

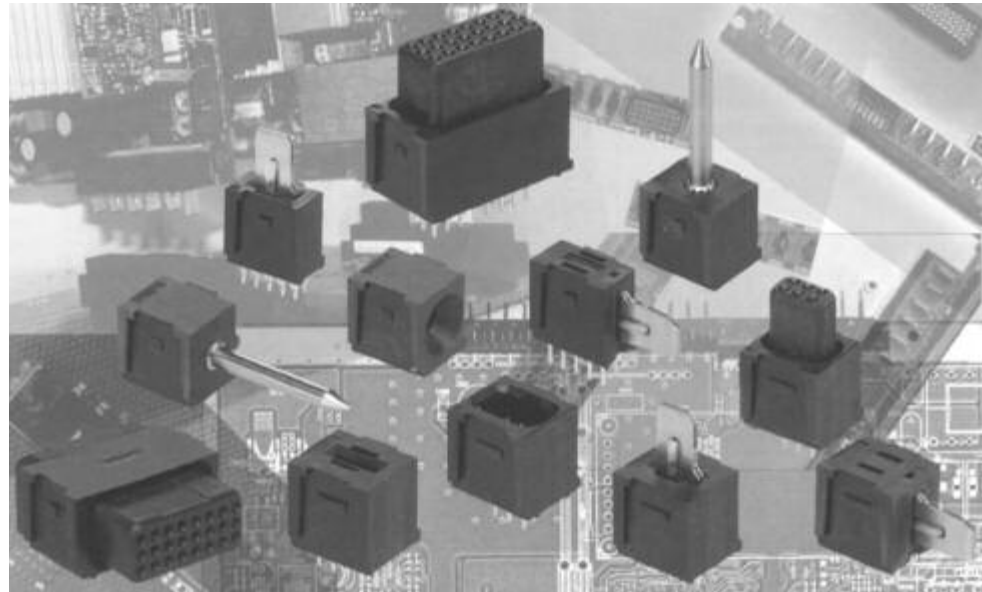
## FLATPAQ Modular Board-to-Board Power Connectors

### Product Facts

- 32 Amp high-performance ELCON CROWN BAND power contacts
- True hot-plug power contacts available for current interruption under load
- Versatile modular design allows customized configuration to meet your specific application requirements
- Perpendicular, parallel and co-planar styles available
- Sequenced mating of power and signal contacts
- Solder and compliant press-fit termination to the board
- Unique active guide modules double as alignment guide and power contact
- All FLATPAQ Products in this section are RoHS compliant

### Typical Applications

- Board-to-board power interconnections
- Hot-swap N+1 power distribution for telecommunications, servers and mini-computers
- Uninterruptible power systems (UPS)
- Removable battery packs



FLATPAQ connectors provide hot-pluggable AC and DC power in board-to-board applications. Customized configurations of up to 45A power contacts, signal & logic lines, and guides (both active and passive) are enabled by the assembly of various standard modules. This allows the designer to specify guidance for blind mating situations, contact mating sequence, spacing for voltage ratings, and current interruption under load (true Hot-Plug), to meet custom design requirements without incurring any tooling expense.

### Product Highlights Highly Configurable

FLATPAQ connectors are custom configurable using standard modules that can be arranged in any order to meet the application requirements. It is even possible to have both power blades and power sockets in the same connector side. Using off-the-shelf, modular components enables quick turnaround of sample requests, typically within one week, to allow your design to move forward on schedule.

### High-performance ELCON Power Contacts

FLATPAQ socket modules use proven CROWN BAND technology, for low insertion and extraction forces, minimal voltage drop and reduced temperature rise. The latest generation contacts are 45A USR rated (32.5A CNR) and can handle even higher currents when mounted on boards with 5 oz copper traces or on bus bars.

Hot-Pluggable socket contacts are rated at 35A USR, 20A CNR. Both Hot-Plug and regular sockets can be mixed in the same connector (as can both power blades and power sockets).

Standard power modules utilize the same contacts as the MINIPAK Connectors for cost effectiveness. The original "float" mounted blade modules are still available where physically isolating the blade from the PCB solder joints is desired.

24-position straight mount Signal socket modules are now available in a cost effective 1A design.

### Power and Signal Sequencing

Power contacts are available in Standard, Premate and Postmate lengths to meet your power sequencing requirements. Signal contacts have Standard and Premate length options, consult Customer Service for details.

