# QPQ0978

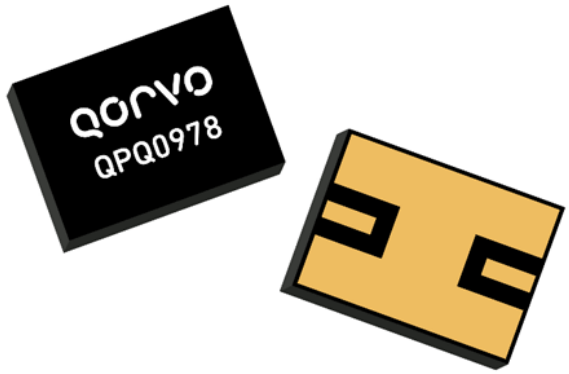
## 978 MHz BAW Filter

## General Description

QPQ0978 is a 978 MHz RF Filter designed in a small hermetic package for high selectivity applications. It offers narrow-band signal control with low insertion loss at the center frequency and is self-matched to 50 ohms.

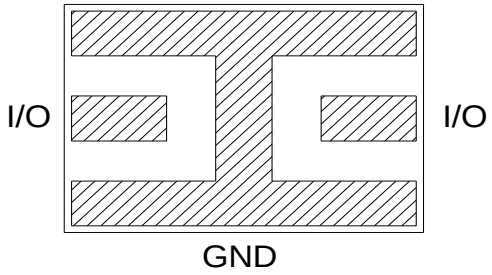
QPQ0978 also offers a tremendous size and weight advantage over ceramic filters (10x smaller) and cavity filters (100x smaller) while still being robust for high-reliability and Defense and Aerospace applications.

No matching components are required, making the PCB design and implementation easy.




CSP: 6.43 X 4.64 X 0.889 mm

## Functional Block Diagram




Bottom View

## Product Features

- Low Insertion Loss
- High Selectivity
- Single-Ended Operation
- No External Matching Required
- 50 Ω Impedance at Input / Output
- Ceramic Chip-Scale Package (CSP)
- Small Size
- Hermetically Sealed
- **RoHS** Compliant, **Pb**-Free

*Performance is typical across frequency. Please reference electrical specification table and data plots for more details*

## Applications

- For SSR/IFF Applications
- For High Selectivity Applications

## Pin Configuration - Single Ended

| Pin No. | Label |
|---|---|
| I/O | Input / Output |
| GND | Ground |

## Ordering Information

| Part No. | Description |
|---|---|
| QPQ0978SR | 978 MHz BAW Filter<br>7” Reel |
| QPQ0978 | 978 MHz BAW Filter Waffle Pack |
| QPQ0978EVB01 | Evaluation Board |

## Absolute Maximum Ratings

| Parameter | Rating |
|---|---|
| Storage Temperature | -55 to 100°C |
| Operation Temperature | -40 to 85°C |
| RF Input Power (1) - Test conditions: PW = 200ms; DC = 50% @ +25 °C | 41 dBm |

Exceeding any one or a combination of the Absolute Maximum Rating conditions may cause permanent damage to the device. Extended application of Absolute Maximum Rating conditions to the device may reduce device reliability.

(1) Input Power for both Input & Output ports

## Minimum Lifetime Ratings

| Conditions | Rating |
|---|---|
| RF Input Power (1), Pin 1 & Pin 2 | >10k hours |
| RF Input Power (2), Pin 1 & Pin 2 | >1 hour |

(1) Input Power: CW, 24 dBm, @ +71 °C

(2) Input Power: CW, 30 dBm, @ +71 °C

## Electrical Specifications (1,2)

Test conditions unless otherwise noted: Temperature Range = -40 °C to +85 °C, 50 Ω system

