

## Power Distribution Connector Overview

### Tyco Electronics Power Connector Technology

For years, Tyco Electronics has pioneered the development of new power interconnect technologies. As the industry leader in Power Interconnects, Tyco Electronics produces power connectors used in laptops through super computers, automobiles, telecommunications base stations, consumer appliances, power utility, industrial controls, locomotives

and many other applications. The products in this catalog are focused on the higher performing power connectors used in the Computer and Telecommunications industries.

Some key factors in the design of these new connectors are the selection of the right contact and housing materials, platings and contact designs. Many of the older single or dual

point of contact interconnects have been replaced with new/next generation designs which can offer significant reductions in contact resistance, insertion/mating force, connector size and total applied cost. In addition, several of the newest designs have significant increases in current and signal density all combined into a single power distribution connector.

As power delivery applications vary widely, Tyco Electronics also produces many variations of the products listed in this catalog for unique applications. If you don't find the product needed for your application, please feel free to contact our Product Information Center or your local Tyco Electronics Sales Engineers.

### High Performance Started with the ELCON CROWN BAND Power Contact Technology



One of the popular technologies used in high current connects is based on the ELCON CROWN BAND Power Contact Technology. Made from high conductivity alloys and used with solid screw machined pin and socket contacts, these contacts deliver superior performance. Many of the high current Drawer Connectors in this catalog use this technology.

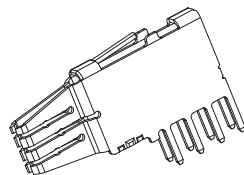
- 1/4th to 1/10th the Contact Resistance
- Maximum Contact Surface Area
- Low Voltage Drop, Low Temperature Rise
- Higher Cycle Durability
- Used in High Performance Pin & Socket Drawer Connectors
- Safety Agency Approved Hot-Plug Contacts Available



### CROWN BAND Performance in Stamped & Formed Configurations

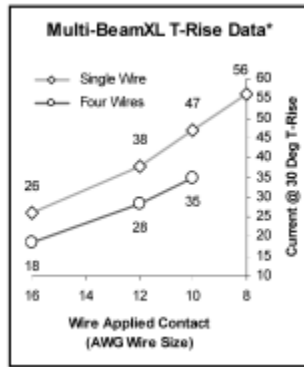
FLATPAQ Connectors, MINIPAK Connectors, CROWN EDGE Connectors, Mini CROWN EDGE Connectors, MULTI-BEAM XL Connectors, AMPPOWER Wave Crimp Products, CROWN CLIP Sockets, Pluggable Bus Bar Products.

These product lines all utilize the multiple point of contact design. With the 6, 8, 10, 12 or more contact points per stamping, the contact resistance remains very low and the mating cycle durability remains high.



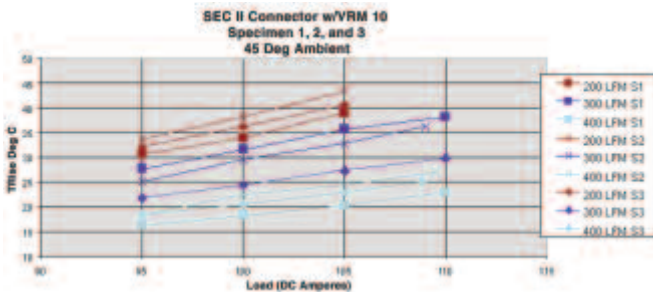
**Extensive Product Qualification**

Tyco Electronics has played a major role in influencing the industry to evaluate power connectors based upon End-Of-Design-Life conditions. This involves a variety of accelerated life tests used to determine the expected results of the power connectors after years of use in demanding applications.



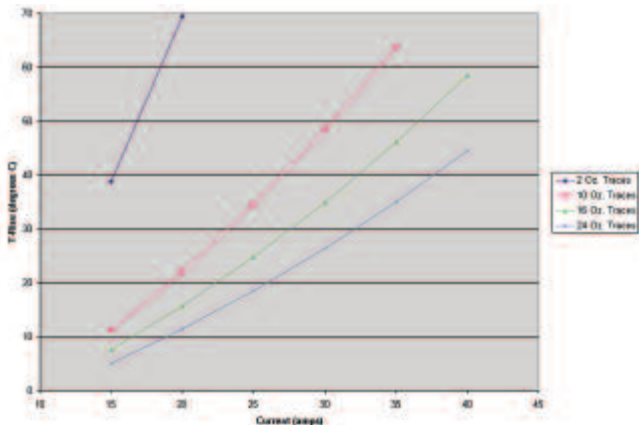
Temperature Rise charts using a single contact have been replaced with more useful data taken from tests of actual fully loaded connectors carrying their maximum current.