**FLATPAQ Modular Board-to-Board Power Connectors (Continued)**

**Various Contact Termination Styles**

All connectors are available in two lengths of solder termination, .115" (2.9 mm) nominal for 0.062" (1.6 mm) thick boards, and 0.177" (4.5 mm) for 0.093" (2.4 mm) and 0.125" (3.18 mm) boards.

Straight mount socket connectors are also available with compliant 'Eye of the Needle' design press-fit terminals for 0.093" (2.4 mm) minimum thickness boards and bus

bars. Tyco Electronics will provide details of the recommended pressing fixture for each assembly.

All terminations fit 0.040 +/- .0030" (1.02 +/- .08 mm) diameter plated through holes.

**Alignment Guides and Mounting Ears**

FLATPAQ Connector alignment guides improve gatherability in blind mate situations and can be either electrically active (35A rated) or passive. Passive

guides should be used in conjunction with mounting ears when placed at the end of the connector. Mounting ears should also be considered on right angle mounted connectors.

**Finished Connector Drawing**

Tyco Electronics will provide a Customer Drawing showing all envelope dimensions and PCB mounting pattern based on the configuration indicated using the layout sheet available at [www.tycoelectronics.com](http://www.tycoelectronics.com).

See page 41 for details on completing the layout sheet. A drawing with general contact sequencing and alignment information is available; please contact Customer Service for a copy.

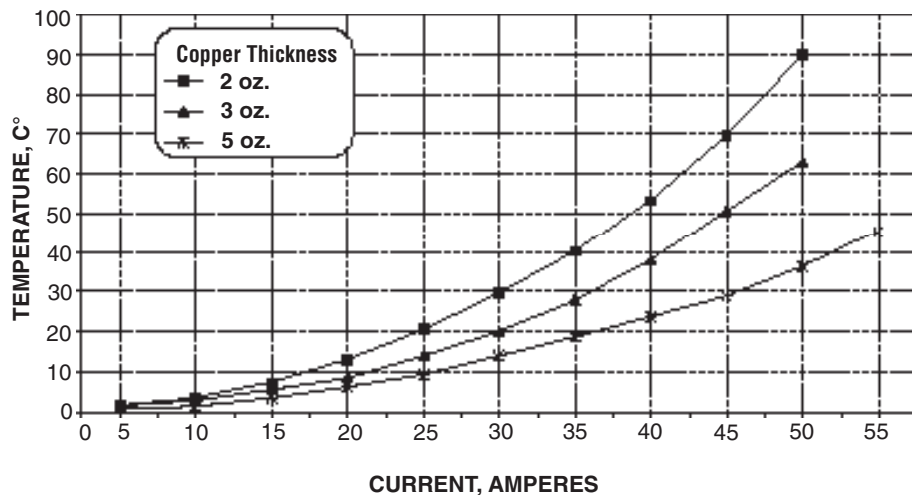
**Safety Regulatory Agency Compliance**

FLATPAQ connector has been evaluated by safety regulatory agencies for use in data, signal, control and power applications. Consult Customer Service for details.

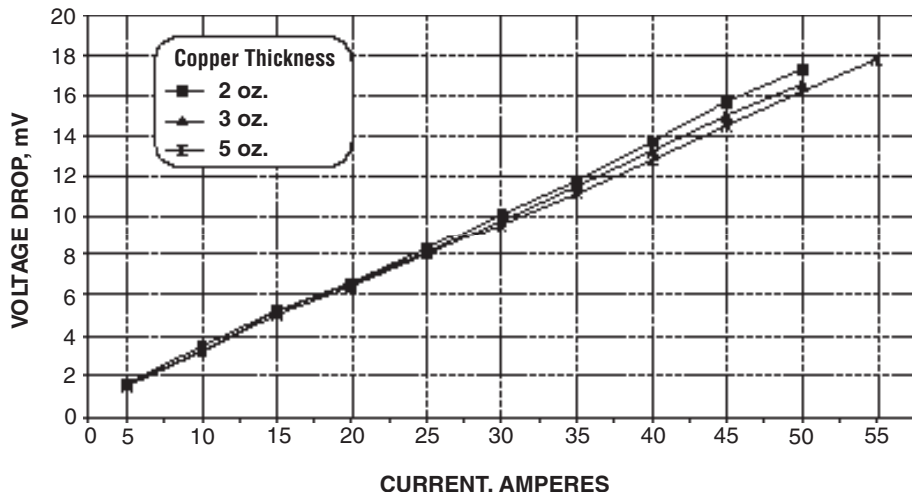
**Electrical Performance**

The graphs below show the performance of the FLATPAQ contact design in terms of temperature rise against current. Tests were performed on 250 V power modules mounted on PC boards with 2 oz, 3 oz, and 5 oz copper traces.

