

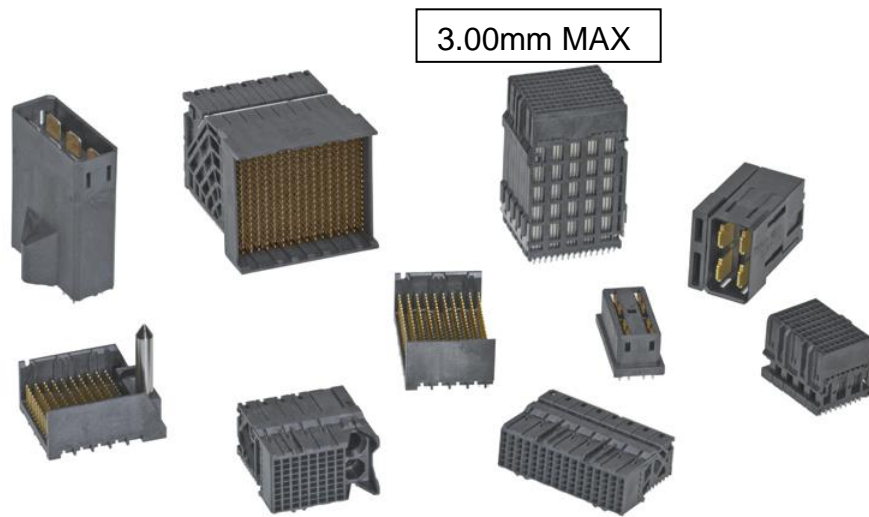


# Application Specification

## DESIGN GUIDE FOR



## HIGH SPEED INTERCONNECT SYSTEMS



REVISION: <b>B1</b>	ECR/ECM INFORMATION: ECM: <b>106670</b> DATE: <b>07/13/2016</b>	TITLE: <b>DESIGN GUIDE FOR IMPACT™ INTERCONNECT SYSTEMS</b>	SHEET No. <b>1 of 23</b>
DOCUMENT NUMBER: <b>AS-76060-9997</b>	CREATED / REVISED BY: <b>Doina Varvara</b>	CHECKED BY: <b>Liz Hardin</b>	APPROVED BY: <b>Tim Elo</b>



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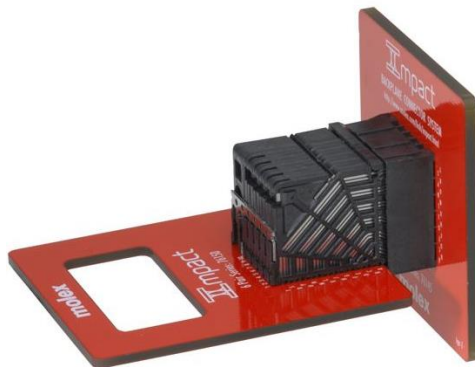
## I: INTRODUCTION

### A) IMPACT™ OVERVIEW

The Impact™ backplane connector system provides data rates up to 25 Gbps and superior signal density up to 80 differential pairs per inch. The Impact™ system's broad-edge-coupled technology enables low cross-talk and high signal bandwidth while minimizing channel performance variation across every differential pair within the system.

Molex's Impact™ system offers multiple compliant-pin design options on both the daughtercard and backplane connectors, providing customers ultimate flexibility to optimize their designs for superior mechanical and electrical performance.

The Impact™ backplane connector system is designed for traditional backplane and/or midplane architectures to meet the growing demands of next-generation telecommunication and data networking equipment manufacturers. The Impact™ backplane connector system is offered in 2 pair, 3 pair, 4 pair, 5 pair, and 6 pair traditional BP header and DC connector versions, with a complete range of guidance, power, coplanar, mezzanine, and high performance cable solutions.



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## B) COMPONENT OVERVIEW (100 OHM AND 85 OHM)

### BACKPLANE HEADER SIGNAL MODULES:

Open	Left Endwall, Right Open	Right Endwall, Left Open
Dual Endwall	Left Guide, Right Open	Left open, Right Guide
Left Endwall, Right Guide	Left Guide, Right Endwall	

### DAUGHTERCARD RECEPTACLE SIGNAL MODULES:

Left Guide	Right Guide	Open

### MEZZANINE RECEPTACLE SIGNAL MODULES:




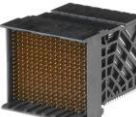




Left Guide	Right Guide	Open

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## COPLANAR HEADER (RAM) SIGNAL MODULES:

 Open	 Left Endwall, Right Open
 Right Endwall, Left Open	 Dual Endwall
 Left Guide, Left Open	 Right Guide, Right Open
 Left Guide, Right Endwall	 Right Guide, Left Endwall

## POWER HEADER (PLUG) MODULES:

 Right Angle (right hold down)	 Right Angle (left hold down)	 Vertical
--	---	---

## POWER RECEPTACLE MODULES:

 Right Angle (right hold down)	 Right Angle (left hold down)	 Vertical
--	---	---

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## C) APPLICABLE DOCUMENTS

- a. Product Specification:
  - i. 100 Ohm: [PS-76060-999](#)
  - ii. 85 Ohm: [PS-170540-999](#)
- b. Routing Guide:
  - i. Standard: [AS-76060-999](#)
  - ii. Orthogonal: [AS-76850-990](#)
- c. Application Tooling Guide:
  - i. [TM-622018799](#)

## D) DISCLAIMER

*Detail included in the 2D sales drawings takes precedence over information included in the Design Guide document.*

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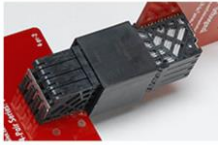






# Application Specification

## II : INITIAL CONNECTOR SELECTION

A) SPEED: UP TO 25 GBPS

B) ORIENTATION:

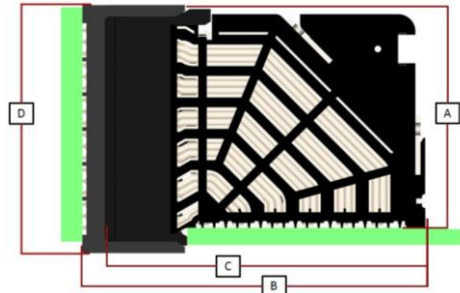
<u>Conventional Right Angle to Vertical</u>	<u>Orthogonal Direct</u>	<u>Mezzanine</u>
		
<u>Coplanar</u>	<u>Orthogonal Midplane</u>	<u>Cable Assemblies</u>
		

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		APPROVED BY: <b>Tim Elo</b>	
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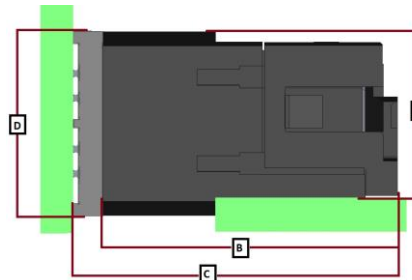
# Application Specification

