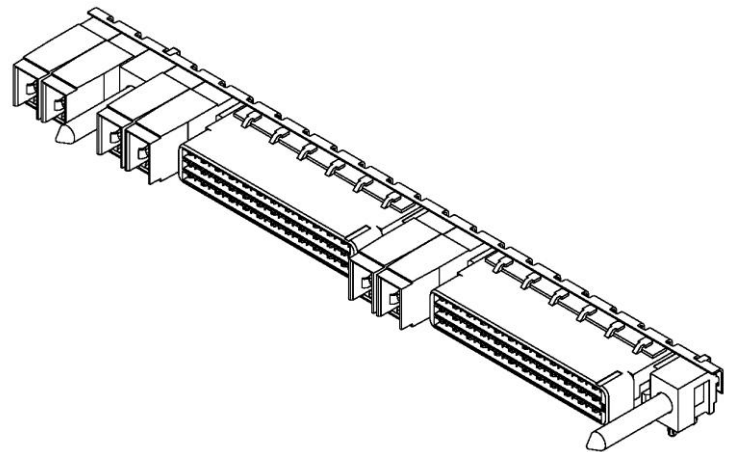
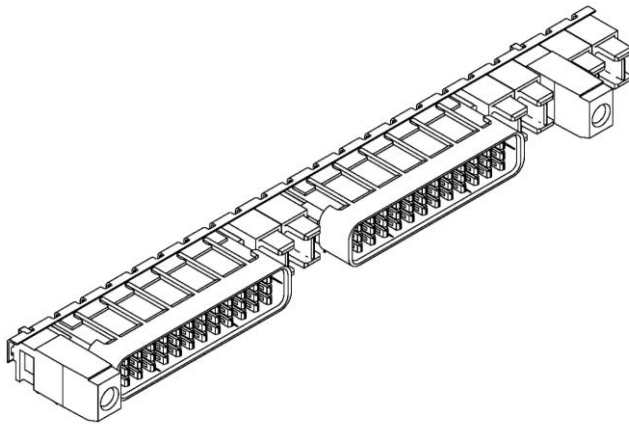
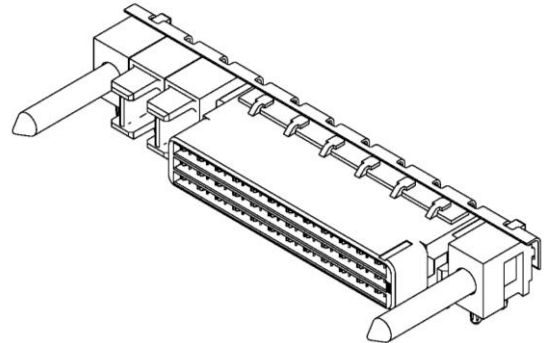
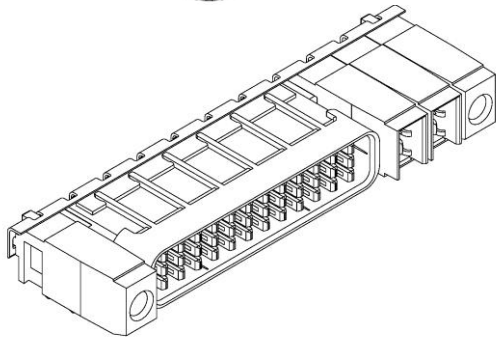
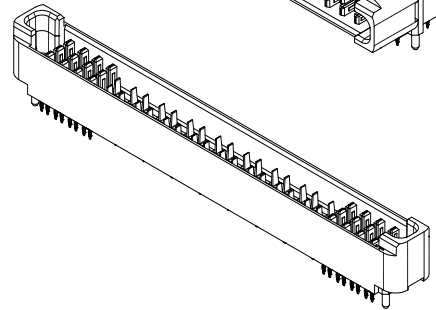
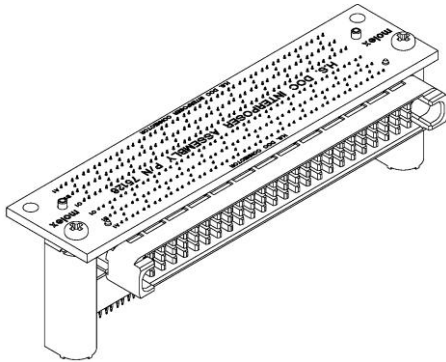
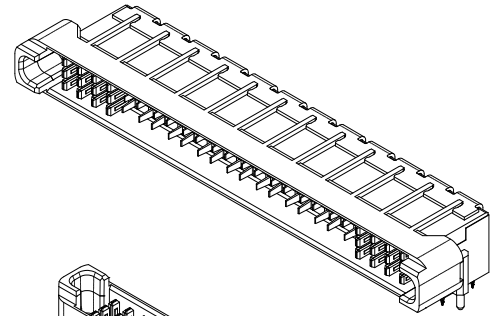
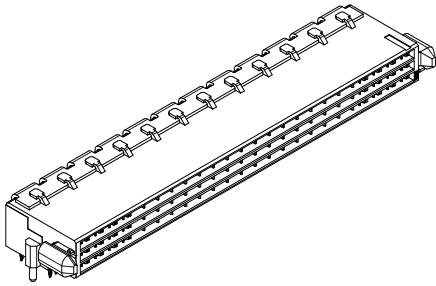




