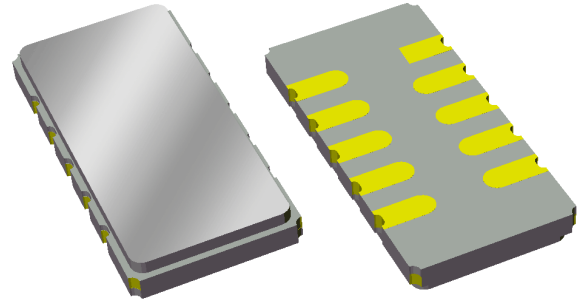


# 856517

## 153.6 MHz SAW Filter

### Applications

- General Purpose
- Broadband Wireless Applications
- For IF applications



### Product Features

- Usable bandwidth 32 MHz
- Low loss
- High Attenuation
- Single-ended operation
- Ceramic Surface Mount Package (SMP)
- Small Size
- Dimensions: 13.30 x 6.50 x 1.5mm
- Hermetic **RoHS** compliant, **Pb-free**

### General Description

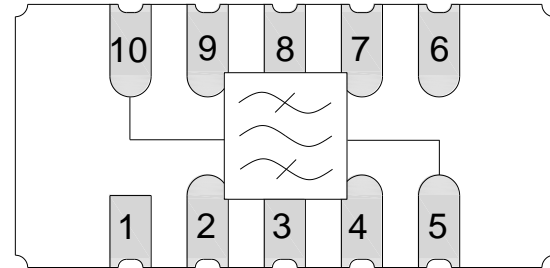
The 856517 is a high-performance IF SAW filter with a center frequency of 153.6 MHz and a usable bandwidth of 32 MHz. It is suitable for a wide variety of applications, including broadband wireless data transceivers.

It features low loss with excellent attenuation, and is designed to be used with a single ended input and output.

The device is RoHS compliant and Pb-free.

### Functional Block Diagram

Top view



### Pin Configuration

| Pin # SE    | Description |
|-------------|-------------|
| 10          | Input       |
| 5           | Output      |
| 1,6         | Ground      |
| 2,3,4,7,8,9 | Case Ground |

### Ordering Information

| Part No.   | Description      |
|------------|------------------|
| 856517     | packaged part    |
| 856517-EVB | evaluation board |

Standard T/R size = 2000 units/reel.

## Specifications

### 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                               |                   | -     | 153.6                  | -     | MHz     |
| Insertion Loss                                 | at 153.6 MHz      | -     | 13                     | 15    | dB      |
| 1.0 dB Lower Frequency <sup>(7)</sup>          |                   | -     | 136.1                  | 136.7 | MHz     |
| 1.0 dB Upper Frequency <sup>(7)</sup>          |                   | 169.6 | 171.1                  | -     | MHz     |
| Amplitude Variation <sup>(5)</sup>             | 137.6 – 169.6 MHz | -     | 0.7                    | 1.2   | dB p-p  |
| Phase Ripple (p-p)                             | 137.6 – 169.6 MHz | -     | 5                      | 12    | deg p-p |
| Phase Ripple (RMS)                             | 137.6 – 169.6 MHz | -     | 1                      | 2.5   | deg p-p |
| Absolute Group Delay at 153.6 MHz              | 137.6 – 169.6 MHz | -     | 0.7                    | 0.8   | µs      |
| Group Delay Variation                          | 137.6 – 169.6 MHz | -     | 50                     | 100   | ns p-p  |
| Stopband Attenuation <sup>(7)</sup>            | 70 – 125 MHz      | 40    | 52                     | -     | dB      |
|  | 275 – 350 MHz     | 35    | 55                     | -     | dB      |
|  | 400 – 1000 MHz    | 40    | 45                     | -     | dB      |
|  | 1000 – 2000 MHz   | 30    | 40                     | -     | dB      |
| Input Return Loss <sup>(6)</sup>               | 137.6 – 169.6 MHz | 8     | 10                     | -     | dB      |
| Output Return Loss <sup>(6)</sup>              | 137.6 – 169.6 MHz | 9     | 11                     | -     | dB      |
| Source Impedance (single-ended) <sup>(8)</sup> | -                 | -     | 50                     | -     | Ω       |
| Load Impedance (single-ended) <sup>(8)</sup>   | -                 | -     | 50                     | -     | Ω       |

Notes:

1. All specifications are based on the TriQuint schematic for the main reference design shown on page 3
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. Is defined as the difference between the lowest loss and the highest loss within defined frequency points
6. An external impedance matching network +/- 2% tolerance will be necessary to achieve proposed return loss
7. Relative to Insertion loss at center frequency
8. This is the optimum impedance in order to achieve the performance shown

### Absolute Maximum Ratings

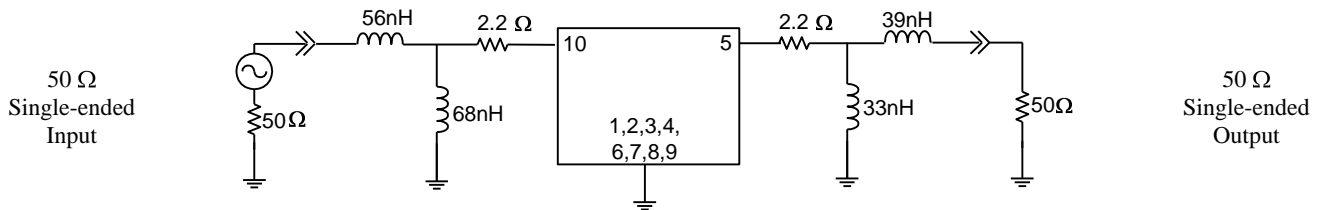
| Parameter                            | Rating        |
|--------------------------------------|---------------|
| Operating Temperature <sup>(9)</sup> | -40 to +85 °C |
| Storage Temperature                  | -40 to +85 °C |

9. Device may operate over this range with degraded Electrical Specifications

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

### Reference Design – 50Ω SE Input, 50Ω SE Output

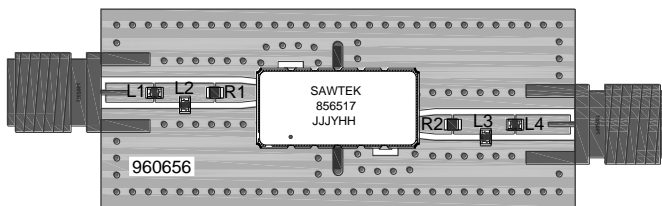
#### Schematic



Notes:

1. Actual matching values may vary due to PCB layout and parasitics

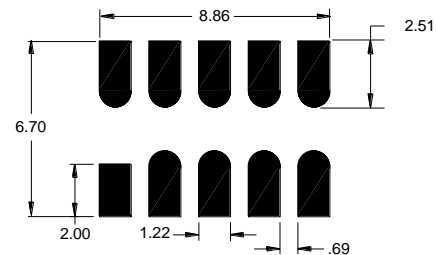
#### PC Board



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



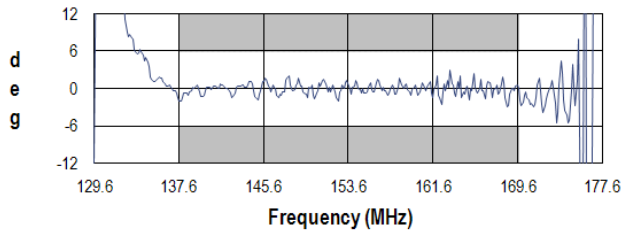
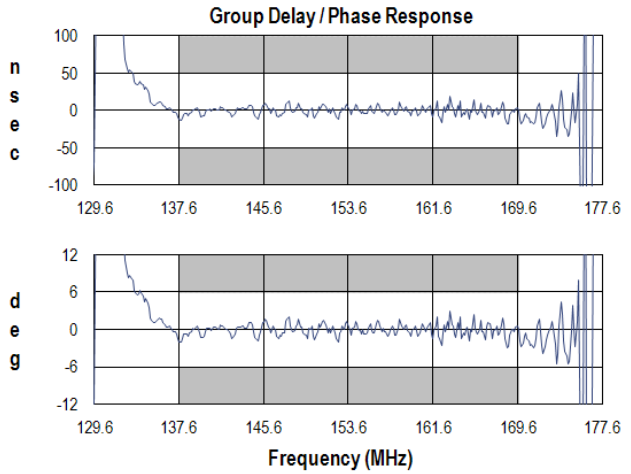
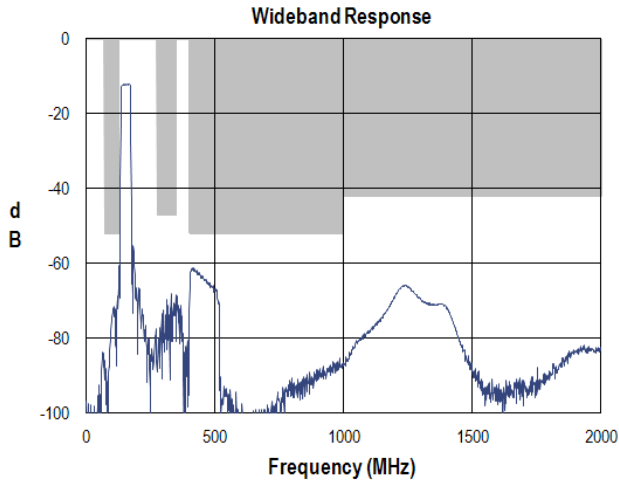
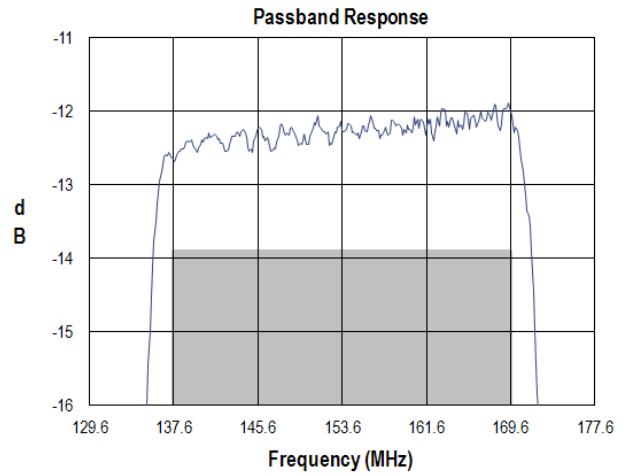
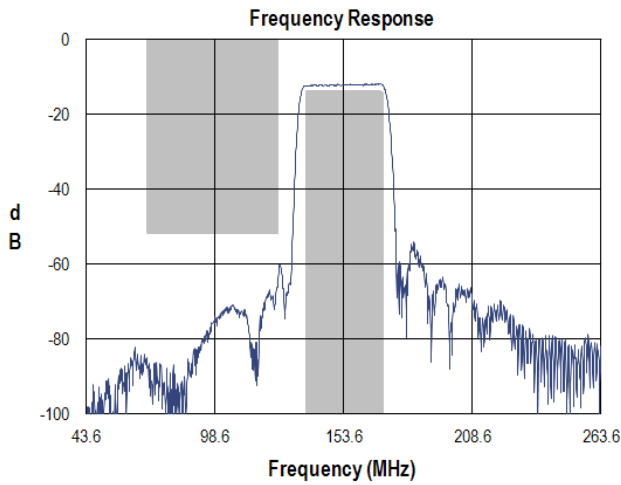
Notes:

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

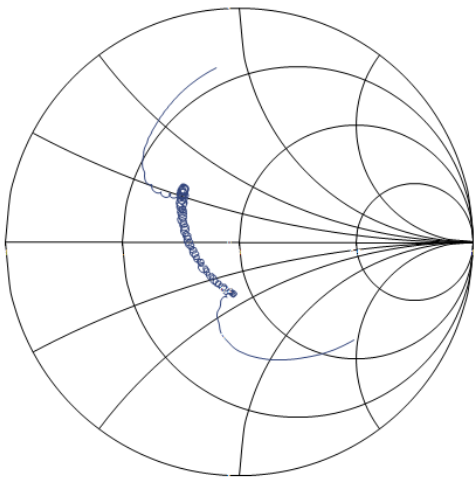
#### Bill of Material

| Reference Desg. | Value    | Description               | Manufacturer     | Part Number    |
|-----------------|----------|---------------------------|------------------|----------------|
| L1              | 56nH     | Coil Wire-wound, 0603, 5% | CoillCraft       | 0603CS-560XJBC |
| L2              | 68nH     | Coil Wire-wound, 0603, 5% | CoillCraft       | 0603CS-680XJBC |
| L3              | 33nH     | Coil Wire-wound, 0603, 5% | CoillCraft       | 0603CS-330XJBC |
| L4              | 39nH     | Coil Wire-wound, 0603, 5% | CoillCraft       | 0603CS-390XJBC |
| R1              | 2.2 Ohms | Chip Ceramic, 0603, 5%    | Skywell          | RC03J2R2G      |
| R2              | 2.2 Ohms | Chip Ceramic, 0603, 5%    | Skywell          | RC03J2R2G      |
| SMA             | N/A      | SMA connector             | Radiall USA Inc. | 9602-1111-018  |
| PCB             | N/A      | 3-layer                   | multiple         | 960740         |

