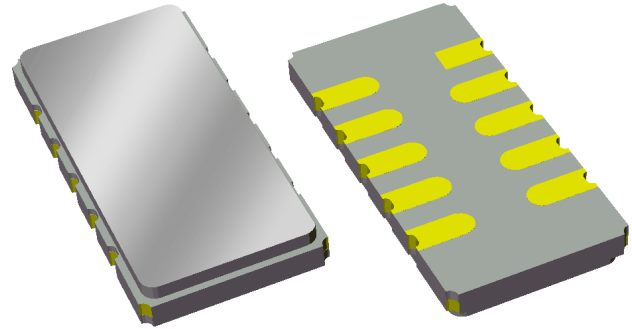


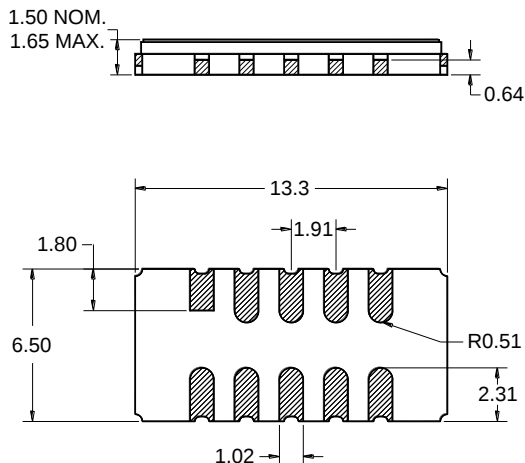
## Features

- For GSM and EDGE applications
- Usable bandwidth 0.22 MHz
- Typical 1dB bandwidth of 0.34 MHz
- Low loss
- High attenuation
- Balanced operation at 200Ω or Single-ended operation at 50Ω (different matching required)
- Ceramic Surface Mount Package (SMP)
- Hermetic
- RoHS compliant (2002/95/EC), Pb-free 



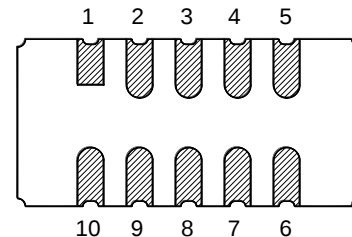
## Package

Surface Mount 13.30 x 6.50 x 1.50 mm  
SMP-53C



## Pin Configuration

Bottom View



### Balanced Configuration

| Pin No. | Description |
|---------|-------------|
| 10,1    | Input       |
| 5,6     | Output      |
| 2,3,4   | Case Ground |
| 7,8,9   | Case Ground |

Dimensions shown are nominal in millimeters  
All tolerances are  $\pm 0.15$ mm except overall  
length and width  $\pm 0.10$ mm

