molex

# PRODUCT SPECIFICATION

# KK 254 / .100

## WIRE-TO-BOARD
## BOARD-TO-BOARD
## CONNECTOR SYSTEM

| Crimp Terminal | Crimp Terminal |
|---|---|
|  |  |
| Series: 2759, 6459 | Series: 41572 |

| Crimp Terminal | Crimp Terminal |
|---|---|
|  |  |
| Series: 4089 | Series: 8088 |

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| REVISION: | ECM INFORMATION: | TITLE: | SHEET No. |
|---|---|---|---|
| T3 | EC No: 617830617830<br>DATE: 2019/05/24201 | PRODUCT SPECIFICATION<br>.100 CENTER KK CONNECTORS | 1 of 13 |

| DOCUMENT NUMBER: | DOC TYPE: | DOC PART: | CREATED / REVISED BY: | CHECKED BY: | APPROVED BY: |
|---|---|---|---|---|---|
| PS-10-07 | PS | 001 | SS06 | ISHWARGISHWARG | ISHWARGISHWAR |

| Crimp Housing | PCB Connector |
|---|---|
|  |  |
| Series: 2695 | Series: 4455 |

| Vertical Header | RA Header |
|---|---|
|  |  |
| Series: 4030 | Series: 4094 |

| Vertical Header with Friction Lock | Right Angle Header with Friction Lock |
|---|---|
|  |  |
| Series: 6373 | Series: 7478 |

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| Vertical Header with Friction Lock | Right Angle Header with Friction Lock |
|---|---|
|  |  |
| Series: 6410 | Series: 7395 |

| Header, Vertical, Breakaway with Friction Lock | Header, RA, Breakaway with Friction Lock |
|---|---|
|  |  |
| Series: 42227 | Series: 42228 |

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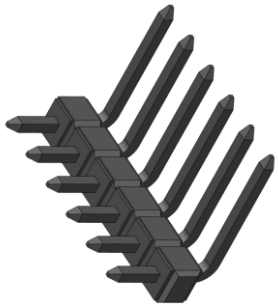
| Header, Vertical, Breakaway | Header, RA, Breakaway |
|---|---|
|  |  |
| Series: 42375 | Series: 42376 |

| Header, Right-Angle, Breakaway, Surface Mount Compatible |
|---|
|  |
| Series: 42377 |

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## 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 either printed circuit board (PCB) connectors or connectors terminated with 22 to 30 AWG wire using crimp technology.

## 2.0 PRODUCT DESCRIPTION

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

| Description | Series |
|---|---|
| Crimp Terminals | 2759, 6459, 41572, 4809, 8088 |
| Crimp Housings | 2695 |
| PCB Connectors | 4455 |
| Headers | 4030, 4094, 6373, 7478, 6410, 7395, 42225, 42226, 42227, 42228, 42375, 42376, 42377, 4380, 42009, 43009, 46607 |

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

### 2.2 DIMENSIONS, MATERIALS, PLATING AND MARKINGS

Terminal Material: Brass or Phos. Bronze (for Max performance use phos. bronze material.)
Housing: Nylon or Polyester
Pins: Brass or Phos. Bronze
For more information on dimensions, materials, and plating see the individual drawings.

RoHS compliant materials*.
**Refer to the "Product Environmental Compliance" section in Molex.com to know the individual PN RoHS compliance status*

### 2.3 SAFETY AGENCY APPROVALS

#### 2.3.1 UL File Number: E29179

#### 2.3.2 C US File Number*: LR19980

| SERIES | Agency Voltage Rating (AC RMS or DC) | | Agency Current Rating (Single Circuit) (Amps) | | Agency Temperature Rating (°C) |
|---|---|---|---|---|---|
| | UL | CSA | UL | CSA | UL |
| 2695 | 500 V AC<br>600 V DC | 250 | - | 2.5 | 105°C |
| 4455 | 600 | 250 | - | 2.5 | 105°C |
| 4030 | 600 | 250 | - | 2.5 | 105°C |
| 4094 | 600 | 250 | - | 2.5 | 105°C |
| 6373 | 600 | 250 | - | 2.5 | 105°C |
| 7478 | 600 | 250 | - | 2.5 | 105°C |
| 6410 | 600 | 250 | - | 2.5 | 105°C |
| 7395 | 600 | 250 | - | 2.5 | 105°C |
| 42225 | 600 | 250 | - | 2.5 | 105°C |
| 42226 | 600 | 250 | - | 2.5 | 105°C |
| 42227 | 600 | 250 | - | 2.5 | 105°C |
| 42228 | 600 | 250 | - | 2.5 | 105°C |
| 42375 | 600 | 250 | - | 2.5 | 120°C |
| 42376 | 600 | 250 | - | 2.5 | 120°C |
| 42377 | 600 | 250 | - | 2.5 | 120°C |