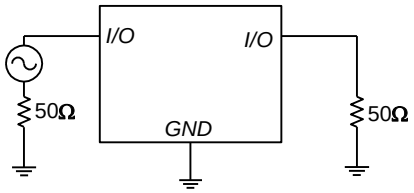
| Parameter (3) | Conditions | Min | Typical (4) | Max | Units |
|---|---|---|---|---|---|
| Center Frequency (Fo) | | - | 978 | - | MHz |
| Passband Insertion Loss | 977.2 MHz to 978.8 MHz | - | - | 4.5 | dB |
| Passband Amplitude Variation (Pk-Pk) | 977.2 MHz to 978.8 MHz | - | - | 1 | dB |
| Passband Group Delay | 977.2 MHz to 978.8 MHz | - | - | 150 | ns |
| Passband Pk-Pk Group Delay Variation | 977.2 MHz to 978.8 MHz | - | - | 30 | ns |
| Stop Band Rejections | | - | - | - | - |
| 100 MHz to 478MHz (6) | Reference to Loss @ Fo | 38 | - | - | dB |
| 478 MHz to 963 MHz | Reference to Loss @ Fo | 38 | - | - | dB |
| 993 MHz to 1423MHz | Reference to Loss @ Fo | 38 | - | - | dB |
| 1423 MHz to 1478 MHz | Reference to Loss @ Fo | 27 | - | - | dB |
| 1478 MHz to 5850 MHz (6) | Reference to Loss @ Fo | 27 | - | - | dB |
| Input/Output Passband Return Loss | 977.2 MHz to 978.8 MHz | 10 | - | - | dB |
| Source Impedance (5) | Single Ended | - | 50 | - | Ω |
| Load Impedance (5) | Single Ended | - | 50 | - | Ω |

Notes:

1. All specifications are based on the Qorvo schematics for the reference designs shown on page 3.
2. In production, devices will be tested at room temperature to a guard banded specification to ensure electrical compliance over temperature.
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacture tolerances.
4. Typical values are based on average measurements at room temperature. (25 °C ±5 °C)
5. Optimum impedance to achieve the performance shown.
6. Guaranteed by design

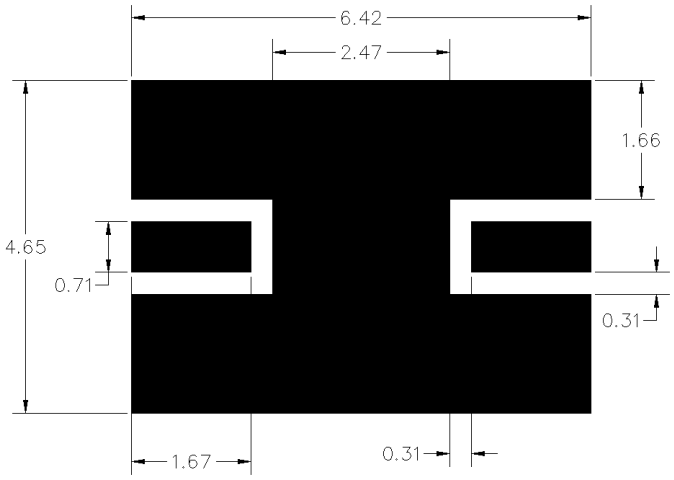
## Matching Schematics

50 Ω
Single-ended
Input




50 Ω
Single-ended
Output

## Recommended PCB Mounting Pattern

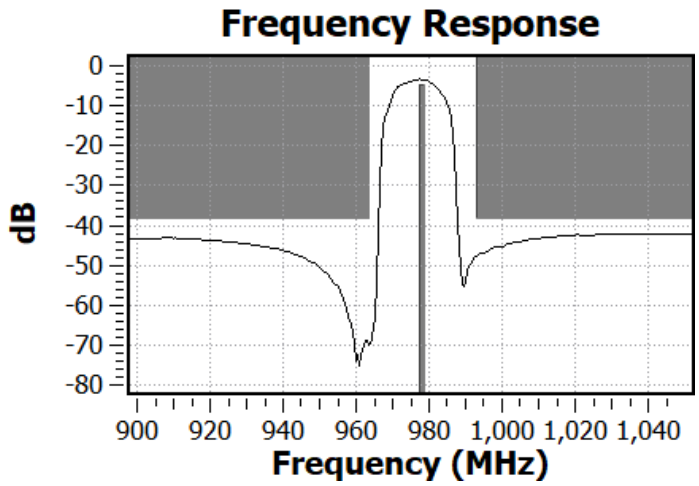


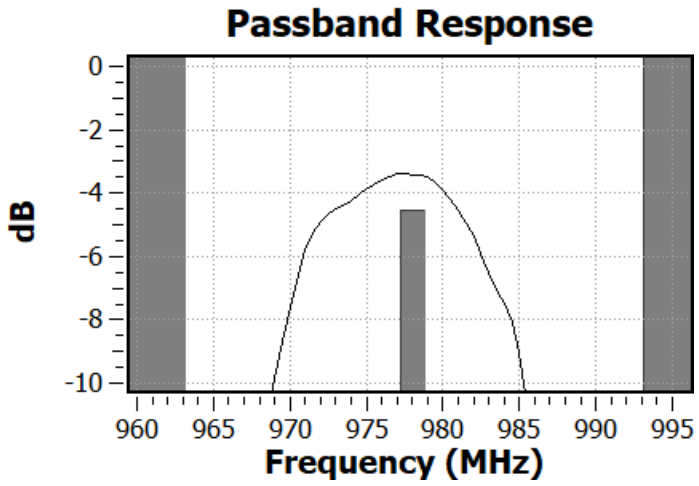

Notes:

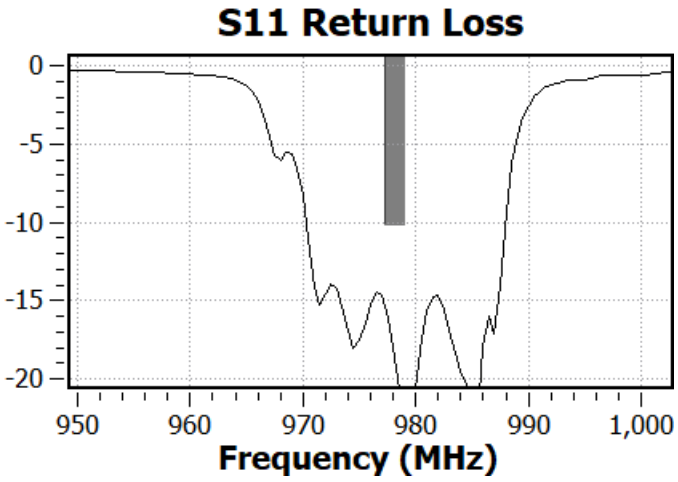
1. All dimensions are in millimeters.
2. Modifications may be necessary to suit end user assembly materials and processes.

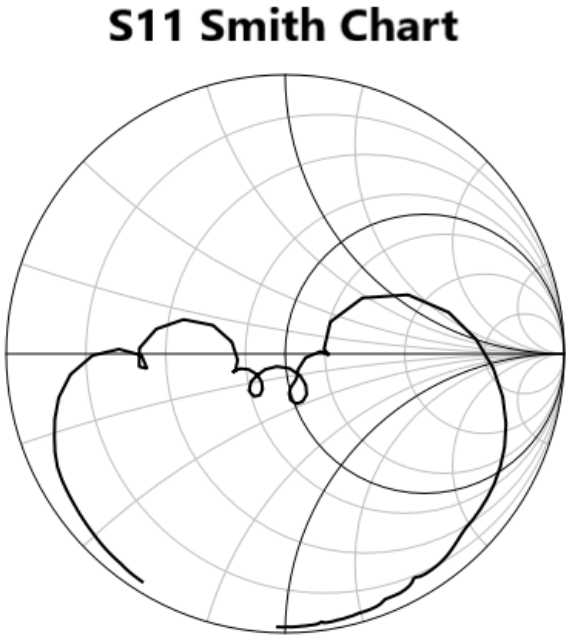
## Typical Performances

Test conditions unless otherwise noted: Temp = +25 °C ±5 °C, 50 Ω system

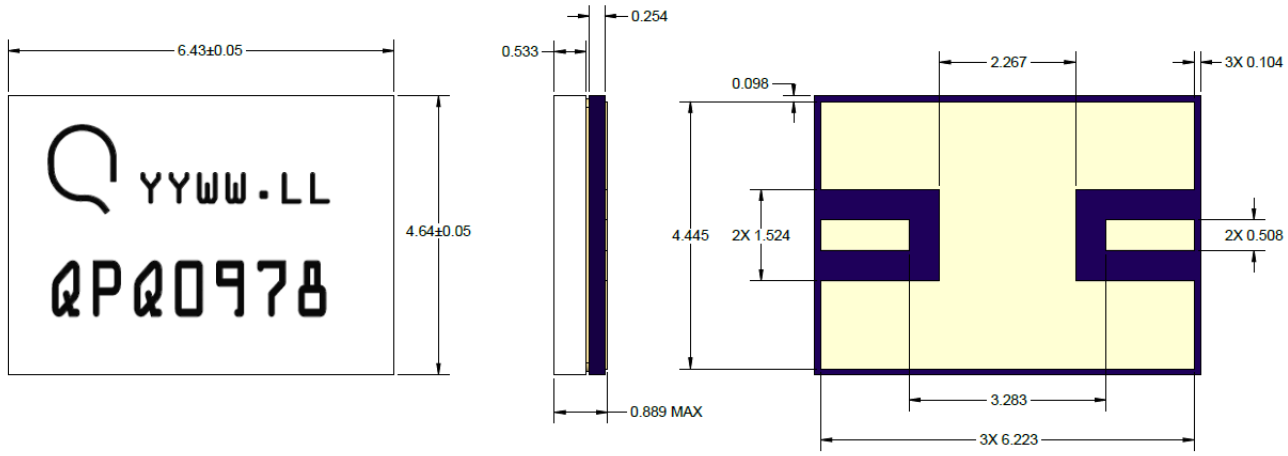


## Device Package Information, Marking and Dimensions




Package Style: CSP
Dimensions: 6.43 x 4.64 x 0.889 mm

Package Base: Sapphire
Package Lid: Alumina
Terminations: Au plating over Ni (2.0 - 6.0 µm Ni, 0.33 – 0.83 µm Au)

