



# QPQ1289

## LTE Band 4 / 10 / 66 BAW Duplexer

### Product Overview

The QPQ1289 is a high performance Bulk Acoustic Wave (BAW) Duplexer designed for Small Cell applications. It is specifically designed to address bands 4, 10, and 66. For band 66, the uplink is fully covered while the downlink is partially covered with 70 MHz bandwidth.

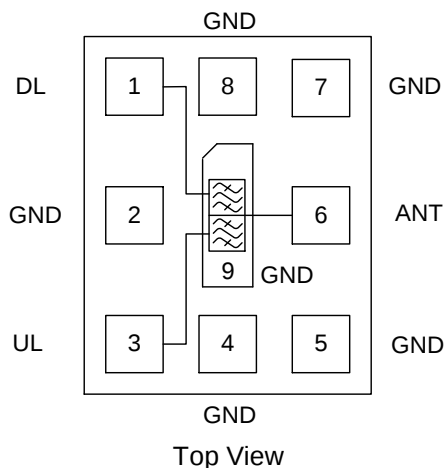
The QPQ1289 provides low insertion loss and high rejection making it an ideal choice for Small Cells. This duplexer is housed in a compact, RoHS compliant 2.00 mm x 2.50 mm x 0.91 mm surface mount package (SMP).

The QPQ1289 is part of Qorvo's extensive portfolio of RF BAW and SAW filters.



9 Pad 2.00 mm x 2.50 mm x 0.91 mm SMP

### Functional Block Diagram



### Pin Configuration - Single Ended

| Pin No.          | Label        |
|------------------|--------------|
| 1                | Downlink     |
| 2, 4, 5, 7, 8, 9 | Ground       |
| 3                | Uplink       |
| 6                | Antenna port |

### Key Features

- 70 MHz Bandwidth
- High Attenuation
- Low Loss
- Excellent Wi-Fi Rejection
- Single Input, Single Output Operation
- Small Size: 2.00 x 2.50 x 0.91 mm
- Surface Mount Device
- **RoHS** compliant (2002/95/EC), **Pb-free**



### Applications

- Extended Band 4 / 10
- Partial Band 66
- Base Station Infrastructure
- General Purpose Wireless

### Ordering Information

| Part No.   | Description                    |
|------------|--------------------------------|
| QPQ1289SB  | Sample Bag with 5 pieces       |
| QPQ1289SR  | Sample Reel with 100 pieces    |
| QPQ1289TR7 | 7" Taped Reel with 2500 pieces |
| QPQ1289EVB | Assembled Evaluation Board     |

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

| Parameter                               | Rating        |
|-----------------------------------------|---------------|
| Storage Temperature                     | -40 to +125°C |
| Operating Temperature <sup>(2)</sup>    | -40 to +95 °C |
| RF in, Pulsed, DL, +25°C <sup>(3)</sup> | +39.5 dBm     |

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
3. Peak Power, 200mS pulse width, 2% Duty Cycle

## Minimum Lifetime Ratings

| Conditions                                        | Rating         |
|---------------------------------------------------|----------------|
| +29 dBm DL, +85°C, FD-LTE, 5 MHz, 16QAM, PAR=8 dB | >290,000 hours |
| +23 dBm CW, UL, +85°C                             | >270,000 hours |

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

Test conditions unless otherwise specified. Temperature Range: -40 to +95 °C

| Parameter                          | Conditions <sup>(1, 2)</sup> | Min | Typ | Max | Unit |
|------------------------------------|------------------------------|-----|-----|-----|------|
| Insertion Loss <sup>(2)</sup>      | 2110 – 2180 MHz              | -   | 2.0 | 2.9 | dB   |
|                                    | 2110 – 2170 MHz, B10DL       | -   | 2.0 | -   | dB   |
|                                    | 2110 – 2155 MHz, B4DL        | -   | 2.0 | -   | dB   |
| Input / Output Return Loss         | 2110 – 2180 MHz              | 9   | 12  | -   | dB   |
| Amplitude Variation <sup>(3)</sup> | 2110 – 2180 MHz              | -   | 0.6 | 1.0 | dB   |
| Attenuation <sup>(4)</sup>         | 10 – 1680 MHz                | 32  | 35  | -   | dB   |
|                                    | 1680 – 1800 MHz              | 42  | 45  | -   | dB   |
|                                    | 2402 – 2494 MHz              | 38  | 43  | -   | dB   |
|                                    | 2496 – 2690 MHz              | 31  | 38  | -   | dB   |

