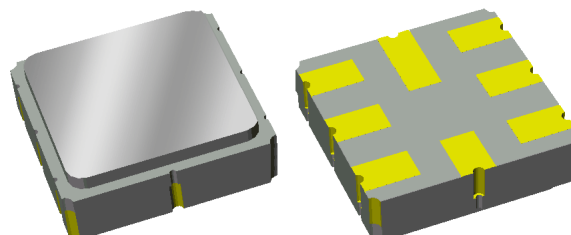


# 856930

## 457.5 MHz SAW Filter

### Applications

- Smart metering
- Remote meter reading wireless modules
- Licensed band wireless
- General purpose wireless



### Product Features

- Usable bandwidth 15 MHz
- Low loss
- Dimensions: 3.80 x 3.80 x 1.27 mm
- Single-ended operation
- No impedance matching required for operation at 50Ω
- Matching can be added for high attenuation performance
- Ceramic Surface Mount Package (SMP)
- Industry standard package
- Hermetic **RoHS** compliant, **Pb-free**

### General Description

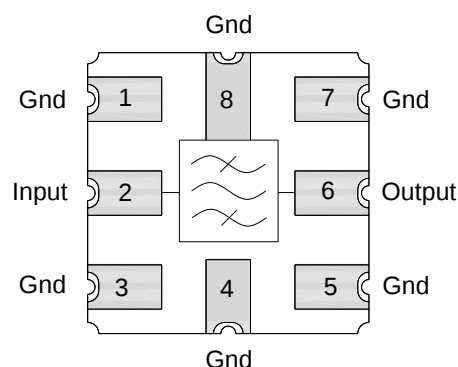
Wireless RF system filter designed specifically for the smart metering infrastructure market.

Low insertion loss, with the option to match for high attenuation, and single ended Input/Output ports make this an effective choice for wireless system designers.

Suitable for use in remote meter reading applications, especially licensed band applications targeting the water metering market.

### Functional Block Diagram

Top view



### Pin Configuration

| Pin # SE | Description |
|----------|-------------|
| 2        | Input       |
| 6        | Output      |
| 1,3,5,7  | Ground      |
| 4,8      | Case Ground |

### Ordering Information

| Part No.   | Description      |
|------------|------------------|
| 856930     | packaged part    |
| 856930-EVB | evaluation board |

Please specify the unmatched or matched configuration when ordering an evaluation board.

Standard T/R size = 4000 units/reel.

## Specifications - Unmatched

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

Specified Temperature Range: <sup>(2)</sup> -40 to +85 °C

| Parameter <sup>(3)</sup>                       | Conditions     | Min | Typical <sup>(4)</sup> | Max | Units  |
|------------------------------------------------|----------------|-----|------------------------|-----|--------|
| Center Frequency                               |                | -   | 457.5                  | -   | MHz    |
| Maximum Insertion Loss                         | 450 – 465 MHz  | -   | 2.2                    | 3.0 | dB     |
| Amplitude Variation <sup>(5)</sup>             | 450 – 465 MHz  | -   | 1.4                    | 2.0 | dB p-p |
| Lower 3.0 dB Bandedge <sup>(6)</sup>           |                | -   | 447.9                  | 450 | MHz    |
| Upper 3.0 dB Bandedge <sup>(6)</sup>           |                | 465 | 466.9                  | -   | MHz    |
| Upper 25 dB Bandedge <sup>(6)</sup>            |                | -   | 470.2                  | 472 | MHz    |
| Upper 34 dB Bandedge <sup>(6)</sup>            |                | -   | 470.5                  | 475 | MHz    |
| Absolute Attenuation <sup>(6)</sup>            | 10 – 420 MHz   | 30  | 35                     | -   | dB     |
|                                                | 472 – 475 MHz  | 25  | 70                     | -   | dB     |
|                                                | 475 – 480 MHz  | 34  | 55                     | -   | dB     |
|                                                | 800 – 1000 MHz | 30  | 36                     | -   | dB     |
| Input/Output Return Loss                       | 450 – 465 MHz  | -   | 9                      | -   | dB     |
| Source Impedance (single-ended) <sup>(7)</sup> |                | -   | 50                     | -   | Ω      |
| Load Impedance (single-ended) <sup>(7)</sup>   |                | -   | 50                     | -   | Ω      |

