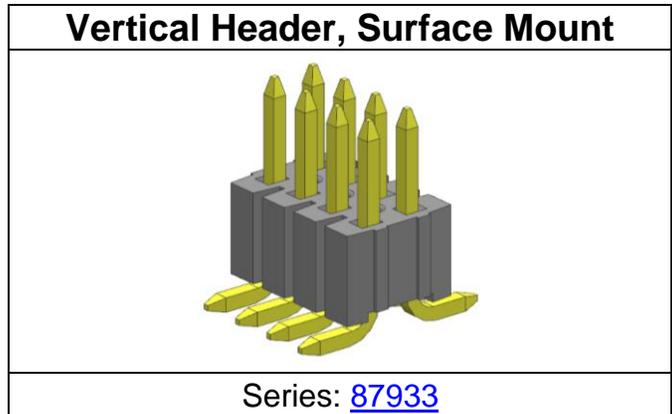


# SLIMGRID

## Board to Board CONNECTOR SYSTEM



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## 1.0 SCOPE

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

## 2.0 PRODUCT DESCRIPTION

### 2.1 DESCRIPTION, SERIES NUMBER, AND LINKS

| DESCRIPTION                                 | SERIES NUMBER |
|---|---------------|
| 1.27 mm Pitch SLIM-GRID® Unshrouded Headers | 87933         |

### 2.2 DIMENSIONS, MATERIALS, PLATINGS

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

### 2.3 ENVIRONMENTAL CONFORMANCE

To find product compliance information:

- [Go to molex.com](http://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 File Number: File E29179, Vol 10  
 CSA File 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, 201021, 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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## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 VOLTAGE

125 Vac

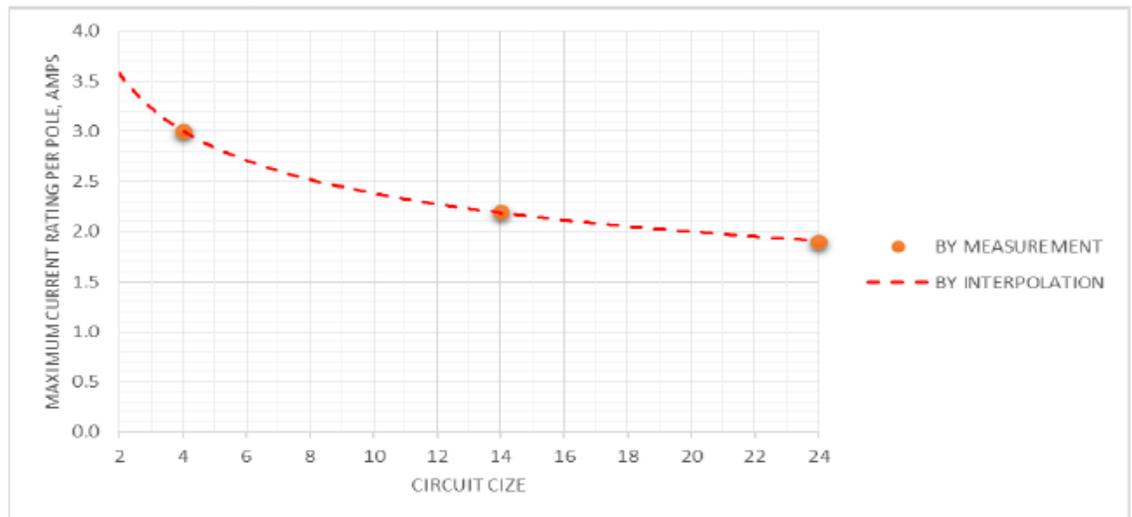
### 4.2 MAXIMUM CURRENT

4.3 Amps per Pole (only 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, AWG WIRE, gross heating from adjacent modules / components and other factors that influence connector performance.*

|                            | CIRCUIT SIZE |      |      |      |      |      |      |      |      |      |      |      |
|----------------------------|--------------|------|------|------|------|------|------|------|------|------|------|------|
|                            | 2*           | 4    | 6*   | 8*   | 10*  | 12*  | 14   | 16*  | 18*  | 20*  | 22*  | 24   |
| Current Rating (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 below for more information.



