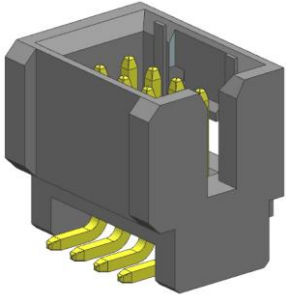
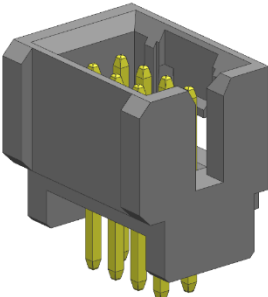
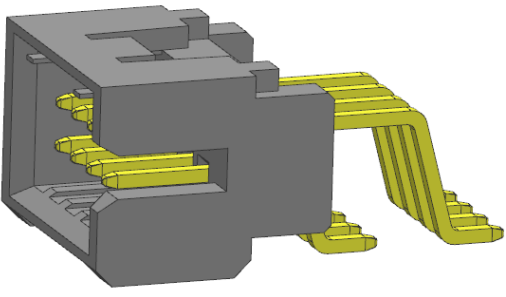
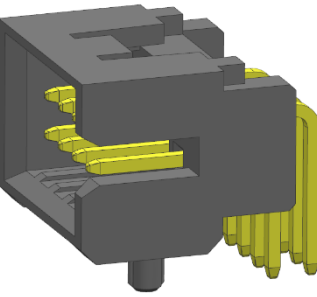


# SLIMGRID

## Board to Board

## CONNECTOR SYSTEM

Vertical SMT Header	Vertical Thru-Hole Header
	
Series: <a href="#">200989</a>	Series: <a href="#">201022</a>

Right Angle SMT Header	Right Angle Thru-Hole Header
	
Series: <a href="#">201173</a>	Series: <a href="#">201021</a>

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<b>2009890001</b>	<b>PS</b>	<b>000</b>	<b>ABABUPS</b>	<b>MRAMAKRISHNA</b>	<b>MRAMAKRISHNA</b>	
<small>TEMPLATE FILENAME: 1703070003 REV A</small>						

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## 1.0 SCOPE

This specification covers the performance requirements for 1.27mm Dual Row Header (SMT/ Vertical/ Right Angle) and receptacle.

## 2.0 PRODUCT DESCRIPTION

### 2.1 DESCRIPTION, SERIES NUMBER, AND LINKS

DESCRIPTION	SERIES NUMBER
1.27 mm Pitch Slim-Grid® Vertical SMT Header	<a href="#">200989</a>
1.27 mm Pitch Slim-Grid® Vertical Thru-hole Header	<a href="#">201022</a>
1.27 mm Pitch Slim-Grid® Right Angle SMT Header	<a href="#">201173</a>
1.27 mm Pitch Slim-Grid® Right Angle Thru-hole Header	<a href="#">201021</a>

### 2.2 DIMENSIONS, MATERIALS, PLATINGS

See sales drawings for details on dimensions, materials and platings.

### 2.3 ENVIRONMENTAL CONFORMANCE

To fine product compliance information:

- [Go to molex.com](#)
- Enter the part number in the search field.
- At the bottom of the page go to “Environmental” to see compliance status.

### 2.4 SAFETY AGENCY LISTINGS

UL Number: E29179, Vol 10  
 CSA Number: 152514 (LR19980)



CSA approval meets following standards/test procedures:

- CSA std. C22.2 No. 182.3-M1987
- 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, 201022, 201173 rated 4.3 A, 125 Vac

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## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

### 3.1 MOLEX DOCUMENTS

- [Molex Solderability Specification SMES-152](#)
- [Molex Heat Resistance Specification AS-40000-5013](#)
- [Molex Moisture Technical Advisory AS-45499-001](#)
- [Molex Package Handling Specification 454990100-PK](#)

### 3.2 INDUSTRY DOCUMENTS

- EIA-364-1000
- UL-60950-1
- UL-1977
- CSA STD. C22.2 NO. 182.3-M1987

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TEMPLATE FILENAME: 1703070003 REV A						

## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 VOLTAGE

125 Volts AC

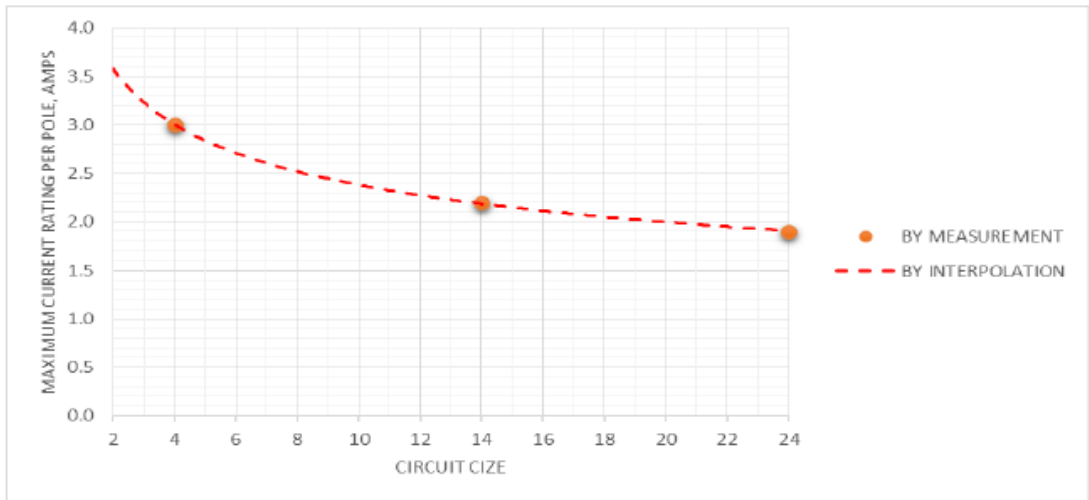
### 4.2 CURRENT RATING (MAXIMUM AMPERES)

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.*

Current Rating per Pole (Amps, Max)	CIRCUIT SIZE (NUMBER OF CONTACTS POWERED UP)											
	2*	4	6*	8*	10*	12*	14	16*	18*	20*	22*	24
	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 below image for more information.



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		CHECKED BY: <b>MRAMAKRISHNA</b>	APPROVED BY: <b>MRAMAKRISHNA</b>
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### 4.3 TEMPERATURE

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

Field Temperature and Field Life: 65°C for 3 years (based EIA-364-1000, table 8)

Note: Temperature life test duration (section 6.3. item 2) is based on the assumption that the contact spends its entire life at the rated field maximum temperature (based on EIA-364-1000, table 8).

### 4.4 DURABILITY

Plating Type	Number of Cycles
Gold Plated	50

*As tested in accordance with EIA-364-1000 test method (see Sec. 6.2 item 2 of this specification).  
 Durability per EIA-364-09.*

## 5.0 QUALIFICATION

Laboratory condition, sample selection and test sequences are in accordance with EIA-364-1000.

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## 6.0 PERFORMANCE

### 6.1 ELECTRICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.1.1	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]
6.1.2	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]
6.1.3	Dielectric Withstanding Voltage	Mated & unmount connectors: apply a voltage of 1000VAC for 1 minute between adjacent terminals and between terminals to ground. (EIA-364-20)	No breakdown; Current leakage < 5 mA
6.1.4	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]

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## 6.2 MECHANICAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.2.1	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]
6.2.2	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]
6.2.3	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]
6.2.4	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]
6.2.5	Vibration	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)	Appearance: No Damage 15milliohms [MAXIMUM] (change from initial) Discontinuity: 1.0 μs [maximum]
6.2.6	Mechanical Shock	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)	Appearance: No Damage Contact Resistance: 15 milliΩ [MAXIMUM] [CHANGE FROM INITIAL] Discontinuity: 1.0 μs [maximum]

