



TAI-SAW TECHNOLOGY CO., LTD.

No. 3, Industrial 2nd Rd., Ping-Chen Industrial District,
Taoyuan, 324, Taiwan, R.O.C.

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Product Specifications Approval Sheet

Product Description: Crystal Oscillator SMD 2.5x2.0 32.768KHz

TST Part No.: TW0459B

Customer Part No.: _____

Customer signature required
Company: _____
Division: _____
Approved by : _____
Date: _____

Checked by: _____ Glen Peng *Glen*

Approved by: _____ Kelly Huang *Kelly Huang*

Date: _____ 04/19/2019

1. Customer signed back is required before TST can proceed with sample build and receive orders.
2. Orders received without customer signed back will be regarded as agreement on the specifications.
3. Any specifications changes must be approved upon by both parties and a new revision of specifications shall be released to reflect the changes.



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SMD 2.5x2.0 32.768KHz Crystal Oscillator

MODEL NO.: TW0459B

REV. NO.: 4.0

Revise:

Rev.	Rev. Page	Rev. Account	Date	Ref. No.	Reviser
1	N/A	Initial release	03/18/13'	N/A	Ginger Huang
2	P3,6	Change Rise & Fall Time, Packing Quantity	11/21/14'	ECN-201400504	Ginger Huang
3	P3,6	Add MSL Spec and Reel Dimensions	12/26/17'	ECN-201700517	Glen Peng
4	P4	Add Recommended Soldering Pattern	04/19/19'	ECN-201900166	Glen Peng



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Features:

- Surface Mount Seam Weld Package
- Excellent Reliability Performance
- Good Frequency Perturbation and Stability over temperature
- Moisture Sensitivity Level (MSL) : Level-1

RoHS Compliant
Lead free
Lead-free soldering

Application:

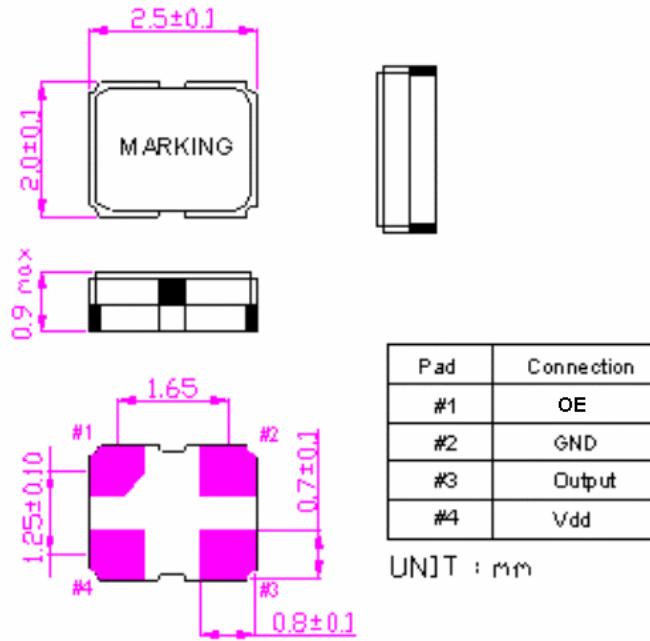
- 1.8 V Supply Voltage CMOS Output
- Option-able stand-by function for output .

Electrical Characteristics:

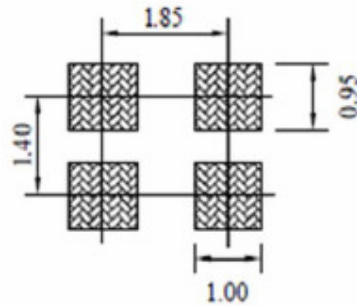
TW0459B	Specifications
Nominal Frequency, Fo	32.768000 KHz
Storage Temperature Range	-55°C to +125°C
Operating Temperature Range	-40°C to +85°C
Power Supply Voltage, Vcc	1.8 V +/- 5%
Load	15pF
“0” Level “1” Level	0.1 Vdd max 0.9 Vdd min
Power Supply Current, Icc	1.5 mA max
Frequency Accuracy ¹	+/-25 ppm max
Duty Cycle	40% ~ 60%
Rise Time (10% -> 90% of final RF level in Vp-p) Fall Time (90% -> 10% of final RF level in Vp-p)	120 nsec max. 120 nsec max
Start-up Time	35 msec max
Aging	+/-3.0 ppm/year
Enable/Disable Function	PIN 1: High or Open, PIN 3:Enable PIN 1: Low, PIN 3:Disable

