MMIC SURFACE MOUNT

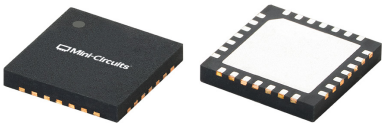
Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

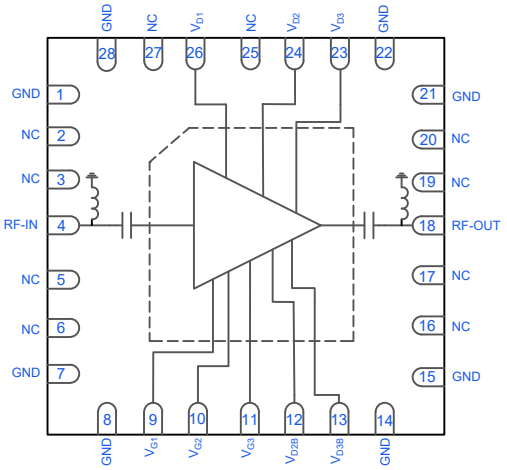
THE BIG DEAL

- High Gain, Typ. 28.9 dB
- High P_{SAT}, Typ. +39.3 dBm
- Excellent PAE, Typ. 32.6%
- 6x6 mm 28-Lead QFN-Style Package
- High Linearity Design Optimized for High PAR Communication Signals



Generic photo used for illustration purposes only

FUNCTIONAL DIAGRAM



APPLICATIONS

- Back Haul Radio Systems
- Radar Systems

PRODUCT OVERVIEW

Mini-Circuits' PMA6-93-10W+ is a GaAs MMIC Power Amplifier operating from 7.1 to 8.5 GHz. This internally matched 50Ω amplifier provides 28.9 dB of gain, +39.3 dBm saturated output power, and +47.1 dBm output IP3, while operating from a +8 V power supply and consuming 2 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 radar systems that require high operating output power, while maintaining very low distortion characteristics.

KEY FEATURES

Feature	Advantages
High P_{SAT} Typ. +39.3 dBm	With a high saturated output power, this device can be used as the power amplifier for Back Haul Radio and/or Radar Systems.
High Gain Typ. 28.9 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. D
ECO-029655
PMA6-93-10W+
MCL NY
260601

Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

ELECTRICAL SPECIFICATIONS[1] AT +25°C, V_{DD} = +8 V, UNLESS NOTED OTHERWISE

Parameter	Condition (GHz)	Min.	Typ.	Max.	Units
Frequency Range		7.1		8.5	GHz
Gain	7.1	27.1	28.4		dB
	7.4	27.4	28.5		
	7.8	27.7	28.9		
	8.2	28.1	29.3		
	8.5	27.6	28.8		
Output Power at 1 dB Compression (P1dB)	7.1		+38.1		dBm
	7.4		+38.5		
	7.8		+38.4		
	8.2		+38.7		
	8.5		+39.1		
Output Power at Saturation (P_{SAT})[2]	7.1		+39.2		dBm
	7.4		+39.4		
	7.8		+39.3		
	8.2		+39.1		
	8.5		+39.2		
Power Added Efficiency (PAE) at P_{SAT}	7.8		32.6		%
Output Third-Order Intercept (P_{OUT} = +20 dBm/Tone)	7.1		+46.0		dBm
	7.4		+46.8		
	7.8		+47.1		
	8.2		+47.0		
	8.5		+46.7		
Input Return Loss	7.1		19		dB
	7.4		20		
	7.8		13		
	8.2		10		
	8.5		10		
Output Return Loss	7.1		20		dB
	7.4		20		
	7.8		15		
	8.2		13		
	8.5		15		
Isolation	7.1		73		dB
	7.4		73		
	7.8		79		
	8.2		69		
	8.5		67		
Noise Figure	7.1		5.5		dB
	7.4		5.5		
	7.8		5.4		
	8.2		5.5		
	8.5		5.7		
Device Operating Voltage (V_{DD})[3]		+6	+8	+8	V
Device Operating Current (I_{DD})[4, 5]			2		A
Gate Voltage (V_{G1} , V_{G2})			-0.75		V
Gate Voltage (V_{G3})			-0.9		V
Device Gate Current (I_{GG})[6]				28	mA
DC Current Variation vs. Temperature[7]			-0.95		mA/°C
DC Current Variation vs. Voltage[8]			-0.35		µA/mV

1. Tested on Mini-Circuits Characterization Test Board TB-PMA69310WCX+. 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. $V_{DD} = V_{D1} = V_{D2} = V_{D3} = V_{D2B} = V_{D3B}$
4. Current at P_{IN} = -15 dBm. Current at saturation reaches 3.7 A.
5. $I_{DD} = I_{DD1} + I_{DD2} + I_{DD3}$. $I_{DD12} = I_{DD1} + I_{DD2}$ = 1000 mA. I_{DD3} = 1000 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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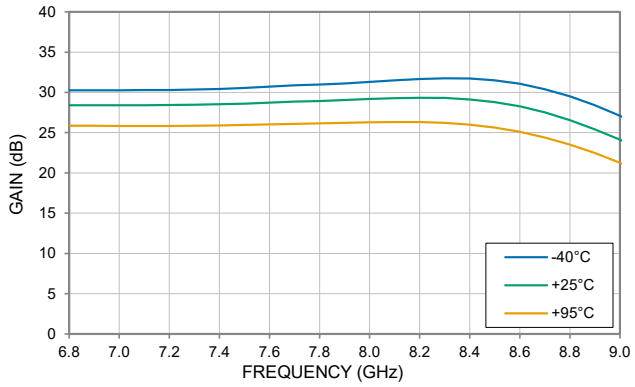
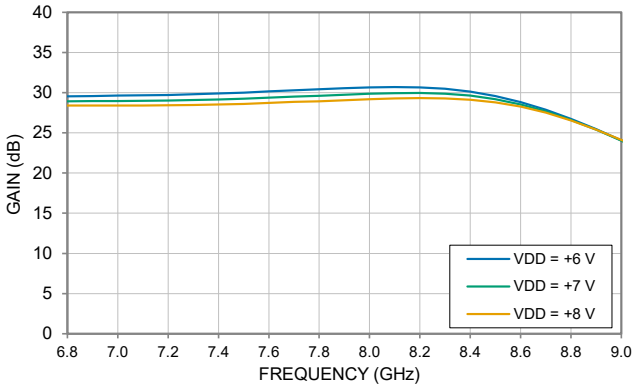
TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

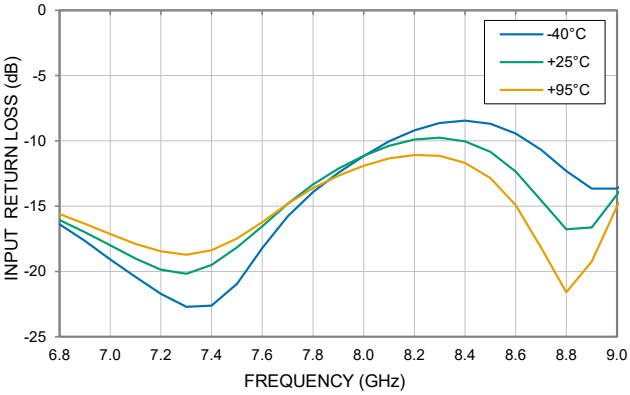
GAIN vs. TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



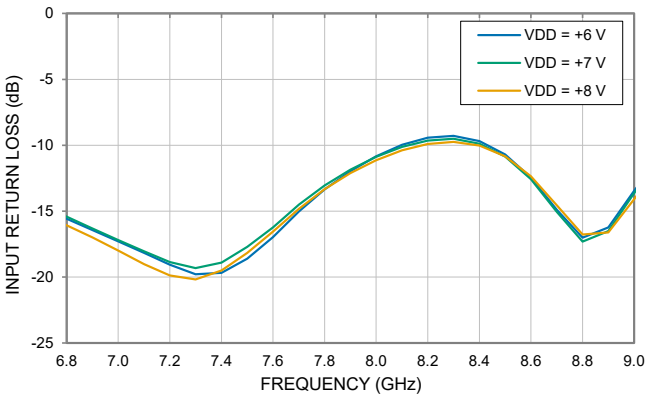
GAIN vs. DEVICE VOLTAGE
P_{IN} = -15 dBm, TEMPERATURE = +25°C



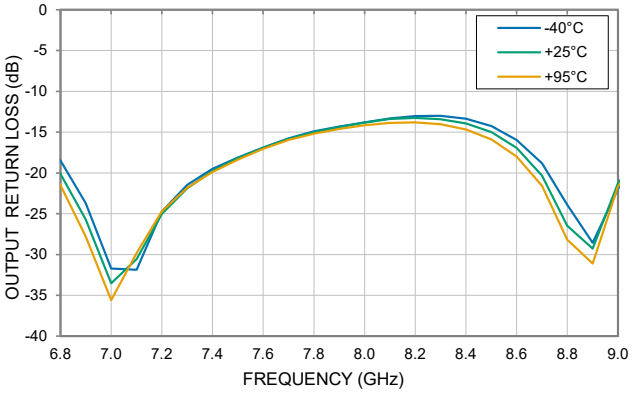
INPUT RETURN LOSS vs. TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



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
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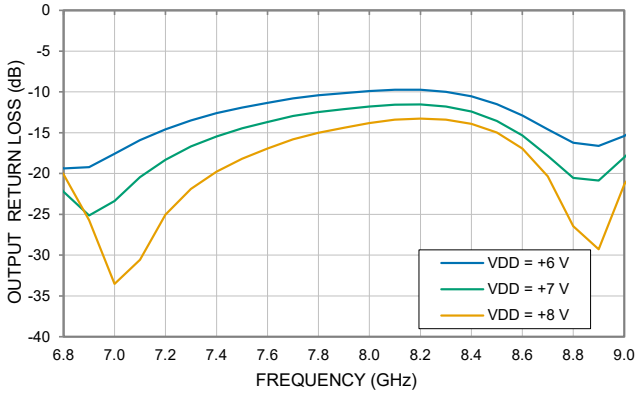

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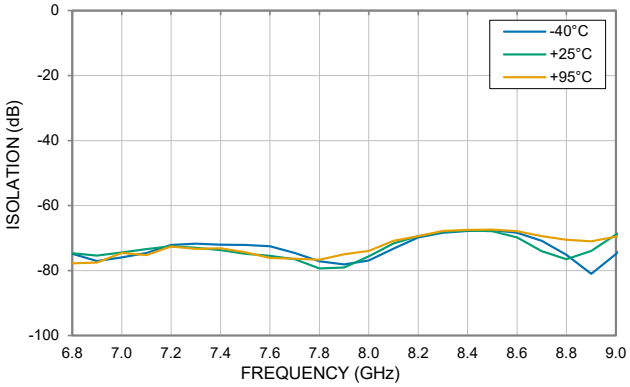
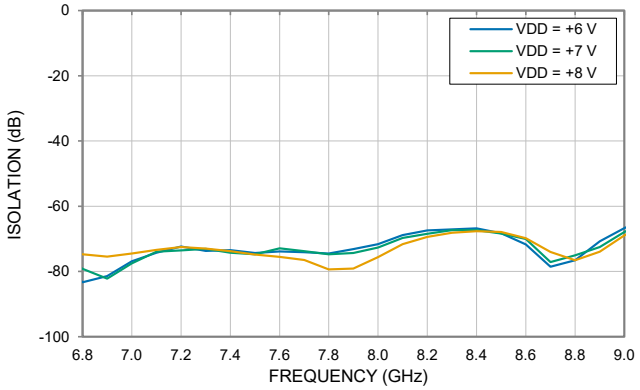
TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

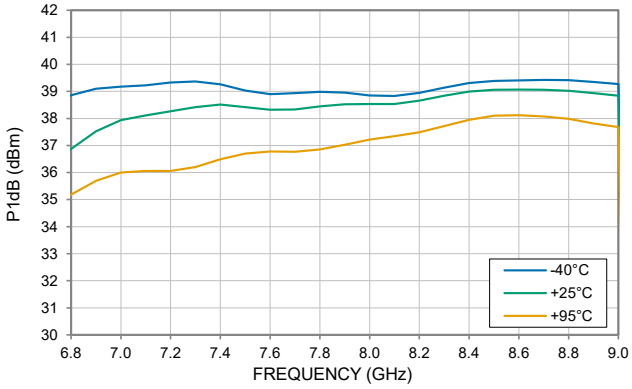
ISOLATION vs.TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



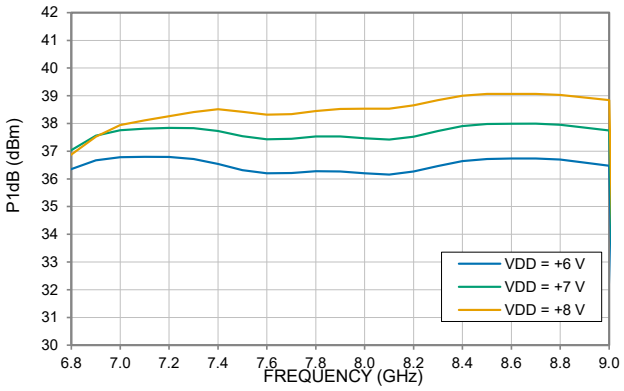
ISOLATION vs. DEVICE VOLTAGE
P_{IN} = -15 dBm, TEMPERATURE = +25°C



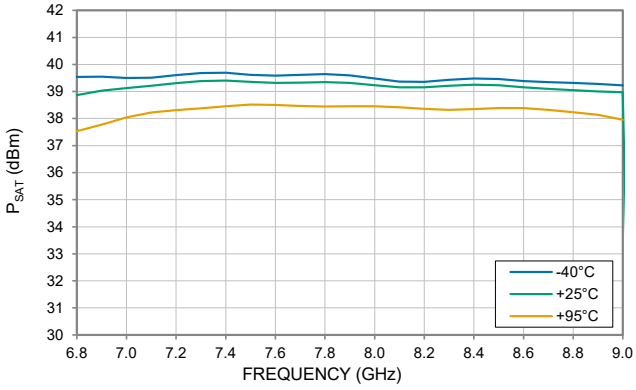
P1dB vs. TEMPERATURE
V_{DD} = +8 V



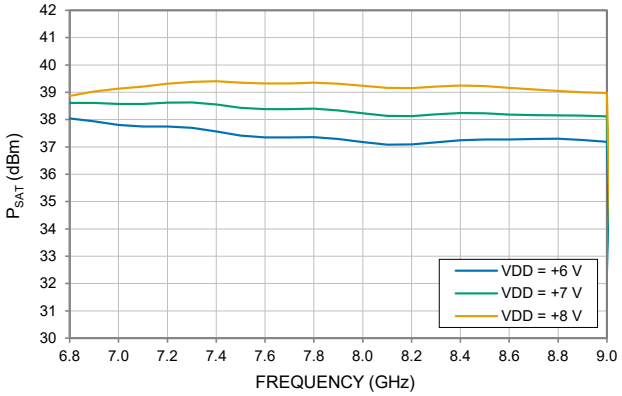
P1dB vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



P_{SAT} vs. TEMPERATURE
V_{DD} = +8 V



P_{SAT} vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



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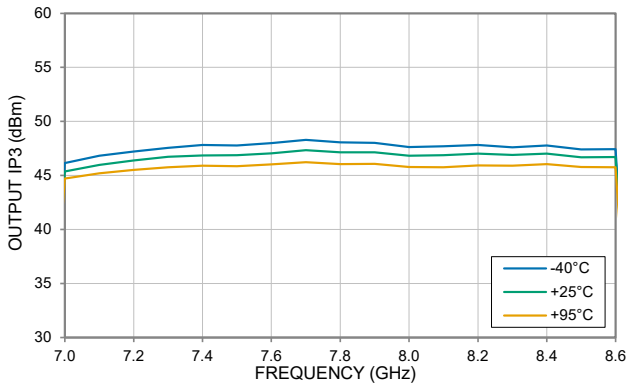
50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

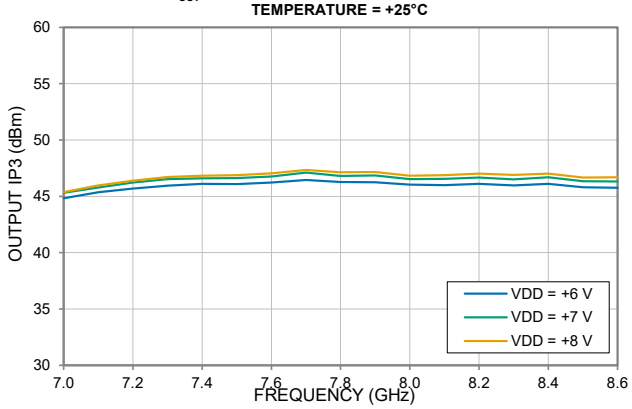
OUTPUT IP3 vs. TEMPERATURE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V



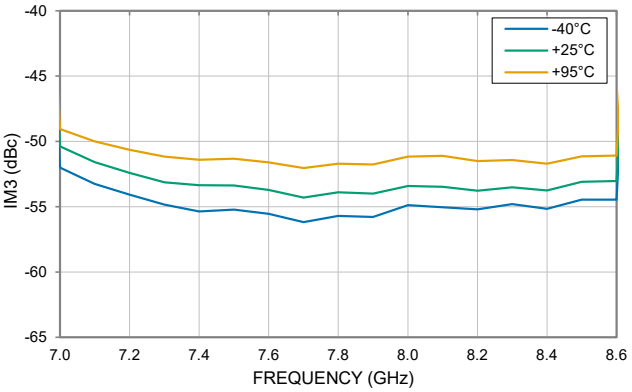
OUTPUT IP3 vs. DEVICE VOLTAGE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



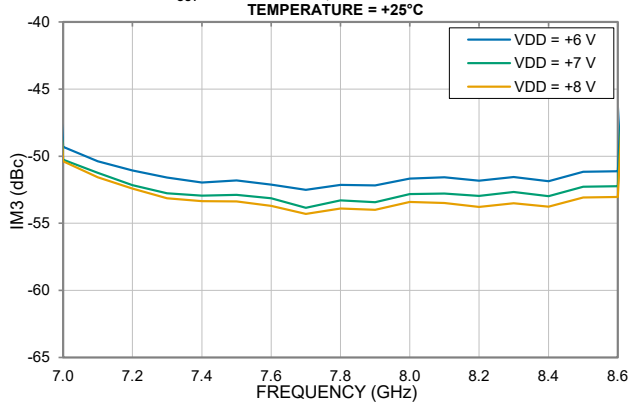
IM3 vs. TEMPERATURE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V



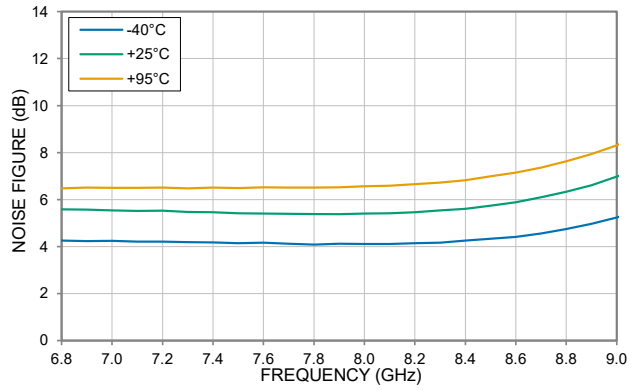
IM3 vs. DEVICE VOLTAGE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



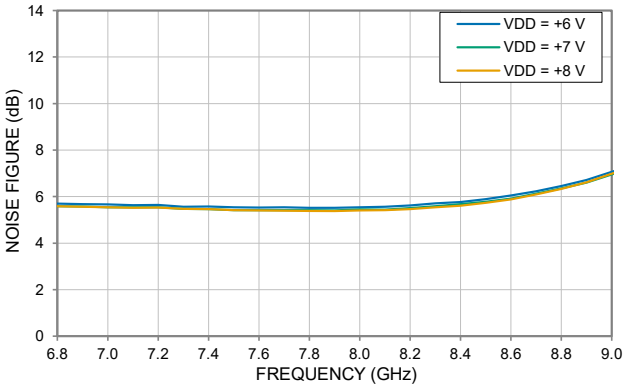
NOISE FIGURE vs. TEMPERATURE

V_{DD} = +8 V



NOISE FIGURE vs. DEVICE VOLTAGE

TEMPERATURE = +25°C



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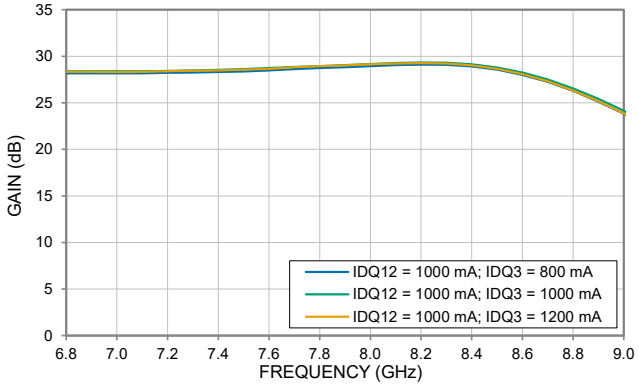
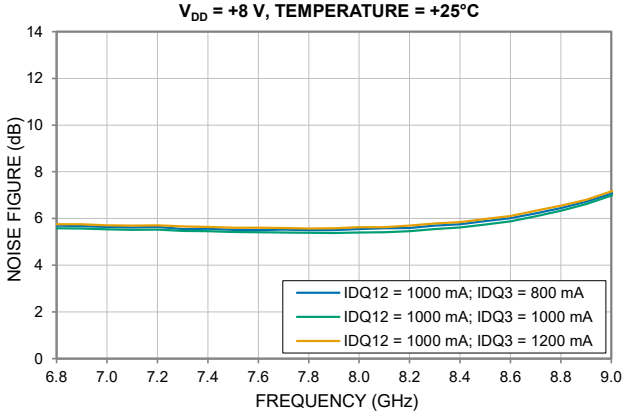
TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

