Tuning Fork Crystal Resonator

TF2012 / TF2012R

Feature

- Miniature Ceramic surface mount with Metal Lid
- Package Size： 2.05 x 1.2 x 0.6mm 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



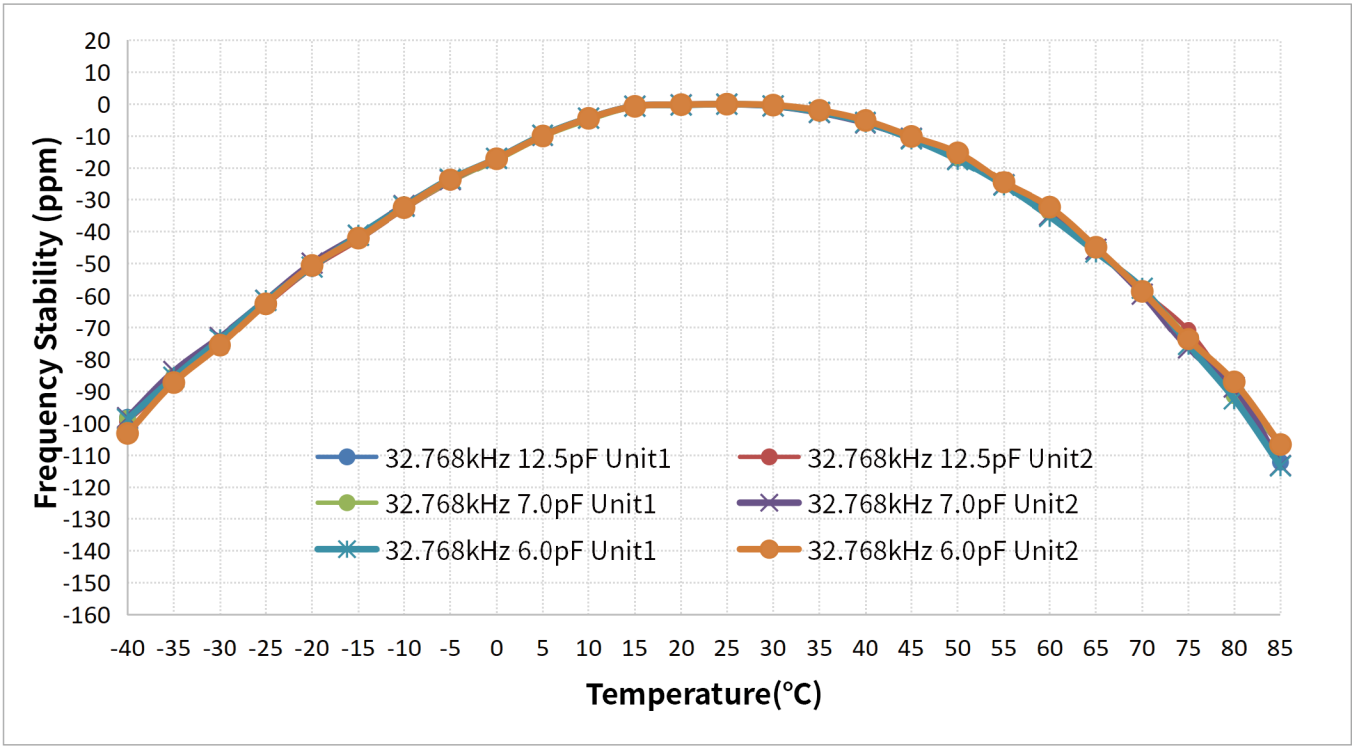
Electrical Specifications

Item	Symb.	Min.	Typ.	Max.	Unit	Notes
Nominal Frequency	Freq.		32.768		kHz	
Oscillation Mode			Fundamental			
Operating Temperature	T_use	-40	—	+85	°C	
Storage Temperature Range	T_stg	-55	—	+125	°C	
Frequency Tolerance	f_tol	-20	—	+20	ppm	at 25°C±3°C
Turnover Temperature	Ti	+20	+25	+30	°C	
Parabolic curvature constant	B	—	—	-0.042	ppm/(△°C)²	Over Operating Temp. Range (Reference 25°C)
Drive Level	DL	—	—	0.5	μW	
Load Capacitance	CL		6, 7, 9, 12.5		pF	
Effective Resistance (TF2012)	RR	—	—	80	kΩ	
Effective Resistance (TF2012R)		—	—	50		
Shunt Capacitance	C0	—	1.10	—	pF	
Motional Capacitance	C1	—	4.60	—	fF	
Aging	f_age	-3	—	3	ppm	1st. Year at 25°C

TEL:0755-86097105 E-mail:sales@sctf-crystal.com Web:www.sctf-crystal.com
Add:10th Floor, T2 Building, Fangda City, Longzhu Fourth Road, Nanshan District, Shenzhen, China
Revision: 11/03/2026

Electrical Specifications Cont.

