



Mini-Circuits

MMIC SURFACE MOUNT

Power Amplifier

PMA6-123-10W+

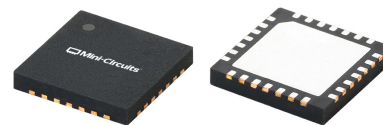
50Ω 10 to 11.7 GHz +39 dBm P_{SAT}

THE BIG DEAL

- High Gain, Typ. 30.3 dB
- High P_{SAT}, Typ. +39.1 dBm
- Excellent PAE, Typ. 28.3%
- High Linearity Design Optimized for High PAR Communication Signals
- 6x6 mm 28-Lead QFN-Style Package

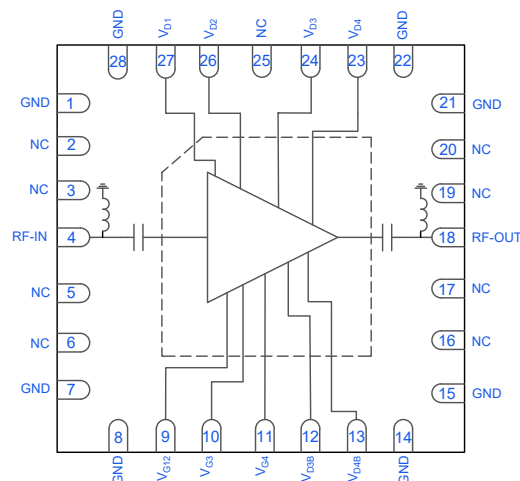
APPLICATIONS

- Back Haul Radio Systems
- Civil Telecommunications



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



PRODUCT OVERVIEW

Mini-Circuits' PMA6-123-10W+ is a GaAs MMIC Power Amplifier operating from 10.0 to 11.7 GHz. This internally matched 50Ω amplifier provides 30.3 dB of gain, +39.1 dBm saturated output power, and +46.1 dBm output IP3, while operating from a +8 V power supply and consuming 1.5 A of bias current. This amplifier is fully matched at the input and output, allowing for seamless implementation, and it is assembled in a 6x6 mm 28-Lead QFN-style package. These characteristics make it ideally suited for back haul radio systems and civil communications that require high operating output power, while maintaining very low distortion characteristics.

KEY FEATURES

Feature	Advantages
High P _{SAT} Typ. +39.1 dBm	With a high saturated output power, this device can be used as the power amplifier for Back Haul Radio and/or Civil Communications.
High Gain Typ. 30.3 dB	Reduces the number of amplification stages at the system level.
6x6 mm 28-Lead QFN-Style Package	Small footprint saves space in dense layouts while providing low inductance, repeatable transitions, and excellent thermal contact to the PCB. Industry standard packaging allows for ease of assembly in high volume manufacturing processes.

REV. F
ECO-029655
PMA6-123-10W+
MCL NY
260601





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PMA6-123-10W+

50Ω 10 to 11.7 GHz +39 dBm P_{SAT}ELECTRICAL SPECIFICATIONS¹ AT +25°C, V_{DD} = +8 V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		10.0		11.7	GHz
Gain	10.0	27.4	29.0		dB
	10.5	27.8	29.4		
	10.9	28.9	30.3		
	11.3	29.4	30.7		
	11.7	29.3	30.7		
Output Power at 1 dB Compression (P _{1dB})	10.0		+38.4		dBm
	10.5		+38.4		
	10.9		+38.6		
	11.3		+38.7		
	11.7		+38.4		
Output Power at Saturation (P _{SAT}) ²	10.0		+39.0		dBm
	10.5		+39.0		
	10.9		+39.1		
	11.3		+39.2		
	11.7		+38.9		
Power Added Efficiency (PAE) at P _{SAT}			28.3		%
Output Third-Order Intercept (P _{OUT} = +31 dBm/Tone)	10.0		+45.9		dBm
	10.5		+45.6		
	10.9		+45.3		
	11.3		+45.0		
	11.7		+44.2		
Input Return Loss	10.0		10		dB
	10.5		11		
	10.9		12		
	11.3		16		
	11.7		16		
Output Return Loss	10.0		17		dB
	10.5		13		
	10.9		13		
	11.3		14		
	11.7		13		
Isolation	10.0		69		dB
	10.5		67		
	10.9		63		
	11.3		64		
	11.7		61		
Noise Figure	10.0		4.9		dB
	10.5		4.9		
	10.9		5.0		
	11.3		5.1		
	11.7		5.2		
Device Operating Voltage (V _{DD}) ³		+6	+8	+8	V
Device Operating Current (I _{DD}) ^{4, 5}			1.5		A
Gate Voltage (V _{G12})			-0.85		V
Gate Voltage (V _{G3})			-0.81		V
Gate Voltage (V _{G4})			-1.2		V
Device Gate Current (I _{GG}) ⁶				29	mA
DC Current Variation vs. Temperature ⁷			-0.34		mA/°C
DC Current Variation vs. Voltage ⁸			-0.44		μA/mV

1. Tested on Mini-Circuits Characterization Test Board TBPMA612310WCX+. See Figure 2. Loss de-embedded to the RF input and output pins of the device. Data measured in CW operation.

2. P_{SAT} is defined as when the Output Power changes 0.1 dB per 1 dB change in Input Power.3. V_{DD} = V_{D1} = V_{D2} = V_{D3} = V_{D4} = V_{D3B} = V_{D4B}4. Current at P_{IN} = -20 dBm. Current at saturation reaches 4.7 A.5. I_{DD} = I_{DD1} + I_{DD2} + I_{DD3} + I_{DD4}; I_{DD12} = I_{DD1} + I_{DD2} = 310 mA; I_{DD3} = 840 mA; I_{DD4} = 350 mA.

6. At saturation.

7. (Current at +95°C - Current at -40°C)/(+135°C)

8. (Current at +8 V - Current at +6 V)/(+2 V)





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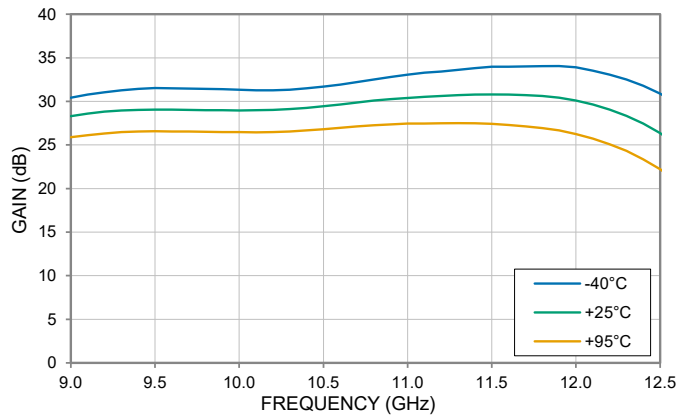
Mini-Circuits

50Ω 10 to 11.7 GHz +39 dBm P_{SAT}

TYPICAL PERFORMANCE GRAPHS DATA BELOW MEASURED IN CW OPERATION

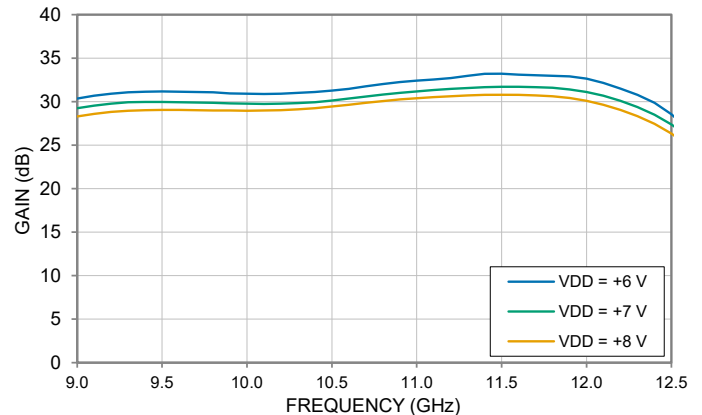
GAIN vs. TEMPERATURE

P_{IN} = -15 dBm, V_{DD} = +8 V



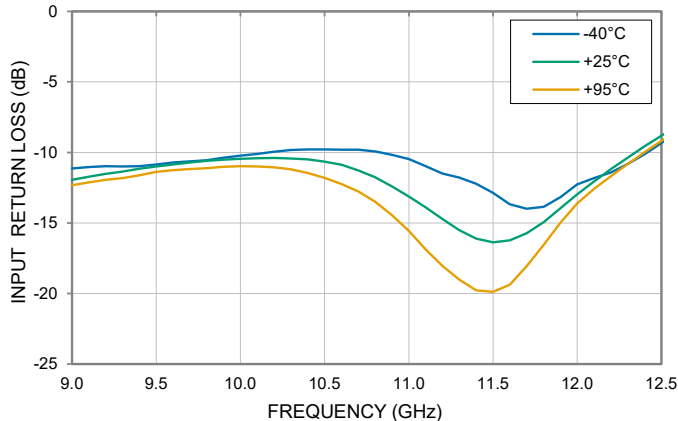
GAIN vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C



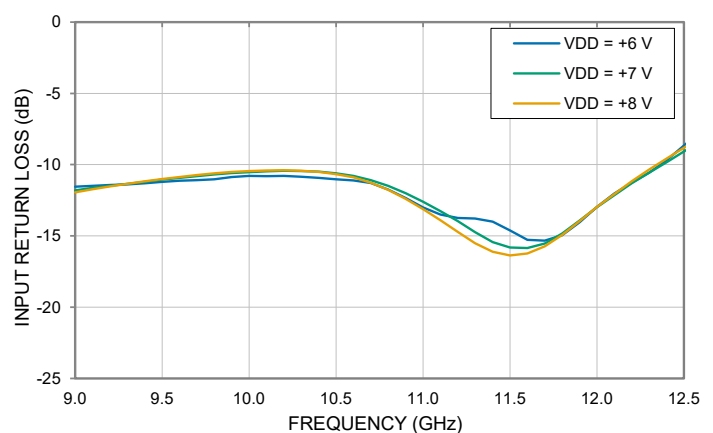
INPUT RETURN LOSS vs. TEMPERATURE

P_{IN} = -15 dBm, V_{DD} = +8 V



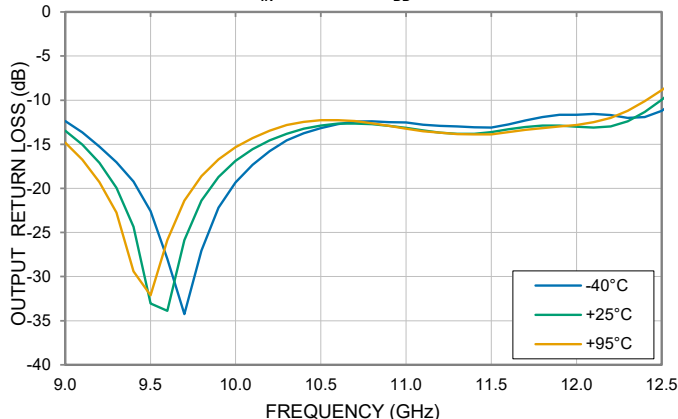
INPUT RETURN LOSS vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C



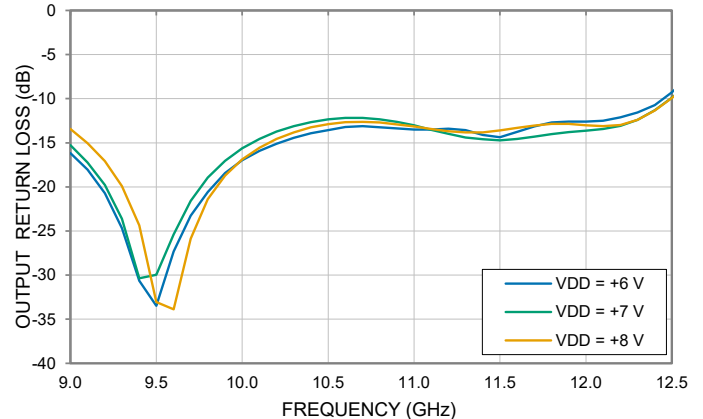
OUTPUT RETURN LOSS vs. TEMPERATURE

P_{IN} = -15 dBm, V_{DD} = +8 V



OUTPUT RETURN LOSS vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C





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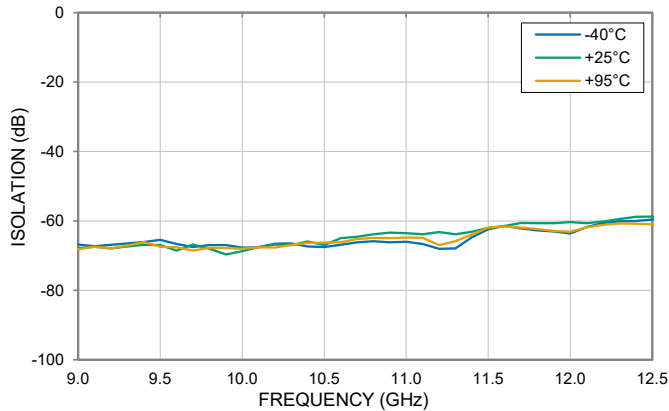
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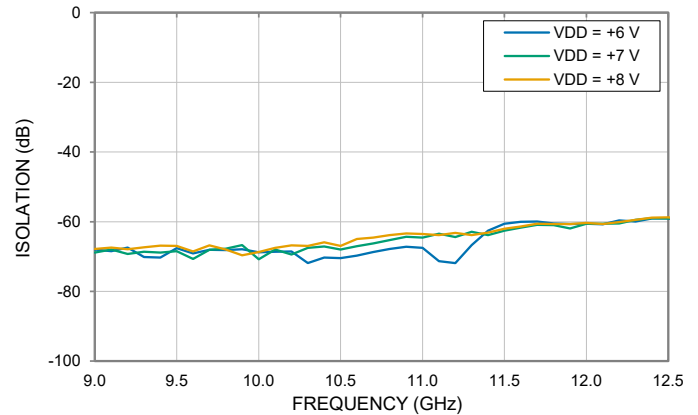
ISOLATION vs. TEMPERATURE

$P_{IN} = -15$ dBm, $V_{DD} = +8$ V



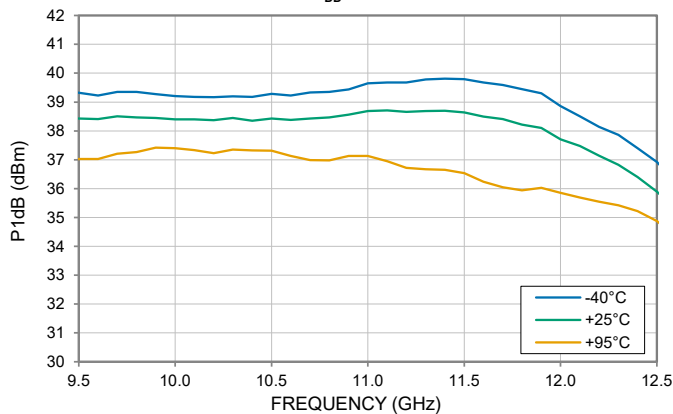
ISOLATION vs. DEVICE VOLTAGE

$P_{IN} = -15$ dBm, TEMPERATURE = +25°C



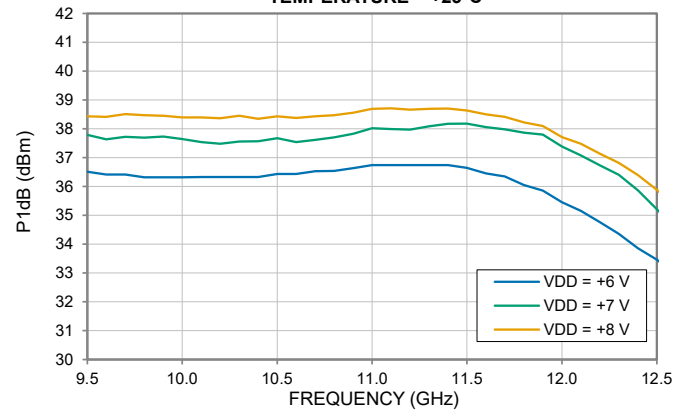
P1dB vs. TEMPERATURE

$V_{DD} = +8$ V



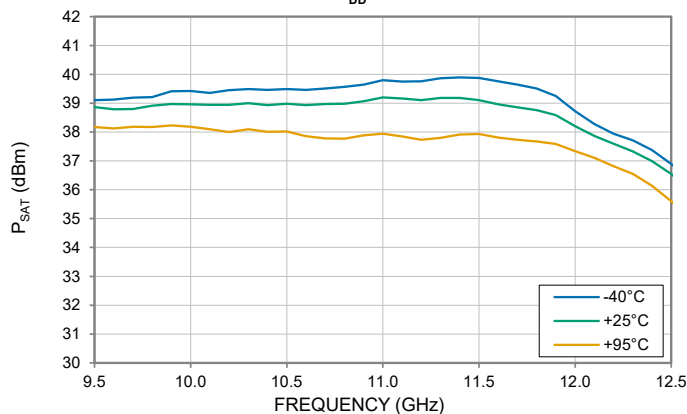
P1dB vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



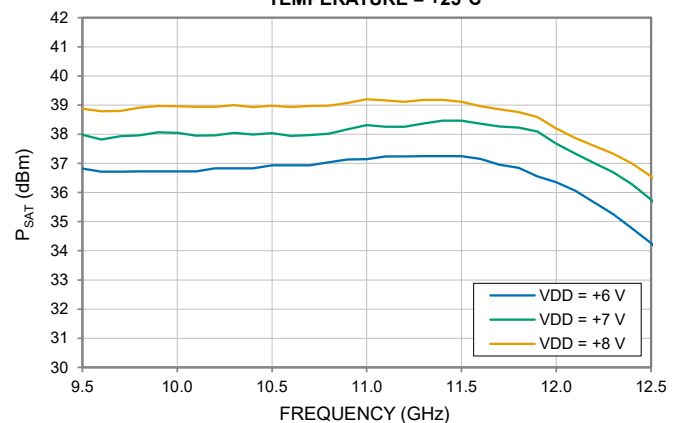
P_{SAT} vs. TEMPERATURE

$V_{DD} = +8$ V



P_{SAT} vs. DEVICE VOLTAGE

TEMPERATURE = +25°C





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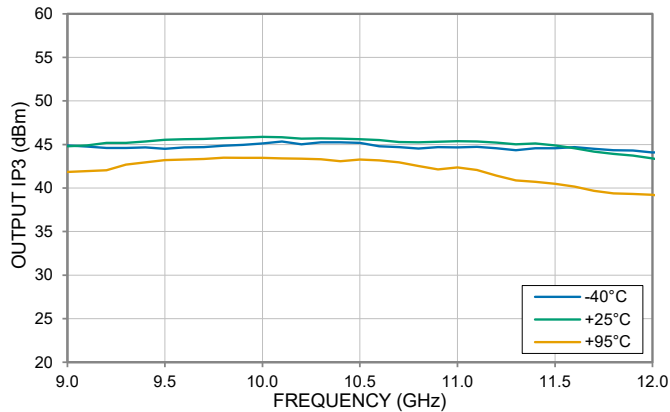
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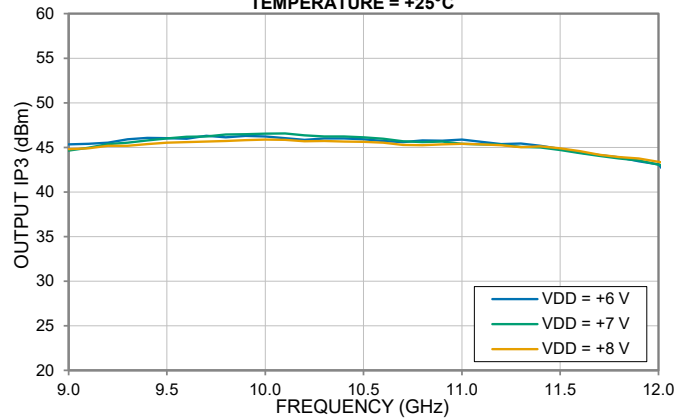
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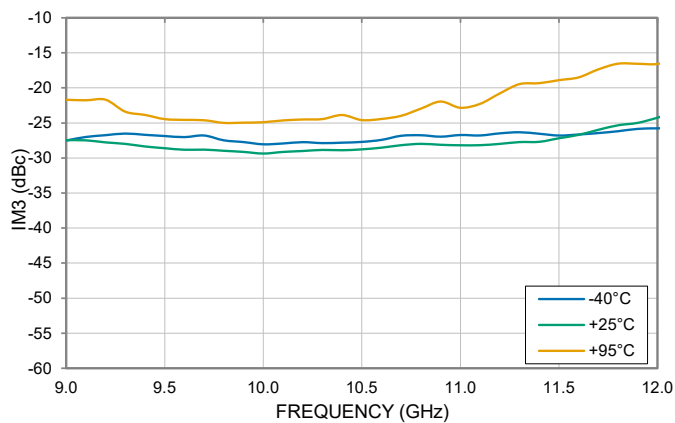
OUTPUT IP3 vs. TEMPERATURE
 $P_{OUT} = +31$ dBm/TONE, TONE SPACING = 5 MHz, $V_{DD} = +8$ V



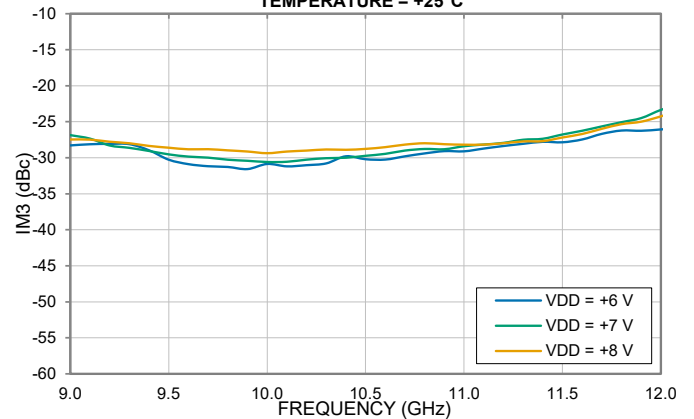
OUTPUT IP3 vs. DEVICE VOLTAGE
 $P_{OUT} = +31$ dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



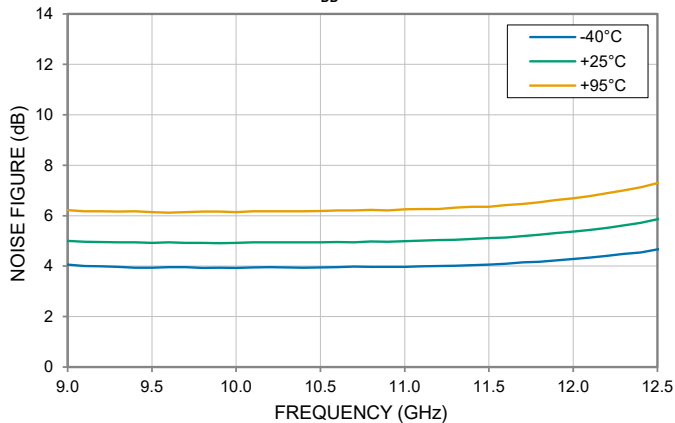
IM3 vs. TEMPERATURE
 $P_{OUT} = +31$ dBm/TONE, TONE SPACING = 5 MHz, $V_{DD} = +8$ V



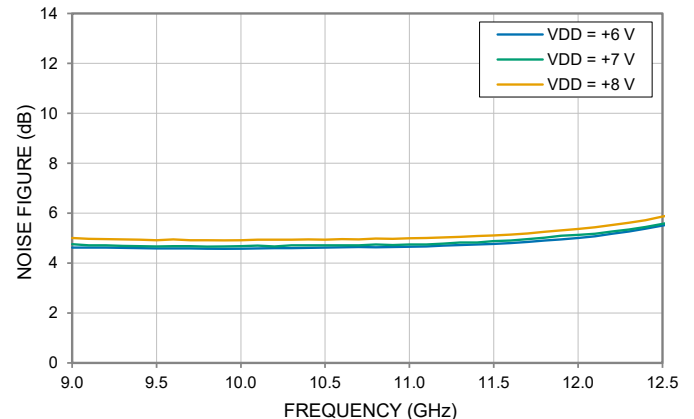
IM3 vs. DEVICE VOLTAGE
 $P_{OUT} = +31$ dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