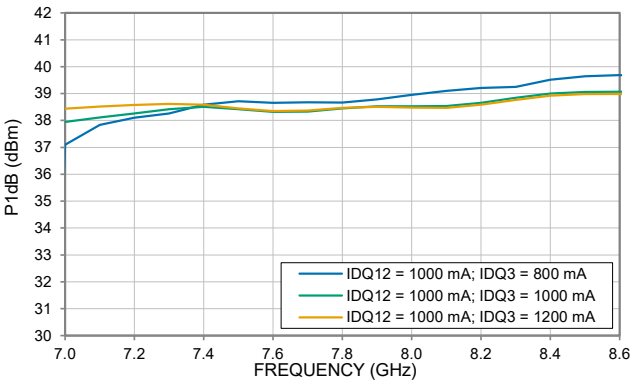
GAIN vs. CURRENT
P_{IN} = -15 dBm, V_{DD} = +8 V, TEMPERATURE = +25°C



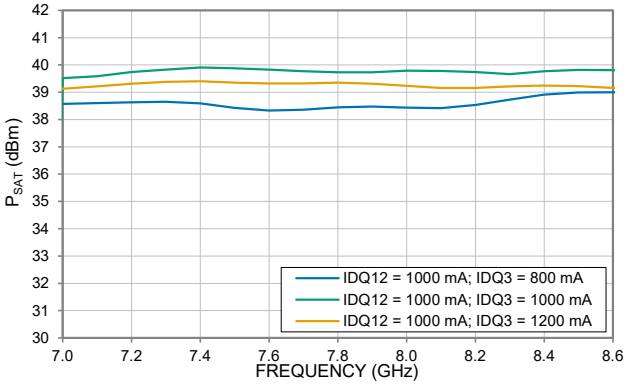
NOISE FIGURE vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



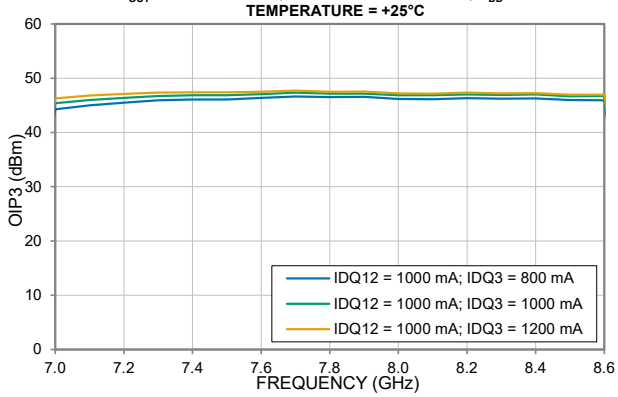
P1dB vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



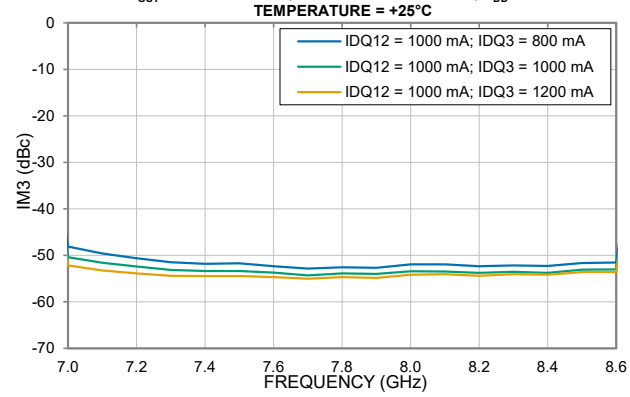
P_{SAT} vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



OIP3 vs. CURRENT
P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V
TEMPERATURE = +25°C



IM3 vs. CURRENT
P_{OUT} = +20 dBm/TONE, TONE SPACING = 5MHz, V_{DD} = +8 V
TEMPERATURE = +25°C



Power Amplifier

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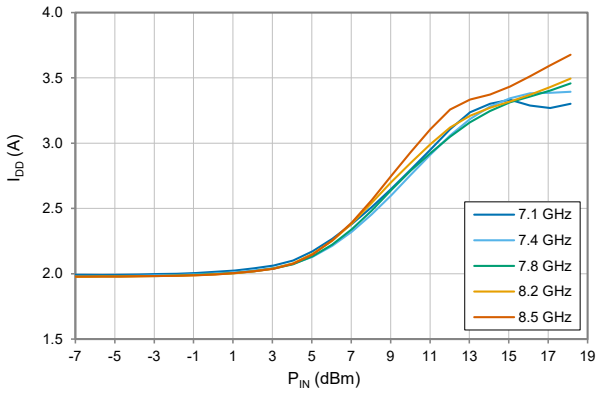
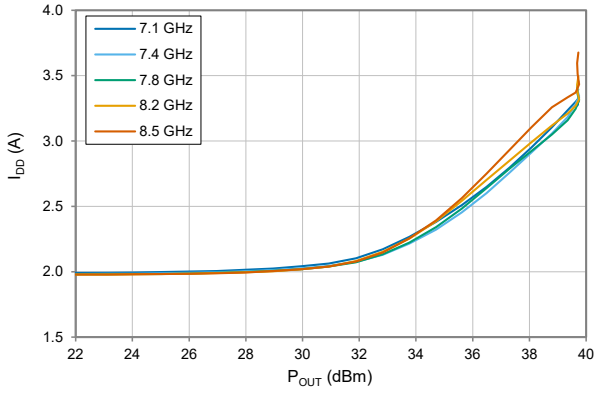
50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

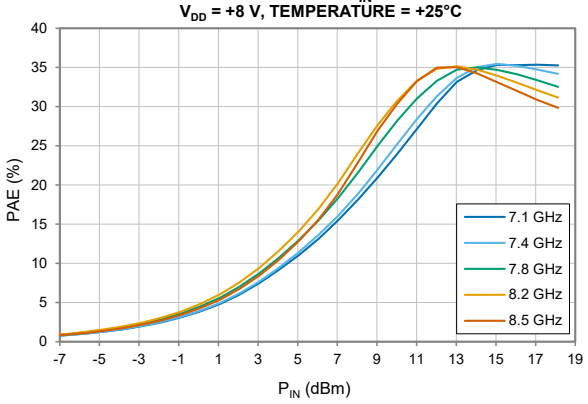
I_{DD} vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C



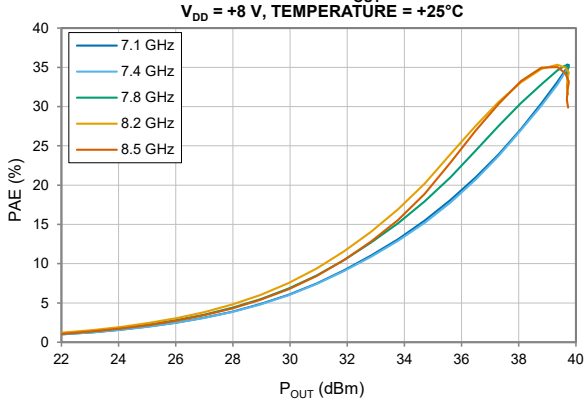
I_{DD} vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C



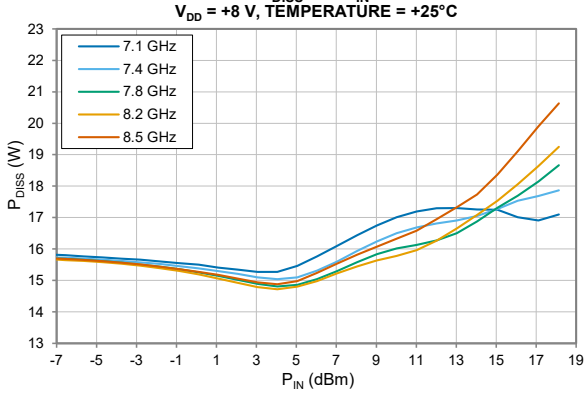
PAE vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C



PAE vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C



P_{DISS} vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C



P_{DISS} vs. P_{OUT}
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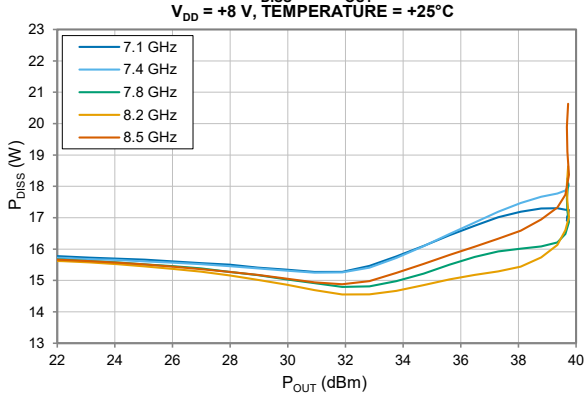

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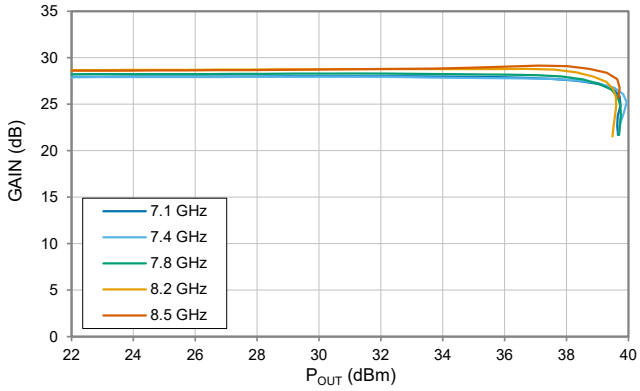
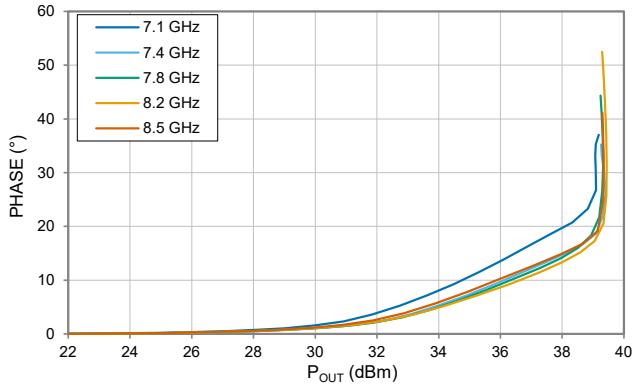
TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

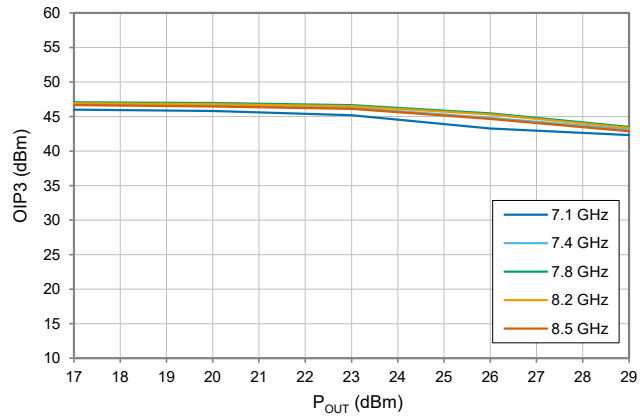
AM - AM
V_{DD} = +8 V, TEMPERATURE = +25°C



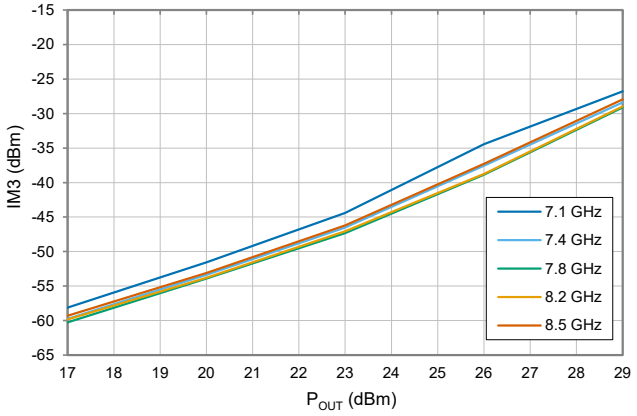
AM - PM
V_{DD} = +8 V, TEMPERATURE = +25°C



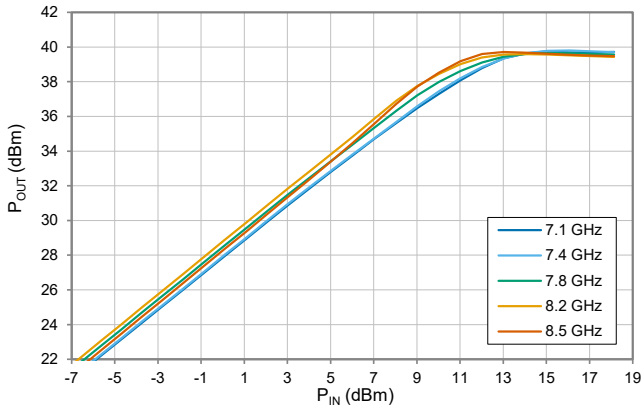
OIP3 vs. P_{OUT}/TONE
V_{DD} = +8 V, TONE SPACING = 5 MHz, TEMPERATURE = +25°C



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



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



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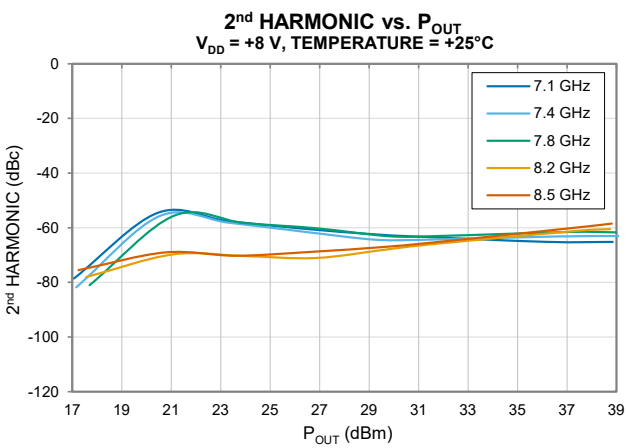
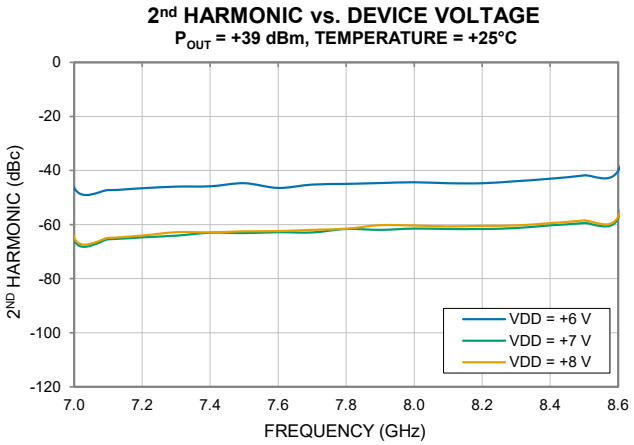
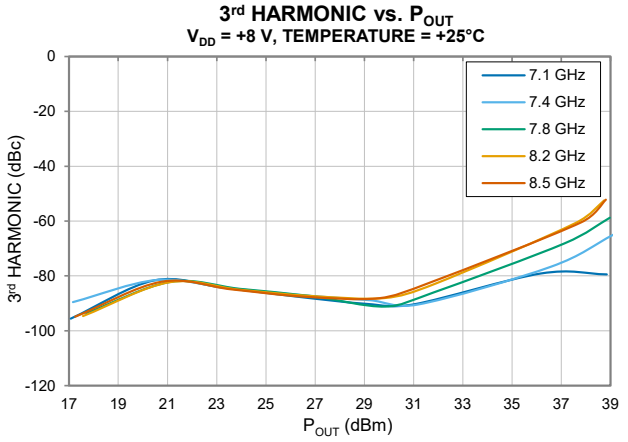
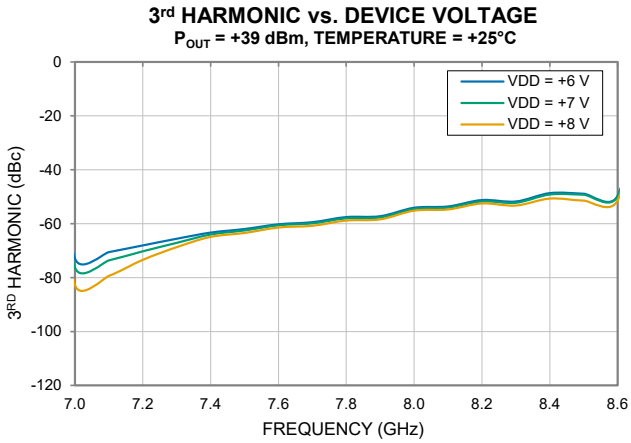
DATA BELOW MEASURED IN CW OPERATION









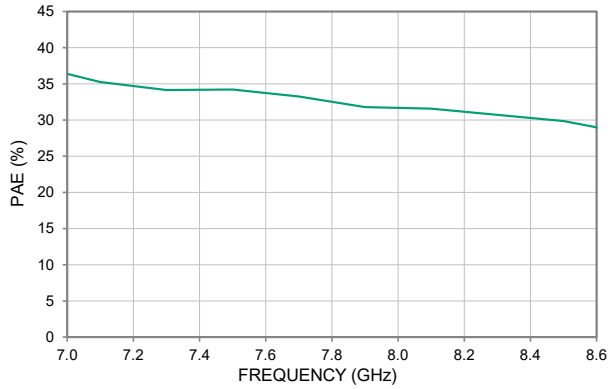
Power Amplifier

PMA6-93-10W+

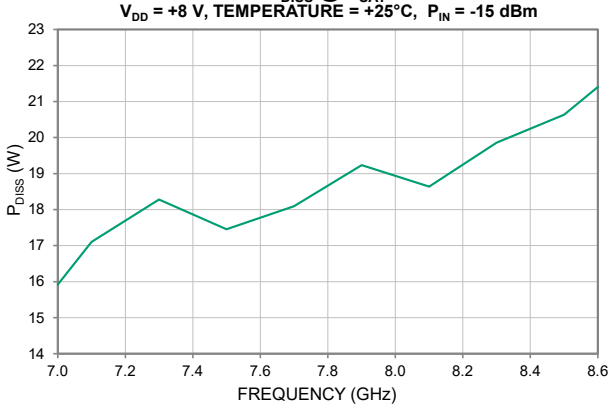
50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

TYPICAL PERFORMANCE GRAPHS
DATA BELOW MEASURED IN CW OPERATION

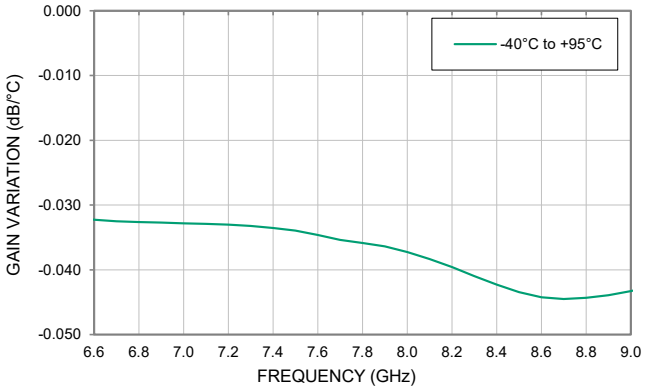
PAE @ P_{SAT}
V_{DD} = +8 V, TEMPERATURE = +25°C, P_{IN} = -15 dBm



P_{DISS} @ P_{SAT}
V_{DD} = +8 V, TEMPERATURE = +25°C, P_{IN} = -15 dBm



GAIN VARIATION vs. TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



ABSOLUTE MAXIMUM RATINGS[9]

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	22 W
Input Power (CW), V_{DD} = +8 V	+33 dBm
DC Drain Voltage at V_{DD}[12]	+9 V
DC Gate Voltage at V_{G1}, V_{G2}, V_{G3}	-3 V ≤ V_{G1}, V_{G2}, V_{G3} ≤ -0.4 V
DC Drain Current I_{DD}	5 A
DC Gate Current I_{GG}	28 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_{D2B} = V_{D3B}

THERMAL RESISTANCE

Parameter	Ratings
Thermal Resistance (Θ_{JC})[13]	4.9°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

Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

FUNCTIONAL DIAGRAM

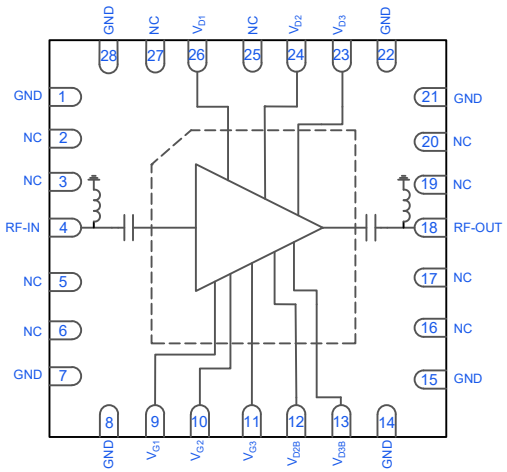


Figure 1. PMA6-93-10W+ Functional Diagram

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}	26	DC Input pin connects to First Stage Drain Voltage port.
V_{D2}	24	DC Input pin connects to Drain Voltage port of 2nd stage top half.
V_{D3}	23	DC Input pin connects to 3rd stage Gate Voltage port.
V_{D2B}	12	DC Input pin connects to Drain Voltage of 2nd stage bottom half.
V_{D3B} [15]	13	DC Input pin connects to Drain Voltage port of 3rd stage bottom half.
V_{G1} [14]	9	DC Input pin connects to First Stage Gate Voltage port.
V_{G2} [14]	10	DC Input pin connects to 2nd Stage Gate Voltage port.
V_{G3}	11	DC Input pin connects to 3rd Stage Gate Voltage port.
NC	3, 5, 17, 19, 27	Not connected on test board. May be connected to ground or left open.
NC	2, 6, 16, 20, 25	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_{G1} and V_{G2} are connected on TB-PMA69310WCX+.
15. For optimal performance voltage should be applied to V_{D3} and V_{D3B} ports. During characterization, both ports were connected via a jumper on TB-PMA69310WCX+.

Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

CHARACTERIZATION BOARD

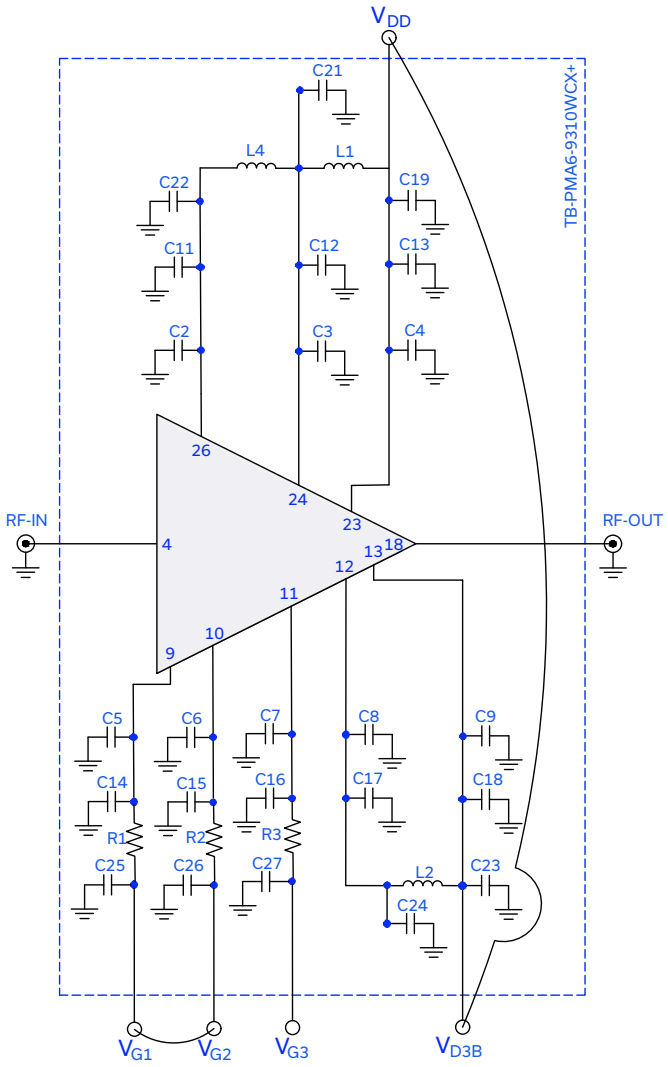


Figure 2. PMA6-93-10W+ Characterization Circuit

Electrical Parameters and Conditions
Gain, Return Loss, Output Power at 1 dB Compression (P1dB), Output IP3 (OIP3), and Noise Figure measured using N542B PNA-X Microwave Network Analyzer. All data taken with test board assembly mounted on heatsink TB-PMA69310WCX+.

Conditions:
1. Gain and Return Loss: P_{IN} = -15 dBm
2. Output IP3 (OIP3): Two tones, spaced 5MHz apart, +20 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} and V_{G3} 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 1000 mA.
4. Increase V_{G3} until desired I_{DD3} is achieved, typical 1000 mA.
5.Turn On RF Signal.

Power Off
1. Turn Off RF Signal.
2. Turn Off V_{DD}.
3. Decrease V_{G3} down to -2 V and Turn Off.
4. 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 >20 W of heat.
See TB-PMA69310WCX+ for example.

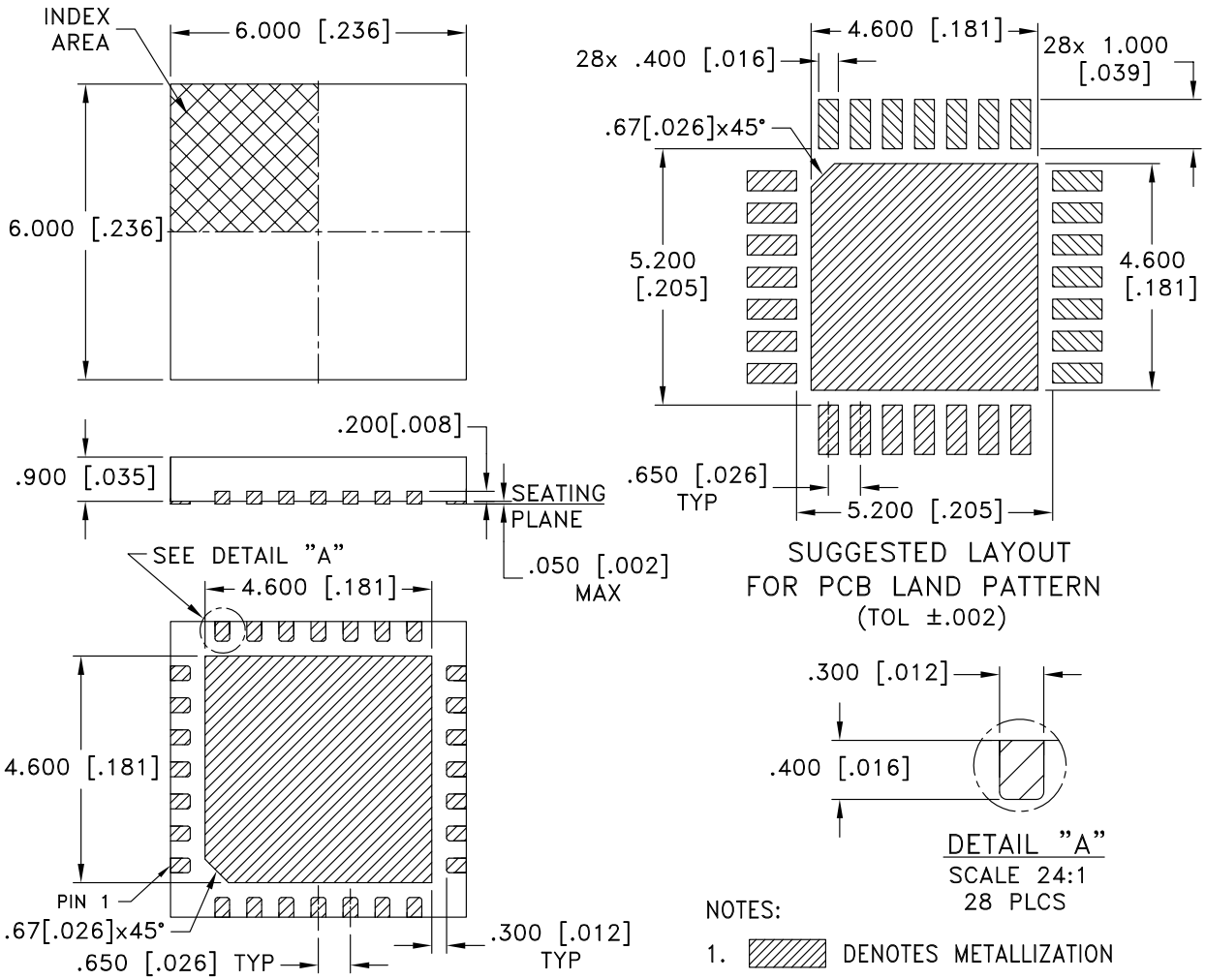
Component	Value	Size	Part Number	Manufacturer
C2 – C9	0.001 µF	0402	GRM1555C1H102JA01D	MURATA
C11 – C18	0.1 µF	0402	GRM155R71E104KE14D	MURATA
C19, C21-C27	1 µF	0603	06035C105KAT2A	KYOCERA AVX
L1, L2	33 nH	0603	0603AF-33NXJRW	COILCRAFT
L4	56 nH	0402	0402DF-560XJRW	COILCRAFT
R1	24Ω	0402	RK73H1ETTP24R0F	KOA SPEER
R2	12Ω	0402	RK73H1ETTP12R0F	KOA SPEER
R3	0Ω	0402	RK73Z1ETTP	KOA SPEER

Power Amplifier

PMA6-93-10W+

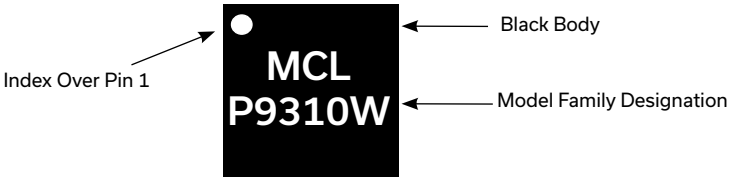
50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

CASE STYLE DRAWING



Weight: 0.11 grams
Dimensions are in mm [inches]. Tolerances: 3 Pl.±.0 50 mm

PRODUCT MARKING



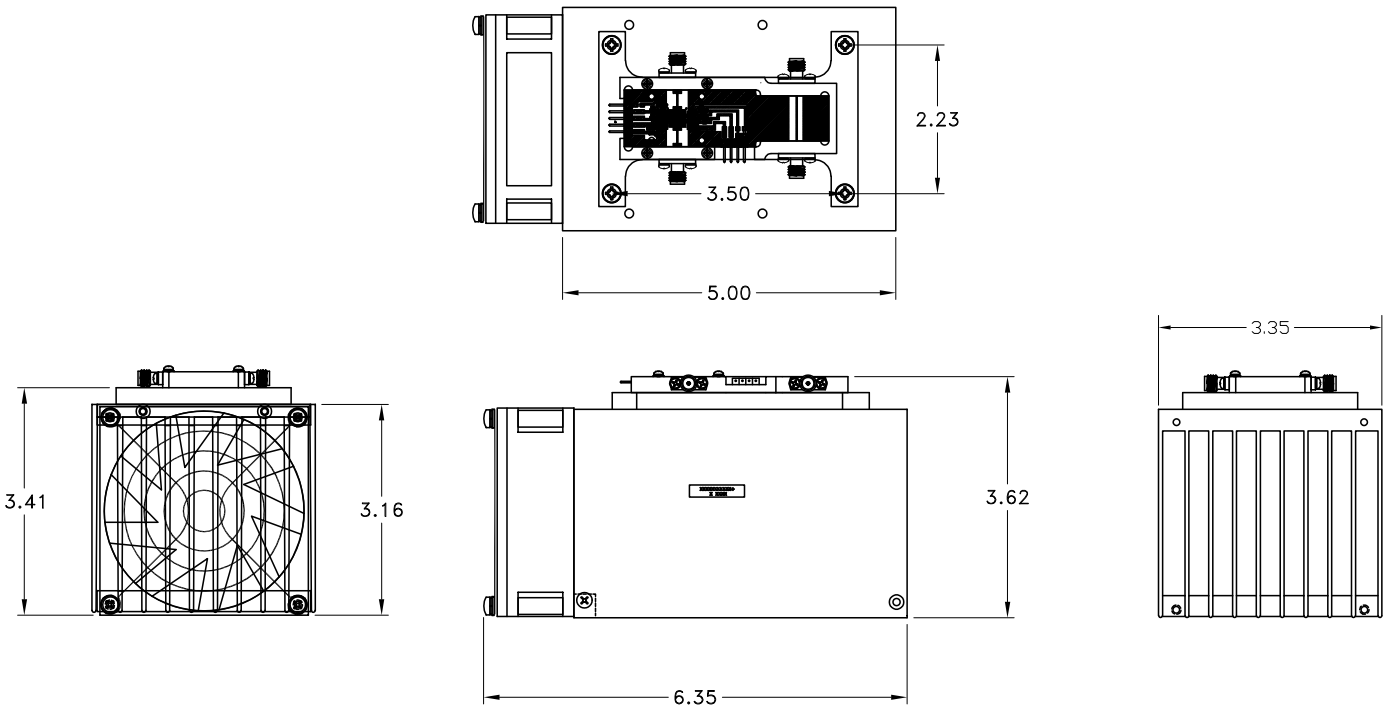
Marking may contain other features or characters for internal lot control.

Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 GHz +39 dBm P_{SAT}

OUTLINE DRAWING FOR TB-PMA69310WCX+



Power Amplifier

PMA6-93-10W+

50Ω 7.1 to 8.5 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 **Standard Quantities Available on Reel**	F68 7" reels with 20, 50, 100, 200, 500, or 1K 13" reels with 2K, 3K, or 4K
Suggested Layout for PCB Design	PL-826
Evaluation Board Mounted on Heatsink	TB-PMA69310WCX+ 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 V, I_{DD} = 2000 mA @ Temperature = +25°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)	(dBc)	(dBm)	(dBm)	(dB)	(dBc)	(dBc)
6.1	26.2	-61.7	-11.2	-5.7	-	-	-	-	5.7	-	-
6.2	27.1	-62.7	-11.5	-6.8	-	-	-	-	5.7	-	-
6.3	27.8	-63.6	-11.8	-8.1	-	-	-	-	5.7	-	-
6.4	28.3	-65.3	-12.3	-9.8	-	-	-	-	5.6	-	-
6.5	28.6	-67.8	-12.9	-12.0	-	-	35.4	38.3	5.6	-	-
6.6	28.8	-70.4	-13.7	-14.7	-	-	35.7	38.4	5.6	-	-
6.7	28.9	-73.9	-14.5	-18.1	-	-	36.4	38.5	5.6	-	-
6.8	28.9	-79.2	-15.4	-22.2	-	-	37.0	38.6	5.6	-	-
6.9	29.0	-82.2	-16.3	-25.1	-	-	37.6	38.6	5.6	-	-
7.0	29.0	-77.5	-17.2	-23.4	45.3	-50.3	37.8	38.6	5.5	-65.6	-76.2
7.1	29.0	-73.9	-18.0	-20.5	45.8	-51.2	37.8	38.6	5.5	-65.4	-73.6
7.2	29.0	-73.5	-18.9	-18.3	46.2	-52.2	37.8	38.6	5.5	-64.7	-70.3
7.3	29.1	-73.0	-19.3	-16.7	46.5	-52.8	37.8	38.6	5.5	-64.1	-67.1
7.4	29.2	-74.3	-18.9	-15.4	46.6	-52.9	37.7	38.6	5.5	-63.0	-64.0
7.5	29.3	-74.7	-17.7	-14.5	46.6	-52.9	37.5	38.4	5.4	-63.1	-62.5
7.6	29.4	-72.9	-16.2	-13.7	46.8	-53.1	37.4	38.4	5.4	-62.8	-60.6
7.7	29.5	-73.8	-14.5	-12.9	47.1	-53.8	37.4	38.4	5.4	-62.9	-59.9
7.8	29.6	-74.7	-13.1	-12.4	46.8	-53.3	37.5	38.4	5.4	-61.6	-58.0
7.9	29.7	-74.4	-11.9	-12.1	46.9	-53.4	37.5	38.3	5.4	-61.9	-57.7
8.0	29.9	-72.6	-10.9	-11.8	46.5	-52.8	37.5	38.2	5.4	-61.5	-54.6
8.1	29.9	-69.7	-10.1	-11.6	46.5	-52.8	37.4	38.1	5.4	-61.6	-54.0
8.2	30.0	-68.4	-9.6	-11.5	46.7	-53.0	37.5	38.1	5.5	-61.6	-51.8
8.3	29.9	-67.4	-9.5	-11.8	46.5	-52.7	37.7	38.2	5.6	-61.3	-52.2
8.4	29.6	-67.3	-9.9	-12.4	46.7	-53.0	37.9	38.2	5.7	-60.3	-49.2
8.5	29.2	-68.3	-10.9	-13.5	46.3	-52.3	38.0	38.2	5.8	-59.4	-49.3
8.6	28.5	-70.0	-12.6	-15.3	46.3	-52.2	38.0	38.2	5.9	-57.6	-49.8
8.7	27.7	-77.1	-15.1	-17.8	-	-	38.0	38.2	6.1	-	-
8.8	26.6	-75.1	-17.3	-20.5	-	-	38.0	38.2	6.3	-	-
8.9	25.4	-72.5	-16.5	-20.8	-	-	37.8	38.1	6.6	-	-
9.0	24.0	-67.9	-13.6	-18.0	-	-	37.7	38.1	6.9	-	-
9.1	22.6	-64.4	-11.0	-15.0	-	-	-	-	7.3	-	-
9.2	21.0	-62.3	-8.9	-12.5	-	-	-	-	7.7	-	-
9.3	19.4	-60.7	-7.3	-10.5	-	-	-	-	8.2	-	-
9.4	17.7	-59.9	-6.1	-9.0	-	-	-	-	8.7	-	-
9.5	16.0	-59.8	-5.0	-7.7	-	-	-	-	9.3	-	-

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 V, I_{DD} = 2000 mA @ Temperature = +25°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)	(dBc)	(dBm)	(dBm)	(dB)	(dBc)	(dBc)
6.1	26.5	-61.7	-11.4	-6.0	-	-	-	-	5.8	-	-
6.2	27.4	-63.0	-11.7	-7.0	-	-	-	-	5.8	-	-
6.3	28.1	-63.9	-12.0	-8.4	-	-	-	-	5.7	-	-
6.4	28.7	-64.9	-12.5	-10.1	-	-	-	-	5.7	-	-
6.5	29.0	-67.5	-13.1	-12.3	-	-	35.0	37.8	5.8	-	-
6.6	29.3	-69.7	-13.9	-14.8	-	-	35.3	37.9	5.7	-	-
6.7	29.4	-74.8	-14.7	-17.5	-	-	35.9	38.0	5.7	-	-
6.8	29.5	-83.3	-15.6	-19.4	-	-	36.3	38.0	5.7	-	-
6.9	29.6	-81.4	-16.4	-19.2	-	-	36.7	37.9	5.7	-	-
7.0	29.6	-76.9	-17.3	-17.6	44.8	-49.3	36.8	37.8	5.7	-46.4	-72.9
7.1	29.7	-74.3	-18.2	-15.9	45.4	-50.4	36.8	37.7	5.6	-47.2	-70.6
7.2	29.7	-72.3	-19.1	-14.6	45.7	-51.1	36.8	37.7	5.6	-46.6	-68.1
7.3	29.8	-73.7	-19.8	-13.5	45.9	-51.6	36.7	37.7	5.6	-46.0	-65.6
7.4	29.9	-73.4	-19.7	-12.6	46.1	-52.0	36.5	37.6	5.6	-45.8	-63.3
7.5	30.0	-74.3	-18.6	-11.9	46.1	-51.8	36.3	37.4	5.5	-44.7	-62.0
7.6	30.2	-73.8	-17.0	-11.3	46.2	-52.1	36.2	37.3	5.5	-46.4	-60.2
7.7	30.3	-74.1	-15.0	-10.8	46.5	-52.5	36.2	37.3	5.5	-45.2	-59.4
7.8	30.4	-74.5	-13.4	-10.4	46.3	-52.1	36.3	37.4	5.5	-44.9	-57.6
7.9	30.5	-73.1	-12.0	-10.2	46.3	-52.2	36.3	37.3	5.5	-44.6	-57.2
8.0	30.7	-71.6	-10.8	-9.9	46.0	-51.7	36.2	37.2	5.5	-44.3	-54.1
8.1	30.7	-68.8	-10.0	-9.7	46.0	-51.6	36.2	37.1	5.6	-44.7	-53.6
8.2	30.7	-67.4	-9.4	-9.7	46.1	-51.8	36.3	37.1	5.6	-44.7	-51.2
8.3	30.5	-67.1	-9.3	-10.0	46.0	-51.6	36.5	37.2	5.7	-43.9	-51.8
8.4	30.1	-66.8	-9.7	-10.5	46.1	-51.9	36.6	37.2	5.8	-43.0	-48.7
8.5	29.6	-68.3	-10.7	-11.5	45.8	-51.2	36.7	37.3	5.9	-41.8	-48.9
8.6	28.8	-71.7	-12.5	-12.9	45.8	-51.1	36.7	37.3	6.0	-40.1	-49.6
8.7	27.9	-78.5	-14.9	-14.6	-	-	36.7	37.3	6.2	-	-
8.8	26.7	-76.6	-17.0	-16.2	-	-	36.7	37.3	6.5	-	-
8.9	25.5	-70.8	-16.2	-16.6	-	-	36.6	37.3	6.7	-	-
9.0	24.1	-66.7	-13.5	-15.4	-	-	36.5	37.2	7.1	-	-
9.1	22.6	-63.4	-10.9	-13.4	-	-	-	-	7.4	-	-
9.2	21.0	-61.2	-8.9	-11.4	-	-	-	-	7.8	-	-
9.3	19.4	-59.7	-7.3	-9.7	-	-	-	-	8.3	-	-
9.4	17.6	-59.2	-6.0	-8.3	-	-	-	-	8.8	-	-
9.5	15.9	-59.2	-5.0	-7.2	-	-	-	-	9.4	-	-

