



TAI-SAW TECHNOLOGY CO., LTD.

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Product Specifications Approval Sheet

Product Description: SMD TSX 1.6X1.2mm 38.4MHz

(Temperature Sensing Crystal)

TST Part No.: TM0017A

Customer Part No.: _____

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

Checked by: _____ Glen Peng *Glen*

Approved by: _____ Kelly Huang *Kelly Huang*

Date: _____ 01/22/2021

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 TSX 1.6x1.2 38.4MHz

MODEL NO.: TM0017A

REV. NO.: 1.0

Revise:

Rev.	Rev. Page	Rev. Account	Date	Ref. No.	Revised by
1.0	N/A	Initial release	01/22/21'	N/A	Glen Peng



TAI-SAW TECHNOLOGY CO., LTD.

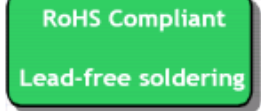
SMD TSX 1.6x1.2 38.4MHz

MODEL NO.: TM0017A

REV. NO.: 1.0

Features:

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



Description and Applications:

Surface mount 1.6mmx1.2mm crystal unit for use in wireless communications devices, especially for a need of ultra miniature package for mobility.

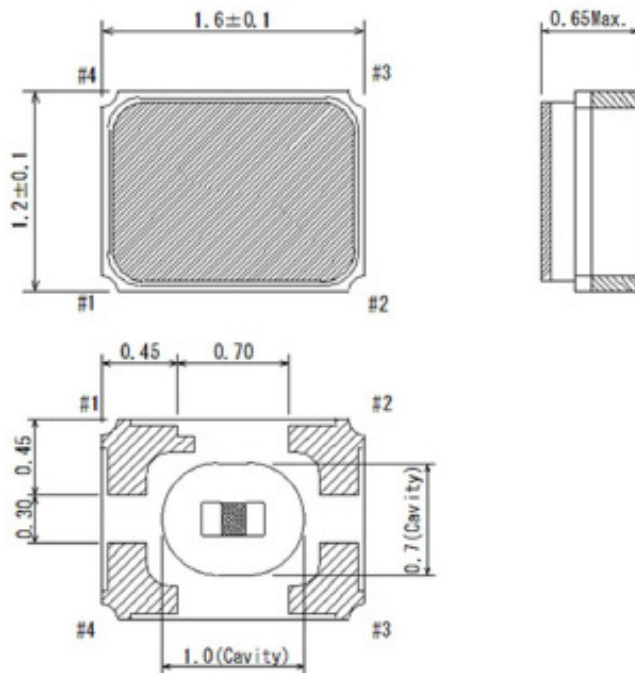
Electrical Specifications:

TM0017A	Specification
Nominal Frequency	38.400000 MHz
Mode of Oscillation	AT-cut Fundamental
Storage Temperature Range	-40°C to +105°C
Operating Temperature Range	-30°C to +85°C
Frequency Stability over Operating Temperature Range	+/-12 ppm (referred to the value at 29°C for temperature range -30°C to 85°C)
Frequency Make Tolerance (FL)	+/-10 ppm @ 25°C +/- 3°C
Equivalent Series Resistance (ESR)	80 Ω max
Frequency Drift After Reflow	+/- 2 ppm after four times reflow
Aging	+/-0.7 ppm / first year
Pulling Sensitivity(TS)	7 ppm/pF min and 16 ppm/pF max.
Load Capacitance (CL)	8 pF
Insulation Resistance	500 MΩ min
Spurious Mode Series Resistance	1100Ω Min. (@ +/- 1MHz)
Quality Factor	75000 Min.
Nominal Drive Level	50 uW typ and 100uW max

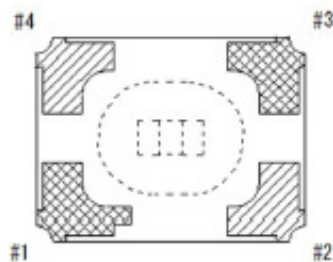
Thermistor Characteristics	
Resistance Value(at 25°C)	100KΩ +/- 1%
Beta Constant	4250K +/- 1%
Rated Power(at 25°C)	100mW Max
Specification(Crystal curve fitting)	
Inflection Temperature	+29°C +/- 1.5°C
First-order Curve Fitting Parameter (C ₁)	-0.40 to -0.10 ppm/°C
Second-order Curve Fitting Parameter (C ₂)	- 4.5 to 4.5 x10 ⁻⁴ ppm/°C ²
Third-order Curve Fitting Parameter (C ₃)	8.5 to 11.5 x10 ⁻⁵ ppm/°C ³
Residual frequency stability slope	+/-50 ppb /°C max

