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## FEATURES AND SPECIFICATIONS

### Features and Benefits

- Sizes 2 to 28 circuits
- Friction lock provides passive lock to connector with ramp
- 7478 with voids is 7832 Series
- Various pin lengths available
- End-to-end stackable
- Edge mount only

### Reference Information

Product Specification: PS-10-07  
 Packaging: Bag  
 UL File No.: E29179  
 CSA File No.: LR19980  
 Mates With: 2695, 4455, 6471, 7720 and 7880  
 Designed In: Inches

### Electrical

Voltage: 250V  
 Current: 4.0A  
 Contact Resistance: 20mΩ max.  
 Dielectric Withstanding Voltage: 1500V  
 Insulation Resistance: 50K MΩ min.

### Mechanical

Durability:  
 Tin—25 cycles max.  
 Gold—100 cycles max.

### Physical

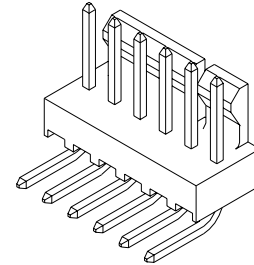
Housing: Red nylon, UL 94V-0  
 Contact: Brass, 0.64mm (.025") square  
 Plating: See Table  
 Operating Temperature: 0 to +75°C

**molex®** 2.54mm (.100") Pitch  
**KK®**

**Solid Header**

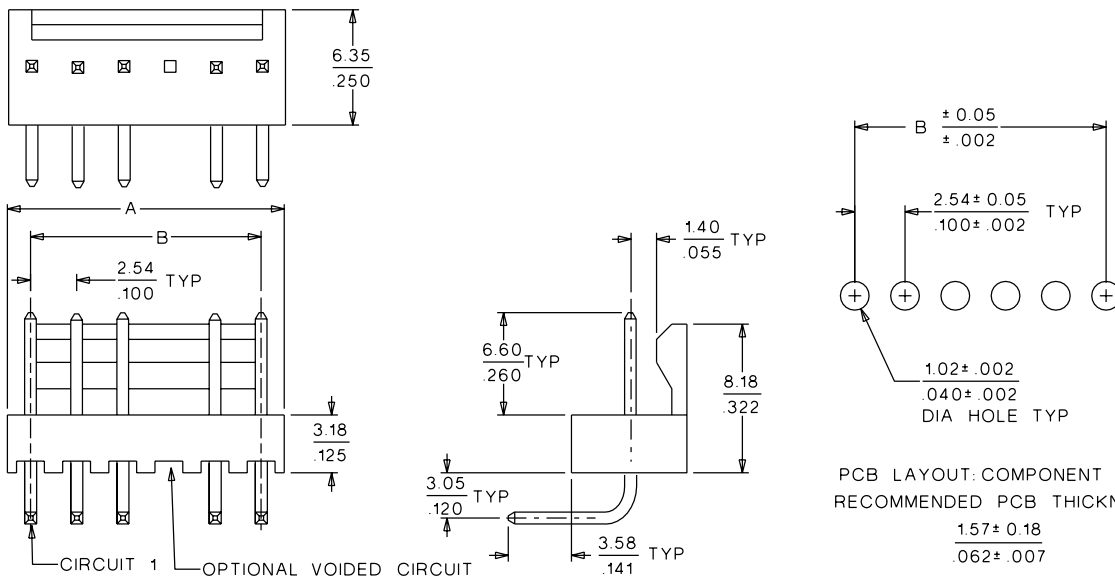
**7478**

**Right Angle  
 Friction Lock**



2.54mm (.100") Pitch

## CATALOG DRAWING (FOR REFERENCE ONLY)



## ORDERING INFORMATION AND DIMENSIONS

Circuits	Order No.		Dimension	
	Tin	Gold	A	B
2	• 22-05-3021	• 22-12-2024	5.08 (.200)	2.54 (.100)
3	• 22-05-3031	• 22-12-2034	7.62 (.300)	5.08 (.200)
4	• 22-05-3041	• 22-12-2044	10.16 (.400)	7.62 (.300)
5	• 22-05-3051	• 22-12-2054	12.70 (.500)	10.16 (.400)
6	• 22-05-3061	• 22-12-2064	15.24 (.600)	12.70 (.500)
7	• 22-05-3071	• 22-12-2074	17.78 (.700)	15.24 (.600)
8	• 22-05-3081	• 22-12-2084	20.32 (.800)	17.78 (.700)
9	• 22-05-3091	• 22-12-2094	22.86 (.900)	20.32 (.800)
10	• 22-05-3101	• 22-12-2104	25.40 (1.000)	22.86 (.900)
11	• 22-05-3111	• 22-12-2114	27.94 (1.100)	25.40 (1.000)
12	• 22-05-3121	• 22-12-2124	30.48 (1.200)	27.94 (1.100)
13	• 22-05-3131	• 22-12-2134	33.02 (1.300)	30.48 (1.200)
14	• 22-05-3141	• 22-12-2144	35.56 (1.400)	33.02 (1.300)
15	• 22-05-3151	• 22-12-2154	38.10 (1.500)	35.56 (1.400)

Circuits	Order No.		Dimension	
	Tin	Gold	A	B
16	• 22-05-3161	• 22-12-2164	40.64 (1.600)	38.10 (1.500)