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} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°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)	(dBc)	(dBm)	(dBm)	(dB)	(dBc)	(dBc)
6.1	25.7	-61.6	-11.7	-5.3	-	-	-	-	5.6	-	-
6.2	26.6	-62.8	-12.0	-6.2	-	-	-	-	5.6	-	-
6.3	27.3	-64.0	-12.4	-7.5	-	-	-	-	5.6	-	-
6.4	27.8	-65.6	-12.9	-9.0	-	-	-	-	5.6	-	-
6.5	28.1	-67.8	-13.5	-10.9	-	-	35.1	38.5	5.6	-	-
6.6	28.3	-70.1	-14.3	-13.3	-	-	35.5	38.5	5.6	-	-
6.7	28.4	-73.4	-15.2	-16.2	-	-	36.2	38.7	5.6	-	-
6.8	28.4	-74.7	-16.1	-20.1	-	-	36.9	38.9	5.6	-	-
6.9	28.4	-75.4	-17.0	-25.7	-	-	37.5	39.0	5.6	-	-
7.0	28.4	-74.5	-18.0	-33.5	45.4	-50.4	37.9	39.1	5.5	-64.8	-82.8
7.1	28.4	-73.4	-19.0	-30.6	46.0	-51.6	38.1	39.2	5.5	-64.9	-79.4
7.2	28.4	-72.5	-19.9	-25.0	46.4	-52.4	38.3	39.3	5.5	-64.1	-73.4
7.3	28.5	-73.0	-20.2	-21.9	46.7	-53.1	38.4	39.4	5.5	-62.8	-68.7
7.4	28.5	-73.7	-19.5	-19.7	46.8	-53.4	38.5	39.4	5.5	-62.9	-64.9
7.5	28.6	-74.8	-18.2	-18.2	46.9	-53.4	38.4	39.4	5.4	-62.5	-63.5
7.6	28.7	-75.5	-16.6	-16.9	47.0	-53.7	38.3	39.3	5.4	-62.4	-61.4
7.7	28.9	-76.5	-14.8	-15.8	47.3	-54.3	38.3	39.3	5.4	-61.9	-60.8
7.8	28.9	-79.4	-13.3	-15.0	47.1	-53.9	38.4	39.3	5.4	-61.5	-58.8
7.9	29.1	-79.1	-12.1	-14.4	47.2	-54.0	38.5	39.3	5.4	-60.2	-58.4
8.0	29.2	-75.6	-11.1	-13.8	46.8	-53.4	38.5	39.2	5.4	-60.4	-55.2
8.1	29.3	-71.6	-10.4	-13.4	46.9	-53.5	38.5	39.2	5.4	-60.7	-54.7
8.2	29.3	-69.4	-9.9	-13.3	47.0	-53.8	38.7	39.2	5.5	-60.5	-52.5
8.3	29.3	-68.1	-9.8	-13.4	46.9	-53.5	38.8	39.2	5.5	-60.3	-53.3
8.4	29.1	-67.6	-10.0	-13.9	47.0	-53.8	39.0	39.3	5.6	-59.5	-50.7
8.5	28.8	-67.9	-10.8	-15.0	46.7	-53.1	39.1	39.2	5.7	-58.5	-51.4
8.6	28.3	-69.8	-12.3	-16.9	46.7	-53.0	39.1	39.2	5.9	-57.0	-51.3
8.7	27.5	-74.0	-14.6	-20.3	-	-	39.1	39.1	6.1	-	-
8.8	26.5	-76.6	-16.8	-26.5	-	-	39.0	39.0	6.3	-	-
8.9	25.4	-74.0	-16.6	-29.3	-	-	38.9	39.0	6.6	-	-
9.0	24.1	-68.9	-14.1	-21.3	-	-	38.8	39.0	7.0	-	-
9.1	22.7	-65.1	-11.5	-16.9	-	-	-	-	7.4	-	-
9.2	21.3	-62.7	-9.3	-13.9	-	-	-	-	7.8	-	-
9.3	19.7	-61.2	-7.6	-11.7	-	-	-	-	8.3	-	-
9.4	18.1	-60.3	-6.3	-10.0	-	-	-	-	8.8	-	-
9.5	16.4	-59.9	-5.2	-8.6	-	-	-	-	9.4	-	-

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 V, I_{DD} = 2000 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)
6.1	27.1	-61.4	-11.5	-4.6	-	-	-	-	4.4
6.2	28.1	-61.8	-11.8	-5.4	-	-	-	-	4.4
6.3	28.9	-63.3	-12.1	-6.5	-	-	-	-	4.3
6.4	29.5	-64.4	-12.6	-7.9	-	-	-	-	4.3
6.5	29.8	-66.7	-13.4	-9.7	-	-	38.0	39.4	4.3
6.6	30.1	-69.2	-14.3	-12.0	-	-	38.2	39.4	4.3
6.7	30.2	-71.5	-15.3	-14.8	-	-	38.5	39.5	4.3
6.8	30.3	-74.8	-16.4	-18.5	-	-	38.9	39.5	4.3
6.9	30.3	-77.1	-17.7	-23.7	-	-	39.1	39.5	4.2
7.0	30.3	-76.0	-19.1	-31.7	46.2	-52.0	39.2	39.5	4.2
7.1	30.3	-74.6	-20.4	-31.9	46.8	-53.3	39.2	39.5	4.2
7.2	30.3	-72.1	-21.7	-24.7	47.2	-54.1	39.3	39.6	4.2
7.3	30.3	-71.7	-22.7	-21.5	47.6	-54.8	39.4	39.7	4.2
7.4	30.4	-72.0	-22.6	-19.5	47.8	-55.4	39.3	39.7	4.2
7.5	30.5	-72.1	-21.0	-18.1	47.8	-55.2	39.0	39.6	4.1
7.6	30.7	-72.6	-18.2	-16.9	48.0	-55.5	38.9	39.6	4.2
7.7	30.9	-74.6	-15.8	-15.8	48.3	-56.2	38.9	39.6	4.1
7.8	31.0	-77.2	-13.9	-14.9	48.1	-55.7	39.0	39.6	4.1
7.9	31.1	-78.1	-12.5	-14.3	48.0	-55.8	39.0	39.6	4.1
8.0	31.3	-77.0	-11.2	-13.8	47.6	-54.9	38.9	39.5	4.1
8.1	31.5	-73.2	-10.0	-13.3	47.7	-55.0	38.8	39.4	4.1
8.2	31.7	-69.8	-9.2	-13.0	47.8	-55.2	38.9	39.4	4.1
8.3	31.7	-68.4	-8.6	-13.0	47.6	-54.8	39.1	39.4	4.2
8.4	31.7	-67.8	-8.4	-13.4	47.8	-55.2	39.3	39.5	4.3
8.5	31.5	-67.6	-8.7	-14.3	47.4	-54.5	39.4	39.5	4.3
8.6	31.1	-68.4	-9.4	-16.0	47.4	-54.5	39.4	39.4	4.4
8.7	30.4	-70.8	-10.7	-18.8	-	-	39.4	39.3	4.6
8.8	29.5	-75.2	-12.3	-23.9	-	-	39.4	39.3	4.8
8.9	28.4	-81.0	-13.7	-28.6	-	-	39.4	39.3	5.0
9.0	27.1	-74.9	-13.7	-22.0	-	-	39.3	39.2	5.2
9.1	25.7	-67.5	-12.3	-17.5	-	-	-	-	5.6
9.2	24.2	-63.8	-10.3	-14.6	-	-	-	-	5.9
9.3	22.6	-61.3	-8.7	-12.4	-	-	-	-	6.4
9.4	21.0	-59.9	-7.2	-10.7	-	-	-	-	6.9
9.5	19.4	-59.3	-5.9	-9.3	-	-	-	-	7.4

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 V, I_{DD} = 2000 mA @ Temperature = +95°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)
6.1	23.3	-62.3	-11.8	-5.8	-	-	-	-	6.6
6.2	24.1	-63.0	-12.0	-6.8	-	-	-	-	6.6
6.3	24.8	-64.2	-12.4	-8.1	-	-	-	-	6.5
6.4	25.2	-65.8	-12.9	-9.8	-	-	-	-	6.5
6.5	25.5	-68.3	-13.4	-11.8	-	-	33.8	37.3	6.5
6.6	25.7	-70.9	-14.1	-14.3	-	-	34.2	37.3	6.5
6.7	25.8	-74.2	-14.8	-17.4	-	-	34.7	37.5	6.5
6.8	25.8	-77.8	-15.6	-21.5	-	-	35.2	37.8	6.5
6.9	25.8	-77.5	-16.4	-27.8	-	-	35.7	38.0	6.5
7.0	25.8	-74.6	-17.1	-35.6	44.7	-49.0	36.0	38.2	6.5
7.1	25.8	-75.3	-17.9	-29.8	45.2	-50.0	36.1	38.3	6.5
7.2	25.8	-72.6	-18.5	-24.7	45.5	-50.6	36.1	38.4	6.5
7.3	25.9	-73.3	-18.7	-21.8	45.8	-51.2	36.2	38.5	6.5
7.4	25.9	-73.2	-18.4	-19.9	45.9	-51.4	36.5	38.5	6.5
7.5	26.0	-74.4	-17.5	-18.4	45.9	-51.3	36.7	38.5	6.5
7.6	26.0	-76.1	-16.2	-17.1	46.0	-51.6	36.8	38.5	6.5
7.7	26.1	-76.4	-14.8	-16.0	46.2	-52.0	36.8	38.4	6.5
7.8	26.1	-76.6	-13.6	-15.2	46.1	-51.7	36.9	38.5	6.5
7.9	26.2	-75.0	-12.7	-14.6	46.1	-51.8	37.0	38.5	6.5
8.0	26.3	-74.0	-11.9	-14.2	45.8	-51.2	37.2	38.4	6.6
8.1	26.3	-70.8	-11.3	-13.9	45.7	-51.1	37.3	38.4	6.6
8.2	26.3	-69.4	-11.1	-13.8	45.9	-51.5	37.5	38.3	6.7
8.3	26.2	-67.9	-11.1	-14.0	45.9	-51.4	37.7	38.3	6.7
8.4	26.0	-67.5	-11.7	-14.7	46.0	-51.7	37.9	38.4	6.8
8.5	25.6	-67.4	-12.8	-15.9	45.8	-51.2	38.1	38.4	7.0
8.6	25.1	-67.9	-14.9	-18.0	45.8	-51.1	38.1	38.3	7.1
8.7	24.4	-69.4	-18.2	-21.6	-	-	38.1	38.2	7.4
8.8	23.5	-70.5	-21.6	-28.2	-	-	38.0	38.1	7.6
8.9	22.5	-71.0	-19.3	-31.1	-	-	37.8	38.0	7.9
9.0	21.3	-69.5	-15.0	-21.7	-	-	37.7	37.8	8.3
9.1	20.0	-67.0	-11.9	-17.2	-	-	-	-	8.8
9.2	18.5	-64.1	-9.6	-14.3	-	-	-	-	9.2
9.3	17.0	-62.0	-7.8	-12.1	-	-	-	-	9.8
9.4	15.4	-61.0	-6.4	-10.4	-	-	-	-	10.4
9.5	13.7	-60.8	-5.3	-9.0	-	-	-	-	11.0

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 1800 mA, 2000 mA, 2200 mA, @ Temperature = +25°C

FREQ	Gain @ 1800 mA	Gain @ 2000 mA	Gain @ 2200 mA	1dB Comp. Output @ 1800 mA	1dB Comp. Output @ 2000 mA	1dB Comp. Output @ 2200 mA	1dB Comp. Output @ 2400 mA	P_{SAT} Output @ 1800 mA	P_{SAT} Output @ 2000 mA	P_{SAT} Output @ 2200 mA	P_{SAT} Output @ 2400 mA
(GHz)	(dB)	(dB)	(dB)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
6.1	25.4	25.7	25.9	-	-	-	-	-	-	-	-
6.2	26.3	26.6	26.7	-	-	-	-	-	-	-	-
6.3	27.0	27.3	27.3	-	-	-	-	-	-	-	-
6.4	27.5	27.8	27.8	-	-	-	-	-	-	-	-
6.5	27.8	28.1	28.1	-	35.1	36.2	36.7	-	38.5	38.6	38.6
6.6	28.0	28.3	28.2	-	35.5	36.5	37.0	-	38.5	38.7	38.7
6.7	28.1	28.4	28.3	-	36.2	37.1	37.5	-	38.7	38.8	38.8
6.8	28.2	28.4	28.3	-	36.9	37.7	38.0	-	38.9	38.9	38.9
6.9	28.2	28.4	28.3	-	37.5	38.2	38.4	-	39.0	39.1	39.1
7.0	28.2	28.4	28.3	37.1	37.9	38.4	38.6	39.5	39.1	39.1	39.1
7.1	28.2	28.4	28.3	37.8	38.1	38.5	38.6	39.6	39.2	39.2	39.2
7.2	28.2	28.4	28.4	38.1	38.3	38.6	38.6	39.7	39.3	39.3	39.3
7.3	28.3	28.5	28.4	38.3	38.4	38.6	38.7	39.8	39.4	39.4	39.4
7.4	28.3	28.5	28.5	38.6	38.5	38.6	38.6	39.9	39.4	39.4	39.4
7.5	28.4	28.6	28.6	38.7	38.4	38.4	38.4	39.9	39.4	39.3	39.3
7.6	28.5	28.7	28.7	38.7	38.3	38.3	38.3	39.8	39.3	39.3	39.3
7.7	28.6	28.9	28.8	38.7	38.3	38.4	38.4	39.8	39.3	39.3	39.3
7.8	28.7	28.9	28.9	38.7	38.4	38.5	38.4	39.7	39.3	39.3	39.3
7.9	28.8	29.1	29.0	38.8	38.5	38.5	38.5	39.7	39.3	39.2	39.2
8.0	28.9	29.2	29.1	38.9	38.5	38.5	38.4	39.8	39.2	39.1	39.1
8.1	29.0	29.3	29.2	39.1	38.5	38.5	38.4	39.8	39.2	39.0	39.0
8.2	29.1	29.3	29.3	39.2	38.7	38.6	38.5	39.7	39.2	39.0	39.0
8.3	29.1	29.3	29.2	39.2	38.8	38.8	38.7	39.7	39.2	39.1	39.1
8.4	28.9	29.1	29.0	39.5	39.0	38.9	38.9	39.8	39.3	39.1	39.1
8.5	28.5	28.8	28.7	39.6	39.1	39.0	39.0	39.8	39.2	39.1	39.1
8.6	28.0	28.3	28.1	39.7	39.1	39.0	39.0	39.8	39.2	39.0	39.0
8.7	27.2	27.5	27.3	39.6	39.1	39.0	39.0	39.7	39.1	39.0	39.0
8.8	26.3	26.5	26.3	39.5	39.0	38.9	38.9	39.6	39.0	39.0	39.0
8.9	25.1	25.4	25.2	39.3	38.9	38.8	38.8	39.5	39.0	38.9	38.9
9.0	23.8	24.1	23.9	38.8	38.8	38.8	38.8	39.3	39.0	38.9	38.9
9.1	22.4	22.7	22.5	-	-	-	-	-	-	-	-
9.2	21.0	21.3	21.0	-	-	-	-	-	-	-	-
9.3	19.4	19.7	19.5	-	-	-	-	-	-	-	-
9.4	17.8	18.1	17.8	-	-	-	-	-	-	-	-
9.5	16.0	16.4	16.1	-	-	-	-	-	-	-	-

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 1800 mA, 2000 mA, 2200 mA, @ Temperature = +25°C

FREQ	IP-3 @ 1800 mA	IP-3 @ 2000 mA	IP-3 @ 2200 mA	IM3 @ 1800 mA	IM3 @ 2000 mA	IM3 @ 2200 mA	Noise Figure @ 1800 mA	Noise Figure @ 2000 mA	Noise Figure @ 2200 mA
(GHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dB)	(dB)
6.1	-	-	-	-	-	-	5.8	5.6	5.8
6.2	-	-	-	-	-	-	5.8	5.6	5.8
6.3	-	-	-	-	-	-	5.7	5.6	5.8
6.4	-	-	-	-	-	-	5.7	5.6	5.8
6.5	-	-	-	-	-	-	5.7	5.6	5.8
6.6	-	-	-	-	-	-	5.7	5.6	5.8
6.7	-	-	-	-	-	-	5.7	5.6	5.8
6.8	-	-	-	-	-	-	5.7	5.6	5.7
6.9	-	-	-	-	-	-	5.7	5.6	5.8
7.0	44.3	45.4	46.3	-48.1	-50.4	-52.2	5.6	5.5	5.7
7.1	45.0	46.0	46.8	-49.6	-51.6	-53.3	5.6	5.5	5.7
7.2	45.5	46.4	47.1	-50.6	-52.4	-53.9	5.6	5.5	5.7
7.3	45.9	46.7	47.3	-51.5	-53.1	-54.4	5.6	5.5	5.7
7.4	46.1	46.8	47.4	-51.8	-53.4	-54.4	5.6	5.5	5.6
7.5	46.1	46.9	47.4	-51.7	-53.4	-54.5	5.5	5.4	5.6
7.6	46.3	47.0	47.5	-52.3	-53.7	-54.7	5.5	5.4	5.6
7.7	46.6	47.3	47.7	-52.8	-54.3	-55.0	5.5	5.4	5.6
7.8	46.5	47.1	47.5	-52.5	-53.9	-54.7	5.5	5.4	5.6
7.9	46.5	47.2	47.5	-52.7	-54.0	-54.8	5.5	5.4	5.6
8.0	46.2	46.8	47.2	-51.9	-53.4	-54.2	5.5	5.4	5.6
8.1	46.1	46.9	47.2	-51.9	-53.5	-54.0	5.6	5.4	5.6
8.2	46.3	47.0	47.3	-52.3	-53.8	-54.4	5.6	5.5	5.7
8.3	46.2	46.9	47.2	-52.2	-53.5	-54.1	5.7	5.5	5.8
8.4	46.3	47.0	47.3	-52.3	-53.8	-54.2	5.8	5.6	5.8
8.5	46.0	46.7	47.0	-51.7	-53.1	-53.6	5.9	5.7	6.0
8.6	45.9	46.7	47.0	-51.5	-53.0	-53.6	6.0	5.9	6.1
8.7	-	-	-	-	-	-	6.2	6.1	6.3
8.8	-	-	-	-	-	-	6.5	6.3	6.6
8.9	-	-	-	-	-	-	6.7	6.6	6.8
9.0	-	-	-	-	-	-	7.1	7.0	7.2
9.1	-	-	-	-	-	-	7.4	7.4	7.5
9.2	-	-	-	-	-	-	7.9	7.8	8.0
9.3	-	-	-	-	-	-	8.3	8.3	8.4
9.4	-	-	-	-	-	-	8.8	8.8	8.9
9.5	-	-	-	-	-	-	9.4	9.4	9.5

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

Power	OIP3 @7.1 GHz	OIP3 @7.4 GHz	OIP3 @7.8 GHz	OIP3 @8.2 GHz	OIP3 @8.5GHz
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
17.0	46.0	46.8	47.1	46.9	46.7
20.0	45.8	46.7	46.9	46.8	46.5
23.0	45.2	46.3	46.7	46.5	46.1
26.0	43.3	44.8	45.5	45.3	44.6
29.0	42.3	43.1	43.5	43.4	42.9

