Network Division
Mission Statement

Our goal is to be the preferred technology partner for copper connectivity interface solutions to leading suppliers of communication network equipment & devices.

Core Skills

• Demonstrated design/engineering and high volume expertise
• Strong relationships with leading electronic OEM’s, CEM’s & PHY companies
• Excellent value and outstanding quality products delivered from high-volume production facilities
• Geographic proximity to customers’ design and production sites
• Worldwide distribution support

Resources

• Pulse Networking Website
  » Buy Now
  » Sample Portal
  » Datasheets, RoHS CoC, 3d Models
  » Application Guides
  » Enhanced Product Finder
  » New Product Releases
• Technical Support
  » America’s
     Prodinfonetworkamericas@pulseelectronics.com
  » Europe, Middle East, Africa:
     Comms-Apps-Europe@pulseelectronics.com
  » Asia, Austrailia (Pacific Rim), Korea
     Prodinfonetworkapac@pulseelectronics.com
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Focus Markets & Applications

Pulse Electronics is developing the next generation of networking components to support the future expansion of the following markets and applications. Pulse has full line of network products which include Ethernet Transformers, Ethernet Connector Modules, Connectors, RF Inductors, Common Mode Chokes, and Telecom Magnetics and Filters.

Industrial Market

Applications
- Automation
- Process Controls
- Communications
- Robot controls
- Security Displays
- Smart Grid

Transportation

Applications
- Infotainment
- Body Controls
- ADAS
- Cameras
- Battery Management Systems

Communications

Applications
- Switches
- Routers
- Gateways
- Access points
- Basestations

Consumer

Applications
- ONT
- Femtocell
- Gateway/Router
- Security
- Home Automation
- Displays/TV’s

Medical

Applications
- In Fusion Pumps
- Imaging
- Ventilators
- Diagnostics
- Monitors

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Battery Management Isolation Transformers

Pulse Electronics offers a full line of isolation transformers and common mode chokes for small to large battery systems for serial port safety isolation and EMI noise rejection application. In large battery pack applications that have Daisy Chain connection, the number of cells connected in series is very high, and the large voltage differences demand component-to-component isolation. The serial communication links between boards need to be isolated by transformer coupling circuits instead of capacitor coupling.

Features and Benefits

- Support serial Daisy Chain isoSPI, SPI and other signal isolation
- Meets AEC-Q200 requirements
- Operating temp. -40°C up to +125°C
- Multiple options for working voltages and voltage isolation

Applications

- Electric Vehicle
- Energy Storage System
- Data Center UPS
- Solar energy storage
- Green – Renewable
- Marine

<table>
<thead>
<tr>
<th>Part Number</th>
<th>No of Chan.</th>
<th>Working Voltage</th>
<th>HI-POT Isolation</th>
<th>Creepage Distance</th>
<th>Center Tap</th>
<th>Common Choke</th>
<th>Operation Temp</th>
<th>Supported IC</th>
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<tbody>
<tr>
<td>HX1188NL</td>
<td>2</td>
<td>100Vdc</td>
<td>1500Vrms</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>-40-85°C</td>
<td>Linear Tech</td>
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<tr>
<td>HM1188NL</td>
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<td>100Vdc</td>
<td>1500Vrms</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech</td>
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<td>HM1190NL</td>
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<td>2500Vrms</td>
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<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech</td>
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<td>1000Vdc</td>
<td>4000Vrms</td>
<td>-</td>
<td>Yes</td>
<td>Yes</td>
<td>-40-85°C</td>
<td>Linear Tech</td>
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<tr>
<td>HM2100NL</td>
<td>2</td>
<td>1000Vdc</td>
<td>4300Vdc</td>
<td>&gt;10mm</td>
<td>No</td>
<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech</td>
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<tr>
<td>HM2101NL</td>
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<td>1000Vdc</td>
<td>4300Vdc</td>
<td>&gt;5mm</td>
<td>No</td>
<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech</td>
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<td>HM2102NL</td>
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<td>1000Vdc</td>
<td>4300Vdc</td>
<td>&gt;8mm</td>
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<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech/NXP</td>
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<tr>
<td>HM2103NL</td>
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<td>1000Vdc</td>
<td>4300Vdc</td>
<td>&gt;5mm</td>
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<td>Yes</td>
<td>-40-125°C</td>
<td>Linear Tech/NXP</td>
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<tr>
<td>HM2106NL</td>
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<td>4300Vdc</td>
<td>&gt;11mm</td>
<td>Yes</td>
<td>No</td>
<td>-40-125°C</td>
<td>Linear Tech/NXP</td>
</tr>
<tr>
<td>HM2108NL</td>
<td>1</td>
<td>1000Vdc</td>
<td>4300Vdc</td>
<td>&gt;11mm</td>
<td>Yes</td>
<td>Yes</td>
<td>-40-125°C</td>
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<tr>
<td>HM1236NL</td>
<td>1</td>
<td>600Vdc</td>
<td>3200VDC</td>
<td>&gt;7mm</td>
<td>Yes</td>
<td>Yes</td>
<td>-40-125°C</td>
<td>MAX17823/11068</td>
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<tr>
<td>HM1237NL</td>
<td>2</td>
<td>600Vdc</td>
<td>2500Vac</td>
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<td>Yes</td>
<td>Yes</td>
<td>-40-125°C</td>
<td>MAX17823/11068</td>
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<tr>
<td>HM1238NL</td>
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<td>1000Vdc</td>
<td>4300Vdc</td>
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<td>Yes</td>
<td>Yes</td>
<td>-40-150°C</td>
<td>MAX17823</td>
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Note: Other solutions available upon request including HMU2102NL and HMU2103NL.
New Products

