

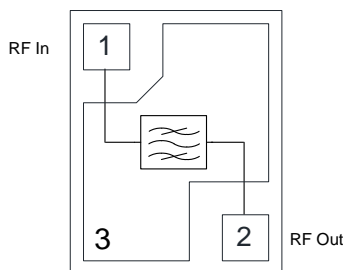
### General Description

The QPQ1288 is a high performance Bulk Acoustic Wave (BAW) filter designed to meet the strict LTE rejection requirements for use in B40, Sub-Band 2300-2390 MHz

QPQ1288 is specifically designed to meet the high performance expectations of insertion loss and rejection for LTE TDD systems under all operating conditions.

The QPQ1288 uses common module packaging techniques to achieve the industry standard 2.0 x 1.6 x 0.73 mm footprint.

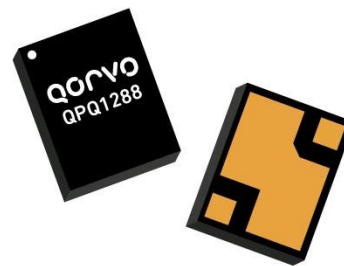
### Functional Block Diagram



Top View


### Pin Configuration

Pin No.	Label
1	RF in
2	RF out
3	Ground



3 Pin 2 x 1.6 mm leadless SMT Package

### Product Features

- Highly selective BAW filter achieving low insertion loss over full bandwidth and operating conditions
- Performance -20 to +90 °C
- Excellent Wi-Fi rejection
- Single-ended operation
- No Matching required for operation at 50  $\Omega$
- High Power Handling Compatible for Small Cells
- Small Size
- RoHS compliant (2002/95/EC), Pb-free 

### Applications

- For Band 40 TD-LTE applications
- 2300 – 2390 MHz Sub-Band
- For Small Cells Base Stations

### Ordering Information

Part No.	Description
QPQ1288SR	100 pieces on a 7" reel
QPQ1288TR7	2,500 pieces on a 7" reel (standard)
QPQ1288EVB	Evaluation Board

### Absolute Maximum Ratings

Parameter	Rating
Storage Temperature <sup>(1)</sup>	-40 to +125 °C
Operating Temperature <sup>(2)</sup>	-40 to +105°C

<sup>(1)</sup> Operation of this device outside the parameter ranges given may cause permanent damage.

<sup>(2)</sup> Device will function but it is not guaranteed to meet electrical specifications.

### Life Test

Conditions	Rating
+29 dBm, LTE SIGNAL PAR = 8dB, 5MHz, 16 QAM + 90 °C	>10 yrs.

