

# 1CKL Series 2.0 x 1.6 mm SMD Crystal Oscillator

1 : 2.0×1.6×0.75 mm | SMD2016-4P

CK : 32.768KHz Crystal Oscillator

L : Low Current Crystal Oscillator

## Feature

- Miniature Ceramic surface mount with Metal Lid
- CMOS compatible logic levels
- Tri-state function available
- Low power active mode: 7.2μA max
- Supply voltage range : 1.8V ~ 3.3V
- RoHS Compliant / Pb Free

## Applications

- Real Time Clock Reference
- Internet of Things (IoT) devices
- Smart meters
- Audio, Video, Gaming products
- Portable Electronics



## Electrical Specifications

Item	Symb.	Min.	Typ.	Max.	Unit	Notes
Frequency Range	Freq.		32.768		KHz	
Operating Temperature	T_use	-20		70	°C	
		-40		85	°C	
Storage Temperature Range	T_stg	-55		125	°C	
Supply Voltage	Vdd	1.8		3.3	V	
Output Load	L_CMOS		15		pF	
Current Consumption	Icc			7.2	μA	No load condition, Vdd=3.0V
				6.5		No load condition, Vdd=1.8V
Duty Cycle	SYM	45		55	%	50 % Vdd level, L_CMOS ≤ 15 pF
Rise / Fall Time	T <sub>R</sub> / T <sub>F</sub>			25	nS	10% Vdd to 90% Level
Start-up Time	T_str			20	mS	To 90% of Final Amplitude
High output voltage	V <sub>OH</sub>	0.9Vdd			V	
Low output voltage	V <sub>OL</sub>			0.1Vdd	V	
Enable Voltage High (Logic 1)	V <sub>IH</sub>	0.7Vdd			V	Output will be disable if OE is Logic 0 Output will be enable if OE is Logic 1 or open
Enable Voltage Low (Logic 0)	V <sub>IL</sub>			0.3Vdd	V	
Enable Voltage Low (Logic 0)	V <sub>PLZ</sub>			20	mS	
Aging	f_age			3	ppm	1st. Year at 25°C

## Frequency Stability & Operating Temperature Range

Temp.	FT	±20ppm	±25ppm	±30ppm	±50ppm
	-20°C to +70°C	△	★	★	★
-40°C to +85°C		△	★	★	

★: Available    △: Conditional

All condition: Include 25°C tolerance, operating temperature range, input voltage change, aging, load change.

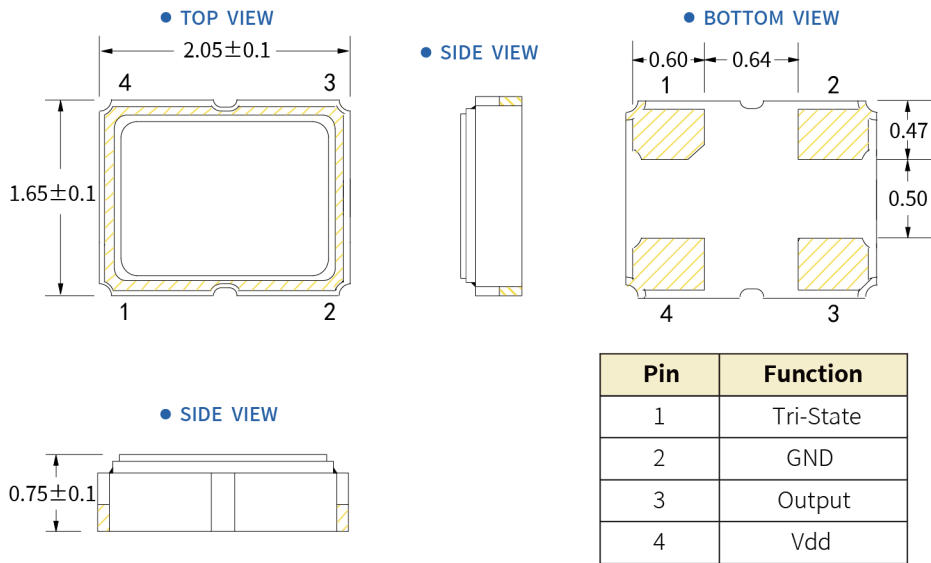
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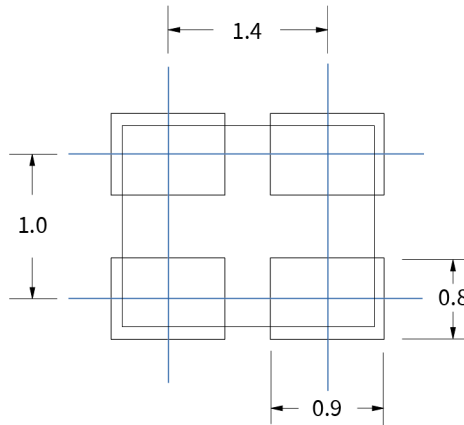
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## Dimensions (UNIT:mm)