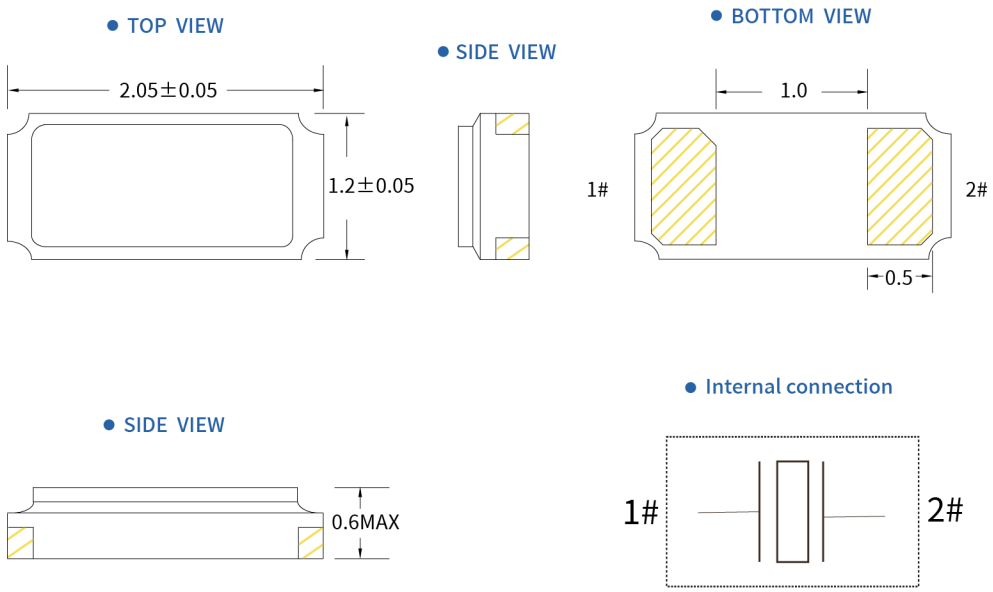
- Table 1: Frequency Stability VS. Temperature



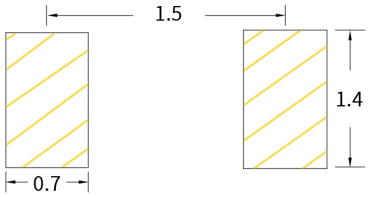
Tuning Fork Crystal Resonator

TF2012 / TF2012R

Dimensions (UNIT:mm)



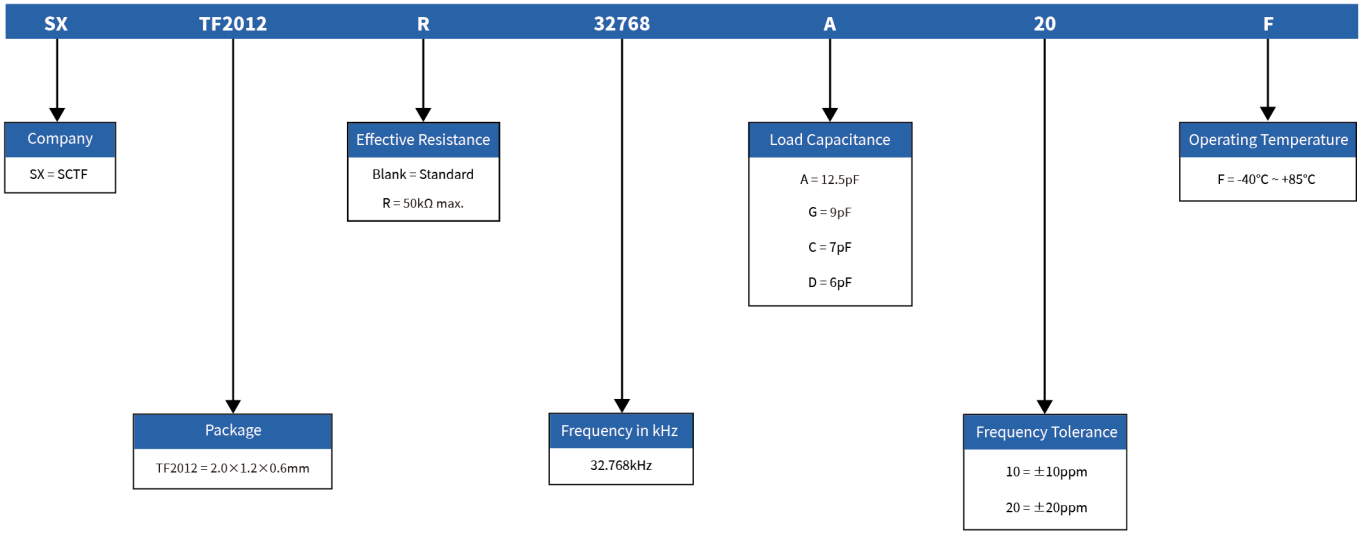
Solder pad layout (UNIT:mm)