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

Power	IM3 @7.1 GHz	IM3 @7.4 GHz	IM3 @7.8 GHz	IM3 @8.2 GHz	IM3 @8.5GHz
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
17.0	-58.1	-59.8	-60.3	-59.8	-59.3
20.0	-51.6	-53.4	-53.9	-53.8	-53.1
23.0	-44.4	-46.5	-47.3	-47.1	-46.2
26.0	-34.4	-37.5	-38.9	-38.7	-37.3
29.0	-26.8	-28.4	-29.1	-29.0	-27.9

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

FREQ	P_{OUT}	Gain	FREQ	P_{OUT}	Gain	FREQ	P_{OUT}	Gain
(GHz)	(dBm)	(dB)	(GHz)	(dBm)	(dB)	(GHz)	(dBm)	(dB)
7.1	20.3	28.0	7.8	20.6	28.2	8.5	21.0	28.6
7.1	21.2	28.0	7.8	21.5	28.2	8.5	21.9	28.6
7.1	22.1	28.0	7.8	22.4	28.2	8.5	22.8	28.6
7.1	23.1	28.0	7.8	23.4	28.2	8.5	23.8	28.6
7.1	24.0	28.0	7.8	24.3	28.2	8.5	24.7	28.6
7.1	25.0	28.0	7.8	25.3	28.2	8.5	25.7	28.6
7.1	25.9	28.0	7.8	26.3	28.3	8.5	26.7	28.7
7.1	26.9	28.0	7.8	27.3	28.3	8.5	27.7	28.7
7.1	27.9	28.0	7.8	28.2	28.3	8.5	28.7	28.7
7.1	28.9	28.0	7.8	29.2	28.3	8.5	29.7	28.7
7.1	29.9	28.0	7.8	30.2	28.3	8.5	30.7	28.8
7.1	30.9	28.0	7.8	31.2	28.3	8.5	31.7	28.8
7.1	31.9	28.0	7.8	32.2	28.3	8.5	32.7	28.8
7.1	32.8	28.0	7.8	33.2	28.3	8.5	33.8	28.8
7.1	33.8	28.0	7.8	34.1	28.2	8.5	34.9	28.9
7.1	34.8	28.0	7.8	35.1	28.2	8.5	36.0	29.0
7.1	35.8	27.9	7.8	36.1	28.2	8.5	37.1	29.2
7.1	36.7	27.8	7.8	37.0	28.1	8.5	38.0	29.1
7.1	37.5	27.7	7.8	37.9	28.0	8.5	38.7	28.8
7.1	38.3	27.5	7.8	38.5	27.7	8.5	39.3	28.4
7.1	39.0	27.2	7.8	39.1	27.2	8.5	39.6	27.7
7.1	39.5	26.7	7.8	39.4	26.6	8.5	39.7	26.8
7.1	39.7	25.9	7.8	39.7	25.8	8.5	39.7	25.7
7.1	39.7	24.9	7.8	39.7	24.8	8.5	39.6	24.6
7.1	39.7	23.8	7.8	39.8	23.8	8.5	39.6	23.5
7.1	39.6	22.7	7.8	39.7	22.8	8.5	39.5	22.5
7.1	39.7	21.7	7.8	39.7	21.7	8.5	39.5	21.4
7.4	20.2	27.9	8.2	21.0	28.7			
7.4	21.1	27.9	8.2	22.0	28.7			
7.4	22.0	27.9	8.2	22.9	28.7			
7.4	22.9	27.9	8.2	23.8	28.7			
7.4	23.9	27.9	8.2	24.8	28.7			
7.4	24.8	27.9	8.2	25.8	28.7			
7.4	25.8	27.9	8.2	26.7	28.7			
7.4	26.8	27.9	8.2	27.7	28.7			
7.4	27.8	27.9	8.2	28.7	28.7			
7.4	28.8	28.0	8.2	29.7	28.8			
7.4	29.8	28.0	8.2	30.7	28.8			
7.4	30.8	28.0	8.2	31.7	28.8			
7.4	31.7	27.9	8.2	32.7	28.8			
7.4	32.7	27.9	8.2	33.7	28.8			
7.4	33.6	27.9	8.2	34.7	28.8			
7.4	34.6	27.8	8.2	35.7	28.8			
7.4	35.6	27.8	8.2	36.7	28.8			
7.4	36.5	27.8	8.2	37.6	28.7			
7.4	37.5	27.7	8.2	38.3	28.4			
7.4	38.3	27.6	8.2	38.9	28.0			
7.4	39.0	27.3	8.2	39.3	27.4			
7.4	39.5	26.8	8.2	39.5	26.6			
7.4	39.8	26.1	8.2	39.6	25.7			
7.4	39.9	25.2	8.2	39.6	24.7			
7.4	39.9	24.1	8.2	39.6	23.7			
7.4	39.7	23.0	8.2	39.5	22.6			
7.4	39.7	21.9	8.2	39.5	21.5			

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

FREQ	P_{OUT}	Phase	FREQ	P_{OUT}	Phase	FREQ	P_{OUT}	Phase
(GHz)	(dBm)	(°)	(GHz)	(dBm)	(°)	(GHz)	(dBm)	(°)
7.1	20.5	0.0	7.8	21.3	0.0	8.5	21.2	0.0
7.1	21.4	0.0	7.8	22.2	0.0	8.5	22.1	0.0
7.1	22.3	0.0	7.8	23.1	0.1	8.5	23.0	0.0
7.1	23.2	0.1	7.8	24.1	0.1	8.5	24.0	0.1
7.1	24.2	0.1	7.8	25.0	0.2	8.5	24.9	0.2
7.1	25.1	0.2	7.8	26.0	0.2	8.5	25.9	0.3
7.1	26.1	0.3	7.8	27.0	0.4	8.5	26.9	0.4
7.1	27.1	0.5	7.8	27.9	0.5	8.5	27.9	0.6
7.1	28.0	0.7	7.8	28.9	0.7	8.5	28.9	0.8
7.1	29.0	1.1	7.8	29.9	1.0	8.5	29.9	1.1
7.1	30.0	1.6	7.8	30.9	1.4	8.5	30.9	1.7
7.1	30.9	2.3	7.8	31.9	2.1	8.5	31.9	2.5
7.1	31.8	3.6	7.8	32.8	3.1	8.5	32.9	3.9
7.1	32.7	5.2	7.8	33.7	4.5	8.5	33.9	5.7
7.1	33.6	7.2	7.8	34.6	6.2	8.5	34.9	7.9
7.1	34.5	9.3	7.8	35.6	8.2	8.5	36.0	10.3
7.1	35.3	11.5	7.8	36.5	10.3	8.5	37.1	12.8
7.1	36.1	13.8	7.8	37.3	12.3	8.5	38.0	14.8
7.1	36.9	16.2	7.8	38.0	14.1	8.5	38.6	16.7
7.1	37.6	18.5	7.8	38.5	16.0	8.5	39.2	19.1
7.1	38.3	20.7	7.8	38.9	18.3	8.5	39.3	24.8
7.1	38.8	23.3	7.8	39.2	21.7	8.5	39.3	32.7
7.1	39.1	26.7	7.8	39.3	26.4	8.5	39.3	41.1
7.1	39.1	30.2	7.8	39.3	31.7			
7.1	39.1	33.1	7.8	39.3	36.8			
7.1	39.1	35.3	7.8	39.3	41.0			
7.1	39.2	37.0	7.8	39.2	44.3			
7.4	20.7	0.0	8.2	21.5	0.0			
7.4	21.6	0.0	8.2	22.4	0.0			
7.4	22.5	0.0	8.2	23.3	0.1			
7.4	23.5	0.1	8.2	24.3	0.1			
7.4	24.4	0.1	8.2	25.2	0.2			
7.4	25.4	0.2	8.2	26.2	0.3			
7.4	26.3	0.3	8.2	27.2	0.4			
7.4	27.3	0.4	8.2	28.2	0.6			
7.4	28.3	0.6	8.2	29.2	0.8			
7.4	29.3	0.8	8.2	30.2	1.1			
7.4	30.3	1.1	8.2	31.2	1.6			
7.4	31.3	1.6	8.2	32.2	2.4			
7.4	32.2	2.4	8.2	33.2	3.6			
7.4	33.1	3.6	8.2	34.2	5.2			
7.4	34.0	5.3	8.2	35.2	7.1			
7.4	34.9	7.1	8.2	36.3	9.3			
7.4	35.8	9.1	8.2	37.3	11.4			
7.4	36.6	11.2	8.2	38.0	13.3			
7.4	37.4	13.2	8.2	38.6	15.2			
7.4	38.1	15.0	8.2	39.1	17.3			
7.4	38.7	16.7	8.2	39.3	20.6			
7.4	39.1	18.7	8.2	39.4	25.6			
7.4	39.3	21.9	8.2	39.4	31.6			
7.4	39.4	25.9	8.2	39.4	37.9			
7.4	39.4	29.8	8.2	39.4	43.7			
7.4	39.3	33.0	8.2	39.3	48.6			
7.4	39.3	35.2	8.2	39.3	52.5			

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

FREQ	P_{OUT}	2nd Harmonics	FREQ	P_{OUT}	3rd Harmonics
(MHz)	(dBm)	(dB)	(MHz)	(dBm)	(dB)
7100	17	-79	7100	17	-96
7100	20	-55	7100	20	-82
7100	23	-57	7100	23	-84
7100	26	-60	7100	26	-87
7100	29	-62	7100	29	-90
7100	31	-63	7100	31	-90
7100	36	-65	7100	36	-79
7100	39	-65	7100	39	-79
7400	17	-82	7400	17	-90
7400	21	-56	7400	21	-82
7400	23	-58	7400	23	-84
7400	26	-61	7400	26	-87
7400	29	-64	7400	29	-89
7400	31	-64	7400	31	-90
7400	37	-63	7400	37	-77
7400	39	-63	7400	39	-65
7800	18	-81	7800	18	-94
7800	21	-56	7800	21	-82
7800	24	-58	7800	24	-85
7800	27	-60	7800	27	-87
7800	30	-63	7800	30	-91
7800	32	-63	7800	32	-86
7800	37	-62	7800	37	-68
7800	39	-62	7800	39	-59
8200	18	-78	8200	18	-95
8200	21	-70	8200	21	-82
8200	24	-70	8200	24	-85
8200	27	-71	8200	27	-87
8200	30	-68	8200	30	-88
8200	32	-66	8200	32	-83
8200	38	-61	8200	38	-61
8200	39	-61	8200	39	-52
8500	17	-76	8500	17	-95
8500	21	-69	8500	21	-82
8500	24	-70	8500	24	-85
8500	27	-69	8500	27	-88
8500	30	-67	8500	30	-88
8500	32	-65	8500	32	-82
8500	38	-60	8500	38	-60
8500	39	-58	8500	39	-52

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

Power	P_{DISS} (@7.1 GHz)	P_{DISS} (@7.4 GHz)	P_{DISS} (@7.8 GHz)	P_{DISS} (@8.2 GHz)	P_{DISS} (@8.5 GHz)	PAE (@7.1 GHz)	PAE (@7.4 GHz)	PAE (@7.8 GHz)	PAE (@8.2 GHz)	PAE (@8.5 GHz)
(dBm)	(W)	(W)	(W)	(W)	(W)	(%)	(%)	(%)	(%)	(%)
20.4	15.8	15.7	15.7	15.7	15.7	0.7	0.7	0.8	0.8	0.7
21.3	15.8	15.7	15.7	15.6	15.7	0.8	0.8	0.9	1.0	0.9
22.2	15.8	15.7	15.7	15.6	15.7	1.0	1.0	1.2	1.3	1.1
23.1	15.7	15.7	15.6	15.6	15.6	1.3	1.3	1.4	1.6	1.4
24.1	15.7	15.7	15.6	15.5	15.6	1.6	1.6	1.8	2.0	1.7
25.0	15.7	15.6	15.5	15.4	15.5	2.0	2.0	2.2	2.4	2.2
26.0	15.6	15.6	15.5	15.4	15.4	2.5	2.5	2.8	3.1	2.7
27.0	15.5	15.5	15.4	15.3	15.4	3.1	3.1	3.5	3.8	3.4
28.0	15.5	15.5	15.3	15.2	15.3	3.9	3.9	4.4	4.8	4.3
29.0	15.4	15.4	15.2	15.0	15.2	4.9	4.8	5.5	6.0	5.4
29.9	15.3	15.3	15.0	14.9	15.1	6.0	6.0	6.8	7.5	6.8
30.9	15.3	15.2	14.9	14.7	14.9	7.5	7.4	8.5	9.4	8.4
31.9	15.3	15.3	14.8	14.6	14.9	9.2	9.1	10.5	11.6	10.5
32.8	15.5	15.4	14.8	14.6	15.0	11.0	10.9	12.7	14.1	12.8
33.8	15.8	15.7	15.0	14.7	15.2	13.1	12.9	15.1	16.9	15.5
34.7	16.1	16.1	15.2	14.9	15.5	15.5	15.2	17.9	20.2	18.9
35.6	16.4	16.5	15.5	15.0	15.8	18.1	17.8	21.0	24.0	22.9
36.5	16.7	16.8	15.8	15.2	16.1	21.0	20.7	24.4	27.5	26.9
37.3	17.0	17.2	15.9	15.3	16.3	23.9	23.8	27.6	30.6	30.4
38.1	17.2	17.5	16.0	15.4	16.6	27.1	27.0	30.4	33.1	33.3
38.8	17.3	17.7	16.1	15.7	16.9	30.4	30.1	32.8	34.8	35.0
39.3	17.3	17.8	16.2	16.1	17.3	33.2	32.8	34.6	35.3	35.0
39.6	17.3	17.9	16.5	16.6	17.7	34.7	34.4	35.2	35.0	34.2
39.8	17.2	18.0	16.9	17.0	18.4	35.3	35.0	35.1	34.4	33.1
39.7	17.0	18.2	17.2	17.5	19.1	35.3	34.9	34.7	33.5	32.0
39.7	16.9	18.2	17.6	18.1	19.9	35.3	34.5	34.0	32.5	30.8
39.7	17.1	18.3	18.1	18.6	20.6	35.3	34.2	33.3	31.6	29.9

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

P_{IN}	P_{OUT} @7.1 GHz	P_{OUT} @7.4 GHz	P_{OUT} @7.8 GHz	P_{OUT} @8.2 GHz	P_{OUT} @8.5 GHz	I_{DD} @7.1 GHz	I_{DD} @7.4 GHz	I_{DD} @7.8 GHz	I_{DD} @8.2 GHz	I_{DD} @8.5 GHz
(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(mA)	(mA)	(mA)	(mA)	(mA)
-7.5	20.4	20.5	20.9	21.2	20.7	2.0	2.0	2.0	2.0	2.0
-6.6	21.3	21.4	21.8	22.1	21.6	2.0	2.0	2.0	2.0	2.0
-5.6	22.2	22.3	22.8	23.1	22.5	2.0	2.0	2.0	2.0	2.0
-4.7	23.1	23.2	23.7	24.0	23.5	2.0	2.0	2.0	2.0	2.0
-3.8	24.1	24.1	24.7	25.0	24.4	2.0	2.0	2.0	2.0	2.0
-2.8	25.0	25.1	25.6	25.9	25.4	2.0	2.0	2.0	2.0	2.0
-1.8	26.0	26.1	26.6	26.9	26.4	2.0	2.0	2.0	2.0	2.0
-0.9	27.0	27.0	27.6	27.9	27.4	2.0	2.0	2.0	2.0	2.0
0.1	28.0	28.0	28.6	28.9	28.4	2.0	2.0	2.0	2.0	2.0
1.1	29.0	29.0	29.6	29.9	29.4	2.0	2.0	2.0	2.0	2.0
2.1	29.9	30.0	30.6	30.9	30.4	2.0	2.0	2.0	2.0	2.0
3.1	30.9	31.0	31.5	31.9	31.4	2.1	2.0	2.0	2.0	2.0
4.1	31.9	32.0	32.5	32.9	32.4	2.1	2.1	2.1	2.1	2.1
5.0	32.8	32.9	33.4	33.8	33.4	2.2	2.1	2.1	2.2	2.1
6.0	33.8	33.8	34.4	34.8	34.5	2.3	2.2	2.2	2.3	2.3
7.0	34.7	34.8	35.4	35.9	35.6	2.4	2.3	2.3	2.4	2.4
8.0	35.6	35.7	36.3	36.9	36.7	2.5	2.5	2.5	2.5	2.6
9.0	36.5	36.6	37.2	37.8	37.7	2.6	2.6	2.6	2.7	2.8
10.0	37.3	37.4	38.0	38.5	38.5	2.8	2.8	2.8	2.8	2.9
11.0	38.1	38.2	38.6	39.0	39.2	2.9	2.9	2.9	3.0	3.1
12.0	38.8	38.8	39.1	39.4	39.6	3.1	3.1	3.0	3.1	3.3
13.0	39.3	39.3	39.4	39.6	39.7	3.2	3.2	3.2	3.2	3.3
14.0	39.6	39.6	39.6	39.6	39.7	3.3	3.3	3.2	3.3	3.4
15.1	39.8	39.8	39.7	39.6	39.6	3.3	3.3	3.3	3.3	3.4
16.1	39.7	39.8	39.6	39.5	39.6	3.3	3.4	3.4	3.4	3.5
17.1	39.7	39.8	39.6	39.5	39.5	3.3	3.4	3.4	3.4	3.6
18.1	39.7	39.7	39.6	39.4	39.5	3.3	3.4	3.5	3.5	3.7

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

Power	P_{DISS} (@7.1 GHz)	P_{DISS} (@7.4 GHz)	P_{DISS} (@7.8 GHz)	P_{DISS} (@8.2 GHz)	P_{DISS} (@8.5 GHz)	PAE (@7.1 GHz)	PAE (@7.4 GHz)	PAE (@7.8 GHz)	PAE (@8.2 GHz)	PAE (@8.5 GHz)
(dBm)	(W)	(W)	(W)	(W)	(W)	(%)	(%)	(%)	(%)	(%)
-7.5	15.8	15.7	15.7	15.7	15.7	0.7	0.7	0.8	0.8	0.7
-6.6	15.8	15.7	15.7	15.6	15.7	0.8	0.9	1.0	1.0	0.9
-5.6	15.8	15.7	15.7	15.6	15.7	1.0	1.1	1.2	1.3	1.1
-4.7	15.7	15.7	15.6	15.6	15.6	1.3	1.3	1.5	1.6	1.4
-3.8	15.7	15.6	15.6	15.5	15.6	1.6	1.6	1.8	2.0	1.7
-2.8	15.7	15.6	15.5	15.5	15.5	2.0	2.0	2.3	2.5	2.2
-1.8	15.6	15.5	15.4	15.4	15.4	2.5	2.5	2.9	3.1	2.7
-0.9	15.5	15.5	15.4	15.3	15.4	3.1	3.2	3.6	3.9	3.4
0.1	15.5	15.4	15.3	15.2	15.3	3.9	4.0	4.5	4.8	4.3
1.1	15.4	15.3	15.1	15.1	15.2	4.9	5.0	5.6	6.1	5.4
2.1	15.3	15.2	15.0	14.9	15.1	6.0	6.2	7.0	7.6	6.8
3.1	15.3	15.1	14.9	14.8	14.9	7.5	7.7	8.7	9.4	8.4
4.1	15.3	15.0	14.8	14.7	14.9	9.2	9.4	10.7	11.6	10.5
5.0	15.5	15.1	14.9	14.8	15.0	11.0	11.4	12.9	14.0	12.8
6.0	15.8	15.3	15.0	15.0	15.2	13.1	13.6	15.5	16.9	15.5
7.0	16.1	15.6	15.3	15.2	15.5	15.5	16.1	18.3	20.2	18.9
8.0	16.4	15.9	15.6	15.4	15.8	18.1	18.9	21.6	24.0	22.9
9.0	16.7	16.2	15.8	15.6	16.1	21.0	22.0	25.0	27.6	26.9
10.0	17.0	16.5	16.0	15.8	16.3	23.9	25.2	28.2	30.7	30.4
11.0	17.2	16.7	16.1	16.0	16.6	27.1	28.4	31.0	33.3	33.3
12.0	17.3	16.8	16.3	16.3	16.9	30.4	31.3	33.3	34.8	35.0
13.0	17.3	16.9	16.5	16.7	17.3	33.2	33.7	34.7	35.2	35.0
14.0	17.3	17.1	16.9	17.1	17.7	34.7	35.1	35.0	34.7	34.2
15.1	17.2	17.3	17.3	17.5	18.4	35.3	35.5	34.7	34.0	33.1
16.1	17.0	17.5	17.7	18.1	19.1	35.3	35.2	34.1	33.0	32.0
17.1	16.9	17.7	18.1	18.6	19.9	35.3	34.7	33.4	32.1	30.8
18.1	17.1	17.9	18.7	19.3	20.6	35.3	34.2	32.5	31.2	29.9

