

Product Description

The QPD2795 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 QPD2795 can be used in Doherty architecture for the final stage of a base station power amplifier for macrocell high efficiency systems.

QPD2795 can deliver P_{SAT} of 407 W at +48 V operation.

RoHS compliant.



2 Lead NI780 Package

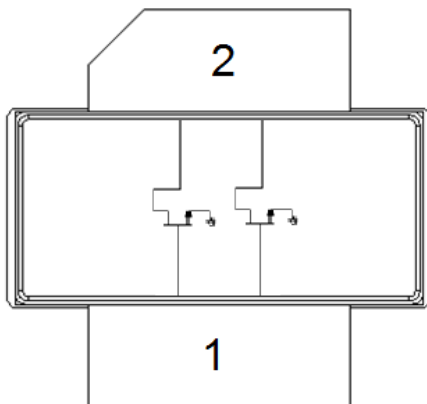
Product Features

- Operating Frequency Range: 2.5–2.7 GHz
- Operating Drain Voltage: +48 V
- Maximum Output Power (P_{SAT}): 407 W
- Maximum Drain Efficiency: 74.1%
- Efficiency-Tuned P3dB Gain: 19.0 dB
- 2-lead, earless, ceramic flange NI780 package

Notes:

1. Single-path load pull data at 2.69 GHz.

Functional Block Diagram



Applications

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

Ordering Information

| Part No. | Description |
|--------------|--|
| QPD2795EVB01 | 2.62-2.69 GHz Single-Ended Eval. Board |

Absolute Maximum Ratings

| Parameter | Value / Range |
|---|------------------------------|
| Breakdown Voltage (BV_{DG}) | +165 V |
| Gate Voltage (V_G) | -7 to +2 V |
| Drain Voltage (V_D) | +55 V |
| Peak RF Input Power | +49 dBm |
| VSWR Mismatch, P1dB Pulse (10% duty cycle, 100 μ width), $T = 25^\circ\text{C}$ | 10:1 |
| Storage Temperature | -65 to +150 $^\circ\text{C}$ |

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

Recommended Operating

| Parameter | Min | Typ | Max | Units |
|--------------------------------|-----|------|-----|-------|
| Gate Voltage (V_G) | | -2.7 | | V |
| Drain Voltage (V_D) | | +48 | | V |
| Quiescent Current (I_{DQ}) | | 700 | | mA |

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

Electrical Specifications

| Parameter | Conditions | Min | Typ | Max | Units |
|--------------------------------------|------------------|------|------|------|-------|
| Operational Frequency Range | | 2620 | | 2690 | MHz |
| Quiescent Drain Current (I_{DQ}) | | | 700 | | mA |
| Gain | 3 dB Compression | | 17.4 | | dB |
| Power (P_{SAT}) | 3 dB Compression | | 55.0 | | dBm |
| Drain Efficiency | 3 dB Compression | | 63.0 | | % |

Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 360\text{ mA}$, $T = +25^\circ\text{C}$, pulse signal (10% duty cycle, 100 μs width) at 2690 MHz on a Class AB single-ended reference design tuned for 2620 – 2690 MHz.

Thermal and Reliability Information

| Parameter | Test Conditions | Value | Units |
|--|--|-------|--------------------|
| Thermal Resistance, Peak IR Surface Temperature at Average Power (θ_{JC}) | $T_{CASE} = +85^\circ\text{C}$, $T_{CH} = 125^\circ\text{C}$, CW: $P_{DISS} = 83.5\text{ W}$, $P_{OUT} = 100\text{ W}$ | 0.5 | $^\circ\text{C/W}$ |

Notes:

1. Thermal resistance is measured to package backside.
2. Refer to the following document: [GaN Device Channel Temperature, Thermal Resistance, and Reliability Estimates](#)



Power-Tuned Load Pull Performance

| Frequency (MHz) | Source Impedance | Load Impedance | Gain @ P3dB (dB) | P3dB (dBm) | Drain Efficiency (%) |
|-----------------|------------------|----------------|------------------|------------|----------------------|
| 2500 | 3.82 – j5.53 | 4.17 + j0.72 | 17.6 | 56.0 | 62.8 |
| 2620 | 7.65 – j5.67 | 3.35 + j1.10 | 17.5 | 56.1 | 64.0 |
| 2690 | 12.75 – j4.47 | 3.18 + j1.56 | 17.2 | 56.1 | 63.8 |

Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 700\text{ mA}$, $T = +25^\circ\text{C}$, Pulse (10% duty cycle, 100 μs width).