All dimensions shown are nominal in millimeters. Angles are in degrees.
Tolerances: XX = ± .25; XXX = ± .100
. Overall width, length, and thickness are the only critical dimensions. All other dimensions are for reference only.

Marking includes corporate logo, date code, and product part number.
The date code consists of, YY = last 2 digits of the year, WW = 2 digits of calendar work week and LL = 2 digits of lot ID.
Marking Diagram is for Reference Only.

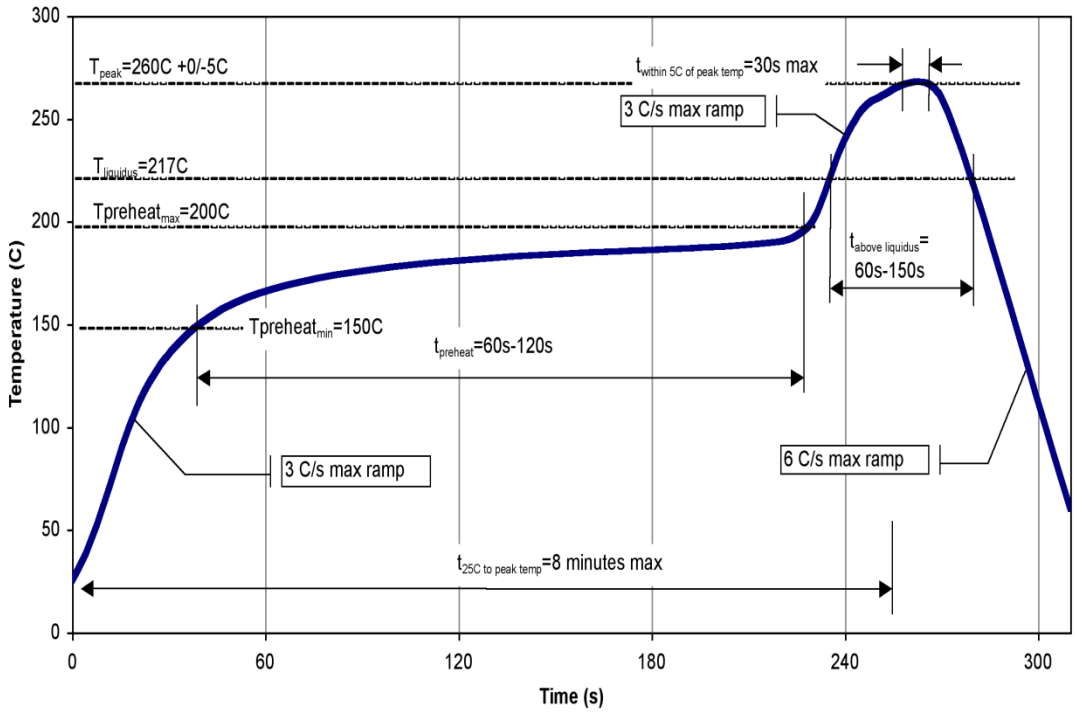
## Packaging Information

- Tape and Reel per EIA-481 available. 7” Reel. Additional information available upon request.

## Assembly Notes

1. Compatible with both Lead-free solder (260°C peak reflow temperature) and tin/lead (245°C peak reflow temp.) soldering processes.
2. Contact plating: Au plating over Ni.

## Recommended Soldering Profile



## Handling Precautions

| Parameter | Rating | Standard |
|---|---|---|
| ESD – Human Body Model (HBM) | Class 2 | ESDA / JEDEC JS-001 |
| ESD – Charged Device Model (CDM) | Class C3 | ESDA / JEDEC JS-002 |
| MSL – Moisture Sensitivity Level | N/A, Hermetic Package | |

Caution!
ESD-Sensitive Device

## 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 ($C_{15}H_{12}Br_4O_2$) Free
- SVHC Free
- PFOS Free

## Contact Information

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

**Web:** www.qorvo.com

**Tel: 1-844-890-8163**

**Email:** customer.support@qorvo.com

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