

Product Description

The QPD2730 is an asymmetric Doherty power device composed of pre-matched, discrete GaN on SiC HEMTs. The device operates from 2.575 to 2.635 GHz.

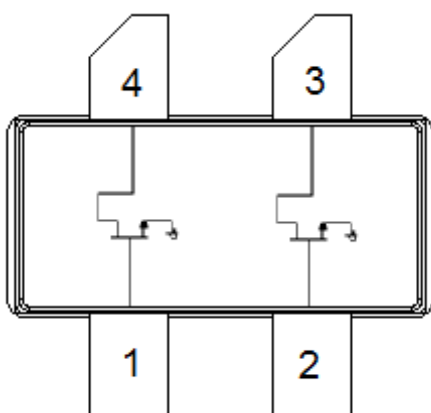
QPD2730 can deliver P_{AVG} of 36 W at +48 V operation.

ROHS compliant.



4 Lead NI780 Package

Functional Block Diagram



Product Features

- Operating Frequency Range: 2.575 – 2.635 GHz
- Peak Doherty Output Power: 53.7 dBm (234 W)
- Average Doherty Output Power: 45.6 dBm (36 W)
- Doherty Drain Efficiency: 54.7%
- Doherty Gain: 16.0 dB
- 4-lead, earless, ceramic flange NI780 package

Applications

- W-CDMA/LTE
- Macrocell Base Station
- Asymmetric Doherty Applications

Ordering Information

Part No.	ECCN	Description
QPD2730	EAR99	36 W (110/220), 2.6 GHz, GaN Doherty



Absolute Maximum Ratings

Parameter	Value / Range
Gate Current (I_G)	-21 to +21 mA
Drain Voltage (V_D)	+55 V
Peak RF Input Power	46 dBm
VSWR Mismatch, P1dB Pulse (10 % 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

Parameter	Min	Typ	Max	Units
Operating Temperature	-40	–	–	°C
Gate Voltage (V_{G1})	–	-2.7	–	V
Gate Voltage (V_{G2})	–	-4.75	–	V
Gate Current (I_{GQ})	-21	0.01	21	mA
Drain Voltage (V_{D1} , V_{D2})	–	48	–	V
Shutdown Voltage (V_{SV})	–	–	-4	V
Quiescent Current (I_{DQ1})	–	210	–	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 – Doherty Specifications

Parameter	Conditions	Min	Typ	Max	Units
Frequency Range		2575	–	2635	MHz
Quiescent Current		–	210	–	mA
Doherty Gain	$P_{AVG} = 45.6$ dBm	–	16.0	–	dB
Average Power		–	45.6	–	dBm
Peak Power	P3dB	–	53.7	–	dBm
Drain Efficiency	$P_{AVG} = 45.6$ dBm	–	54.7	–	%

Test conditions unless otherwise noted: $V_{G2} = -4.75$ V, $V_{D1} = V_{D2} = +48$ V, $I_{DQ1} = 210$ mA, T = 25°C, Frequency = 2605 MHz, 1C WCDMA signal, Input PAR = 7 dB at 0.01% CCDF

