OSCILENT Corporation **Data Sheet**

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BACK

Product Category: Quartz Crystal

Series Number	Package	Description	Last Modified
111 ~ 113	3x8, 2x6, 1.5x5	32.768 KHz Tuning Fork	July. 01 2005

Quartz Crystal FEATURES

- Excellent resistance and environmental characteristics
- Tight tolerance
- Long term stability
- Cost effective
- 3 available packages
- See Oscilent 223 series for surface mount version
- RoHs / Lead Free compliant

OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

PARAMETERS		111 Series	112 Series	113 Series	UNITS
Size (Figure No.)	-	3x8 (Fig. 1)	2x6 (Fig. 2)	1.5x5 (Fig. 3)	-
Frequency Range	f_O	32.768			KHz
Frequency Tolerance	Δf/fo	±10 or ±20			PPM
Load Capacitance (typ.)	C_L	12.5 (typ.) / 6.0 (optional)		8.0 (typ.)	pF
Drive Level (max.)	D_L	1.0 ± 0.2			µW
Resistance (at Series Resonance)	R_1	30 max.	40 max.		Kohm
Q-Factor	Q	80,000 (typ.), 50,000 min.	70,000 (typ.), 40,000 min.	80,000 (typ.)	-
Turnover Temperature	T_M	+25 ±5			°C
Parabolic Curveture Constant	-	-0.036 ± 0.006			PPM/°C°
Shunt Capacitance	C_o	1.30 (typ.), 2.0 max.	1.10 (typ.), 1.8 max.	1.0 (typ.)	pF
Capacitance Ratio	-	530 (typ.), 650 max.	470 (typ.), 650 max.	400 (typ.)	-
Operating Temperature	T_{OPR}	-10~+60			°C
Storage Temperature	T_{STG}	-20~+70			°C
Shock Resistance	-	Drop test 3 times on hard wooden board fr. height 75cm/±3 PPM max.			PPM
Insulation Resistance	IR	500 Mohm min./DC100V			Mohm

PACKAGE DIMENSIONS (mm)

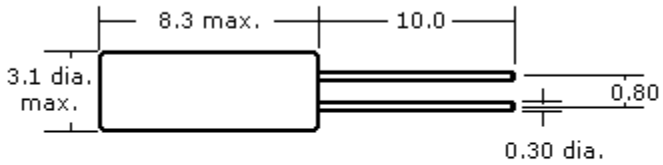


Figure 1) 3x8mm

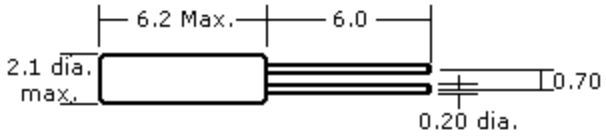


Figure 2) 2x6mm

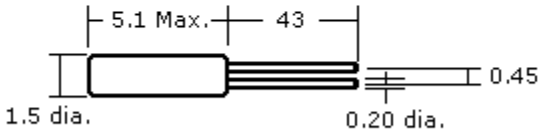
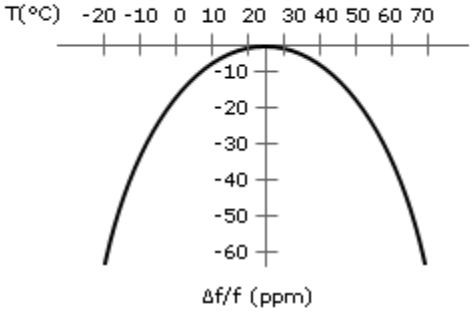


Figure 3) 1.5x5mm

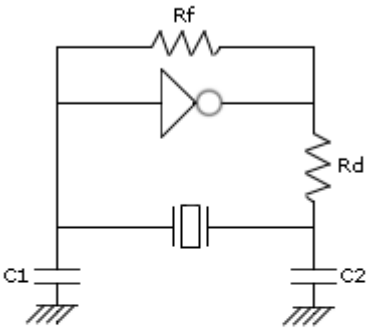
PARABOLIC TEMPERATURE CURVE



To determine frequency stablitiy, 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 = -0.04ppm x $(\Delta T)^2$
= -0.04ppm x $(20)^2$
= -16.0ppm

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	Figure No.	Frequency	Load Capacitance	Frequency Tolerance	Part Number	Packaging**

3x8	1	32.768 KHz	12.5 pF	±10	111-000312-10	Blank* = Bulk -TR = Tape/ Reel
				±20	111-000312-20	
			6.0 pF	±10	111-000306-10	
				±20	111-000306-20	
2x6	2		12.5 pF	±10	112-000312-10	
				±20	112-000312-20	
			6.0 pF	±10	112-000306-10	
				±20	112-000306-20	
1.5x5	3		8.0 pF (typ.) or Specify	±10	113-000308-10	
				±20	113-000308-20	

NOTE: Deviations on all parameters available. Please consult Oscilent for details.
DEFINITIONS: Click on the characteristic names above for definitions of that particular characteristic.
***STANDARDS:** "Blank" part number selections indicate standard variables for that particular characteristic.
****PACKAGING:** Click on the packaging name above for tape/reel specifications

Series No.: 111 to 113

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