1X1 1G/2.5G/5G/10GBase-T 4P PoE Top Entry Series

Pulse Electronics introduces the J1V-2 series of 1x1 Top Entry 1000Base-T to 10GBASE-T 4P PoE Ethernet Connector Modules. These parts have options for LED’s and 4 and 5 channel magnetics for 10GBase-T. The package is ideal for applications requiring higher bandwidth and higher power such as Base Stations, IPTV, Gateways, Video Displays, and Thin Clients.

Features and Benefits

- 1x1 Top Entry
- 1000Base-T, 2.5GBase-T, 5GBase-T, 10GBase-T performance
- 4P PoE up to 90W
- 4 & 5 Channel available
- RoHS 6/6 capable
- Compatible with all major PHY’s
- In Volume Production

Applications

- Base Stations
- IPTV
- Video Displays
- Gateways
- Thin Clients

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>Speed</th>
<th>IEEE Specification</th>
<th>PoE Watts</th>
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</thead>
<tbody>
<tr>
<td>J1V-U2100NL</td>
<td>1x1 Top Entry</td>
<td>1000Base-T</td>
<td>802.3ab</td>
<td>75W</td>
</tr>
<tr>
<td>J1V-U2500NL</td>
<td>1x1 Top Entry</td>
<td>2.5GBase-T</td>
<td>802.3bz</td>
<td>100W</td>
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<tr>
<td>J1V-U5000NL</td>
<td>1x1 Top Entry</td>
<td>5GBase-T</td>
<td>802.3bz</td>
<td>72W</td>
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<tr>
<td>J1V-U7000NL</td>
<td>1x1 Top Entry</td>
<td>10GBase-T</td>
<td>802.3an</td>
<td>60W</td>
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</tbody>
</table>
2.5GBASE-T Ethernet Transformers

Pulse electronics offers full line of 2.5GBASE-T Ethernet magnetics supporting 4P PoE connections for multiple Ethernet applications. The parts are compatible with all major 2.5GBASE-T PHY suppliers. Multiple package options and extended temperature solutions are available. The parts are ideal for applications requiring higher bandwidth and PoE function such as base stations, 802.11ac access points, routers, switches and video displays.

