



### Features

- All-purpose surface-mount crystal
- Four pad land pattern compatible with common plastic molded designs

### Applications

- Computers, modems and communications
- Clock applications
- Microprocessors

### General Specifications

Frequency Range	3.200 to 70.000MHz	
Mode of Oscillation	Fundamental	3.200 to 32.768MHz
	Third Overtone	24.576 to 70.000MHz
Frequency Tolerance at 25°C	±10 to ±30ppm (±30ppm standard)	
Frequency Stability over Temperature Range	See Stability vs. Temperatur Table	
Storage Temperature	-55 to +125°C	
Aging per Year	±3ppm max.	
Load Capacitance $C_L$	10 to 32pF and Series Resonance	
Shunt Capacitance $C_0$	7.0pF	
Equivalent Series Resistance (ESR)	See ESR Table	
Drive Level	1.0mW max.	
Insulation Resistance (MΩ)	500 at 100Vdc ±15Vdc	

### Equivalent Series Resistance (ESR)

Frequency Range - MHz	$\Omega$ max.	Mode of Operation
3.200 to 3.500	300	Fundamental
3.510 to 3.999	200	
4.000 to 5.999	120	
6.000 to 7.999	80	
8.000 to 9.999	60	
10.000 to 15.999	50	
16.000 to 32.768	40	Fundamental - Third Overtone
24.576 to 70.000	80	

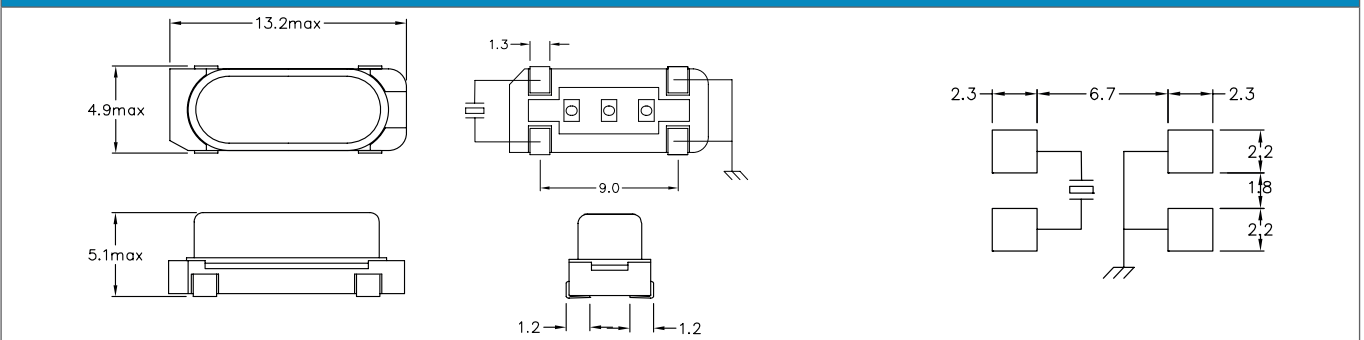
custom values available upon request

### Frequency Stability vs. Temperature

Operating Temperature	±10ppm	±20ppm	±30ppm	±50ppm	±100ppm
-20 to +70°C	○	○	○	○	○
-40 to +85°C	-	○	○	●	○

● standard ○ available

### Mechanical Dimensions



### Part Numbering Guide

Quarz-technik Code	Package	Nominal Frequency (in MHz)	Vibration Mode	Load Capacitance	Frequency Tolerance	Operating Temperature Range	Frequency Stability	Automotive Indicator	Packaging
QT = Quarz-technik	C4 = HC-49/U-S SMD 4-Pad	7 digits including the decimal point (f.i.e. 12.0000)	F = AT-Fund	S = Series A = 8pF <b>B = 12pF</b> C = 16pF D = 18pF E = 20 pF	T1 = ±10ppm T2 = ±20ppm <b>T3 = ±30ppm</b> T5 = ±50ppm T0 = ±100ppm	C = -20 - +70°C I = <b>-40 - +85°C</b>	10 = ±10ppm 15 = ±15ppm 20 = ±20ppm <b>30 = ±30ppm</b> 50 = ±50ppm 00 = ±100ppm	not available	M = 250pcs Tape&Reel R = 1000pcs Tape&Reel B = Bulk

Example: QTC412.0000FT3I30R

bold letters = recommended standard specification



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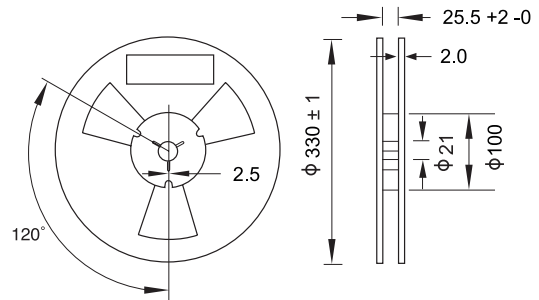
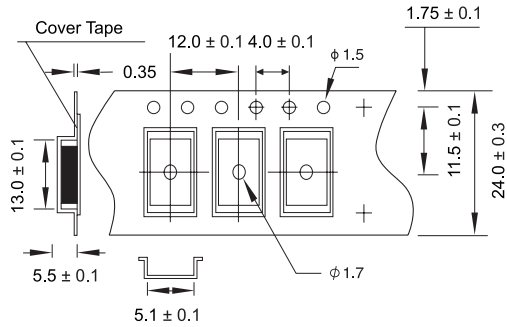
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### Tape and Reel Dimensions



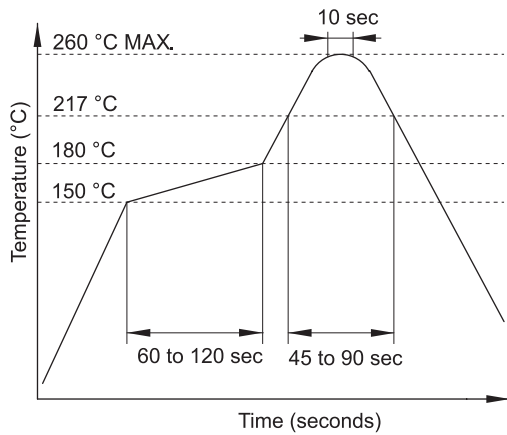
### Marking Code Guide

Contains frequency, Quarztechnik manufacturing code, production code (month and year) and load capacitance.

Month Codes				Year Codes						Load Capacitance Code in pF			
January	A	July	G	2010	0	2011	1	2012	2	pF	PN Code	pF	PN Code
February	B	August	H	2013	3	2014	4	2015	5	12	A	20	F
March	C	September	I	2016	6	2017	7	2018	8	18	B	22	G
April	D	October	J	2019	9	2020	0	2021	1	8	C	30	H
May	E	November	K							10	D	32	I
June	F	December	L							16	E	S	S

Example: First Line: 12.000 (Frequency) Second Line: QA4A (Quarztechnik - January - 2014 - 12 pF)

### Solder Reflow Profile



### Environmental Specifications

Mechanical Shock	MIL-STD-202, Method 213, C
Vibration	MIL-STD-202, Method 201 & 204
Thermal Cycle	MIL-STD, Method 1010, B
Gross Leak	MIL-STD-202, Method 112
Fine Leak	MIL-STD-202, Method 112



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