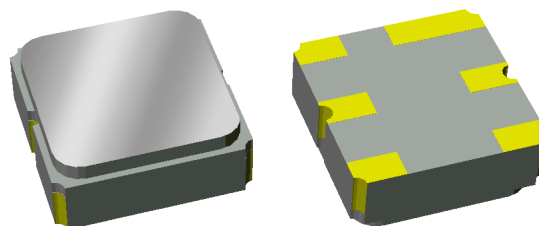



## Applications

- General purpose wireless
- Wireless infrastructure
- Base Station Applications

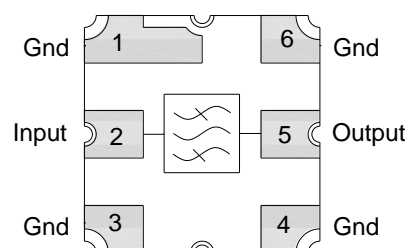


SMP – 12, 3.00 X 3.00 X 1.22 mm

## Product Features

- Usable bandwidth of 45 MHz
- For wideband applications
- Low Loss
- 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 (2002/95/EC), Pb-free 

## Functional Block Diagram



## General Description

857193 is a general purpose Uplink filter for Band 28. This filter was specifically designed in a 3x3mm hermetic package for base station applications 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' Uplink RF filtering needs.

## Pin Configuration – Single Ended

Pin No.	Label
2	Input
5	Output
1,3,4,6	Ground

## Ordering Information

Part No.	Description
857193	Product description
857193-EVB	Evaluation board description

Standard T/R size = 5000 units/reel

### Absolute Maximum Ratings <sup>(1)</sup>

Parameter	Rating
Storage Temperature	-40 to +85°C
Operable Temperature	-30 to +105 °C
RF Input Power <sup>(2)</sup>	+22 dBm

Notes

1. Operation of this device outside the parameter ranges given may cause permanent damage.
2. Input power with applied CW signal at =105° C in the 703 – 748MHz frequency band for 24 hrs.

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

Specified Temperature Range: <sup>(2)</sup> -30°C to +105°C

Parameter <sup>(3)</sup>	Conditions	Min	Typ <sup>(4)</sup>	Max	Units
Center Frequency		-	725.5	-	MHz
Maximum Insertion Loss	703 – 748 MHz	-	2.3	4.0	dB
Amplitude Variation <sup>(5)</sup>	703 – 748 MHz Any 5 MHz span within 703 -748 MHz	-	0.8 0.4	1.0 0.6	dB p-p dB p-p
Temperature Drift <sup>(6)</sup>	703 – 748 MHz	-	0.25	0.3	dB
Phase Ripple	703 – 748 MHz	-	21	35	deg. p-p
EVM <sup>(7)</sup>	703 – 748 MHz Any 3.84 MHz span within 703 – 748 MHz	-	1.6	2.0	%
IIP3 <sup>(8)</sup>	Tones 5 MHz separated, power >5 dBm per tone	44	50	-	dBm
Absolute Delay	703 – 748 MHz	-	17	30	ns
Group Delay Variation	703 – 748 MHz	-	20	30	ns p-p
Relative Attenuation <sup>(9)</sup>	10 – 100 MHz	30	60	-	dB
	430 – 480 MHz	30	36	-	dB
	480 – 648 MHz	20	25	-	dB
	773 – 830 MHz	20	28	-	dB
	936 – 971 MHz	20	30	-	dB
	1615 – 1660 MHz	45	60	-	dB
	1660 – 2690 MHz	20	55	-	dB
3510 – 3800 MHz	20	50	-	dB	
Input/Output VSWR <sup>(10)</sup>	703 – 748 MHz	-	1.7	2.0:1	-
Load/Source Impedance <sup>(11)</sup>	single-ended	-	50	-	Ohms

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. Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency points
6. Temperature Drift specification is defined on Page 3 and is guaranteed by design and will not be measured in production.
7. Measured with a RRC filtered QPSK modulated signal
8. To be measured only during engineering development
9. Relative to the maximum insertion loss
10. 2% tolerance on the matching component values would be needed to achieve this specification
11. This is the optimum impedance in order to achieve the performance shown

