

1. QUARTZ CRYSTAL UNIT SPECIFICATION

Parameter	Sign	Specification
1.1 Nominal Frequency :	F0	8.000MHz
1.2 Holder type :	-	FTX321S (SMD3225 SEAM TYPE)
1.3 Mode of oscillation :	-	Fundamental
1.4 Frequency tolerance :	FL	±10ppm at 25 °C±3°C
1.5 Equivalent resistance :	RR	300 ohms max.
1.6 Operating temperature range :	T _{OPR}	-40°C To +85°C
1.7 Storage temperature range :	T _{STG}	-55°C To +125°C
1.8 Frequency Stability :	TC	±50ppm at -40 °C To +85°C
1.9 Loading capacitance :	CL	12pF
1.10 Drive level :	DL	10 uW Typical. 200uW Max
1.11 Shunt Capacitance :	C0	3.0pF max.
1.12 Insulation resistance :	IR	More than 500MΩ at DC 100V
1.13 Circuit:	-	Measured in HP/E5100A,S&A 250B
1.14 Aging :	Fa	±2ppm max. (+25°C 1 st Year)
1.15 Dimensions and marking :		Refer to page.3
1.16 Emboss carrier tape & reel :		Refer to page.5 and page.6
1.17 Note :		

Standard atmospheric conditions

Unless otherwise specified, the standard range of atmospheric conditions for making measurement and tests are as follow:

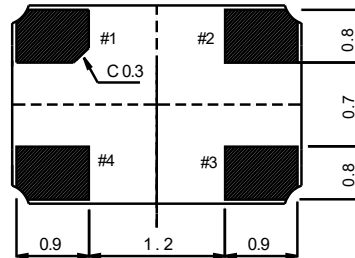
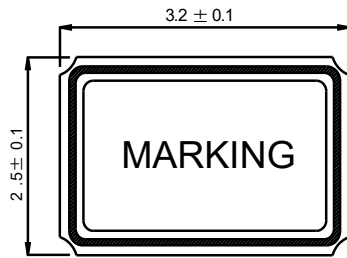
Ambient temperature : 25±3°C

Relative humidity : 40%~70%

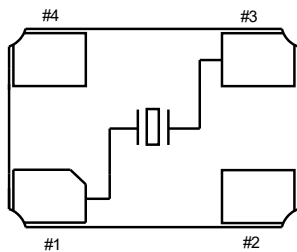
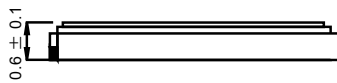
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2. FTX321S MARKING & DIMENSIONS

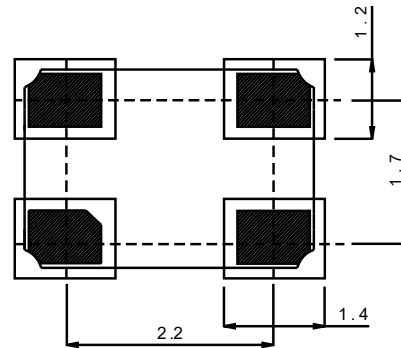
(UNIT: mm)



Marking #2, #4 is connected with metal cap of top.



<TOPVIEW>



Recommended Solder Pad Layout:

*Marking should be printed as following:

Logo, Nominal Frequency

*Manufacturing Logo: FT

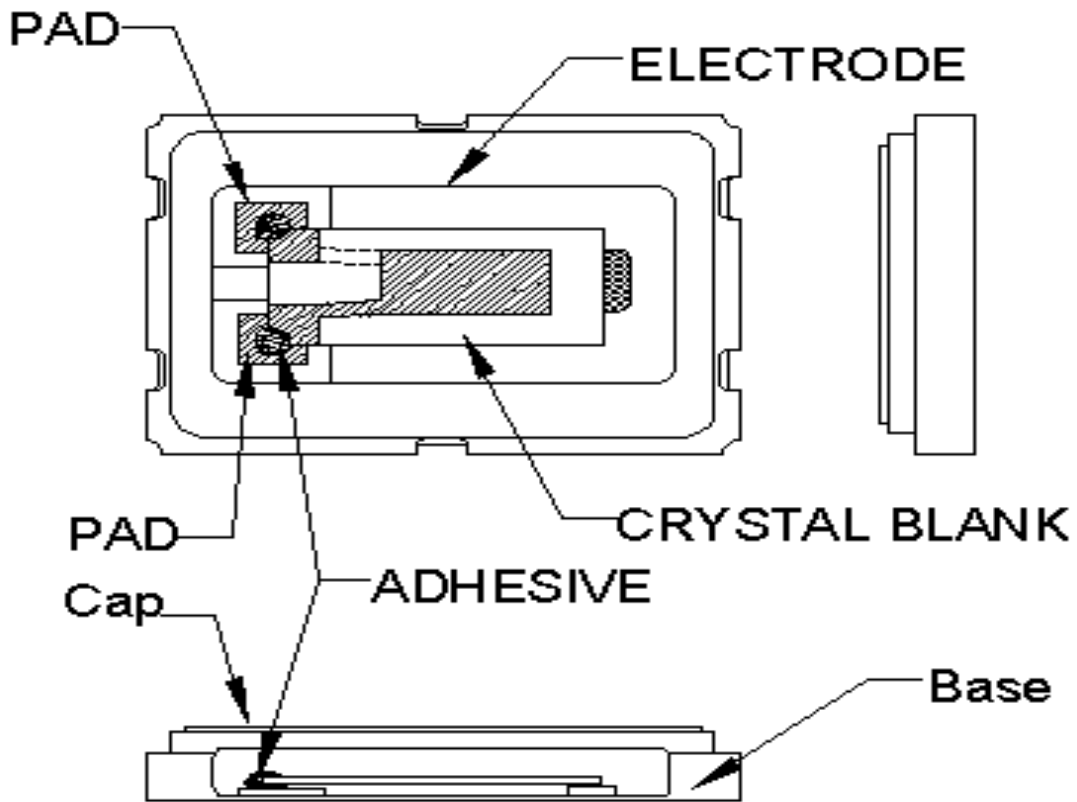
*Nominal frequency = 3 number after decimal point MAX.

(ex. 10.000 MHz → 10.000)

Marking: Laser marking

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3. INSIDE STRUCTURE



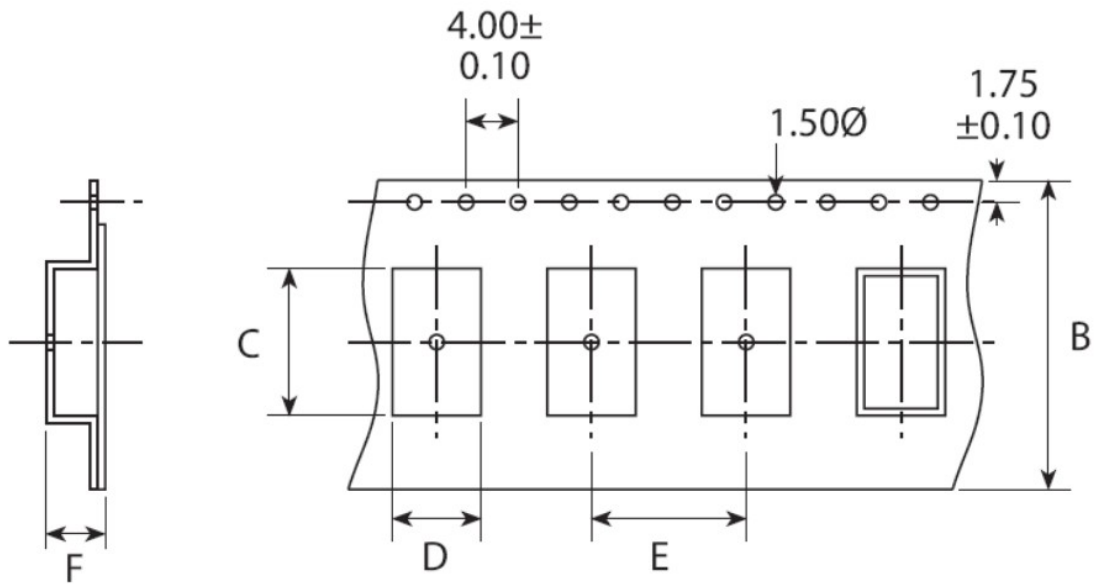
Reference drawing

Base:	Alumina Ceramic (Al_2O_3) Metallized Pad: W Ni Plating Au Plating
Cap:	Fe-Ni
(3) Crystal Enclosure Seal:	Seal Seam
(4) Crystal Blank	Rectangular At-Cut Quartz Crystal Blank
(5) Adhesive	Silver Conductive Polyimide Resin
(6) Electrode	Ag
(7) PAD	Alumina Ceramic (W. Ni. Au)