## C) CONNECTOR ENVELOPE DIMENSIONS:



Signal Modules

Item	Signal Dimension	2-Pair	3-Pair	4-Pair	5-Pair	6-Pair
DC Height off Board (mm)	<b>A</b>	9.7	13.8	17.8	21.9	25.9
Mated Depth (mm)	<b>B</b>	22.8	26.8	30.9	34.9	40.0
DC Depth (mm)	<b>C</b>	20.1	24.2	28.2	32.3	37.3
Header Width (mm)	<b>D</b>	12.6	16.7	20.7	24.8	28.8



Power Modules

Item	Power Dimension	3-Pair	4-Pair	5-Pair	6-Pair
Plug height off board (mm)	<b>A</b>	13.5	20.0	22.8	26.9
Plug depth (mm)	<b>B</b>	24.0	28.0	32.1	36.1
Mated depth (mm)	<b>C</b>	26.7	30.8	34.6	38.6
Receptacle width (mm)	<b>D</b>	15.0	21.2	22.8	27.2

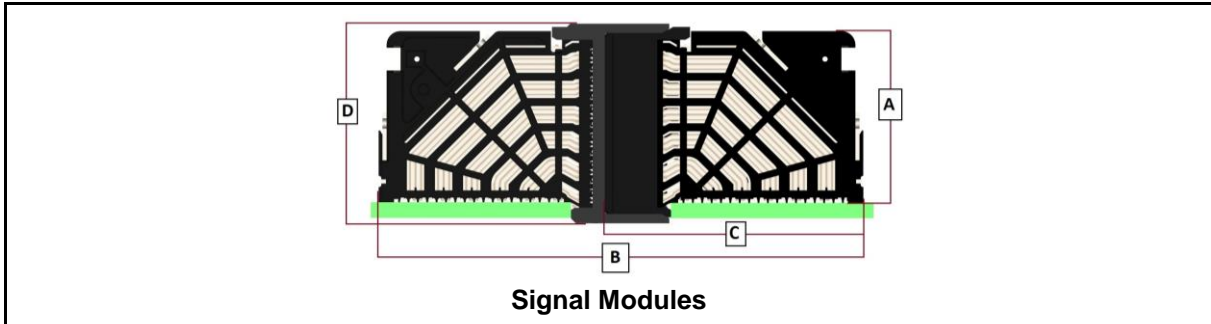
Figure 1: Conventional Right Angle to Vertical Application

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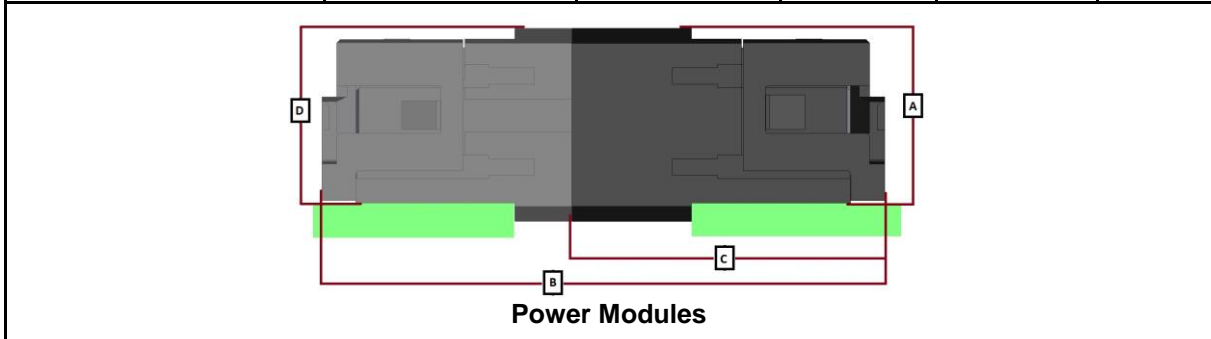




# Application Specification



Item	Signal Dimension	2-Pair	3-Pair	4-Pair	6-Pair
DC Height off Board (mm)	<b>A</b>	9.2	13.3	17.3	25.4
Mated Depth (mm)	<b>B</b>	35.4	43.5	51.6	69.8
DC Depth (mm)	<b>C</b>	20.1	24.1	28.2	37.3
RAM Header Width (mm)	<b>D</b>	12.7	16.7	20.8	28.9



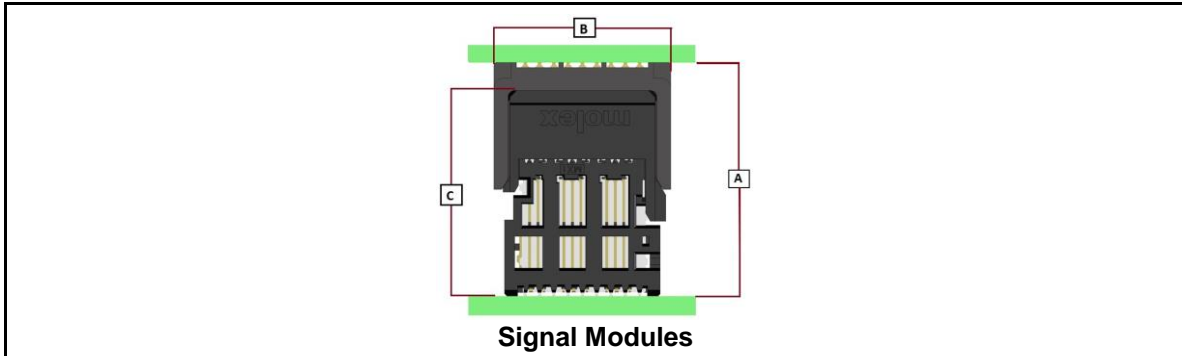
Item	Power Dimension	3-Pair	4-Pair
Plug height off board (mm)	<b>A</b>	13.5	20.0
Mated depth (mm)	<b>B</b>	43.4	51.6
Plug depth (mm)	<b>C</b>	24.0	28.0
Receptical Height off board (mm)	<b>D</b>	14.9	17.4