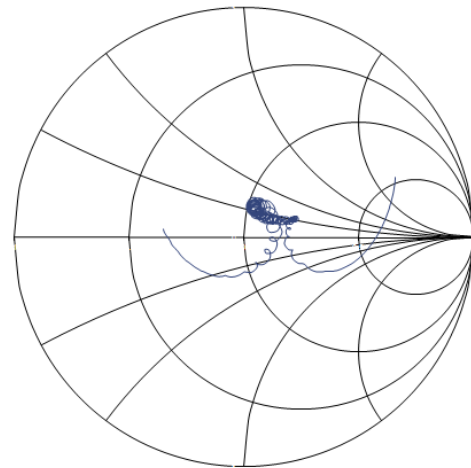
**Typical Performance (at room temperature)**



**Input Smith Chart**

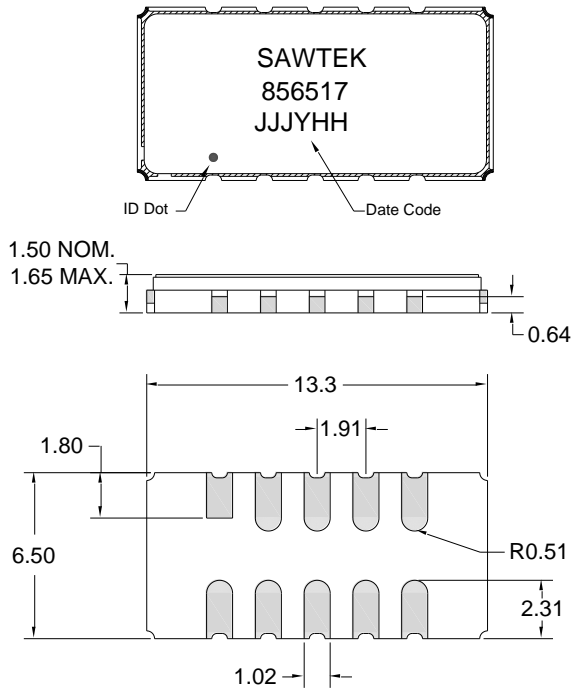


**Output Smith Chart**



**Mechanical Information**

**Package Information, Dimensions and Marking**



Package Style: SMP-53C  
 Dimensions: 13.3 x 6.50 x 1.50 mm

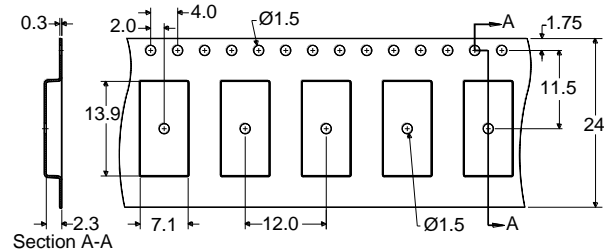
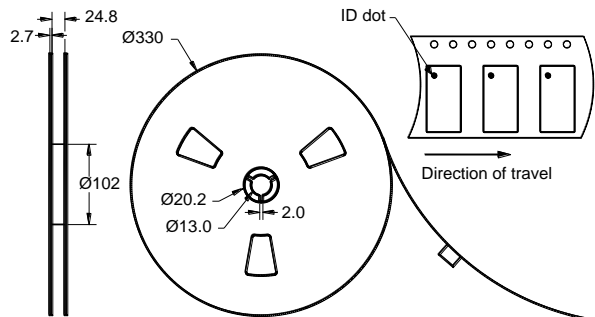
Body:  $Al_2O_3$  ceramic  
 Lid: Kovar, Ni plated  
 Terminations: Au plating 0.5 - 1.0 $\mu$ m, over a 2-6 $\mu$ m Ni plating

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), last digit of the year (1 digit) and hour (2 digits)

**Tape and Reel Information**

Standard T/R size = 2000 units/reel. All dimensions are in millimeters



## Product Compliance Information

### ESD Information



#### Caution! ESD-Sensitive Device

ESD Rating: TBD

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

ESD Rating: TBD

Value: Passes  $\geq$  TBD 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

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