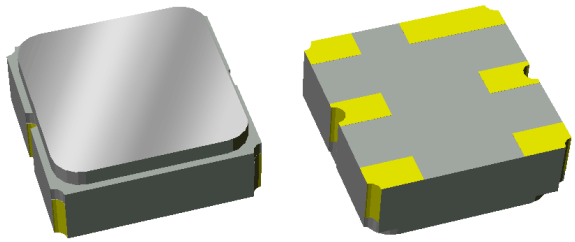
# 857145

## *1960 MHz SAW Filter*

## Applications

- For filtering in DPD path
- For ultra wideband applications
- Wireless infrastructure

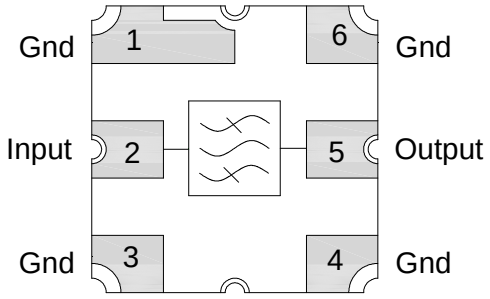


## Product Features

- Usable bandwidth 160 MHz
- Low Loss
- High attenuation,
- Excellent power handling
- Single-ended operation
- Matching required for operation at 50Ω
- Small Size: 3.00 x 3.00 x 1.22 mm
- Ceramic Surface Mount Package (SMP)
- Hermetically sealed
- **RoHS** compliant, **Pb**-free

## Functional Block Diagram

Top view




## General Description

857145 is a RF filter for wireless infrastructure applications. This filter was specifically designed for filtering in the digital pre-distortion path in Base Station applications. This filter is designed in a 3x3mm hermetic package and is part of our wide portfolio of RF filters in the same package.

Low insertion loss, coupled with high attenuation and excellent power handling, makes this filter a natural choice for our customers Downlink RF filtering needs.

## Pin Configuration

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

## Ordering Information

| Part No. | Description |
|---|---|
| 857145 | packaged part |
| 857145-EVB | evaluation board |

Standard T/R size = 5000 units/reel.

# Specifications

## Electrical Specifications [1]

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

| Parameter [3] | Conditions | Min | Typical [4] | Max | Units |
|---|---|---|---|---|---|
| Center Frequency | | - | 1960 | - | MHz |
| Maximum Insertion Loss | 1930 – 1990 MHz | - | 3.0 | 4.0 | dB |
| Amplitude Variation [5] | 1930 – 1990 MHz | - | 0.7 | 1.1 | dB p-p |
| | 1930 – 1990 MHz (Over any 5 MHz span) | - | 0.3 | 0.6 | dB p-p |
| | 1880 – 2040 MHz | - | 1.5 | 2.5 | dB p-p |
| Phase Ripple [5] | 1930 – 1990 MHz | - | 2.6 | 6 | deg p-p |
| | 1930 – 1990 MHz (Over any 5 MHz span) | - | 1.7 | 3 | deg p-p |
| | 1880 – 2040 MHz | - | 21 | 36 | deg p-p |
| Group Delay Variation [5] | 1930 – 1990 MHz | - | 2.8 | 6 | ns p-p |
| | 1880 – 2040 MHz | - | 6.2 | 12 | ns p-p |
| Absolute Delay | Average over 1930 – 1990 MHz | - | 4 | 10 | ns |
| EVM | 1930 – 1990 MHz (Over any 3.84 MHz span) | - | 0.8 | 1.5 | % |
| IIP3 [6] | Tones 5 MHz separated, power > 5dBm per tone | 44 | 52 | - | dBm<br>- |
| Temperature Drift [7] | 1930 – 1990 MHz | - | 0.22 | 0.3 | dB |
| Input/Output VSWR | 1930 – 1990 MHz | - | 1.5 | 2.0:1 | - |
| Relative Attenuation [8] | 10 – 704 MHz | 45 | 53 | - | dB |
| | 704 – 1561 MHz | 25 | 29 | - | dB |
| | 1561 – 1622 MHz | 25 | 29 | - | dB |
| | 1622 – 1790 MHz | 25 | 29 | - | dB |
| | 2170 – 4000 MHz | 25 | 28 | - | dB |
| | 4000 – 6000 MHz | 20 | 25 | - | dB |
| Source/Load Impedance [9] | Single-ended | - | 50 | - | Ω |

Notes:

1. All specifications are based on the TriQuint schematic 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. Variation is defined as the total peak to peak variation over the defined frequency range.
6. To be measured only during engineering development.
7. Temperature Drift specification is defined on Page 3 and is guaranteed by design and won't be measured in production
8. Relative to maximum insertion loss at center frequency.
9. This is the optimum impedance in order to achieve the performance shown.

