

Multi Voltage 32.768kHz Crystal Oscillator



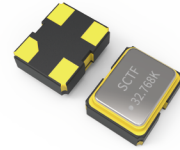
0CKM / 1CKM / 2CKM / 3CKM / 5CKM / 7CKM

Feature

- Ultra Miniature Ceramic surface mount with Metal Lid
- CMOS compatible logic levels
- Tri-state function available
- Supply voltage : 1.62V ~ 3.63V
- 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}	-40	—	+85	°C	
Storage Temperature Range	T _{stg}	-55	—	+155	°C	
Supply Voltage	V _{dd}	1.62	—	3.63	V	
Output Load(CMOS)	L _{CMOS}	15			pF	
Current Consumption	I _{cc}	—	—	90	μA	No load
Duty Cycle	SYM	45	—	55	%	50% V _{dd} level, L _{CMOS} ≤ 15pF
Output Voltage	V _{OH}	0.9V _{dd}	—	—	V	
	V _{OL}	—	—	0.1V _{dd}		
Enable Voltage High	V _{IH}	0.7V _{dd}	—	—	V	Output will be disable if OE is Logic"0" Output will be enable if OE is Logic"1" or open
Disable Voltage Low	V _{IL}	—	—	0.3V _{dd}		
Rise / Fall Time	T _R / T _F	—	—	25	nS	10% V _{dd} to 90% V _{dd} level
Start-up time	T _{str}	—	—	5	mS	To 90% of Final Amplitude
Aging	f _{age}	-3	—	+3	ppm	at 25°C ± 3°C. First Year

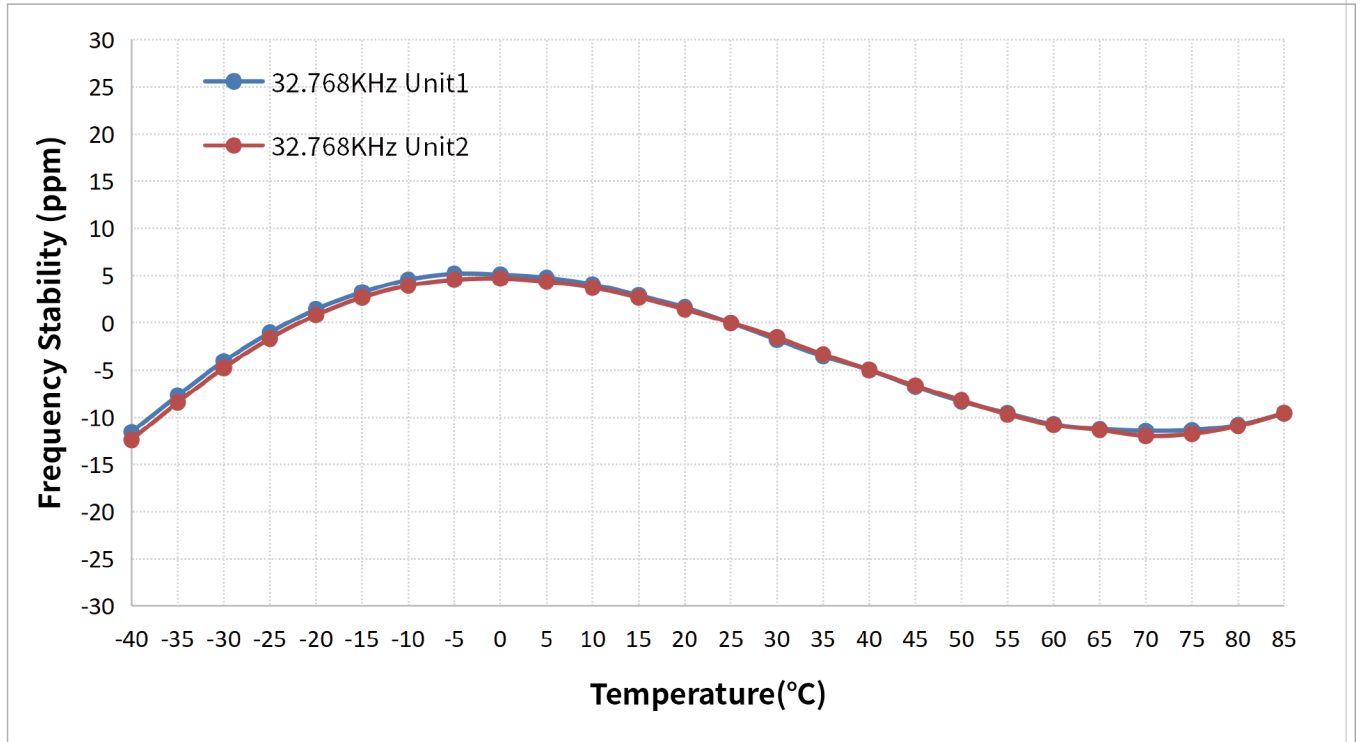
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Electrical Specifications Cont.

