

Applications

- Band 1 Duplexer for Small cell BTS
- General Purpose Wireless

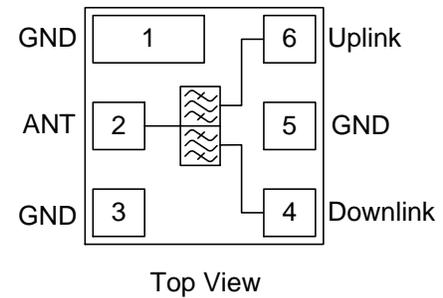


6 Pin 3.0 x 3.0 mm leadless SMT Package

Product Features

- 60 MHz Bandwidth
- High Attenuation
- Low Loss
- No External Matching Required
- Small Size: 3.0 x 3.0 x 1.02 mm
- Surface Mount Device
- RoHS Compliant, Pb-Free

Functional Block Diagram



General Description

The TQQ7101 is an exceptionally high performance BAW duplexer for LTE Band 1. This filter is housed in a compact 3.0 mm x 3.0 mm package for base station applications.

Low insertion loss, coupled with high attenuation makes this filter an ideal choice for small cell BTS needs.

The TQQ7101 is part of Qorvo's extensive portfolio of RF BAW and SAW filters.

Pin Configuration

| Pin No. | Label |
|---------|----------|
| 2 | ANT |
| 4 | Downlink |
| 6 | Uplink |
| 1, 3, 5 | GND |

Ordering Information

| Part No. | Description |
|-------------|------------------|
| TQQ7101 | Band 1 Duplexer |
| TQQ7101-EVB | Evaluation Board |

Standard T/R size = 2500 pieces on a 7" reel

Absolute Maximum Ratings

| Parameter | Rating |
|--|--------------|
| Storage Temperature | -40 to +85°C |
| RF Input Power DL (LTE, 5MHz, PAR=8 dB) | +29 dBm |
| RF Input Power UL (CW) | +23 dBm |
| Maximum DC Voltage on RF Input Pins | +5V |

Operation of this device outside the parameter ranges given may cause permanent damage

Recommended Operating Conditions

| Parameter | Min | Typ | Max | Units |
|-------------------|-----|-----|-----|-------|
| T _{CASE} | -20 | | +85 | °C |

Electrical specifications are measured at specified test conditions.

Electrical Specifications – Downlink ⁽¹⁾

Operating Temperature Range: -20 to +85 °C

| Parameter | Conditions | Min | Typ | Max | Units |
|------------------------------------|--------------------------------------|------|------|------|-------|
| Passband | | 2110 | - | 2170 | MHz |
| Insertion Loss ⁽²⁾ | 2110 – 2170 MHz | - | 2.8 | 3.8 | dB |
| Amplitude Variation | 2110 – 2170 MHz (+25 °C) | - | 1.2 | 2.0 | dB |
| Return Loss ⁽²⁾ | Antenna Port | 7.1 | 10.2 | - | dB |
| Return Loss ⁽²⁾ | Downlink Port | 7.7 | 10.8 | - | dB |
| Attenuation | 0.009 – 1920 MHz | 36 | 37 | - | dB |
| | 1920 – 1980 MHz | 44 | 47 | - | |
| | 1980 – 2025 MHz | 36 | 40 | - | |
| | 2025 – 2070 MHz | 37 | 40 | - | |
| | 2210 – 2300 MHz | 22 | 47 | - | |
| | 2300 – 2370 MHz | 48 | 51 | - | |
| | 2370 – 2484 MHz | 44 | 45 | - | |
| | 2484 – 2690 MHz | 41 | 42 | - | |
| | 2690 – 3400 MHz | 35 | 38 | - | |
| | 3400 – 4200 MHz | 24 | 26 | - | |
| 4200 – 4400 MHz | 35 | 39 | - | | |
| 5150 – 5850 MHz | 32 | 34 | - | | |
| Harmonic Distortion ⁽³⁾ | Pin = +29 dBm | 50 | 55 | - | dBc |
| Channel Power | LTE 5 MHz, PAR = 8dB, 8 years, 85 °C | +29 | - | - | dBm |

Notes:

1. All specifications are based on the TriQuint schematic for the main reference design.
2. Average value over the indicated band.
3. Additional 2nd harmonic improvement can be achieved using appropriate application. Refer to product technical notes for details.

