





**PRODUCT DESCRIPTION:**

MICRO-HI POWER CONNECTOR

**PRODUCT NUMBER:**

PCB SIDE:

70094 SERIES

70095 SERIES

70096 SERIES

HOUSING FOR CABLE SIDE:

70093 SERIES

70189 SERIES

TERMINAL FOR CABLE SIDE:

70097 SERIES

<u>REVISION:</u> <b>B.1</b>	<u>ECR/ECN NUMBER:</u> <b>EK2017-0028</b>	<u>DOCUMENT NUMBER</u> <b>PS-70094-001</b>	<u>SHEET No.</u> <b>1 of 11</b>
<u>DATE:</u> <b>2017 / 02 / 07</b>	<u>CREATED / REVISED BY:</u> <b>Kevin Miao</b>	<u>CHECKED BY:</u> <b>Ivanov Wang</b>	<u>APPROVED BY:</u> <b>Ivanov Wang</b>

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## 1.0 SCOPE

This Product Specification covers the 3.00 mm (.118 inch) centerline (pitch) square pin headers when mated with either printed circuit board (PCB) connector.

## 2.0 APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

EIA-364

UL Safety Agency Approval File Numbers: E346898

## 3.0 CONSTRUCTION AND MATERIAL

Housings:

LCP (Header);

Nylon (Receptacle);

Header Terminal:

Copper Alloy

Receptacle Terminal:

Copper Alloy

## 4.0 RATINGS

### 4.1 UL Safety Agency Ratings

Agency Voltage Rating: 600V (AC/DC)

Agency Current Rating: 12.5A (Single Circuit) (Amps)

### 4.2 VOLTAGE RATING: 600V

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### 4.3 CURRENT DERATING AND APPLICABLE WIRES

Current is dependent on connector size, contact material, plating, ambient temperature, printed circuit board characteristics and related factors. Actual current rating is application dependent and should be evaluated for each application.

AWG	Outside Insulation Diameter
16	2.40 mm
18	2.10 mm
20	1.85 mm
22	1.85 mm
24	1.85 mm
26	1.27 mm
28	1.27 mm
30	1.27 mm

CURRENT DERATING REFERENCE INFORMATION (A/PER PIN)							
Circuit Size	2	4	6,8	10	12	14,16,18	20,22,24
16 AWG (A/PER PIN)	12.5A	12A	10.5A	10.5A	9.0A	8.5A	8.0A
18 AWG (A/PER PIN)	10.5A	9.5A	8.5A	8.0A	8.0A	7.5A	7.0A
20 AWG (A/PER PIN)	9.0A	9.0A	7.0A	6.5A	6.5A	6.0A	5.5A
22 AWG (A/PER PIN)	6.0A	5.0A	4.5A	4.0A	4.0A	3.5A	3.5A
24 AWG (A/PER PIN)	5.5A	5.0A	4.5A	4.0A	3.5A	3.5A	3.0A
26 AWG (A/PER PIN)	4.5A	4.0A	4.0A	3.5A	3.5A	3.0A	2.5A
28 AWG (A/PER PIN)	4.0A	3.5A	3.0A	3.0A	3.0A	2.5A	2.0A
30 AWG (A/PER PIN)	3.5A	3.0A	3.0A	2.5A	2.5A	1.5A	1.0A

- 1) Values are for reference only.
- 2) Current deratings are based on not exceeding 30°C Temperature Rise.
- 3) PCB trace design can greatly affect temperature rise results in Wire-to-Board applications.
- 4) Data is for all circuits powered.
- 5) \* indicates interpolated information.

**4.4** Service temperature: -40°C to 105°C ; Storage temperature: -40°C to 105°C

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## 5.0 PERFORMANCE, TEST REQUIREMENT AND PROCEDURES SUMMARY

### 5.1 APPEARANCE REQUIREMENTS

Item	Test Description	Test Method	Reference Standard
1	Examination of product	Visual according to applicable quality inspection plan.	Meet the requirements of product

