
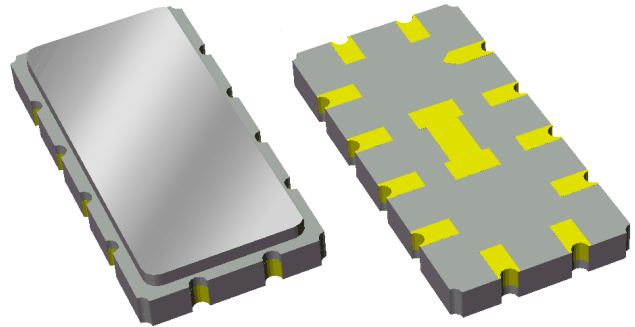


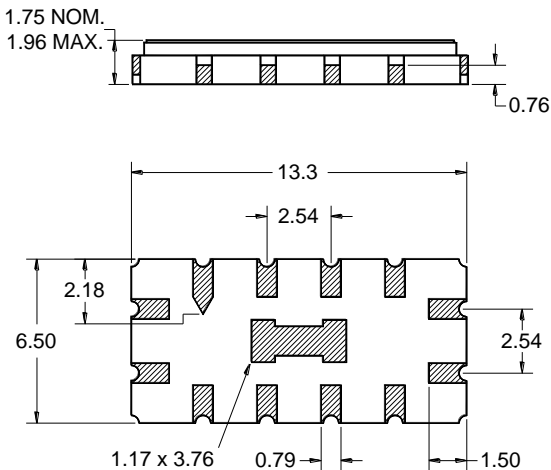
Features

- For GPS applications
- Usable bandwidth 16 MHz
- Low loss
- High attenuation
- Single-ended operation
- Ceramic Surface Mount Package (SMP)
- Hermetic
- RoHS compliant (2002/95/EC), Pb-free 



Package

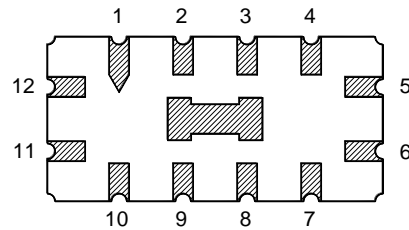
Surface Mount 13.30 x 6.50 x 1.75 mm
SMP-53



Pin Configuration

Bottom View

This package includes a center pad.
Soldering of the center pad to PCB is not recommended and not required.



Single-ended Configuration

| Pin No. | Description |
|-------------|-------------|
| 11 | Input |
| 5 | Output |
| 1,2,3,4,6 | Case Ground |
| 7,8,9,10,12 | Case Ground |

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

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

Electrical Specifications ⁽¹⁾

Operating Temperature Range: ⁽²⁾ +25 °C

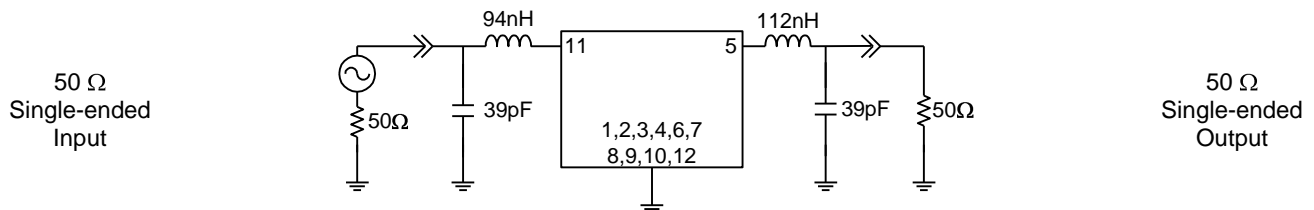
| Parameter ⁽³⁾ | Minimum | Typical ⁽⁴⁾ | Maximum | Unit |
|--|---------|------------------------|---------|--------|
| Center Frequency | 139.6 | 140 | 140.4 | MHz |
| Minimum Insertion Loss at Center Frequency | - | 8.4 | 11 | dB |
| 1 dB Bandwidth | 15 | 16 | - | MHz |
| 3 dB Bandwidth | 16 | 16.9 | - | MHz |
| 35 dB Bandwidth | - | 21.17 | 22 | MHz |
| Passband Ripple 133.6 - 146.4 MHz | - | 0.6 | 1 | dB p-p |
| Phase Linearity 133.6 - 146.4 MHz | - | 10 | 14 | ° p-p |
| Group Delay Variation 133.6 - 146.4 MHz | - | 60 | 160 | ns p-p |
| Absolute Group Delay | - | 1.02 | - | µs |
| Temperature Shift | - | -94 | - | ppm/°C |
| Source Impedance (single-ended) ⁽⁵⁾ | - | 50 | - | Ω |
| Load Impedance (single-ended) ⁽⁵⁾ | - | 50 | - | Ω |