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

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

Operating Temperature Range: <sup>(2)</sup> 0 to +70 °C

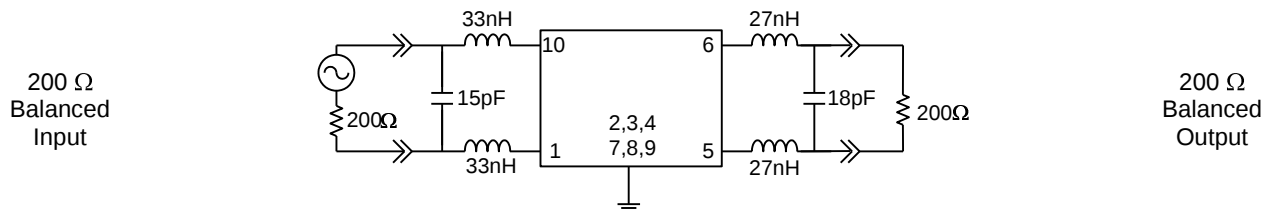
| Parameter <sup>(3)</sup>                                  | Minimum | Typical <sup>(4)</sup> | Maximum | Unit     |
|-----------------------------------------------------------|---------|------------------------|---------|----------|
| Center Frequency ( $f_c$ )                                | -       | 201                    | -       | MHz      |
| Insertion Loss                                            | -       | 6.1                    | 7.0     | dB       |
| Lower 1 dB Band Edge                                      | -       | 200.83                 | 200.89  | MHz      |
| Upper 1 dB Band Edge                                      | 201.11  | 201.17                 | -       | MHz      |
| Amplitude Variation <sup>(5)</sup><br>200.89 – 201.11 MHz | -       | 0.6                    | 1.0     | dB p-p   |
| Absolute Group Delay at $f_c$                             | 2.05    | 2.3                    | 2.55    | $\mu$ S  |
| Group Delay Variation<br>200.89 – 201.11 MHz              | -       | 0.8                    | 1.5     | $\mu$ S  |
| Stopband Attenuation <sup>(6)</sup>                       |         |                        |         |          |
| $f_c \pm 0.3$ MHz to $f_c \pm 0.4$ MHz                    | 16      | 25                     | -       | dB       |
| $f_c \pm 0.4$ MHz to $f_c \pm 0.6$ MHz                    | 27      | 29                     | -       | dB       |
| $f_c \pm 0.6$ MHz to $f_c \pm 0.8$ MHz                    | 28      | 32                     | -       | dB       |
| $f_c \pm 0.8$ MHz to $f_c \pm 1.5$ MHz                    | 36      | 40                     | -       | dB       |
| $f_c \pm 1.5$ MHz to $f_c \pm 35$ MHz                     | 38      | 40                     | -       | dB       |
| Source Impedance (Balanced) <sup>(7)</sup>                | -       | 200                    | -       | $\Omega$ |
| Load Impedance (Balanced) <sup>(7)</sup>                  | -       | 200                    | -       | $\Omega$ |

### Notes:

1. All specifications are based on the TriQuint test circuit shown below
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. Relative to insertion loss at 201 MHz
7. This is the optimum impedance in order to achieve the performance shown

### Test Circuit:

Actual matching values may vary due to PCB layout and parasitics



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

Operating Temperature Range: <sup>(2)</sup> -40 to +85 °C