NOISE FIGURE vs. TEMPERATURE
 $V_{DD} = +8$ V



NOISE FIGURE vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



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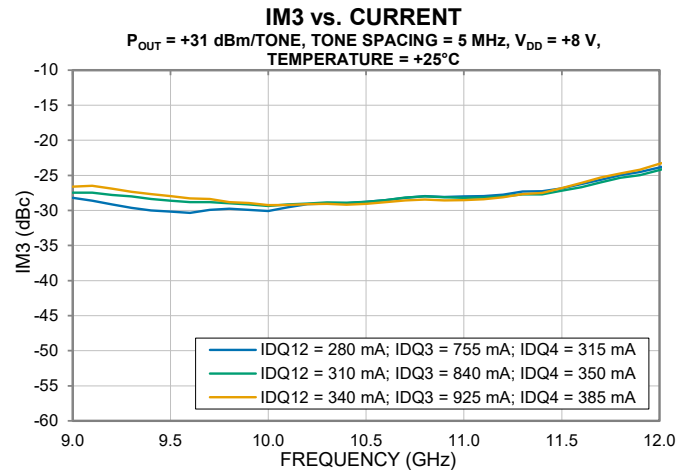
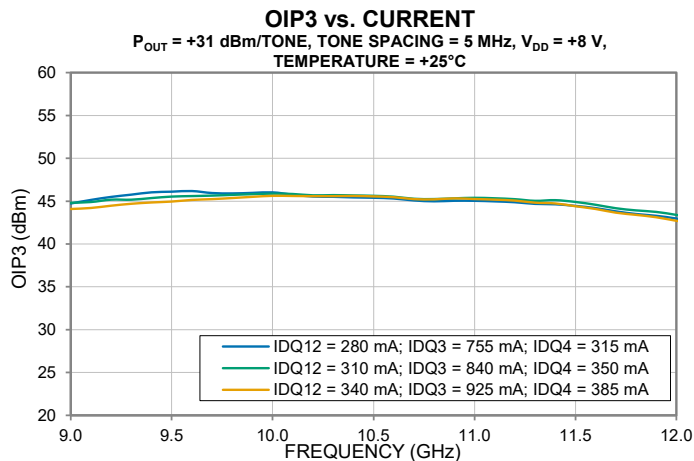
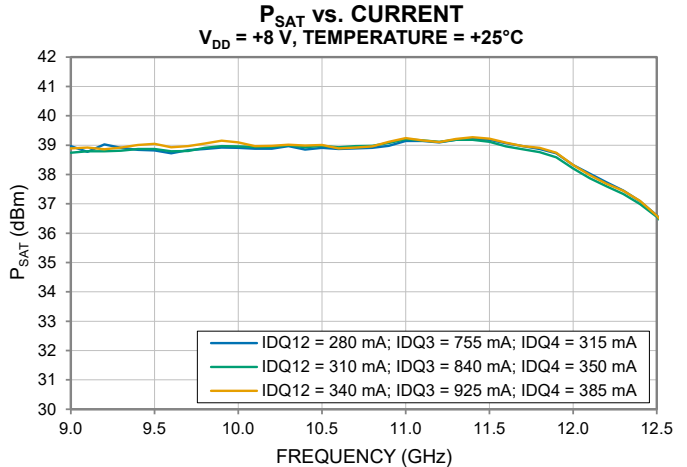
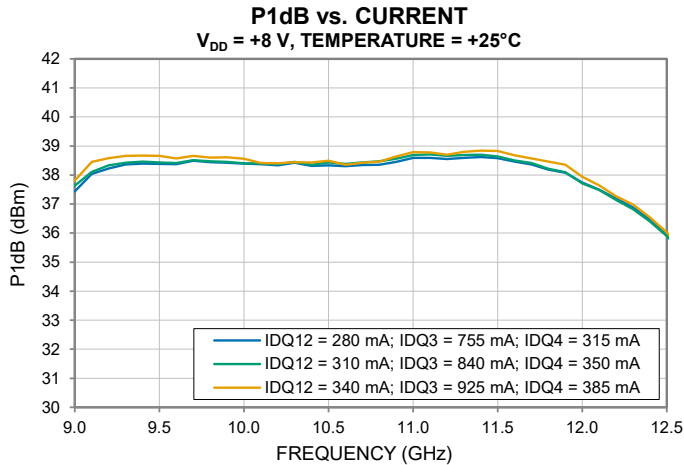
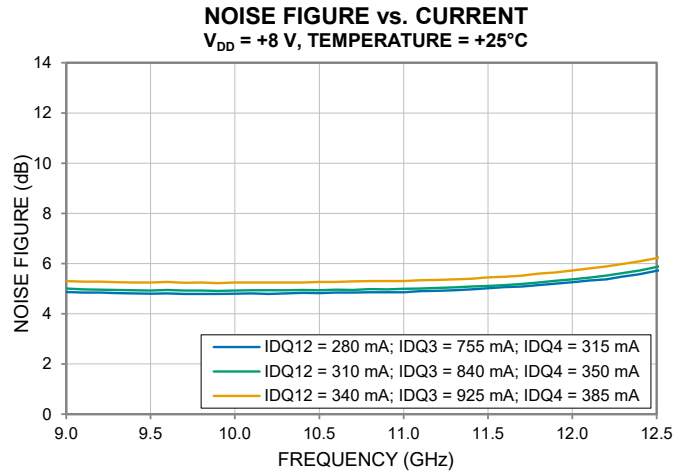
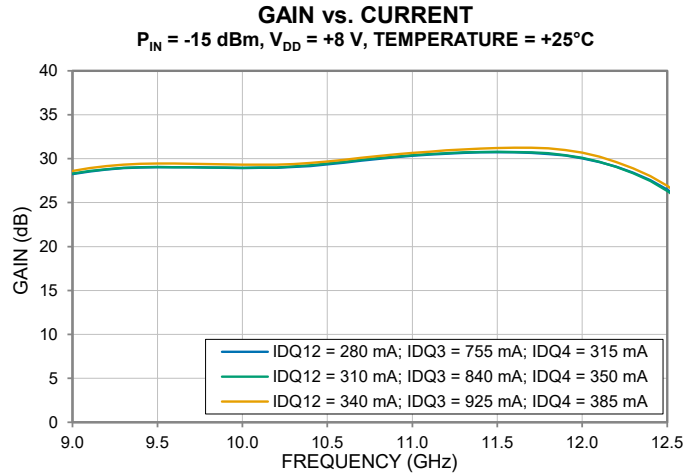
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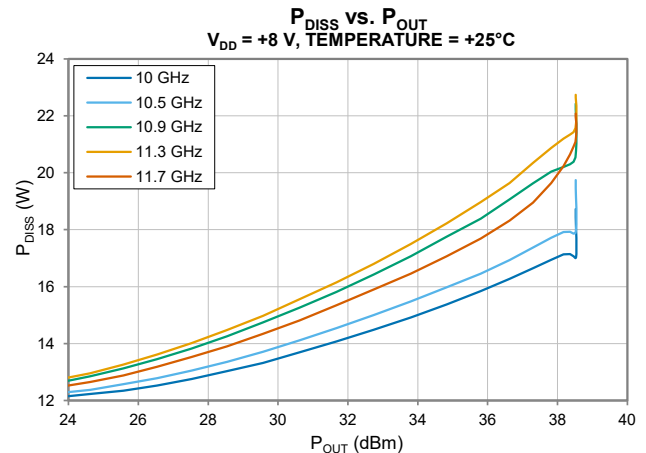
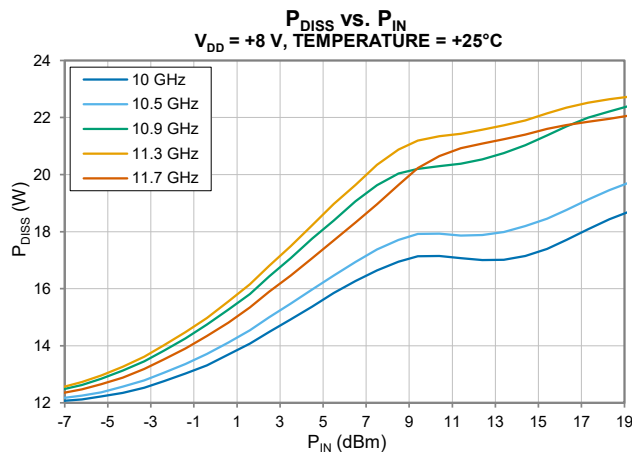
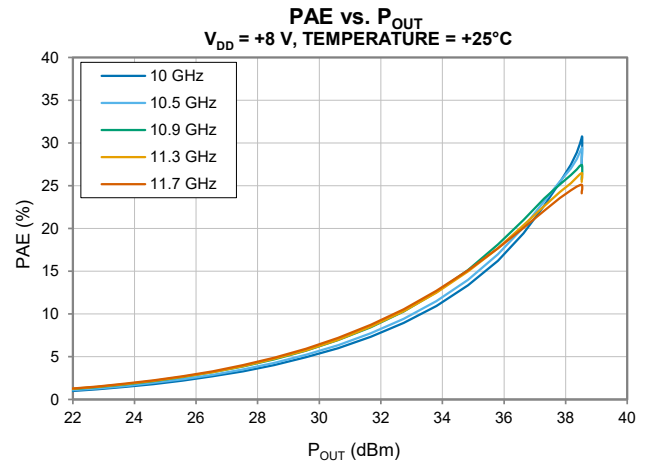
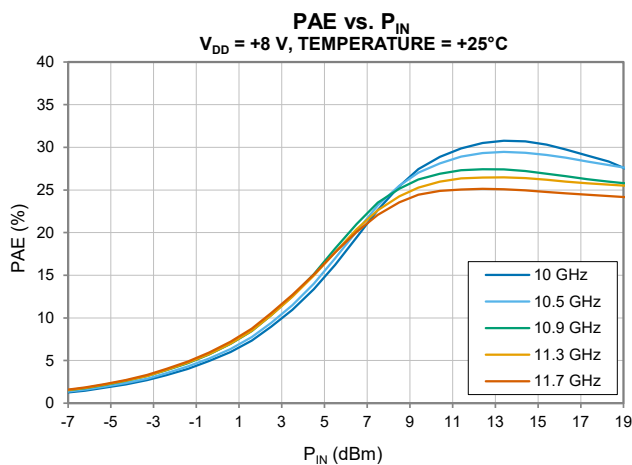
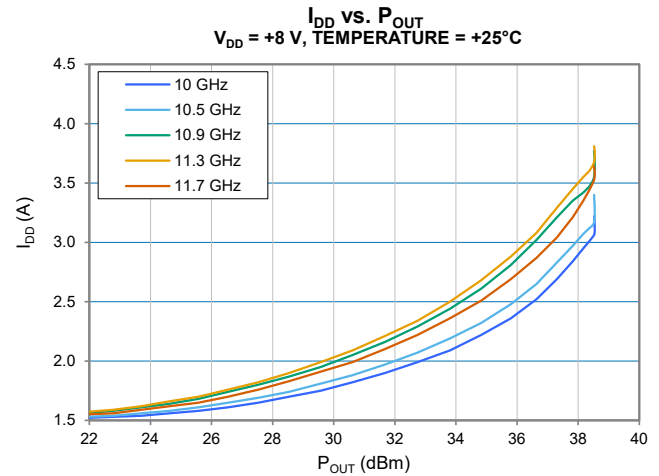
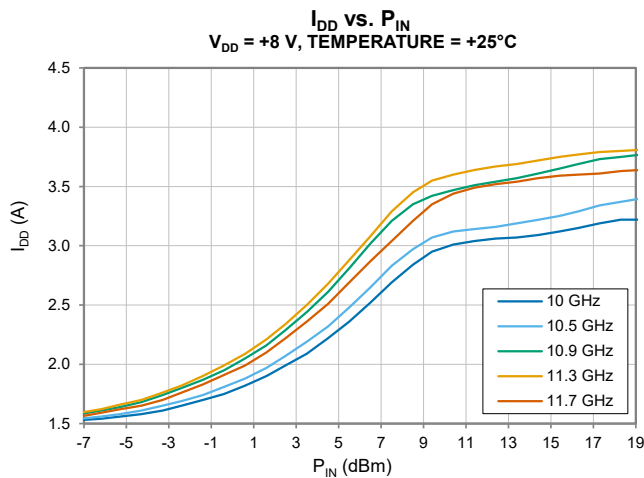
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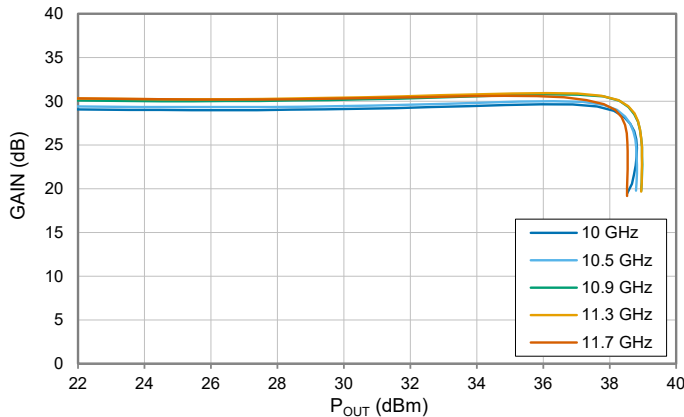
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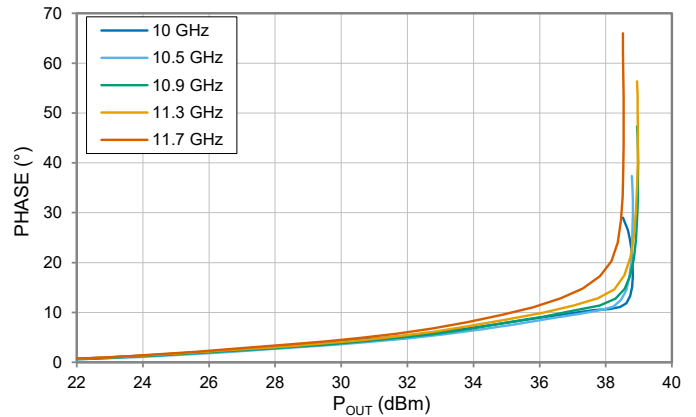
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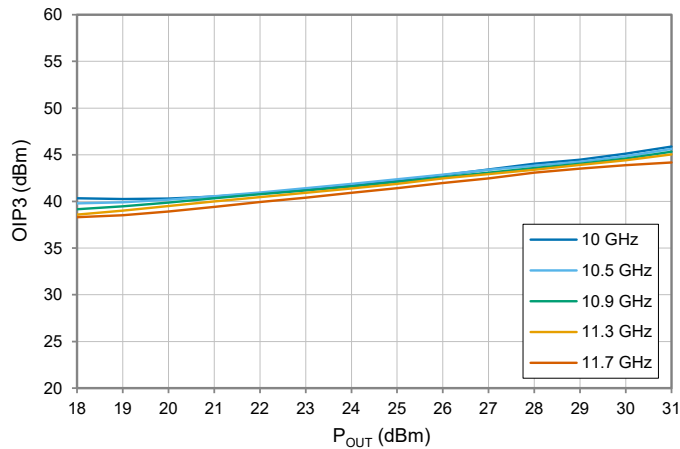
AM - AM
 $V_{DD} = +8\text{ V}$, TEMPERATURE = +25°C



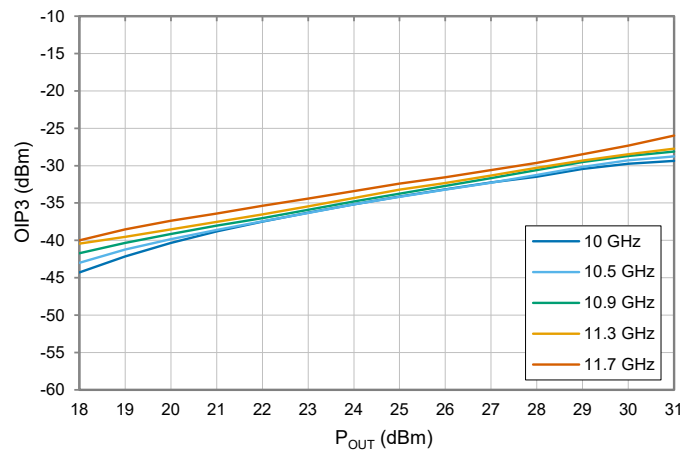
AM - PM
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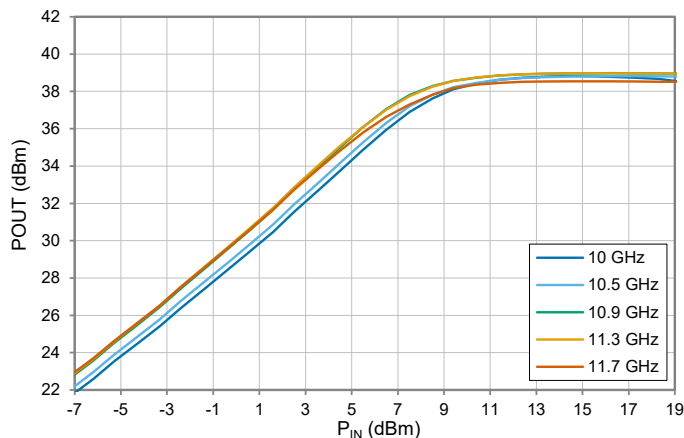
OIP3 vs. P_{OUT} /TONE
 $V_{DD} = +8\text{ V}$, TONE SPACING = 5 MHz, TEMPERATURE = +25°C



IM3 vs. P_{OUT} /TONE
 $V_{DD} = +8\text{ V}$, TONE SPACING = 5 MHz, TEMPERATURE = +25°C



P_{OUT} vs. P_{IN}
 $V_{DD} = +8\text{ V}$, TEMPERATURE = +25°C





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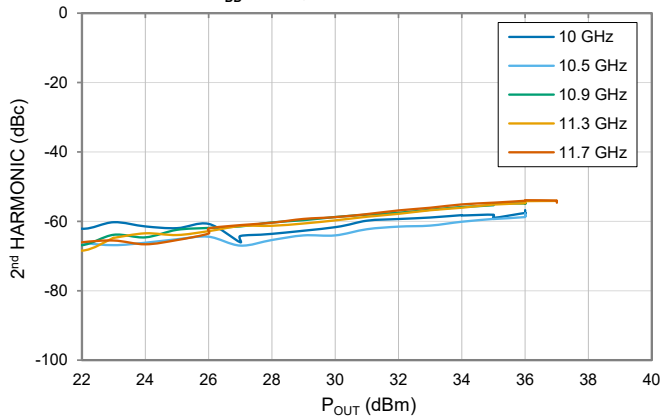
PMA6-123-10W+

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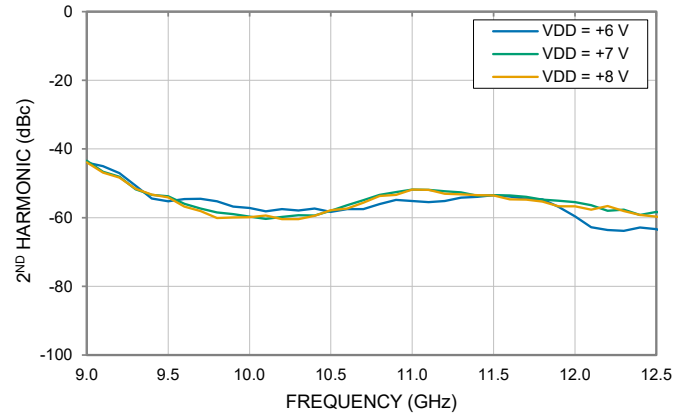
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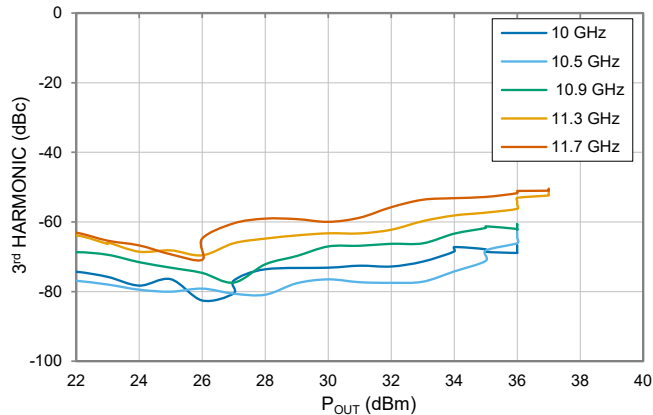
2nd HARMONIC vs. P_{OUT}
 $V_{DD} = +8$ V, TEMPERATURE = +25°C



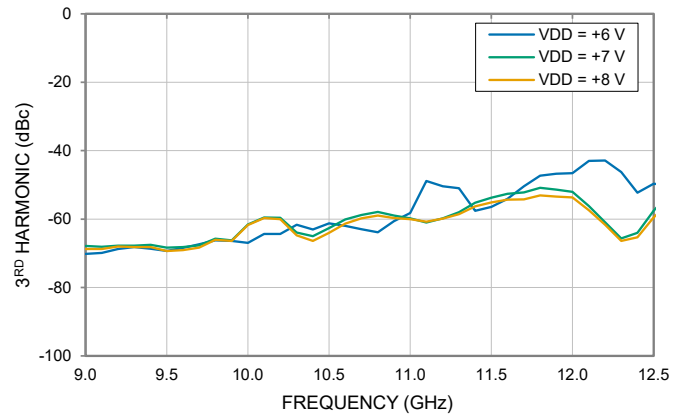
2nd HARMONIC vs. DEVICE VOLTAGE
 $P_{OUT} = +39$ dBm, TEMPERATURE = +25°C



3rd HARMONIC vs. P_{OUT}
 $V_{DD} = +8$ V, TEMPERATURE = +25°C



3rd HARMONIC vs. DEVICE VOLTAGE
 $P_{OUT} = +39$ dBm, TEMPERATURE = +25°C





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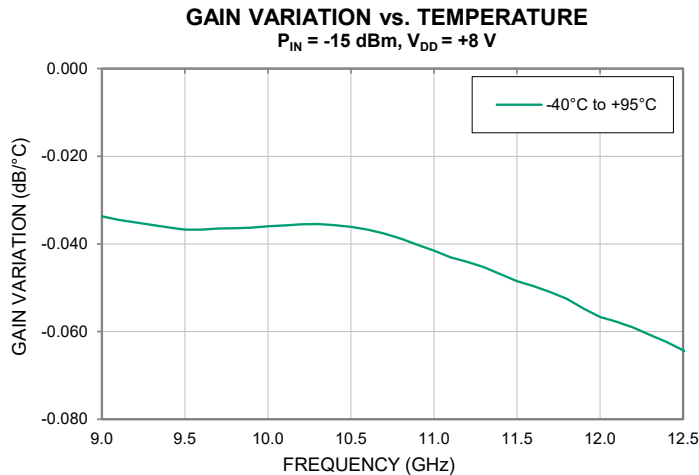
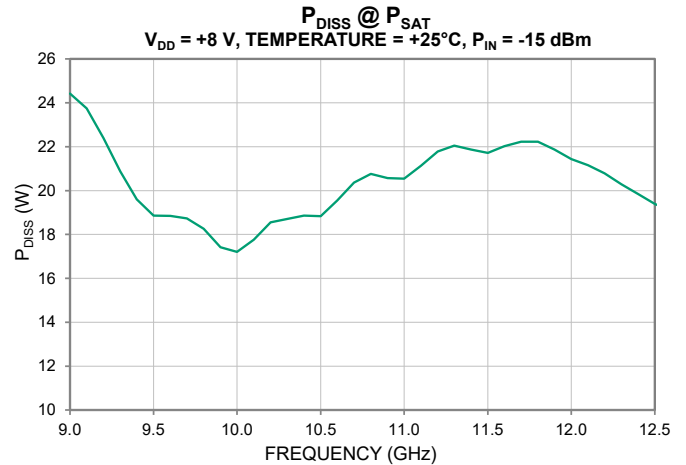
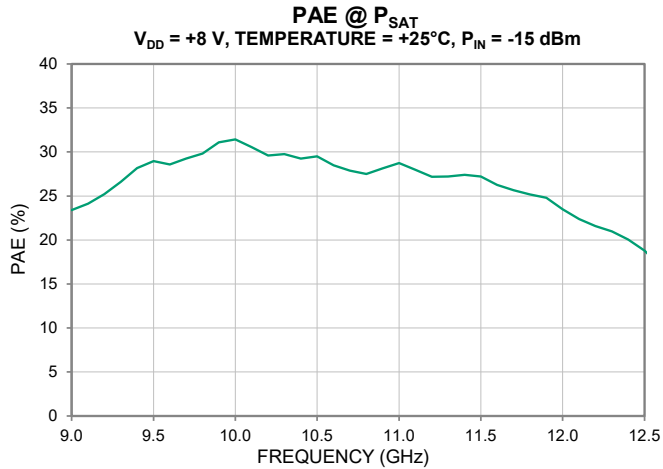
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ABSOLUTE MAXIMUM RATINGS⁹

Parameter	Ratings
Operating Temperature ¹⁰	-40°C to +95°C
Storage Temperature	-65°C to +150°C
Junction Temperature ¹¹	+175°C
Total Power Dissipation	24 W
Input Power (CW), V _{DD} = +8 V	+34 dBm
DC Drain Voltage at V _{DD} ¹²	+9 V
DC Gate Voltage at V _{G12} , V _{G3} , V _{G4}	-3 V ≤ V _{G12} , V _{G3} , V _{G4} ≤ -0.4 V
DC Drain Current I _{DD}	5 A
DC Gate Current I _{GG}	29 mA

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

10. Bottom of Die.

11. Peak temperature on top of Die.

12. V_{DD} = V_{D1} = V_{D2} = V_{D3} = V_{D4} = V_{D3B} = V_{D4B}

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ _{JC}) ¹³	4.8°C/W

13. Θ_{JC} = (Hot Spot Temperature on Die - Temperature at Ground Lead) / Dissipated Power

ESD RATING

	Class	Voltage Range	Reference Standard
HBM	1A	250 to < 500	ANSI/ESDA/JEDEC JS-001-2023
CDM	C3	250 to < 500	ANSI/ESDA/JEDEC JS-002-2022



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.