Electrical Specifications – Uplink ⁽¹⁾

Operating Temperature Range: -20 to +85 °C

| Parameter | Conditions | Min | Typ | Max | Units |
|-------------------------------|--------------------------|------|------|------|-------|
| Passband | | 1920 | | 1980 | dB |
| Insertion Loss ⁽²⁾ | 1920 – 1980 MHz | - | 3.1 | 3.7 | dB |
| Amplitude Variation | 1920 – 1980 MHz (+25 °C) | - | 1.3 | 1.9 | dB |
| Return Loss ⁽²⁾ | Antenna Port | 8.0 | 10.4 | - | dB |
| Return Loss ⁽²⁾ | Uplink Port | 7.3 | 8.6 | - | dB |
| Attenuation | 0.009 – 1880 MHz | 37 | 38 | - | dB |
| | 1880 – 1900 MHz | 34 | 44 | - | |
| | 2000 – 2010 MHz | 4 | 21 | - | |
| | 2010 – 2110 MHz | 33 | 37 | - | |
| | 2110 – 2690 MHz | 38 | 39 | - | |
| | 2690 – 3400 MHz | 32 | 36 | - | |
| | 3400 – 3800 MHz | 34 | 35 | - | |
| 3800 – 5850 MHz | 18 | 21 | - | | |
| Channel Power | CW, 8 years, 85 °C | +23 | - | - | dBm |

Notes:

1. All specifications are based on the TriQuint schematic for the main reference design.
2. Average value over the indicated band.

Electrical Specifications – Isolation Uplink to Downlink ⁽¹⁾

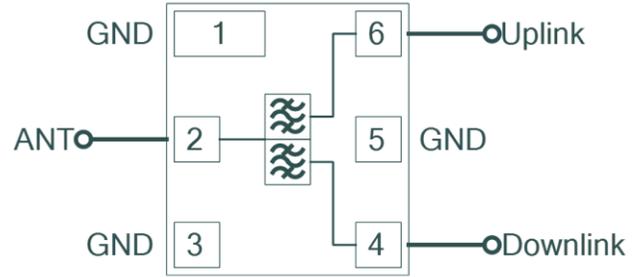
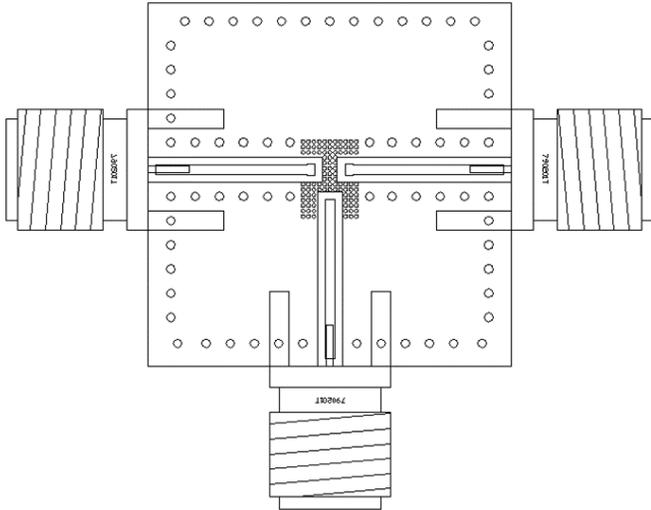
Operating Temperature Range: -20 to +85 °C

| Parameter | Conditions | Min | Typ | Max | Units |
|--------------------------------------|-----------------|-----|-----|-----|-------|
| Isolation in Uplink ⁽²⁾ | 1920 – 1980 MHz | 48 | 51 | - | dB |
| Isolation in Downlink ⁽²⁾ | 2110 – 2170 MHz | 39 | 42 | - | dB |

Notes:

1. All specifications are based on the TriQuint schematic for the main reference design.
2. Average value over the indicated band.

