QPD2796

200 W, 48 V 2.5-2.7GHz GaN RF Power Transistor

Applications

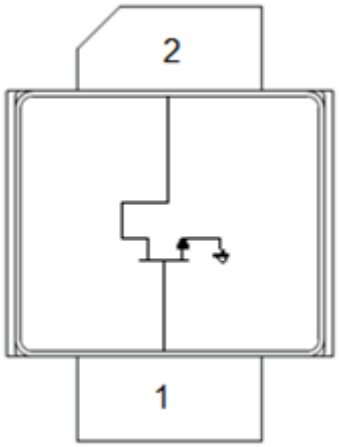
- W-CDMA / LTE
- Macrocell Base Station
- Active Antenna
- General Purpose Applications

2 Lead NI400 Package

Product Features

- Operating Frequency Range: 2.5 – 2.7 GHz
- Operating Drain Voltage: 48 V
- Maximum Output Power (P_{SAT}): 200 W
- Maximum Drain Efficiency: 72%
- Efficiency-Tuned P3dB Gain: 20 dB
- 2-lead, earless, ceramic flange NI400 package

Functional Block Diagram



General Description

The QPD2796 is a discrete GaN on SiC HEMT which operates from 2.5–2.7 GHz. The device is a single stage matched power amplifier transistor.

The QPD2796 can be used in Doherty architecture for the final stage of a base station power amplifier for macrocell high efficiency systems.

QPD2796 can deliver P_{SAT} of 200 W at 48 V operation.

Lead-free and ROHS compliant.

Pin Configuration

Pin No.	Label
1	RF IN, V_G
2	RF OUT, V_D
Backside Paddle	RF/DC Ground

Ordering Information

Part No.	ECCN	Description
QPD2796	EAR99	200 W, 2.5-2.7 GHz, GaN RF Power Transistor

Absolute Maximum Ratings

Parameter	Rating
Gate Voltage (V_G)	–10 V
Drain Voltage (V_D)	+55 V
Peak RF Input Power	40 dBm
VSWR Mismatch, P1dB Pulse (20% duty cycle, 100 µ width), T = 25°C	10:1
Storage Temperature	−65 to +150 °C

Operation of this device outside the parameter ranges given above may cause permanent damage.

Recommended Operating Conditions

Parameter	Min	Typ	Max	Units
Operating Temperature	–40			°C
Gate Voltage (V_G)		–2.7		V
Drain Voltage (V_D)		48		V
Quiescent Current (I_{CQ})		360		mA
T_{CH} for >10^6 hours MTTF			225	°C

Electrical performance is measured under conditions noted in the electrical specifications table. Specifications are not guaranteed over all recommended operating conditions.

RF Characterization – Power-Tuned Load Pull Performance

Test conditions unless otherwise noted: V_D = 48 V, I_{DQ} = 360 mA, T = 25°C, Pulsed (10% duty cycle, 100 µs width)

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2500	4.19 – j7.30	15.21 + j3.95	18.07	52.99	57.79
2600	7.50 – j10.00	13.14 + j3.66	18.30	53.08	60.41
2700	8.00 – j8.00	10.89 + j5.55	18.62	52.93	60.78

RF Characterization – Efficiency-Tuned Load Pull Performance

Test conditions unless otherwise noted: V_D = 48 V, I_{DQ} = 360 mA, T = 25°C, Pulsed (10% duty cycle, 100 µs width)

