TAI-SAW TECHNOLOGY CO., LTD.
No. 3, Industrial 2nd Rd., Ping-Chen Industrial District,
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Product Specifications Approval Sheet

Product Description: Crystal Unit SMD 2.0x1.6 48.0MHz

TST Part No.: TZ3393A

Customer Part No.:_____

Customer signature required

Company:_____

Division:_____

Approved by :_____

Date:_____

Checked by:_____Glen Peng_____

Approved by:_____Kelly Huang_____

Date:_____01/08/2019_____

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.

TAI-SAW TECHNOLOGY CO., LTD.

Crystal Unit SMD 2.0x1.6 48.0MHz

MODEL NO.: TZ3393A REV. NO.: 2

Revise:

Rev.	Rev. Page	Rev. Account	Date	Ref. No.	Revised by
1	N/A	Initial release	02/29/18’	N/A	Glen Peng
2	5	Correct Pin# and Update traceable code to avoid confusion.	01/08/19’	ECN-201800075	Glen Peng

TAI-SAW TECHNOLOGY CO., LTD.

Crystal Unit SMD 2.0x1.6 48.0MHz

MODEL NO.: TZ3393A REV. NO.: 2

Features:

RoHS Compliant
Lead free
Lead-free soldering

- Surface Mount Hermetic Package
- Excellent Reliability Performance
- Good Frequency Perturbation and Stability over temperature
- Ultra Miniature Package
- AEC-Q200 compliance
- Moisture Sensitivity Level (MSL) : Level-1

Description and Applications:

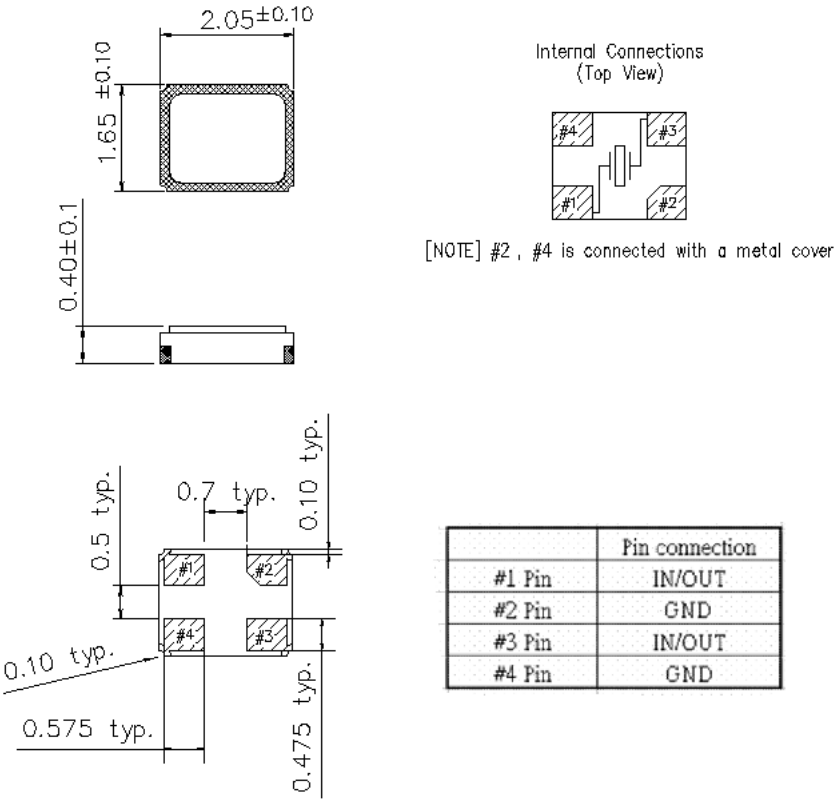
Surface mount 2.0mmx1.6mm crystal unit for use in wireless communications devices, especially for a need of ultra miniature package for mobility.