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4. FTX321S EMBOSS CARRIER TAPE & REEL

a.) Dimensions of Carrier Tape

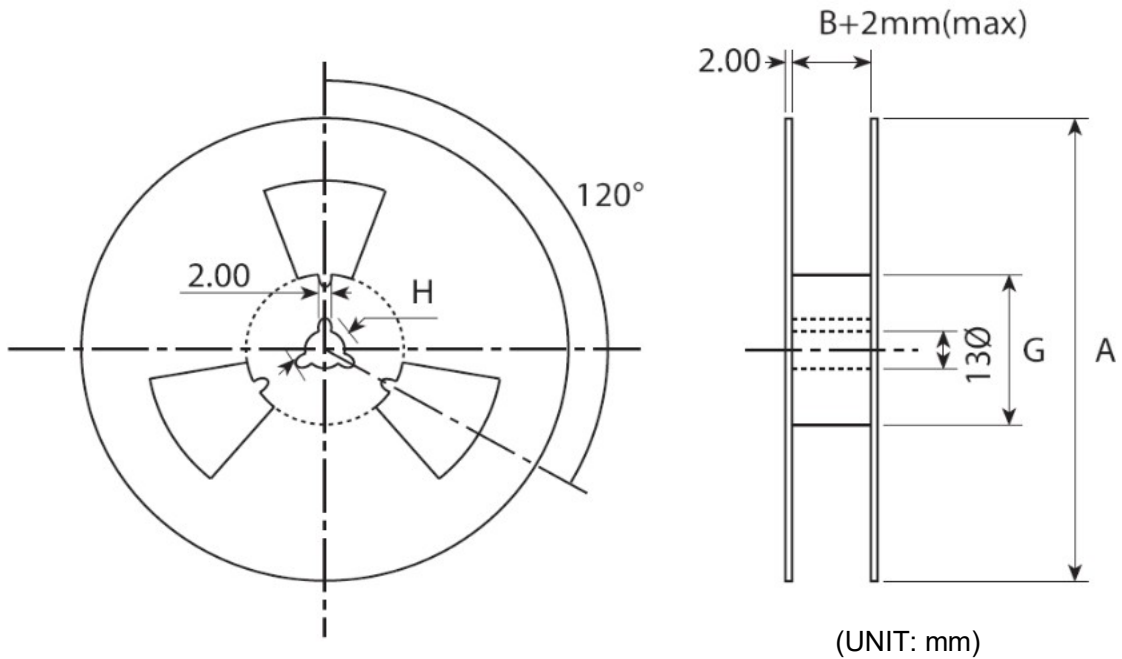


	A	B	C	D	E	F	G
SMD322	178 ± 2.0	8.0 ± 0.3	3.5 ± 0.1	2.8 ± 0.1	4.0 ± 0.1	1.4 ± 0.1	60.5 ± 1.0
5							

(UNIT: mm)

b.) Dimensions of Reel

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c.) Storage condition

Temperature: +40deg.C Max.

Relative Humidity: 80% Max.

d.) Standard packing quantity

3,000PCS / REEL

e.) Material of the tape

Tape	Material
Carrier tape	A – PET
Top tape	Polyester

f.) Label contents

- .The type of product
- .Our specification No.
- .Your Part No.
- .Lot No.
- .Nominal Frequency
- .Quantity
- .Our Company Name