#### Notes:

1. All specifications are based on the TriQuint schematic for the main reference design shown on page 4
2. In production, devices will be tested at room temperature to a guardbanded 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 manufacturing tolerances
4. Typical values are based on average measurements at room temperature
5. Evaluated as the total variation over the specified band
6. Relative to zero dB
7. This is the optimum impedance in order to achieve the performance shown

### Absolute Maximum Ratings

| Parameter                  | Rating        |
|----------------------------|---------------|
| Operating Temperature      | -40 to +85 °C |
| Storage Temperature        | -40 to +85 °C |
| Input Power <sup>(8)</sup> | +20 dBm       |

8. Input Power is targeted for an applied CW modulated RF signal at 55 °C for 10,000 hours. Operation of this device outside of the parameter ranges listed above may cause permanent damage.

## Specifications - Matched

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

Specified Temperature Range: <sup>(2)</sup> -40 to +85 °C

| Parameter <sup>(3)</sup>                       | Conditions     | Min | Typical <sup>(4)</sup> | Max   | Units  |
|------------------------------------------------|----------------|-----|------------------------|-------|--------|
| Center Frequency                               |                | -   | 457.5                  | -     | MHz    |
| Maximum Insertion Loss                         | 450 – 465 MHz  | -   | 2.9                    | 3.5   | dB     |
| Amplitude Variation <sup>(5)</sup>             | 450 – 465 MHz  | -   | 1.4                    | 2.2   | dB p-p |
| Lower 3.5 dB Bandedge <sup>(6)</sup>           |                | -   | 448.33                 | 450   | MHz    |
| Upper 3.5 dB Bandedge <sup>(6)</sup>           |                | 465 | 466.93                 | -     | MHz    |
| Upper 25 dB Bandedge <sup>(6)</sup>            |                | -   | 470.5                  | 472.4 | MHz    |
| Upper 34 dB Bandedge <sup>(6)</sup>            |                | -   | 470.81                 | 475   | MHz    |
| Absolute Attenuation <sup>(6)</sup>            | 10 – 300 MHz   | 50  | 53                     | -     | dB     |
|                                                | 300 – 420 MHz  | 25  | 32                     | -     | dB     |
|                                                | 472.4 – 475MHz | 25  | 65                     | -     | dB     |
|                                                | 475 – 480 MHz  | 34  | 62                     | -     | dB     |
|                                                | 480 – 1000 MHz | 30  | 39                     | -     | dB     |
| Input/Output Return Loss                       | 450 – 465 MHz  | -   | 9                      | -     | dB     |
| Source Impedance (single-ended) <sup>(7)</sup> |                | -   | 50                     | -     | Ω      |
| Load Impedance (single-ended) <sup>(7)</sup>   |                | -   | 50                     | -     | Ω      |

#### Notes:

1. All specifications are based on the TriQuint schematic for the main reference design shown on page 6
2. In production, devices will be tested at room temperature to a guardbanded 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 manufacturing tolerances
4. Typical values are based on average measurements at room temperature
5. Evaluated as the total variation over the specified band
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### Absolute Maximum Ratings

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| Operating Temperature      | -40 to +85 °C |
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| Input Power <sup>(8)</sup> | +20 dBm       |

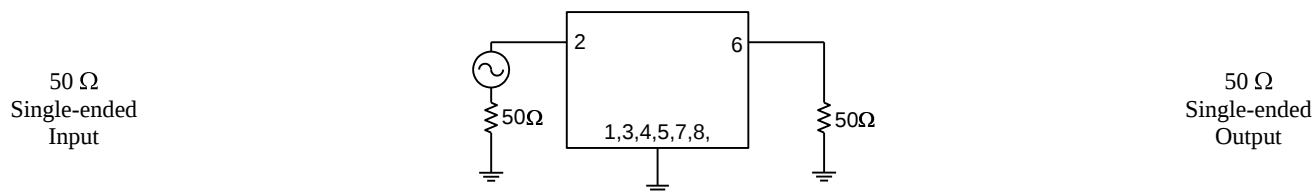
8. Input Power is targeted for an applied CW modulated RF signal at 55 °C for 10,000 hours. Operation of this device outside the parameter ranges given above may cause permanent damage.

