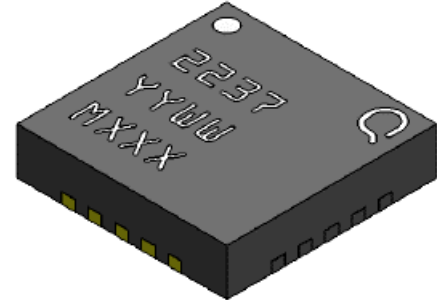


Product Description

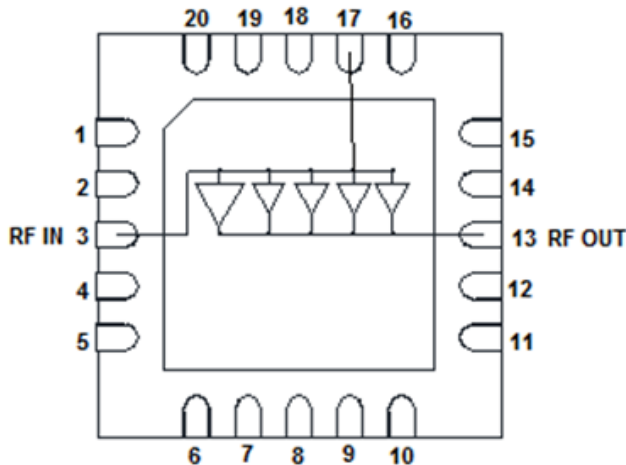
Qorvo's QPA2237 is a wideband amplifier fabricated on Qorvo's production 0.25um GaN on SiC process. The QPA2237 operates from 0.03 – 2.5 GHz and provides 10W of saturated output power with 13 dB of large signal gain and 52% power-added efficiency.

The QPA2237 is available in a low-cost, surface-mount, 20 lead, 4x4 OVM QFN. It is ideally suited to support both radar and communication applications across defense and commercial markets as well as electronic warfare. The QPA2237 is fully matched to 50Ω at both RF ports allowing for simple system integration. DC blocks are required on both RF ports and the drain voltage must be injected through an off chip bias-tee on the RF output port.



QFN 4x4 mm 20L

Functional Block Diagram



Applications

- Commercial and military radar
- Communications
- Electronic Warfare

Product Features

- Frequency Range: 0.03 – 2.5 GHz
- P_{SAT} : 40 dBm at $P_{IN} = 27$ dBm
- PAE: 52%
- Large Signal Gain: 13 dB
- Small Signal Gain: 18.5 dB
- Input Return Loss: 9 dB
- Output Return Loss: 9.5 dB
- Bias: $V_D = 32$ V, $I_{DQ} = 360$ mA
- Wideband Flat Power
- Package Dimensions: 4.0 x 4.0 x 0.85 mm

Performance is typical across frequency. Please reference electrical specification table and data plots for more details.

Ordering Information

Part No.	Description
QPA2237	0.03 – 2.5 GHz 10 W GaN Power Amplifier
QPA2237EVB01	Evaluation Board

Recommended Operating Conditions

Parameter	Value / Range
Drain Voltage (V_D)	+32 V
Drain Current (I_{DQ})	360 mA
Temperature (T_{BASE})	-40 to 85 °C

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

Electrical Specifications

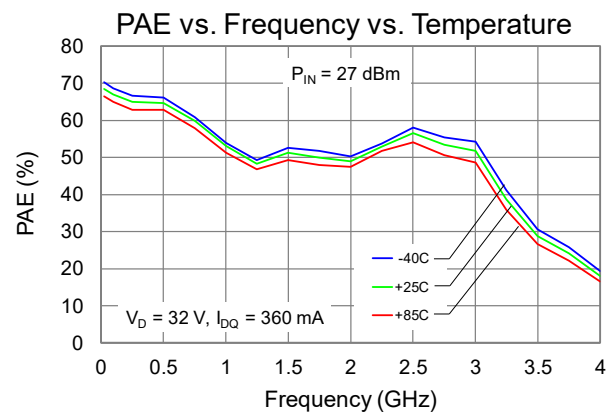
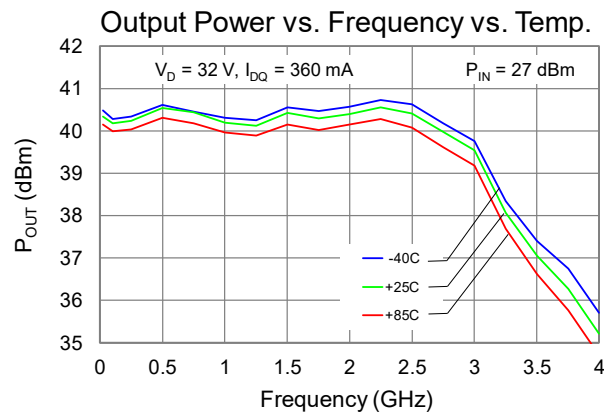
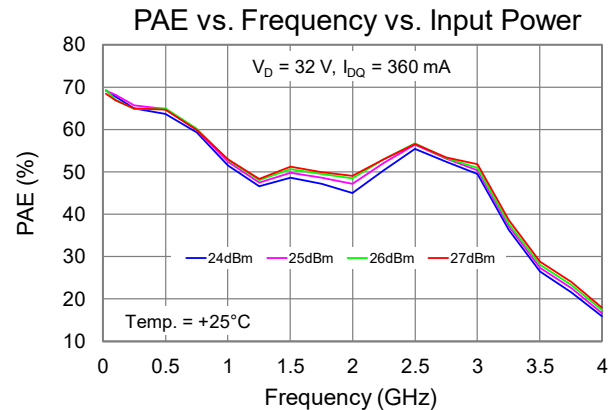
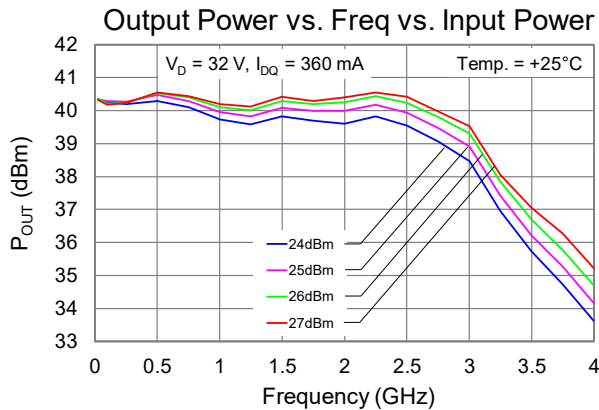
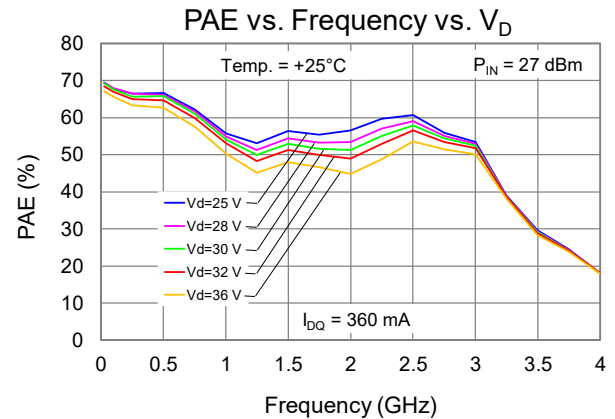
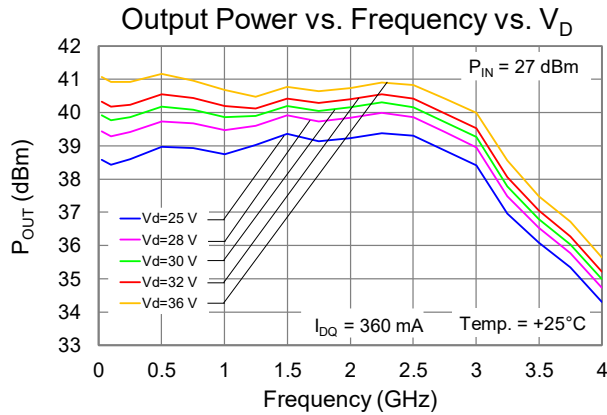
Test conditions unless otherwise noted: $V_D = +32$ V, $I_{DQ} = 360$ mA, CW, 25 °C.