MSL RATING

Moisture Sensitivity: MSL3 in accordance with IPC/JEDEC J-STD-020E/JEDEC J-STD-033C





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FUNCTIONAL DIAGRAM

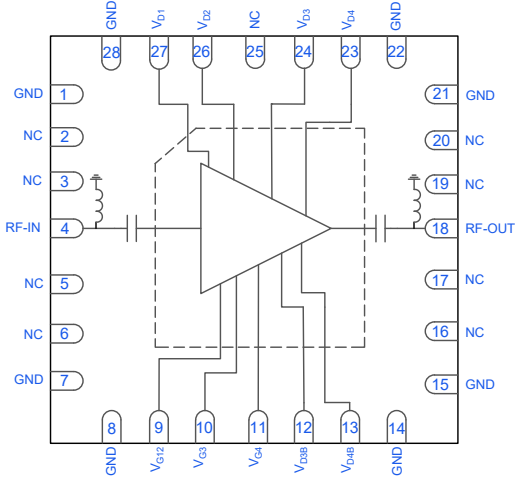


Figure 1. PMA6-123-10W+ Functional Diagram

PIN DESCRIPTION

Function	Pin Number	Description (Refer to Figure 1)
RF-IN	4	RF-IN pin connects to RF Input port.
RF-OUT	18	RF-OUT pin connects to RF Output port.
V_{D1}	27	DC Input pin connects to First Stage Drain Voltage port.
V_{G12}	9	DC Input pin connects to First/Second Stage Gate Voltage port.
V_{D2}	26	DC Input pin connects to Drain Voltage port of 2 nd stage top half.
V_{D3}	24	DC Input pin connects to Drain Voltage port of 3 rd stage top half.
V_{G3}	10	DC Input pin connects to 3 rd Stage Gate Voltage port.
V_{D4}	23	DC Input pin connects to 4 th Stage Drain Voltage port.
V_{G4}	11	DC Input pin connects to 4 th Stage Gate Voltage port.
V_{D3B}	12	DC Input pin connects to Drain Voltage port of 3 rd stage bottom half.
V_{D4B}^{14}	13	DC Input pin connects to 4 th Stage Drain Voltage Alternate port.
NC	3, 5, 17, 19, 25	Not connected on test board. May be connected to ground or left open.
NC	2, 6, 16, 20	Connected to ground on test board. May be connected to ground or left open.
GND	1, 7, 8, 14, 15, 21, 22, 28 PADDLE	Connect to ground.

14. V_{D4B} can be used as an alternate to V_{D4} . V_{D4B} and V_{D4} are connected internally. For optimal performance, voltage should be applied to both ports. During characterization, V_{D4} and V_{D4B} were connected via a jumper on TBPMA612310WCX+.



MMIC SURFACE MOUNT

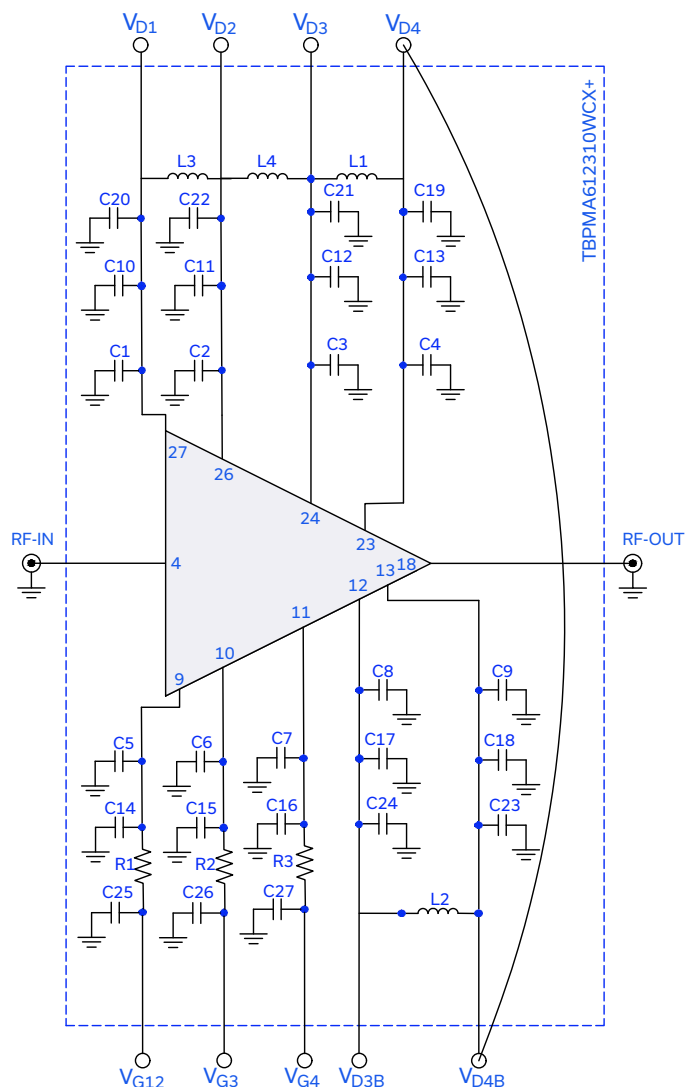
Power Amplifier

PMA6-123-10W+

Mini-Circuits

50Ω 10 to 11.7 GHz +39 dBm P_{SAT}

CHARACTERIZATION BOARD



Electrical Parameters and Conditions

Gain, Return Loss, Output Power at 1 dB Compression (P_{1dB}), Output IP₃ (OIP₃), and Noise Figure measured using N542B PNA-X Microwave Network Analyzer. All data taken with test board assembly mounted on heatsink TBPMA612310WCX+.

Conditions:

1. Gain and Return Loss: P_{IN} = -15 dBm
2. Output IP₃ (OIP₃): Two tones, spaced 5MHz apart, +31 dBm/Tone at output.

Power ON/ Power OFF Sequence

Caution: Permanent damage to the device will occur if the Power ON/ Power OFF sequences are not followed.

Power ON

1. Set V_{G12}, V_{G3} and V_{G4} pins to -2 V and Turn On.
2. Set V_{DD} to +8 V and Turn On .
3. Increase V_{G12} until desired I_{DD1} + I_{DD2} is achieved, typical 310 mA.
4. Increase V_{G3} until desired I_{DD3} is achieved, typical 840 mA.
5. Increase V_{G4} until desired I_{DD4} is achieved, typical 350 mA.
6. Turn On RF Signal.

Power OFF

1. Turn Off RF Signal.
2. Turn Off V_{DD}.
3. Decrease V_{G4} to -2 V and Turn Off.
4. Decrease V_{G3} to -2 V and Turn Off.
5. Decrease V_{G12} to -2 V and Turn Off.

Critical Note: For CW operation, the test board must be mounted on a heatsink large enough to cool a device dissipating >20W of heat. See TBPMA612310WCX+ for example.

Figure 2. PMA6-123-10W+ Characterization Circuit

Component	Value	Size	Part Number	Manufacturer
C1 – C9	0.001 μF	0402	GRM1555C1H102JA01D	MURATA
C10 – C18	0.1 μF	0402	GRM155R71E104KE14D	MURATA
C19 – C27	1 μF	0603	06035C105KAT2A	KYOCERA AVX
L1, L2	33 nH	0603	0603AF-33NXJRW	COILCRAFT
L3, L4	56 nH	0402	0402DF-560XJRW	COILCRAFT
R1	24Ω	0402	RK73H1ETTP24R0F	KOA SPEER
R2	12Ω	0402	RK73H1ETTP12R0F	KOA SPEER
R3	0Ω	0402	RK73Z1ETTP	KOA SPEER



MMIC SURFACE MOUNT

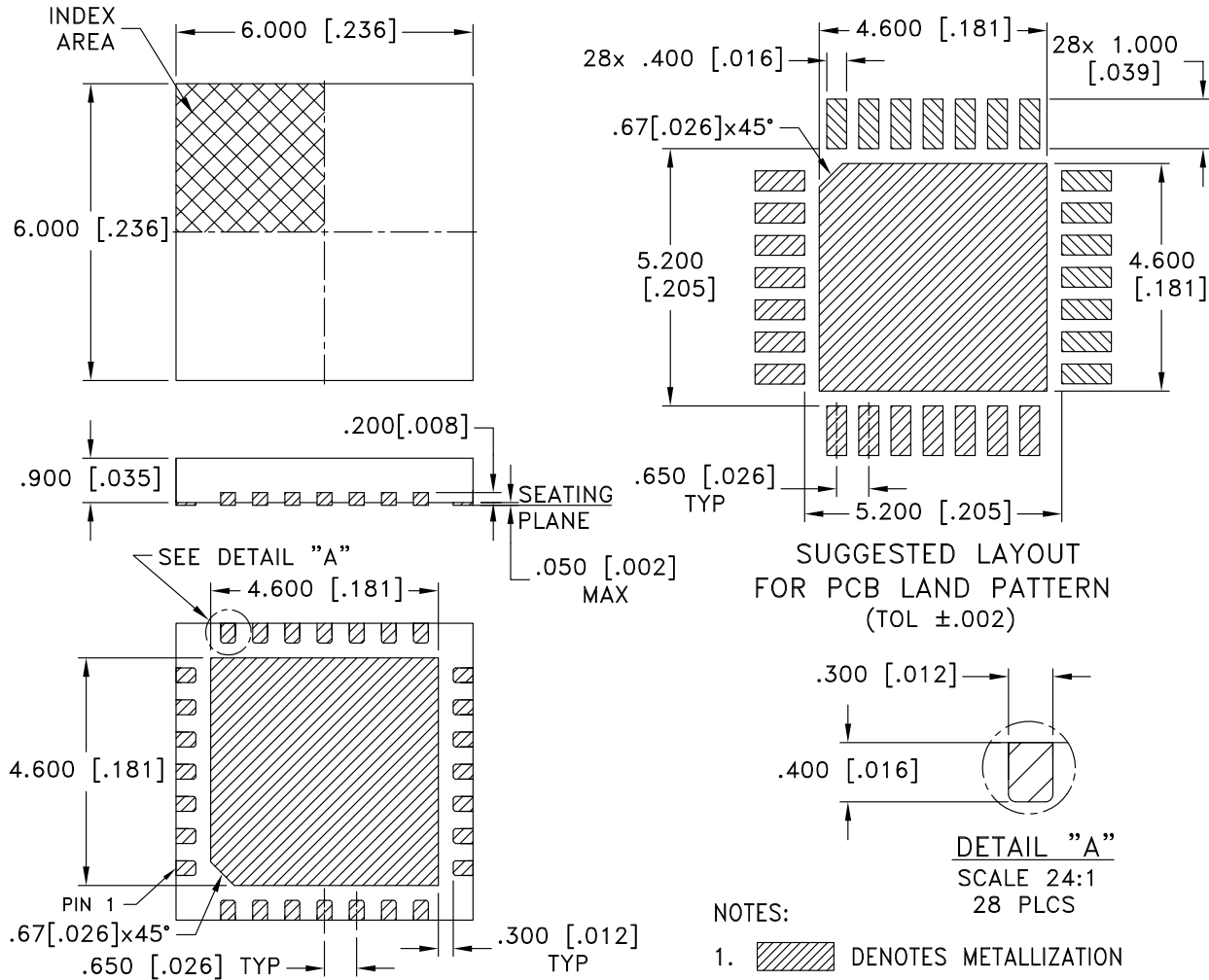
Power Amplifier

PMA6-123-10W+

Mini-Circuits

50Ω 10 to 11.7 GHz +39 dBm P_{SAT}

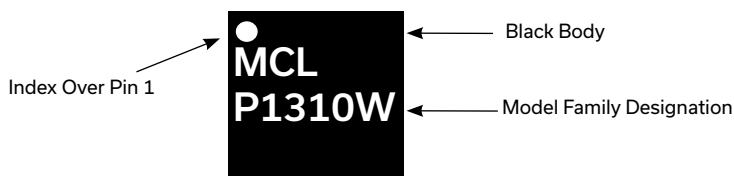
CASE STYLE DRAWING



Weight: 0.11 grams

Dimensions are in mm [inches]. Tolerances: 3 Pl. ±0.050 mm

PRODUCT MARKING



Marking may contain other features or characters for internal lot control.

Mini-Circuits

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MMIC SURFACE MOUNT

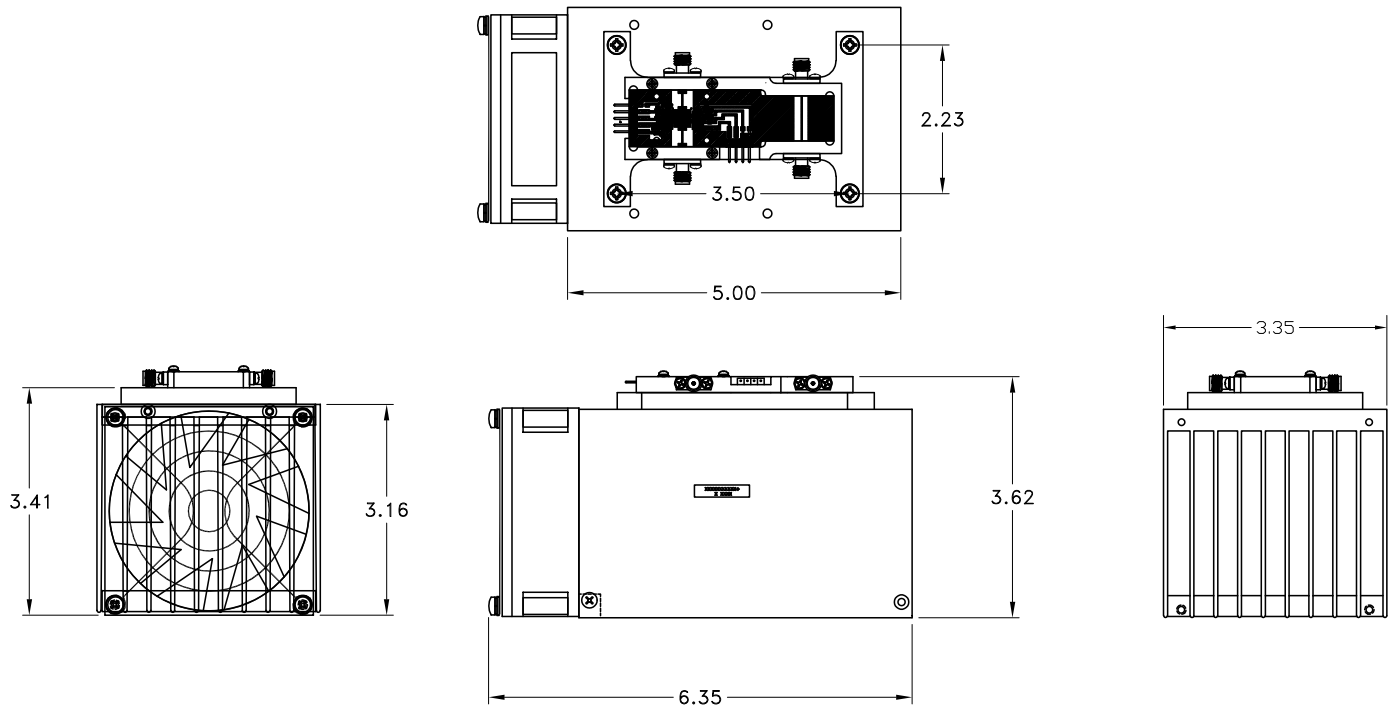
Power Amplifier

PMA6-123-10W+

Mini-Circuits

50 Ω 10 to 11.7 GHz +39 dBm P_{SAT}

OUTLINE DRAWING FOR TBPMA612310WCX+





MMIC SURFACE MOUNT

Power Amplifier

PMA6-123-10W+

50Ω 10 to 11.7 GHz +39 dBm P_{SAT}

ADDITIONAL DETAILED INFORMATION IS AVAILABLE ON OUR DASHBOARD

[CLICK HERE](#)

Performance Data & Graphs	Data
	Graphs
	S-Parameter (S2P Files) Data Set (.zip file)
Case Style	WQ3359 Plastic package, exposed paddle, Lead Finish: Matte-Tin
RoHs Status	Compliant
Tape & Reel	F68
Standard Quantities Available on Reel	7" reels with 20, 50, 100, 200, 500, or 1K 13" reels with 2K, 3K, or 4K
Suggested Layout for PCB Design	PL-824
Evaluation Board Mounted on Heatsink	TBPMA612310WCX+
	Gerber File
Environmental Ratings	ENV08T1

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.
- B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
- C. The parts covered by this specification document are subject to Mini-Circuits standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the standard terms and the exclusive rights and remedies thereunder, please visit Mini-Circuits' website at www.minicircuits.com/terms/viewterm.html



Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required

Definitions:

Input Return Loss = S11 (dB)

Gain (Power Gain) = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $V_{DD} = +7\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^\circ\text{C}$

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	IP-3 Output	IM3 Output	1dB Comp. Output	P_{SAT} Output	Noise Figure	2nd Harmonics	3rd Harmonics
(GHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)
9.0	29.3	-68.9	-11.8	-15.3	44.6	-26.9	37.8	38.5	4.8	-43.4	-67.9
9.1	29.6	-68.0	-11.6	-17.2	44.9	-27.3	38.0	38.4	4.7	-46.6	-68.1
9.2	29.8	-69.3	-11.5	-19.8	45.4	-28.3	37.9	38.3	4.7	-48.1	-67.8
9.3	29.9	-68.6	-11.4	-23.6	45.5	-28.6	37.8	38.2	4.7	-51.8	-67.8
9.4	30.0	-68.9	-11.2	-30.4	45.8	-29.1	37.8	38.1	4.7	-53.3	-67.5
9.5	30.0	-68.4	-11.1	-30.0	46.0	-29.5	37.8	38.0	4.7	-53.8	-68.4
9.6	30.0	-70.7	-10.9	-25.4	46.2	-29.8	37.6	37.8	4.7	-56.0	-68.2
9.7	29.9	-68.1	-10.8	-21.6	46.2	-30.0	37.7	37.9	4.7	-57.3	-67.7
9.8	29.9	-67.8	-10.7	-19.0	46.4	-30.3	37.7	38.0	4.7	-58.5	-65.8
9.9	29.8	-66.7	-10.6	-17.1	46.5	-30.4	37.7	38.1	4.7	-58.9	-66.2
10.0	29.8	-70.8	-10.5	-15.6	46.5	-30.6	37.7	38.1	4.7	-59.7	-61.6
10.1	29.8	-68.0	-10.5	-14.6	46.6	-30.6	37.5	38.0	4.7	-60.4	-59.5
10.2	29.8	-69.4	-10.4	-13.7	46.3	-30.3	37.5	38.0	4.7	-59.8	-59.6
10.3	29.8	-67.5	-10.5	-13.1	46.2	-30.1	37.6	38.1	4.7	-59.3	-63.9
10.4	30.0	-67.1	-10.5	-12.7	46.2	-30.0	37.6	38.0	4.7	-59.4	-65.0
10.5	30.1	-68.0	-10.6	-12.4	46.1	-29.7	37.7	38.0	4.7	-58.0	-62.6
10.6	30.4	-67.0	-10.8	-12.2	46.0	-29.5	37.5	37.9	4.7	-56.4	-60.1
10.7	30.6	-66.2	-11.1	-12.2	45.7	-29.0	37.6	38.0	4.7	-54.9	-58.8
10.8	30.8	-65.3	-11.5	-12.3	45.6	-28.8	37.7	38.0	4.7	-53.3	-57.9
10.9	31.0	-64.3	-12.0	-12.6	45.6	-28.8	37.8	38.2	4.7	-52.6	-59.0
11.0	31.2	-64.5	-12.6	-13.0	45.4	-28.4	38.0	38.3	4.7	-51.9	-59.8
11.1	31.3	-63.5	-13.3	-13.5	45.3	-28.2	38.0	38.3	4.8	-51.9	-61.0
11.2	31.5	-64.4	-14.0	-14.0	45.3	-27.9	38.0	38.3	4.8	-52.3	-59.8
11.3	31.6	-62.9	-14.7	-14.4	45.1	-27.5	38.1	38.4	4.8	-52.6	-58.0
11.4	31.7	-63.8	-15.4	-14.6	45.0	-27.4	38.2	38.5	4.8	-53.6	-55.2
11.5	31.7	-62.6	-15.8	-14.7	44.7	-26.8	38.2	38.5	4.9	-53.4	-53.8
11.6	31.7	-61.7	-15.9	-14.6	44.4	-26.3	38.1	38.4	4.9	-53.6	-52.6
11.7	31.7	-60.9	-15.5	-14.3	44.0	-25.6	38.0	38.3	5.0	-53.9	-52.2
11.8	31.6	-61.0	-14.8	-14.0	43.8	-25.1	37.9	38.2	5.0	-54.7	-50.9
11.9	31.4	-61.9	-13.9	-13.8	43.5	-24.5	37.8	38.1	5.1	-55.1	-51.4
12.0	31.1	-60.6	-13.0	-13.6	43.1	-23.4	37.4	37.7	5.1	-55.5	-52.0
12.1	30.7	-60.6	-12.2	-13.4	42.6	-22.5	37.1	37.3	5.2	-56.4	-56.2
12.2	30.1	-60.5	-11.3	-13.1	42.3	-22.2	36.7	37.0	5.3	-58.0	-60.9
12.3	29.4	-59.5	-10.6	-12.4	42.1	-22.2	36.4	36.7	5.3	-57.6	-65.7
12.4	28.5	-59.0	-9.8	-11.3	-	-	35.9	36.3	5.5	-59.2	-64.0
12.5	27.4	-59.1	-9.1	-9.9	-	-	35.2	35.8	5.6	-58.4	-57.6
12.6	26.0	-58.9	-8.4	-8.3	-	-	34.5	35.1	5.7	-59.3	-52.3
12.7	24.3	-58.6	-7.7	-6.8	-	-	33.8	34.5	5.8	-59.1	-53.8

Typical Performance Data

NOTE: Use PDF Bookmarks to view DATA at required

Definitions:

Input Return Loss = S11 (dB)

Gain (Power Gain) = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $V_{DD} = +6\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	IP-3 Output	IM3 Output	1dB Comp. Output	P _{SAT} Output	Noise Figure	2nd Harmonics	3rd Harmonics
(GHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)
9.0	30.3	-68.0	-11.5	-16.2	45.3	-28.3	37.2	37.8	4.6	-44.0	-70.2
9.1	30.7	-68.5	-11.5	-18.0	45.4	-28.1	37.1	37.6	4.6	-45.0	-69.9
9.2	30.9	-67.4	-11.4	-20.7	45.5	-28.1	36.9	37.4	4.6	-47.1	-68.7
9.3	31.1	-70.1	-11.4	-24.7	45.9	-28.1	36.8	37.2	4.6	-50.7	-68.2
9.4	31.2	-70.3	-11.3	-30.7	46.1	-29.0	36.6	37.0	4.6	-54.4	-68.7
9.5	31.2	-67.6	-11.2	-33.5	46.0	-30.3	36.5	36.8	4.6	-55.2	-69.3
9.6	31.1	-69.1	-11.1	-27.3	46.0	-30.9	36.4	36.7	4.6	-54.5	-68.4
9.7	31.1	-68.0	-11.1	-23.3	46.3	-31.2	36.4	36.7	4.6	-54.5	-67.4
9.8	31.1	-68.1	-11.0	-20.6	46.1	-31.3	36.3	36.7	4.6	-55.2	-66.2
9.9	31.0	-67.9	-10.9	-18.4	46.3	-31.6	36.3	36.7	4.6	-56.8	-66.4
10.0	30.9	-68.8	-10.8	-17.0	46.2	-30.9	36.3	36.7	4.6	-57.1	-66.9
10.1	30.9	-68.6	-10.8	-15.9	46.0	-31.2	36.3	36.7	4.6	-58.1	-64.3
10.2	30.9	-68.6	-10.8	-15.1	45.9	-31.0	36.3	36.8	4.6	-57.5	-64.3
10.3	31.0	-71.9	-10.8	-14.4	46.0	-30.8	36.3	36.8	4.6	-57.9	-61.7
10.4	31.1	-70.3	-10.9	-13.9	46.0	-29.8	36.3	36.8	4.6	-57.4	-63.0
10.5	31.3	-70.5	-11.0	-13.5	45.9	-30.2	36.4	36.9	4.6	-58.3	-61.3
10.6	31.5	-69.7	-11.1	-13.2	45.7	-30.2	36.4	36.9	4.6	-57.5	-62.0
10.7	31.8	-68.7	-11.3	-13.1	45.6	-29.8	36.5	36.9	4.6	-57.5	-62.9
10.8	32.0	-67.9	-11.7	-13.2	45.8	-29.4	36.5	37.0	4.6	-56.1	-63.9
10.9	32.2	-67.2	-12.3	-13.4	45.7	-29.1	36.6	37.1	4.6	-54.8	-60.6
11.0	32.4	-67.5	-13.0	-13.5	45.9	-29.1	36.7	37.1	4.7	-55.1	-58.2
11.1	32.5	-71.3	-13.5	-13.5	45.6	-28.7	36.7	37.2	4.7	-55.5	-48.9
11.2	32.7	-71.9	-13.7	-13.4	45.4	-28.4	36.7	37.2	4.7	-55.1	-50.4
11.3	33.0	-66.7	-13.8	-13.6	45.4	-28.1	36.7	37.2	4.7	-54.2	-51.0
11.4	33.2	-62.6	-14.0	-14.1	45.2	-27.8	36.7	37.2	4.7	-54.0	-57.6
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11.7	33.0	-60.0	-15.3	-13.2	44.1	-26.7	36.4	37.0	4.8	-54.5	-50.4
11.8	33.0	-60.5	-15.0	-12.7	43.9	-26.2	36.1	36.9	4.9	-54.7	-47.3
11.9	32.9	-60.7	-14.0	-12.6	43.5	-26.3	35.9	36.6	4.9	-56.9	-46.8
12.0	32.6	-60.6	-13.0	-12.6	43.1	-26.1	35.5	36.4	5.0	-59.6	-46.6
12.1	32.2	-60.8	-12.0	-12.5	40.4	-25.8	35.2	36.1	5.1	-62.8	-43.0
12.2	31.5	-59.6	-11.3	-12.1	-	-24.9	34.8	35.7	5.2	-63.6	-42.9
12.3	30.8	-60.0	-10.6	-11.6	-	-25.0	34.4	35.3	5.3	-63.8	-46.2
12.4	29.9	-59.1	-9.7	-10.7	-	-23.4	33.9	34.8	5.4	-62.9	-52.3
12.5	28.6	-59.0	-8.7	-9.3	-	-	33.5	34.3	5.5	-63.3	-49.7
12.6	26.8	-60.0	-7.7	-7.5	-	-	33.0	33.7	5.6	-65.1	-50.1
12.7	24.6	-61.4	-6.9	-5.9	-	-	32.4	33.1	5.8	-62.1	-51.8