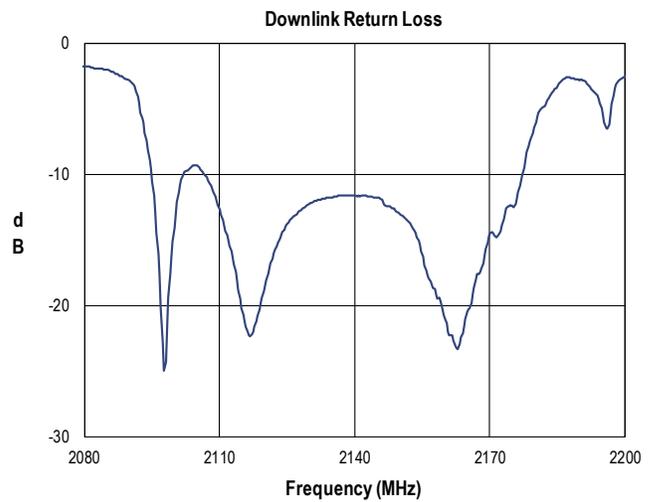
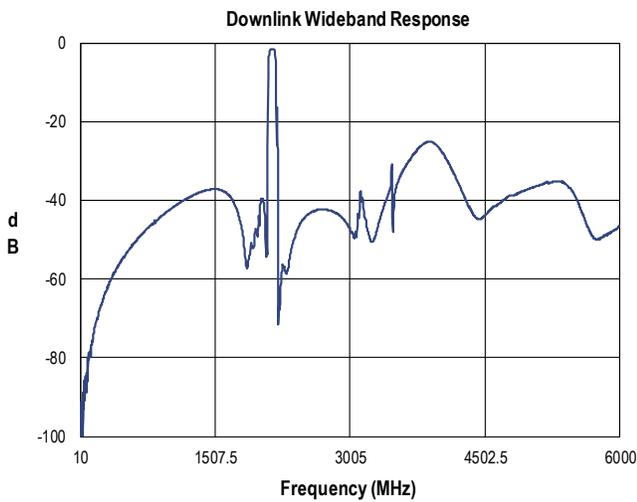
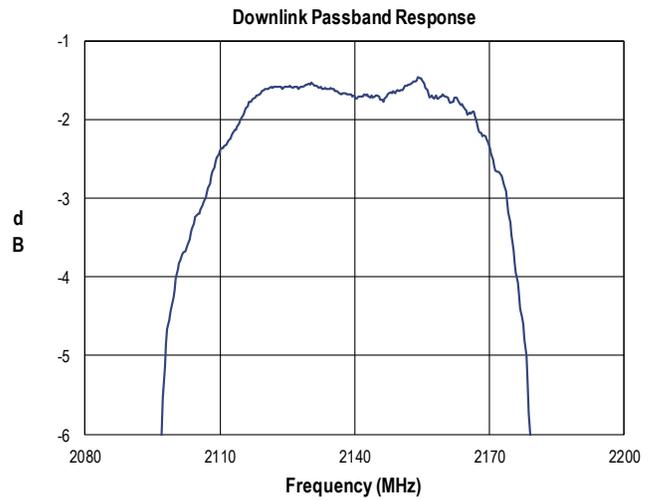
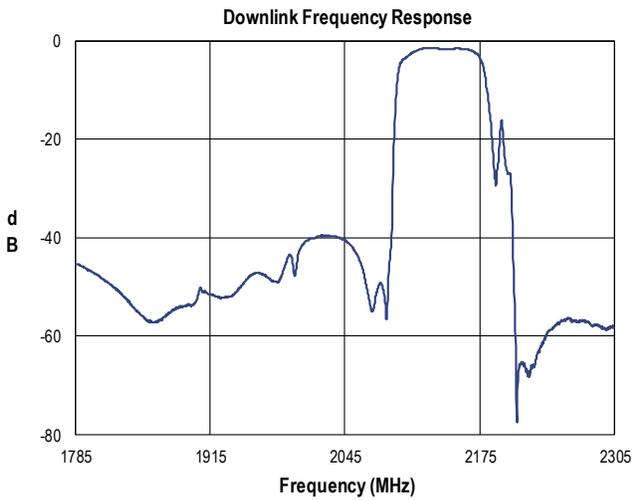
TQQ7101-PCB Evaluation Board



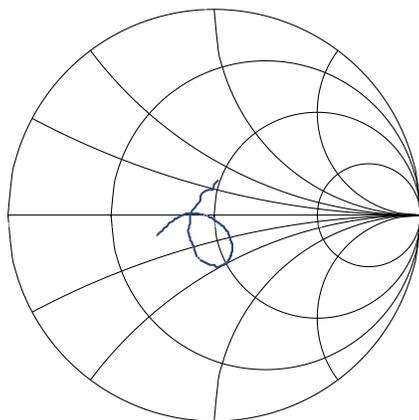
Bill of Material – TQQ7101-PCB

| Reference Des. | Value | Description | Manuf. | Part Number |
|----------------|-------|-----------------------|--------|-------------|
| U1 | n/a | Band 1 BAW Duplexer | Qorvo | TQQ7101 |
| n/a | n/a | Printed Circuit Board | Qorvo | 1039708 |
| n/a | n/a | SMA Edge Connector | | 1041120 |

