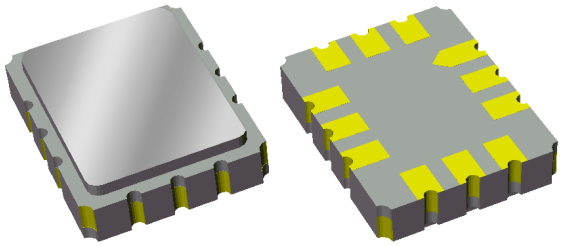
# 856893

## *172.8 MHz SAW Filter*

## Applications

- General purpose wireless
- Wireless infrastructure
- 3G, 4G, Multistandard



## Product Features

- Usable bandwidth 21 MHz
- Low loss
- High attenuation
- Low EVM
- Balanced operation
- Ceramic Surface Mount Package (SMP)
- Small Size: 7.01 x 5.51 x 1.63 mm
- Hermetic **RoHS** compliant, **Pb**-free

## General Description

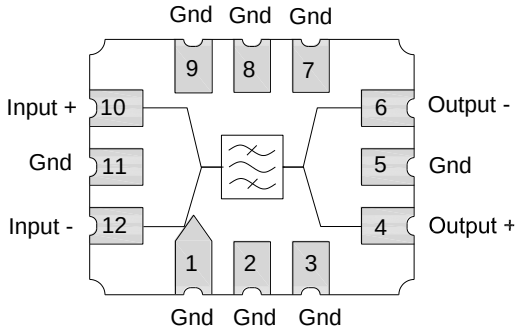
Uplink IF filter specifically designed for the demanding requirements of 4G wireless infrastructure systems.

Designed for versatile drive configurations, this filter is optimized for a balanced input and output, leading to elimination of baluns.

Low insertion loss, excellent attenuation and flat in-band performance leading to low EVM contribution, makes this filter an effective choice for our customers LTE and Multi-standard platforms.

## Functional Block Diagram

Top view




## Pin Configuration

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

## Ordering Information

| Part No. | Description |
|---|---|
| 856893 | packaged part |
| 856893-EVB | evaluation board |

Standard T/R size = 3000 units/reel.

## Specifications

### Electrical Specifications [1]

Specified Temperature Range: [2] -40 to +85 ºC

| Parameter [3] | Conditions | Min | Typical [4] | Max | Units |
|---|---|---|---|---|---|
| Center Frequency | | - | 172.8 | - | MHz |
| Insertion Loss | at 172.8 MHz | - | 8.2 | 10 | dB |
| 1 dB Bandwidth [5] | | 21 | 23.15 | - | MHz |
| 10 dB Bandwidth [5] | | - | 27.83 | - | MHz |
| Lower 1 dB Band Edge [5] | | - | 160.81 | 162.3 | MHz |
| Upper 1 dB Band Edge [5] | | 183.3 | 183.96 | - | MHz |
| Lower 10 dB Band Edge [5] | | 153.5 | - | - | MHz |
| Amplitude Ripple [6] | 162.3 – 183.3 MHz | - | 0.33 | 1.0 | dB p-p |
| Group Delay | At 172.8 MHz | - | 580 | - | ns |
| Group Delay Variation | 162.3 – 183.3 MHz | - | 38 | 100 | ns p-p |
| Input Return Loss | 162.3 – 183.3 MHz | 8 | 14 | - | dB |
| Output Return Loss | 162.3 – 183.3 MHz | 8 | 11 | - | dB |
| Relative Attenuation [5] | | | | | |
| | 10.0 – 145.0 MHz | 50 | 53 | - | dB |
| | 145.0 – 153.5 MHz | 10 | 43 | - | dB |
| | 200.0 – 290.0 MHz | 50 | 53 | - | dB |
| | 290.0 – 315.0 MHz | 50 | 69 | - | dB |
| | 315.0 – 390.0 MHz | 37 | 40 | - | dB |
| | 390.0 – 1000 MHz | 50 | 73 | - | dB |
| Source Impedance (balanced) [7] | | - | 200 | - | Ω |
| Load Impedance (balanced) [7] | | - | 150 | - | 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. Relative to insertion loss at center frequency
6. Amplitude Ripple is defined as the worst case difference between a peak and an adjacent valley within defined frequency points
7. This is the optimum impedance in order to achieve the performance shown

### Absolute Maximum Ratings

| Parameter | Rating |
|---|---|
| Operating Temperature | -40 to +85 ºC |
| Storage Temperature | -40 to +85 ºC |
| Input Power (at +55°C for 100 hours max) | +10 dBm |