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

FREQ	P_{DISS} (@ P_{SAT})	PAE (@ P_{SAT})
(GHz)	(W)	(%)
7.0	15.9	36.4
7.1	17.1	35.3
7.3	18.3	34.2
7.5	17.5	34.2
7.7	18.1	33.3
7.9	19.2	31.8
8.1	18.6	31.6
8.3	19.9	30.7
8.5	20.6	29.9
8.6	21.4	29.0

MMIC Amplifier PMA6-93-10W+

Typical Performance Data

TEST CONDITIONS: V_{DD} = +8 V, I_{DD} = 2000 mA @ Temperature = +25°C

P_{OUT}	I_{DD} @7.1 GHz	I_{DD} @7.4 GHz	I_{DD} @7.8 GHz	I_{DD} @8.2 GHz	I_{DD} @8.5 GHz
(dBm)	(mA)	(mA)	(mA)	(mA)	(mA)
20.4	2.0	2.0	2.0	2.0	2.0
21.3	2.0	2.0	2.0	2.0	2.0
22.2	2.0	2.0	2.0	2.0	2.0
23.1	2.0	2.0	2.0	2.0	2.0
24.1	2.0	2.0	2.0	2.0	2.0
25.0	2.0	2.0	2.0	2.0	2.0
26.0	2.0	2.0	2.0	2.0	2.0
27.0	2.0	2.0	2.0	2.0	2.0
28.0	2.0	2.0	2.0	2.0	2.0
29.0	2.0	2.0	2.0	2.0	2.0
29.9	2.0	2.0	2.0	2.0	2.0
30.9	2.1	2.0	2.0	2.0	2.0
31.9	2.1	2.1	2.1	2.1	2.1
32.8	2.2	2.1	2.1	2.2	2.1
33.8	2.3	2.2	2.2	2.3	2.3
34.7	2.4	2.3	2.3	2.4	2.4
35.6	2.5	2.5	2.5	2.5	2.6
36.5	2.6	2.6	2.6	2.7	2.8
37.3	2.8	2.8	2.8	2.8	2.9
38.1	2.9	2.9	2.9	3.0	3.1
38.8	3.1	3.1	3.0	3.1	3.3
39.3	3.2	3.2	3.2	3.2	3.3
39.6	3.3	3.3	3.2	3.3	3.4
39.8	3.3	3.3	3.3	3.3	3.4
39.7	3.3	3.4	3.4	3.4	3.5
39.7	3.3	3.4	3.4	3.4	3.6
39.7	3.3	3.4	3.5	3.5	3.7

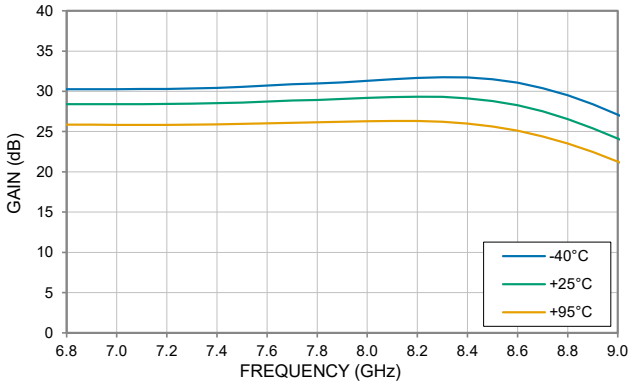
GAIN VARIATION VS FREQUENCY & TEMPERATURE
INPUT POWER = -15.00dBm, Vd = 8.00V

FREQ	-40°C to +95°C
GHz	℃
6.1	-0.028
6.2	-0.029
6.3	-0.030
6.4	-0.031
6.5	-0.032
6.6	-0.032
6.7	-0.033
6.8	-0.033
6.9	-0.033
7.0	-0.033
7.1	-0.033
7.2	-0.033
7.3	-0.033
7.4	-0.034
7.5	-0.034
7.6	-0.035
7.7	-0.035
7.8	-0.036
7.9	-0.036
8.0	-0.037
8.1	-0.038
8.2	-0.040
8.3	-0.041
8.4	-0.042
8.5	-0.043
8.6	-0.044
8.7	-0.045
8.8	-0.044
8.9	-0.044
9.0	-0.043
9.1	-0.043
9.2	-0.042
9.3	-0.042
9.4	-0.042
9.5	-0.042

Typical Performance Curves

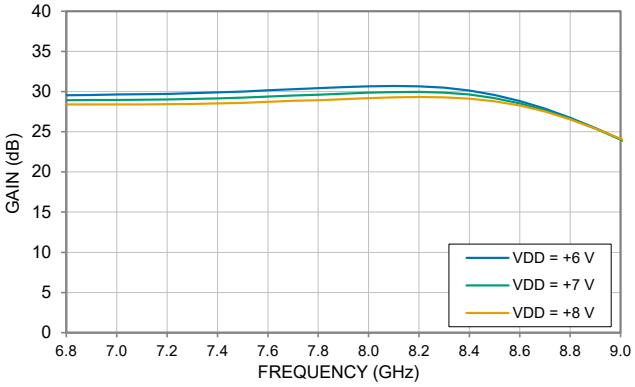
GAIN vs. TEMPERATURE

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



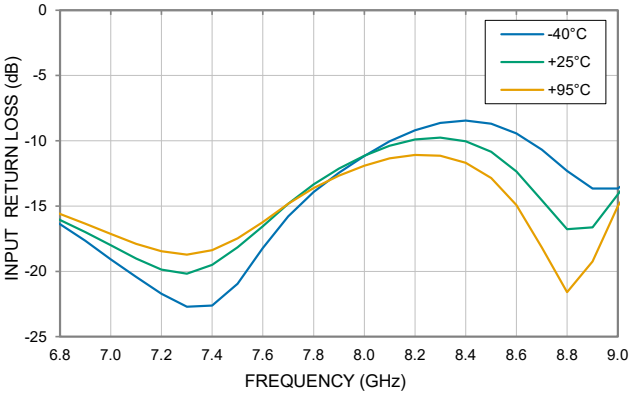
GAIN vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C



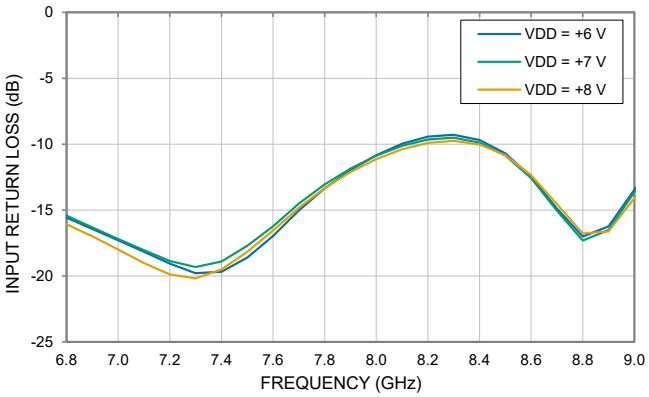
INPUT RETURN LOSS vs. TEMPERATURE

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



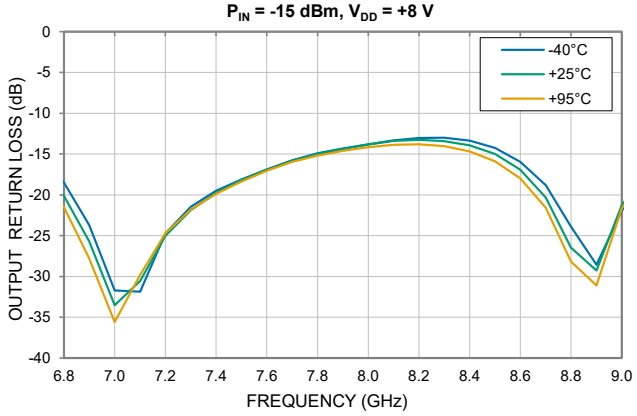
INPUT RETURN LOSS vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C



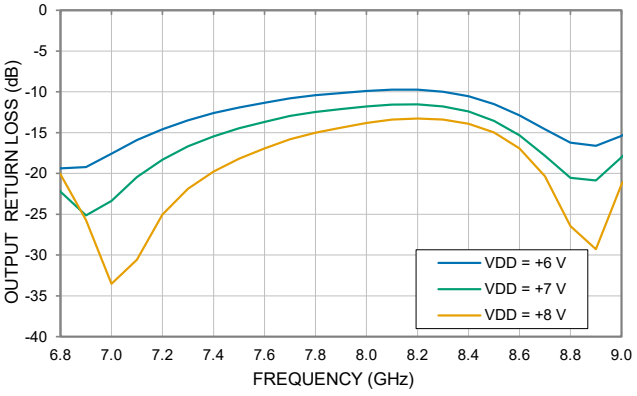
OUTPUT RETURN LOSS vs. TEMPERATURE

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



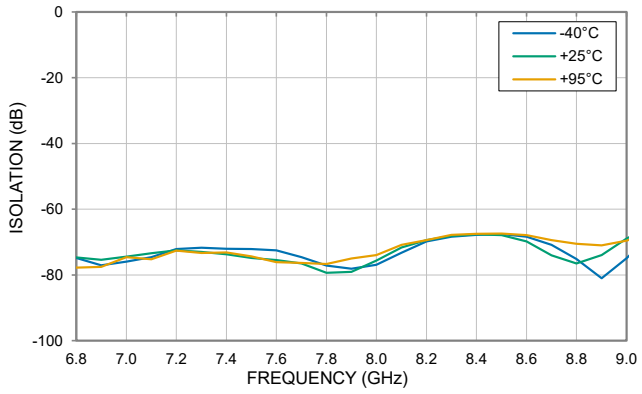
OUTPUT RETURN LOSS vs. DEVICE VOLTAGE

P_{IN} = -15 dBm, TEMPERATURE = +25°C

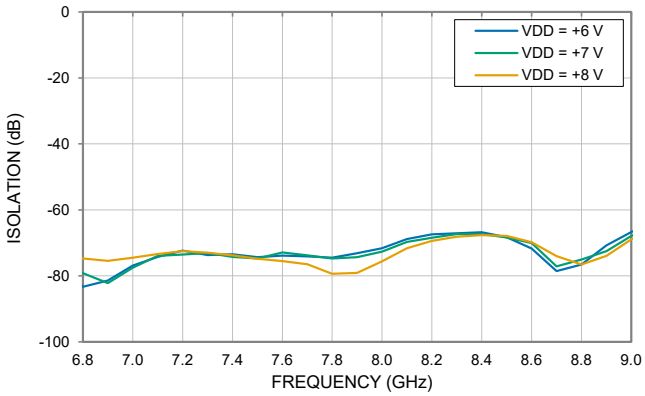


Typical Performance Curves

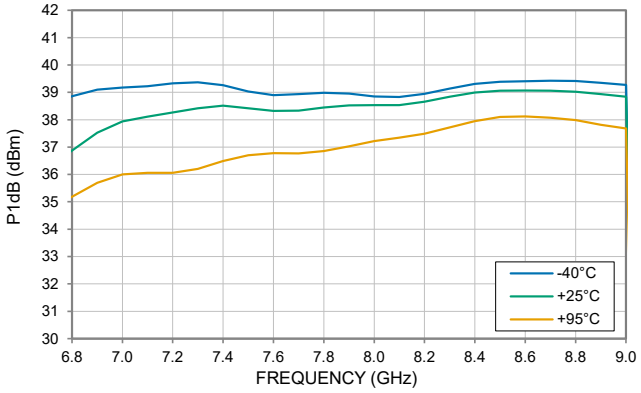
ISOLATION vs.TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



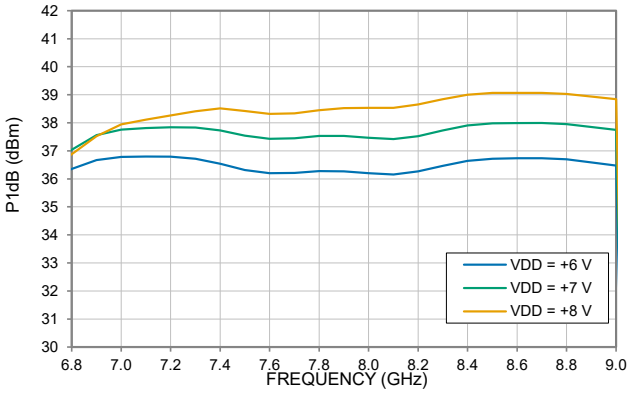
ISOLATION vs. DEVICE VOLTAGE
P_{IN} = -15 dBm, TEMPERATURE = +25°C



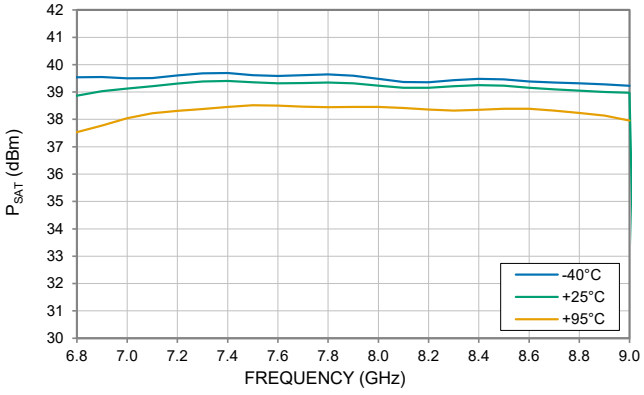
P1dB vs. TEMPERATURE
V_{DD} = +8 V



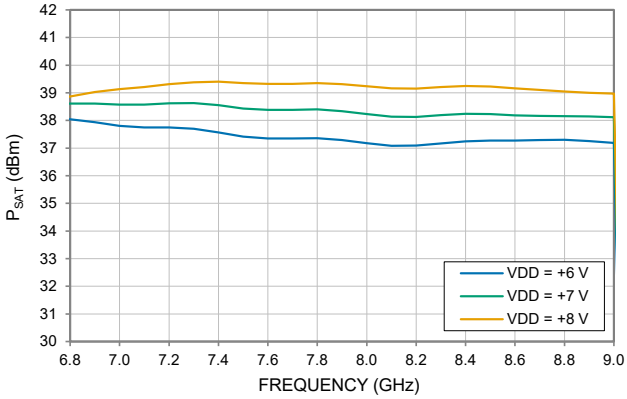
P1dB vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



P_{SAT} vs. TEMPERATURE
V_{DD} = +8 V



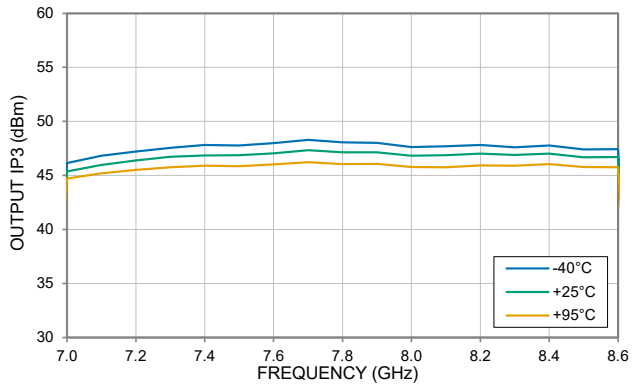
P_{SAT} vs. DEVICE VOLTAGE
TEMPERATURE = +25°C



Typical Performance Curves

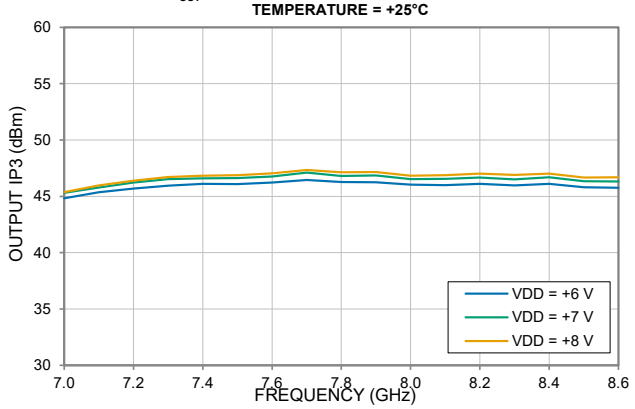
OUTPUT IP3 vs. TEMPERATURE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V



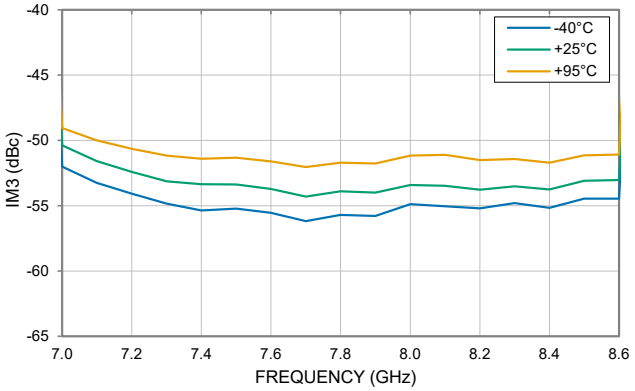
OUTPUT IP3 vs. DEVICE VOLTAGE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



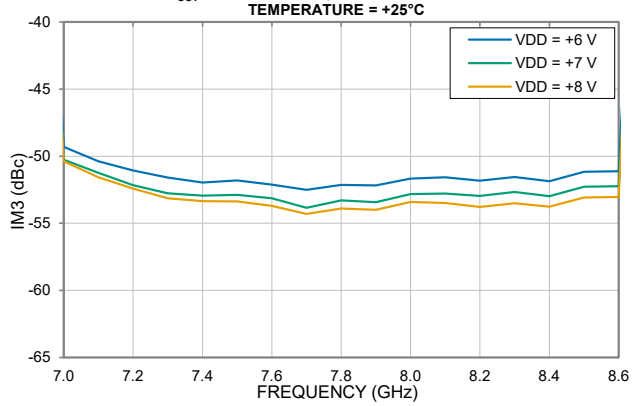
IM3 vs. TEMPERATURE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V



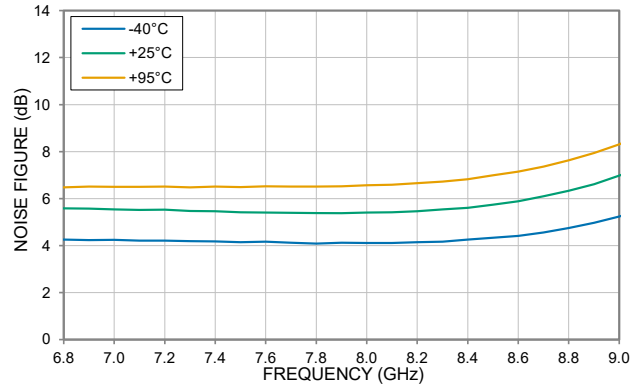
IM3 vs. DEVICE VOLTAGE

P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz
TEMPERATURE = +25°C



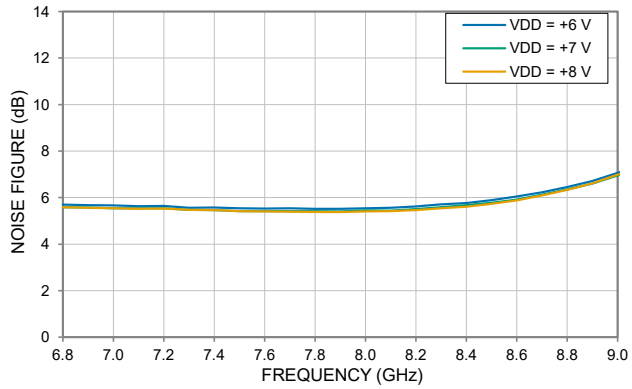
NOISE FIGURE vs. TEMPERATURE

V_{DD} = +8 V



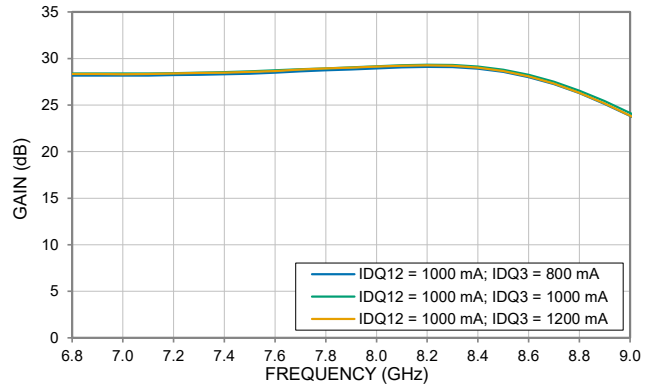
NOISE FIGURE vs. DEVICE VOLTAGE

TEMPERATURE = +25°C

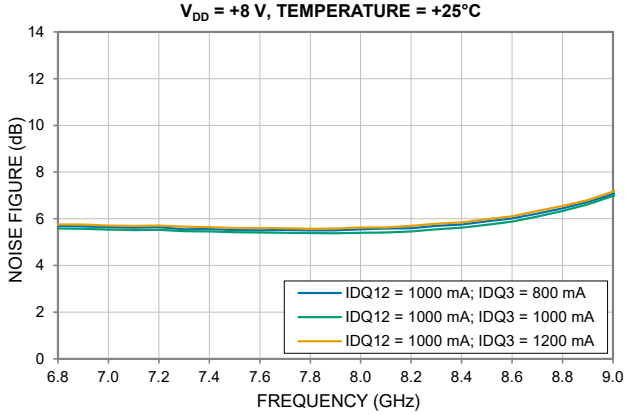


Typical Performance Curves

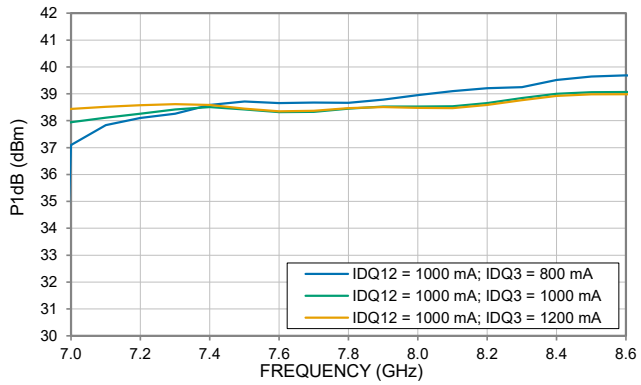
GAIN vs. CURRENT
P_{IN} = -15 dBm, V_{DD} = +8 V, TEMPERATURE = +25°C