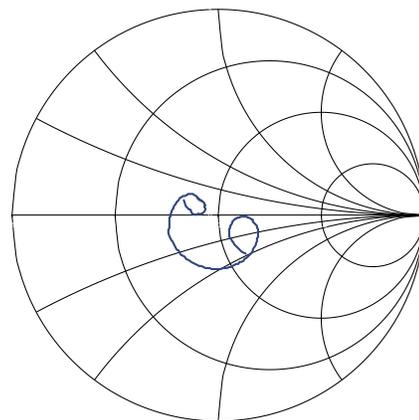
Performance Plots – Downlink



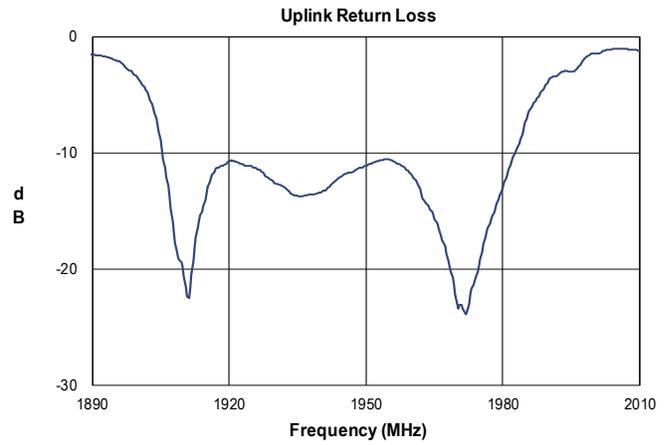
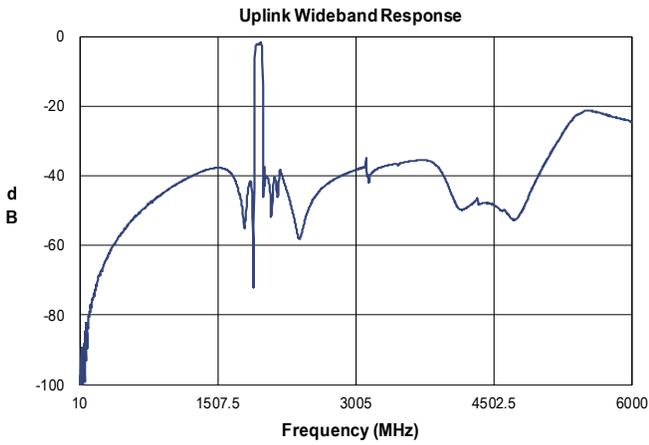
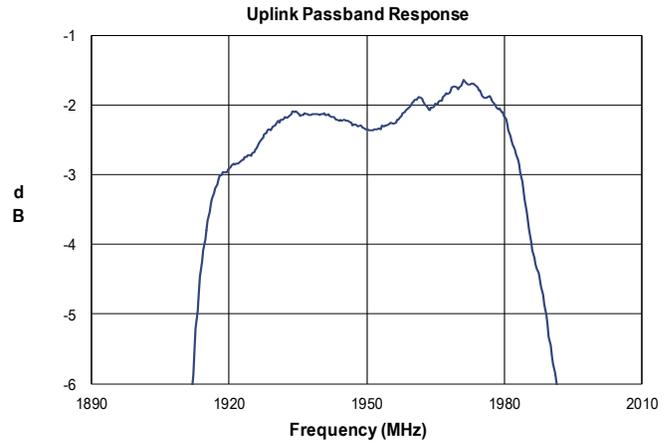
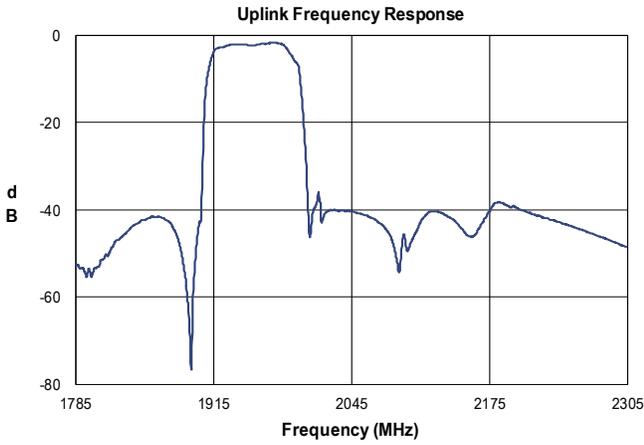
Downlink Path - Ant Port Impedance



