

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

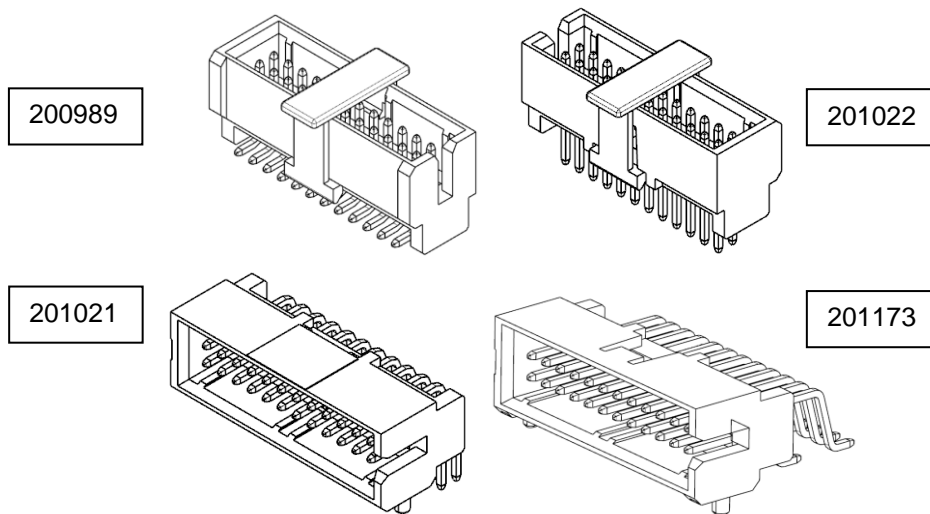
1.0 SCOPE

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
<u>1.27mm</u> Pitch SLIM-GRID® Vertical SMT Header	200989
<u>1.27mm</u> Pitch SLIM-GRID® Vertical Thru-hole Header	201022
<u>1.27mm</u> Pitch SLIM-GRID® Right Angle SMT Header	201173
<u>1.27mm</u> Pitch SLIM-GRID® Right Angle Thru-hole Header	201021



2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

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

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 1 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

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

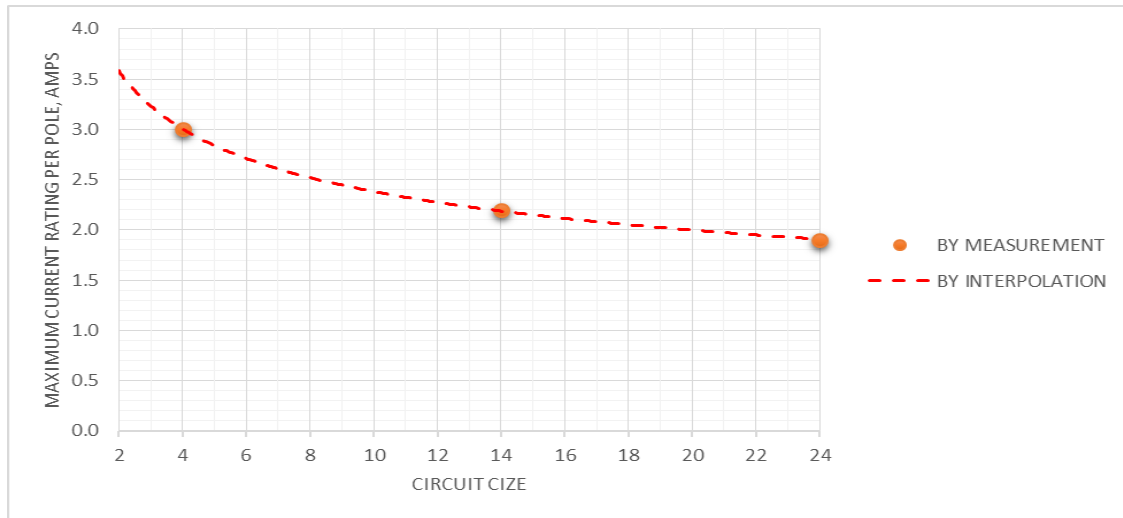
4.3 Amps per pole (with 1 contact powered up)

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.