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATION

### 3.1 MOLEX DOCUMENTS

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

Cosmetic Specification PS-45499-002

Molex Quality Crimping Handbook Order No. 63800-0029
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
ATS – Application Tooling Specification*
**Application Tooling Specification for terminals is not provided in this document. ATS for terminals can be available from respective terminal part number page in Molex.com*

### 3.2 INDUSTRY DOCUMENTS

EIA-364-1000.01
UL-1977
CSA STD. C22.2 NO. 182.3-M1987

## 4.0 ELECTRICAL PERFORMANCE RATINGS

### 4.1 VOLTAGE
500 Volts AC (or 600 Volts DC)

### 4.2 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.)

| AWG | Amps (Max.) | Outside Insulation Diameter |
|---|---|---|
| 22 | 4.00 | See Drawings |
| 24 | 3.75 | See Drawings |
| 26 | 3.50 | See Drawings |
| 28 | 3.00 | See Drawings |
| 30 | 2.50 | See Drawings |

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

### 4.3 TEMPERATURE (AMBIENT +30°C TEMP)

| | Brass Terminals | Phos Bronze Terminals |
|---|---|---|
| **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.
**parts not mated

### 4.4 DURABILITY

Tin / Gold plated: 25 mating cycles
As tested in accordance with EIA-364-1000.01 test method (see Sec. 6.2 of this specification).

## 5.0 QUALIFICATION

Laboratory conditions and sample selection are in accordance with EIA-364-1000.01

## 6.0 PERFORMANCE

### 6.1 ELECTRICAL PERFORMANCE

| 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:<br>1) 96 hours (steady state)<br>2) 240 hours (45 minutes ON and 15 minutes OFF per hour)<br>3) 96 hours (steady state) | Temperature rise: +30°C MAXIMUM |

### 6.2 MECHANICAL PERFORMANCE

| DESCRIPTION | TEST CONDITION | REQUIREMENT |
|---|---|---|
| Connector Mate and Unmate Forces | Per circuit when mated to an .025 Sq. pin header without friction lock. Mate and unmate connector (male to female) at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | 4.9 N (1.1 lbf) MAXIMUM insertion force & 0.56 N (0.125 lbf) MINIMUM withdrawal force |
| Connector Mate and Unmate Forces 46856 series only | Per circuit when mated to a .093 thick PCB Mate and unmate connector at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | 6.67 N (1.5 lbf) MAXIMUM insertion force & 0.56 N (0.125 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 |
| Terminal Insertion Force (into Housing) | Apply an axial insertion force on the terminal at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (Forces will change with platings and materials.) | 11.12 N (2.5 lbf) MAXIMUM insertion 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 (Sine) | Mate connectors and vibrate per EIA 364-28, test condition I. | 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 |
| Wire Pullout Force (Axial) | Apply an axial pullout force on the wire at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. (For maximum performance use Molex application tooling with stranded tinned copper wire) | Wire pullout force depends on crimp tooling. See relevant Molex Application Tooling Specification for requirements. |
| Normal Force | Apply a perpendicular force. | 2.94 N (300 grams) average |

| | | | | |
|---|---|---|---|---|
| Kinked PC Pin Insertion Force (into PCB Hole) | Apply an axial insertion force on pins at a rate of 25 ± 6 mm (1 ± ¼ inch) per minute. | Number of kinked pins | Maximum Insertion force (per pin) | Average Insertion force (per pin) |
| | | 2 | 44.0 N (9.9 lbf) | 15.1N (3.4 lbf) |
| | | 4 | 21.4 N (4.8 lbf) | 9.8 N (2.2 lbf) |
| | | 6 | 18.2 N (4.1 lbf) | 4.9 N (1.1 lbf) |

