Features

- *MACOM PURE CARBIDE*™ Amplifier Series
- Suitable for Linear & Saturated Applications
- Pulsed Operation: 15 W Output Power
- 260°C Reflow Compatible
- 50 V & 28 V Operation
- 100% RF Tested
- RoHS* Compliant
- End-Use Statement Required

3 x 3 mm AQFN

Description

The MAPC-S1101 is a high power GaN on Silicon Carbide HEMT D-mode amplifier suitable for DC - 12 GHz frequency operation. The device supports pulsed and linear operation with peak output power levels of at least 15 W (41.8 dBm) in an air cavity plastic package.

Typical RF Performance:

- Measured under load-pull at 2.5 dB Compression, 100 µs pulse width, 10% duty cycle.

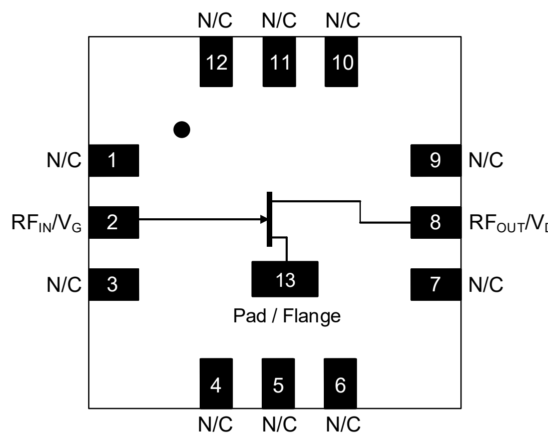
Frequency (GHz)	Output Power[1] (dBm)	Gain[2] (dB)	η_D[2] (%)
3.0	42.9	18.5	67.3
5.0	42.9	14.4	65.4
6.0	42.7	12.0	66.6
8.0	41.7	13.8	60.4
9.0	41.6	13.9	57.4
10.0	41.6	12.4	56.4

- VDS = 50 V, IDQ = 40 mA, TC = 25°C

Frequency (GHz)	Output Power[1] (dBm)	Gain[2] (dB)	η_D[2] (%)
3.0	40.0	17.1	65.6
5.0	40.1	13.3	67.3
6.0	40.2	13.6	69.2
8.0	39.4	12.2	60.3
9.0	39.4	12	57.7
10.0	39.3	10.6	58.3

1. Load impedance tuned for maximum output power.
2. Load impedance tuned for maximum drain efficiency.

Functional Schematic



Pin Configuration

Pin #	Pin Name	Function
1	NC[3]	No Connection
2	RF_{IN} / V_G	RF Input / Gate
3 - 7	NC[3]	No Connection
8	RF_{OUT} / V_D	RF Output / Drain
9 - 12	NC[3]	No Connection
13	Flange[4]	Ground / Source

3. MACOM recommends connecting unused package pins to ground.
4. The exposed pad centered on the package bottom must be connected to RF, DC and thermal ground.

Ordering Information

Part Number	Package
MAPC-S1101-AD000	Bulk Quantity
MAPC-S1101-ADTR1	Tape and Reel
MAPC-S1101-ADSB1	Sample Board

* Restrictions on Hazardous Substances, compliant to current RoHS EU directive.

RF Electrical Characteristics: T_C = 25°C, V_{DS} = 50 V, I_{DQ} = 40 mA
Note: Performance in MACOM 2.7 - 3.5 GHz Evaluation Test Fixture, 50 Ω system

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Small Signal Gain	Pulsed[5], 3.5 GHz	G_{SS}	-	18.3	-	dB
Power Gain	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	G_{SAT}	-	15.7	-	dB
Saturated Drain Efficiency	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	η_{SAT}	-	57.8	-	%
Saturated Output Power	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	P_{SAT}	-	41.8	-	dBm
Gain Variation (-40°C to +85°C)	Pulsed[5], 3.5 GHz	ΔG	-	0.014	-	dB/°C
Power Variation (-40°C to +85°C)	Pulsed[5], 3.5 GHz	ΔP2.5dB	-	0.001	-	dB/°C
Power Gain	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	G_P	-	15.8	-	dB
Drain Efficiency	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	η	-	57.0	-	%
Input Return Loss	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	IRL	-	-6.7	-	dB
Ruggedness: Output Mismatch	All phase angles	Ψ	VSWR = 10:1, No Damage			

RF Electrical Specifications: T_A = 25°C, V_{DS} = 50 V, I_{DQ} = 40 mA
Note: Performance in MACOM Production Test Fixture, 50 Ω system

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Power Gain	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	G_{SAT}	-	14.1	-	dB
Saturated Drain Efficiency	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	η_{SAT}	-	54.5	-	%
Saturated Output Power	Pulsed[5], 3.5 GHz, 2.5 dB Gain Compression	P_{SAT}	-	42.3	-	dBm
Power Gain	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	G_P	-	15.5	-	dB
Drain Efficiency	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	η	-	53.1	-	%
Input Return Loss	Pulsed[5], 3.5 GHz, P_{IN} = 26 dBm	IRL	-	-20	-	dB

5. Pulse details: 100 µs pulse width, 10% Duty Cycle.

DC Electrical Characteristics: T_A = 25°C

Parameter	Test Conditions	Symbol	Min.	Typ.	Max.	Units
Drain-Source Leakage Current	V_{GS} = -8 V, V_{DS} = 130 V	I_{DLK}	-	-	2.8	mA
Gate-Source Leakage Current	V_{GS} = -8 V, V_{DS} = 0 V	I_{GLK}	-	-	2.8	mA
Gate Threshold Voltage	V_{DS} = 50 V, I_D = 2.8 mA	V_T	-	-3.1	-	V
Gate Quiescent Voltage	V_{DS} = 50 V, I_D = 40 mA	V_{GSQ}	-	-2.9	-	V
On Resistance	V_{GS} = 2 V, I_D = 21 mA	R_{ON}	-	1.71	-	Ω
Maximum Drain Current	V_{DS} = 7 V, pulse width 300 µs	$I_{D, MAX}$	-	3.33	-	A

Absolute Maximum Ratings[6,7,8,9,10]

Parameter	Absolute Maximum
Drain Source Voltage, V_{DS}	150 V
Gate Source Voltage, V_{GS}	-15 to 2 V
Gate Current, I_G	2.8 mA
Storage Temperature Range	-65°C to +150°C
Case Operating Temperature Range	-40°C to +85°C
Channel Operating Temperature Range, T_{CH}	-40°C to +225°C
Absolute Maximum Channel Temperature	+250°C

6. Exceeding any one or combination of these limits may cause permanent damage to this device.
7. MACOM does not recommend sustained operation near these survivability limits.
8. Operating at drain source voltage V_{DS} < 55 V will ensure MTTF > 2 x 10^6 hours.
9. Operating at nominal conditions with $T_{CH} \leq 225°C$ will ensure MTTF > 2 x 10^6 hours.
10. MTTF may be estimated by the expression MTTF (hours) = A $e^{[B + C/(T+273)]}$ where *T* is the channel temperature in degrees Celsius, *A* = 1.03, *B* = -33.74, and *C* = 24.137.

Thermal Characteristics[11]

Parameter	Test Conditions	Symbol	Typical	Units
Thermal Resistance using Finite Element Analysis	V_{DS} = 50 V T_C = 85°C, T_{CH} = 225°C	R_θ(FEA)	9	°C/W
Thermal Resistance using Infrared Measurement of Die Surface Temperature	V_{DS} = 50 V T_C = 85°C, T_{CH} = 225°C	R_θ(IR)	7.2	°C/W

11. Case temperature measured using thermocouple embedded in heat-sink. Contact local applications support team for more details on this measurement.

Handling Procedures

Please observe the following precautions to avoid damage:

Static Sensitivity

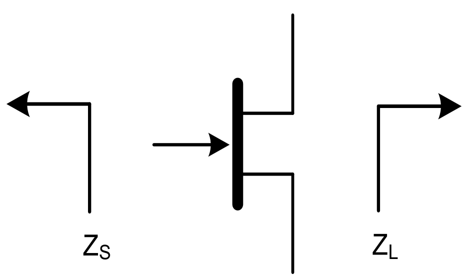
Gallium Nitride Circuits are sensitive to electrostatic discharge (ESD) and can be damaged by static electricity. Proper ESD control techniques should be used when handling these devices.

Pulsed[5] Load-Pull Performance[14] at 50 V
Reference Plane at Device Leads

Frequency (GHz)	Z_{SOURCE} (Ω)	Maximum Output Power					
		V_{DS} = 50 V, I_{DQ} = 40 mA, T_C = 25°C, P2.5dB					
		Z_{LOAD}[12] (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	η_D (%)	AM/PM (°)
3.0	1.8 + j2.1	31.4 + j14.7	18.4	42.9	19.5	55.8	61.3
5.0	2.5 - j8.9	22.2 + j8.0	13.8	42.9	19.5	52.7	29.2
6.0	1.7 - j14.5	16.9 + j4.6	11.9	42.7	18.6	55.1	14.3
8.0	2.4 - j25.9	14.3 + j2.2	12.5	41.7	15.0	48.7	-15.3
9.0	2.2 - j33.5	9.3 - j6.9	12.3	41.6	14.8	48.7	-31.7
10.0	2.2 - j38	8 - j10.3	11.0	41.6	14.8	46.6	-42.4

Frequency (GHz)	Z_{SOURCE} (Ω)	Maximum Drain Efficiency					
		V_{DS} = 50 V, I_{DQ} = 40 mA, T_C = 25°C, P2.5dB					
		Z_{LOAD}[13] (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	η_D (%)	AM/PM (°)
3.0	1.1 + j0.4	22.2 + j42.5	18.5	40.5	11.2	67.3	54.1
5.0	1.9 - j9.5	10.2 + j19.5	14.4	41.0	12.6	65.4	23.9
6.0	1.4 - j14.6	6.5 + j13.1	12.0	40.3	10.7	66.6	6
8.0	1.6 - j25.9	4.6 + j2.7	13.8	38.8	7.6	60.4	-21.5
9.0	1.3 - j33.6	3.7 - j4.9	13.9	39.4	8.7	57.4	-38.1
10.0	1.5 - j37.9	3.5 - j8.4	12.4	40.0	10	56.4	-47.7

Impedance Reference

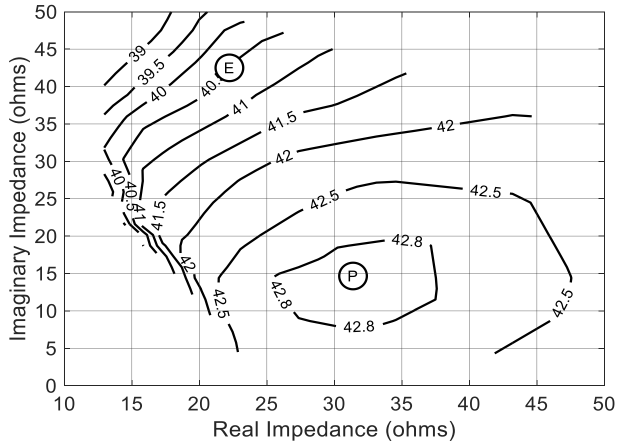


Z_{SOURCE} = Measured impedance presented to the input of the device at package reference plane.
Z_{LOAD} = Measured impedance presented to the output of the device at package reference plane.

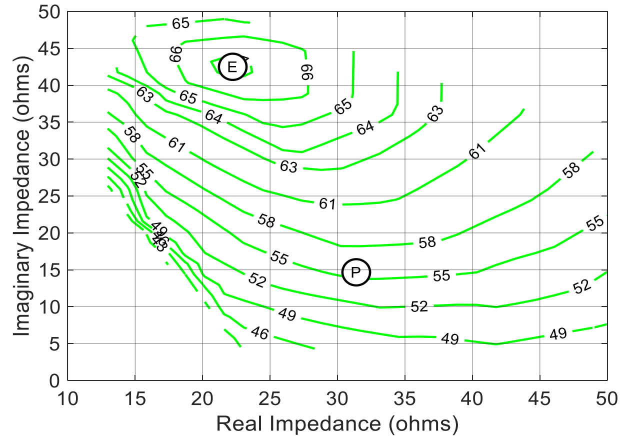
12. Load Impedance for optimum output power.
13. Load Impedance for optimum efficiency.
14. Fundamental optimization only. No harmonic control on source or load.