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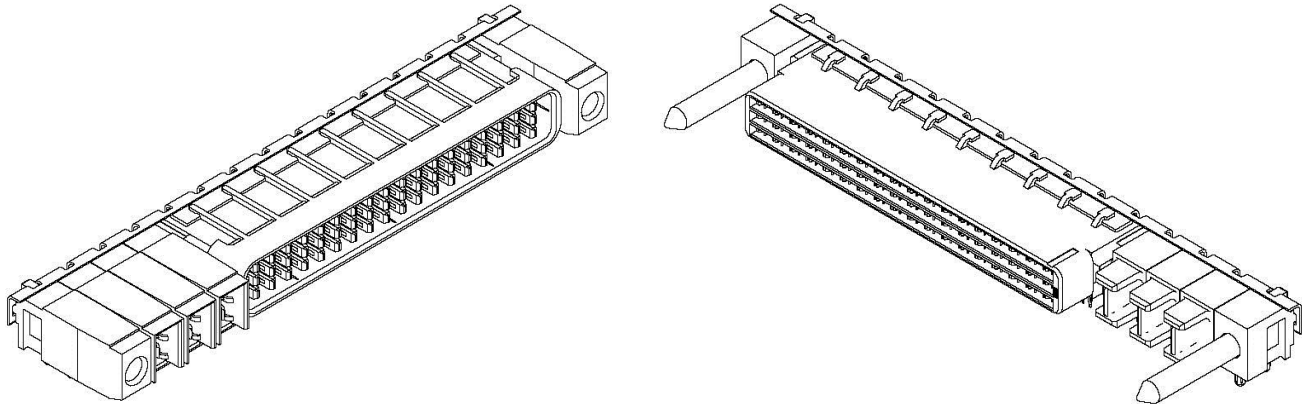
## HIGH SPEED DOCKING CONNECTOR FAMILY



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# PRODUCT SPECIFICATION



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# PRODUCT SPECIFICATION

## HIGH SPEED DOCKING CONNECTOR

### 1.0 SCOPE

This Product Specification is intended to define the mechanical, electrical and environmental requirements for the High Speed Docking connector system. The interface consists of differential pair signal lines over-molded in plastic and surrounded by a plated plastic housing. The signal contact pairs are on a column-to-column pitch of 3.50 mm and a row-to-row pitch of 2.46 mm. There are also dedicated lines for power, power return and detect.