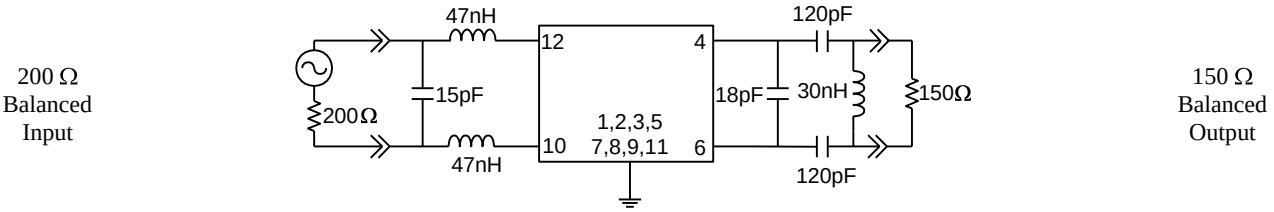
Operation of this device outside the parameter ranges given above may cause permanent damage.

# 856893

***172.8 MHz SAW Filter***

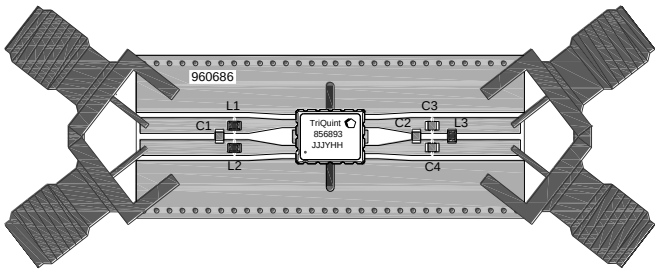
## Reference Design – 200Ω Bal Input, 150Ω Bal Output

### Schematic



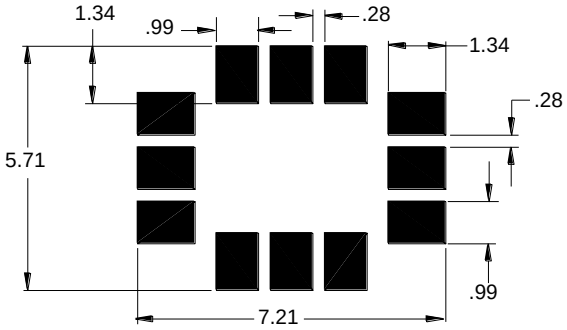

Notes:
1. Actual matching values may vary due to PCB layout and parasitic

### 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



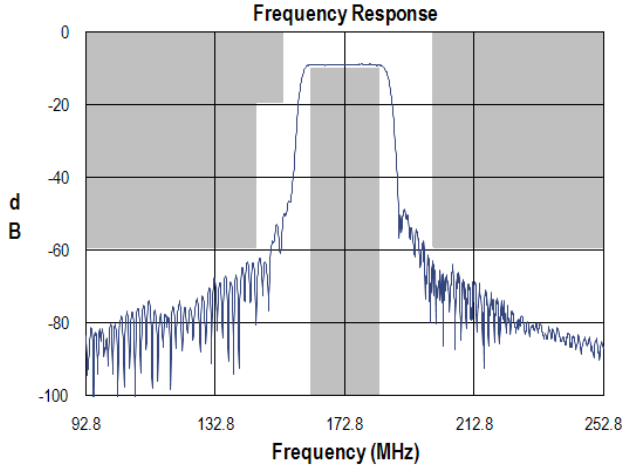

Notes:
1. All dimensions are in millimeters.
2. This footprint represents a recommendation only.