Power rating is valid when Power is injected into Pin 1 or Pin 2

### Electrical Specifications <sup>(1)</sup>

Test conditions unless otherwise specified. Temperature Range: -20 to +90 °C

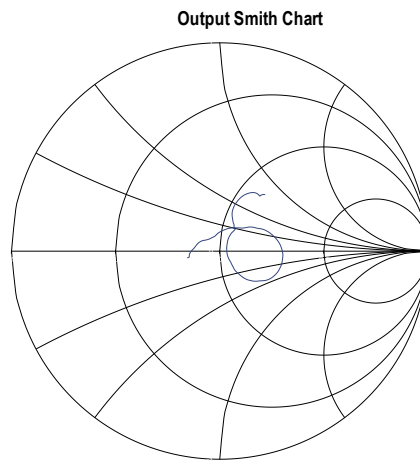
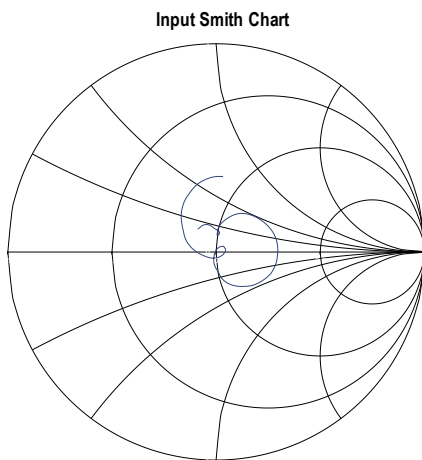
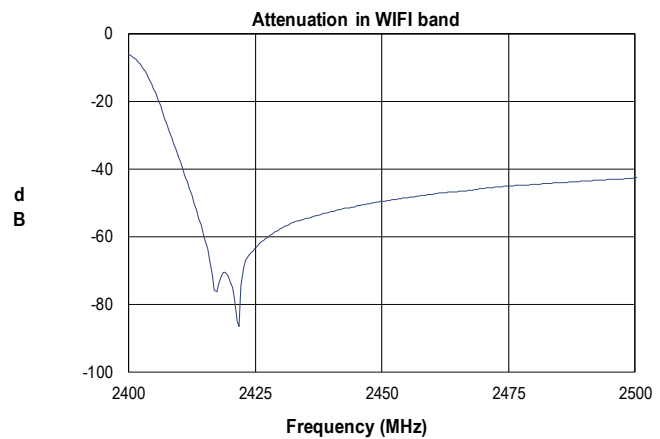
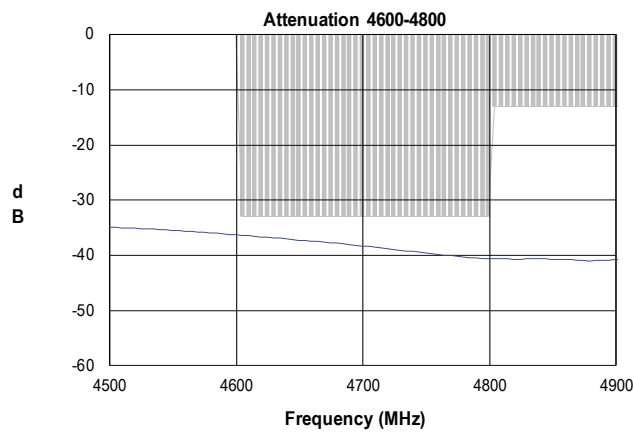
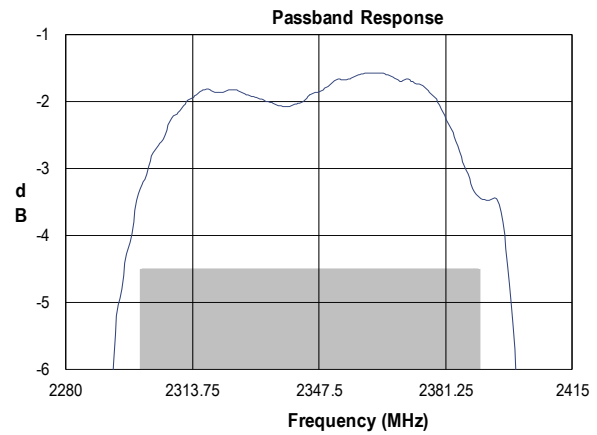
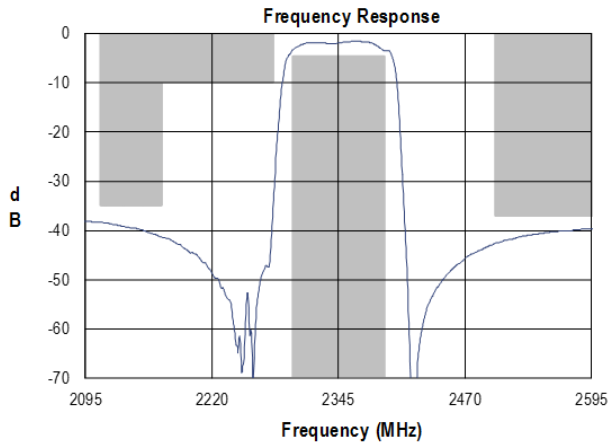
Parameter	Conditions	Min	Typ	Max	Units
Average Insertion Loss <sup>(2)</sup>	2300 – 2310	-	2.8	3.5	dB
	2310 – 2370 (Over any 10 MHz)	-	2.1	2.8	dB
	2370 – 2380	-	2.1	2.8	dB
	2380 – 2390	-	2.8	3.5	dB
Input / Output VSWR	2300.0–2390.0 MHz	-	2:1	2.4:1	-
Input / Output Return Loss	2300.0–2390.0 MHz	7.7	9.0	-	dB
Amplitude Variation <sup>(3)</sup> (over any 10 MHz window)	2300.0–2390.0 MHz	-	1.2	2.0	dB
	2305.0–2385.0 MHz	-	0.7	1.6	dB
Group Delay Ripple <sup>(4)</sup> (over any 10 MHz window)	2300.0–2390.0 MHz	-	15	30	ns p-p