Pulsed[5] Load-Pull Performance[14] @ 3.0 GHz

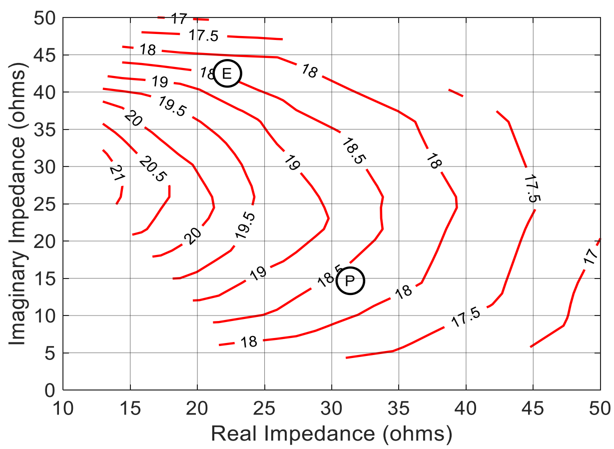
P2.5dB Loadpull Output Power Contours (dBm)



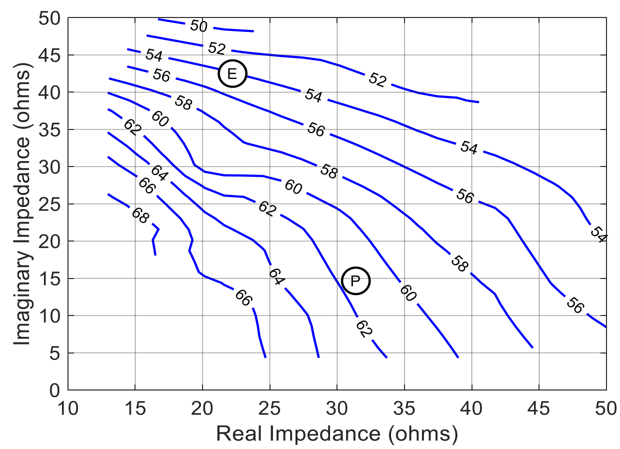
P2.5dB Loadpull Drain Efficiency Contours (%)



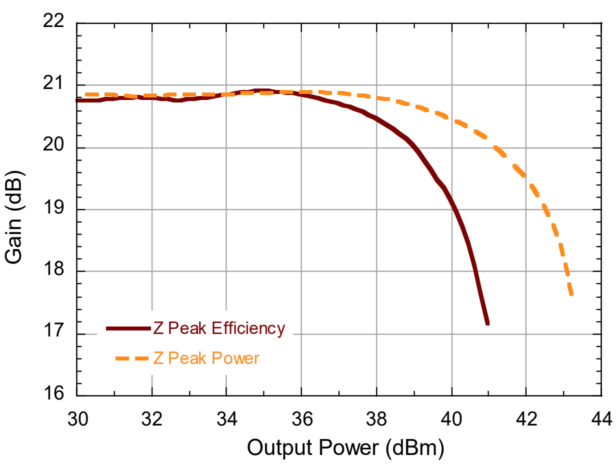
P2.5dB Loadpull Gain Contours (dB)



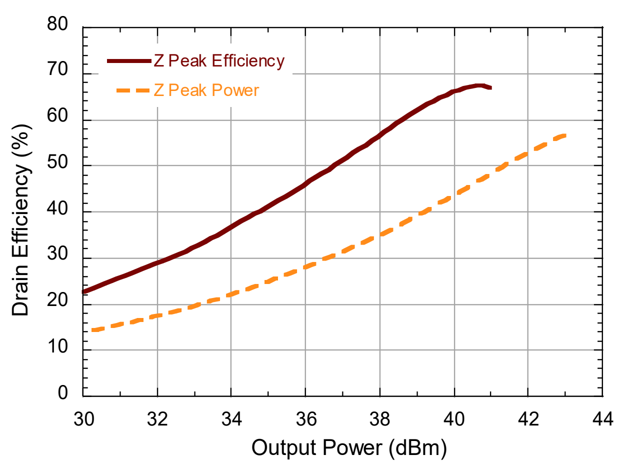
P2.5dB Loadpull AM/PM Contours (°)



Gain vs. Output Power

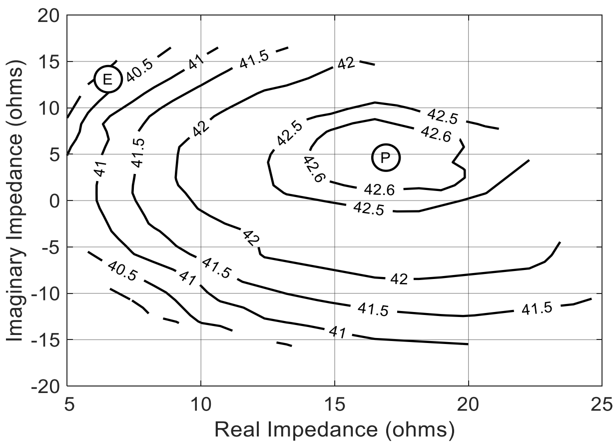


Drain Efficiency vs. Output Power

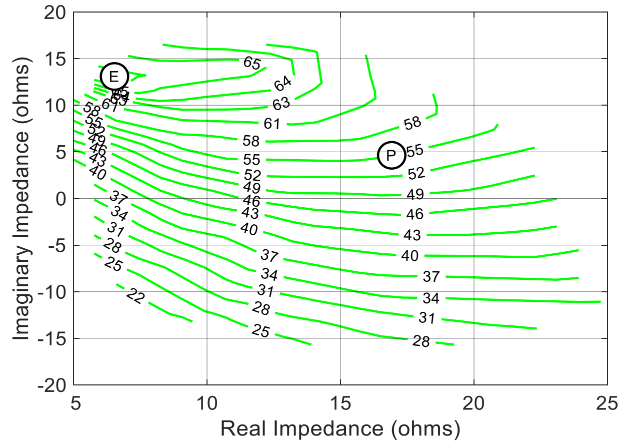


Pulsed[5] Load-Pull Performance[14] @ 6.0 GHz

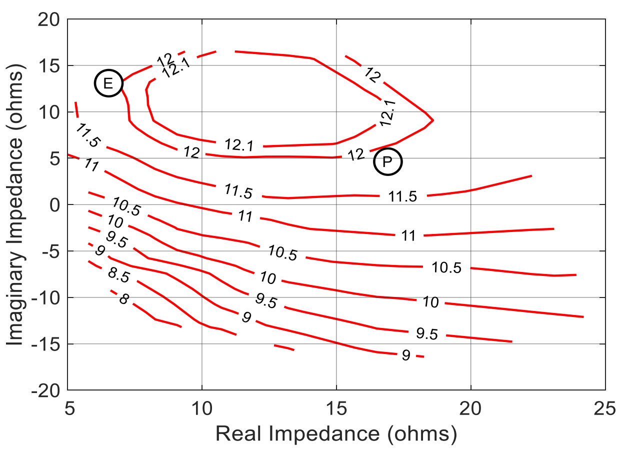
P2.5dB Loadpull Output Power Contours (dBm)



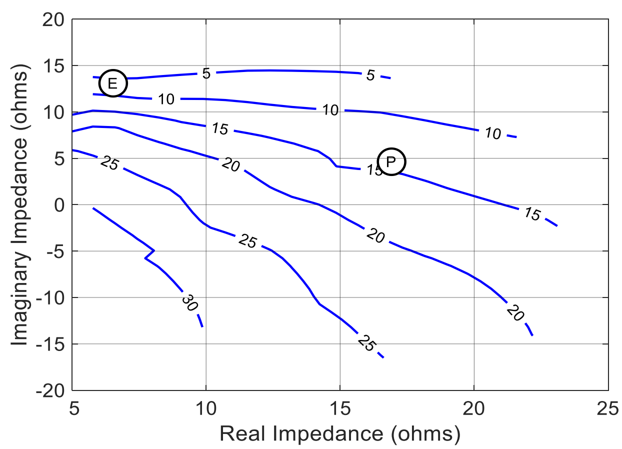
P2.5dB Loadpull Drain Efficiency Contours (%)



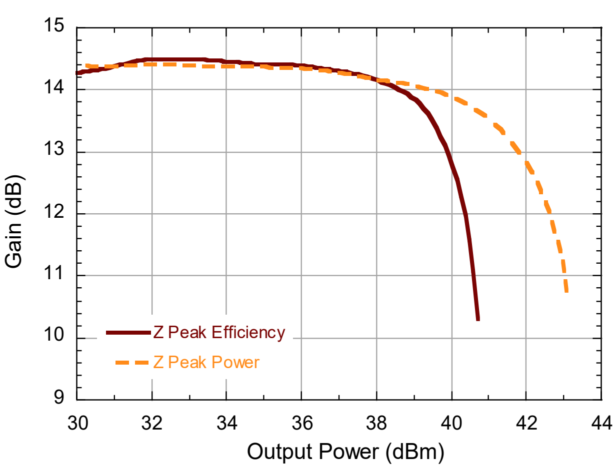
P2.5dB Loadpull Gain Contours (dB)



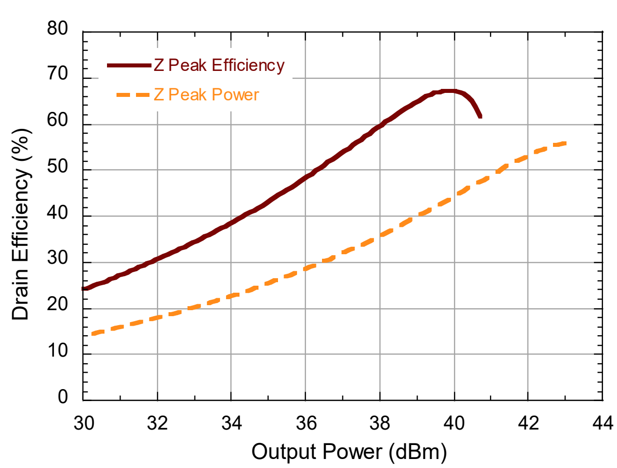
P2.5dB Loadpull AM/PM Contours (°)



Gain vs. Output Power

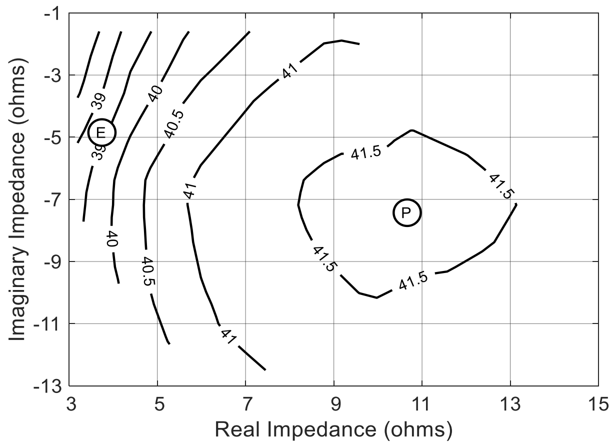


Drain Efficiency vs. Output Power

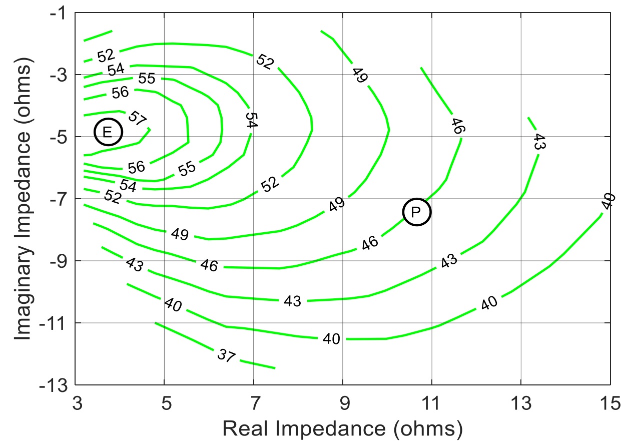


Pulsed[5] Load-Pull Performance[14] @ 9.0 GHz

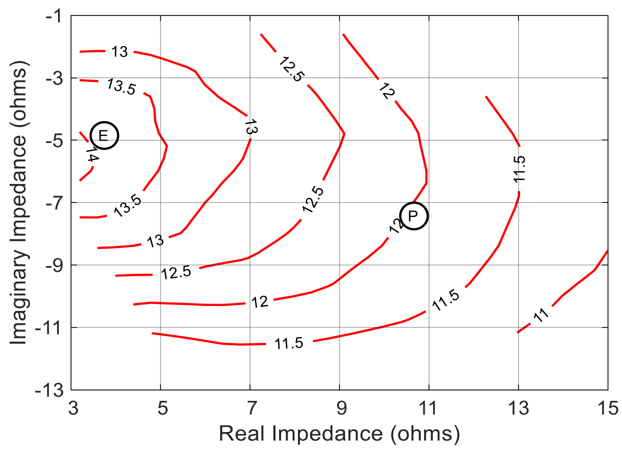
P2.5dB Loadpull Output Power Contours (dBm)



