



PRODUCT SPECIFICATION

MINI-FIT JR. AND PLUS HCS CONNECTOR SYSTEM COMPLIANT PIN INTERFACE (CPI) (WIRE TO PCB & PCB TO PCB)

1.0 SCOPE

This specification covers the 4.20 mm / (.165 in.) centerline (pitch) Mini-Fit Jr. Compliant Pin Interface (Mini-Fit CPI™) dual row connector system in wire to board and board to board applications.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND PART NUMBER

| <u>Product Name</u> | <u>Part Number</u> |
|-----------------------------------|--------------------|
| Minifit Jr Female Terminal | 5556-**** |
| Minifit Plus HCS Female Terminals | 45750-**** |
| Receptacle (dual row) | 5557-**** |
| BMI Receptacle Header (dual row) | 42385-**** |
| BMI Receptacle (dual row) | 42474-**** |
| CPI Vertical Header | 43879-**** |

2.2 DIMENSIONS, MATERIALS PLATINGS & MARKINGS

See the appropriate sales drawings for the information on dimensions, materials, platings and markings.

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See sales drawings and the other sections of this specification for the necessary referenced documents and specifications.

3.1 AGENCY APPROVALS

UL File #E29179
CSA Certificate #LR 19980

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| REVISION: 6 | ECR/ECN INFORMATION: EC No: UCP2013-0617 DATE: 2013/08/08 | TITLE: PRODUCT SPECIFICATION MINI-FIT JR. AND PLUS HCS CONNECTOR SYSTEM COMPLIANT PIN INTERFACE (CPI) | SHEET No. 1 of 6 |
| DOCUMENT NUMBER: PS-43879-001 | CREATED / REVISED BY: NNGUYEN | CHECKED BY: BELL | APPROVED BY: SMITH-ROEMER |



PRODUCT SPECIFICATION

4.0 RATINGS

4.1 VOLTAGE RATINGS

UL / CSA 600 VOLTS AC (RMS) / DC

4.2 CURRENT RATINGS**

5556 Mini fit Jr Brass or Phosphor Bronze terminals with Tin or Gold Plating

| | Ckt. Size / Wire Awg. | 2 | 4 - 6 | 7 - 10 | 12 - 24 |
|--|-----------------------|----------|--------------|---------------|----------------|
| Maximum Rated Current Wire to Board | 16 Awg | 8 Amps | 7 Amps | 6 Amps | 5 Amps |
| | 18 Awg | 8 Amps | 7 Amps | 6 Amps | 5 Amps |
| | 20 Awg | 6 Amps | 5 Amps | 4 Amps | 4 Amps |
| | 22 Awg | 4 Amps | 3 Amps | 3 Amps | 3 Amps |
| | 24 Awg | 3 Amps | 2 Amps | 2 Amps | 2 Amps |
| | 26 Awg | 2 Amps | 1 Amps | 1 Amps | 1 Amps |
| | 28 Awg | 1 Amps | 1 Amps | 1 Amps | 1 Amps |
| Header to Header | Ckt. Size | 2 | 4 - 6 | 7 - 10 | 12 - 24 |
| | Current | 8 Amps | 7 Amps | 6 Amps | 6 Amps |

45750 Mini fit Plus HCS terminals with Tin or Gold Plating

| | Ckt. Size / Wire Awg | 2 | 4 | 6, 8 | 10, 12 | 14, 16, 18 | 20, 22, 24 |
|--|----------------------|-----------|----------|----------|----------|------------|------------|
| Maximum Rated Current Wire to Board | 16 Awg | 11.5 Amps | 9.5 Amps | 9 Amps | 8 Amps | 8 Amps | 7.5 Amps |
| | 18 Awg | 10 Amps | 8.5 Amps | 7.5 Amps | 7 Amps | 7 Amps | 6.5 Amps |
| | 20 Awg | 9 Amps | 8 Amps | 7 Amps | 6.5 Amps | 6 Amps | 5.5 Amps |

** Ratings shown represent *MAXIMUM* current carrying capacity of a fully loaded connector with all circuits powered. Ratings are based on a 30°C maximum temperature rise limit over ambient (room temperature). Testing conducted with tinned copper conductor stranded wire. Above charts are intended as a guideline. Current rating is application dependent. Appropriate de-rating is required depending on factors such as higher ambient temperature, smaller copper weight of PCB traces, gross heating from adjacent modules or components and other factors that influence connector performance.

