

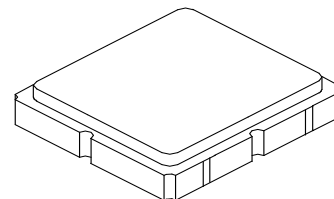
- **Low-loss RF SAW Filter**
- **Surface-mount 3.0 x 3.0 x 1.3 mm Package**
- **Complies with Directive 2002/95/EC (RoHS)**
- **AEC-Q200 Qualified**
- **Moisture Sensitivity Level: 1**

#### Absolute Maximum Ratings

| Rating                                                  | Value       | Units |
|---------------------------------------------------------|-------------|-------|
| Input Power Level                                       | 10          | dBm   |
| DC Voltage on any Non-ground Terminal                   | 3           | V     |
| Operating Temperature Range                             | -40 to +105 | °C    |
| Storage Temperature Range in Tape and Reel              | -40 to +85  | °C    |
| Usable Temperature Range                                | -40 to 125  | °C    |
| Solder Reflow Temperature, 10 seconds, 5 cycles maximum | 260         | °C    |

**SF2176E**

**433.92 MHz**  
**SAW Filter**



**SM3030-6**

#### Electrical Characteristics -40 to +85°C

| Characteristic                                                   | Sym                                     | Notes | Min | Typ    | Max | Units             |
|------------------------------------------------------------------|-----------------------------------------|-------|-----|--------|-----|-------------------|
| Center Frequency                                                 | F <sub>C</sub>                          |       |     | 433.92 |     | MHz               |
| Maximum Insertion Loss, 433.12 to 434.72 MHz                     | IL <sub>MAX</sub>                       |       |     | 2.2    | 2.9 | dB                |
| Amplitude Ripple, 433.12 to 434.72 MHz                           |                                         |       |     | 0.4    | 1.0 | dB <sub>p-p</sub> |
| VSWR, 433.12 to 434.72 MHz                                       |                                         |       |     | 1.6    | 2.0 |                   |
| Attenuation Referenced to 0 dB:                                  |                                         |       |     |        |     |                   |
| 10.00 to 380.00 MHz                                              |                                         |       | 58  | 61     |     | dB                |
| 380.00 to 423.42MHz                                              |                                         |       | 46  | 50     |     |                   |
| 443.42 to 453.42 MHz                                             |                                         |       | 25  | 30     |     |                   |
| 453.42 to 460.00 MHz                                             |                                         |       | 35  | 40     |     |                   |
| 460.00 to 700.00 MHz                                             |                                         |       | 50  | 54     |     |                   |
| 700.00 to 1000.00 MHz                                            |                                         |       | 42  | 46     |     |                   |
| Source Impedance                                                 | Z <sub>S</sub>                          |       |     | 50     |     | Ω                 |
| Load Impedance                                                   | Z <sub>L</sub>                          |       |     | 50     |     |                   |
| Case Style                                                       | SM3030-6 3.0 x 3.0 mm Nominal Footprint |       |     |        |     |                   |
| Lid Symbolization (Y=year, WW=week, S=shift) dot=pin 1 indicator | A09, YWWS                               |       |     |        |     |                   |



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

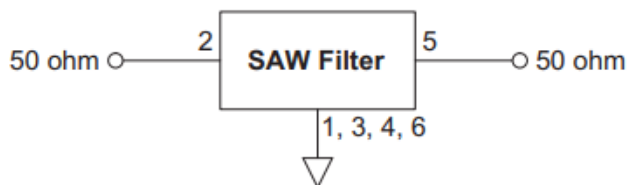
#### NOTES:

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.