**Figure 2: Coplanar Application**

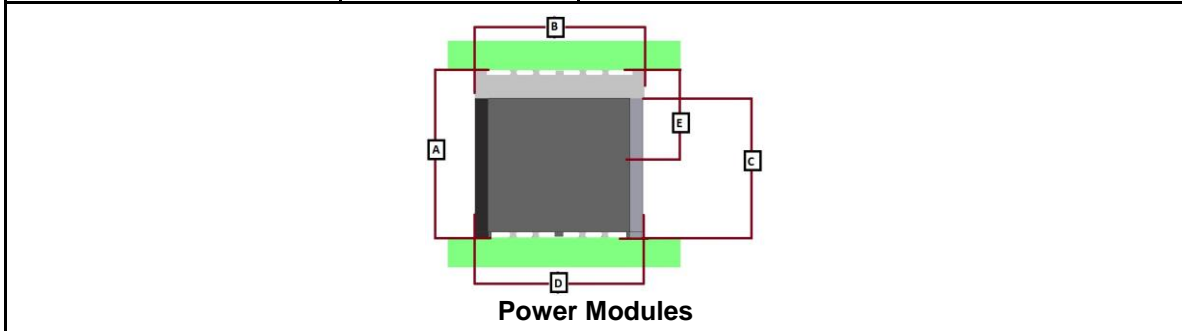
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Item	Signal Dimensions	3-Pair	4-Pair	5-Pair
Ohm		100	85	100
Stack Height (mm)	<b>A</b>	18, 22	18, 25, 37	28, 38, 40
Header Width (mm)	<b>B</b>	16.7	20.7	24.8
DC Depth (mm)	<b>C</b>	<b>*Varies by stack height*</b>		



Item	Power Dimensions	3-Pair	5-Pair
Plug height off board (mm)	<b>A</b>	12.3	<b>*Varies by stack height*</b>
Plug width (mm)	<b>B</b>	14.9	20.8
Receptacle Height off board (mm)	<b>C</b>	9.8	9.8
Recept width (mm)	<b>D</b>	15.0	22.8
Mated depth (mm)	<b>E</b>	15.0	40.0

**Figure 3: Mezzanine Application**

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<small>FILENAME: PS74031C.DOC</small>			



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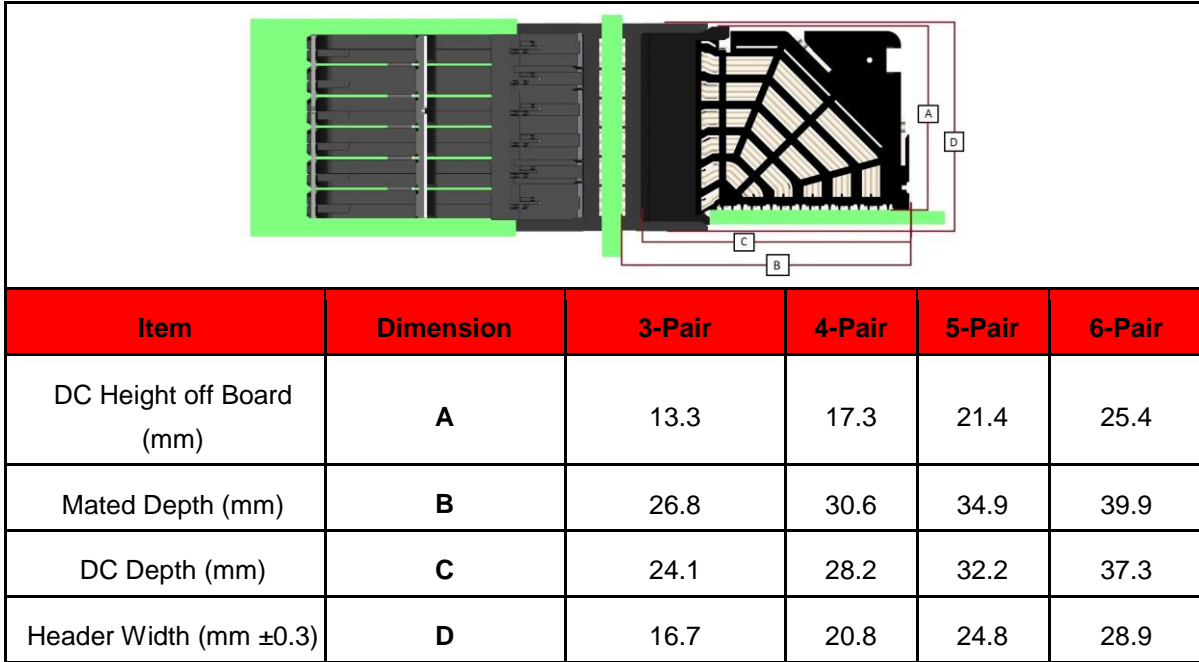


Figure 4: Orthogonal Signal Modules

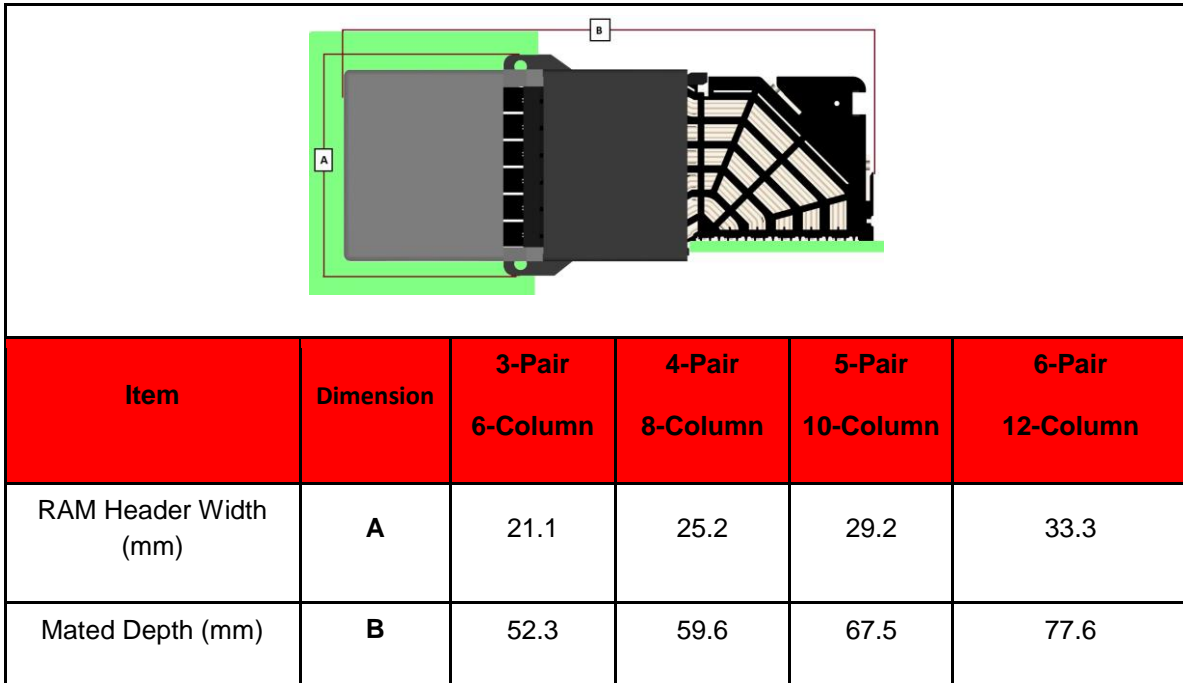


Figure 5: Orthogonal Direct Signal Modules

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## D) CONNECTOR PART NUMBER SELECTION:

- a) Signal Types:
  - a. Differential Pairs for High Speed
  - b. Single Ended pins for Low Speed
  - c. Low Power
    - i. 0.75A per signal pin
  - d. High Power Modules





RA Header	Vert Recept	RA Recept	Vert Header	
				
Component	3-Pair	4-Pair	5-Pair	6-Pair
Current per Blade	15A	20A	25A	20A
Current per Module	60A	80A	100A	120A
# of Blades per Module	4	4	4	6

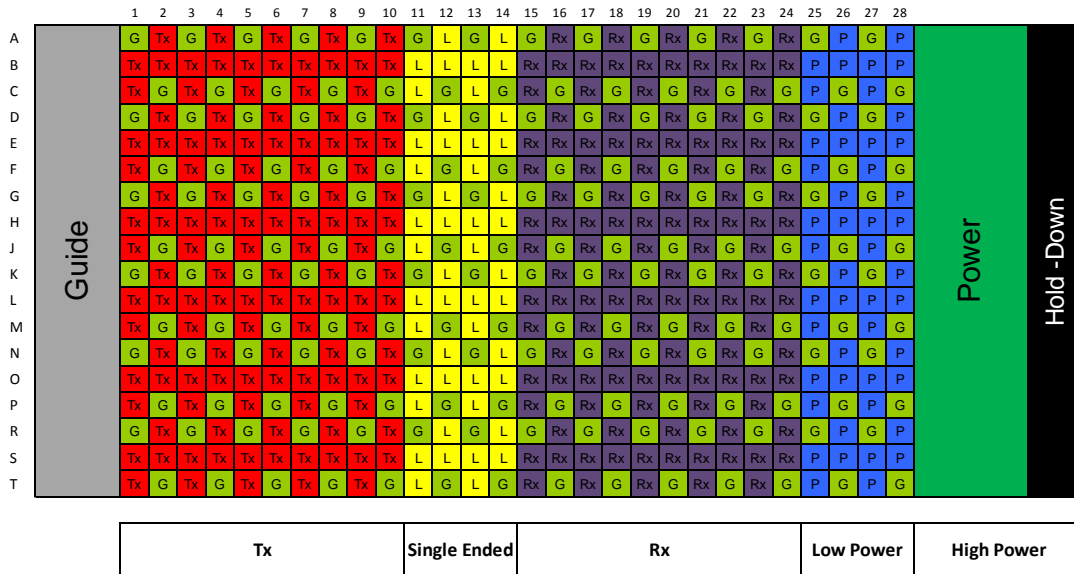
Figure 6: High Power Modules

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- b) Pin Map Configurator – [Molex Pin Map Configurator](#)
  - a. Customized Pin Maps for customer specific application



**Figure 7: Custom Pin Map Example**

- c) Part Number Selection - [Impact Part Number Logic Guide](#)
  - a. Currently tooled Impact connector options and part numbering
- d) Plated Through Hole Dimension: Reference routing guide [AS-76060-9999](#) or [AS-76850-990](#) for further detail
  - a. 0.39mm PTH
  - b. 0.46mm PTH

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- e) Mating Pin Length
  - a. 100 and 85 Ohm vertical headers
    - i. 3 length options available for standard product
    - ii. See Figure 8 for tooled lengths
  - b. Orthogonal Midplane, Orthogonal Direct RAM and RAM headers
    - i. 2 length options available for standard product
    - ii. See Figure 8 for tooled lengths
  - c. Custom pin length capability: Commonly used for detect signal
    - i. Vertical headers – any pin in the pin field can be specified as a shorter or longer length
    - ii. Orthogonal Midplane and Orthogonal Direct RAM headers – contact Molex for custom pin length capabilities
    - iii. RAM headers – any column in the connector can be specified as a shorter or longer length

Pin Length	Component Type				
	100 Ohm Vertical Header	85 Ohm Vertical Header	Orthogonal Midplane Header	Orthogonal Direct RAM	RAM Header
4.50mm	X	X			
4.90mm	X	X	X	X	X
5.50mm	X	X	X	X	X

**Figure 8: Header Pin Length Options**

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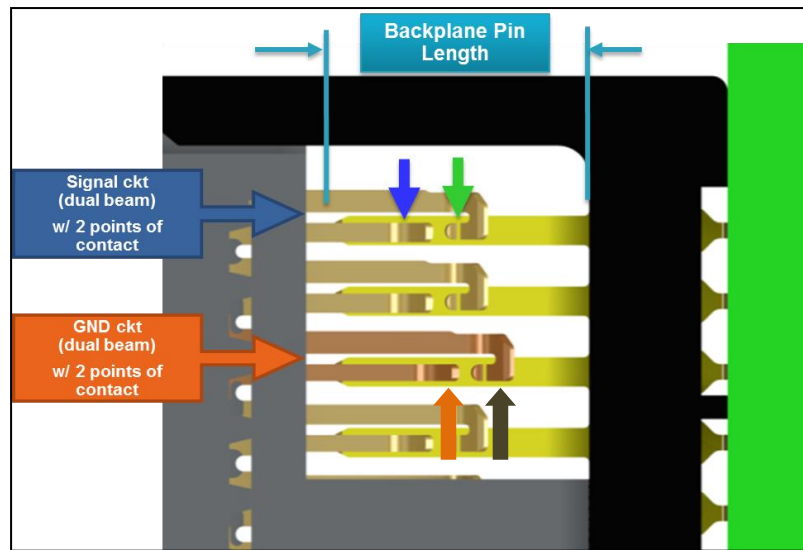
## E) CONTACT WIPE

- a) Contact Molex for nominal wipe and mating sequence detail for Impact 100 Ohm and 85 Ohm
- b) See Figure 9 for minimum contact wipe detail

100 Ohm	<b>Backplane Header Pin Lengths</b>			
	<b>Daughtercard Mating Point</b>	<b>4.5mm Pin</b>	<b>4.9mm Pin</b>	<b>5.5mm Pin</b>
	➡ Long Ground	2.52 mm	2.92 mm	3.52 mm
	➡ Short Ground	1.52 mm	1.92 mm	2.52 mm
	➡ Long Signal	2.02 mm	2.42 mm	3.02 mm
	➡ Short Signal	1.02 mm	1.42 mm	2.02 mm
85 Ohm	<b>Backplane Header Pin Lengths</b>			
	<b>Daughtercard Mating Point</b>	<b>4.5mm Pin</b>	<b>4.9mm Pin</b>	<b>5.5mm Pin</b>
	➡ Long Ground	2.92 mm	3.32 mm	3.92 mm
	➡ Short Ground	1.92 mm	2.32 mm	2.92 mm
	➡ Long Signal	2.52 mm	2.92 mm	3.52 mm
	➡ Short Signal	1.52 mm	1.92 mm	2.52 mm