Parameter ^{1, 2}		Min	Typ	Max	Units
Operational Frequency Range		0.03	–	2.5	GHz
Output Power @ P _{IN} = 27 dBm	Frequency = 0.05 GHz	39.5	40.5	–	dBm
	Frequency = 1.25 GHz	39.5	40.1	–	
	Frequency = 2.5 GHz	39.5	40.4	–	
Power Added Efficiency @ P _{IN} = 27 dBm	Frequency = 0.05 GHz	48	65	–	%
	Frequency = 1.25 GHz	48	48.5	–	
	Frequency = 2.5 GHz	48	57	–	
Small Signal Gain	Frequency = 0.05 GHz	–	22.5	–	dB
	Frequency = 1.25 GHz	–	20	–	
	Frequency = 2.5 GHz	–	19	–	
Input Return Loss	Frequency = 0.05 GHz	–	9	–	dB
	Frequency = 1.25 GHz	–	13	–	
	Frequency = 2.5 GHz	–	13	–	
Output Return Loss	Frequency = 0.05 GHz	–	10	–	dB
	Frequency = 1.25 GHz	–	11	–	
	Frequency = 2.5 GHz	–	16	–	
Gate Leakage (V _D =30V, V _G =–5.0V)		–2.4	–	–	mA
Small Signal Gain Temperature Coefficient		–	–0.017	–	dB/°C
Output Power Temperature Coefficient		–	–0.004	–	dBm/°C
Recommended Operating Voltage:		–	32	36	V

1. Test data shown are de-embedded of blocking cap and bias-tee effects.
2. DVT test employed external coaxial bias-tee, not on-board version which uses L1 choke as shown in EVB and application circuit.

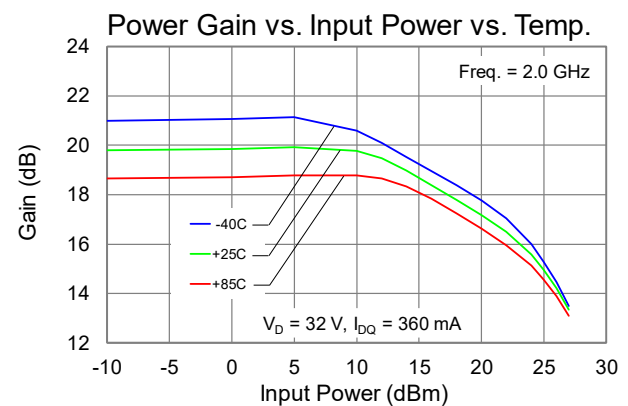
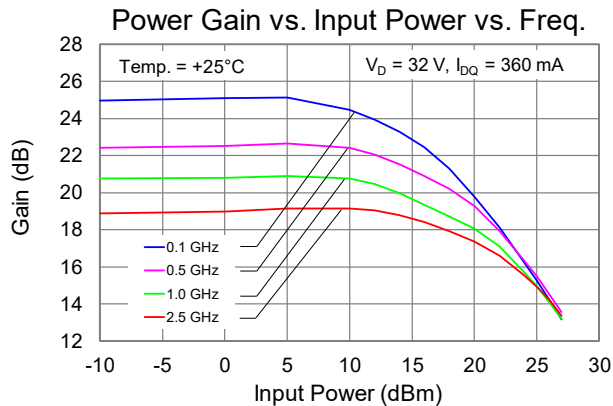
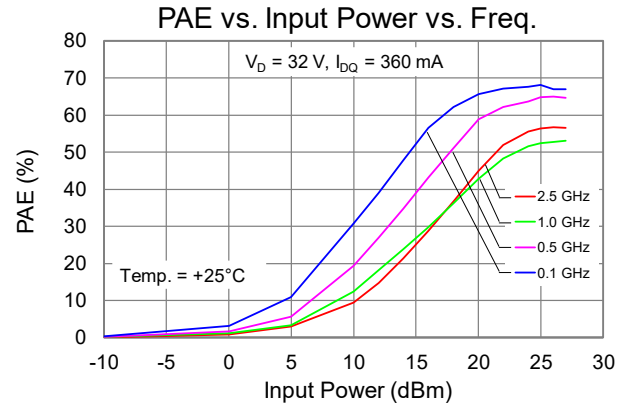
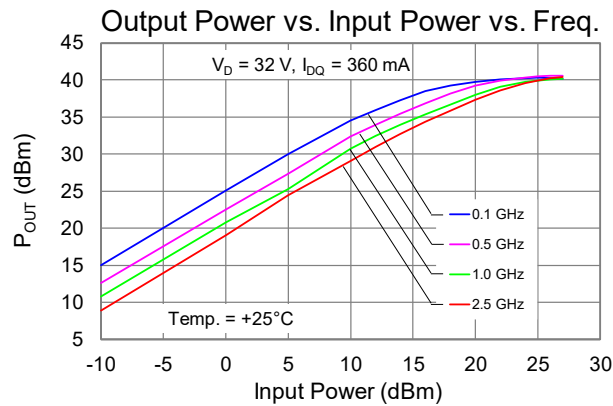
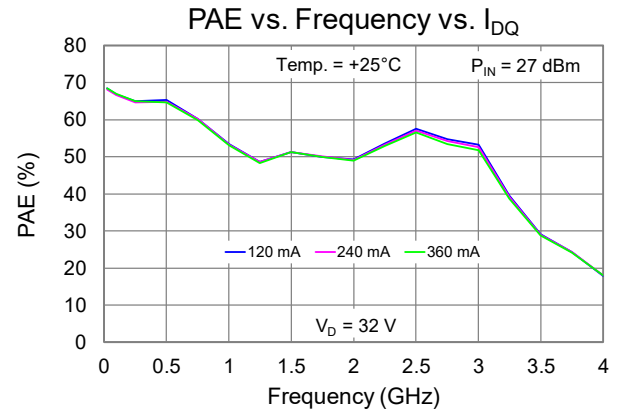
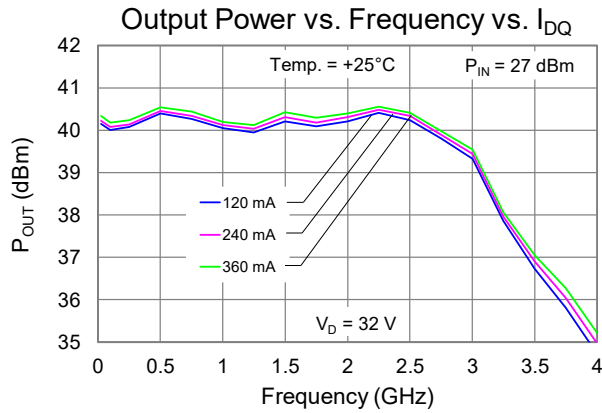
Performance Plots – Large Signal (CW)