## Electrical Characteristics -40 to +105°C

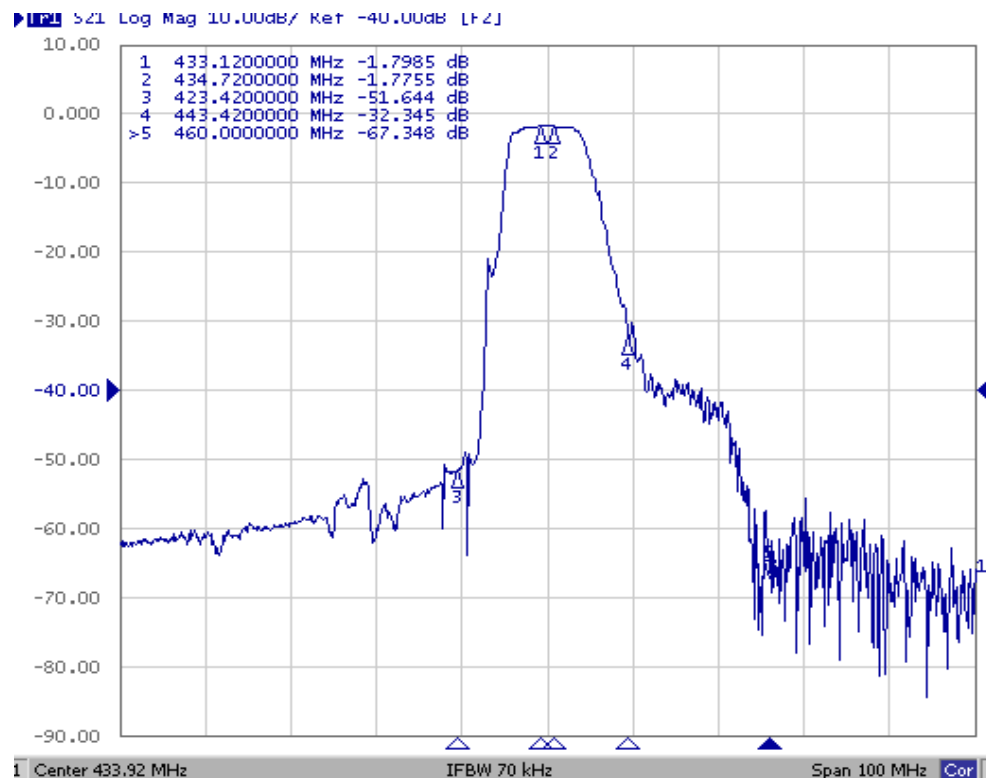
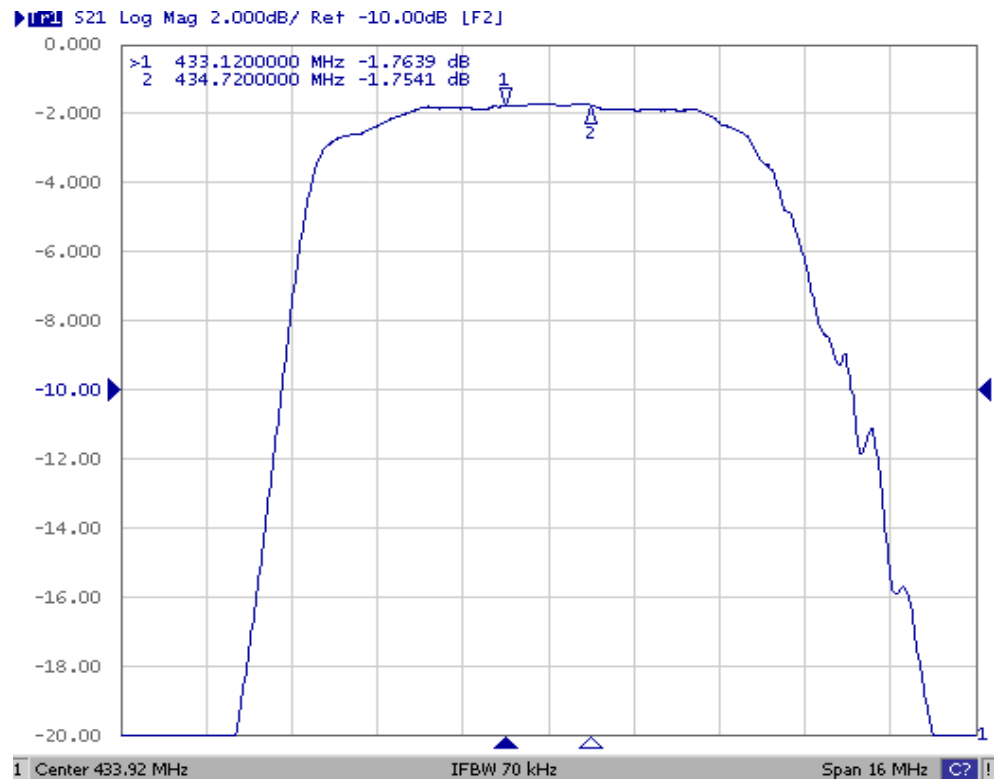
| Characteristic                               | Sym        | Notes | Min | Typ    | Max | Units             |
|----------------------------------------------|------------|-------|-----|--------|-----|-------------------|
| Center Frequency                             | $F_C$      |       |     | 433.92 |     | MHz               |
| Maximum Insertion Loss, 433.12 to 434.72 MHz | $IL_{MAX}$ |       |     | 2.2    | 3.2 | dB                |
| Amplitude Ripple, 433.12 to 434.72 MHz       |            |       |     | 0.4    | 1.4 | dB <sub>P-P</sub> |
| VSWR, S11 S22                                |            |       |     | 1.6    | 2.0 |                   |
| Attenuation Referenced to 0 dB:              |            |       |     |        |     |                   |
| 10.00 to 380.00 MHz                          |            |       | 58  | 61     |     | dB                |
| 380.00 to 423.42MHz                          |            |       | 46  | 50     |     |                   |
| 443.42 to 453.42 MHz                         |            |       | 12  | 30     |     |                   |
| 453.42 to 460.00 MHz                         |            |       | 35  | 40     |     |                   |
| 460.00 to 700.00 MHz                         |            |       | 50  | 54     |     |                   |
| 700.00 to 1000.00 MHz                        |            |       | 42  | 46     |     |                   |
| Source Impedance                             | $Z_S$      |       |     | 50     |     | $\Omega$          |
| Load Impedance                               | $Z_L$      |       |     | 50     |     |                   |