• Table 1: Frequency Stability VS. Temperature



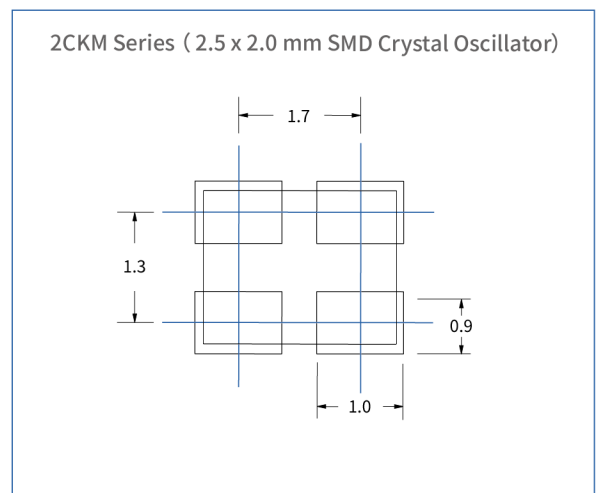
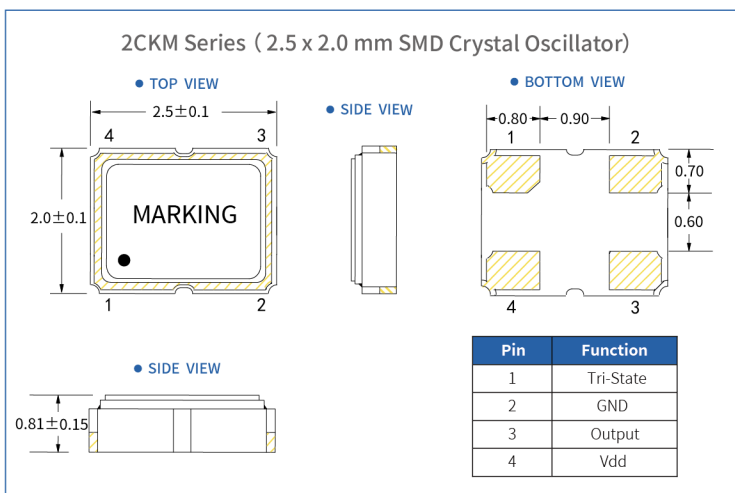
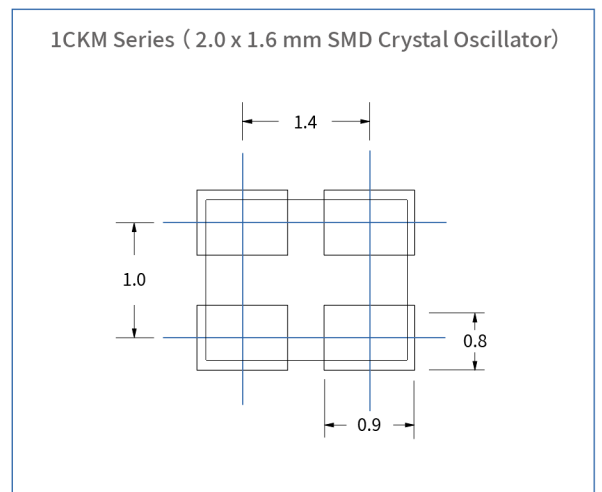
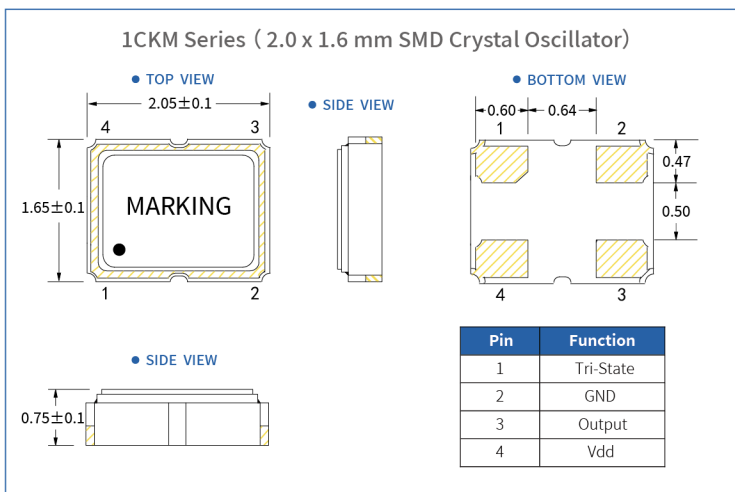
