



# QPQ1040Q

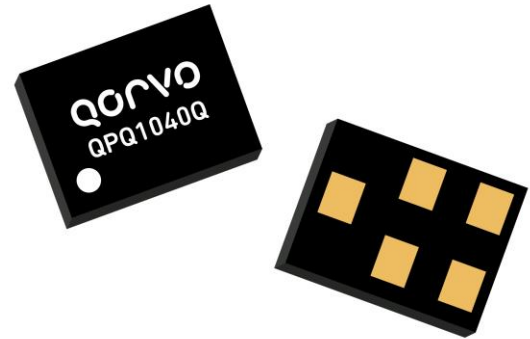
## 2300-2400 MHz TX/RX Filter

### Product Overview

The QPQ1040Q is a high-performance, high power Bulk Acoustic Wave (BAW) TX filter designed to meet the strict LTE/NR rejection requirements for use in B40/n40.

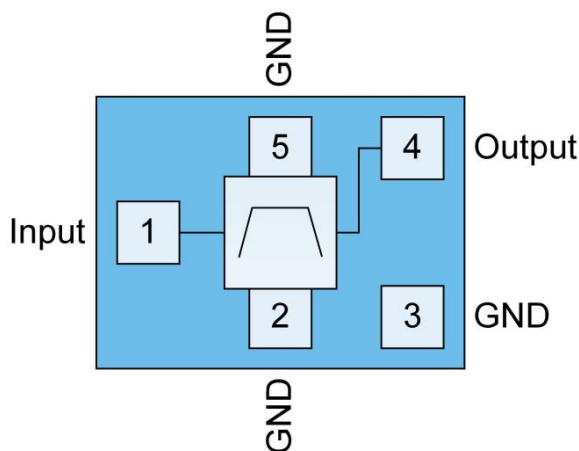
The QPQ1040Q is specifically designed to meet the high performance expectations of insertion loss and rejection for LTE/NR transmit systems under all operating conditions.

The QPQ1040Q uses common module packaging techniques to achieve the industry standard 1.1 x 0.9 x 0.55 mm footprint. The filter exhibits excellent power handling capabilities.



1.1 x 0.9 x 0.55 mm

### Functional Block Diagram



Top View

### Key Features

- Qualified to AEC-Q 200 Grade 3
- Highly selective BAW filter achieving low insertion loss over full bandwidth and operating conditions
- Excellent WiFi Rejection
- RoHS Compliant, Pb-free Module Package

### Applications

- LTE Telematics Modules
- For Band 40 TD-LTE applications

### Ordering Information

| Part Number  | Description           |
|--------------|-----------------------|
| QPQ1040QEVB  | Evaluation Board      |
| QPQ1040QSB   | 5pc sample bag        |
| QPQ1040QSR   | 100pcs on 7" reel     |
| QPQ1040QTR13 | 15,000pcs on 13" reel |

# QPQ1040Q

## 2300-2400 MHz TX/RX Filter

### Absolute Maximum Ratings

| Parameter                   | Conditions                           | Rating        |
|-----------------------------|--------------------------------------|---------------|
| Storage Temperature         |                                      | -40 to +150°C |
| Peak RF Input Power (Pin 1) | CW, +25 °C, Max duration of 0.2 sec. | +37dBm        |

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

### Recommended Operating Conditions

| Parameter                     | Min | Typ. | Max | Units |
|-------------------------------|-----|------|-----|-------|
| Operating Ambient Temperature | -40 | +25  | +85 | °C    |

Electrical specifications are measured at specified test conditions. Specifications are not guaranteed over all recommended operating conditions.