### 6.3 ENVIRONMENTAL PERFORMANCE

| DESCRIPTION | TEST CONDITION | REQUIREMENT |
|---|---|---|
| Shock (Thermal) | Mate connectors; expose to 5 cycles of:<br>Temperature °C — Duration (Minutes)<br>-40 +0/-3 — 30<br>+25 ±10 — 5 MAXIMUM<br>+105 +3/-0 — 30<br>+25 ±10 — 5 MAXIMUM | 10 milliohms MAXIMUM (change from initial)<br>&<br>Visual: No Damage |
| Thermal Aging | Mate connectors; expose to:<br>96 hours at 105 ± 2°C | 10 milliohms MAXIMUM (change from initial])<br>&<br>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.<br><br>Note: Remove surface moisture and air dry for 1 hour prior to measurements. | 10 milliohms MAXIMUM (change from initial)<br>&<br>Dielectric Withstanding Voltage: No Breakdown at 500 VAC<br>&<br>Insulation Resistance: 1000 Megohms MINIMUM<br>&<br>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.<br><br>{Note: Remove surface moisture and air dry for 1 hour prior to measurements.} | 10 milliohms MAXIMUM (change from initial)<br>&<br>Dielectric Withstanding Voltage: No Breakdown at 500 VAC<br>&<br>Insulation Resistance: 1000 Megohms MINIMUM<br>&<br>Visual: No Damage |
| Solderability | Per SMES-152 | Solder coverage: 95% MINIMUM (per SMES-152) |
| Solder Resistance | Dip connector terminal tails in solder:<br>Solder Duration: 5 ± 0.5 seconds;<br>Solder Temperature: 230 ± 5°C | Visual:<br>No Damage to insulator material |
| Cold Resistance | Mate connectors:<br>Duration: 96 hours;<br>Temperature: -40 ± 3°C | 10 milliohms MAXIMUM (change from initial)<br>&<br>Visual: No Damage |
| Corrosive Atmosphere: Flowing Mixed Gas (FMG) | Test per EIA-364-65, Class II,<br>Exposure to gasses for 4 days, unmated. | 10 milliohms MAXIMUM (change from initial)<br>&<br>Visual: No Damage |

## 7.0 SOLDER INFORMATION

### 7.1 SOLDER PROCESS TEMPERATURES

Wave Solder: 235°C MAX

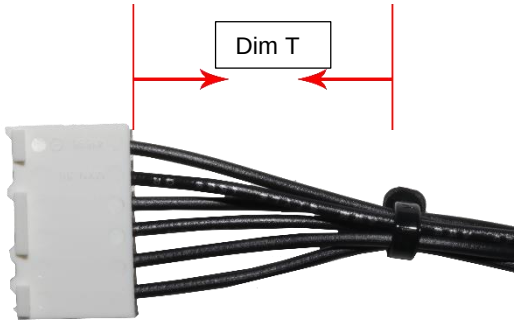
Molex Solderability Specification SMES-152
(Click Here)

## 8.0 PACKAGING

Parts shall be packaged to protect against damage during normal handling, transit and storage. “For specific part packaging details, refer to the packaging specification called out on the applicable product sales drawing.

## 9.0 CABLE TIE AND/ OR TWIST LOCATION

| Circuit Sizes | | | Dimension T Minimum |
|---|---|---|---|
| 2 | 4 | 6 | 0.50” (12.7mm) |
| 8 | | | 0.75” (19.1mm) |
| 10 | 12 | | 1.00” (25.40mm) |
| 14 | 16 | | 1.25” (31.75mm) |
| 18 | 20 | | 1.50” (38.09mm) |
| 22 | 24 | | 1.75” (44.45mm) |




The “T” dimension defines a “free” length of wire, or a length of wire that is not subject to significant bias by external factors such as a wire tie, wire twisting, or other means of bending or deforming of the wires that repositions them from their natural relaxed state or location where they enter the housing. Wires are to be dressed in such a manner to allow the terminals to float freely in the pocket. This dimension is general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.