



# PRODUCT SPECIFICATION

## Milligrig BMI 2mm Pitch Vertical Header

### 1.0 SCOPE

This specification covers the performance requirements for 2mm pitch, Vertical Header

### 2.0 PRODUCT DESCRIPTION

#### 2.1 PRODUCT NAME AND SERIES NUMBER (S)

**Product Name**

MILLIGRID 2MM PITCH VERTICAL HEADER

**Series Number**

151013

This series mates with Molex Milligrig 2mm Wire to Board Connector Crimp Receptacle Housing, 51110-\*\*52 and 51110-\*\*60 series and Crimp Terminal, 50394 series.

#### 2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

See Sales Drawing, SD-151013-0001 for information on dimensions, materials platings and markings.

#### 2.3 SAFETY AGENCY APPROVALS

UL Number: E29179

CSA Number: 1585720 (LR19980)

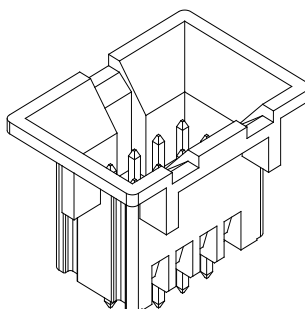


CSA approval meets following standards/test procedures:

- 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 151013, 151014, rated 2.5A (No. 24 AWG), 250V



REVISION: <b>A1</b>	ECR/ECN INFORMATION: EC No: 121915 DATE: 2017/09/12	TITLE: <b>MILLIGRID BMI 2MM PITCH VERTICAL HEADER</b>	SHEET No. <b>1 of 6</b>
DOCUMENT NUMBER: <b>PS-151013-0001</b>	CREATED / REVISED BY: <b>SCHEONG</b>	CHECKED BY: <b>GMENARLY</b>	APPROVED BY: <b>KHLIM</b>



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## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See Sales Drawing SD-151013-0001, IPC/WHMA-A-620AS and other sections of this Specification for the necessary referenced Documents and Specifications.

## 4.0 RATINGS

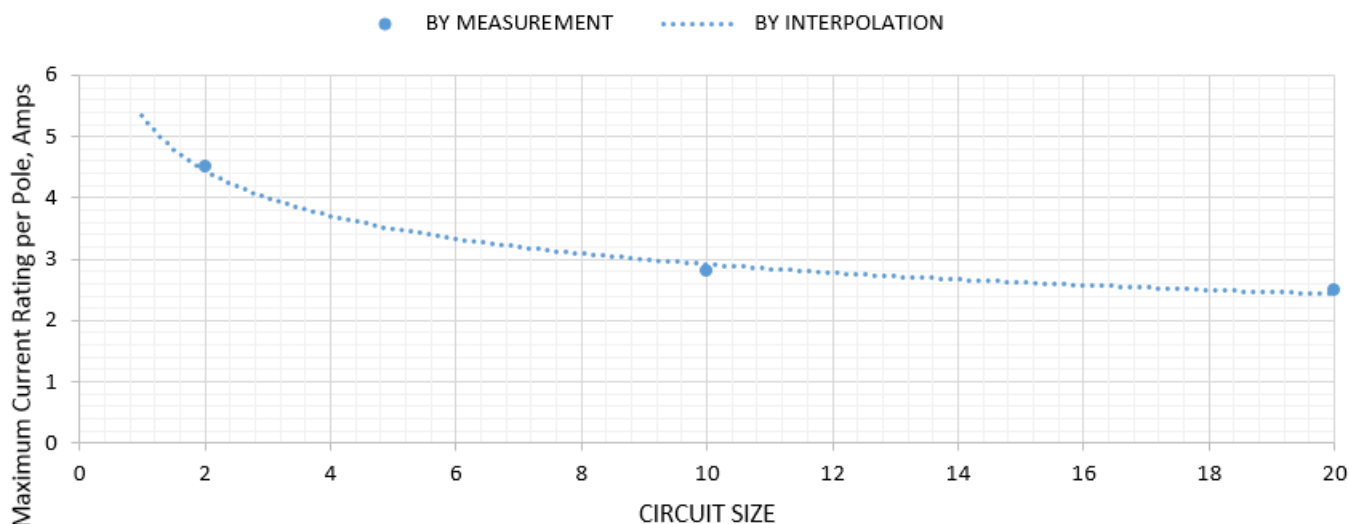
**4.1 VOLTAGE** : 125 V Max.

