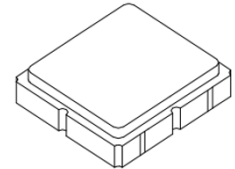


SF2170D

**165 MHz
SAW Filter**



SM3838-6

- **Low Insertion Loss**
- **3.8 X 3.8 X 1.0 mm Surface Mount Case**
- **Single-Ended Input/Output**
- **Complies with Directive 2002/95/EC (RoHS)**
- **Moisture Sensitivity Level: 1**

Absolute Maximum Ratings

| Rating | Value | Units |
|--|----------------|-------|
| Maximum Incident Power in Passband | +10 | dBm |
| Maximum DC Voltage Between any 2 Terminals | 30 | VDC |
| Storage Temperature Range in Tape and Reel | -40 to +85 | °C |
| Suitable for Lead-free Soldering - Maximum Soldering Profile | 260°C for 30 s | |

Electrical Characteristics

| Characteristic | Sym | Notes | Min | Typ | Max | Units |
|---|-------|-------|-----|------|-----|-------------------|
| Center Frequency | f_c | | | 165 | | MHz |
| Source Impedance to Matching Network (single ended) | | | | 50 | | Ω |
| Load Impedance to Matching Network (single ended) | | | | 50 | | Ω |
| Passband Width | | | 20 | 22 | | MHz |
| Rejection Referenced to Minimum Insertion Loss: | | | | | | dB |
| 10 MHz to 110 MHz | | | 35 | 40 | | |
| 127 MHz to 149 MHz | | | 10 | 15 | | |
| 190 to 210 MHz | | | 30 | 40 | | |
| 210 to 450 MHz | | | 40 | 45 | | |
| Maximum Insertion Loss | | | | 9 | 10 | dB |
| Insertion Loss Variation over -40 to 85 °C | | | | | 1 | dB |
| Amplitude Variation over 20 MHz Passband | | | | 1.0 | 1.5 | dB _{p-p} |
| Group Delay Variation over 20 MHz Passband | | | | 40 | 80 | ns _{p-p} |
| Absolute Group Delay at f_c | | | | 0.33 | | μ s |
| Input/Output Return Loss into Matching over 20 MHz BW | | | 6 | 8 | | dB |
| Operating Temperature | | | -40 | | +85 | °C |

| | |
|--|---|
| Case Style | SM3838-6 3.8 x 3.8 mm Nominal Footprint |
| Lid Symbolization (Y=year, WW=week, S=shift) dot=pin 1 indicator | 865, <u>YWWS</u> |

 **CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.**

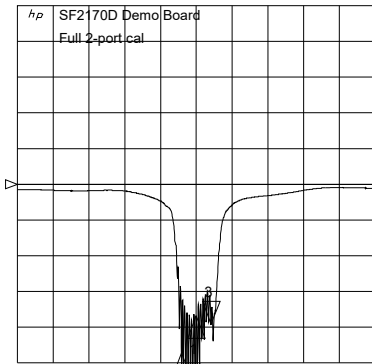
NOTES:

1. The design, manufacturing process, and specifications of this device are subject to change.
2. US or International patents may apply.
3. RoHS compliant from the first date of manufacture.

Broadband Filter Response and Return Loss (through matching network)