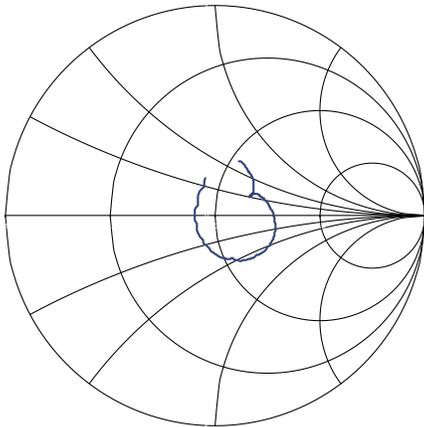
Downlink Port Impedance



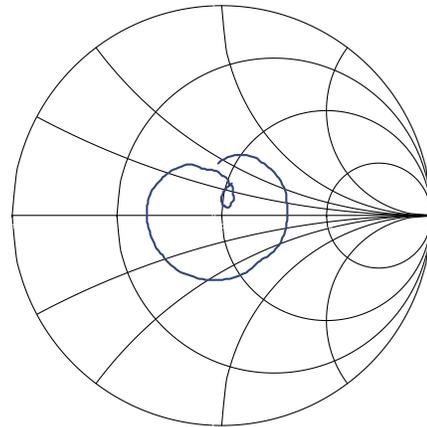
Performance Plots – Uplink



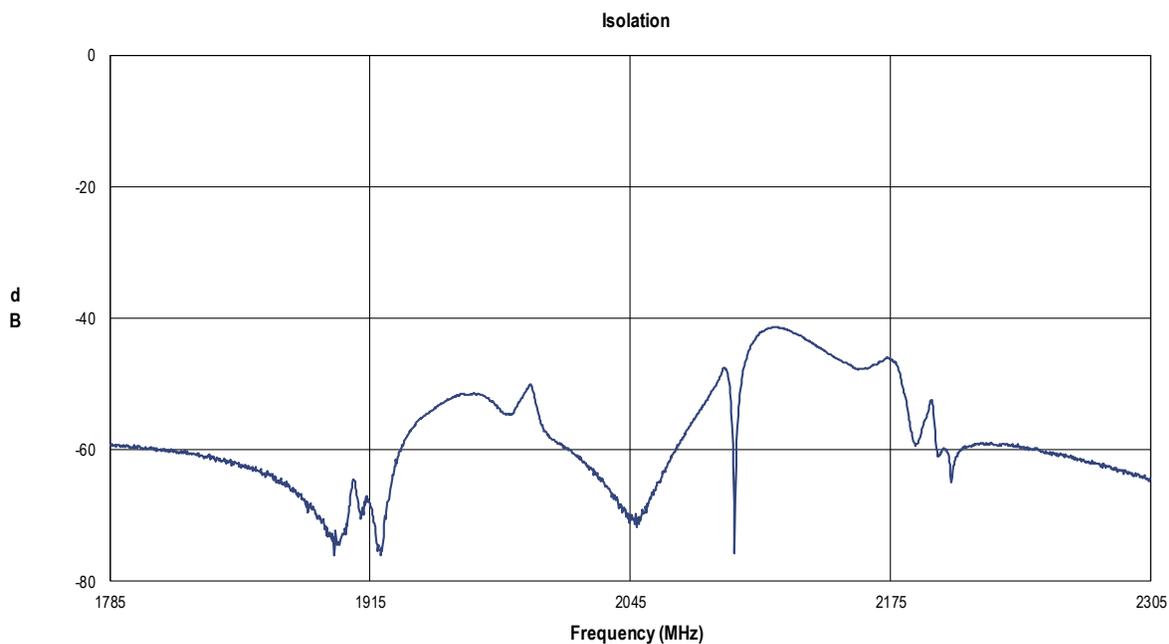
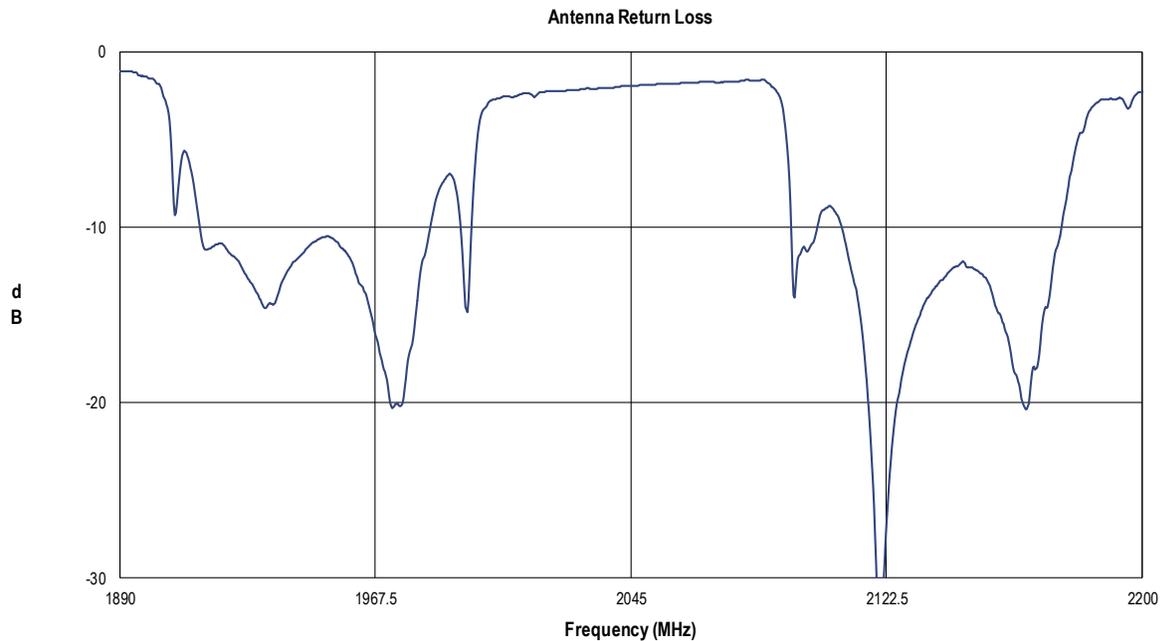
Uplink Path - Ant Port Impedance



