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With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



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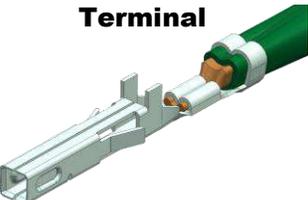
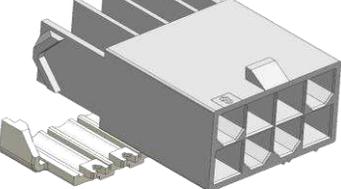
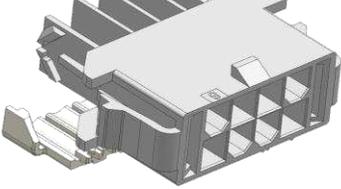
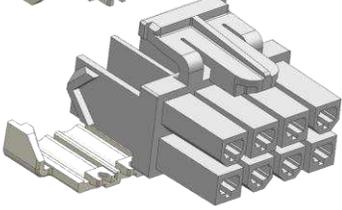
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# PRODUCT SPECIFICATION

## Mini-fit TPA2 INTERCONNECT SYSTEMS

Plug w/ TPA	Receptacle w/ TPA
<b>See section 2.1 for series numbers</b>	
<p data-bbox="613 674 776 737"><b>Male Crimp Terminal</b></p> 	<p data-bbox="894 737 1089 800"><b>Female Crimp Terminal</b></p> 
<p data-bbox="472 911 651 932"><b>TPA Retainer</b></p>  <p data-bbox="691 984 805 1047"><b>Plug Housing</b></p> 	<p data-bbox="837 1094 1024 1115"><b>TPA Retainer</b></p> 
<p data-bbox="472 1352 651 1373"><b>TPA Retainer</b></p>  <p data-bbox="691 1331 813 1478"><b>Plug Housing, Panel Mount</b></p> 	<p data-bbox="984 1457 1154 1520"><b>Receptacle Housing</b></p> 

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# PRODUCT SPECIFICATION

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# PRODUCT SPECIFICATION

## 1.0 SCOPE

This Product Specification covers the performance requirements for the MINI-FIT TPA2 Wire-To-Board and Wire-To-Wire, 4.20mm pitch dual row and single row connector series using brass and phos bronze terminals with Tin plating terminated with 16 to 24 AWG wire using Molex crimp technology. The TPA Retainer (terminal position assurance) is intended to ensure the crimp terminals are fully seated and to prevent incidence of terminal back-out due to partially seated terminals.

## 2.0 PRODUCT DESCRIPTION

### 2.1 NAMES AND SERIES NUMBER(S)

WIRE-TO-BOARD				
Description	Series Number	UL (600 V)	CSA (250 V)	IEC (250 V)
Mini-Fit TPA2, Receptacle Hsg, Dual Row	172708	Yes	Yes	Yes
Mini-Fit TPA2, Receptacle Hsg, Single Row	200453	Yes	Yes	Yes
Mini-Fit TPA2, Female Crimp Terminal	172718	Yes	Yes	Yes
Mini-Fit TPA2, TPA Retainer	172709	Yes	Yes	Yes

MATES TO



Right Angle Hdr, Dual Row	35318	Yes	Yes	Yes
Right Angle Hdr, Dual Row	44130	Yes	Yes	Yes
Right Angle Hdr, Dual Row	87427	Yes	Yes	Yes
Right Angle Hdr, Dual Row, Glow Wire Capable	172448	Yes	Yes	Yes
Right Angle Hdr, Dual Row, Reflow Capable	46991	Yes	Yes	Yes
Right Angle Hdr, Single and Dual Row	5569	Yes	Yes	Yes
Right Angle Hdr, Single Row, Reflow Capable	172648	Yes	Yes	Yes
Test Plug	44281	n/a	n/a	n/a
Vertical Hdr, Dual Row	5566	Yes	Yes	Yes
Vertical Hdr, Dual Row	35317	Yes	Yes	Yes
Vertical Hdr, Dual Row	36633	Yes	Yes	Yes
Vertical Hdr, Dual Row	43460	Yes	Yes	Yes
Vertical Hdr, Dual Row	44482	Yes	Yes	Yes
Vertical Hdr, Dual Row	47254	Yes	Yes	Yes
Vertical Hdr, Dual Row	47256	Yes	Yes	Yes
Vertical Hdr, Dual Row	67120	Yes	Yes	Yes
Vertical Hdr, Dual Row	87427	Yes	Yes	Yes
Vertical Hdr, Dual Row Glow Wire Capable	172447	Yes	Yes	Yes
Vertical Hdr, Dual Row Reflow Capable	46207	Yes	Yes	Yes
Vertical Hdr, Single Row	172647	Yes	Yes	Yes

