Universal Serial Bus (USB) Type-C Connectors and Cable Assemblies

More compact USB Type-C connectors offer greater PCB savings while enabling high-frequency mating in data, consumer and other I/O applications

Features and Benefits

<table>
<thead>
<tr>
<th>Feature</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support for 5.0A of power in plug and receptacles</td>
<td>Reduces battery-charging time by 64% versus micro-USB 2.0’s current rating of 1.8A</td>
</tr>
<tr>
<td>Mid-plate connector ‘tongue’ design in receptacle</td>
<td>Ensures high reliability while preventing damage from connector abuse</td>
</tr>
<tr>
<td>High-temperature Nylon insert-mold receptacle housing</td>
<td>Increases connector strength to reduce potential shorting between mid-plate and terminals</td>
</tr>
<tr>
<td>Single-piece metal shell on cable plug</td>
<td>Provides easy identification and differentiation against non Type-C USB cables</td>
</tr>
<tr>
<td>Mylar between plug housing and shell</td>
<td>Prevents potential electrical shorting during mating</td>
</tr>
<tr>
<td>High normal force terminal design on plug</td>
<td>Stabilizes electrical performance while supporting higher current-carrying capacity with reduced temperature-rise</td>
</tr>
<tr>
<td>Availability of cable options meeting USB 2.0 and 3.1 speeds</td>
<td>Suits a variety of users depending on application requirements</td>
</tr>
</tbody>
</table>

Applications

Data/Computing/Telecommunications/Networking
- Data centers
- Servers and Workstations
- Personal computers, note and tablet PCs
- Routers, switches, hubs

Consumer
- Smartphones
- Digital cameras and digital video recorders
- Power banks and mobile chargers
- Docking stations
- Adapters and dongles
- Home entertainment systems
- Home appliances
- Gaming devices

Automotive
- Infotainment systems
- Cigarette chargers

Industrial
- Security cameras
- Drones
- Office equipment
- Airplane entertainment systems
- In-room multi-port electric outlets

Customer Convenient Ports

Tablet PCs and Smartphones

Office equipment

Car infotainment systems

Drones

In-room multi-port electric outlets
Comparison of Various Standard USB Receptacles

<table>
<thead>
<tr>
<th>USB 2.0 Type-A</th>
<th>Mini-USB 2.0</th>
<th>Micro-USB 2.0</th>
<th>USB 3.0 Type-A</th>
<th>Micro-USB 3.0</th>
<th>USB Type-C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circuits</td>
<td>4</td>
<td>5</td>
<td>5</td>
<td>9</td>
<td>10</td>
</tr>
<tr>
<td>No. of Rows</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Pitch (mm)</td>
<td>2.0/2.5</td>
<td>0.80</td>
<td>0.65</td>
<td>2.0/2.5</td>
<td>0.65</td>
</tr>
<tr>
<td>Connector Width (without shell; mm)</td>
<td>12.50 +/-0.10</td>
<td>6.90 +0.05/-0.04</td>
<td>6.90 +0.06/-0.02</td>
<td>12.50 +/-0.10</td>
<td>12.25 +0.06/-0.02</td>
</tr>
<tr>
<td>Connector Height (without shell; mm)</td>
<td>5.12 +/-0.10</td>
<td>3.10 +0.08/-0.02</td>
<td>1.85 +0.08/-0.02</td>
<td>5.12 +/-0.10</td>
<td>1.85 +0.08/-0.02</td>
</tr>
<tr>
<td>Receptacle Tongue Depth (mm)</td>
<td>8.38 +/-0.08</td>
<td>4.60 +/-0.05</td>
<td>2.70 +0.05/-0.08</td>
<td>10.15 min.</td>
<td>2.70 +0.05/-0.08</td>
</tr>
<tr>
<td>Connector Mating Depth (mm)</td>
<td>8.88 +/-0.20</td>
<td>5.50 +0.10/0</td>
<td>3.50 +/-0.10</td>
<td>10.38 ref.</td>
<td>3.50 +/-0.10</td>
</tr>
<tr>
<td>Connector Depth (mm)</td>
<td>–15.26</td>
<td>–9</td>
<td>5.0-6.8</td>
<td>–16.50</td>
<td>5.6-6.8</td>
</tr>
<tr>
<td>Data Rate</td>
<td>480Mbps</td>
<td>480Mbps</td>
<td>480Mbps</td>
<td>5.0Gbps</td>
<td>5.0Gbps</td>
</tr>
<tr>
<td>Data Pairs</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Durability (mating cycles)</td>
<td>1,500</td>
<td>5,000</td>
<td>10,000</td>
<td>1,500</td>
<td>10,000</td>
</tr>
<tr>
<td>Unmating Force (final)</td>
<td>10N min.</td>
<td>3N min.</td>
<td>8 to 25N</td>
<td>8N min.</td>
<td>8 to 25N</td>
</tr>
<tr>
<td>Reversible</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Current (power/signal)</td>
<td>1.5A</td>
<td>1.0A</td>
<td>1.8 / 0.5A</td>
<td>1.8 / 0.25A</td>
<td>1.8 / 0.25A</td>
</tr>
<tr>
<td>Terminal Insertion</td>
<td>Post-insert</td>
<td>Post-insert</td>
<td>Insert-mold</td>
<td>Post-insert</td>
<td>Insert-mold</td>
</tr>
</tbody>
</table>

With reversible plugging capabilities, the USB Type-C connector is smallest in pitch (0.50mm) but big (5.0A) in current-carrying capacity. Above the rest (of preceding USB standards), Type-C connectors feature maximum data throughput (10Gbps) and, with similar-end USB 3.1 Type-C cables, enables power charging in either direction.