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

Test conditions unless otherwise specified. Temperature Range: -40 to +95 °C

| Parameter                          | Conditions (1, 2)      | Min | Typ | Max | Unit |
|------------------------------------|------------------------|-----|-----|-----|------|
| Insertion Loss <sup>(2)</sup>      | 1710 – 1780 MHz        | -   | 2.3 | 3.2 | dB   |
|                                    | 1710 – 1770 MHz, B10UL | -   | 2.3 | -   | dB   |
|                                    | 1710 – 1755 MHz, B4UL  | -   | 2.3 | -   | dB   |
| Input / Output Return Loss         | 1710 – 1780 MHz        | 9   | 11  | -   | dB   |
| Amplitude Variation <sup>(3)</sup> | 1710 – 1780 MHz        | -   | 0.7 | 1.5 | dB   |
| Attenuation <sup>(4)</sup>         | 10 – 870 MHz           | 40  | 45  | -   | dB   |
|                                    | 870 – 1680 MHz         | 25  | 32  | -   | dB   |
|                                    | 1850 – 2050 MHz        | 38  | 45  | -   | dB   |
|                                    | 2080 – 2225 MHz        | 32  | 35  | -   | dB   |
|                                    | 2402 – 2494 MHz        | 34  | 37  | -   | dB   |
|                                    | 2496 – 2690 MHz        | 18  | 34  | -   | dB   |

Notes:

1. All specifications are based on the QORVO schematic for the main reference design.
2. Maximum Insertion Loss 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. Attenuation is referenced to zero dB

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

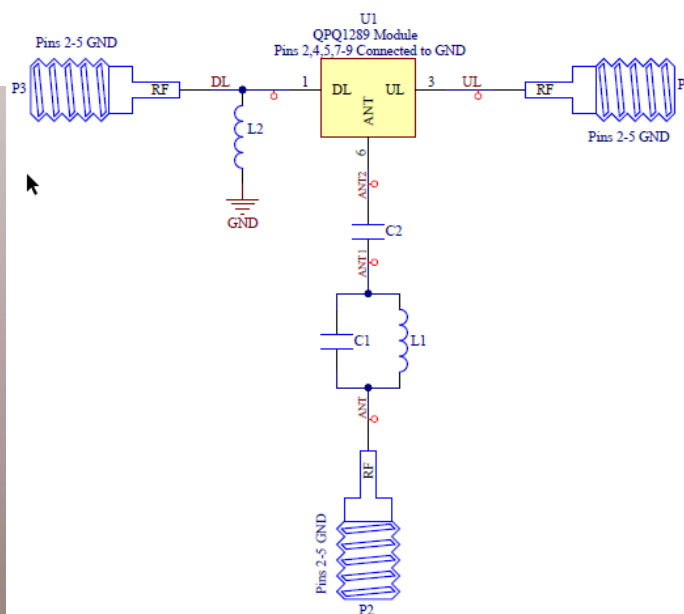
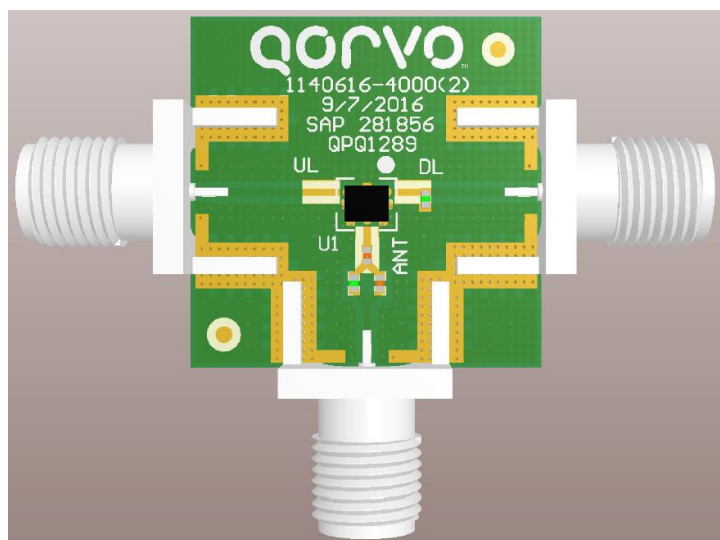
Test conditions unless otherwise specified. Temperature Range: -40 to +95 °C

| Parameter | Conditions <sup>(1, 2)</sup> | Min | Typ | Max | Unit |
|-----------|------------------------------|-----|-----|-----|------|
| Isolation | 1710 – 1780 MHz              | 42  | 45  | -   | dB   |
|           | 2110 – 2180 MHz              | 38  | 42  | -   | dB   |
|           | 1710 – 1780 MHz, B10UL       | -   | 45  | -   | dB   |
|           | 2110 – 2170 MHz, B10DL       | -   | 42  | -   | dB   |
|           | 1710 – 1755 MHz, B4UL        | -   | 46  | -   | dB   |
|           | 2110 – 2155 MHz, B4DL        | 40  | 44  | -   | dB   |

