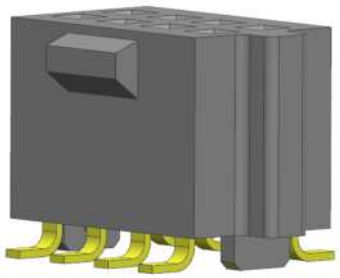
molex

PRODUCT SPECIFICATION

SLIMGRID

Board to Board

CONNECTOR SYSTEM

Receptacle, Surface Mount

Series: 78120

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	PRODUCT SPEC. SLIM-GRID VER. RECEPTACLE	1 of 15

DOCUMENT NUMBER:	DOC TYPE:	DOC PART:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
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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

This connector mates with Molex Header Series:
87933, 200989, 201021, 201022, 201173

DESCRIPTION	SERIES NUMBER
1.27 mm Pitch Slim-Grid® Vertical SMT Receptacle	78120

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

C US

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

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

2009890001 1.27 mm Pitch SLIM-GRID® Shrouded Header
879330001 1.27 mm Pitch SLIM-GRID® Unshrouded Header

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

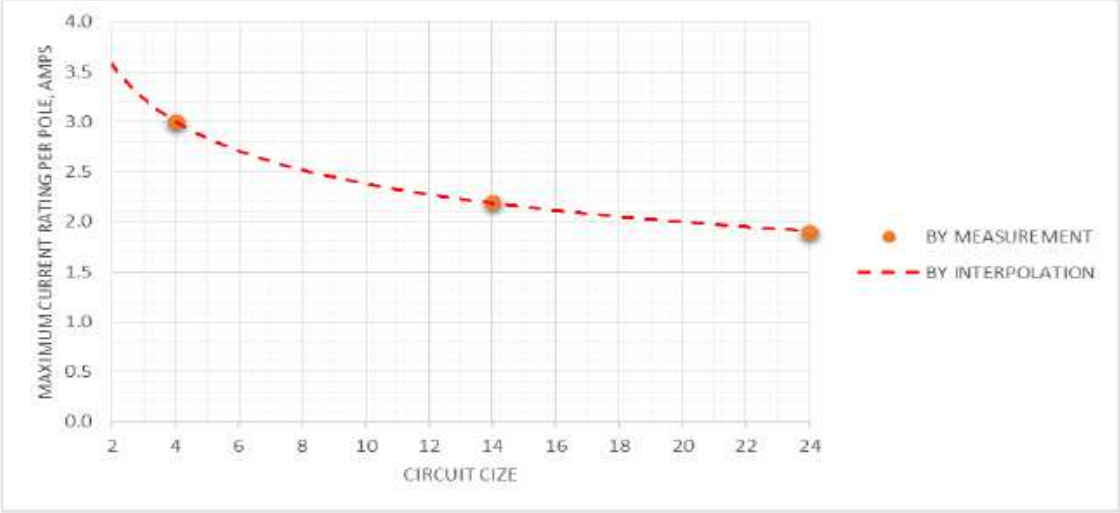
4.2 CURRENT RATING (MAXIMUM AMPERES)

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.

	CIRCUIT SIZE											
	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 below image 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 [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]

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)	2.22 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: 1.52 mm (.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]

6.3 ENVIRONMENTAL PERFORMANCE

<table>
<tr><th>ITEM</th><th>DESCRIPTION</th><th>TEST CONDITION</th><th>REQUIREMENT</th></tr>
<tr><td>6.3.1</td><td>Thermal Shock</td><td>Mate connectors, expose to
5 cycles of:-
<table><tr><th>Temp °C</th><th>Duration (Minutes)</th></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:
15 milliΩ
[Maximum]
[Change from Initial]</td></tr>
<tr><td>6.3.2</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:
15 milliΩ
[Maximum]
[Change from Initial]</td></tr>
<tr><td>6.3.3</td><td>Cyclic Temperature and Humidity</td><td>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)</td><td>Appearance: No Damage
Contact Resistance:
15 milliΩ
[Maximum]
[Change from Initial]
Dielectric Withstanding Voltage:
No Breakdown
Insulation Resistance:
1000 MegaΩ Minimum</td></tr>
<tr><td>6.3.4</td><td>Low Temperature Test</td><td>Mate connectors and expose to:
Temperature: -40 °C ± 3 °C
Duration: 96 + 5/-0 Hours
(EIA-364-59A)</td><td>Appearance: No Damage
Contact Resistance:
15 milliΩ
[Maximum]
[Change from Initial]</td></tr>
<tr><td>6.3.5</td><td>SO_2 Gas
(Gold Plated only)</td><td>Mate connectors and expose to:
SO_2 gas density: 50 ± 5 ppm
Temperature: 40 ± 2 °C
Duration: 24 hours</td><td>Appearance: No Damage
Contact Resistance:
15 milliΩ
[Maximum]
[Change from Initial]</td></tr>
</table>

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	SMT Convection reflow Sample to be passed through reflow oven according to temperature profiles (shown in section10.0) (EIA-364-56C, Procedure 6)	Appearance: No Damage
6.3.8	Solderability	Unmate connector. Steam age for 8 hour ± 15 min. (precondition: Condition C) 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 10.0 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

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				
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, 7						
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	2				
Solderability											1			
Temperature Rise												1		

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

8.0 OTHERS

8.1 Although some discolouration could be seen on the solder tail 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 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.