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



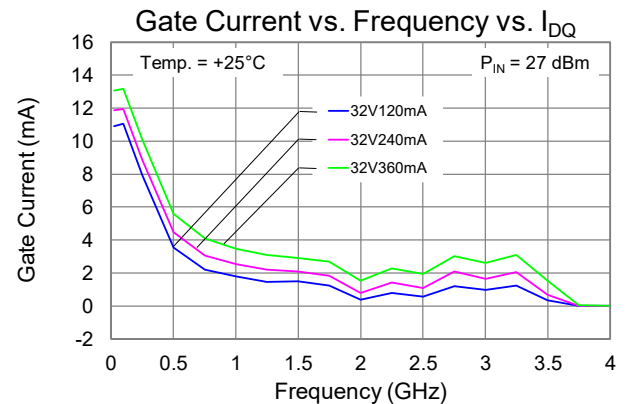
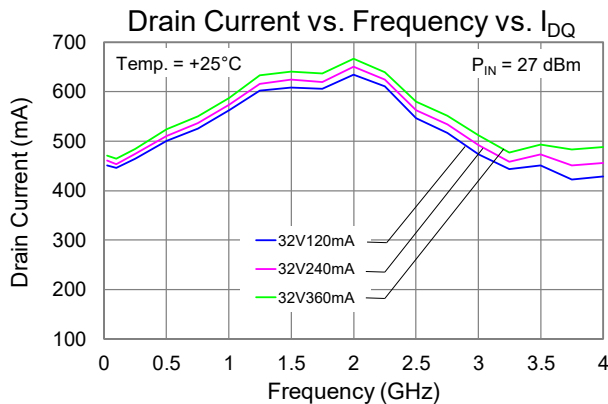
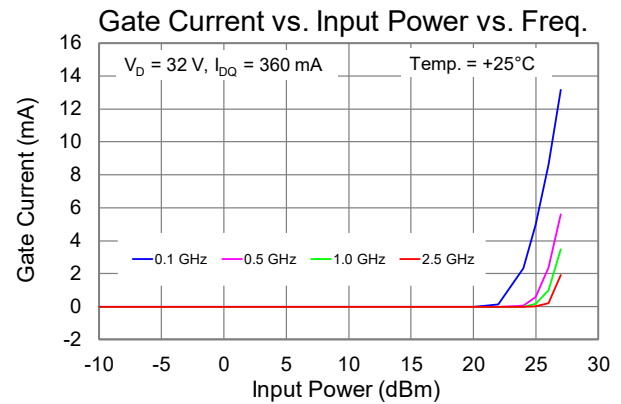
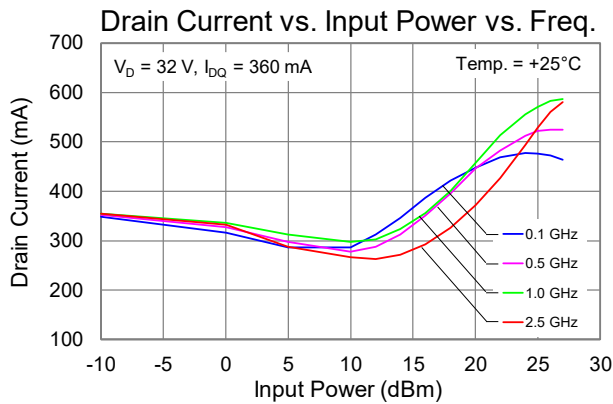
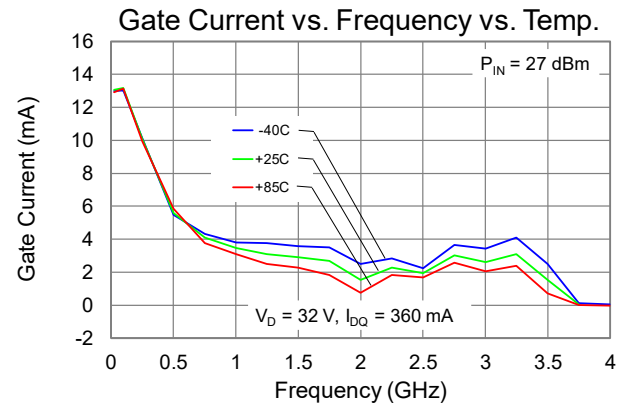
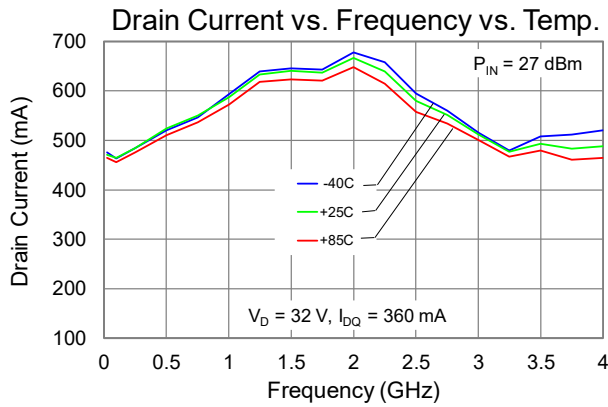
Performance Plots – Large Signal (CW)