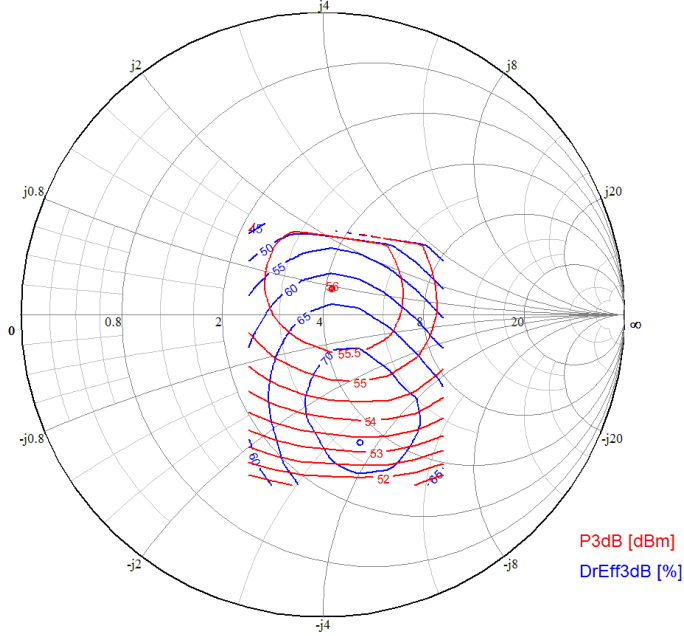
Efficiency-Tuned Load Pull Performance

| Frequency (MHz) | Source Impedance | Load Impedance | Gain @ P3dB (dB) | P3dB (dBm) | Drain Efficiency (%) |
|-----------------|------------------|----------------|------------------|------------|----------------------|
| 2500 | 3.82 – j5.53 | 3.38 – j3.57 | 19.3 | 53.3 | 72.8 |
| 2620 | 7.65 – j5.67 | 5.53 – j2.50 | 19.0 | 54.0 | 74.3 |
| 2690 | 12.75 – j4.47 | 5.90 – j1.67 | 19.0 | 53.9 | 74.1 |

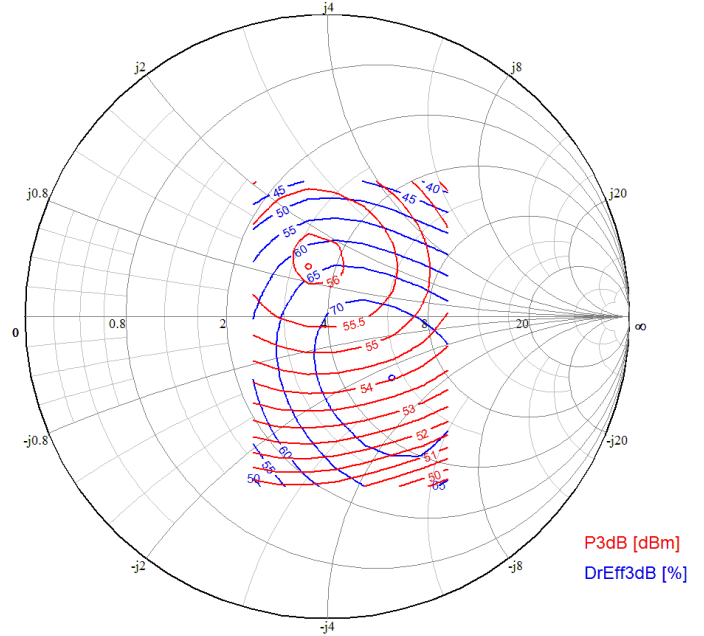
Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 700\text{ mA}$, $T = +25^\circ\text{C}$, Pulse (10% duty cycle, 100 μs width).