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# PRODUCT SPECIFICATION

WIRE-TO-WIRE				
Description	Series Number	UL (600 V)	CSA (250 V)	IEC (250 V)
Mini-Fit TPA2, Female Crimp Terminal	172718	Yes	Yes	Yes
Mini-Fit TPA2, Receptacle Hsg, Dual Row	172708	Yes	Yes	Yes
Mini-Fit TPA2, Receptacle Hsg, Single Row	200453	Yes	Yes	Yes
Mini-Fit TPA2, TPA Retainer	172709	Yes	Yes	Yes
Mini-Fit TPA2, Male Crimp Terminal	172765	Yes	Yes	Yes
Mini-Fit TPA2, Plug Hsg, Dual Row	172762	Yes	Yes	Yes
Mini-Fit TPA2, Plug Hsg, Panel Mount, Dual Row	172767	Yes	Yes	Yes
Mini-Fit TPA2, Plug Hsg, Single Row	200471	Yes	Yes	Yes
Mini-Fit TPA2, Plug Hsg, Panel Mount, Single Row	200488	Yes	Yes	Yes

ALSO MATES TO



Plug Hsg, Dual Row, Glow Wire Capable	46993	Yes	Yes	Yes
Plug Hsg, Dual Row, Glow Wire Capable	172646	Yes	Yes	Yes
Plug Hsg, Single and Dual Row, Panel Mount	5559	Yes	Yes	Yes
Receptacle Hsg, Single and Dual Row	5557	Yes	Yes	Yes
Receptacle Hsg, Dual Row, Glow Wire Capable	46992	Yes	Yes	Yes
Receptacle Hsg, Single Row, Glow Wire Capable	46994	Yes	Yes	Yes
Receptacle Hsg, Single Row	36633	Yes	Yes	Yes

## 2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

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

## 2.3 SAFETY AGENCY APPROVALS

UL File Number: E29179

CSA: LR19980

IEC 61984 Certification: Tested to and found in compliance with IEC 61984. NRTL type examination certificate available from Molex upon request. Contact Molex Safety Agency team for questions regarding certification on specific part numbers.

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

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

## 4.0 RATINGS

### 4.1 VOLTAGE

See chart in section 2.1

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# PRODUCT SPECIFICATION

## 4.2 APPLICABLE WIRES

<b>Applicable Wire Gauges And Insulation Diameter Range</b>	16 AWG: 1.98mm (.078") – 3.14mm (.124")
	18-20 AWG: 1.42mm (.056") – 2.85mm (.112")
	22-24 AWG: 1.07mm (.042") – 2.38mm (.094")
	0.75mm <sup>2</sup> : 1.42mm (.056") – 2.85mm (.112")
	0.50mm <sup>2</sup> : 1.42mm (.056") – 2.85mm (.112")
	0.35mm <sup>2</sup> : 1.07mm (.042") – 2.38mm (.094")
	0.25mm <sup>2</sup> : 1.07mm (.042") – 2.38mm (.094")
	0.22mm <sup>2</sup> : 1.07mm (.042") – 2.38mm (.094")

## 4.3 MAXIMUM CURRENT RATING (Amperes)\*\*

Brass					Phosphor Bronze				
Wire \ Ckt. Size	2 & 3	4-6	8-10	12	Wire \ Ckt. Size	2 & 3	4-6	8-10	12
AWG #16	9	8	7	6	AWG #16	8	7	6	5
AWG #18	9	8	7	6	AWG #18	8	7	6	5
AWG #20	7	6	5	5	AWG #20	6	5	4	4
AWG #22	5	4	4	4	AWG #22	4	3	3	3
AWG #24	4	3	3	3	AWG #24	3	2	2	2

**Note:** PCB trace design may greatly affect temperature rise results.

\*\* 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). 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.

## 4.4 TEMPERATURE RATING

Operating Range (including T-rise from applied current): - 40°C to + 105°C

Non-operating Range: - 40°C to + 105°C

Field Temperature and Field Life: 60°C for 10 years (based EIA-364-1000, table 8)

Note: Temperature life test duration (section 6.3. item 1) is based on the assumption that the contact spends its entire life at the rated field maximum temperature (based on EIA-364-1000, table 8).

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## 4.5 DURABILITY RATING

30 cycles

## 4.6 WAVE SOLDER PROCESS TEMPERATURE

Headers with pegs: 240°C MAX

Headers without pegs: 260°C MAX

## 5.0 QUALIFICATION

Laboratory condition, sample selection and test sequences are in accordance with EIA-364-1000. See page 9 for detail test sequences.