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 2 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM



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]

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 3 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

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: 15milliΩ [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: 15milliΩ [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 [MINIMUM]

REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
A2	ECM: 118480 DATE: 2017/06/22	PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID[®] SHROUDED HEADERS	4 of 12
DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
2009890001	SCHEONG	CGOH	KHLIM
TEMPLATE FILENAME: PRODUCT_SPEC[SIZE_A4](V.2).DOC			

5.3 ENVIRONMENTAL REQUIREMENTS

9	Vibration	<p>Mate connectors and subject to the following vibration conditions, for a period of 2 hours in each 3 mutually perpendicular axis.</p> <p>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.</p> <p>(EIA-364-28, Test Condition I)</p>	<p>Appearance: No Damage</p> <p>15milliohms [MAXIMUM] (change from initial)</p> <p>Discontinuity: 1.0 µs [maximum]</p>										
10	Mechanical shock	<p>Mate connectors and subject to the following shock conditions, 3 shocks shall be applied along 3 mutually perpendicular axis. (total of 18 shocks)</p> <p>Peak value: 490 m/s sq. (50G) Test pulse : half sine Duration : 11 ms in each x-y-z axis</p> <p>(EIA-364-27B Condition A)</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p> <p>Discontinuity: 1.0 µs [maximum]</p>										
11	Thermal shock	<p>Mate connectors, expose to 5 cycles of:-</p> <table border="1" data-bbox="563 1126 1054 1395"> <thead> <tr> <th>Temperature °c</th> <th>Duration (minutes)</th> </tr> </thead> <tbody> <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> </tbody> </table> <p>(EIA-364-32G Method A, Condition VII)</p>	Temperature °c	Duration (minutes)	-55+0/-5	30	Transfer time from cold to hot	5 maximum	+105+3/-0	30	Transfer time from hot to cold	5 maximum	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p>
Temperature °c	Duration (minutes)												
-55+0/-5	30												
Transfer time from cold to hot	5 maximum												
+105+3/-0	30												
Transfer time from hot to cold	5 maximum												
12	Temperature life	<p>Mate connectors, expose to:-</p> <p>Temperature: 105 ± 2 °c Duration: 96 hours.</p> <p>(EIA-364-17, Method A, Condition 4)</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p>										

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 5 of 12	
DOCUMENT NUMBER: 2009890001		CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

13	Cyclic temperature and humidity	<p>ate connector and expose to:-</p> <p>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)</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p> <p>Dielectric withstanding Voltage: No breakdown</p> <p>Insulation resistance: 1000 megaΩ minimum</p>
14	Low temperature test	<p>Mate connectors and expose to:</p> <p>Temperature: -40 ± 3°C Duration: 96 +5/-0 hours (EIA-364-59A)</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p>
15	SO₂ gas	<p>Mate connectors and expose to:</p> <p>SO₂ gas density: 50 ±5 ppm Temperature: 40 ±2 °C Duration: 24 hours Humidity: 60-75%.</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p>
16	Salt spray	<p>Expose the mated connectors to the following salt mist condition:</p> <p>Concentration : 5 ±1% Temperature : 35 +1/-2°C Test time : 48 hours</p> <p>(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.</p> <p>(EIA-364-26C, Condition B)</p>	<p>Appearance: No Damage</p> <p>Contact Resistance: 15milliΩ [MAXIMUM] [CHANGE FROM INITIAL]</p>

<u>REVISION:</u> A2	<u>ECR/ECN INFORMATION:</u> ECM: 118480 DATE: 2017/06/22	<u>TITLE:</u> PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID[®] SHROUDED HEADERS	<u>SHEET No.</u> 6 of 12	
<u>DOCUMENT NUMBER:</u> 2009890001		<u>CREATED / REVISED BY:</u> SCHEONG	<u>CHECKED BY:</u> CGOH	<u>APPROVED BY:</u> KHLIM

17	Solderability	<p>Unmate connector.</p> <p>Steam age for 8 hour ± 15 min. (precondition: Condition C)</p> <p>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: ROLO</p> <p>THRU-HOLES Dip and look test Dip solder tails into solder pot at a temperature of $245 \pm 5^{\circ}\text{c}$ for 5 ± 0.5 sec. Emersion rate: 25.4 ± 6.4 mm /sec Flux type: rol1</p> <p>(JESD22-B-102E; Method 1 and 2)</p>	95% of the immersed area must show no voids, pin holes
18	Resistance to solder Heats	<p>SMT Convection reflow Sample to be passed through reflow over according to temperature profiles (shown in section10.0)</p> <p>(EIA-364-56C, Procedure 6)</p>	Appearance: no damage
19	Resistance to Wave Soldering	<p>THRU-HOLES WAVE solder terminations Sample to be mounted on pcb and passed through oven according to temperature profiles (shown in section 10.0)</p>	Appearance: no bridging
20	Optional Crushed Pegs Insertion Force (For 201021 Only)	<p>Mount connectors onto the board at a rate of 25.4 mm/min.</p> <p>(EIA-364-13D, Method A)</p>	Insertion Force: 20 N [MAXIMUM]