**4.2 CURRENT** : 2.00 Amps Max ( with 20 Contacts 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. Wire size, insulation thickness, stranding, tin coated or bare copper, wire length & crimp quality are other factors that influence current rating.*

	CIRCUIT SIZE (NUMBER OF CONTACTS POWERED UP)									
	2	4*	6*	8*	10	12*	14*	16*	18*	20
Current Rating per Pole (Amps, Max)	4.50	3.70	3.30	3.00	2.80	2.80	2.70	2.60	2.55	2.50

Tested with AWG 24 wire and PCB with 1oz Copper Traces. \* Extrapolated from test data.



## 4.3 TEMPERATURE

Operating	-40°C to +105°C
Non-operating	-40°C to +105°C

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## 5.0 PERFORMANCE

### 5.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Contact Resistance (Low Level)</b>	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA Per EIA-364-23	<b>40 milliohms Max.</b>
2	<b>Insulation Resistance</b>	Unmate connectors: apply <b>500 VDC</b> for <b>1</b> minute, measure the insulation resistance between adjacent terminals Per EIA 364-21	<b>1000 Megaohms Min.</b>
3	<b>Dielectric Withstanding Voltage</b>	Unmate connectors: apply <b>1250 VAC</b> for <b>1</b> minute between adjacent terminals Per EIA 364-20	No breakdown
4	<b>Temperature Rise (via Current Cycling)</b>	Mate connectors: measure the temperature rise at the rated current after: 1.) 96 hours (steady state) 2.) 240 hours (45 minutes ON and 15 minutes OFF per hour). 3.) 96 hours (steady state)	Temperature rise: <b>+30°C Max.</b>

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## 5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
5	<b>Pin Retention Force</b>	Apply an axial load on the terminal in the housing to dislodge the terminals from the connector at a rate of 12.5mm per minute	<b>8.5 N Min.</b> per pin (initial)
6	<b>Durability</b>	Mate connectors <b>25</b> cycles with maximum rate of <b>10</b> cycles per minute Per EIA-364-09	<b>20 milliohms Max.</b> (change from initial) No evidence of physical Damage
7	<b>Vibration</b>	Mate connectors : Test Condition per EIA 364-28, test condition VII, test condition letter D (15 min. in each of 3 mutual perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another.	<b>10 milliohms Max.</b> (change from initial) & Discontinuity < <b>1</b> microsecond
8	<b>Mechanical Shock</b>	Mate connectors and shock at <b>50 g's</b> with ½ sine wave (11 milliseconds) shocks in the ± X, ± Y, ± Z axes ( <b>18</b> shocks total).	<b>10 milliohms Max.</b> (change from initial) & Discontinuity < <b>1</b> microsecond

## 5.3 ENVIRONMENT REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT										
9	<b>Solderability</b>	Solder Time: 5 +/-0.5 secs. Solder Temperature: 260+/- 5°C Steam aging for 8hours	Dipped portion should have 95% continuous new solder coating coverage										
10	<b>Resistance to Soldering Heat</b>	Refer to Section 8.0 for soldering profile	No damage in appearance of the connector										
11	<b>Thermal Shock</b>	Mate connectors; expose to <b>5</b> cycles of: <table border="0"> <tr> <td><u>Temperature °C</u></td> <td><u>Duration (Minutes)</u></td> </tr> <tr> <td><b>-55+0/-3</b></td> <td><b>30</b></td> </tr> <tr> <td><b>+25±10</b></td> <td><b>5 MAXIMUM</b></td> </tr> <tr> <td><b>+85+3/-0</b></td> <td><b>30</b></td> </tr> <tr> <td><b>+25±10</b></td> <td><b>5 MAXIMUM</b></td> </tr> </table> Per EIA 364-32 condition I	<u>Temperature °C</u>	<u>Duration (Minutes)</u>	<b>-55+0/-3</b>	<b>30</b>	<b>+25±10</b>	<b>5 MAXIMUM</b>	<b>+85+3/-0</b>	<b>30</b>	<b>+25±10</b>	<b>5 MAXIMUM</b>	<b>20 milliohms Max.</b> (change from initial) & Visual: No Damage
<u>Temperature °C</u>	<u>Duration (Minutes)</u>												
<b>-55+0/-3</b>	<b>30</b>												
<b>+25±10</b>	<b>5 MAXIMUM</b>												
<b>+85+3/-0</b>	<b>30</b>												
<b>+25±10</b>	<b>5 MAXIMUM</b>												
12	<b>Temperature Life</b>	Mate connectors; expose to: <b>96</b> hours at <b>105 ± 2°C</b> Per EIA 364-17	<b>20 milliohms Max.</b> (change from initial]) & Visual: No Damage										

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ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
13	<b>Humidity (Cyclic)</b>	<b>24</b> cycles at temperature <b>25 ± 3°C</b> at <b>80 ± 3%</b> relative humidity and <b>65 ± 3°C</b> at <b>50 ± 3%</b> relative humidity; dwell time of <b>1.0</b> hour; ramp time of <b>0.5</b> hours. Dwell times start when the temperature and humidity have stabilized within the specified levels. Per EIA-364-31	Dielectric Withstanding Voltage: No Breakdown at <b>500 VAC</b> & Insulation Resistance: <b>1250</b> Megohms Min. & Visual: No Damage

## 6.0 PACKAGING

Refer to Packing Specification, PK-151013-0001 for packaging details.

