### PRODUCT FEATURES

#### General Description

The SMSC USB2412 hub is a low-power, single transaction translator (STT) hub controller IC with two downstream ports for embedded USB applications. The SMSC hub controller supports low-speed, full-speed, and hi-speed (if operating as a hi-speed hub) downstream devices on all of the enabled downstream ports.

#### Features

- Fully integrated USB termination and pull-up/pull-down resistors
- Supports a single external 3.3 V supply source; internal regulators provide 1.2 V internal core voltage
- On-chip 24 MHz crystal and ceramic resonator driver or external 24 MHz clock input
- ESD protection up to 4 kilovolts on all USB pins
- Supports self-powered operation
- Contains a built-in default configuration; no external configuration options or components are required
- Downstream ports as optional non-removable ports
- Supports compound devices on a port-by-port basis
- 28-pin QFN (5 x 5 mm) lead-free RoHS compliant package
- Supports the commercial temperature range: 0°C to +70°C

#### Highlights

- High performance, low-power, small footprint hub controller IC with two downstream ports
- Fully compliant with the USB 2.0 specification
- 28QFN low pin count package
- Optimized for minimal bill-of-materials and low cost designs

#### Applications

- Automobile/home audio systems
- Cable/DSL modems
- Embedded systems
- Gaming consoles
- HDD enclosures
- IP telephony
- KVM switches
- LCD monitors and TVs
- Multi-function USB peripherals
- Mobile PC docking
- PC motherboards
- PC media drive bay
- Portable hub boxes
- Point-of-Sale (POS) systems
- Printers and scanners
- Server front panels
- Set-top boxes, DVD players, DVR/PVR
- Thin client terminals
Order Number(s):

<table>
<thead>
<tr>
<th>ORDER NUMBERS</th>
<th>PACKAGE TYPE</th>
<th>PACKAGE SIZE</th>
<th>REEL SIZE</th>
</tr>
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<tbody>
<tr>
<td>USB2412-DZK</td>
<td>28-Pin QFN Lead-Free, RoHS Compliant Package (includes tape and reel option)</td>
<td>5 x 5 x 0.5 mm</td>
<td>-</td>
</tr>
<tr>
<td>USB2412-DZK-TR</td>
<td>2-Port USB 2.0 Hi-Speed Hub Controller</td>
<td></td>
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</table>

This product meets the halogen maximum concentration values per IEC61249-2-21
For RoHS compliance and environmental information, please visit www.smc.com/rohs

80 ARKAY DRIVE, HAUPPAUGE, NY 11788 (631) 435-6000 or 1 (800) 443-SEMI

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Block Diagram

Figure 1 USB2412 Block Diagram
Package Outline

Figure 2 USB2412 28-Pin QFN Package Outline (5x5 mm Body, 0.5 Pitch, 3.1 ePad)

Table 1 Package Parameters

<table>
<thead>
<tr>
<th>MIN</th>
<th>NOMINAL</th>
<th>MAX</th>
<th>NOTE</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>0.80</td>
<td>0.85</td>
<td>1.00</td>
<td>Overall Package Height</td>
</tr>
<tr>
<td>A1</td>
<td>0</td>
<td>0.02</td>
<td>0.05</td>
<td>Standoff</td>
</tr>
<tr>
<td>A2</td>
<td>0.60</td>
<td>-</td>
<td>0.80</td>
<td>Mold Cap Thickness</td>
</tr>
<tr>
<td>D/E</td>
<td>4.90</td>
<td>5.00</td>
<td>5.10</td>
<td>X/Y Overall Body Size</td>
</tr>
<tr>
<td>D1/E1</td>
<td>4.55</td>
<td>4.75</td>
<td>4.95</td>
<td>X/Y Mold Cap Size</td>
</tr>
<tr>
<td>D2/E2</td>
<td>3.00</td>
<td>3.10</td>
<td>3.20</td>
<td>X/Y Exposed Pad Size</td>
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<tr>
<td>L</td>
<td>0.30</td>
<td>0.40</td>
<td>0.50</td>
<td>Terminal Length</td>
</tr>
<tr>
<td>b</td>
<td>0.18</td>
<td>0.25</td>
<td>0.30</td>
<td>Terminal Width</td>
</tr>
<tr>
<td>K</td>
<td>0.45</td>
<td>0.55</td>
<td>-</td>
<td>Terminal to ePad Clearance</td>
</tr>
<tr>
<td>e</td>
<td>0.50 BSC</td>
<td></td>
<td>-</td>
<td>Terminal Pitch</td>
</tr>
</tbody>
</table>

Notes:
1. All dimensions are in millimeters.
2. Position tolerance of each terminal and exposed pad is ±0.05 mm at maximum material condition. Instances of dimension “b” apply to plated terminals and is measured between 0.15 and 0.33 mm from the terminal tip.
3. Details of terminal #1 identifier are optional. However, they must be located within the area indicated.
4. Coplanarity zone applies to exposed pad and terminals.
2-Port USB 2.0 Hi-Speed Hub Controller

SMSC USB2412

PRODUCT PREVIEW

FULL RADIUS IS OPTIONAL

LAND PATTERN DIMENSIONS

<table>
<thead>
<tr>
<th>SYMBOL</th>
<th>MIN</th>
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<tr>
<td>GD/GE</td>
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<td>3.10</td>
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<td>X</td>
<td>-</td>
<td>-</td>
<td>0.28</td>
</tr>
<tr>
<td>Y</td>
<td>-</td>
<td>-</td>
<td>0.89</td>
</tr>
<tr>
<td>e</td>
<td></td>
<td>0.50</td>
<td></td>
</tr>
</tbody>
</table>

THE USER MAY MODIFY THE PCB LAND PATTERN DIMENSIONS BASED ON THEIR EXPERIENCE AND/OR PROCESS CAPABILITY

RECOMMENDED PCB LAND PATTERN

Figure 3 Recommended Printed Circuit Board (PCB) Land Pattern