### Minimum Lifetime Ratings

| Conditions   | Rating |
|--|--------|
| RF Input Signal (Pin 1)<br>2300-2400 MHz, 40% duty cycle/LTE, QPSK, 5MHz, 25RB, +55 °C, +32.5dBm | 5K Hrs |

# QPQ1040Q

## 2300-2400 MHz TX/RX Filter

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

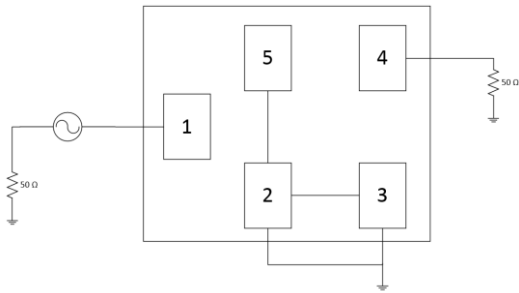
Unless otherwise noted: Operating Temp = -40 to 85°C

| Parameter                         | Conditions                     | Min. | Typ. <sup>(2)</sup> | Max. | Units |
|-----------------------------------|--------------------------------|------|---------------------|------|-------|
| Insertion Loss <sup>(3)</sup>     | 2300 – 2395 MHz                |      | 1.0                 | 2.0  | dB    |
|                                   | 2395 – 2400 MHz                |      | 1.4                 | 2.5  |       |
| VSWR (ANT)                        | 2300 – 2400 MHz                |      | 1.7                 | 2.1  | Ratio |
| VSWR (TX)                         | 2300 – 2400 MHz                |      | 1.6                 | 2.1  |       |
| Passband Ripple Over 5MHz Channel | 2300 – 2400 MHz                |      | 0.2                 | 0.8  | dB    |
| Attenuation                       | 10 – 1574 MHz                  | 30   | 35                  |      | dB    |
|                                   | 1574 – 1577 MHz                | 30   | 36                  |      |       |
|                                   | 1577 – 1680 MHz                | 30   | 36                  |      |       |
|                                   | 1710 – 1785 MHz                | 30   | 36                  |      |       |
|                                   | 1805 – 2170 MHz                | 31   | 37                  |      |       |
|                                   | 2110 – 2170 MHz                | 37   | 46                  |      |       |
|                                   | 2423 – 2441 MHz <sup>(4)</sup> | 13   | 35                  |      |       |
|                                   | 2428 – 2446 MHz <sup>(4)</sup> | 24   | 44                  |      |       |
|                                   | 2433 – 2481 MHz <sup>(4)</sup> | 40   | 48                  |      |       |
|                                   | 2460 – 2500 MHz                | 41   | 50                  |      |       |
| 4600 – 4800 MHz                   | 34                             | 41   |                     |      |       |
| 6900 – 7200 MHz                   | 26                             | 33   |                     |      |       |

Notes:

1. All specifications are based on the applications circuit and Min/max is specified over -40 °C to +85 °C unless otherwise noted.
2. Typical values are based on average measurement at 25°C
3. Data is averaged over the specified frequency
4. Integrated over each 18MHz channel