Phase Ripple <sup>(4)</sup> (over any 10 MHz window)	2300.0–2390.0 MHz	-	7	25	° p-p
Attenuation in WIFI Band <sup>(5)</sup> (Average per Channel using 802.11b Spectrum mask)	2401 – 2423 MHz (Channel 1)	11	37	-	dB
	2406 – 2428 MHz (Channel 2)	22	46	-	
	2411 – 2433 MHz (Channel 3)	52	62	-	
	2416 – 2463 MHz (Channel 4 - 9)	50	56	-	
	2446 – 2468 MHz (Channel 10)	46	48	-	
	2451 – 2473 MHz (Channel 11)	45	47	-	
	2456 – 2478 MHz (Channel 12)	44	46	-	
	2461 – 2483 MHz (Channel 13)	42	44	-	
Attenuation <sup>(7)</sup>	2473 – 2495 MHz (Channel 14)	41	43	-	dB
	10 – 766 MHz	50	55	-	
	791 – 960 MHz	47	49	-	
	1150 – 1195 MHz	35	44	-	
	1574.4 – 1576.4 MHz	37	40	-	
	1710 – 2170 MHz	35	38	-	
	2170 – 2275 MHz	10	37	-	
	2500 – 2690 MHz	36	39	-	
	3400 – 3500 MHz	35	39	-	
	4600 – 4800 MHz	32	36	-	
	5150 – 5850 MHz	20	23	-	
	6000 – 8000 MHz	13	17	-	
2 <sup>nd</sup> Harmonic <sup>(8)</sup>	Pin = +29 dBm (2300-2390 MHz)	55	80		dBc
Source/Load Impedance <sup>(9)</sup>	Single-ended	-	50	-	Ω