Electrical Specifications:

TZ3393A	**Specification**
Nominal Frequency	48.000000 MHz
Mode of Oscillation	Fundamental
Storage Temperature Range	-40°C to +125°C
Operating Temperature Range	-40°C to +120°C
Frequency Stability over Operating Temperature	+/-25 ppm (referred to the value at 25°C)
Frequency Make Tolerance (FL)	+/-8 ppm @ 25°C +/- 3°C
Equivalent Series Resistance (ESR)	30 Ω max.
Nominal Drive Level	10uW typical and 300uW max
Shunt Capacitance (Co)	2.0 pF max
Load Capacitance (CL)	9.75 pF
DLD DR Retrace DR Max-Min DF Retrace DF Max-Min	8point (0.001, 0.01, 0.03, 0.1, 0.3, 1, 30, 100uW) 3 ohm max. 4 ohm max. 3 ppm max. 4 ppm max.

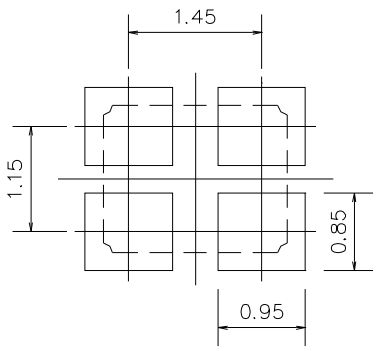
Aging	+/-1ppm/ 1 year
Frequency Discontinuity	+/-1ppm (-40°C to +120°C DL=100uW 5°C Step)
Insulation Resistance	500 MΩ min./DC 100V
Marking	Laser Marking
Unit Weight	0.017+/-0.005 g

Mechanical Dimensions (mm):



	Pin connection
#1 Pin	IN/OUT
#2 Pin	GND
#3 Pin	IN/OUT
#4 Pin	GND

Recommended Land Pattern: (unit: mm)

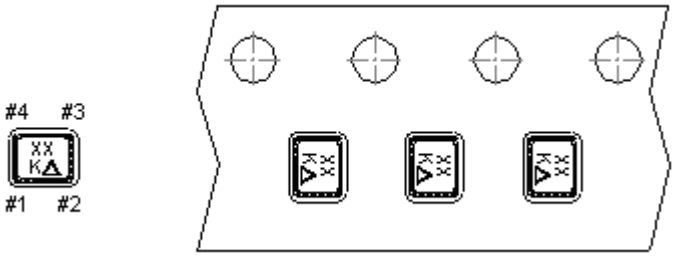


Recommended Land Pattren

Marking:

Line 1: XX： Frequency (48)

