PRODUCT SPECIFICATION

1.27mm PITCH SLIM-GRID® SHROUDED HEADERS (BOARD TO BOARD)

1.0 SCOPE

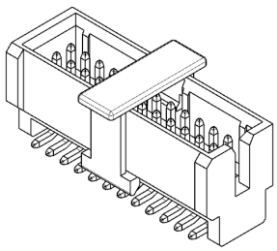
This Product Specification covers the 1.27mm centerline (pitch) printed circuit board (PCB) connector series

2.0 PRODUCT DESCRIPTION

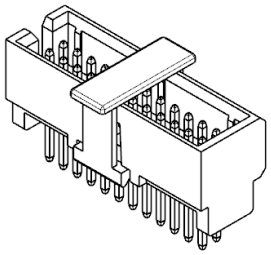
2.1 PRODUCT NAME AND SERIES NUMBER(S)

Product Name	Series Number
1.27mm Pitch SLIM-GRID® Vertical SMT Header	200989
1.27mm Pitch SLIM-GRID® Vertical Thru-hole Header	201022
1.27mm Pitch SLIM-GRID® Right Angle SMT Header	201173
1.27mm Pitch SLIM-GRID® Right Angle Thru-hole Header	201021

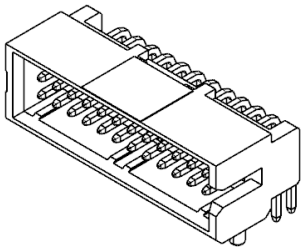
200989



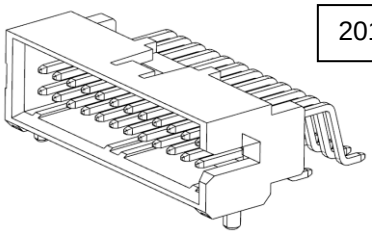
201022



201021



201173



2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

See Sales Drawing 2009890024, 2010210024, 2010220024 and 2011730024 for information on dimensions, materials, platings and markings.

2.3 SAFETY AGENCY APPROVALS

UL File Number : File E29179, Vol 10
CSA File Number : 152514 (LR 19980)

CSA approval meets following standards/test procedures:
a) CSA std. C22.2 No. 182.3-M1987
b) UL-1977

* "C" and "US" mark adjacent to CSA signifies that the product has been evaluated to the applicable CSA and ANSI/UL standards, for use in Canada and US respectively.
Series 78120, 87933, 200989, 201021, 201022, 201173, rated 4.3A, 125Vac

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

The following documents form a part of this specification to the extended specified herewith. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence

Reference Product Specifications
781200001 1.27mm Pitch SLIM-GRID® Receptacle

4.0 RATINGS

4.1 MAXIMUM VOLTAGE

125 Volts Vac

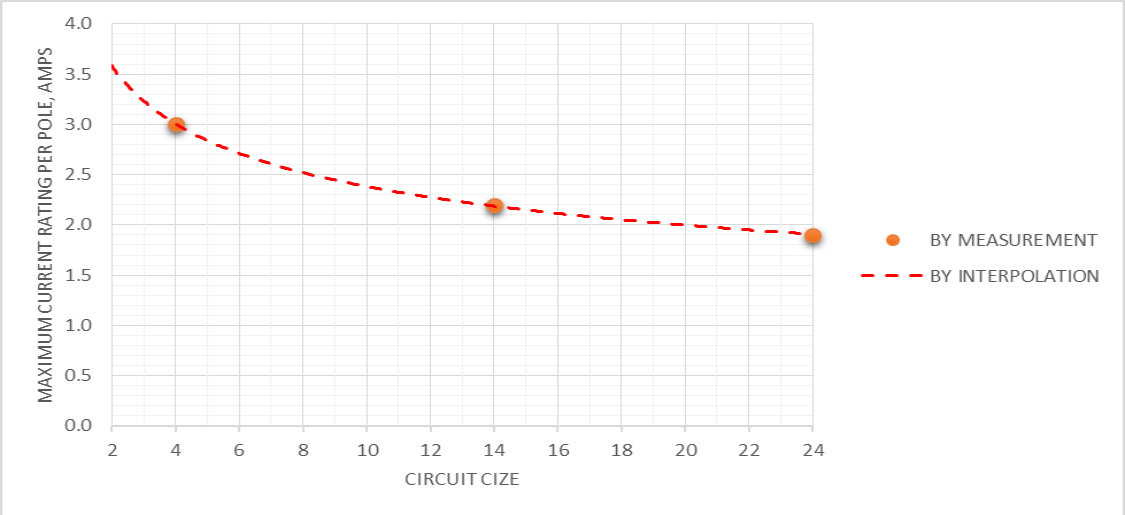
4.2 MAXIMUM CURRENT

4.3 Amps per pole (with 1 contact powered up)

Current rating is application dependent and each application should be evaluated by the end user for compliance to specific safety agency requirements. The ratings listed in the chart below are per Molex test method based on a 30° C maximum temperature rise over ambient temperature and are provided as a guideline. Appropriate de-rating is required based on circuit size, ambient temperature, copper trace size on the PCB, gross heating from adjacent modules/components and other factors that influence connector performance.

	CIRCUIT SIZE (NUMBER OF CONTACTS POWERED UP)											
	2*	4	6*	8*	10*	12*	14	16*	18*	20*	22*	24
Current Rating per Pole (Amps, Max)	3.60	3.00	2.70	2.50	2.40	2.30	2.20	2.10	2.10	2.00	2.00	1.90

*Extrapolated from test data. Refer to sheet 3 of 12 for more information.



4.3 TEMPERATURE

Operating: - 55°C to + 105°C
Non-operating: - 55°C to + 105°C

5.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	**Contact Resistance (LLCR)**	Mate connectors: apply a maximum voltage of **20** mV and a current of **100** mA. (EIA-364-23) Note: Wire resistance and traces shall be removed from the measured value.	**30** milliohms [MAXIMUM] [initial]
2	**Insulation Resistance**	Mated & unmount connectors: apply a voltage of **500** VDC between adjacent terminals and between terminals to ground. (EIA-364-21)	**1000** Megohms [MINIMUM]
3	**Dielectric Withstanding Voltage**	Mated & unmount connectors: apply a voltage of **1000**VAC for **1** minute between adjacent terminals and between terminals to ground. (EIA-364-20)	No breakdown; Current leakage < **5** mA
4	**Temperature Rise**	Mate connectors: measure the temperature rise of the contact when the maximum DC rated current is passed. (EIA-364-70, Method 1)	Temperature rise: **+30**°C [MAXIMUM]

5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5	**Connector Mate & Unmate Force**	Mate and unmate connectors at a rate of **25.4 mm/min**.. (EIA-364-13D, Method A)	**Mate Force** **15N** (24ckt) **10N** (4ckt) [MAXIMUM] **Unmate Force** **3.0N** (24ckt) **0.5N** (4ckt) [MINIMUM]
6	**Durability**	Mate connectors up to **50** cycles at a maximum rate of **500 ±50 cycles/hr**. (EIA-364-09)	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL]
7	**Reseating**	Manually mate and unmate the connector with mating half for **3 cycles** with rate of **5 cycles/min** maximum. (EIA-364-09)	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL]
8	**Terminal Retention Force (Header)**	Axial pullout force on the terminal in the housing at a rate of **25 ± 6** mm (**1 ± ¼** inch) per minute. (EIA-364-29, Method C)	**16.0 N** [MINIMUN]

5.3 ENVIRONMENTAL REQUIREMENTS

<table>
<tr><td>9</td><td>Vibration</td><td>Mate connectors and subject to the following vibration conditions, for a period of 2 hours in each 3 mutually perpendicular axis.

Amplitude: 1.52mm (.060 inch) peak to peak
Test pulse: half sine
Sweep: 10->55->10 Hz in 1 minute
Duration: 2 hours in each x-y-z axis.