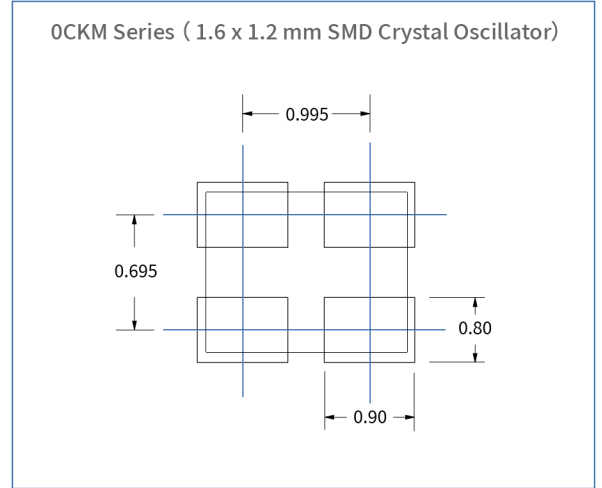
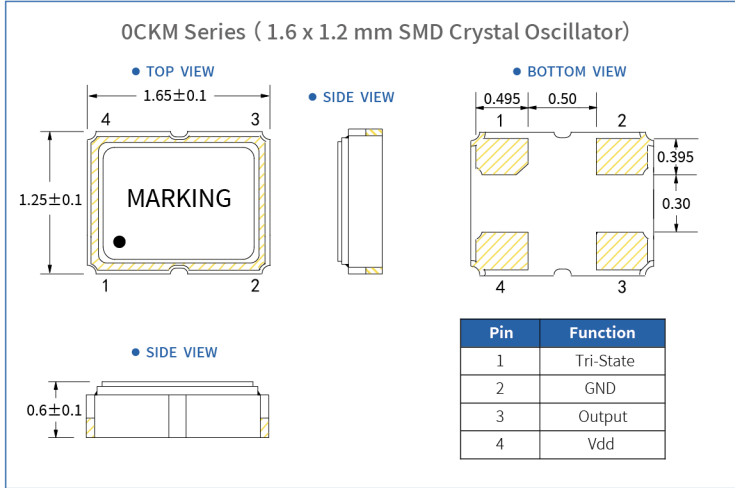
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Dimensions (UNIT:mm)

Solder pad layout (UNIT:mm)