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



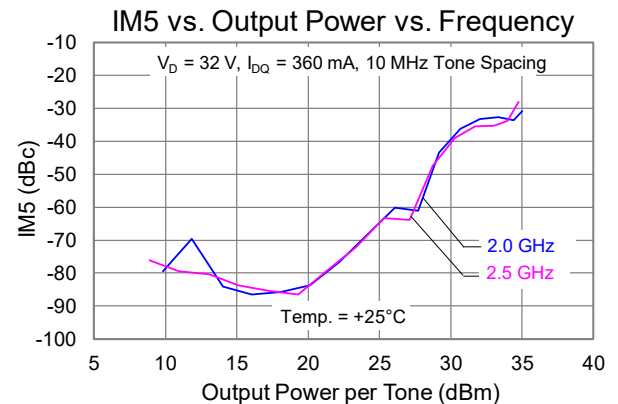
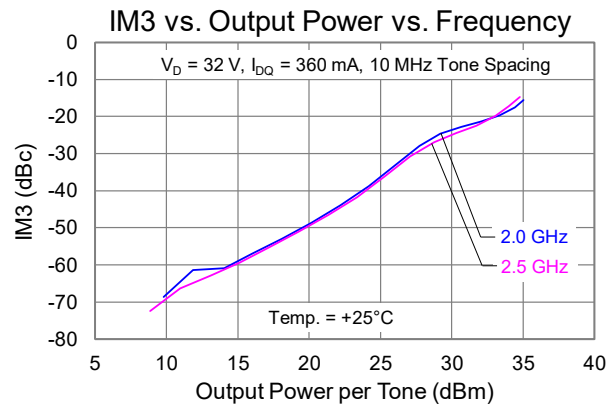
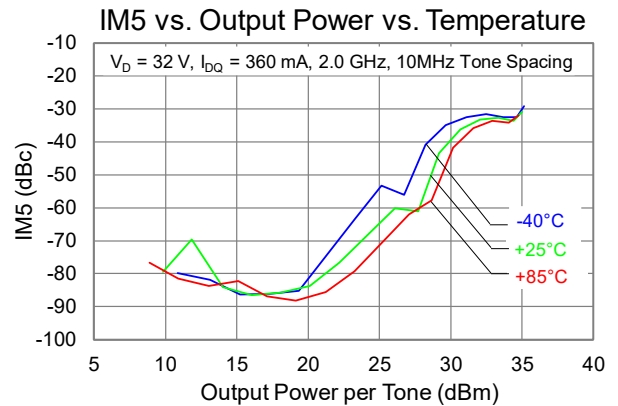
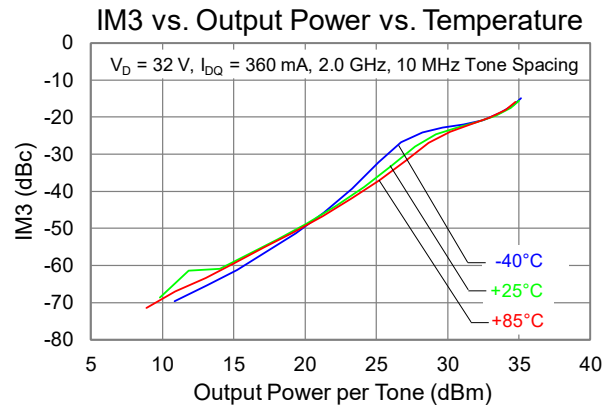
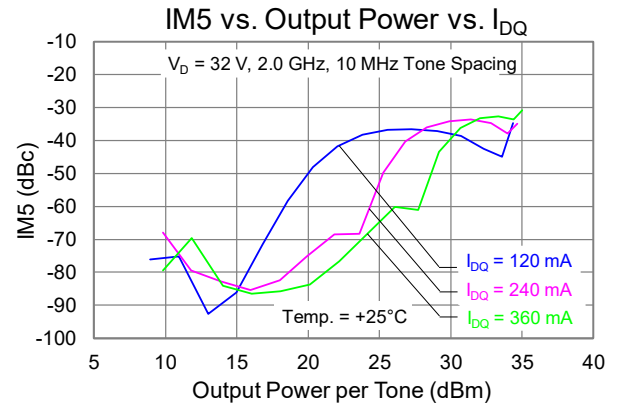
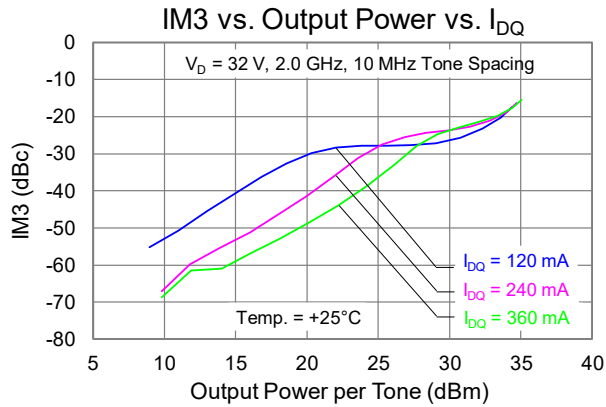
Performance Plots – Large Signal (CW)

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



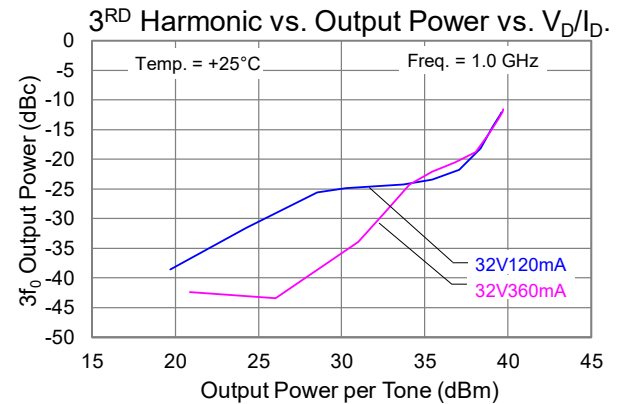
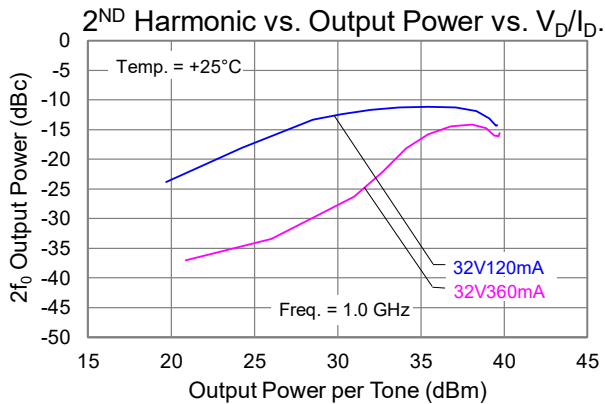
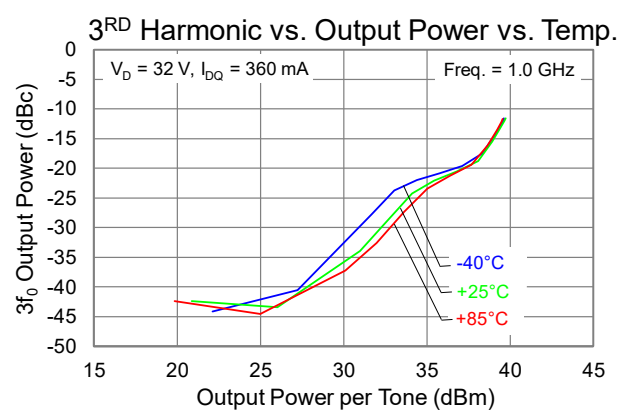
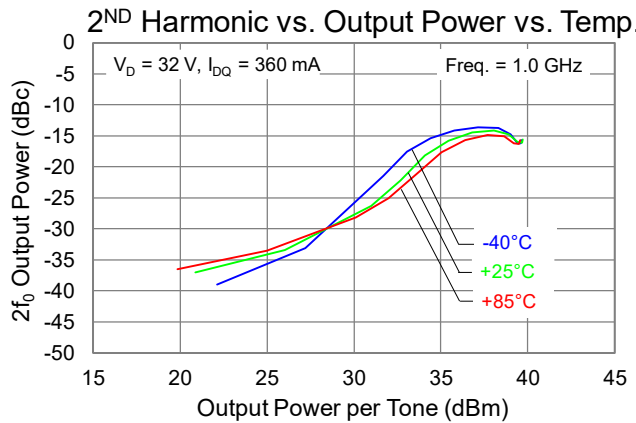
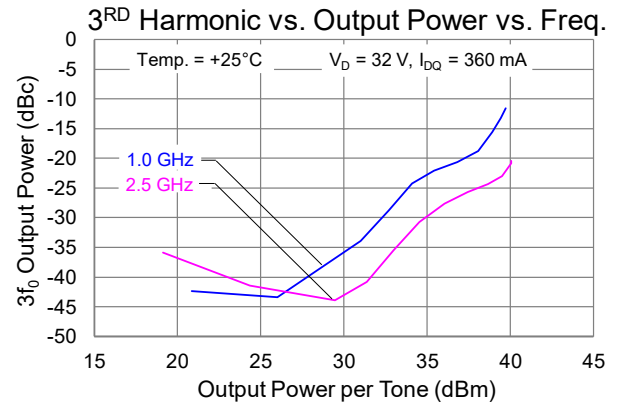
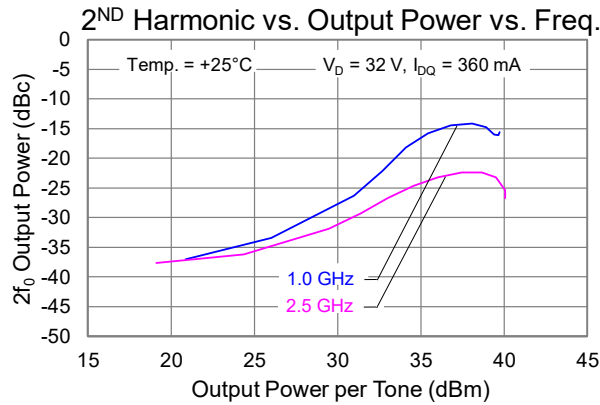
Performance Plots – Linearity