## Absolute Maximum Ratings

| Parameter | Rating |
|---|---|
| Operable Temperature | -40 to +85 °C |
| Storage Temperature | -40 to +85 °C |
| Input Power | +22 dBm (max) CW for 24 hours at +55˚C |

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

## Temperature Drift Specification

Temperature Drift Equations:

$$\text{Temp Drift}_{high} = \left| \frac{\max(T_{ambient} - T_{hot}) - \min(T_{ambient} - T_{hot})}{2} \right|$$

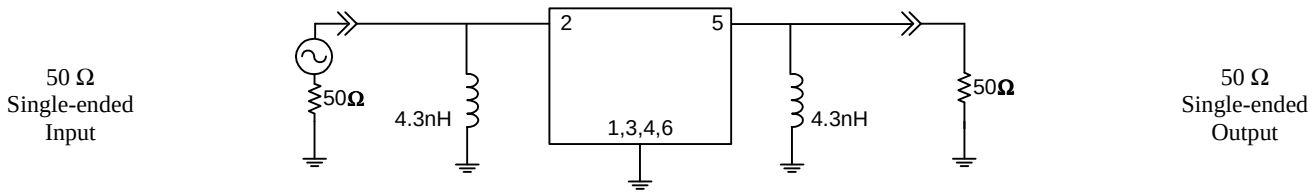
$$\text{Temp Drift}_{low} = \left| \frac{\max(T_{ambient} - T_{cold}) - \min(T_{ambient} - T_{cold})}{2} \right|$$

Temperature Drift Terms Defined:

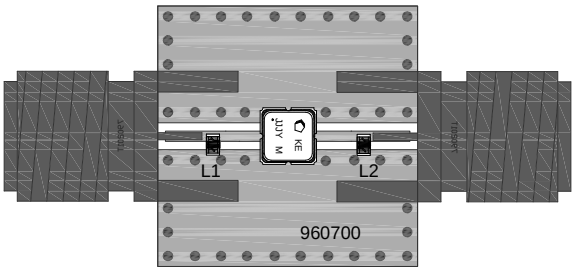
$T_{ambient}$ - Transmission power in dB measured at +25 degrees C.
$T_{hot}$ - Transmission power in dB measured at +85 degrees C.
$T_{cold}$ - Transmission power in dB measured at -40 degrees C.
Temperature Drift - Greater of $\text{Temp Drift}_{high}$ vs $\text{Temp Drift}_{low}$

## Reference Design

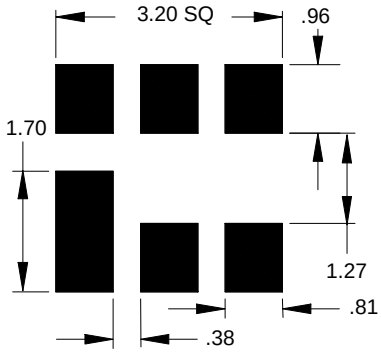
### Schematic




### PC Board




### Mounting Configuration




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

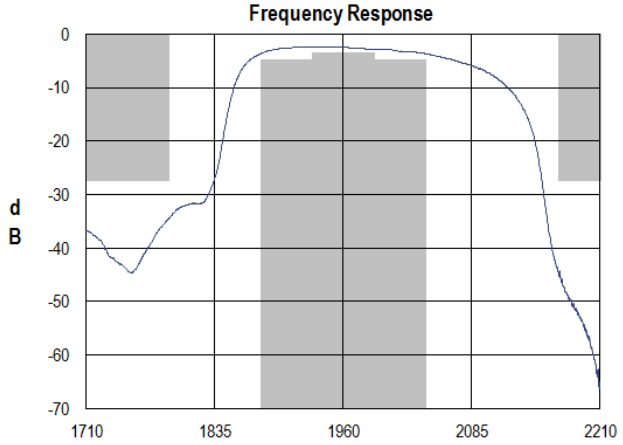
Notes:
1. All dimensions are in millimeters.
2. This footprint represents a recommendation only.