#### Notes:

- All specifications are based on the QORVO schematic for the main reference design shown on page 5.
- Average Insertion Loss is calculated by averaging |S<sub>21</sub>| in dB for each measured point within defined frequency range
- Amplitude Variation is defined as the difference between the lowest loss and the highest loss within 10 MHz channels.
- This is defined as the worst difference between a peak and adjacent valley within defined frequency points
- WIFI attenuation is calculated by averaging |S<sub>21</sub>| in dB referenced to ZERO dB for each measured point within defined frequency range
- Typical values are an average of 20 pieces measured at a temperature of 25 C.
- Attenuation is referenced to ZERO dB
- Non-Linear Response is the same for Pin 2 Input
- This is the optimum impedance in order to achieve the performance shown

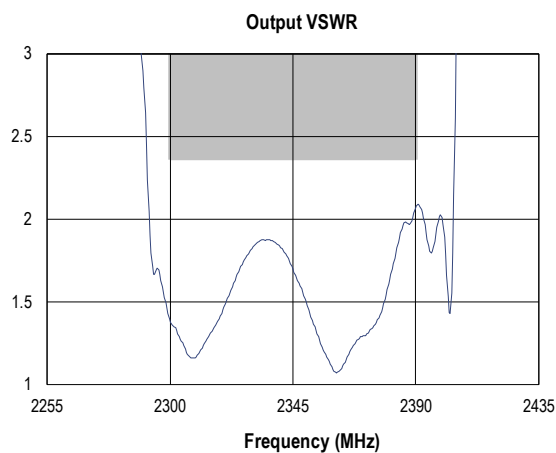
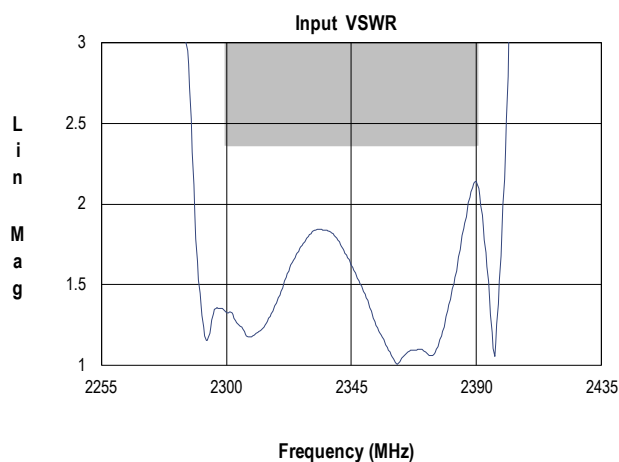
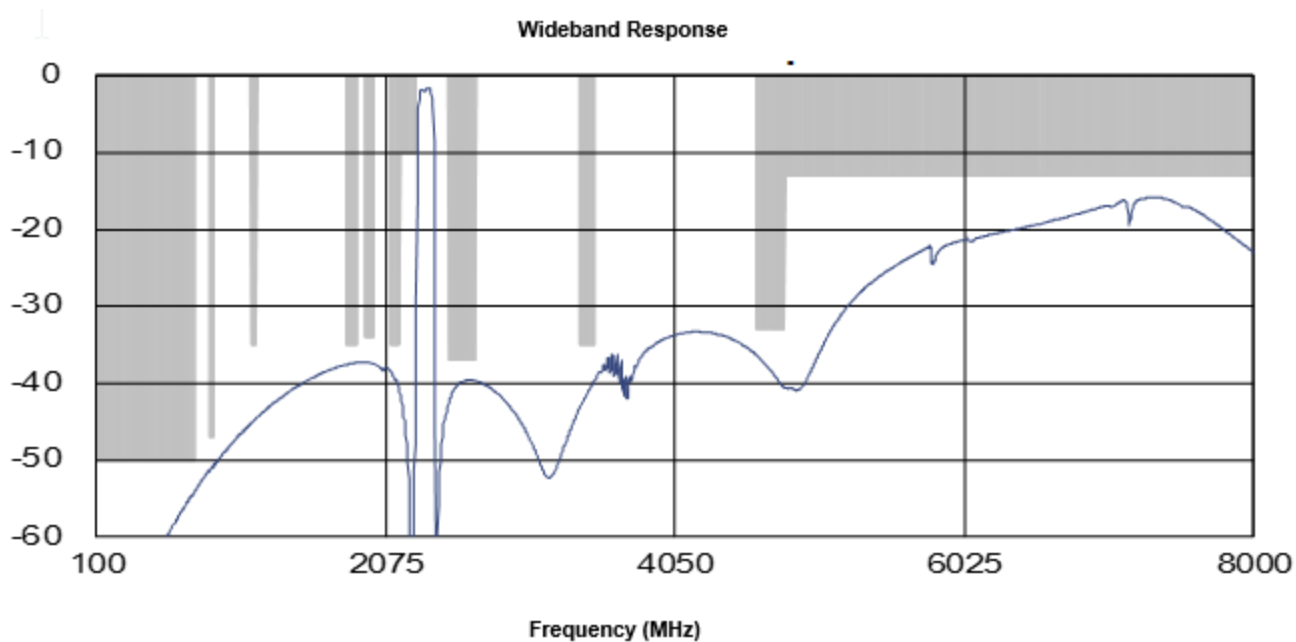
### Performance Plots

