Product Preliminary

VP222

USB Type-C DFP CC Controller with Universal Battery Charging

Mar. 07, 2015

Product Feature

- **Detect the attachment and detachment of Type-C port**

- **Provide Type-C cable orientation identification**

- **Provide the selection of V$_{BUS}$ power capability setting**

- **Provide the control signal for V$_{BUS}$**

- **Provide V$_{CONN}$ application with maximum 1.5W**

- **Integrate V$_{CONN}$ MOSFET power switch**

- **Support Audio Accessory Identification**

- **Support Debug Accessory Identification**

- **Supports Sleep-mode charging for most available Apple devices, BC 1.2 compliant devices and Samsung Devices**

- **Meets Chinese Telecommunication Industrial Standard YD/T 1591-2009**

- **Meets Battery Charging Specification BC 1.2 for DCP and CDP**

- **Automatic SDP/CDP switching for devices**

- **Automatic selection of D+/D- mode for an attached device**

- **1.2-GHz bandwidth USB 2.0 high speed data switch**

- **Thermal and Short-Circuit protection for Vconn**

- **Under-Voltage Lock Out protection**

- **Reverse current blocking for CC1 & CC2**

- **Supports USB Low/Full/High speed devices wake up**

- **Ambient operating temperature: -40 ℃ to 85 ℃**

- **Available in 16-pin QFN package**

- **Lead(Pb)-Free and RoHS compliant**

Applications

- **USB Type-C DFP Ports (Host and Hub)**

- **Notebook/Desktop PCs**

- **USB Type C Backup Battery**

General Description

VIA Lab's VP222 is an USB Type-C DFP CC controller and a universal battery charging controller with an integrated USB 2.0 high-speed data switch. The VP222 provides the electrical measurement to support the following Type-C CC controller features;

 (1) Detect attach of USB Type-C ports

 (2) Resolve cable orientation and twist connections to establish USB data bus routing

 (3) Establish DFP and UFP roles between two attached portsDiscover and configure V_{BUS}: USB Type-C Current mode

 (4) Configure V_{CONN}

 (5) Discover and configure accessory modes

The VP222 also provides the backward compatibility with the electrical protocol handshake on D+/D- to support the following battery charging schemes:

 (1) USB 2.0 Battery Charging Specification 1.2 (BC 1.2)

 (2) Chinese Telecommunication Standard YD/T 1591-2009

 (3) Divider mode, complaint with most of Apple® devices such as iPod®, iPhone® (1A), and iPad® (2.4A)

 (4) DCP 1.2V Mode, compliant with Samsung devices

The PowerModeX pins are used to configure the USB Type-C current modes and the charging modes of USB BC 1.2. These Type-C current modes include Default USB power, 1.5A and 3.0A modes. These charge modes of USB BC 1.2 allow the host device to actively select between Dedicated Charging Port (DCP) for wall adaptor emulation, Charging Downstream Port (CDP) for USB 2.0 data communication with 1.5A support, or Standard Downstream Port (SDP) for regular USB2.0/USB3.0 data communication with 500mA/900mA support. The chip also integrates an auto-detect feature that supports both DCP schemes for USB2.0 Battery Charging Specification (BC 1.2) and the Divider mode and DCP 1.2V mode without the need from outside user interaction.

The wide bandwidth (1.2GHz) data switch features low capacitance and low on resistance, allowing signals to pass with minimum edge and phase distortion. The VP222 supports low/full/high speed HID (human interface device like mouse/keyboard) wake function.