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FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	IP-3 Output	IM3 Output	1dB Comp. Output	P_{SAT} Output	Noise Figure	2nd Harmonics	3rd Harmonics
(GHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dBm)	(dBm)
9.0	28.3	-67.9	-11.9	-13.5	44.8	-27.5	37.6	38.7	5.0	-43.9	-68.7
9.1	28.6	-67.4	-11.7	-15.1	44.9	-27.5	38.1	38.8	5.0	-46.8	-68.7
9.2	28.8	-67.9	-11.5	-17.1	45.2	-27.8	38.3	38.8	5.0	-48.3	-68.0
9.3	29.0	-67.4	-11.4	-19.9	45.2	-28.0	38.4	38.8	5.0	-51.5	-68.2
9.4	29.0	-66.9	-11.2	-24.4	45.4	-28.4	38.5	38.9	4.9	-53.3	-68.2
9.5	29.1	-66.9	-11.0	-33.0	45.5	-28.6	38.4	38.9	4.9	-54.1	-69.3
9.6	29.0	-68.5	-10.9	-33.9	45.6	-28.8	38.4	38.8	5.0	-56.8	-69.1
9.7	29.0	-66.8	-10.7	-25.9	45.6	-28.8	38.5	38.8	4.9	-58.1	-68.3
9.8	29.0	-68.0	-10.6	-21.4	45.7	-29.0	38.5	38.9	4.9	-60.1	-66.0
9.9	29.0	-69.6	-10.5	-18.7	45.8	-29.1	38.5	39.0	4.9	-60.0	-66.4
10.0	29.0	-68.7	-10.5	-16.9	45.9	-29.4	38.4	39.0	4.9	-59.8	-61.7
10.1	29.0	-67.5	-10.4	-15.6	45.8	-29.1	38.4	38.9	4.9	-59.4	-59.7
10.2	29.0	-66.8	-10.4	-14.6	45.7	-29.0	38.4	38.9	4.9	-60.4	-60.0
10.3	29.1	-67.0	-10.4	-13.8	45.7	-28.8	38.5	39.0	4.9	-60.4	-64.8
10.4	29.3	-65.9	-10.5	-13.3	45.7	-28.9	38.4	38.9	5.0	-59.5	-66.4
10.5	29.4	-67.0	-10.7	-12.9	45.6	-28.8	38.4	39.0	4.9	-57.9	-64.0
10.6	29.7	-65.0	-10.9	-12.7	45.5	-28.5	38.4	38.9	5.0	-57.3	-61.3
10.7	29.9	-64.6	-11.3	-12.6	45.3	-28.2	38.4	39.0	5.0	-55.6	-59.8
10.8	30.1	-63.9	-11.8	-12.7	45.2	-28.0	38.5	39.0	5.0	-53.7	-59.0
10.9	30.3	-63.3	-12.4	-12.9	45.3	-28.1	38.6	39.1	5.0	-53.4	-59.7
11.0	30.4	-63.6	-13.1	-13.1	45.4	-28.2	38.7	39.2	5.0	-51.9	-60.1
11.1	30.5	-63.8	-13.9	-13.4	45.3	-28.2	38.7	39.2	5.0	-51.9	-60.8
11.2	30.6	-63.2	-14.7	-13.7	45.2	-28.0	38.7	39.1	5.0	-53.0	-59.9
11.3	30.7	-63.9	-15.5	-13.8	45.0	-27.7	38.7	39.2	5.1	-53.2	-58.6
11.4	30.8	-63.1	-16.1	-13.8	45.1	-27.7	38.7	39.2	5.1	-53.5	-56.3
11.5	30.8	-62.0	-16.4	-13.6	44.9	-27.2	38.6	39.1	5.1	-53.6	-55.1
11.6	30.8	-61.4	-16.2	-13.3	44.6	-26.7	38.5	39.0	5.1	-54.7	-54.3
11.7	30.7	-60.6	-15.7	-13.1	44.2	-26.0	38.4	38.9	5.2	-54.8	-54.3
11.8	30.6	-60.7	-14.9	-12.9	43.9	-25.3	38.2	38.8	5.3	-55.3	-53.1
11.9	30.4	-60.7	-14.0	-12.9	43.7	-25.0	38.1	38.6	5.3	-56.7	-53.4
12.0	30.1	-60.3	-13.0	-13.0	43.4	-24.2	37.7	38.2	5.4	-56.7	-53.7
12.1	29.6	-60.6	-12.1	-13.1	43.0	-23.4	37.5	37.9	5.4	-57.7	-57.4
12.2	29.1	-60.1	-11.2	-13.0	42.9	-23.5	37.1	37.6	5.5	-56.6	-61.6
12.3	28.3	-59.5	-10.4	-12.4	42.7	-23.5	36.8	37.3	5.6	-58.1	-66.4
12.4	27.5	-58.8	-9.6	-11.4	-	-	36.4	37.0	5.7	-59.2	-65.3
12.5	26.3	-58.8	-8.8	-9.9	-	-	35.9	36.6	5.9	-59.7	-59.6
12.6	25.0	-59.2	-8.1	-8.4	-	-	35.3	36.0	6.0	-60.6	-54.9
12.7	23.2	-59.0	-7.4	-6.9	-	-	34.8	35.4	6.2	-62.1	-57.7

Typical Performance Data

Definitions:

Input Return Loss = S11 (dB)

Gain (Power Gain) = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = -40°C

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	IP-3 Output	IM3 Output	1dB Comp. Output	P _{SAT} Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
9.0	30.4	-66.8	-11.1	-12.4	44.9	-27.5	39.3	40.0	4.1
9.1	30.8	-67.3	-11.0	-13.7	44.8	-27.0	39.5	40.0	4.0
9.2	31.1	-66.9	-11.0	-15.3	44.6	-26.7	39.5	39.5	4.0
9.3	31.3	-66.5	-11.0	-17.1	44.6	-26.5	39.5	39.2	4.0
9.4	31.4	-66.1	-11.0	-19.2	44.7	-26.7	39.4	39.1	3.9
9.5	31.5	-65.5	-10.9	-22.6	44.5	-26.9	39.3	39.1	3.9
9.6	31.5	-66.7	-10.7	-28.0	44.7	-27.0	39.2	39.1	4.0
9.7	31.5	-67.5	-10.6	-34.3	44.7	-26.8	39.4	39.2	4.0
9.8	31.4	-67.0	-10.6	-27.0	44.8	-27.5	39.4	39.2	3.9
9.9	31.4	-67.0	-10.4	-22.2	45.0	-27.7	39.3	39.4	3.9
10.0	31.3	-67.7	-10.2	-19.3	45.1	-28.0	39.2	39.4	3.9
10.1	31.3	-67.6	-10.1	-17.3	45.3	-27.9	39.2	39.4	4.0
10.2	31.3	-66.6	-9.9	-15.8	45.0	-27.7	39.2	39.5	4.0
10.3	31.3	-66.5	-9.8	-14.5	45.3	-27.9	39.2	39.5	4.0
10.4	31.5	-67.4	-9.8	-13.7	45.2	-27.8	39.2	39.5	3.9
10.5	31.7	-67.6	-9.8	-13.2	45.2	-27.7	39.3	39.5	4.0
10.6	31.9	-66.9	-9.8	-12.7	44.8	-27.4	39.2	39.5	4.0
10.7	32.2	-66.2	-9.8	-12.4	44.7	-26.8	39.3	39.5	4.0
10.8	32.5	-65.9	-9.9	-12.4	44.5	-26.8	39.4	39.6	4.0
10.9	32.8	-66.2	-10.2	-12.5	44.7	-27.0	39.4	39.6	4.0
11.0	33.1	-66.0	-10.5	-12.5	44.7	-26.7	39.7	39.8	4.0
11.1	33.3	-66.7	-11.0	-12.8	44.7	-26.8	39.7	39.8	4.0
11.2	33.4	-68.0	-11.5	-12.9	44.6	-26.5	39.7	39.8	4.0
11.3	33.6	-67.9	-11.8	-13.0	44.3	-26.3	39.8	39.9	4.0
11.4	33.8	-64.7	-12.2	-13.1	44.6	-26.5	39.8	39.9	4.0
11.5	34.0	-62.4	-12.9	-13.1	44.6	-26.8	39.8	39.9	4.1
11.6	34.0	-61.4	-13.7	-12.7	44.7	-26.6	39.7	39.8	4.1
11.7	34.0	-62.2	-14.0	-12.3	44.5	-26.4	39.6	39.6	4.2
11.8	34.0	-62.7	-13.9	-11.9	44.3	-26.2	39.5	39.5	4.2
11.9	34.1	-63.0	-13.2	-11.7	44.3	-25.8	39.3	39.3	4.2
12.0	33.9	-63.6	-12.3	-11.7	44.1	-25.8	38.9	38.7	4.3
12.1	33.5	-61.8	-11.8	-11.6	44.1	-25.7	38.5	38.3	4.3
12.2	33.1	-60.6	-11.4	-11.7	44.2	-25.9	38.1	37.9	4.4
12.3	32.5	-60.1	-10.8	-12.0	44.3	-26.1	37.9	37.7	4.5
12.4	31.8	-60.0	-10.1	-11.9	44.4	-26.3	37.4	37.4	4.5
12.5	30.9	-59.6	-9.4	-11.2	44.0	-25.5	36.9	36.9	4.7
12.6	29.7	-59.6	-8.4	-9.8	42.1	-21.6	36.2	36.3	4.8
12.7	28.2	-59.9	-7.6	-8.1	-	-	35.5	35.7	4.9

Typical Performance Data

Definitions:

Input Return Loss = S11 (dB)

Gain (Power Gain) = S21 (dB)

Isolation = S12 (dB)

Output Return Loss = S22 (dB)

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+95^{\circ}\text{C}$

FREQ	Gain	Isolation	Input Return Loss	Output Return Loss	IP-3 Output	IM3 Output	1dB Comp. Output	P _{SAT} Output	Noise Figure
(GHz)	(dB)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
9.0	25.9	-68.1	-12.3	-14.8	41.8	-21.7	35.4	37.6	6.2
9.1	26.1	-67.4	-12.1	-16.8	41.9	-21.8	35.9	37.7	6.2
9.2	26.3	-67.9	-12.0	-19.3	42.1	-21.7	36.3	37.9	6.2
9.3	26.5	-67.1	-11.8	-22.7	42.7	-23.4	36.6	38.0	6.2
9.4	26.6	-66.1	-11.6	-29.4	43.0	-23.9	36.9	38.2	6.2
9.5	26.6	-67.4	-11.4	-32.1	43.2	-24.5	37.0	38.2	6.1
9.6	26.6	-67.6	-11.3	-25.9	43.3	-24.6	37.0	38.1	6.1
9.7	26.5	-68.5	-11.2	-21.4	43.3	-24.6	37.2	38.2	6.1
9.8	26.5	-67.8	-11.1	-18.6	43.5	-25.0	37.3	38.2	6.2
9.9	26.5	-67.8	-11.0	-16.7	43.5	-25.0	37.4	38.2	6.2
10.0	26.5	-68.0	-11.0	-15.3	43.5	-24.9	37.4	38.2	6.1
10.1	26.5	-67.6	-11.0	-14.3	43.4	-24.6	37.3	38.1	6.2
10.2	26.5	-67.7	-11.1	-13.5	43.4	-24.5	37.2	38.0	6.2
10.3	26.6	-66.9	-11.2	-12.8	43.3	-24.4	37.4	38.1	6.2
10.4	26.7	-66.3	-11.5	-12.5	43.1	-23.9	37.3	38.0	6.2
10.5	26.8	-66.3	-11.8	-12.3	43.3	-24.6	37.3	38.0	6.2
10.6	27.0	-66.1	-12.2	-12.3	43.2	-24.4	37.1	37.9	6.2
10.7	27.1	-65.2	-12.8	-12.4	43.0	-24.0	37.0	37.8	6.2
10.8	27.3	-64.9	-13.5	-12.6	42.5	-23.0	37.0	37.8	6.2
10.9	27.4	-65.0	-14.4	-12.9	42.2	-21.9	37.1	37.9	6.2
11.0	27.5	-64.8	-15.6	-13.2	42.4	-22.8	37.1	37.9	6.3
11.1	27.5	-64.9	-16.9	-13.5	42.1	-22.3	37.0	37.9	6.3
11.2	27.5	-67.0	-18.1	-13.7	41.4	-20.8	36.7	37.7	6.3
11.3	27.5	-65.8	-19.0	-13.8	40.9	-19.5	36.7	37.8	6.3
11.4	27.5	-63.9	-19.8	-13.9	40.7	-19.3	36.7	37.9	6.4
11.5	27.4	-62.0	-19.9	-13.9	40.5	-18.9	36.5	37.9	6.4
11.6	27.3	-61.6	-19.4	-13.6	40.2	-18.5	36.2	37.8	6.4
11.7	27.1	-62.0	-18.1	-13.4	39.7	-17.4	36.1	37.7	6.5
11.8	26.9	-62.4	-16.6	-13.2	39.4	-16.5	35.9	37.7	6.5
11.9	26.7	-62.9	-15.0	-13.0	39.3	-16.6	36.0	37.6	6.6
12.0	26.3	-63.1	-13.6	-12.8	39.2	-16.6	35.9	37.3	6.7
12.1	25.7	-61.9	-12.6	-12.5	38.9	-15.8	35.7	37.1	6.8
12.2	25.1	-61.1	-11.7	-12.0	38.7	-15.4	35.6	36.8	6.9
12.3	24.3	-60.7	-10.8	-11.2	38.6	-15.9	35.4	36.6	7.0
12.4	23.4	-60.8	-10.0	-10.1	-	-	35.2	36.1	7.1
12.5	22.2	-61.0	-9.2	-8.8	-	-	34.9	35.6	7.3
12.6	20.8	-61.9	-8.4	-7.6	-	-	34.3	34.9	7.4
12.7	19.0	-62.8	-7.8	-6.3	-	-	33.7	34.0	7.6

*Typical Performance Data*TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1350\text{ mA}$, 1500 mA , 1650 mA @ Temperature = $+25^{\circ}\text{C}$

FREQ	Gain @ 1350 mA	Gain @ 1500 mA	Gain @ 1650 mA	1dB Comp. Output @ 1350 mA	1dB Comp. Output @ 1500 mA	1dB Comp. Output @ 1650 mA	P_{SAT} Output @ 1350 mA	P_{SAT} Output @ 1500 mA	P_{SAT} Output @ 1650 mA
(GHz)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
9.0	28.2	28.3	28.6	37.4	37.6	37.8	39.0	38.7	38.9
9.1	28.5	28.6	28.9	38.0	38.1	38.5	38.8	38.8	38.9
9.2	28.8	28.8	29.2	38.2	38.3	38.6	39.0	38.8	38.9
9.3	28.9	29.0	29.3	38.4	38.4	38.7	38.9	38.8	38.9
9.4	29.0	29.0	29.4	38.4	38.5	38.7	38.8	38.9	39.0
9.5	29.0	29.1	29.4	38.4	38.4	38.7	38.8	38.9	39.0
9.6	29.0	29.0	29.4	38.4	38.4	38.6	38.7	38.8	38.9
9.7	29.0	29.0	29.4	38.5	38.5	38.7	38.8	38.8	39.0
9.8	29.0	29.0	29.4	38.4	38.5	38.6	38.9	38.9	39.1
9.9	29.0	29.0	29.4	38.4	38.5	38.6	38.9	39.0	39.2
10.0	28.9	29.0	29.3	38.4	38.4	38.6	38.9	39.0	39.1
10.1	29.0	29.0	29.3	38.4	38.4	38.4	38.9	38.9	39.0
10.2	29.0	29.0	29.3	38.3	38.4	38.4	38.9	38.9	39.0
10.3	29.1	29.1	29.4	38.4	38.5	38.4	39.0	39.0	39.0
10.4	29.2	29.3	29.5	38.3	38.4	38.4	38.9	38.9	39.0
10.5	29.4	29.4	29.7	38.3	38.4	38.5	38.9	39.0	39.0
10.6	29.6	29.7	29.9	38.3	38.4	38.4	38.9	38.9	38.9
10.7	29.8	29.9	30.1	38.3	38.4	38.4	38.9	39.0	38.9
10.8	30.0	30.1	30.3	38.4	38.5	38.5	38.9	39.0	39.0
10.9	30.2	30.3	30.5	38.5	38.6	38.6	39.0	39.1	39.1
11.0	30.3	30.4	30.7	38.6	38.7	38.8	39.1	39.2	39.2
11.1	30.5	30.5	30.8	38.6	38.7	38.8	39.1	39.2	39.2
11.2	30.6	30.6	30.9	38.6	38.7	38.7	39.1	39.1	39.1
11.3	30.7	30.7	31.1	38.6	38.7	38.8	39.2	39.2	39.2
11.4	30.7	30.8	31.1	38.6	38.7	38.8	39.2	39.2	39.3
11.5	30.7	30.8	31.2	38.6	38.6	38.8	39.2	39.1	39.2
11.6	30.7	30.8	31.3	38.5	38.5	38.7	39.1	39.0	39.1
11.7	30.7	30.7	31.2	38.4	38.4	38.6	39.0	38.9	39.0
11.8	30.5	30.6	31.2	38.2	38.2	38.5	38.9	38.8	38.9
11.9	30.4	30.4	31.0	38.1	38.1	38.4	38.7	38.6	38.7
12.0	30.0	30.1	30.7	37.7	37.7	37.9	38.3	38.2	38.3
12.1	29.6	29.6	30.2	37.5	37.5	37.6	38.0	37.9	38.0
12.2	29.1	29.1	29.6	37.2	37.1	37.3	37.7	37.6	37.7
12.3	28.4	28.3	28.9	36.9	36.8	37.0	37.5	37.3	37.4
12.4	27.6	27.5	28.0	36.5	36.4	36.5	37.1	37.0	37.1
12.5	26.5	26.3	26.9	36.0	35.9	36.0	36.6	36.6	36.6
12.6	25.2	25.0	25.6	35.4	35.3	35.3	36.0	36.0	35.9
12.7	23.6	23.2	23.9	34.9	34.8	34.8	35.4	35.4	35.3

MMIC Amplifier

PMA6-123-10W+

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1350\text{ mA}$, 1500 mA , 1650 mA @ Temperature = $+25^{\circ}\text{C}$

FREQ	IP-3 @ 1350 mA	IP-3 @ 1500 mA	IP-3 @ 1650 mA	IM3 @ 1350 mA	IM3 @ 1500 mA	IM3 @ 1650 mA	Noise Figure @ 1350 mA	Noise Figure @ 1500 mA	Noise Figure @ 1650 mA
(GHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dB)	(dB)
9.0	44.7	44.8	44.1	-28.2	-27.5	-26.6	4.9	5.0	5.3
9.1	45.1	44.9	44.2	-28.6	-27.5	-26.5	4.8	5.0	5.3
9.2	45.5	45.2	44.5	-29.1	-27.8	-26.9	4.8	5.0	5.3
9.3	45.8	45.2	44.7	-29.6	-28.0	-27.3	4.8	5.0	5.3
9.4	46.0	45.4	44.8	-30.0	-28.4	-27.7	4.8	4.9	5.2
9.5	46.1	45.5	45.0	-30.2	-28.6	-27.9	4.8	4.9	5.3
9.6	46.2	45.6	45.1	-30.3	-28.8	-28.3	4.8	5.0	5.3
9.7	45.9	45.6	45.2	-29.9	-28.8	-28.4	4.8	4.9	5.2
9.8	45.9	45.7	45.4	-29.7	-29.0	-28.8	4.8	4.9	5.2
9.9	46.0	45.8	45.5	-29.9	-29.1	-28.9	4.8	4.9	5.2
10.0	46.0	45.9	45.6	-30.1	-29.4	-29.2	4.8	4.9	5.2
10.1	45.8	45.8	45.6	-29.5	-29.1	-29.2	4.8	4.9	5.2
10.2	45.5	45.7	45.6	-29.1	-29.0	-29.1	4.8	4.9	5.2
10.3	45.5	45.7	45.6	-29.0	-28.8	-29.1	4.8	4.9	5.3
10.4	45.4	45.7	45.6	-29.0	-28.9	-29.2	4.8	5.0	5.3
10.5	45.4	45.6	45.6	-28.8	-28.8	-29.1	4.8	4.9	5.3
10.6	45.3	45.5	45.5	-28.5	-28.5	-28.8	4.8	5.0	5.3
10.7	45.1	45.3	45.2	-28.2	-28.2	-28.6	4.8	5.0	5.3
10.8	45.0	45.2	45.2	-28.0	-28.0	-28.4	4.9	5.0	5.3
10.9	45.0	45.3	45.3	-28.1	-28.1	-28.6	4.9	5.0	5.3
11.0	45.0	45.4	45.2	-28.0	-28.2	-28.5	4.9	5.0	5.3
11.1	45.0	45.3	45.2	-28.0	-28.2	-28.4	4.9	5.0	5.3
11.2	44.9	45.2	45.1	-27.7	-28.0	-28.1	4.9	5.0	5.4
11.3	44.7	45.0	44.8	-27.3	-27.7	-27.7	4.9	5.1	5.4
11.4	44.6	45.1	44.7	-27.2	-27.7	-27.5	5.0	5.1	5.4
11.5	44.4	44.9	44.4	-26.8	-27.2	-26.8	5.0	5.1	5.5
11.6	44.2	44.6	44.1	-26.3	-26.7	-26.1	5.1	5.1	5.5
11.7	43.8	44.2	43.7	-25.6	-26.0	-25.3	5.1	5.2	5.5
11.8	43.5	43.9	43.4	-25.0	-25.3	-24.7	5.1	5.3	5.6
11.9	43.3	43.7	43.1	-24.5	-25.0	-24.2	5.2	5.3	5.7
12.0	43.0	43.4	42.7	-23.9	-24.2	-23.3	5.3	5.4	5.7
12.1	42.5	43.0	42.3	-23.2	-23.4	-22.6	5.3	5.4	5.8
12.2	42.2	42.9	42.1	-22.9	-23.5	-22.4	5.4	5.5	5.9
12.3	-	-	-	-	-	-	5.5	5.6	6.0
12.4	-	-	-	-	-	-	5.6	5.7	6.1
12.5	-	-	-	-	-	-	5.7	5.9	6.2
12.6	-	-	-	-	-	-	5.8	6.0	6.4
12.7	-	-	-	-	-	-	6.0	6.2	6.6

*Typical Performance Data*TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

Power	IM3 (@10 GHz)	IM3 (@10.5 GHz)	IM3 (@10.9 GHz)	IM3 (@11.3 GHz)	IM3 (@11.7 GHz)
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
18.0	-44.3	-43.0	-41.7	-40.4	-40.0
19.0	-42.2	-41.2	-40.3	-39.5	-38.5
20.0	-40.3	-39.8	-39.2	-38.5	-37.4
21.0	-38.8	-38.6	-38.0	-37.5	-36.4
22.0	-37.5	-37.5	-37.0	-36.5	-35.4
23.0	-36.3	-36.3	-35.9	-35.5	-34.4
24.0	-35.2	-35.2	-34.8	-34.3	-33.4
25.0	-34.1	-34.2	-33.8	-33.2	-32.4
26.0	-33.2	-33.2	-32.7	-32.3	-31.6
27.0	-32.2	-32.3	-31.7	-31.3	-30.6
28.0	-31.5	-31.3	-30.6	-30.3	-29.6
29.0	-30.4	-30.2	-29.5	-29.3	-28.5
30.0	-29.7	-29.3	-28.7	-28.5	-27.3
31.0	-29.4	-28.8	-28.1	-27.7	-26.0

*Typical Performance Data*TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

Power	OIP3 (@10 GHz)	OIP3 (@10.5 GHz)	OIP3 (@10.9 GHz)	OIP3 (@11.3 GHz)	OIP3 (@11.7 GHz)
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
18.0	40.3	39.8	39.2	38.6	38.3
19.0	40.3	39.9	39.5	39.0	38.5
20.0	40.3	40.2	39.9	39.5	38.9
21.0	40.5	40.5	40.3	40.0	39.4
22.0	40.9	41.0	40.8	40.5	39.9
23.0	41.3	41.4	41.2	40.9	40.4
24.0	41.7	41.9	41.6	41.4	40.9
25.0	42.3	42.4	42.1	41.9	41.4
26.0	42.8	42.9	42.6	42.5	42.0
27.0	43.4	43.4	43.1	42.9	42.5
28.0	44.0	43.8	43.6	43.4	43.1
29.0	44.5	44.3	44.0	43.9	43.5
30.0	45.1	44.8	44.6	44.4	43.9
31.0	45.9	45.6	45.3	45.0	44.2

