	14.0	53.2	14.3	13.6	60.7	1.0	24.8	14.1	4.5
41.0	13.5	50.7	15.3	13.5	48.5	1.0	25.5	13.8	4.6
41.5	13.1	50.6	16.0	13.6	50.2	1.0	23.3	13.2	4.7
42.0	12.7	51.9	16.6	14.3	61.9	1.0	24.1	12.8	4.9
42.5	12.3	51.0	16.5	15.1	58.6	1.0	23.5	12.7	5.0
43.0	12.0	49.7	16.1	15.8	52.6	1.0	23.4	12.2	5.1
43.5	11.6	48.9	15.4	16.1	49.7	1.0	24.4	12.2	5.3
44.0	11.2	48.4	14.4	15.9	49.0	1.0	24.3	11.8	5.5
44.5	10.7	48.6	13.6	15.8	52.7	1.0	25.3	10.3	5.7
45.0	10.1	47.9	12.8	15.6	51.3	1.0	24.0	10.3	5.7

## Typical Performance Curves

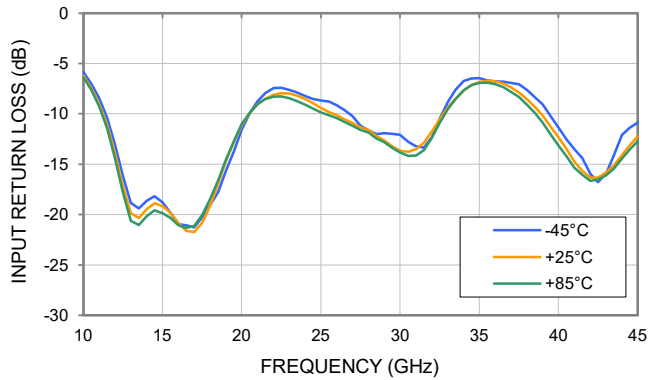
**GAIN vs. TEMPERATURE,**  
 $P_{IN} = -25 \text{ dBm}, V_{DD} = +5 \text{ V}$



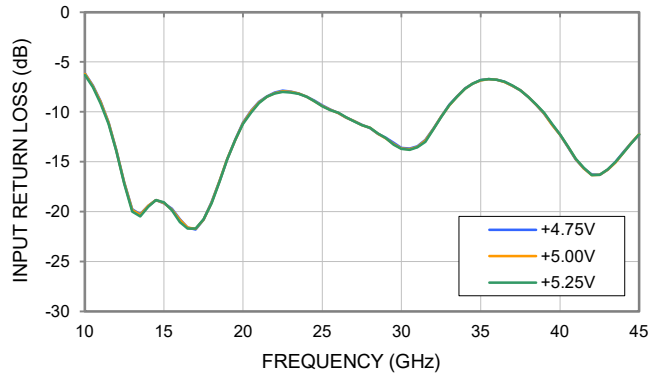
**GAIN vs.  $V_{DD}$ ,**  
 $P_{IN} = -25 \text{ dBm}, \text{TEMPERATURE} = +25^\circ\text{C}$



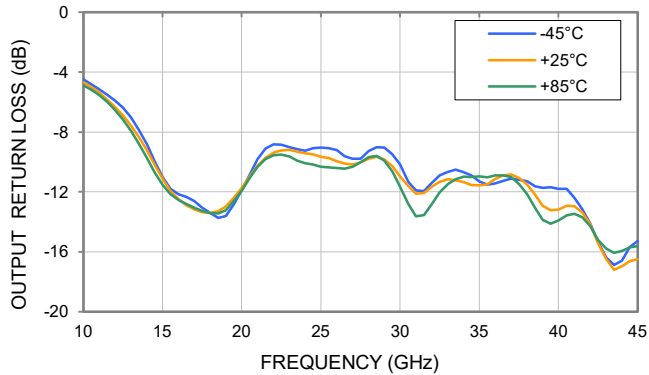
**INPUT RETURN LOSS vs. TEMPERATURE,**  
 $P_{IN} = -25 \text{ dBm}, V_{DD} = +5 \text{ V}$