## Solder pad layout (UNIT:mm)



## Options and Part Identification : Example SX1M32.768KB20F30TLN

Company	Ceramic Package	Frequency Code [KHz]	Supply Voltage	Frequency Tolerance	Operating Temperature	Frequency Drift	Output	Current Consumption	Phase Noise
<b>SX</b>	<b>1M</b>	<b>32.768K</b>	<b>B</b>	<b>20</b>	<b>F</b>	<b>30</b>	<b>T</b>	<b>L</b>	<b>N</b>
Code Company		Frequency		Code Frequency Tolerance		Code Frequency Drift		Code Current	
SX SCTF		32.768		10 ±10ppm 20 ±20ppm		15 ±15ppm 20 ±20ppm 30 ±30ppm		L 10µA M 7µA P 3µA Q 2µA U 1µA	
	Code Ceramic Package		Code Voltage		Code Operating Temperature		Code Output		Code Phase Noise
	7M 7.0×5.0×1.3mm 5M 5.0×3.2×1.2mm 3M 3.2×2.5×0.95mm 2M 2.5×2.0×0.81mm 1M 2.0×1.6×0.75mm		D 1.8V H 2.5V B 3.3V		E -20°C ~ +70°C F -40°C ~ +85°C		T Squarewave		N Standard

If you have other parameter requirements, you can contact **SCTF** at any time.

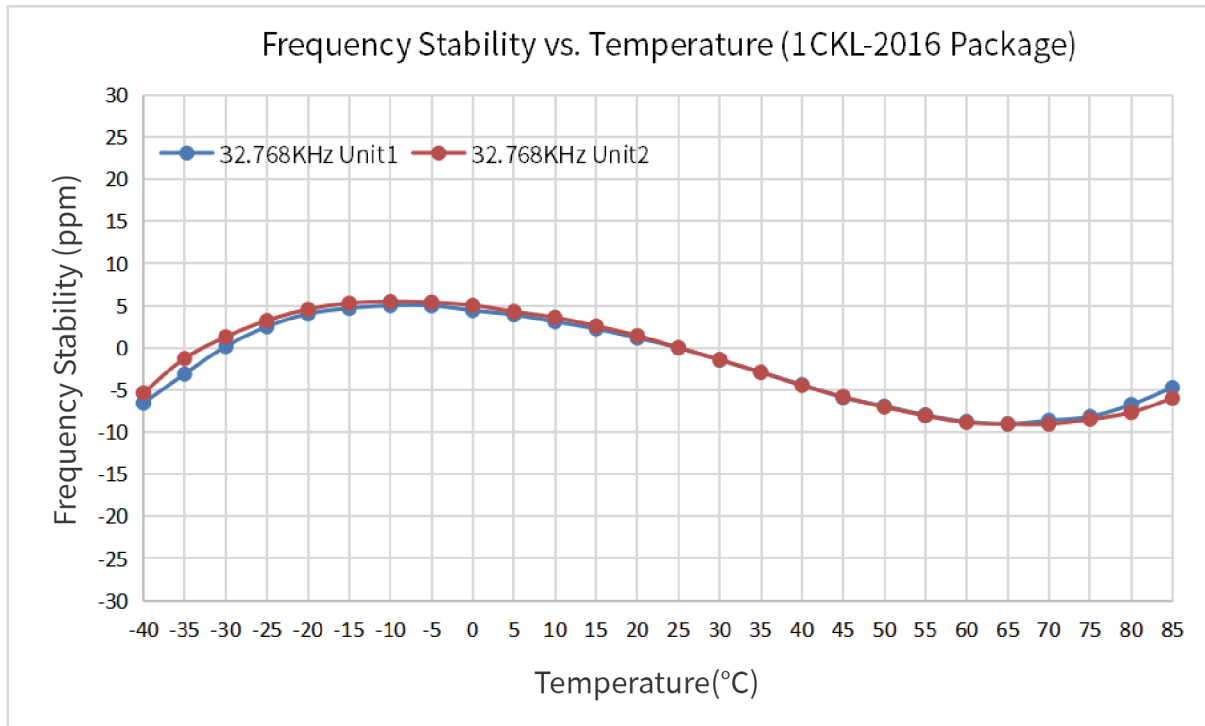
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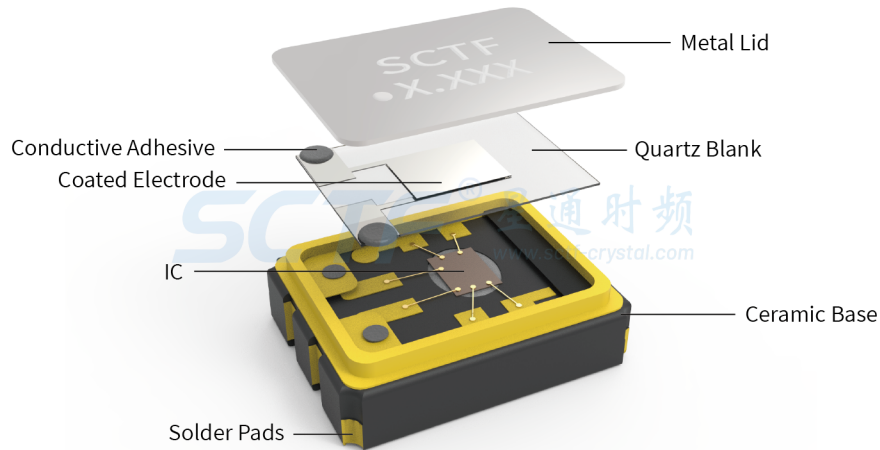
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## Frequency Temperature Characteristics