17	• 22-05-3171	• 22-12-2174	43.18 (1.700)	40.64 (1.600)
18	• 22-05-3181	• 22-12-2184	45.72 (1.800)	43.18 (1.700)
19	• 22-05-3191	• 22-12-2194	48.26 (1.900)	45.72 (1.800)
20	• 22-05-3201	• 22-12-2204	50.80 (2.000)	48.26 (1.900)
21	• 22-05-3211	• 22-12-2214	53.34 (2.100)	50.80 (2.000)
22	• 22-05-3221	• 22-12-2224	55.88 (2.200)	53.34 (2.100)
23	• 22-05-3231	• 22-12-2234	58.42 (2.300)	55.88 (2.200)
24	• 22-05-3241	• 22-12-2244	60.96 (2.400)	58.42 (2.300)
25	• 22-05-3251	• 22-12-2254	63.50 (2.500)	60.96 (2.400)
26	• 22-05-3261	• 22-12-2264	66.04 (2.600)	63.50 (2.500)
27	• 22-05-3271	• 22-12-2274	68.58 (2.700)	66.04 (2.600)
28	• 22-05-3281	• 22-12-2284	71.12 (2.800)	68.58 (2.700)

• US Standard Product, available through Molex franchised distributors

Note: Circuit 1 designation is used to orient the header to locate the voided circuit. Review mating connector to assure correct mating orientation.



# 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 either printed circuit board (PCB) connectors or connectors terminated with 22 to 28 AWG wire using crimp technology.

## 2.0 PRODUCT DESCRIPTION

### 2.1 PRODUCT NAME AND SERIES NUMBERS

Crimp Terminals: 2759, 41572, 6459

Crimp Housings: 2695

PCB Connectors: 4455, 42625

Headers: 4030, 4094, 6373, 7478, 42225, 42226, 42227, 42228, 42152, 42153, 42375, 42376, 42377, 42624.

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 or Phos. Bronze

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

### 2.3 SAFETY AGENCY APPROVALS

UL File Number ..... E29179

CSA .....LR19980

## 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

None

## 4.0 RATINGS

### 4.1 VOLTAGE

250 Volts

**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

### 4.3 TEMPERATURE (ambient + 30° temp rise)

Operating: 0°C to +75°C

Nonoperating: - 40°C to +105°C

REVISION: <b>P</b>	ECR/ECN INFORMATION: EC No: <b>UCR2002-0299</b> DATE: <b>2001 / 09 / 18</b>	TITLE: <b>PRODUCT SPECIFICATION .100 CENTER KK CONNECTORS</b>	SHEET No. <b>1 of 5</b>
DOCUMENT NUMBER: <b>PS-10-07</b>	CREATED / REVISED BY: <b>SAMIEC</b>	CHECKED BY: <b>MUELLER</b>	APPROVED BY: <b>MARGULIS</b>



