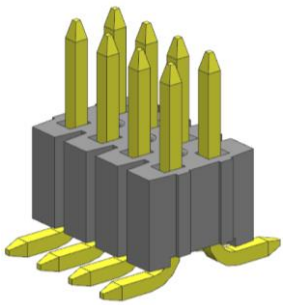
molex

PRODUCT SPECIFICATION

SLIMGRID

Board to Board

CONNECTOR SYSTEM

Vertical Header, Surface Mount

Series: 87933

[Slim-Grid B-t-B Connector System Web Page](#) | [TABLE OF CONTENTS](#)

REVISION:	ECM INFORMATION:	TITLE:	SHEET No.
B	EC No: 635370 DATE: 2020/04/06	PROD. SPEC. SLIM-GRID UNSHROUDED HEADERS	1 of 14

DOCUMENT NUMBER:	DOC TYPE:	DOC PART:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
879330001	PS	000	ABABUPS	MRAMAKRISHNA	MRAMAKRISHNA

TEMPLATE FILENAME: 1703070003 REV A

Table of Contents

ITEM		PAGE
1.0	SCOPE	3
2.0	PRODUCT DESCRIPTION	3
2.1	DESCRIPTION, SERIES NUMBER, AND LINKS	3
2.2	DIMENSIONS, MATERIALS, PLATINGS	3
2.3	ENVIRONMENTAL CONFORMANCE	3
2.4	SAFETY AGENCY LISTINGS	3
3.0	APPLICABLE DOCUMENTS AND SPECIFICATION	4
3.1	MOLEX DOCUMENTS	4
3.2	INDUSTRY DOCUMENTS	4
4.0	ELECTRICAL PERFORMANCE RATINGS	5
4.1	VOLTAGE	5
4.2	MAXIMUM CURRENT	5
4.3	TEMPERATURE	6
4.4	DURABILITY	6
5.0	QUALIFICATION	6
6.0	PERFORMANCE	7
6.1	ELECTRICAL PERFORMANCE	7
6.2	MECHANICAL PERFORMANCE	8
6.3	ENVIRONMENTAL PERFORMANCE	9
7.0	TEST SEQUENCE GROUPS	11
8.0	SOLDER INFORMATION	12
8.1	SOLDER PROCESS TEMPERATURE	12
8.2	REFLOW SOLDERING PROFILE	12
9.0	PACKAGING	13
10.0	OTHERS	13
11.0	POLARIZATION AND KEYING OPTIONS	14

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 fine product compliance information:
a. Go to molex.com
b. Enter the part number in the search field.
c. 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:
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 4.3 A, 125 Vac

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

4.0 ELECTRICAL PERFORMANCE RATINGS

4.1 VOLTAGE

125 Vac

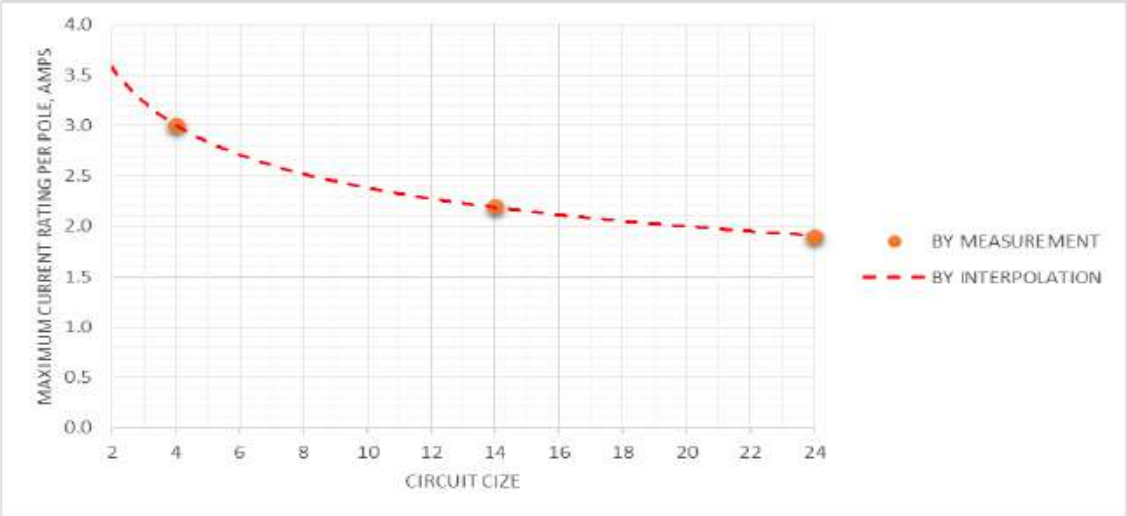
4.2 MAXIMUM CURRENT

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.



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.