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TF2012 / TF2012R

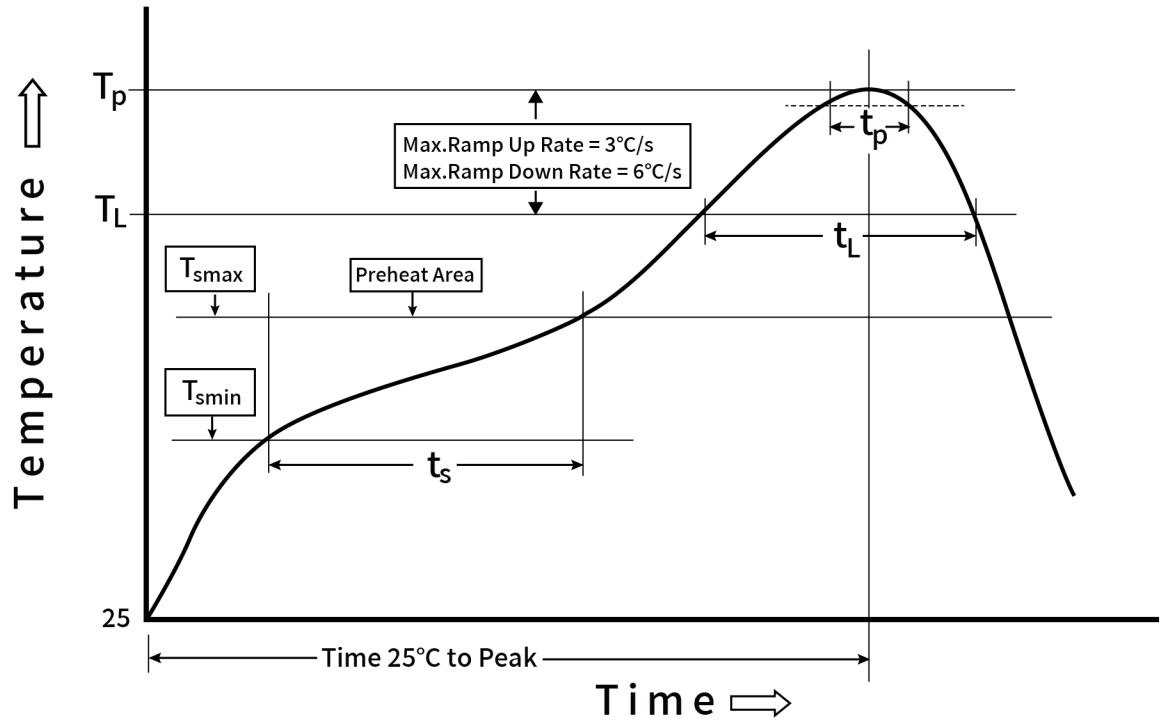
Options and Part Identification



List of available part numbers

Part NO#			
SXTF201232768A20F	SXTF201232768G20F	SXTF201232768C20F	SXTF201232768D20F

Reflow Profile



Profile Feature	Sn - Pb Eutectic Assembly	Preheat / Soak
Preheat / Soak ● 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 ● 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.
Suggust reflow times	**2 Times max.**	

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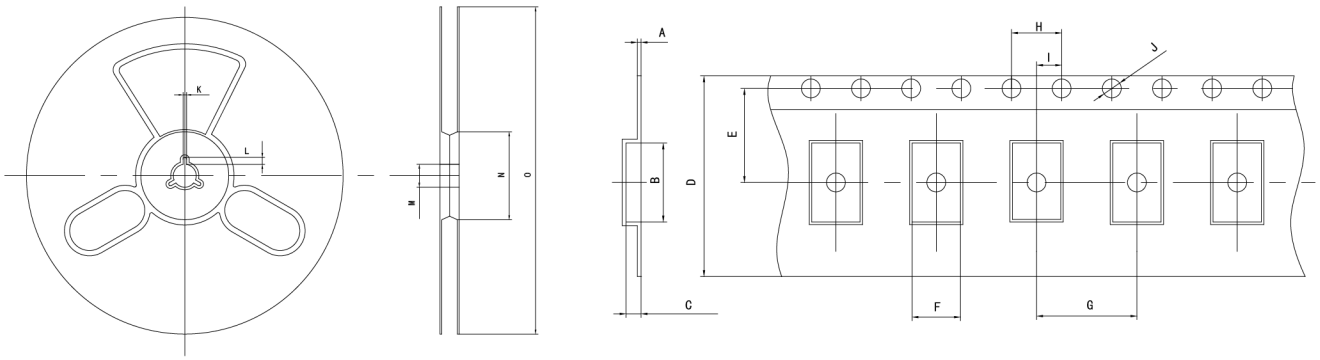
Reliability Specification