# PRODUCT SPECIFICATION

## 5.0 PERFORMANCE

### 5.1 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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DOCUMENT NUMBER: <b>PS-10-07</b>	CREATED / REVISED BY: <b>SAMIEC</b>	CHECKED BY: <b>MUELLER</b>	APPROVED BY: <b>MARGULIS</b>



# PRODUCT SPECIFICATION

## 5.2 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 $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	1.95 N (0.438 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 $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ 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 $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch). (Forces will change with platings and materials.)	6.67 N (1.5 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 (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 $\frac{1}{2}$ sine wave (11 milliseconds) shocks in the $\pm X, \pm Y, \pm Z$ 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 $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch). (For maximum performance use Molex application tooling with stranded tinned copper wire)	22 awg = 44 N (10 lbf) 24 awg = 35 N (8 lbf) 26 awg = 26 N (6 lbf) 28 awg = 17 N (4 lbf) 30 awg = 13 N (3 lbf)
Normal Force	Apply a perpendicular force.	2.94 N (300 grams) average

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DOCUMENT NUMBER: <b>PS-10-07</b>	CREATED / REVISED BY: <b>SAMIEC</b>	CHECKED BY: <b>MUELLER</b>	APPROVED BY: <b>MARGULIS</b>



# PRODUCT SPECIFICATION

## 5.3 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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DOCUMENT NUMBER: <b>PS-10-07</b>	CREATED / REVISED BY: <b>SAMIEC</b>	CHECKED BY: <b>MUELLER</b>	APPROVED BY: <b>MARGULIS</b>



# PRODUCT SPECIFICATION

## 5.3 ENVIRONMENTAL REQUIREMENTS

DESCRIPTION	TEST CONDITION	REQUIREMENT
Solder Resistance	Dip connector terminal tails in solder: Solder Duration: $5 \pm 0.5$ seconds; Solder Temperature: $230 \pm 5^\circ\text{C}$	Visual: No Damage to insulator material
Salt Spray	Mate connectors: Duration: 48 hours exposure; Atmosphere: salt spray from a 5% solution; Temperature: $35 +1/-2^\circ\text{C}$	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Cold Resistance	Mate connectors: Duration: 96 hours; Temperature: $-40 \pm 3^\circ\text{C}$	10 milliohms MAXIMUM (change from initial) & Visual: No Damage
Corrosive Atmosphere: Flowing Mixed Gas (FMG)	Mate connectors: Test per EIA-364-65, method 2A	10 milliohms MAXIMUM (change from initial) & Visual: No Damage

## 6.0 PACKAGING

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

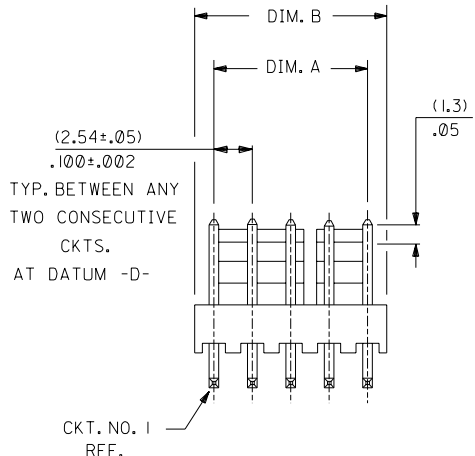
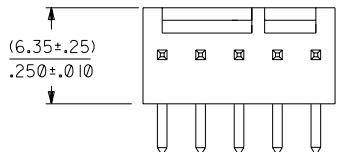
## 7.0 GAGES AND FIXTURES