**Temperature Rise**



**Voltage Drop**



## FLATPAQ Connector Product Specifications



### Materials

Insulators	PPA, UL 94V-0 flammability rated, color black
Power Blades	Copper alloy
Power Sockets	Phosphor Bronze
Hot-Plug Power Sockets & Active Guide Sockets	Crown Bands: Beryllium Copper Holder: Phosphor Bronze
Signal Pin Contacts	Solder termination: Brass Press-fit: Phosphor Bronze
Signal Socket Contacts	1 Amp: Phosphor Bronze 3 Amp: Beryllium Copper
Passive Guide Pin	Brass
Active Guide Pin	Copper alloy

### Finishes

Contacts	Selectively plated gold (30 microinches minimum) with tin on terminations, all over nickel
Passive Guide Pin	Nickel
Active Guide Pin	Silver

### Electrical

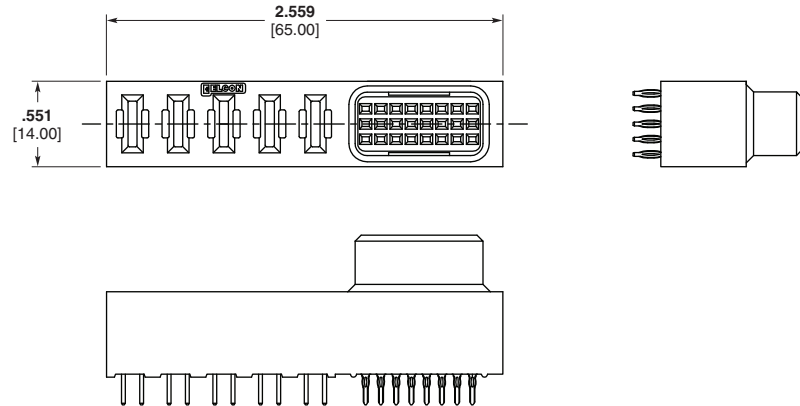
Current Rating	UL	45 Amp
Power Contacts	CUR/CSA	32.5 Amp
Current Rating, Hot-Plug Power Contacts	UL	35 Amp at 250V, 50 cycles
Hot-Plug Power Contacts	CUR/CSA	20 Amp at 250V, 50 cycles
Signal Contacts, 1 Amp	UL	1 Amp, 250 VAC
	CUR/CSA	1 Amp, 250 VAC
Signal Contacts, 3 Amp	UL	3 Amp, 250 VAC
	CUR/CSA	2.5 Amp, 250 VAC
Contact resistance	Power	2 mΩ maximum initial, (3 mΩ maximum after 500 cycles durability), at 35A per MIL-STD-1344, Method 3004
	Signal	15 mΩ maximum initial, (30 mΩ maximum after 500 cycles durability), at 100mA, 20 mV, per MIL-STD-1344, Method 3002
Insulation Resistance		5,000 MΩ minimum at 500VDC for 2 minutes, per MIL-STD-1344, Method 3003
Dielectric Strength		1,500 VDC for 1 minute, per MIL-STD-1344, Method 3001