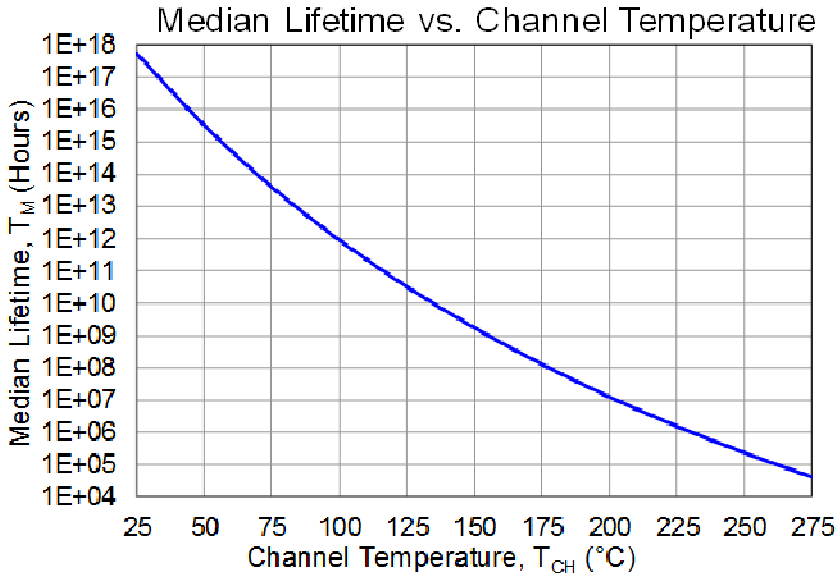
Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2500	4.19 – j7.30	12.03 – j9.90	19.92	51.45	72.09
2600	7.50 – j10.00	12.39 – j11.45	20.27	50.49	72.77
2700	8.00 – j8.00	14.88 – j2.48	19.96	51.67	71.66

Thermal Information

Parameter	Conditions	Value	Units
Thermal Resistance at Average Power (θ_{JC})	T_{CASE} = 85°C, T_{CH} = 175°C CW: P_{DISS} = 60.9 W, P_{OUT} = 56 W	1.47	°C/W

Notes:
1. Thermal resistance measured to package backside.
2. Based on expected carrier amplifier efficiency of Doherty.
3. Pout assumes 20% peaking amplifier contribution of total average Doherty rated power.

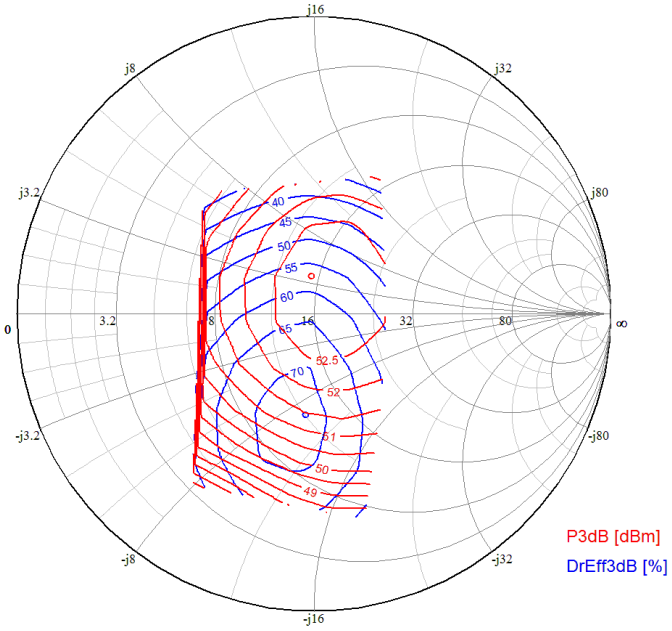
Median Lifetime



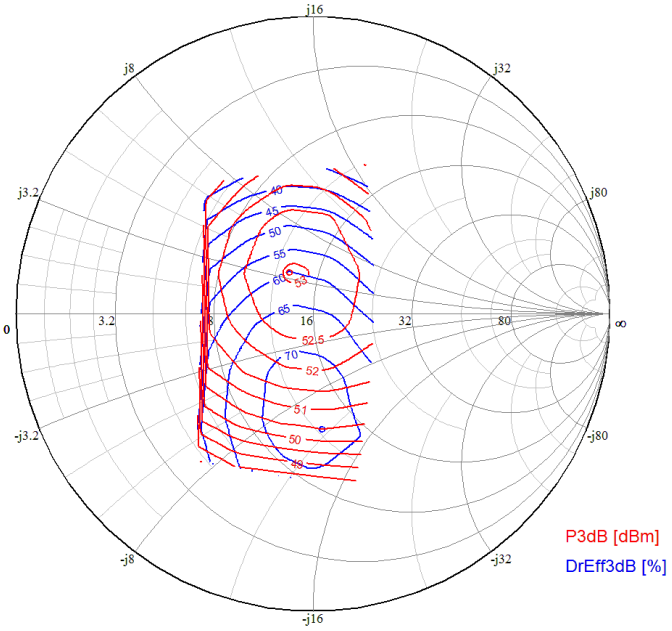
Load Pull Plots

Test conditions unless otherwise noted: V_D = 48 V, I_{CQ} = 360 mA, T = 25°C, Pulsed (10% duty cycle, 100 µs width)