**Temp Drift Specification**

Temperature Drift Equations:

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

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

Temperature Drift Terms Defined:

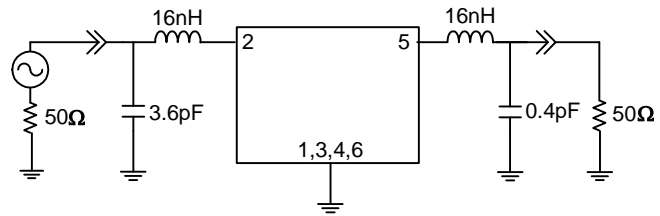
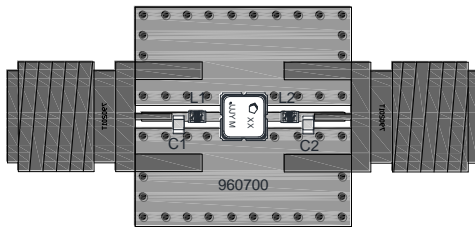
$T_{\text{ambient}}$  - Transmission power in dB measured at +25°C.

$T_{\text{hot}}$  - Transmission power in dB measured at +100°C.

$T_{\text{cold}}$  - Transmission power in dB measured at -30°C.

Temperature Drift - Greater of Temp Drift<sub>high</sub> vs Temp Drift

**857193-EVB Evaluation Board**



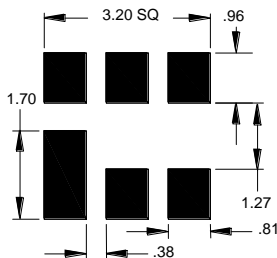
Notes:

1. Impedance matching required.
2. PCB: .500 x .500 x .063; Construction (5 layer stack-up):  
 ½ oz Cu Top Layer; Dielectric: Taconic TLY-5A (.0075); ½ oz Cu Middle Layer, FR4; ½ oz Cu Bottom Layer; total thickness (0.063) (dimensions are in inches).  
 Contact TriQuint for Gerber files.

**Bill of Material – 857193-EVB**

Reference Des.	Value	Description	Manuf.	Part Number
U1	N/A	725.5 MHz SAW filter	TriQuint	857193
L1, L2	16nH	0402 chip, series, wire wound, ±3%	Murata	LQW15AN16NH00
C1	3.6 pF	0402 chip, ceramic, GRM, ±2%	Murata	GRM1555C1H3R6GZ01
C2	0.4 pF	0402 chip, ceramic, GRM, ±10%	Murata	GRM1555C1HR40KZ01
SMA	N/A	SMA connector	Radiall USA	9602-1111-018
PCB	N/A	3-layer	Multiple	960700