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## 6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	
6.3.1	Thermal Shock	Mate connectors, expose to 5 cycles of:-		Appearance: No Damage Contact Resistance: 15 milliΩ [Maximum] [Change from Initial]
		Temp °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	
(EIA-364-32G Method A, Condition VII)				
6.3.2	Temperature Life	Mate Connectors, expose to:- Temperature: 105 ± 2 °C Duration: 96 hours. (EIA-364-17, Method A, condition 4)	Appearance: No Damage Contact Resistance: 15 milliΩ [Maximum] [Change from Initial]	
6.3.3	Cyclic Temperature and Humidity	Mate 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	
6.3.4	Low Temperature Test	Mate connectors and expose to: Temperature: -40 °C ± 3 °C Duration: 96 + 5/-0 Hours (EIA-364-59A)	Appearance: No Damage Contact Resistance: 15 milliΩ [Maximum] [Change from Initial]	
6.3.5	SO <sub>2</sub> Gas (Gold Plated only)	Mate connectors and expose to: SO <sub>2</sub> 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]	

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## 6.3 ENVIRONMENTAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.6	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 °C ± 3 °C. Sample examination done in room temperature. (EIA-364-26C, Condition B)	Appearance: No Damage Contact Resistance: 15 milliΩ [Maximum] [Change from Initial]
6.3.7	Resistance to Solder Heats	<u>SMT</u> Convection reflow Sample to be passed through reflow oven according to temperature profiles (shown in section 11.0) (EIA-364-56C, Procedure 6)	Appearance: No Damage
6.3.8	Solderability	Unmate connector. Steam age for 8 hour ± 15 min. (precondition: Condition C) <u>SMT</u> 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 section 11.0 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

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## 6.3 ENVIRONMENTAL PERFORMANCE CONTINUED

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.9	Resistance to Wave Soldering	<u>THRU-HOLE</u> WAVE solder terminations Sample to be mounted on pcb and passed through oven according to temperature profiles (shown in section 11.0)	Appearance: no bridging
6.3.10	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]

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## 7.0 TEST SEQUENCE GROUPS

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 <sub>2</sub> gas (Gold plated)						3								
Salt Spray							3							
Pin Retention (in housing)									1	2				
Solderability											1			
Temperature Rise												1		

Notes:

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

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## 8.0 APPLICATION

### 8.1 PLACEMENT FORCE – CONNECTOR 201021 SERIES

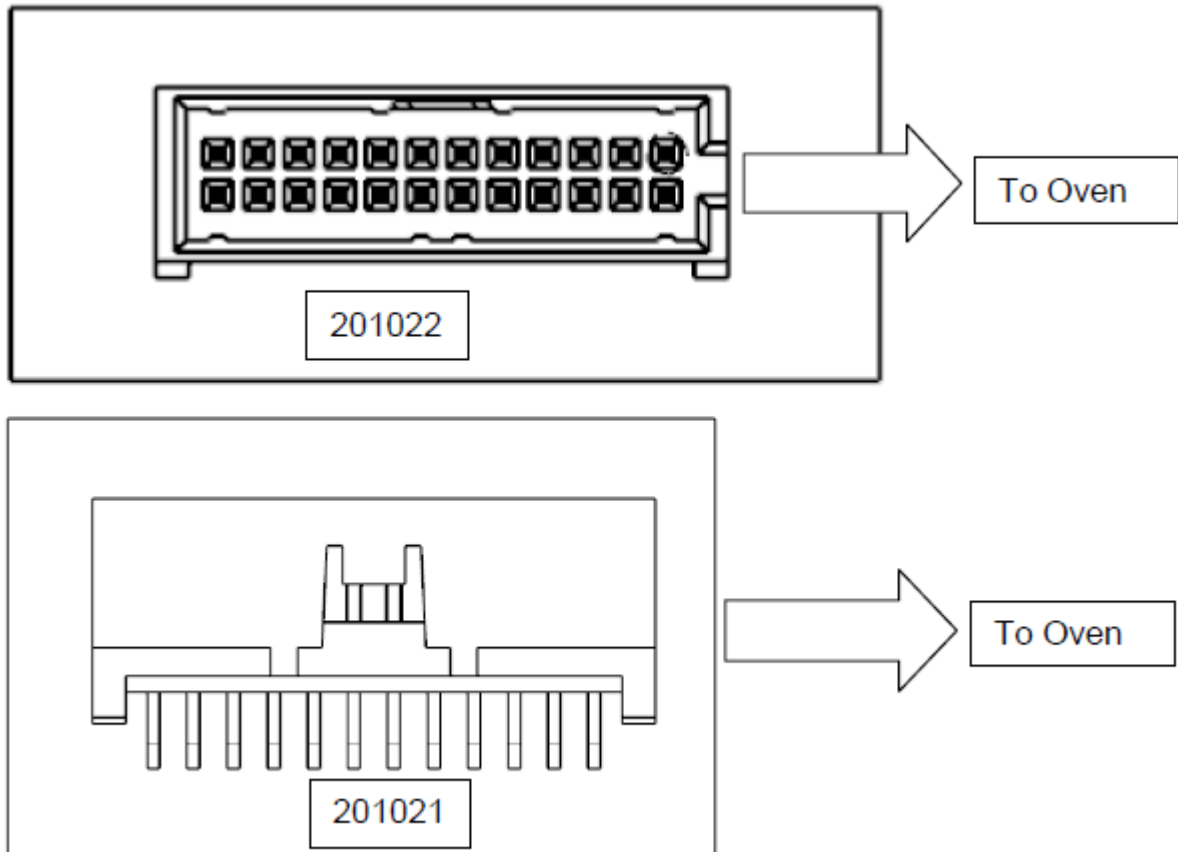
For series 201021 with peg option, it is recommended to apply a minimum force of 20 N onto a mounting gauge to ensure crushed pegs are properly inserted into PCB holes.