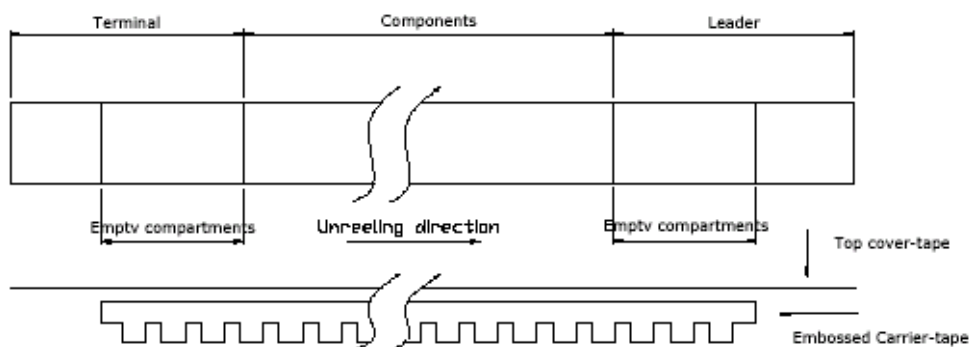
Sticks label for every reel.

PART NUMBER	
PO NO	
PR. NO:	
HOLDER TYPE	
FREQUENCY	
REMAKS	
QUANTITY	

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g.) Taping dimension

Leader	Cover-tape	The length of cover-tape in the leader is more than 400 mm including empty
	Carrier-tape	After all products were packaged, must remain more than twenty pieces or
Terminal	Cover-tape	The tip of cover-tape shall be fixed temporary by paper tape and roll around
	Carrier-tape	The empty embossed area which are sealed by top cover-tape must remain



h.) Joint of tape

The carrier-tape and top cover-tape should not be jointed.

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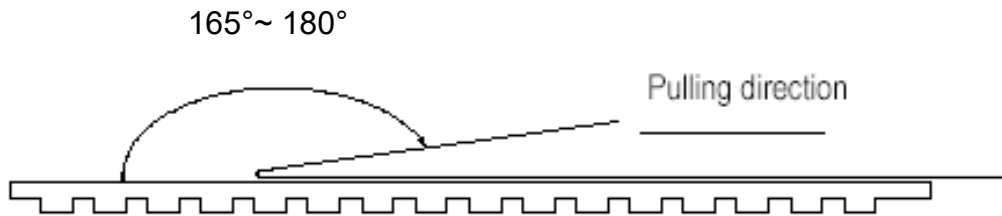
i.) Release strength of cover tape

It has to be between 0.1N to 0.7N under following condition.

Pulling direction 165° to 180°

Speed 300mm/min.

Otherwise unless specified.



Other standards shall be based on JIS C 0806-1990.

5. Mechanical Endurance: Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour.

	Item	Conditions	Specifications
5.1	Drop	Fall freely from 100 cm of height 3 times on a firm wood	MIL-STD-202F-203B
5.2	Mechanical Shock	Device are shocked to half sine wave (1000 G) three mutually perpendicular axes each 3 times.	MIL-STD-202F
5.3	Vibration	(1)Vibration Frequency: 10~55Hz (2)Cycle: 1 to 2 Min. (3)Full Cycle: 1.5mm P-P. (4)Direction: X.Y.Z (5)Time: 2 Hours / Each Direction	MIL-STD-883E
5.4	Substrate Bending	Mount the specimen on substrate. Apply the following pressure Direction: see Fig -1 Speed: 0.5 mm/sec Hours: 5 ± 1 sec Amount of substrate: 3 mm Max.	Without mechanical damage such as breaks. Without electrode peeling. Electrical characteristics shall be satisfied.
5.5	Adhesion	Mount the specimen on substrate. Apply the following pressure Direction: see Fig -2 Weight: 10N Hours: 10 ± 1 sec	

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5.6	Body strength	Mount the specimen on substrate. Apply the following pressure Direction: see Fig -3 Weight: 10N Hours: 10 ± 1 sec	
5.7	Seal	Fine Leak: 4.5kgf/cm ² 2hours 1×10 ⁻⁹ Pa.m ³ /sec Gross Leak: 4.5kgf/cm ² 2hours 1.5×10 ⁻⁵ Pa.m ³ /sec	MIL-STD-883E