Pin Diagram
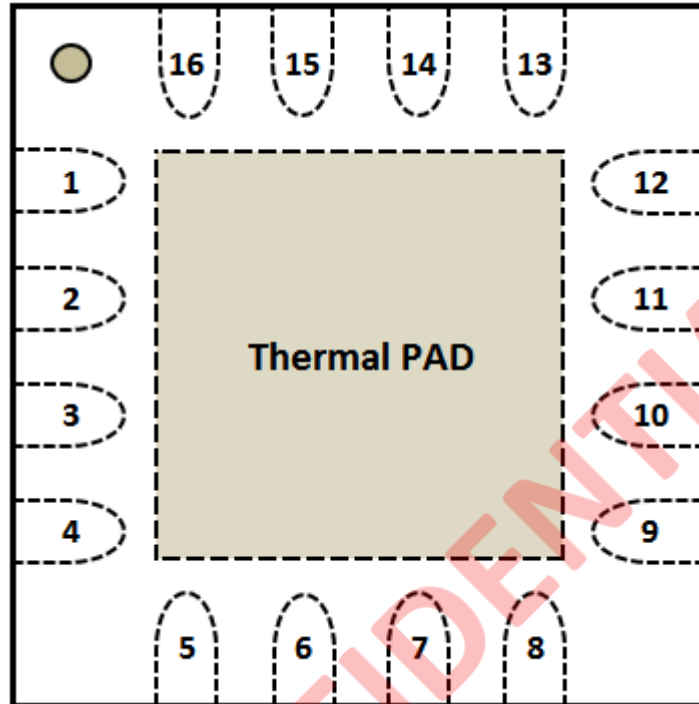
Pin Descriptions

Signal Type Definition

Name	Type	Signal Description
Input	I	Input is a standard input-only signal
Output	O	This is a standard active driver
Input/Output	IO	This is an input/output signal
Open-Drain Output	OD	Output with Open-Drain driver
Power	PWR	A power pin
Ground	GND	A ground pin

Pin Name	Pin #	Type	Description
DM_Out	1	I/O	D- data line to USB host connector
DP_Out	2	I/O	D+ data line to USB host connector
IN	4	PWR	Input voltage and supply voltage
ILIM	3	I	External Resistor referred by Rp.
PMODE1	16	I	
PMODE2	15	I	Logic-level control input for setting the Type-C current mode
PMODE3	14	I	
nFault (for V_{CONN})	13	OD	Active-low open-drain output, asserted during over-temperature or current limit
CC2	9	O	Initially monitor voltage on it and monitor the voltage when UFP is connected.
CC1	10	O	The V_{CONN} will be applied in the other CC pin is connected and the other CC pin detect Ra
DP_IN	11	I/O	D+ data line to downstream connector
DM_IN	12	I/O	D- data line to downstream connector
nDebug	8	OD	Active-low open-drain output, asserted during Debug Accessory Mode
nAudio	7	OD	Active-low open-drain output, asserted during Audio Accessory Mode
Polarity	6	OD	Active-low open-drain output, asserted during negative connection
V_{BUS}_EN	5	O	Logic-level output signal used to control the V_{BUS} Power Switch
PowerPAD		GND	Internally connected to GND; used to heat-sink the part to the circuit board traces, Connect to GND plane

Package Information
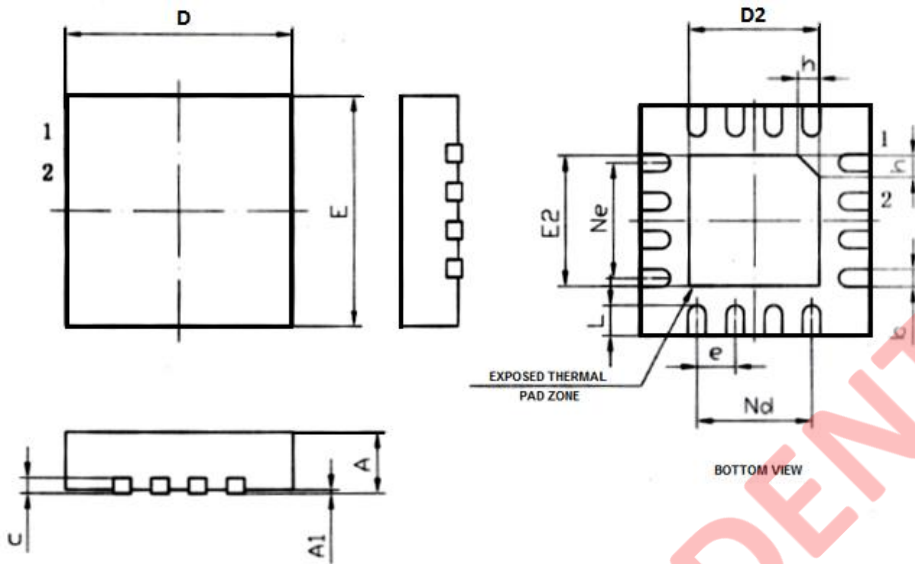
SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	0.70	0.75	0.80
A1	-	0.02	0.05
b	0.18	0.25	0.30
c	0.18	0.20	0.25
D	2.90	3.00	3.10
D2	1.55	1.65	1.75
e	0.50BSC		
Ne	1.50BSC		
Nd	1.50BSC		
E	2.90	3.00	3.10
E2	1.55	1.65	1.75
L	0.35	0.40	0.45
H	0.20	0.25	0.30
L/F 載體尺寸 (mil)	75x75		

VIA Labs, Inc.

www.via-labs.com

7F, 529-1, Zhongzheng Rd.,

Xindian District, New Taipei City 231 Taiwan

Tel: (886-2) 2218-1838

Fax: (886-2) 2218-8924

Email: sales@via-labs.com.tw