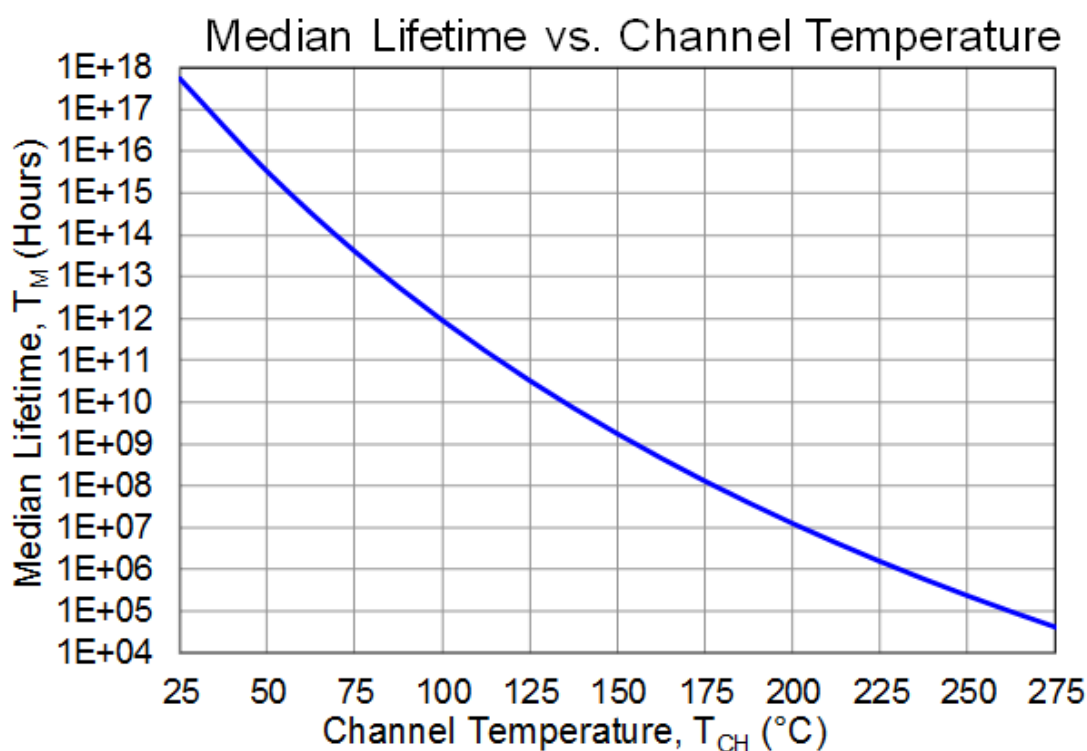
Thermal and Reliability Information

Parameter	Test Conditions	Value	Units
Thermal Resistance at Average Power (θ_{JC})	$T_{CASE} = 85^{\circ}\text{C}$, $T_{CH} = 128^{\circ}\text{C}$, CW: $P_{DISS} = 18.6\text{W}$, $P_{OUT} = 29.0\text{W}$	2.27	$^{\circ}\text{C/W}$