**PCB Mounting Pattern**

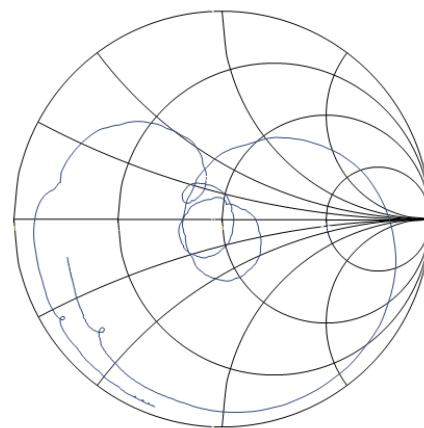
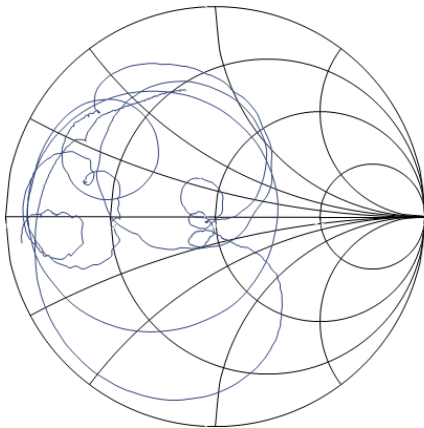
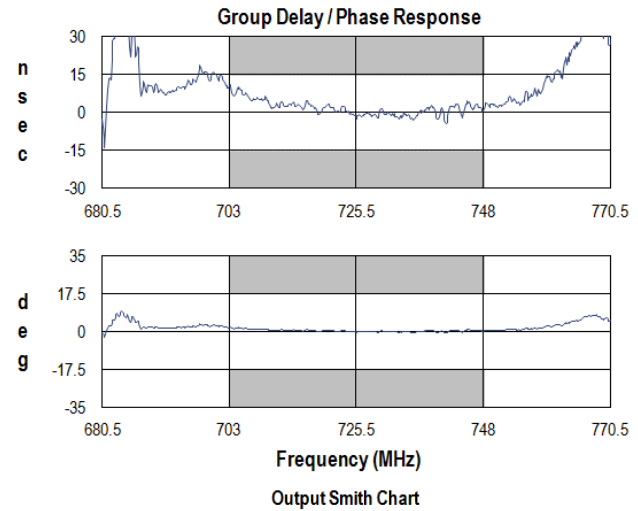
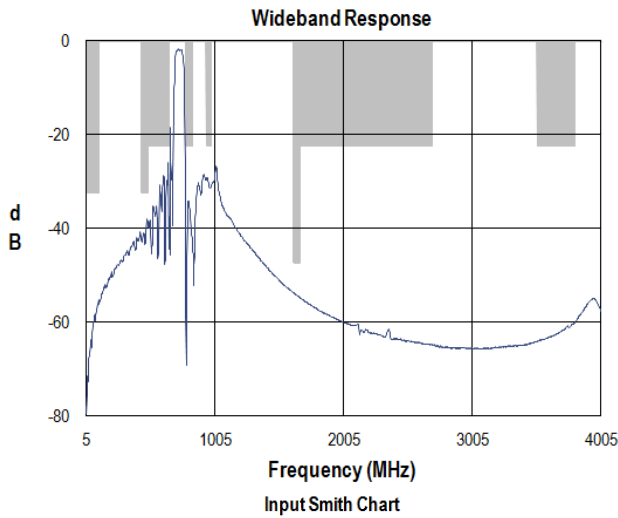
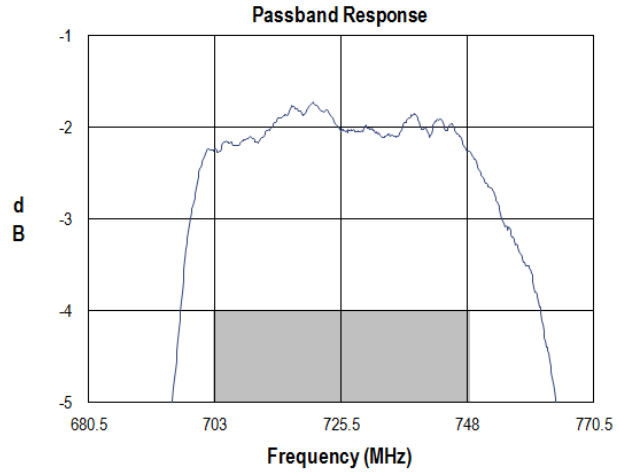
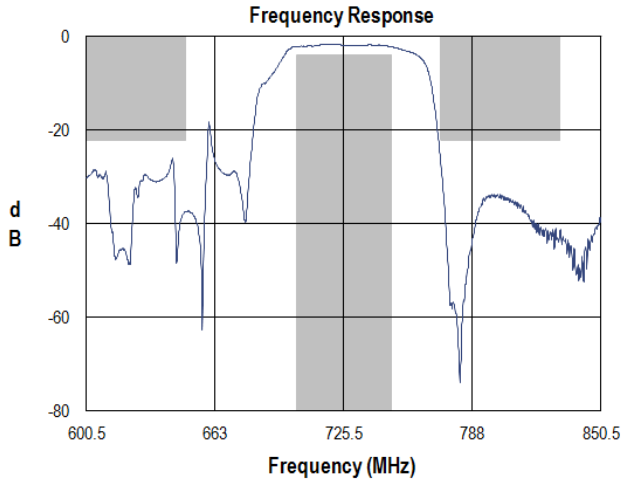