### Mechanical

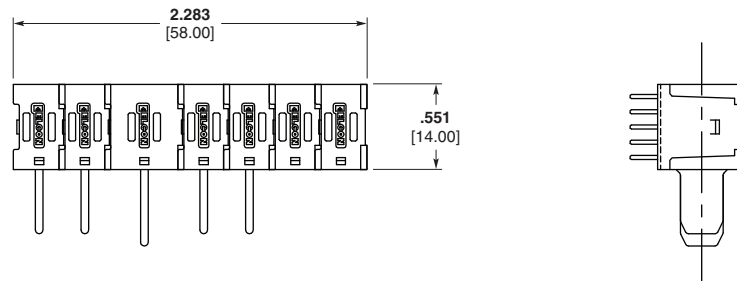
Insertion Force	Power Signal	4.0 lbf (17.8 N) maximum 5.0 ozf (1.4 N) maximum, using .0305" (.775mm) diameter steel test pin
Extraction Force	Power Signal	1.0 lbf (4.4 N) minimum 0.5 ozf (0.1 N) minimum, using .0295" (.749mm) diameter steel test pin
Contact Retention (in insulator)	Power Signal	10.0 lbf (44.4 N) minimum 5.0 lbf (22.2 N) minimum
Durability		500 Cycles, per MIL-STD-1344, Method 2016
Operating Temperature		-40 to +105° C
Recommended PCB Hole		Finished hole: 0.040 +/- .0030" dia. (1.02 +/- .08 mm dia.) Drilled hole: 0.0453 +/- .0005" dia. (1.15 +/- .013 mm dia.) Copper Plate: 0.0010" (.025 mm) min. per surface Tin Plate: 0.0003" (.008 mm) min. per surface
Press-Fit Tooling		Press fixture is recommended for compliant press-fit assemblies. Consult Tyco Electronics for tool drawing
Marking		Connectors are marked with manufacturer's logo, part number and lot code

**FLATPAQ Connectors**

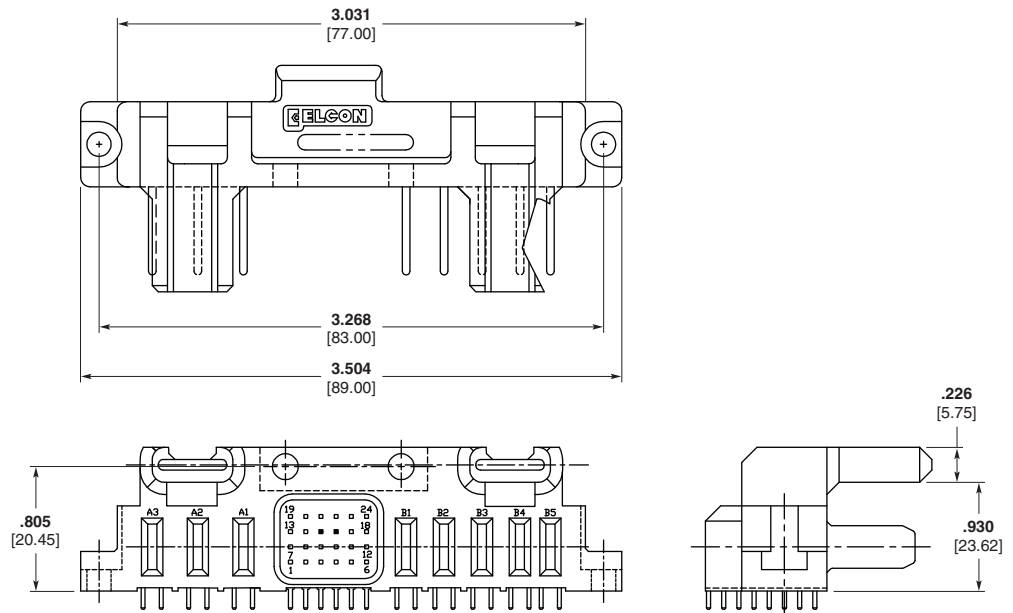
**Part Number 6646465-1**  
**FLATPAQ 250V Straight**  
**Socket Connector**  
**4 Power, 24 Signal**  
**Contacts**



**Part Number 6646871-1**  
**FLATPAQ 250V/600V**  
**Right Angle Pin Connector**  
**6 (250V) Power,**  
**1 (600V) Power**



**Part Number 6646770-1**  
**FLATPAQ Right Angle**  
**Pin Connector**  
**8 Power, 24 Signal**  
**Contacts**



**Note:** All part numbers are RoHS compliant.

## How to Specify Your Modular FLATPAQ Connector

We will generate a Customer Drawing for you to check and approve prior to connector production. Samples are also available upon request.

- 1** Enter your contact information, including signature and date.
- 2** Indicate the connector layout by filling in the FP number of each module required in the boxes, one per box. Use one form per mated pair. The left to right order of the modules should match the mating face views of the connector. When laying out right angle assemblies, make sure that you look at the termination tails facing downwards.
- 3** For solder terminated assemblies, indicate the tail length for each half of the connector using the checkboxes to the right of the layout grid.