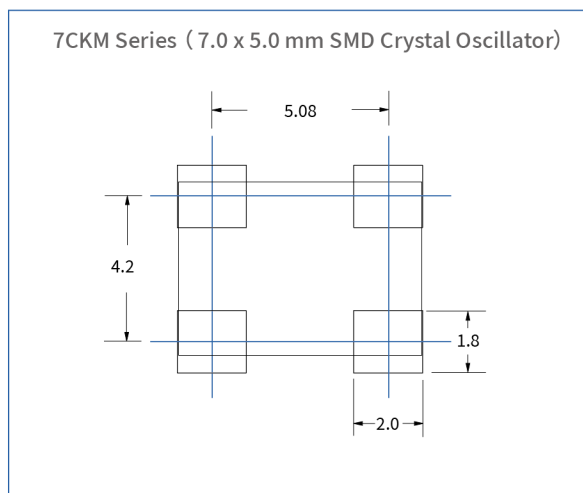
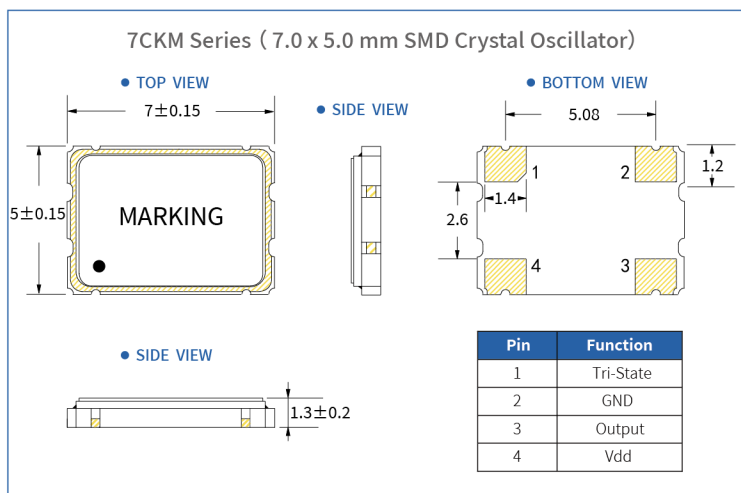
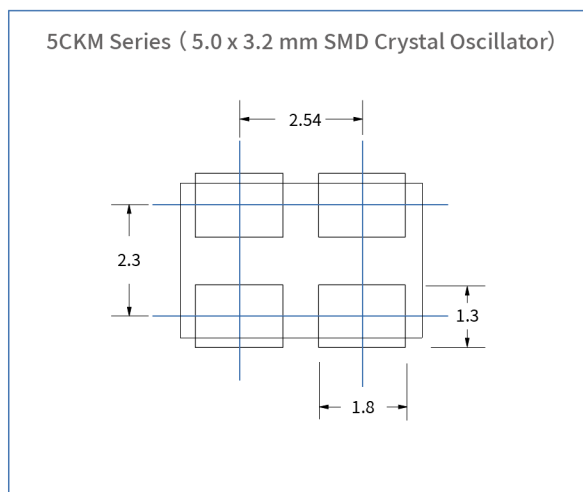
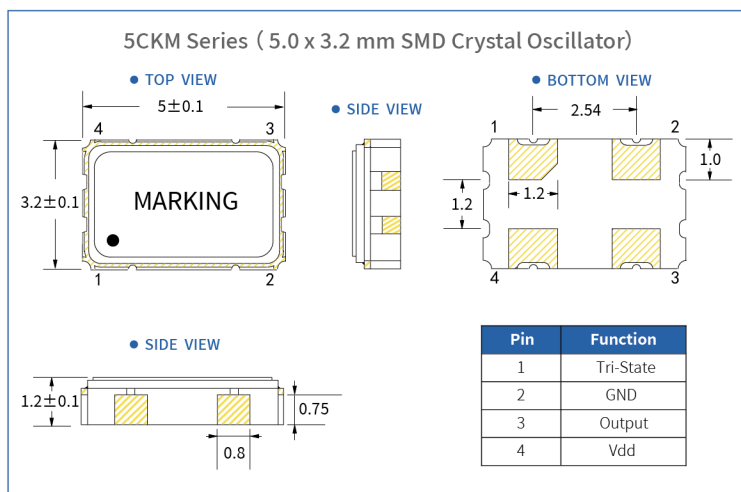