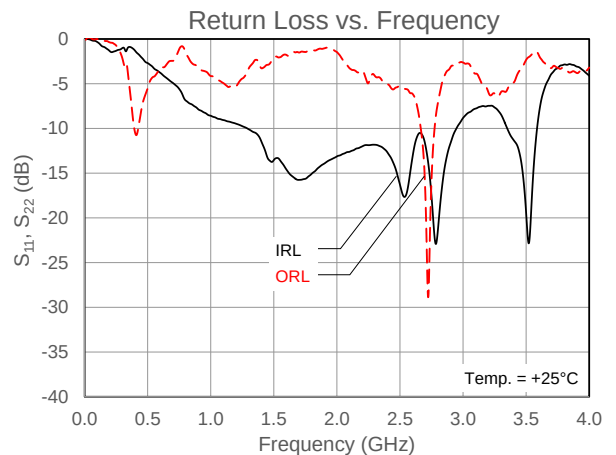
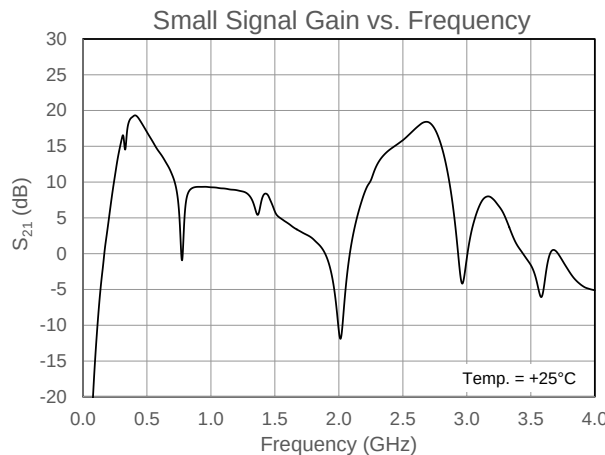
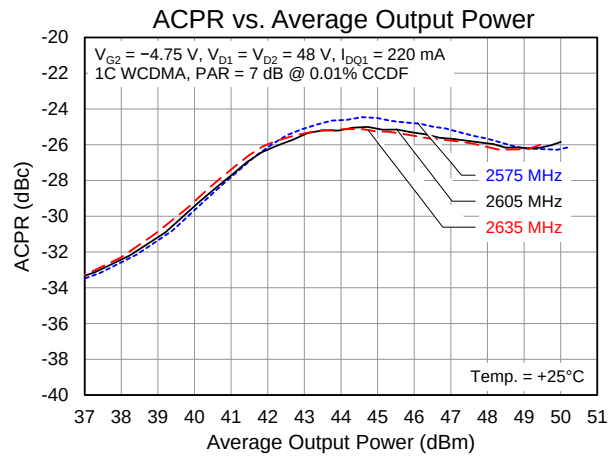
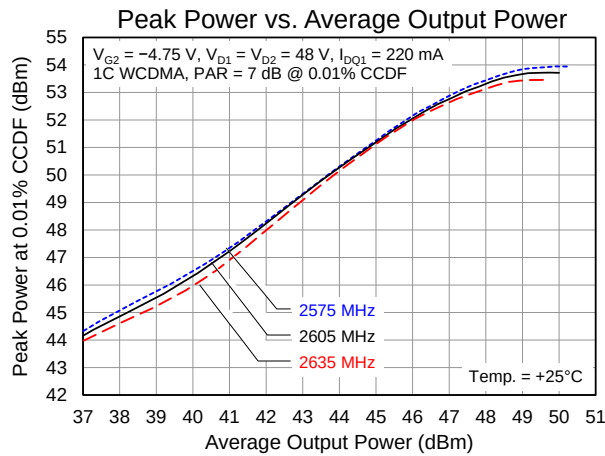
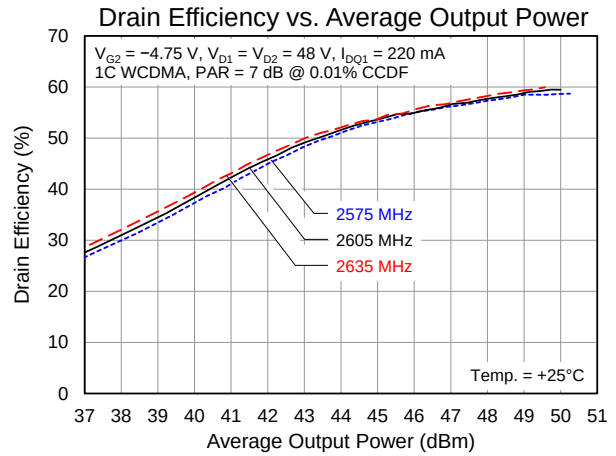
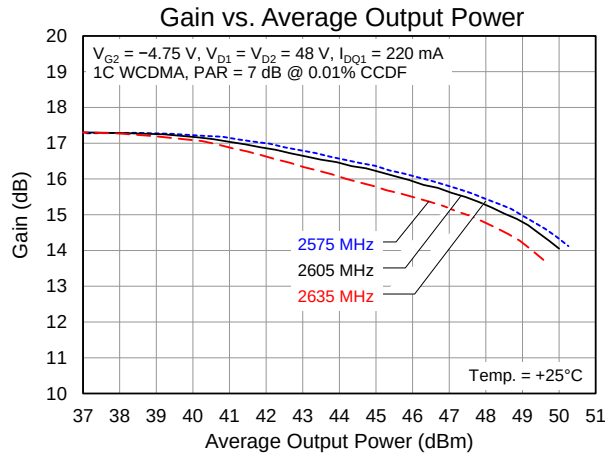
Notes:

1. Thermal resistance measured to package backside.
2. Based on expected carrier amplifier efficiency of Doherty.
3. P_{OUT} assumes 20% peaking amplifier contribution of total average Doherty rated power.

Median Lifetime



Doherty Performance Plots



Test conditions unless otherwise noted: $V_{G2} = -4.75 \text{ V}$, $V_{D1} = V_{D2} = +48 \text{ V}$, $I_{DQ1} = 210 \text{ mA}$, $T = 25^\circ\text{C}$, Frequency = 2605 MHz, 1C WCDMA signal, Input PAR = 7 dB at 0.01% CCDF

RF Characterization – Power-Tuned Carrier Load Pull Performance

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2575	17.710 – j14.460	16.414 – j0.156	15.48	50.74	60.50
2600	17.240 – j11.430	16.412 – j0.184	15.50	50.73	61.54
2635	21.810 – j10.050	16.416 – j0.189	15.24	50.67	61.73

Test conditions unless otherwise noted: $V_{D1} = +48\text{ V}$, $I_{DQ1} = 210\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

RF Characterization – Efficiency-Tuned Carrier Load Pull Performance

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2575	17.710 – j14.460	8.846 – j9.607	17.92	48.95	73.51
2600	17.240 – j11.430	9.966 – j11.333	17.43	48.94	73.79
2635	21.810 – j10.050	11.869 – j9.968	17.03	49.37	72.96