### Bill of Material

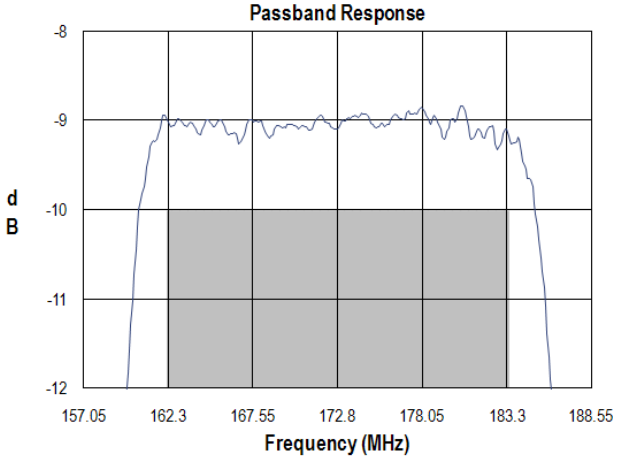
| Reference Desg. | Value | Description | Manufacturer | Part Number |
|---|---|---|---|---|
| L1 | 47nH | Coil Wire-wound, 0603, 5% | Coilcraft | 0603CS-47NXJBC |
| L2 | 47nH | Coil Wire-wound, 0603, 5% | Coilcraft | 0603CS-47NXJBC |
| L3 | 30 nH | Coil Wire-wound, 0603, 5% | Coilcraft | 0603CS-30NXJBC |
| C1 | 15pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H150KCV |
| C2 | 18pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H180KCV |
| C3 | 120pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H121KCV |
| C4 | 120pF | Chip Ceramic, 0603, 5% | Panasonic | ECU-V1H121KCV |
| SMA | N/A | SMA connector | Johnson Components | 142-0701-801 |
| PCB | N/A | 3-layer | multiple | 960686 |