# 856930

## 457.5 MHz SAW Filter

### Reference – Unmatched

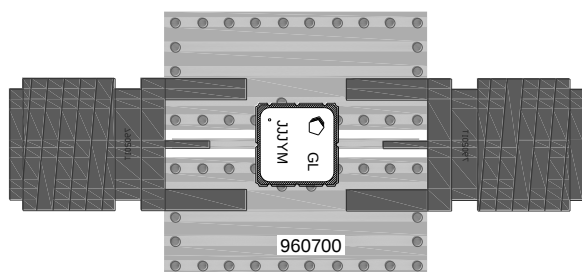
#### Schematic



Notes:

1. No impedance matching required
2. Actual matching values may vary due to PCB layout and parasitic

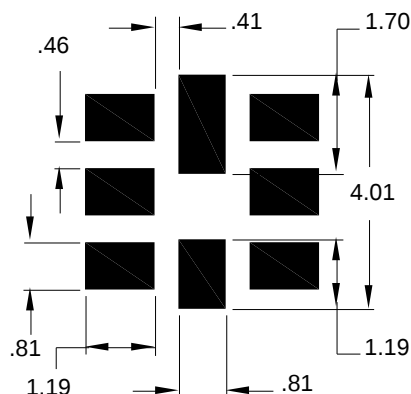