Load Pull Plots

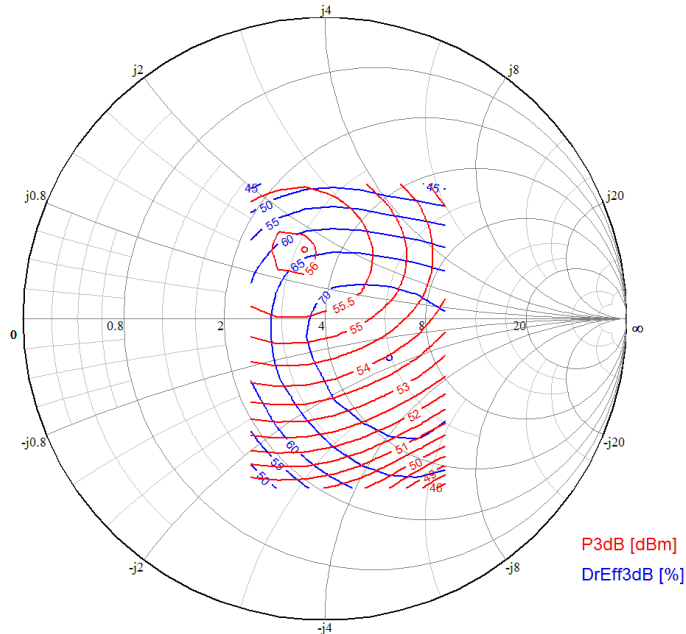
Load Pull at 2.5 GHz



Load Pull at 2.62 GHz

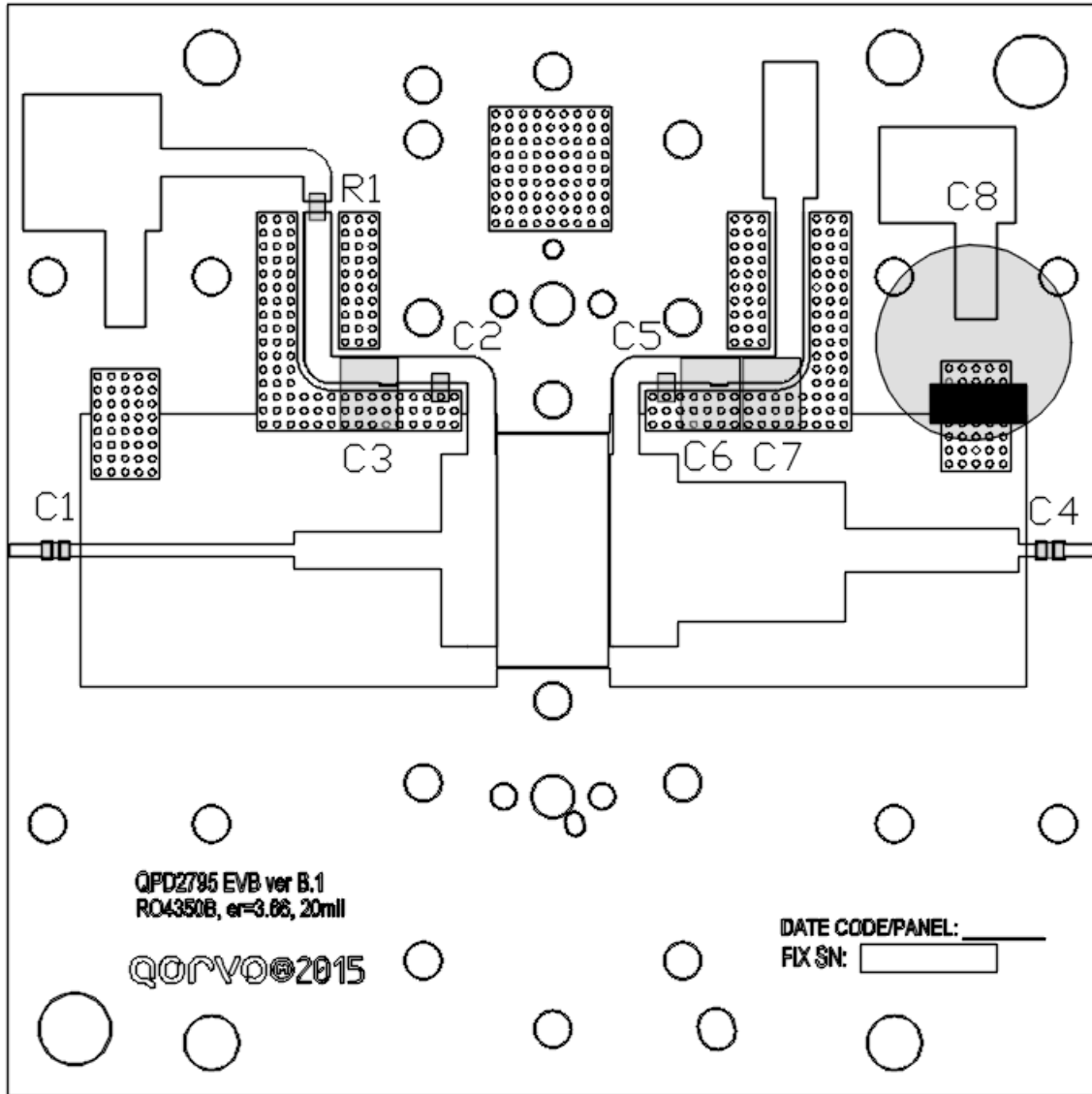


Load Pull at 2.69 GHz



Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 700\text{ mA}$, $T = +25^\circ\text{C}$, Pulse (10% duty cycle, 100 μs width).

