







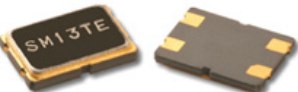
Pletronics

Crystal Selection Guide

LOWEST COST SOLUTIONS

RoHS 6/6 Compliant

	Package	Series	Frequency Range	Package Size
THRU-HOLE		MP49	1.8 MHz–210 MHz ◆ <u>Lowest cost thru-hole package</u> ◆ 3rd and 5th overtones available	4.47 x 10.8 x 13.21h mm
		LP21 LP24 LP49	3.2 MHz–70 MHz ◆ Leaded version of the SM25, SM30, SM42 ◆ 3rd overtone available	LP21: 4.47 x 10.8 x 2.1h mm LP24: 4.47 x 10.8 x 2.5h mm LP49: 4.47 x 10.8 x 3.56h mm
		UM1 UM4 UM5	10 MHz–150 MHz ◆ 3rd and 5th overtones available ◆ Gull wing available	UM1: 3.2 x 9.0 x 8.1h mm UM4: 3.2 x 9.0 x 4.8h mm UM5: 3.2 x 9.0 x 6.0h mm
METAL SMD		SM25 SM30 SM42	3.0 MHz–70 MHz ◆ <u>Lowest cost metal surface mount package</u> ◆ Rugged reliable package ◆ Lowest frequencies not available in minimum height package	SM25: 5.0 max x 13.5 max x 2.9h mm SM30: 5.0 max x 13.5 max x 3.5h mm SM42: 5.0 max x 13.5 max x 4.6h mm
		SM45	3.0 MHz–70 MHz ◆ Carrier added under LP49 to make the part SMD. ◆ Adds electrical connections ◆ Mounts nicely for P&P operations	SM45: 4.8 max x 13 max x 5.0h mm
CERAMIC		SM10T	12MHz–67.5MHz ◆ <u>Lowest cost ceramic surface mount package</u> ◆ Fundamental	2.5 x 3.2 x .7h mm
		SM11T	12 MHz–300 MHz ◆ Fundamental and 3rd and 5th overtone	3.2 x 5.0 x .85h mm
32.768 KHz CRYSTALS				
WATCH CRYSTALS		SM20S	◆ <u>Lowest cost surface mount package</u> ◆ 4 pad plastic SMD ◆ 12.5 and 6 pF available	3.8 x 8.5 x 2.5h mm
		SM13S	◆ 2 pad plastic SMD	1.5 x 7.0 x 1.4h mm
		SM8S	◆ 2 pad ceramic SMD	1.5 x 3.2 x 1.0h mm

Package	Frequency Range	Package Size
 SM7T	26 MHz—60 MHz	1.25 x 1.6 x 0.32h mm
 SM8T	20 MHz—80 MHz	1.6 x 2.0 x 0.45h mm
 SM9T	16 MHz—80 MHz	2.0 x 2.5 x 0.55h mm
 SM10T *	12 MHz—67.5 MHz	2.5 x 3.2 x 0.7h mm
 SM11T *	12 MHz—300 MHz	3.2 x 5.0 x 0.85h mm
 SM12T *	10 MHz—250 MHz	3.5 x 6.0 x 1.2h mm
 SM13T *	6 MHz—150 MHz	5.0 x 7.0 x 1.1h mm

Tight Tolerance Solutions * These devices have been developed to be specified to very tight tolerances.

KEY PARAMETERS NEEDED TO SPECIFY A CRYSTAL

C_{load}

This parameter is valid for crystals used in load or parallel resonant oscillator circuits. C_{load} is the capacitance value, specified in pf, used during frequency calibration. e.g. 18 pf

ESR (Equivalent Series Resistance):

This resistance represents the equivalent impedance of the crystal at its resonant frequency and is specified in Ohms. e.g. 50 ohms max

Overtone:

Crystals have sharp resonant peaks at their fundamental frequency and at odd harmonics above the fundamental. Crystals designed to function at one of these harmonics are called overtone crystals. At higher oscillator frequencies overtone designs reduce cost by using thicker, and easier to manufacture, crystal elements.

The majority of crystals in use today are fundamental or third overtone. e.g. Fund

Calibration Tolerance:

This is the maximum deviation from nominal frequency at 25° C. Calibration tolerance is specified in Parts-Per-Million (ppm). e.g. ±30ppm

Stability:

Stability is the maximum deviation of the crystal frequency over the specified operational temperature range referenced to 25° C. Like calibration tolerance, stability is specified in ppm. The combined effects of calibration tolerance and stability are additive over the operational temperature range. E.g. ±50ppm

Part Number Builder:

A complete guide to building a crystal part number can be found in the crystal product section at www.pletronics.com.