### Bill of Material

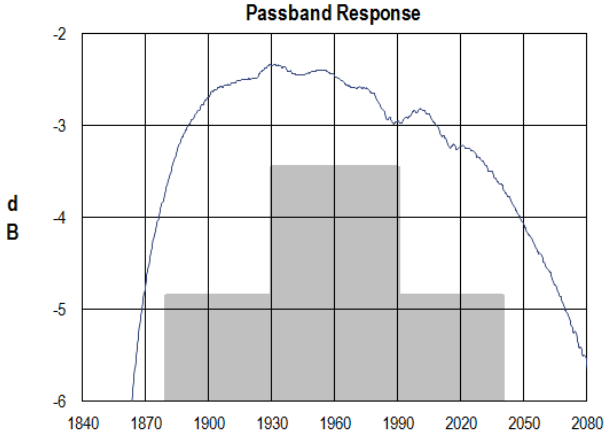
| Reference Desg. | Value | Description | Manufacturer | Part Number |
|---|---|---|---|---|
| L1 | 4.3nH | Coil Wire-wound, 0402, 5% | MuRata | LQW15AN4N3D00 |
| L2 | 4.3nH | Coil Wire-wound, 0402, 5% | MuRata | LQW15AN4N3D00 |
| SMA | N/A | SMA connector | Radiall USA Inc. | 9602-1111-018 |
| PCB | N/A | 3-layer | multiple | 960700 |