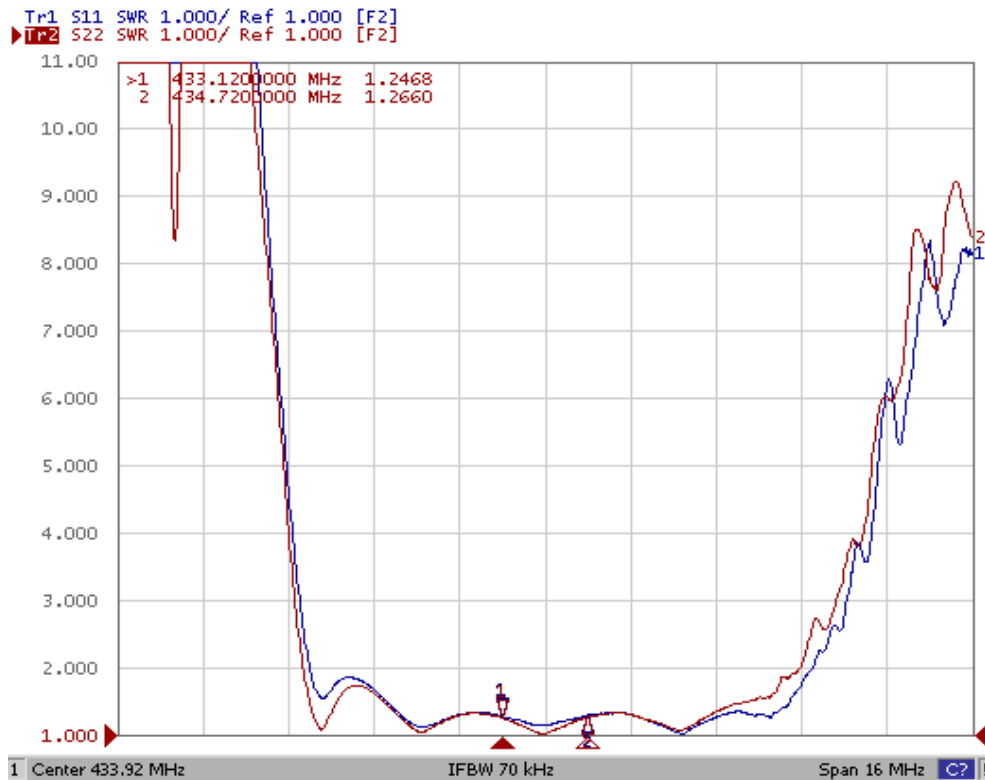
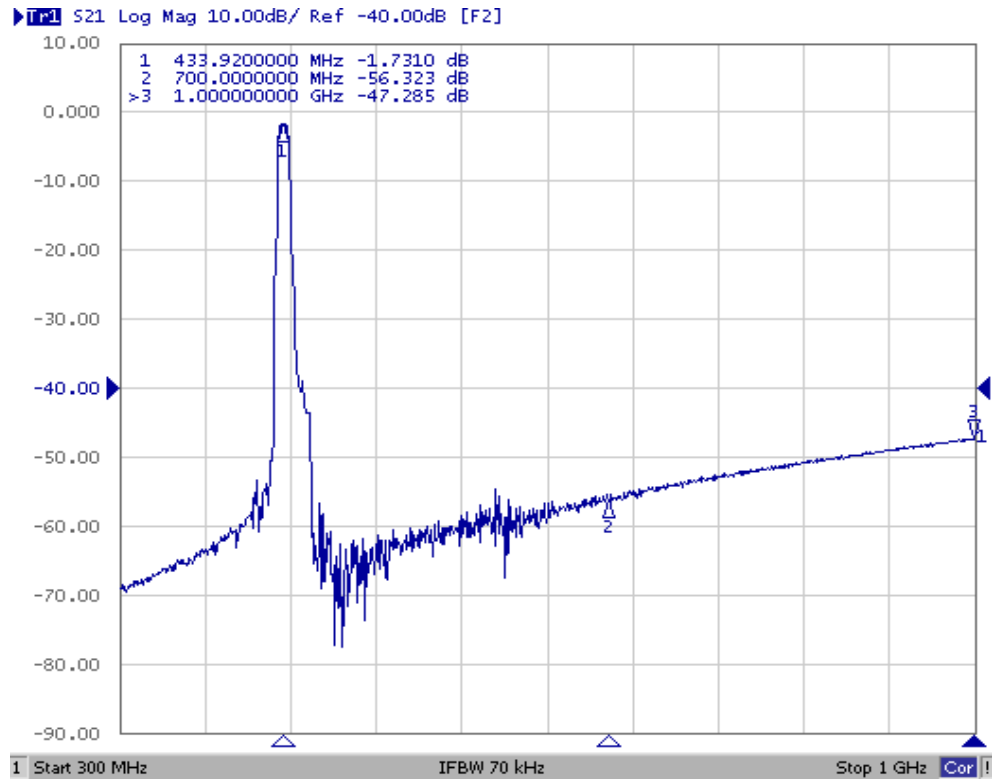
## Filter Test Circuit