(EIA-364-28, Test Condition I)</td><td>Appearance: No Damage

15milliohms
[MAXIMUM]
(change from initial)

Discontinuity: 1.0 µs
[maximum]</td></tr>
<tr><td>10</td><td>Mechanical shock</td><td>Mate connectors and subject to the following shock conditions, 3 shocks shall be applied along 3 mutually perpendicular axis. (total of 18 shocks)

Peak value: 490 m/s sq. (50G)
Test pulse : half sine
Duration : 11 ms in each x-y-z axis

(EIA-364-27B Condition A)</td><td>Appearance: No Damage

Contact Resistance:
15milliΩ
[MAXIMUM]
[CHANGE FROM INITIAL]

Discontinuity: 1.0 µs
[maximum]</td></tr>
<tr><td>11</td><td>Thermal shock</td><td>Mate connectors, expose to 5 cycles of:-
<table><tr><td>Temperature °c</td><td>Duration (minutes)</td></tr><tr><td>-55+0/-5</td><td>30</td></tr><tr><td>Transfer time from cold to hot</td><td>5 maximum</td></tr><tr><td>+105+3/-0</td><td>30</td></tr><tr><td>Transfer time from hot to cold</td><td>5 maximum</td></tr></table>
(EIA-364-32G Method A, Condition VII)</td><td>Appearance: No Damage

Contact Resistance:
15milliΩ
[MAXIMUM]
[CHANGE FROM INITIAL]</td></tr>
<tr><td>12</td><td>Temperature life</td><td>Mate connectors, expose to:-

Temperature: 105 ± 2 °c
Duration: 96 hours.

(EIA-364-17, Method A, Condition 4)</td><td>Appearance: No Damage

Contact Resistance:
15milliΩ
[MAXIMUM]
[CHANGE FROM INITIAL]</td></tr>
</table>

13	**Cyclic temperature and humidity**	ate connector and expose to:- Temperature: **25** ± **3** °C @ Humidity**: 80**% ± **3**% And Temperature: **65** ± **3** °C @ Humidity**: 50**% ± **3**% Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Duration: **24 cycles (72 hours**)	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL] Dielectric withstanding Voltage: No breakdown Insulation resistance: **1000** megaΩ minimum
14	**Low temperature test**	Mate connectors and expose to: Temperature: **-40 ± 3**°C Duration: **96 +5/-0** hours (EIA-364-59A)	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL]
15	**SO_2 gas**	Mate connectors and expose to: SO_2 gas density: **50 ±5** ppm Temperature: **40 ±2** °C Duration: **24 hours** Humidity: **60-75%.**	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL]
16	**Salt spray**	Expose the mated connectors to the following salt mist condition: Concentration : **5 ±1**% Temperature : **35 +1/-2**°C Test time : **48 hours** (Note: immediately after exposure, the test specimens shall be dipped in running tap (≤38°C) for 5 mins max and dried for 16 hour max in a circulating air oven at 38 ± 3°C. Sample examination done in room temperature. (EIA-364-26C, Condition B)	Appearance: No Damage Contact Resistance: **15**milliΩ [MAXIMUM] [CHANGE FROM INITIAL]

17	**Solderability**	Unmate connector. Steam age for **8 hour ± 15 min.** (precondition: Condition C) **SMT** Surface mount process simulation test Solder paste is deposited onto screen (e.g.ceramic plate) via stencil. The connectors are placed onto the solder paste print. Subject the substrate and component to the reflow process through a convection oven. Refer to section10.0 for temperature profile. Flux type: **ROL0** **THRU-HOLES** Dip and look test Dip solder tails into solder pot at a temperature of 245 ± 5°c for 5 ± 0.5 sec. Emersion rate: 25.4 +/-6.4 mm /sec Flux type: rol1 (JESD22-B-102E; Method 1 and 2)	95% of the immersed area must show no voids, pin holes
18	**Resistance to solder Heats**	**SMT** Convection reflow Sample to be passed through reflow over according to temperature profiles (shown in section10.0) (EIA-364-56C, Procedure 6)	Appearance: no damage
19	**Resistance to Wave Soldering**	**THRU-HOLES** WAVE solder terminations Sample to be mounted on pcb and passed through oven according to temperature profiles (shown in section 10.0)	Appearance: no bridging
20	**Optional Crushed Pegs Insertion Force (For 201021 Only)**	Mount connectors onto the board at a rate of **25.4 mm/min**. (EIA-364-13D, Method A)	**Insertion Force:** **20 N** [MAXIMUM]