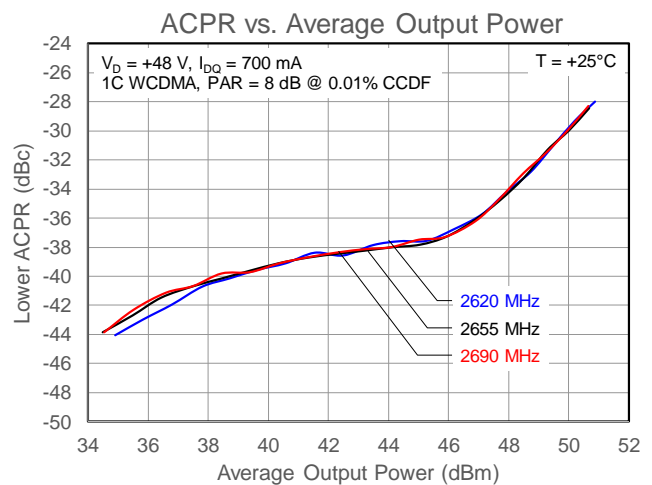
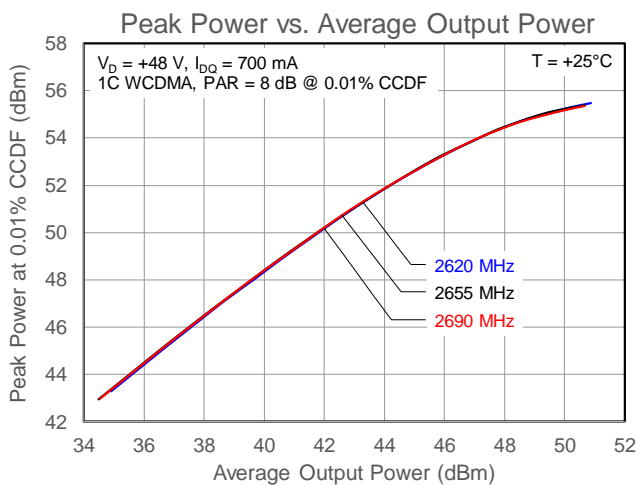
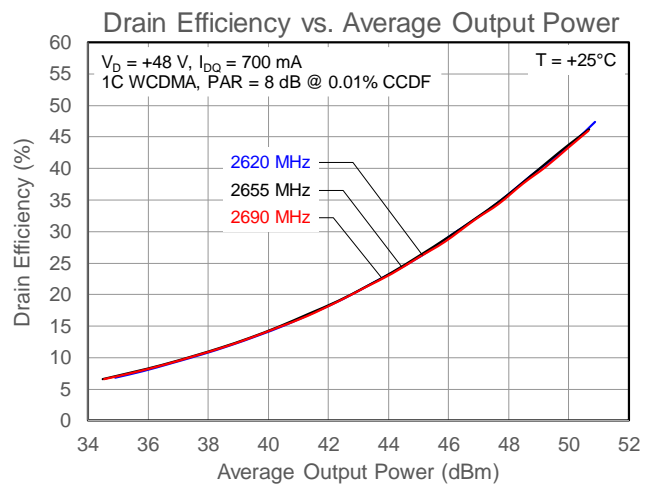