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

FREQ	P _{OUT}	Gain	FREQ	P _{OUT}	Gain	FREQ	P _{OUT}	Gain
(GHz)	(dBm)	(dB)	(GHz)	(dBm)	(dB)	(GHz)	(dBm)	(dB)
10.0	14.9	29.1	10.9	15.8	30.2	11.7	16.0	30.4
10.0	15.6	29.1	10.9	16.6	30.2	11.7	16.7	30.4
10.0	16.4	29.1	10.9	17.4	30.2	11.7	17.5	30.4
10.0	17.2	29.1	10.9	18.2	30.2	11.7	18.4	30.4
10.0	18.1	29.1	10.9	19.1	30.1	11.7	19.2	30.4
10.0	19.0	29.1	10.9	20.0	30.1	11.7	20.1	30.4
10.0	19.8	29.1	10.9	20.8	30.1	11.7	21.0	30.4
10.0	20.8	29.1	10.9	21.7	30.1	11.7	21.9	30.3
10.0	21.7	29.1	10.9	22.6	30.1	11.7	22.8	30.3
10.0	22.6	29.0	10.9	23.6	30.0	11.7	23.7	30.3
10.0	23.5	29.0	10.9	24.5	30.0	11.7	24.6	30.2
10.0	24.5	29.0	10.9	25.5	30.0	11.7	25.6	30.2
10.0	25.4	29.0	10.9	26.5	30.0	11.7	26.5	30.2
10.0	26.4	29.0	10.9	27.5	30.0	11.7	27.5	30.2
10.0	27.4	29.0	10.9	28.5	30.1	11.7	28.5	30.2
10.0	28.4	29.0	10.9	29.5	30.1	11.7	29.6	30.3
10.0	29.4	29.1	10.9	30.6	30.2	11.7	30.6	30.4
10.0	30.5	29.1	10.9	31.7	30.3	11.7	31.7	30.4
10.0	31.5	29.2	10.9	32.8	30.4	11.7	32.7	30.5
10.0	32.6	29.3	10.9	33.9	30.6	11.7	33.8	30.6
10.0	33.8	29.5	10.9	35.0	30.7	11.7	34.8	30.6
10.0	34.9	29.6	10.9	36.1	30.8	11.7	35.8	30.6
10.0	35.9	29.7	10.9	37.1	30.8	11.7	36.6	30.4
10.0	36.9	29.6	10.9	37.8	30.6	11.7	37.3	30.1
10.0	37.6	29.4	10.9	38.3	30.1	11.7	37.8	29.7
10.0	38.1	28.9	10.9	38.6	29.4	11.7	38.2	29.0
10.0	38.4	28.2	10.9	38.7	28.5	11.7	38.4	28.2
10.0	38.6	27.4	10.9	38.9	27.7	11.7	38.5	27.3
10.0	38.7	26.6	10.9	38.9	26.7	11.7	38.5	26.3
10.0	38.8	25.6	10.9	39.0	25.8	11.7	38.5	25.3
10.0	38.8	24.7	10.9	39.0	24.8	11.7	38.5	24.3
10.0	38.8	23.7	10.9	39.0	23.8	11.7	38.5	23.3
10.0	38.8	22.7	10.9	39.0	22.8	11.7	38.5	22.2
10.0	38.7	21.6	10.9	39.0	21.8	11.7	38.5	21.2
10.0	38.7	20.6	10.9	39.0	20.7	11.7	38.5	20.2
10.0	38.5	19.4	10.9	39.0	19.8	11.7	38.5	19.2
10.5	15.2	29.5	11.3	15.9	30.4			
10.5	16.0	29.5	11.3	16.7	30.4			
10.5	16.8	29.5	11.3	17.5	30.4			
10.5	17.6	29.5	11.3	18.3	30.4			
10.5	18.5	29.5	11.3	19.2	30.4			
10.5	19.3	29.5	11.3	20.1	30.4			
10.5	20.2	29.4	11.3	20.9	30.3			
10.5	21.1	29.4	11.3	21.8	30.3			
10.5	22.0	29.4	11.3	22.7	30.3			
10.5	23.0	29.4	11.3	23.7	30.3			
10.5	23.9	29.4	11.3	24.6	30.2			
10.5	24.8	29.3	11.3	25.6	30.2			
10.5	25.8	29.3	11.3	26.5	30.2			
10.5	26.8	29.3	11.3	27.5	30.3			
10.5	27.8	29.4	11.3	28.6	30.3			
10.5	28.8	29.4	11.3	29.6	30.4			
10.5	29.8	29.4	11.3	30.7	30.5			
10.5	30.9	29.5	11.3	31.8	30.6			
10.5	31.9	29.6	11.3	32.9	30.7			
10.5	33.0	29.7	11.3	34.0	30.8			
10.5	34.2	29.8	11.3	35.1	30.9			
10.5	35.3	30.0	11.3	36.1	30.9			
10.5	36.3	30.0	11.3	37.0	30.9			
10.5	37.2	29.9	11.3	37.8	30.6			
10.5	37.8	29.6	11.3	38.3	30.1			
10.5	38.2	29.0	11.3	38.6	29.5			
10.5	38.5	28.3	11.3	38.8	28.6			
10.5	38.6	27.4	11.3	38.9	27.7			
10.5	38.7	26.5	11.3	38.9	26.8			
10.5	38.8	25.6	11.3	39.0	25.8			
10.5	38.8	24.7	11.3	39.0	24.8			
10.5	38.8	23.7	11.3	39.0	23.7			
10.5	38.8	22.7	11.3	39.0	22.7			
10.5	38.8	21.7	11.3	39.0	21.7			
10.5	38.8	20.8	11.3	39.0	20.7			
10.5	38.8	19.8	11.3	39.0	19.7			

*Typical Performance Data*TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

FREQ	P _{OUT}	Phase	FREQ	P _{OUT}	Phase	FREQ	P _{OUT}	Phase
(GHz)	(dBm)	(°)	(GHz)	(dBm)	(°)	(GHz)	(dBm)	(°)
10.0	14.9	0.0	10.9	15.8	0.0	11.7	16.0	0.0
10.0	15.6	0.0	10.9	16.6	0.0	11.7	16.7	0.1
10.0	16.4	0.1	10.9	17.4	0.1	11.7	17.5	0.1
10.0	17.2	0.1	10.9	18.2	0.1	11.7	18.4	0.2
10.0	18.1	0.2	10.9	19.1	0.2	11.7	19.2	0.3
10.0	19.0	0.3	10.9	20.0	0.3	11.7	20.1	0.4
10.0	19.8	0.3	10.9	20.8	0.4	11.7	21.0	0.5
10.0	20.8	0.5	10.9	21.7	0.6	11.7	21.9	0.7
10.0	21.7	0.7	10.9	22.6	0.8	11.7	22.8	1.0
10.0	22.6	0.9	10.9	23.6	1.1	11.7	23.7	1.3
10.0	23.5	1.2	10.9	24.5	1.4	11.7	24.6	1.7
10.0	24.5	1.5	10.9	25.5	1.8	11.7	25.6	2.1
10.0	25.4	1.9	10.9	26.5	2.2	11.7	26.5	2.6
10.0	26.4	2.4	10.9	27.5	2.6	11.7	27.5	3.1
10.0	27.4	2.9	10.9	28.5	3.1	11.7	28.5	3.6
10.0	28.4	3.4	10.9	29.5	3.5	11.7	29.6	4.2
10.0	29.4	3.9	10.9	30.6	4.1	11.7	30.6	4.9
10.0	30.5	4.5	10.9	31.7	4.9	11.7	31.7	5.7
10.0	31.5	5.1	10.9	32.8	5.6	11.7	32.7	6.8
10.0	32.6	5.8	10.9	33.9	6.7	11.7	33.8	8.0
10.0	33.8	6.7	10.9	35.0	8.0	11.7	34.8	9.5
10.0	34.9	7.8	10.9	36.1	9.1	11.7	35.8	11.0
10.0	35.9	8.9	10.9	37.1	10.4	11.7	36.6	12.8
10.0	36.9	9.8	10.9	37.8	11.4	11.7	37.3	14.8
10.0	37.6	10.5	10.9	38.3	12.8	11.7	37.8	17.3
10.0	38.1	10.7	10.9	38.6	14.7	11.7	38.2	20.3
10.0	38.4	11.1	10.9	38.7	17.4	11.7	38.4	24.0
10.0	38.6	11.8	10.9	38.9	20.8	11.7	38.5	28.4
10.0	38.7	13.3	10.9	38.9	24.4	11.7	38.5	33.2
10.0	38.8	15.1	10.9	39.0	28.6	11.7	38.5	38.4
10.0	38.8	17.5	10.9	39.0	32.6	11.7	38.5	43.7
10.0	38.8	20.1	10.9	39.0	36.5	11.7	38.5	48.5
10.0	38.8	22.4	10.9	39.0	40.0	11.7	38.5	53.3
10.0	38.7	24.7	10.9	39.0	42.6	11.7	38.5	58.2
10.0	38.7	26.6	10.9	39.0	45.2	11.7	38.5	62.5
10.0	38.5	29.0	10.9	39.0	47.3	11.7	38.5	66.0
10.5	15.2	0.0	11.3	15.9	0.0			
10.5	16.0	0.0	11.3	16.7	0.0			
10.5	16.8	0.0	11.3	17.5	0.1			
10.5	17.6	0.1	11.3	18.3	0.1			
10.5	18.5	0.1	11.3	19.2	0.2			
10.5	19.3	0.2	11.3	20.1	0.3			
10.5	20.2	0.3	11.3	20.9	0.5			
10.5	21.1	0.4	11.3	21.8	0.7			
10.5	22.0	0.6	11.3	22.7	0.9			
10.5	23.0	0.8	11.3	23.7	1.2			
10.5	23.9	1.1	11.3	24.6	1.6			
10.5	24.8	1.4	11.3	25.6	2.0			
10.5	25.8	1.8	11.3	26.5	2.4			
10.5	26.8	2.2	11.3	27.5	2.9			
10.5	27.8	2.6	11.3	28.6	3.3			
10.5	28.8	3.1	11.3	29.6	3.9			
10.5	29.8	3.5	11.3	30.7	4.5			
10.5	30.9	4.1	11.3	31.8	5.3			
10.5	31.9	4.7	11.3	32.9	6.2			
10.5	33.0	5.6	11.3	34.0	7.4			
10.5	34.2	6.5	11.3	35.1	8.7			
10.5	35.3	7.6	11.3	36.1	10.0			
10.5	36.3	8.8	11.3	37.0	11.4			
10.5	37.2	9.7	11.3	37.8	12.8			
10.5	37.8	10.4	11.3	38.3	14.6			
10.5	38.2	11.2	11.3	38.6	17.5			
10.5	38.5	12.5	11.3	38.8	21.1			
10.5	38.6	14.5	11.3	38.9	25.4			
10.5	38.7	17.1	11.3	38.9	30.3			
10.5	38.8	20.1	11.3	39.0	35.2			
10.5	38.8	23.4	11.3	39.0	39.9			
10.5	38.8	26.7	11.3	39.0	43.9			
10.5	38.8	29.7	11.3	39.0	47.5			
10.5	38.8	32.6	11.3	39.0	50.6			
10.5	38.8	35.1	11.3	39.0	53.5			
10.5	38.8	37.4	11.3	39.0	56.4			

MMIC Amplifier

PMA6-123-10W+

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

FREQ	P _{out}	2nd Harmonics	FREQ	P _{out}	3rd Harmonics
(GHz)	(dBm)	(dB)	(GHz)	(dBm)	(dB)
10.0	18.0	-56.5	10.0	18.0	-73.5
10.0	19.0	-57.7	10.0	19.0	-73.6
10.0	20.0	-58.9	10.0	20.0	-73.5
10.0	21.0	-59.0	10.0	21.0	-74.1
10.0	22.0	-62.1	10.0	22.0	-74.3
10.0	23.0	-60.2	10.0	23.0	-75.8
10.0	24.0	-61.5	10.0	24.0	-78.3
10.0	25.0	-62.0	10.0	25.0	-78.4
10.0	26.0	-60.7	10.0	26.0	-82.6
10.0	27.0	-66.0	10.0	27.0	-80.5
10.0	27.0	-64.2	10.0	27.0	-76.8
10.0	28.0	-63.6	10.0	28.0	-73.6
10.0	30.0	-61.7	10.0	30.0	-73.1
10.0	31.0	-59.8	10.0	31.0	-72.6
10.0	32.0	-59.3	10.0	32.0	-72.8
10.0	33.0	-58.9	10.0	33.0	-71.4
10.0	34.0	-58.2	10.0	34.0	-68.5
10.0	34.0	-56.3	10.0	34.0	-67.2
10.0	35.0	-58.1	10.0	35.0	-67.9
10.0	35.0	-59.0	10.0	35.0	-68.6
10.0	36.0	-57.6	10.0	36.0	-68.9
10.0	36.0	-57.8	10.0	36.0	-68.6
10.0	36.0	-57.6	10.0	36.0	-67.6
10.0	36.0	-57.6	10.0	36.0	-67.0
10.0	36.0	-57.1	10.0	36.0	-66.9
10.0	36.0	-56.8	10.0	36.0	-66.7
10.5	18.0	-63.3	10.5	18.0	-72.9
10.5	19.0	-63.8	10.5	19.0	-73.7
10.5	20.0	-66.8	10.5	20.0	-74.1
10.5	21.0	-63.0	10.5	21.0	-76.2
10.5	22.0	-66.0	10.5	22.0	-76.9
10.5	23.0	-66.9	10.5	23.0	-78.0
10.5	24.0	-66.2	10.5	24.0	-78.5
10.5	25.0	-65.2	10.5	25.0	-80.0
10.5	26.0	-64.4	10.5	26.0	-79.2
10.5	27.0	-67.0	10.5	27.0	-80.6
10.5	28.0	-65.4	10.5	28.0	-80.9
10.5	29.0	-64.0	10.5	29.0	-77.6
10.5	30.0	-64.0	10.5	30.0	-77.5
10.5	31.0	-62.3	10.5	31.0	-77.3
10.5	32.0	-61.5	10.5	32.0	-77.5
10.5	33.0	-61.2	10.5	33.0	-77.2
10.5	34.0	-60.1	10.5	34.0	-74.2
10.5	35.0	-59.3	10.5	35.0	-71.2
10.5	35.0	-59.3	10.5	35.0	-68.2
10.5	36.0	-58.8	10.5	36.0	-66.1
10.5	36.0	-58.5	10.5	36.0	-64.5
10.5	36.0	-58.5	10.5	36.0	-63.4
10.5	36.0	-58.0	10.5	36.0	-62.7
10.5	36.0	-58.1	10.5	36.0	-62.2
10.5	36.0	-58.2	10.5	36.0	-61.6
10.5	36.0	-58.3	10.5	36.0	-61.3
10.5	36.0	-57.7	10.5	36.0	-61.0
10.9	19.0	-66.3	10.9	19.0	-69.0
10.9	20.0	-68.2	10.9	20.0	-68.0
10.9	21.0	-65.6	10.9	21.0	-69.2
10.9	22.0	-66.9	10.9	22.0	-68.7
10.9	23.0	-63.9	10.9	23.0	-69.4
10.9	24.0	-64.6	10.9	24.0	-71.6
10.9	25.0	-62.4	10.9	25.0	-73.1
10.9	26.0	-61.9	10.9	26.0	-74.6
10.9	27.0	-61.5	10.9	27.0	-77.4
10.9	28.0	-60.3	10.9	28.0	-72.2
10.9	29.0	-59.7	10.9	29.0	-69.8
10.9	30.0	-58.8	10.9	30.0	-67.0
10.9	31.0	-58.1	10.9	31.0	-66.8
10.9	32.0	-57.5	10.9	32.0	-66.3
10.9	33.0	-56.7	10.9	33.0	-66.2
10.9	34.0	-55.9	10.9	34.0	-63.4
10.9	35.0	-55.4	10.9	35.0	-61.7
10.9	35.0	-54.8	10.9	35.0	-61.3
10.9	36.0	-54.9	10.9	36.0	-62.0
10.9	36.0	-54.8	10.9	36.0	-62.3
10.9	36.0	-54.7	10.9	36.0	-62.1
10.9	36.0	-54.8	10.9	36.0	-61.7
10.9	36.0	-54.8	10.9	36.0	-61.7
10.9	36.0	-54.9	10.9	36.0	-61.2
10.9	36.0	-54.9	10.9	36.0	-60.9
10.9	36.0	-54.8	10.9	36.0	-60.6
10.9	36.0	-54.9	10.9	36.0	-60.8
11.3	20.0	-68.0	11.3	20.0	-64.5
11.3	21.0	-65.3	11.3	21.0	-64.7
11.3	22.0	-68.4	11.3	22.0	-63.9
11.3	23.0	-64.7	11.3	23.0	-66.3
11.3	23.0	-64.8	11.3	23.0	-65.9
11.3	24.0	-63.4	11.3	24.0	-68.6
11.3	25.0	-63.9	11.3	25.0	-68.2
11.3	26.0	-62.8	11.3	26.0	-68.6
11.3	27.0	-61.4	11.3	27.0	-66.1
11.3	28.0	-61.3	11.3	28.0	-64.8
11.3	29.0	-60.6	11.3	29.0	-63.9
11.3	30.0	-59.7	11.3	30.0	-63.3
11.3	31.0	-58.7	11.3	31.0	-63.3
11.3	32.0	-57.8	11.3	32.0	-62.2
11.3	33.0	-56.8	11.3	33.0	-59.8
11.3	34.0	-56.1	11.3	34.0	-58.1
11.3	35.0	-55.2	11.3	35.0	-57.3
11.3	36.0	-54.8	11.3	36.0	-56.2
11.3	36.0	-54.5	11.3	36.0	-55.0
11.3	36.0	-54.3	11.3	36.0	-54.0
11.3	36.0	-54.2	11.3	36.0	-53.1
11.3	37.0	-54.1	11.3	37.0	-52.4
11.3	37.0	-54.2	11.3	37.0	-52.0
11.3	37.0	-54.1	11.3	37.0	-51.5
11.3	37.0	-54.1	11.3	37.0	-51.3
11.3	37.0	-54.2	11.3	37.0	-51.0
11.3	37.0	-54.1	11.3	37.0	-50.8
11.7	20.0	-68.0	11.7	20.0	-62.5
11.7	21.0	-67.4	11.7	21.0	-62.5
11.7	22.0	-66.0	11.7	22.0	-63.1
11.7	23.0	-65.5	11.7	23.0	-64.4
11.7	24.0	-66.6	11.7	24.0	-66.7
11.7	25.0	-65.4	11.7	25.0	-69.3
11.7	26.0	-63.5	11.7	26.0	-70.9
11.7	26.0	-62.1	11.7	26.0	-64.8
11.7	27.0	-61.1	11.7	27.0	-60.4
11.7	28.0	-60.4	11.7	28.0	-59.0
11.7	29.0	-59.3	11.7	29.0	-59.2
11.7	30.0	-58.8	11.7	30.0	-60.0
11.7	31.0	-57.9	11.7	31.0	-58.8
11.7	32.0	-56.9	11.7	32.0	-55.8
11.7	33.0	-56.1	11.7	33.0	-53.6
11.7	34.0	-55.1	11.7	34.0	-53.2
11.7	35.0	-54.6	11.7	35.0	-52.8
11.7	36.0	-54.1	11.7	36.0	-51.7
11.7	36.0	-54.0	11.7	36.0	-51.2
11.7	36.0	-53.9	11.7	36.0	-51.1
11.7	37.0	-54.0	11.7	37.0	-51.0
11.7	37.0	-54.2	11.7	37.0	-50.9
11.7	37.0	-54.4	11.7	37.0	-50.9
11.7	37.0	-54.4	11.7	37.0	-50.8
11.7	37.0	-54.5	11.7	37.0	-50.6
11.7	37.0	-54.5	11.7	37.0	-50.4
11.7	37.0	-54.6	11.7	37.0	-50.4

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = +25°C

Power	P_{DISS} (@10 GHz)	P_{DISS} (@10.5 GHz)	P_{DISS} (@10.9 GHz)	P_{DISS} (@11.3 GHz)	P_{DISS} (@11.7 GHz)	PAE (@10 GHz)	PAE (@10.5 GHz)	PAE (@10.9 GHz)	PAE (@11.3 GHz)	PAE (@11.7 GHz)
(dBm)	(W)	(W)	(W)	(W)	(W)	(%)	(%)	(%)	(%)	(%)
16.0	11.9	11.9	12.0	12.0	12.0	0.3	0.3	0.3	0.3	0.3
16.7	11.9	12.0	12.0	12.0	12.0	0.3	0.3	0.4	0.4	0.4
17.5	11.9	12.0	12.0	12.0	12.0	0.4	0.4	0.5	0.5	0.5
18.4	11.9	12.0	12.1	12.1	12.0	0.4	0.5	0.5	0.6	0.6
19.2	11.9	12.0	12.1	12.1	12.1	0.5	0.6	0.7	0.7	0.7
20.1	12.0	12.0	12.2	12.2	12.1	0.7	0.7	0.8	0.8	0.8
21.0	12.0	12.0	12.2	12.3	12.1	0.8	0.9	1.0	1.0	1.0
21.9	12.0	12.1	12.3	12.4	12.2	1.0	1.1	1.2	1.2	1.2
22.8	12.1	12.2	12.5	12.5	12.3	1.2	1.3	1.5	1.5	1.5
23.7	12.1	12.3	12.6	12.7	12.5	1.5	1.6	1.8	1.8	1.8
24.6	12.2	12.4	12.8	13.0	12.7	1.8	1.9	2.1	2.2	2.2
25.6	12.3	12.6	13.1	13.3	12.9	2.2	2.4	2.6	2.6	2.7
26.5	12.5	12.8	13.5	13.6	13.2	2.7	2.9	3.2	3.2	3.3
27.5	12.8	13.1	13.8	14.0	13.5	3.3	3.5	3.9	3.9	4.0
28.5	13.0	13.4	14.3	14.5	13.9	4.0	4.3	4.7	4.7	4.9
29.6	13.3	13.7	14.7	15.0	14.3	4.9	5.2	5.7	5.8	5.9
30.6	13.7	14.1	15.3	15.6	14.8	6.0	6.4	7.0	7.0	7.2
31.7	14.1	14.5	15.8	16.2	15.3	7.3	7.7	8.4	8.5	8.7
32.7	14.5	15.0	16.4	16.8	15.9	9.0	9.4	10.3	10.3	10.6
33.8	14.9	15.5	17.1	17.5	16.5	10.9	11.5	12.5	12.5	12.7
34.8	15.4	16.0	17.8	18.2	17.1	13.4	14.0	15.1	15.0	15.1
35.8	15.8	16.5	18.4	19.0	17.7	16.2	17.0	18.1	17.7	17.7
36.6	16.3	16.9	19.1	19.6	18.3	19.4	20.1	21.0	20.4	20.1
37.3	16.6	17.4	19.6	20.3	19.0	22.7	23.2	23.5	22.6	22.1
37.8	16.9	17.7	20.0	20.9	19.6	25.4	25.5	25.2	24.3	23.6
38.2	17.1	17.9	20.2	21.2	20.2	27.5	27.0	26.2	25.3	24.4
38.4	17.1	17.9	20.3	21.3	20.6	28.9	28.1	26.9	26.0	24.9
38.5	17.1	17.9	20.4	21.4	20.9	29.9	28.9	27.3	26.3	25.1
38.5	17.0	17.9	20.5	21.6	21.1	30.5	29.3	27.4	26.5	25.1
38.5	17.0	18.0	20.8	21.7	21.2	30.8	29.5	27.4	26.5	25.1
38.5	17.1	18.2	21.0	21.9	21.4	30.7	29.3	27.2	26.4	25.0
38.5	17.4	18.5	21.4	22.1	21.6	30.3	29.1	26.9	26.2	24.8
38.5	17.7	18.8	21.7	22.4	21.7	29.8	28.8	26.6	26.0	24.6
38.5	18.1	19.1	22.0	22.5	21.8	29.1	28.3	26.3	25.8	24.5
38.5	18.4	19.5	22.2	22.6	22.0	28.3	27.9	26.0	25.6	24.3
38.5	18.7	19.7	22.4	22.7	22.1	27.3	27.5	25.7	25.5	24.1