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|---|---|---|-------------------------------------|
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PRODUCT SPECIFICATION

4.3 TEMPERATURES

Operating:* -40 Degrees C to +105 Degrees C
 Nonoperating: -40 Degrees C to +105 Degrees C
 *(Including 30 degrees C terminal temperature at full current)

Note: The Mini-Fit CPI™ connector system was not designed or tested for either current sharing or hot plugging (mating and unmating of live circuits). Use of this connector system in these types of applications is not recommended and is not within the scope of this product specification.

5.0 PERFORMANCE

5.1 ELECTRICAL PERFORMANCE

| Section | Item | Test Condition | Requirement |
|---------|--|--|---------------|
| 5.1.1 | Initial Contact Resistance (low level) | Mate connectors, measure by dry circuit, 20mV max., 100mA. Wire resistance shall be removed from the measured value. | 10 mΩ max. |
| 5.1.2 | Insulation Resistance | Mate connectors, apply 500V AC for 1 minute adjacent terminal or ground. | 1000 MΩ min. |
| 5.1.3 | Dielectric Strength | Mate connectors, apply 1500V AC for 1 minute between adjacent terminal or ground. | No breakdown. |
| 5.1.4 | Compliant Pin Interface Resistance | Insert individual Compliant Pin terminal into printed circuit board. | 1.0 mΩ max. |

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|---|---|---|-------------------------------------|
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| DOCUMENT NUMBER: PS-43879-001 | CREATED / REVISED BY: NNGUYEN | CHECKED BY: BELL | APPROVED BY: SMITH-ROEMER |



PRODUCT SPECIFICATION

5.2 MECHANICAL PERFORMANCE

| Section | Item | Test Condition | Requirement |
|---------|---|---|--|
| 5.2.1 | Contact Insertion and Withdrawal for 5556 terminals | Insert and withdraw a contact at a speed rate of 25± 6 mm / Minute | Max. Insertion = 1.5Kg. Min. Withdrawal = .01Kg. |
| 5.2.2 | Crimp Terminal Insertion Force | Insert the crimped terminal into the housing | Max. Insertion = 1.5Kg |
| 5.2.3 | Crimp Terminal Retention Force | Apply axial pull out force at a speed rate of 25± 6 mm/minute on the terminal inserted in the housing. | Min. Retention = 3.0Kg |
| 5.2.4 | Header Terminal Retention Force | Apply axial pull out force at a speed rate of 25± 6mm / minute on the terminal assembled in the housing. | Min. Retention = 1.0Kg |
| 5.2.5 | Wire Pull Out Force | Mount the crimped terminal, apply an axial pull out force on the wire at a speed rate of 25± 6mm / minute. | 16 Awg = 7.0 Kg Min. 18 Awg = 7.0 Kg Min. 20 Awg – 6.0 Kg Min. 22 Awg = 4.0 Kg Min. 24 Awg = 3.0 Kg Min. 26 Awg = 2.0 Kg Min. 28 Awg = 1.0 Kg Min. |
| 5.2.6 | Normal Force for 5556 terminals | Apply a perpendicular force simultaneously to each beam to desired deflection at a speed rate of 25± 6 mm / minute. | 150 g min. |
| 5.2.7 | Normal Force for 45750 Plus HCS | Apply a perpendicular force simultaneously to each beam to desired deflection at a speed rate of 25± 6 mm / minute. | 360 g min. |
| 5.2.8 | Compliant Pin Insertion and Retention Force | Insert Compliant Pin terminal at a speed rate of 25± 6 mm / minute into printed circuit board. | Insertion = 20 Kg max. Withdrawal = 2 Kg min. |
| 5.2.9 | Panel Insertion & Withdrawal | Insert and withdraw a connector at a speed rate of 25± 6 mm / minute | Insertion = 23 Kg max. Withdrawal = 12 Kg min. |
| 5.2.10 | Durability for 5556 terminals | Insert and withdraw connectors (30 times) at a maximum rate of 10 cycles per minute prior to environmental tests. | Contact Res. Change = 20 mΩ max. |

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| REVISION: | ECR/ECN INFORMATION: | TITLE: | SHEET No. |
| 6 | EC No: UCP2013-0617 DATE: 2013/08/08 | PRODUCT SPECIFICATION MINI-FIT JR. AND PLUS HCS CONNECTOR SYSTEM COMPLIANT PIN INTERFACE (CPI) | 4 of 6 |
| DOCUMENT NUMBER: | CREATED / REVISED BY: | CHECKED BY: | APPROVED BY: |
| PS-43879-001 | NNGUYEN | BELL | SMITH-ROEMER |