### 2.0 PRODUCT DESCRIPTION

#### 2.1 PRODUCT NAME AND SERIES NUMBERS

- High Speed Docking Connector
- 75018 – Fixed Connector (mates with 75019)
- 75019 – Floating Connector (mates with 75018, 75126 & 75140)
- 75126 – Interposer (mates with 75019)
- 75140 – Vertical Fixed Connector (mates with 75019)
- 75475 – Fixed Connector with external power and guide (mates with 75476)
- 75476 – Floating Connector with external power and guide (mates with 75475)

#### 2.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKINGS

(see appropriate sales drawings for information)

#### 2.3 SAFETY AGENCY APPROVALS

- UL: E29179
- CSA: 1373502

### 3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

See the Sales Drawing and other sections of this Specification for the necessary referenced Documents and Specifications.

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# PRODUCT SPECIFICATION

## 4.0 RATINGS

### 4.1 VOLTAGE

12 Volts DC

### 4.2 CURRENT

Signal Connector

2.7 Amps – one pair

2.4 Amps – two adjacent pairs

2.0 Amps – three or more adjacent pairs

Power Module (externally mounted with guide module)

20 Amps

18 Amps

16 Amps

### 4.3 TEMPERATURE

Operating: - 20°C to + 85°C

Non-operating: - 40°C to + 85°

### 4.4 CHARACTERISTIC IMPEDANCE

100 Ohms – differential pair signals

50 Ohms – single ended signals

### 4.5 DIGITAL BANDWIDTH

0 to 10 Gbps – differential pair

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## 5.0 PERFORMANCE

### 5.1 ELECTRICAL CHARACTERIZATION

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Contact Resistance (Low Level)</b>	Mate connectors: apply a maximum voltage of <b>20</b> mV and a current of <b>100</b> mA. (Measurement locations in Section 7.0)	Signal – <b>30</b> milliohms Power – <b>20</b> milliohms <b>MAXIMUM</b> [initial]
2	<b>Dielectric Withstanding Voltage</b>	Unmate connectors: apply a voltage of <b>500</b> VAC for <b>1</b> minute between adjacent terminals and between terminals to ground.	No breakdown; current leakage < <b>5</b> mA
3	<b>Temperature Rise (via Current Cycling)</b>	Mate connectors: measure the temperature rise at the rated current after: <b>96</b> hours ( <b>45</b> minutes ON and <b>15</b> minutes OFF per hour).	Temperature rise: <b>+30°C</b> MAXIMUM
4	<b>Impedance (differential pair)</b>	Mate connectors: rise time of 150 ps (10/90)	<b>100 ± 10%</b> ohms
5	<b>Bandwidth (differential pair)</b>	Mate connectors: including launches	<b>Average: 10</b> Gbps
6	<b>Cross-talk (NEXT) (differential pair)</b>	Mate connectors: rise time of 50/100/150 ps (10/90), all adjacent pairs driven	<b>50ps - &lt;0.8%</b> <b>100ps - &lt;0.7%</b> <b>150ps - &lt;0.6%</b>
7	<b>Cross-talk (FEXT) (differential pair)</b>	Mate connectors: rise time of 100 ps (10/90), all adjacent pairs driven	<b>&lt;0.5%</b>
8	<b>Impedance (single ended)</b>	Mate connectors: rise time of 1 ns	<b>50 ± 10%</b> ohms
9	<b>Bandwidth (single ended)</b>	Mate connectors: including launches	<b>&lt;3.125</b> Gbps
10	<b>Cross-talk (NEXT) (single ended)</b>	Mate connectors: rise time of 1 ns, within a pair	<b>&lt;4%</b>
11	<b>Cross-talk (FEXT) (single ended)</b>	Mate connectors: rise time of 1 ns, within a pair	<b>&lt;1%</b>
12	<b>Differential Skew (within pair)</b>	Mate connectors:	<b>&lt;1</b> ps
13	<b>Propagation Delay</b>	Mate connectors: calculated using group delay	A to A' < <b>130</b> ps B to B' < <b>185</b> ps C to C' < <b>240</b> ps
14	<b>Plated Housing Resistivity</b>		<b>&lt; 2</b> milliohms / cm
15	<b>Differential Insertion Loss (DP)</b>	Mate connectors: -3db	<b>Average: 5GHz</b>
16	<b>Differential Insertion Loss (SE)</b>	Mate connectors: -3db	<b>Average: 4GHz</b>

Note: High-speed electrical characterization is for 4.74mm centerline right angle product mated in an in-line orientation. Contact your Molex Representative for additional information.

