

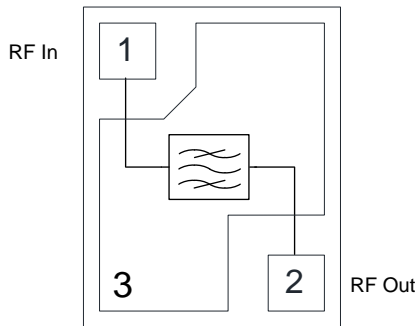
### Product Overview

The QPQ1287 is a high performance Bulk Acoustic Wave (BAW) filter designed to meet the strict LTE rejection requirements for use in B40, Full Band 2300-2400 MHz. The QPQ1287 is specifically designed to meet the high performance expectations of insertion loss and rejection for LTE TDD systems under all operating conditions.

The QPQ1287 is manufactured using Qorvo's world class BAW technology and is housed in a compact, industry standard 2.0 mm x 1.6 mm x 0.73 mm package that is lead free and RoHS compliant.

The QPQ1287 is part of Qorvo's extensive portfolio of RF BAW and SAW filters.

### Functional Block Diagram



### Pin Configuration - Single Ended

| Pin No. | Label     |
|---------|-----------|
| 1       | RF Input  |
| 2       | RF Output |
| 3       | Ground    |



3 Pad 2.0 mm x 1.6 mm x 0.73 mm SMT Package

### Key Features

- Highly Selective BAW Filter
- Low Insertion Loss Over Full Bandwidth and Operating Conditions
- Performance over -20 to +90 °C
- Excellent Wi-Fi Rejection
- Single-Ended Operation
- Internally Matched to 50 Ohms
- High Power Handling for Small Cells
- Small Size: 2.00 x 1.60 x 0.73 mm
- **RoHS** compliant (2002/95/EC), **Pb-free**

### Applications

- Band 40 TD-LTE
- 2300 – 2400 MHz Band
- Small Cells Base Stations

### Ordering Information

| Part No.   | Description                    |
|------------|--------------------------------|
| QPQ1287SB  | Sample Bag with 5 pieces       |
| QPQ1287SR  | Sample Reel with 100 pieces    |
| QPQ1287TR7 | 7" Taped Reel with 2500 pieces |
| QPQ1287EVB | Assembled Evaluation Board     |

## Absolute Maximum Ratings <sup>(1)</sup>

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

Notes:

1. Operation of this device outside the parameter ranges given may cause permanent damage.
2. Device will function but it is not guaranteed to meet electrical specifications