### Sample Modular FLATPAQ Connector Layout Form

#### Instructions

1. Indicate the connector layout by filling in the FP number of each module required in the boxes, one per box. Use one form per mated pair.
2. The left to right order of the modules should match the **mating face views** of the connector. **When laying out right angle assemblies**, make sure you look at the mating face with the termination tails facing downwards.
3. For **solder terminated assemblies**, indicate the tail length for each half of the connector using the checkboxes to the right of the layout grid.
4. Sign, date and send the completed form to your local Tyco Electronics Sales Engineer.

**Upon receipt of this form, Tyco Electronics will generate a Customer Drawing for you to check and approve prior to connector production.**

Write the "FP" numbers to indicate the layout of one half of the connector assembly, matching the left to right order with the mating face view of the connector (right angle assembly tails facing downwards).

FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	<b>Solder Tail Options</b> <input type="checkbox"/> .115" (2.9 mm); .062" thick boards <input type="checkbox"/> .177" (4.5 mm); .093/.125" boards
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Write the "FP" numbers to indicate the layout of the mate of the above assembly, matching the left to right order with the mating face view of the connector (right angle assembly tails facing downwards).

FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	FP	<b>Solder Tail Options</b> <input type="checkbox"/> .115" (2.9 mm); .062" thick boards <input type="checkbox"/> .177" (4.5 mm); .093/.125" boards
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ENTER CUSTOMER INFORMATION	
Company	Location
Contact Name	Title
Telephone	Fax
Email Address	
I am: <input type="checkbox"/> End user <input type="checkbox"/> Contract manufacturer (end user: _____)	
Signature	Today's Date
Annual Quantity Required	

Submit to your local Tyco Electronics Sales Engineer.

#### Right Angle Mount

**250 V Power Modules**

 FP151 Standard Blade	 FP152 Premate Blade	 FP153 Postmate Blade	 FP104 Hot-Plug Socket	 FP512 Spacer, 250 V
Float, Standard	Float, Premate	Float, Postmate		

**Signal Modules**

 FP302 24-Pin	 FP303 24-Pin Socket	 FP314 6-Pin	 FP315 6-Pin Socket
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**600 V Power Modules**

 FP155 Standard Blade	 FP156 Premate Blade	 FP157 Postmate Blade	 FP120 Hot-Plug Socket	 FP514 Spacer, 600 V
Float, Standard	Float, Premate	Float, Postmate		

**Mounts**

 FP500 Left Flange Mount	 FP501 Right Flange Mount
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**Guides**

 FP506 Passive Guide Pin	 FP507 Right Angle Passive Guide Pin
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#### Straight Mount

**250 V Power Modules**

 FP150 Socket, Solder	 FP161 Standard Blade	 FP162 Premate Blade	 FP163 Postmate Blade	 FP511 Spacer, 250 V
Socket, Press-fit	Float, Standard	Float, Premate	Float, Postmate	

**Signal Modules**

 FP300 24-Pin, Press-fit	 FP400 24-Pin Skt, Press-fit	 FP318 24-Pin Socket	 FP418 24-Pin Skt, Press-fit	 FP312 6-Pin	 FP412 6-Pin	 FP313 6-Pin Socket	 FP413 6-Pin Skt, Press-fit
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**600 V Power Modules**

 FP154 Socket, Solder	 FP165 Standard Blade	 FP166 Premate Blade	 FP167 Postmate Blade	 FP513 Spacer, 600 V
Socket, Press-fit	Float, Standard	Float, Premate	Float, Postmate	

**Mounts**

 FP500 Left Flange Mount	 FP501 Right Flange Mount
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**Guides**

 FP502 Straight Passive Guide Socket	 FP503 Passive Guide Pin	 FP515 Active, M3 Guide Socket	 FP517 Active, 4-40 Guide Pin
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**Note:** All modules are solder tail termination unless indicated as compliant Press-fit. Select solder tail length using checkboxes to the right of the connector layout grid above. 0.093" or thicker boards are recommended for compliant Press-fit termination style. Consult Tyco Electronics for signal module sequencing. See Catalog 1773096 for benefits of Hot-Plug and Float options.

### How to Obtain Modular FLATPAQ Connector Layout Forms

Modular FLATPAQ Connector layout forms can be obtained directly from Customer Service or through your Tyco Electronics Sales Engineer. They can also be downloaded from the website; at <http://www.tycoelectronics.com>.