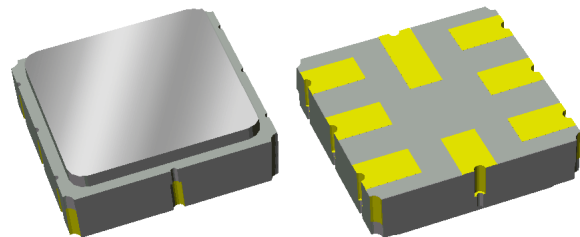


# 856930

## 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

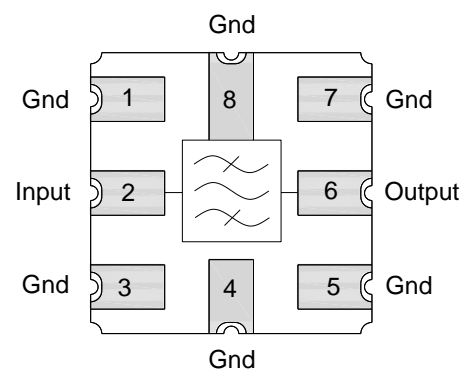
Wireless RF system filter designed specifically for the smart metering infrastructure market.

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 – 475MHz	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:

- All specifications are based on the TriQuint schematic for the main reference design shown on page 4
- In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
- Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
- Typical values are based on average measurements at room temperature
- Evaluated as the total variation over the specified band
- Relative to zero dB
- 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	-	
	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:

- All specifications are based on the TriQuint schematic for the main reference design shown on page 6
- In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
- Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
- Typical values are based on average measurements at room temperature
- Evaluated as the total variation over the specified band
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### Absolute Maximum Ratings

Parameter	Rating
Operating Temperature	-40 to +85 °C
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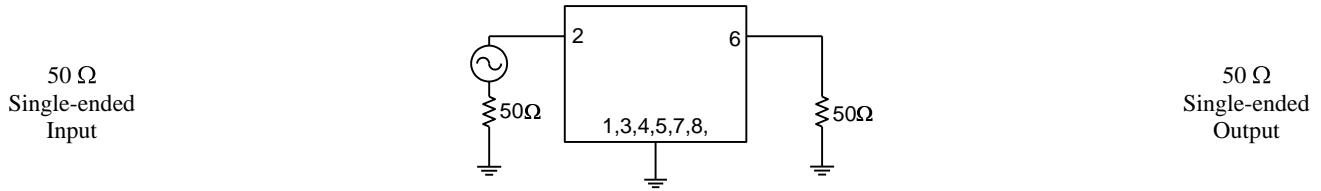
- Input Power is targeted for an applied CW modulated RF signal at 55 °C for 10,000 hours. Operation of this device outside the parameter ranges given above may cause permanent damage.

# 856930

## 457.5 MHz SAW Filter

### Reference – Unmatched

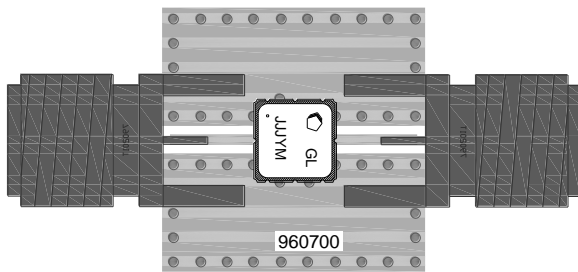
#### Schematic



Notes:

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

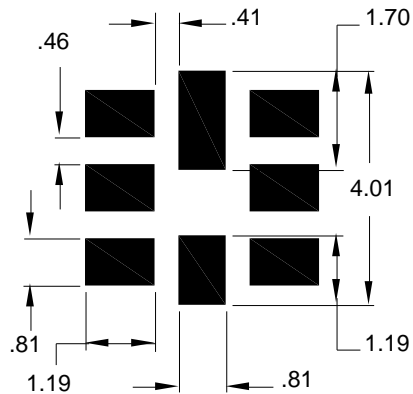
#### PC Board



Notes:

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

#### Mounting Configuration



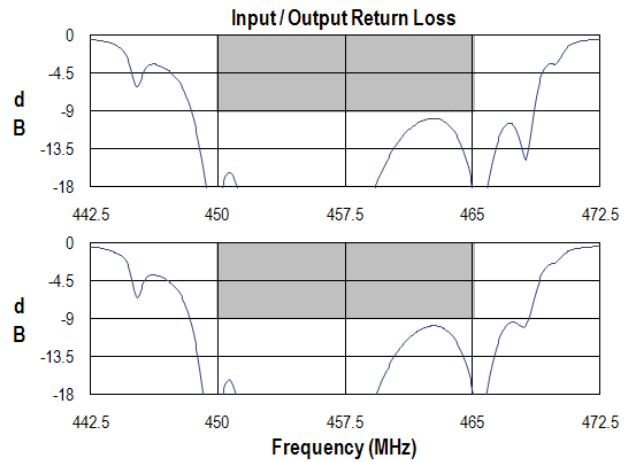
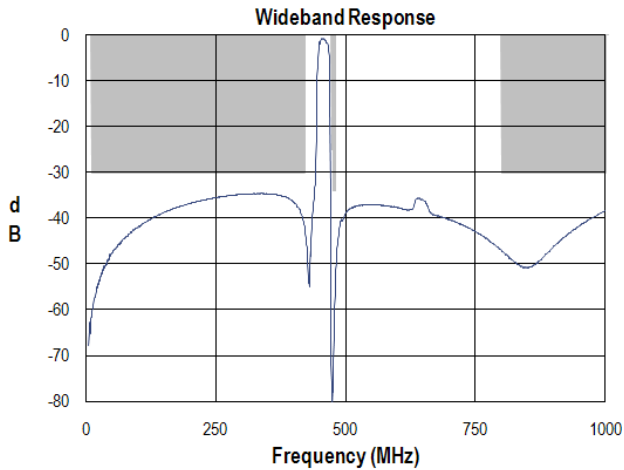
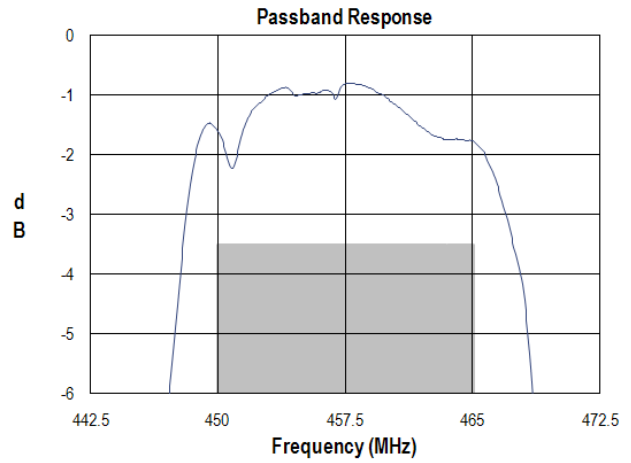
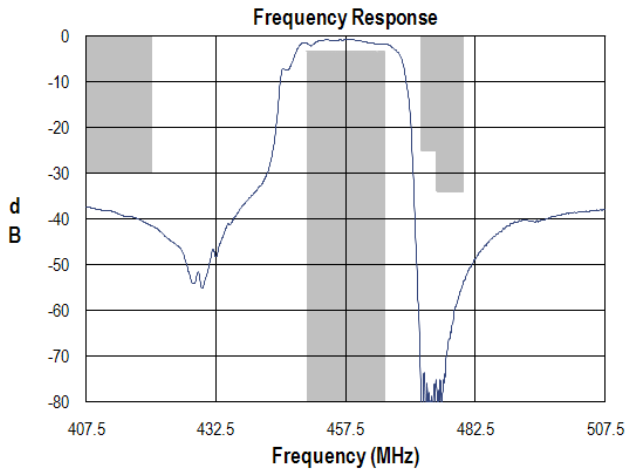
Notes:

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

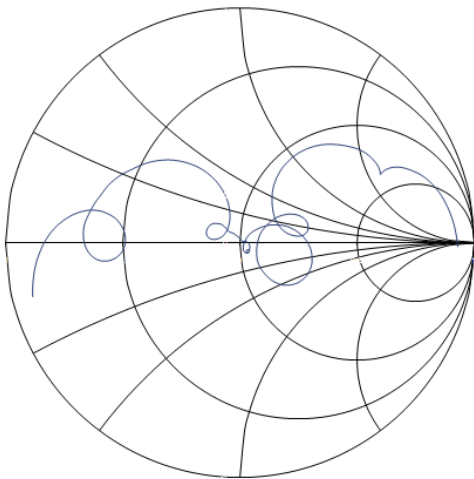
#### Bill of Material

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

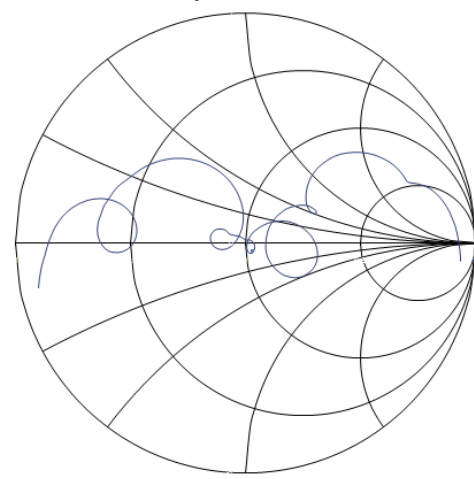
### Typical Performance - Unmatched (at room temperature)



Input Smith Chart



Output Smith Chart

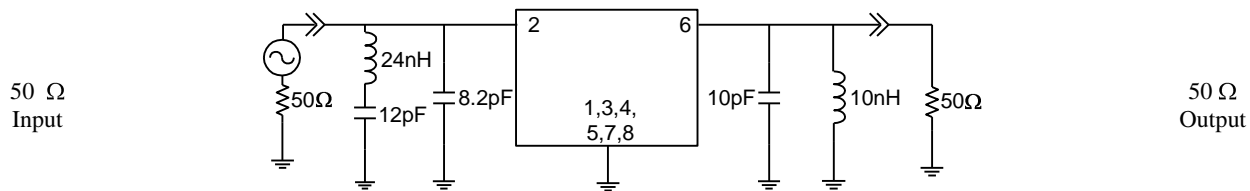


# 856930

## 457.5 MHz SAW Filter

### Reference – Matched

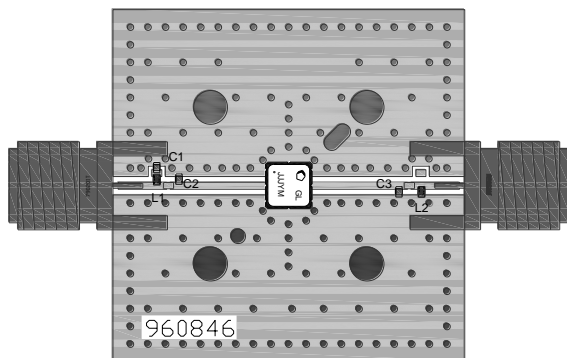
#### Schematic



Notes:

Actual matching values may vary due to PCB layout and parasitic

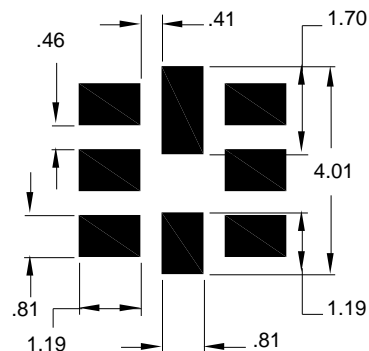
#### PC Board



Notes:

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

#### Mounting Configuration



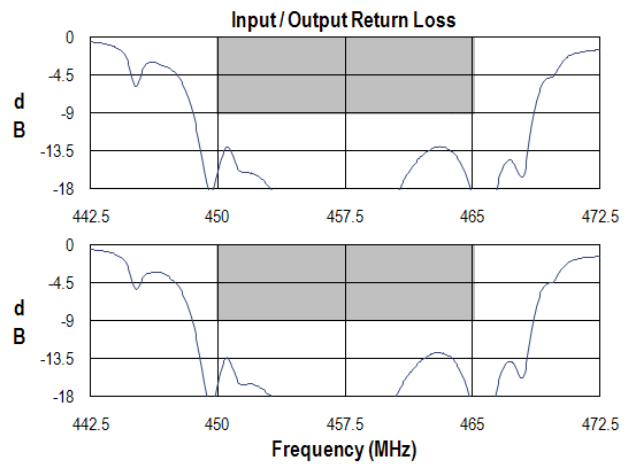
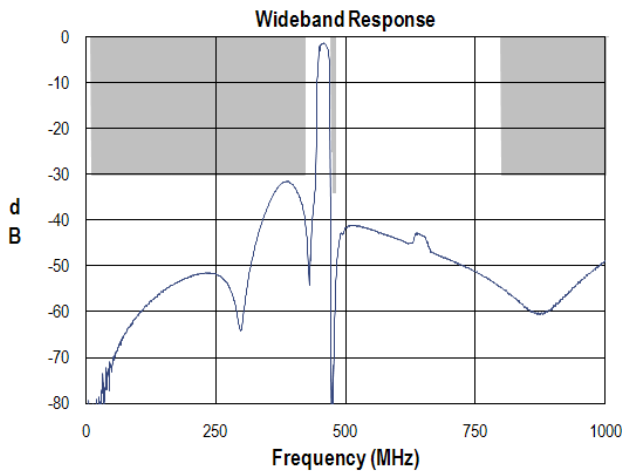
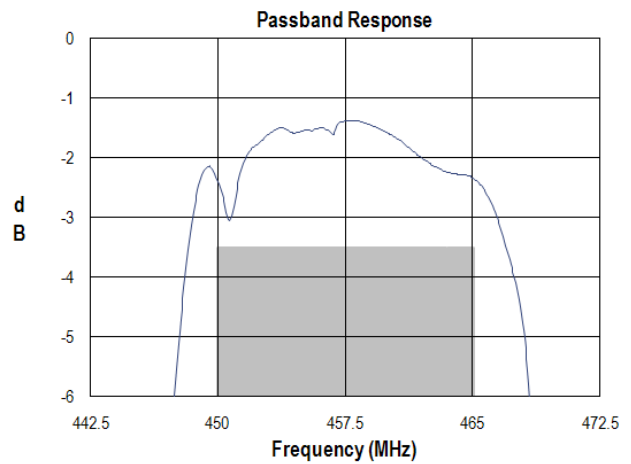
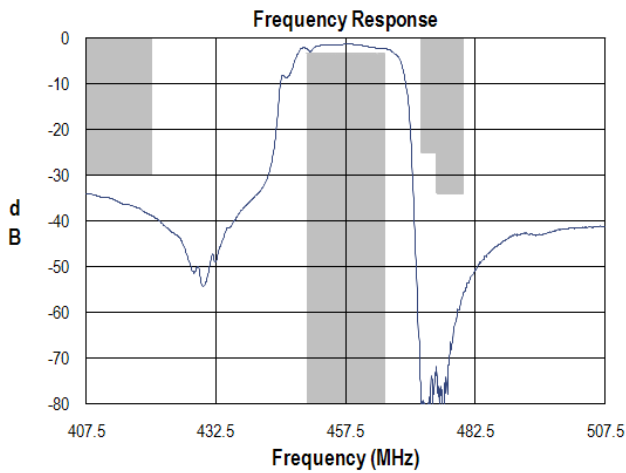
Notes:

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

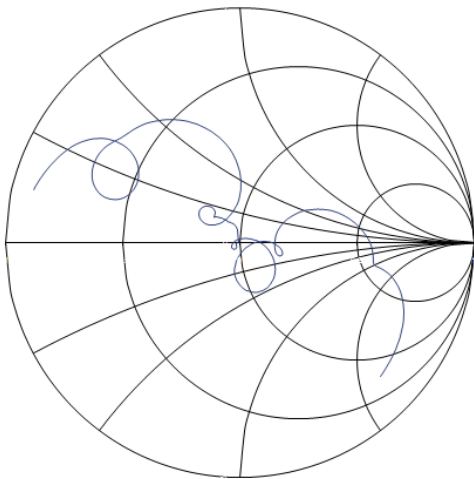
#### Bill of Material

Reference Desg.	Value	Description	Manufacturer	Part Number
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