MMIC Amplifier

PMA6-123-10W+

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = +25°C

P_{IN}	P_{OUT} (@10 GHz)	P_{OUT} (@10.5 GHz)	P_{OUT} (@10.9 GHz)	P_{OUT} (@11.3 GHz)	P_{OUT} (@11.7 GHz)	I_{DD} (@10 GHz)	I_{DD} (@10.5 GHz)	I_{DD} (@10.9 GHz)	I_{DD} (@11.3 GHz)	I_{DD} (@11.7 GHz)
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(mA)	(mA)	(mA)	(mA)	(mA)
-14.0	14.9	15.2	15.8	15.9	16.0	1.5	1.5	1.5	1.5	1.5
-13.2	15.6	16.0	16.6	16.7	16.7	1.5	1.5	1.5	1.5	1.5
-12.5	16.4	16.8	17.4	17.5	17.5	1.5	1.5	1.5	1.5	1.5
-11.6	17.2	17.6	18.2	18.3	18.4	1.5	1.5	1.5	1.5	1.5
-10.8	18.1	18.5	19.1	19.2	19.2	1.5	1.5	1.5	1.5	1.5
-9.9	19.0	19.3	20.0	20.1	20.1	1.5	1.5	1.5	1.5	1.5
-9.0	19.8	20.2	20.8	20.9	21.0	1.5	1.5	1.5	1.6	1.5
-8.1	20.8	21.1	21.7	21.8	21.9	1.5	1.5	1.6	1.6	1.6
-7.2	21.7	22.0	22.6	22.7	22.8	1.5	1.5	1.6	1.6	1.6
-6.2	22.6	23.0	23.6	23.7	23.7	1.5	1.6	1.6	1.6	1.6
-5.3	23.5	23.9	24.5	24.6	24.6	1.6	1.6	1.6	1.7	1.6
-4.3	24.5	24.8	25.5	25.6	25.6	1.6	1.6	1.7	1.7	1.7
-3.3	25.4	25.8	26.5	26.5	26.5	1.6	1.7	1.7	1.8	1.7
-2.4	26.4	26.8	27.5	27.5	27.5	1.7	1.7	1.8	1.8	1.8
-1.4	27.4	27.8	28.5	28.6	28.5	1.7	1.7	1.9	1.9	1.8
-0.4	28.4	28.8	29.5	29.6	29.6	1.8	1.8	2.0	2.0	1.9
0.6	29.4	29.8	30.6	30.7	30.6	1.8	1.9	2.1	2.1	2.0
1.6	30.5	30.9	31.7	31.8	31.7	1.9	2.0	2.2	2.2	2.1
2.5	31.5	31.9	32.8	32.9	32.7	2.0	2.1	2.3	2.3	2.2
3.5	32.6	33.0	33.9	34.0	33.8	2.1	2.2	2.4	2.5	2.4
4.5	33.8	34.2	35.0	35.1	34.8	2.2	2.3	2.6	2.7	2.5
5.5	34.9	35.3	36.1	36.1	35.8	2.4	2.5	2.8	2.9	2.7
6.5	35.9	36.3	37.1	37.0	36.6	2.5	2.7	3.0	3.1	2.9
7.5	36.9	37.2	37.8	37.8	37.3	2.7	2.8	3.2	3.3	3.0
8.5	37.6	37.8	38.3	38.3	37.8	2.8	3.0	3.4	3.5	3.2
9.4	38.1	38.2	38.6	38.6	38.2	3.0	3.1	3.4	3.6	3.4
10.4	38.4	38.5	38.7	38.8	38.4	3.0	3.1	3.5	3.6	3.4
11.4	38.6	38.6	38.9	38.9	38.5	3.0	3.1	3.5	3.6	3.5
12.4	38.7	38.7	38.9	38.9	38.5	3.1	3.2	3.5	3.7	3.5
13.4	38.8	38.8	39.0	39.0	38.5	3.1	3.2	3.6	3.7	3.5
14.4	38.8	38.8	39.0	39.0	38.5	3.1	3.2	3.6	3.7	3.6
15.4	38.8	38.8	39.0	39.0	38.5	3.1	3.3	3.7	3.8	3.6
16.3	38.8	38.8	39.0	39.0	38.5	3.2	3.3	3.7	3.8	3.6
17.3	38.7	38.8	39.0	39.0	38.5	3.2	3.3	3.7	3.8	3.6
18.3	38.7	38.8	39.0	39.0	38.5	3.2	3.4	3.8	3.8	3.6
19.3	38.5	38.8	39.0	39.0	38.5	3.2	3.4	3.8	3.8	3.6

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^\circ\text{C}$

Power	P_{DISS} (@10 GHz)	P_{DISS} (@10.5 GHz)	P_{DISS} (@10.9 GHz)	P_{DISS} (@11.3 GHz)	P_{DISS} (@11.7 GHz)	PAE (@10 GHz)	PAE (@10.5 GHz)	PAE (@10.9 GHz)	PAE (@11.3 GHz)	PAE (@11.7 GHz)
(dBm)	(W)	(W)	(W)	(W)	(W)	(%)	(%)	(%)	(%)	(%)
-14.0	11.9	11.9	12.0	12.0	12.0	0.3	0.3	0.3	0.3	0.3
-13.2	11.9	12.0	12.0	12.0	12.0	0.3	0.3	0.4	0.4	0.4
-12.5	11.9	12.0	12.0	12.0	12.0	0.4	0.4	0.5	0.5	0.5
-11.6	11.9	12.0	12.1	12.1	12.0	0.4	0.5	0.5	0.6	0.6
-10.8	11.9	12.0	12.1	12.1	12.1	0.5	0.6	0.7	0.7	0.7
-9.9	12.0	12.0	12.2	12.2	12.1	0.7	0.7	0.8	0.8	0.8
-9.0	12.0	12.0	12.2	12.3	12.1	0.8	0.9	1.0	1.0	1.0
-8.1	12.0	12.1	12.3	12.4	12.2	1.0	1.1	1.2	1.2	1.2
-7.2	12.1	12.2	12.5	12.5	12.3	1.2	1.3	1.5	1.5	1.5
-6.2	12.1	12.3	12.6	12.7	12.5	1.5	1.6	1.8	1.8	1.8
-5.3	12.2	12.4	12.8	13.0	12.7	1.8	1.9	2.1	2.2	2.2
-4.3	12.3	12.6	13.1	13.3	12.9	2.2	2.4	2.6	2.6	2.7
-3.3	12.5	12.8	13.5	13.6	13.2	2.7	2.9	3.2	3.2	3.3
-2.4	12.8	13.1	13.8	14.0	13.5	3.3	3.5	3.9	3.9	4.0
-1.4	13.0	13.4	14.3	14.5	13.9	4.0	4.3	4.7	4.7	4.9
-0.4	13.3	13.7	14.7	15.0	14.3	4.9	5.2	5.7	5.8	5.9
0.6	13.7	14.1	15.3	15.6	14.8	6.0	6.4	7.0	7.0	7.2
1.6	14.1	14.5	15.8	16.2	15.3	7.3	7.7	8.4	8.5	8.7
2.5	14.5	15.0	16.4	16.8	15.9	9.0	9.4	10.3	10.3	10.6
3.5	14.9	15.5	17.1	17.5	16.5	10.9	11.5	12.5	12.5	12.7
4.5	15.4	16.0	17.8	18.2	17.1	13.4	14.0	15.1	15.0	15.1
5.5	15.8	16.5	18.4	19.0	17.7	16.2	17.0	18.1	17.7	17.7
6.5	16.3	16.9	19.1	19.6	18.3	19.4	20.1	21.0	20.4	20.1
7.5	16.6	17.4	19.6	20.3	19.0	22.7	23.2	23.5	22.6	22.1
8.5	16.9	17.7	20.0	20.9	19.6	25.4	25.5	25.2	24.3	23.6
9.4	17.1	17.9	20.2	21.2	20.2	27.5	27.0	26.2	25.3	24.4
10.4	17.1	17.9	20.3	21.3	20.6	28.9	28.1	26.9	26.0	24.9
11.4	17.1	17.9	20.4	21.4	20.9	29.9	28.9	27.3	26.3	25.1
12.4	17.0	17.9	20.5	21.6	21.1	30.5	29.3	27.4	26.5	25.1
13.4	17.0	18.0	20.8	21.7	21.2	30.8	29.5	27.4	26.5	25.1
14.4	17.1	18.2	21.0	21.9	21.4	30.7	29.3	27.2	26.4	25.0
15.4	17.4	18.5	21.4	22.1	21.6	30.3	29.1	26.9	26.2	24.8
16.3	17.7	18.8	21.7	22.4	21.7	29.8	28.8	26.6	26.0	24.6
17.3	18.1	19.1	22.0	22.5	21.8	29.1	28.3	26.3	25.8	24.5
18.3	18.4	19.5	22.2	22.6	22.0	28.3	27.9	26.0	25.6	24.3
19.3	18.7	19.7	22.4	22.7	22.1	27.3	27.5	25.7	25.5	24.1

*Typical Performance Data*TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

FREQ	P_{DISS} (@ P_{SAT})	PAE (@ P_{SAT})
(GHz)	(W)	(%)
9.0	24.4	23.4
9.1	23.7	24.1
9.2	22.4	25.2
9.3	20.9	26.6
9.4	19.6	28.2
9.5	18.9	28.9
9.6	18.8	28.6
9.7	18.7	29.2
9.8	18.3	29.8
9.9	17.4	31.1
10.0	17.2	31.4
10.1	17.8	30.5
10.2	18.5	29.6
10.3	18.7	29.7
10.4	18.9	29.2
10.5	18.8	29.5
10.6	19.6	28.5
10.7	20.4	27.9
10.8	20.8	27.5
10.9	20.6	28.1
11.0	20.5	28.7
11.1	21.1	28.0
11.2	21.8	27.2
11.3	22.0	27.2
11.4	21.9	27.4
11.5	21.7	27.2
11.6	22.0	26.3
11.7	22.2	25.7
11.8	22.2	25.2
11.9	21.9	24.8
12.0	21.4	23.5
12.1	21.2	22.4
12.2	20.8	21.6
12.3	20.3	21.0
12.4	19.8	20.1
12.5	19.4	18.8
12.6	19.1	17.0
12.7	18.7	15.3

MMIC Amplifier

PMA6-123-10W+

Typical Performance Data

TEST CONDITIONS: $V_{DD} = +8\text{ V}$, $I_{DD} = 1500\text{ mA}$ @ Temperature = $+25^{\circ}\text{C}$

P_{OUT}	I_{DD} @10 GHz	I_{DD} @10.5 GHz	I_{DD} @10.9 GHz	I_{DD} @11.3 GHz	I_{DD} @11.7 GHz
(dBm)	(mA)	(mA)	(mA)	(mA)	(mA)
16.0	1.5	1.5	1.5	1.5	1.5
16.7	1.5	1.5	1.5	1.5	1.5
17.5	1.5	1.5	1.5	1.5	1.5
18.4	1.5	1.5	1.5	1.5	1.5
19.2	1.5	1.5	1.5	1.5	1.5
20.1	1.5	1.5	1.5	1.5	1.5
21.0	1.5	1.5	1.5	1.6	1.5
21.9	1.5	1.5	1.6	1.6	1.6
22.8	1.5	1.5	1.6	1.6	1.6
23.7	1.5	1.6	1.6	1.6	1.6
24.6	1.6	1.6	1.6	1.7	1.6
25.6	1.6	1.6	1.7	1.7	1.7
26.5	1.6	1.7	1.7	1.8	1.7
27.5	1.7	1.7	1.8	1.8	1.8
28.5	1.7	1.7	1.9	1.9	1.8
29.6	1.8	1.8	2.0	2.0	1.9
30.6	1.8	1.9	2.1	2.1	2.0
31.7	1.9	2.0	2.2	2.2	2.1
32.7	2.0	2.1	2.3	2.3	2.2
33.8	2.1	2.2	2.4	2.5	2.4
34.8	2.2	2.3	2.6	2.7	2.5
35.8	2.4	2.5	2.8	2.9	2.7
36.6	2.5	2.7	3.0	3.1	2.9
37.3	2.7	2.8	3.2	3.3	3.0
37.8	2.8	3.0	3.4	3.5	3.2
38.2	3.0	3.1	3.4	3.6	3.4
38.4	3.0	3.1	3.5	3.6	3.4
38.5	3.0	3.1	3.5	3.6	3.5
38.5	3.1	3.2	3.5	3.7	3.5
38.5	3.1	3.2	3.6	3.7	3.5
38.5	3.1	3.2	3.6	3.7	3.6
38.5	3.1	3.3	3.7	3.8	3.6
38.5	3.2	3.3	3.7	3.8	3.6
38.5	3.2	3.3	3.7	3.8	3.6
38.5	3.2	3.4	3.8	3.8	3.6
38.5	3.2	3.4	3.8	3.8	3.6

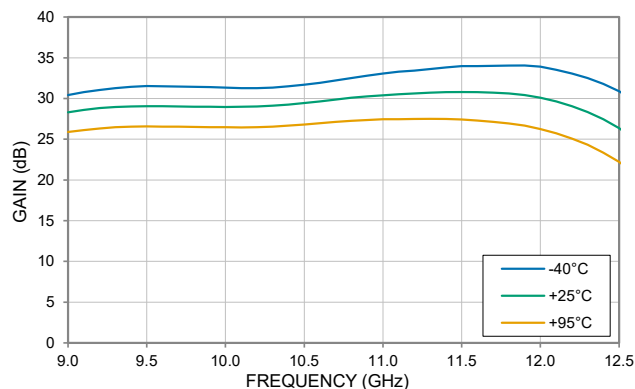
*Typical Performance Data***GAIN VARIATION VS FREQUENCY & TEMPERATURE****INPUT POWER = -15.00dBm, Vd = 8.00V**

FREQ	-40°C to +95°C
GHz	°C
9.0	-0.034
9.1	-0.035
9.2	-0.035
9.3	-0.036
9.4	-0.036
9.5	-0.037
9.6	-0.037
9.7	-0.037
9.8	-0.036
9.9	-0.036
10.0	-0.036
10.1	-0.036
10.2	-0.036
10.3	-0.035
10.4	-0.036
10.5	-0.036
10.6	-0.037
10.7	-0.038
10.8	-0.039
10.9	-0.040
11.0	-0.042
11.1	-0.043
11.2	-0.044
11.3	-0.045
11.4	-0.047
11.5	-0.049
11.6	-0.050
11.7	-0.051
11.8	-0.053
11.9	-0.055
12.0	-0.057
12.1	-0.058
12.2	-0.059
12.3	-0.061
12.4	-0.062
12.5	-0.064
12.6	-0.066
12.7	-0.068

Typical Performance Curves

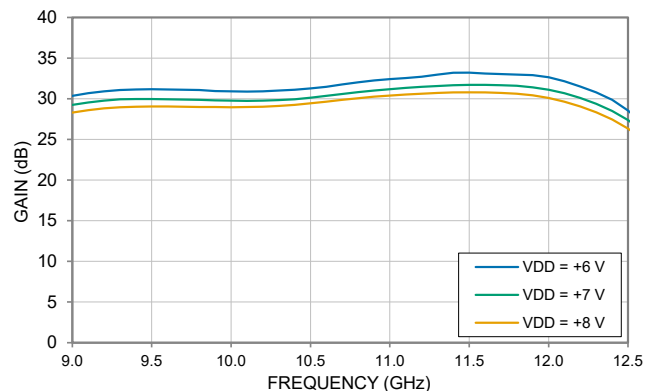
GAIN vs. TEMPERATURE

$P_{IN} = -15 \text{ dBm}$, $V_{DD} = +8 \text{ V}$



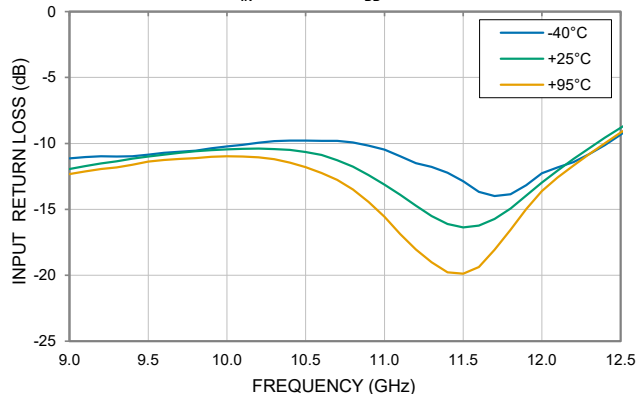
GAIN vs. DEVICE VOLTAGE

$P_{IN} = -15 \text{ dBm}$, TEMPERATURE = +25°C



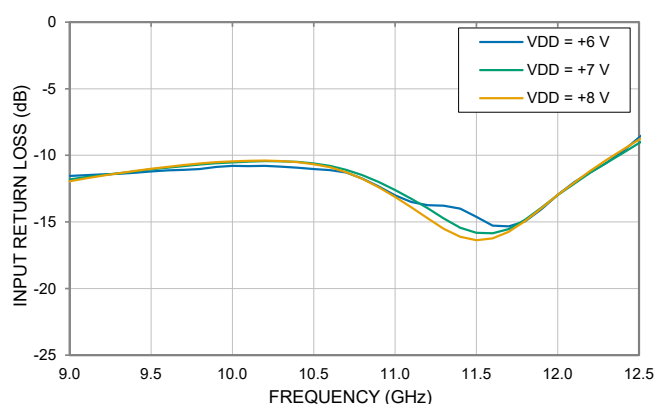
INPUT RETURN LOSS vs. TEMPERATURE

$P_{IN} = -15 \text{ dBm}$, $V_{DD} = +8 \text{ V}$



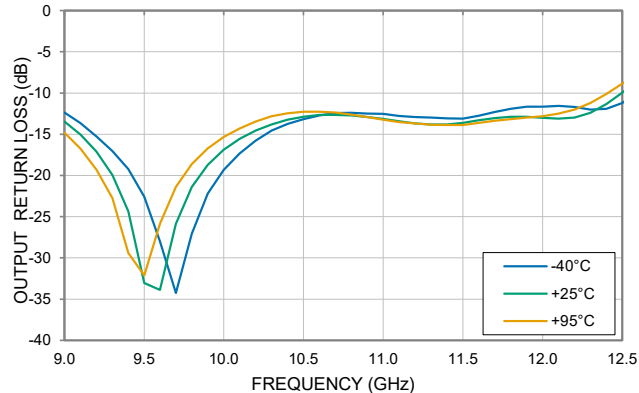
INPUT RETURN LOSS vs. DEVICE VOLTAGE

$P_{IN} = -15 \text{ dBm}$, TEMPERATURE = +25°C



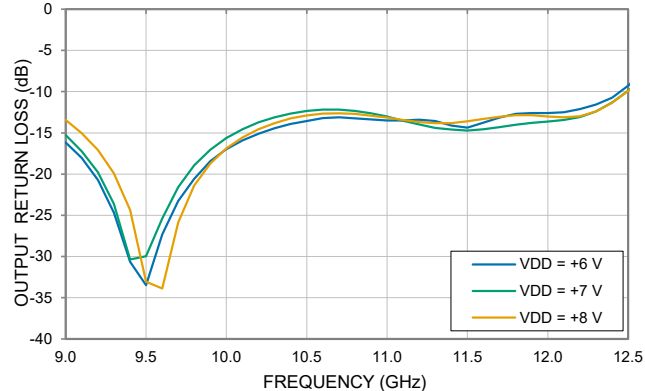
OUTPUT RETURN LOSS vs. TEMPERATURE

$P_{IN} = -15 \text{ dBm}$, $V_{DD} = +8 \text{ V}$



OUTPUT RETURN LOSS vs. DEVICE VOLTAGE

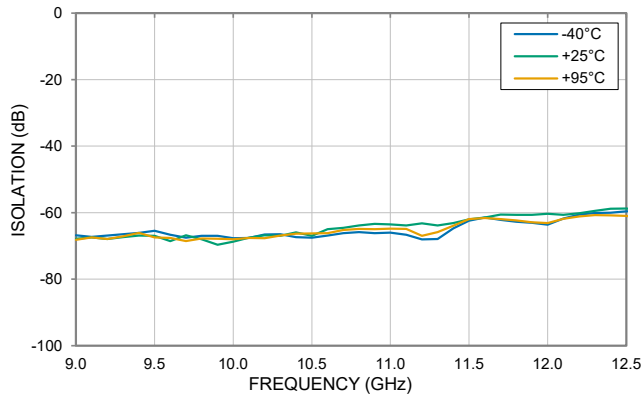
$P_{IN} = -15 \text{ dBm}$, TEMPERATURE = +25°C



Typical Performance Curves

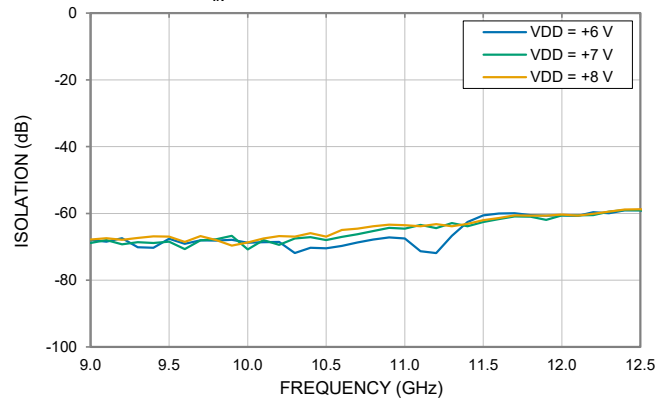
ISOLATION vs. TEMPERATURE

$P_{IN} = -15 \text{ dBm}$, $V_{DD} = +8 \text{ V}$



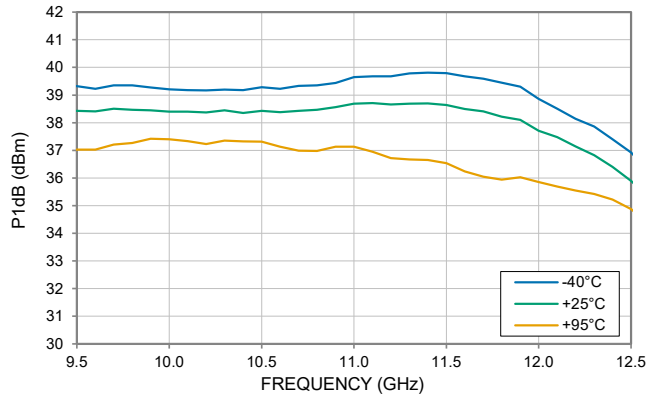
ISOLATION vs. DEVICE VOLTAGE

$P_{IN} = -15 \text{ dBm}$, TEMPERATURE = +25°C



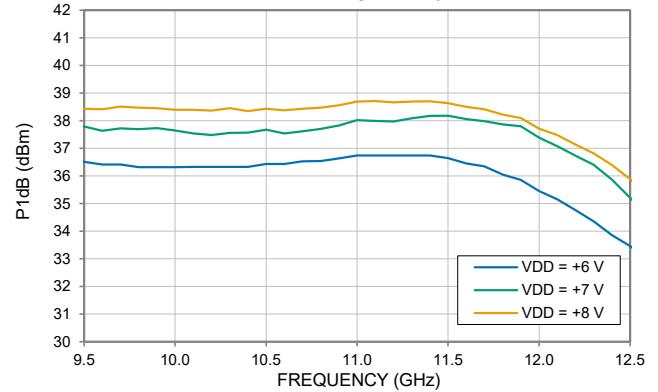
P1dB vs. TEMPERATURE

$V_{DD} = +8 \text{ V}$



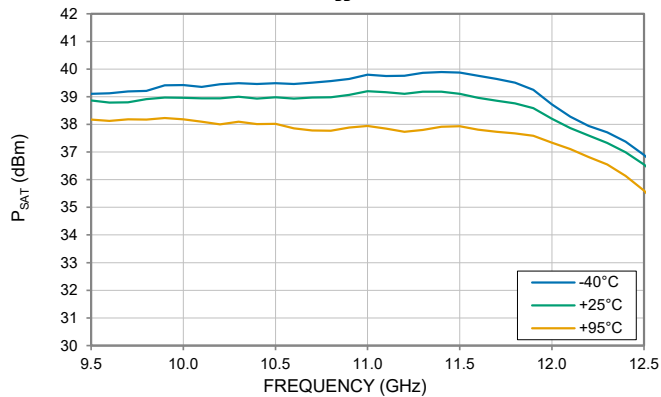
P1dB vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



