

Product Description

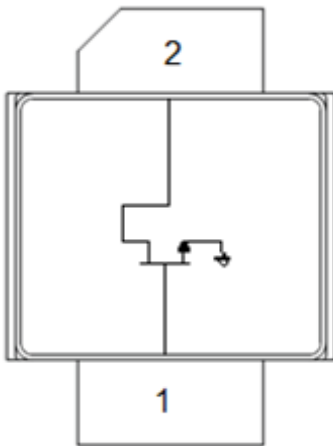
The QPD3800 is a discrete GaN on SiC HEMT which operates from 3.4–3.8 GHz. The device is a single stage matched power amplifier transistor.

The QPD3800 can be used in Doherty architecture for the final stage of a base station power amplifier for small cell, microcell, macrocell, and active antenna systems. The QPD3800 can also be used as a driver in a macrocell base station power amplifier.

QPD3800 can deliver P_{SAT} of 85 W at +48 V operation.

ROHS compliant.

Functional Block Diagram



2 Lead NI400 Package

Product Features

- Operating Frequency Range: 3.4 – 3.8 GHz
- Operating Drain Voltage: +48 V
- Maximum Output Power (P_{SAT}): 85 W
- Maximum Drain Efficiency: 70%
- Efficiency-Tuned P3dB Gain: 19 dB
- 2-lead, earless, ceramic flange NI400 package

Applications

- W-CDMA/LTE
- Macrocell Base Station
- Microcell Base Station Final Stage
- Small Cell Final Stage
- Active Antenna
- General Purpose Applications

Ordering Information

Part No.	ECCN	Description
QPD3800TR13	3A001.b.3.a.4	13" reel with 250 pieces

Absolute Maximum Ratings

Parameter	Range / Value	Units
Gate Voltage (V_G)	-10	V
Drain Voltage (V_D)	+55	V
Peak RF Input Power	38	dBm
VSWR Mismatch, P1dB Pulse (20 % duty cycle, 100 μ s width), $T = 25^\circ\text{C}$	10:1	-
Storage Temperature	-65 to +150	$^\circ\text{C}$

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	-	-	$^\circ\text{C}$
Gate Current (I_G)	-	-	-	mA
Gate Voltage (V_G)	-	-2.7	-	V
Drain Voltage (V_D)	-	48	-	V
Quiescent Current (I_{DQ})	-	180	-	mA
T_{CH} for $>10^6$ hours MTTF	-	-	225	$^\circ\text{C}$

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

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
3400	15.39 – j20.22	10.75 – j4.28	16.8	49.2	58.7
3600	28.35 – j15.62	13.32 – j2.24	17.1	49.2	59.7
3800	25.46 + j7.46	12.78 + j0.92	16.9	49.1	58.5

Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 180\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed 10% duty cycle, 100 μ s width)

RF Characterization – Efficiency-Tuned Load Pull Performance

Frequency (MHz)	Source Impedance	Load Impedance	Gain @ P3dB (dB)	P3dB (dBm)	Drain Efficiency (%)
3400	15.39 – j20.22	6.21 – j8.85	17.9	48.0	70.4
3600	28.35 – j15.62	9.78 – j9.27	19.0	48.0	70.5
3800	25.46 + j7.46	14.80 – j10.94	18.9	47.3	68.5

Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 180\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed 10% duty cycle, 100 μ s width)