**Figure 9: Minimum Contact Wipe**

*\*see Figure 10 below for short and long signal/ground*



**Figure 10: Short/Long Signal and Ground beam**

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## F) GUIDANCE AND ENDWALLS:

- a) Integrated Guidance available in all Headers, Orthogonal Mid-Plane, RAM, and Orthogonal Direct Assemblies, see Figure 11
- b) Integrated Keying available in Headers and RAM assemblies (not available in 2P Impact)
- c) Recommended that any exposed contact beams be enclosed by an endwall

### GUIDE PIN RECOMMENDATIONS

DAUGHTERCARD CONNECTOR SPAN	DAUGHTERCARD WEIGHT	RECOMMENDED GUIDANCE (Minimum)
Less than 125mm	Less than 7 lbs	1 Standard Guide
	7 lbs – 14 lbs	2 Standard Guides or 1 Heavy Duty Guide
	14 lbs – 21 lbs	3 Standard Guides or 2 Heavy Duty Guides
	Over 21 lbs	Contact Molex Field Application Engineer
125mm – 250mm	Less than 14 lbs	2 Standard Guides
	14 lbs – 21 lbs	3 Standard Guides or 2 Heavy Duty Guides
	Over 21 lbs	Contact Molex Field Application Engineer
250mm – 375mm	Less than 21 lbs	3 Standard Guides
	Over 21 lbs	Contact Molex Field Application Engineer
Over 375mm	Any	Contact Molex Field Application Engineer

Figure 11: Guide Quantity Recommendations

## G) POINT OF CONTACT WHEN FULLY MATED

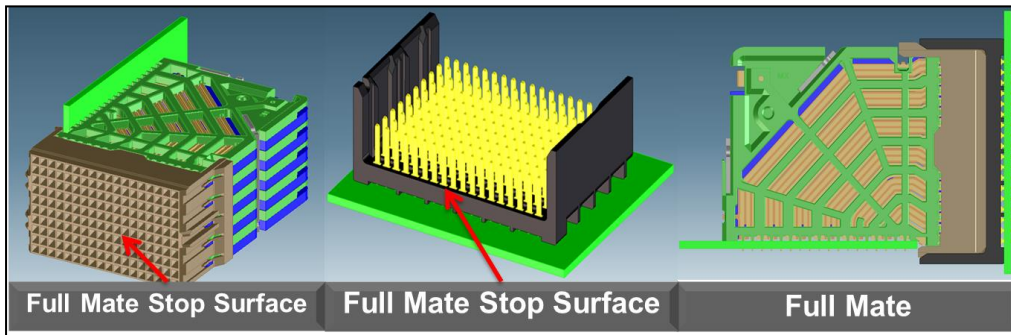


Figure 13: Mating Surfaces of Signal Modules

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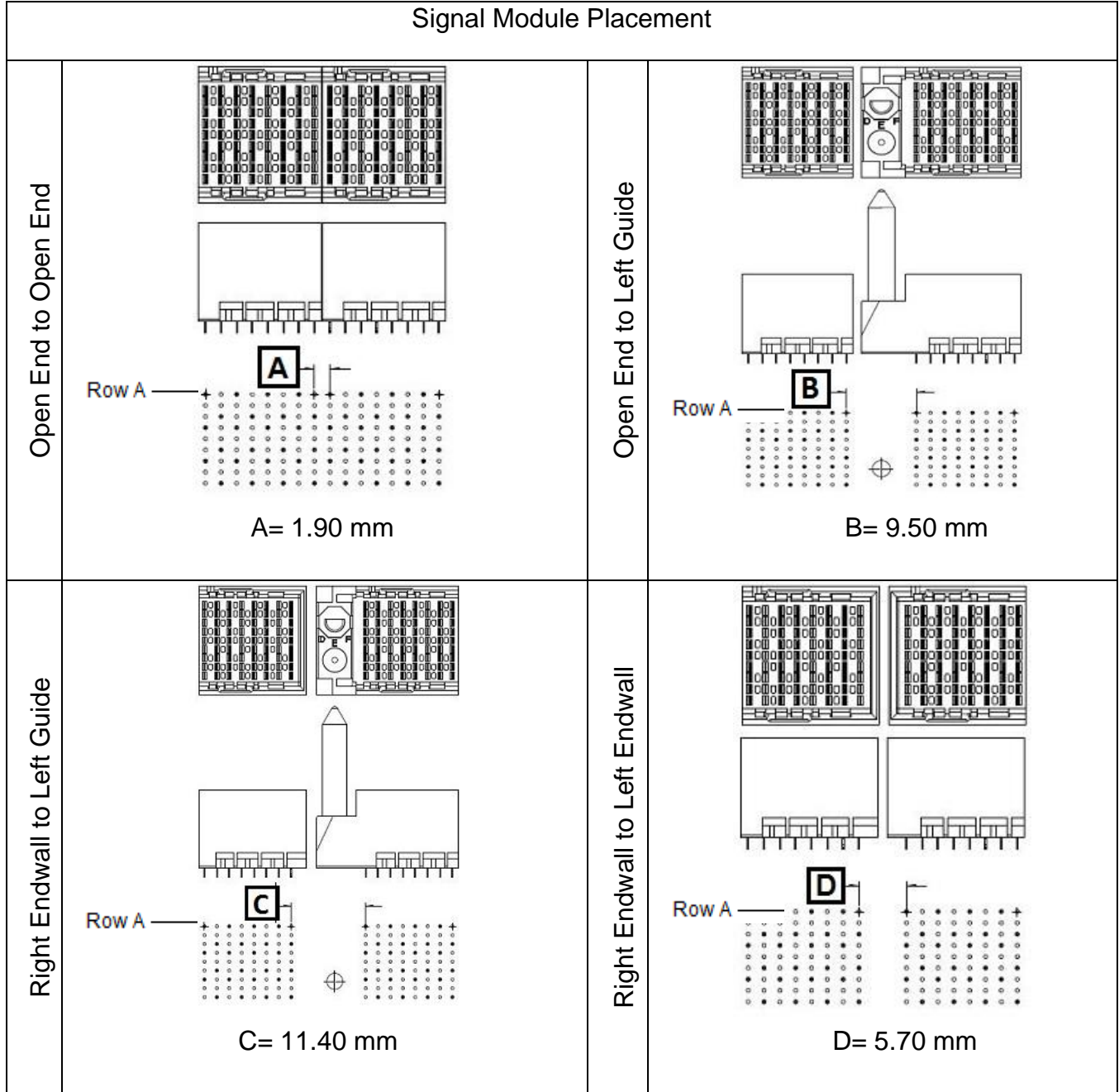