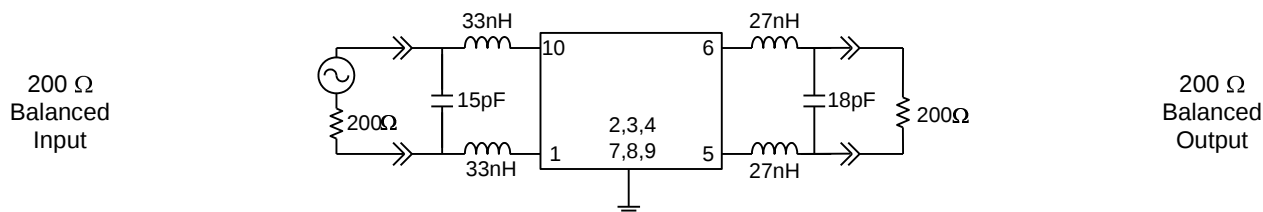
| Parameter <sup>(3)</sup>                                  | Minimum | Typical <sup>(4)</sup> | Maximum | Unit     |
|-----------------------------------------------------------|---------|------------------------|---------|----------|
| Center Frequency ( $f_c$ )                                | -       | 201                    | -       | MHz      |
| Insertion Loss                                            | -       | 6.1                    | 7.2     | dB       |
| Lower 1 dB Band Edge                                      | -       | 200.83                 | 200.89  | MHz      |
| Upper 1 dB Band Edge                                      | 201.081 | 201.17                 | -       | MHz      |
| Amplitude Variation <sup>(5)</sup><br>200.89 – 201.11 MHz | -       | 0.6                    | 1.4     | dB p-p   |
| Absolute Group Delay at $f_c$                             | 2.05    | 2.3                    | 2.55    | $\mu$ s  |
| Group Delay Variation<br>200.89 – 201.11 MHz              | -       | 0.8                    | 1.5     | $\mu$ s  |
| Stopband Attenuation <sup>(6)</sup>                       |         |                        |         |          |
| $f_c$ - 35 MHz to $f_c$ - 1.5 MHz                         | 38      | 40                     | -       | dB       |
| $f_c$ - 1.5 MHz to $f_c$ - 0.8 MHz                        | 35      | 40                     | -       | dB       |
| $f_c$ - 0.8 MHz to $f_c$ - 0.6 MHz                        | 28      | 32                     | -       | dB       |
| $f_c$ - 0.6 MHz to $f_c$ - 0.4 MHz                        | 25      | 29                     | -       | dB       |
| $f_c$ - 0.4 MHz to $f_c$ - 0.3 MHz                        | 10.5    | 25                     | -       | dB       |
| $f_c$ + 0.3 MHz to $f_c$ + 0.4 MHz                        | 16      | 25                     | -       | dB       |
| $f_c$ + 0.4 MHz to $f_c$ + 0.6 MHz                        | 27      | 29                     | -       | dB       |
| $f_c$ + 0.6 MHz to $f_c$ + 0.8 MHz                        | 28      | 32                     | -       | dB       |
| $f_c$ + 0.8 MHz to $f_c$ + 1.5 MHz                        | 35      | 40                     | -       | dB       |
| $f_c$ + 1.5 MHz to $f_c$ + 35 MHz                         | 38      | 40                     | -       | dB       |
| Source Impedance (Balanced) <sup>(7)</sup>                | -       | 200                    | -       | $\Omega$ |
| Load Impedance (Balanced) <sup>(7)</sup>                  | -       | 200                    | -       | $\Omega$ |