Features and Benefits

- Designed to meet IEEE802.3bz for 2.5GBASE-T
- Compatible with all Major PHYs
- 4P PoE 60W, expanding to +90W
- Available in -40°C to +85°C operating temperature
- Multiple package options available
- Industry Standard Footprints
- 5GBASE-T coming soon

Application

- Access Points
- Switches
- Base Stations
- Gateways
- Video & Displays

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Ports</th>
<th>PoE</th>
<th>PHY Compatibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>HU4102NL</td>
<td>Dual</td>
<td>No</td>
<td>Aquantia-Broadcom-Marvell</td>
</tr>
<tr>
<td>HU4103NL</td>
<td>Dual</td>
<td>60W</td>
<td>Aquantia-Broadcom-Marvell</td>
</tr>
<tr>
<td>HU4006NL</td>
<td>Single</td>
<td>60W</td>
<td>Aquantia-Broadcom-Marvell</td>
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<tr>
<td>HU4009NL</td>
<td>Single</td>
<td>60W</td>
<td>Aquantia-Broadcom-Marvell</td>
</tr>
<tr>
<td>HU4108NL</td>
<td>Single</td>
<td>60W</td>
<td>Aquantia-Broadcom-Marvell</td>
</tr>
</tbody>
</table>
Pulse has designed our 1000BASE-T PoE parts to allow for maximum power of 140W. Pulse has both Ethernet magnetics and Ethernet connector modules that accommodate the higher power. The parts are compatible with all major PHY’s 1000BASE-T PHYs. The parts are ideal for applications requiring higher power like Notebooks, Base stations, Access points, Video Displays, and Gateways.

**Features and Benefits**

- 140W max. power
- Multiple package options
- Compatible with all major PHY’s
- In Volume Production
- Industry Standard Footprint

**Applications**

- Base Stations
- Access Points
- Notebooks
- Video Displays
- Gateways

<table>
<thead>
<tr>
<th>Part Number</th>
<th># of Ports</th>
<th>Max. Power</th>
<th>Speed</th>
</tr>
</thead>
<tbody>
<tr>
<td>HX6098NL</td>
<td>Single</td>
<td>140W</td>
<td>1000BASE-T</td>
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<tr>
<td>JK0-0229NL</td>
<td>1X1</td>
<td>140W</td>
<td>1000BASE-T</td>
</tr>
<tr>
<td>J0B-3563NL</td>
<td>2X6</td>
<td>140W</td>
<td>1000BASE-T</td>
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</table>
1X2 10GBASE-T Offset Ethernet Connectors

The Pulse JTL product is a 1x2 10GBASE-T Offset Ethernet Connector Module that has options for 4 and 5 channel magnetics and with or without LED’s. The parts are compatible with all major 10GBASE-T PHY’s. The package is ideal for applications requiring higher bandwidth and lower height such as Blade servers, Media servers, Base stations, Access points.

### Features and Benefits

- 1x2 Offset 10GBASE-T
- Meets IEEE802.3an specification
- Offset for lower overall height
- 4 & 5 Channel available
- RoHS 6/6 capable
- Compatible with all major PHY’s
- In Volume Production
- Industry Standard Footprint

### Applications

- Servers
- Base Stations
- Access Points
- Routers
- Switches
- Gateways

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th># of Channels</th>
<th>PHY Compatibility</th>
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<tbody>
<tr>
<td>JTL-U1001NL</td>
<td>RJ45, 1x2, 10G, 4P PoE</td>
<td>4</td>
<td>Intel/Aquantia</td>
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<tr>
<td>JTL-U1002NL</td>
<td>RJ45, 1x2, 10G, 4P PoE</td>
<td>4</td>
<td>Broadcom</td>
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<tr>
<td>JTL-U1003NL</td>
<td>RJ45, 1x2, 10G, 4P PoE</td>
<td>4</td>
<td>Marvell</td>
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</table>
1X2 and 1X4 10GBASE-T Offset Ethernet Connectors

The Pulse JT8 1x2 and 1x4 10GBASE-T Ethernet Connector Modules has options for 4 and 5 channel magnetics and with or without LED’s. The parts are compatible with all major 10GBASE-T PHY’s. The package is ideal for applications requiring higher bandwidth and lower height such as Servers, Routers, Base stations, Access points, Gateways and Video Displays.