Notes:

1. All specifications are based on the QORVO schematic for the main reference design.
2. Maximum Insertion Loss 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. Attenuation is referenced to zero dB

## Evaluation Board and Schematic – QPQ1289EVB



Notes:

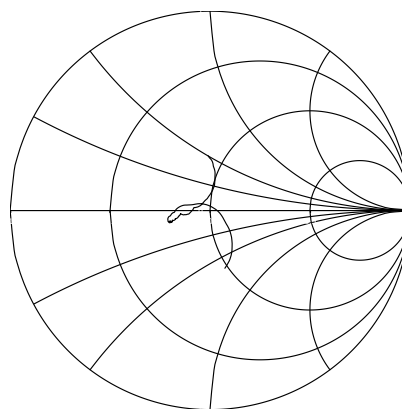
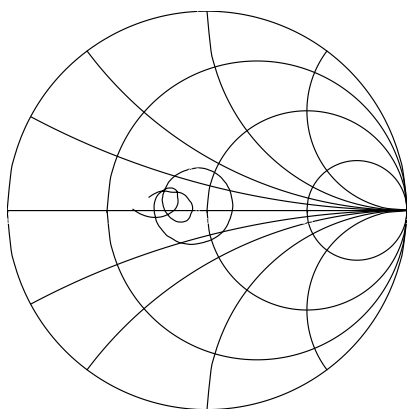
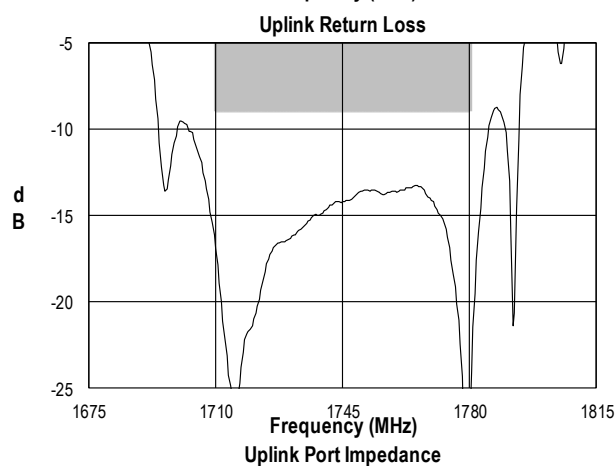
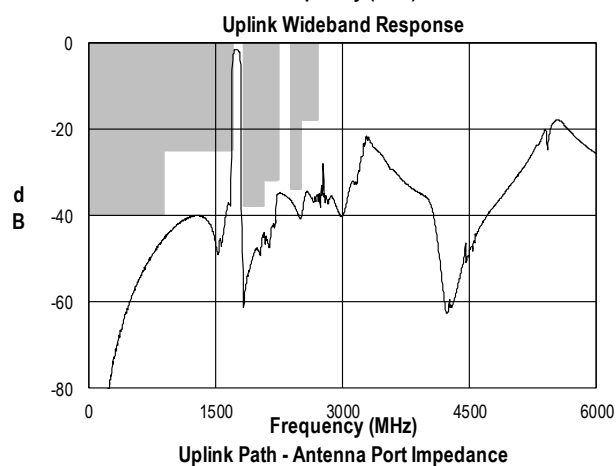
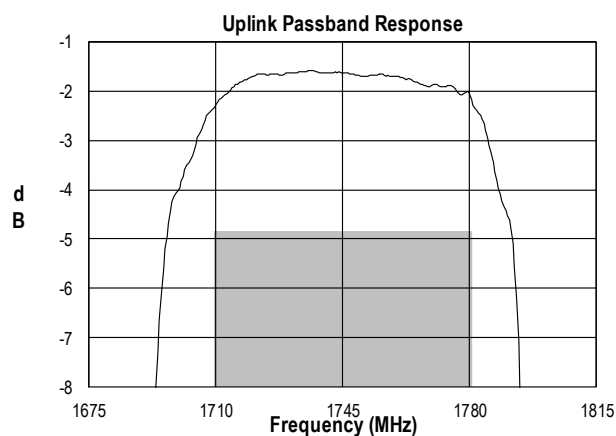
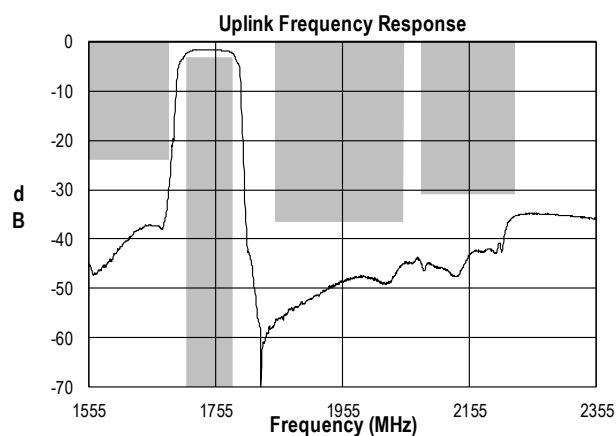
1. Distance from left side of L2 to right side of U1: 5 mils.