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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)<br>Note: Wire resistance and traces shall be removed from the measured value.  | 30 milliohms<br>[Initial]<br>[Maximum]  |
| 6.1.2 | Insulation Resistance           | Mate & unmount connectors; apply a voltage of 500 VDC between adjacent terminals and between terminals to ground. (EIA-364-21)  | 1000 Megohms<br>[Minimum]               |
| 6.1.3 | Dielectric Withstanding Voltage | Mate & unmount connectors; apply a voltage of 1000 VAC between adjacent terminals and between terminals to ground.<br>Mate & unmount connectors; apply a voltage of 1250 VAC between adjacent terminals and between terminals to ground. (EIA-364-20) | No breakdown;<br>Current Leakage < 5 mA |
| 6.1.4 | Temperature Rise                | Mate connectors: measure the temperature rise of contact when the maximum DC rated current is passed. (EIA-364-70, Method 1)  | Temperature Rise +30°C<br>[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..<br>(EIA-364-13D, Method A)  | Mate Force<br>15 N (24ckt)<br>10 N (4ckt)<br>[Maximum]<br>Unmate Force<br>3.0 N (24ckt)<br>0.5 N (4ckt)<br>[Minimum]               |
| 6.2.2 | Durability                            | Mate connectors up to 50 cycles at a maximum rate of 500 ±50 cycles/hr.<br>(EIA-364-09)   | Appearance: No Damage<br>Contact Resistance: 15 milliΩ<br>[Maximum]<br>[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.<br>(EIA-364-09)   | Appearance: No Damage<br>Contact Resistance: 15 milliΩ<br>[Maximum]<br>[Change from Initial]                                       |
| 6.2.4 | Terminal Retention Force (in Housing) | Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.<br>(EIA-364-29, Method C)  | 4.0 N<br>[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.<br>Amplitude: 1.52mm (.060 inch) peak to peak<br>Test pulse: half sine<br>Sweep: 10->55->10 Hz in 1 minute<br>Duration: 2 hours in each x-y-z axis.<br>(EIA-364-28, Test Condition I) | Appearance: No Damage<br>15 milliohms<br>[Maximum]<br>(change from initial)<br>Discontinuity: 1.0 μs<br>[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)<br>Peak value: 490 m/s sq. (50G)<br>Test pulse : half sine<br>Duration : 11 ms in each x-y-z axis<br>(EIA-364-27B Condition A)                                       | Appearance: No Damage<br>Contact Resistance: 15 milliΩ<br>[Maximum]<br>[Change from Initial]<br>Discontinuity: 1.0 μs<br>[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<br>Contact Resistance: 15 milliΩ [Maximum]<br>[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:-<br>Temperature: 105 ± 2 °C<br>Duration: 96 hours.<br>(EIA-364-17, Method A, condition 4)  | Appearance: No Damage<br>Contact Resistance: 15 milliΩ [Maximum]<br>[Change from Initial]  |   |
| 6.3.3                                 | Cyclic Temperature and Humidity           | Mate connector and expose to:-<br>Temperature: 25 ± 3 °C @<br>Humidity: 80% ± 3%<br>and<br>Temperature: 65 ± 3 °C @<br>Humidity: 50% ± 3%<br>Ramp times should be 0.5 hour and dwell times should be 1.0 hour.<br>Dwell times start when the temperature and humidity have stabilized within the specified levels.<br>Duration: 24 cycles (72 hours) | Appearance: No Damage<br>Contact Resistance: 15 milliΩ [Maximum]<br>[Change from Initial]<br>Dielectric Withstanding Voltage:<br>No Breakdown<br>Insulation Resistance: 1000 MegaΩ Minimum |   |
| 6.3.4                                 | Low Temperature Test                      | Mate connectors and expose to:<br>Temperature: -40 °C ± 3 °C<br>Duration: 96 + 5/-0 Hours<br>(EIA-364-59A)   | Appearance: No Damage<br>Contact Resistance: 15 milliΩ [Maximum]<br>[Change from Initial]  |   |
| 6.3.5                                 | SO <sub>2</sub> Gas<br>(Gold Plated only) | Mate connectors and expose to:<br>SO <sub>2</sub> gas density: 50 ± 5 ppm<br>Temperature: 40 ± 2 °C<br>Duration: 24 hours<br>Humidity: 60-75%  | Appearance: No Damage<br>Contact Resistance: 15 milliΩ [Maximum]<br>[Change from Initial]  |   |