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## 5.2 MECHANICAL CHARACTERIZATION

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Connector Mate and Unmate Forces</b>	Mate and unmate connector (male to female) at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch) per minute.	<b>144 CIRCUIT:</b> <b>80 N (18.0 lbf)</b> MAXIMUM insertion force <b>35 N (7.9 lbf)</b> MINIMUM withdrawal force <b>50 N (11.2 lbf)</b> MAXIMUM withdrawal force  <b>108CKT:</b> <b>60 N (13.5 lbf)</b> MAXIMUM insertion force <b>20 N (4.5 lbf)</b> MINIMUM withdrawal force <b>35 N (7.9 lbf)</b> MAXIMUM withdrawal force
2	<b>Durability</b>	Mate connectors up 100 cycles, at a maximum rate of <b>10</b> cycles per minute. Test per EIA-364-09.	<b>10</b> milliohms MAXIMUM (change from initial)
3	<b>Vibration (Random)</b>	Mate connectors and vibrate per EIA 364-28, test condition VII.	<b>10</b> milliohms MAXIMUM (change from initial) & Discontinuity < <b>1</b> microsecond
4	<b>Compliant Pin Insertion into PCB</b>	Apply an axial insertion force on the terminal at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).	Signal – <b>35 N (7.9 lbf)</b> Power – <b>53 N (12.0 lbf)</b> MAXIMUM insertion force Per compliant pin
5	<b>Compliant Pin Retention into PCB</b>	Apply an axial extraction force on the terminal at a rate of $25 \pm 6$ mm ( $1 \pm \frac{1}{4}$ inch).	Signal – <b>9 N (2 lbf)</b> Power – <b>9 N (2 lbf)</b> MINIMUM retention force Per compliant pin

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## 5.3 ENVIRONMENTAL REQUIREMENTS

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT
1	<b>Fretting Corrosion (Thermal Shock)</b>	Mate connectors: expose for 10 cycles between -55°C and 85°C; dwell 0.5 hours at each temperature. Test per EIA-364-32, Condition 1	<b>10 milliohms MAXIMUM</b> (change from initial)
2	<b>Temperature Life (Thermal Aging)</b>	Mate connectors: expose to 1500 hours at 90°C ± 2°C. Test per EIA-364-17, Method A, Test Condition 4.	<b>10 milliohms MAXIMUM</b> (change from initial)
3	<b>Temperature Life (pre-conditioning)</b>	Mate connectors: expose to 500 hours at 90°C ± 2°C. Test per EIA-364-17, Method A, Test Condition 4.	<b>10 milliohms MAXIMUM</b> (change from initial)
4	<b>Cyclic Humidity</b>	Mate connectors: 10 cycles (10 days) between 25°C at 80%RH and 65°C at 50%RH. Test per EIA-364-31, Method III, Test Condition B.	<b>10 milliohms MAXIMUM</b> (change from initial)
5	<b>Thermal Disturbance</b>	Mate connectors: 10 cycles between 15°C and 85°C. Temperature ramp should be 2°C per minute with 5-minute dwell minimum.	<b>10 milliohms MAXIMUM</b> (change from initial)
6	<b>Mixed Flowing Gas</b>	Mate connectors: expose to Class II environment for 14 days. Test per EIA-364-65.	<b>10 milliohms MAXIMUM</b> (change from initial, 2% allowed above 10 milliohms but below 50 milliohms)