NO.	Item	Conditions	Basis of Verdict
1	Drop	High:150cm;cement floor;3 times.	△FL≤±20ppm △RR≤RR(max)*10%
2	Vibration	Frequency:10~500Hz speed:11min/cycle Amplitude:1.5mm(10~55Hz) acceleration rate:200m/s2(55~500Hz) Direction:X,Y,Z Test cycle:10 cycles	△FL≤±10ppm △RR≤RR(max)*10%
3	Temperature Shock	-40°C±2°C（30min）←→85°C±2°C（30min）; For 10 cycles	△FL≤±10ppm △RR≤RR(max)*10%
4	Humidity	Temp:40°C±2°C;Humidity:90-95%;Times:96h	△FL≤±10ppm △RR≤RR(max)*10%
5	Cold Resistance	Temp:-40°C±2°C;Times:96h	△FL≤±10ppm △RR≤RR(max)*10%
6	Heat Resistance	Temp:125°C±2°C;Times:96h	△FL≤±10ppm △RR≤RR(max)*10%
7	Reflow	Keep 150 °C ± 5 °C 120s and then rose to 260 °C ± 5 °C for 10s,warming and holding time is less than the 200s, placed at room temperature 1 ~ 2h after test	△FL≤±20ppm △RR≤RR(max)*10%
8	Aging	Temp:85°C;Times:30days	△FL≤±5ppm △RR≤RR(max)*10%
9	Leakage	He(0.6~0.65MPa):10min	≤3*10-9Pa.m3/s
10	Solder	Temp:235°C±5°C	Soldering tin rate greater than 90%
11	Terminal Strength	Bending: 3mm, Hold time: 5sec, Speed: 0.5mm/sec	△FL≤±20ppm △RR≤RR(max)*10%
12	Sticking Tendency	Load: 10N, Hold time: 10 seconds, Fixture: R0.5 (product side position)	△FL≤±20ppm △RR≤RR(max)*10%
13	Element Assembly Strength	Load: 10N, Hold time: 10 seconds, Fixture: R0.5 (product center position)	△FL≤±20ppm △RR≤RR(max)*10%

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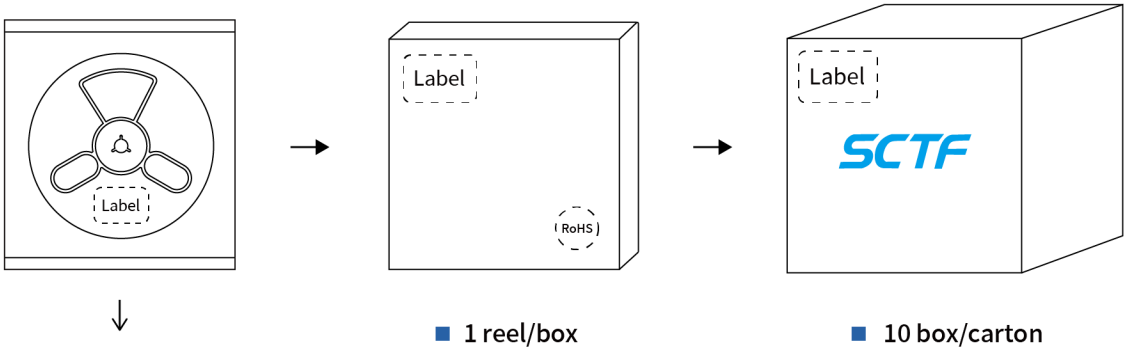
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Taping Specifications



Series	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
TF2012 TF2012R	0.20±0.05	2.3±0.1	0.75±0.1	8.0±0.3	3.5±0.1	1.40±0.1	4±0.1	4.0±0.1	2.0±0.1	ϕ1.5±0.1	2.0±0.2	4.0±1.0	ϕ13±0.5	ϕ60±1	ϕ180±1

Packaging specifications



■ 1 reel/box

■ 10 box/carton

Series	Packaging
TF2012/TF2012R	3,000 pcs/reel