PRODUCT SPECIFICATION

5.2 MECHANICAL PERFORMANCE (cont.)

| Section | Item | Test Condition | Requirement |
|---------|--|--|--|
| 5.2.11 | Durability for 45750 terminals* | Per EIA-364-09C, mate connectors 100 cycles for tin plated product, 250 cycles for gold plated product at a maximum rate of 500 cycles per hour. | 10 mΩ Max. chg. from Initial; Visual: No Damage |
| 5.2.12 | Vibration for 5556 terminals | Amplitude: 1.50 mm peak to peak Sweep: 10-50-10 Hz in one minute Duration: 2 hours in each X-Y-Z axis. | Contact Res. Change = 20 MΩ max. Discontinuity not greater than 1 μsecond. |
| 5.2.13 | Vibration (Random) for 45750 terminals | EIA 364-28: Mate connectors and vibrate per, test condition VII, Letter D. 15 minutes in each axis | 10 mΩ Max. chg. from Initial; Discontinuity < 1 microsecond |
| 5.2.14 | Mechanical Shock with 5556 terminals | 50 G's with three saw tooth wave form shocks in each X-Y-Z axis | Contact Res. Change = 20 mΩ max. Discontinuity not greater than 1 μsecond |

* Durability ratings established as tested per Durability Test Procedures described by EIA-364-09C and meet requirements for low level contact resistance and DWV as prescribed per EIA-364-1000 Test Sequence Group 7.

5.3 ENVIRONMENTAL PERFORMANCE

| Section | Item | Test Condition | Requirement |
|---------|-------------------------------------|---|--|
| 5.3.1 | Cold Resistance with 5556 terminals | -40± -3°C for 96 hrs. | Appearance: No damage Contact Res. Change =20mΩ max. |
| 5.3.2 | Thermal Shock | Mate connectors, expose to 10 cycles of: -55 +0-3°C for 30 minutes +105± 10°C for 5 minutes max. | Appearance: No damage Contact Res. Change =20mΩ max. |
| 5.3.3 | Thermal Aging with 5556 terminals | Mate connectors, expose to 96 hours at 105 ±2°C | Appearance: No damage Contact Res. Change =10 mΩ max. |
| 5.3.4 | Thermal Aging with 45750 terminals | Mate connectors, expose to 240 hours at 105 ±2°C | Appearance: No damage Contact Res. Change =10 mΩ max. |

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|-----------------------|---|---|----------------------------|
| REVISION: 6 | ECR/ECN INFORMATION: EC No: UCP2013-0617 DATE: 2013/08/08 | TITLE: PRODUCT SPECIFICATION MINI-FIT JR. AND PLUS HCS CONNECTOR SYSTEM COMPLIANT PIN INTERFACE (CPI) | SHEET No. 5 of 6 |
|-----------------------|---|---|----------------------------|

| | | | |
|---|---|----------------------------|-------------------------------------|
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|---|---|----------------------------|-------------------------------------|



PRODUCT SPECIFICATION

5.3 ENVIRONMENTAL PERFORMANCE (cont.)

| Section | Item | Test Condition | Requirement |
|---------|--|--|---|
| 5.3.5 | Humidity (Steady State) with 5556 terminals | Mate connectors, expose to a temperature of 60±2°C with a relative humidity of 90% to 95% for 96 hours. | Appearance: No damage Contact Res. Change = 20 mΩ max. Dielectric withstanding voltage: No breakdown Insul res. 1000MΩ min |
| 5.3.6 | Immunity to Fretting Corrosion (thermal cycling) | Mate connectors, expose to 500 cycles with a max. transition time of 5 minutes between extremes. +25±10°C for 30 minutes +70+3/-0°C for 30 minutes | Appearance: No damage Contact Res. Change: =20mΩ max. |
| 5.3.7 | Temp. Rise & Current Cycling | Mate the connectors and measure the temperature rise at the rated current for 96 hrs., 45 minutes ON and 15 minutes OFF for 240 hrs., and an additional 96 hrs. of steady-state current. | Max. Temp. Rise = 30°C above ambient. |

6.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit, and storage.

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| DOCUMENT NUMBER: PS-43879-001 | CREATED / REVISED BY: NNGUYEN | CHECKED BY: BELL | APPROVED BY: SMITH-ROEMER |