



# PRODUCT SPECIFICATION

## 1.0 SCOPE

This Product Specification covers the 2.54 mm (.100 inch) centerline (pitch) 0.64 mm (.025) square pin headers when mated with printed circuit board (PCB) connectors.

## 2.0 PRODUCT DESCRIPTION

### 2.1 PRODUCT NAME AND SERIES NUMBERS

PCB connectors: 4455

Headers: 171856, 171857

Other products conforming to this specification are noted on the individual drawings.

### 2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

Terminal Material: Brass or Phos. Bronze (for Max performance use phos. bronze material.)

Housing: Nylon or Polyester

Pins: Brass

For more information on dimensions, materials, and plating see the individual drawings.

### 2.3 SAFETY AGENCY APPROVALS

UL File Number ..... E29179

CSA ..... LR19980

SERIES	Agency Voltage Rating (AC RMS or DC)		Agency Current Rating (Single Circuit) (Amps)		Agency Temperature Rating (°C)
	UL	CSA	UL	CSA	UL
171856	250	250	7	7	65*
171857	250	250	7	7	65*

\*Temperature rating of 65°C is default rating and is expected to increase to 105°C upon completion of the in-progress product safety tests.

## 3.0 RATINGS

### 3.1 VOLTAGE

250 Volts

**3.2 CURRENT 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.

Maximum current assuming PCB trace size is equivalent to the following wire sizes:

AWG	Amps (Max)
22	4.00
24	3.75
26	3.50
28	3.00

Note: current ratings are for a single circuit, based on not exceeding 30°C temperature rise.

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DOCUMENT NUMBER: <b>PS-171856-0002</b>	CREATED / REVISED BY: <b>JDFOX</b>	CHECKED BY: <b>MKIPPER</b>	APPROVED BY: <b>FSMITH</b>



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## 3.2 TEMPERATURE

	Brass	Phos Bronze
Operating Temperature	-40°C to +80°C*	-40°C to +105°C*
Non Operating Temperature	-40°C to +105°C**	-40°C to +105°C

\*including terminal temperature rise. Testing of the housing material to establish the maximum operating temperature for the connector assembly at UL is in progress. The currently assigned maximum operating temperature rating at UL is 65°C and is the default rating for the material. This rating is expected to be increased to 105°C upon completion of the in-progress product safety tests.

\*\*parts not mated

## 4.0 PERFORMANCE

### 4.1 ELECTRICAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Contact Resistance (Low Level)	Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA.	10 milliohms MAXIMUM [initial]
Contact Resistance of Wire Termination (Low Level)	Terminate the applicable wire to the terminal and measure wire using a voltage of 20 mV and a current of 100 mA.	2 milliohms MAXIMUM [initial]
Insulation Resistance	Unmate & unmount connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
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
Capacitance	Measure between adjacent terminals at 1 MHz.	2 picofarads MAXIMUM
Temperature Rise (via Current Cycling)	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: +30°C MAXIMUM

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## 4.2 MECHANICAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Connector Mate and Unmate Forces	Per circuit when mated to an .025 Sq. pin. Mate and unmate connector (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute.	2.55 N (0.574 lbf) MAXIMUM insertion force & 1.33 N (0.300 lbf) MINIMUM withdrawal force
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. (Forces will change with platings and materials.)	17.8 N (4.0 lbf) MINIMUM withdrawal force
Durability	Mate connectors up to 25 cycles at a maximum rate of 10 cycles per minute prior to Environmental Tests.	10 milliohms MAXIMUM (change from initial)
Vibration (Random)	Mate connectors and vibrate per EIA 364-28, test condition VII.	10 milliohms MAXIMUM (change from initial) & Discontinuity < 1 microsecond
Shock (Mechanical)	Mate connectors and shock at 50 g's with ½ sine wave (11 milliseconds) shocks in the ±X, ±Y, ±Z axes (18 shocks total).	10 milliohms MAXIMUM (change from initial) & Discontinuity < 1 microsecond
Normal Force	Apply a perpendicular force.	2.94 N (300 grams) average

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## 4.3 ENVIRONMENTAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT										
Shock (Thermal)	Mate connectors; expose to 5 cycles of: <table border="1"> <thead> <tr> <th>Temperature °C</th> <th>Duration (Minutes)</th> </tr> </thead> <tbody> <tr> <td>-40 +0/-3</td> <td>30</td> </tr> <tr> <td>+25 ±10</td> <td>5 MAXIMUM</td> </tr> <tr> <td>+105 +3/-0</td> <td>30</td> </tr> <tr> <td>+25 ±10</td> <td>5 MAXIMUM</td> </tr> </tbody> </table>	Temperature °C	Duration (Minutes)	-40 +0/-3	30	+25 ±10	5 MAXIMUM	+105 +3/-0	30	+25 ±10	5 MAXIMUM	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Temperature °C	Duration (Minutes)											
-40 +0/-3	30											
+25 ±10	5 MAXIMUM											
+105 +3/-0	30											
+25 ±10	5 MAXIMUM											
Thermal Aging	Mate connectors; expose to: 96 hours at 105 ± 2°C	10 milliohms MAXIMUM (change from initial]) & Visual: No Damage										
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.	10 milliohms MAXIMUM (change from initial) & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms MINIMUM & Visual: No Damage										
Humidity (Cyclic)	Mate connectors: cycle per EIA-364-31: 24 cycles at temperature 25 ± 3°C at 80 ± 5% relative humidity and 65 ± 3°C at 50 ± 5% relative humidity; dwell time of 1.0 hour; ramp time of 0.5 hours.  {Note: Remove surface moisture and air dry for 1 hour prior to measurements.}	10 milliohms MAXIMUM (change from initial) & Dielectric Withstanding Voltage: No Breakdown at 500 VAC & Insulation Resistance: 1000 Megohms MINIMUM & Visual: No Damage										
Solderability	Per SMES-152	Solder coverage: 95% MINIMUM (per SMES-152)										

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DESCRIPTION	TEST CONDITION	REQUIREMENT
Solder Resistance	<p><b>171856 and 171857 Series:</b> Convection Reflow Solder Process 260°C MAX Per AS-40000-5013</p> <p>Wave Solder Process Dip connector terminal tails in solder; Solder Duration: 10 seconds MAX Solder Temperature: 260 ± 5°C Per AS-40000-5013</p> <p><b>4455 Series:</b> Wave Solder Process Dip connector terminal tails in solder; Solder Duration: 5 ± 5 seconds; Solder Temperature: 230 ± 5°C</p>	Visual: No Damage to insulator material
Cold Resistance	Mate connectors: Duration: 96 hours; Temperature: -40 ± 3°C	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Corrosive Atmosphere: Flowing Mixed Gas (FMG)	Test per EIA-364-65, Class II, Exposure to gasses for 4 days, unmated.	10 milliohms MAXIMUM (change from initial) & Visual: No Damage

## 5.0 PACKAGING

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

## 6.0 GAGES AND FIXTURES

## 7.0 OTHER

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