Test conditions unless otherwise noted: $V_{D1} = +48\text{ V}$, $I_{DQ1} = 210\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

RF Characterization – Power-Tuned Peaking Amplifier Load Pull Performance

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2575	10.510 – j8.480	10.438 – j5.787	16.17	54.09	66.57
2600	10.330 – j6.500	10.873 – j3.769	15.63	54.09	63.55
2635	10.750 – j3.760	11.119 – j3.758	15.45	53.98	62.43

Test conditions unless otherwise noted: $V_{D2} = +48\text{ V}$, $I_{DQ2} = 410\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

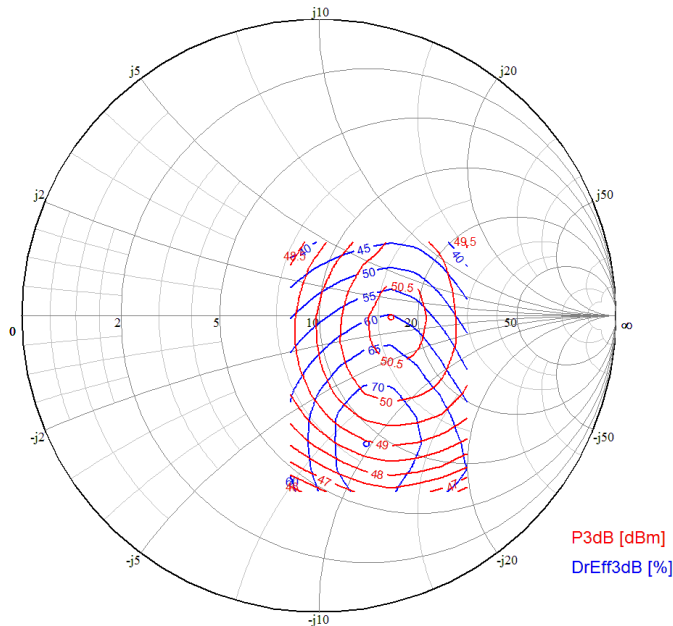
RF Characterization – Efficiency-Tuned Peaking Amp. Load Pull Performance

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
2575	10.510 – j8.480	6.319 – j9.729	17.62	52.82	74.01
2600	10.330 – j6.500	6.310 – j9.732	17.38	52.57	74.50
2635	10.750 – j3.760	6.309 – j9.711	17.50	52.35	72.97

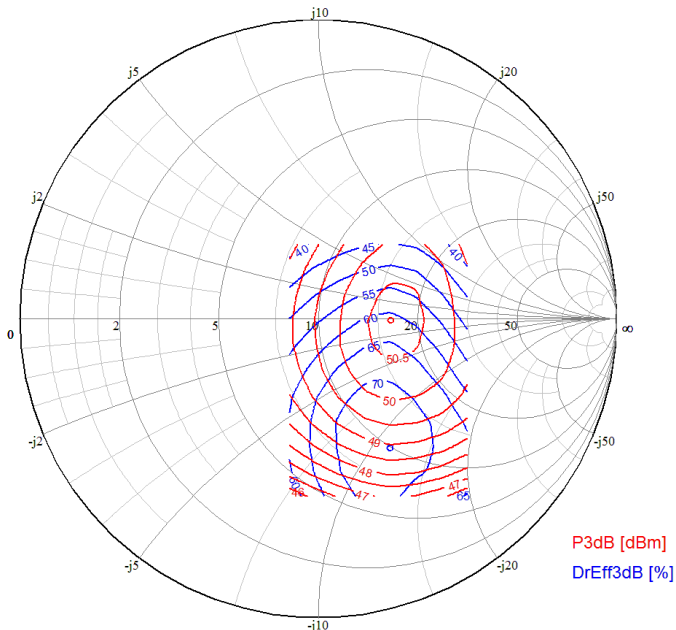
Test conditions unless otherwise noted: $V_{D2} = +48\text{ V}$, $I_{DQ2} = 410\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