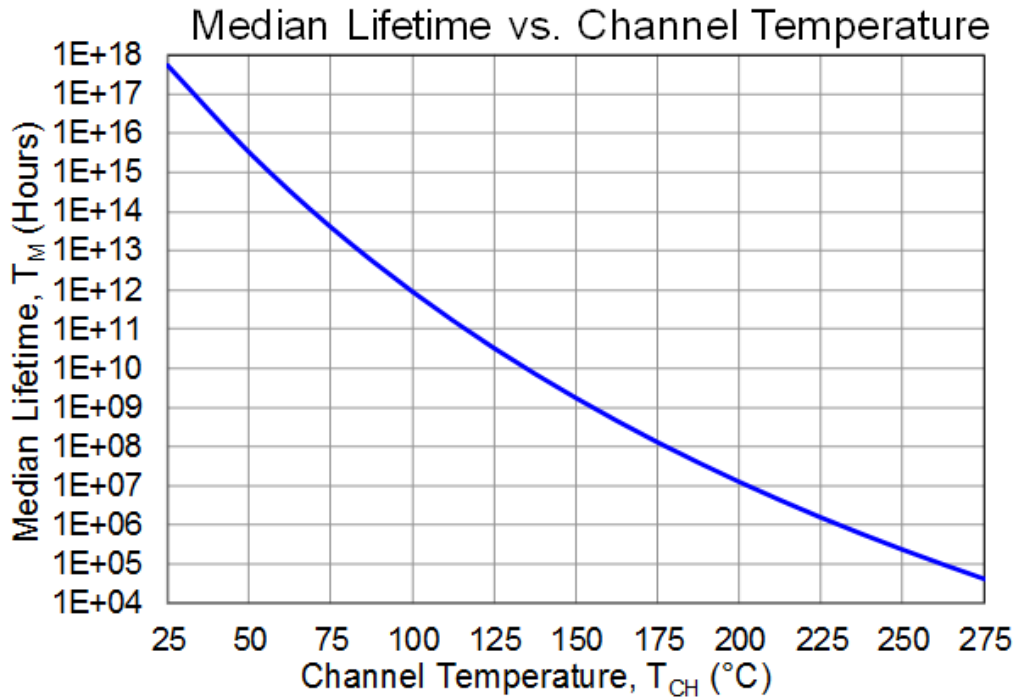
Thermal and Reliability Information

Parameter	Test Conditions	Value	Units
Thermal Resistance at Average Power (θ_{JC})	$T_{CASE} = 105^{\circ}C$, $T_{CH} = 171^{\circ}C$ CW: $P_{DISS} = 24 W$, $P_{OUT} = 28 W$	2.71	$^{\circ}C/W$

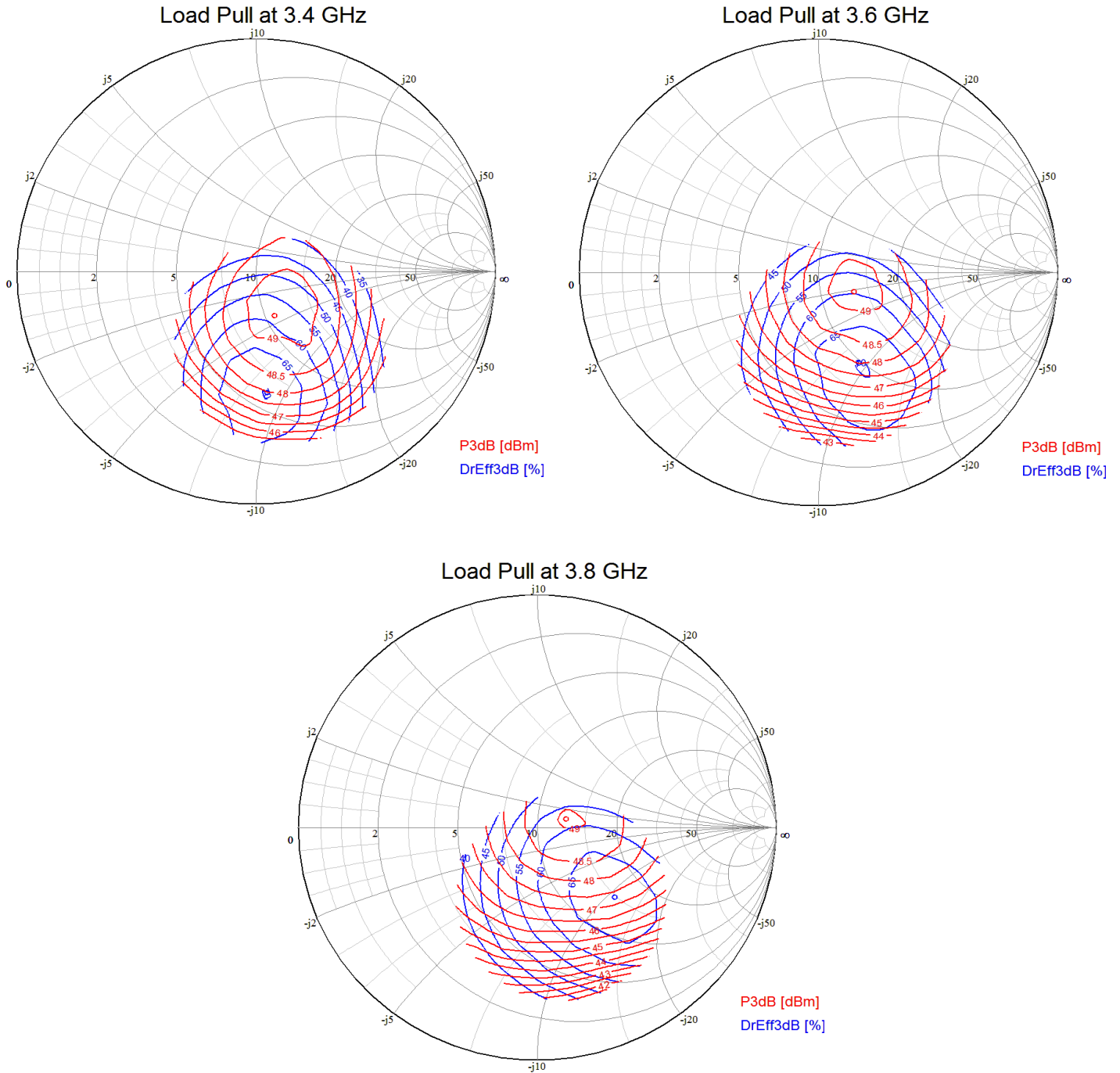
Notes:

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

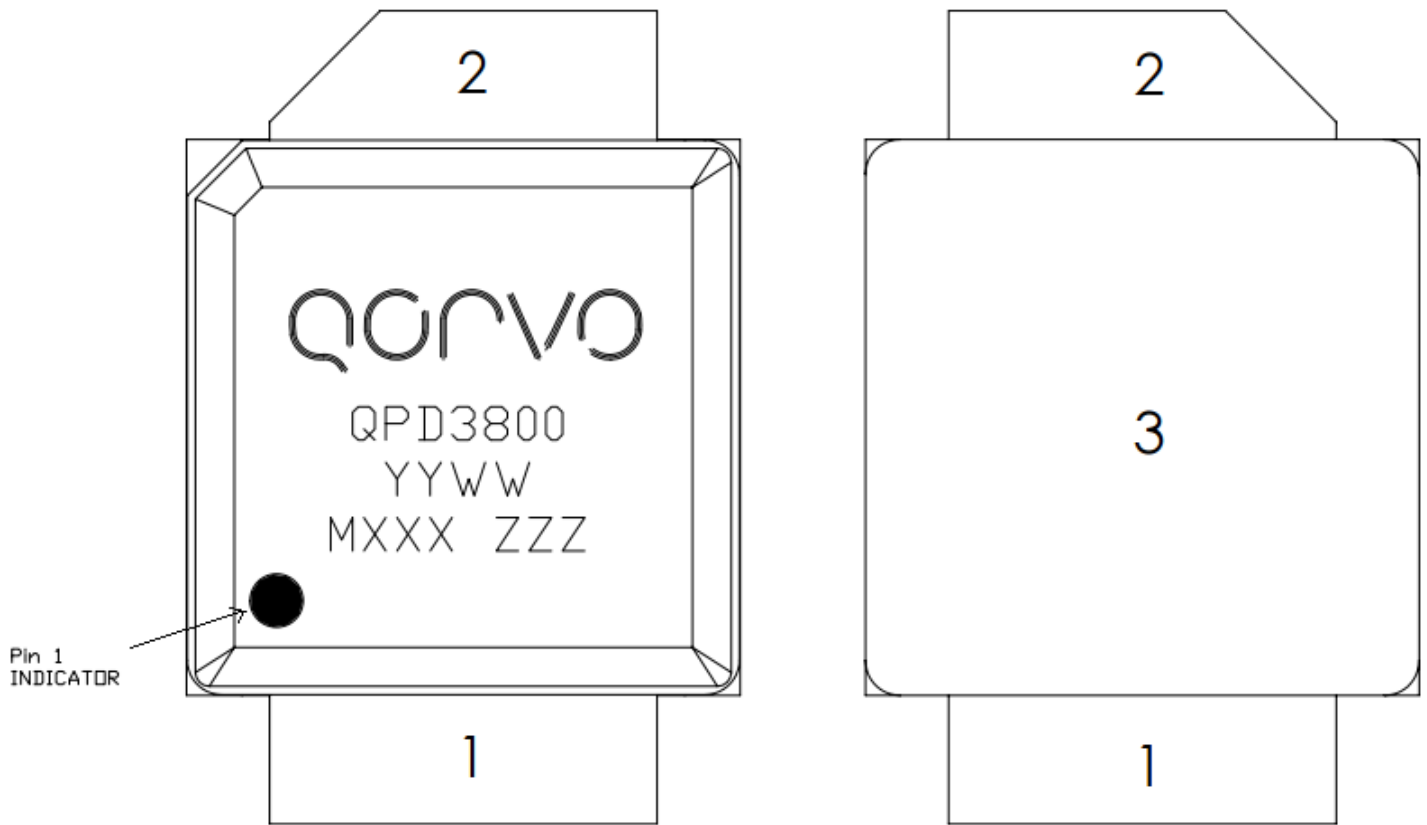


Load Pull Plots



Test conditions unless otherwise noted: $V_D = +48\text{ V}$, $I_{DQ} = 180\text{ mA}$, $T = 25^\circ\text{C}$, Pulsed 10% duty cycle, 100 μs width)