Mechanical Dimensions (mm):

1) Dimension (Unit : mm)



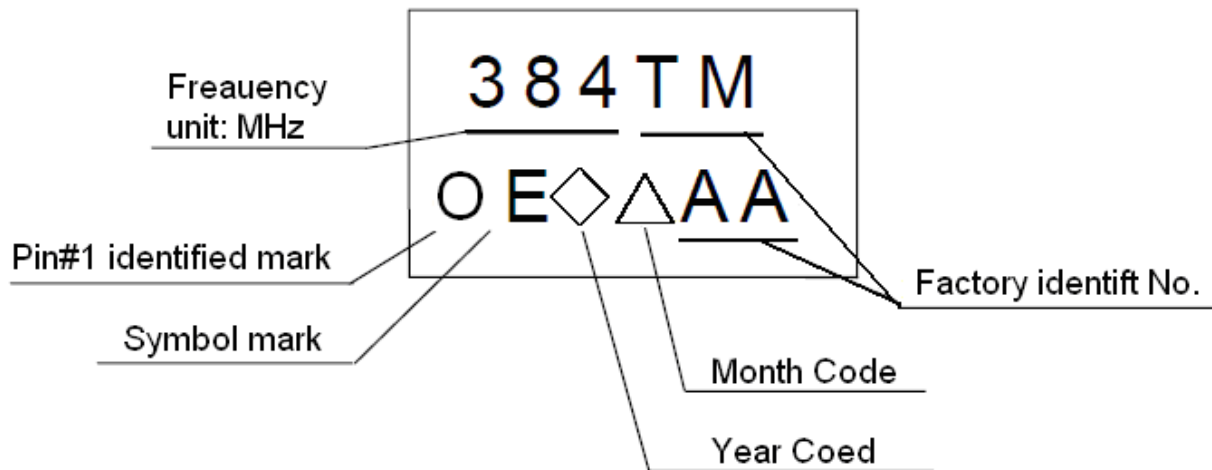
2) Circuit



Pin	Connection
1	XTAL
2	GND, thermistor
3	XTAL
4	Thermistor

(Top View)

Marking:



Nominal frequency omits the figure below the first place of decimals.

Ex) 38.4 MHz..... [384]

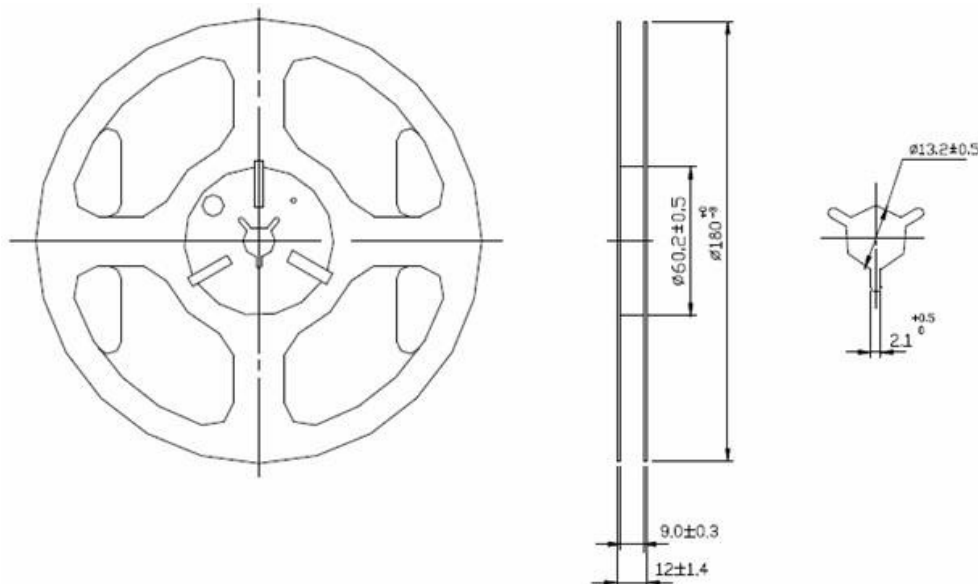
◊Year Code Table:

Year	2017	2018	2019	2020	2021
Code	7	8	9	0	1
Year	2022	2023	2024	2025	2026
Code	2	3	4	5	6

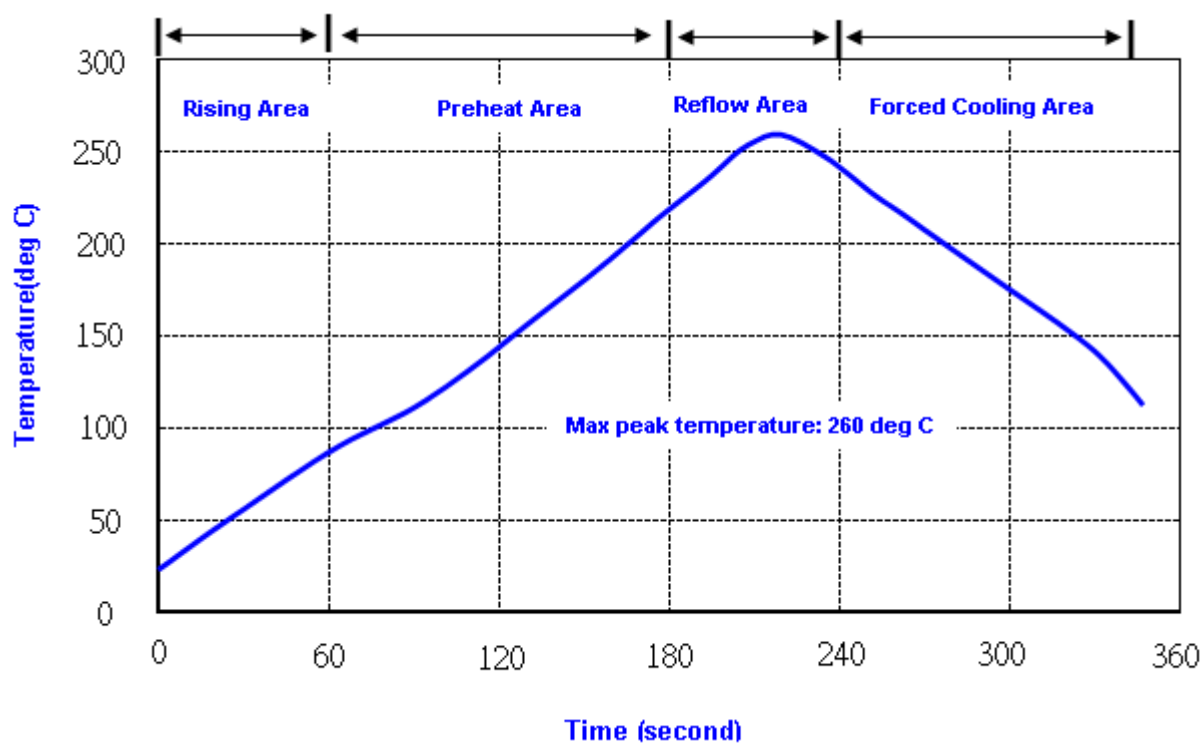
△Month Code Table:

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Month Code	1	2	3	4	5	6	7	8	9	X	Y	Z

Reel Dimensions (mm):



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 : 260 °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 55 Hz Sweep period : 1.0 minute Vibration directions : 3 mutually perpendicular Duration : 2 hr / direc.	MIL-STD 202F method 201A
Mechanical Shock	directions : 3 impacts per axis Acceleration : 3000g's, +20/-0 % Duration : 0.3 ms (total 18 shocks) Waveform : Half-sine	MIL-STD 202F method 213C
Solderability	Solder Temperature:265±5 °C Duration time: 5±0.5 seconds.	MIL-STD 883G method 2003
Environmental characteristics		
Thermal Shock	Heat cycle conditions -55 °C (30min) ↔ 125 °C (30min) * cycle time : 10 times	MIL-STD 883G method 1010.7
Humidity test	Temperature : 70 ± 2 °C Relative humidity : 90~95% Duration : 96 hours	MIL-STD 202F method 103B
Dry heat (Aging test)	Temperature : 125 ± 2 °C Duration : 168 hours	MIL-STD 883G method 1008.2 condition C
PCT test	Pressure: 2.06kg/cm ² (2.03*10 ⁵ pa) Temperature : 121 ± 2 °C Relative humidity : 100% Duration : 24 hours	EIAJED-4701-3 B-123A