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



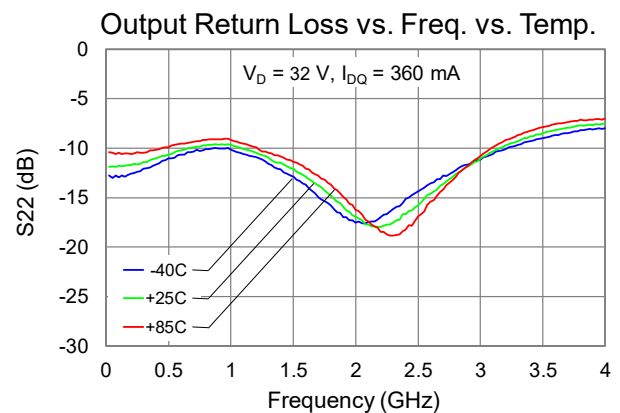
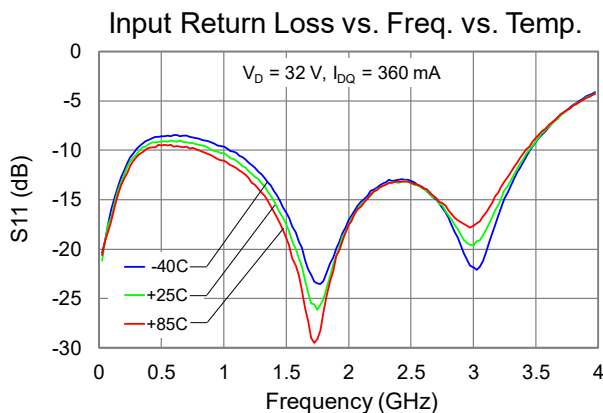
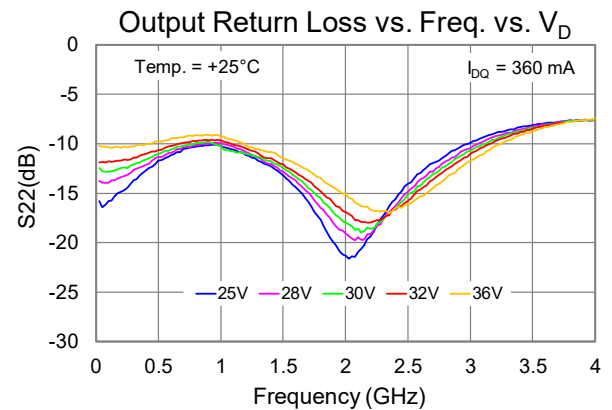
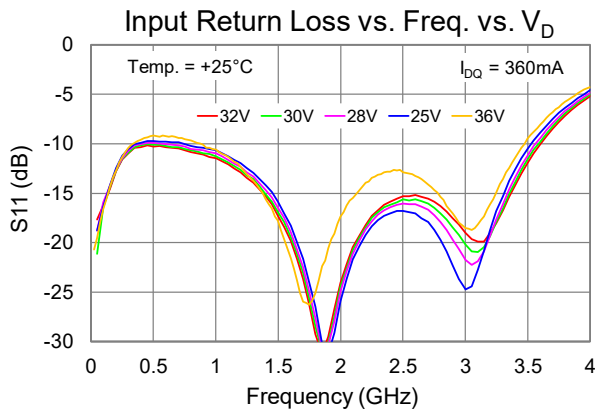
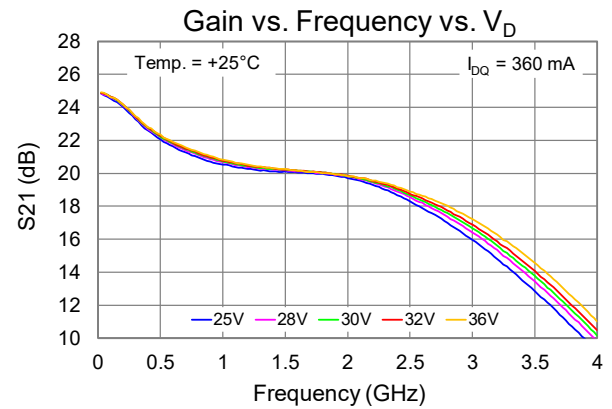
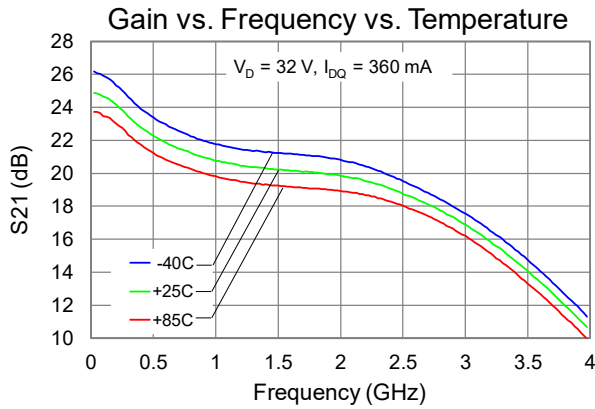
Performance Plots – Linearity

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



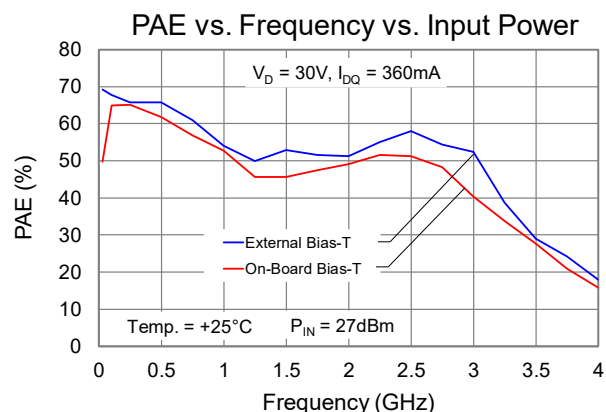
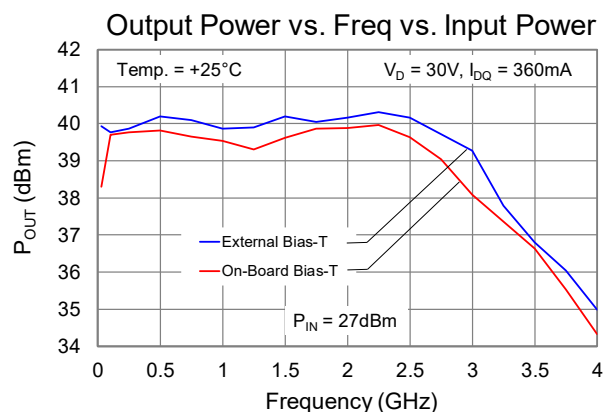
Performance Plots – Small Signal

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



Performance Plots – Large Signal (CW), On-board vs External Coaxial Bias-Tee

Test conditions unless otherwise noted: $V_D = +32\text{ V}$, $I_{DQ} = 360\text{ mA}$, CW, 25°C .