## 6.0 PERFORMANCE REQUIREMENTS

### 6.1 ELECTRICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Contact Resistance (Low Level)</b>	Per EIA 364-23 Mate connectors: apply a maximum voltage of 20 mV and a current of 100 mA. Wire resistance shall be removed from the measured value.	10 milliohms MAXIMUM [initial]
2	<b>Insulation Resistance</b>	Per EIA-364-21 Mate connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
3	<b>Dielectric Withstanding Voltage</b>	Per EIA 364-20 (initial only) Mate connectors: apply a voltage of 2200 VAC for 1 minute between adjacent terminals and between terminals to ground.	No breakdown. Current leakage < 5 mA
4	<b>Temperature Rise (via current profiling)</b>	Per EIA 364-70B	Temperature rise: +30°C MAXIMUM
5	<b>Steady State Temperature Rise (via current cycling at rated current)</b>	Per EIA 364-55B Mate connectors. Measure the temperature rise at the rated current after 96 hours, during current cycling (45 minutes ON and 15 minutes OFF per hour) for 240 hours, and after final 96-hour steady state.	Temperature rise: +30°C MAXIMUM
6	<b>Steady State Voltage Drop (at rated current)</b>	Per EIA 364-70B Mate connectors. Apply the rated current.	30 millivolt MAX (change from initial)

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## 6.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
7	<b>Connector Mate and Unmate Forces Per Circuit</b>	Insert and withdraw (male to female) at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute. <i>(Does not include thumb latch)</i>	14.7 N (3.30 lbf) MAX insertion force 1.0 N (0.22 lbf) MIN withdrawal force
8	<b>Crimp Terminal Insertion Force (into Housing)</b>	Apply an axial insertion force on the terminal at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).	15 N (3.4 lbf) MAX insertion force
9	<b>Crimp Terminal Retention Force (in Housing w/ TPA)</b>	Axial pullout force on the terminal in the housing at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	30 N (6.74 lbf) MIN retention force
10	<b>Durability (w/o thumb latch)</b>	Per EIA-364-09 Mate/un-mate connectors 30 cycles at a maximum rate of 10 cycles per minute	20 milliohms MAX (change from initial)
11	<b>Durability (pre-conditioning)</b>	Per EIA-364-09 Mate/un-mate connectors 20 cycles at a maximum rate of 10 cycles per minute	20 milliohms MAX (change from initial)
12	<b>Vibration</b>	Per EIA-364-28 test condition VII-D Mate connectors and vibrate for 15 minutes each axis.	20 milliohms MAX (change from initial) & Discontinuity < 1 microsecond
13	<b>Wire Crimp Pullout Force (Axial)</b>	Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).	16 Awg = 88 N (19.8 lbf) MIN 18 Awg = 88 N (19.8 lbf) MIN 20 Awg = 59 N (13.3 lbf) MIN 22 Awg = 39 N (8.8 lbf) MIN 24 Awg = 29 N (6.5 lbf) MIN
14	<b>Thumb Latch Operation Force</b>	Depress latch at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	16 N (3.6 lbf) MAX
15	<b>Thumb Latch Yield Strength</b>	Mate loaded connectors fully. Pull connectors apart at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	60 N (13.5 lbf) MIN (V-0) 45 N (10.1 lbf) MIN (V-2)

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## 6.3 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
16	Temperature Life	Per EIA-364-17 Mate Connectors, expose to 108 hours at 105°C	20 milliohms MAX (change from initial)
17	Temperature Life (pre-conditioning)	Per EIA-364-17 Mate Connectors, expose to 66 hours at 105°C	20 milliohms MAX (change from initial)
18	Thermal Shock	Per EIA-364-32 Mate connectors: expose for 5 cycles Between temperatures -55 and 105° C; Dwell 0.5 hours at each temperature.	20 milliohms MAX (change from initial) Visual: No Damage
19	Cyclic Temperature and Humidity	Per EIA-364-31 method 3 Mate connectors: expose to 24 cycles from 25 °C / 80% RH to 65 °C / 50% RH	20 milliohms MAX (change from initial)