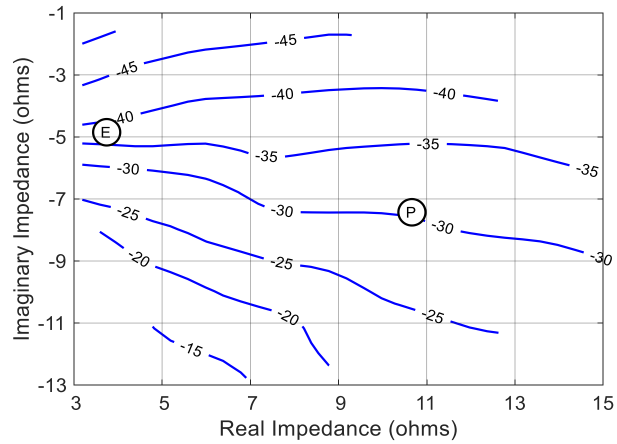
P2.5dB Loadpull Drain Efficiency Contours (%)



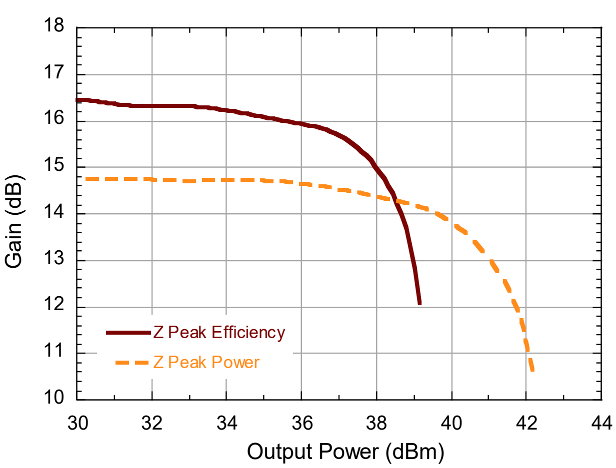
P2.5dB Loadpull Gain Contours (dB)



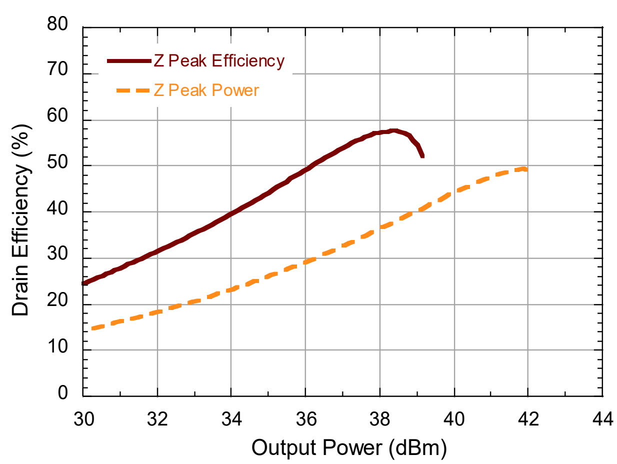
P2.5dB Loadpull AM/PM Contours (°)



Gain vs. Output Power

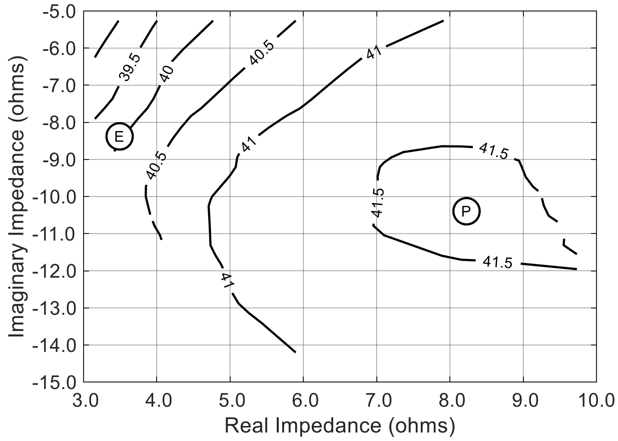


Drain Efficiency vs. Output Power

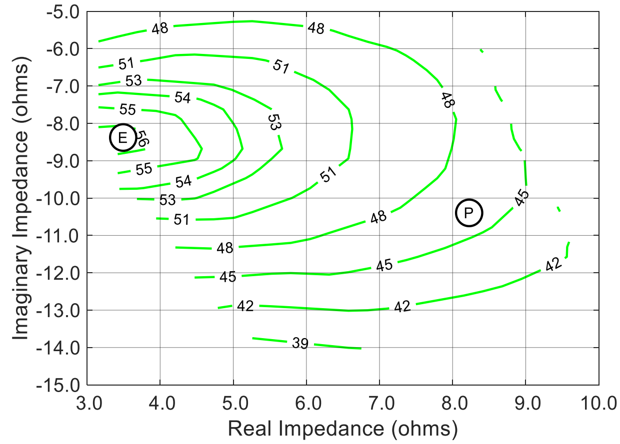


Pulsed[5] Load-Pull Performance[14] @ 10.0 GHz

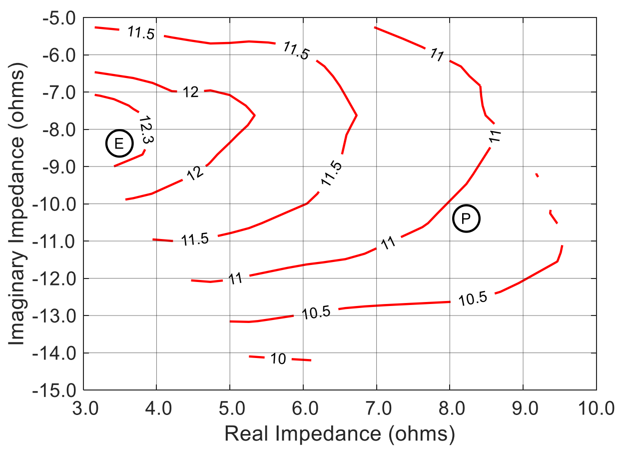
P2.5dB Loadpull Output Power Contours (dBm)



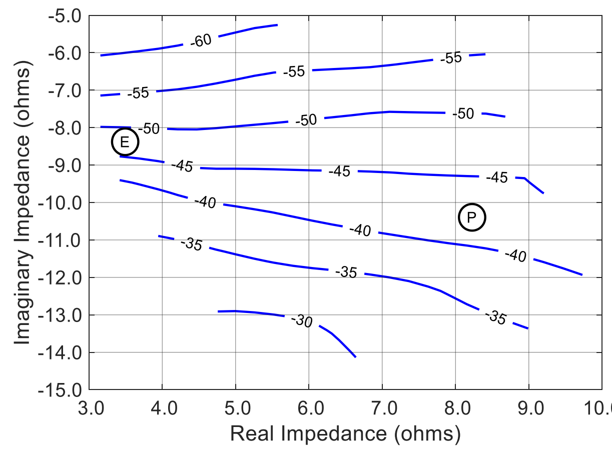
P2.5dB Loadpull Drain Efficiency Contours (%)



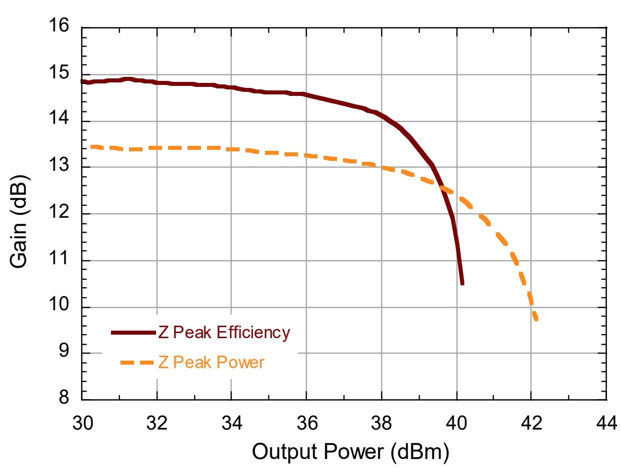
P2.5dB Loadpull Gain Contours (dB)



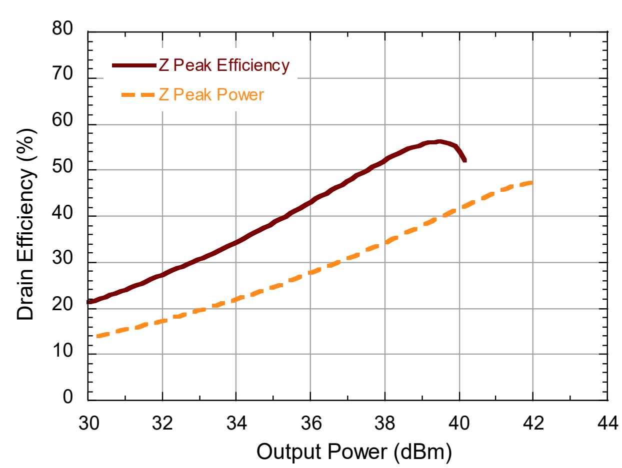
P2.5dB Loadpull AM/PM Contours (°)



Gain vs. Output Power



Drain Efficiency vs. Output Power

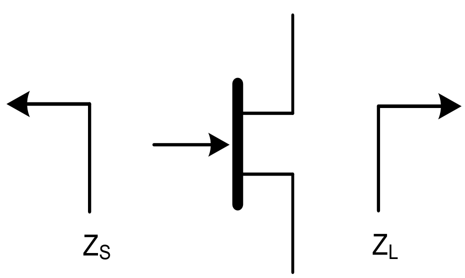


Pulsed[5] Load-Pull Performance[14] at 28 V
Reference Plane at Device Leads

Frequency (GHz)	Z_{SOURCE} (Ω)	Maximum Output Power V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C, P2.5dB					
		Z_{LOAD}[12] (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	η_D (%)	AM/PM (°)
3.0	1.9 + j2.2	25.1 + j2.7	16.8	40.0	10	56.3	62.6
5.0	2.3 - j8.9	16.7 - j1.2	12.6	40.1	10.2	55.7	34..1
6.0	2.0 - j14.6	16.4 + j2.5	12.5	40.2	10.5	59.6	16.5
8.0	2.5 - j25.9	13.8 - j11.1	10.8	39.4	8.7	50.9	-11.3
9.0	2.5 - j33.5	11.5 - j14.3	10	39.4	8.7	47.5	-24.1
10.0	2.4 - j37.8	8.6 - j14.7	9.3	39.3	8.5	50.4	-37

Frequency (GHz)	Z_{SOURCE} (Ω)	Maximum Drain Efficiency V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C, P2.5dB					
		Z_{LOAD}[13] (Ω)	Gain (dB)	P_{OUT} (dBm)	P_{OUT} (W)	η_D (%)	AM/PM (°)
3.0	1.3 + j0.9	22.6 + j24.7	17.1	37.9	6.2	65.6	52.8
5.0	1.5 - j9.6	9.7 + j10.7	13.3	37.9	6.2	67.3	21.2
6.0	1.6 - j14.8	10.1 + j5.0	13.6	38.9	7.8	69.2	6.7
8.0	1.8 - j26.4	6.2 - j4.9	12.2	37.1	5.1	60.3	-21.7
9.0	1.7 - j33.5	4.6 - j10.4	12	37.4	5.5	57.7	-33.7
10.0	1.7 - j37.8	4.0 - j13.8	10.6	38.1	6.5	58.3	-41.2

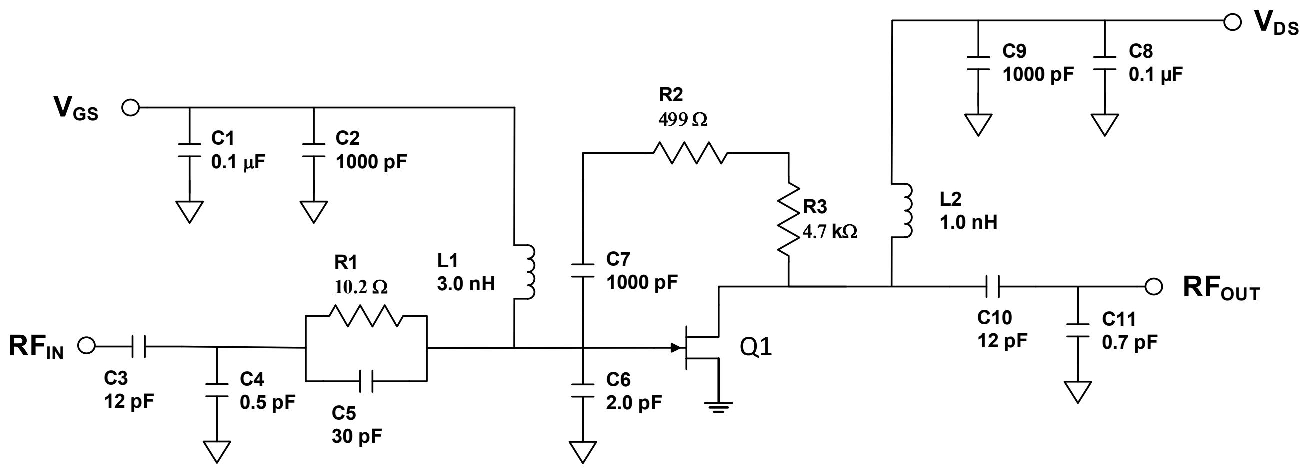
Impedance Reference



Z_{SOURCE} = Measured impedance presented to the input of the device at package reference plane.
Z_{LOAD} = Measured impedance presented to the output of the device at package reference plane.