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## 6.0 TEST SEQUENCES AND CONFORMANCE REQUIREMENTS

Test Description	Eia-364-1000.01 Test Sequences				
	1	2	3	4	7
LLCR or Contact Resistance (5.1.1)	1, 4, 6	1, 4, 6, 8	1,4,6	1,4,6,8,10	2,4
Dielectric Withstanding Voltage (5.1.2)					1,5
Durability (5.2.2)					3
Mechanical Vibration (5.2.3)			5		
Thermal Shock (5.3.1)		3			
Temperature Life (5.3.2)	3				
Temperature Life (pre-conditioning) (5.3.3)			3	3	
Cyclic Humidity (5.3.4)		5			
Thermal Disturbance (5.3.5)				7	
Mixed Flowing Gas (5.3.6)				5	

Test Description	Additional Test Sequences					
	1	2	3	4	5	6
Temperature Rise (5.1.4)	1					
Mating Force (5.2.1)		1				
Un-mating Force (5.2.1)		2				
Compliant Pin Insertion Force (5.2.4)			1			
Compliant Pin Retention Force (5.2.5)			2			

Test Description	High Speed Test Sequences					
	1	2	3	4	5	6
Impedance – differential pair (5.1.4)	1					
Bandwidth – differential pair (5.1.5)	2					
Cross-talk – differential pair (5.1.6, 5.1.7)		1				
Impedance – single ended (5.1.8)			1			
Bandwidth – single ended (5.1.9)			2			
Cross-talk – single ended (5.1.10, 5.1.11)				1		
Skew – within pair (5.1.12)					1	
Propagation Delay (5.1.13)					2	
Insertion Loss / Return Loss (5.1.15,5.1.16)		2		2		

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## 6.1 QUALIFICATION TESTING

### 6.1.1 SPECIMEN SELECTION

Samples for testing shall be representative of normal production lots.

### 6.1.2 DATA

Sample groups shall consist of a minimum of 5 mated connectors.

## 7.0 PACKAGING

See applicable sales drawing for packaging information.

## 8.0 APPLICATION NOTES

### A. APPLICATION OF CONNECTOR TO PCB

Connector is to be applied with Molex application tool or equivalent.

See document AS-75018-001 for application instructions and application tool requirements.

Connector is to be pressed into PCB within  $\pm 0.10$ mm of the PCB surface.

### B. REPAIR OF CONNECTOR ON PCB

Connector is to be removed with Molex removal or equivalent.

See document AS-75018-001 for removal instructions and removal tool requirements.

Connector may be repaired a maximum of three times.

### C. MATING OF CONNECTORS

Connector is designed for use in a rack/card cage environment.

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Connector is designed to be able to handle a maximum of  $\frac{1}{2}^\circ$  rotation. (See illustration 1)  
 Connector is designed to be able to mate within 1.27mm of misalignment. (See Illustration 2)  
 Excess zippering of connectors during mating or un-mating operation could damage contact interface.