## Bill of Material – QPQ1289EVB

| Ref. Des. | Value  | Description                              | Manufacturer | Part Number       |
|-----------|--------|------------------------------------------|--------------|-------------------|
| U1        | N/A    | Band 66 BAW Duplexer                     | Qorvo        | QPQ1289           |
| N/A       | N/A    | Printed Circuit Board                    | Qorvo        | 1140616           |
| C2        | 3.3 pF | Cap., Chip, 0402, 5%, 50V. NPO/COG       | Murata       | GJM1555C1H3R3BB01 |
| C1        | 0.4 pF | Cap., Chip, 0402, +/-0.1pF, 50V. NPO/COG | Murata       | GJM1555C1HR40WB01 |
| L2        | 5.6 nH | Inductor, 0402, LQG                      | Murata       | LQP03TN5N6H02     |
| L1        | 1.8 nH | Inductor, 0402, LQG                      | Murata       | LQP03TN1N8B02     |
| N/A       | N/A    | SMA Edge Connector                       | Radial       | 9602-1111-018     |

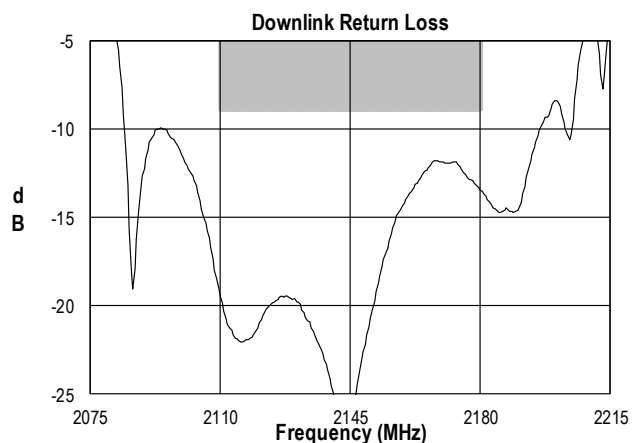
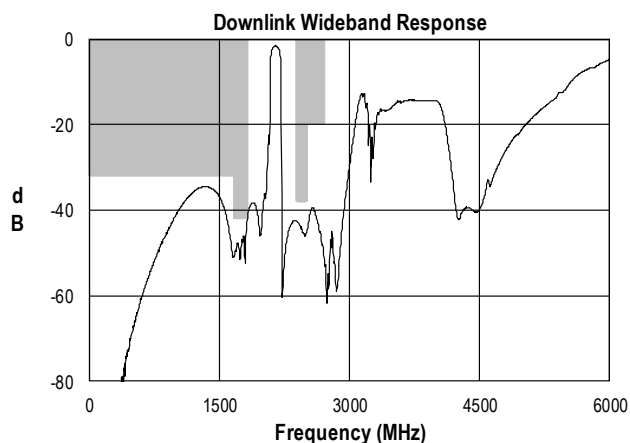
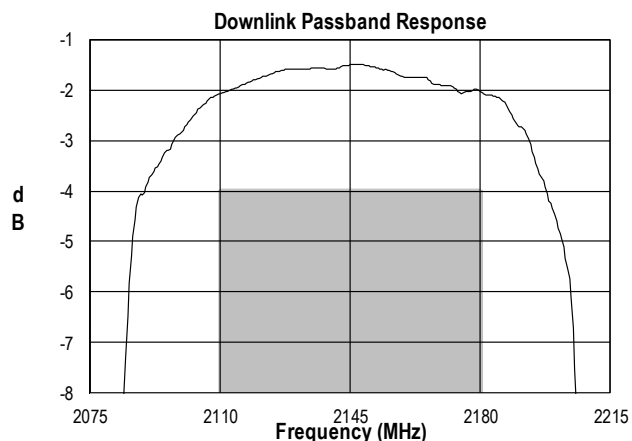
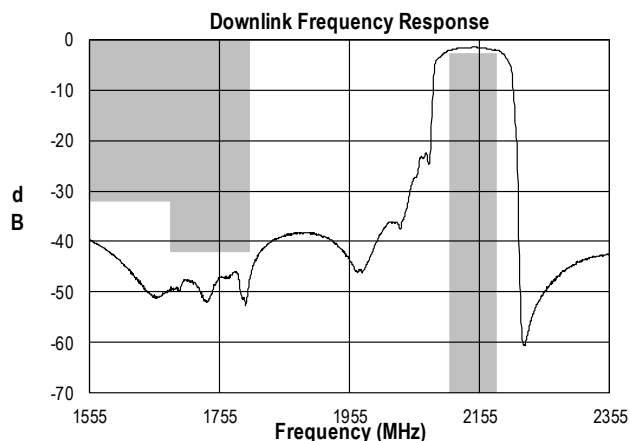
## Performance Plots Uplink

