




**RF1211**

- **Ideal Front-End Filter for USA Automotive Wireless Receivers**
- **Low-Loss, Coupled-Resonator Quartz Design**
- **Simple External Impedance Matching**
- **Rugged TO39 Hermetic Package**
- **Complies with Directive 2002/95/EC (RoHS)** 

**315.0 MHz  
SAW Filter**

The RF1211 is a low-loss, compact, and economical surface-acoustic-wave (SAW) filter designed to provide front-end selectivity in 315.0 MHz receivers. Receiver designs using this filter include superhet with 10.7 MHz or 500 kHz IF, direct conversion and superregen. Typical applications of these receivers are wireless remote-control and security devices (especially for automotive keyless entry) operating in the USA under FCC Part 15, in Canada under DOC RSS-210, and in Italy.



This coupled-resonator filter (CRF) uses selective null placement to provide suppression, typically greater than 40 dB, of the LO and image spurious responses of superhet receivers with 10.7 MHz IF. RFM's advanced SAW design and fabrication technology is utilized to achieve high performance and very low loss with simple external impedance matching (not included). Quartz construction provides excellent frequency stability over a wide temperature range.

**Electrical Characteristics**

| Characteristic   |                                      | Sym             | Notes | Minimum                      | Typical   | Maximum  | Units               |
|--|--------------------------------------|-----------------|-------|------------------------------|-----------|----------|---------------------|
| Center Frequency at 25°C                                 | Absolute Frequency                   | $f_c$           | 1, 2  | 314.92                       | 315.00    | 315.080  | MHz                 |
|  | Tolerance from 315.0 MHz             | $\Delta f_c$    |       |                              |           | $\pm 80$ | dB                  |
| Insertion Loss   |                                      | IL              | 1     |                              | 1.7       | 3.0      | dB                  |
| 3 dB Bandwidth   |                                      | BW <sub>3</sub> | 1, 2  | 500                          | 700       | 800      | kHz                 |
| Rejection  | at $f_c - 21.4$ MHz (Image)          |                 | 1     | 40                           | 50        |          | dB                  |
|  | at $f_c - 10.7$ MHz (LO)             |                 |       | 15                           | 40        |          |                     |
|  | Ultimate                             |                 |       |                              | 80        |          |                     |
| Temperature  | Operating Case Temp.                 | $T_C$           | 3, 4  | -40                          |           | +85      | °C                  |
|  | Turnover Temperature                 | $T_O$           |       | 22                           | 37        | 52       | °C                  |
|  | Turnover Frequency                   | $f_O$           |       |                              | $f_c$     |          | MHz                 |
|  | Freq. Temp. Coefficient              | FTC             |       |                              | 0.032     |          | ppm/°C <sup>2</sup> |
| Frequency Aging  | Absolute Value during the First Year | fA              | 5     |                              | $\leq 10$ |          | ppm/yr              |
| External Impedance                                       | Series Inductance                    | L               | 1     | 86 nH (Pin 1), 82 nH (Pin 2) |           |          |                     |
|  | Shunt Capacitance                    | C               |       |                              | 9         |          | pF                  |
| Lid Symbolization (in addition to Lot and/or Date Codes) |                                      | RFM RF1211      |       |                              |           |          |                     |



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

**Notes:**

1. Unless noted otherwise, all measurements are made with the filter installed in the specified test fixture which is connected to a 50 Ω test system with VSWR ≤ 1.2:1. The test fixture L and C are adjusted for minimum insertion loss at the filter center frequency,  $f_c$ . Note that insertion loss, bandwidth, and passband shape are dependent on the impedance matching component values and quality.
2. The frequency  $f_c$  is defined as the midpoint between the 3dB frequencies.
3. Unless noted otherwise, specifications apply over the entire specified operating temperature range.
4. The turnover temperature,  $T_O$ , is the temperature of maximum (or turnover) frequency,  $f_O$ . The nominal frequency at any case temperature,  $T_C$ , may be calculated from:  $f = f_O [1 - FTC (T_O - T_C)^2]$ .
5. Frequency aging is the change in  $f_c$  with time and is specified at +65°C or less. Aging may exceed the specification for prolonged temperatures above +65°C. Typically, aging is greatest the first year after manufacture, decreasing significantly in subsequent years.
6. The design, manufacturing process, and specifications of this device are subject to change without notice.
7. One or more of the following U.S. Patents apply: 4,54,488, 4,616,197, and others pending.
8. All equipment designs utilizing this product must be approved by the appropriate government agency prior to manufacture or sale.