# Application Specification

## III : MECHANICAL LAYOUT

### A) SPACING BETWEEN MODULES

\*values listed are minimum needed between modules

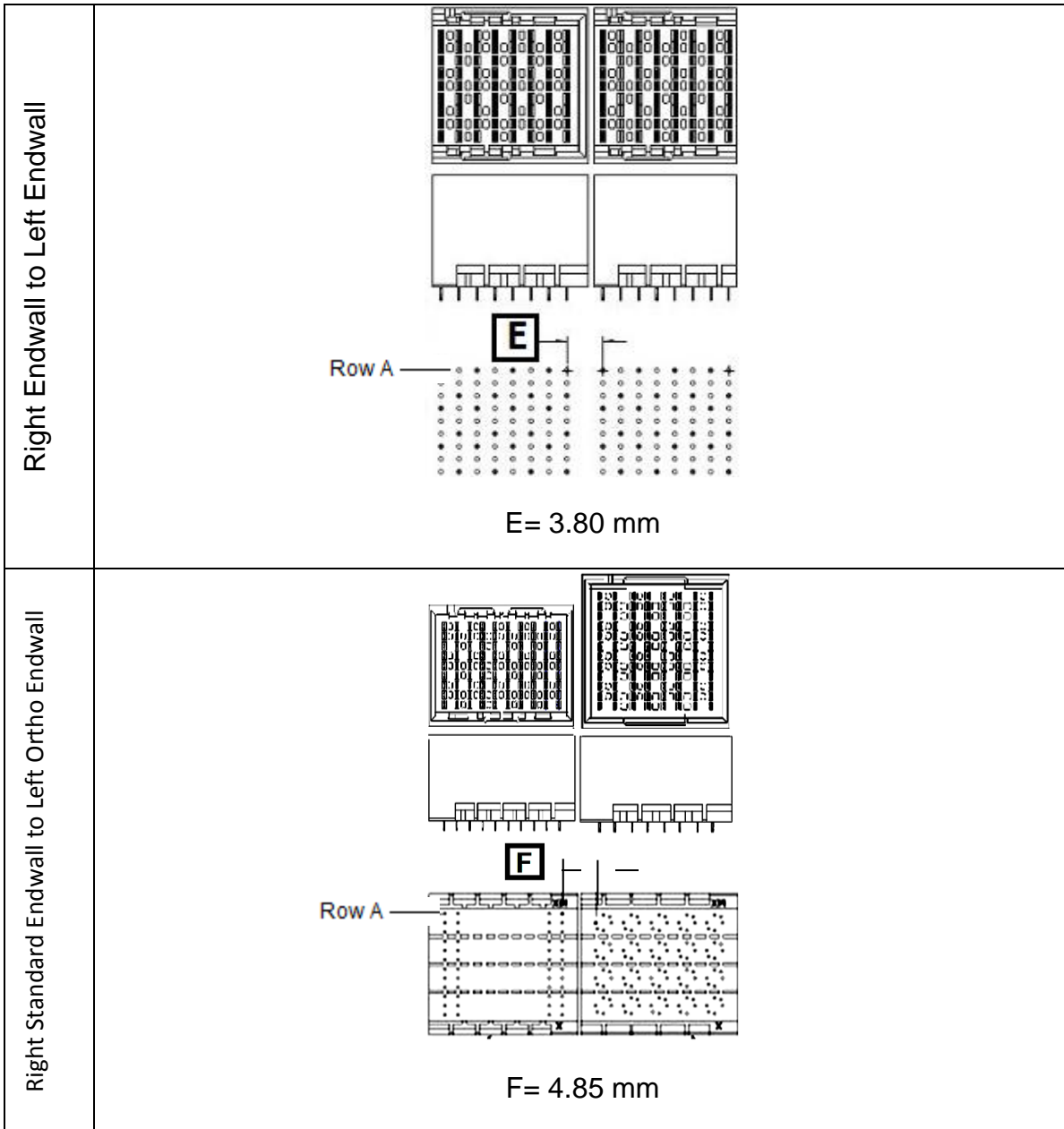


**Figure 14: Signal Module Placement for Standard Modules**

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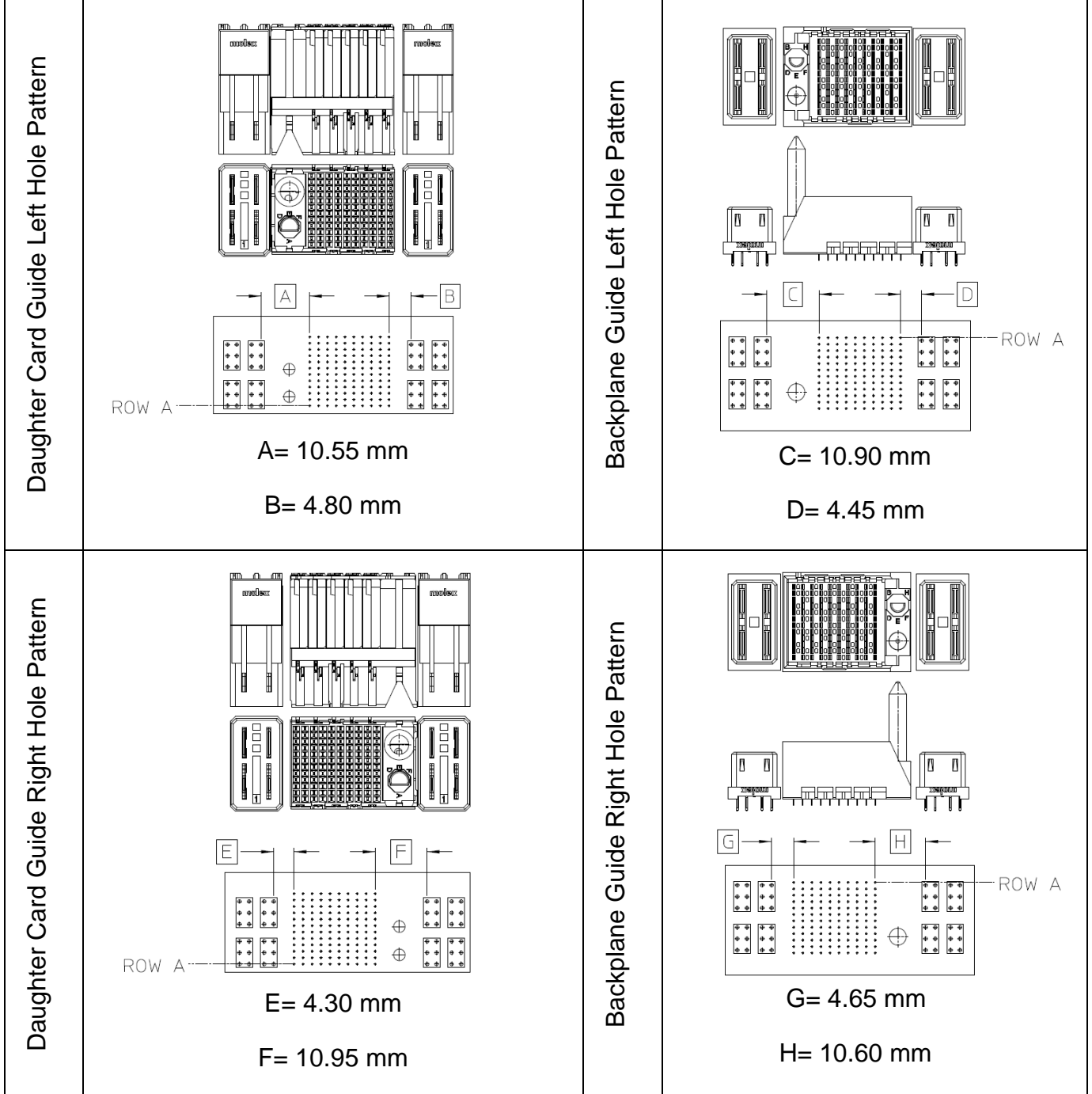
**Figure 15: Signal Module Placement for Orthogonal Modules**