## 8.0 OTHER

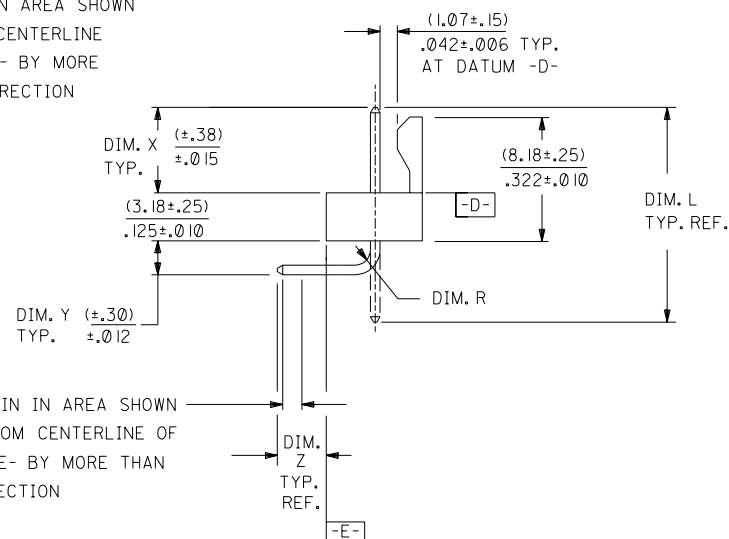
REVISION: <b>P</b>	ECR/ECN INFORMATION: EC No: <b>UCR2002-0299</b> DATE: <b>2001 / 09 / 18</b>	TITLE: <b>PRODUCT SPECIFICATION .100 CENTER KK CONNECTORS</b>	SHEET No. <b>5 of 5</b>
DOCUMENT NUMBER: <b>PS-10-07</b>	CREATED / REVISED BY: <b>SAMIEC</b>	CHECKED BY: <b>MUELLER</b>	APPROVED BY: <b>MARGULIS</b>

NOTES:

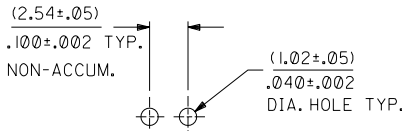
1. MATERIAL: NYLON, UL 94V-0, COLOR-WHITE
2. PARTS ARE STACKABLE END TO END ON (2.54)/.100 CENTERS.
3. PIN PUSH OUT FORCE: 2 LBS. MIN.
5. PARTS CONFORM TO PROD. SPEC. 10-07
8. CIRCUIT ONE DESIGNATION IS USED TO DEFINE VOID LOCATION. CIRCUIT ONE OF HEADER AND HOUSING MAY NOT BE ALIGNED



(1.3)  
.05 CENTERLINE OF PIN IN AREA SHOWN NOT TO VARY FROM CENTERLINE OF PIN AT DATUM -D- BY MORE THAN .008 IN ANY DIRECTION



CENTERLINE OF PIN IN AREA SHOWN NOT TO VARY FROM CENTERLINE OF PIN AT DATUM -E- BY MORE THAN .005 IN ANY DIRECTION



RECOMMENDED P.C. BOARD HOLE LAYOUT

A-7478-N\*\*\*  
NO. OF CKTS.

SECONDARY OPERATIONS	
CODE	PACKAGE
BLANK	BULK

VERSION LETTER CHANGES WHEN PIN NO. OR PRESS DIM. CHANGES

PLATING  
 (102) TIN 200 M.I. MIN OVER COPPER  
 (501) GOLD 20 M.I. MIN OVER NICKEL  
 (503) GOLD 30 M.I. MIN OVER NICKEL  
 FOR ADDITIONAL INFORMATION SEE SDES-88.