## Typical Performance (at room temperature)

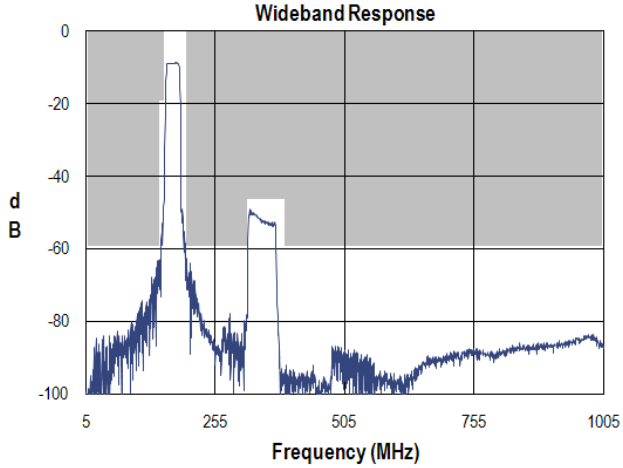
Frequency Response



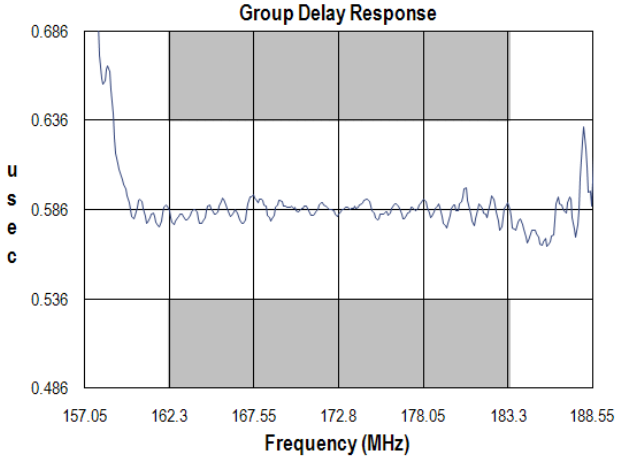

Passband Response



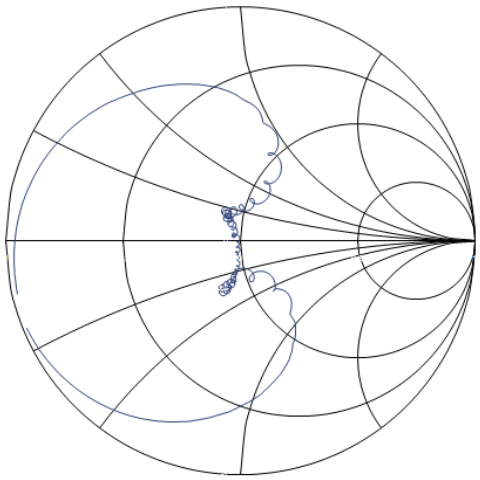

Wideband Response



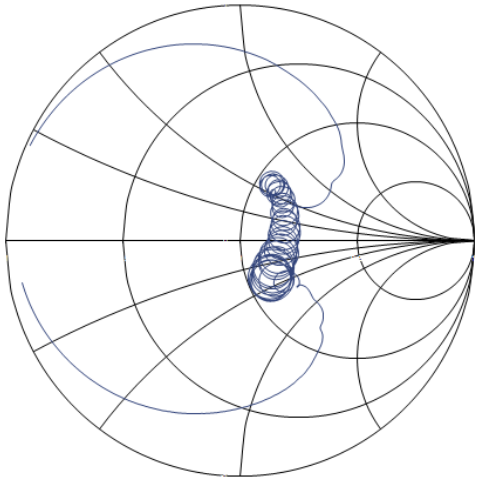

Group Delay Response




Input Smith Chart

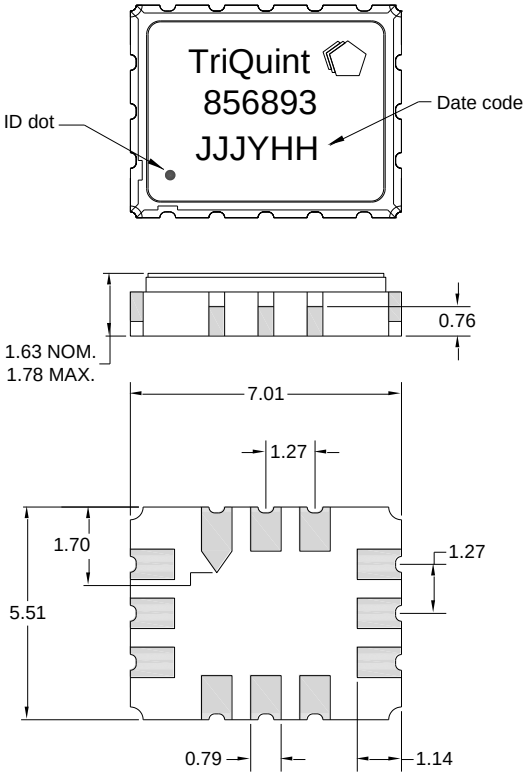


Output Smith Chart



## Mechanical Information

### Package Information, Dimensions and Marking




Package Style: SMP-28B
Dimensions: 7.01 x 5.51 x 1.63 mm

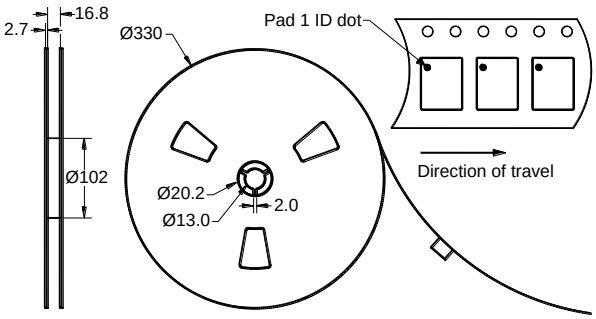
Body: $Al_2O_3$ ceramic
Lid: *Kovar, Ni* plated
Terminations: *Au* plating 0.5 - 1.0µm, over a 2-6µm *Ni* plating

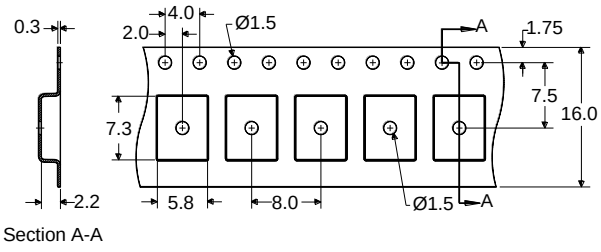
All dimensions shown are nominal in millimeters
All tolerances are ±0.15mm except overall length and width ±0.10mm

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

## Tape and Reel Information

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



## Product Compliance Information

### ESD Information

**Caution! ESD-Sensitive Device**

ESD Rating: 1B
Value: Passes ≥ 500 V min.
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: B
Value: Passes ≥ 250 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:

**Web:** www.triquint.com **Tel:** +1.407.886.8860
**Email:** info-sales@tqs.com **Fax:** +1.407.886.7061

For technical questions and application information:

**Email:** flapplication.engineering@tqs.com

## Important Notice

The information contained herein is believed to be reliable. TriQuint makes no warranties regarding the information contain herein. TriQuint assumes no responsibility or liability whatsoever for any of the information contained herein. TriQuint assumes no responsibility or liability whatsoever for the use of the information contained herein. The information contained herein is provided "AS IS, WHERE IS" and with all faults, and the entire risk associated with such information is entirely with the user. All information contained herein is subject to change without notice. Customers should obtain and verify the latest relevant information before placing orders for TriQuint products. The information contained herein or any use of such information does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other intellectual property rights, whether with regard to such information itself or anything described by such information.

TriQuint products are not warranted or authorized for use as critical components in medical, life-saving, or life-sustaining applications, or other applications where a failure would reasonably be expected to cause severe personal injury or death.