Test conditions unless otherwise noted: Temp.= +25 °C

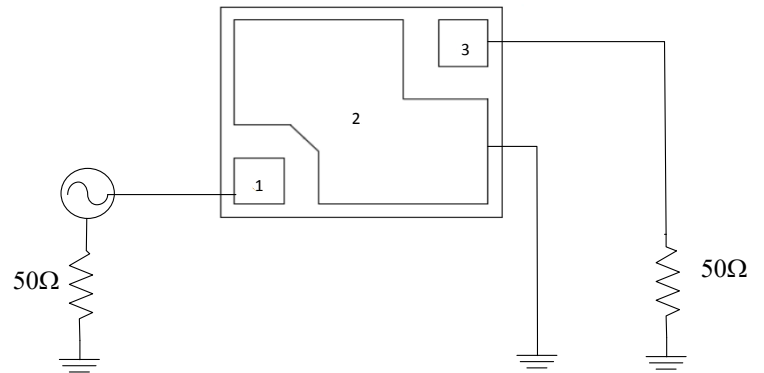
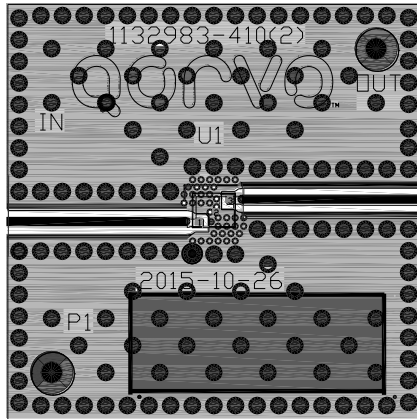


### Performance Plots – (continued)

Test conditions unless otherwise noted: Temp.= +25 °C



### Evaluation Board

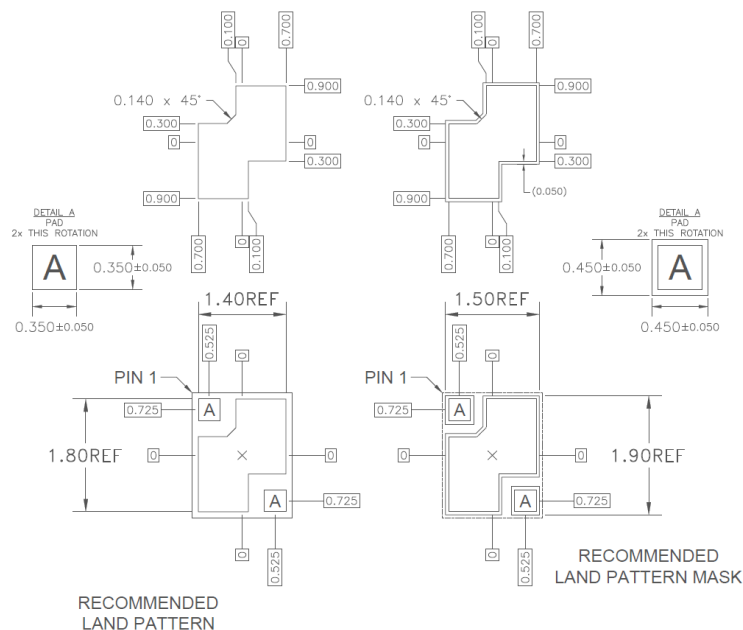


### Bill of Material

Reference Des.	Value	Description	Manuf.	Part Number
SMA	N/A	SMA connector	Radiall	9602-1111-018
PCB	N/A	3-layer	Multiple	1132983