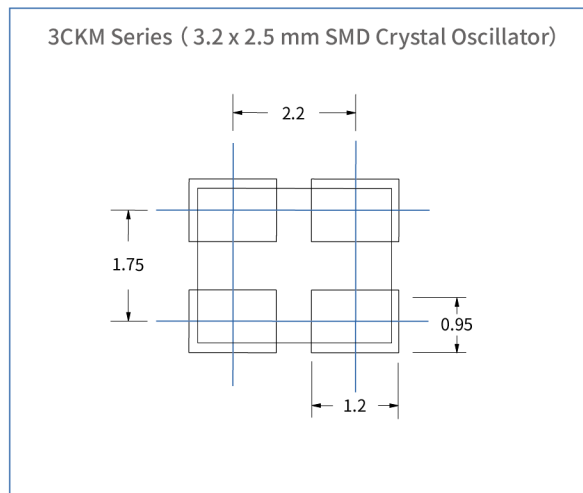
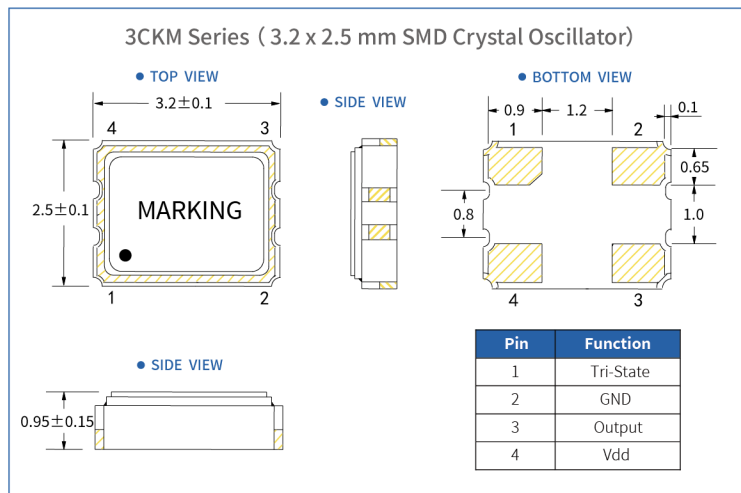
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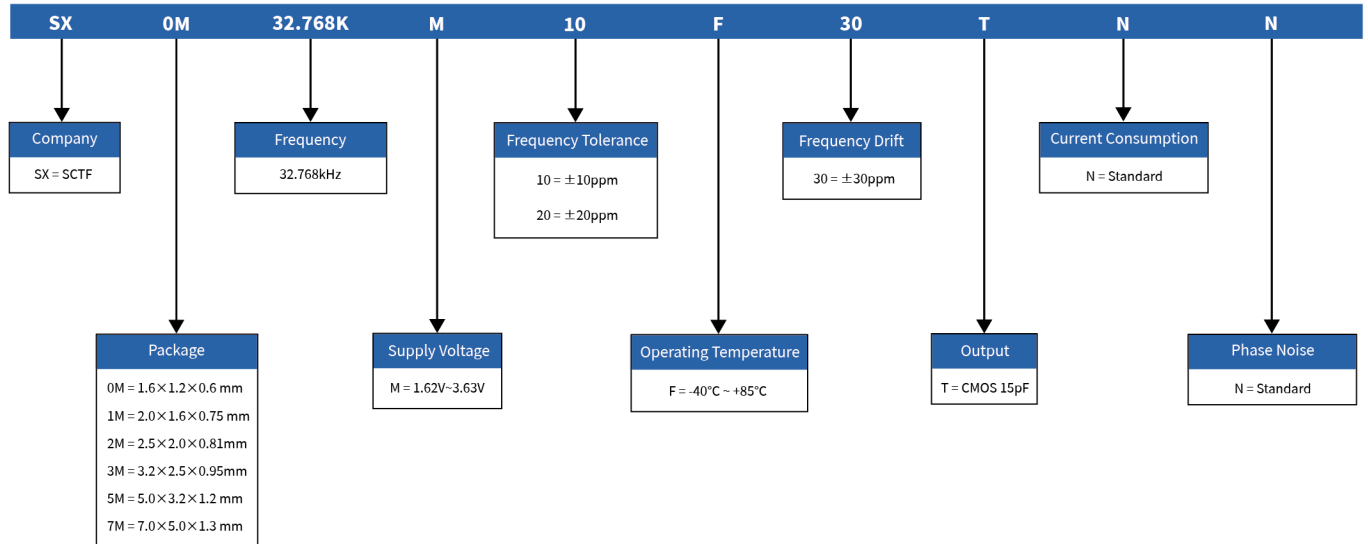