6.0 APPLICATION

6.1 PLACEMENT FORCE - CONNECTOR 201021 SERIES

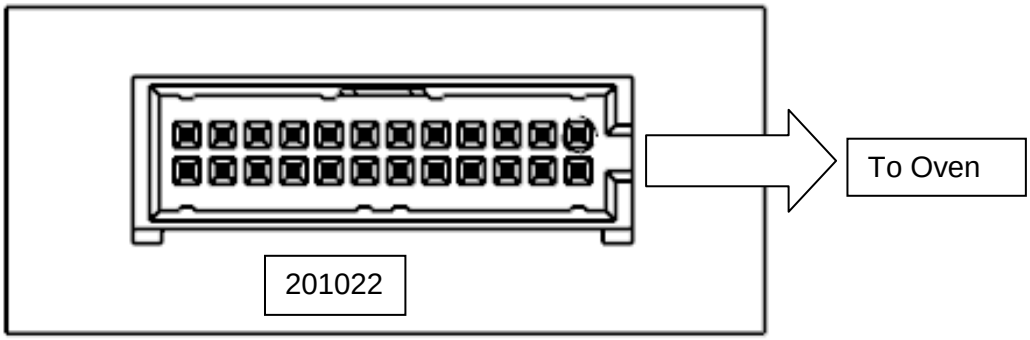
For series 201021 with peg option, it is recommended to apply a minimum force of 20N onto a mounting gauge to ensure crushed pegs are properly inserted into PCB holes

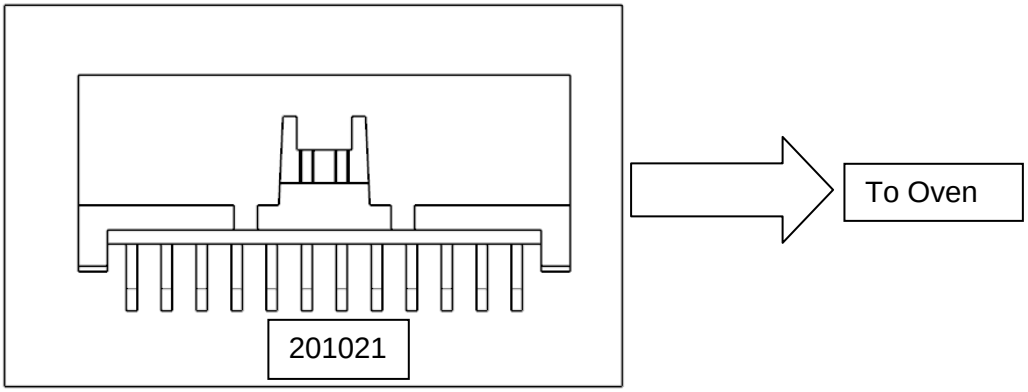
6.2 MOUNTING WEIGHT - CONNECTOR 201021 SERIES

For series 201021 without peg option, it is recommended to place a weight (>2g) on connector to minimize the lifting of light weight connector by surface tension of solder paste

6.3 PCBA ORIENTATION TO OVEN - CONNECTOR 201021/201022 THROUGH-HOLE SERIES

It is recommended to place the connector on board in the following orientation before send the PCBA assembly to wave soldering oven.





7.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage.
Parts are packaged in bulk, tape and reel or tube, refer to Appropriate Sales Drawing and Packaging Specification for specific information.

8.0 OTHERS

8.1 Although some discolouration could be seen on the soldertail after reflow, it does not impact on the product's performance.
8.2 Mating should be performed as close as possible to the mating axis for the delicate ckt sizes.