Pin Configuration

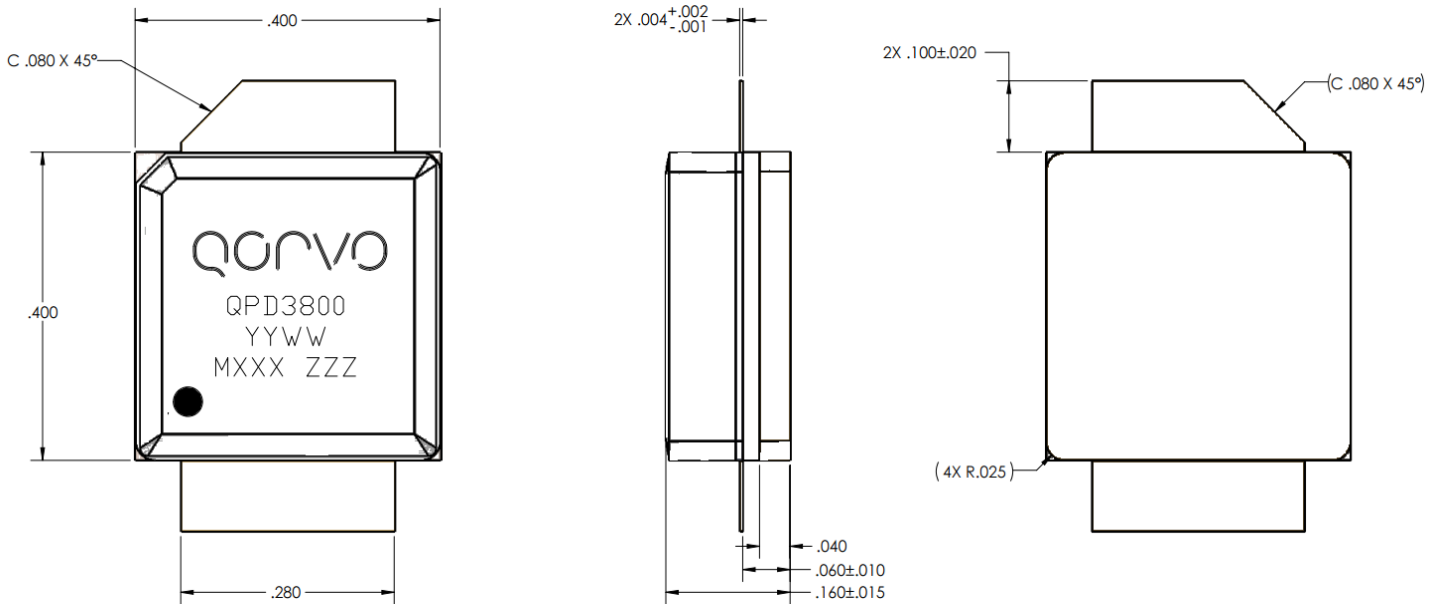


Pin Description

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

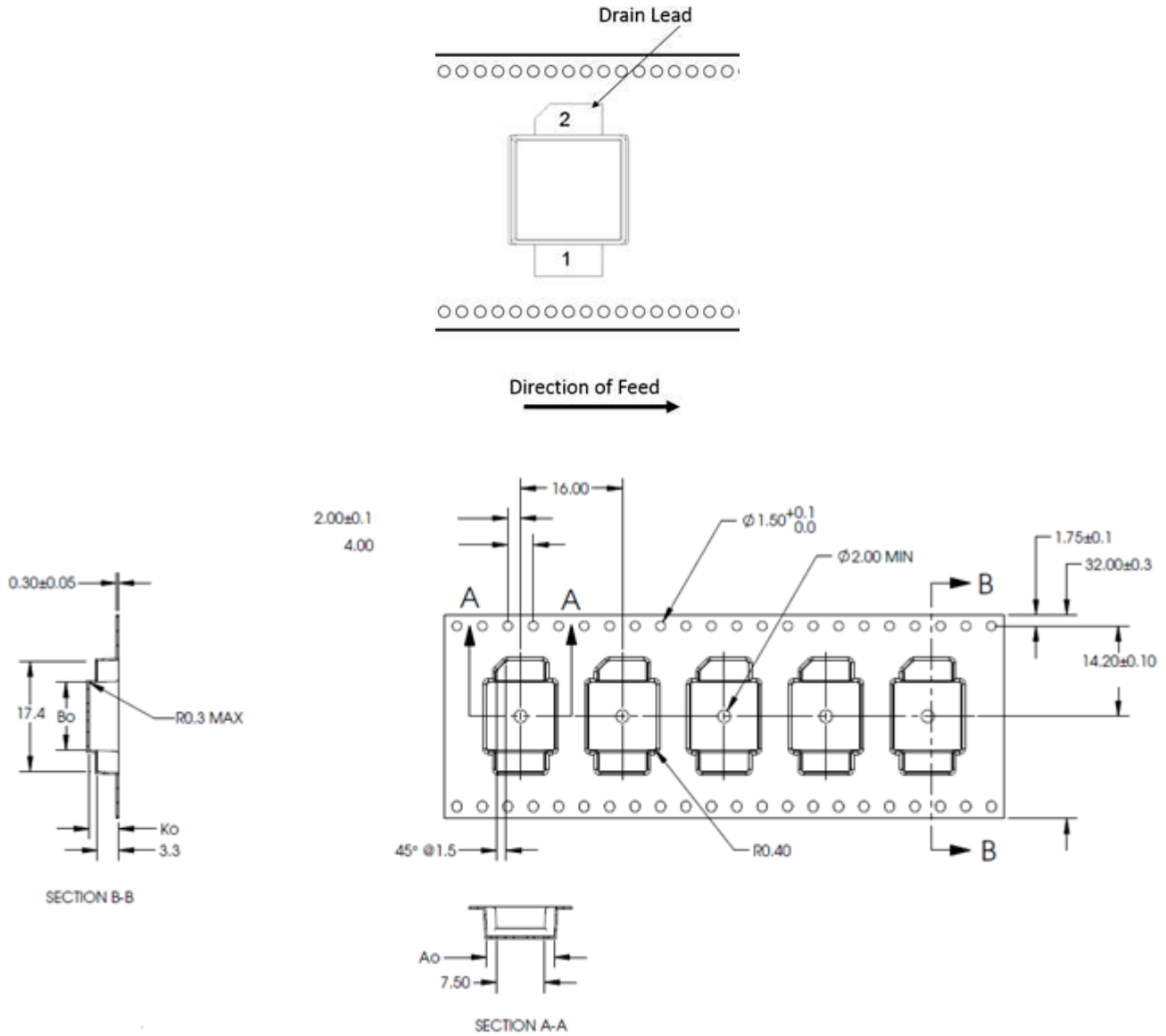
Package Marking and Dimensions

Marking: Qorvo Logo
 Part Number and Package Version – QPD3800
 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.