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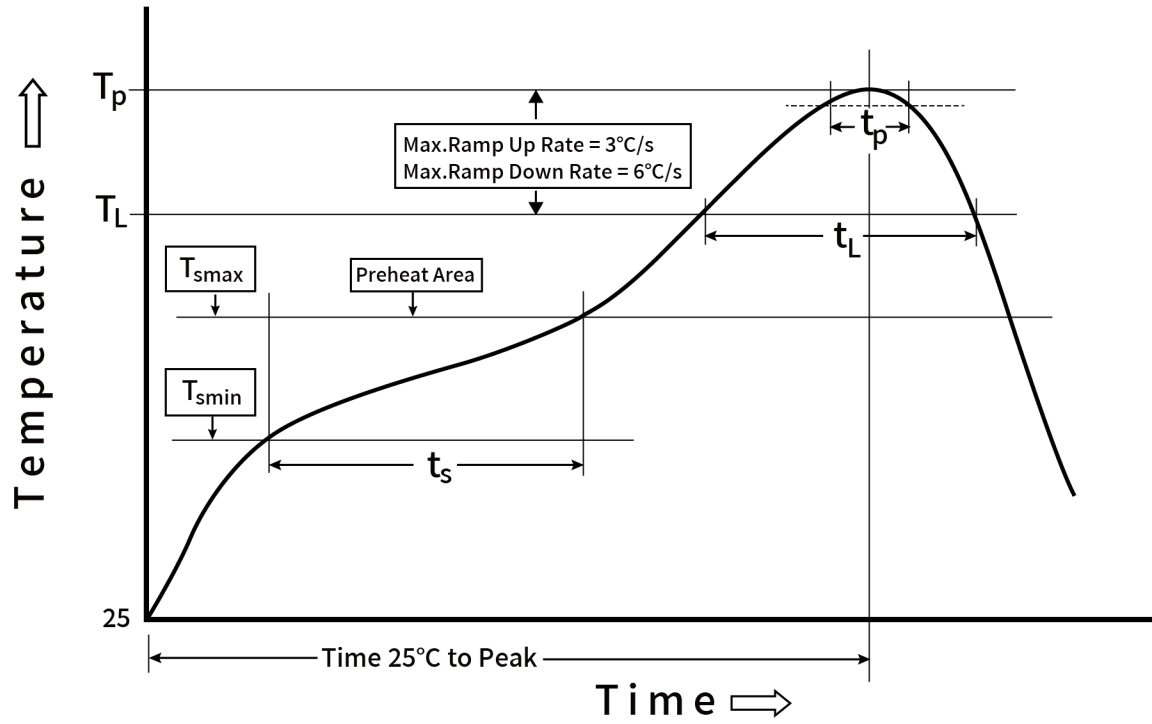
Options and Part Identification



