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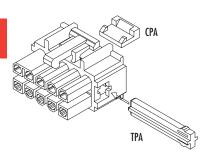
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Jameco Part Number 1962527

## 4.20mm (.165") Pitch Mini-Fit TPA™ Receptacle

#### 30067

Dual Row With Secondary Terminal Retention



#### **Features and Benefits**

- Receptacle housing for wire-to-wire and wire-to-board applications
- Terminal Position Assurance (TPA) allows the terminal to be fully seated in the housing assuring that it will not back out during high vibration applications
- Connector Position Assurance (CPA) assures housing cannot be inadvertently disengaged
- Contrasting color (white) TPA/CPA for high visibility
- TPA and CPA keys are sold individually to meet customerspecific needs

#### **Reference Information**

Packaging: Bag UL File No.: E29179 CSA File No.: LR19980 TUV License No.: R75142

Use With: 46083, 45750 and 5556 terminals Mates With: 30068 housing, 30069 and

30070 headers Designed In: Millimeters

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Housing: Black polyester, UL 94V-0 Operating Temperature: -40 to +105°C

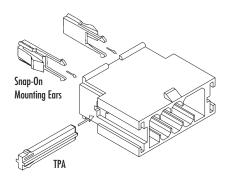
Circuits	Order No.					
CITCUITS	Receptacle (30067 Series)	TPA Pin (30072 Series)	CPA Key (30071 Series)	- Lead-free		
2	<u>15-97-5021</u>	15 07 0041*				
4	<u>15-97-5041</u>	<u>15-97-9041</u> *				
6	<u>15-97-5061</u>	<u>15-97-9061</u>				
8	<u>15-97-5081</u>	<u>15-97-9081</u>	<u>15-97-0071</u> †	Yes		
10	<u>15-97-5101</u>	<u>15-97-9101</u>				
12	<u>15-97-5121</u>	<u>15-97-9121</u>				
16	<u>15-97-5161</u>	<u>15-97-9161</u>				

<sup>\*</sup> The same TPA pin is used for both the 2 and 4 circuit receptacles

## 4.20mm (.165") Pitch Mini-Fit TPA™ Plug

### 30068

## Dual Row with Secondary Terminal Retention



#### **Features and Benefits**

- Plug housing for wire-to-wire applications
- Terminal Position Assurance (TPA) allows the terminal to be fully seated in the housing, assuring that it will not back out during high-vibration applications
- TPA key is sold individually to meet customerspecific needs
- Optional snap-on ears for panel mounting
- Contrasting color (white) TPA/CPA for high visibility

#### **Reference Information**

Packaging: Bag UL File No.: E29179 CSA File No.: LR19980 TUV License No.: R75142

Use With: 46314, 46012 and 5558 terminals

Mates With: 30067 housing Designed In: Millimeters

#### Physical

Housing: Black polyester, UL 94V-0 Operating Temperature: -40 to +105°C

Circuits		Order No.	Order No.			
Circuits	Plug (30068 Series)	TPA Pin (30072 Series)	Snap-on Mounting Ears	Lead-free		
2	<u>15-97-6021</u>	15-97-9041*				
4	<u>15-97-6041</u>	13-77-7041				
6	<u>15-97-6061</u>	<u>15-97-9061</u>	<u>43130-0001</u> †	Yes		
8	<u>15-97-6081</u>	<u>15-97-9081</u>				
16	<u>15-97-6161</u>	<u>15-97-9161</u>				

 $<sup>^</sup>st$  The same TPA pin is used for both the 2 and 4 circuit plugs



<sup>†</sup> The same CPA key is used for all receptacles, regardless of circuit size

<sup>†</sup> Two snap-on mounting ears required per plug housing for panel mounting application



## **MINI-FIT TPA**

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#### 1.0 SCOPE

This Product Specification covers performance requirements for the MINI-FIT TPA 4.20 mm (.165 inch) centerline (pitch) printed circuit board (PCB) connector series with Tin or Gold plating in Wire-To-Wire, Wire-to-Board and terminated with 16 to 28 AWG wire using Crimp technology.