### 5.2 ELECTRICAL REQUIREMENTS

Item	Test Description	Test Method	Reference Standard
2	Contact Resistance (Low Level)	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA. (Does not include wire resistance)	5 milliohms MAXIMUM [initial]
3	Insulation Resistance	Unmate & unmount connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
4	Dielectric Withstanding Voltage	Unmate connectors: apply a voltage of {two times the rated voltage plus 1000 volts} VAC for 1 minute between adjacent terminals and between terminals to ground.	No breakdown; current leakage < 5 mA
5	Temperature Rise	Mate connectors, measure the temperature rise at the rated current. The ambient condition is still air at 25°C, Per EIA-364-70 method 2.	Temperature rise: +30°C MAXIMUM

### 5.3 MECHANICAL REQUIREMENTS

Item	Test Description	Test Method	Reference Standard
6	Connector Mate And Unmate Forces	Mate and unmate connector (male to female) at a rate of 25 ± 6 mm per minute. (Per circuit)	8.0 N (1.8 lbf) MAXIMUM insertion force & 2.0 N (0.45lbf) MINIMUM withdrawal force (Tin plated)  5.6 N (1.26 lbf) MAXIMUM insertion force & 1.5 N (0.34lbf) MINIMUM withdrawal force (Gold plated)
7	Terminal Retention Force (in Housing)	Axial pullout force on the terminal in the housing at a rate of 25 ± 6 mm per minute.	24.5 N (5.5 lbf) MINIMUM retention force

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# PRODUCT SPECIFICATION

8	Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of $25 \pm 6$ mm per minute.	14.7 N (3.3 lbf) MAXIMUM insertion force
9	Durability	Mate connectors up to 30 cycles at a maximum rate of 10 cycles per minute prior to Environmental Tests.	6 milliohms MAXIMUM
10	Vibration (Random)	Mate connectors and vibrate per EIA 364-28, test condition VII, Letter D. Test Duration: 15 minutes each axis.	6 milliohms MAXIMUM & Discontinuity < 1 microsecond
11	Shock (Mechanical)	Mate connectors and shock at 50 g' s with $\frac{1}{2}$ sine wave (11 milliseconds) shocks in the $\pm X, \pm Y, \pm Z$ axes (18 shocks total).	6 milliohms MAXIMUM & Discontinuity < 1 microsecond
12	Wire Pullout Force (Axial) (Wire from Terminal)	Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm per minute.	MINIMUM pullout force 16 Awg: 88.0 N (19.8 lbf) 18 Awg: 88.0 N (19.8 lbf) 20 Awg: 57.8 N (13.0 lbf) 22 Awg: 35.5 N (8.0 lbf) 24 Awg: 26.6 N (6.0 lbf) 26 Awg: 13.3 N (3.0 lbf) 28 Awg: 8.9 N (2.0 lbf) 30 Awg: 6.6 N (1.5 lbf)
13	Pin to Header Retention	Apply axial push force to pin at a rate of $25 \pm 6$ mm per minute.	13.7 N (3.1 lbf) MINIMUM pushout force
14	Thumb Latch to Ramp Yield Strength	Full mate and then Unmate the connectors at a rate of $25 \pm 6$ mm per minute.	45 N (10.125 lbf) MINIMUM Yield Strength

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## 5.4 ENVIRONMENTAL REQUIREMENTS

Item	Test Description	Test Method	Reference Standard
15	Thermal Aging	Mate connectors; expose to: 240 hours at 105 ± 2°C or 500 hours at 85 ± 2°C	6 milliohms MAXIMUM
16	Humidity (Steady State)	Mate connectors: expose to a temperature of 40 ± 2°C with a relative humidity of 90-95% for 96 hours. Note: Remove surface moisture and air dry for 1 hour prior to measurements.	6 milliohms MAXIMUM & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms MINIMUM
17	Solder ability	Immerse the solder pin of the connector in the solder bath at 260°C +/-5°C for 5+/-0.5 seconds After dipped the pin in the flux of RAM or R type for 5 seconds MIL-STD-202 METHOD 208	Solder coverage: 95% MINIMUM
18	Solder Resistance	A) Wave Solder Process Dip connector terminal tails in solder; Solder Duration: 10 seconds MAX Solder Temperature: 260°C MAX  B) Convection Reflow Solder Process 235°C MAX Parts identified with a green dot on the primary shipping carton label and all parts with a manufacturing date after 11/1/2007: 260°C MAX	Visual :No Damage to insulator material
19	Cold Resistance	Mate connectors: Duration: 96 hours; Temperature: -40 ± 3°C	6 milliohms MAXIMUM
20	Thermal Shock	Test cycles: 5cycles Temperature range : -55±3°C→30 minute 85±2°C→30 minute	No Damage