## Product Structure & Marking Information

### Product Structure



### Marking Information



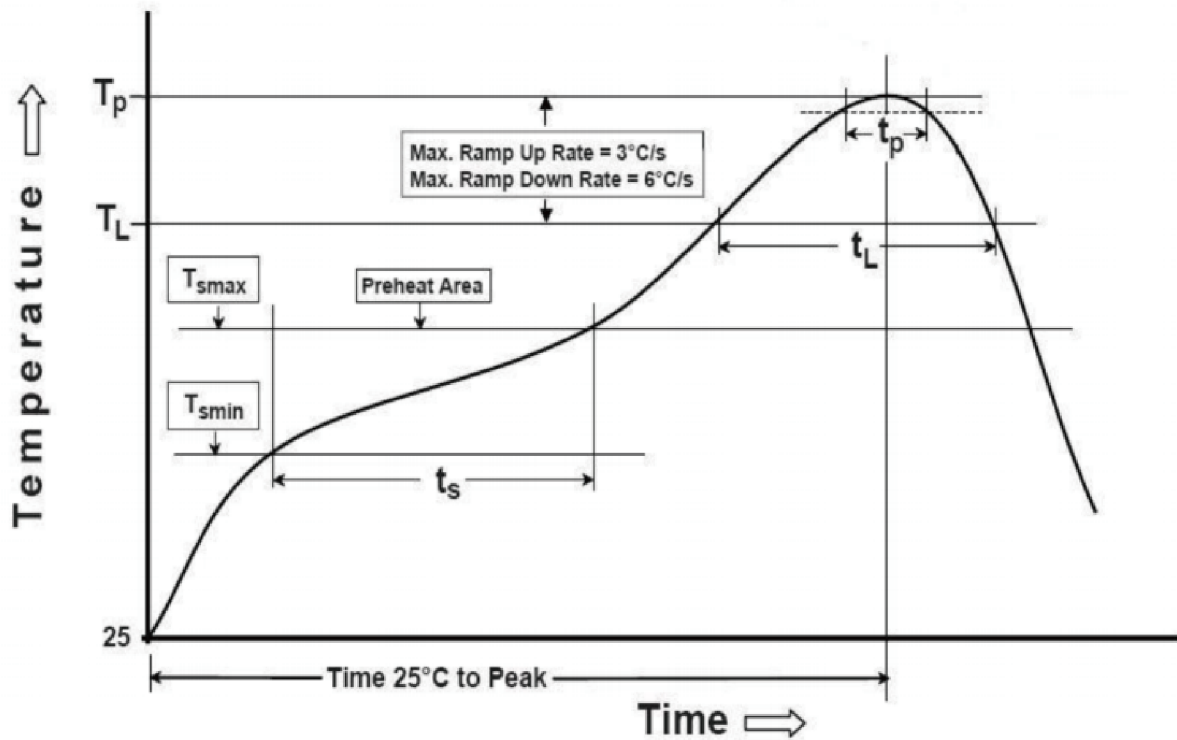
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## Suggested Reflow Profile