Notes:

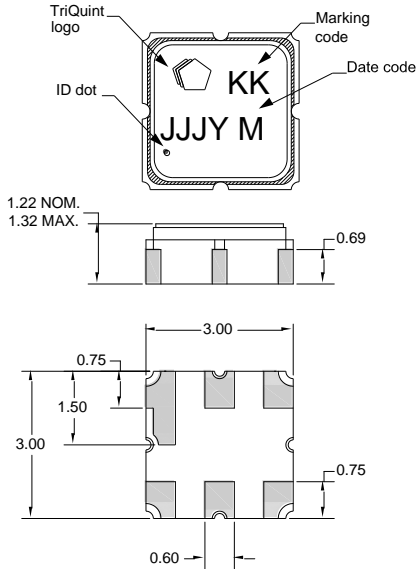
1. All dimensions are in millimeters. Angles are in degrees.
2. This drawing specifies the mounting pattern used on the TriQuint evaluation board for this product. Some modification may be necessary to suit end user assembly materials and processes.

**Performance Plots - 857193-EVB**

Test conditions unless otherwise noted: Temp= +25°C



## Package Information, Marking and Dimensions



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 - 1.0 $\mu$ 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

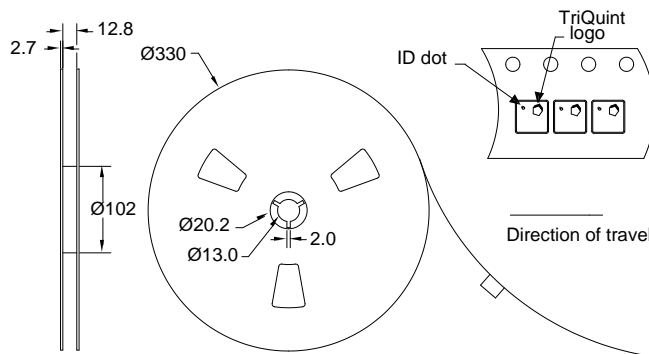
The date code consists of day of the current year (Julian, 3 digits), Y = last digit of the year, and M = manufacturing site code

Notes:

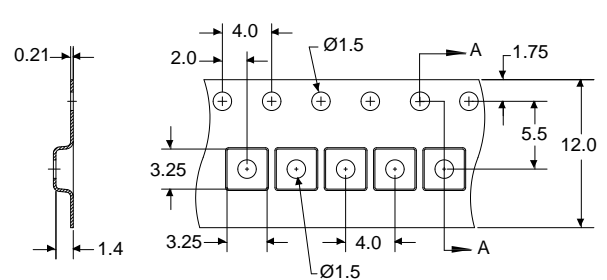
1. All dimensions shown are typical in millimeters
2. An asterisk (\*) in front of the marking code indicates prototype.

## Tape and Reel information

Standard T/R size = 5000 units/reel. All dimensions are in millimeters



Section A-A



## Product Compliance Information

### ESD Sensitivity Ratings



Caution! ESD-Sensitive Device

ESD Rating: Class 1B  
Value: Passes  $\geq 650$  V to  $< 700$  V  
Test: Electrostatic Discharge Sensitivity Testing,  
Human Body Model (HBM) - component level  
Standard: ESDA/JEDEC JS-001-2012

ESD Rating: Class B  
Value: Passes  $\geq 300$  V to  $350$  V  
Test: Machine Model (MM)  
Standard: JEDEC Standard JESD22-A115

### MSL Rating

Not applicable. Hermetic package.

### Solderability

Compatible with both lead-free ( $260^{\circ}\text{C}$  maximum reflow temperature) and tin/lead ( $245^{\circ}\text{C}$  maximum reflow temperature) soldering processes.

Refer to [Soldering Profile](#) for recommended guidelines.

### RoHS Compliance

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:

- Lead Free
- Halogen Free (Chlorine, Bromine)
- Antimony Free
- TBBP-A ( $\text{C}_{15}\text{H}_{12}\text{Br}_4\text{O}_2$ ) 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](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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