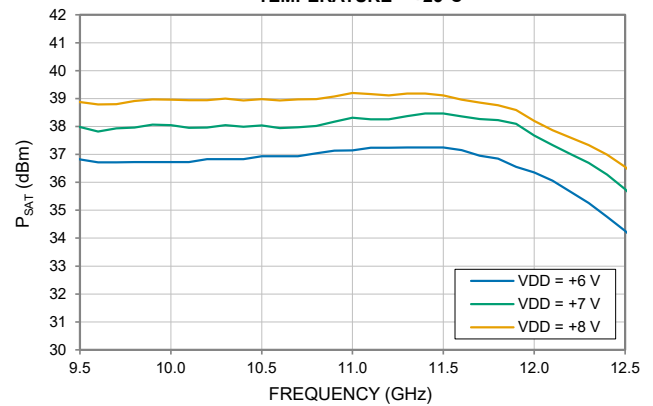
P_{SAT} vs. TEMPERATURE

$V_{DD} = +8 \text{ V}$

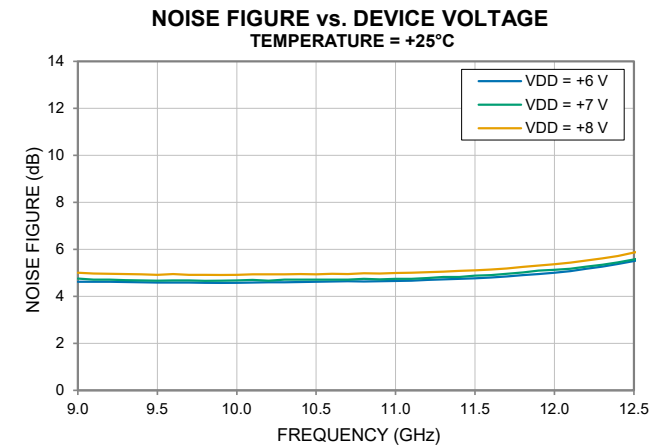
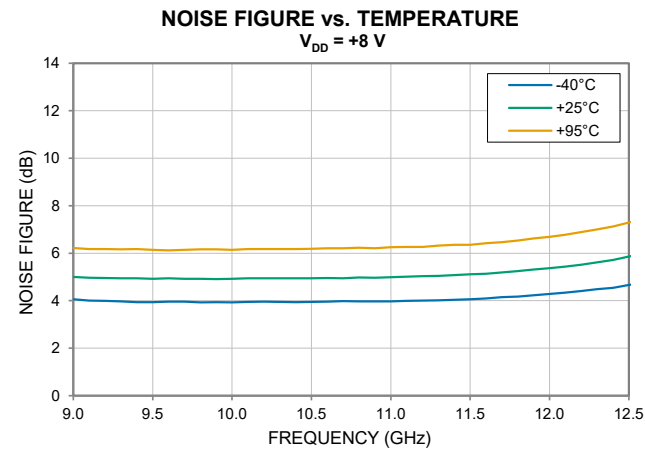
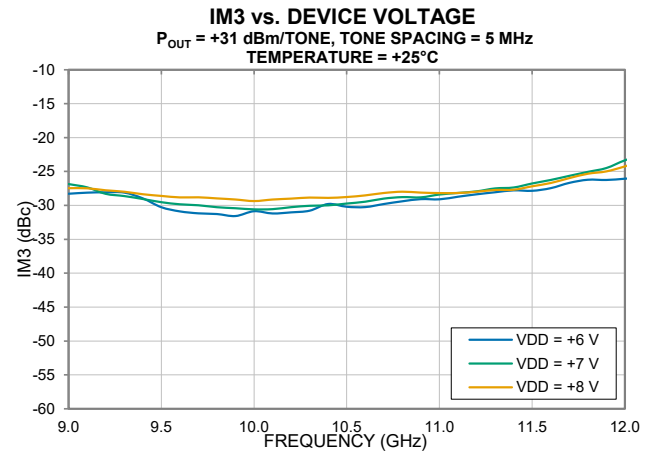
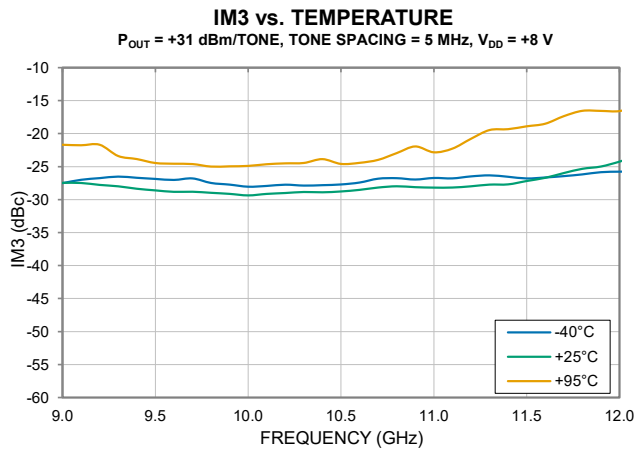
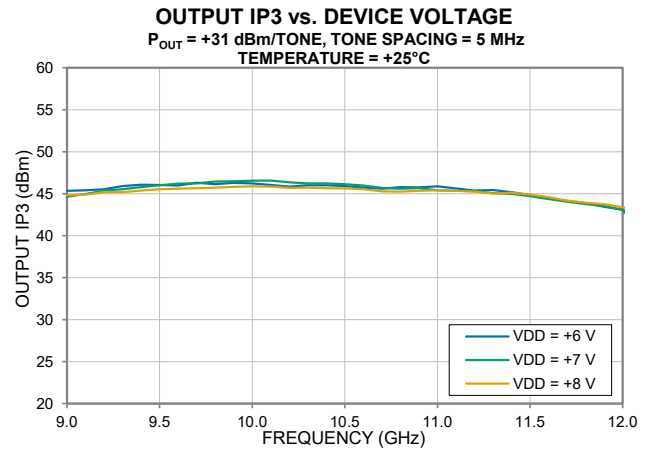
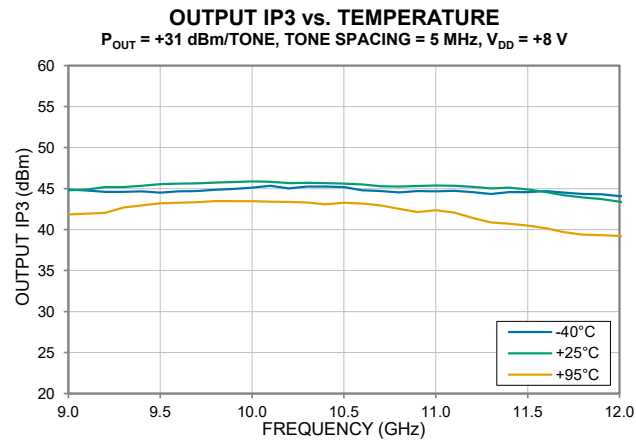


P_{SAT} vs. DEVICE VOLTAGE

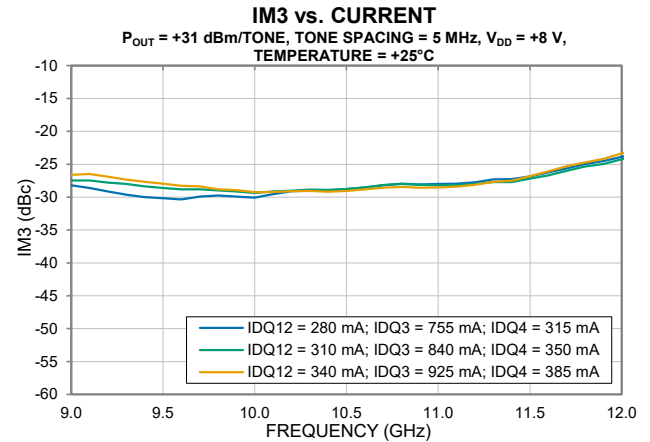
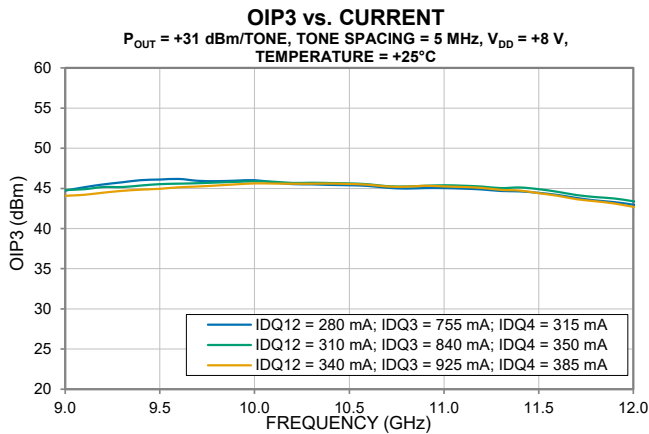
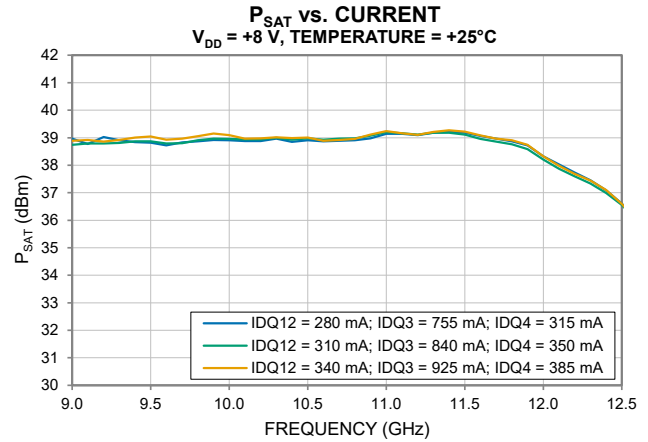
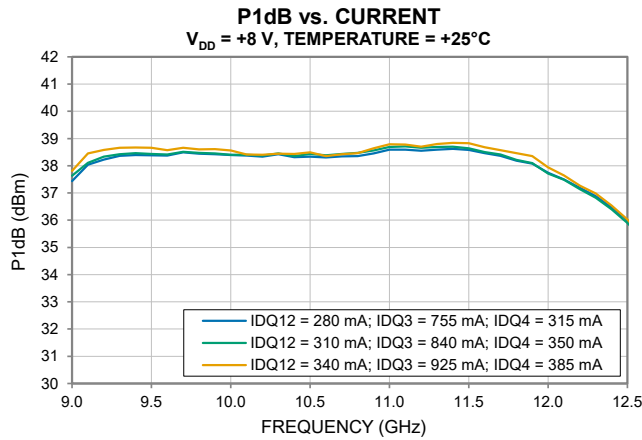
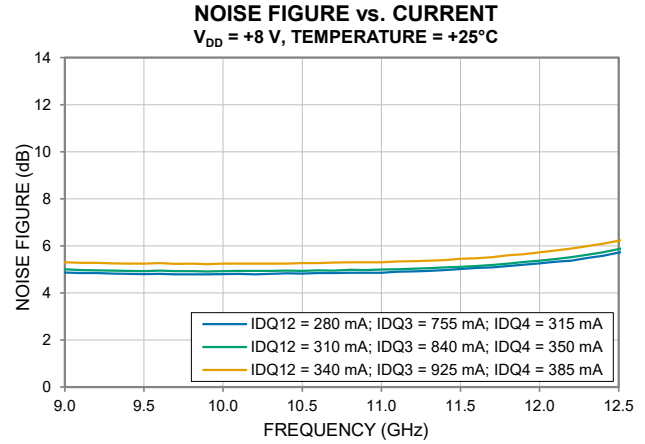
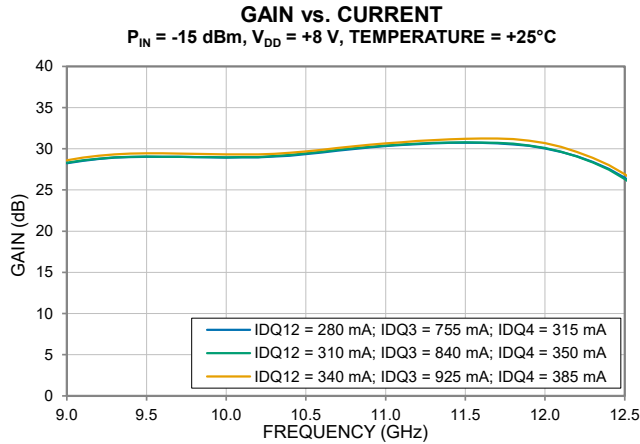
TEMPERATURE = +25°C



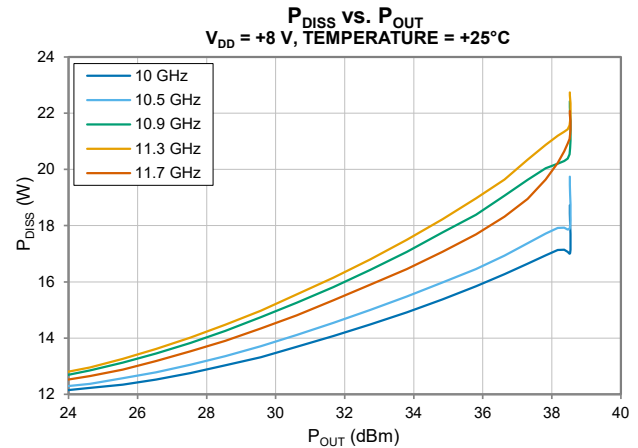
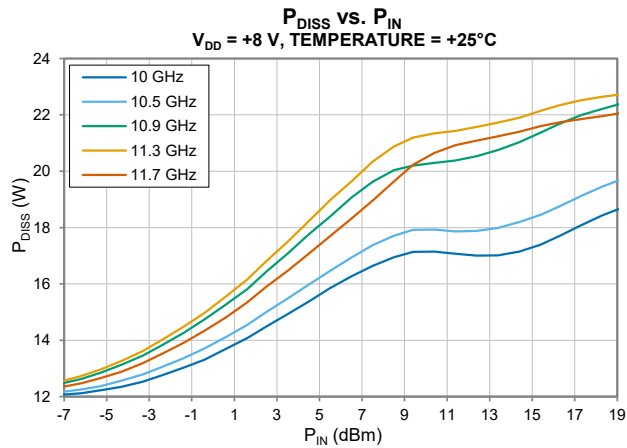
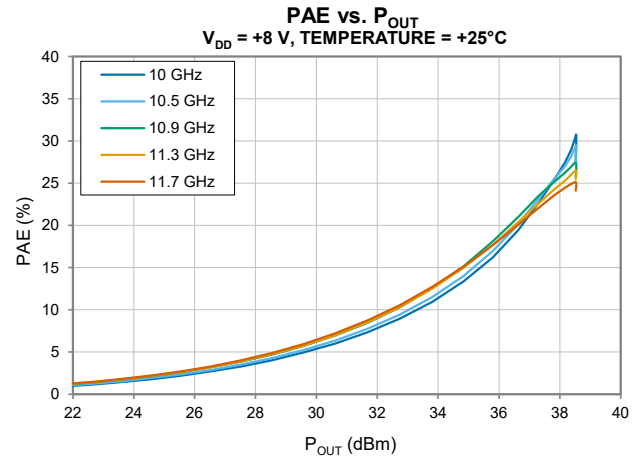
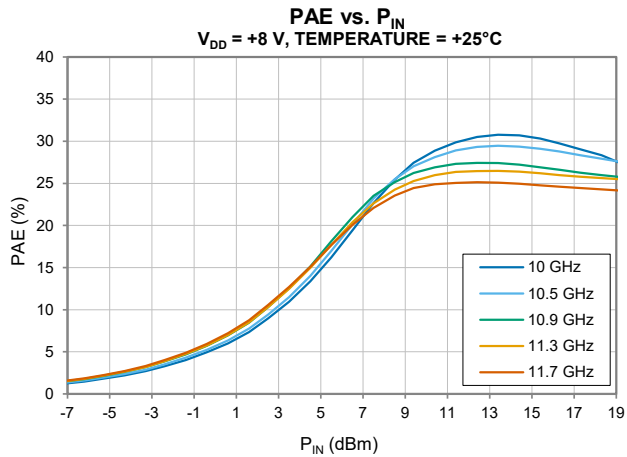
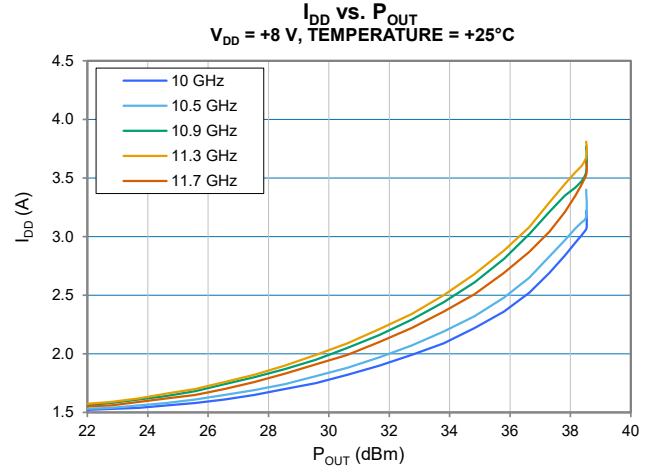
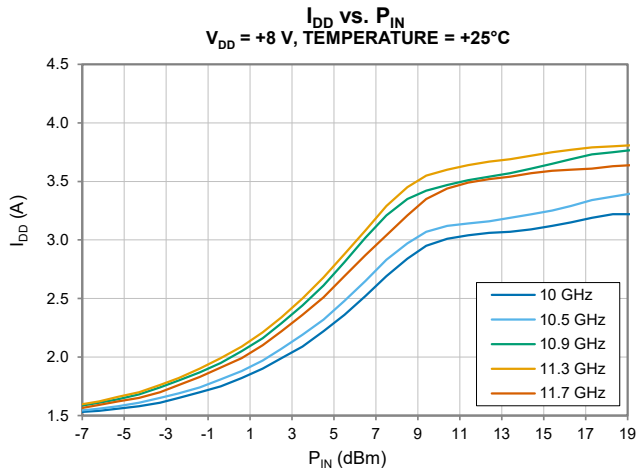
Typical Performance Curves



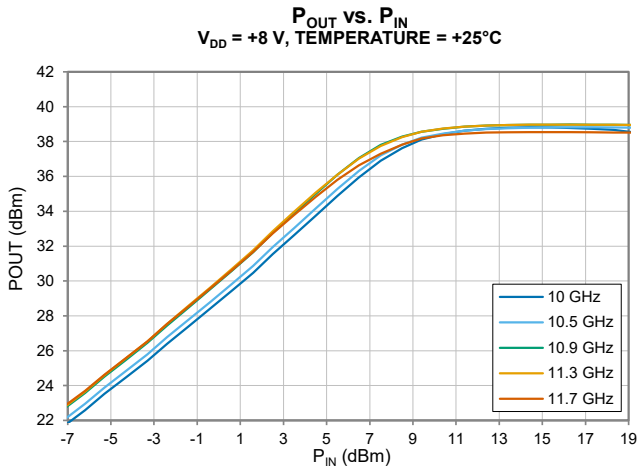
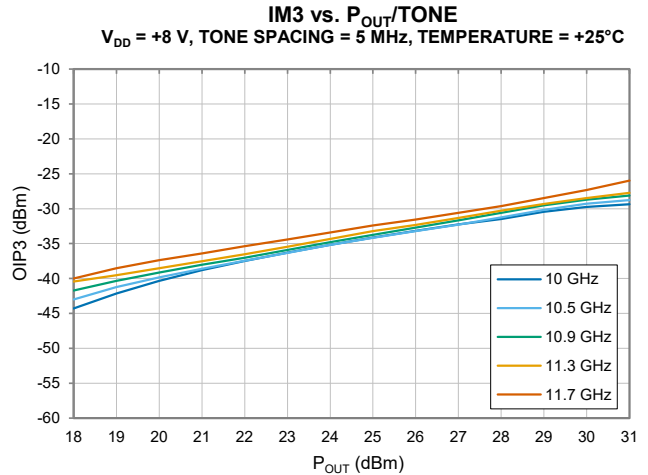
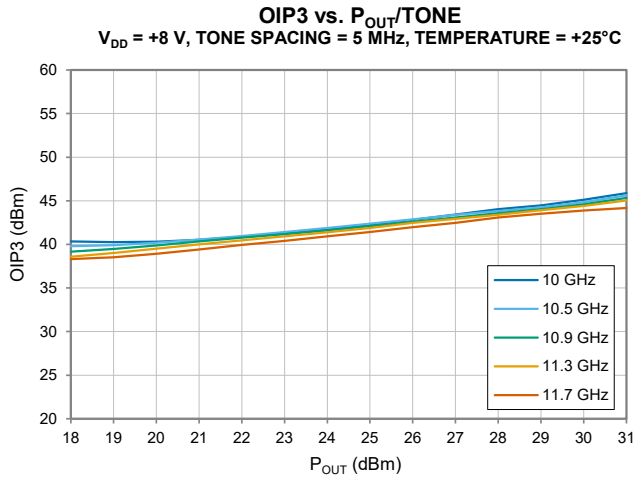
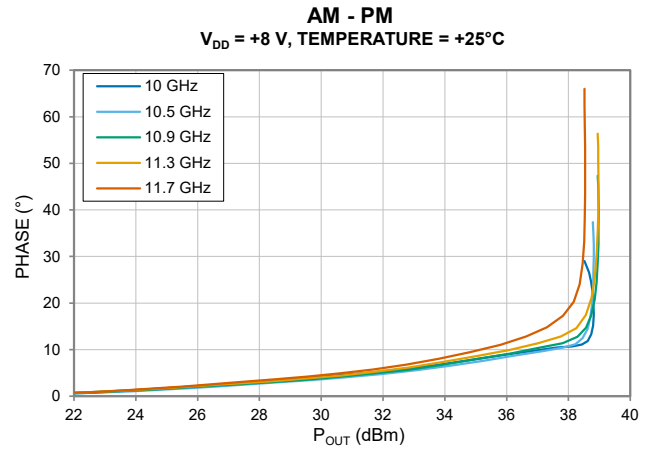
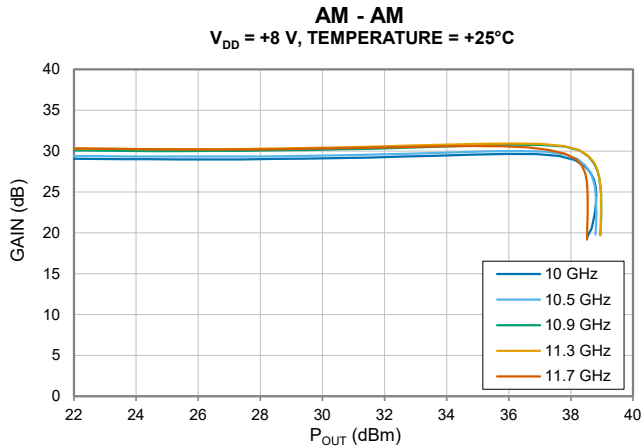
Typical Performance Curves



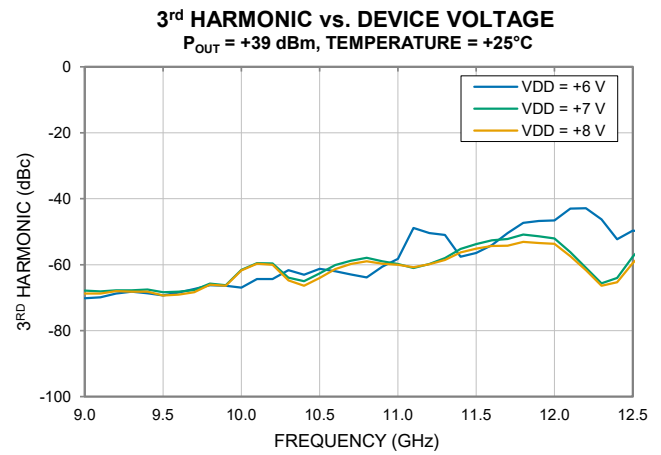
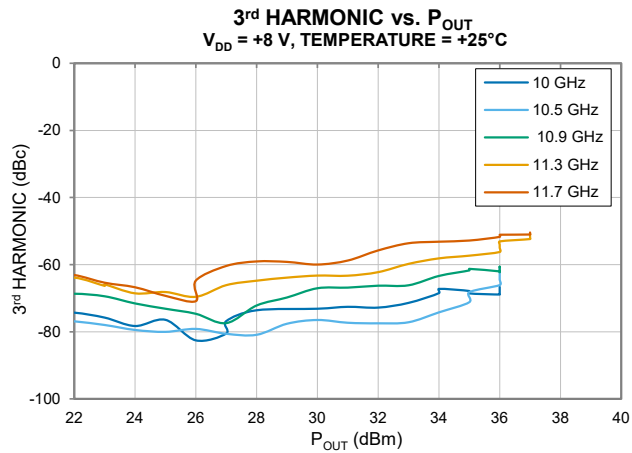
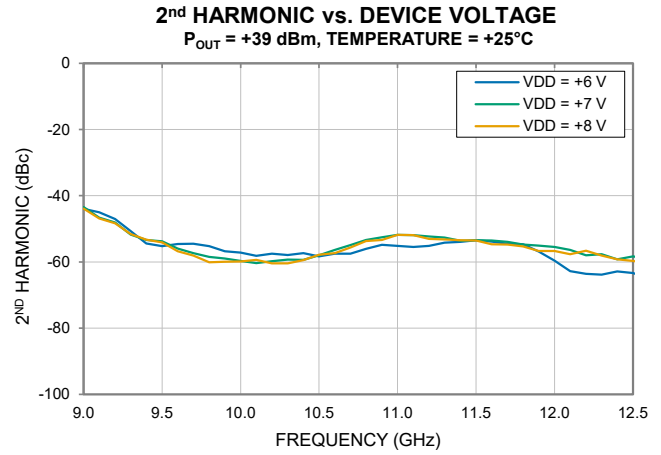
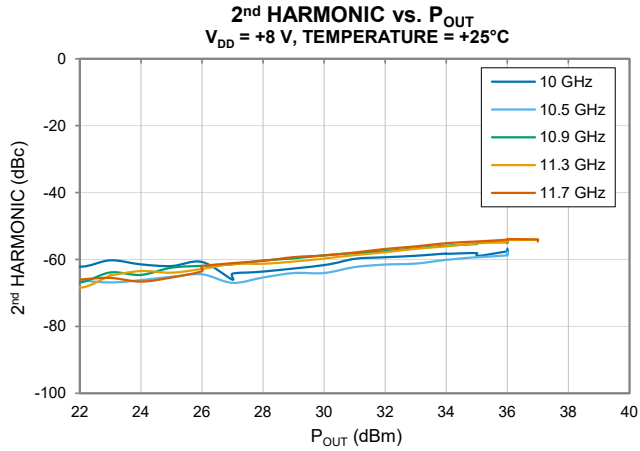
Typical Performance Curves