9.0 TEST SEQUENCE

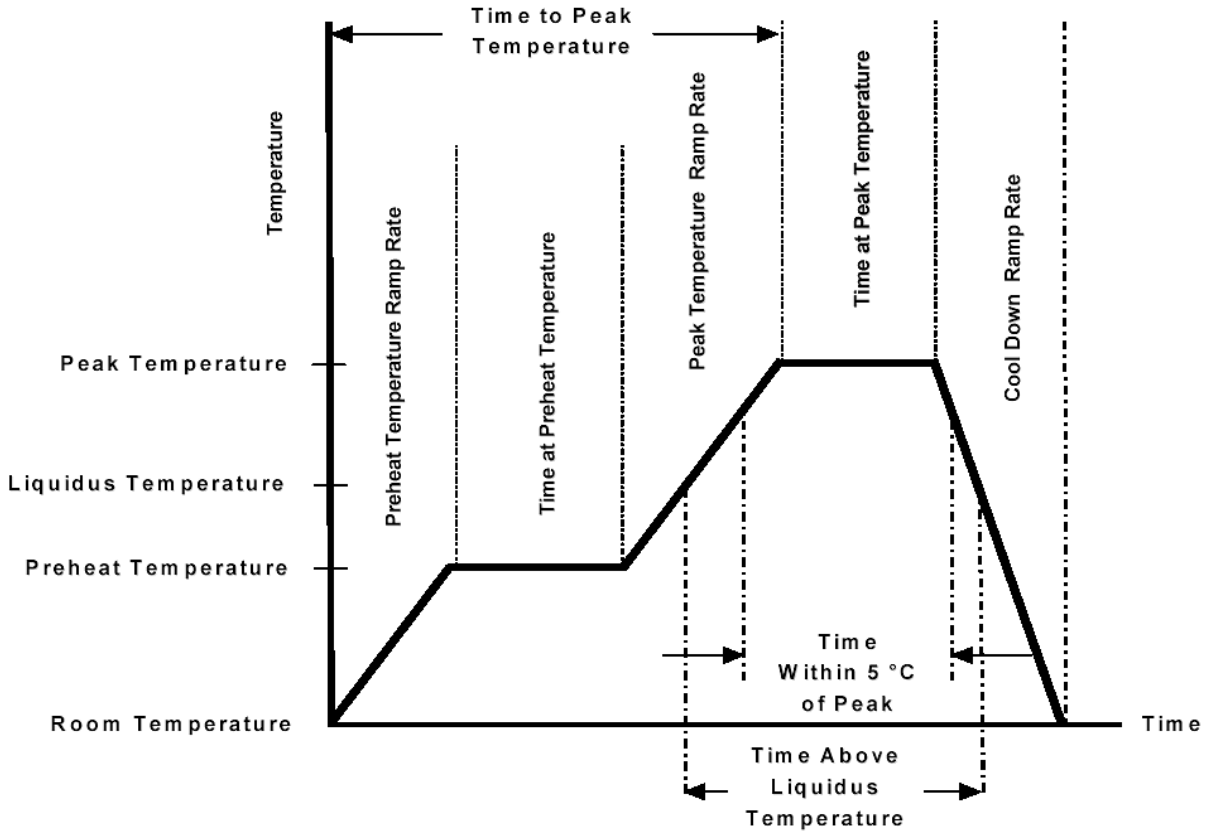
Sequential Tests Group →	1	2	3	4	5	6	7	8	9.1	9.2	10	11	12	13
Test or Examination ↓														
Sample size	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Resistance to Solder Heat	1	1	1	1	1	1	1	1		1				
Resistance to Wave Soldering														1
Low Level Contact Resistance (LLCR)	2, 5, 7	2, 5, 7, 9	2, 5, 7, 9		2, 4	2, 4	2, 4	3, 6						
Insulation Resistance				2, 6										
Dielectric Withstanding Voltage				3, 7										
Connector Mate								2, 7						
Connector Unmate								4, 8						
Durability	3(a)	3(a)	3(a)					5						
Crushed Pegs Insertion Force													1	
Reseating	6	8												
Vibration			6											
Mechanical Shock			8											
Thermal Shock		4		4										
Temperature Life	4		4(a)											
Cyclic Temperature & Humidity		6		5										
Low Temperature Test					3									
SO_2 gas (Gold plated)						3								
Salt Spray							3							
Pin Retention (in housing)									1	2				
Solderability											1			
Temperature Rise												1		

Notes:

(a) Preconditioning
- Durability: 20cycles for gold plated
- Temperature life: duration is 48 hours.

