

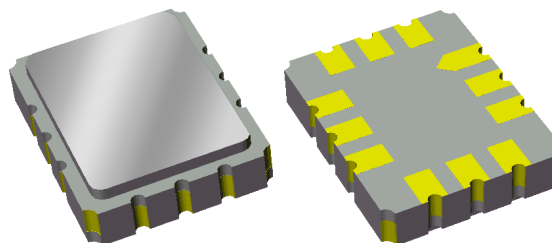
856882

358.4 MHz SAW Filter



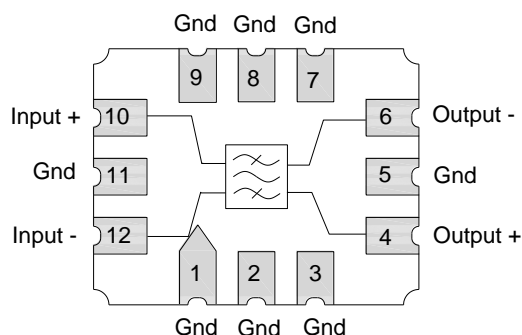
Applications

- General Purpose Wireless
- Wireless Infrastructure
- 3G, 4G, Multistandard



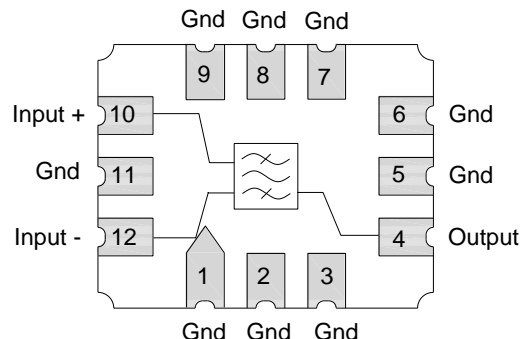
Functional Block Diagram Bal/Bal

Top view



Functional Block Diagram Bal/SE

Top view



Product Features

- Usable bandwidth 39.6 MHz
- Low loss
- High attenuation
- Low EVM
- Balanced-Balanced or Balanced-Single ended operation
- Ceramic Surface Mount Package (SMP)
- Small Size: 7.01 x 5.51 x 1.70 mm
- Excellent power handling
- Hermetic **RoHS** compliant, **Pb-free**

General Description

The 856882 is a high performance IF SAW filter developed for 4G and Multistandard infrastructure applications.

It features low loss with excellent attenuation, and is designed to be used with multiple impedance values and configurations. The filter is developed for excellent in-band characteristics in order to minimize system bit-error rates.

This device is RoHS compliant and Pb-free.

Pin Configuration

| Pin # | Bal/Bal | Description |
|----------------------|---------|-------------|
| 10 | | Input + |
| 12 | | Input - |
| 4 | | Output + |
| 6 | | Output - |
| 1,2,3,5, 7, 8, 9, 11 | | Ground |

| Pin # | Bal/SE | Description |
|------------------------|--------|-------------|
| 10 | | Input + |
| 12 | | Input - |
| 4 | | Output |
| 1,2,3,5,6, 7, 8, 9, 11 | | Ground |

Ordering Information

| Part No. | Description |
|------------|------------------|
| 856882 | packaged part |
| 856882-EVB | evaluation board |

Standard T/R size = 3000 units/reel.

Please specify the evaluation board impedance:

1. Balanced 200 Ω input, Balance 200 Ω output.
2. Balanced 200 Ω input, Single-ended 50 Ω output.
3. Balanced 100 Ω input, Balance 100 Ω output.

Specifications

Electrical Specifications ^(1, 2)