### 8.2 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.

### 8.3 PCBA ORIENTATION – CONNECTOR 201021 / 201022 SERIES 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.



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## 9.0 OTHERS

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

## 10.0 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.

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## 11.0 SOLDER INFORMATION

Per SMES-152 and AS-40000-5013

\*These specifications establish standard solderability test methods used to evaluate a products ability to accept molten solder. Solder Process Temperatures and Reflow Solder Profiles will vary based on application, equipment, solder paste, PCB thickness, etc.

### 11.1 SOLDER PROCESS TEMPERATURE

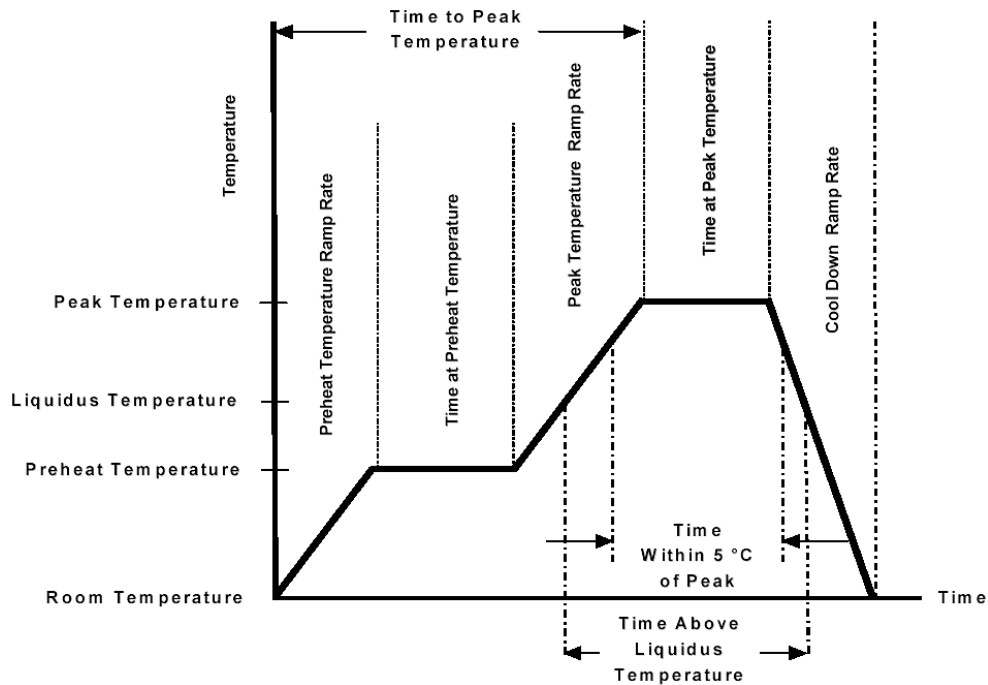
Wave Solder Temperature: 245 °C Max  
 Reflow Solder Temperature: 260 °C Max