**QPQ1040Q Application Circuit**

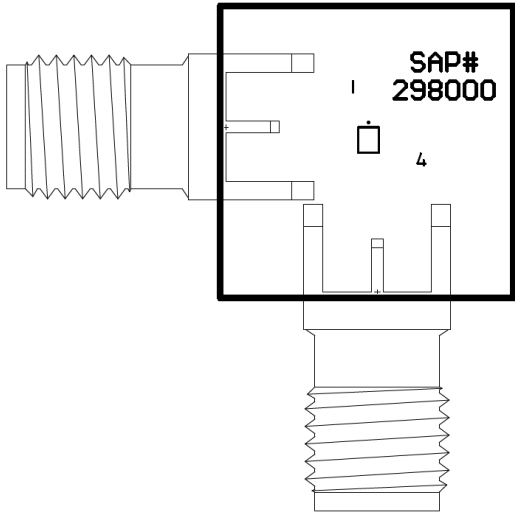


RF ports are internally matched to 50Ω

**QPQ1040Q EVB PCB Information**

| Layer | Name           | Material       | Thickness | Constant | Board Layer Stack |
|-------|----------------|----------------|-----------|----------|-------------------|
|       | Top Overlay    |                |           |          |                   |
|       | Top Solder     | Solder Resist  | 0.40mil   | 3.5      |                   |
| 1     | Top Layer      | Copper         | 0.70mil   |          |                   |
|       | Dielectric1    | Taconic TLY-5A | 7.50mil   | 2.4      |                   |
| 2     | Signal Layer 1 | Copper         | 0.70mil   |          |                   |
|       | Dielectric 3   | FR-4           | 52.00mil  | 4.2      |                   |
| 3     | Bottom Layer   | Copper         | 0.70mil   |          |                   |
|       | Bottom Solder  | Solder Resist  | 0.40mil   | 3.5      |                   |
|       | Bottom Overlay |                |           |          |                   |

Total Thickness: 62mil

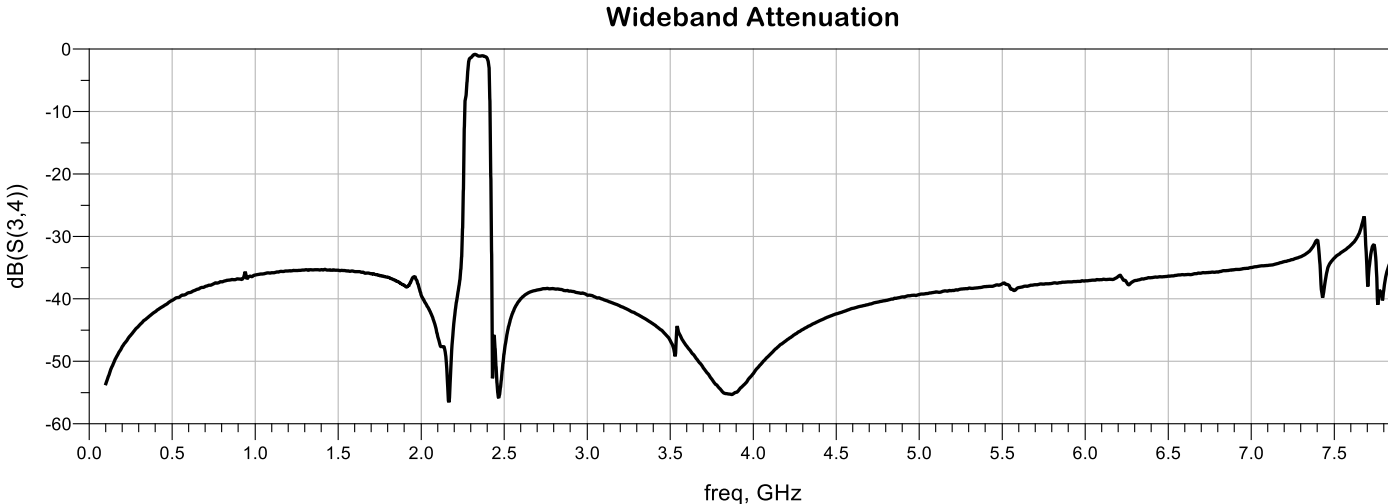
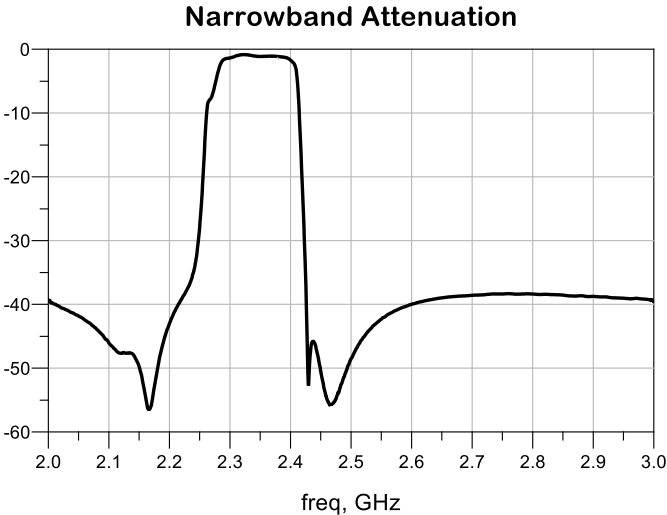