12. Load Impedance for optimum output power.
13. Load Impedance for optimum efficiency.
14. Fundamental optimization only. No harmonic control on source or load.

Evaluation Test Fixture and Recommended Tuning Solution 2.7 - 3.5 GHz



Description

Parts measured on evaluation board (20-mil thick RO4350). Matching is provided using a combination of lumped elements and transmission lines as shown in the simplified schematic above. Recommended tuning solution component placement, transmission lines, and details are shown on the next page.

Bias Sequencing

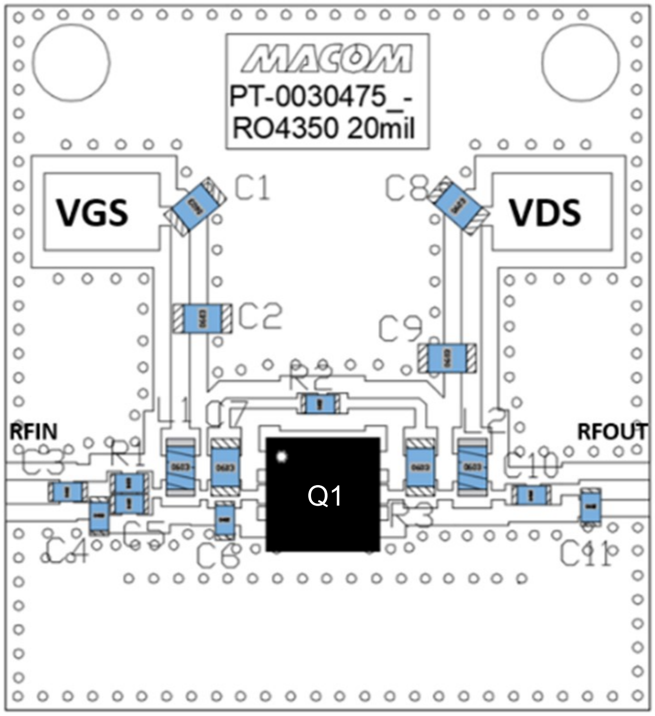
Turning the device ON

1. Set V_{GS} to pinch-off (V_P).
2. Turn on V_{DS} to nominal voltage (50 V).
3. Increase V_{GS} until I_{DS} current is reached.
4. Apply RF power to desired level.

Turning the device OFF

1. Turn the RF power OFF.
2. Decrease V_{GS} down to V_P pinch-off.
3. Decrease V_{DS} down to 0 V.
4. Turn off V_{GS}.

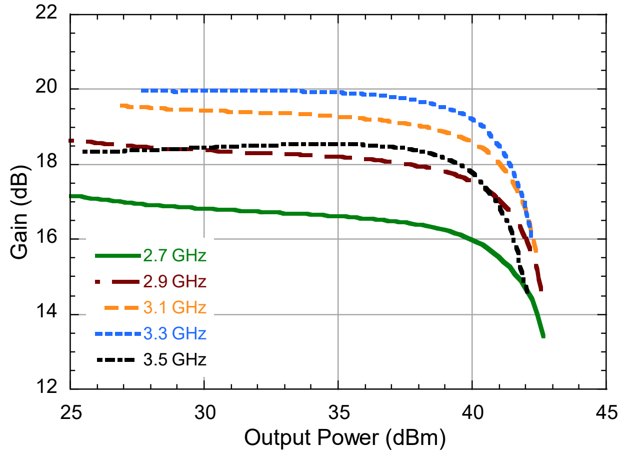
Evaluation Test Fixture and Recommended Tuning Solution 2.7 - 3.5 GHz



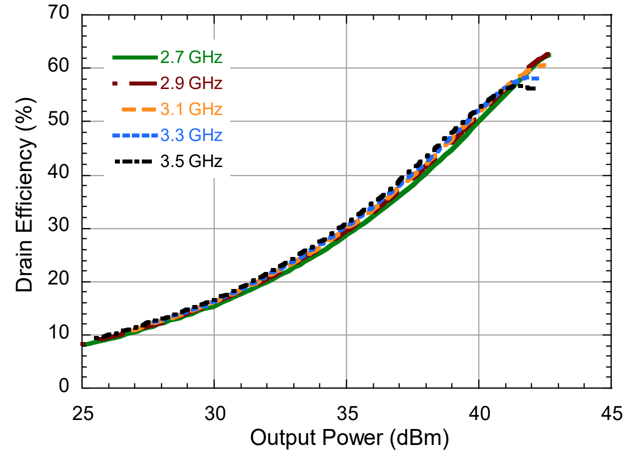
Reference Designator	Value	Tolerance	Manufacturer	Part Number
C1, C8	0.1 µF	+/- 10 %	Murata	GRM188R72A104KA35J
C2, C7, C9	1000 pF	+/- 10 %	Murata	GCJ188R71H102KA01D
C3, C10	12 pF	+/- 5 %	PPI	0402N120JW500
C4	0.5 pF	+/- 0.1 pF	PPI	0402N0R5BW201
C5	30 pF	+/- 5 %	PPI	0402N300JW500
C6	2.0 pF	+/- 0.1 pF	PPI	0402N2R0BW201
C11	0.7 pF	+/- 0.1 pF	PPI	0402N0R7BW201
R1	10.2 Ω	+/- 1 %	Viking	CR-02FL6--10R2
R2	499 Ω	+/- 1 %	Viking	CR-02FL6--499R
R3	4.7 kΩ	+/- 5 %	Vishay	CRCW06034K70JNEAC
L1	3.0 nH	+/- 5 %	CoilCraft	0603CT-3N0XJR
L2	1 nH	+/- 5 %	CoilCraft	0603CT-1N0XJR
Q1	MACOM GaN Power Amplifier			MAPC-S1101
PCB	RO4350, 20 mil, 0.5 oz. Cu, Au Finish			

Typical Performance Curves as Measured in the 2.7 - 3.5 GHz Evaluation Test Fixture:
Pulsed[5] 3.5 GHz, V_{DS} = 50 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

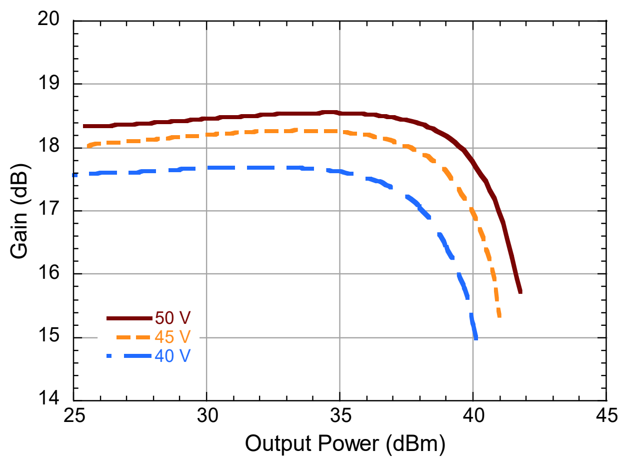
Gain vs. Output Power and Frequency



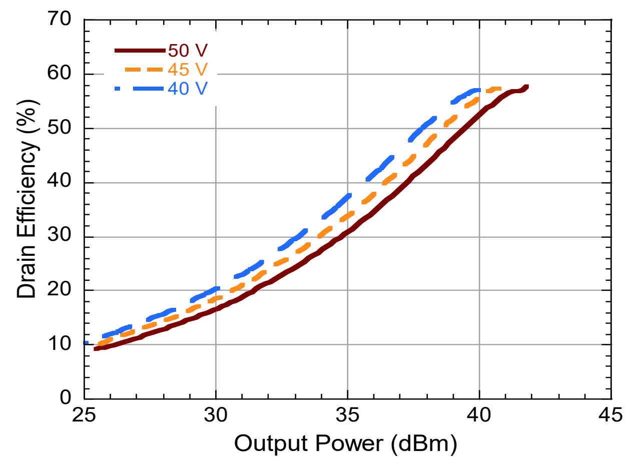
Drain Efficiency vs. Output Power and Frequency



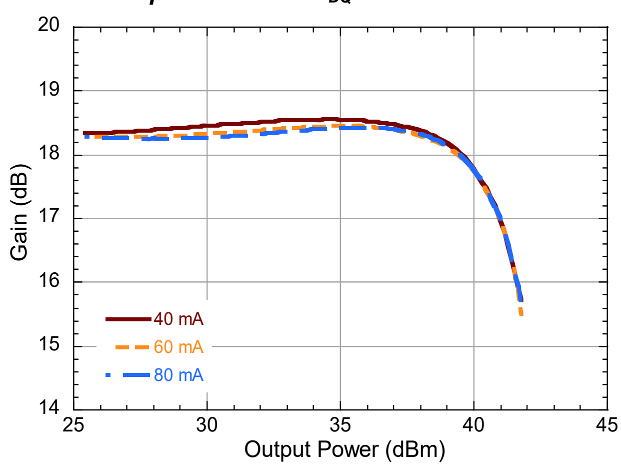
Gain vs. Output Power and V_{DS}



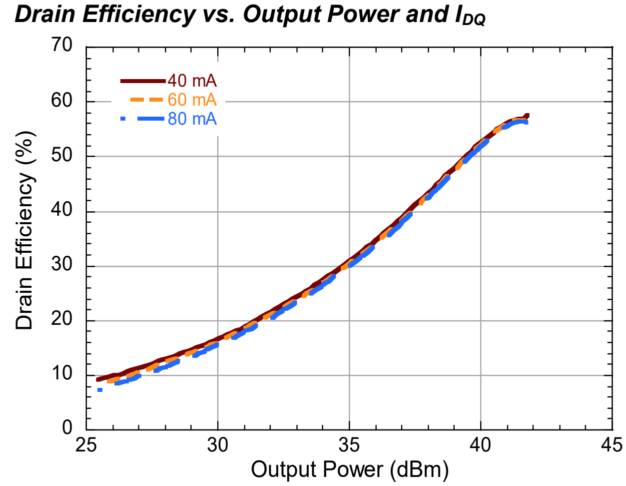
Drain Efficiency vs. Output Power and V_{DS}



Gain vs. Output Power and I_{DQ}

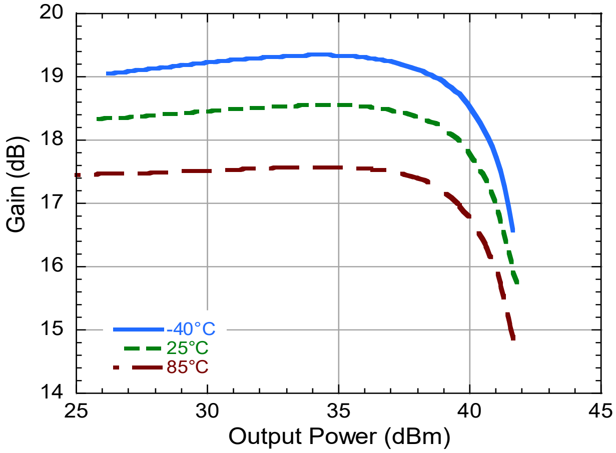


Drain Efficiency vs. Output Power and I_{DQ}

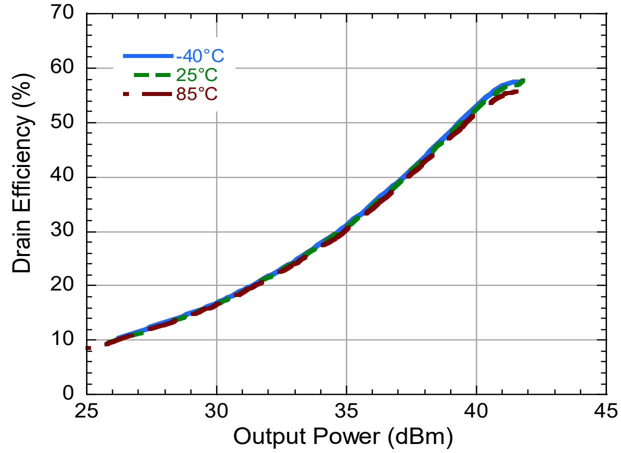


Typical Performance Curves as Measured in the 2.7 - 3.5 GHz Evaluation Test Fixture:
Pulsed[5] 3.5 GHz, V_{DS} = 50 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