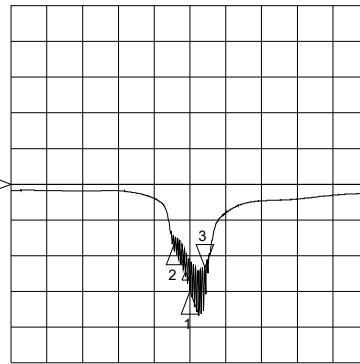
17 Sep 2008 06:49:06

CH1 LOG 5 dB/ REF 0 dB
S11 3 : 5.2056 dB 20 .000 000 MHz



CH1 Markers
Δ REF=2
mean : -20 .948 dB
s. dev : 5.2747 dB
p-p : 29.591 dB

CH3 LOG 5 dB/ REF 0 dB
S22 3 : -3.5658 dB 20 .000 000 MHz

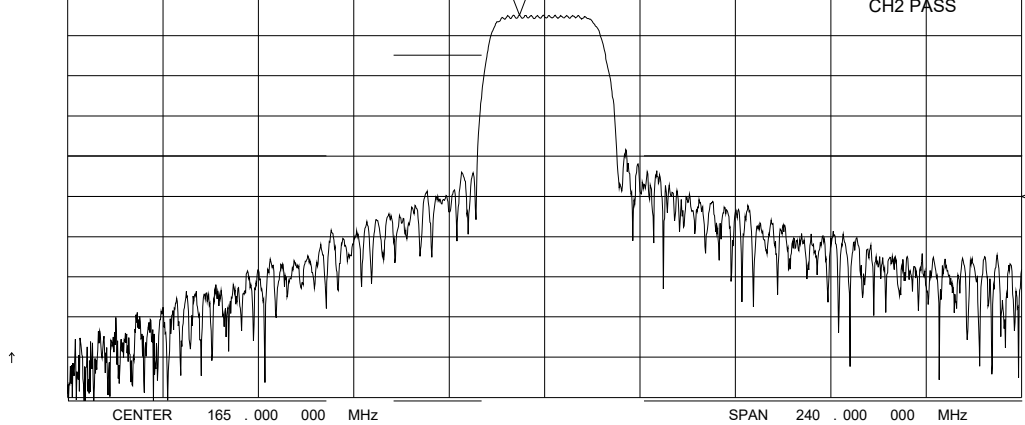


CH3 Markers
Δ REF=2
mean : -12 .005 dB
s. dev : 2.7750 dB
p-p : 11.003 dB

CENTR 165 .000 MHz Δ SPAN 240 .000 MHz

CENTR 165 .000 MHz SPAN 240 .000 MHz

CH2 S21 LOG 10 dB/ REF -55 dB 1 : -9.8909 dB 158 .700 000 MHz



Max

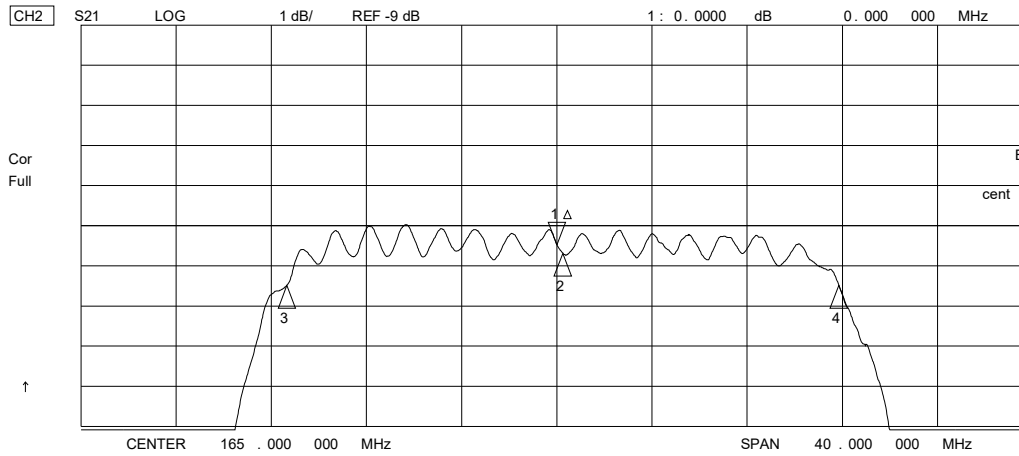
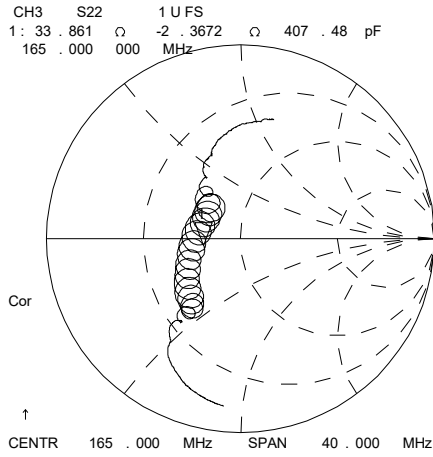
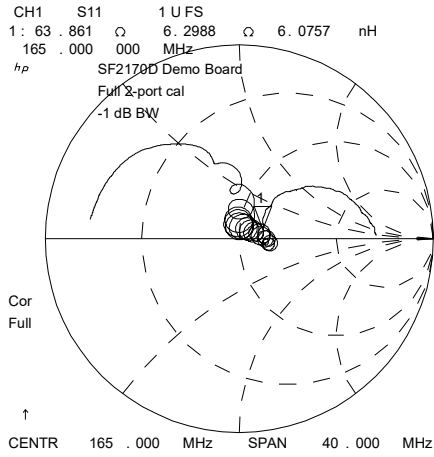
↑