#Note 1: Frequency accuracy includes 25C tolerance, operating temperature range -40 to 85 deg C, aging and voltage or load change

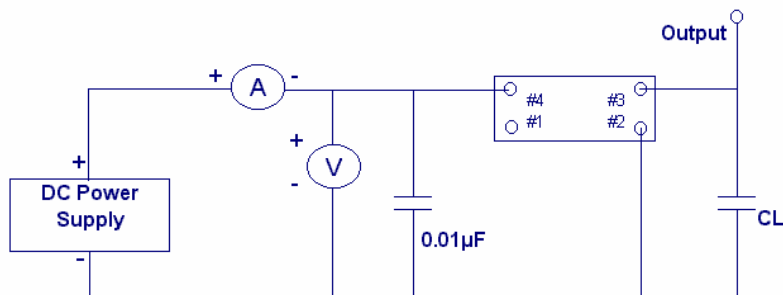
Mechanical Dimensions: (Unit: mm)



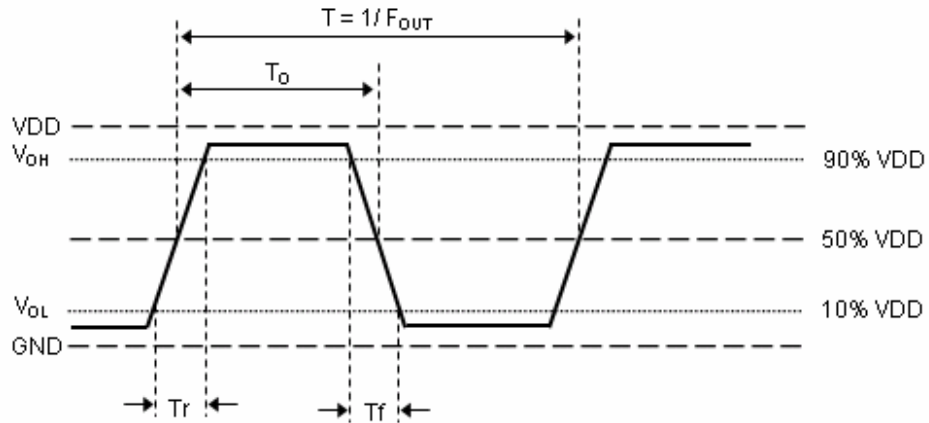
Recommended Soldering Pattern



Test Circuit:



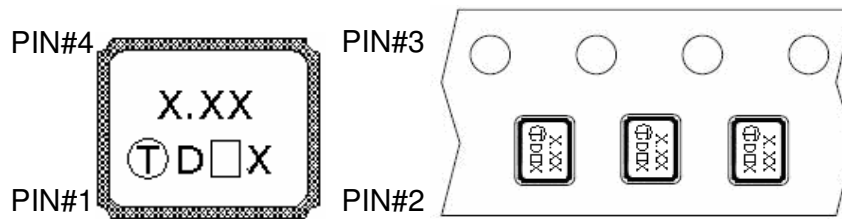
Output Waveform :



Marking:

Line 1: Frequency (32.7K)

Line 2: TST Logo + Date Code + Product Code (X is TST internal tracking code, could be a~z and A~Z, : Can Track Year , (Under line With Even Year and Odd Year for Nothing)



The inner vision of PIN#1,PIN#4 side is XTAL blank mounting pad.