Specified Temperature Range: ⁽³⁾ -33 to +85 °C

| Parameter ⁽⁴⁾ | Conditions | Min | Typical ⁽⁵⁾ | Max | Units |
|--------------------------------------|---|-----|------------------------|------|--------|
| Center Frequency | | - | 358.4 | - | MHz |
| Insertion Loss | At 358.4 MHz | - | 9.5 | 11.5 | dB |
| Amplitude Variation ⁽⁶⁾ | 338.6 – 378.2 MHz | - | 0.35 | 1.0 | dB p-p |
| Absolute Group Delay | At 358.4 MHz | - | 0.43 | 0.5 | μs |
| Group Delay Variation ⁽⁶⁾ | 338.6 – 378.2 MHz | - | 21 | 50 | ns p-p |
| Time side-lobe response attenuation | (1.0 – 500 μs) | 40 | 45 | - | dB |
| IIP3 | Tones 5 MHz separated power > 5dBm per tone | 45 | 50 | - | dBm |
| EVM ⁽⁷⁾ | | - | 1.3 | 3 | % |
| Absolute Attenuation ⁽⁸⁾ | 10.0 – 253.4 MHz | 55 | 61 | - | dB |
| | 253.4 – 270.0 MHz | 53 | 56 | - | dB |
| | 270.0 – 294.4 MHz | 55 | 58 | - | dB |
| | 294.4 – 312.4 MHz | 40 | 53 | - | dB |
| | 312.4 – 326.4 MHz | 25 | 44 | - | dB |
| | 326.4 – 388.4 MHz | 30 | 37 | - | dB |
| | 388.4 – 404.4 MHz | 40 | 49 | - | dB |
| | 404.4 – 422.4 MHz | 45 | 52 | - | dB |
| | 422.4 – 463.4 MHz | 55 | 66 | - | dB |
| | 463.4 – 660.0 MHz | 35 | 38 | - | dB |
| | 660.0 – 780.0 MHz | 55 | 62 | - | dB |
| Input/Output Return Loss | 338.6 – 378.2 MHz | 10 | 12 | - | dB |
| Source/Load Impedance ⁽⁹⁾ | | - | 200, 100, 50 | - | Ω |

Notes:

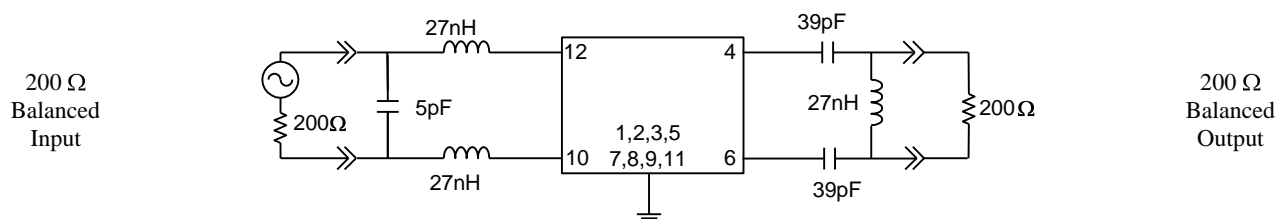
1. All specifications are based on the TriQuint schematics for the different impedances shown on page 3, 4 & 5.
2. An external impedance matching network with $\pm 2\%$ tolerance will be necessary to achieve the proposed specifications.
3. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature.
4. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances.
5. Typical values are based on average measurements at room temperature.
6. These Variations are defined as the difference between the lowest loss and the highest loss within the defined frequency points.
7. Measured with an RRC filtered QPSK modulated signal with a BW of 3.84 MHz placed anywhere within 338.6 to 378.2 MHz.
8. Relative to insertion loss at center frequency.
9. See the impedance options in the ordering information section on page 1.

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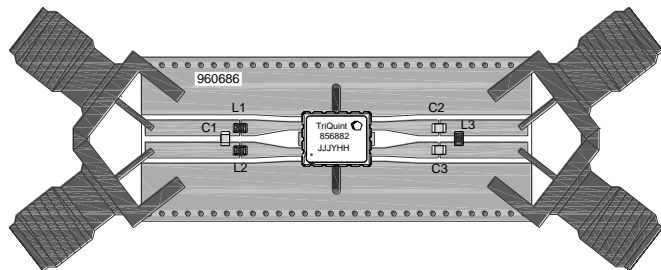
Impedance option #1 – 200Ω Bal Input, 200Ω Bal Output

Schematic



Note: Actual matching values may vary due to PCB layout and parasitic

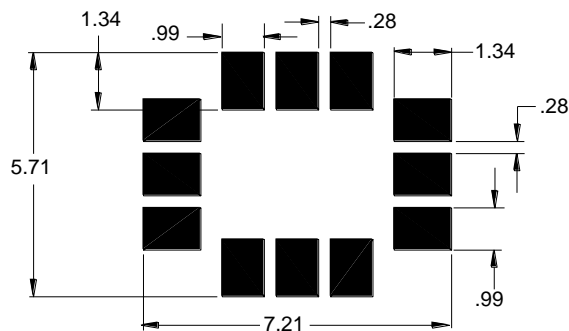
PC Board



Notes:

Top, middle & bottom layers: 1 oz copper
Substrates: FR4 dielectric, .031" thick
Finish plating: Nickel: 3-8μm thick, Gold: .03-.2μm thick
Hole plating: Copper min .0008μm thick

Mounting Configuration



Notes:

1. All dimensions are in millimeters.
2. This footprint represents a recommendation only.

Bill of Material

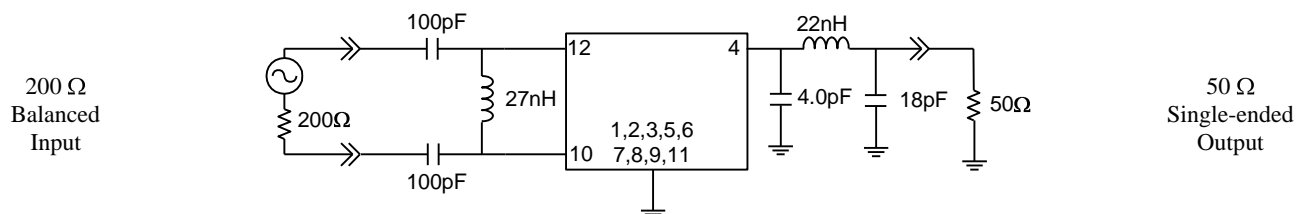
| Reference Desg. | Value | Description | Manufacturer | Part Number |
|-----------------|--------|---------------------------|--------------------|----------------|
| C1 | 5.0 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H0050CCV |
| C2 | 39 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H390KCV |
| C3 | 39 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H390KCV |
| L1 | 27nH | Coil Wire-wound, 0603, 5% | Coillcraft | 0603CS-27NXJBC |
| L2 | 27nH | Coil Wire-wound, 0603, 5% | Coillcraft | 0603CS-27NXJBC |
| L3 | 27nH | Coil Wire-wound, 0603, 5% | Coillcraft | 0603CS-27NXJBC |
| SMA | N/A | SMA connector | Johnson Components | 142-0701-801 |
| PCB | N/A | 3-layer | multiple | 960686 |

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358.4 MHz SAW Filter

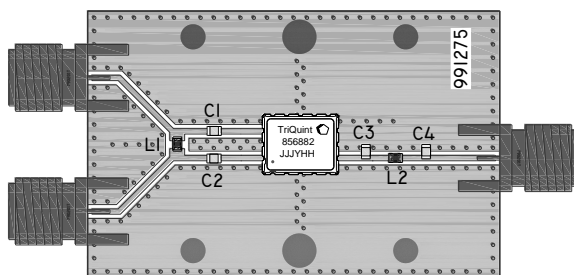
Impedance option #2 – 200Ω Bal Input, 50Ω SE Output

Schematic



Note: Actual matching values may vary due to PCB layout and parasitic

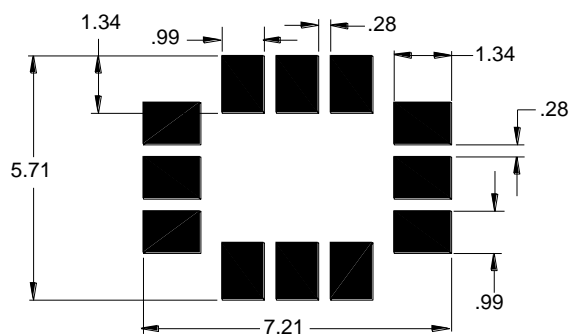
PC Board



Notes:

Top, middle & bottom layers: 1 oz copper
Substrates: FR4 dielectric, .031" thick
Finish plating: Nickel: 3-8μm thick, Gold: .03-.2μm thick
Hole plating: Copper min .0008μm thick

Mounting Configuration



Notes:

3. All dimensions are in millimeters.
4. This footprint represents a recommendation only.

Bill of Material

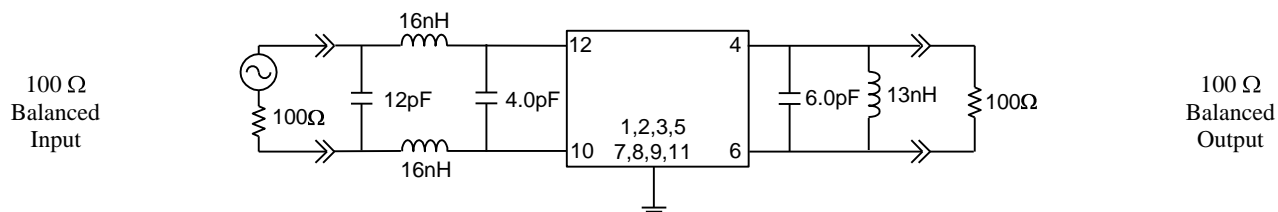
| Reference Desg. | Value | Description | Manufacturer | Part Number |
|-----------------|--------|---------------------------|--------------------|----------------|
| C1 | 100 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H101KCV |
| C2 | 100 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H101KCV |
| C3 | 4.0 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H040CCV |
| C4 | 18 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H0180KCV |
| L1 | 27 nH | Coil Wire-wound, 0603, 5% | MuRata | LQW18AN27NJ00 |
| L2 | 22 nH | Coil Wire-wound, 0603, 5% | MuRata | LQW18AN22NJ00 |
| SMA | N/A | SMA connector | Johnson Components | 142-0701-801 |
| PCB | N/A | 3-layer | multiple | 991275 |

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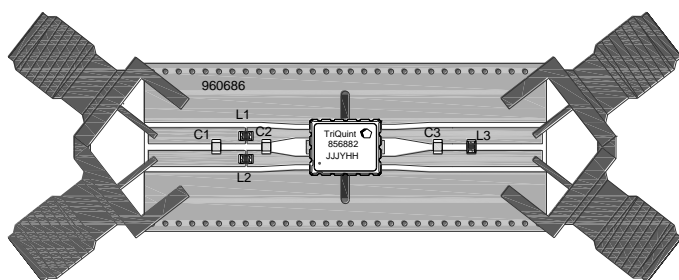
Impedance option #3 100Ω Bal Input, 100Ω Bal Output

Schematic



Note: Actual matching values may vary due to PCB layout and parasitic

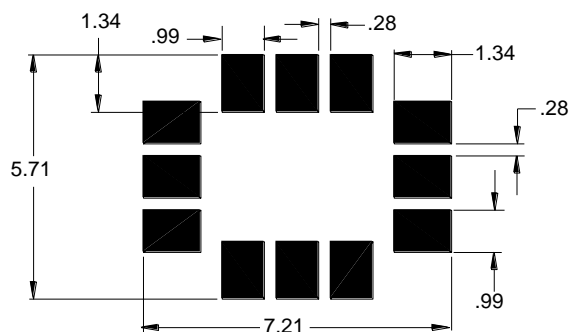
PC Board



Notes:

Top, middle & bottom layers: 1 oz copper
Substrates: FR4 dielectric, .031" thick
Finish plating: Nickel: 3-8μm thick, Gold: .03-.2μm thick
Hole plating: Copper min .0008μm thick

Mounting Configuration



Notes:

5. All dimensions are in millimeters.
6. This footprint represents a recommendation only.

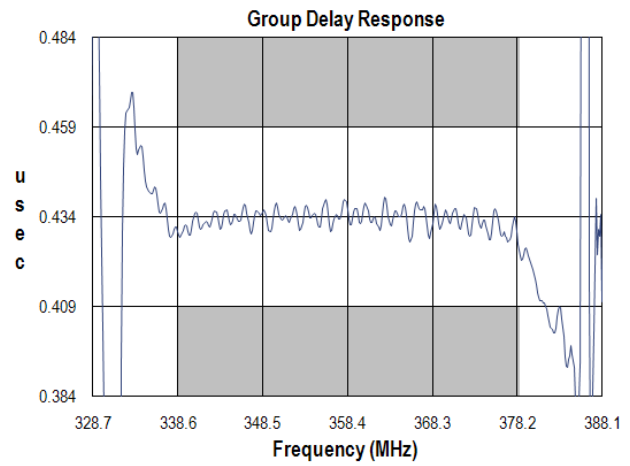
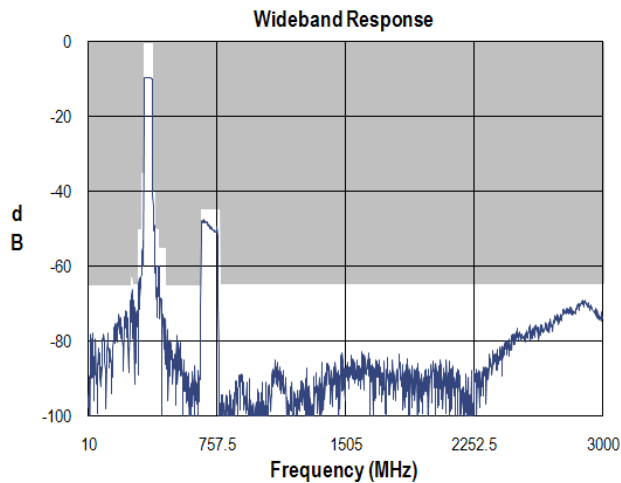
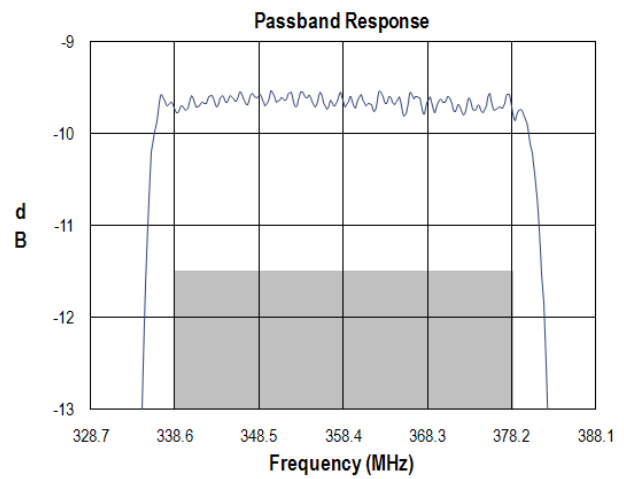
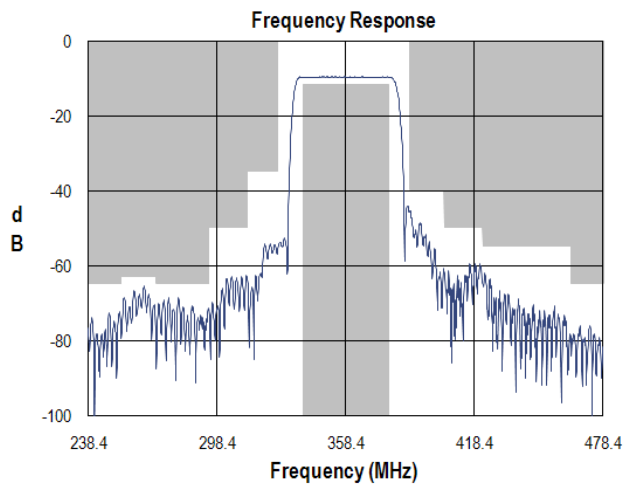
Bill of Material

| Reference Desg. | Value | Description | Manufacturer | Part Number |
|-----------------|--------|---------------------------|--------------------|---------------|
| C1 | 12 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H120JCV |
| C2 | 4.0 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H040CCV |
| C3 | 6.0 pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H060CCV |
| L1 | 16 nH | Coil Wire-wound, 0603, 5% | MuRata | LQW18AN16NJ00 |
| L2 | 16 nH | Coil Wire-wound, 0603, 5% | MuRata | LQW18AN16NJ00 |
| L3 | 13 nH | Coil Wire-wound, 0603, 5% | MuRata | LQW18AN13NJ00 |
| SMA | N/A | SMA connector | Johnson Components | 142-0701-801 |
| PCB | N/A | 3-layer | multiple | 960686 |