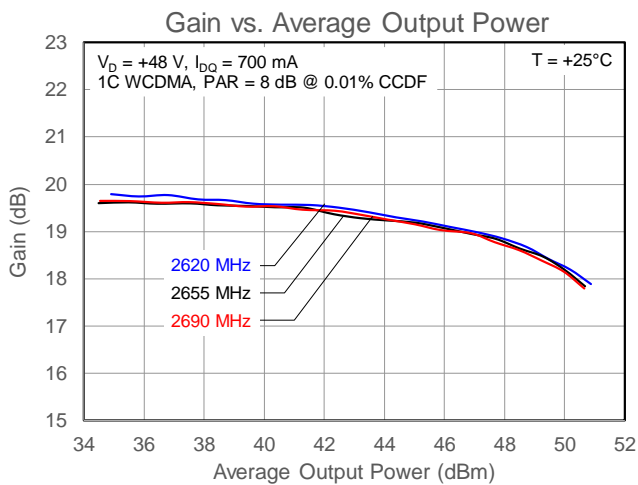
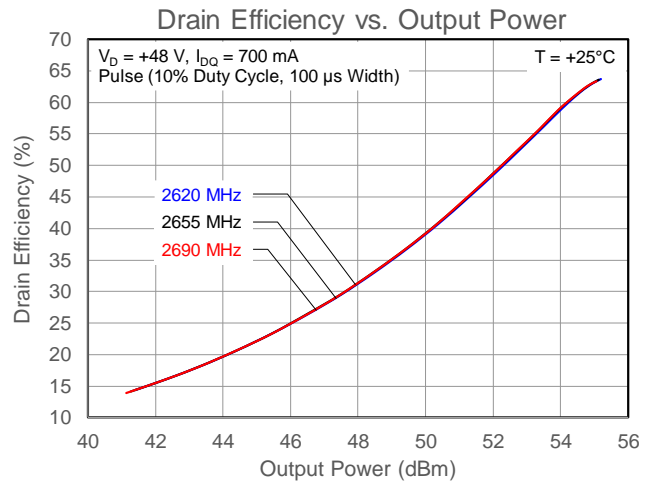
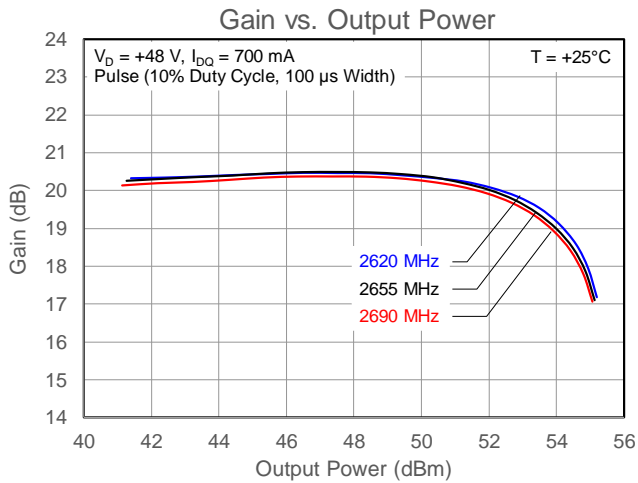
EVB Layout