[Molex Solderability Specification SMES-152](#)  
 (Click Here)

### 11.2 REFLOW SOLDERING PROFILE

[Molex Connector Heat Resistance Specification AS-40000-5013](#)  
 (Click Here)

#### Lead-free reflow profile requirement for soldering heat resistance testing



[Slim-Grid B-t-B Connector System Web Page](#)

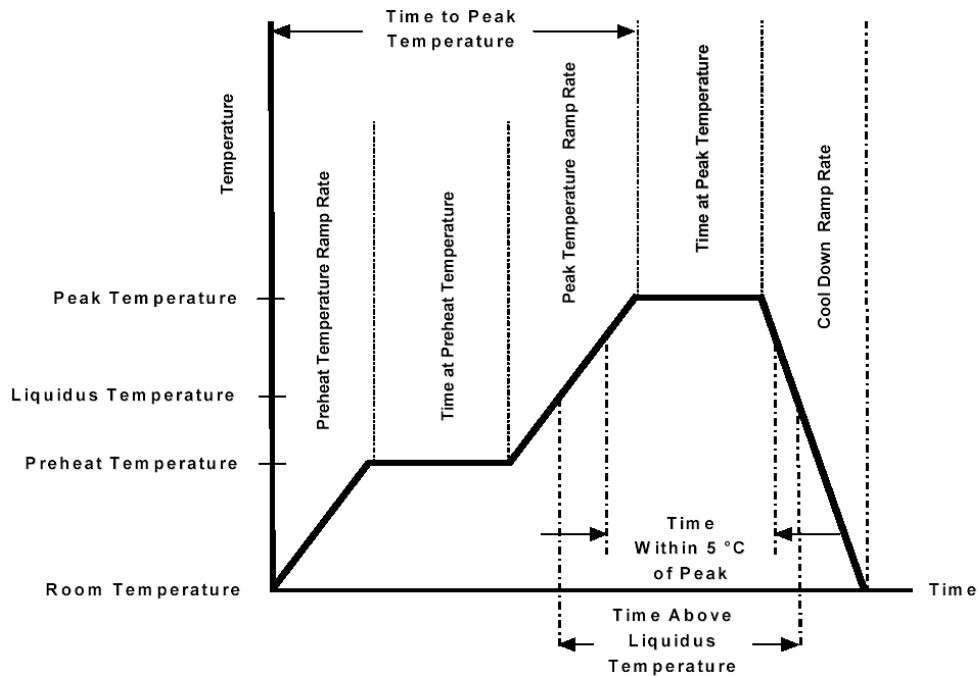
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REVISION: <b>B</b>	ECM INFORMATION: EC No: 635370 DATE: 2020/04/06	TITLE: <b>PROD. SPEC. SLIM-GRID SHROUDED HEADERS</b>				SHEET No. <b>15 of 19</b>
DOCUMENT NUMBER: <b>2009890001</b>	DOC TYPE: <b>PS</b>	DOC PART: <b>000</b>	CREATED / REVISED BY: <b>ABABUPS</b>	CHECKED BY: <b>MRAMAKRISHNA</b>	APPROVED BY: <b>MRAMAKRISHNA</b>	
TEMPLATE FILENAME: 1703070003 REV A						

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
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