#### PC Board



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.

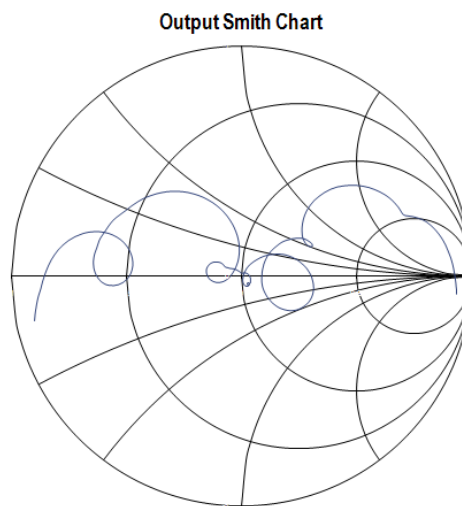
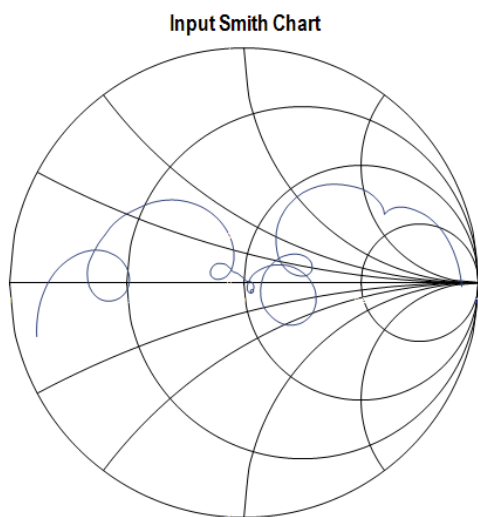
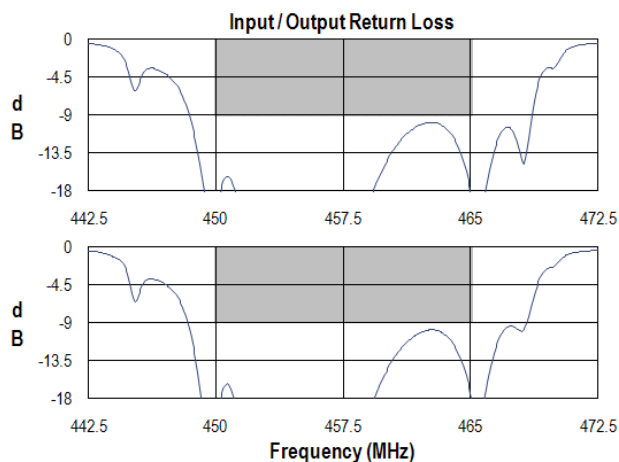
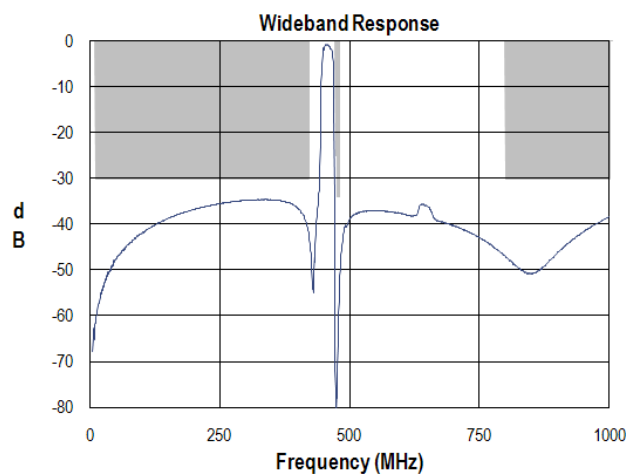
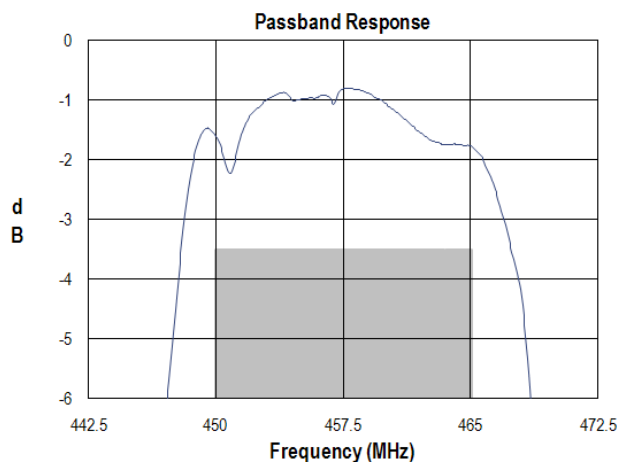
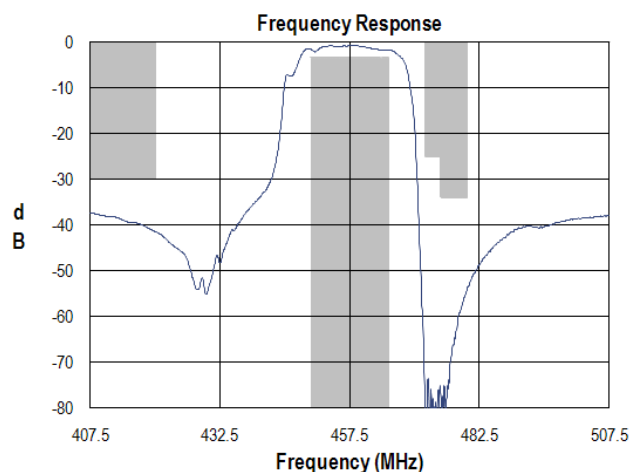
#### Bill of Material