List of available part numbers

Part NO#			
SX0M32.768KM10F30TNN	SX1M32.768KM10F30TNN	SX2M32.768KM20F30TNN	SX3M32.768KM20F30TNN
SX5M32.768KM20F30TNN	SX7M32.768KM20F30TNN		

Reflow Profile



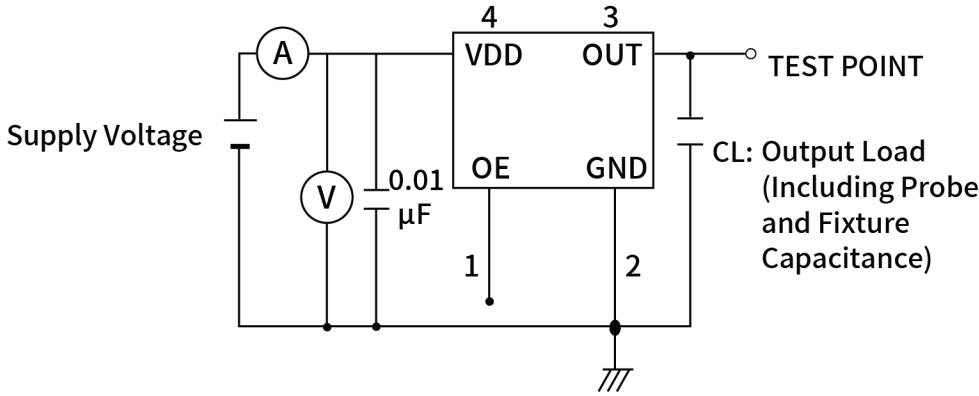
Profile Feature	Sn - Pb Eutectic Assembly	Preheat / Soak
Preheat / Soak <ul style="list-style-type: none"> ● Temperature Min (T_s min) ● Temperature Max (T_s max) ● Time (T_s min to T_s max) 	100°C 150°C 60-120 seconds	150°C 200°C 60-120 seconds
Ramp - up rate (T _L to T _p)	3°C/ second max.	3°C/ second max.
Time maintained above <ul style="list-style-type: none"> ● Liquidous temperature (T_L) ● Time (t_L) maintained above T_L 	183°C 60-150 seconds	217°C 60-150 seconds
Peak package body temperature (T _p)	235°C	260°C
Time within 5° C of the specified classification temperature (T _p)	20 seconds	30 seconds
Ramp - down rate (T _p to T _L)	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.	

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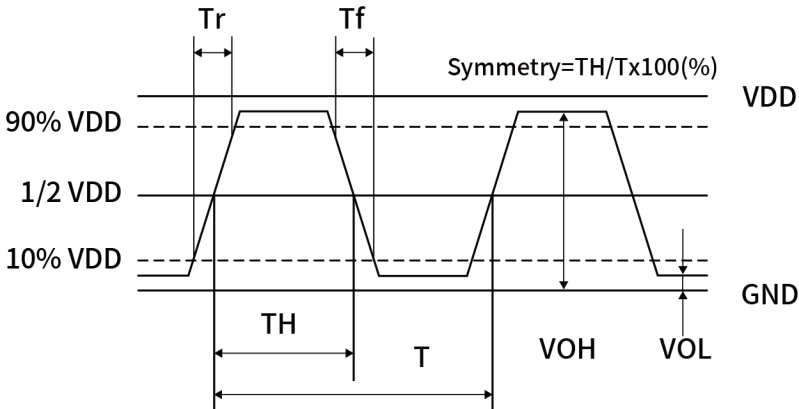
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Testing Circuit



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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Reliability Specification