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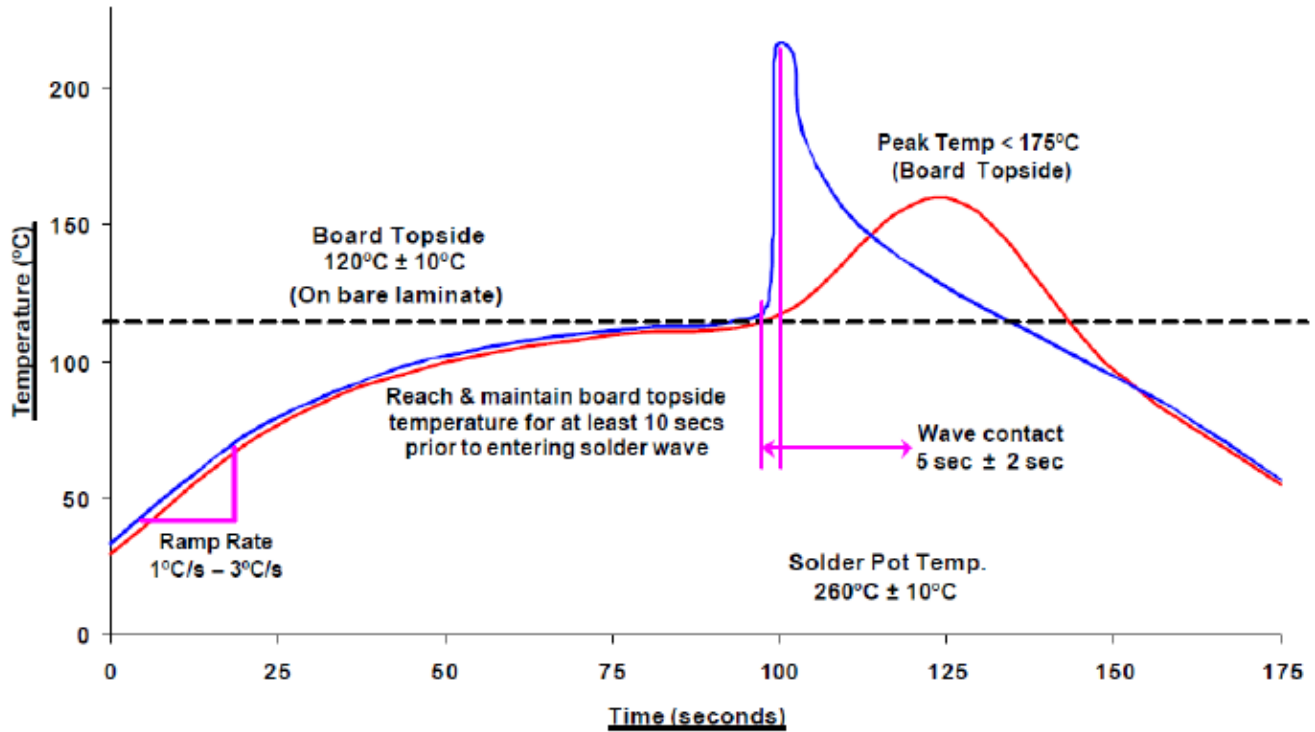


REVISION: <b>B</b>	ECM INFORMATION: EC No: 635370 DATE: 2020/04/06	TITLE: <b>PROD. SPEC. SLIM-GRID SHROUDED HEADERS</b>				SHEET No. <b>16 of 19</b>
DOCUMENT NUMBER: <b>2009890001</b>	DOC TYPE: <b>PS</b>	DOC PART: <b>000</b>	CREATED / REVISED BY: <b>ABABUPS</b>	CHECKED BY: <b>MRAMAKRISHNA</b>	APPROVED BY: <b>MRAMAKRISHNA</b>	
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## Lead-free wave soldering profile requirement