### PCB Mounting Pattern

All dimensions are in millimeters



### Package Marking and Dimensions

#### Marking

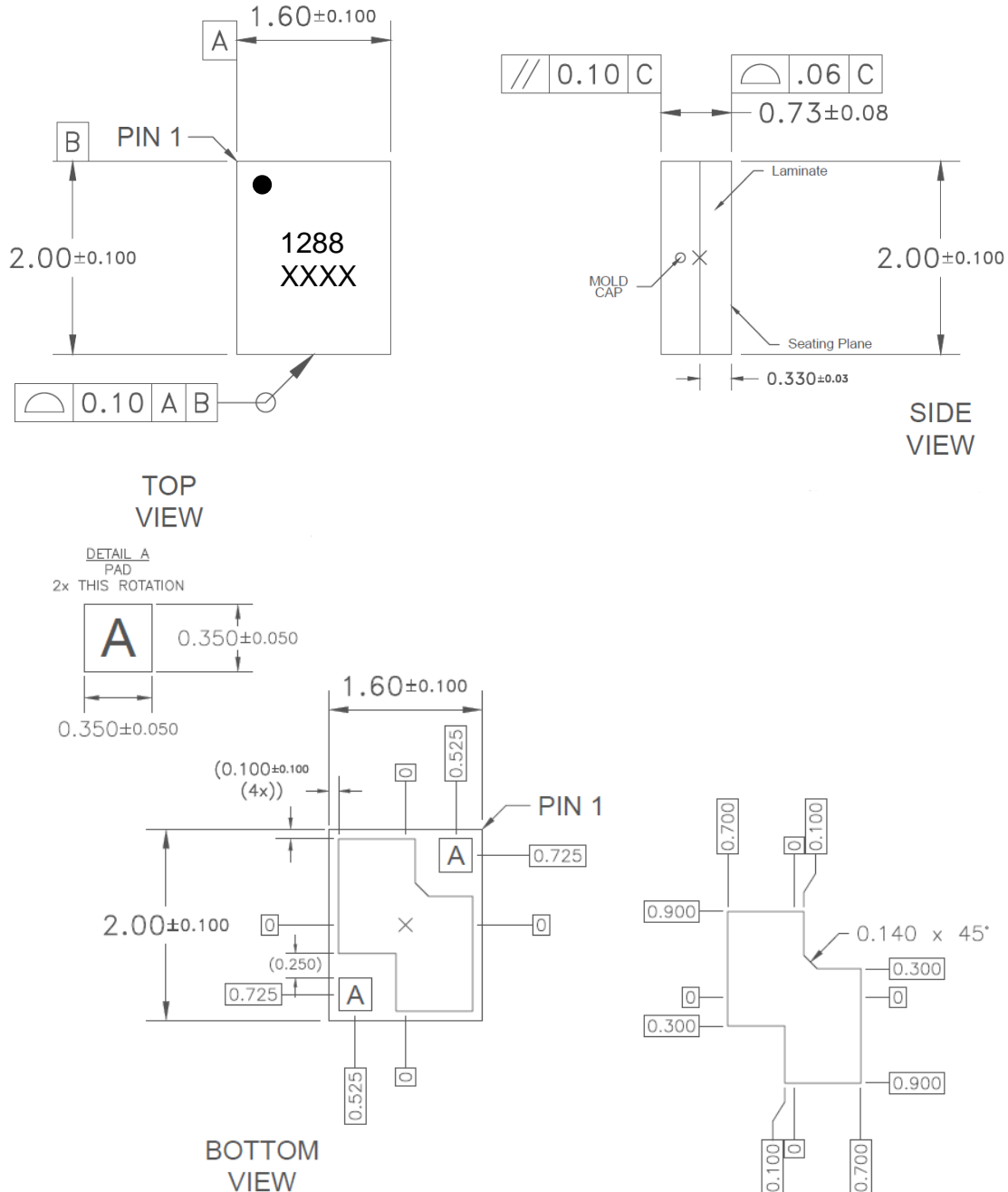
4-digit Part Number: 1288

4-digit Trace Code: XXXX

Body: Al<sub>2</sub>O<sub>3</sub> ceramic

Lid: Kovar, Au over Ni plating

Terminations: Au plating 0.5 - 1.0µm, over a 2-6µm Ni plating