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

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

| Parameter   | Conditions <sup>(1, 2)</sup>  | Min | Typ <sup>(6)</sup> | Max    | Unit     |
|---|-------------------------------|-----|--------------------|--------|----------|
| Average Insertion Loss <sup>(2)</sup>   | 2300 – 2310 MHz               | -   | 3.1                | 3.9    | dB       |
|   | 2310 – 2380 MHz               | -   | 2.2                | 3.0    |          |
|   | 2380 – 2390 MHz               | -   | 2.2                | 3.2    |          |
|   | 2390 – 2400 MHz               | -   | 2.7                | 3.9    |          |
| Input / Output VSWR   | 2300.0 – 2400.0 MHz           | -   | 2.0:1              | 2.25:1 | -        |
| Input / Output Return Loss  | 2300.0 – 2400.0 MHz           | 8.3 | 9.3                | -      | dB       |
| Amplitude Variation <sup>(3)</sup><br>(over any 10 MHz window)                                  | 2300.0 – 2400.0 MHz           | -   | 1.2                | 2.5    | dB       |
|   | 2305.0 – 2395.0 MHz           | -   | 0.8                | 1.5    |          |
| Group Delay Variation <sup>(4)</sup><br>(over any 10 MHz window)                                | 2300.0 – 2400.0 MHz           | -   | 9.1                | 25     | ns p-p   |
| Phase Ripple <sup>(4)</sup><br>(over any 10 MHz window)   | 2300.0 – 2400.0 MHz           | -   | 4.2                | 20     | Deg. p-p |
| Attenuation in WIFI Band <sup>(5)</sup><br>(Average per Channel using 802.11b<br>Spectrum mask) | 2401 – 2423 MHz (Channel 1)   | 5   | 16                 | -      | dB       |
|   | 2406 – 2428 MHz (Channel 2)   | 10  | 28                 | -      |          |
|   | 2411 – 2433 MHz (Channel 3)   | 20  | 40                 | -      |          |
|   | 2416 – 2463 MHz (Channel 4–9) | 45  | 54                 | -      |          |
|   | 2446 – 2468 MHz (Channel 10)  | 45  | 51                 | -      |          |
|   | 2451 – 2473 MHz (Channel 11)  | 45  | 49                 | -      |          |
|   | 2456 – 2478 MHz (Channel 12)  | 43  | 48                 | -      |          |
|   | 2461 – 2483 MHz (Channel 13)  | 43  | 47                 | -      |          |
| 2473 – 2495 MHz (Channel 14)  | 40                            | 45  | -                  |        |          |
| Attenuation <sup>(7)</sup>  | 10 – 766 MHz                  | 50  | 54                 | -      | dB       |
|   | 869 – 894 MHz                 | 47  | 50                 | -      |          |
|   | 1150 – 1195 MHz               | 40  | 44                 | -      |          |
|   | 1574.4 – 1576.4 MHz           | 35  | 38                 | -      |          |
|   | 1710 – 2170 MHz               | 34  | 36                 | -      |          |
|   | 2500 – 2690 MHz               | 35  | 38                 | -      |          |
|   | 3400 – 3500 MHz               | 30  | 36                 | -      |          |
|   | 4600 – 4800 MHz               | 27  | 33                 | -      |          |
| 5150 – 5850 MHz   | 23                            | 27  | -                  |        |          |
| 6000 – 8000 MHz   | 25                            | 30  | -                  |        |          |
| 2 <sup>nd</sup> Harmonic <sup>(8)</sup>   | Pin = +29 dBm (2300–2400 MHz) | 55  | 65                 | -      | dBc      |
| Source/Load Impedance <sup>(9)</sup>  | Single-ended                  | -   | 50                 | -      | Ω        |

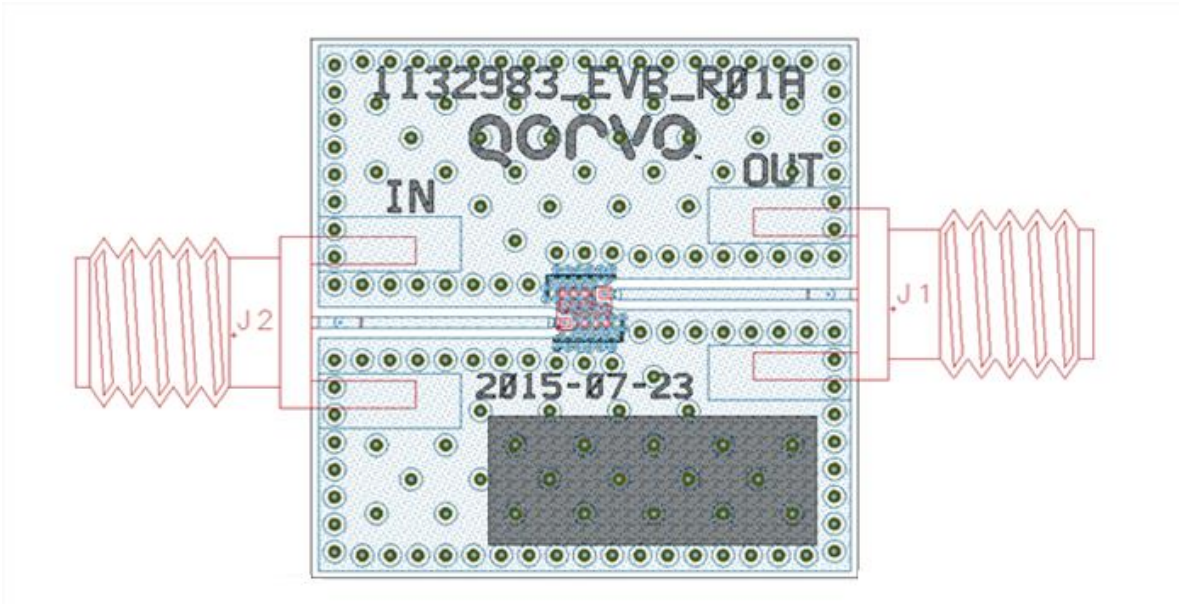
Notes:

1. All specifications are based on the QORVO schematic for the main reference design shown on page 5.
2. Average Insertion Loss is calculated by averaging |S<sub>21</sub>| in dB for each measured point within defined frequency range .
3. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within 10 MHz channels.
4. This is defined as the worst difference between a peak and adjacent valley within defined frequency points.
5. WIFI attenuation is calculated by averaging |S<sub>21</sub>| in dB referenced to ZERO dB for each measured point within defined frequency range.
6. Typical values are an average of 20 pieces measured at a temperature of +25 °C.
7. Attenuation is referenced to zero dB
8. Non-Linear Response is not the same for Pin 2 input.
9. This is the optimum impedance in order to achieve the performance shown.

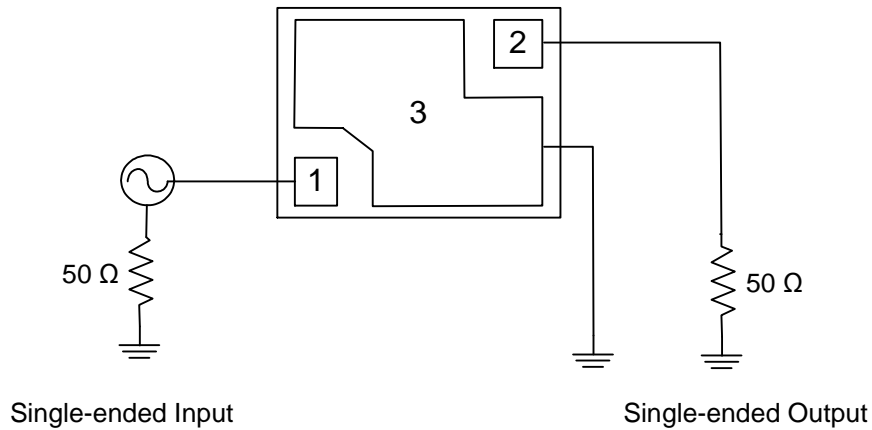
## Life Test

| Conditions  | Rating      |
|---|-------------|
| P <sub>IN</sub> =+29 dBm, Temp.=+90 °C,<br>FD-LTE, 5 MHz, 16QAM, PAR=8 dB | >87600 hrs. |

**Evaluation Board and Schematic – QPQ1287EVB**



- Notes:
1. Top, middle & bottom layers: 1/2 oz copper, Substrates: FR4 dielectric, .062" thick, Finish plating: Nickel: 3-8  $\mu\text{m}$  thick, Gold: .03-.2  $\mu\text{m}$  thick, Hole plating: Copper min .0008  $\mu\text{m}$  thick.