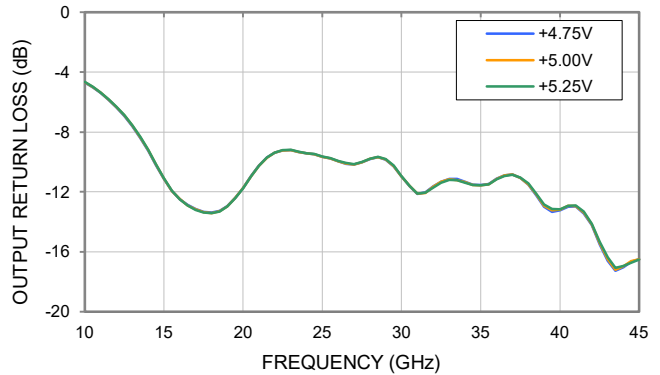
**INPUT RETURN LOSS vs.  $V_{DD}$ ,**  
 $P_{IN} = -25 \text{ dBm}, \text{TEMPERATURE} = +25^\circ\text{C}$



**OUTPUT RETURN LOSS vs. TEMPERATURE,**  
 $P_{IN} = -25 \text{ dBm}, V_{DD} = +5 \text{ V}$

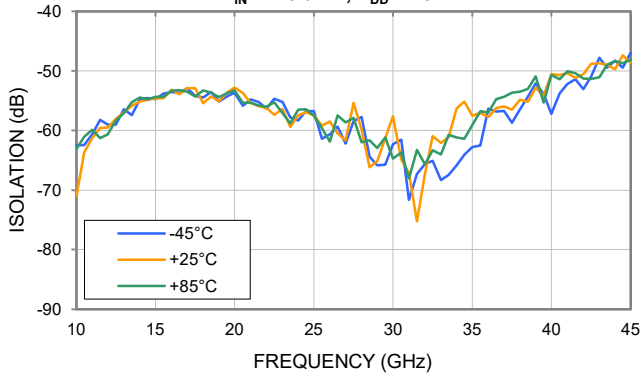


**OUTPUT RETURN LOSS vs.  $V_{DD}$ ,**  
 $P_{IN} = -25 \text{ dBm}, \text{TEMPERATURE} = +25^\circ\text{C}$

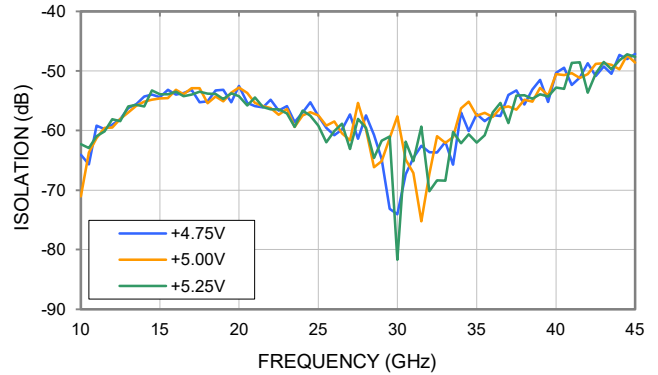


## Typical Performance Curves

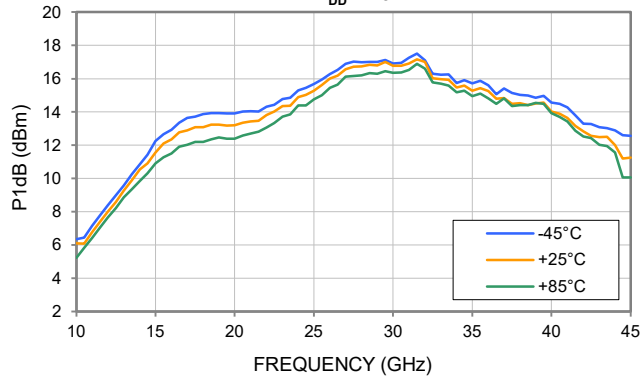
**ISOLATION vs. TEMPERATURE,**  
 $P_{IN} = -25 \text{ dBm}$ ,  $V_{DD} = +5 \text{ V}$



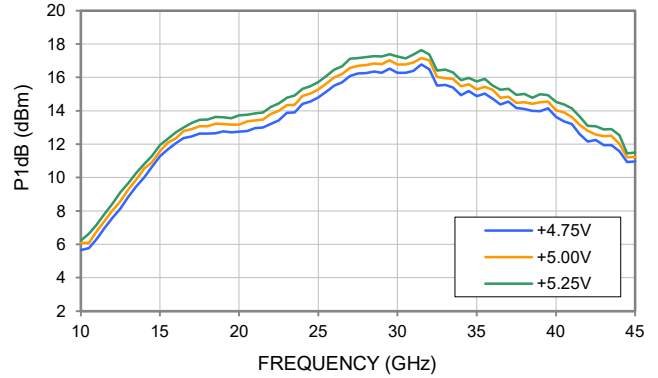
**ISOLATION vs.  $V_{DD}$ ,**  
 $P_{IN} = -25 \text{ dBm}$ , TEMPERATURE = +25°C