**QPQ1040Q Bill of Material**

| Ref. Des. | Value | Description                | Manuf.           | Part number   |
|-----------|-------|----------------------------|------------------|---------------|
| PCB       | N/A   | 3 layer                    | Multiple         |               |
| U1        | N/A   | 2300-2400 MHz TX/RX Filter | Qorvo            | QPQ1040Q      |
| SMA       | N/A   | SMA connector              | Radiall USA Inc. | 9602-1111-018 |

### Performance Plots

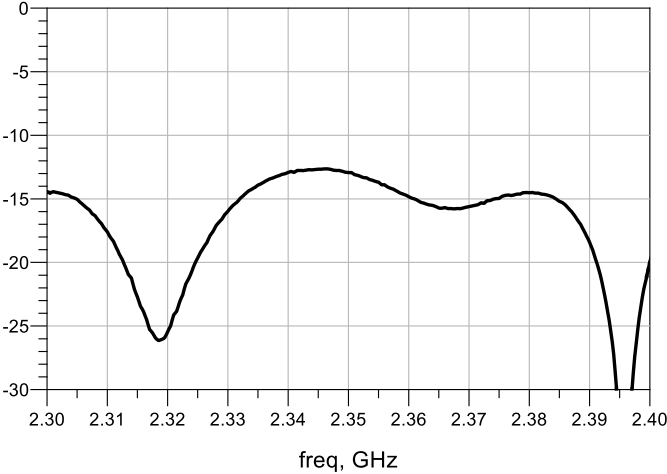
Test conditions unless otherwise noted: Temp. = +25°C