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. 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 ⁽¹⁾

Operating Temperature Range: ⁽²⁾ -40 to +85 °C

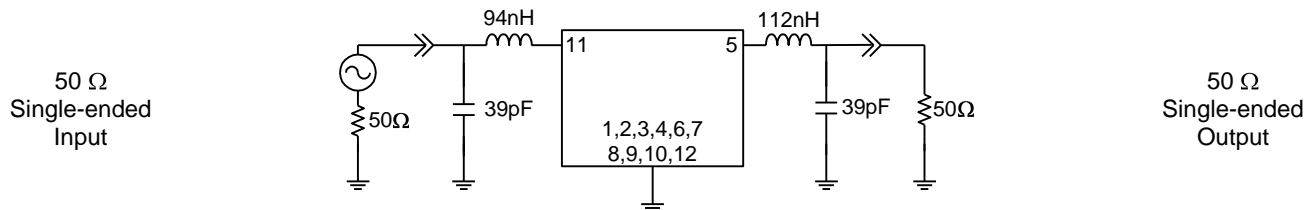
| Parameter ⁽³⁾ | Minimum | Typical ⁽⁴⁾ | Maximum | Unit |
|--|---------|------------------------|---------|------|
| Center Frequency | 138.6 | 140 | 141.4 | MHz |
| Minimum Insertion Loss at Center Frequency | - | 8.9 | 11 | dB |
| Lower 1 dB Band Edge | - | 132.1 | 132.9 | MHz |
| Upper 1 dB Band Edge | 147.1 | 148.2 | - | MHz |
| Lower 3 dB Band Edge | - | 131.7 | 132.6 | MHz |
| Upper 3 dB Band Edge | 147.6 | 148.7 | - | MHz |
| Lower 35 dB Band Edge | 128.6 | 130.2 | - | MHz |
| Upper 35 dB Band Edge | - | 151.3 | 154.0 | MHz |
| Passband Ripple 133.6 - 146.4 MHz | - | 0.6 | 1 | dB |
| Phase Linearity 133.6 - 146.4 MHz | - | 10 | 14 | deg |
| Group Delay Variation 133.6 - 146.4 MHz | - | 60 | 160 | ns |
| Absolute Group Delay | - | 1.02 | - | μs |
| Source Impedance (single-ended) ⁽⁶⁾ | - | 50 | - | Ω |
| Load Impedance (single-ended) ⁽⁶⁾ | - | 50 | - | Ω |

Notes:

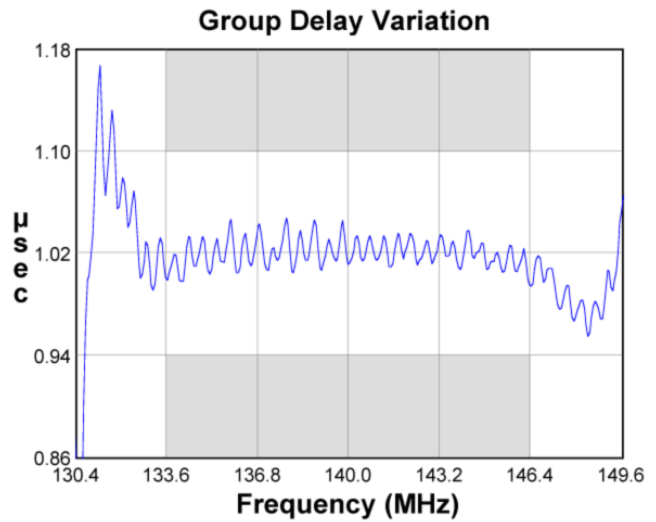
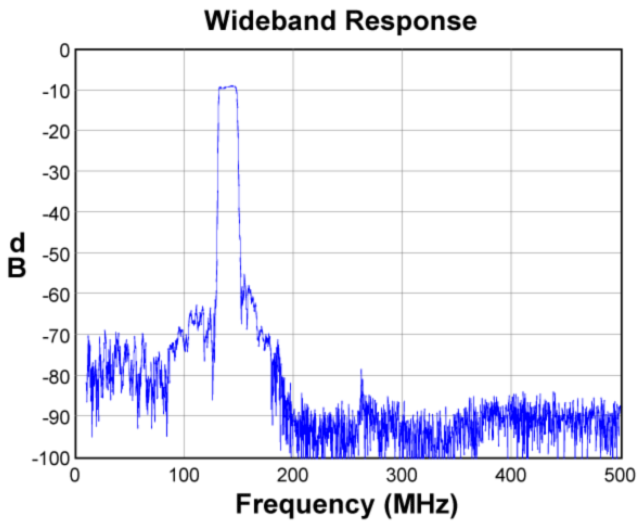
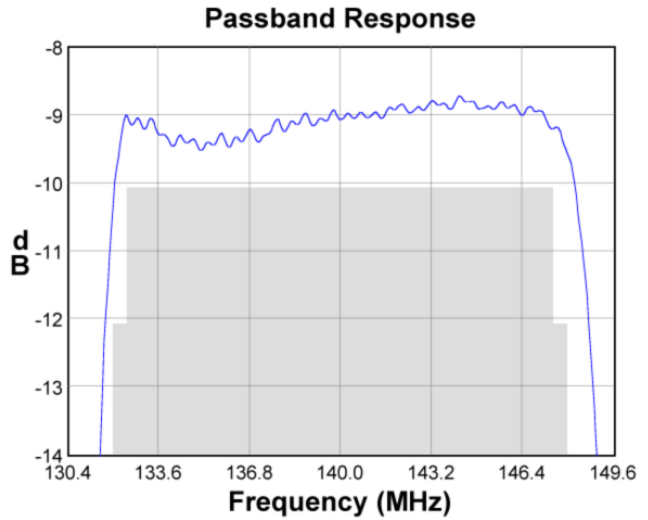
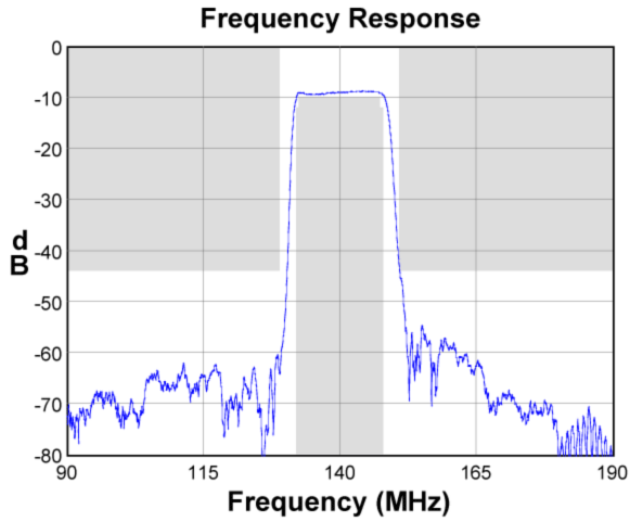
1. All specifications are based on the TriQuint test circuit shown below
2. In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
3. Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
4. Typical values are based on average measurements at room temperature
5. This is the optimum impedance in order to achieve the performance shown

Test Circuit:

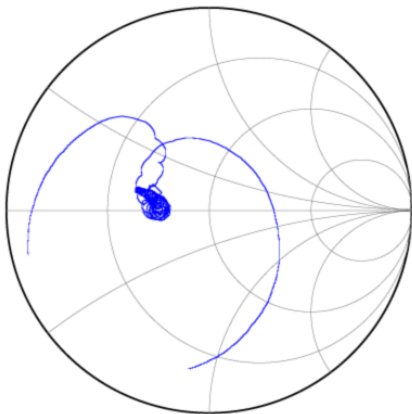
Actual matching values may vary due to PCB layout and parasitics



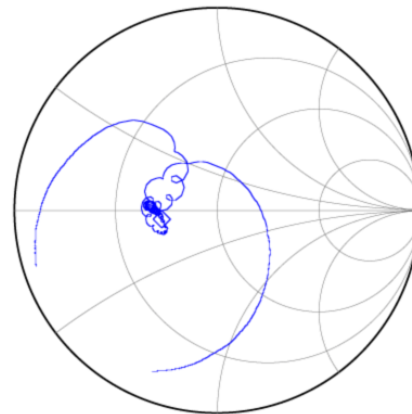
Typical Performance (at room temperature)