#### 2.0 PRODUCT DESCRIPTION

### 2.1 NAMES AND SERIES NUMBER(S)

Table 1 – WIRE-TO-WIRE										
Description Series Number UL CSA T										
Female Crimp Terminal	5556	N/A	N/A	N/A						
Receptacle Housing, TPA	30067	Yes	Yes	Yes						
Male Crimp Terminal	5558	N/A	N/A	N/A						
Plug Housing, TPA	30068	Yes	Yes	Yes						
CPA Key	30071	N/A	N/A	N/A						
TPA Key	30072	N/A	N/A	N/A						

Table 2 – WIRE-TO-BOARD										
Description	Series Number	UL	CSA	TUV						
Female Crimp Terminal	5556	N/A	N/A	N/A						
Receptacle Housing, TPA	30067	Yes	Yes	Yes						
Vertical Header, TPA	30069	Yes	Yes	Yes						
Right Angle Header, TPA	30070	Yes	Yes	Yes						
Vertical Header, TPA	44482	Yes	Yes	No						
Right Angle Header, TPA	44483	Yes	Yes	No						
CPA Key	30071	N/A	N/A	N/A						
TPA Key	30072	N/A	N/A	N/A						

## 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: E29179

DEVICION, ECD/ECN INFORMATION, TITLE.

CSA Certificate: LR19980 TUV Certificate: R75142-8

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

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

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## 4.0 RATINGS

### 4.1 VOLTAGE

600 Volts AC (RMS) (or 600 Volts DC)

## **4.2 APPLICABLE WIRES**

Applicable Wire Gauges And Maximum Insulation Diameter 16 AWG: 3.10 / .122 MAXIMUM

18-20 AWG: 3.10 / .122 MAXIMUM

22-28 AWG: 1.80 / .071 MAXIMUM

## 4.3 MAXIMUM CURRENT RATING (Amperes)

	Table 3 – WIRE-TO-WIRE										
Brass						Phosp	hor Bro	nze			
Ckt. Size Wire	2-3	4 - 6	7 - 10	11 - 16	Ckt. Size Wire	2-3	4 - 6	7 - 10	11 - 16		
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		
AWG #26	3	2	2	2	AWG #26	2	1	1	1		
AWG #28	2	1	1	1	AWG #28	1	1	1	1		

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## 4.3 MAXIMUM CURRENT RATING (continued)

	Table 4 – WIRE-TO-BOARD											
Brass						Phosp	hor Bro	nze				
Ckt. Size Wire	2-3	4 - 6	7 - 10	11 - 16	Ckt. Size Wire	2-3	4 - 6	7 - 10	11 - 16			
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			
AWG #26	3	2	2	2	AWG #26	2	1	1	1			
AWG #28	2	1	1	1	AWG #28	1	1	1	1			

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

## 4.4 TEMPERATURE

Operating: \* - 40°C to + 105°C Nonoperating: - 40°C to + 105°C

\*Including 30°C terminal temperature rise at rated current

## 4.5 WAVE SOLDER PROCESS TEMPERATURE

Headers with pegs: 240°C MAX. Headers without pegs: 260°C MAX.

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## 5.0 WIRE-TO-WIRE PERFORMANCE

## **5.1 ELECTRICAL REQUIREMENTS**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level)	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	2 Resistance Mate connectors: apply a maximum voltage MAXIMU		10 milliohms MAXIMUM [initial]
3	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.	5 milliohms MAXIMUM [initial]
4	Insulation Resistance	Mate connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
5	Dielectric Withstanding Voltage	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
6	Temperature Rise (via Current Cycling)	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