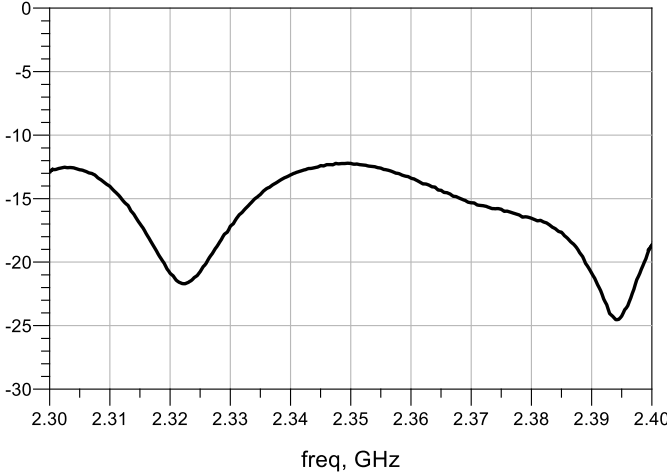
**Performance Plots (cont'd)**

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

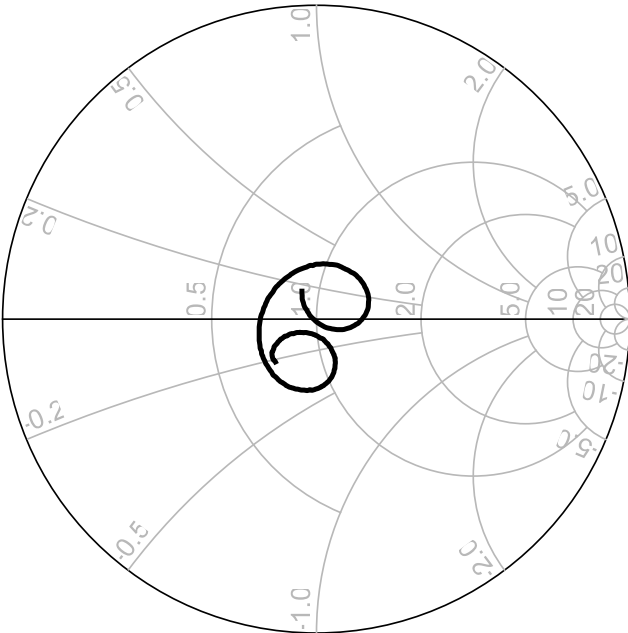
**ANT Return Loss**



**Input Return Loss**

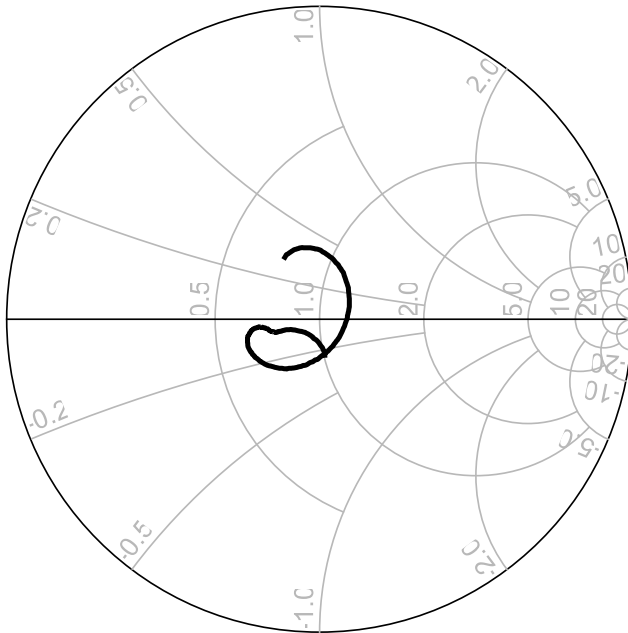


**ANT Impedance**



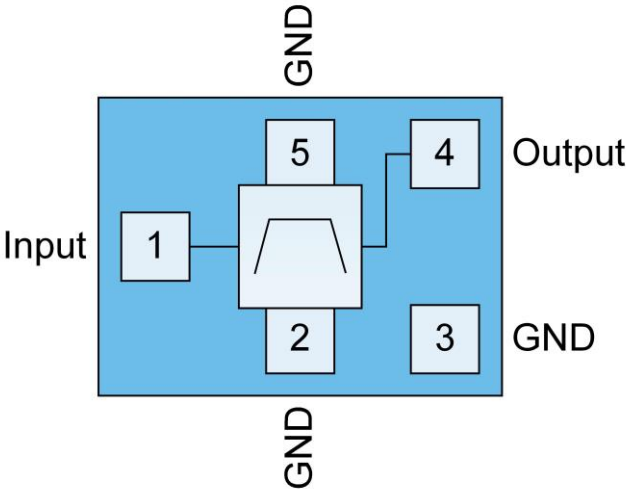
freq (2.300GHz to 2.400GHz)

**Input Impedance**



freq (2.300GHz to 2.400GHz)

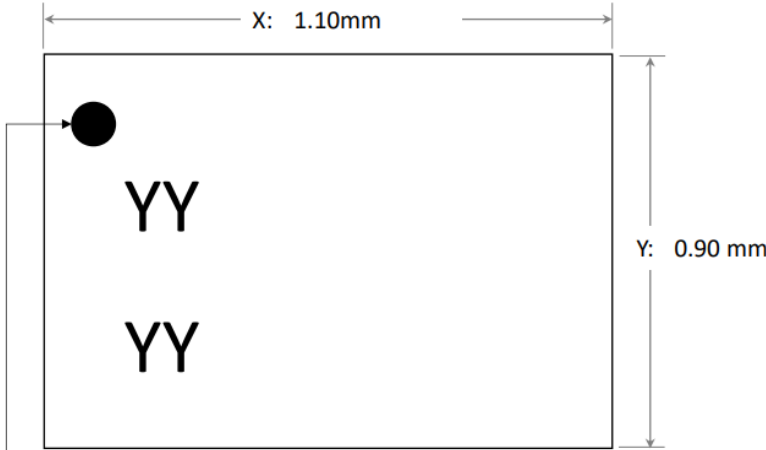
Pin Configuration and Description



Top View

| Pin Number | Label  | Description  |
|------------|--------|--------------|
| 1          | Input  | B40 TX Input |
| 4          | Output | B40 Ant      |
| 2,3,5      | Ground | Ground       |