Recommended RF800 Profile  
Lead-free Alloy SAC305 / SAC405



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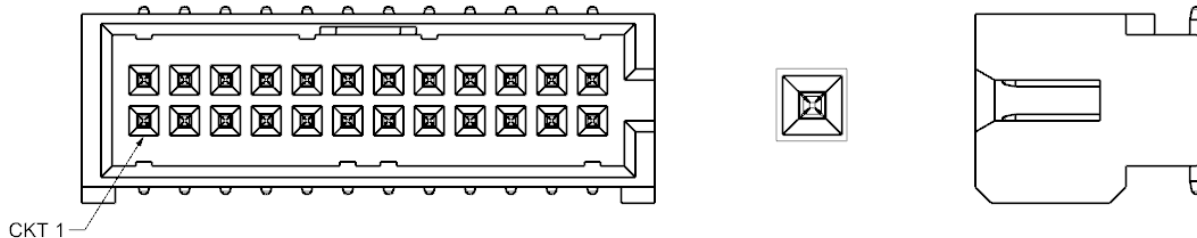
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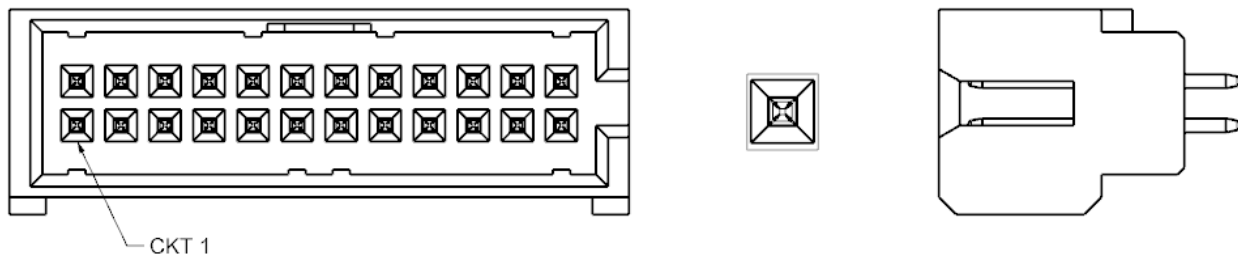
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**12.0 POLARIZATION AND KEYING OPTIONS**

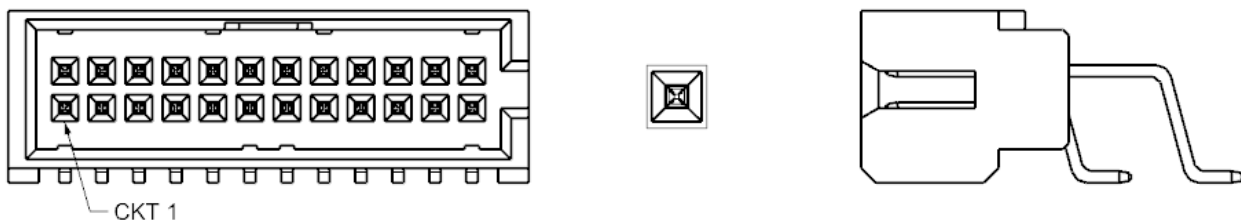
**12.1 Vertical SMT Header (Series: [200989](#))**



**12.2 Vertical Thru Hole Header (Series: [201022](#))**



**12.3 Right Angle SMT Header (Series: [201173](#))**



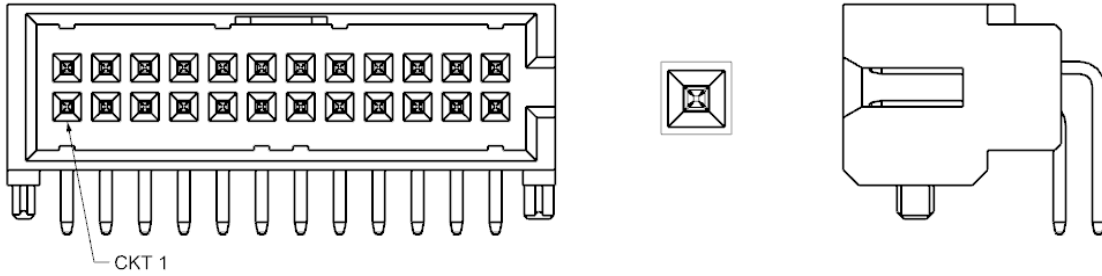
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**12.4 Right Angle Thru-hole Header (Series: [201021](#))**



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DOCUMENT NUMBER: <b>2009890001</b>	DOC TYPE: <b>PS</b>	DOC PART: <b>000</b>	CREATED / REVISED BY: <b>ABABUPS</b>	CHECKED BY: <b>MRAMAKRISHNA</b>	APPROVED BY: <b>MRAMAKRISHNA</b>	
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