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## Signal Module to Power Module Stack



**Figure 16: Signal to Power Module Placement**

*\*These views mate to each other in conventional right angle to vertical application.*

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## B) GATHERABILITY

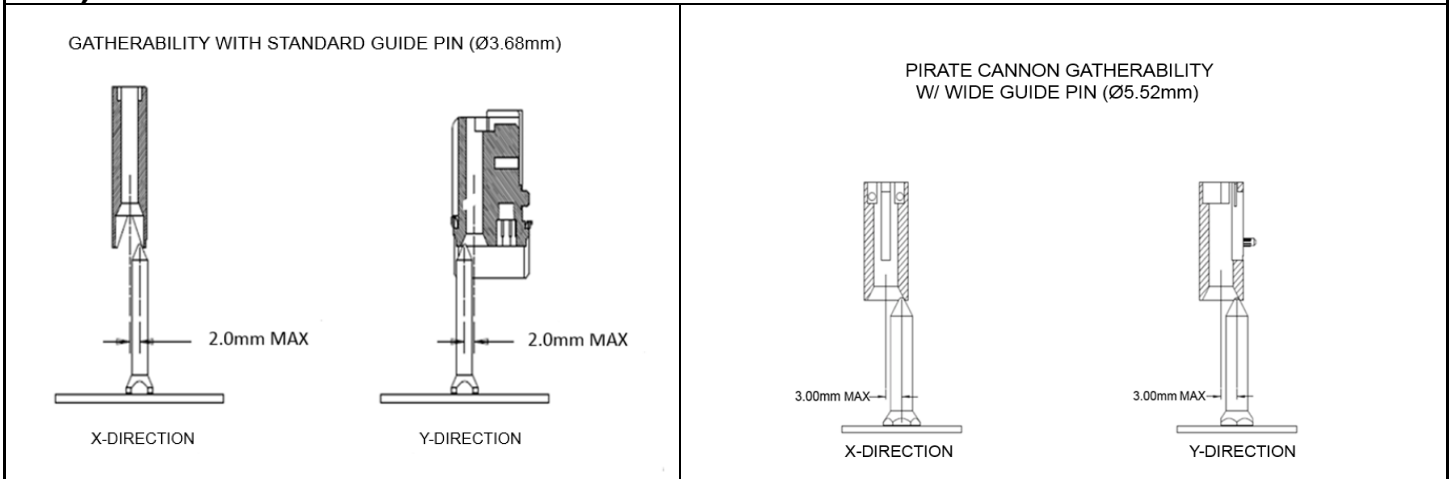


Figure 17: Gatherability of integrated and stand-alone guidance

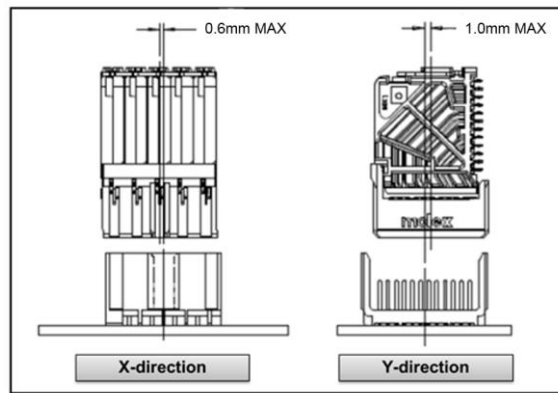


Figure 18: Gatherability of receptacle windows

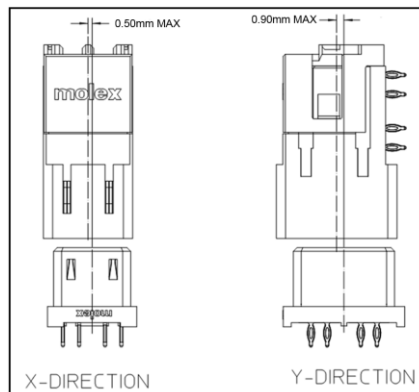


Figure 19: Gatherability of power modules

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DOCUMENT NUMBER: <b>AS-76060-9997</b>	CREATED / REVISED BY: <b>Doina Varvara</b>	CHECKED BY: <b>Liz Hardin</b>	APPROVED BY: <b>Tim Elo</b>
FILENAME: PS74031C.DOC			



# Application Specification

## C) ANGULAR MATING

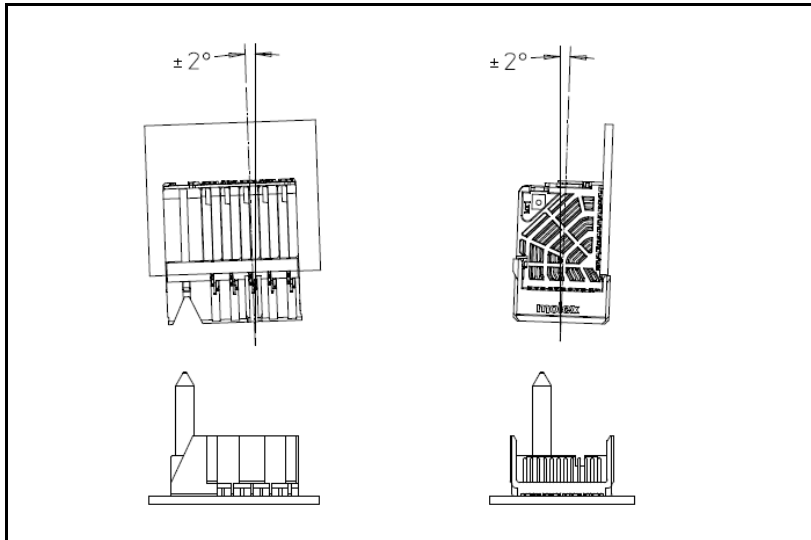


Figure 20: Angular mating tolerance of the connector

## D) MATING FORCE

- a) 100 Ohm Impact - [PS-76060-999](#)
- b) 85 Ohm Impact – [PS-170540-999](#)