### Notes:

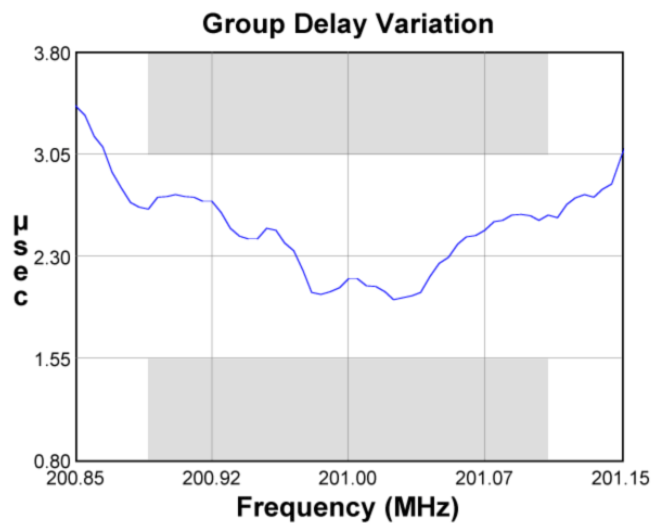
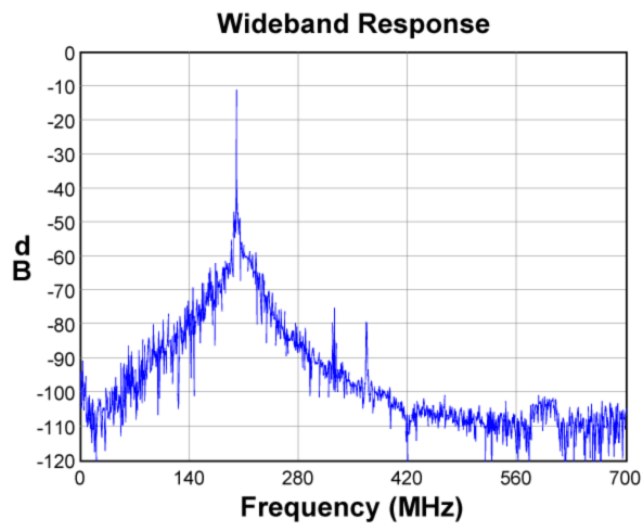
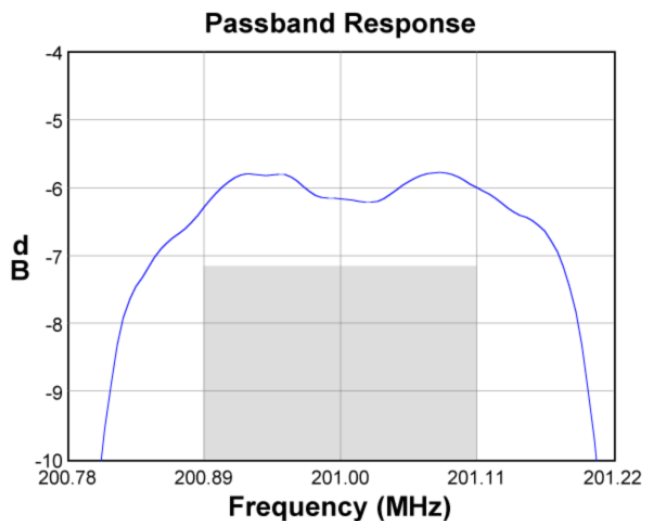
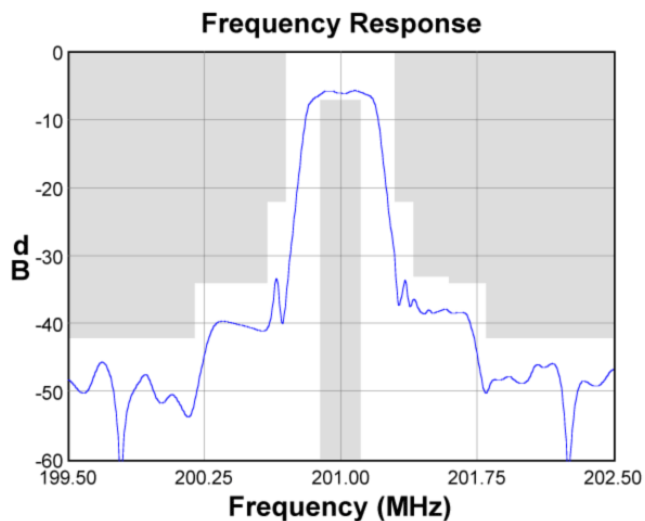
1. All specifications are based on the TriQuint test circuit shown below
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
3. Electrical margin has been built into the design to account for the variations due to 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. Relative to insertion loss at 201 MHz
7. This is the optimum impedance in order to achieve the performance shown