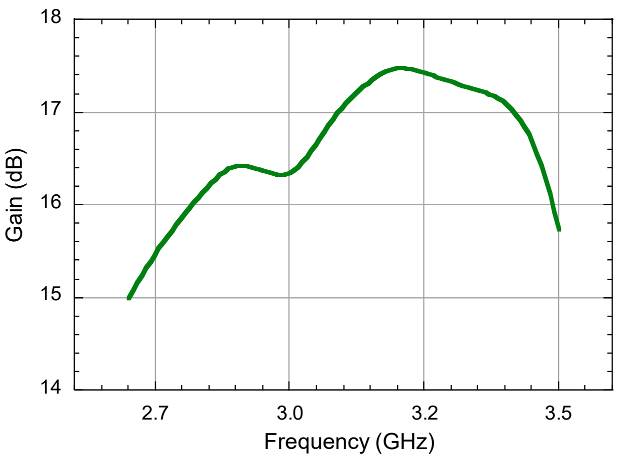
Gain vs. Output Power and T_C



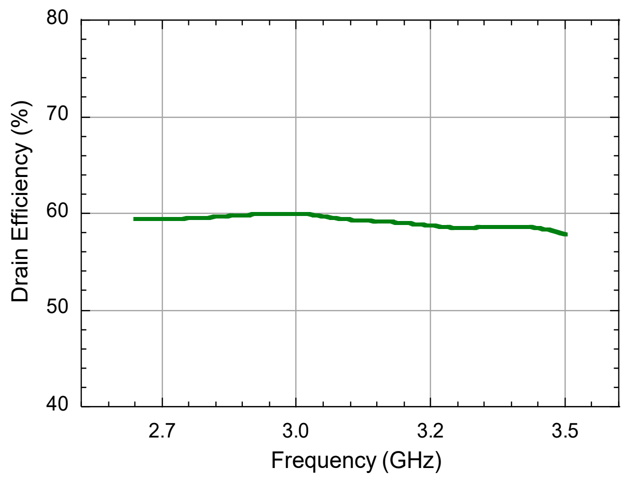
Drain Efficiency vs. Output Power and T_C



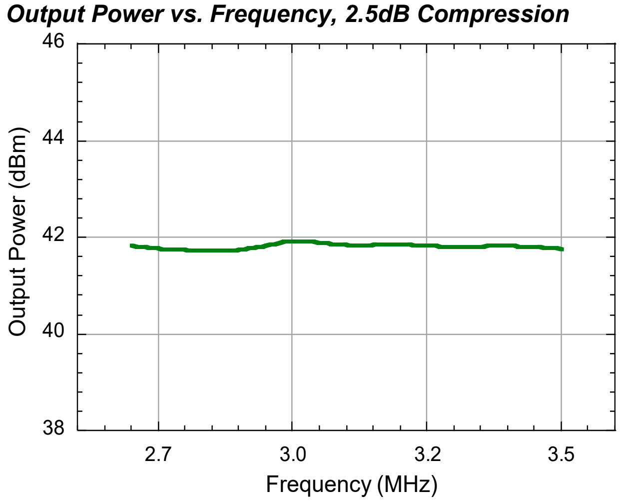
Gain vs. Frequency, 2.5dB Compression



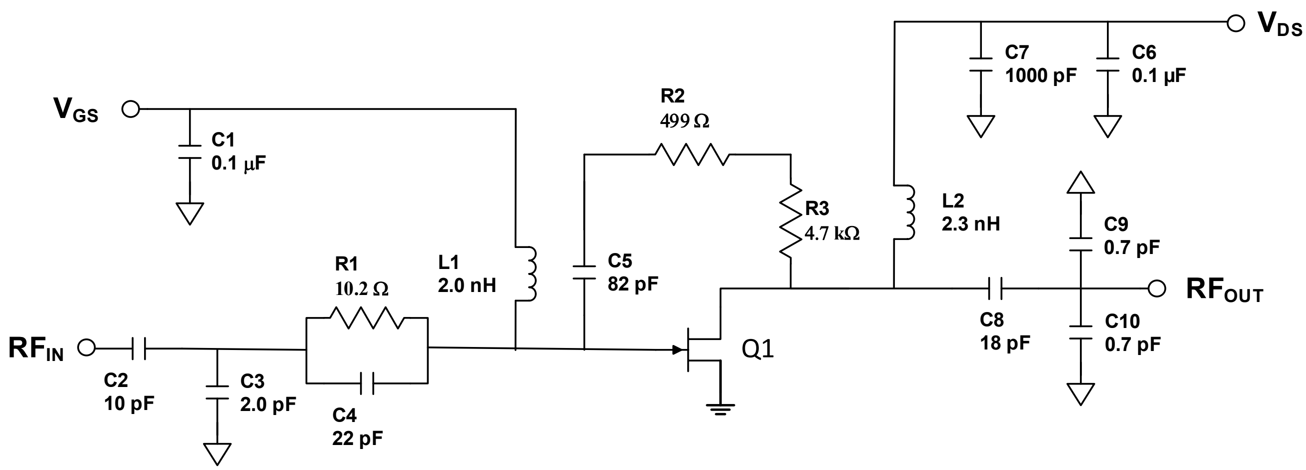
Drain Efficiency vs. Frequency, 2.5dB Compression



Output Power vs. Frequency, 2.5dB Compression



Evaluation Test Fixture and Recommended Tuning Solution 2.2 - 2.6 GHz



Description

Parts measured on evaluation board (20-mil thick RO4350). Matching is provided using a combination of lumped elements and transmission lines as shown in the simplified schematic above. Recommended tuning solution component placement, transmission lines, and details are shown on the next page.

Bias Sequencing

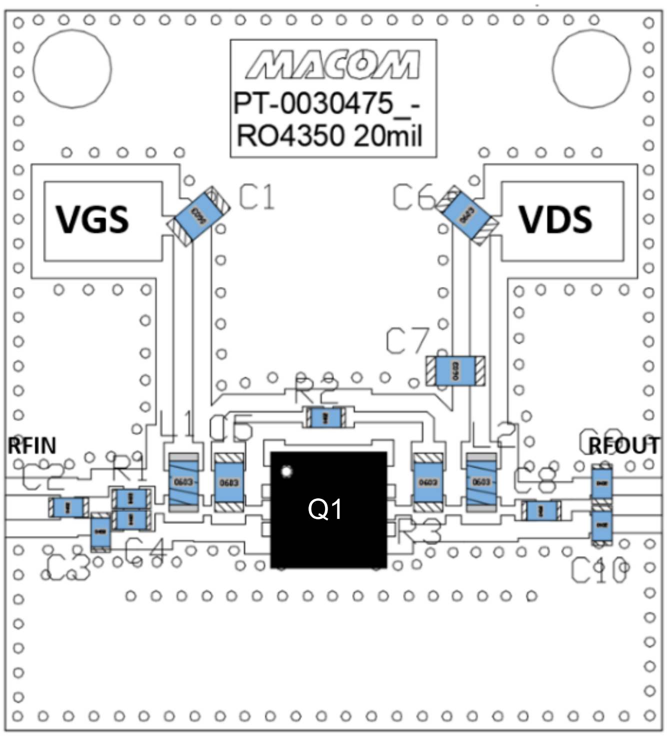
Turning the device ON

1. Set V_{GS} to pinch-off (V_P).
2. Turn on V_{DS} to nominal voltage (50 V).
3. Increase V_{GS} until I_{DS} current is reached.
4. Apply RF power to desired level.

Turning the device OFF

1. Turn the RF power OFF.
2. Decrease V_{GS} down to V_P pinch-off.
3. Decrease V_{DS} down to 0 V.
4. Turn off V_{GS}.

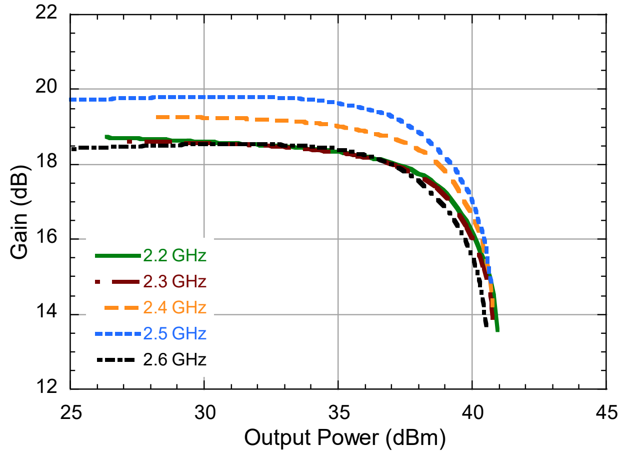
Evaluation Test Fixture and Recommended Tuning Solution 2.2 - 2.6 GHz



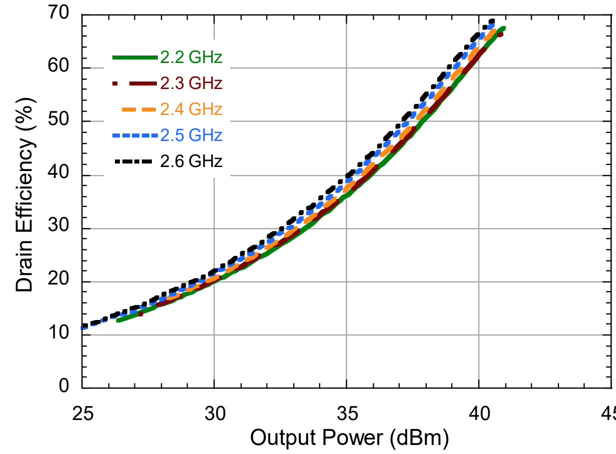
Reference Designator	Value	Tolerance	Manufacturer	Part Number
C1, C6	0.1 µF	+/- 10 %	Murata	GRM188R72A104KA35J
C2	10 pF	+/- 5 %	PPI	0402N100JW500
C3	2.0 pF	+/- 0.1 pF	PPI	0402N2R0BW201
C4	22 pF	+/- 5 %	PPI	0402N220JW500
C5	82 pF	+/- 5 %	PPI	0402N820JW500
C7	1000 pF	+/- 10 %	Murata	GCJ188R71H102KA01D
C8	18 pF	+/- 5 %	PPI	0402N180JW500
C9, C10	0.7 pF	+/- 0.1 pF	PPI	0402N0R7BW201
R1	10.2 Ω	+/- 1 %	Viking	CR-02FL6--10R2
R2	499 Ω	+/- 1 %	Viking	CR-02FL6--499R
R3	4.7 kΩ	+/- 5 %	Vishay	CRCW06034K70JNEAC
L1	2.0 nH	+/- 5 %	CoilCraft	0603CT-2N0XJR
L2	2.3 nH	+/- 5 %	CoilCraft	0603CT-2N3XJR
Q1	MACOM GaN Power Amplifier			MAPC-S1101
PCB	RO4350, 20 mil, 0.5 oz. Cu, Au Finish			

Typical Performance Curves as Measured in the 2.2 - 2.6 GHz Evaluation Test Fixture:
Pulsed[5] 2.6 GHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

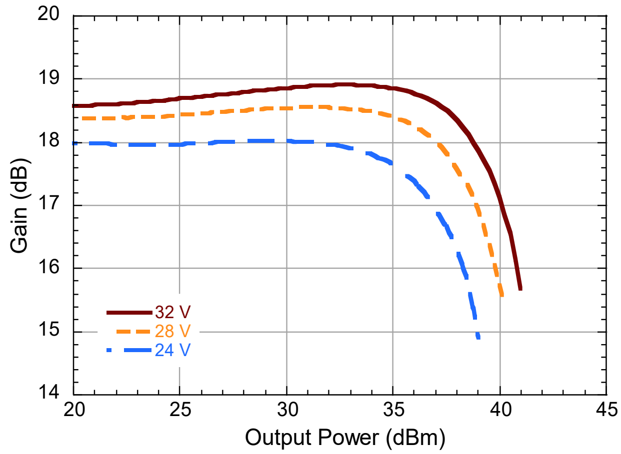
Gain vs. Output Power and Frequency



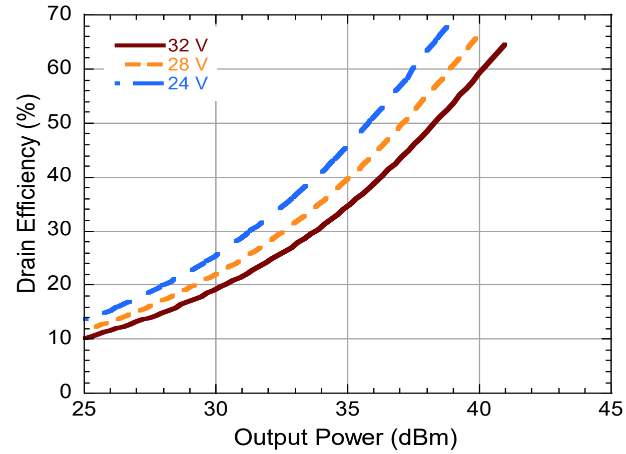
Drain Efficiency vs. Output Power and Frequency