## 7.0 TEST SEQUENCES

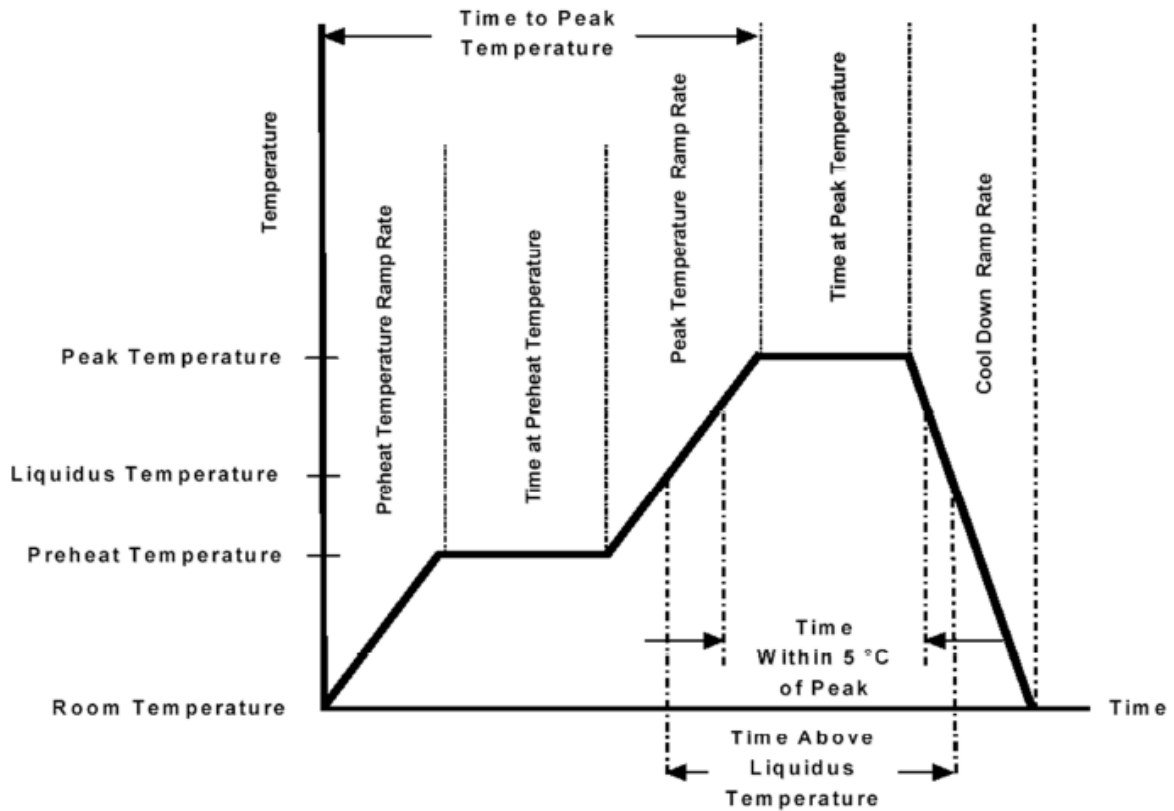
Test Group →	A	B	C	D	E	F	G
<b>Test or Examination ↓</b>							
Examination of the connector(s)	1	1,5	1	1,8	1	1	1
Contact Resistance (Low Level) (LLCR)				3,5, 7	3,5, 7	3,5, 7,9	
Insulation Resistance	3,6						
Dielectric Withstanding Voltage	4,7						
Temperature Rise (via Current Cycling)		4					
Pin Retention Force in housing			2				
Durability		3		4	4	4	
Vibration						6	
Mechanical Shock						8	
Humidity (cyclic)	5						
Temperature Life				6			
Thermal Shock					6		
Resistance to Soldering Heat	2	2		2	2	2	
Solderability							2

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## 8.0 SOLDERING PROFILE



Description	Requirement
Average Ramp Rate	3°C/sec Max
Preheat Temperature	150°C Min to 200°C max
Preheat Time	60 to 180sec
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 40sec
Ramp - Cool Down	6°C/sec max
Time 25°C to Peak	8min Max

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