![1x2 and 1x4 10GBASE-T Ethernet Connector Modules](image)

### Features and Benefits
- 1x2 and 1x4 10GBASE-T Offset
- Meets IEEE802.3an specification
- 4 & 5 Channel available
- RoHS 6/6 capable
- Halogen Free
- Compatible with all major PHY’S
- In Volume Production

### Applications
- Servers
- Base Stations
- Access Points
- Routers
- Video Displays
- Gateways

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th># Channels</th>
<th>PHY Compatibility</th>
</tr>
</thead>
<tbody>
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<td>JT8-2000HL</td>
<td>1x2, RJ45, 10G</td>
<td>5</td>
<td>Intel/Aquantia</td>
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<tr>
<td>JT8-4000HL</td>
<td>1x4, RJ45, 10G</td>
<td>5</td>
<td>Intel/Aquantia</td>
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</table>
Industrial 1x1 JXD6 SMT Ethernet Connectors

Pulse’s latest range of 1x1 100BASE-TX SMT Ethernet Connector Modules are designed to provide isolation and noise reduction in a single solution, operating with a wide range of industrial protocols. The SMT allows for processing these components using a standard IR Reflow profile which can save on overall cost for manufacturing.

### Features and Benefits

- Designed to meet IEEE802.3u (100BASE-TX)
- -40C to +85C operating temperature
- Suitable for CAT 3, CAT 5 UTP
- UL File Listing E216177
- SMT pins allow for Reflow Soldering
- Compact form factor optimizing board space
- Supports all major PHY manufactures

### Applications

- Industrial Automation
- Process or Remote Control and Monitoring
- Campus
- Factory or Rugged Communication Networks
- Power over Ethernet
- Touch Screen Display & Panels
- Security & Image processing
- Access Control

### Part Number Details

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tab Location</th>
<th>Ports</th>
<th>EMI TABS</th>
<th>BST</th>
<th>LED Left/Right (pin style)</th>
<th>PoE</th>
<th>Contact Plating</th>
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<tr>
<td>JXD6-0001NL</td>
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<td>1X1</td>
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<td>YES</td>
<td>Green/Yellow (rear)</td>
<td>NO</td>
<td>6uinch</td>
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<tr>
<td>JXD6-0002NL</td>
<td>UP</td>
<td>1X1</td>
<td>NO</td>
<td>YES</td>
<td>Green/Green (rear)</td>
<td>NO</td>
<td>15uinch</td>
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<tr>
<td>JXD6-1100NL</td>
<td>DOWN</td>
<td>1X1</td>
<td>NO</td>
<td>YES</td>
<td>NONE</td>
<td>NO</td>
<td>15uinch</td>
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</table>
New Products

Industrial 1x2 and 1x4 Tab Down Ethernet Connectors

Pulse’s latest “JXDO-2” and “JXDO-4” Tab down series of 1x2 and 1x4 Ethernet Connector Modules are designed to provide isolation and noise reduction in a single solution, operate with a wide range of industrial protocols. These 1xN Tab Down are compact and make it easy on designers to layout their PCB’s.

Features and Benefits

- Designed to meet IEEE802.3u (100BASE-TX) and 802.3ab (1000BASE-T) standards
- -40C to +85C operating temperature
- Suitable for CAT 3, CAT 5 UTP or higher
- UL File Listing E216177
- Compact form factor optimizing board space
- Supports all major PHY manufactures

Applications

- Industrial Automation
- Process or Remote Control and Monitoring
- Campus
- Factory or Rugged Communication Networks
- Power over Ethernet
- Touch Screen Display & Panels
- Security & Image processing
- Access Control

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Tab Location</th>
<th>Ports</th>
<th>EMI TABS</th>
<th>BST</th>
<th>LED Left/ Right</th>
<th>PoE</th>
<th>Contact plating</th>
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<td>YES</td>
<td>Green/Yellow</td>
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<td>JXDO-4005NL</td>
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<td>YES</td>
<td>YES</td>
<td>Green/Green</td>
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</table>

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AEC - Q200 Automotive Magnetics

Pulse products support multiple technology's used in the Automobile including MOST, CAN Bus, FlexRay, Ethernet Audio Video Bridging (AVB), 100Base-T1, 1000Base-T1, and Power over Data Lines (PoDL). Pulse's parts are designed to operate from -40°C up to +125°C, have high reliability, high volume manufacturing, long term manufacturing support, and meet AEC-Q200 automotive quality requirements.