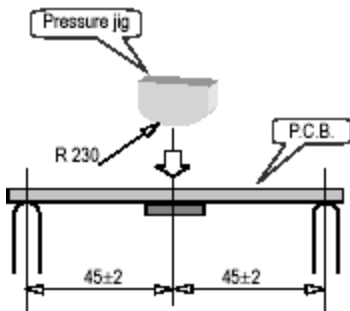


Fig-1

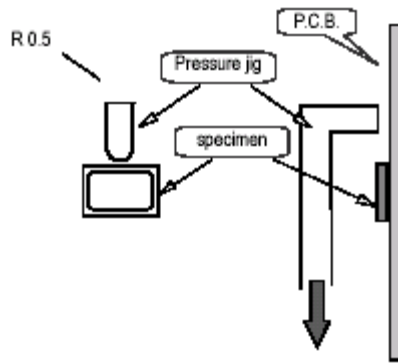


Fig-2

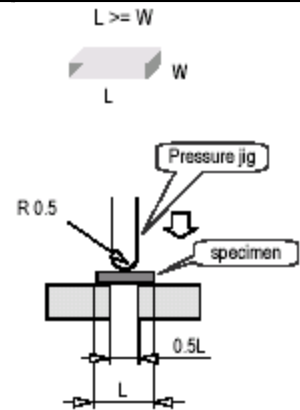


Fig-3

5.8	Solder ability	Pre-heat temperature : +150±10°C Pre-heat time : 60~120s When the temperature of the specimen is reached at +215±3°C, it shall be left for 30±1sec. Peak temperature 240±5°C Material: Pb-free (Sn-3.0Ag-0.5Cu) Flux : Rosin resin methyl alcohol solvent (1:4) The electrodes should be covered by a new solder at least 90% of immersed area.	MIL-STD-883E 2003
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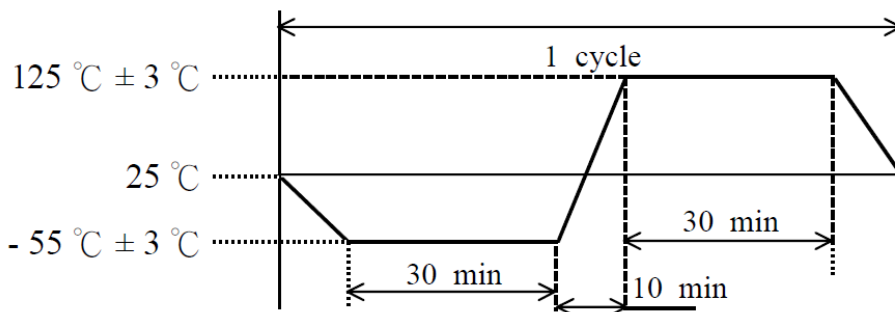
5.9	Resistance to Soldering Heat	<p>Run in Reflow Reflow soldering shall be allowed Only two(2) time.</p> <p style="text-align: center;">Available for Lead Free Soldering</p> <table border="1" data-bbox="454 929 1045 1052"> <tr> <td>(1)</td> <td>Preheat</td> <td>160~180 deg.C</td> <td>120sec.</td> </tr> <tr> <td>(2)</td> <td>Primary heat</td> <td>220 deg.C</td> <td>60sec.</td> </tr> <tr> <td>(3)</td> <td>Peak</td> <td>260 deg.C</td> <td>10sec. Max.</td> </tr> </table>	(1)	Preheat	160~180 deg.C	120sec.	(2)	Primary heat	220 deg.C	60sec.	(3)	Peak	260 deg.C	10sec. Max.	MIL-STD-202F
(1)	Preheat	160~180 deg.C	120sec.												
(2)	Primary heat	220 deg.C	60sec.												
(3)	Peak	260 deg.C	10sec. Max.												

6. Environmental Endurance: Provided that measurement shall be carried out after letting it alone in the room temperature for 1 hour.