‡Remark: Current values for Type-C Connector comprise the following:
- 5A max. for total VBUS pins (Pin A4, A9, B4, B9)
- 1.25A max. for Vconn (B5 of plug) with return path through the corresponding GND pins (Pin A1, A12, B1, B12)
- 0.25A min. for all other contacts
Universal Serial Bus (USB) Type-C Connectors and Cable Assemblies

Specifications

Connector and Plug

Reference Information

Packaging: Tape and Reel
Mates With: Series 105450 receptacle with Type-C cables or cable plug
Series 105444 cable plug with Series 105450 receptacle
Terminal Used: Copper Alloy
Designed In: Millimeters
RoHS: Yes
Halogen Free: Yes
Glow Wire Compliant: No

Cable Assemblies

Reference Information

Packaging: Bag
Mates With: Type-C (series 105450) receptacle or USB 2.0 Type A receptacle (105057 and 48416)
Designed In: Millimeters
RoHS: Yes
Halogen Free: No
Glow Wire Compliant: No

Electrical

Voltage (max.): 30V (DC/AC) max.
Current (max.): 5.0A
Contact Resistance:
40 (initial) max.; 50 milliohms after test
Dielectric Withstanding Voltage: 100 VAC
Insulation Resistance: 100 Megohms min.

Mechanical

Contact Retention to Housing: Insert-mold
Matting Force: 5 to 20N
Unmatting Force:
8 to 20N (1-30 cycles);
6 to 20N (after 10,000 insertion/extraction cycles)
Durability (min.): 10,000 cycles

Electrical

Voltage (max.): 30 Volts DC max.
Current (max.): 3.0A
Contact Resistance (max.): 40 milliohms (initial);
50 milliohms after test
Insulation Resistance: 10 Megohms
Dielectric Withstanding Voltage: 100 VAC

Mechanical

Matting Force: 5 to 20N
Unmatting Force:
8 to 20N (1-30 insertion/extraction cycles);
6 to 20N (after 10,000 insertion/extraction cycles)
Durability (min.): 10,000 cycles

Physical

Housing:
High Temperature Nylon (HTN) (receptacle)
LCP (plug)
Contact: Copper Alloy
Plating:
Contact Area — Gold Flash over 0.76µm Palladium/Nickel (Pd/Ni) (receptacle)
— 0.76µm Gold (plug)
Solder Tail Area — 0.05µm Gold (Au) min. (receptacle)
— 3.05µm Matte Tin (Sn) min. (plug)
Underplating — 2µm Nickel (Ni) min. overall PCB Thickness:
0.60 to 0.70mm (receptacle); 0.80mm (plug)
Operating Temperature: -30 to +85°C

Physical

Housing: LCP
Contact: Copper Alloy
Plating:
Contact Area — 0.76µm Gold min
Solder Tail Area — 3.05µm Matte Tin min
Underplating — 2.03µm Nickel overall
Operating Temperature: -10 to +50°C

Ordering Information

Connector and Plug

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Component</th>
<th>Circuits</th>
<th>Mounting Style</th>
<th>Termination</th>
</tr>
</thead>
<tbody>
<tr>
<td>105450-0101</td>
<td>Right Angle Receptacle</td>
<td>24</td>
<td>Top-mount</td>
<td>SMT with 4 Through-hole soldertabs</td>
</tr>
<tr>
<td>105444-0001</td>
<td>Right Angle Cable Plug</td>
<td>22</td>
<td>Straddle-mount</td>
<td>SMT</td>
</tr>
</tbody>
</table>

Cable Assemblies

<table>
<thead>
<tr>
<th>Part No.</th>
<th>Classification</th>
<th>End-to-End Cable Connectors (Cable Length)</th>
<th>Cable Speed</th>
<th>Cable Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>68796-0002</td>
<td>Standard</td>
<td>Type C-to-C USB 2.0 (1m)</td>
<td>480Mbps</td>
<td>Black</td>
</tr>
<tr>
<td>68796-0003</td>
<td>Standard</td>
<td>Type C-to-C USB 3.1 (1m)</td>
<td>5Gbps (Gen 1)</td>
<td>Black</td>
</tr>
<tr>
<td>68796-0004</td>
<td>Standard</td>
<td>Type C-to-C USB 3.1 (0.8m)</td>
<td>10Gbps (Gen 2)</td>
<td>Black</td>
</tr>
<tr>
<td>68796-0001</td>
<td>Legacy</td>
<td>Type C-to-A USB 2.0 (1m)</td>
<td>480Mbps</td>
<td>White</td>
</tr>
<tr>
<td>68798-0005</td>
<td>Legacy</td>
<td>Type C-to-A USB 3.1 (0.6m)</td>
<td>10Gbps (Gen 2)</td>
<td>Black</td>
</tr>
<tr>
<td>68798-0006</td>
<td>Legacy</td>
<td>Type C-to-A USB 2.0 (1m)</td>
<td>480Mbps</td>
<td>Black</td>
</tr>
</tbody>
</table>

www.molex.com/link/usbproducts.html