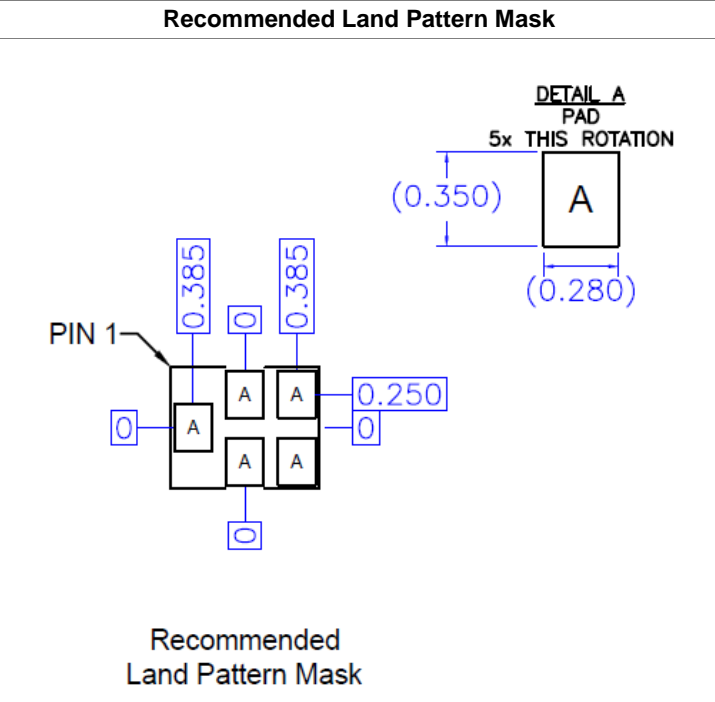
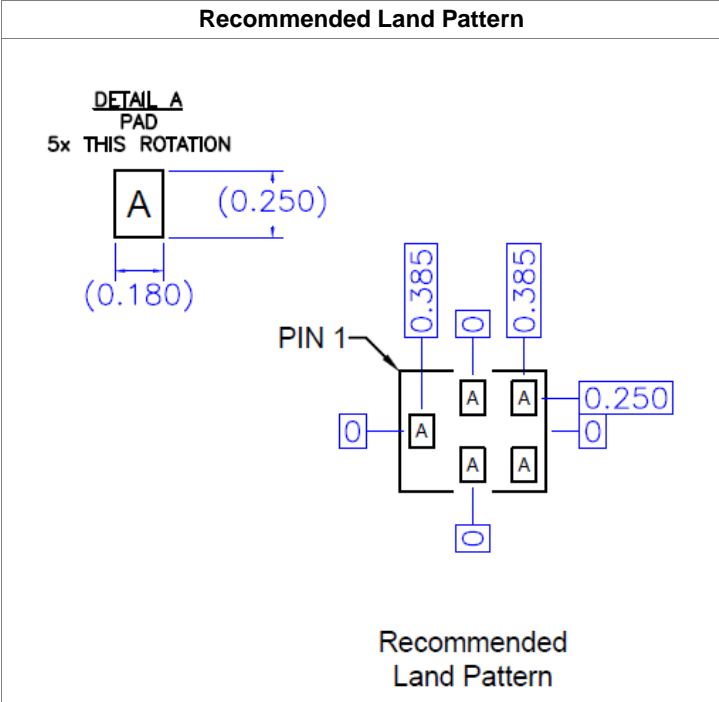