The tests are run with pre-stressed (end-of-life) connectors to provide worst case results based on the environmental exposure the connectors will see.



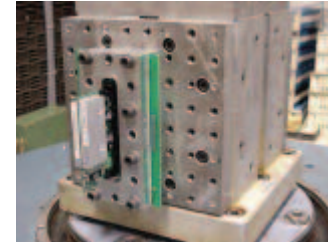
In many cases the common safety agency approvals are also provided. While these tests are typically far less stringent than Tyco Electronics' internal

test sequences, they provide additional safety/regulatory information for end users to help them make the connector selection easier.



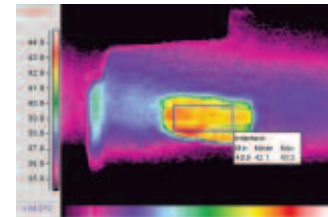
**Shock & Vibration**

Shock and vibration testing is used to verify the mechanical integrity of the connector system. Shock capability to test half-sine, saw-tooth, and trapezoidal waveforms up to 3000 g's. Vibration capability to test sinusoidal, random, sine-on-random, and narrow band random-on-random profiles up to 2000 Hz.



**Thermal Image**

Thermography is used to optimize the design and to pinpoint the exact hot spot on the contacts — to measure the true worst case temperature-rise. Then thermocouples are placed on the hot spot to confirm the temperature at the end-of-life conditions.



**Durability and Hot-Plug Set-Up**

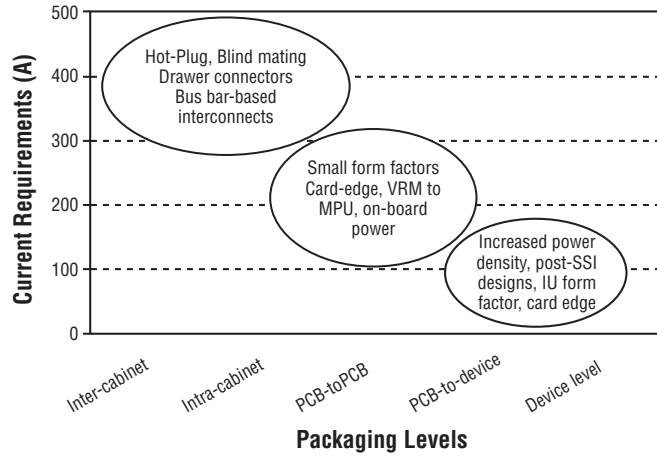
Current Interrupt (hot-plug) tests are performed to customer-specific requirements to determine the ability of the connector to sustain repeated make & break cycles under load. Power generation capability up to 600 VDC.

Durability tests are performed in accordance with both industry (EIA 364-70) standards and Tyco Electronics documented test sequences. With this, the user knows exactly what was tested and how it was tested, in order to achieve the specified durability rating.



## Tyco Electronics Delivers Both Industry Standard and Application-Specific Power Connectors

Technology



### Industry or De-Facto Standard Products

- MULTI-BEAM XL Connectors (SSI and AdvancedTCA 300 Standards)
- Z1 Power Connector (AdvancedTCA)
- MINIPAK HD Connector (MicroTCA)
- Universal MATE-N-LOK Connectors
- VRM Card Edge Connectors (VRM 8.5 – 11.0)
- Universal Power Module (CPCI Express)
- AMP Power Series (50 – 350 Amp DC power)
- IEC Power Entry Modules (IEC 320)
- Power POD Connector (IA 64)

### Application Specific Products

- Drawer Series (Top Drawer — Mini Drawer)
- CROWN EDGE & Mini CROWN EDGE Connectors
- FLATPAQ Connectors
- MINIPAK Connectors
- CROWN CLIP Connectors
- ICCON Connectors
- RAPID LOCK Connectors

## Standards Activities / Safety Agency Approvals

Tyco Electronics has a broad line of power interconnects meeting the industry's most stringent safety standards:

Tyco Electronics End-Of-Design-Life (EODL) accelerated life testing has influenced many new standards for power interconnects.