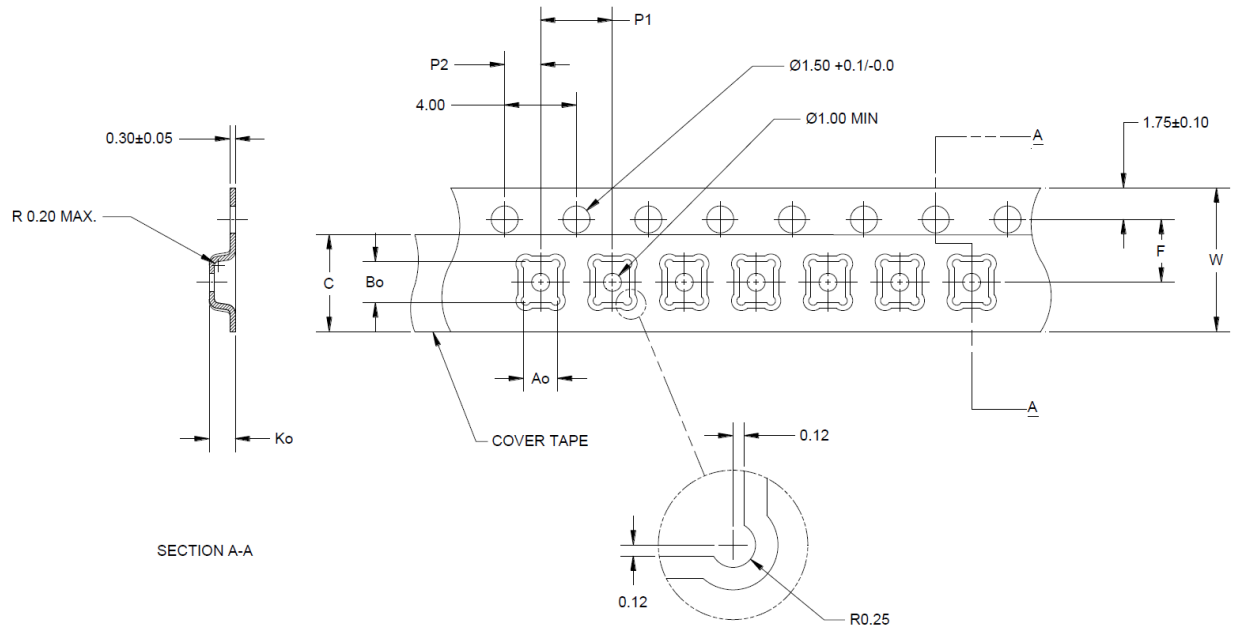


#### Notes:

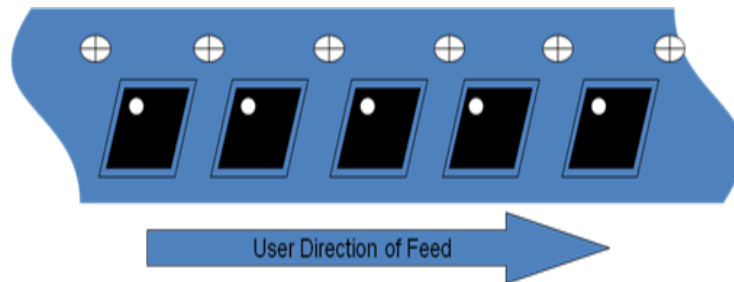
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

## Tape and Reel Information – Carrier and Cover Tape Dimensions

Tape and reel specifications for this part are also available on the Qorvo website.  
Standard T/R size = 2500 pieces on a 7" reel.