CENTR 165 .000 000 MHz

SPAN 240 .000 000 MHz

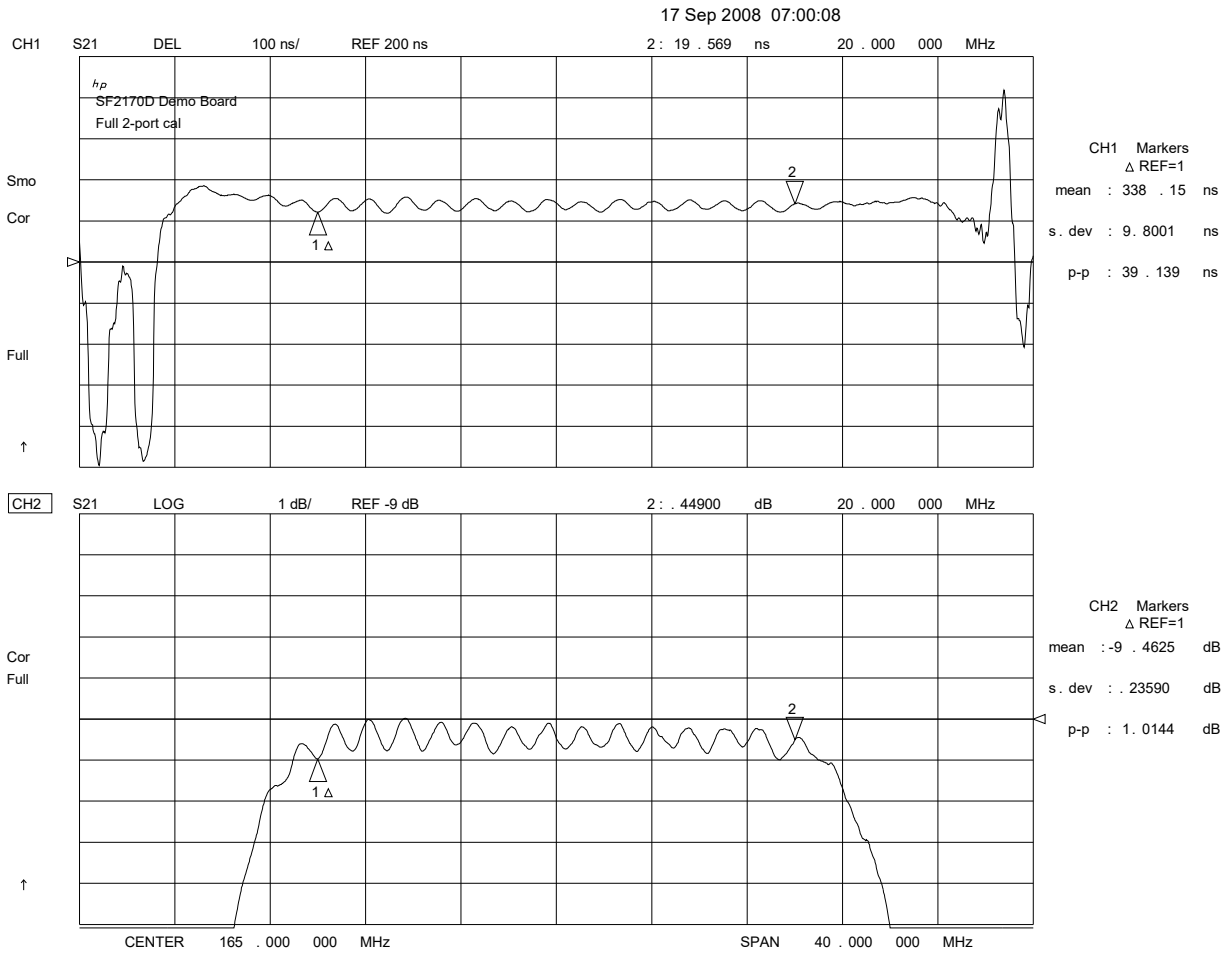
Passband Amplitude and Impedance Detail

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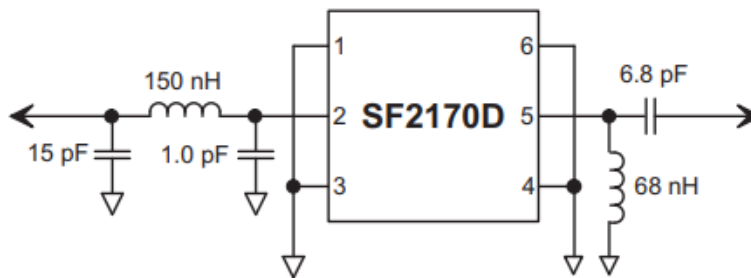


CH2 Markers
 Δ REF=1
 BW: 23 . 196777 MHz
 cent : 165 . 256979 MHz
 Q: 7 . 1241
 1 loss : -9 . 4834 dB

