

- **Ideal for European 868.35 MHz Transmitters**
- **Very Low Series Resistance**
- **Quartz Stability**

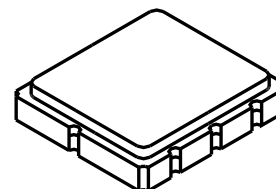
The RO3164C is a true one-port, surface-acoustic-wave (SAW) resonator in a surface-mount ceramic case. It provides reliable, fundamental-mode, quartz frequency stabilization of fixed-frequency transmitters operating at 868.35 MHz.

#### Absolute Maximum Ratings

Rating	Value	Units
Input Power Level	10	dBm
DC Voltage	12	VDC
Storage Temperature	-40 to +85	°C
Operating Temperature	-40 to +85	°C

**RO3164C**

**868.35 MHz  
SAW  
Resonator**



**SM5050-8 Case  
5 X 5**

#### Electrical Characteristics

Characteristic	Sym	Notes	Minimum	Typical	Maximum	Units
Frequency (+25 °C) Nominal Frequency RO3164C	$f_C$	2,3,4,5	868.150		868.550	MHz
Tolerance from 868.35 MHz RO3164C	$\Delta f_C$				$\pm 200$	kHz
Insertion Loss	IL	2,5,6		1.1	2.5	dB
Quality Factor	Unloaded Q	5,6,7		7000		
	50 $\Omega$ Loaded Q			671		
Temperature Stability	Turnover Temperature	6,7,8	10	25	40	°C
	Turnover Frequency			$f_C$		kHz
	Frequency Temperature Coefficient			0.032		ppm/°C <sup>2</sup>
Frequency Aging	Absolute Value during the First Year	fA	1	< $\pm 10$		ppm/yr
DC Insulation Resistance between Any Two Terminals		5	1.0			M $\Omega$
RF Equivalent RLC Model	Motional Resistance	5, 6, 7, 9		10.8		$\Omega$
	Motional Inductance			13.6		$\mu$ H
	Motional Capacitance			2.5		fF
	Shunt Static Capacitance	5, 6, 9		2.1		pF
Test Fixture Shunt Inductance	$L_{TEST}$	2, 7		16		nH
Lid Symbolization (in addition to Lot and/or Date Codes)	799 / YWW D					



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

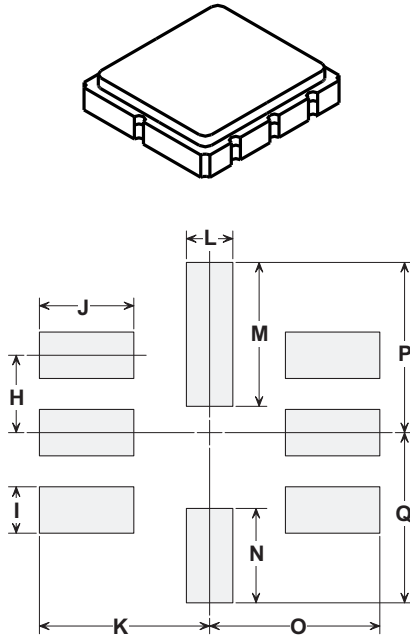
#### NOTES:

- 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 in subsequent years.
- The center frequency,  $f_C$ , is measured at the minimum insertion loss point,  $IL_{MIN}$ , with the resonator in the 50  $\Omega$  test system ( $VSWR \leq 1.2:1$ ). The shunt inductance,  $L_{TEST}$ , is tuned for parallel resonance with  $C_O$  at  $f_C$ . Typically,  $f_{OSCILLATOR}$  or  $f_{TRANSMITTER}$  is approximately equal to the resonator  $f_C$ .
- One or more of the following United States patents apply: 4,454,488 and 4,616,197.
- Typically, equipment utilizing this device requires emissions testing and government approval, which is the responsibility of the equipment manufacturer. Unless noted otherwise, case temperature  $T_C = +25^\circ\text{C} \pm 2^\circ\text{C}$ .
- The design, manufacturing process, and specifications of this device are subject to change without notice.
- Derived mathematically from one or more of the following directly measured parameters:  $f_C$ , IL, 3 dB bandwidth,  $f_C$  versus  $T_C$ , and  $C_O$ .
- 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:  $f = f_O [1 - FTC (T_O - T_C)^2]$ . Typically  $oscillator T_O$  is approximately equal to the specified  $resonator T_O$ .
- This equivalent RLC model approximates resonator performance near the resonant frequency and is provided for reference only. The capacitance  $C_O$  is the static (nonmotional) capacitance between the two terminals measured at low frequency (10 MHz) with a capacitance meter. The measurement includes parasitic capacitance with "NC" pads unconnected. Case parasitic capacitance is approximately 0.05 pF. Transducer parallel capacitance can be calculated as:  $C_P \approx C_O - 0.05 \text{ pF}$ .