Bill of Materials

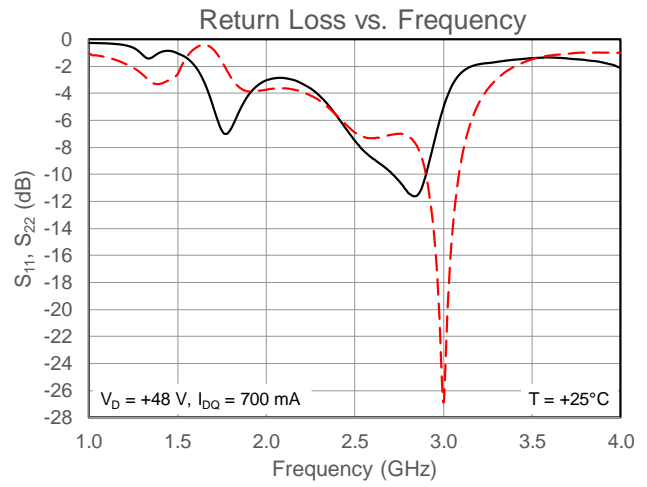
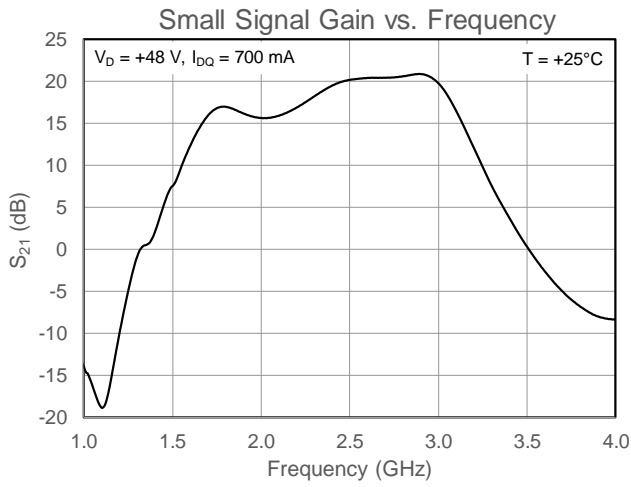
| Reference Designator | Value | Description | Manuf. | Part Number |
|----------------------|-------------|---|----------|---------------------|
| C1, C4 | 12 pF | Capacitor, 12 pF, 0805 | ATC | 600F |
| C2, C5 | 10 pF | Capacitor, 10 pF, 0603 | ATC | 600S |
| C3 | 10 μ F | Capacitor, 10 μ F, 50 V | TDK | C5750X7R1H106K230KB |
| C6, C7 | 10 μ F | Capacitor, 10 μ F, 100 V | TDK | C5750X7S2A106M230KB |
| C8 | 220 μ F | Capacitor, 220 μ F, 100 V, Electrolytic | Nichicon | - |
| R1 | 50 Ω | Resistor, 50 Ω | various | - |

Performance Plots



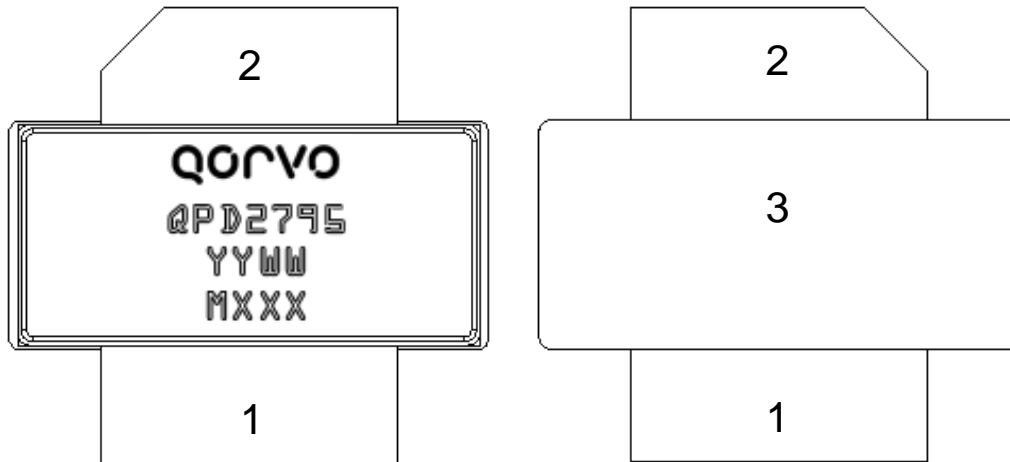
Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 700\text{ mA}$, $T = +25^\circ\text{C}$, on a reference design fixture tuned for 2.62 – 2.69 GHz.

