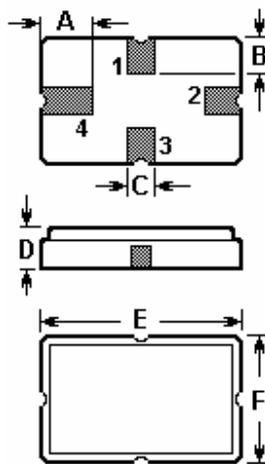


### Features

- 1-port Resonator
- Provides reliable, fundamental mode, quartz frequency stabilization i.e. in transmitters or local oscillators
- **Surface Mounted Technology (SMT)**
- Lead-free production and RoHS compliance

### Package Dimensions

Ceramic Package: QCC4A



Pin		Configuration	
1		Input / Output	
3		Output / Input	
2/4		Case Ground	
Sign	Data (unit: mm)	Sign	Data (unit: mm)
A	1.2	D	1.4
B	0.8	E	5.0
C	0.5	F	3.5

### Marking

## LGE R4003

Laser Marking

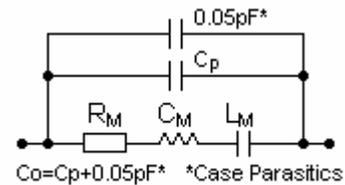
Top View, Laser Marking

"LGE": Manufacturer's mark

"R": SAW resonator

"4003": Part number

### Equivalent LC Model



Code	1	2	3	4	5	6	7	8	9	10	11	12
2009	A	B	C	D	E	F	G	H	J	K	L	M
2010	N	P	Q	R	S	T	U	V	W	X	Y	Z
2011	a	b	c	d	e	f	g	h	i	j	k	m
2012	n	p	q	r	s	t	u	v	w	x	y	z

### Maximum Ratings

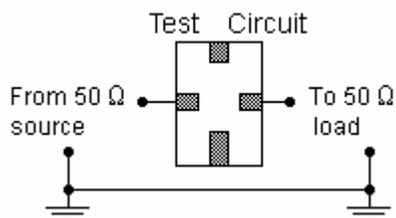
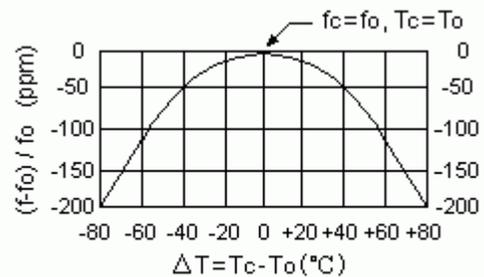
Rating	Value	Unit
CW RF power dissipation	$P$	0
DC voltage between any terminals	$V_{DC}$	$\pm 30$
Operating temperature range	$T_A$	$-40 \sim +85$
Storage temperature range	$T_{stg}$	$-40 \sim +85$

**Electrical Characteristics**

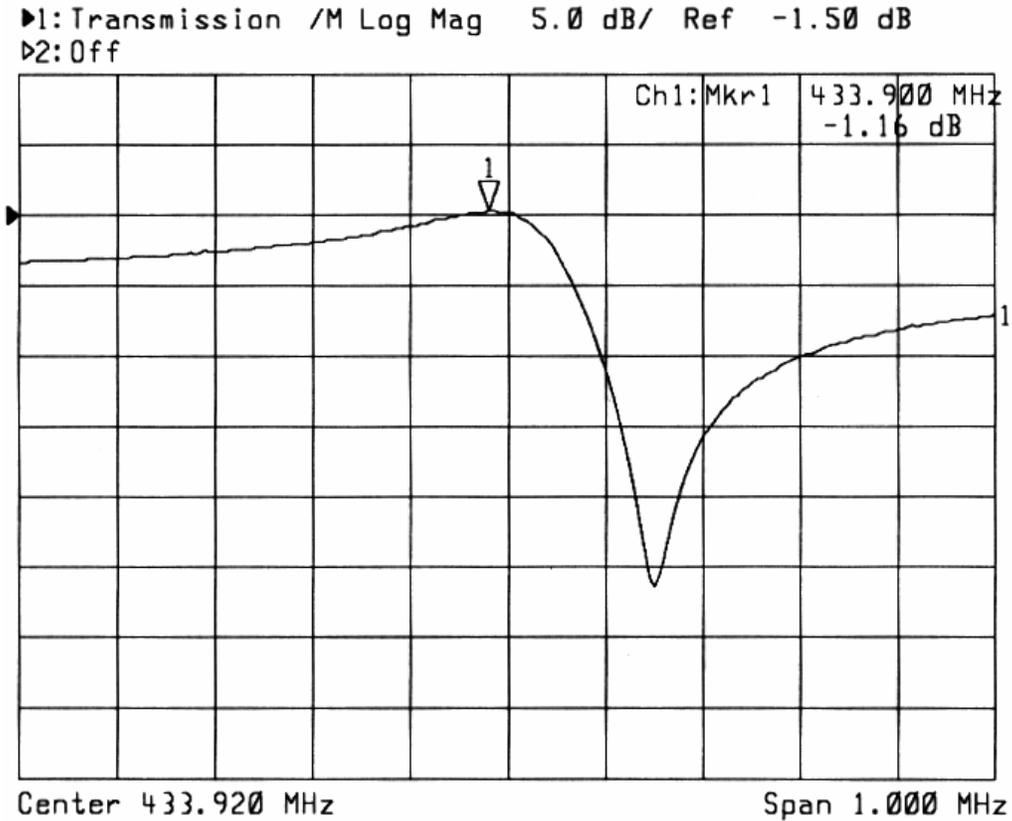
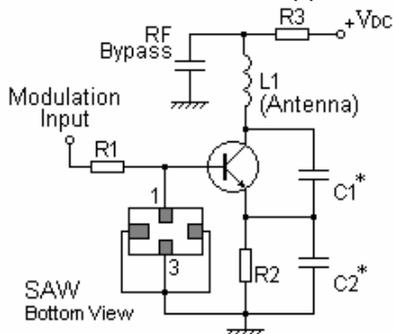
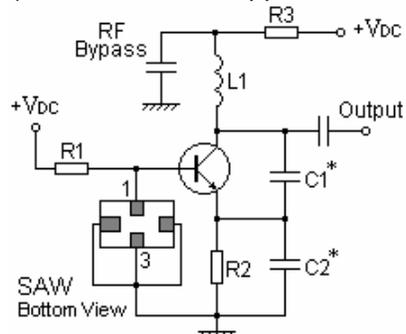
Characteristic		Sym	Minimum	Typical	Maximum	Unit
Center Frequency (+25°C)	Absolute Frequency	$f_c$	433.845		433.995	MHz
	Tolerance from 433.920 MHz	$\Delta f_c$		$\pm 75$		kHz
Insertion Loss		$I_L$		1.5	2.0	dB
Quality Factor	Unloaded Q	$Q_U$		9,000		
	50 $\Omega$ Loaded Q	$Q_L$		1,500		
Temperature Stability	Turnover Temperature	$T_0$	25		55	°C
	Turnover Frequency	$f_0$		$f_c$		kHz
	Frequency Temperature Coefficient	FTC		0.032		ppm/°C <sup>2</sup>
Frequency Aging	Absolute Value during the First Year	$ f_A $		$\leq 10$		ppm/yr
DC Insulation Resistance Between Any Two Terminals				1.0		M $\Omega$
RF Equivalent RLC Model	Motional Resistance	$R_M$		19	26	$\Omega$
	Motional Inductance	$L_M$		65.5042		$\mu$ H
	Motional Capacitance	$C_M$		2.0559		fF
	Shunt Static Capacitance	$C_0$	1.9	2.2	2.5	pF