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## 6.3 ENVIRONMENTAL PERFORMANCE

| ITEM  | DESCRIPTION                | TEST CONDITION  | REQUIREMENT  |
|-------|----------------------------|---|--|
| 6.3.6 | Solderability              | <p>Unmate connector.<br/>Steam age for 8 hour <math>\pm</math> 15 min.<br/>(precondition: Condition C)<br/><u>SMT</u><br/>Surface mount process simulation test<br/>Solder paste is deposited onto screen<br/>(e.g. ceramic plate) via stencil.<br/>The connectors are placed onto the<br/>solder paste print.<br/>Subject the substrate and component<br/>to the reflow process through a<br/>convection oven.<br/>Refer to section 8.0 for temperature<br/>profile.<br/>Flux type: ROL0</p> | 95% of the immersed area must show no voids, pin holes |
| 6.3.7 | Resistance to solder Heats | <p><u>SMT</u><br/>Convection reflow<br/>Sample to be passed through reflow<br/>over according to temperature profiles<br/>(shown in section 8.0)<br/>(EIA-364-56C, Procedure 6)</p>   | Appearance: no damage                                  |

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## 7.0 TEST SEQUENCE GROUPS

| Sequential Tests Group →            | 1       | 2          | 3          | 4    | 5    | 6    | 7    | 8    | 9 | 10 | 11 |
|-------------------------------------|---------|------------|------------|------|------|------|------|------|---|----|----|
| Test or Examination ↓               |         |            |            |      |      |      |      |      |   |    |    |
| Sample size                         | 5       | 5          | 5          | 5    | 5    | 5    | 5    | 5    | 5 | 5  | 5  |
| Resistance to Soldering Conditions  | 1       | 1          | 1          | 1    | 1    | 1    | 1    | 1    |   |    |    |
| Low Level Contact Resistance (LLCR) | 2, 5, 7 | 2, 5, 7, 9 | 2, 5, 7, 9 |      | 2, 4 | 2, 4 | 2, 4 | 3, 7 |   |    |    |
| Insulation Resistance               |         |            |            | 2, 6 |      |      |      |      |   |    |    |
| Dielectric Withstanding Voltage     |         |            |            | 3, 7 |      |      |      |      |   |    |    |
| Connector Mate                      |         |            |            |      |      |      |      | 2, 6 |   |    |    |
| Connector Unmate                    |         |            |            |      |      |      |      | 4, 8 |   |    |    |
| Durability                          | 3(a)    | 3(a)       | 3(a)       |      |      |      |      | 5    |   |    |    |
| 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 |    |    |
| Solderability                       |         |            |            |      |      |      |      |      |   | 1  |    |
| Temperature Rise                    |         |            |            |      |      |      |      |      |   |    | 1  |

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## 8.0 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.