Performance Plots



Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 700\text{ mA}$, $T = +25^\circ\text{C}$, on a reference design fixture tuned for 2.62 – 2.69 GHz.

Pin Configuration



Pin Description

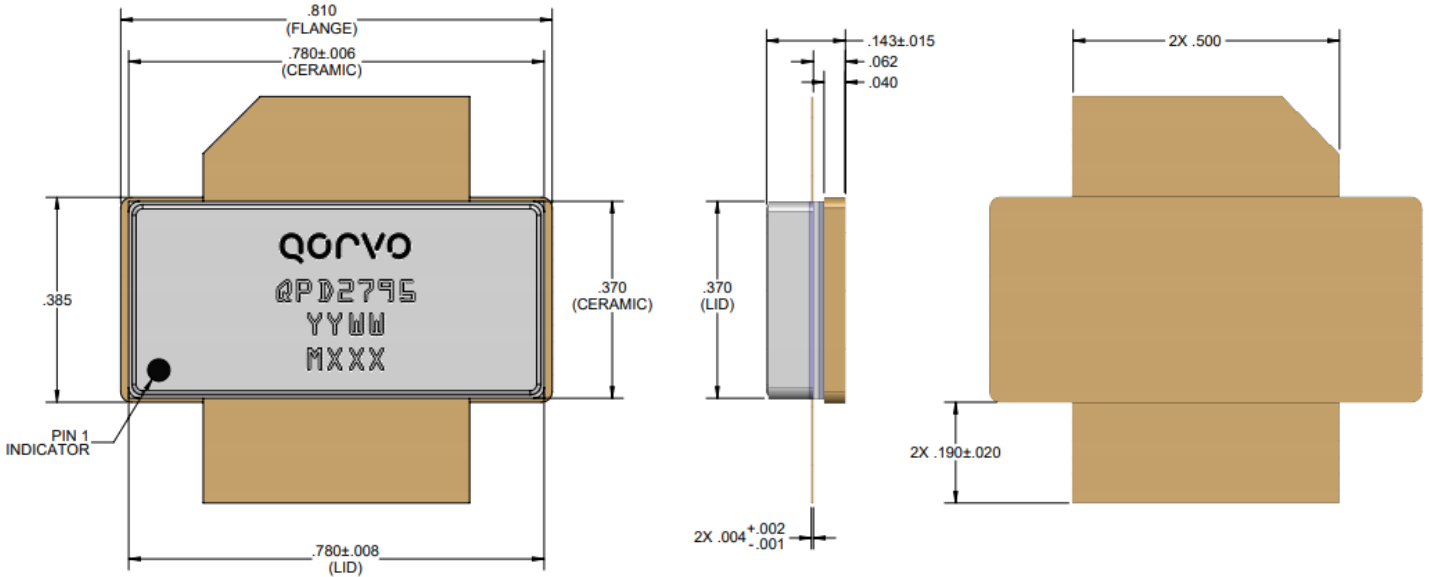
| Pin No. | Label | Description |
|---------------------|---------------|-----------------------|
| 1 | RF IN, V_G | RF Input, Gate Bias |
| 2 | RF OUT, V_D | RF Output, Drain Bias |
| 3 (Backside Paddle) | RF/DC GND | RF/DC Ground |

Bias Procedures

| Bias-up Procedure | Bias-down Procedure |
|---|---|
| 1. Turn ON $V_G = -4$ V. | 1. Turn OFF RF |
| 2. Turn ON $V_D = +48$ V | 2. Adjust V_G to -4 V. |
| 3. Adjust V_G until I_D is 700 mA. (Typically, $V_G = -2.7$ V.) | 3. Turn off V_D |
| 4. Turn ON RF. | 4. Wait two (2) seconds to allow drain capacitor to discharge |
| | 5. Turn OFF V_G |