# SM5050-8 Surface-Mount 8-Terminal Ceramic Case

## 5.0 X 5.0 mm Nominal Footprint

### Case Dimensions



PCB Footprint

Dimension	mm			Inches		
	Min	Nom	Max	Min	Nom	Max
A	4.80	5.00	5.20	0.189	0.197	0.205
B	4.80	5.00	5.20	0.189	0.197	0.205
C	1.30	1.50	1.70	0.050	0.060	0.067
D	1.98	2.08	2.18	0.078	0.082	0.086
E	1.07	1.17	1.27	0.042	0.046	0.050
F	0.50	0.64	0.70	0.020	0.025	0.028
G	2.39	2.54	2.69	0.094	0.100	0.106
H		1.27			0.050	
I		0.76			0.030	
J		1.55			0.061	
K		2.79			0.110	
L		0.76			0.030	
M		2.36			0.093	
N		1.55			0.061	
O		2.79			0.110	
P		2.79			0.110	
Q		2.79			0.110	

### Case Materials

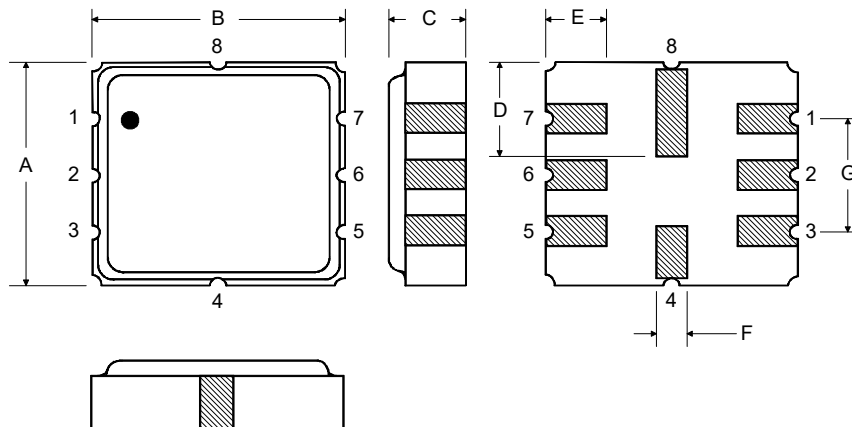
Materials	
Solder Pad Plating	0.3 to 1.0 $\mu$ m Gold over 1.27 to 8.89 $\mu$ m Nickel
Lid Plating	2.0 to 3.0 $\mu$ m Nickel
Body	Al <sub>2</sub> O <sub>3</sub> Ceramic
Pb Free	

### Electrical Connections

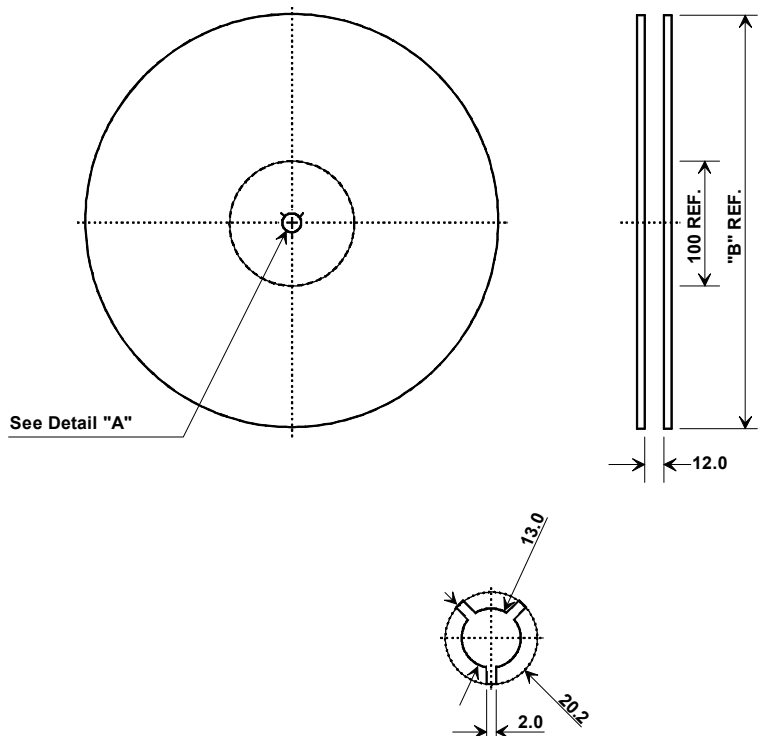
Connection		Terminals
Port 1	Input	2
Port 2	Output	6
	Ground	All others
Dot indicates Pin 1		

TOP VIEW

BOTTOM VIEW



## Tape and Reel Specifications



"B"		Quantity Per Reel
Inches	millimeters	
7	178	500
13	330	3000

## COMPONENT ORIENTATION and DIMENSIONS

Carrier Tape Dimensions	
Ao	5.3 mm
Bo	5.3 mm
Ko	2.0 mm
Pitch	8.0 mm
W	12.0 mm

COVER TAPE SIZE