### 8.1 SOLDER PROCESS TEMPERATURE

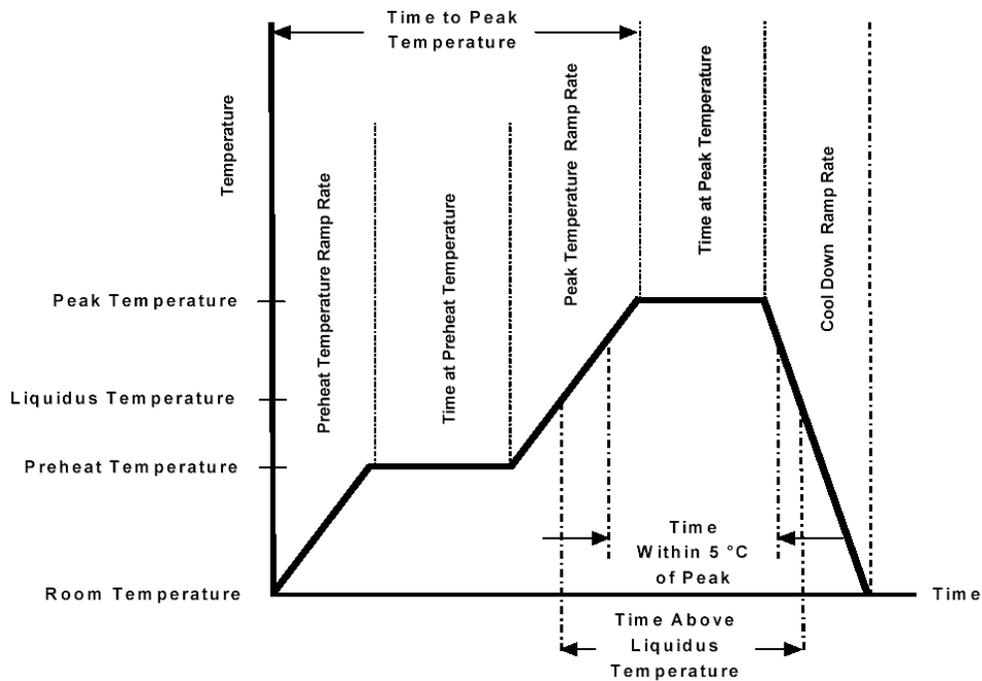
Wave Solder: 245 °C  
 Reflow Solder: 260 °C

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

### 8.2 REFLOW SOLDERING PROFILE

(This profile is per AS-40000-5013 and is provided as a guideline only. Please see notes for additional information)

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



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| 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                |

## 9.0 PACKAGING

Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. Parts are packaged in bulk, tape and reel or tube. Refer to Packaging Specification, PK-87933-565 and PK-87933-300.

## 10.0 OTHERS

Although some discoloration could be seen on the solder tail after reflow, it does not impact on the product's performance.

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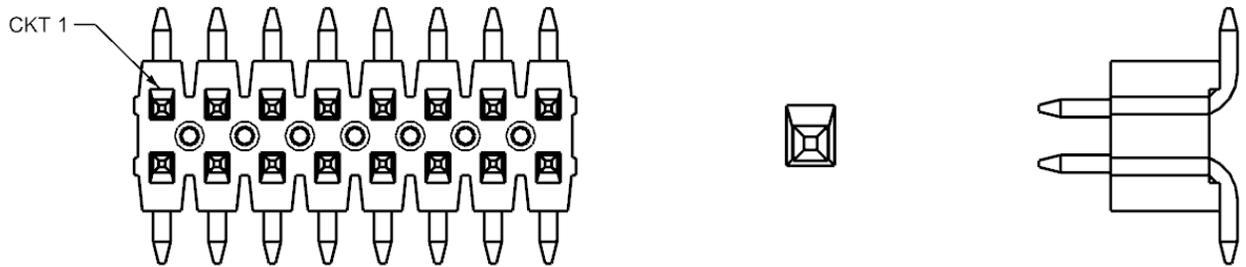
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**11.0 POLARIZATION AND KEYING OPTIONS**

**11.1 UNSHROUDED HEADER (Series: [87933](#))**



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