Profile Feature	Sn - Pb Eutectic Assembly	Preheat / Soak
Preheat / Soak <ul style="list-style-type: none"> <li>● Temperature Min ( Ts min )</li> <li>● Temperature Max ( Ts max )</li> <li>● Time ( Ts min to Ts max )</li> </ul>	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"> <li>● Liquidous temperature ( TL )</li> <li>● Time ( tL ) maintained above TL</li> </ul>	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.
<b>Suggest reflow times</b>	<b>2 Times max.</b>	

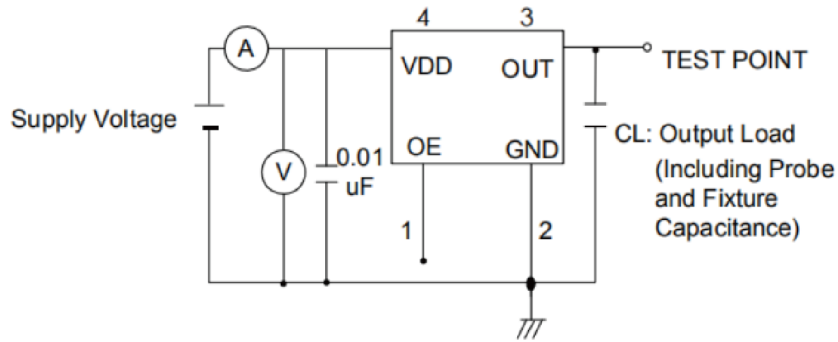
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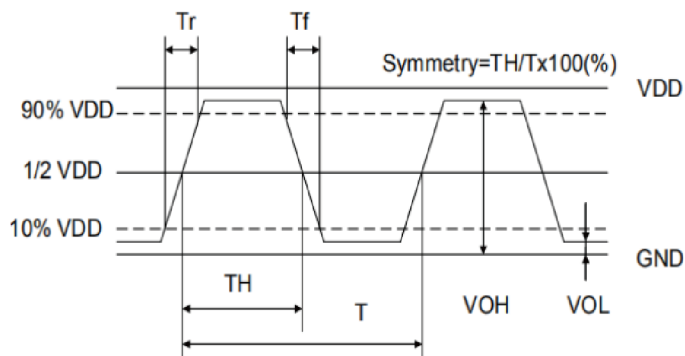
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## Testing Circuit



※ Notes: PIN 1 connected to Vdd or floating, the product is working properly; connected to GND, stops working.

## Waveform Conditions



Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.

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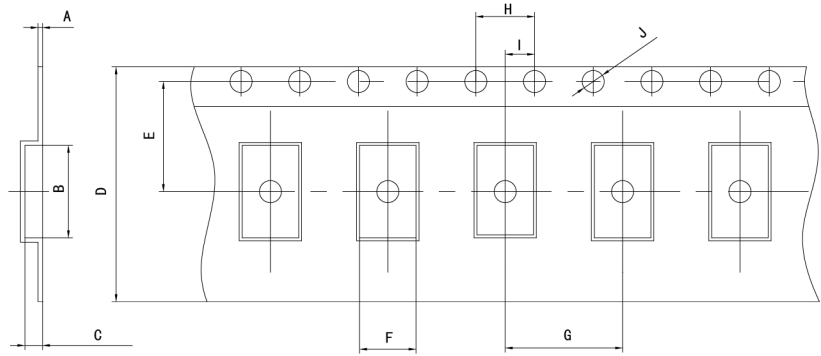
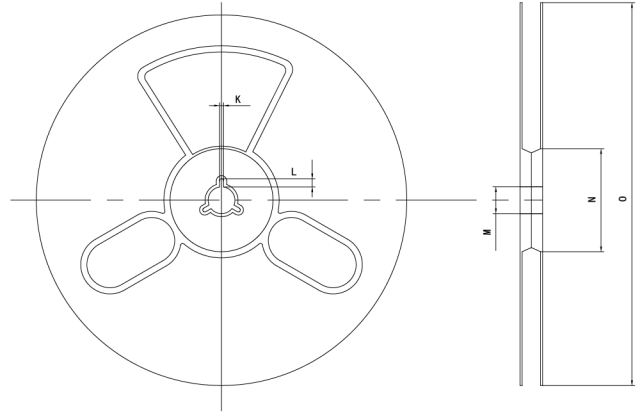
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## Packaging Information

T=Tape and reel (3,000pcs/reel)



### Pocket Tape Dimensions(mm)

Series	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1CKL	0.25±0.05	2.3±0.1	1.0±0.1	8.0±0.1	3.5±0.1	1.9±0.1	4.0±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