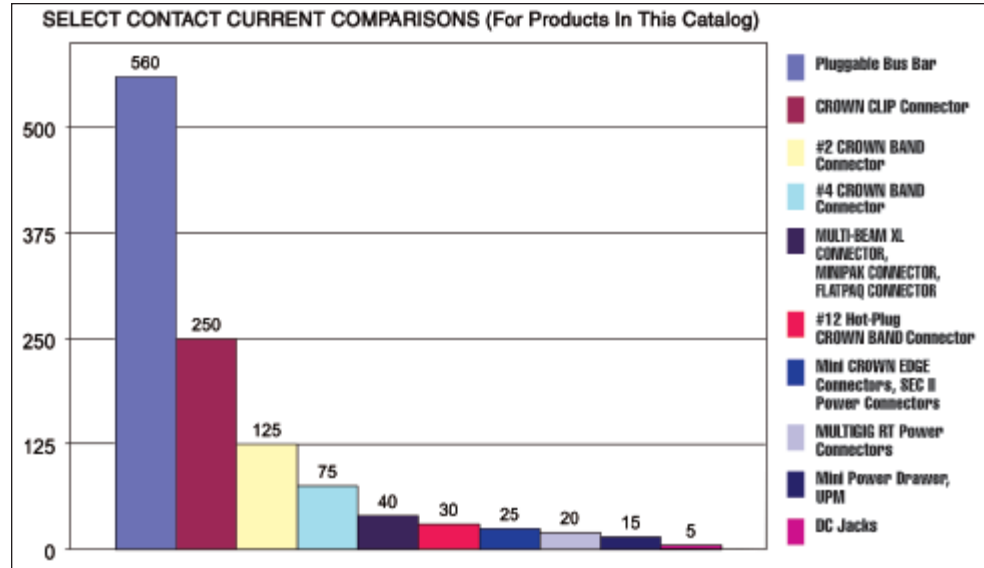
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## Current Carrying Capabilities

Tyco Electronics offers a wide range of power contacts, which handle up to 500 Amps. The total current capacity of each contact in a given connector is dependent upon the heat rise resulting from the combination of electrical loads of the contacts in the connector arrangement and the maximum ambient temperature in which the connector will be operating. Caution must be taken so that this combination of conditions does not cause the internal temperature of the connector to exceed the maximum operating temperature of the housing material. Several variables which must be considered when determining this maximum current capability for your application are:

- **Wire Size** — Larger wire will carry more current since it has less internal resistance to current flow and generates less heat. The wire also conducts heat away from the connector.
- **Connector Size** — In general, with more circuits in a connector, less current per contact can be carried.
- **Current Load Distribution** — Spreading those lines with greater current loads throughout the connector, particularly around the outer perimeter, will enhance heat dissipation.
- **Ambient Temperature** — With higher ambient temperatures, less current can be carried.

**Note:** The current ratings in this chart are based upon single contact loading and a 30° C temperature rise. More useful "fully loaded" ratings are available and are dependent upon the variables listed above.



## Application-Specific Designs

**In the shortest time to market in the industry.**

If none of our standard products satisfies your requirements, Tyco Electronics can develop a design specific to your application. We will work closely with your engineers to fully understand the design requirements and develop an interconnect solution that meets your exact needs. After the concept and design stages, Tyco Electronics produces prototypes that perform both electrically and mechanically the same as production parts. These machined parts are used for testing, regulatory agency evaluations, and even as pre-production components, allowing the shortest lead time from concept to manufacturing in the industry.

### Concept



Tyco Electronics engineers work closely with the customer to fully understand the design requirements of the application.

### Design



A sketch drawing of the design concept is created for customer review, and the design is finalized only when it fully meets the requirements of the customer.

### Prototypes



Once the design is frozen, and while Tyco Electronics works on the molds and the connector assembly processes, Tyco Electronics builds prototypes that are identical to the production parts.

### Production

By the time both Tyco Electronics and the customer are ready for mass production, all requirements for release to production, such as qualification testing and regulatory agency approval, have been cleared.