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## 5.2 MECHANICAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Terminal Mate and Unmate Forces Per Circuit	Insert and withdraw terminal (male to female) at a rate of 25 ± 6 mm (1 ± 1/4 inch) per minute.	14.7 N (3.30 lbf) MAXIMUM insertion force & 1.0 N (0.02 lbf) MINIMUM withdrawal force
2	Crimp Terminal Retention Force (in Housing)	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) MINIMUM retention force
3	Crimp Terminal Retention Force (in Housing With TPA Key)	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.	SECTION 5.2.7
4	Durability	Mate connectors up to 30 cycles at a maximum rate of 10 cycles per minute prior to Environmental Tests.	20 milliohms MAXIMUM
5	Vibration (Random)	Mate connectors and vibrate per EIA 364-28, test condition VII.	10 milliohms MAXIMUM (change from initial) & Discontinuity < 1 microsecond
6	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).	20 milliohms MAXIMUM & Discontinuity < 1 microsecond
7	Wire Pullout Force (Axial)	Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm $(1 \pm \frac{1}{4})$ inch).	16 Awg = 88.0 N (19.8 lbf) Min. 18 Awg = 88.0 N (19.8 lbf) Min. 20 Awg = 59.0 N (13.3 lbf) Min. 22 Awg = 39.0 N (8.78 lbf) Min. 24 Awg = 29.0 N (6.52 lbf) Min. 26 Awg = 19.0 N (4.27 lbf) Min. 28 Awg = 9.80 N (2.20 lbf) Min.
8	Crimp Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of 25 $\pm$ 6 mm (1 $\pm$ $\frac{1}{4}$ inch).	15.0 N (3.37 lbf) MAXIMUM insertion force
9	Normal Force	Apply a perpendicular force.	0.49 N (50 grams) MINIMUM [Gold (noble) plating] OR 1.47 N (150 grams) MINIMUM [Tin (non-noble) plating]

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5.2 MECHANICAL REQUIREMENTS (continued)

10	Thumb Latch Operation Force	Depress latch at a rate of 25 ± 6mm (1 ± ¼ inch) per minute.	16.67 N (3.75 LBF) MAX.
11	Thumb Latch Yield Strength	Mate loaded connectors fully. Pull connectors apart at a rate of 25 ± 6mm (1 ± 1/4 inch) per minute.	68 N (15.29 LBF) MIN.
12	Panel Insertion and Withdrawal Forces (for 30067 with 43130 Snap-on Ears installed)	Insert and withdraw a connector at a rate of 25 ± 6 mm (1 ± 1/4 inch) per minute.	225 N (50.7 lbf) MAXIMUM insertion force & 157 N (35.3 lbf) MINIMUM withdrawal force

## 5.3 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Thermal Shock	Mate connectors: expose for 5 cycles Between temperatures –55 and 105° C; Dwell 0.5 hours at each temperature.	20 milliohms MAXIMUM Visual: No Damage Dielectric Strength per 5.1.5 Insulation Resistance per 5.1.4
2	Thermal Aging	Mate connectors; expose to: 96 hours at 105 ± 2°C	20 milliohms MAXIMUM & Visual: No Damage
3	Humidity (Steady State)	Mate connectors: expose to a temperature of $60 \pm 2^{\circ}\text{C}$ with a relative humidity of 90-95% for 96 hours.	20 milliohms MAXIMUM Dielectric Strength per 5.1.5 Insulation Resistance per 5.1.4 Visual: No Damage
4	Mixed Flowing Gas	EIA-364-65 with Class IIa Gas concentrations (Gold plated only)	20 milliohms MAXIMUM Visual: No Damage

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## 6.0 WIRE-TO-BOARD PERFORMANCE

## **6.1 ELECTRICAL REQUIREMENTS**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Contact Resistance (Low Level)	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	Mate connectors: apply a maximum voltage		10 milliohms MAXIMUM [initial]
3	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.	5 milliohms MAXIMUM [initial]
4	Insulation Resistance	Mate connectors: apply a voltage of 500 VDC between adjacent terminals and between terminals to ground.	1000 Megohms MINIMUM
5	Dielectric Withstanding Voltage	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
6	Temperature Rise (via Current Cycling)	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