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## 6.0 TESTING SEQUENCE

### 6.1 TEST GROUP

Test of Examination	Test Group									
	A	B	C	D	E	F	G	H	I	J
	Test Sequence									
Examination of Product	1	1	1,4,6	1,7	1	1	1	1	1	1
Low Level Contact Resistance	2,4,6	2,4,6	10	2,4	4	2,5				
Insulation Resistance			2, 8							
Dielectric Withstanding Voltage			3, 9							
Temperature Rise					2					
Connector Mate And Unmate Forces						3				
Terminal Retention Force (in Housing)								3		
Terminal Insertion Force (into Housing)								2		
Durability						4				
Vibration (Random)	3									
Shock (Mechanical)	5									
Wire Pullout Force (Axial) (Wire from Terminal)									2	
Pin to Header Retention							2			
Thumb Latch to Ramp Yield Strength										2
Thermal Aging				3						
Humidity (Steady State)		5	7							
Solder ability				5						
Solder Resistance				6						
Cold Resistance					3					
Thermal Shock		3	5							
Sample size	5	5	5	5	5	5	5	5	5	5

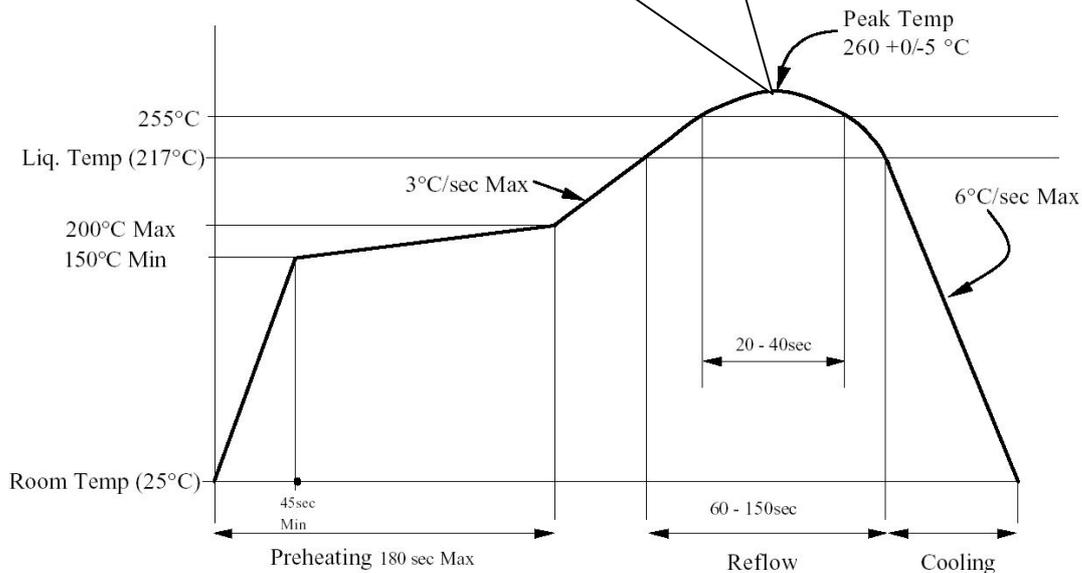
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## 6.2 IR PROFILE

Recommended Reflow Pre-Solder Process and Profile.

Actual reflow profile also depends on equipment, solder paste, PCB thickness, and other components on the board. Please consult your solder paste & reflow equipment manufacturer for their recommendations to adopt a suitable process.

260°C Max 10 second/cycles 2 cycles(Peak Temperature)



### LEAD-FREE PROFILE FOR PEAK REFLOW - 260°C

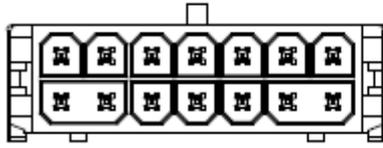
#### Notes :

1. Reflow solder preheat at 3°C/s to 150°C.
2. Reflow at 255°C for 30s per figure.
3. Peak temperature to be at 260 +0/-5°C.

