

Package	Description	Last Modified
SMD	32.768 kHz Crystal	Jan. 01 2008

## Features

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

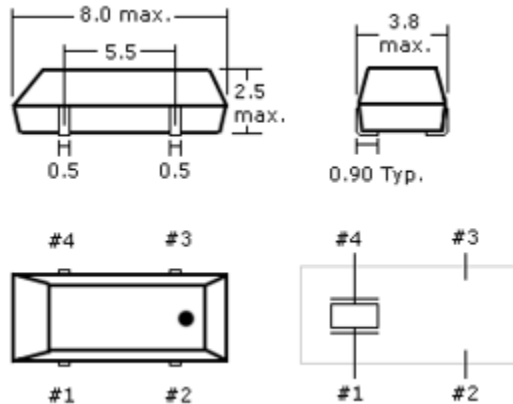
## Electrical Characteristics

Parameter	Conditions	Characteristics	Units
Nominal Frequency	f <sub>0</sub>	32.768	kHz
Calibration Tolerance	@25°C	±20	PPM
Turnover Temperature	T <sub>0</sub>	+25 ±5	°C
Operating Temperature	T <sub>OPR</sub>	-40 ~ +85	°C
Storage Temperature	T <sub>STG</sub>	-55 ~ +125	°C
Equivalent Series Resistance	R <sub>1</sub>	50 max.	kohm
Load Capacitance	C <sub>L</sub>	12.5 (typ.) / 6.0 (Optional)	pF
Motional Capacitance	C <sub>1</sub>	0.003 (typ.)	pF
Shunt Capacitance	C <sub>0</sub>	1.35 (typ.)	pF
Temperature Coefficient	-	-0.040 PPM / °C <sup>2</sup> max.	PPM/( °C <sup>2</sup> )
Drive Level	DL	1 max.	μW
Insulation Resistance	IR <sub>c</sub>	500 min. DC 100V	Mohm
Aging (First Year)	@25°C	±3 PPM max.	PPM
Q Factor	Q	50,000 min.	-

## Part Numbering Guide

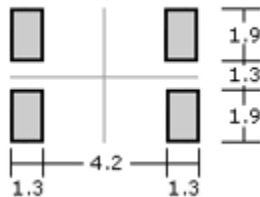
Size	Frequency	Load Capacitance	Part Number	Option	Packaging
SMD	32.768kHz	12.5	223-000312-20	Blank* = RoHs / Lead Free compliant -LF = RoHs / Lead Free compliant	Blank* = Bulk -TR = Tape and Reel
		6.0	223-000306-20		
<p><b>NOTE:</b> - Deviations on all parameters available. Please consult Oscilent for details.  <b>*STANDARDS:</b> - "Blank" part number selections, indicate standard variables for the particular characteristic.</p>					

## Package Dimensions



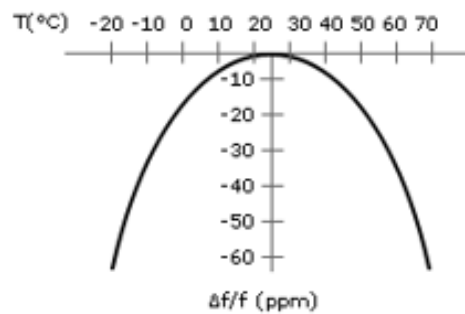
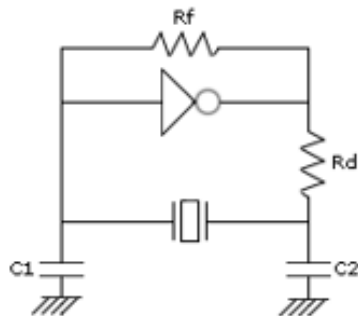
## Recommended Solder Pad Dimensions

(All Dimensions in Millimeters)



## Recommended Oscillation Circuit

## Parabolic Temperature Curve



### 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.

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 =  $-0.04\text{ppm} \times (\Delta T)^2$   
 $= -0.04\text{ppm} \times (20)^2$   
 $= -16.0\text{ppm}$

## Tape & Reel

- 1000 pieces per reel
- Compliant to EIA-481
- All Dimensions in Millimeters