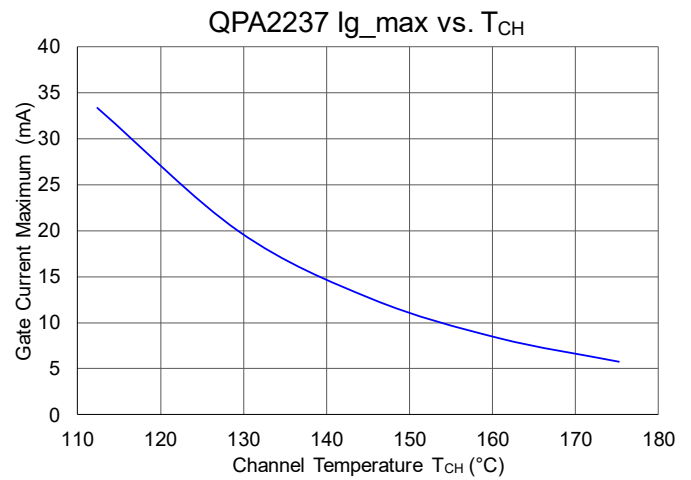
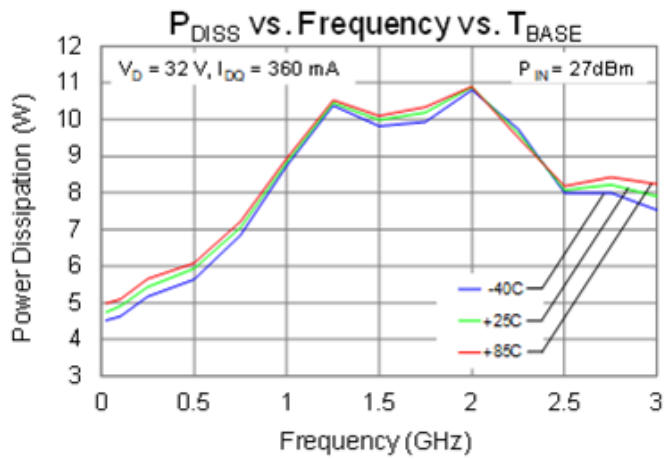
Thermal and Reliability Information

Parameter	Test Conditions	Value	Units
Thermal Resistance (θ_{JC}) ⁽¹⁾	$T_{BASE} = 85^{\circ}\text{C}$, $V_D = +32\text{ V}$ (CW), Freq = 2.0 GHz	5.948	$^{\circ}\text{C/W}$
Channel Temperature (T_{CH}) (Under RF drive) ⁽²⁾	$P_{IN} = 27\text{ dBm}$, $I_{DQ} = 360\text{ mA}$, $I_{D_Drive} = 648\text{ mA}$, $P_{OUT} = 40\text{ dBm}$, $P_{DISS} = 10.9\text{ W}$	149.8	$^{\circ}\text{C}$

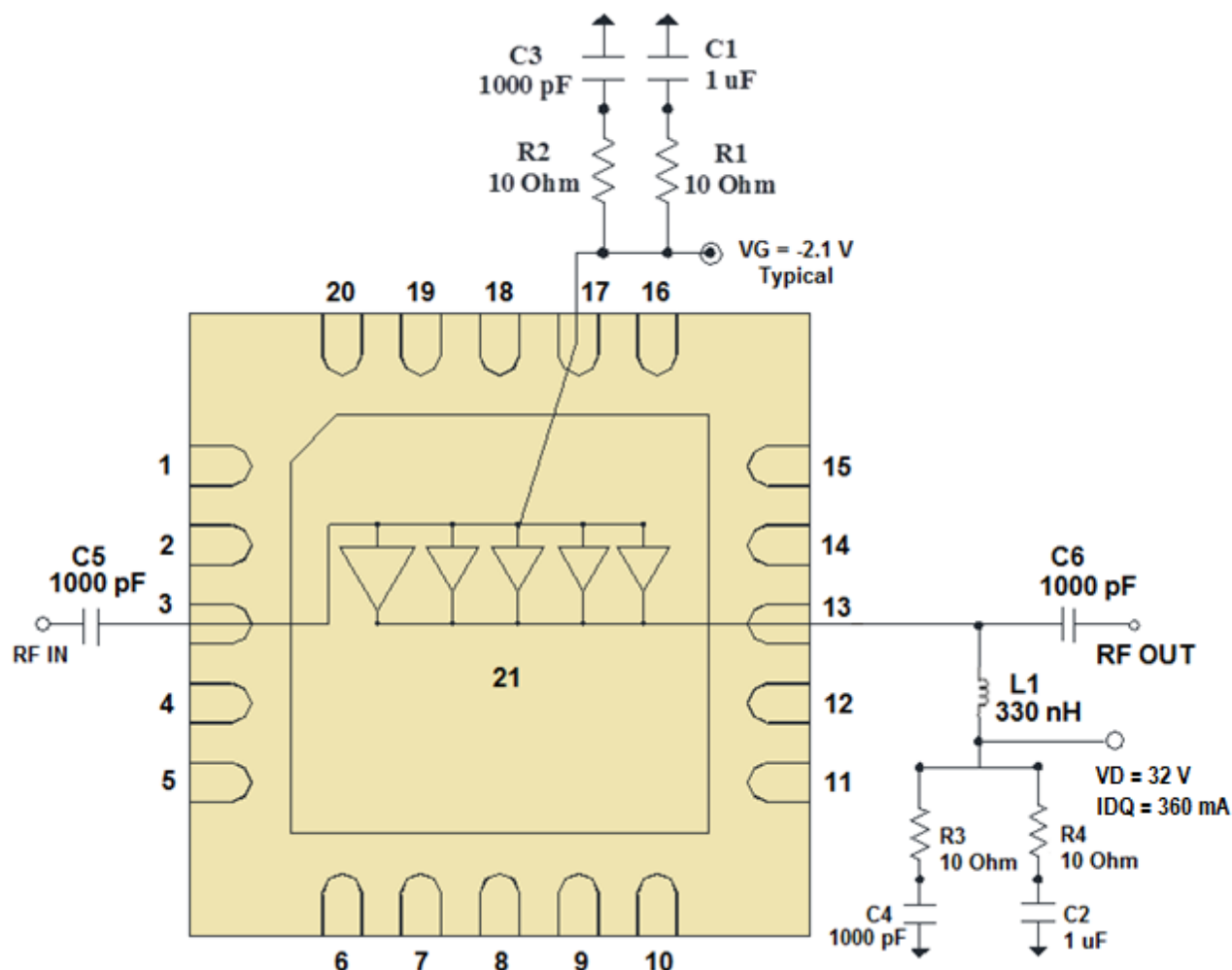
Notes:

1. Thermal resistance referenced to back of package with base temperature at 85°C .
2. IR scan equivalent channel temperature. Refer to the following document: [GaN Device Channel Temperature, Thermal Resistance, and Reliability Estimates](#)

Power Dissipation and Maximum Gate Current



Application Circuit



Notes:

1. There is DC voltage at RF ports, if this causes issue, DC blocks (C5 and C6) should be used.
2. Test data shown are captured using external coaxial bias-tee, data de-embedded of bias-tee and blocking cap effects.
3. The EVB employed an on-board bias-tee at the output port. Performance of the DUT with DC blocks and bias-tee components may be degraded, these components should be optimized for the desired operational bandwidth.