Features and Benefits
- Designed to meet 100BASE-TX/T1 and 1000BASE-TX/T1 IEEE802.3 standards
- Supports all major PHY manufacturers
- Multiple packages and configurations available
- Meets AEC-Q200 requirements
- Designed to operate from -40°C up to +125°C
- TS-16949 and PPAP capable

Application
- Infotainment
- Advanced Driver Assist Systems (ADAS) Body Control
- Camera/Radar
- Battery Management
- Backbone Diagnostics

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Part Description</th>
<th>Technology</th>
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<tbody>
<tr>
<td>HM0068ANL</td>
<td>Single, Low Profile, 100Base-TX</td>
<td>Ethernet AVB, MOST</td>
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<tr>
<td>HM1188NL</td>
<td>Single, 100Base-TX</td>
<td>Ethernet AVB, MOST</td>
</tr>
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<td>HM1234FNL</td>
<td>Dual, 100Base-TX</td>
<td>Ethernet AVB, MOST</td>
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<td>HM1225NL</td>
<td>Single, 100Base-TX</td>
<td>MOST</td>
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<td>HM5004EFNL</td>
<td>Single, 1000Base-T</td>
<td>Ethernet AVB</td>
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<td>HM5149NL</td>
<td>Single, 1000Base-T</td>
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<td>HM6098FNL</td>
<td>Single, 1000Base-T, PoE+</td>
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<td>AE2002</td>
<td>100Base-T1</td>
<td>Single Pair Ethernet</td>
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<tr>
<td>AE3003</td>
<td>100Base-T1 PoDL</td>
<td>PoDL</td>
</tr>
<tr>
<td>AE5002</td>
<td>1000Base-T1</td>
<td>Single Pair Ethernet</td>
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</table>
### Specifications

- Ethernet, T1/E1, ISDN, VDSL2, G.Fast
- HDBaseT Compliant
- High Isolation up to 7kV
- IEEE 802.3 compliant to 10G
- Higher reliability (Carrier class & AEC-Q200)
- Single, Dual, Quad packages
- SMT & BGA options
- Extended Temperature -40°C to +85°C
- PoE++ Capable

### Ethernet Connector Modules

#### Specifications

- IEEE 802.3 compliant to 10G
- Thru Hole, Press Fit, Pin-In-Paste, SMT options
- Multiple platforms - 1x1, 1xN, 2xN Tab up, Tab down, Side entry, Top entry, Low Profile, Offset
- Higher isolation (TVSS, surge)
- With and without LED’s
- Extended temperature -40°C to +85°C
- PoE++ Capable
RJ45 Connectors

Specifications

- Multiple Platforms - 1x1, 1xN, 2xN, Side entry, Top entry, Offset, Low profile
- CAT3 to CAT5e connectors available
- With & without LED’s
- With & without shields

Fiber Optic Connectors, Cages & Transceivers

Specifications

SFP/SFP+ Connectors & Cages
- 1G & 10G performance
- 1XN & 2XN Platforms
- Standard industry footprints
- EMI shielding options
- Signal integrity simulations

Transceivers
- Hot Pluggable SFP and SFP+ footprints
- Compliant to Ethernet and Fiber Channel standards
- Standard reaches from very short to long haul
- SFF-8472 compliant Diagnostic Monitoring Interface
- Support up to 11.1Gbps
Product Overview

IO Connectors

Specifications

- USB 3.1 Type C, USB 3.0, Thunderbolt
- High Speed (5G/s - 10G/s performance)
- Right Angle/Vertical, THT/SMT options

RF Filters

Specifications

- Multi band modules (SMT, TH)
- High rejection, low loss
- Excellent return loss
- Compliant to Docsis & MoCA
- Balun Transformers
Filter Components

**Specifications**
- RF Chip Inductors
- EMI Suppression Ferrite Beads
- Chip Chokes
- Array type beads

MSAN Filters

**Specifications**
- VDSL2 up to 30 MHz
- Extended temperature options
- Low profile options
- Dual & SMT Modules
Product Overview

Broadband Filters

CPE VDSL2 Splitters

CPE Filters: Z-300 Series

Specifications

- VDSL2 up to 30MHz
- Video grade
- ANSI & ETSI spec. compliance