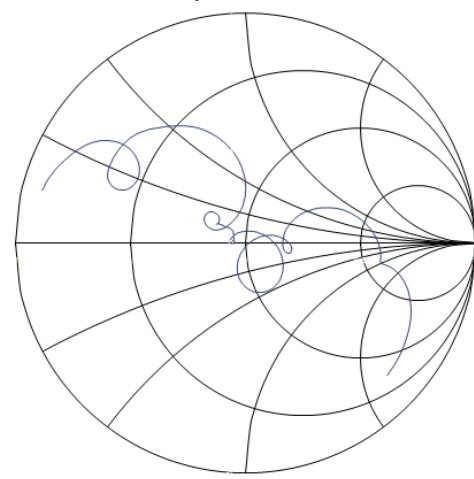
### Typical Performance - Matched (at room temperature)



Input Smith Chart

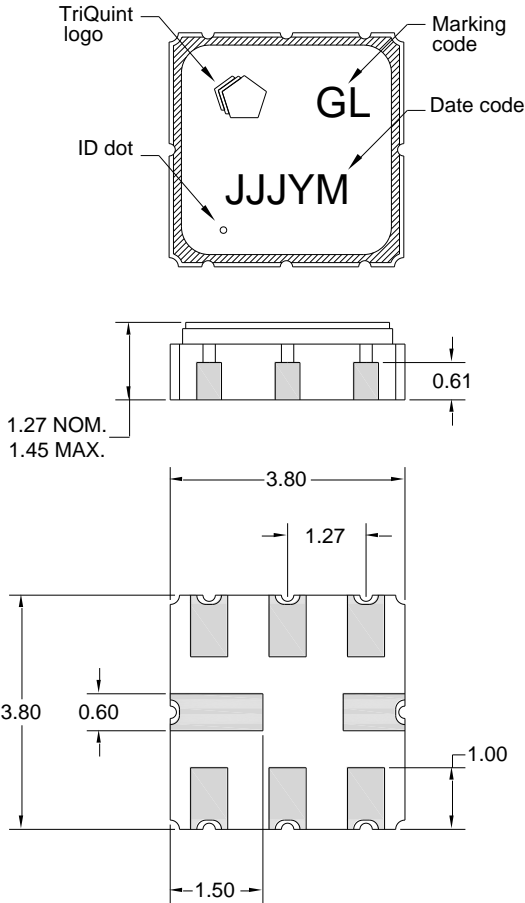


Output Smith Chart



### Mechanical Information

#### Package Information, Dimensions and Marking



Package Style: SMP-15  
 Dimensions: 3.80 x 3.80 x 1.27 mm

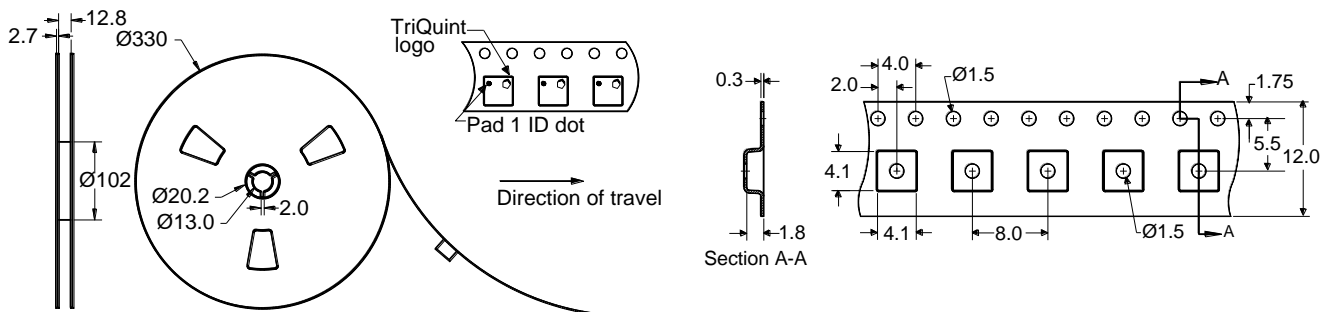
Body:  $Al_2O_3$  ceramic  
 Lid: Kovar, Ni plated  
 Terminations: Au plating 0.5 - 1.0  $\mu$ m, over a 2-6  $\mu$ m Ni plating

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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