



RF3404

433.92 MHz SAW Filter

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

The RF3404 is a low-loss, compact and economical surface-acoustic-wave (SAW) filter designed to provide front-end selectivity in 433.92 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 operating in Europe under ETSI I-ETS 300 220.

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 Tolerance from 433.92 MHz | f_c | 1, 2 | | 433.92 | | MHz |
| | Δf_c | | | | ±80 | kHz |
| Insertion Loss | IL | 1 | | 3.5 | 5.0 | dB |
| 3 dB Bandwidth | BW ₃ | 1, 2 | 500 | 600 | 800 | kHz |
| Rejection at $f_c - 21.4$ MHz (Image) at $f_c - 10.7$ MHz (LO) Ultimate | | 1 | 40 | 50 | | dB |
| | | | 15 | 30 | | |
| | | | | 80 | | |
| Temperature Operating Case Temp. Turnover Temperature Turnover Frequency Freq. Temp. Coefficient | T_C | 3, 4 | -40 | | +85 | °C |
| | T_O | | 15 | 25 | 40 | °C |
| | f_O | | | f_c | | MHz |
| | FTC | | | | 0.032 | ppm/ °C ² |
| Frequency Aging Absolute Value during the First Year | fA | 5 | | ≤10 | | ppm/yr |
| External Impedance Series Inductance Shunt Capacitance | L | 1 | | 47 | | nH |
| | C | | | 11 | | pF |
| Lid Symbolization (in addition to Lot and/or Date Codes) | | | RFM RF3404 | | | |



CAUTION: Electrostatic Sensitive Device. Observe precautions for handling.

Notes:

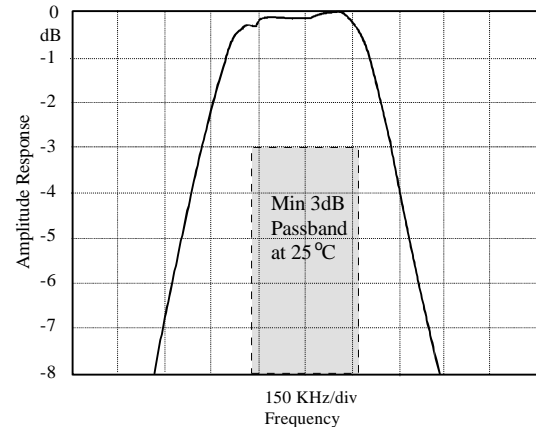
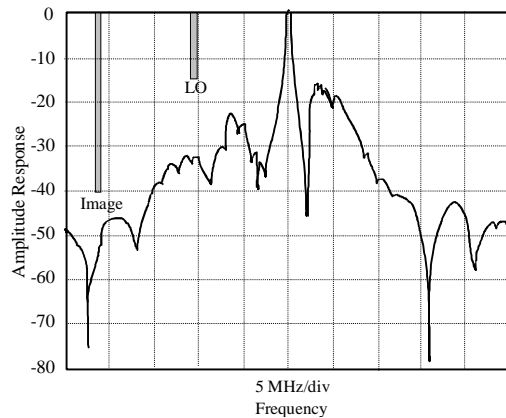
1. Unless noted otherwise, all measurements are made with the filter installed in the specified test fixture which is connected to a 50 Ω test system with VSWR ≤ 1.2:1. The test fixture L and C are adjusted for minimum insertion loss at the filter center frequency, f_c . Note that insertion loss, bandwidth, 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. Where noted, 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.

Absolute Maximum Ratings

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

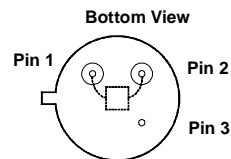
Typical Filter Response

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.

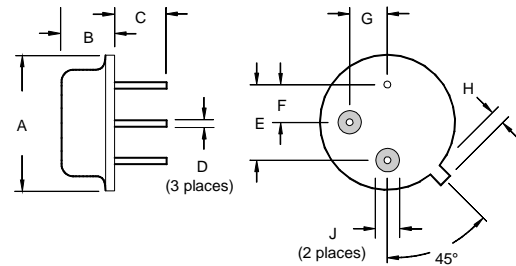


Electrical Connections

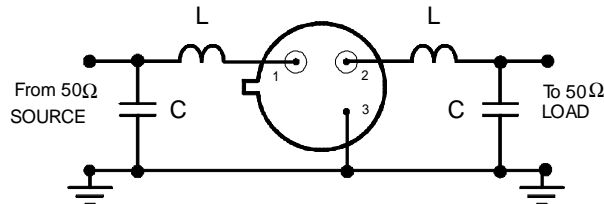
| Pin | Connection |
|-----|-----------------|
| 1 | Input or Output |
| 2 | Output or Input |
| 3 | Case Ground |



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 | |