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID[®] SHROUDED HEADERS	SHEET No. 7 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

6.0 APPLICATION

6.1 PLACEMENT FORCE - CONNECTOR 201021 SERIES

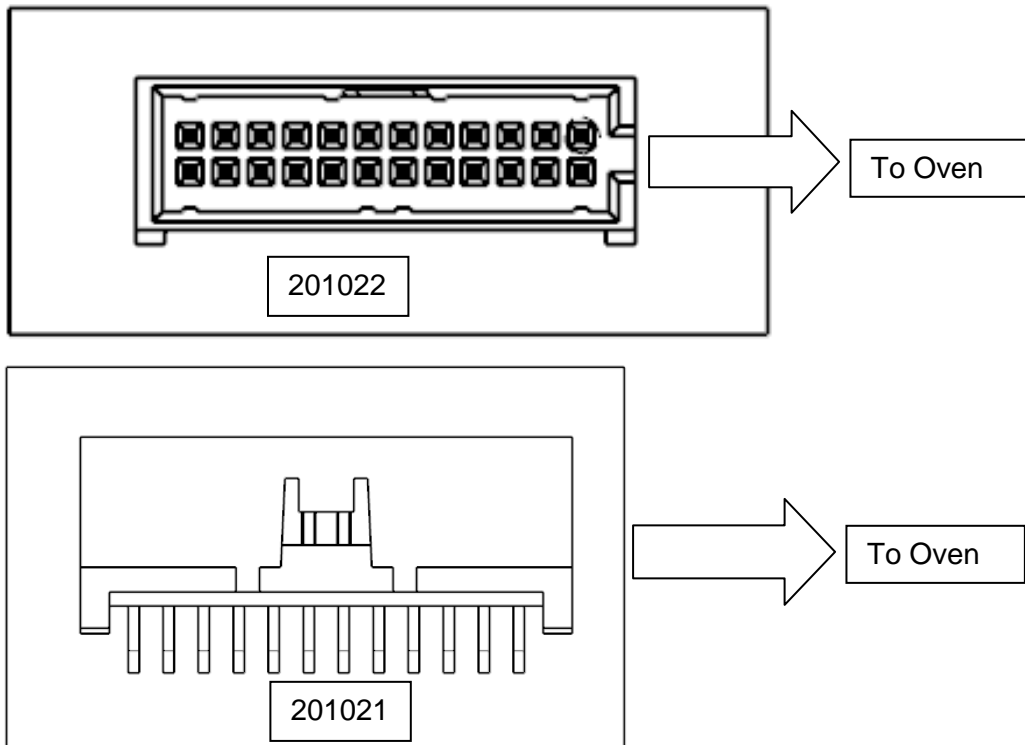
For series 201021 with peg option, it is recommended to apply a minimum force of 20N onto a mounting gauge to ensure crushed pegs are properly inserted into PCB holes

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.

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 8 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

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:

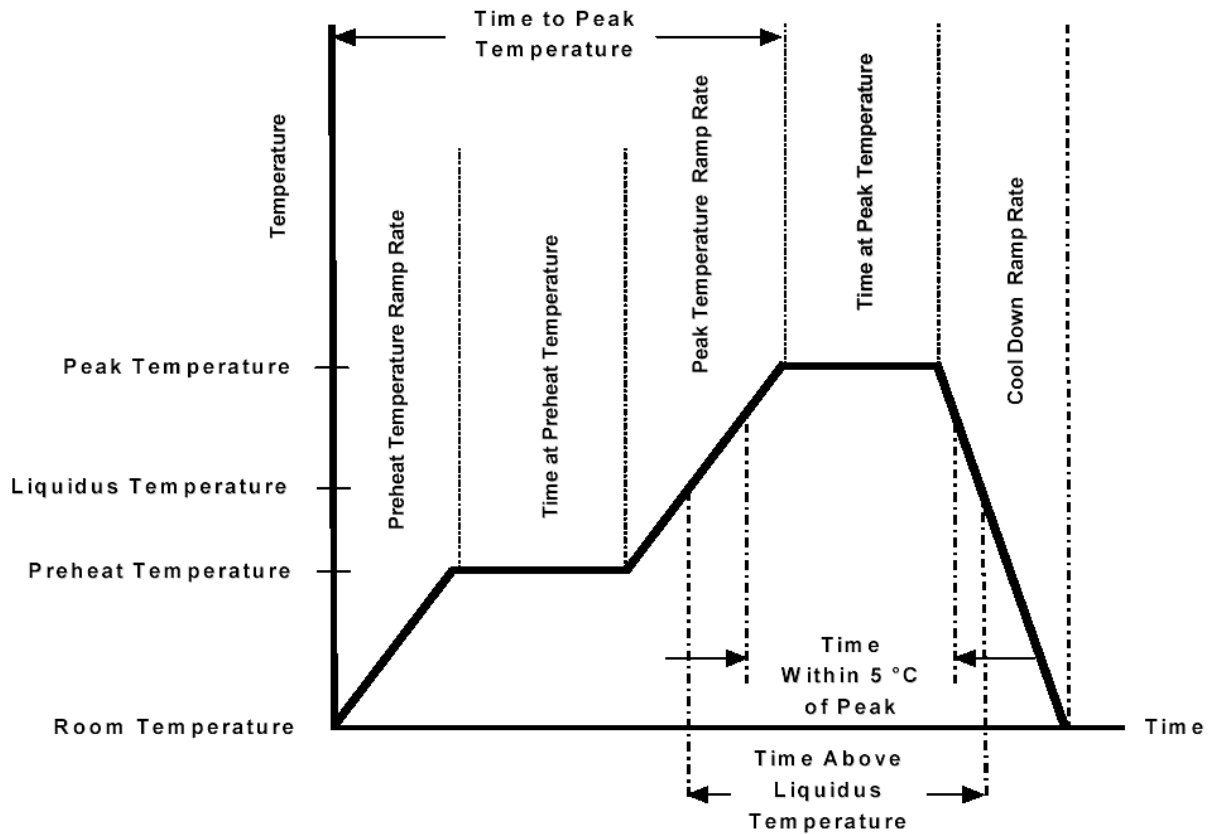
(a) Preconditioning

- Durability: 20cycles for gold plated
- Temperature life: duration is 48 hours.

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 9 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

10.0 REFLOW PROFILE

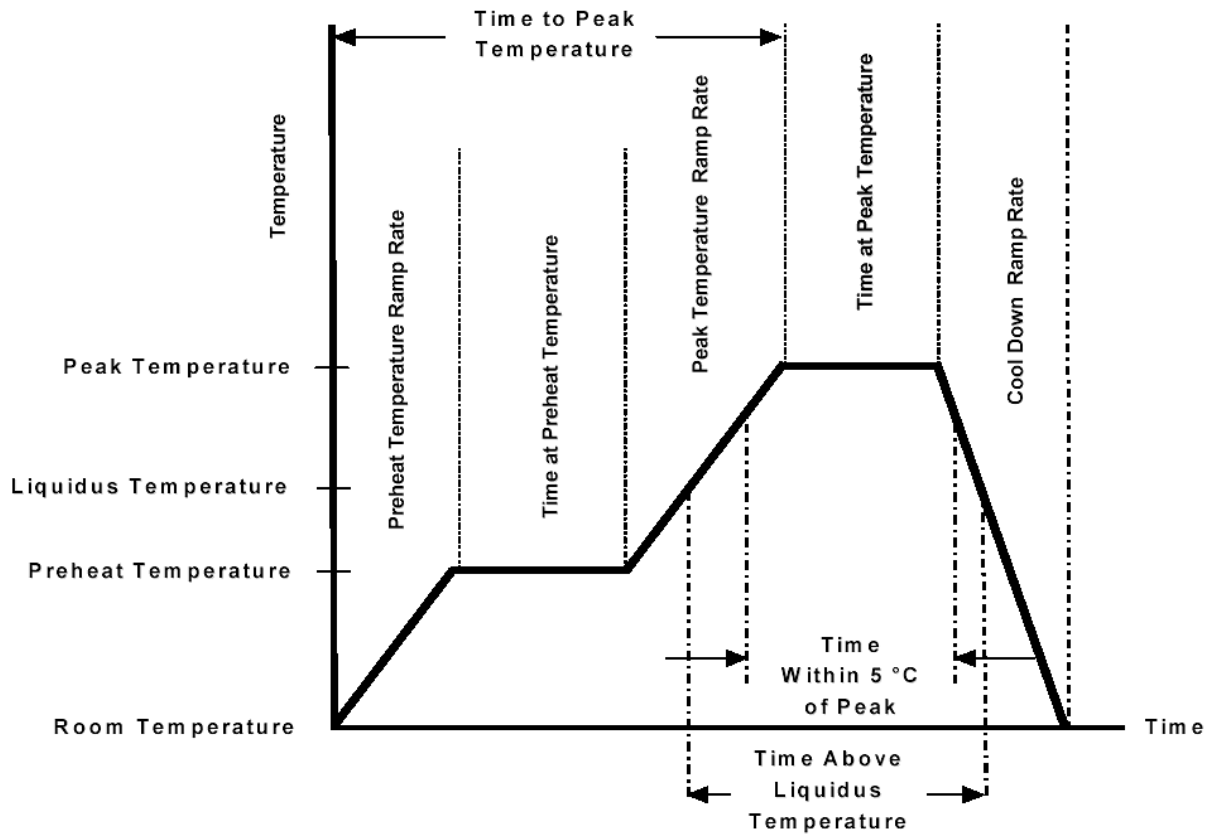
Lead-free reflow profile requirement for soldering heat resistance testing