| Connection | Terminals  |
|------------|------------|
| Input      | 2          |
| Output     | 5          |
| Ground     | All Others |

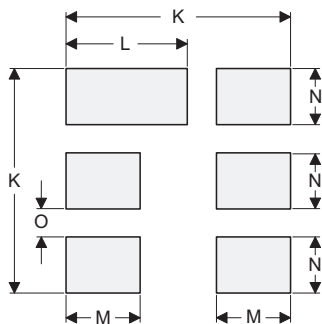
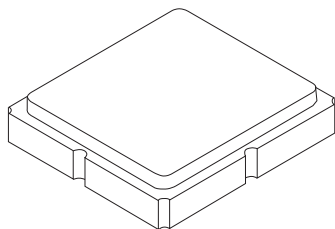
## Filter Response Plots





# SM3030-6 Case

## 6-Terminal Ceramic Surface-Mount Case 3.0 X 3.0 mm Nominal Footprint



PCB Footprint Top View

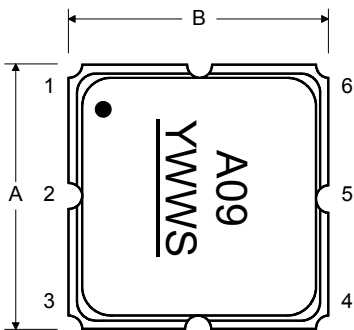
Case and PCB Footprint Dimensions

| Dimension | mm   |      |      | Inches |       |       |
|-----------|------|------|------|--------|-------|-------|
|           | Min  | Nom  | Max  | Min    | Nom   | Max   |
| A         | 2.87 | 3.00 | 3.13 | 0.113  | 0.118 | 0.123 |
| B         | 2.87 | 3.00 | 3.13 | 0.113  | 0.118 | 0.123 |
| C         | 1.12 | 1.25 | 1.38 | 0.044  | 0.049 | 0.054 |
| D         | 0.77 | 0.90 | 1.03 | 0.030  | 0.035 | 0.040 |
| E         | 2.67 | 2.80 | 2.93 | 0.105  | 0.110 | 0.115 |
| F         | 1.47 | 1.60 | 1.73 | 0.058  | 0.063 | 0.068 |
| G         | 0.72 | 0.85 | 0.98 | 0.028  | 0.033 | 0.038 |
| H         | 1.37 | 1.50 | 1.63 | 0.054  | 0.059 | 0.064 |
| I         | 0.47 | 0.60 | 0.73 | 0.019  | 0.024 | 0.029 |
| J         | 1.17 | 1.30 | 1.43 | 0.046  | 0.051 | 0.056 |
| K         |      | 3.20 |      |        | 0.126 |       |
| L         |      | 1.70 |      |        | 0.067 |       |
| M         |      | 1.05 |      |        | 0.041 |       |
| N         |      | 0.81 |      |        | 0.032 |       |
| O         |      | 0.38 |      |        | 0.015 |       |

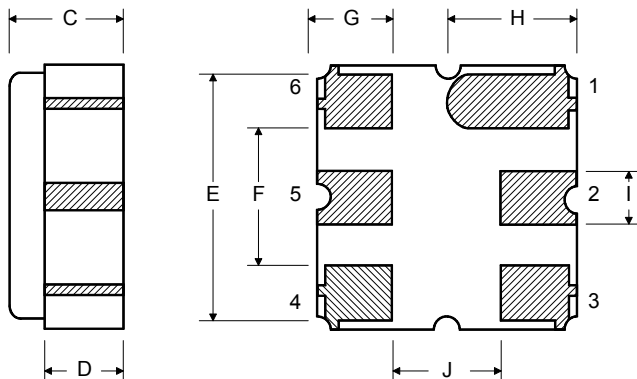
Case Materials

| Materials          |                                                          |
|--------------------|----------------------------------------------------------|
| Solder Pad Plating | 0.3 to 1.0 $\mu$ m Gold over 1.27 to 8.89 $\mu$ m Nickel |
| Lid Plating        | 2.0 to 3.0 $\mu$ m Nickel                                |
| Body               | Al <sub>2</sub> O <sub>3</sub> Ceramic                   |