Input Smith Chart

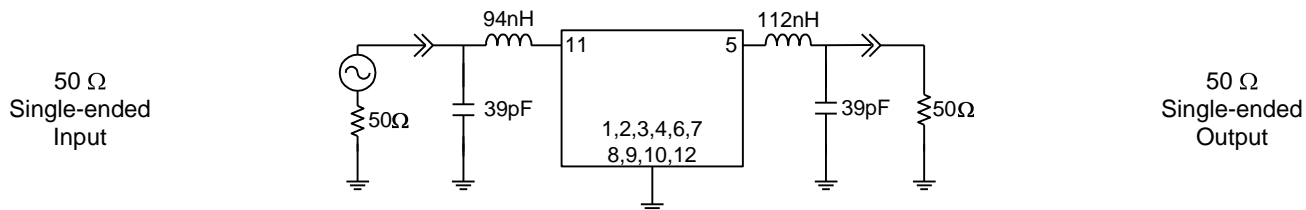


Output Smith Chart

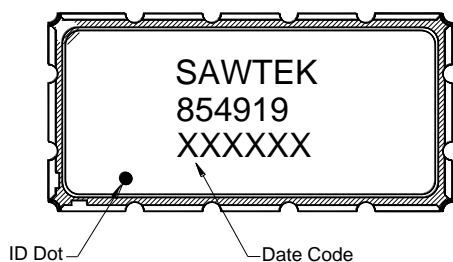


Matching Schematics

Actual matching values may vary due to PCB layout and parasitics

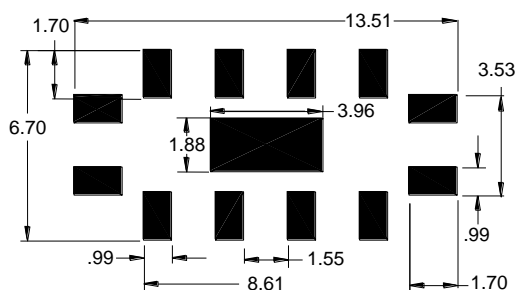


Marking



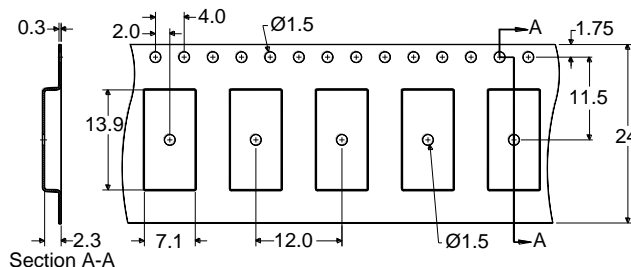
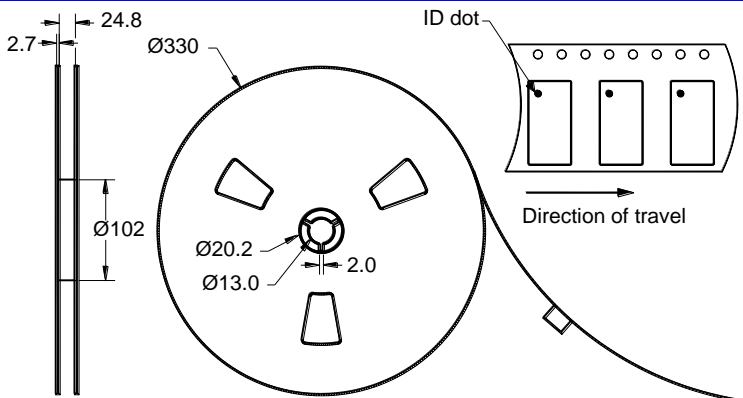
The date code consists of: day of the current year (Julian, 3 digits), last digit of the year (1 digit) and hour (2 digits)

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 _{stg} | -40 | +85 | °C |
| ESD (Human Body Model), JEDEC JESD22-A114 | V _{HBM} | 200 | - | Volts |
| ESD (Machine Model), JEDEC JESD22-A115 | V _{MM} | 150 | - | Volts |

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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