# 315.0 MHz

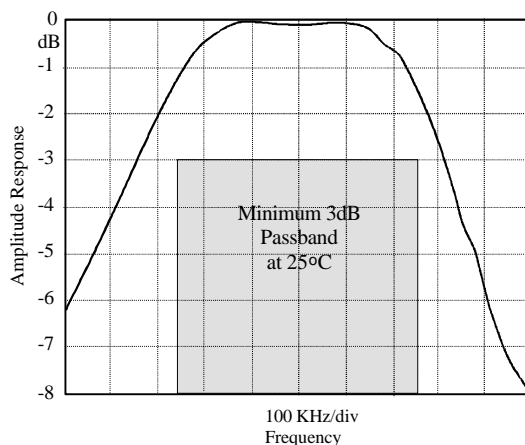
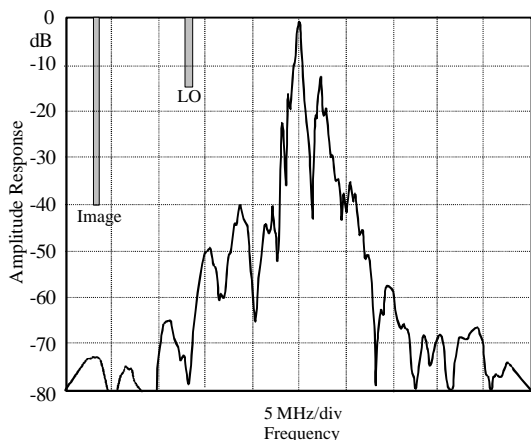
# SAW Filter

## Absolute Maximum Ratings

| Rating  | Value      | Units |
|---|------------|-------|
| Incident RF Power   | +13        | dBm   |
| DC Voltage Between Any Two Pins (Observe ESD Precautions) | ±30        | VDC   |
| Case Temperature <sup>5</sup>                             | -40 to +85 | °C    |
| Soldering Temperature (10 seconds/5 cycles Max)           | 260        | °C    |

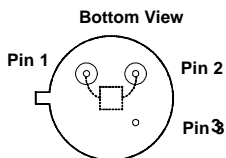
## Typical Filter Response

Typical filter responses are shown below. The actual response is dependent on external impedance matching and circuit layout. Illustrated frequencies and minimum rejection for LO and IMAGE are shown only for superhet receivers with 10.7 MHz IF.

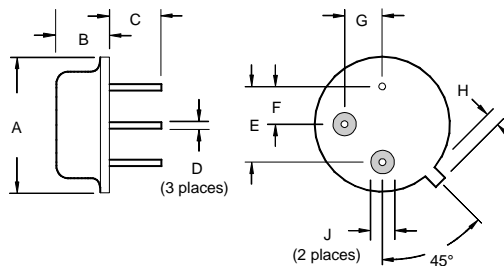


## Electrical Connections

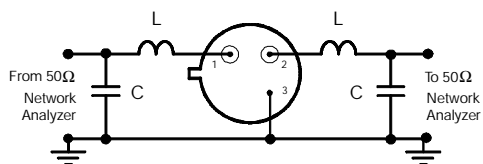
| Pin | Connection      |
|-----|-----------------|
| 1   | Input or Output |
| 2   | Output or Input |
| 3   | Case Ground     |



## Case Design



## Typical Test Circuit



| Dimensions | Millimeters  |      | Inches        |       |
|------------|--------------|------|---------------|-------|
|            | Min          | Max  | Min           | Max   |
| A          |              | 9.40 |               | 0.370 |
| B          |              | 3.18 |               | 0.125 |
| C          | 2.50         | 3.50 | 0.098         | 0.138 |
| D          | 0.46 Nominal |      | 0.018 Nominal |       |
| E          | 5.08 Nominal |      | 0.200 Nominal |       |
| F          | 2.54 Nominal |      | 0.100 Nominal |       |
| G          | 2.54 Nominal |      | 0.100 Nominal |       |
| H          |              | 1.02 |               | 0.040 |
| J          | 1.40         |      | 0.055         |       |