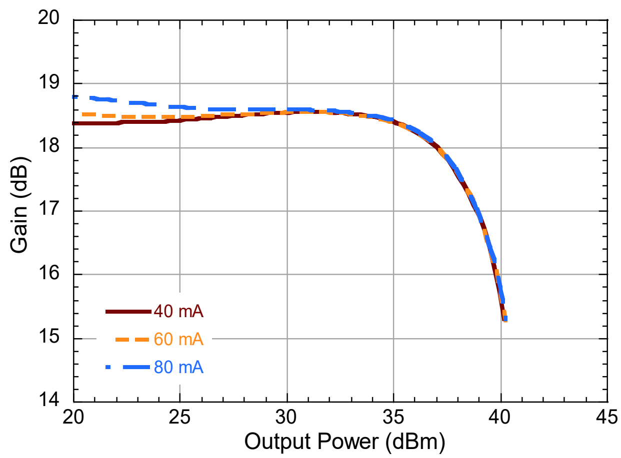
Gain vs. Output Power and V_{DS}



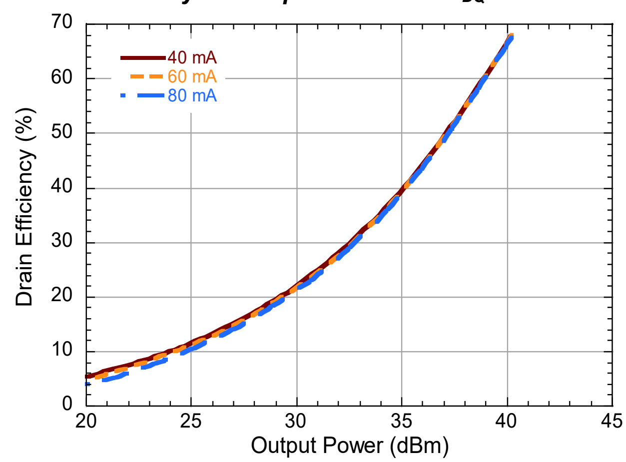
Drain Efficiency vs. Output Power and V_{DS}



Gain vs. Output Power and I_{DQ}

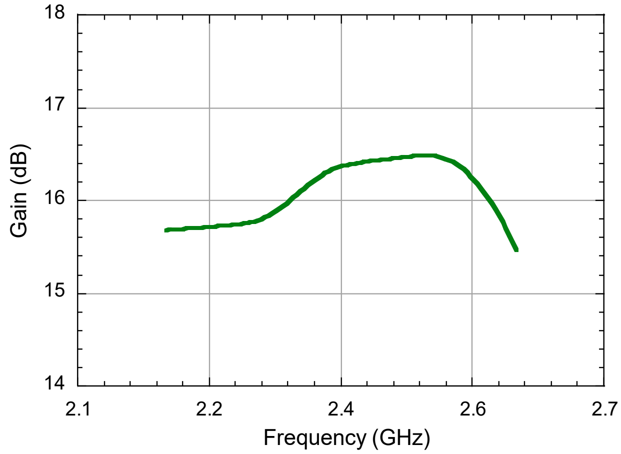


Drain Efficiency vs. Output Power and I_{DQ}

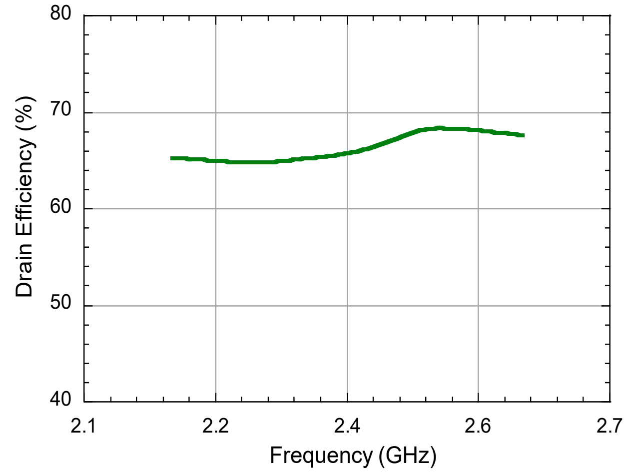


Typical Performance Curves as Measured in the 2.2 - 2.6 GHz Evaluation Test Fixture:
Pulsed[5] 2.6 GHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

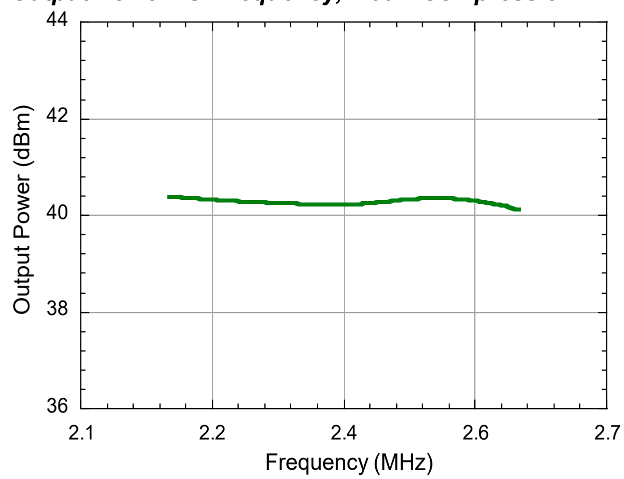
Gain vs. Frequency, 2.5dB Compression



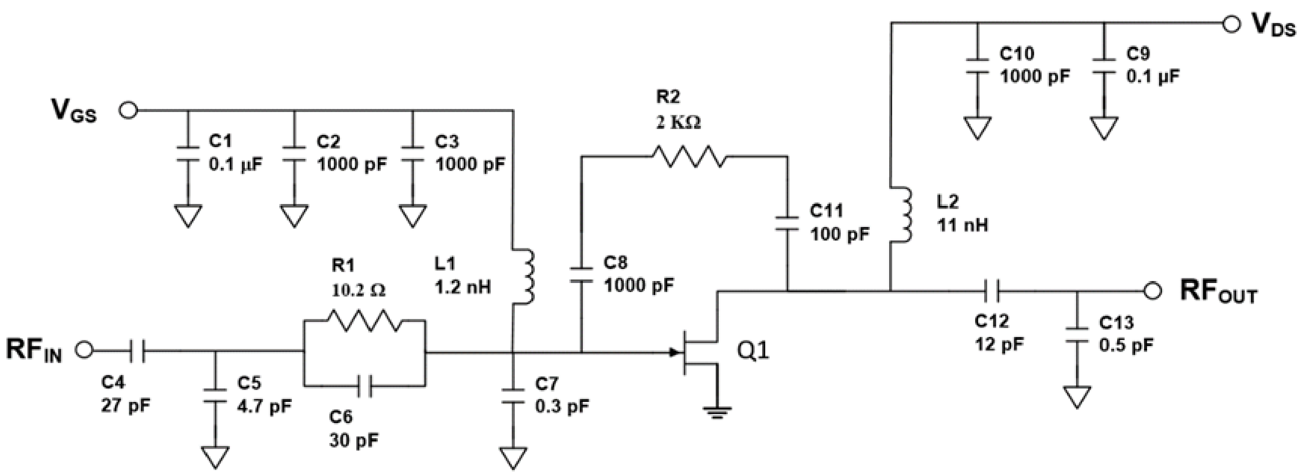
Drain Efficiency vs. Frequency, 2.5dB Compression



Output Power vs. Frequency, 2.5dB Compression



Evaluation Test Fixture and Recommended Tuning Solution 900 - 950 MHz



Description

Parts measured on evaluation board (20-mil thick RO4350). Matching is provided using a combination of lumped elements and transmission lines as shown in the simplified schematic above. Recommended tuning solution component placement, transmission lines, and details are shown on the next page.

Bias Sequencing

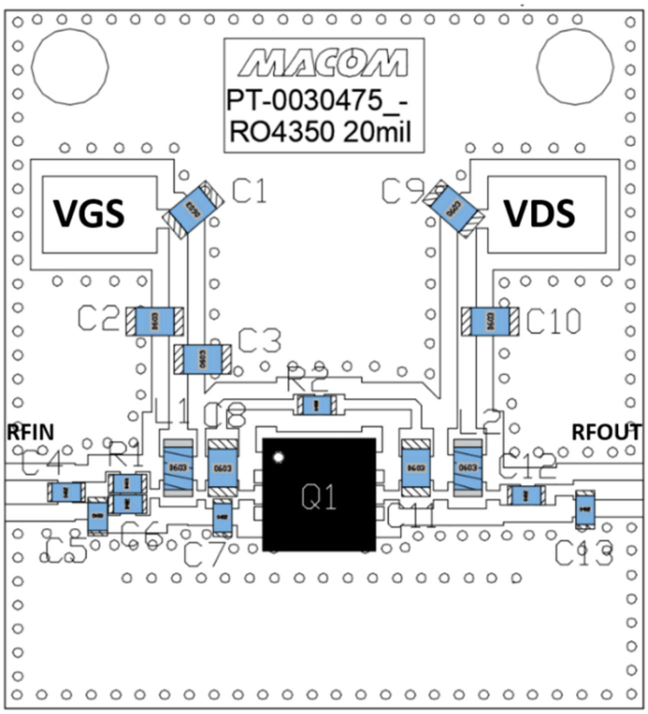
Turning the device ON

1. Set V_{GS} to pinch-off (V_P).
2. Turn on V_{DS} to nominal voltage (50 V).
3. Increase V_{GS} until I_{DS} current is reached.
4. Apply RF power to desired level.

Turning the device OFF

1. Turn the RF power OFF.
2. Decrease V_{GS} down to V_P pinch-off.
3. Decrease V_{DS} down to 0 V.
4. Turn off V_{GS}.

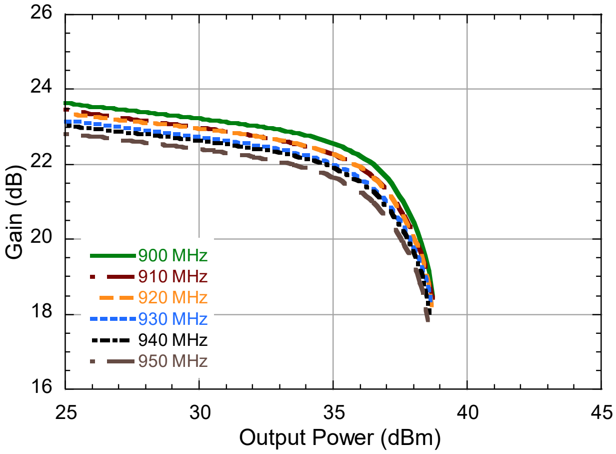
Evaluation Test Fixture and Recommended Tuning Solution 900 - 950 MHz



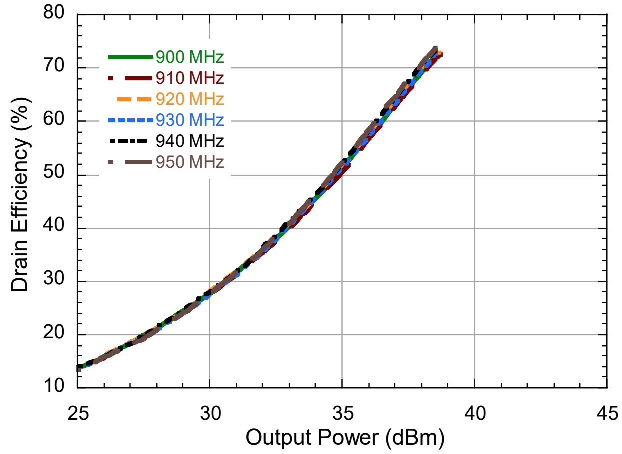
Reference Designator	Value	Tolerance	Manufacturer	Part Number
C1, C9	0.1 µF	+/- 10 %	Murata	GRM188R72A104KA35J
C2, C3, C8, C10	1000 pF	+/- 10 %	Murata	GCJ188R71H102KA01D
C4	27 pF	+/- 5 %	PPI	0402N270JW500
C5	4.7 pF	+/- 0.1 pF	PPI	0402N4R7BW201
C6	30 pF	+/- 5 %	PPI	0402N300JW500
C7	0.3 pF	+/- 0.1 pF	PPI	0402N0R3BW201
C11	100 pF	+/- 5 %	PPI	0603N101JW251
C12	12 pF	+/- 5 %	PPI	0402N120JW500
C13	0.5 pF	+/- 0.1 pF	PPI	0402N0R5BW201
R1	10.2 Ω	+/- 1 %	Viking	CR-02FL6--10R2
R2	2.0 kΩ	+/- 1 %	Viking	CR-02FL6----2K
L1	1.2 nH	+/- 5 %	CoilCraft	0603CT-1N2XJR
L2	11 nH	+/- 5 %	CoilCraft	0603CT-11NXJR
Q1	MACOM GaN Power Amplifier			MAPC-S1101
PCB	RO4350, 20 mil, 0.5 oz. Cu, Au Finish			