Package Marking and Dimension¹⁻⁵

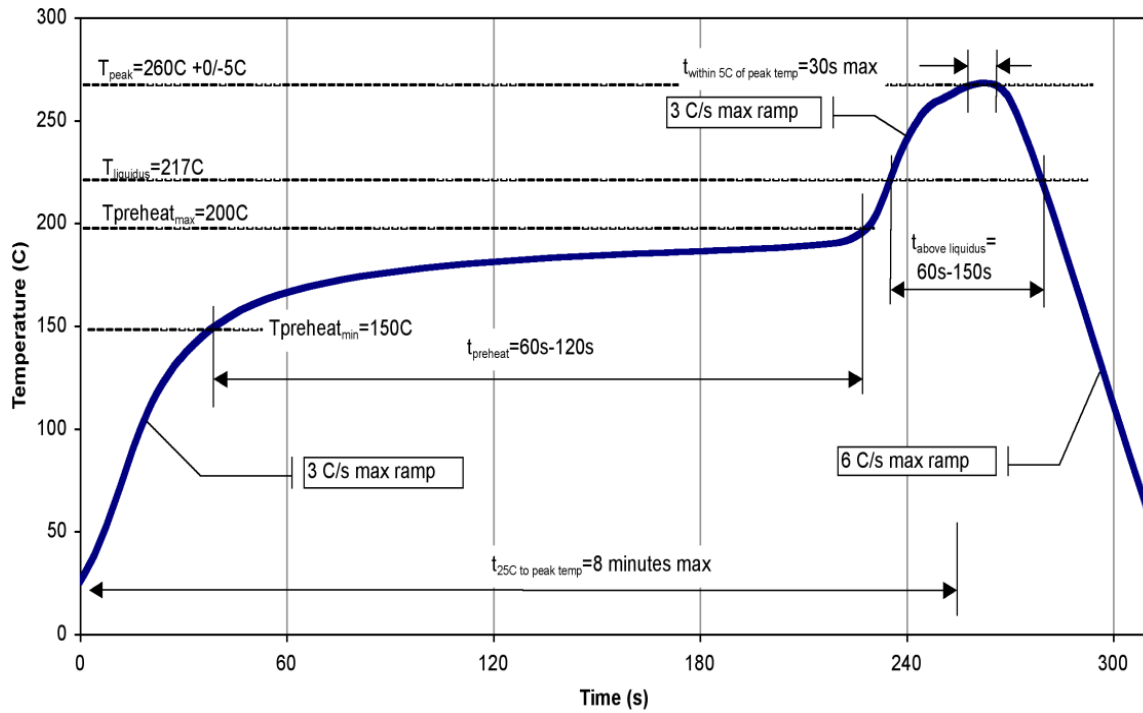
Marking: Qorvo Logo
 Product Name – QPD2795
 Date Code – YYWW
 Production Lot Number – MXXX



Notes: Unless Otherwise Specified;

1. Material:
 - Package Base: Ceramic/Metal
 - Package Lid: Ceramic
2. Package exposed metallization is Gold Plated
3. Part is epoxy sealed.
4. Part meets industry NI780 footprint.
5. Body dimensions do not include lid shift or epoxy run out, which can be up to 0.020" per side.
6. Dimensions are in inches. General tolerance is ± 0.005 ".

Recommended Solder Temperature Profile



Handling Precautions

| Parameter | Rating | Standard |
|----------------------------------|------------------|-------------------------------------|
| ESD – Human Body Model (HBM) | Class 1B (500V) | JEDEC Standard JS-001-2012 |
| ESD – Charged Device Model (CDM) | Class C3 (1000V) | JEDEC Standard JESD22-C101F |
| MSL – 260°C Convection Reflow | MSL3 | JEDEC standard IPC/JEDEC J-STD-020. |



Solderability

Compatible with lead-free (260°C maximum reflow temperature) soldering processes. The use of no-clean solder to avoid washing after soldering is recommended. Contact plating is NiAu. Au thickness is minimum 60 μin.

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:

- Product uses RoHS Exemption 7c-II to meet RoHS Compliance requirements.
- 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, and information about Qorvo:

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Tel: 1-844-890-8163

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