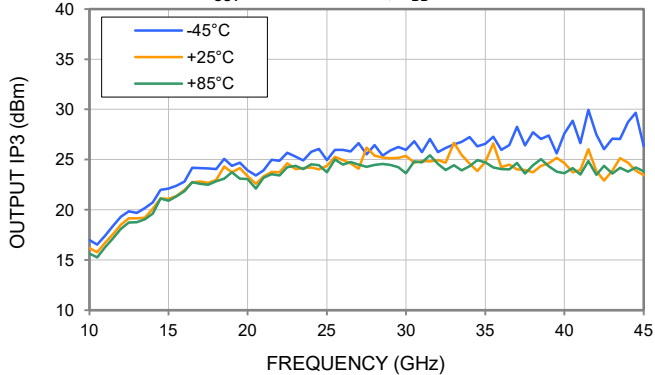
**P1dB vs. TEMPERATURE,**  
 $V_{DD} = +5 \text{ V}$



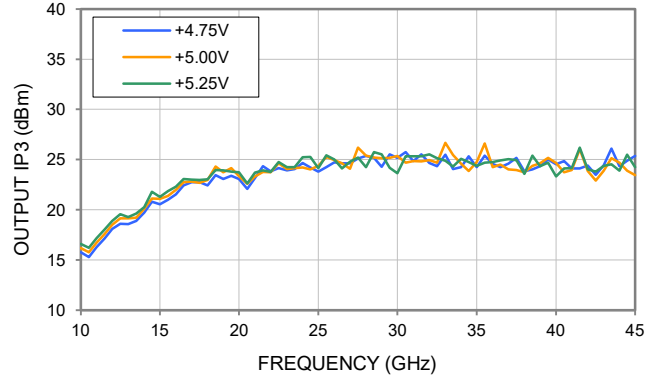
**P1dB vs.  $V_{DD}$ ,**  
 TEMPERATURE = +25°C



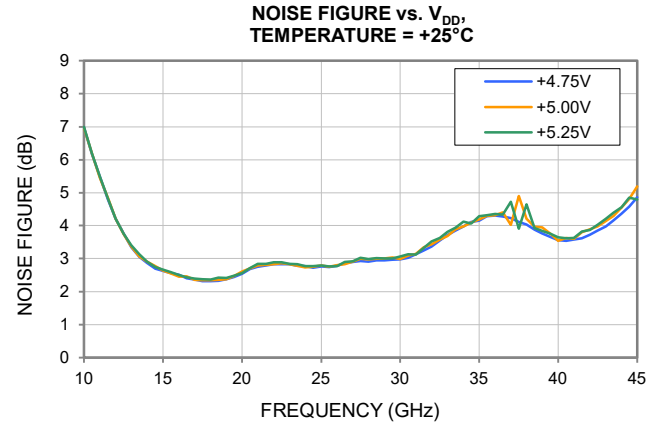
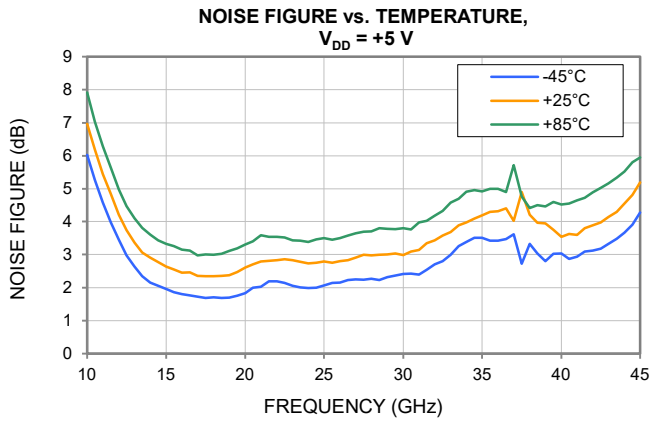
**OUTPUT IP3 vs. TEMPERATURE,**  
 $P_{OUT} = -5 \text{ dBm/TONE}$ ,  $V_{DD} = +5 \text{ V}$



**OUTPUT IP3 vs.  $V_{DD}$ ,**  
 $P_{OUT} = -5 \text{ dBm/TONE}$ , TEMPERATURE = +25°C



## Typical Performance Curves



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85° C or -40° to 105° C or -55° to 105° C or -45° to 105° C Ambient Environment	Refer to Individual Model Data Sheet
Storage Environment (Die)	-65° to 150°C	Individual Model Data Sheet
Storage Environment(Packaging)	-40° to 70°C and 40 to 60% humidity (In Factory Shipped Package)	