
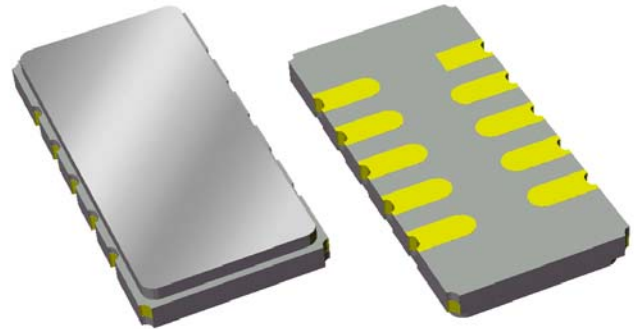


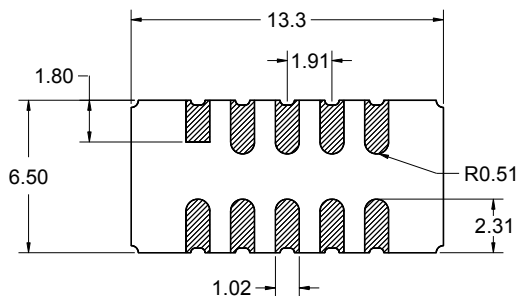
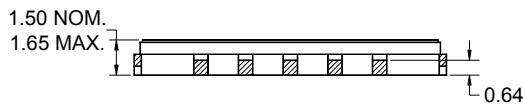
**Features**

- Usable bandwidth 32 MHz
- High attenuation
- Impedance matching required
- Single-ended operation
- Ceramic Surface Mount Package (SMP)
- Hermetic
- RoHS compliant (2002/95/EC), Pb-free 



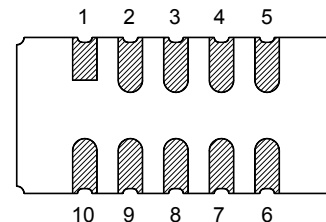
**Package**

Surface Mount 13.3 x 6.50 x 1.50 mm



**Pin Configuration**

Bottom View



Pin No.	Description
10	Input
5	Output
1,2,3, 4	Case ground
6,7,8, 9	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:  $\text{Al}_2\text{O}_3$  ceramic  
Lid: Kovar, Ni plated  
Terminations: Au plating 0.5 - 1.0 $\mu\text{m}$ ,  
over a 2 - 6 $\mu\text{m}$  Ni plating

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

Operating Temperature Range: <sup>(2)</sup> -40 to +80 °C

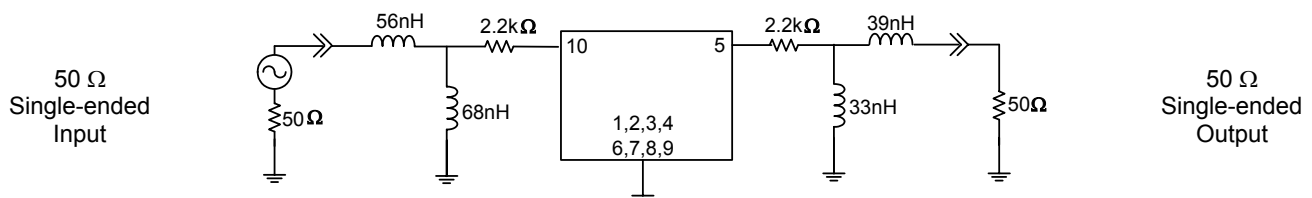
Parameter <sup>(3)</sup>	Minimum	Typical	Maximum	Unit
Center Frequency	-	153.6	-	MHz
Insertion Loss at Fc	-	13	15	dB
1 dB Lower Frequency <sup>(4)</sup>	-	136.1	137.6	MHz
1 dB Upper Frequency <sup>(4)</sup>	169.6	171.1	-	MHz
Stopband Attenuation <sup>(4)</sup>				
70 - 125 MHz	40	52	-	dB
275 - 350 MHz	35	55	-	dB
400 - 1000 MHz	40	45	-	dB
1000 - 2000 MHz	30	40	-	dB
Amplitude Variation <sup>(5)</sup>				
137.6 - 169.6 MHz	-	0.7	1.2	dB p-p
Phase Ripple (p-p)				
136.6 - 169.6 MHz	-	5	12	deg
Phase Ripple (RMS)				
137.6 - 169.6 MHz	-	1	2.5	deg
Absolute Group Delay at 153.6 MHz				
137.6 - 169.6 MHz	-	0.7	0.8	μs
Group Delay Variation				
137.6 - 169.6 MHz	-	50	100	ns
Input Return Loss <sup>(6)</sup>				
137.6 - 169.6 MHz	8	10	-	dB
Output Return Loss <sup>(6)</sup>				
137.6 - 169.6 MHz	9	11	-	dB
Source/Load Impedance <sup>(7)</sup>	-	50	-	Ω