| Reference Desg. | Value | Description   | Manufacturer     | Part Number   |
|-----------------|-------|---------------|------------------|---------------|
| SMA             | N/A   | SMA connector | Radiall USA Inc. | 9602-1111-018 |
| PCB             | N/A   | 3-layer       | multiple         | 960700        |

# 856930

## 457.5 MHz SAW Filter

### Typical Performance - Unmatched (at room temperature)

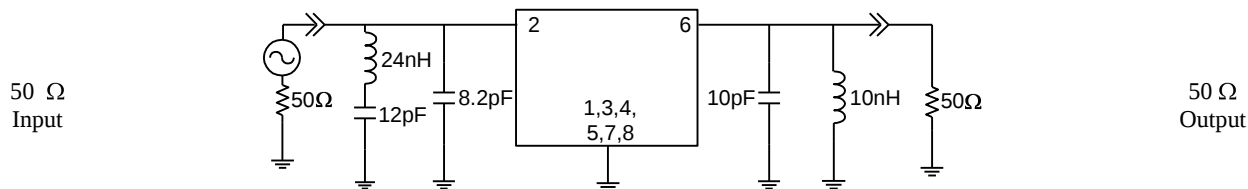


# 856930

## 457.5 MHz SAW Filter

### Reference – Matched

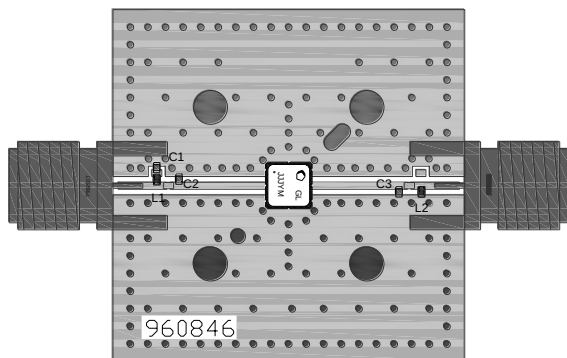
#### Schematic



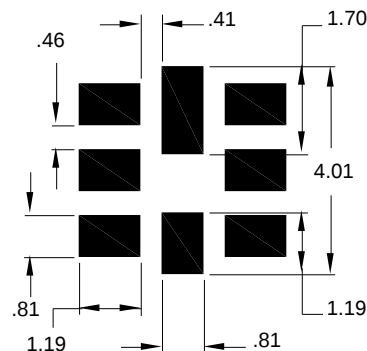
#### Notes:

Actual matching values may vary due to PCB layout and parasitic

#### PC Board



#### Mounting Configuration



#### Notes:

3-layer board - top, middle & bottom layer: 1 oz copper  
Substrates: .031" thick FR4 dielectric.  
Finish plating: Nickel: 3-8 $\mu$ m thick, Gold: .03-.2 $\mu$ m thick  
Hole plating: Copper min .0008 $\mu$ m thick