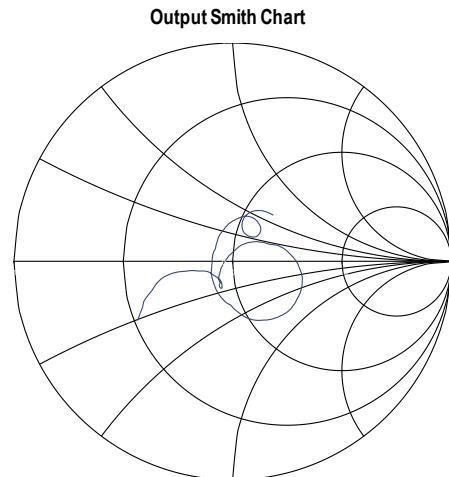
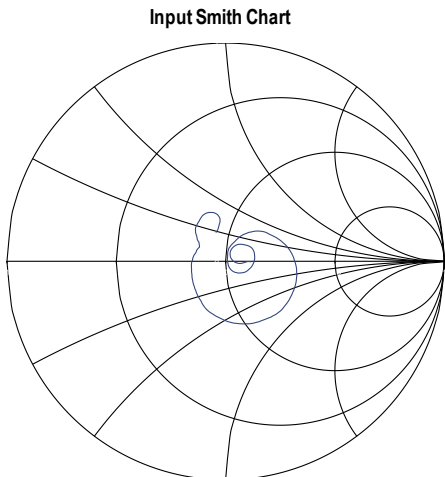
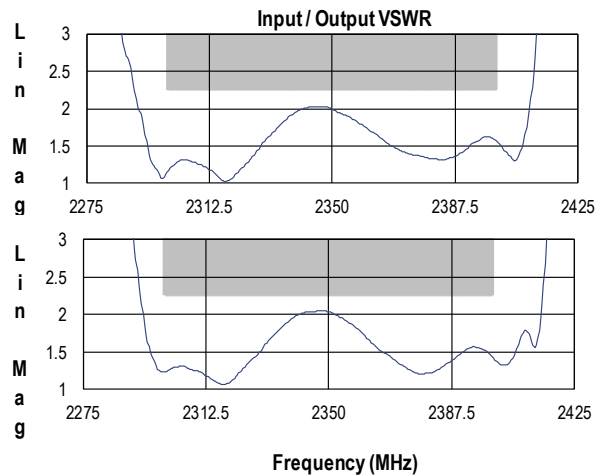
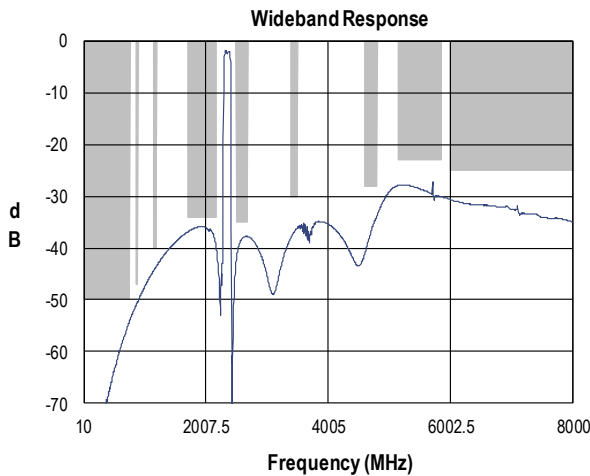
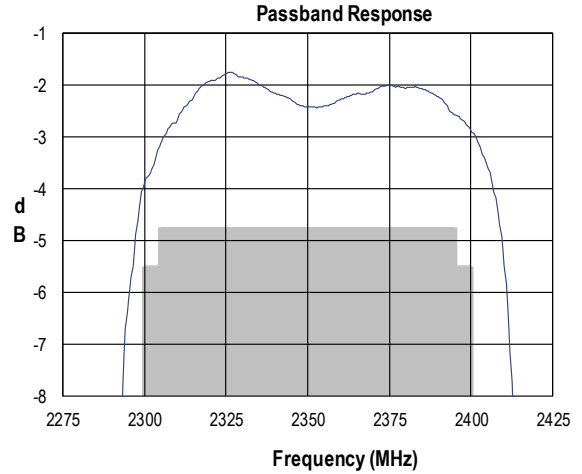
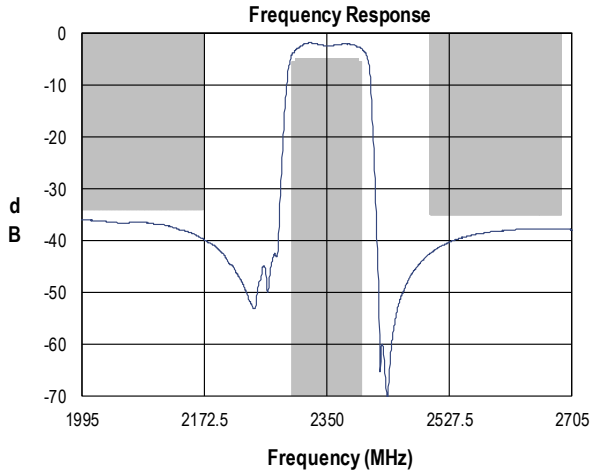