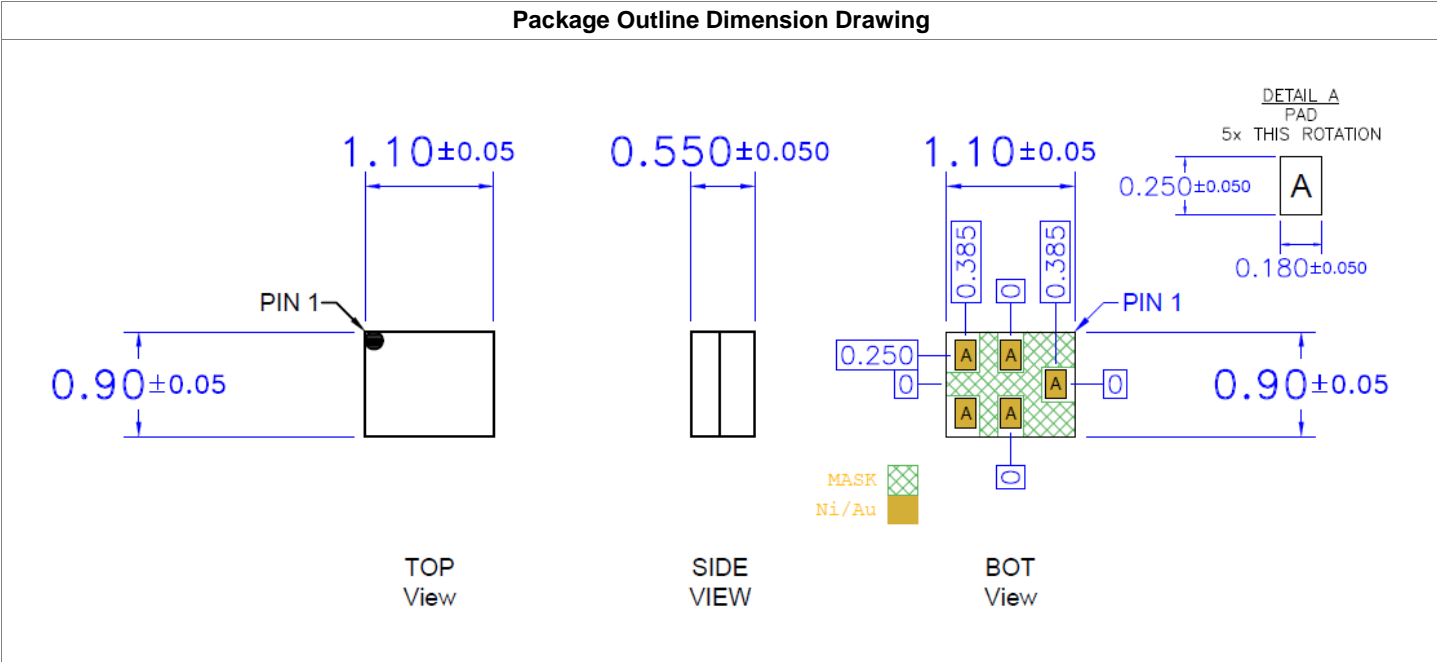
Marking Diagram