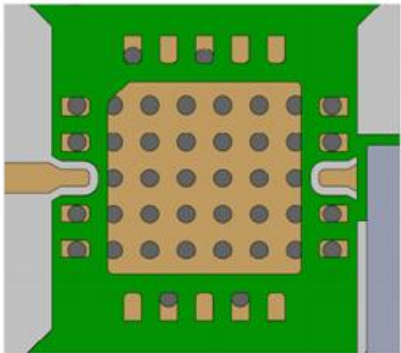
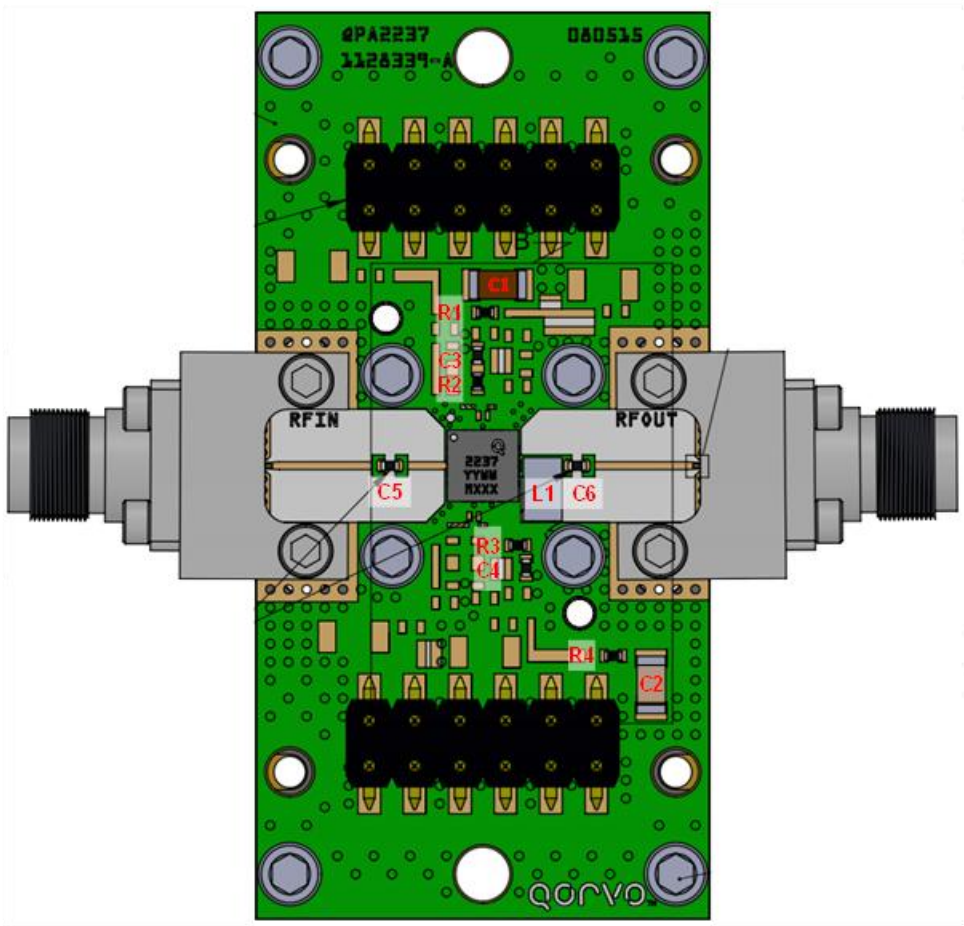
Bias Up Procedure

1. Set I_D limit to 700mA, I_G limit to 15mA
2. Set V_G to -5.0V
3. Set V_D +32V
4. Adjust V_G more positive until $I_{DQ} = 360\text{mA}$ ($V_G \sim -2.1\text{V}$ Typical)
5. Apply RF signal

Bias Down Procedure

1. Turn off RF signal
2. Reduce V_G to -5.0V. Ensure $I_{DQ} \sim 0\text{mA}$
3. Set V_D to 0V
4. Turn off V_D supply
5. Turn off V_G supply

EVB Layout (with On-Board DC Blocks and Bias-Tee)

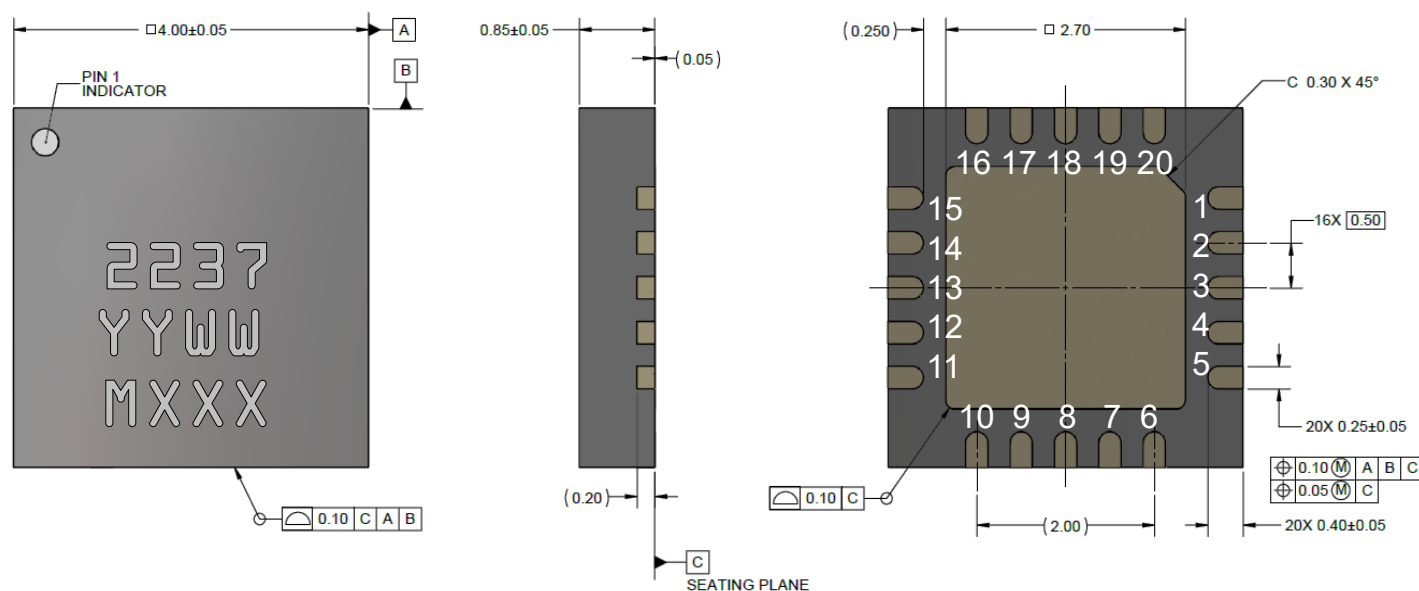


Package Pad Landing Area

Bill of Materials for EVB

Reference Des.	Value	Description	Manuf.	Part Number
C1, C2	1 uF	Cap, 1206, 50V, 5%, X7R	Various	–
C3 – C6	1000 pF	Cap, 0402, 100V, 10%, X7R	Various	–
L1	330 nH	Ind, 1206, 850mA, 5%	Various	–
R1 – R4	10Ω	Res, 0402, 5%, SMD	Various	–