**Bill of Material – QPQ1287EVB**

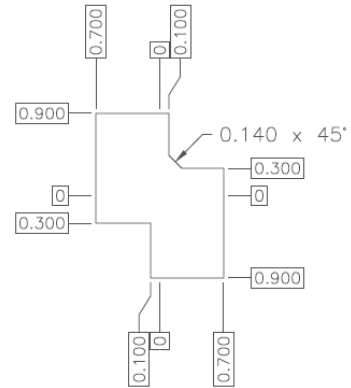
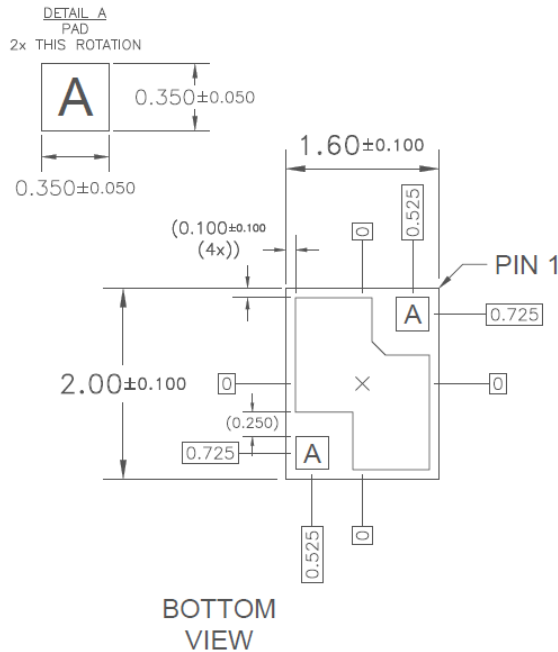
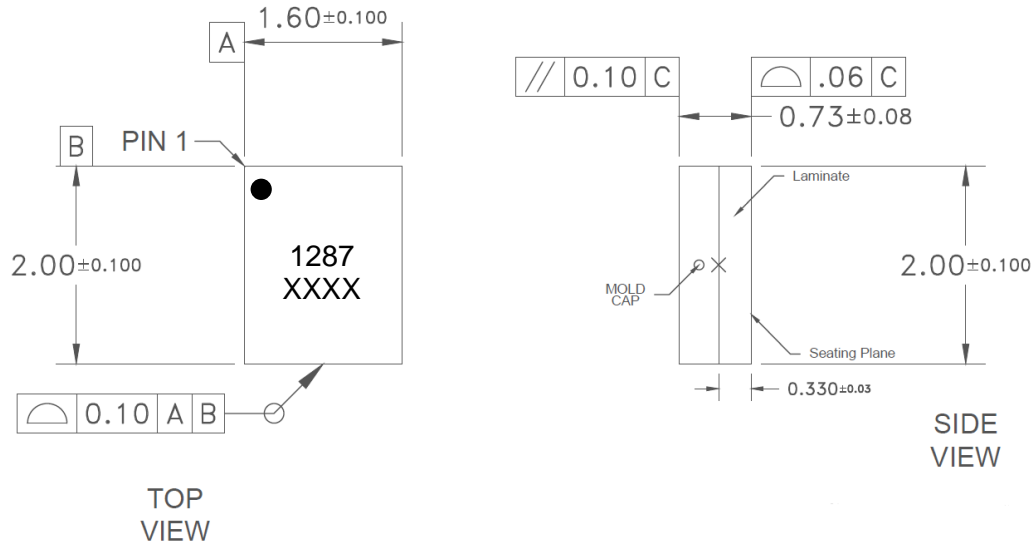
| Ref. Des. | Value | Description           | Manufacturer | Part Number   |
|-----------|-------|-----------------------|--------------|---------------|
| U1        | N/A   | 2350.0 MHz BAW Filter | Qorvo        | QPQ1287       |
| N/A       | N/A   | Printed Circuit Board | Qorvo        | 1132983       |
| N/A       | N/A   | SMA Edge Connector    | Radial       | 9602-1111-018 |