Carrier Amplifier Load Pull Plots

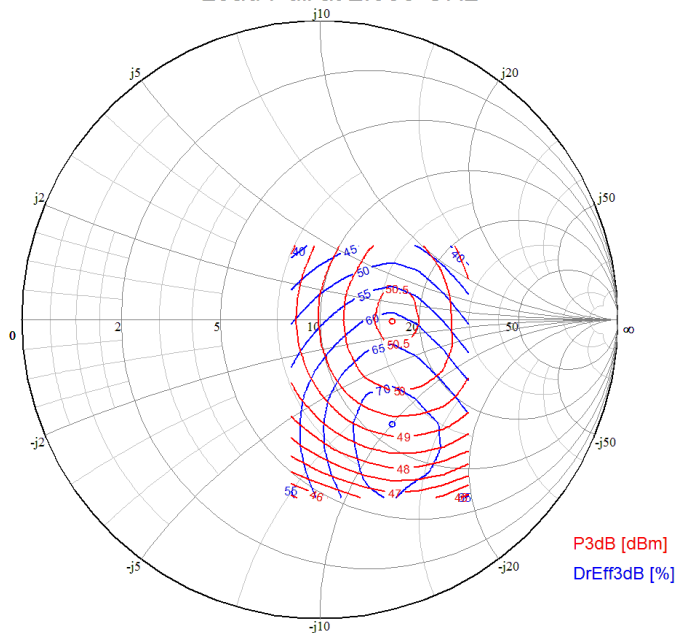
Load Pull at 2.575 GHz



Load Pull at 2.6 GHz



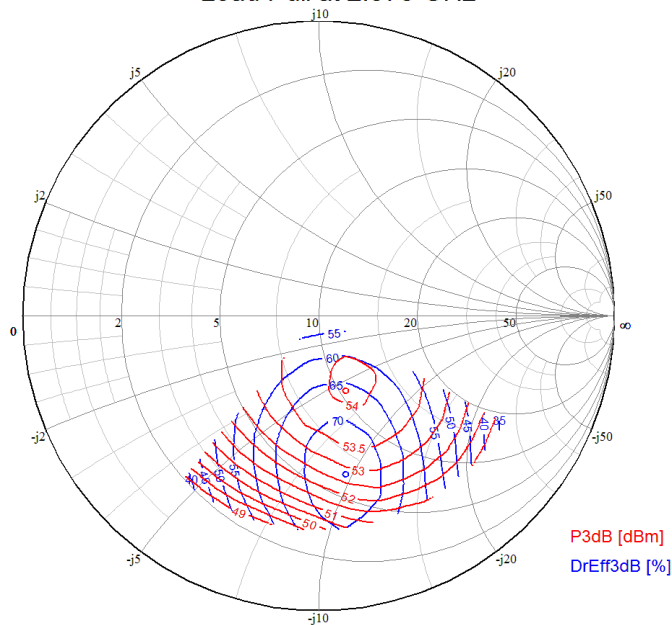
Load Pull at 2.635 GHz



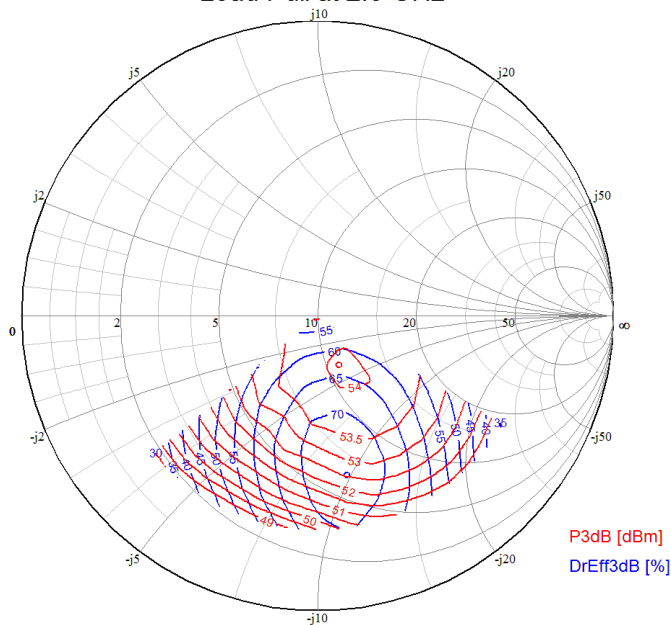
Test conditions unless otherwise noted: $V_{D1} = +48\text{ V}$, $I_{DQ1} = 210\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