**Notes:**

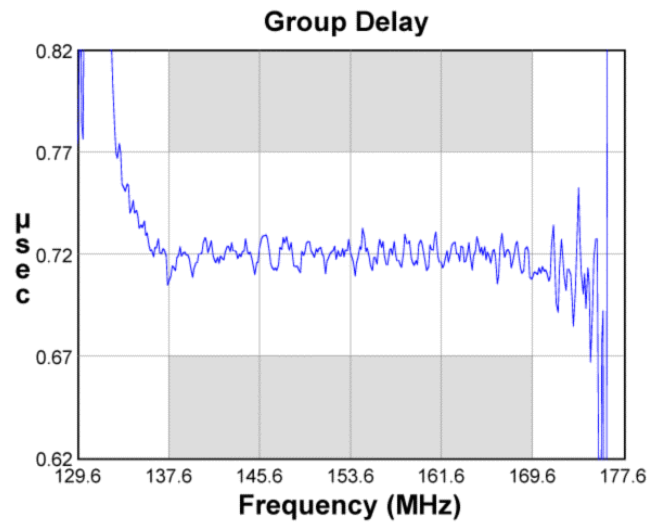
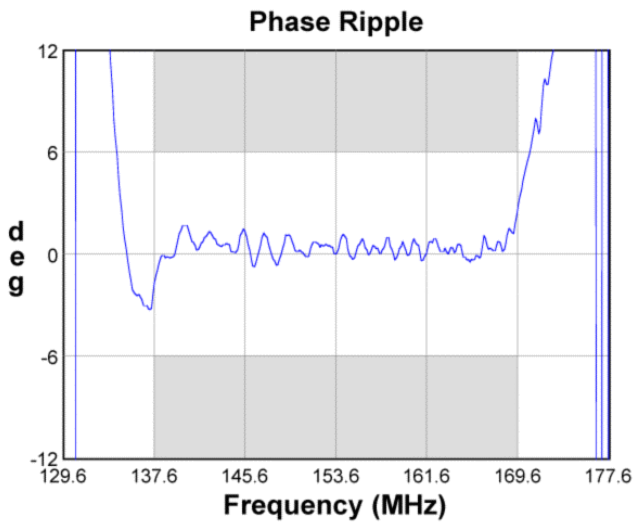
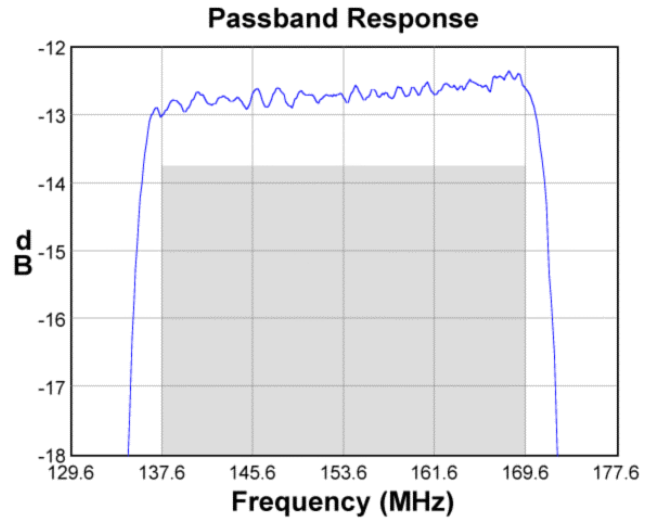
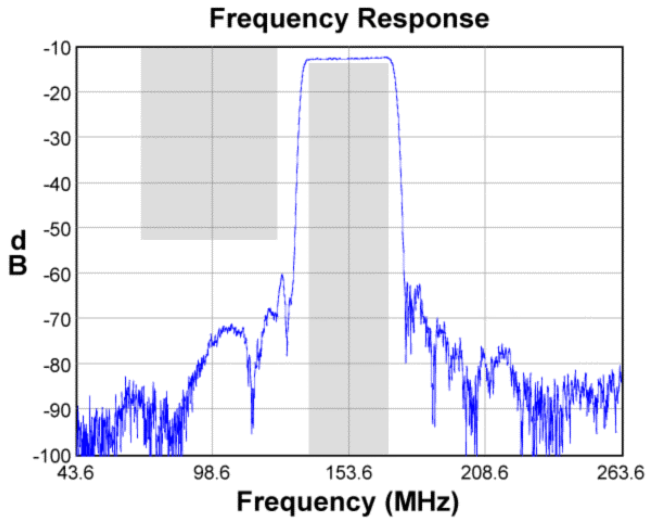
- All specifications are based on the test circuit shown below
- In production, devices will be tested at room temperature to a guardbanded specification to ensure electrical compliance over temperature
- Electrical margin has been built into the design to account for the variations due to temperature drift and manufacturing tolerances
- Referenced to insertion loss at Fc.
- Amplitude Variation is defined as the difference between the lowest loss and the highest loss within defined frequency points.
- An external impedance matching network with +/- 2% tolerance will be necessary to achieve proposed return loss.
- This is the optimum impedance in order to achieve the performance shown