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

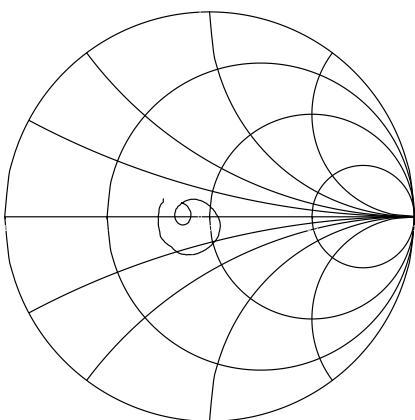


## Performance Plots Downlink

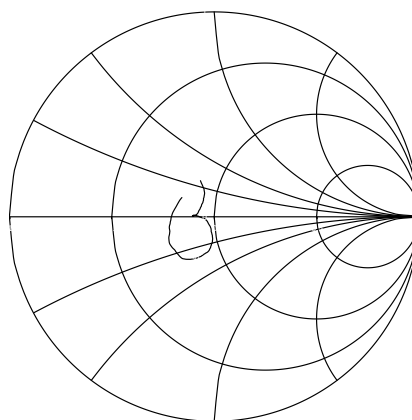
Test conditions unless otherwise noted: Temp= +25°C



Downlink Path - Antenna Port Impedance

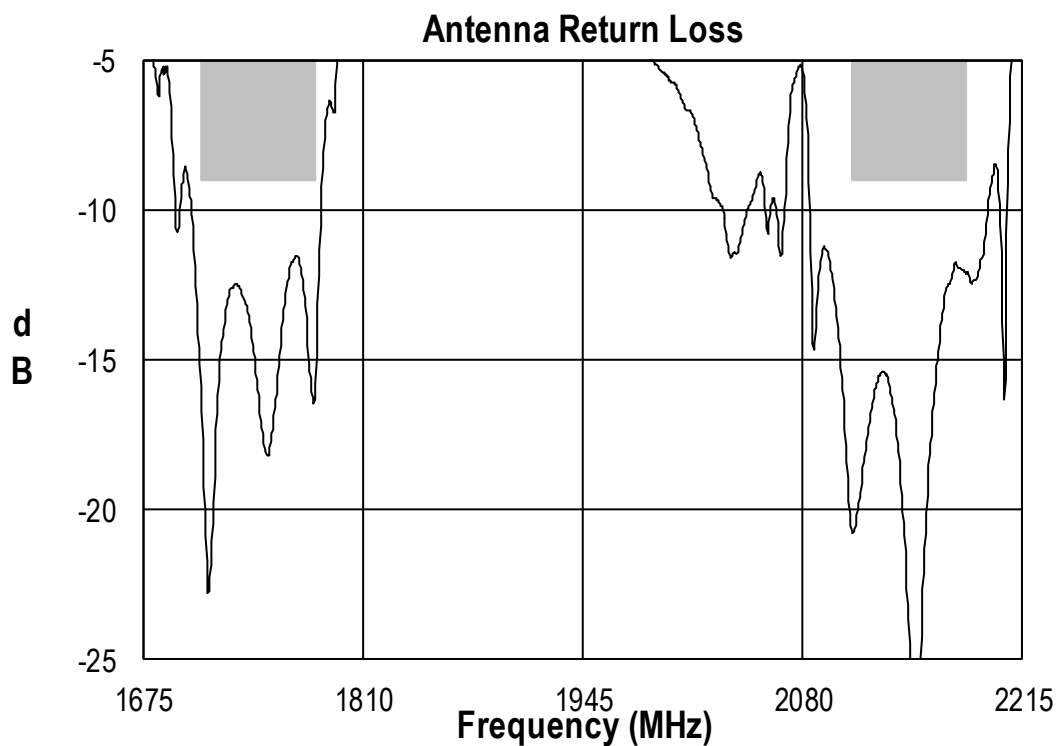
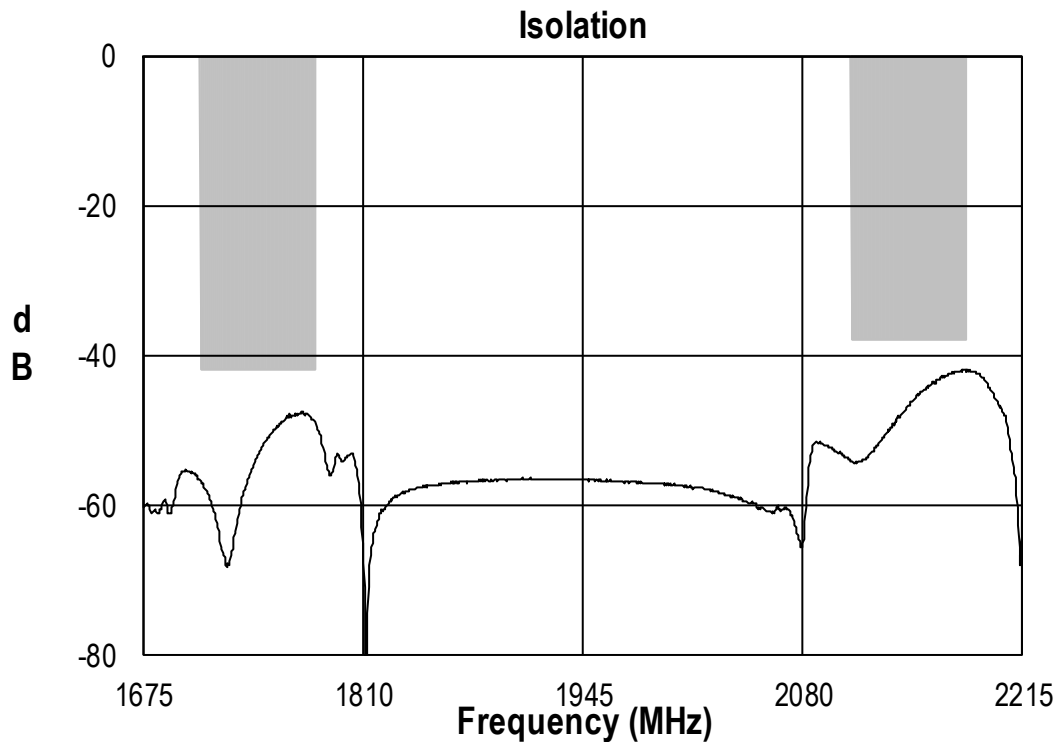


Downlink Port Impedance

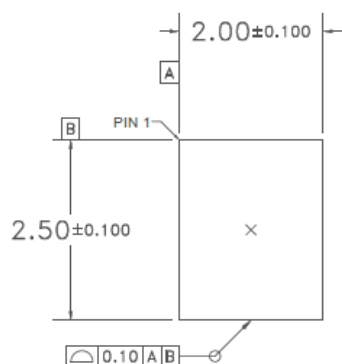


## Performance Plots Isolation

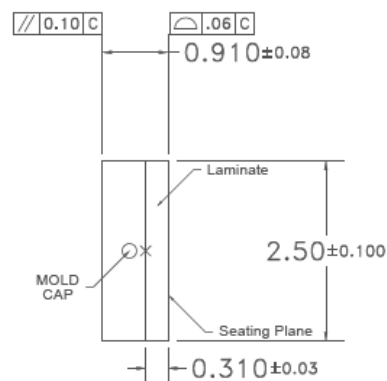
Test conditions unless otherwise noted: Temp= +25°C



