

**XX sub miniature  
ultra thin smd crystal  
(12.0 ~ 60.0)MHz fundamental  
(80.0 ~ 400.0)MHz inverted mesa fundamental**

- (3.2 x 2.5)mm, height 0.7mm,
- ceramic package, vacuum seal
- 8mm tape and reel, 3000 pieces per reel
- RoHS compliant

### Electrical specification

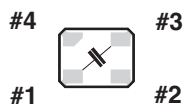
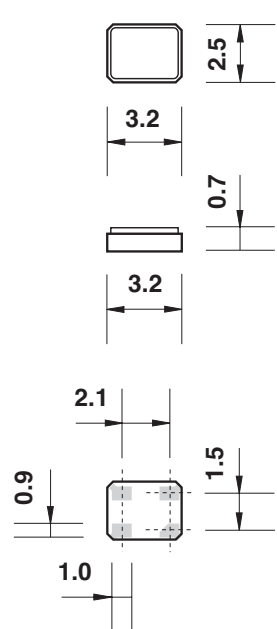
<b>case style</b>	XX: (3.2 x 2.5)mm, height 0.7mm
<b>frequency range</b>	(12.0 ~ 400.0)MHz
<b>standard frequencies</b>	16.0MHz, 24.0MHz, 26.0MHz, 27.0MHz, 32.0MHz, 40.0MHz, 122.326MHz, 122.344MHz, 122.408MHz, 122.430MHz, 125.0MHz, 156.125MHz
<b>adjustment tolerance</b>	from $\pm 5$ ppm at +25°C, frequency dependent
<b>temperature tolerance</b>	from $\pm 5$ ppm, frequency and temperature range dependent
<b>operating temperature</b>	(-10 +60)°C ~ (-40 +85)°C
<b>storage temperature</b>	(-55 +125)°C
<b>load</b>	customer specified
<b>shunt capacitance <math>C_0</math></b>	3.0pF max.
<b>drive level</b>	(12.0 ~ 60.0)MHz: 10 $\mu$ W ~ 100 $\mu$ W, (80.0 ~ 400.0)MHz: 10 $\mu$ W ~ 300 $\mu$ W,
<b>Q factor</b>	>30K for f<70MHz, >20K for f<100MHz, >10K for f<200MHz
<b>ageing</b>	(12.0 ~ 60.0)MHz: $\pm 1$ ppm per year typical, (80.0 ~ 400.0)MHz: $\pm 3$ ppm per year typical
<b>insulation resistance</b>	500Meg. ohm min. at+100Vd.c.

### Ordering information

<b>EXAMPLE</b>	XX crystal, 16.00MHz, load 20pF, $\pm 10$ ppm at +25°C, $\pm 10$ ppm(-10 +60)°C
<b>TFC PART NUMBER</b>	XX 16.00M H B B I
<b>XX</b>	crystal series: XX
<b>16.00M</b>	frequency: 16.00M = 16.00MHz, frequency range from (12.0 ~ 400.0)MHz
<b>H</b>	load capacitance: H = 20pF
<b>B</b>	adjustment tolerance at +25°C: C = $\pm 10$ ppm
<b>B</b>	temperature tolerance: B = $\pm 10$ ppm
<b>I</b>	temperature range: I = (-10 +60)°C
<b>OPTIONS</b>	Not all combinations of options are available
<b>load capacitance</b>	A: 8pF, B: 9pF, C: 10pF, D: 12pF, E: 15pF, F: 16pF, G: 18pF, H: 20pF, J: 32pF, S: series
<b>adjustment tolerance</b>	A: $\pm 5$ ppm, B: $\pm 10$ ppm, P: $\pm 15$ ppm, C: $\pm 20$ ppm, E: $\pm 30$ ppm, G: $\pm 50$ ppm
<b>temperature tolerance</b>	A: $\pm 5$ ppm, B: $\pm 10$ ppm, P: $\pm 15$ ppm, C: $\pm 20$ ppm, E: $\pm 30$ ppm, G: $\pm 50$ ppm, H: $\pm 100$ ppm, I: $\pm 150$ ppm
<b>temperature range</b>	B: (0 +55)°C, I: (-10 +60)°C, C: (-20 +70)°C, D: (-25 +85)°C, L: (-40 +85)°C

**XX sub miniature smd crystal**

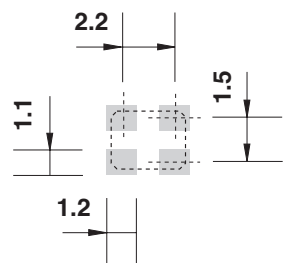
**XX dimensions(mm)**



Top view

pads 1 and 3 crystal

pads 2 and 4 connected to metal lid = ground



suggested pad layout

**ESR - equivalent series resistance**

frequency range(MHz)	cut/mode	esr( $\Omega$ )
12 ~ 13	AT1	<150
13 ~ 19.5	AT1	<80
19.5 ~ 27	AT1	<60
27 ~ 60	AT1	<50
80 ~ 400	AT1 inverted mesa	<60