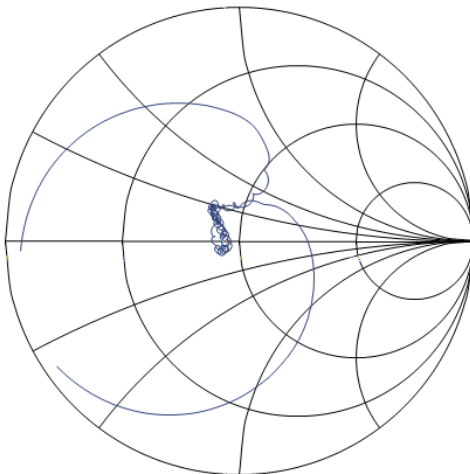
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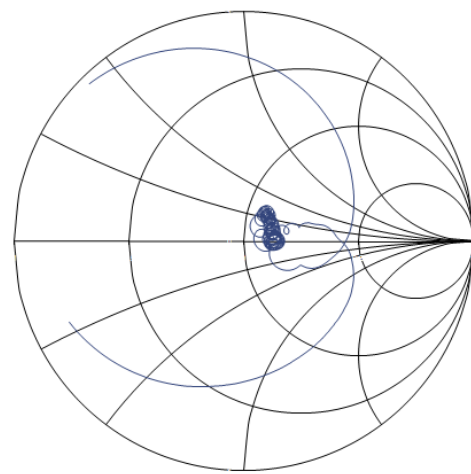
Typical Performance (at room temperature)



Input Smith Chart



Output Smith Chart

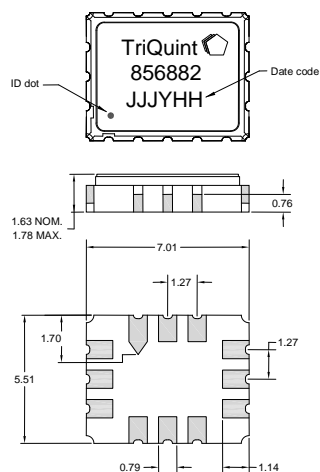


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Mechanical Information

Package Information, Dimensions and Marking



Package Style: SMP-28B

Dimensions: 7.01 x 5.51 x 1.63 mm

Body: Al_2O_3 ceramic

Lid: Kovar, Ni plated

Terminations: Au plating 0.5 - 1.0 μ m, over a 2-6 μ m Ni plating

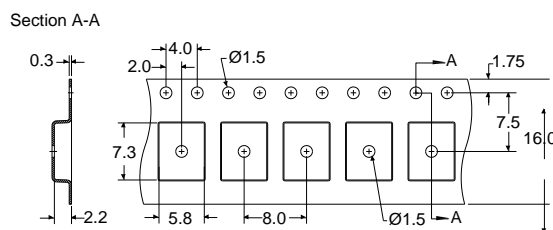
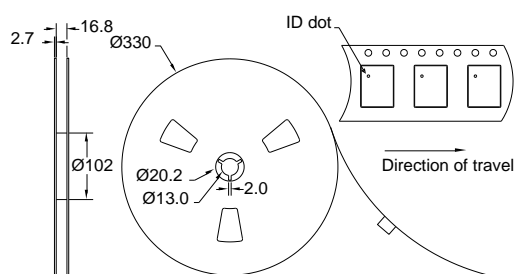
All dimensions shown are nominal in millimeters

All tolerances are ± 0.15 mm except overall length and width ± 0.10 mm

The date code consists of: day of the current year (Julian, 3 digits), Y = last digit of the year (1 digit), and HH = hour (2 digits)

Tape and Reel Information

Standard T/R size = 3000 units/reel. All dimensions are in millimeters



Absolute Maximum Ratings

| Parameter | Condition | Value | Unit |
|-----------------------------|---------------------------------|----------------|------|
| Operating Temperature range | | -33 to +85 | °C |
| Storage Temperature range | | -40 to +85 | °C |
| Input Power | 24 Hrs at 50 °C, in band | +19 | dBm |
| | 24 Hrs at 50 °C, out of band | +25 | dBm |
| DC Voltage | Between input/output and ground | 5 | V |
| DC Voltage | Between terminals 10/12 or 4/6 | 5 | V |
| Moisture Sensitivity level | | MSL3 or better | - |

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

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Product Compliance Information

ESD Information



Caution! ESD-Sensitive Device

ESD Rating: 1B

Value: Passes ≥ 550 V min.
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: B

Value: Passes ≥ 350 V min.
Test: Machine Model (MM)
Standard: JEDEC Standard JESD22-A115

MSL Rating

Devices are Hermetic, therefore MSL is not applicable

Solderability

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

Refer to **Soldering Profile** for recommended guidelines.

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:

- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ($C_{15}H_{12}Br_4O_2$) Free
- PFOS Free
- SVHC Free

Contact Information

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

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Tel: +1.407.886.8860
Fax: +1.407.886.7061

For technical questions and application information:

Email: flapplication.engineering@tqs.com

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