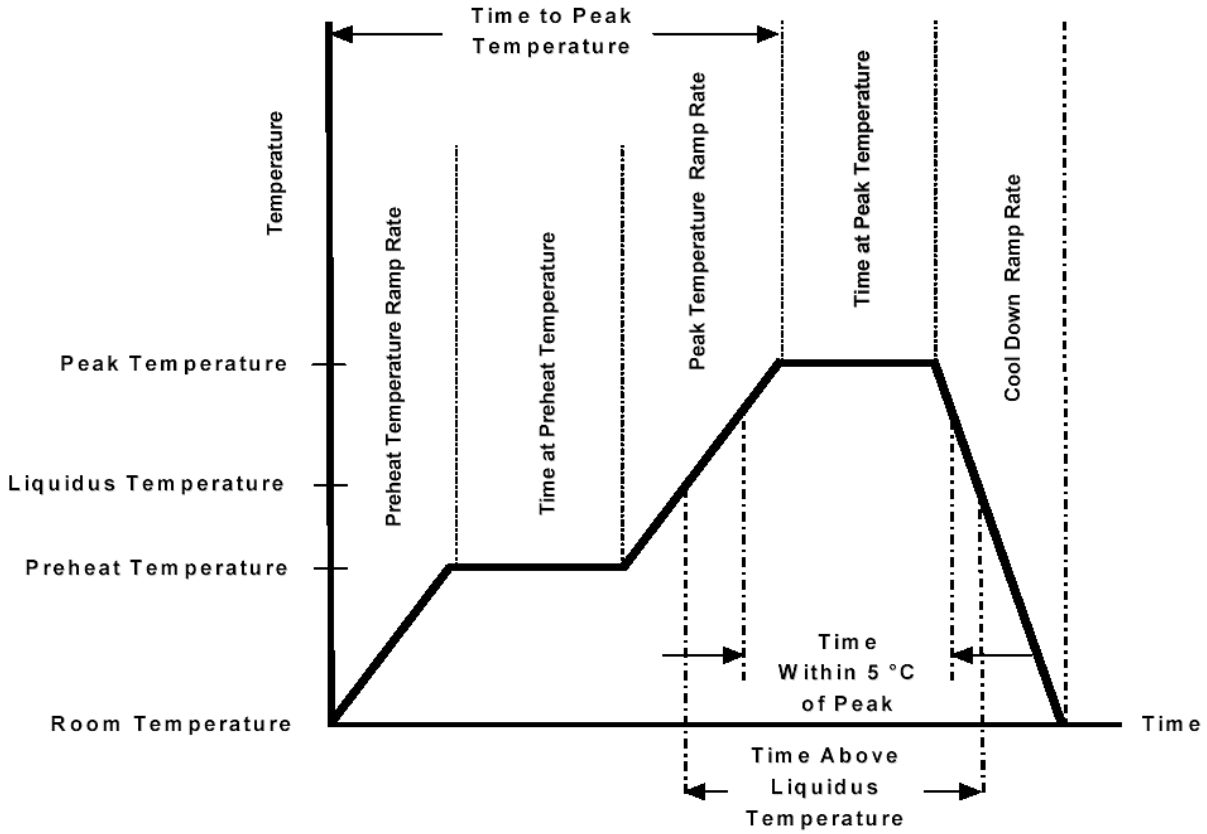
10.0 REFLOW PROFILE

Lead-free reflow profile requirement for soldering heat resistance testing



Description	Requirement
Average Ramp Rate	3°C/sec Max
Preheat Temperature	150°C Min to 200°C Max
Preheat Time	60 to 180 sec
Ramp to Peak	3°C/sec Max
Time over Liquidus (217°C)	60 to 150 sec Max
Peak Temperature	260 0/-5°C
Time within 5°C of Peak	20 to 40 sec
Ramp - Cool Down	6°C/sec Max
Time 25 °C to Peak	8 Min Max

Lead-free reflow profile requirement for solderability test



Description	Requirement
Preheat Temperature	160°C Min to 180°C Max
Preheat Time	50 to 70 sec
Peak Temperature	230 ~ 245°C
Time within 5°C of Peak	50 to 70 sec

Lead-free wave soldering profile requirement