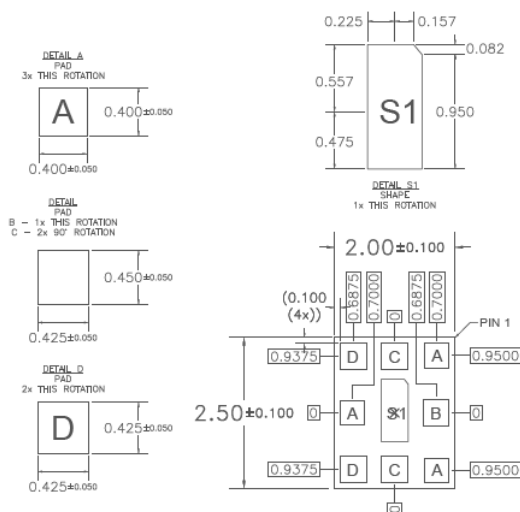
## Package Dimensions



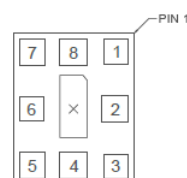
TOP  
VIEW



SIDE  
VIEW



BOTTOM  
VIEW



BOTTOM PINS  
VIEW

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.

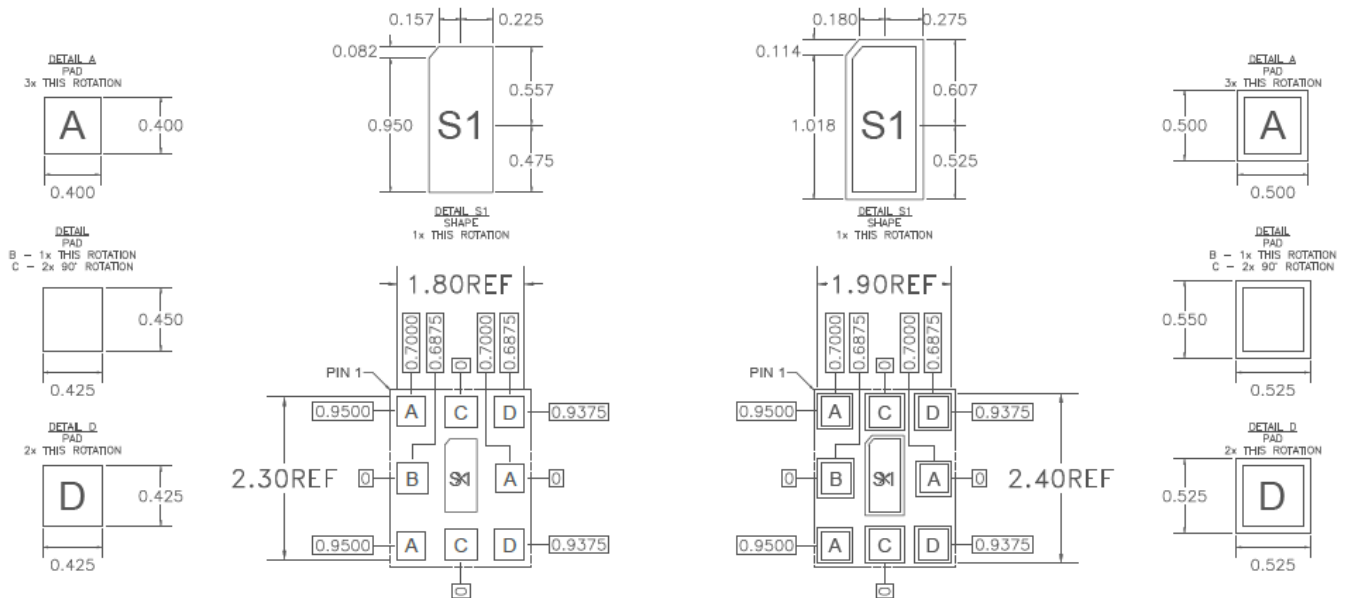
## Package Marking

### Package Marking

Qorvo Logo  
Product Identifier: 1289  
Trace Code: XXXX



## PCB Mounting Pattern

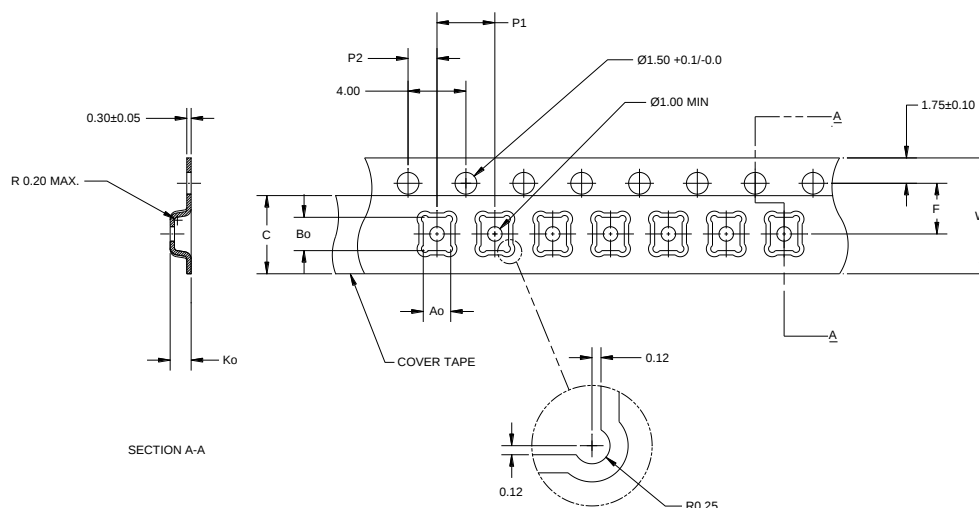


### Notes:

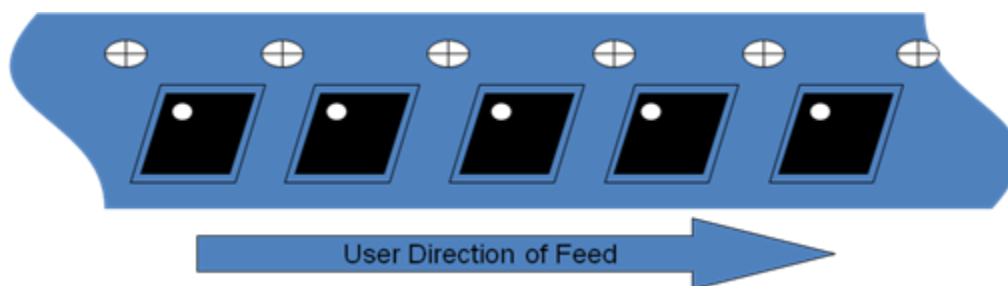
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the Qorvo evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

## 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.

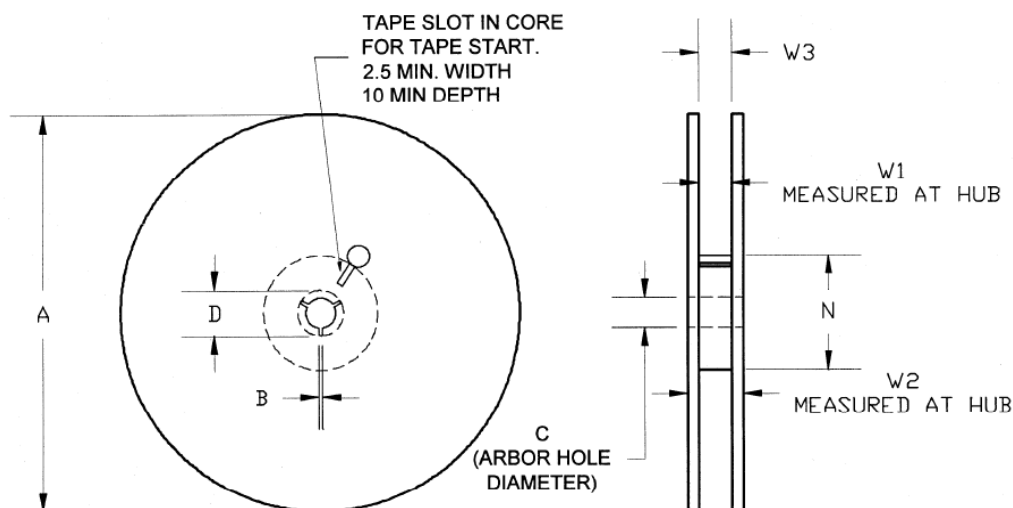


| Feature             | Measure                                  | Symbol | Size (in) | Size (mm) |
|---------------------|------------------------------------------|--------|-----------|-----------|
| Cavity              | Length                                   | A0     | 0.092     | 2.34      |
|                     | Width                                    | B0     | 0.112     | 2.85      |
|                     | Depth                                    | K0     | 0.043     | 1.10      |
|                     | 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 1C | 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: TBD

## 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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