TOP VIEW

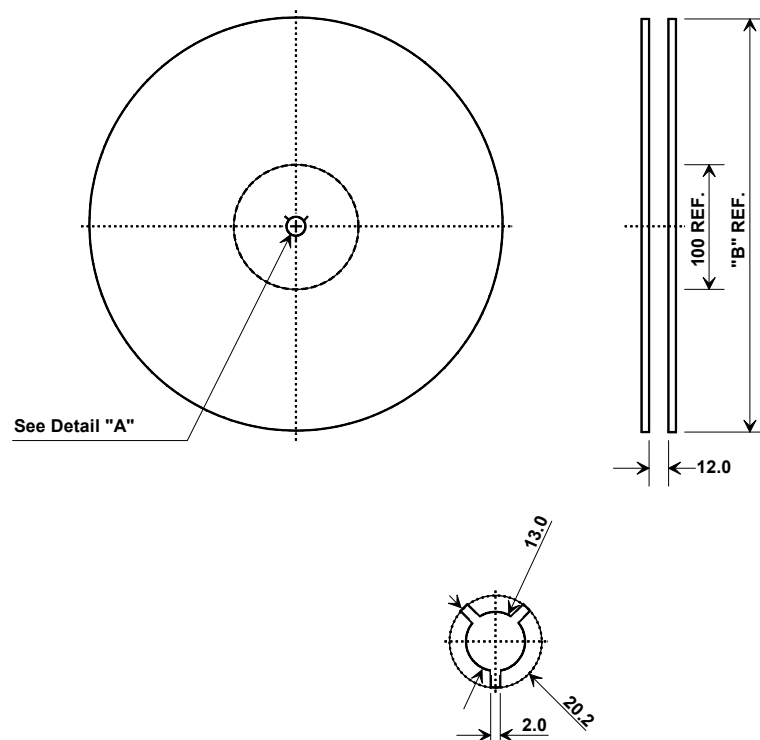


BOTTOM VIEW



---

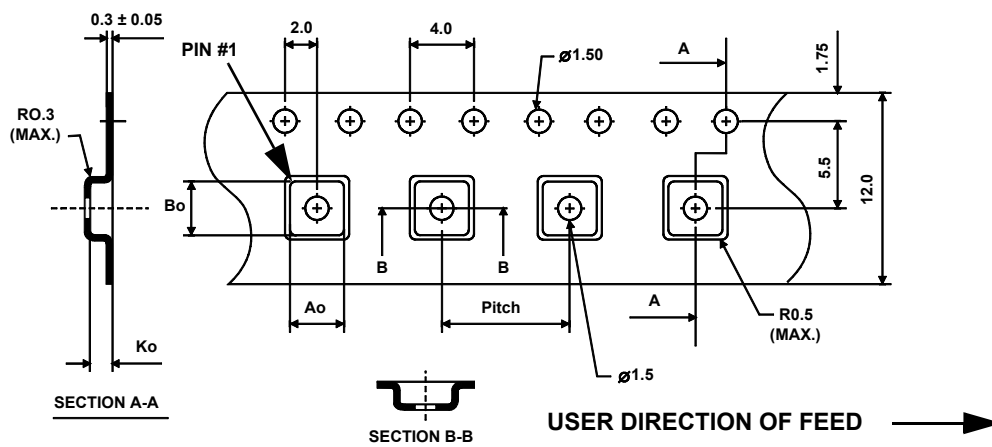
Tape and Reel Standard per ANSI/EIA-481



| “B”    |             | Quantity Per Reel |
|--------|-------------|-------------------|
| Inches | millimeters |                   |
| 7      | 178         | 500               |
| 13     | 330         | 3000              |

## COMPONENT ORIENTATION and DIMENSIONS

| Carrier Tape Dimensions |         |
|-------------------------|---------|
| Ao                      | 3.35 mm |
| Bo                      | 3.35 mm |
| Ko                      | 1.40 mm |
| Pitch                   | 8.0 mm  |
| W                       | 12.0 mm |



## 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.