Mechanical Information



NOTES (UNLESS OTHERWISE SPECIFIED):

1. ALL DIMENSIONS ARE IN MM
2. PACKAGE LEADS ARE GOLD PLATED
3. PART IS MOLD ENCAPSULATED
4. PART MARKING
 - 2237: PART NUMBER
 - YY: PART ASSEMBLY YEAR
 - WW: PART ASSEMBLY WEEK
 - XXX: BATCH ID

TOLERANCES

.XX = $\pm .25$
 .XXX = $\pm .127$
 .XXXX = $\pm .0254$

Pin Description

Pin No.	Symbol	Description
1, 2, 4 – 12, 14 – 16, 18 – 20	N/C	No connection
3	RF IN	RF Input; matched to 50 Ω , DC coupled.
13	RF OUT / V _D	RF Output and Drain Voltage; matched to 50 Ω , DC coupled.
17	V _G	Gate Voltage, bias network is required; see recommended Application Information on page 11
21	GND	Ground Paddle. Multiple vias should be employed on the PCB to minimize inductance and thermal resistance.

Absolute Maximum Ratings

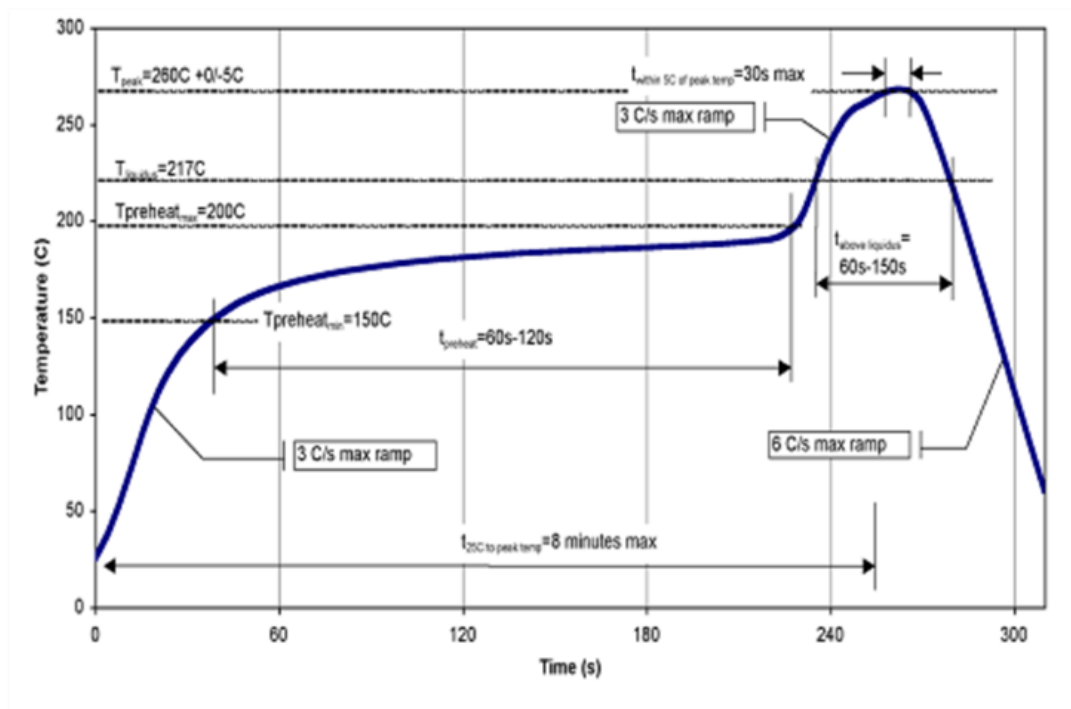
Parameter	Min	Max	Units
Drain Voltage (V_D)	-	40	V
Gate Voltage Range (V_G)	-8	0	V
Drain Current (I_D)	--	1.2	A
Gate Current (I_G)	See plot page 10		
Power Dissipation (P_{DISS}), 85 °C	-	19	W
Input Power (P_{IN}), CW, 50 Ω , 85 °C	-	33	dBm
Input Power (P_{IN}), CW, VSWR 3:1, $V_D = 32$ V, 85 °C	-	33	dBm
Max VSWR, CW, $P_{IN} = 27$ dBm, $V_D = 32$ V, 85 °C (Load)	-	10:1	N.A.
Storage Temperature	-55	150	°C

Operation of this device outside the parameter ranges given above may cause permanent damage. These are stress ratings only, and functional operation of the device at these conditions is not implied.

Assembly Notes

Compatible with lead-free soldering processes with 260°C peak reflow temperature.

Contact plating: NiPdAu.



Recommended Soldering Temperature Profile

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 3A	JEDEC Standard JESD22-A114
ESD – Charge Device Model (CDM)	Class C3	JESD22-C101
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!
ESD-Sensitive Device

RoHS Compliance

This product is compliant with the 2011/65/EU RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment), as amended by Directive 2015/863/EU. This product also has the following attributes:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

For the latest specifications, additional product information, worldwide sales and distribution locations:

Web: www.qorvo.com

Tel: 1-844-890-8163

Email: customer.support@qorvo.com

Important Notices

The information contained in this Data Sheet and any associated documents ("Data Sheet Information") is believed to be reliable; however, Qorvo makes no warranties regarding the Data Sheet Information and assumes no responsibility or liability whatsoever for the use of or reliance on said information. All Data Sheet Information is subject to change without notice. Customers should obtain and verify the latest relevant Data Sheet Information before placing orders for Qorvo® products. Information concerning Qorvo's product life cycles is available at <https://www.qorvo.com/support/product-lifecycle-information>. Data Sheet Information or the use thereof does not grant, explicitly, implicitly or otherwise any rights or licenses with respect to patents or any other intellectual property whether with regard to such Data Sheet Information itself or anything described by such information.

Qorvo grants you permission to use this Data Sheet and any associated resources only to develop an application that uses the Qorvo products described in the Data Sheet and any associated resources. Other reproduction and display of this Data Sheet and any associated resources is prohibited.

Qorvo's products are provided subject to Qorvo's [Terms of Sale](#) or provided in conjunction with such Qorvo products. Qorvo objects to and rejects any additional or different terms customer may have proposed regarding the purchase of Qorvo products.

DATA SHEET INFORMATION DOES NOT CONSTITUTE A WARRANTY WITH RESPECT TO THE PRODUCTS DESCRIBED HEREIN, AND QORVO HEREBY DISCLAIMS ANY AND ALL WARRANTIES WITH RESPECT TO SUCH PRODUCTS WHETHER EXPRESS OR IMPLIED BY LAW, COURSE OF DEALING, COURSE OF PERFORMANCE, USAGE OF TRADE OR OTHERWISE, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Without limiting the generality of the foregoing, Qorvo® products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death. Applications described in the Data Sheet Information are for illustrative purposes only. Customers are responsible for validating that a particular product described in the Data Sheet Information is suitable for use in a particular application.

© 2025 Qorvo US, Inc. All rights reserved. This document is subject to copyright laws in various jurisdictions worldwide and may not be reproduced or distributed, in whole or in part, without the express written consent of Qorvo US, Inc.

QORVO® is a registered trademark of Qorvo US, Inc. All other trademarks and trade names are properties of their respective owners.