45W USB Type-C® Power Delivery 3.0 adapter based on STCH03, SRK1001 and STUSB4761

Features

• USB-IF certified
• USB Type-C® PD 3.0 references:
  – Power Brick EVLSTCH03-45WPD TID: 2071
  – PD Controller STUSB4761 TID: 2070
• Universal AC input range $V_{IN}$:
  – 90 VAC to 264 VAC
• PD output profile:
  – 5 V - 9 V - 12 V - 15 V @ 3 A
  – 20 V @ 2.25 A
• Maximum efficiency at full load:
  – > 90% @ AC input range
• No-load consumption (no cable plug-in):
  – < 30 mW @ 230 VAC
• Energy efficiency meeting all DOE and UE CoC requirements
• Isolated quasi-resonant flyback topology with adaptive synchronous rectification
• Programmable output voltage and current protections
• Safety according to EN60065
• EMI according to EN55022 - Class B
• Compact form factor: 70 x 50 X 26.8 mm
• RoHS compliant

Description

The EVLSTCH03-45WPD 45W USB Type-C® Power Delivery 3.0 adapter is a USB-IF certified solution and reference design. The EVLSTCH03-45WPD is an isolated power supply with a standalone USB PD controller. The evaluation board implements at the primary side a quasi-resonant flyback converter based on the STCH03 controller with optocoupler feedback for voltage regulation. This controller combines a high performance low-voltage PWM controller chip with a 650 V HV start-up cell in the same package. The STCH03 controller drives the gate of the new 650 V MDmesh™ M6 technology Power MOSFET STD7N65M6.

At the secondary side, to increase the system efficiency, the rectification is based on the SRK1001 adaptive synchronous rectification controller. This controller drives the gate of the 100V STRipFET™ F7 technology Power MOSFET STL110N10F7.

Always on the secondary side the CC/CV regulation loop to drive the power regulation stage and the USB Type-C® PD interface are based on the STUSB4761 controller. This controller offers the benefits of a full hardware USB PD stack allowing robust, deterministic and safe negotiation in line with USB PD standard.

The EVLSTCH03-45WPD is protected against destructive electrostatic discharge from the USB Type-C® connector using a Dual Transil array for ESD protection ESDA25L.
The evaluation board implements a robust adapter protected for output overvoltage, output undervoltage, output overpower and output short-circuit. This reference design, based on STMicroelectronics semiconductors, helps designers to develop adapters with a short bill of materials in order to obtain a cost-effective and fast design.
1  Electrical schematic

Figure 1. EVLSTCH03-45W evaluation board schematic
## Revision history

**Table 1. Document revision history**

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<th>Date</th>
<th>Version</th>
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<tr>
<td>9-Dec-2019</td>
<td>2</td>
<td>Compact form factor value updated in Section Features</td>
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