### Test Circuit:

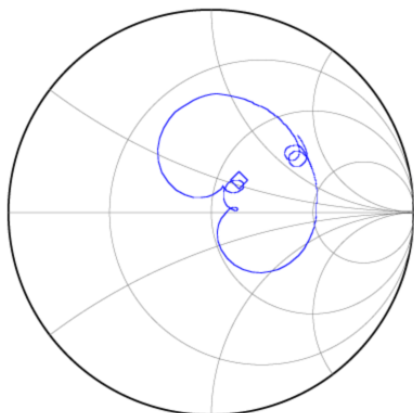
Actual matching values may vary due to PCB layout and parasitics



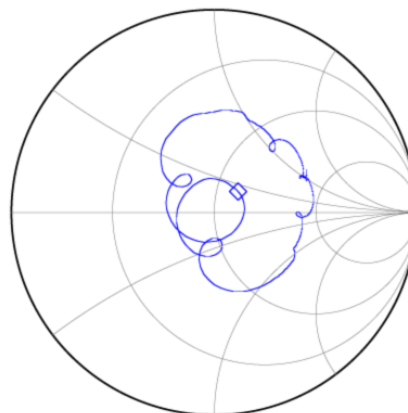
**Typical Performance (at room temperature)**



**Input Smith Chart**

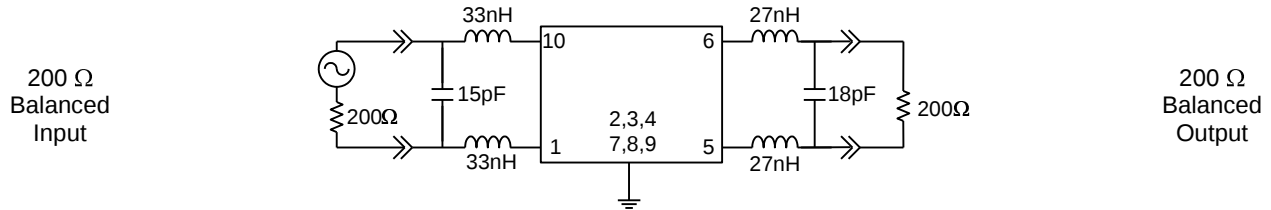


**Output Smith Chart**

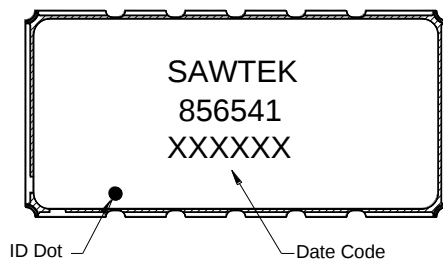


## Matching Schematics

Actual matching values may vary due to PCB layout and parasitics

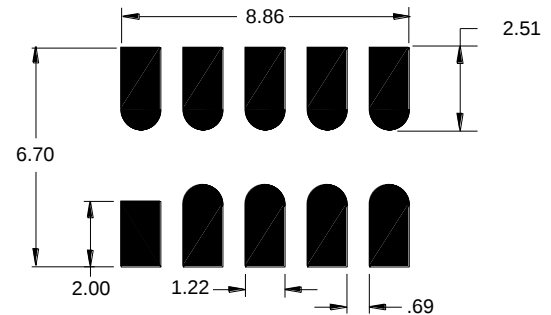


## Marking



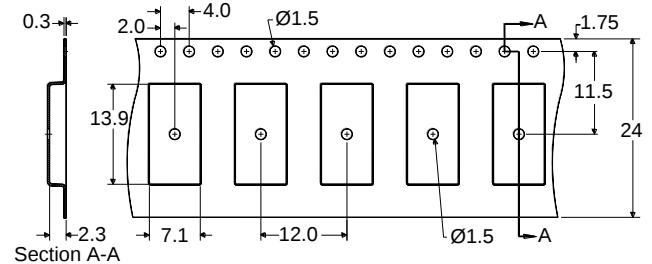
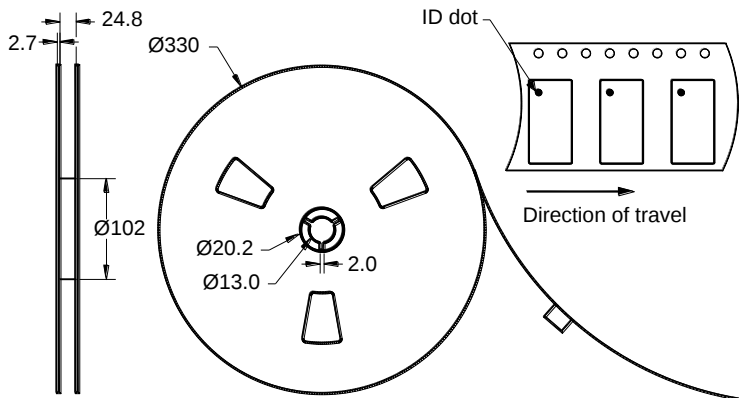
The date code consists of: day of the current year (Julian, 3 digits), last digit of the year (1 digit) and hour (2 digits)

## PCB Footprint



This footprint represents a recommendation only  
Dimensions shown are nominal in millimeters

## Tape and Reel



Dimensions shown are nominal in millimeters  
Packaging quantity: 2000 units/reel

## Maximum Ratings

| Parameter                   | Symbol           | Minimum | Maximum | Unit |
|-----------------------------|------------------|---------|---------|------|
| Operating Temperature Range | T                | -40     | +85     | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -40     | +85     | °C   |

## Important Notes

### Warnings

- Electrostatic Sensitive Device (ESD) 
- Avoid ultrasonic exposure

### RoHS Compliance

- This product complies with EU directive 2002/95/EC (RoHS) 

### Solderability

- Compatible with JESD22-B102, Pb-free process, 260C peak reflow temperature ([see soldering profile](#))

## Links to Additional Technical Information

[PCB Layout Tips](#)

[Qualification Flowchart](#)

[Soldering Profile](#)

[S-Parameters](#)

[RoHS Information](#)

[Other Technical Information](#)

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## Contact Information

**TriQuint**   
SEMICONDUCTOR

PO Box 609501  
Orlando, FL 32860-9501  
USA

Phone: +1 (407) 886-8860  
Fax: +1 (407) 886-7061  
Email: [info-product@tqs.com](mailto:info-product@tqs.com)  
Web: [www.triquint.com](http://www.triquint.com)

Or contact one of our worldwide  
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