Uplink Port Impedance



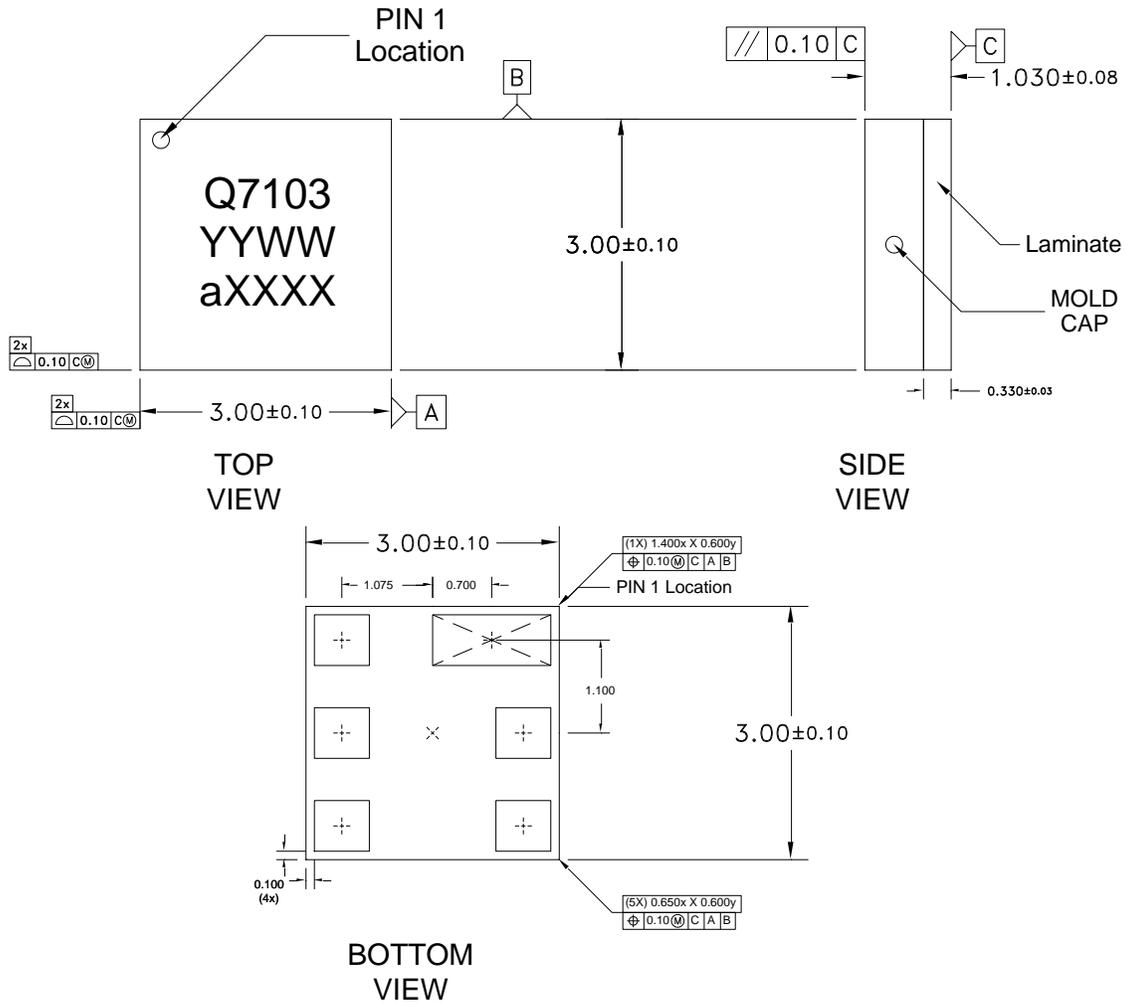
Performance Plots (cont'd)