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# Application Specification

## III : PROCESSING

### A) APPLICATION TOOL MANUAL - [TM-622018799](#)

### B) APPLICATION TOOL RECOMMENDATIONS

\* for all Molex Impact Application Tooling, see TM622018799 (link above)

- a) Vertical Backplane Headers, Orthogonal Midplane Headers –
  - i. Recommend Molex design press-in tools, see Impact Application Tool Manual
- b) Daughtercard Receptacles, Mezzanine Receptacles, RAM Headers, OD RAM Headers –
  - i. Molex designed tool – reference Impact Application Tool Manual for part number
  - ii. If using Flat Rock– Do not make contact with front housing (see Figure 21)

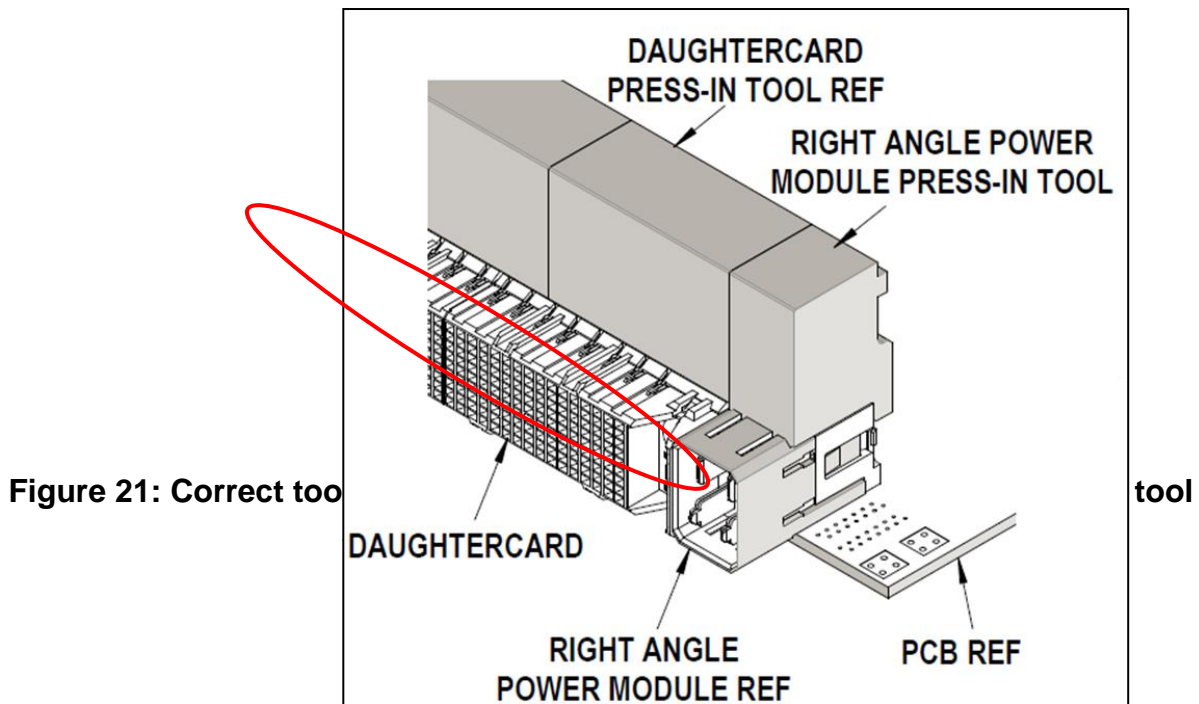


Figure 21: Correct tool

tool

### C) BOARD FABRICATION RECOMMENDATIONS

\*See *Impact Connector Routing Guide AS-76060-990* or *AS-76060-990* for more detail on board fabrication, processing and design - [AS-76060-990.pdf](#) ; [AS-76850-990](#)

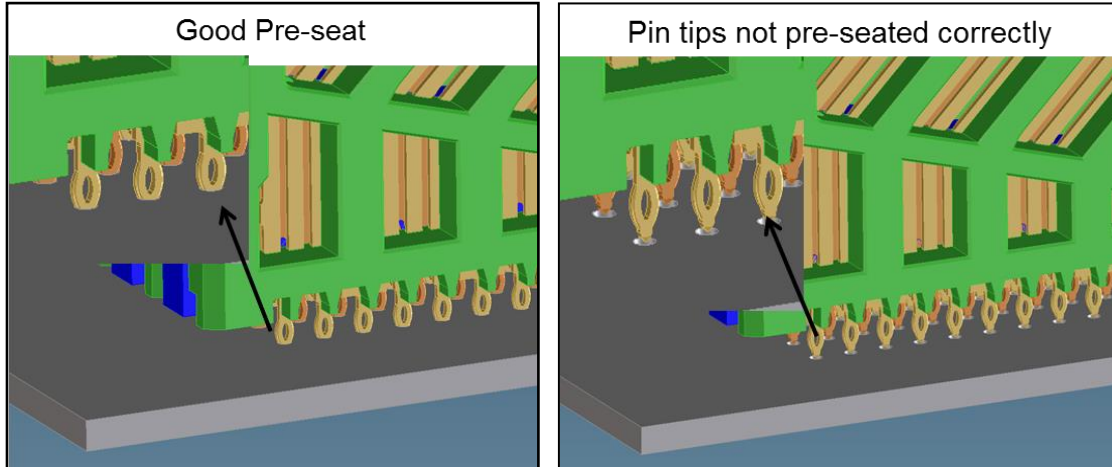
- a) Plating thickness and type

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# Application Specification

- i. Recommend refer to [AS-76060-990](#) or [AS-76850-990](#) for further detail
- b) Pre-Seat Process
  - i. Manual – Reference [AS-76150-9999](#)
  - ii. Visually check for bent pins prior to insertion (see Figure 22 below)



**Figure 22: Pre-Seat Evaluation**

- c) Seating Process –
  - i. Refer to Section 2 of [TM-622018799](#)
- d) Seating Depth
  - i. Minimum recommended depth 0.10mm from the bottom of the plastic housing to the board as noted in section 2 of [TM-622018799](#)
- e) Screw Application Spec – [AS-76060-9999](#)

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