Passband Group Delay and Amplitude Ripple



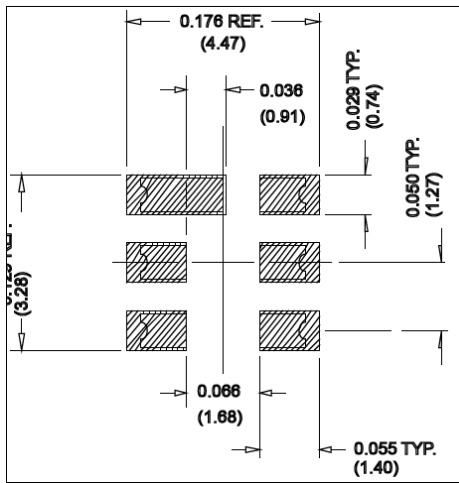
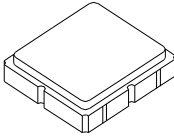
SF2170D Demo Circuit



SM3838-6 Case

6-Terminal Ceramic Surface-Mount Case

3.8 X 3.8 mm Nominal Footprint



PCB Footprint

| Case Dimensions | | | | | | |
|-----------------|------|------|------|--------|-------|-------|
| Dimension | mm | | | Inches | | |
| | Min | Nom | Max | Min | Nom | Max |
| A | 3.60 | 3.80 | 4.0 | 0.14 | 0.15 | 0.16 |
| B | 3.60 | 3.80 | 4.0 | 0.14 | 0.15 | 0.16 |
| C | 1.30 | 1.50 | 1.70 | 0.05 | 0.06 | 0.067 |
| D | 0.95 | 1.10 | 1.25 | 0.037 | 0.043 | 0.05 |
| E | 2.39 | 2.54 | 2.69 | 0.090 | 0.10 | 0.110 |
| G | 0.90 | 1.0 | 1.10 | 0.035 | 0.04 | 0.043 |
| H | 1.90 | 2.0 | 2.10 | 0.75 | 0.08 | 0.83 |
| I | 0.50 | 0.6 | 0.70 | 0.020 | 0.024 | 0.028 |
| J | 1.70 | 1.8 | 1.90 | 0.067 | 0.07 | 0.075 |

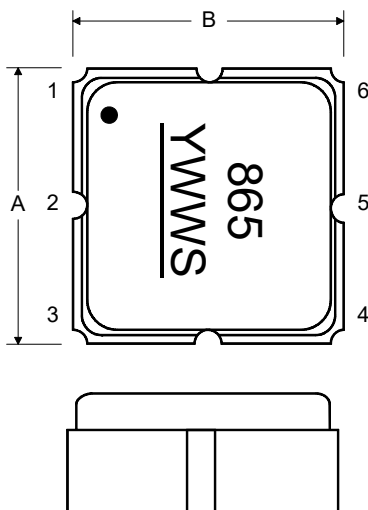
| Electrical Connections | | |
|------------------------|---------------------|------------|
| Connection | Terminals | |
| Port 1 | Single-ended Input | 2 |
| Port 2 | Single-ended Output | 5 |
| | Ground | All others |

Single Ended Operation Only

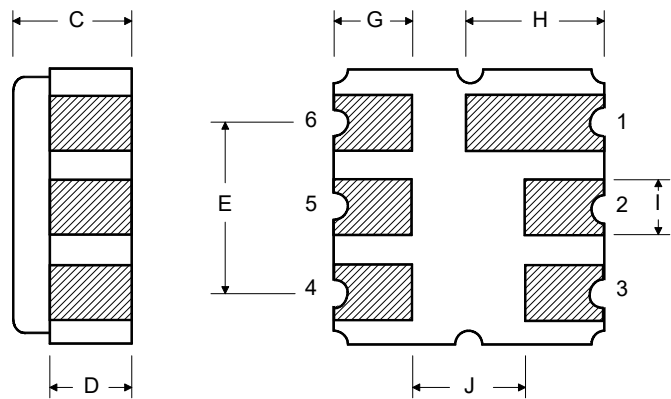
Dot indicates Pin 1

| Materials | |
|--------------------|--|
| Solder Pad Plating | 0.3 to 1.0 μm Gold over 1.27 to 8.89 μm Nickel |
| Lid Plating | 2.0 to 3.0 μm Nickel |
| Body | Al_2O_3 Ceramic |

TOP VIEW



BOTTOM VIEW



Recommended Reflow Profile

1. Preheating shall be fixed at 150~180°C for 60~90 seconds.
2. Ascending time to preheating temperature 150°C shall be 30 seconds min.
3. Heating shall be fixed at 220°C for 50~80 seconds and at 260°C +0/-5°C peak (10 seconds).
4. Time: 5 times maximum.