28	(68.58 ± .25) 2.700 ± .010	(71.12 / 70.61) 2.800 / 2.780
27	(66.04 ± .25) 2.600 ± .010	(68.58 / 68.07) 2.700 / 2.680
26	(63.50 ± .25) 2.500 ± .010	(66.04 / 65.53) 2.600 / 2.580
25	(60.96 ± .25) 2.400 ± .010	(63.50 / 62.99) 2.500 / 2.480
24	(58.42 ± .25) 2.300 ± .010	(60.96 / 60.45) 2.400 / 2.380
23	(55.88 ± .23) 2.200 ± .009	(58.42 / 57.96) 2.300 / 2.282
22	(53.34 ± .23) 2.100 ± .009	(55.88 / 55.42) 2.200 / 2.182
21	(50.80 ± .23) 2.000 ± .009	(53.34 / 52.88) 2.100 / 2.082
20	(48.26 ± .23) 1.900 ± .009	(50.80 / 50.34) 2.000 / 1.982
19	(45.72 ± .23) 1.800 ± .009	(48.26 / 47.80) 1.900 / 1.882
18	(43.18 ± .20) 1.700 ± .008	(45.72 / 45.31) 1.800 / 1.784
17	(40.64 ± .20) 1.600 ± .008	(43.18 / 42.77) 1.700 / 1.684
16	(38.10 ± .20) 1.500 ± .008	(40.64 / 40.23) 1.600 / 1.584
15	(35.56 ± .20) 1.400 ± .008	(38.10 / 37.69) 1.500 / 1.484
14	(33.02 ± .18) 1.300 ± .007	(35.56 / 35.20) 1.400 / 1.386
13	(30.48 ± .18) 1.200 ± .007	(33.02 / 32.66) 1.300 / 1.286
12	(27.94 ± .18) 1.100 ± .007	(30.48 / 30.12) 1.200 / 1.186
11	(25.40 ± .18) 1.000 ± .007	(27.94 / 27.58) 1.100 / 1.086
10	(22.86 ± .15) .900 ± .006	(25.40 / 25.04) 1.000 / .986
9	(20.32 ± .15) .800 ± .006	(22.86 / 22.50) .900 / .886
8	(17.78 ± .15) .700 ± .006	(20.32 / 19.96) .800 / .786
7	(15.24 ± .13) .600 ± .005	(17.78 / 17.42) .700 / .686
6	(12.70 ± .13) .500 ± .005	(15.24 / 14.88) .600 / .586
5	(10.16 ± .13) .400 ± .005	(12.70 / 12.40) .500 / .488
4	(7.62 ± .13) .300 ± .005	(10.16 / 9.86) .400 / .388
3	(5.08 ± .10) .200 ± .004	(7.62 / 7.32) .300 / .288
2	(2.54 ± .05) .100 ± .002	(5.08 / 4.78) .200 / .188
NO. OF CKTS.	DIM. A	DIM. B

7	W2
6	W
5	P
4	W1
3	G
2	G
1	Y1

DIMENSIONS SHOWN (METRIC) INCH UNLESS OTHERWISE SPECIFIED TOLERANCES: ANGULAR ± 1/2°		$\nabla = 0$ $\blacktriangledown = 0$ REVISE ONLY ON CAD SYSTEM	
3 PLACE ± .015	INCH	2 PLACE ± .025	METRIC
1 PLACE ± 0.36			
DRAWING WHERE APPLICABLE MUST REMAIN WITHIN DIMENSIONS			
DRWG. BY: LENZ	CHK'D. BY:	FILE NAME: S7478X1	DATE: 07/30/87
REVISIONS	SCALE:	MOLEX INCORPORATED LITSE, ILL. 60532 U.S.A.	
TITLE: FRICTION LOCK HEADER ASS'Y (2.54)/.100¢ BENT SQ. PINS 7478 SERIES DWG.		SHEET NO. 1 OF 7 PART NO. SDA-7478 DRWG. NO.	
TR. REVISIONS LTR. REVISIONS		THIS DRAWING CONTAINS INFORMATION THAT IS PROPRIETARY TO MOLEX INC. AND SHOULD NOT BE USED WITHOUT WRITTEN PERMISSION.	



	13	12	11	10	9	8	7	6	5	4	3	2	1																																																																			
J	ENG. NO.	PIN NO.	DIM. L	DIM. X	DIM. Z	DIM. Y	DIM. W	DIM. R	ENG. NO.	PIN NO.	DIM. L	DIM. X	DIM. Z	DIM. Y	DIM. W	DIM. T																																																																
	A-7478-NA102	2766-41(102)	(18.69) .736	(6.60) .260	(3.58) .141	(3.05) .120	90°	(1.17) .046																																																																								
	A-7478-NA501	2766-41(501)	(18.69) .736	(6.60) .260	(3.58) .141	(3.05) .120	90°	(1.17) .046																																																																								
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