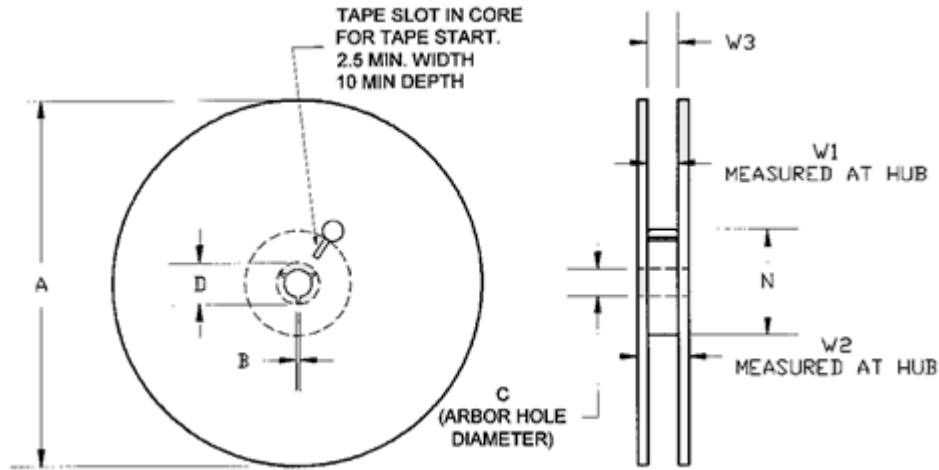
Tape and Reel Information – Carrier and Cover Tape Dimensions



Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.417	10.60
	Width	B0	0.419	10.65
	Depth	K0	0.181	4.60
	Pitch	P1	0.630	16
Centerline Distance	Cavity to Perforation – Length Direction	P2	0.079	2.00
	Cavity to Perforation – Width Direction	F	0.559	14.20
Cover Tape	Width	C	1.004	25.50
Carrier Tape	Width	W	1.260	32

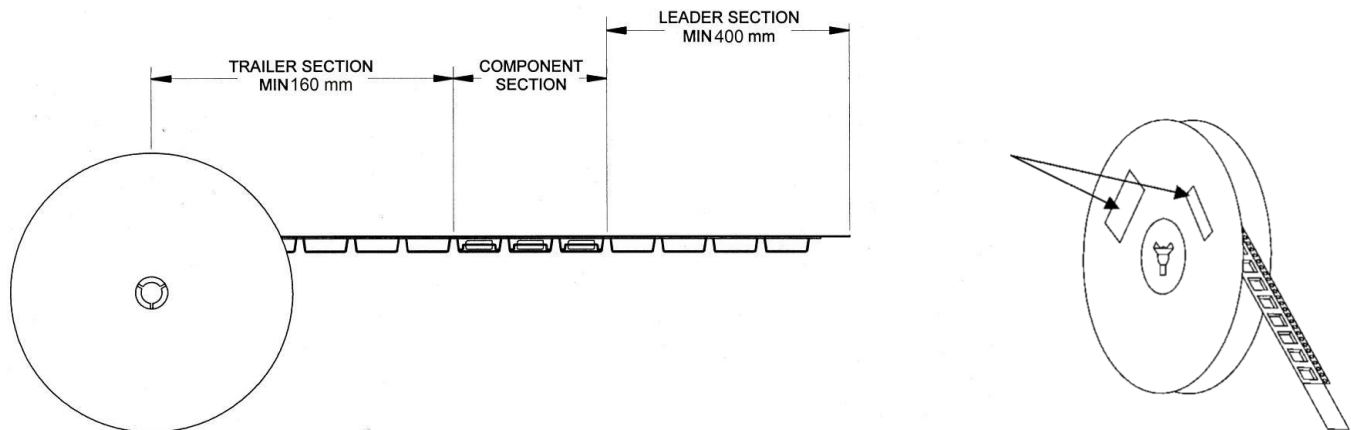
Tape and Reel Information – Reel Dimensions

Standard T/R size = 250 pieces on a 13" reel.



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	12.992	330.0
	Thickness	W2	1.504	38.2
	Space Between Flange	W1	1.291	32.8
Hub	Outer Diameter	N	4.016	102.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.787	20.0

Tape and Reel Information – Tape Length and Label Placement



Notes:

1. Empty part cavities at the trailing and leading ends are sealed with cover tape. See EIA 481-1-A.
2. Labels are placed on the flange opposite the sprockets in the carrier tape.