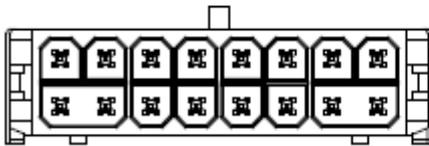
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## 7.0 OTHER INFORMATION

### 7.1 STANDARD POLARIZATION FOR HEADERS



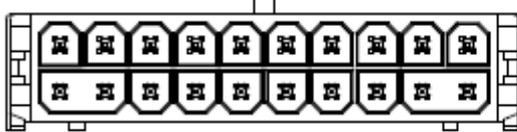
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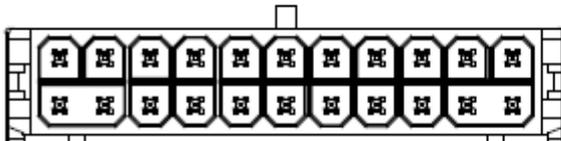
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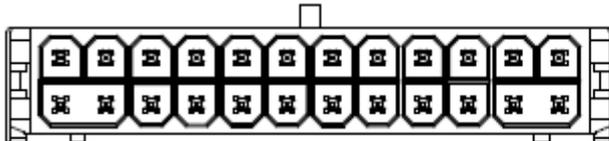
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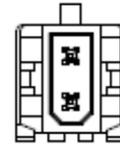
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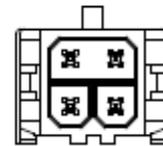
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CIRCUITS SIZE: 24



CIRCUITS SIZE: 2



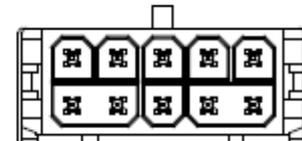
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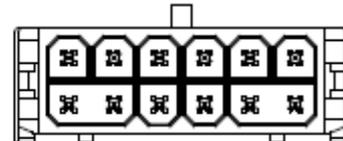
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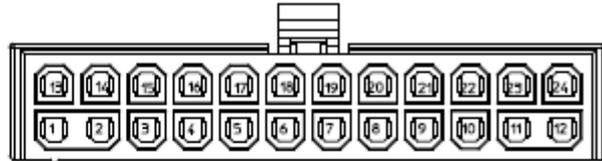
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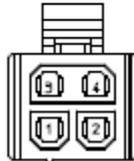
## 7.2 STANDARD POLARIZATION FOR RECEPTACLES



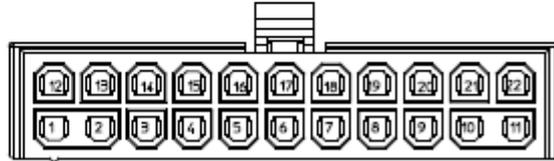
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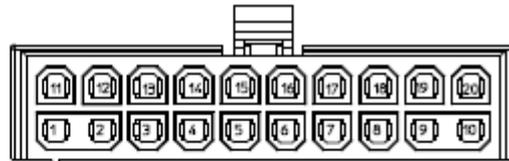
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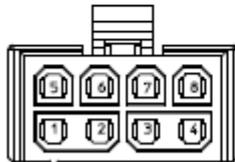
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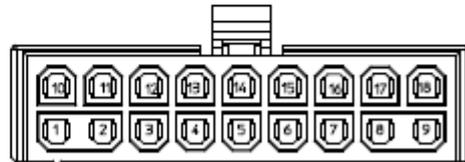
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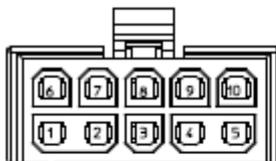
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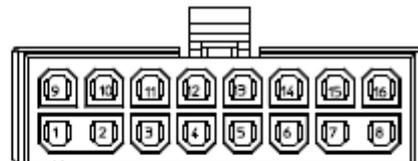
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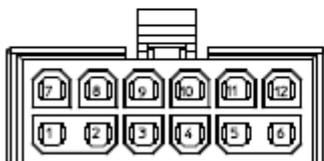
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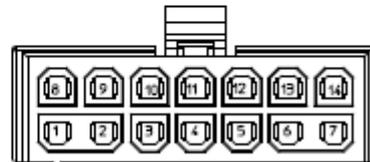
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