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

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 10 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

Lead-free reflow profile requirement for solderability test

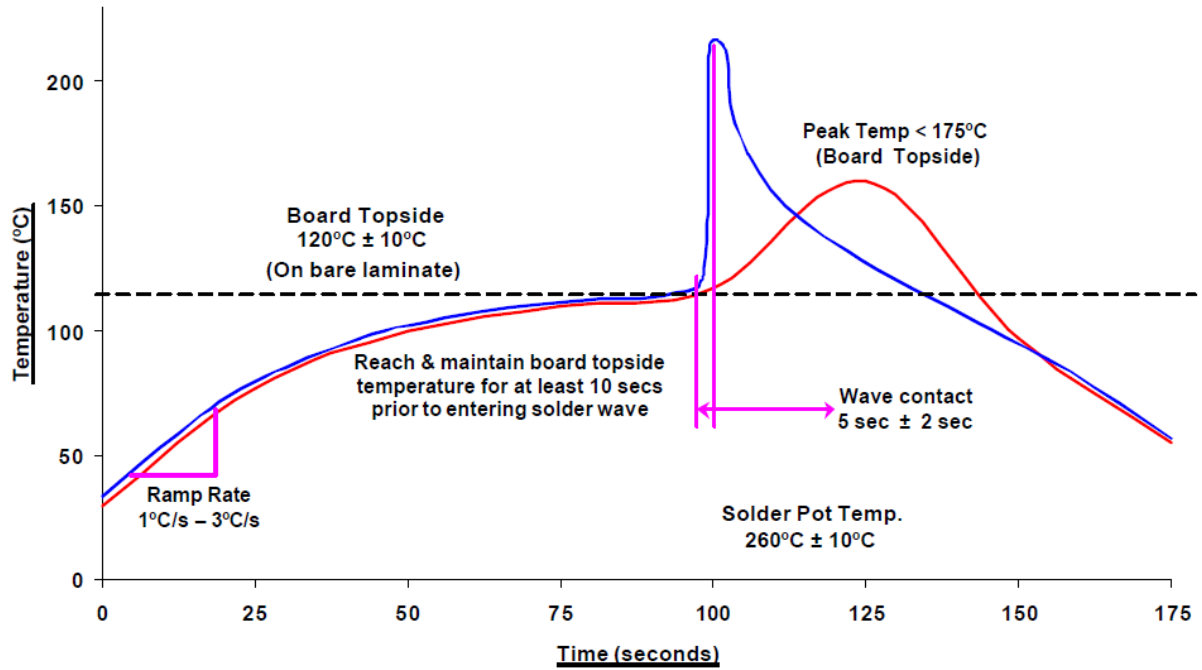


Description	Requirement
Preheat Temperature	160°C Min to 180°C Max
Preheat Time	50 to 70 sec
Peak Temperature	230 ~ 245°C
Time within 5°C of Peak	50 to 70 sec

REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 11 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM

Lead-free wave soldering profile requirement

Recommended RF800 Profile
Lead-free Alloy SAC305 / SAC405



REVISION: A2	ECR/ECN INFORMATION: ECM: 118480 DATE: 2017/06/22	TITLE: PRODUCT SPECIFICATION 1.27mm PITCH SLIM-GRID® SHROUDED HEADERS	SHEET No. 12 of 12
DOCUMENT NUMBER: 2009890001	CREATED / REVISED BY: SCHEONG	CHECKED BY: CGOH	APPROVED BY: KHLIM