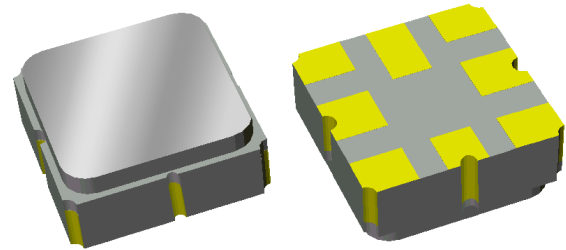


# 856990


## 403.5 MHz SAW Filter

### Applications

- Medical Applications
- 402 - 405 MHz MICS Band



### Product Features

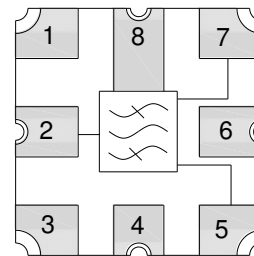
- Usable bandwidth 3 MHz
- Low loss
- Balanced to Single-ended operation
- No impedance matching required
- Small Size: 3.00 x 3.00 x 1.22 mm
- Ceramic Surface Mount Package (SMP)
- Hermetically sealed
- **RoHS** compliant (2002/95/EC), **Pb-free** 

### General Description

856990 is a high-performance IF SAW filter with a center frequency of 403.5 MHz and bandwidth of 3 MHz designed to provide front-end selectivity in the 402-405 MHz band. It features low loss with excellent attenuation, and is designed to be used with a Balanced to Single-ended operation. It is ideal for short range wireless medical data applications where small size and low power consumption are required features. This device is RoHS compliant and Pb-free.

### Functional Block Diagram

Top view



### Pin Configuration

Pin #	Bal/Se	Description
5		Input -
7		Input +
2		Output -
1,3,6		To be Grounded
4,8		Case Ground

### Ordering Information

Part No.	Description
856990	packaged part
856990-EVB	evaluation board

Standard T/R size = 5000 units/reel.

## Specifications

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

Specified Temperature Range: <sup>(2)</sup> 0 to +55 °C

Parameter <sup>(3)</sup>	Conditions	Min	Typical <sup>(4)</sup>	Max	Units
Center Frequency		-	403.5	-	MHz
Amplitude Variation <sup>(5)</sup>	402 – 405 MHz	-	0.5	1.0	dBp-p
Insertion Loss	402 – 405 MHz	-	2.1	3.0	dB
Absolute Attenuation <sup>(6)</sup>	10 – 390 MHz	30	40	-	dB
	390 – 398 MHz	20	37	-	dB
	410 – 428 MHz	20	24	-	dB
	428 – 2000 MHz	30	36	-	dB
Source Impedance <sup>(7)</sup>	Balanced	-	120	-	Ω
Load Impedance <sup>(7)</sup>	Single-ended	-	30	-	Ω

#### Notes:

- All specifications are based on the TriQuint schematic for the main reference design shown on page 3
- 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
- Amplitude Variation is defined as the difference between the lowest and highest responses between 402 and 405 MHz.
- Relative to zero dB
- This is the optimum impedance in order to achieve the performance shown

### Absolute Maximum Ratings

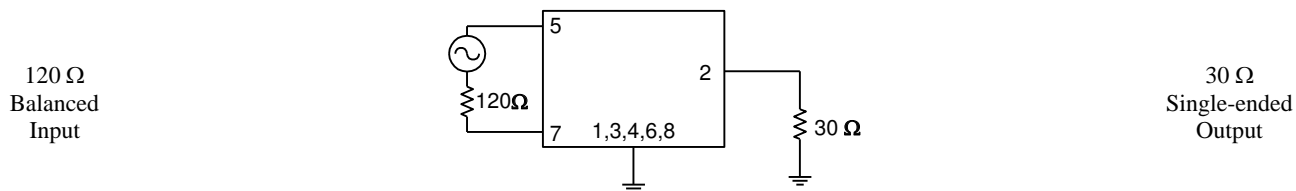
Operation of this device outside the parameter ranges given above may cause permanent damage.

Parameter	Rating
Operable Temperature <sup>(8)</sup>	-40 to +85 °C
Storage Temperature	-40 to +85 °C
Input Power <sup>(9)</sup>	+10 dBm

- Device may operate over this range with degraded Electrical Specifications
- Device may be operable at this level for the equivalent 5K hours @ +40°C [ CW Signal ]

**Reference Design 120Ω Bal Input/30Ω SE output**

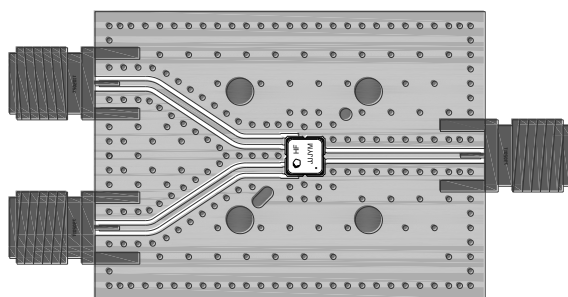
**Schematic**



Notes:

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

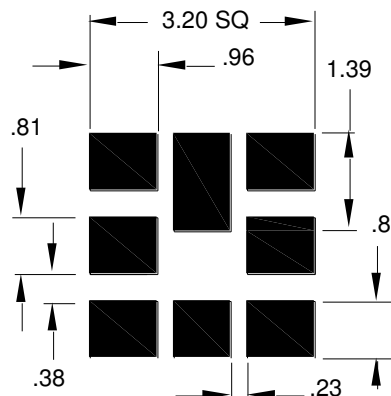
**PC Board**



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**



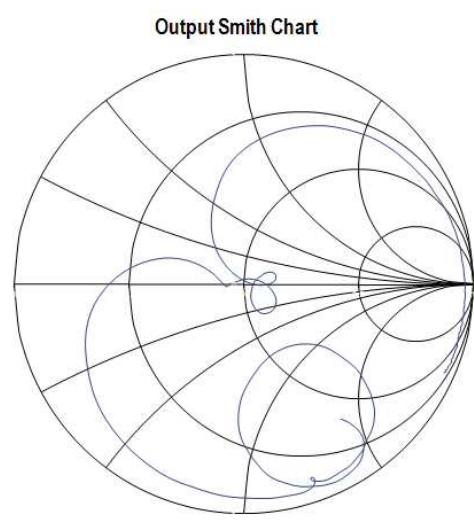
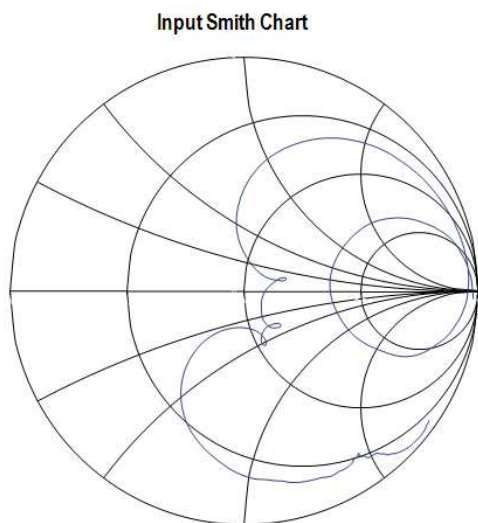
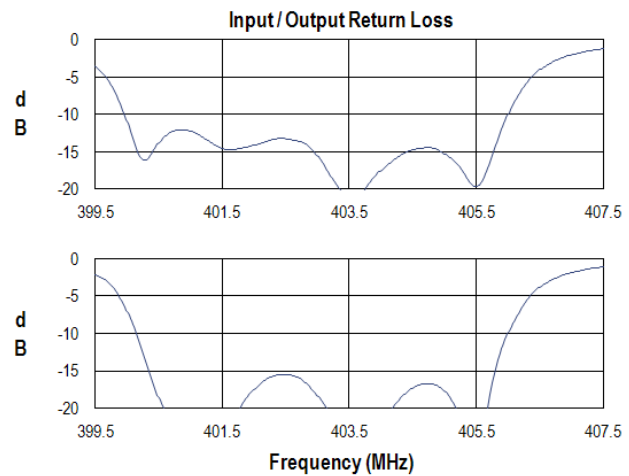
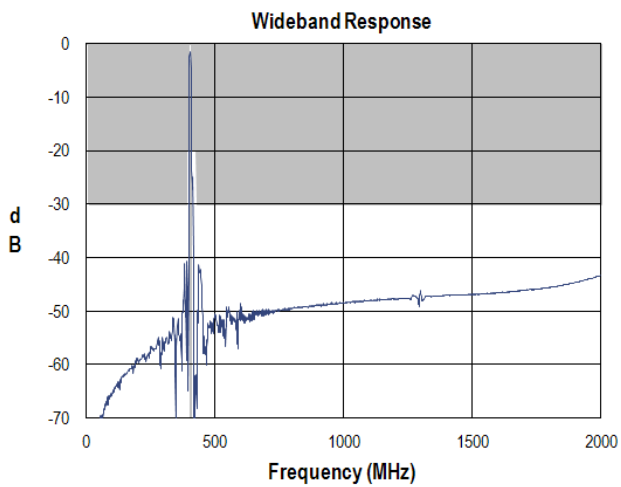
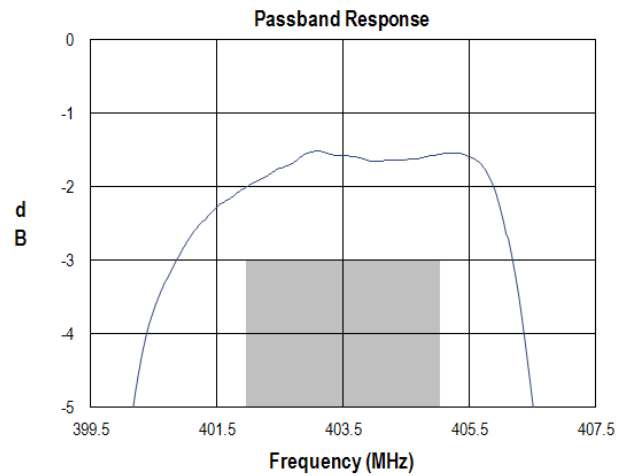
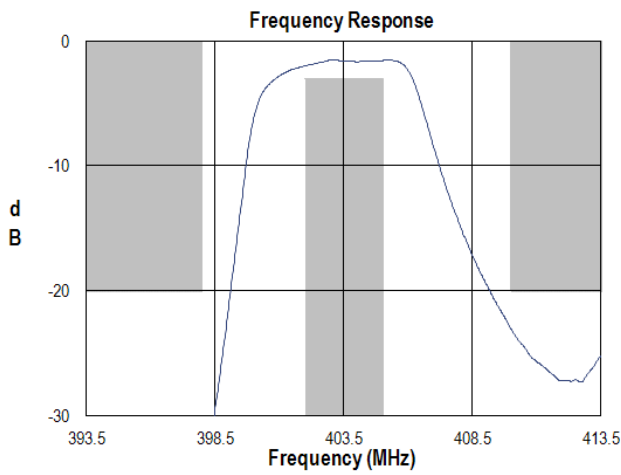
Notes:

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	960563

### Typical Performance (at room temperature) Reference Design

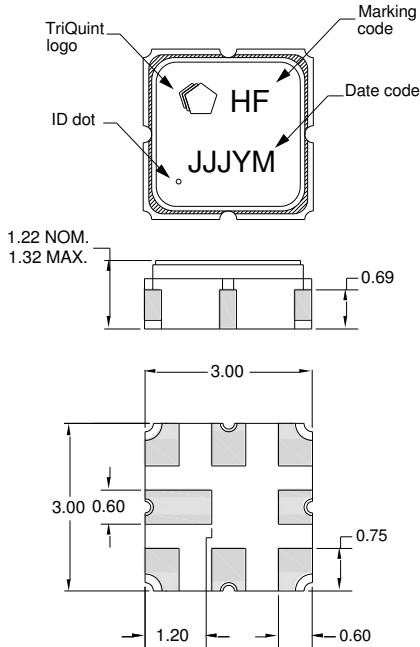


# 856990

## 403.5 MHz SAW Filter

### Mechanical Information

#### Package Information, Dimensions and Marking



Package Style: SMP-12D  
Dimensions: 3.00 x 3.00 x 1.22 mm

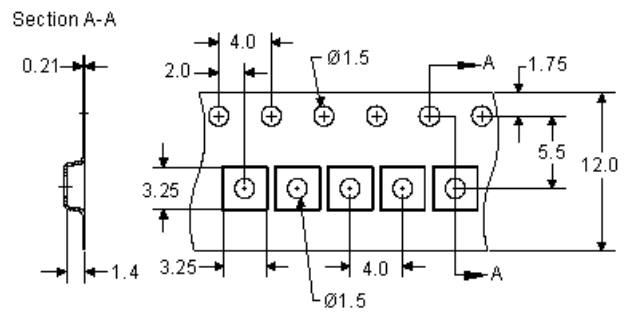
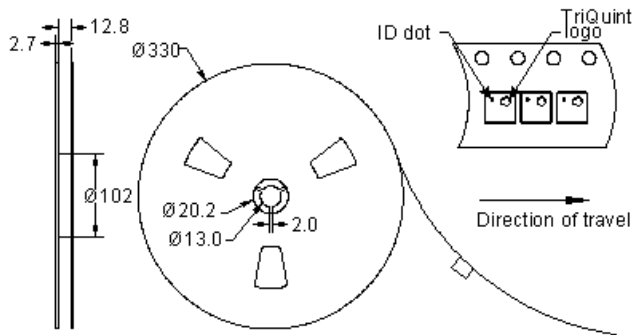
Body: Al<sub>2</sub>O<sub>3</sub> ceramic  
Lid: Kovar, Ni plated  
Terminations: Au plating 0.5 - 1.0µm, over a 2-6µm Ni plating

All dimensions shown are nominal in millimeters  
All tolerances are ±0.15mm except overall length and width ±0.10mm

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 = 5000 units/reel. All dimensions are in millimeters



## Product Compliance Information

### ESD Information



#### Caution! ESD-Sensitive Device

ESD Rating: 1B

Value: Passes  $\geq 500V$  min.  
 Test: Human Body Model (HBM)  
 Standard: JEDEC Standard JESD22-A114

ESD Rating: A

Value: Passes  $\geq 150V$  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:

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

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