

Features

- Miniature Ceramic surface mount with Metal Lid
- Package Size:2.0 x1.2 x0.6mm Max.
- Low Aging, Low Power Consumption,High reliability characteristics
- RoHS Compliant/Pb Free

Applications

- Real Time Clock
- Portable Electronics
- Smart Meters
- Communication Electronics
- IoT Devices



Electrical Specifications

Item	Symb.	Electrical spec.		Notes
		TF2012	TF2012R	
Nominal Frequency	Freq.	32.768KHz		
Operating Temperature	T_use	-40°C ~ +85°C		
Storage Temperature Range	T_stg	-55~125°C		
Oscillation Mode	-	Fundamental		
Frequency Tolerance	f_tol	±10ppm / ±20ppm		at 25°C ±3°C
Turnover Temperature	Ti	25°C ±5°C		
Parabolic curvature constant	B	-0.042ppm/(Δ°C) ² max.		Over Operating Temp. Range (Reference 25°C)
Drive Level	DL	0.5 μW Max.		
Load Capacitance	CL	6pF;7pF;9pF;12.5pF		
Effective Resistance	RR	80kΩ max.	50kΩ max.	
Aging	f_age	±3 ppm Max.		1st. Year at 25°C

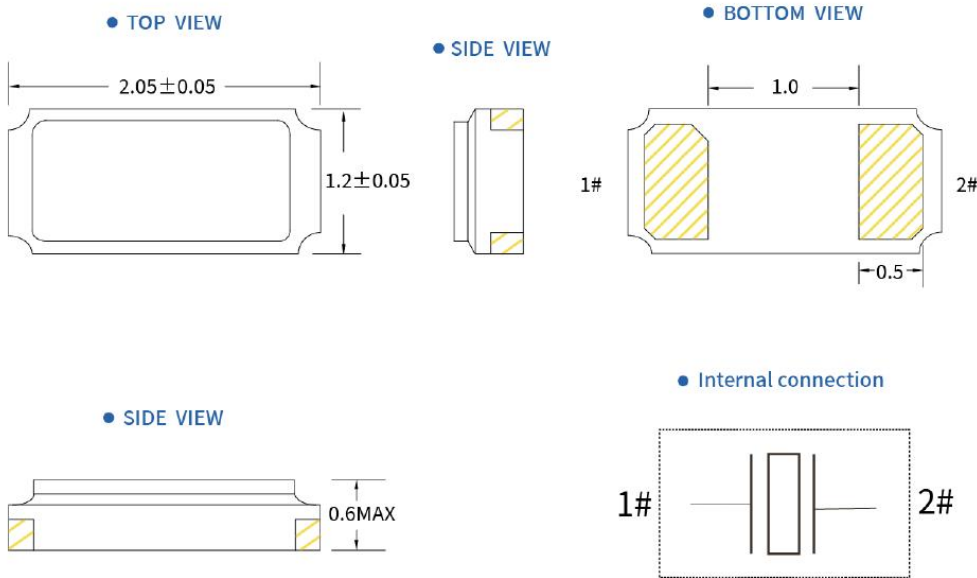


Frequency Stability & Operating Temperature Range

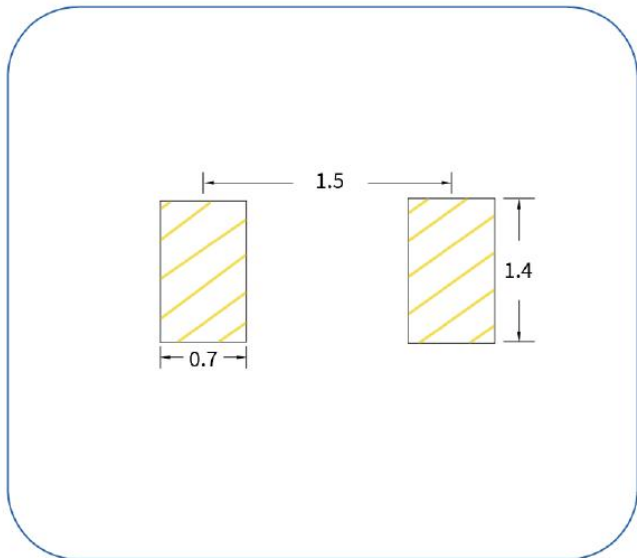
Temp. \ FT	±10ppm	±15ppm	±20ppm	±30ppm
-20°C to +70°C	△	★	★	★
-40°C to +85°C		△	★	★