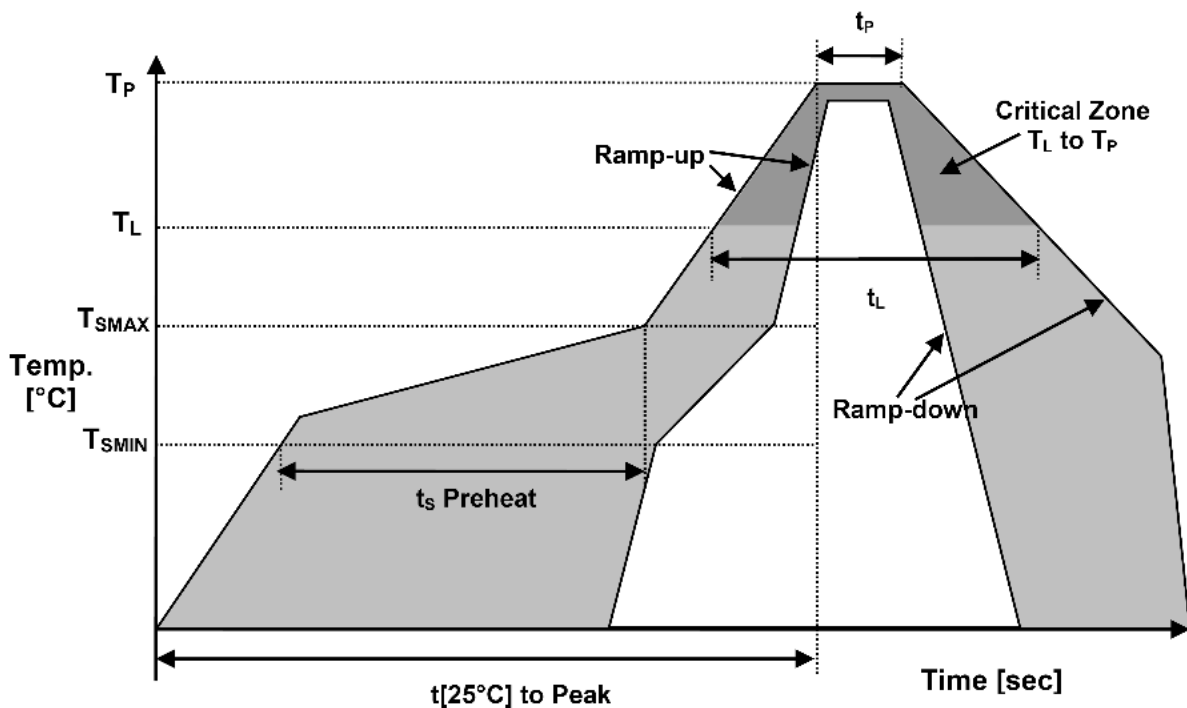
	Item	Conditions	Specifications
6.1	Humidity	+60°C±2°C, RH 80~85%, Duration of 500 hours. The units are then allowed to stand for approx 2 hours in room temperature before checking	MIL-STD-202F

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6.2	Storage in Low Temperature	Temperature: $-40\pm 2^{\circ}\text{C}$, Duration of 500 hours. The units are then allowed to stand at room temperature for approx 2 hours before checking.	MIL-STD-883E
6.3	Storage in High Temperature	Temperature: $+85^{\circ}\text{C}\pm 2^{\circ}\text{C}$, Duration of 500 hours. The units are then allowed to stand at room temperature for approx 2 hours before checking.	MIL-STD-883E
6.4	Thermal Shock	Temperature 1: $-55^{\circ}\text{C}\pm 5^{\circ}\text{C}$ Temperature 2: $125^{\circ}\text{C}\pm 5^{\circ}\text{C}$ Temperature change between T1 and T2 at soonest Run 100 cycles, maintain T1 and T2 30minutes each in one cycle (Refer to Fig-4)	MIL-STD-883E



7. Recommended Solder Reflow Profile



Temperature Min Preheat	T _{SMIN}	150°C
Temperature Max Preheat	T _{SMAX}	175°C
Time (T _{SMIN} to T _{SMAX})	t _s	60-180 sec.
Temperature	T _L	217°C
Peak Temperature	T _P	260°C
Ramp-up rate	R _{UP}	3°C/sec max.
Ramp-down rate	R _{DOWN}	6°C/sec max.
Time within 5°C of Peak Temperature	t _P	10 sec max.
Time t[25°C] to Peak Temperature	t[25°C] to Peak	480 sec max.
Time	t _L	60-150 sec.

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