TE Connectivity
IP68 Micro USB2.0 Connector Overview
IP68 Micro USB2.0 Connector Introduction

TE Connectivity (TE) micro USB connectors are well-known for their reliability, robustness and versatility in meeting different USB applications. To satisfy its customers’ emerging needs, TE has designed the IP68 micro USB2.0 connector, an upgrade to the IP57 connector, to provide stronger protection for today’s smaller and thinner mobile devices against the ingestion of water and solid objects such as dust.
The ingress protection (IP) rating specifies the degree of protection against either solid objects or liquid. The first digit describes the protection against solid objects, while the second digit indicates the protection against liquid. The higher the number, the better the protection. The IP68 connector remains intact at a water depth of 1.5m for a minimum of 30 minutes, which is one of the highest standards of available relevant products in the market.
Key Features

- Dimension H 3.04mm x W 17.8mm (with ears) x D 7.9mm
- Staggered contact provides improved signal separation as well as enhanced mechanical stability.
- The MIM shell provides the lowest height possible with the metal shield and waterproof structure integrated in one piece; it provides a strong structure—a 3D-molded structure.
- Equipped with an undercut matching the plug latches, the connector keeps the plug mated like the normal micro USB connector.
- The metal reinforcement plate prevents damage to the plastic tab containing the contacts inside the connector and helps prevent potential electrical short circuits.
- The circular interface to the main shell allows for easy integration of the connector in a device.
- Screw mounting ears make it easier to integrate and position the connector in the final application.
Key Applications

- Cell phones/smartphones
- Tablets
- MP3 players
- GPS units
- e-Readers
- Home electronic devices
- Digital cameras and camcorders
- Wearable devices
In order to integrate this component in the device, a silicone-compliant seal is required to close off the perimeter of the connector against water ingression.

This seal must be supplied by the OEM. The seal should accommodate some level of tolerance stack-up but it is typically limited.

There are two ways to reduce the tolerance stack-up:

1. Screw the connector and PCB board to the device casing in close proximity to the connector, using the mounting ears on the MIM shell.
2. Mount the connector on an FPC and encapsulate it in the device frame. The fixing does not need a screw.
Pin Assignment

<table>
<thead>
<tr>
<th>Pin assignment</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Vbus</td>
</tr>
<tr>
<td>2</td>
<td>D-</td>
</tr>
<tr>
<td>3</td>
<td>D+</td>
</tr>
<tr>
<td>4</td>
<td>ID</td>
</tr>
<tr>
<td>5</td>
<td>GND</td>
</tr>
</tbody>
</table>

- Pin 1
- Pin 5
- Potting providing IP68 sealing
- TE logo and date code
Dimension

- Height: 3.04
- Width: 17.8
- Depth: 6.5
- Depth: 7.9
- Width: 8.97

Dimensions in millimeters.
Why a MIM shell? Reduced Component Height

Over-molded Shell Design

- Shell over mold must present a tight interface for potting
- Shell thickness + Outer Mold thickness \(\Rightarrow\) Increased Thickness and therefore Overall Height

\[
\text{Height} = 1.88 \text{ (Plug)} \\
0.6 \text{ (Shell Top & Lock Lever Hole Bottom)} \\
0.3 \text{ (Shell Bottom)} \\
0.6 \text{ (Over Mold)} \\
\]

\(= 3.38 \) (Min. requirement Height)

TE’s MIM Shell Design

\[
\text{Height} = 1.88 \text{ (Plug)} \\
0.9 \text{ (Shell Top & Lock Lever Hole Bottom)} \\
0.3 \text{ (Shell Bottom)} \\
\]

\(= 3.08 \) (Min. requirement Height)
Why a MIM shell? High Wrenching Force

Wrenching Forces

Over-molded Shell Design

No soldering area

MIM Shell Design

DIP

Soldering Area

Stamped and formed
Body is composed of separate metal shell and over molding
Design is not resistant against wrenching forces
Separation of shell from over-molding
If Over mold is damaged, shell will also be damaged

MIM Design
Body is one metal component by MIM which is strong in mechanical tests.
In addition, the DIP is also part of the body.
Soldering strength is strong

The MIM shell design provides a full metal shell featuring higher tensile strength and the ability to solder the product at the very bottom. This results in a wrenching strength of >10N which is exceptionally strong compared to a normal micro USB connector (USB spec min. 50N)
Contact TE


Product Enquiry: Stellinga, Egbert estellinga@te.com