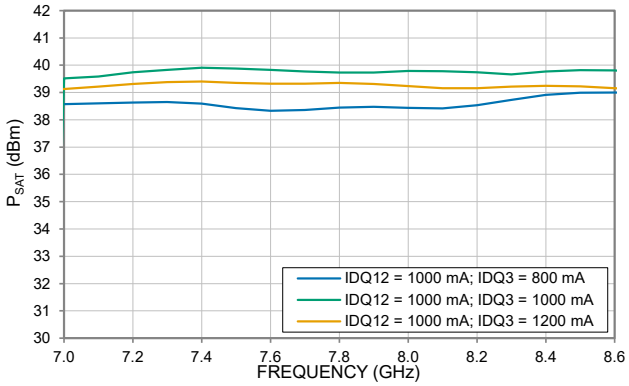
NOISE FIGURE vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



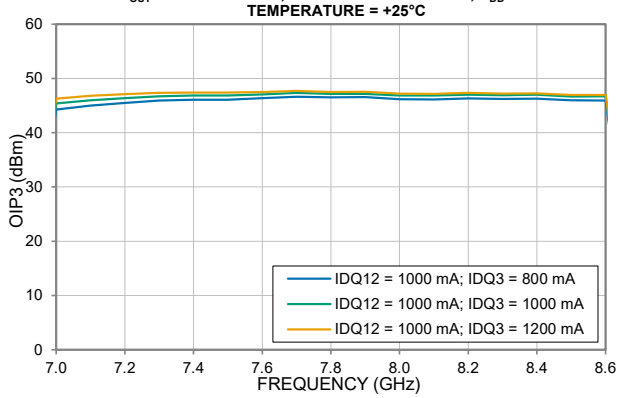
P1dB vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



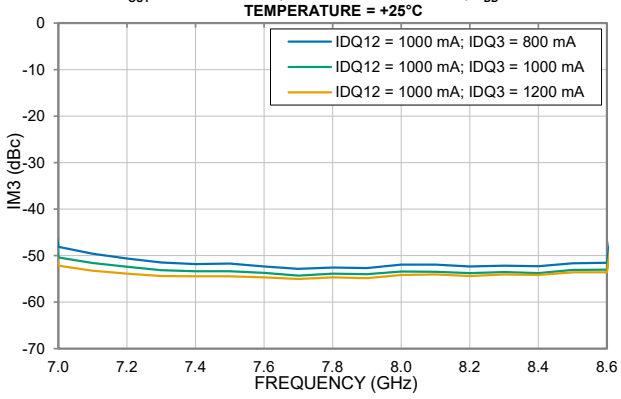
P_{SAT} vs. CURRENT
V_{DD} = +8 V, TEMPERATURE = +25°C



OIP3 vs. CURRENT
P_{OUT} = +20 dBm/TONE, TONE SPACING = 5 MHz, V_{DD} = +8 V
TEMPERATURE = +25°C

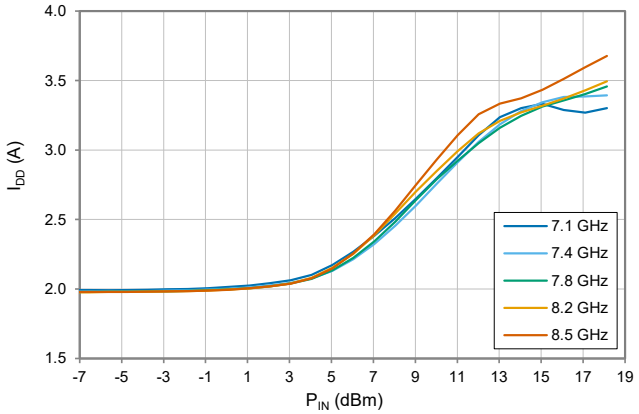


IM3 vs. CURRENT
P_{OUT} = +20 dBm/TONE, TONE SPACING = 5MHz, V_{DD} = +8 V
TEMPERATURE = +25°C

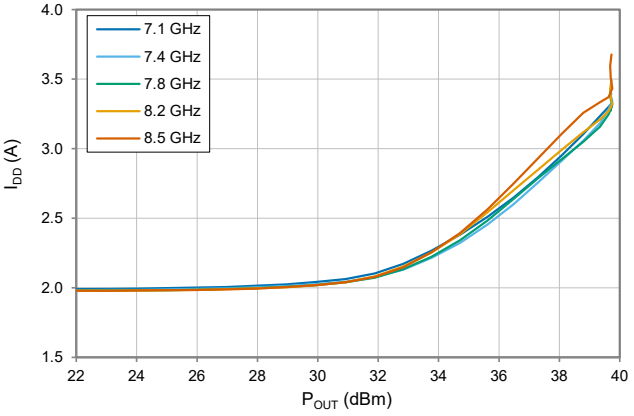


Typical Performance Curves

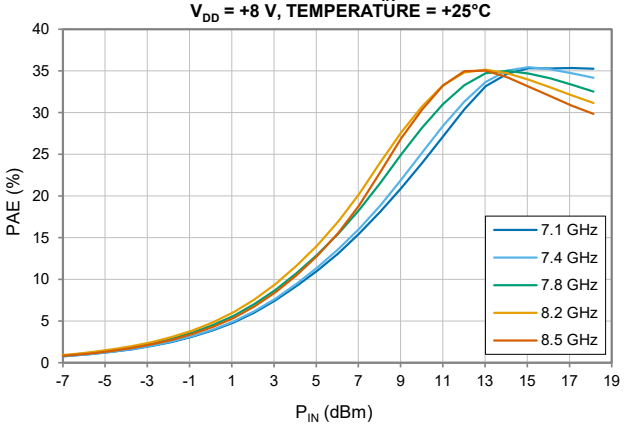
I_{DD} vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C



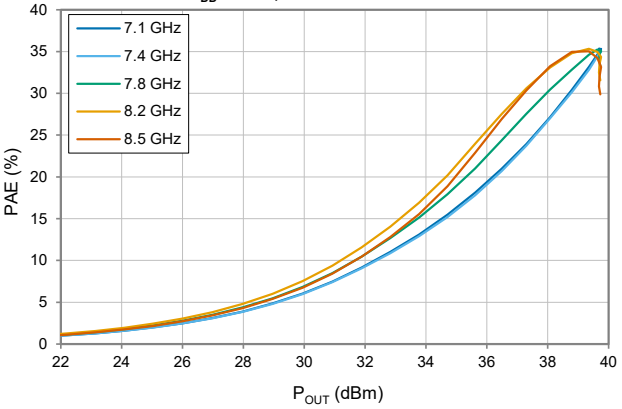
I_{DD} vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C



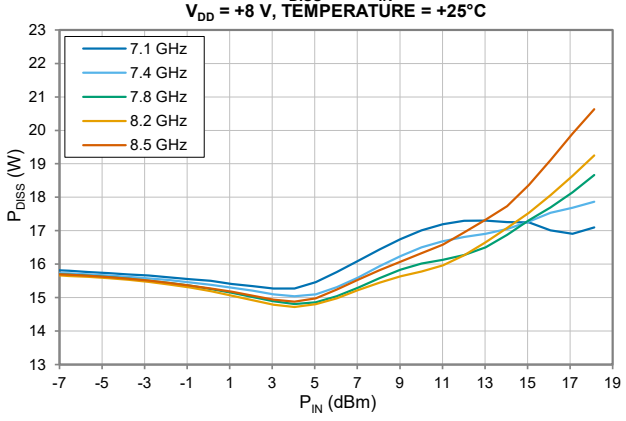
PAE vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C



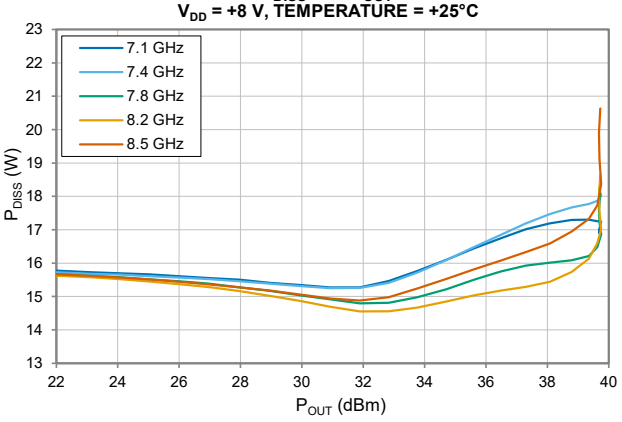
PAE vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C



P_{DISS} vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C

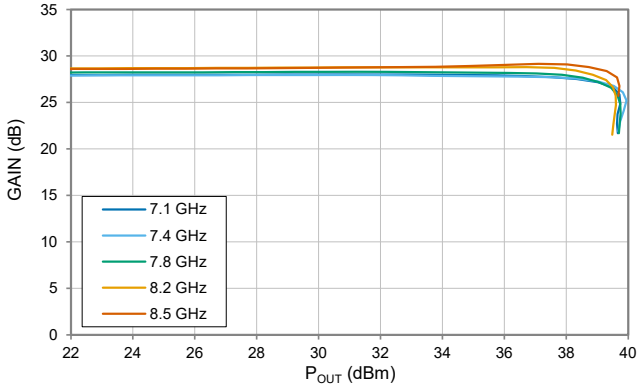


P_{DISS} vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C

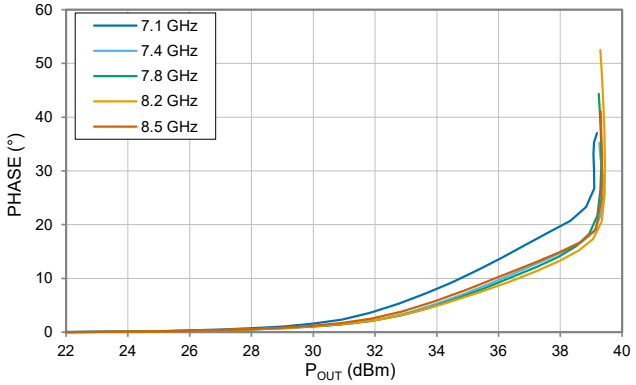


Typical Performance Curves

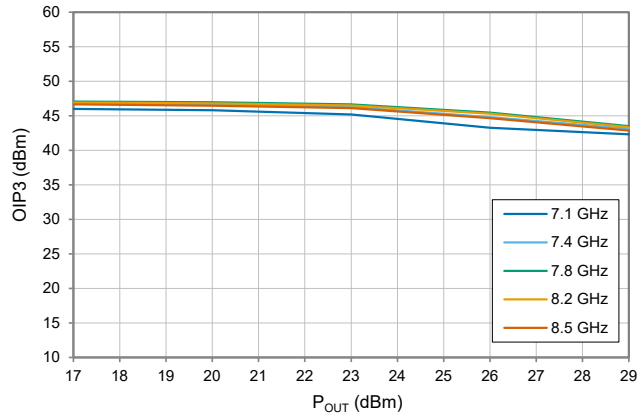
AM - AM
V_{DD} = +8 V, TEMPERATURE = +25°C



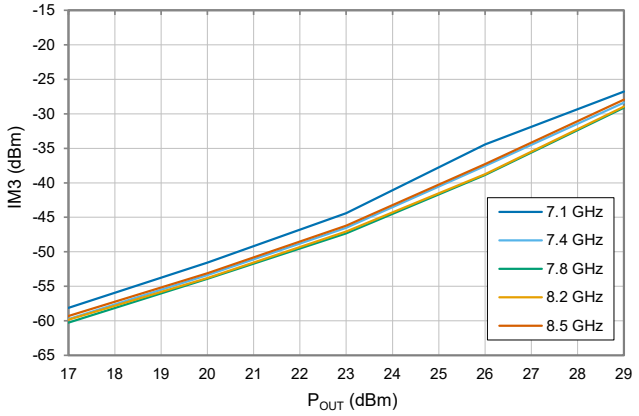
AM - PM
V_{DD} = +8 V, TEMPERATURE = +25°C



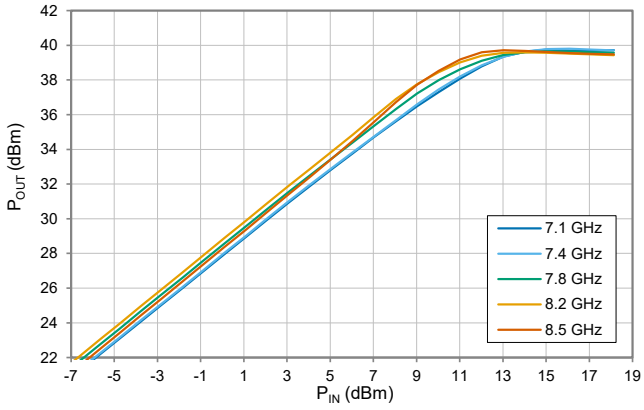
OIP3 vs. P_{OUT}/TONE
V_{DD} = +8 V, TONE SPACING = 5 MHz, TEMPERATURE = +25°C



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

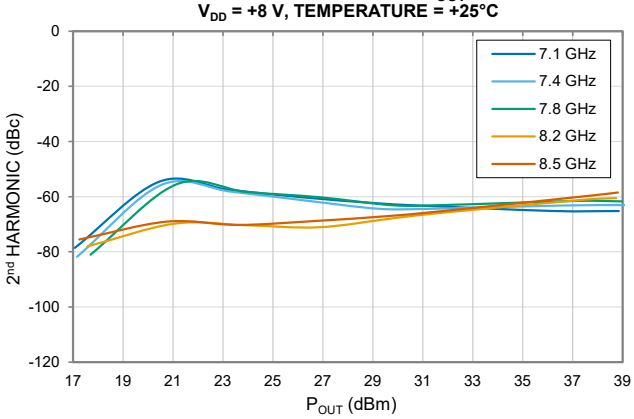


P_{OUT} vs. P_{IN}
V_{DD} = +8 V, TEMPERATURE = +25°C

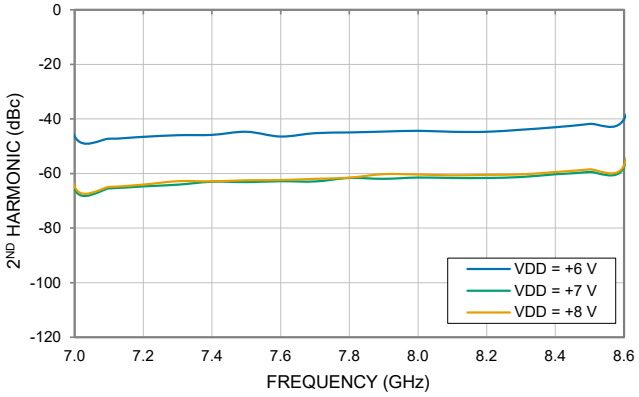


Typical Performance Curves

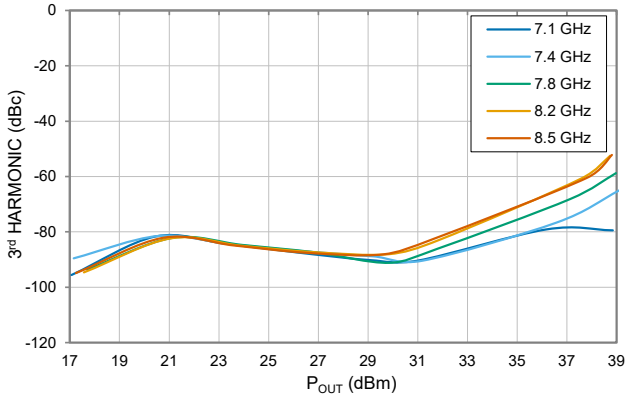
2nd HARMONIC vs. P_{OUT}
V_{DD} = +8 V, TEMPERATURE = +25°C



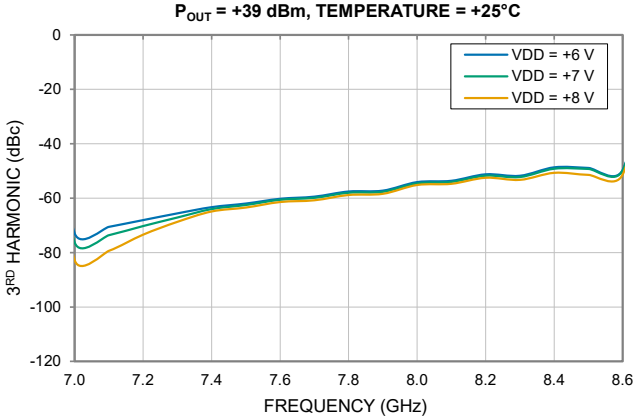
2nd HARMONIC vs. DEVICE VOLTAGE
P_{OUT} = +39 dBm, TEMPERATURE = +25°C



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

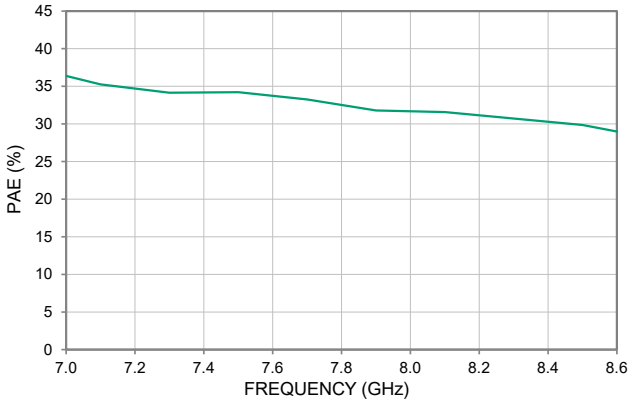


3rd HARMONIC vs. DEVICE VOLTAGE
P_{OUT} = +39 dBm, TEMPERATURE = +25°C

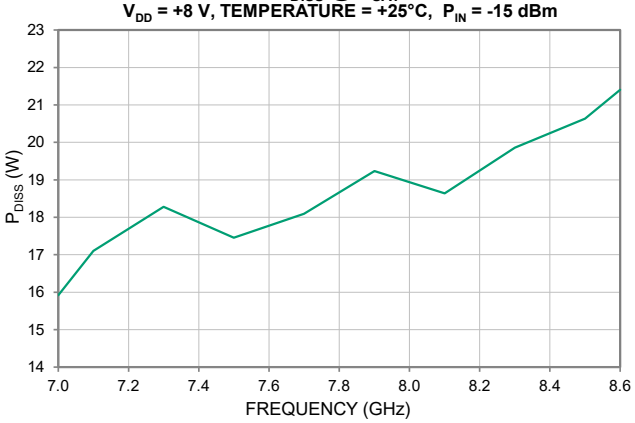


Typical Performance Curves

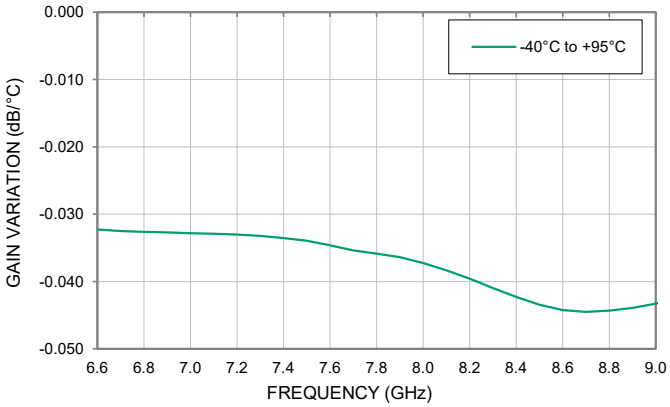
PAE @ P_{SAT}
V_{DD} = +8 V, TEMPERATURE = +25°C, P_{IN} = -15 dBm