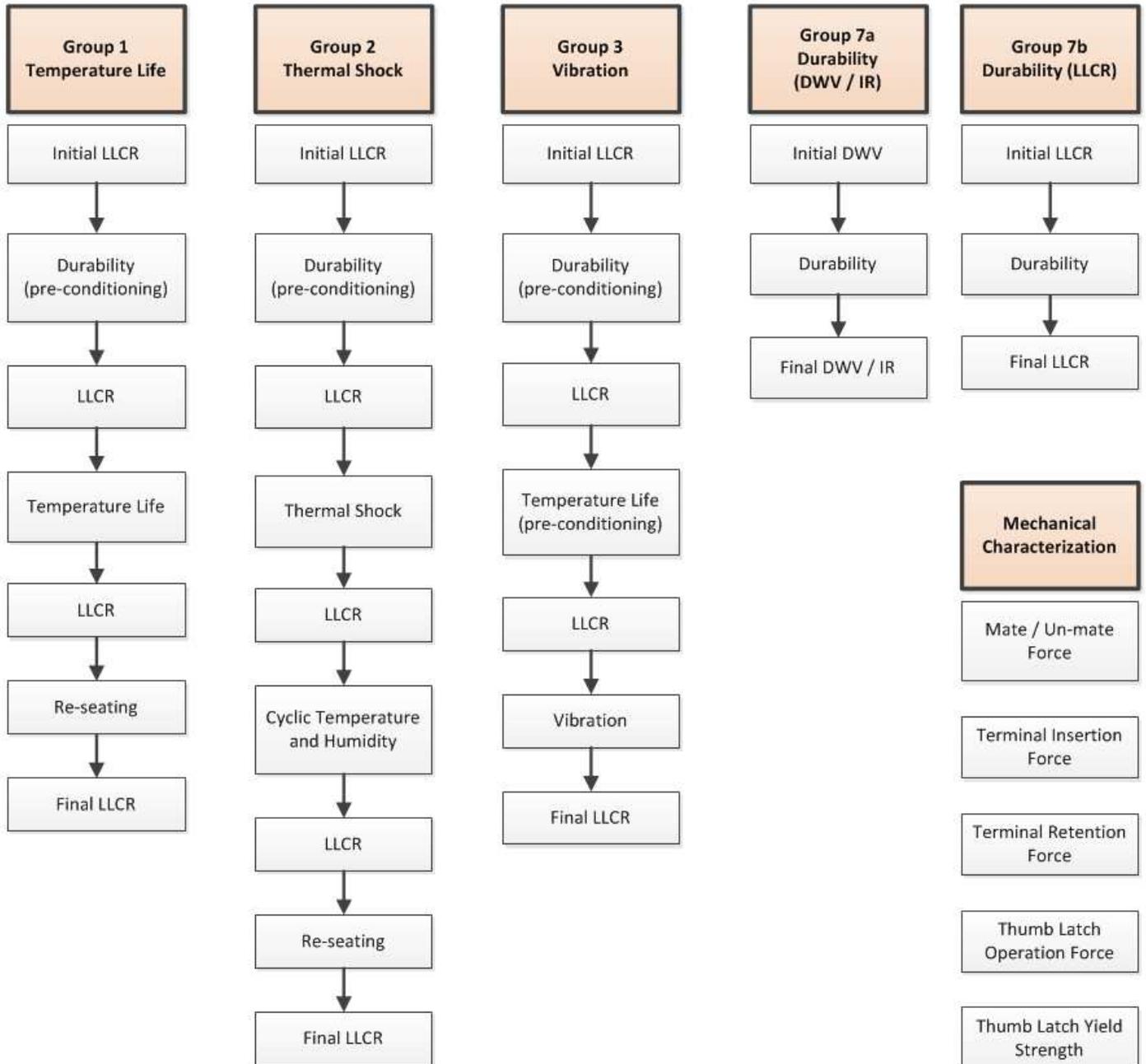
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## 7.0 TEST SEQUENCES

Testing sequences to be performed in accordance with EIA-364-1000.01



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## 8.0 PACKAGING

Parts shall be packaged to protect against damage during handling, transit and storage. Nylon parts should remain in their original packaging until ready for use. Refer to Molex specification AS-45499-001 for moisturizing nylon connector parts.

## 9.0 OTHER INFORMATION

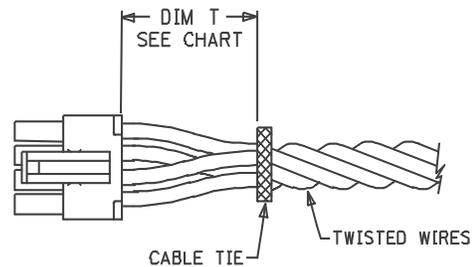
### 9.1 GAGES AND FIXTURES

It is recommended that test plugs (Series 44281) be used for continuity testing of receptacles. Standard mating parts should not be used for harness testing.

NOTE: The use of unauthorized testing devices and/or probes with a Molex product may cause damage to and affect functionality of the Molex product, and such use may void any and all warranties, expressed or implied.

### 9.2 CABLE TIE AND OR WIRE TWIST LOCATION

CKT Size	Dim T Min.
2-6	.50" (12.7 mm)
8	.75" (19.1 mm)
10-12	1.00" (25.4 mm)



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 a general recommendation and may need to be adjusted for different wire gauges and wire type and insulation thickness and insulation material.

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