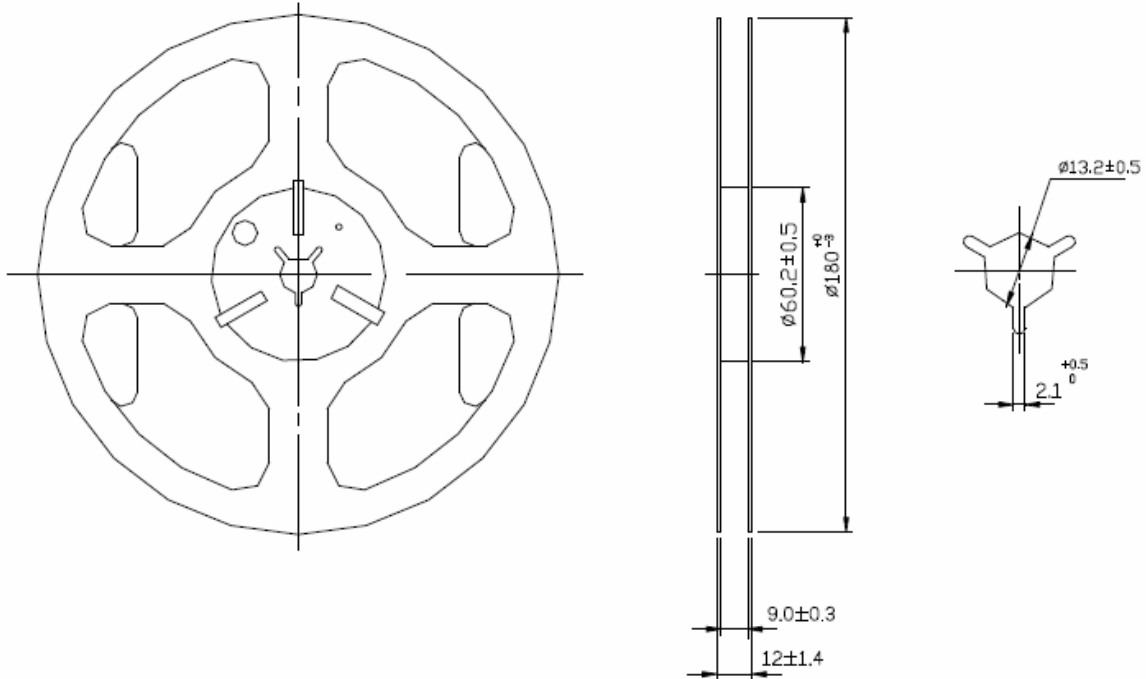
Date Code Table

WK01	WK02	WK03	WK04	WK05	WK06	WK07	WK08	WK09	WK10	WK11	WK12	WK13
A	B	C	D	E	F	G	H	I	J	K	L	M
WK14	WK15	WK16	WK17	WK18	WK19	WK20	WK21	WK22	WK23	WK24	WK25	WK26
N	O	P	Q	R	S	T	U	V	W	X	Y	Z
WK27	WK28	WK29	WK30	WK31	WK32	WK33	WK34	WK35	WK36	WK37	WK38	WK39
a	b	c	d	e	f	g	h	i	j	k	l	m
WK40	WK41	WK42	WK43	WK44	WK45	WK46	WK47	WK48	WK49	WK50	WK51	WK52
n	o	p	q	r	s	t	u	v	w	x	y	z