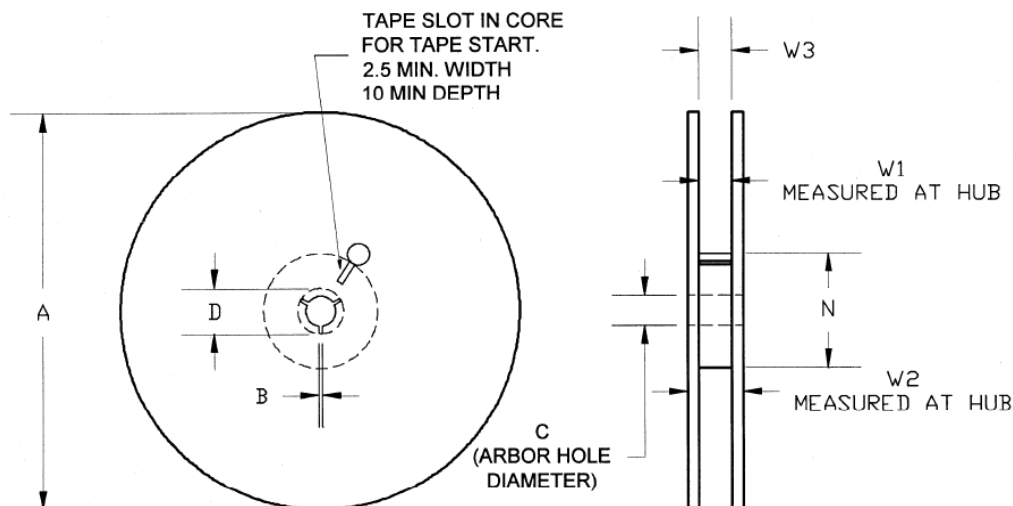


Feature	Measure	Symbol	Size (in)	Size (mm)
Cavity	Length	A0	0.077	1.95
	Width	B0	0.093	2.35
	Depth	K0	0.045	1.15
	Pitch	P1	0.157	4.00
Centerline Distance	Cavity to Perforation - Length Direction	P2	0.079	2.00
	Cavity to Perforation - Width Direction	F	0.138	3.50
Cover Tape	Width	C	0.213	5.40
Carrier Tape	Width	W	0.315	8.00



### Tape and Reel Information – Reel Dimensions

Tape and reel specifications for this part are also available on the Qorvo website.  
Standard T/R size = 2500 pieces on a 7" reel.



Feature	Measure	Symbol	Size (in)	Size (mm)
Flange	Diameter	A	6.969	177.0
	Thickness	W2	0.559	14.2
	Space Between Flange	W1	0.346	8.8
Hub	Outer Diameter	N	2.283	58.0
	Arbor Hole Diameter	C	0.512	13.0
	Key Slit Width	B	0.079	2.0
	Key Slit Diameter	D	0.787	20.0



### Handling Precautions

Parameter	Rating	Standard
ESD – Human Body Model (HBM)	Class 3B	ESDA / JEDEC JS-001-2012
ESD – Charged Device Model (CDM)	Class C3	ESDA / JEDEC JS-002-2014
MSL – Moisture Sensitivity Level	Level 3	IPC/JEDEC J-STD-020



Caution!  
ESD-Sensitive Device

### Solderability

Compatible with both lead-free (260°C max. reflow temp.) and tin/lead (245°C max. reflow temp.) soldering processes.  
Solder profiles available upon request.

Contact plating: Au over Ni

### 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
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A (C<sub>15</sub>H<sub>12</sub>Br<sub>4</sub>O<sub>2</sub>) Free
- PFOS Free
- SVHC Free
- Qorvo Green



### Contact Information

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

Web: [www.qorvo.com](http://www.qorvo.com)

Tel: 1-844-890-8163

Email: [customer.support@qorvo.com](mailto:customer.support@qorvo.com)

For technical questions and application information:

Email: [appsupport@qorvo.com](mailto:appsupport@qorvo.com)

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