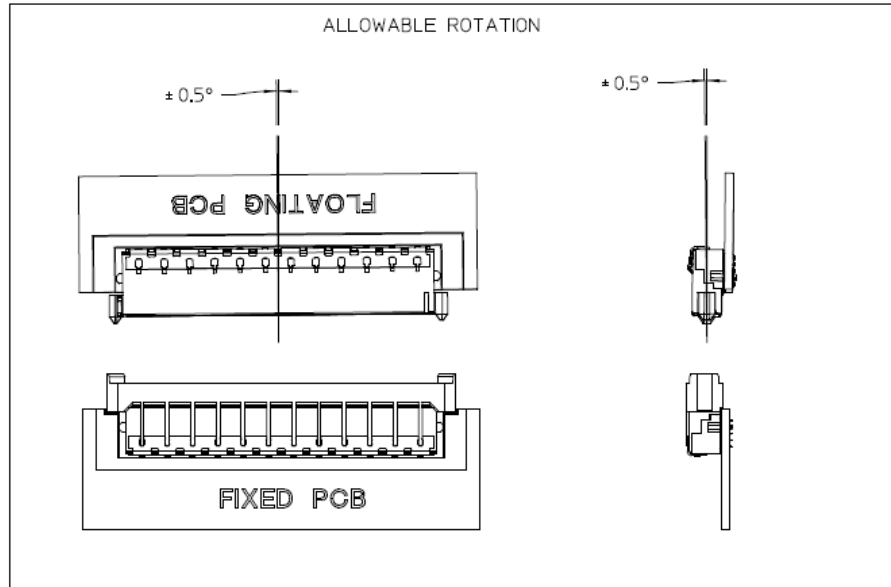


Illustration 1

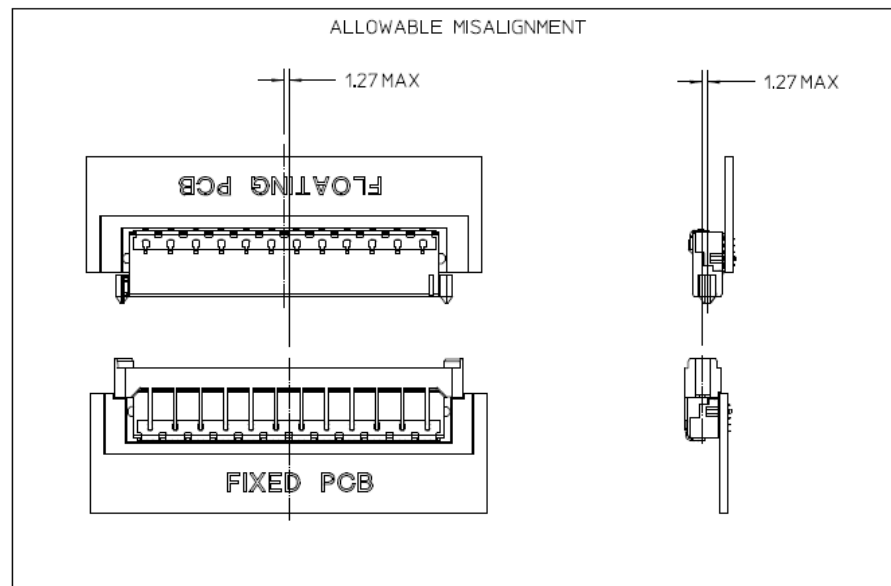


Illustration 2

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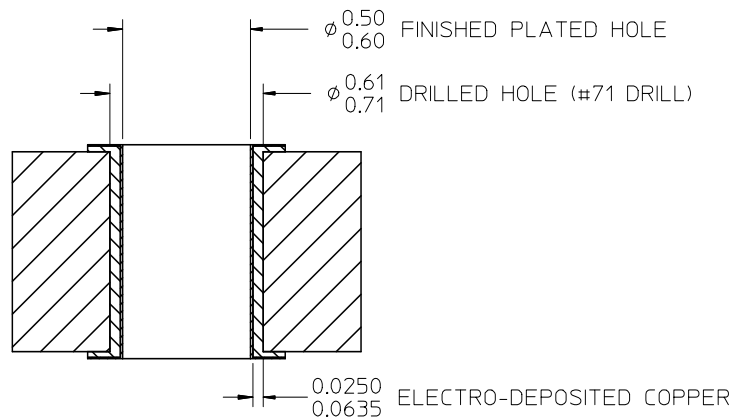
## 9.0 OTHER INFORMATION

### 9.1 PCB REQUIREMENTS

The compliant pin shall be capable of being inserted one time.

The PCB hole shall be capable of retaining the compliant pin for a maximum of three insertions. The removal of the compliant pin from the PCB shall not damage the PCB hole beyond the point to be able to retain a compliant pin (that has not been inserted into a PCB).

The minimum thickness of PCB for use with the compliant pin is 1.80.



## HOLE PLATING DETAIL

### 9.2 MULTIPLE CONNECTORS IN PARALLEL

Multiple connectors may be used in parallel. When using multiple connectors in parallel the PCB holes must be drilled as a single pattern. The positional requirement of the pattern is to be:



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