Peaking Amplifier Load Pull Plots

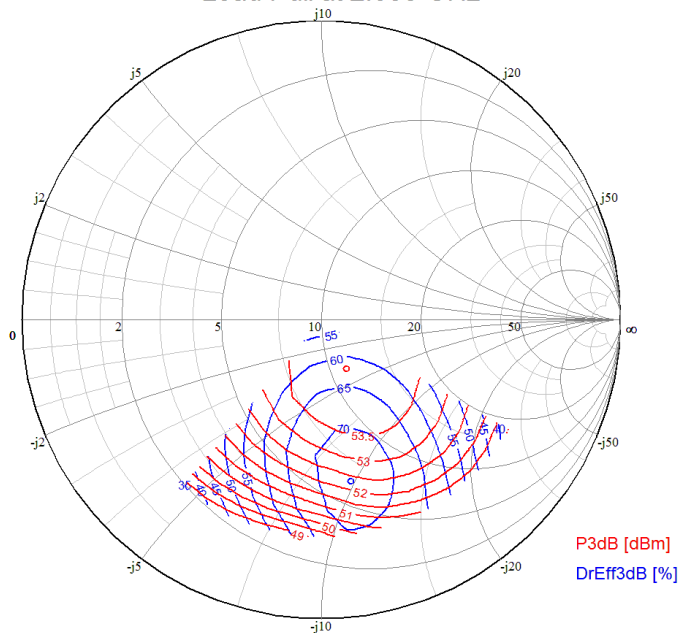
Load Pull at 2.575 GHz



Load Pull at 2.6 GHz

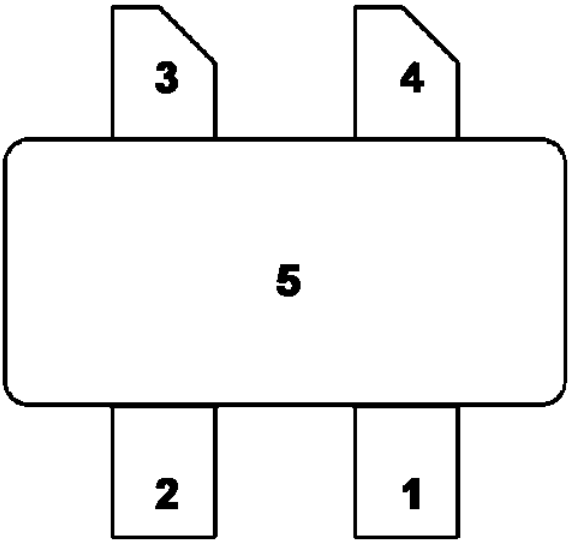
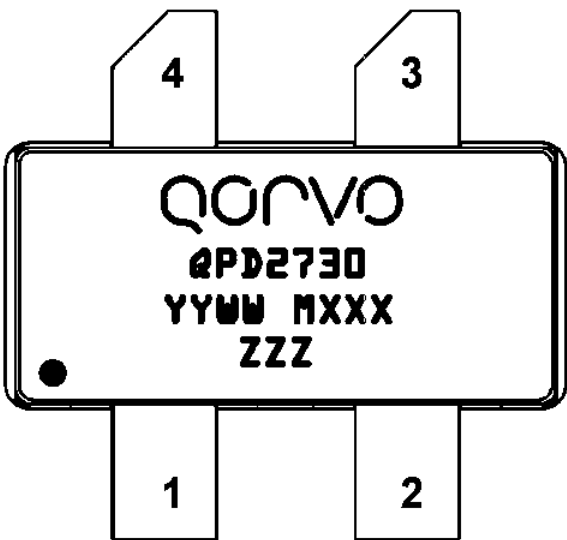


Load Pull at 2.635 GHz



Test conditions unless otherwise noted: $V_{D2} = +48\text{ V}$, $I_{DQ2} = 410\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed (10% duty cycle, 100 μs width)

Pin Configuration



Pin Description

Pin No.	Label	Description
1	RF IN 1, V_{G1}	Carrier Amplifier RF Input, Gate Bias
2	RF IN 2, V_{G2}	Peaking Amplifier RF Input, Gate Bias
3	RF OUT 2, V_{D2}	Peaking Amplifier RF Output, Drain Bias
4	RF OUT 1, V_{D1}	Carrier Amplifier RF Output, Drain Bias
5 (Backside Paddle)	RF/DC GND	RF/DC Ground