**Test Circuit:**

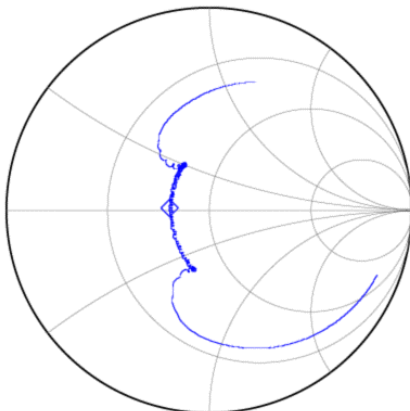
Actual matching values may vary due to PCB layout and parasitics



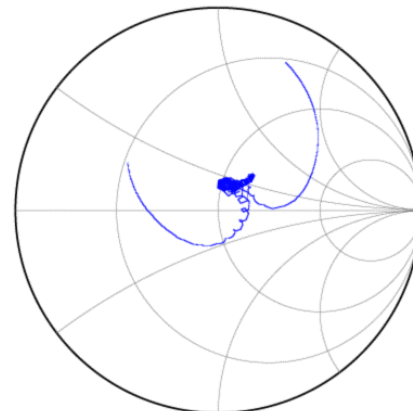
**Typical Performance (at +25°C)**



**Input Smith Chart**

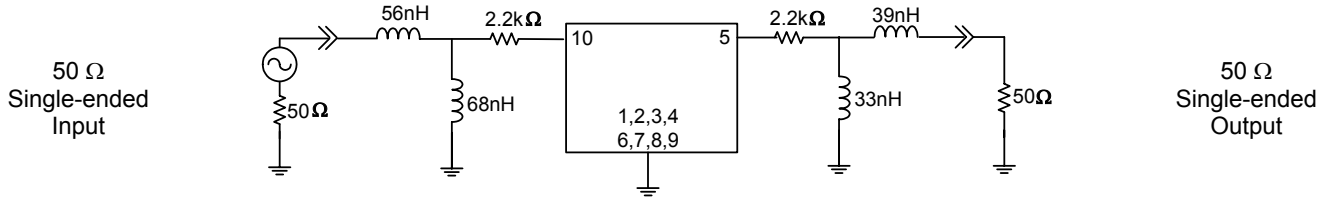


**Output Smith Chart**

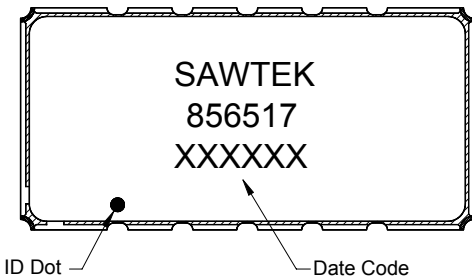


**Matching Schematics**

Actual matching values may vary due to PCB layout and parasitics

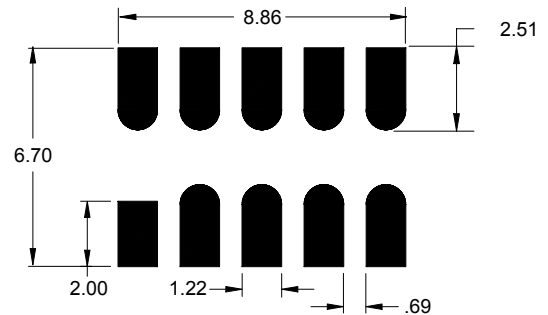


**Marking**



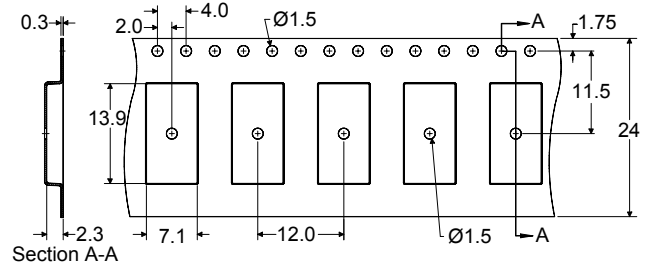
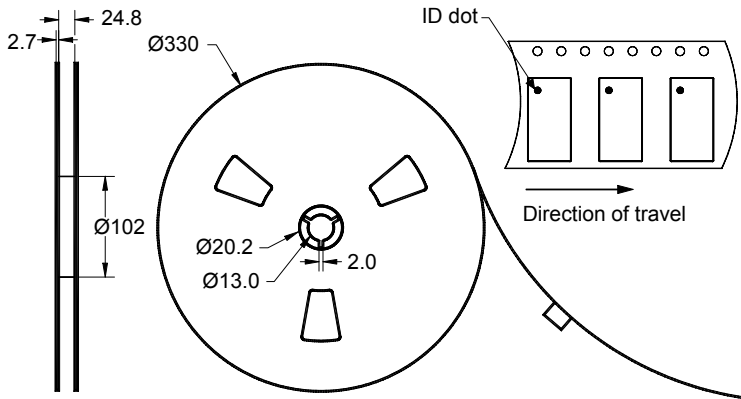
The date code consists of: day of the current year (Julian, 3 digits), last digit of the year (1 digit) and hour (2 digits)

**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	+80	°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 JEDEC J-STD-020C **Pb-free** process, **260°C** 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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