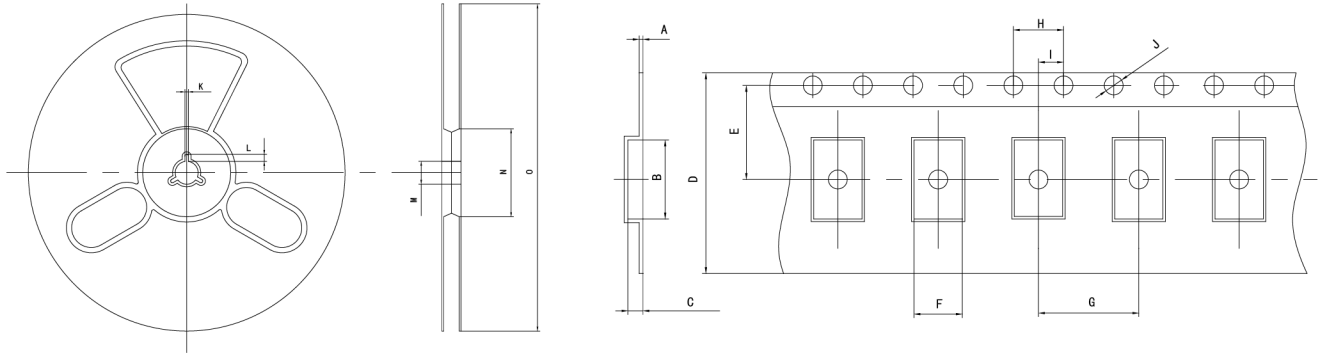
NO.	Item	Conditions	Basis of Verdict
1	Drop	High:100cm;Thickness:3cm;3 times.	$\Delta FL \leq \pm 5 \text{ppm}$
2	Vibration	Frequency:10~500HZ speed:11min/cycle Amplitude:1.5mm(10~55Hz) acceleration rate:200m/s ² (55~500Hz) Direction:X,Y,Z	$\Delta FL \leq \pm 5 \text{ppm}$
3	Low Temperature Storage	Temp:-40°C±2°C;Times:96h	$\Delta FL \leq \pm 5 \text{ppm}$
4	High Temperature Storage	Temp:125°C±2°C;Times:96h	$\Delta FL \leq \pm 5 \text{ppm}$
5	High Temp.&Humidity	Temp:80°C±2°C; Humidity:85%±5%;Times:1000h	$\Delta FL \leq \pm 5 \text{ppm}$
6	Thermal Shock	-40°C±2°C (30min) ↔ 85°C±2°C (30min) ; For 100 cycles	$\Delta FL \leq \pm 5 \text{ppm}$
7	Resistance to Soldering Heat	Keep 150 °C ± 5 °C 120s and then rose to 265 °C ± 5 °C for 10s,warming and holding time is less than the 200s, placed at room temperature 1 ~ 2h after test	$\Delta FL \leq \pm 5 \text{ppm}$
8	Aging	Temp:85°C;Times:30days	$\Delta FL \leq \pm 5 \text{ppm}$
9	Soldering Test	Dipping in solder bath at 245deg.C ± 5deg.C for 3±0.5 sec.	Soldering tin rate greater than 95%

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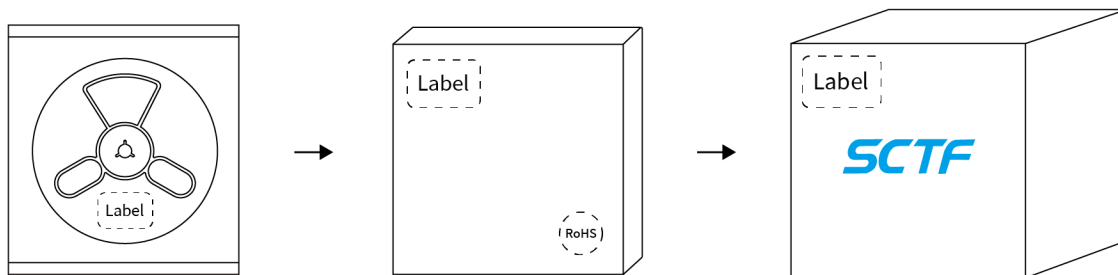
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Taping Specifications



Series	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
0CKM	0.25±0.05	1.8±0.1	0.7±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
1CKM	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
2CKM	0.25±0.05	3.5±0.1	1.4±0.1	8.0±0.1	3.5±0.1	2.70±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
3CKM	0.25±0.05	3.5±0.1	1.4±0.1	8.0±0.1	3.5±0.1	2.70±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
5CKM	0.3±0.05	5.5±0.1	1.25±0.1	12±0.1	5.5±0.1	3.6±0.1	8.0±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
7CKM	0.3±0.05	7.6±0.1	2.0±0.1	16±0.3	7.5±0.1	5.4±0.1	8.0±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

Packaging specifications



■ 1 reel/box

■ 10 box/carton

Series	Packaging
0CKM	3,000 pcs/reel
1CKM	3,000 pcs/reel
2CKM	3,000 pcs/reel
3CKM	3,000 pcs/reel
5CKM	1,000 pcs/reel
7CKM	1,000 pcs/reel