Package Marking and Dimensions

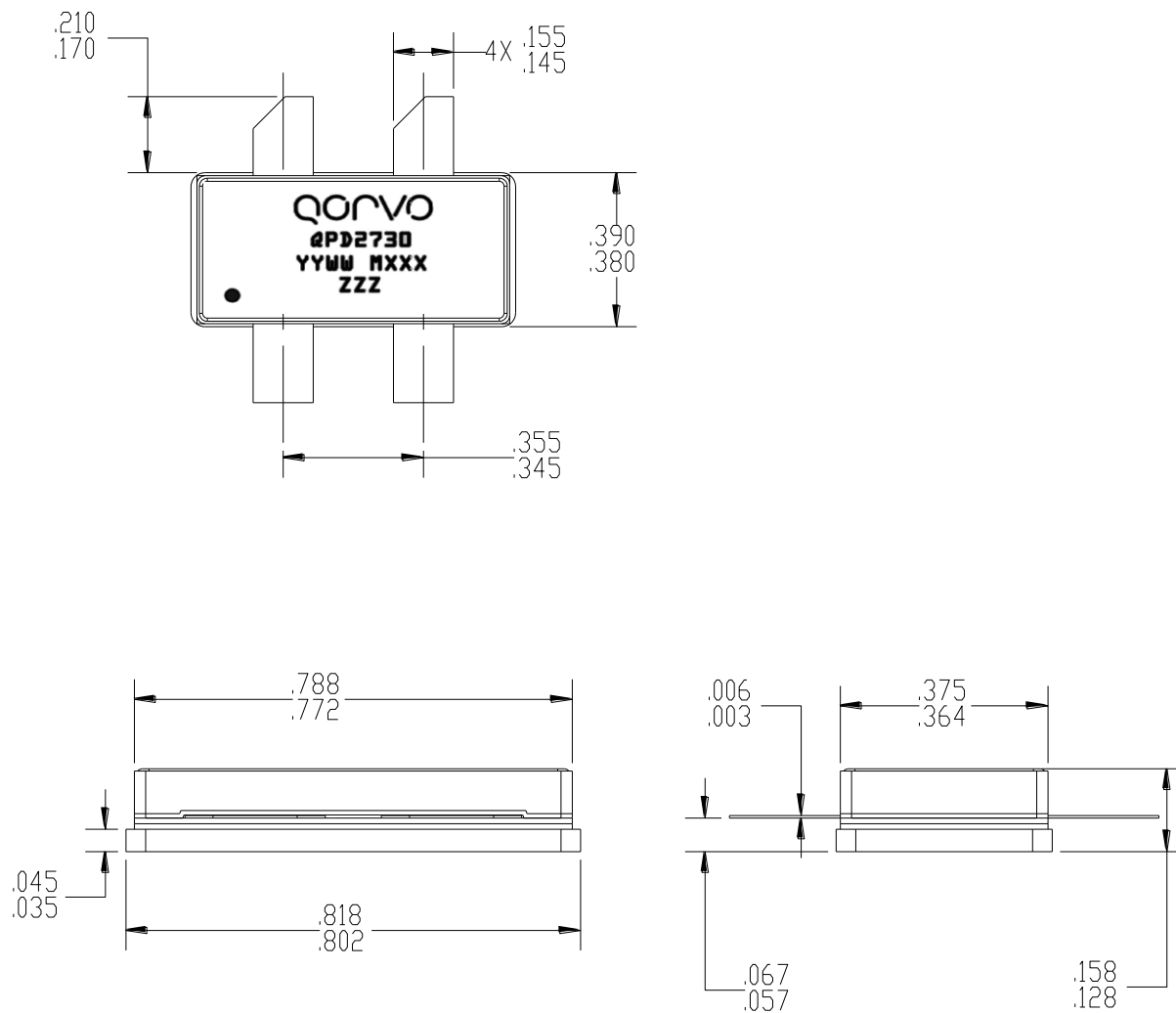
Marking: Qorvo Logo

Part Number and Package Version – QPD2730

Date 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.

Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	TBD	JEDEC Standard JESD22 A114
ESD – Charged Device Model (CDM)	TBD	JEDEC Standard JESD22-C101F
MSL – 260 °C Convection Reflow	TBD	JEDEC standard IPC/JEDEC J-STD-020.



Caution!
ESD-Sensitive Device

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 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:

- Antimony Free
- TBBP-A (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

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