Typical Performance Curves as Measured in the 900 - 950 MHz Evaluation Test Fixture: Pulsed[5] 950 MHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

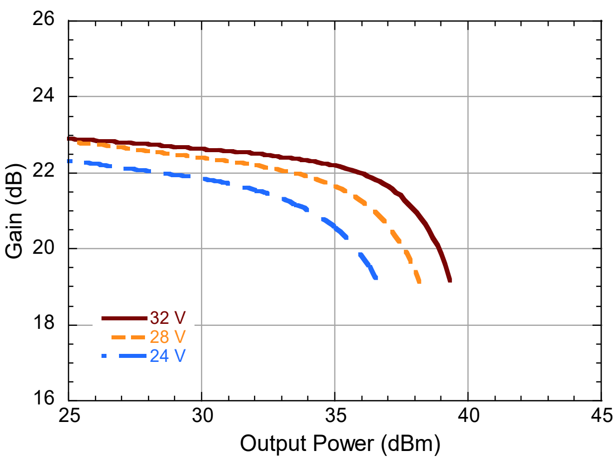
Gain vs. Output Power and Frequency



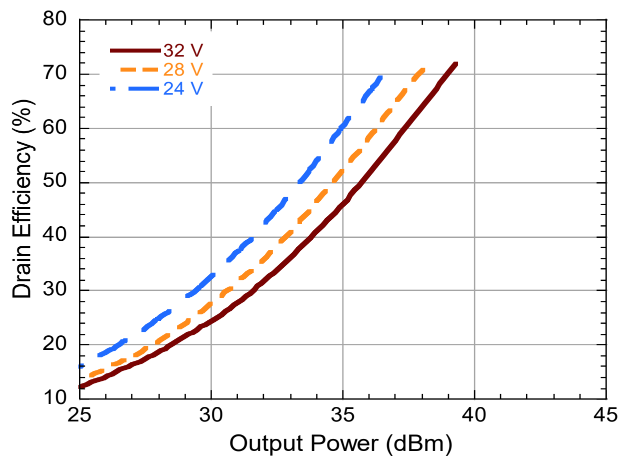
Drain Efficiency vs. Output Power and Frequency



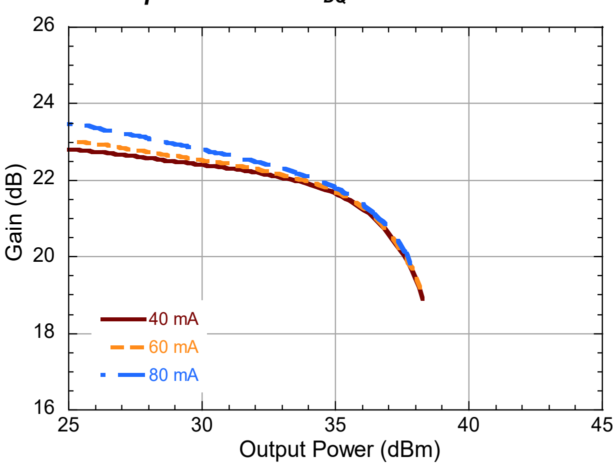
Gain vs. Output Power and V_{DS}



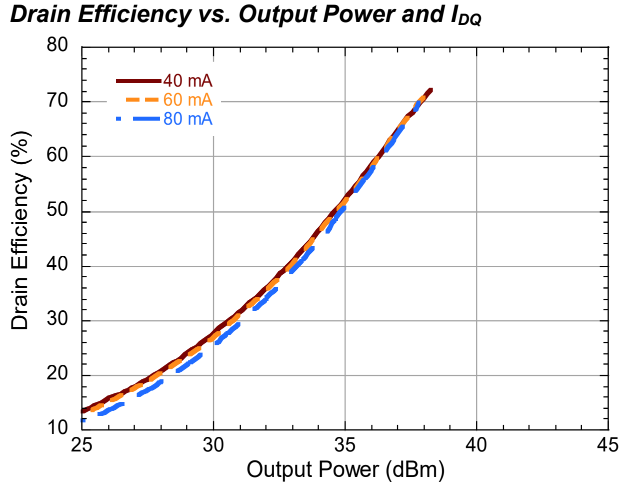
Drain Efficiency vs. Output Power and V_{DS}



Gain vs. Output Power and I_{DQ}

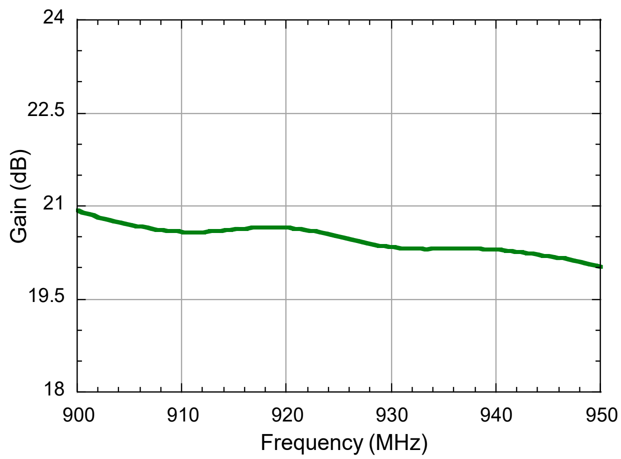


Drain Efficiency vs. Output Power and I_{DQ}

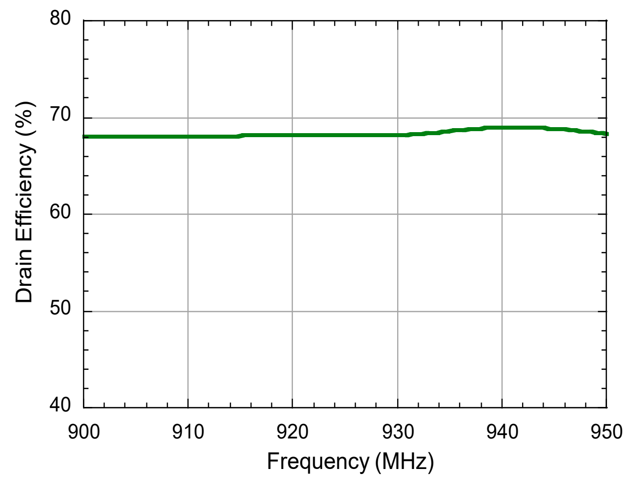


Typical Performance Curves as Measured in the 900 - 950 MHz Evaluation Test Fixture: Pulsed[5] 950 MHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

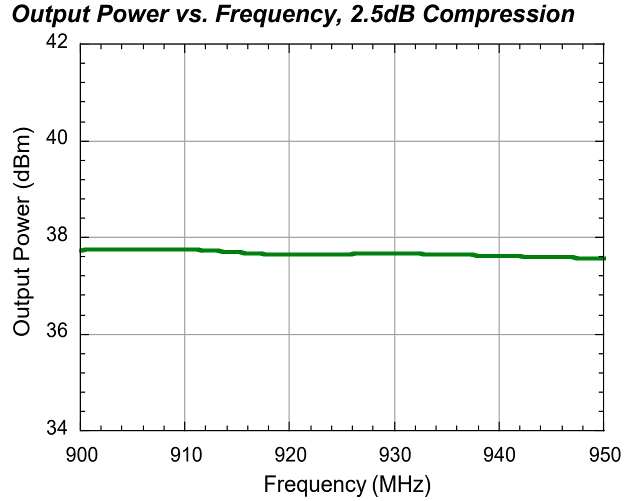
Gain vs. Frequency, 2.5dB Compression



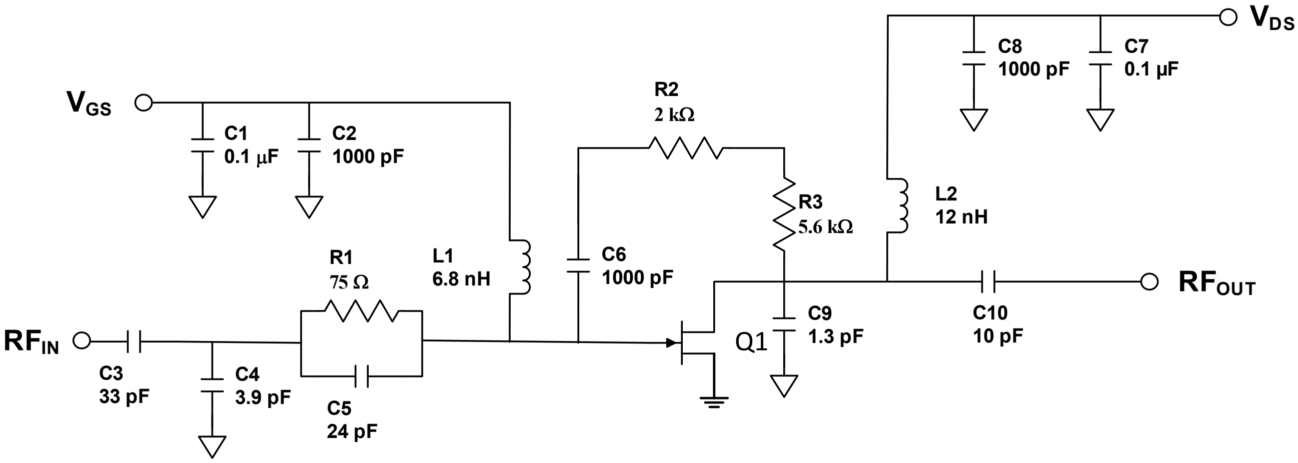
Drain Efficiency vs. Frequency, 2.5dB Compression



Output Power vs. Frequency, 2.5dB Compression



Evaluation Test Fixture and Recommended Tuning Solution 450 - 512 MHz



Description

Parts measured on evaluation board (20-mil thick RO4350). Matching is provided using a combination of lumped elements and transmission lines as shown in the simplified schematic above. Recommended tuning solution component placement, transmission lines, and details are shown on the next page.

Bias Sequencing

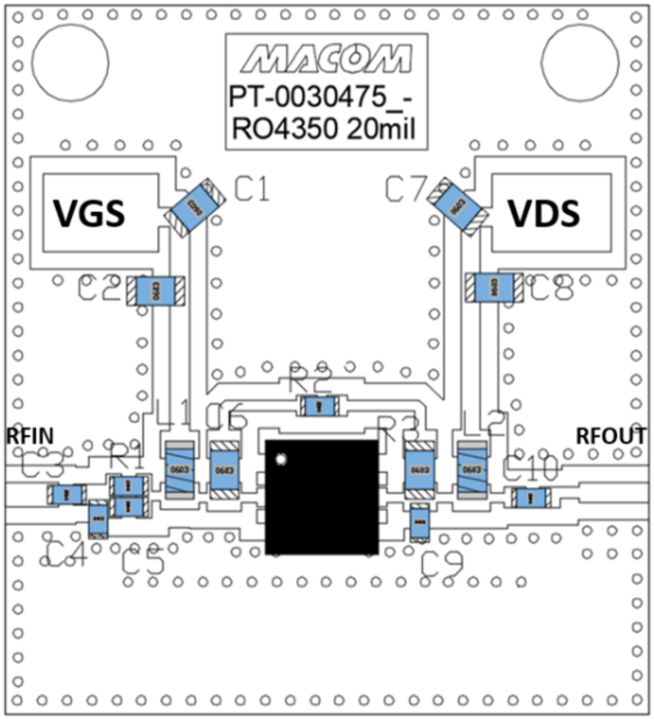
Turning the device ON

1. Set V_{GS} to pinch-off (V_P).
2. Turn on V_{DS} to nominal voltage (50 V).
3. Increase V_{GS} until I_{DS} current is reached.
4. Apply RF power to desired level.

