




Data Sheet



Product Category: SMD Quartz Crystal

Series Number	Package	Description	Last Modified
223	SMD	32.768 KHz Crystal	Jan. 01 2008

## FEATURES

- Low profile
- Tape & Reel
- Long term stability
- Industry standard footprint
- Excellent shock resistance
- Excellent environmental characteristics
- RoHs / Lead Free compliant 



## OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

PARAMETERS		CHARACTERISTICS	UNITS
Nominal Frequency	$f_0$	32.768 (typ.)	KHz
Calibration Tolerance	@25°C	±20	PPM
Turnover Temperature	$T_0$	+25 ±5	°C
Operating Temperature	$T_{OPR}$	-40 ~ +85	°C
Storage Temperature	$T_{STG}$	-55 ~ +125	°C
Equivalent Series Resistance	$R_1$	50 max.	Kohm
Load Capacitance	$C_L$	12.5 (typ.) / 6.0 (Optional)	pF
Motional Capacitance	$C_1$	0.003 (typ.)	pF
Shunt Capacitance	$C_0$	1.35 (typ.)	pF
Temperature Coefficient	-	-0.040 PPM / °C <sup>2</sup> max.	PPM/(ΔC°)
Drive Level	$D_L$	1 max.	μW
Insulation Resistance	IR	500 min. DC 100V	Mohm
Aging (First Year)	@25°C	±3 PPM max.	PPM
Q Factor	Q	50,000 min.	-

**PACKAGE DIMENSIONS (mm)**

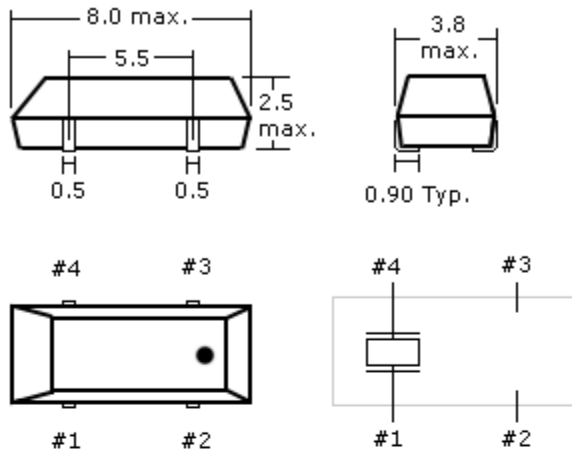


Figure 1) Pin Connection

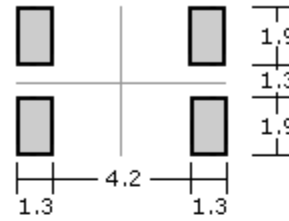
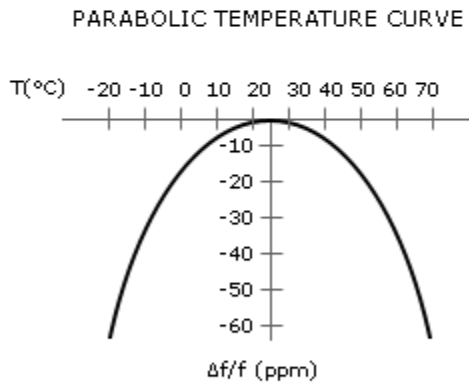
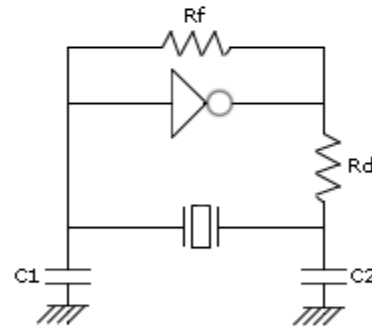


Figure 2) Land Pattern - Top View



To determine frequency stability, use parabolic curvature.  
 For example: What is the stability at 45°C?  
 1) Change in T(°C) = 45 - 25 = 20°C  
 2) Change in frequency =  $-0.04\text{ppm} \times (\Delta T)^2$   
 $= -0.04\text{ppm} \times (20)^2$   
 $= -16.0\text{ppm}$

**RECOMMENDED OSCILLATION CIRCUIT**



**ELECTRICAL CHARACTERISTICS**

IC: TC 4069P  
 Rf: 10 Megohms  
 Rd: 330 Kohms (As required)  
 C1 = 22pF, C2 = 22pF  
 Vdd = 3.0V

In this circuit, low drive level with a maximum of 1uW is recommended. If excessive drive is applied, irregular oscillation or quartz element fractures may occur.

**PART NUMBER GUIDE**

Size	Frequency	Load Capacitance	Part Number	Option	Packaging
SMD	32.768	12.5	<b>223-000312-20</b>	Blank* = RoHs / Lead Free compliant -LF = RoHs / Lead Free compliant *ALL parts are RoHS / Lead Free as of Jan 2006.	Blank* = Bulk -TR = Tape and Reel
		6.0	<b>223-000306-20</b>		

**NOTE:** - Deviations on all parameters available. Please consult Oscilent for details.

**DEFINITIONS:** - Click on the characteristic names above, for definitions of the particular characteristic.

**\*STANDARDS:** - "Blank" part number selections, indicate standard variables for the particular characteristic.

**Oscilent Corporation** - CALL **949.252.0522**

**Series No.:** 223

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