**Performance Plots – QPQ1287EVB**

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



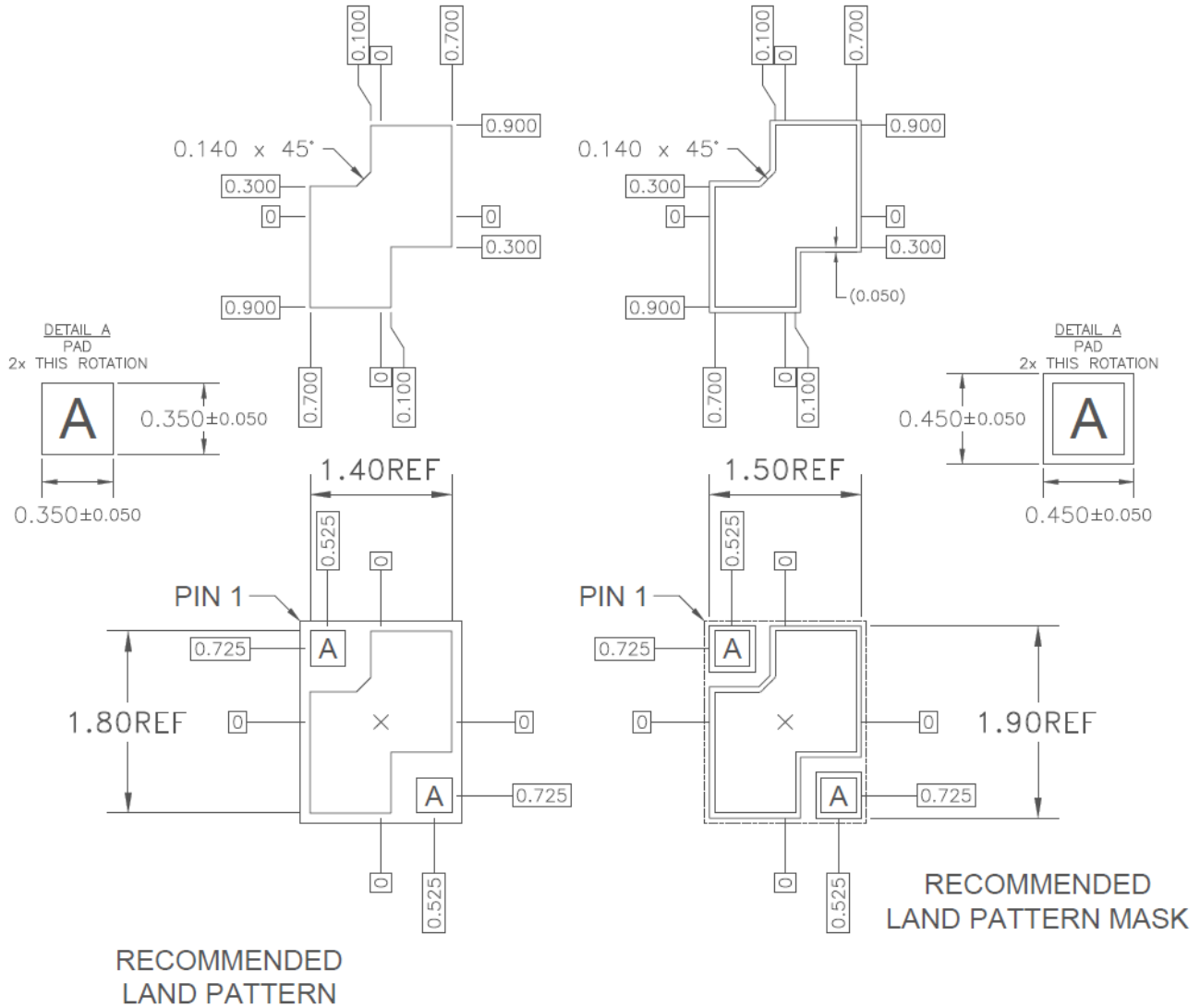
Package Marking and Dimensions



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.
4. Body:  $Al_2O_3$  ceramic
5. Lid: Kovar, Au over Ni plating
6. Terminations: Au plating 0.5 - 1.0 $\mu$ m, over a 2-6 $\mu$ m Ni plating
7. An asterisk (\*) in front of the marking code indicates prototype.