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 [Initial] [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 [Minimum]
6.1.3	Dielectric Withstanding Voltage	Mate & unmount connectors; apply a voltage of 1000 VAC between adjacent terminals and between terminals to ground. Mate & unmount connectors; apply a voltage of 1250 VAC 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 contact when the maximum DC rated current is passed. (EIA-364-70, Method 1)	Temperature Rise +30°C [Maximum]

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 15 N (24ckt) 10 N (4ckt) [Maximum] Unmate Force 3.0 N (24ckt) 0.5 N (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: 15 milliΩ [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 (in Housing)	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)	4.0 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 15 milliohms [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]

6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.1	Thermal Shock	Mate connectors, expose to 5 cycles of:- 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)	Appearance: No Damage Contact Resistance: 15 milliΩ [Maximum] [Change from Initial]
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_2 Gas (Gold Plated only)	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]

6.3 ENVIRONMENTAL PERFORMANCE

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
6.3.6	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 section 8.0 for temperature profile. Flux type: ROL0	95% of the immersed area must show no voids, pin holes
6.3.7	Resistance to solder Heats	SMT Convection reflow Sample to be passed through reflow over according to temperature profiles (shown in section 8.0) (EIA-364-56C, Procedure 6)	Appearance: no damage

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_2 gas (Gold plated)						3					
Salt Spray							3				
Pin Retention (in housing)									1		
Solderability										1	
Temperature Rise											1

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

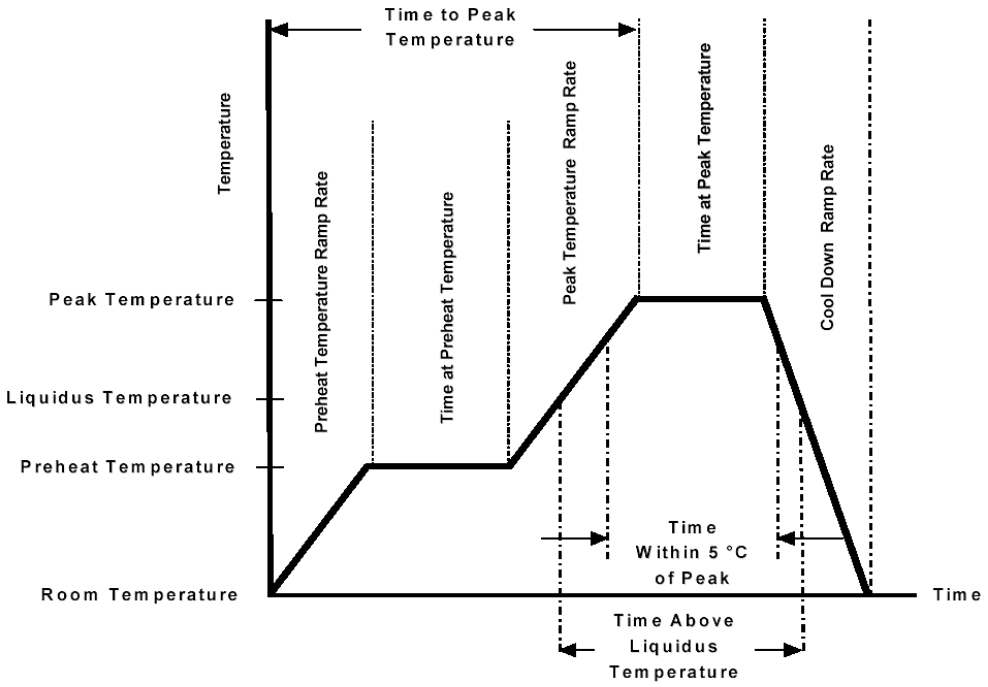
Wave Solder: 245 °C
Reflow Solder: 260 °C

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)



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

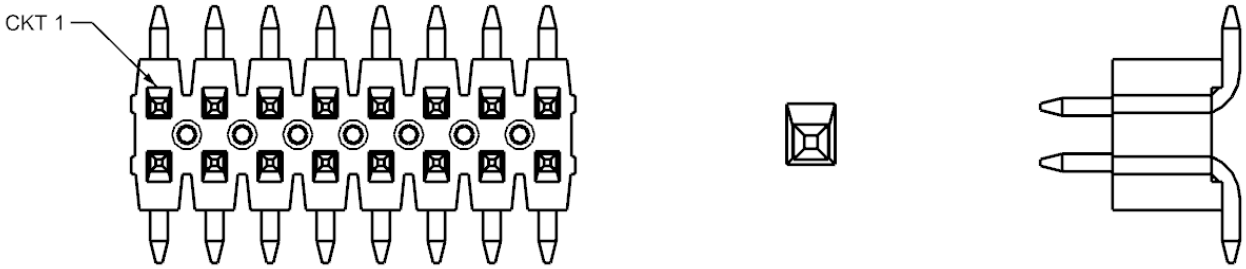
Parts shall be packaging to protect the parts from damage during standard shipping, storage, and handling. Parts are packaged in bulk, tape and reel or tube. Refer to Packaging Specification, PK-87933-565 and PK-87933-300.

10.0 OTHERS

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

11.0 POLARIZATION AND KEYING OPTIONS

11.1 UNSHROUDED HEADER (Series: 87933)



Slim-Grid B-t-B Connector System Web Page | TABLE OF CONTENTS