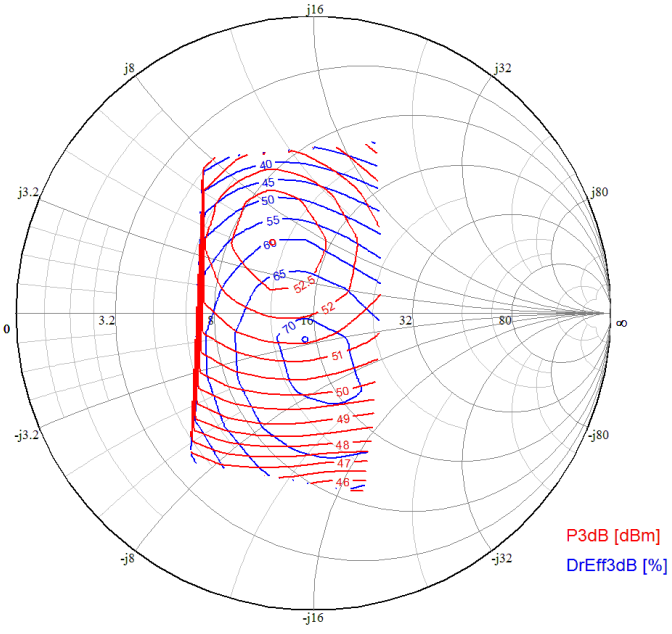
Load Pull at 2.5 GHz



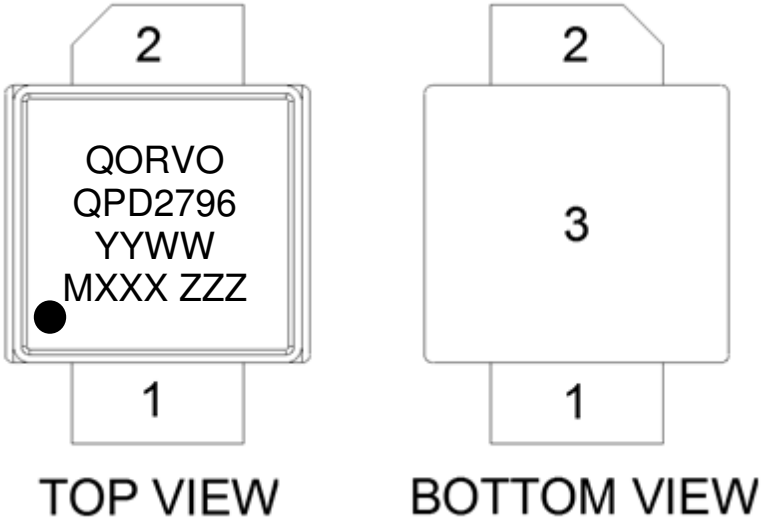
Load Pull at 2.6 GHz



Load Pull at 2.7 GHz



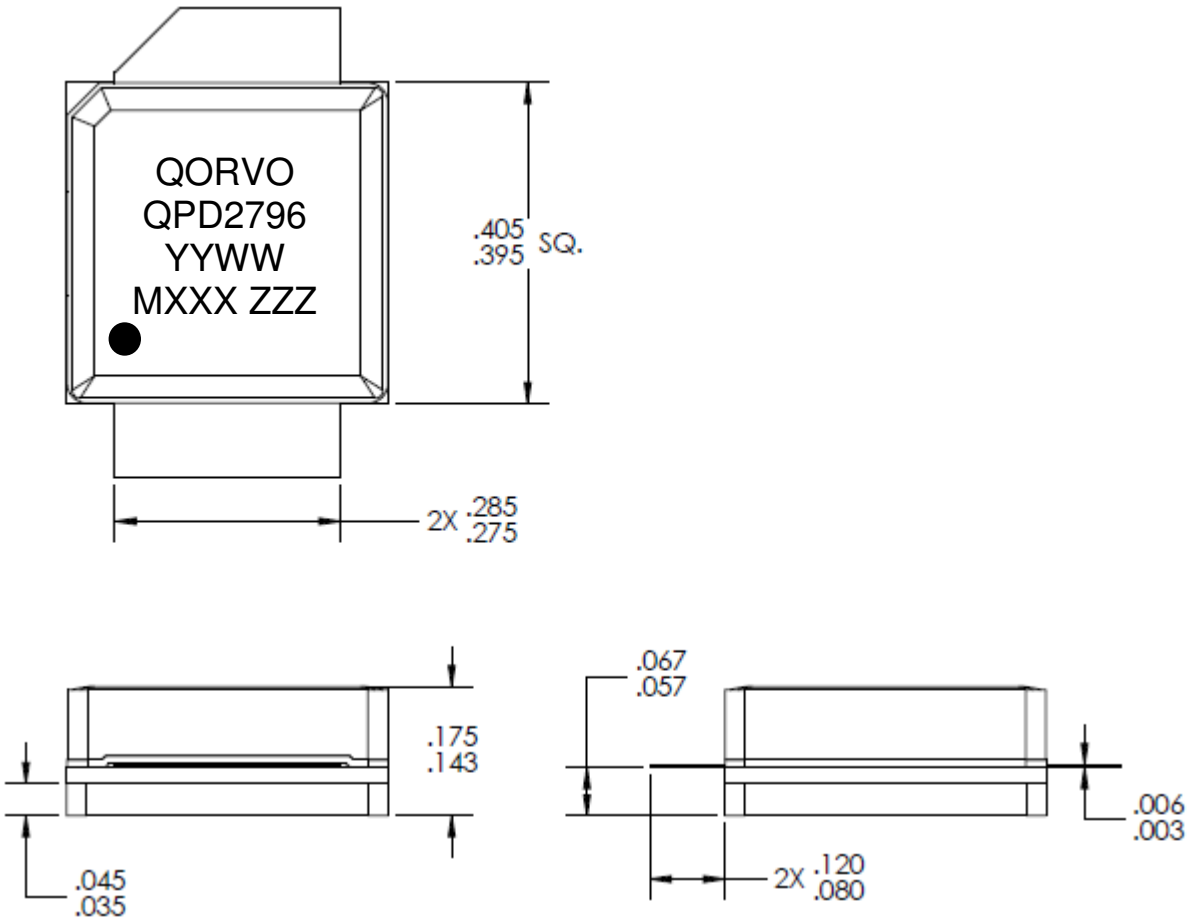
Pin Configuration and Description



Pin No.	Label	Description
1	RF IN, V_G	RF Input, Gate Bias
2	RF OUT, V_D	RF Output, Drain Bias
3 (Backside Paddle)	RF/DC GND	RF/DC Ground

Package Marking and Dimensions

Marking: Product Name – QPD2796
Year/Week Code– YYWW
Production Lot Number – MXXX
Serial Number – ZZZ



Notes:
1. All dimensions are in inches. Angles are in degrees.
2. Exposed metallization is NiAu plated.

Product Compliance Information

ESD Sensitivity Ratings

Caution! ESD-Sensitive Device

ESD Class: TBD
Volt. Range: TBD
Test: Human Body Model (HBM)
Standard: JEDEC Standard JS-001-2012

ESD Class: TBD
Range: TBD
Test: Charged Device Model (CDM)
Standard: JEDEC Standard JESD22-C101F

MSL Rating

MSL Rating: TBD
Test: 260 °C convection reflow
Standard: JEDEC Standard IPC/JEDEC J-STD-020

ECCN

US Department of Commerce EAR99

Solderability

Compatible with both lead-free (260 °C maximum reflow temperature) and tin/lead (245 °C maximum reflow temperature) soldering processes.

Contact plating: NiAu

RoHS Compliance

This part is compliant with EU 2002/95/EC RoHS directive (Restrictions on the Use of Certain Hazardous Substances in Electrical and Electronic Equipment).

This product also has the following attributes:

- Lead Free
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Contact Information

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

Web: www.triquint.com **Tel: 877-800-8584**
Email: customer.support@qorvo.com

For information about the merger of RFMD and TriQuint as Qorvo: **Web:** www.qorvo.com

For technical questions and application information: **Email:** btsapplications@tqs.com

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