#### Notes:

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

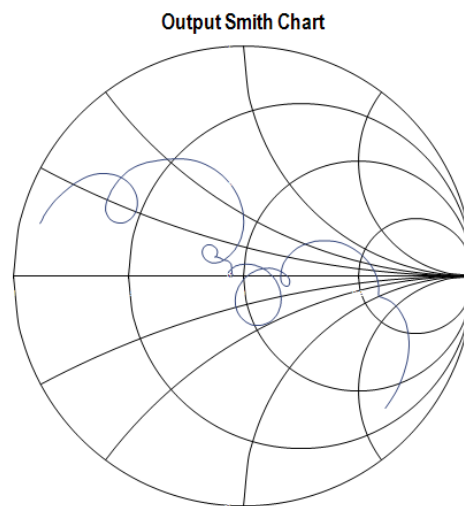
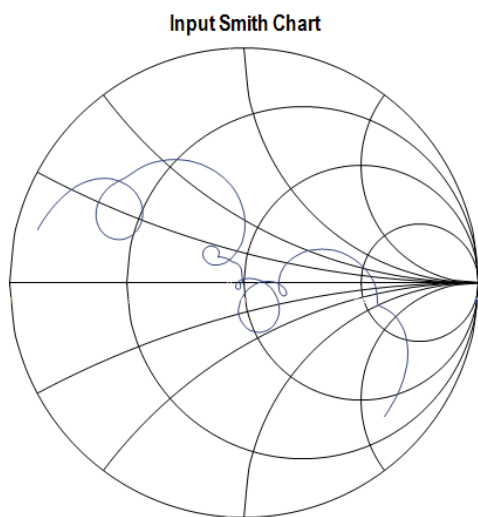
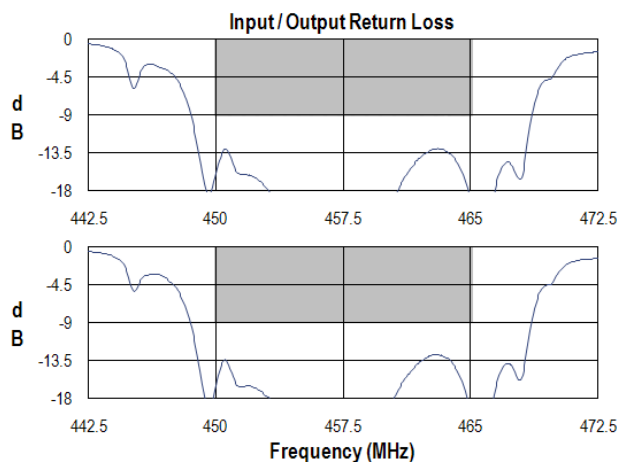
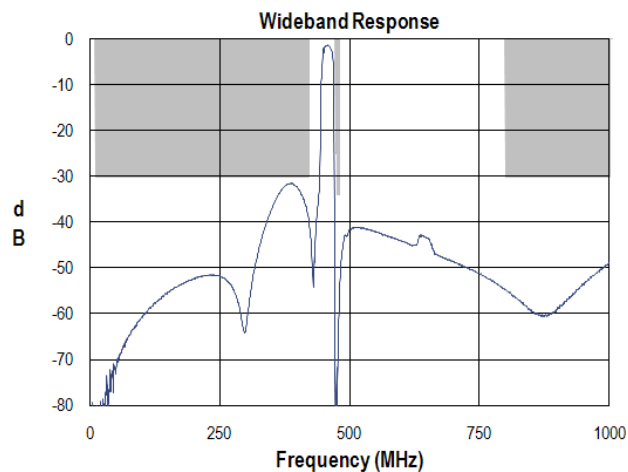
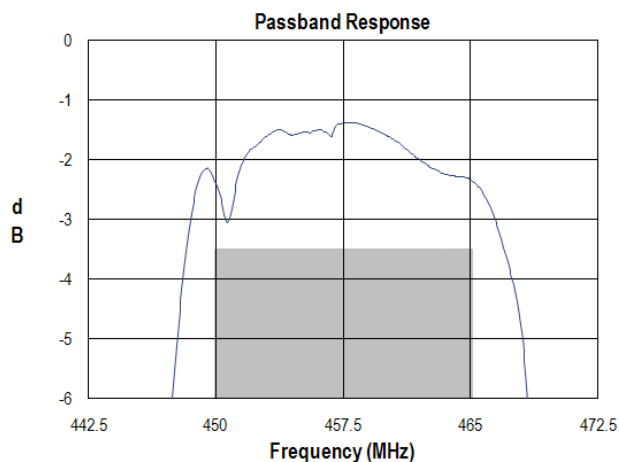
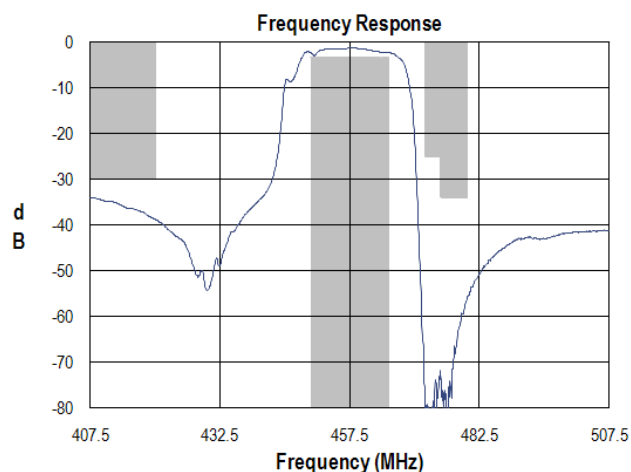
#### Bill of Material

| Reference Desg. | Value | Description           | Manufacturer     | Part Number       |
|-----------------|-------|-----------------------|------------------|-------------------|
| L1              | 24nH  | Coil Wire-wound, 0402 | MuRata           | LQW15AN24NJ00     |
| L2              | 10nH  | Coil Wire-wound, 0402 | MuRata           | LQW15AN10NJ00     |
| C1              | 12pF  | Chip Ceramic, 0402    | MuRata           | GRM1555C1H120GZ01 |
| C2              | 8.2pF | Chip Ceramic, 0402    | MuRata           | GRM1555C1H8R2FZ01 |
| C3              | 10pF  | Chip Ceramic, 0402    | MuRata           | GRM1555C1H100KZ01 |
| SMA             | N/A   | SMA connector         | Radiall USA Inc. | 9602-1111-018     |
| PCB             | N/A   | 3-layer               | multiple         | 960846            |