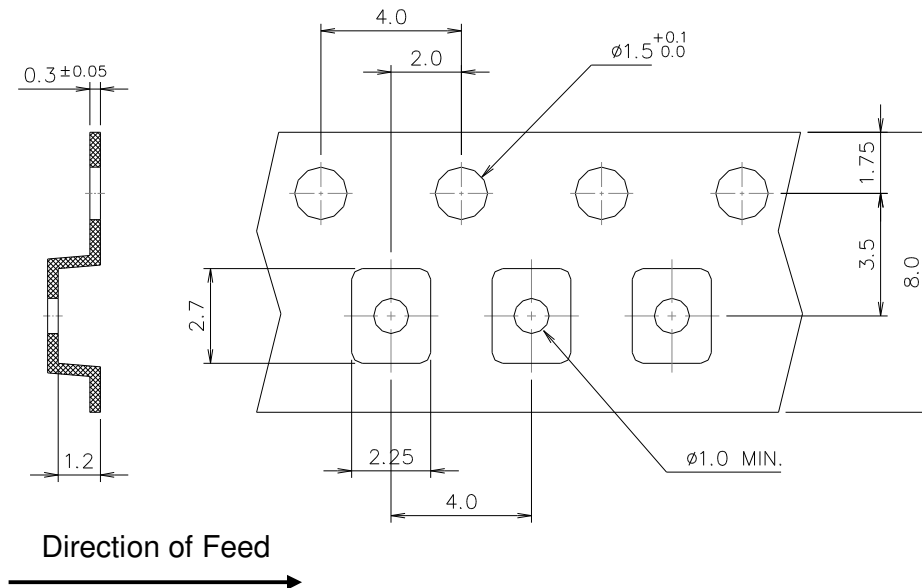
Product Code Table: (Under line With Even Year and Odd Year for Nothing)

Year						Product Code
2013	2015	2017	2019	2021	2023	<input type="checkbox"/>
2014	2016	2018	2020	2022	2024	<input type="checkbox"/>

Reel Dimensions (mm):



Tape Dimensions (mm):

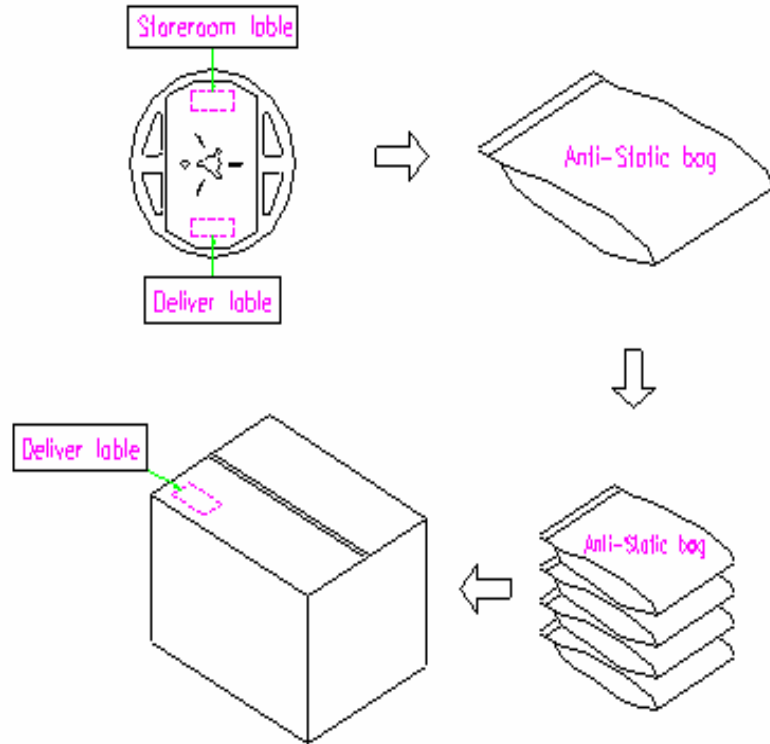


[NOTE]:

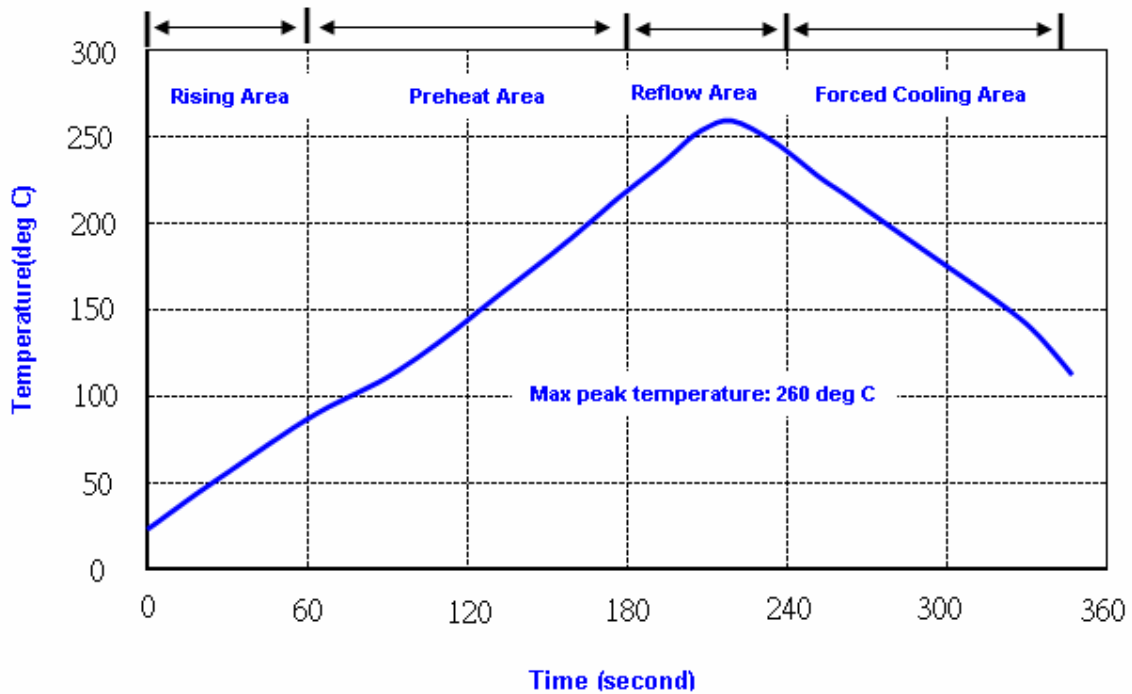
1. Unless otherwise specified tolerance on dimension ± 0.1 mm.
2. Material: conductive polystyrene with color black.
3. 10 pitch cumulative tolerance ± 0.2 mm.

Packing Quantity/Packing:

3K pcs maximum per reel



Reflow Profile:



Note: 1. Max peak temperature: 260 +/- 5 deg C; Time: 10 +/- 2 sec
2. Temperature: 217 +/- 5 deg C; Time: 90 ~ 100 sec

Reliability Specifications

Test name	Test process / method	Reference standard
Mechanical characteristics		
resistance to Soldering heat (IR reflow)	Temp/ Duration : 265°C / 10sec × 2 times Total time : 4min. (IR-reflow)	EIAJED-4701 -300(301)M(II)
Vibration	Total peak amplitude : 1.5mm Vibration frequency : 10 to 2000 Hz Sweep period : 20 minute Vibration directions : 3 mutually perpendicular Duration : 2 hr / direc.	MIL-STD 202G method 204
Mechanical Shock	directions : 3 impacts per axis Acceleration : 3000g's, +20/-0 % Duration : 0.3 ms (total 18 shocks) Waveform : Half-sine	MIL-STD 202G method 213
Solderability	Solder Temperature: 265±5 °C Duration time: 5±0.5 seconds.	J-STD-002
Environmental characteristics		
Thermal Shock	Heat cycle conditions -40 °C (30min) ↔ 85 °C (30min) * cycle time : 10 times	MIL-STD 883G method 1010.8
Humidity test	Temperature : 85 ± 2 °C Relative humidity : 85% Duration : 96 hours	MIL-STD 202G method 103
Dry heat (Aging test)	Temperature : 125 ± 2 °C Duration : 168 hours	MIL-STD 202G method 108A
Cold resistance (Low Temp Storage)	Temperature : -40 ± 2 °C Duration : 96 hours	IEC 60068-2-1