Pin 1 Indicator  
 Trace Code to be assigned by SubCon  
 Logo: Use : No Logo  
 (Where YYYY Indicates Trace Code)

**QPQ1040Q**  
**2300-2400 MHz TX/RX Filter**

**Package Marking and Dimensions**



**Notes:**

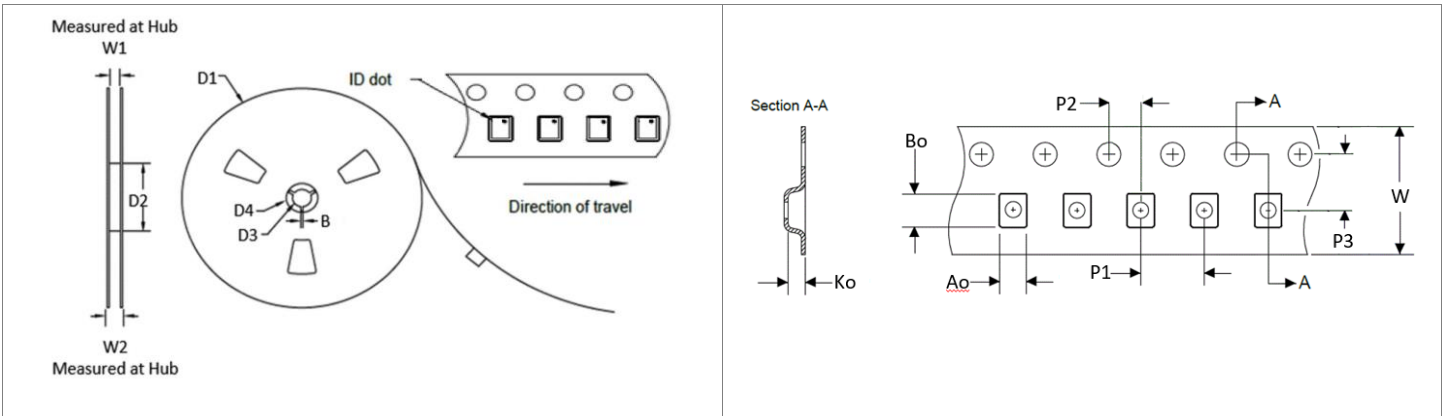
- All dimensions are in millimeters. Angles are in degrees.
- Dimension and tolerance formats conform to ASME Y14.4M-1994.

The terminal #1 identifier and terminal numbering conform to JESD 95-1 SPP-012



# QPQ1040Q 2300-2400 MHz TX/RX Filter

## Tape and Reel Information



| Feature | Measure              | Symbol | Size (mm) |
|---------|----------------------|--------|-----------|
| Flange  | Diameter             | D1     | 330.0     |
|         | Thickness            | W2     | 14.2      |
|         | Space Between Flange | W1     | 8.8       |
| Hub     | Outer Diameter       | D2     | 102.0     |
|         | Arbor Hole Diameter  | D3     | 13.0      |
|         | Key Slit Width       | B      | 2.0       |
|         | Key Slit Diameter    | D4     | 20.2      |

| Feature             | Measure                        | Symbol | Size (mm) |
|---------------------|--------------------------------|--------|-----------|
| Cavity              | Length                         | Ao     | 1.10      |
|                     | Width                          | Bo     | 1.30      |
|                     | Depth                          | Ko     | 0.72      |
|                     | Pitch                          | P1     | 4.0       |
| Centerline Distance | Cavity to Perforation (Length) | P2     | 2.0       |
|                     | Cavity to Perforation (Width)  | P3     | 3.5       |
| Carrier Tape        | Width                          | W      | 8.0       |

(Unless otherwise specified, all dimension tolerances per EIA-481)

## Handling Precautions

| Parameter                        | Rating   | Standard            |
|----------------------------------|----------|---------------------|
| ESD – Human Body Model (HBM)     | Class 1C | ESDA/JEDEC JS-001   |
| ESD – Charged Device Model (CDM) | Class C3 | ESDA/JEDEC JS-002   |
| MSL – Moisture Sensitivity Level | MSL3     | IPC/JEDEC J-STD-020 |



Caution!

ESD sensitive device

## Solderability

Compatible with the latest version of J-STD-020, lead free solder, 260°C.

## RoHS Compliance

This part is compliant with the 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

## REVISION HISTORY

| Revision | Description   | Date                        |
|----------|---|-----------------------------|
| A        | Initial preliminary datasheet<br>Updated spec table, plots and EVB information                                  |                             |
| B        | Updated Min/Max Spec<br>Updated Minimum Lifetime and ESD Rating<br>Updated Marking diagram and outline drawings | Feb 12 <sup>th</sup> , 2021 |
| C        | Updated Min/Max, EVB Information and Marking diagram  | Apr 30 <sup>th</sup> , 2021 |

## Contact Information

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

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

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