10.0 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.

10.1 SOLDER PROCESS TEMPERATURE

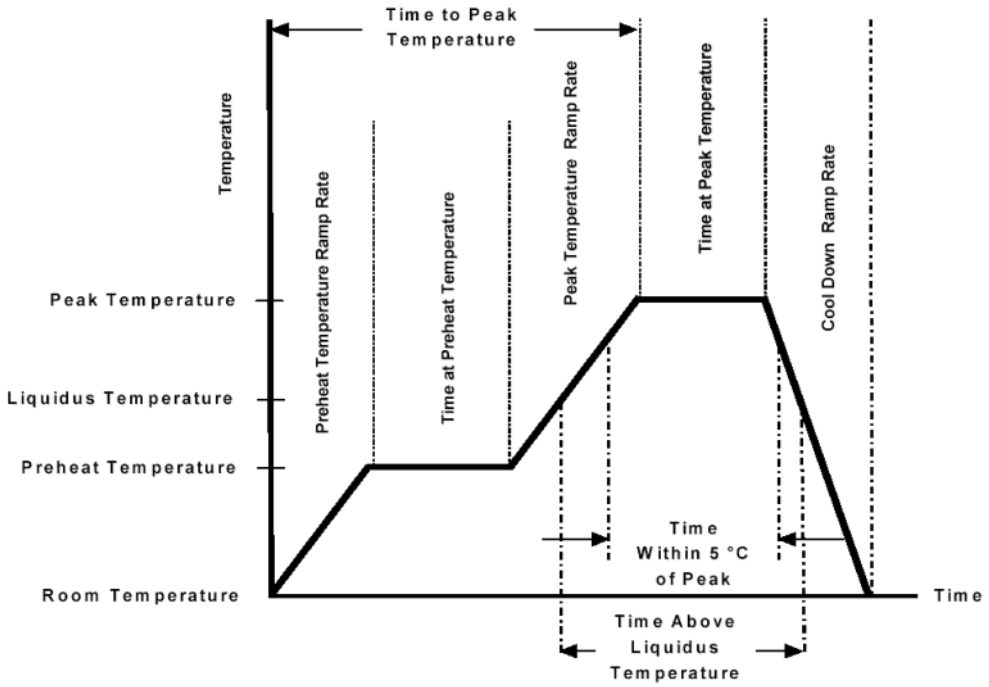
Wave Solder Temperature: 245 °C Max
Reflow Solder Temperature: 260 °C Max

Molex Solderability Specification SMES-152
(Click Here)

10.2 REFLOW SOLDERING PROFILE

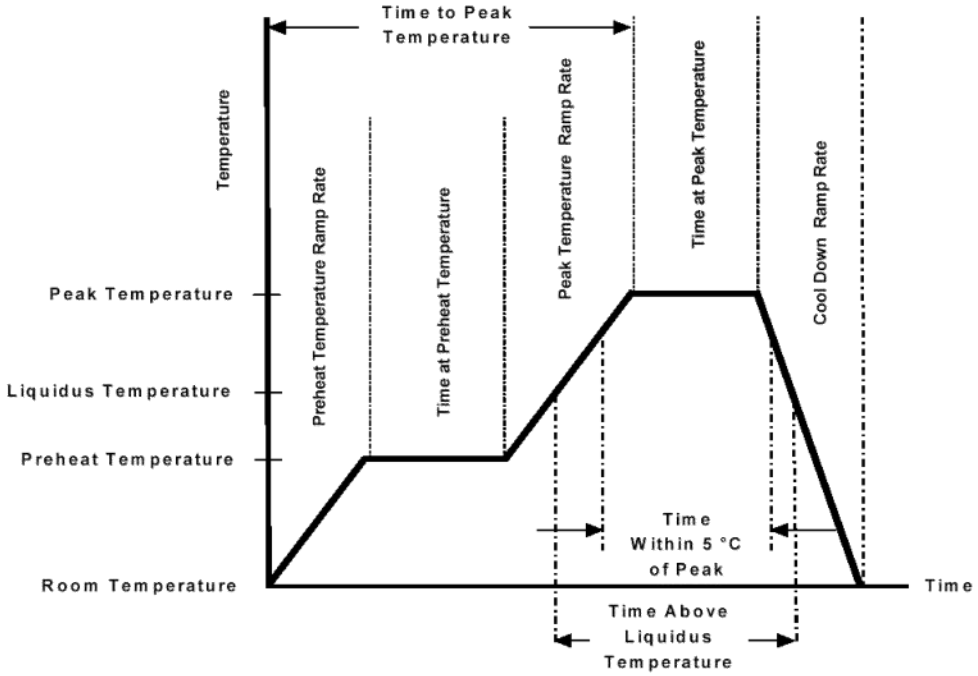
Molex Connector Heat Resistance Specification
AS-40000-5013
(Click Here)

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
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

11.0 POLARIZATION AND KEYING OPTIONS

11.1 Vertical SMT Receptacle (Series: 78120)