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## 457.5 MHz SAW Filter

### Typical Performance - Matched (at room temperature)

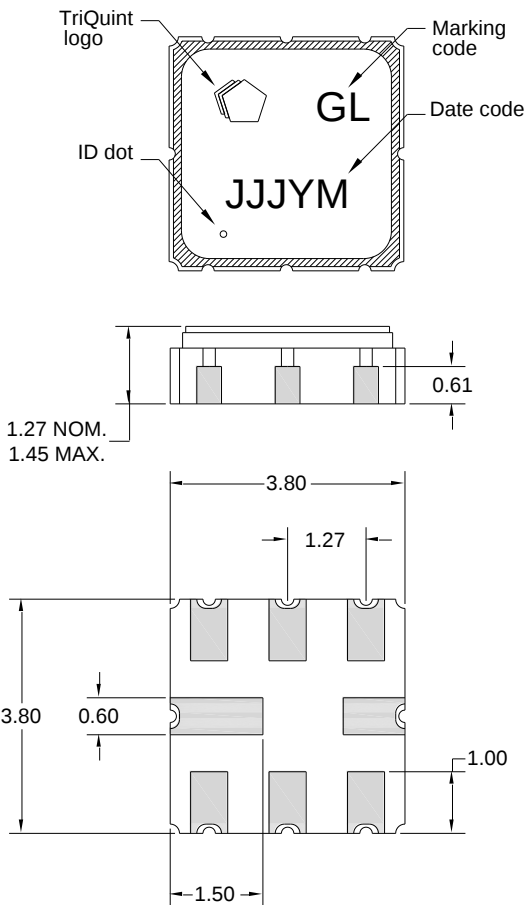


# 856930

## 457.5 MHz SAW Filter

### Mechanical Information

#### Package Information, Dimensions and Marking



Package Style: SMP-15

Dimensions: 3.80 x 3.80 x 1.27 mm

Body:  $Al_2O_3$  ceramic

Lid: Kovar, Ni plated

Terminations: Au plating 0.5 - 1.0  $\mu m$ , over a 2-6  $\mu m$  Ni plating

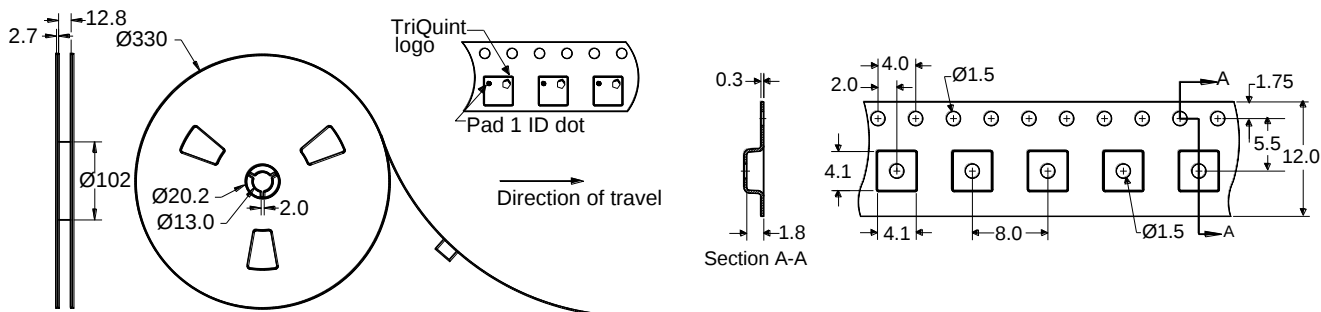
All dimensions shown are nominal in millimeters

All tolerances are  $\pm 0.15 mm$  except overall length and width  $\pm 0.10 mm$

The date code consists of day of the current year (Julian, 3 digits), Y = last digit of the year, and M = manufacturing site code

#### Tape and Reel Information

Standard T/R size = 4000 units/reel. All dimensions are in millimeters



# 856930

## 457.5 MHz SAW Filter

### Product Compliance Information

#### ESD Information



**Caution! ESD-Sensitive Device**

ESD Rating: 1B

Value: Passes  $\geq 800$  V min.

Test: Human Body Model (HBM)

Standard: JEDEC Standard JESD22-A114

ESD Rating: B

Value: Passes  $\geq 300$  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<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, and information about TriQuint:

Web: [www.triquint.com](http://www.triquint.com)  
Email: [info-sales@tqs.com](mailto:info-sales@tqs.com)

Tel: +1.407.886.8860  
Fax: +1.407.886.7061

For technical questions and application information:

Email: [flapplication.engineering@tqs.com](mailto:flapplication.engineering@tqs.com)

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