 **RoHS Compliant**
 **Electrostatic Sensitive Device**

1. Unless noted otherwise, case temperature  $T_C = +25^\circ\text{C} \pm 2^\circ\text{C}$ .
2. The center frequency,  $f_c$ , is measured at the minimum insertion loss point with the resonator in the 50 $\Omega$  test system.
3. 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.
4. Turnover temperature,  $T_0$ , is the temperature of maximum (or turnover) frequency,  $f_0$ . The nominal frequency at any case temperature,  $T_C$ , may be calculated from:  $f = f_0 [1 - \text{FTC} (T_0 - T_C)^2]$ .
5. This equivalent RLC model approximates resonator performance near the resonant frequency and is provided for reference only. The capacitance  $C_0$  is the static capacitance between the two terminals measured at low frequency (10MHz) with a capacitance meter. The measurement includes case parasitic capacitance.

**Test Circuit**

**Temperature Characteristics**


The curve shown above accounts for resonator contribution only.

**Typical Frequency Response**

**Typical Application Circuits**
**1) Low-Power Transmitter Application**

**2) Local Oscillator Application**


**Stability Characteristics**

	Test item	Condition of test
1	Mechanical shock	(a) Drops: 3 times on concrete floor (b) Height: 1.0 m
2	Vibration resistance	(a) Frequency of vibration: 10~55Hz (c) Directions: X,Y and Z (b) Amplitude: 1.5 mm (d) Duration: 2 hours
3	Moisture resistance	(a) Condition: 40°C, 90~95% R.H. (c) Wait 4 hours before measurement (b) Duration: 96 hours
4	Climatic sequence	(a) +70°C for 16 hours (c) -25°C for 2 hours (e) Wait 4 hours before measurement (b) +55°C for 24 hours, 90~95% R.H. (d) +40°C for 24 hours, 90~95% R.H.
5	High temperature exposure	(a) Temperature: 70°C (c) Wait 4 hours before measurement (b) Duration: 250 hours
6	Thermal impact	(a) +70°C for 30 minutes ⇒ -25°C for 30 minutes repeated 3 times (b) Wait 4 hours before measurement

**Requirements:** The SAW resonator shall remain within the electrical specifications after tests.

**Remarks**

- SAW devices should not be used in any type of fluid such as water, oil, organic solvent, etc.
- Be certain not to apply voltage exceeding the rated voltage of components.
- Do not operate outside the recommended operating temperature range of components.
- Sudden change of temperature shall be avoided, deterioration of the characteristics can occur.
- Be careful of soldering temperature and duration of components when soldering.
- Do not place soldering iron on the body of components.
- Be careful not to subject the terminals or leads of components to excessive force.
- SAW devices are electrostatic sensitive. Please avoid static voltage during operation and storage.
- Ultrasonic cleaning shall be avoided. Ultrasonic vibration may cause destruction of components.