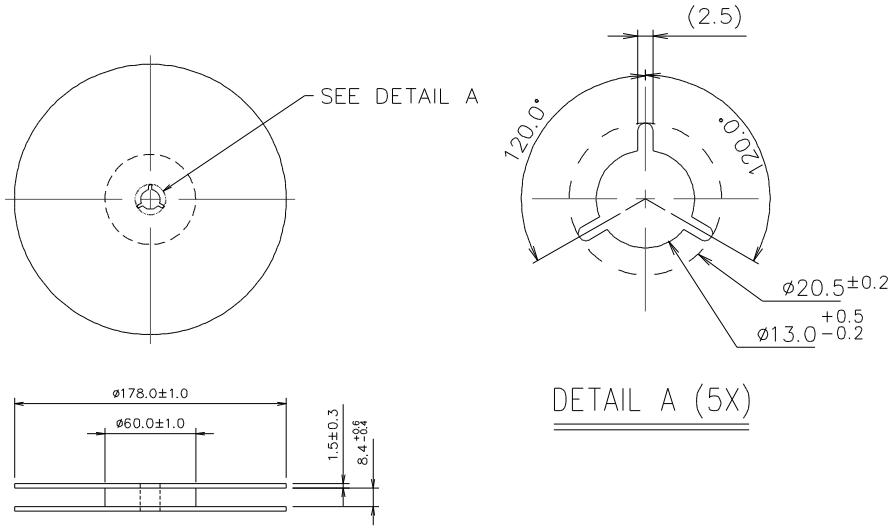
Line 2: K + △ ： Date Code of Year/Month



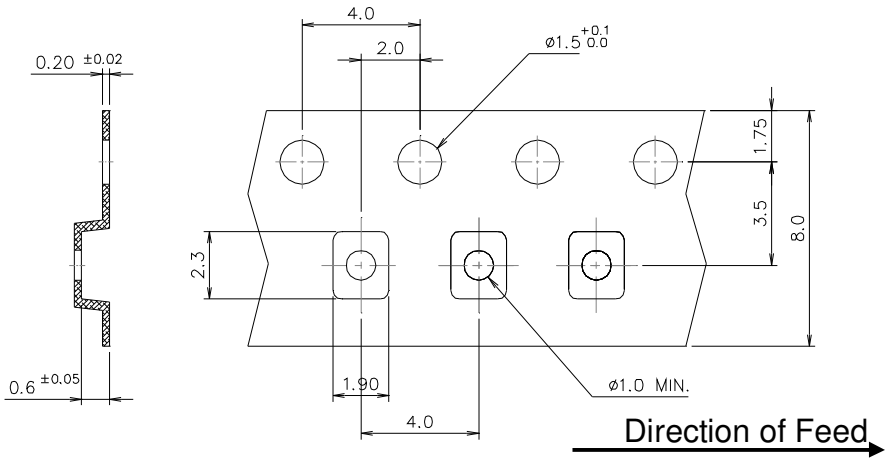
△ ：Date Code Table of Year/Month

Year/Month	1	2	3	4	5	6	7	8	9	10	11	12
2018	A	B	C	D	E	F	G	H	J	K	L	M
2019	N	P	Q	R	S	T	U	V	W	X	Y	Z
2020	a	b	c	d	e	f	g	h	i	j	k	m
2021	n	p	q	r	s	t	u	v	w	x	y	z

Reel Dimensions (mm):



Tape Dimensions (mm):

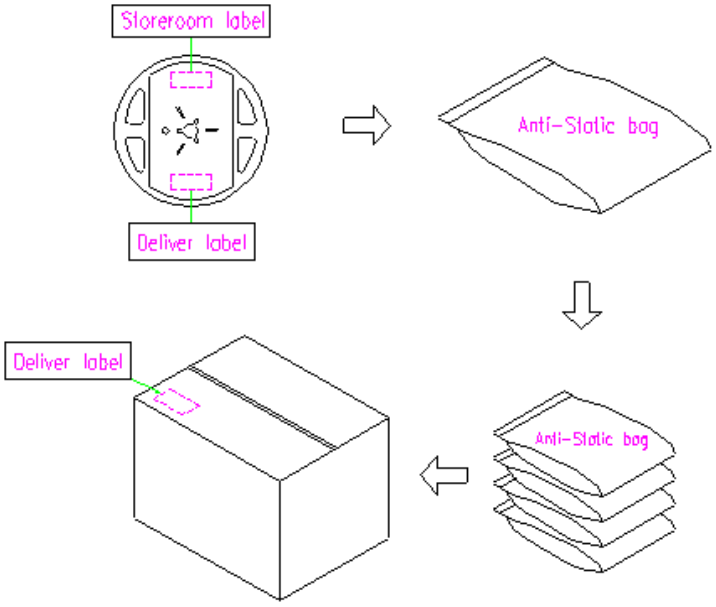


[NOTE]:

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



ESD Capability:

ESD Capability		
Type	MM	HBM
7M Series	CLASS C	CLASS 2

Classification criteria:

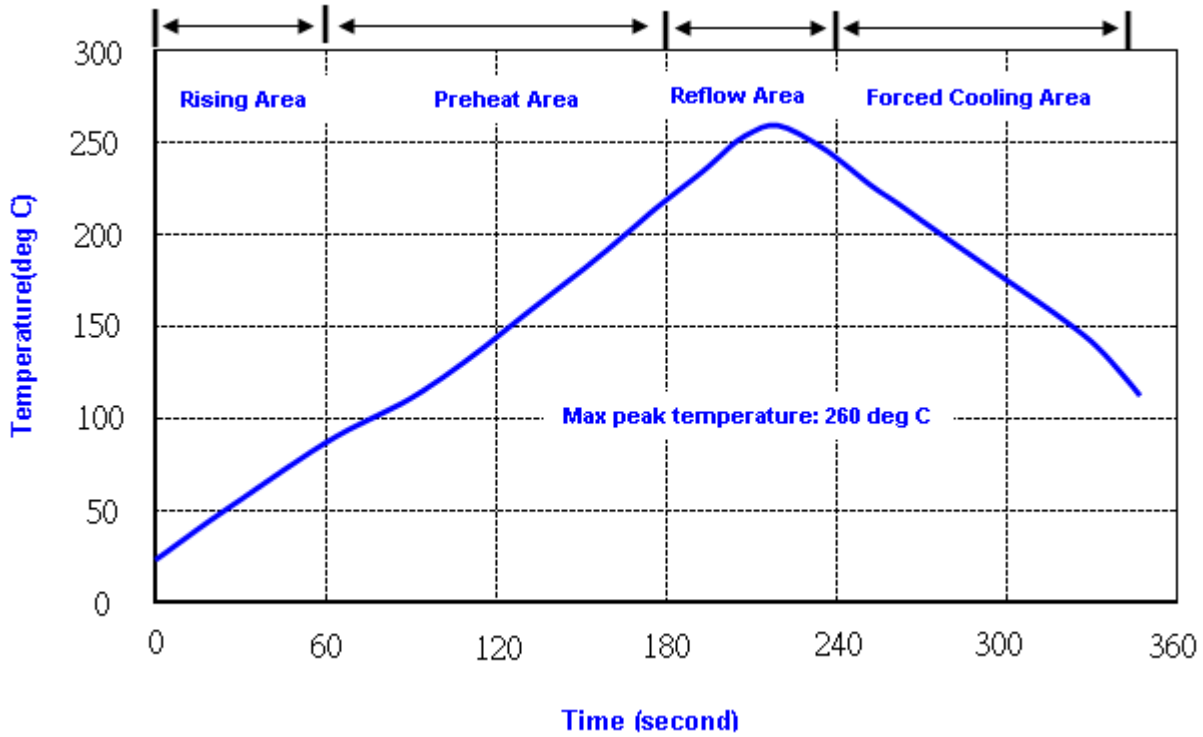
Level	Machine Mode (MM)	Standard
CLASS A	<200V	JESD22-A115-A
CLASS B	200V ~ 400V	
CLASS C	>400V	

Level	Human Body Mode (HBM)	Standard
CLASS 1B	500V ~ 1000V	JESD22-A115-B
CLASS 1C	1000V ~ 2000V	
CLASS 2	2000V ~ 4000V	
CLASS 3A	4000V ~ 8000V	

MSL : Level-1

Place of Production : Taiwan

Reflow Profile: Two times in process before function test



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 (AEC-Q200)

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	MIL-STD 202G method 204
Mechanical Shock	directions : 3 impacts per axis Acceleration : 6000g's, +20/-0 % Duration : 0.3 ms (total 18 shocks) Waveform : Half-sine	MIL-STD 202G method 213
Solderability	Solder Temperature:265±5℃ Duration time: 5±0.5 seconds.	J-STD-002
Environmental characteristics		
Thermal Shock	Heat cycle conditions -55℃ (30min) ←→ 125℃ (30min) * cycle time : 1000 times	MIL-STD 883G method 1010.8
Humidity test	Temperature : 85 ± 2 ℃ Relative humidity : 85% Duration : 1000 hours	MIL-STD 202G method 103
Dry heat (Aging test)	Temperature : 125 ± 2 ℃ Duration : 1000 hours	MIL-STD 202G method 108A
Cold resistance (Low Temp Storage)	Temperature : -40 ± 3 ℃ Duration : 1000 hours	IEC 60068-2-1