Package Marking and Dimensions

Package Marking

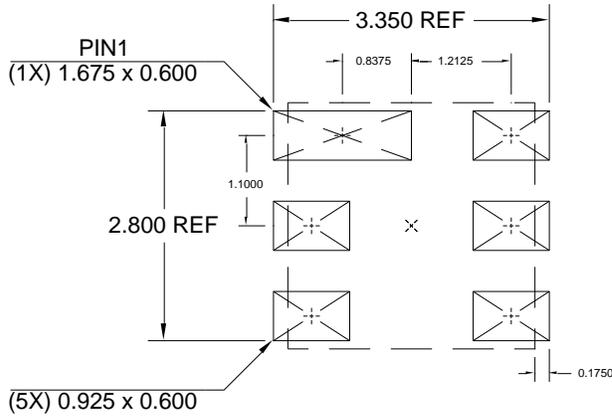
Product Identifier: Q7103
 Date Code: YYWW
 Assembly Code: aXXXX



Notes:

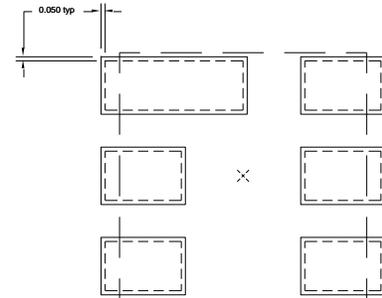
1. All dimensions are in millimeters. Angles are in degrees.
2. Dimension and tolerance formats conform to ASME Y14.4M-1994.
3. The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012.

PCB Mounting Pattern



**RECOMMENDED
LAND PATTERN**

Top view recommended land pattern metallization.



**RECOMMENDED
LAND PATTERN MASK**

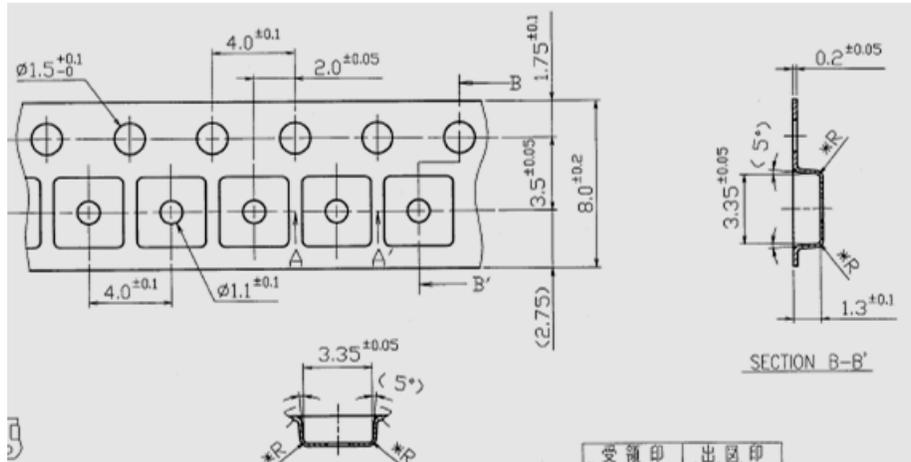
Top view recommended land pattern stencil aperture.