P_{DISS} @ P_{SAT}
V_{DD} = +8 V, TEMPERATURE = +25°C, P_{IN} = -15 dBm



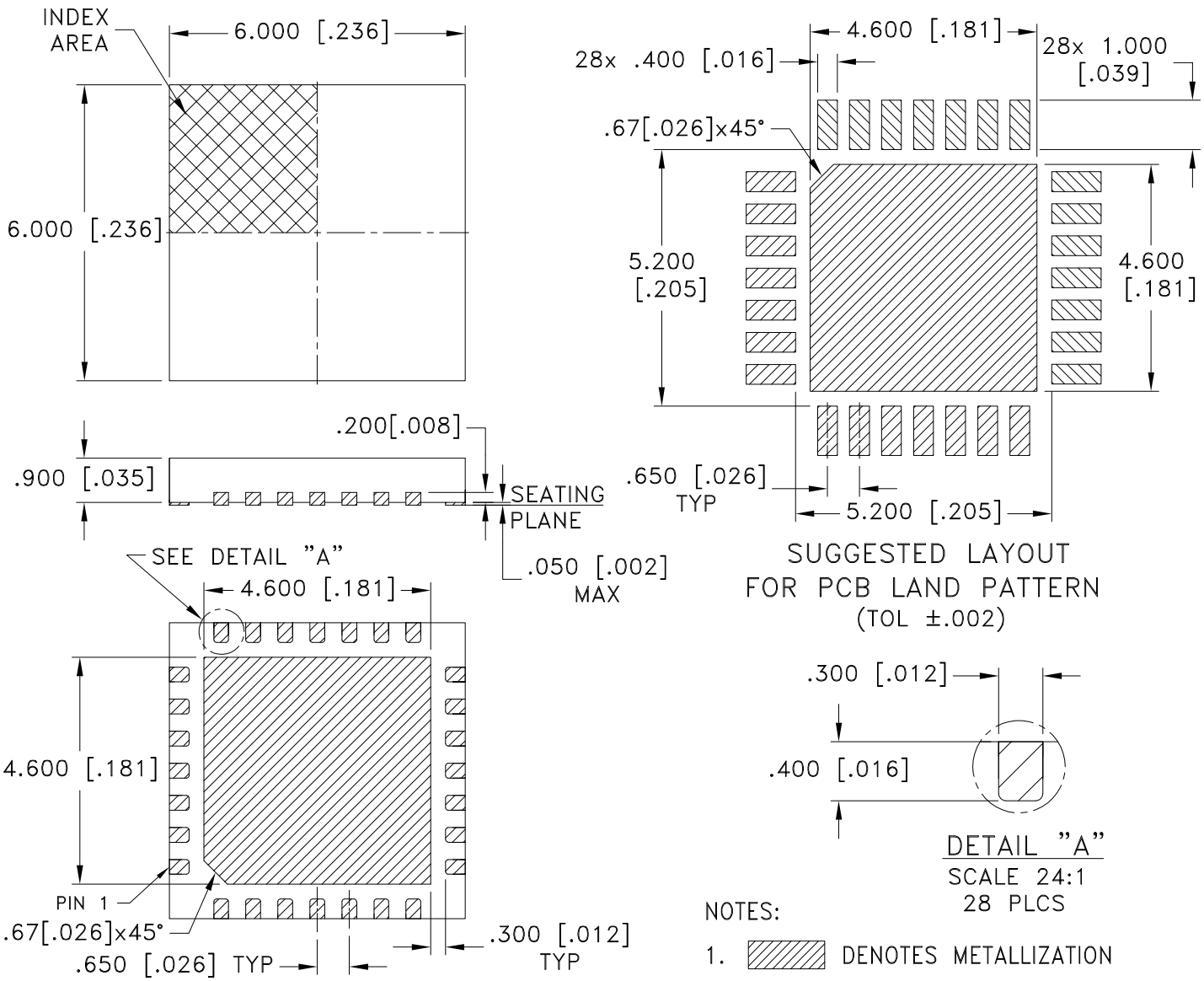
GAIN VARIATION vs. TEMPERATURE
P_{IN} = -15 dBm, V_{DD} = +8 V



Case Style WQ

Outline Dimensions

WQ3359



Weight: 0.11 grams

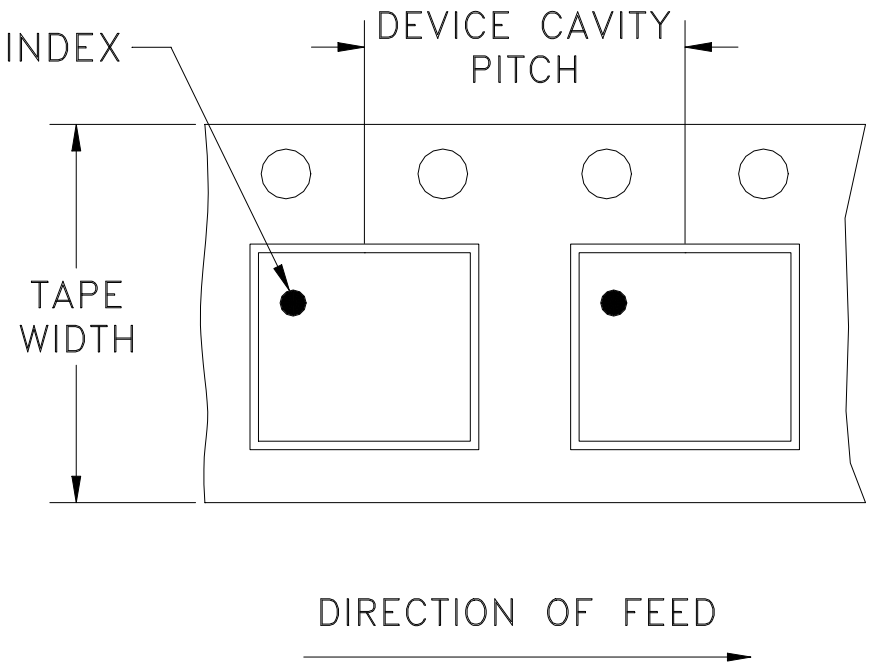
Dimensions are in mm [inches]. Tolerances: 3 Pl.±.050 mm

Notes:

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

Tape & Reel Packaging TR-F68

DEVICE ORIENTATION IN T&R



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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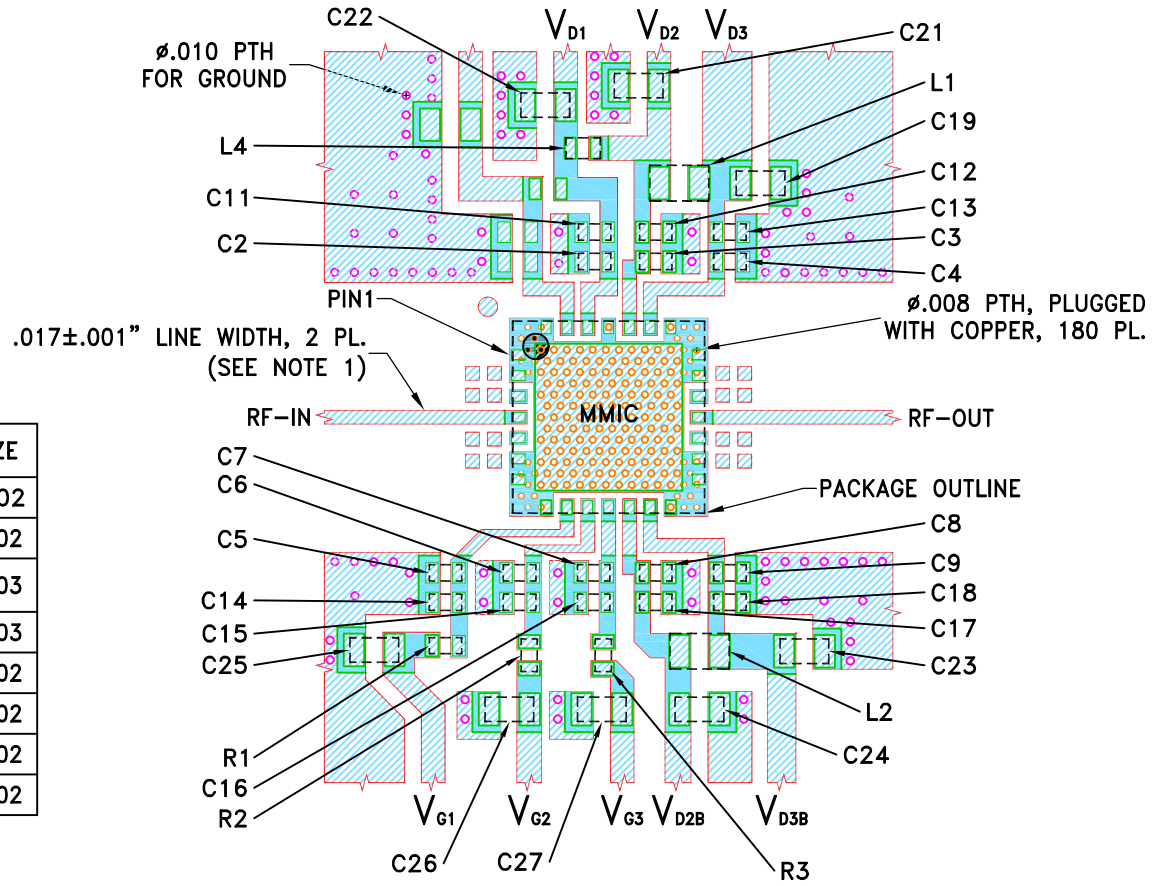
THIRD ANGLE PROJECTION

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
C2–C9	0402
C9–C18	0402
C19,C21–C27	0603
L1–L2	0603
L4	0402
R1	0402
R2	0402
R3	0402

NOTES:

1. TRACE WIDTH PARAMETERS ARE SHOWN FOR ROGERS RO4003C LoPro FOIL, DIELECTRIC THICKNESS: .0087±.001"; COPPER: 1 OZ. EACH SIDE. FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
2. CHIP COMPONENT FOOT PRINTS SHOWN FOR REFERENCE. FOR COMPONENT VALUES REFER TO TB-PMA69310WC+.
3. 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 ±	APPROVED	IL	07/09/25
3 PL DECIMALS ± .005			
ANGLES ±			
FRACTIONS ±			

Mini-Circuits®

ASHEETA1.DWG REV:A DATE:01/12/95

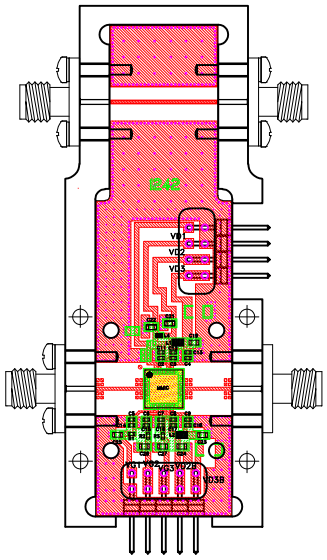
Mini-Circuits® 13 Neptune Avenue Brooklyn NY 11235

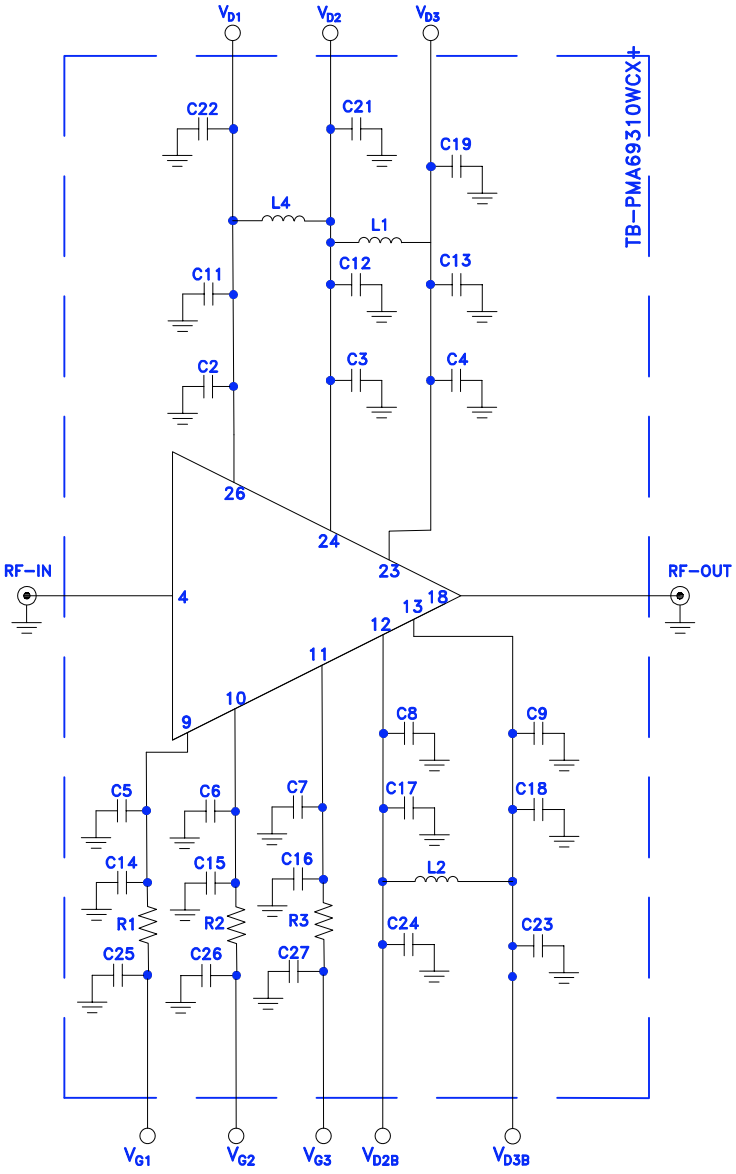
PL, WQ3359, TB-PMA69310WC+

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	98-PL-826	OR

FILE:	SCALE:	SHEET:
98PL826	4:1	1 OF 1

Evaluation Board and Circuit

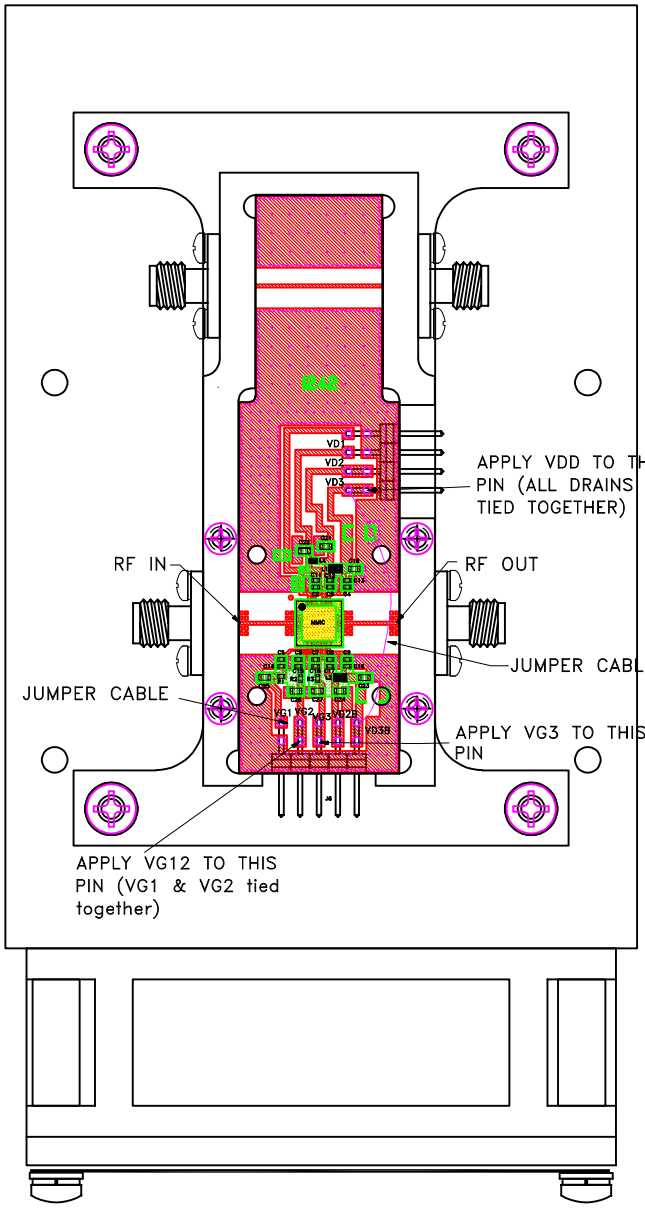


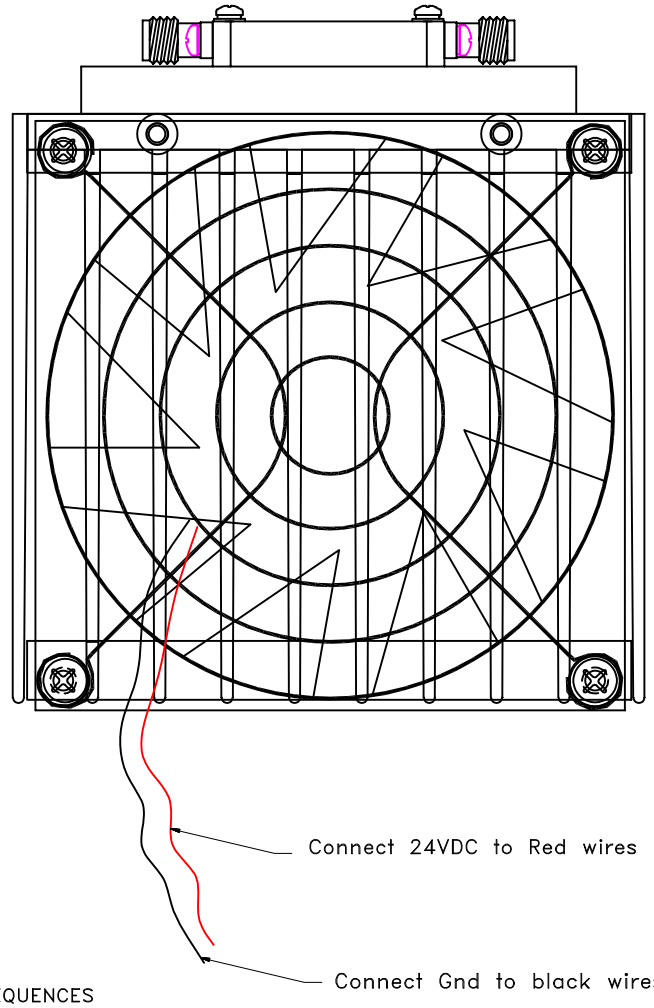


Component	Size	Value	PartNumber	Manufacturer
R1	0402	24Ω	RK73H1ETTP24R0F	KOA SPEER ELECTRONICS
R2	0402	12Ω	RK73H1ETTP12R0F	KOA SPEER ELECTRONICS
R3	0402	0Ω	RK73Z1ETTP	KOA SPEER ELECTRONICS
C2–C9	0402	0.001µF	GRM1555C1H102JA01D	MURATA
C11–C18	0402	0.1µF	GRM155R71E104KE14D	MURATA
C19–C27	0603	1µF	06035C105KAT2A	AVX CORPORATION
L1,L2	0603	1000nH	0603AF-33NXJRW	COILCRAFT
L4	0402	56nH	0402DF-560XJRW	COILCRAFT

Notes:

1. 2.92mm Female Connectors.
2. PCB Material: Roger RO4003C or equivalent,
   Dielectric constant=3.38, Thickness=0.0087±.001 inch





BIAS SEQUENCES

Drain Voltage: VDD; = 8 V
-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.

Quiescent current: IDQ12 = 1 A, IDQ3 = 1 A , Total IDQ= 2A(IDQ12+IDQ3)

Typical Gate voltage required is between -0.9 and -0.7 V.

Note:

- All Drains are tied together thru L1, L4, L2 and a jumper cable connecting top and bottom Drains.
- Gates VG1 and VG2 are tied together and Gate VG3 is 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 & 1 grounds for gate) to the fixture, with a thick enough wire that can handle at least 4A.Pic for reference.

Bias up sequence:
1)Before turning on VDD, apply -2 V on VG12; and VG3 pins.
2)Turn on VDD to 8 V.
3)Increase VG12 until desired IDQ12(=1A) is reached.
4)Increase VG3 until desired IDQ3(=1A) is reached(Total IDQ= IDQ12+IDQ3=2A)
5)Turn on RF.

Bias down sequence:
1)Turn off RF.
2)Decrease VG3 down to -2 V.
3)Decrease VG12 to -2 V.
4)Turn off VDD.

ASHEETA2.DWG REV:A DATE: 01/12/94

ALL DIMENSIONS ARE IN INCHES EXCEPT OTHERWISE SPECIFIED

SIZE	CODE IDENT	DRAWING NO:	REV:
A	15542	TBPMA69310WCX-20+	1

FILE: WTB-PMA69310WC-20+ SCALE: 4:1 SHEET: 2 OF 2

Mini-Circuits

Environmental Specifications **ENV08T1**

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