PCB Mounting Pattern

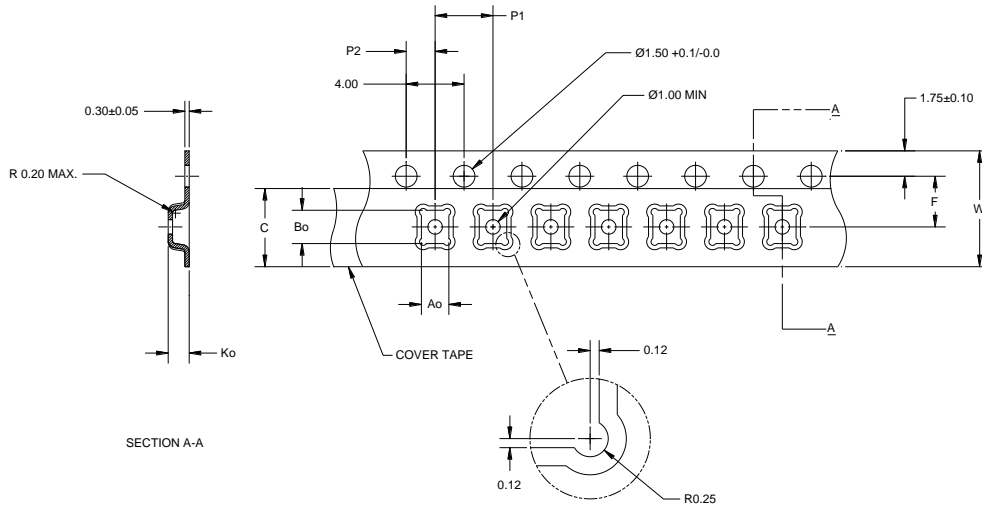


Notes:

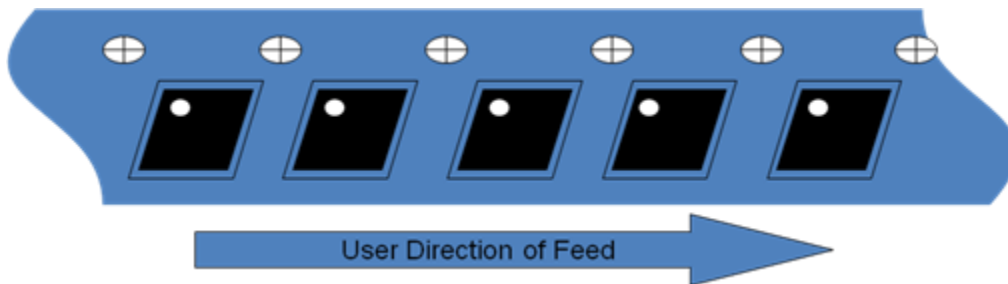
1. All dimensions are in millimeters. Angles are in degrees.
2. Use 1 oz. copper minimum for top and bottom layer metal.

**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.

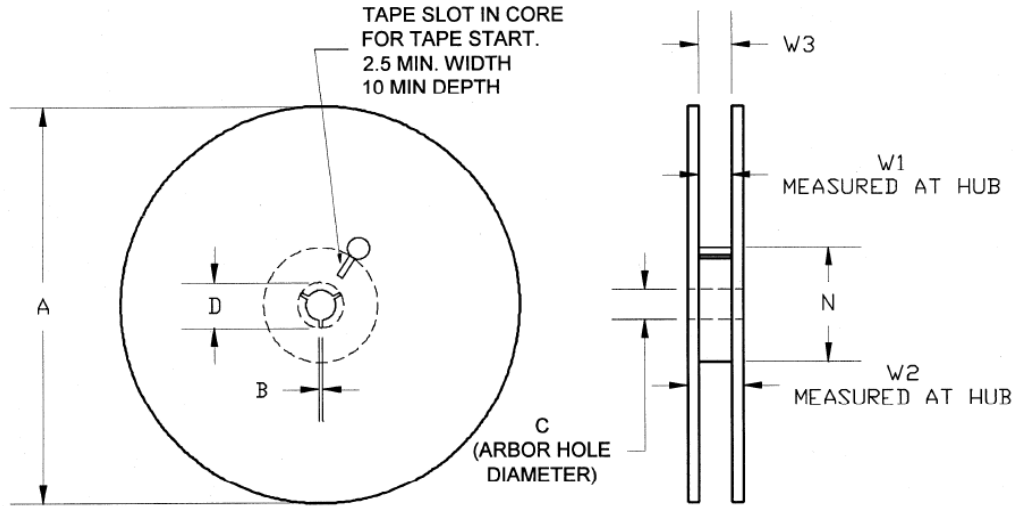


| Feature             | Measure                                  | Symbol | Size (in) | Size (mm) |
|---------------------|--|--------|-----------|-----------|
| Cavity              | Length                                   | A0     | 0.077     | 1.95      |
|                     | Width                                    | 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 plating 0.5 - 1.0µm, over a 2-6µm Ni plating

## RoHS Compliance

This part is compliant with 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:

- 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



## 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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