★: Available △: Conditional

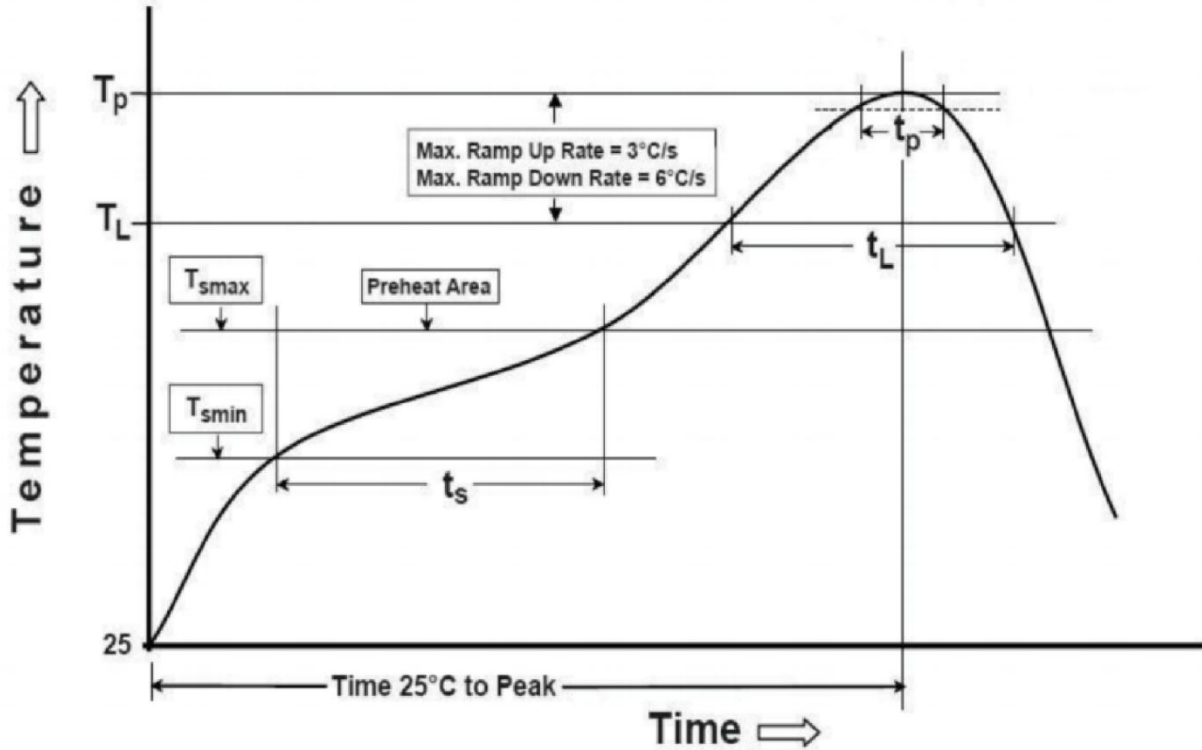
Dimensions (mm)



Solder pad layout (UNIT:mm)



Suggested Reflow Profile



Profile Feature	Sn - Pb Eutectic Assembly	Preheat / Soak
Preheat / Soak <ul style="list-style-type: none"> ● Temperature Min (Ts min) ● Temperature Max (Ts max) ● Time (Ts min to Ts max) 	100°C 150°C 60-120 seconds	150°C 200°C 60-120 seconds
Ramp - up rate (TL to Tp)	3°C/ second max.	3°C/ second max.
Time maintained above <ul style="list-style-type: none"> ● Liquidous temperature (TL) ● Time (tL) maintained above TL 	183°C 60-150 seconds	217°C 60-150 seconds
Peak package body temperature (Tp)	235°C	260°C
Time within 5° C of the specified classification temperature (Tp)	20 seconds	30 seconds
Ramp - down rate (Tp to TL)	6°C/ second max.	6°C/ second max.
Time 25° C to peak temperature	6 minutes max.	8 minutes max.
Suggest reflow times	2 Times max.	



PN Structure:

WQC-TF20123276812520FTR

WQC-TF2012 32.768KHz 12.5pF ±20ppm -40°C~+85°C ESR 50KΩ 2,0x1,2mm 2PIN SMD Tape Reel RoHS

WQC-	TF2012	R	32768	12.5	20	F	T	R
Series		Effective Resistance	Frequency Code	Load Capacitance	Frequency Tolerance	Operating Temperature	Tape Reel	RoHS
		<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>

1. Effective Resistance

Blank	Standard
R	50KΩ Max.

2, Frequency Code(KHz)

32768	32.768
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3, Capacitance

125	12.5pF
09	9pF
07	7pF
06	6pF

4, Frequency Tolerance

10	±10ppm
20	±20ppm

5, Operating Temperature

E	-20°C +70°C
F	-40°C +85°C

6, Packing

T	Tape Reel
B	Bulk

7, RoHS

R	RoHS
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