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## **6.2 MECHANICAL REQUIREMENTS**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Terminal Mate and Unmate Forces Per Circuit	Insert and withdraw terminal (male to female) at a rate of 25 $\pm$ 6 mm (1 $\pm$ $\frac{1}{4}$ inch) per minute.	14.7 N (3.30 lbf) MAXIMUM insertion force & 1.0 N (0.02 lbf) MINIMUM withdrawal force
2	Crimp Terminal Retention Force (in Housing)	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) MINIMUM retention force
3	Crimp Terminal Retention Force (in Housing With TPA Key)	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.	SEE SECTION 6.2.9
4	Solid PC Tail Header Pin Retention Force (in Housing)	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.	4.45 N (1.00 lbf) MINIMUM retention force
5	Stamped PC Tail Terminal Retention Force (in Housing)	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) MINIMUM retention force
6	Durability	Mate connectors up to 30 cycles at a maximum rate of 10 cycles per minute prior to Environmental Tests.	20 milliohms MAXIMUM
7	Vibration (Random)	Mate connectors and vibrate per EIA 364-28, test condition VII.	10 milliohms MAXIMUM (change from initial) & Discontinuity < 1 microsecond
8	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).	20 milliohms MAXIMUM & Discontinuity < 1 microsecond
9	Wire Pullout Force (Axial)	Apply an axial pullout force on the wire at a rate of $25 \pm 6$ mm (1 $\pm \frac{1}{4}$ inch).	16 Awg = 88.0 N (19.8 lbf) Min. 18 Awg = 88.0 N (19.8 lbf) Min. 20 Awg = 59.0 N (13.3 lbf) Min. 22 Awg = 39.0 N (8.78 lbf) Min. 24 Awg = 29.0 N (6.52 lbf) Min. 26 Awg = 19.0 N (4.27 lbf) Min. 28 Awg = 9.80 N (2.20 lbf) Min.

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6.2 MECHANICAL REQUIREMENTS (continued)

10	Crimp Terminal Insertion Force (into Housing)	Apply an axial insertion force on the terminal at a rate of $25 \pm 6$ mm $(1 \pm \frac{1}{4}$ inch).	15.0 N (3.37 lbf) MAXIMUM insertion force
11	Normal Force	Apply a perpendicular force.	0.49 N (50 grams) MINIMUM [Gold (noble) plating] OR 1.47 N (150 grams) MINIMUM [Tin (non-noble) plating]
12	PCB Peg Engagement and Separation Forces	Engage and separate a connector at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute. (Applies to parts with PCB retention features only)	98.0 N (22.0 lbf) MAXIMUM insertion force & 10.0 N (2.24 lbf) MINIMUM withdrawal force
13	Thumb Latch Operation Force	Depress latch at a rate of 25 $\pm$ 6mm (1 $\pm$ $\frac{1}{4}$ inch) per minute.	16.67 N (3.75 LBF) MAX.
14	Thumb Latch Yield Strength	Mate loaded connectors fully. Pull connectors apart at a rate of 25 ± 6mm (1 ± ¼ inch) per minute.	68 N (15.29 LBF) MIN.

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## **6.3 ENVIRONMENTAL REQUIREMENTS**

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	Thermal Shock	Mate connectors: expose for 5 cycles Between temperatures –55 and 105° C; Dwell 0.5 hours at each temperature.	20 milliohms MAXIMUM Visual: No Damage Dielectric Strength per 5.1.5 Insulation Resistance per 5.1.4
2	Thermal Aging	Mate connectors; expose to: 96 hours at 105 ± 2°C	20 milliohms MAXIMUM & Visual: No Damage
3	Humidity (Steady State)	Mate connectors: expose to a temperature of $60 \pm 2^{\circ}\text{C}$ with a relative humidity of 90-95% for 96 hours.	20 milliohms MAXIMUM Dielectric Strength per 5.1.5 Insulation Resistance per 5.1.4 Visual: No Damage
4	Solderability	Per SMES-152	Solder coverage: 95% MINIMUM (per SMES-152)
5	Solder Temperature Heat Transfer Resistance	Dip connector terminals tail in solder: Solder Duration: 5 ± 0.5 seconds; Solder Temperature: 260 ± 5°C	Visual: No Damage to the insulator where the terminal or pin locks to the connector housing
6	Mixed Flowing Gas	EIA-364-65 with Class IIa Gas concentrations (Gold plated only)	20 milliohms MAXIMUM Visual: No Damage

## 7.0 TEST SEQUENCES

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

## 8.0 PACKAGING

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

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