Notes:

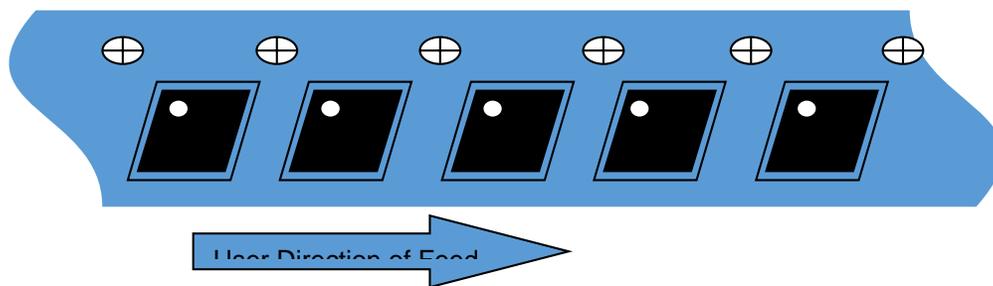
1. All dimensions are in millimeters. Angles are in degrees.
2. Use 1 oz. copper minimum for top and bottom layer metal.

Tape and Reel Information – Carrier and Cover Tape Dimensions

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

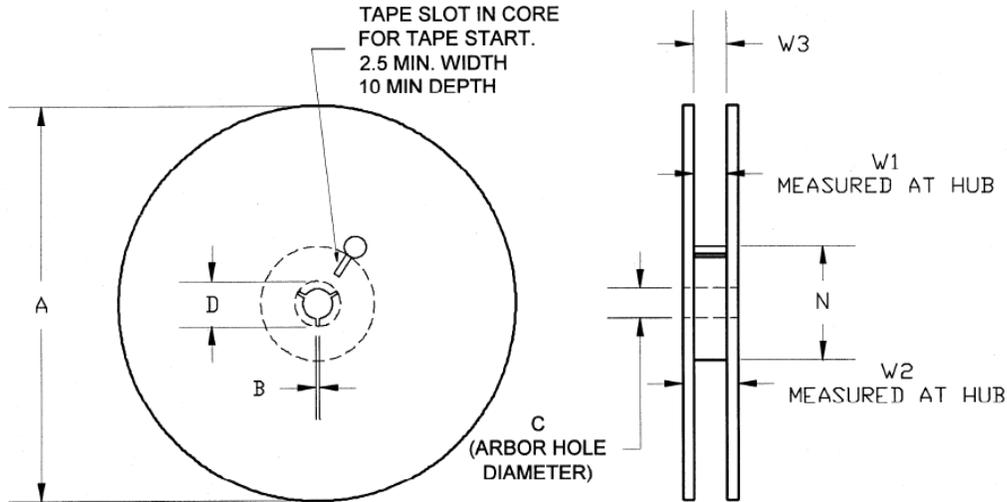


| Feature | Measure | Symbol | Size (in) | Size (mm) |
|---------------------|--|--------|-----------|-----------|
| Cavity | Length | A0 | 0.132 | 3.35 |
| | Width | B0 | 0.132 | 3.35 |
| | Depth | K0 | 0.055 | 1.40 |
| | Pitch | P1 | 0.157 | 4.00 |
| Centerline Distance | Cavity to Perforation - Length 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 TriQuint website.
Standard T/R size = 2,500 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 |

Product Compliance Information

ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating: Class 0B
Value: ≥ 125 V to < 250 V
Test: Human Body Model (HBM)
Standard: ESDA / JEDEC Standard JS-001-2012

ESD Rating: Class B
Value: > 200 V to < 400 V
Test: Machine Model (MM)
Standard: JEDEC Standard JESD22-A115

MSL Rating

MSL Rating: Level 3
Test: 260°C convection reflow
Standard: JEDEC Standard IPC/JEDEC J-STD-020

Solderability

Compatible with both lead-free (+260 °C maximum reflow temperature) and tin/lead (+245 °C maximum reflow temperature) soldering processes.
Contact plating: ENIG (Electroless Nickel Immersion Gold)

Refer to [Soldering Profile](#) for recommended guidelines.

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 (C₁₅H₁₂Br₄O₂) Free
- PFOS Free
- SVHC Free

Contact Information

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

Web: www.triquint.com
Email: customer.support@qorvo.com

Tel: 877-800-8584

For information about the merger of RFMD and TriQuint as Qorvo:

Web: www.qorvo.com

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