Turning the device OFF

1. Turn the RF power OFF.
2. Decrease V_{GS} down to V_P pinch-off.
3. Decrease V_{DS} down to 0 V.
4. Turn off V_{GS}.

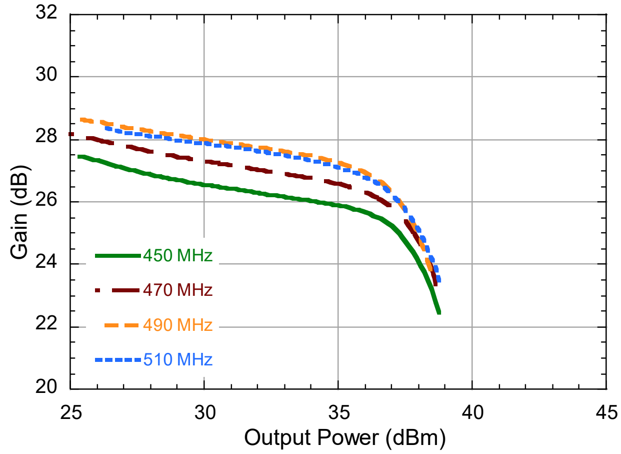
Evaluation Test Fixture and Recommended Tuning Solution 450 - 512 MHz



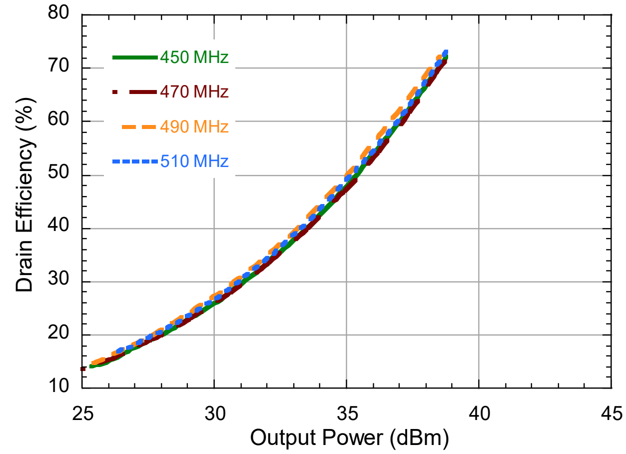
Reference Designator	Value	Tolerance	Manufacturer	Part Number
C1, C7	0.1 µF	+/- 10 %	Murata	GRM188R72A104KA35J
C2, C6, C8	1000 pF	+/- 10 %	Murata	GCJ188R71H102KA01D
C3	33 pF	+/- 5 %	PPI	0402N330JW500
C4	3.9 pF	+/- 0.1 pF	PPI	0402N3R9BW201
C5	24 pF	+/- 5 %	PPI	0402N240JW500
C9	1.3 pF	+/- 0.1 pF	PPI	0402N1R3BW201
C10	10 pF	+/- 5 %	PPI	0402N100JW500
R1	75 Ω	+/- 1 %	Viking	CR-02FL6----75
R2	2.0 kΩ	+/- 1 %	Viking	CR-02FL6---2K
R3	5.6 kΩ	+/- 5 %	Vishay	CRCW06035K60JNEAC
L1	6.8 nH	+/- 5 %	CoilCraft	0603CT-6N8XJR
L2	12 nH	+/- 5 %	CoilCraft	0603CT-12NXJR
Q1	MACOM GaN Power Amplifier			MAPC-S1101
PCB	RO4350, 20 mil, 0.5 oz. Cu, Au Finish			

Typical Performance Curves as Measured in the 450 - 512 MHz Evaluation Test Fixture: Pulsed[5] 450 MHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

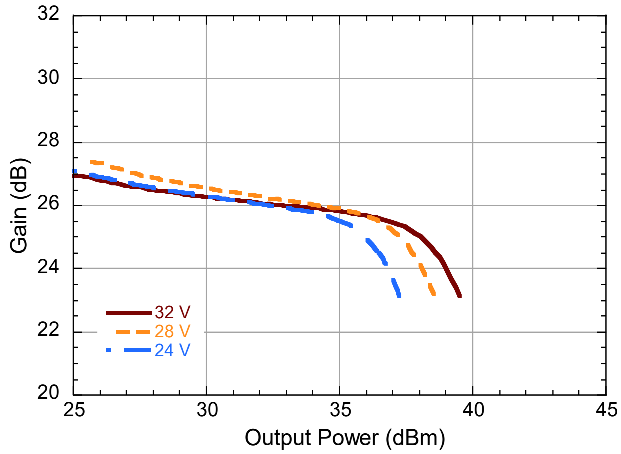
Gain vs. Output Power and Frequency



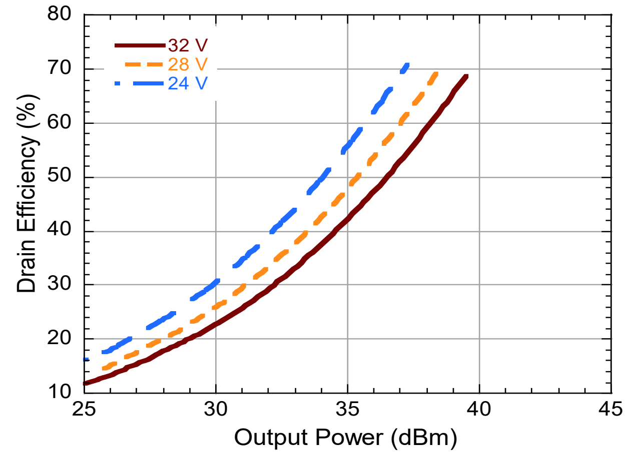
Drain Efficiency vs. Output Power and Frequency



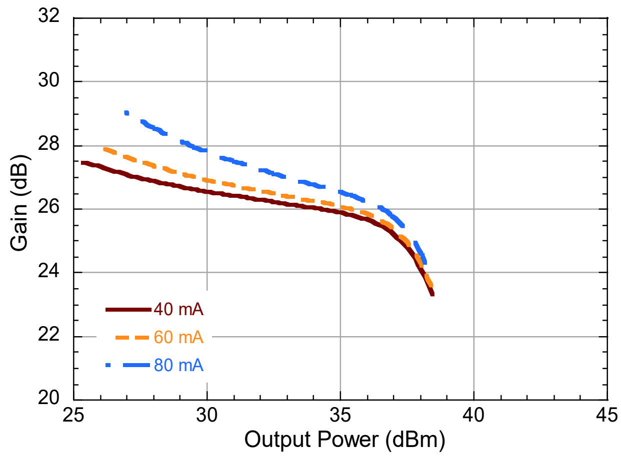
Gain vs. Output Power and V_{DS}



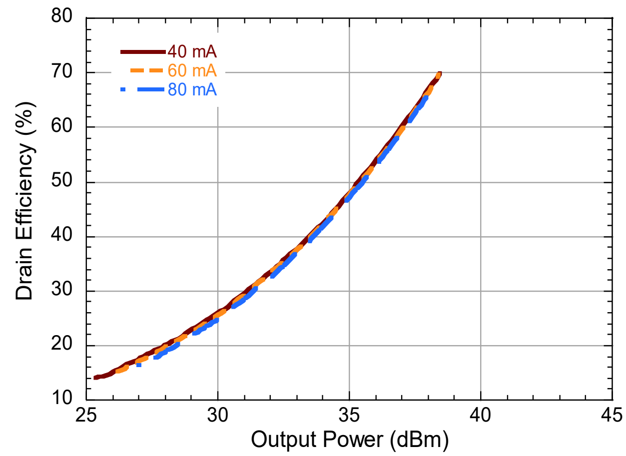
Drain Efficiency vs. Output Power and V_{DS}



Gain vs. Output Power and I_{DQ}

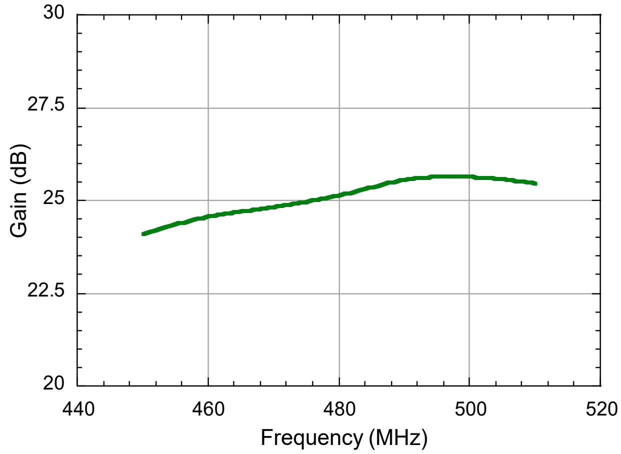


Drain Efficiency vs. Output Power and I_{DQ}

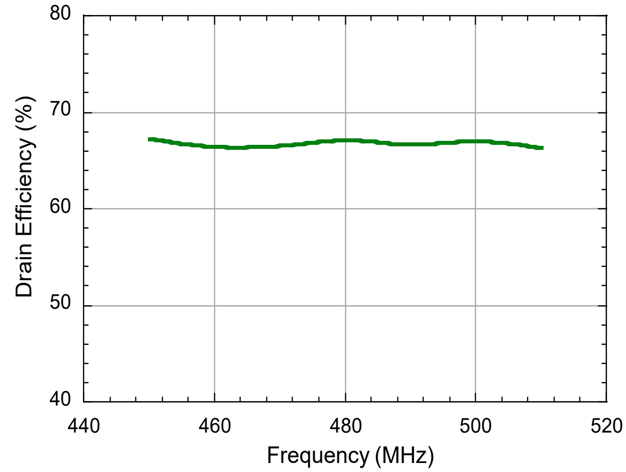


Typical Performance Curves as Measured in the 450 - 512 MHz Evaluation Test Fixture:
Pulsed[5] 450 MHz, V_{DS} = 28 V, I_{DQ} = 40 mA, T_C = 25°C (Unless Otherwise Noted)

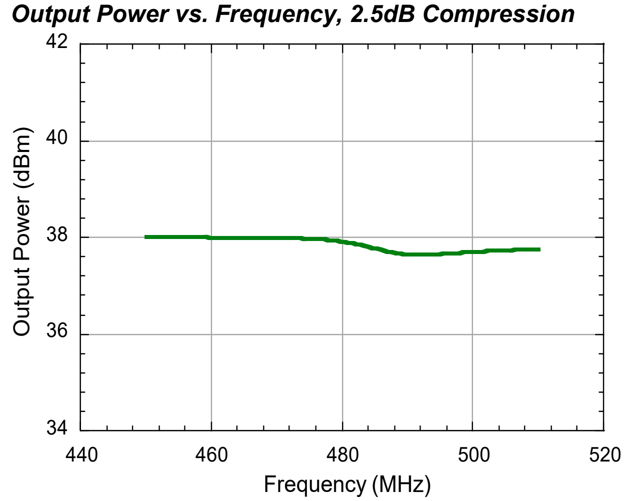
Gain vs. Frequency, 2.5dB Compression



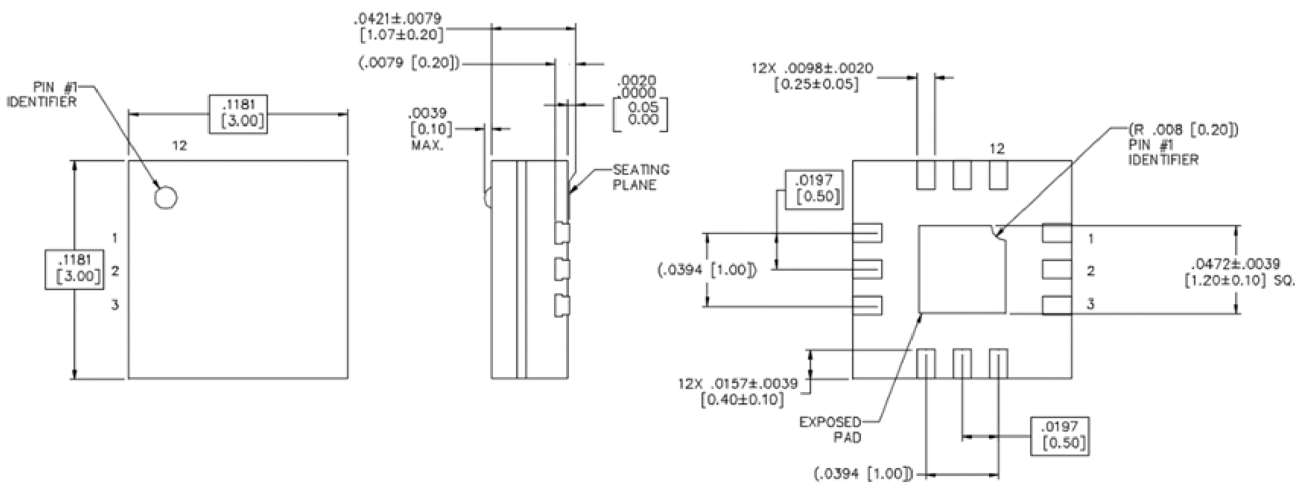
Drain Efficiency vs. Frequency, 2.5dB Compression



Output Power vs. Frequency, 2.5dB Compression



Lead-Free 3 x 3 mm AQFN Package Dimensions†



All dimensions shown as in [mm]

† Reference Application Note S2083 for lead-free solder reflow recommendations.
Meets JEDEC moisture sensitivity level (MSL) 3 requirements.
Plating is NiPdAu.