## Typical Performance (at room temperature)

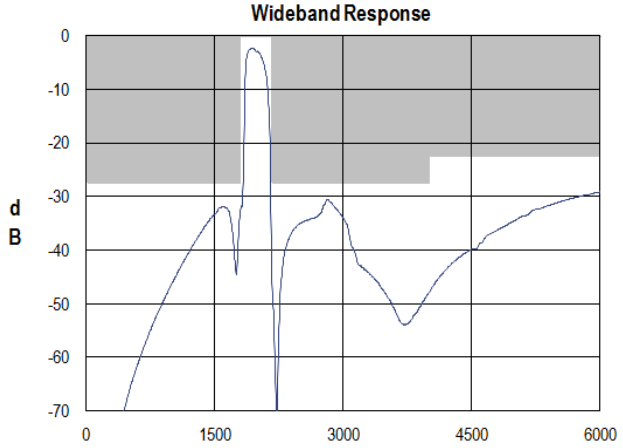
Frequency Response



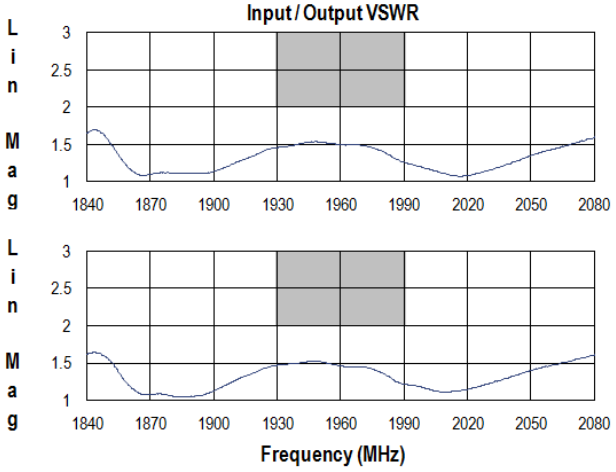

Passband Response



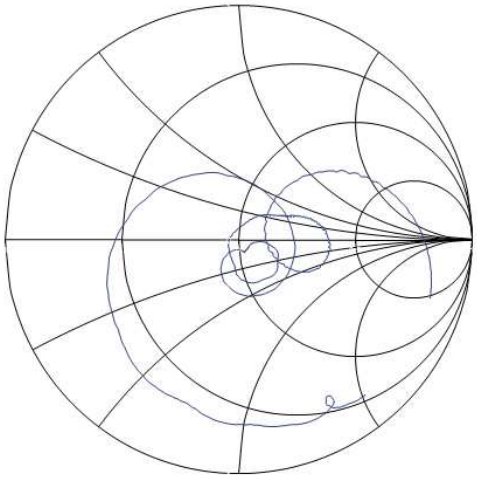

Wideband Response



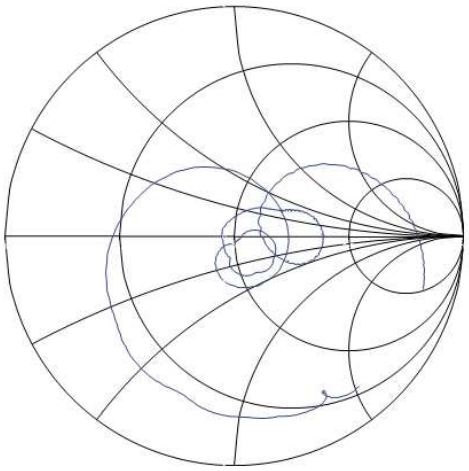

Input / Output VSWR




Input Smith Chart

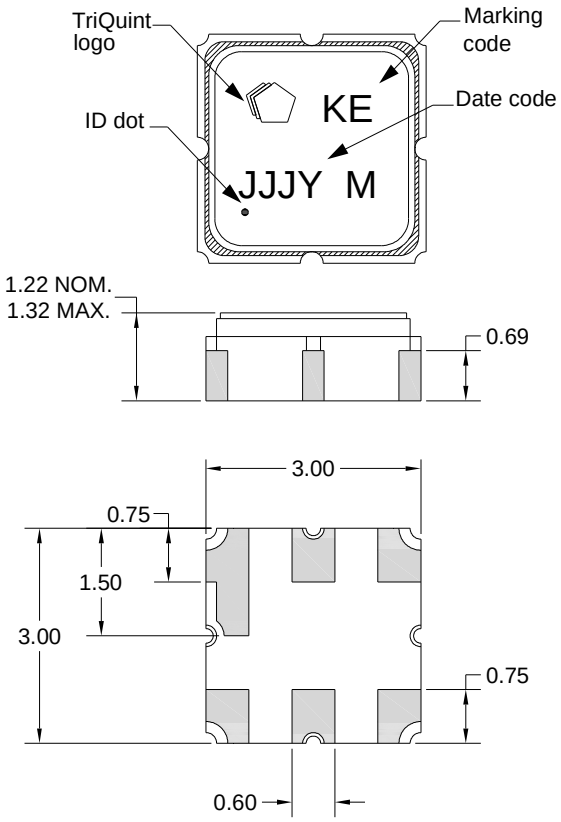


Output Smith Chart



## Mechanical Information

### Package Information, Dimensions and Marking




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

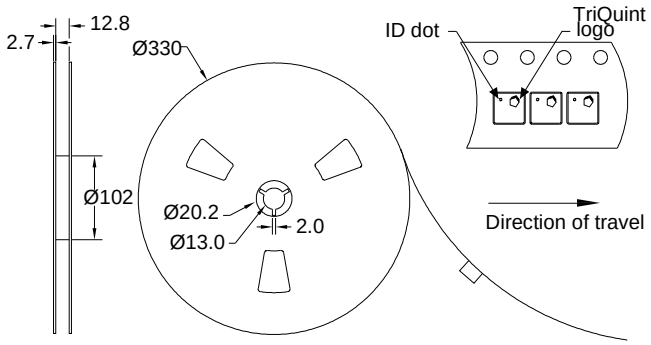
Body: $Al_2O_3$ ceramic
Lid: *Kovar*, *Ni* plated
Terminations: *Au* plating 0.5 - 1.0µm, over a 2-6µm *Ni* plating

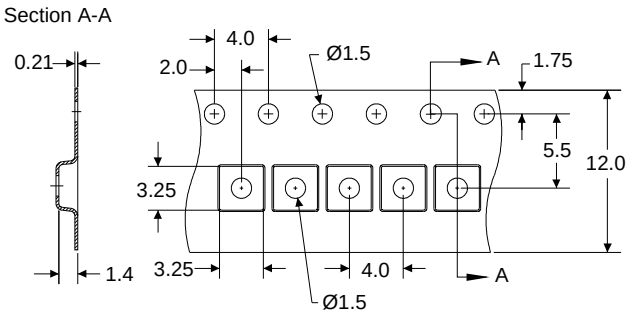
All dimensions shown are nominal in millimeters
All tolerances are ±0.15mm except overall length and width ±0.10mm

The date code consists of day of the current year (Julian, 3 digits), Y = last digit of the year, 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 ≥ 550 V min.
Test: Human Body Model (HBM)
Standard: JEDEC Standard JESD22-A114

ESD Rating: B
Value: Passes ≥ 200 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

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Телефон: 8 (812) 309-75-97 (многоканальный)
Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А