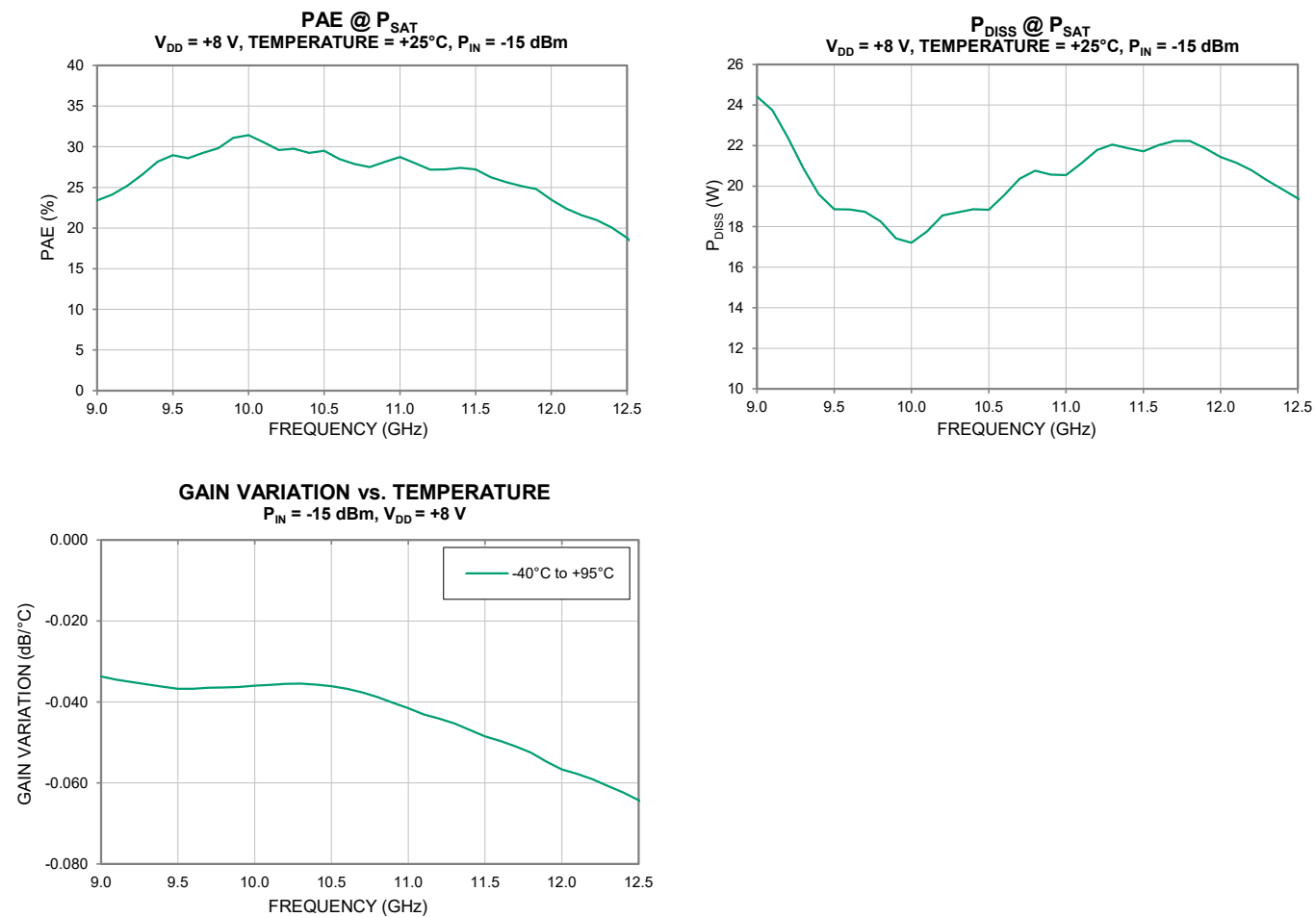
Typical Performance Curves



Typical Performance Curves

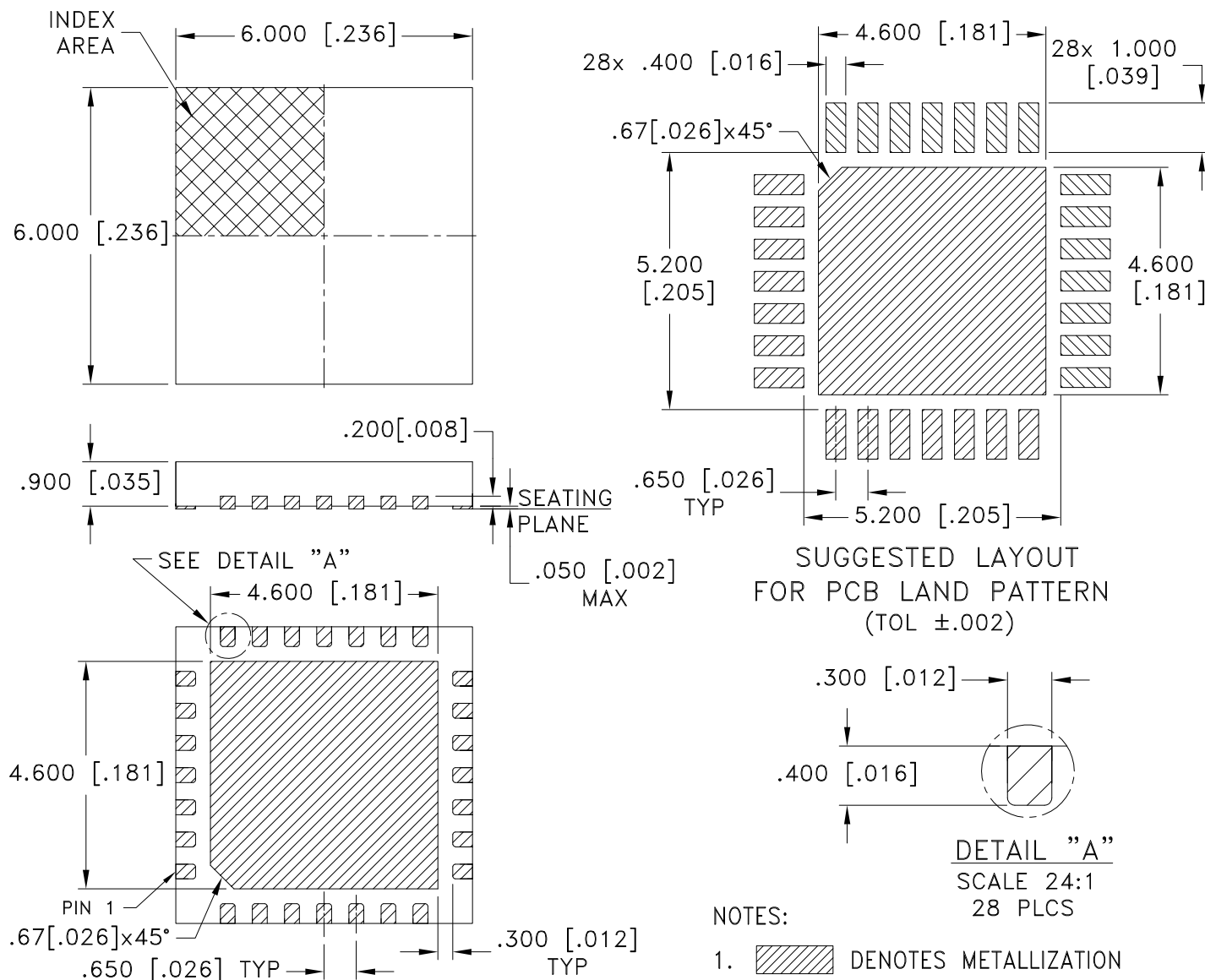


Typical Performance Curves



Outline Dimensions

WQ3359



Weight: 0.11 grams

Dimensions are in mm [inches]. Tolerances: 3 Pl.±.050 mm

Notes:

1. Case material: Plastic.
2. Termination finish: Matte-Tin.

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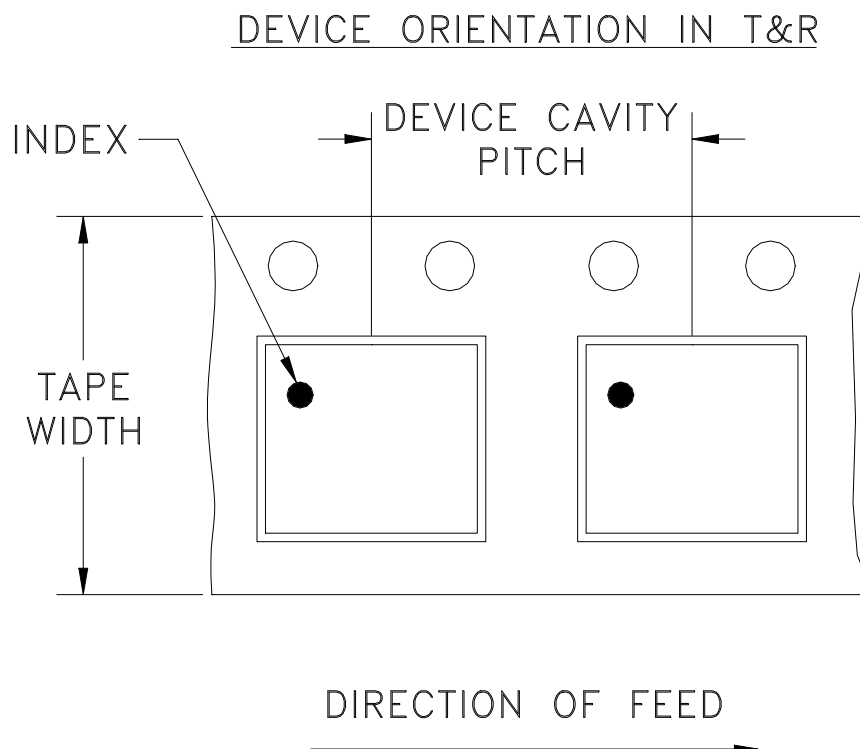
P.O. Box 350166, Brooklyn, New York 11235-0003 (718) 934-4500 Fax (718) 332-4661 For detailed performance specs & shopping online see Mini-Circuits web site



The Design Engineers Search Engine Provides ACTUAL Data Instantly From MINI-CIRCUITS At: www.minicircuits.com

RF/IF MICROWAVE COMPONENTS

Tape & Reel Packaging TR-F68



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel see note	
12	8	7	Small quantity standard	20
				50
				100
				200
				500
		7	Standard	1000
		13	Standard	2000
				3000
				4000

Mini-Circuits carrier tape materials provide protection from ESD (Electro-Static Discharge) during handling and transportation. Tapes are static dissipative and comply with industry standards EIA-481/EIA-541.

Go to: www.minicircuits.com/pages/pdfs/tape.pdf



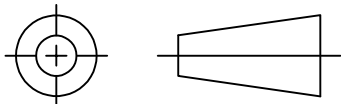
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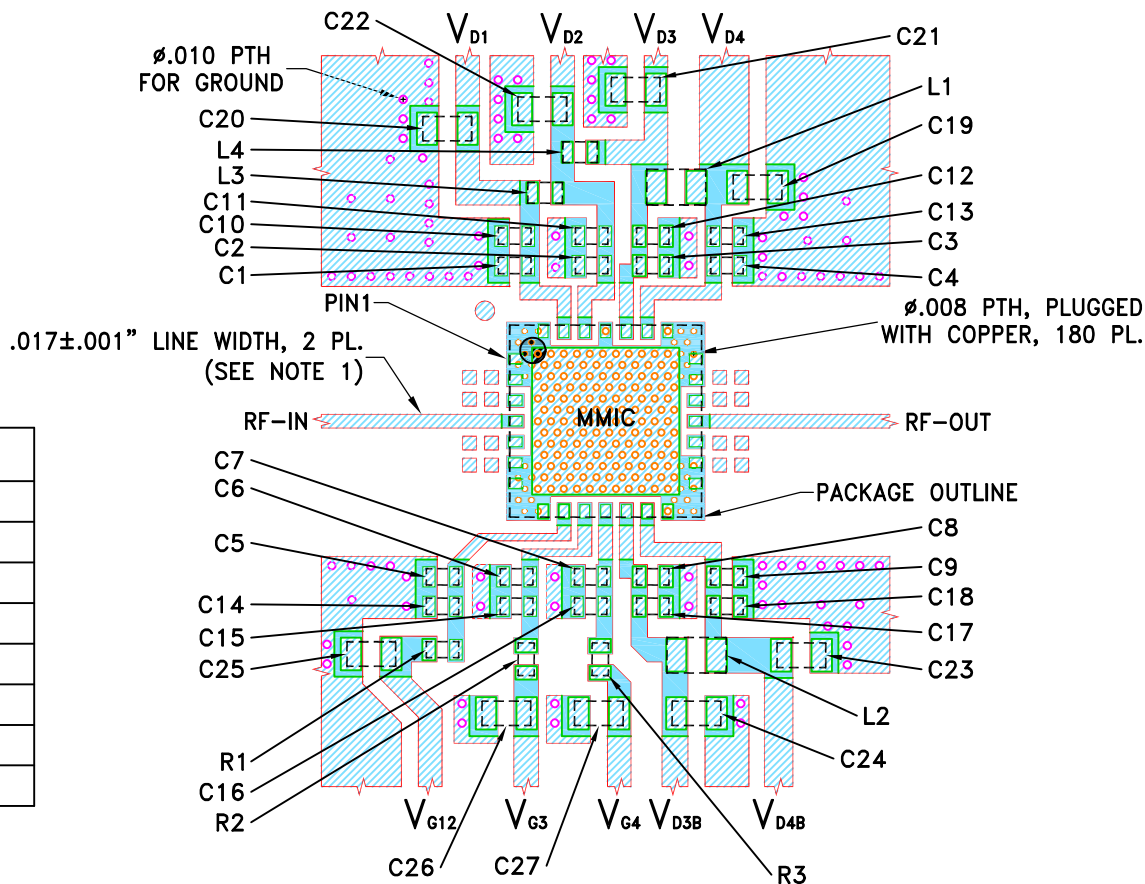
THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
OR	ECO-026157	NEW RELEASE	07/09/25	NP	IL

SUGGESTED MOUNTING CONFIGURATION FOR WQ3359 CASE STYLE



COMPONENT	SIZE
C1-C9	0402
C10-C18	0402
C19-C27	0603
L1-L2	0603
L3-L4	0402
R1	0402
R2	0402
R3	0402

NOTES:

- TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS R04003C LoPro FOIL, DIELECTRIC THICKNESS: $.0087 \pm .001$ "; COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
- CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA612310WC+.
- BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.

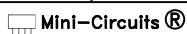


DENOTES PCB COPPER LAYOUT WITH SMOBC (SOLDER MASK OVER BARE COPPER).



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK.

UNLESS OTHERWISE SPECIFIED	INITIALS	DATE
DIMENSIONS ARE IN INCHES	DRAWN NP	07/09/25
TOLERANCES ON:	CHECKED GF	07/09/25
2 PL DECIMALS $\pm$	APPROVED IL	07/09/25
3 PL DECIMALS $\pm$.005		
ANGLES $\pm$		
FRACTIONS $\pm$		



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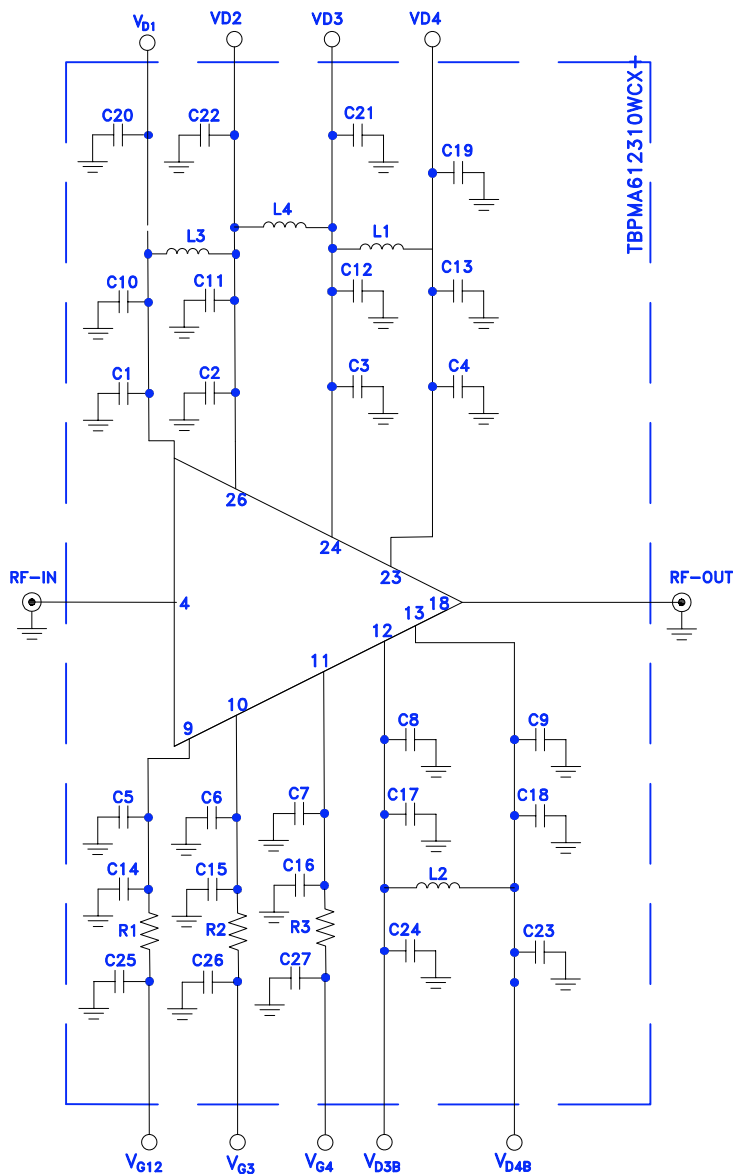
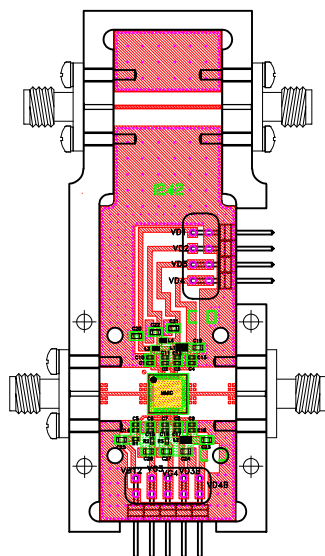


Mini-Circuits® 13 Neptune Avenue
Brooklyn NY 11235

PL, WQ3359, TB-PMA612310WC+

SIZE	CODE IDENT	DRAWING NO:	REV:
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FILE:	98PL824	SCALE: 4:1	SHEET: 1 OF 1

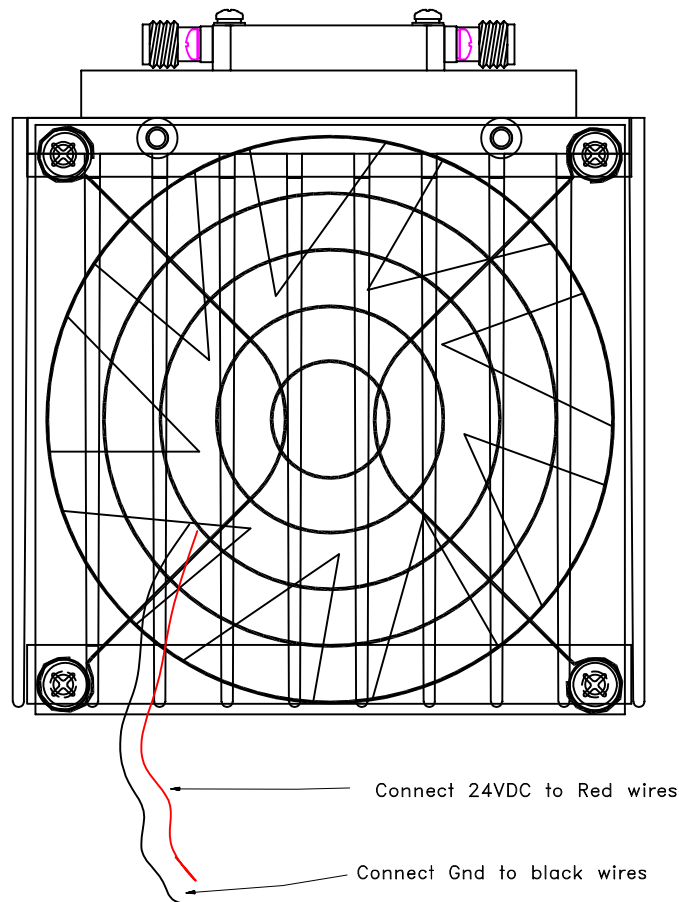
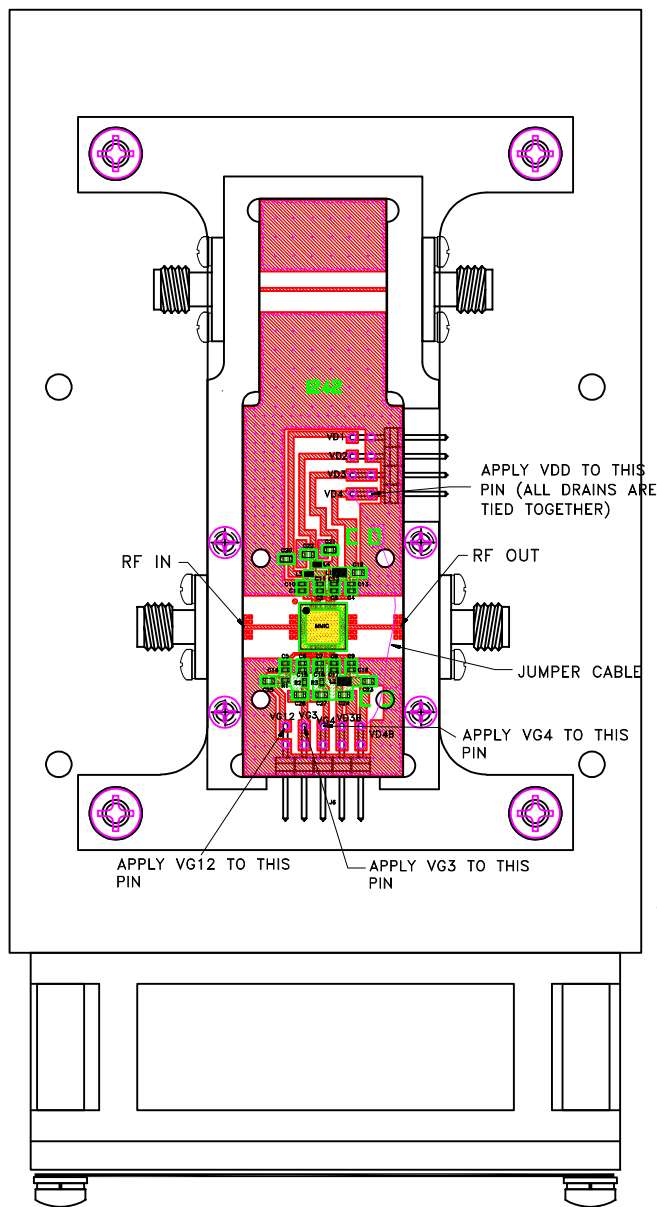
Evaluation Board and Circuit



Component	Size	Value	PartNumber	Manufacturer
R1	0402	24Ω	RK73H1ETTP24R0F	KOA SPEER ELECTRONICS
R2	0402	12Ω	RK73H1ETTP12R0F	KOA SPEER ELECTRONICS
R3	0402	0Ω	RK73Z1ETTP	KOA SPEER ELECTRONICS
C1–C9	0402	0.001μF	GRM1555C1H102JA01D	MURATA
C10–C18	0402	0.1μF	GRM155R71E104KE14D	MURATA
C19–C27	0603	1μF	06035C105KAT2A	AVX CORPORATION
L1,L2	0603	1000nH	0603AF–33NXJRW	COILCRAFT
L3,L4	0402	56nH	0402DF–560XJRW	COILCRAFT

Notes:

- 2.92mm Female Connectors.
- PCB Material: Roger R04003C or equivalent,
Dielectric constant=3.38, Thickness=0.0087±.001 inch



- **Adjusting Drain Voltage: VDD; = 8 V**
Please check true voltage at the package leads and adjust voltage from the power supply in order to compensate for possible voltage drop across DC cables and meters.

- (1) BIAS ON SEQUENCE
- (2) Before turning on VDD, apply -2 V on VG12 , VG3; , and VG4; pins.
- (3) Turn on VDD to 8 V.

Since all VD1, VD2, VD3, and VD4 are connected with L1, L2, L3 and L4

- (4) Increase VG12 until desired current 310 mA(=Idq12) is achieved
 - (5) Increase VG3 until desired current 1150 mA(=Idq12+Idq3) is achieved
 - (6) Increase VG4 until desired current 1500 mA(=Idq12+Idq3+Idq4) is achieved
 - (7) Turn on RF.
- (Typical Gate voltages are between -0.9 and -0.7 V for VG12 ; and VG3; between - 1.3 and -1.0 V for VG4)

Note:

- All Drains are tied together thru L1, L4, L2,L3 and a jumper cable connecting top and bottom Drains.
- Gates VG12(Gate 1 & 2) are tied together and Gate VG3,VG4 are separate.
- Current handling of the jumper should be at least 2A.
- It is also recommended to DC probe the unit before turning it on. Just check the DC resistance on the gate side and make sure it is about 500 KΩ
- It is recommended to connect all grounds(2grounds for Drain & 1grounds for gate) to the fixture, with a thick enough wire that can handle at least 4A. Pic for reference



- **BIAS OFF SEQUENCE:**
 - (1) Turn off RF.
 - (2) Decrease VG4; down to -2 V.
 - (2) Decrease VG3; down to -2 V.
 - (3) Decrease VG12; to -2 V.
 - (4) Turn off VDD;.

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ALL DIMENSIONS ARE IN INCHES EXCEPT OTHERWISE SPECIFIED

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	TBPMMA612310WCX-20+	1

FILE: WTBPMA6123310WCX-20+ SCALE: 4:1 SHEET: 2 OF 2



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 -45° to 85° C or -55° to 105° C or -40° to 105° C or -40° to 95° C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C or -65° to 150° Ambient Environment	Individual Model Data Sheet
HTOL	1000 hours at 125°C	MIL-STD-883, Method 1005, Condition B
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Mechanical Shock	1.5Kg, 0.5 ms, 5 shock pulses, Y1 direction only	MIL-STD-883, Method 2002, Condition B, except Y1 direction only
Vibration (Variable Frequency)	50g peak	MIL-STD-883, Method 2007, Condition B
Autoclave	15 psig, 100% RH, 121°C, 96 hours	JESD22-A102, Condition C
HAST	130°C, 85% RH, 96 hours	JESD22-A110
Solderability	10X Magnification	J-STD-002, Para 4.2.5, Test S, 95% Coverage
Solder Reflow Heat	Sn-Pb Eutetic Process: 240°C peak Pb-Free Process: 260°C peak	J-STD-020, Table 4-1, 4-2 and 5-2; Figure 5-1
Moisture Sensitivity: Level 1	Bake at 125°C for 24 hours Soak at 85°C/85% RH for 168 hours, Reflow 3 cycles at 260°C peak	J-STD-020



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
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215