



**THE DATASHEET OF
EV5030D-QH-00A**





EV5030D-QH-00A

USB Charging Port Controller with Current Limit Switch, Supporting CDP, DCP Modes

DESCRIPTION

The EV5030D-QH-00A is an evaluation board for MP5030D, which integrates an USB current limit switch and charging port identification circuit. It achieves 3A continuous output current over a wide input supply range.

With MP5030D, it supports Dedicated Charging Port (DCP) and Charging Downstream Port (CDP) schemes for Battery Charging specification (BC1.2), the divider Mode, 1.2V/1.2V Mode without the need for external user interaction.

MP5030D provides linear line drop compensation, load current detection and status indication.

Fault condition protection includes hiccup current limiting, input OVP and thermal shutdown.

MP5030D requires a minimum number of readily standard external components to complete USB switch and charging mode auto detection solution. MP5030D is available in QFN-10(1.5mmx2mm) package.

ELECTRICAL SPECIFICATION

| Parameter | Symbol | Value | Units |
|------------------------|-----------|-------|-------|
| System Input Voltage | V_{IN} | 12 | V |
| Default Output Voltage | V_{OUT} | 5 | V |
| Output Current | I_{OUT} | 3 | A |

FEATURES

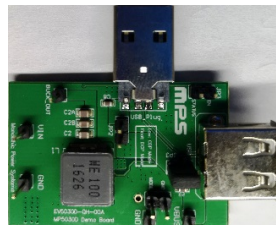
- Load Current Detection and Status Indication
- Up to 14V Operating Input Voltage Range
- Support DCP schemes for BC 1.2, Divider Mode and 1.2V/1.2V Mode
- Support CDP Mode for USB 2.0 Data
- Line Drop Compensation
- Programmable High Accuracy Current Limit
- 32m Ω Low- $R_{DS(ON)}$ Power MOSFET
- Input over Voltage Shutdown Protection
- Thermal Shutdown

APPLICATIONS

- USB Charging Downstream Port (CDP)
- USB Dedicated Charging Ports (DCP)

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS" and "The Future of Analog IC Technology" are registered trademarks of Monolithic Power Systems, Inc.

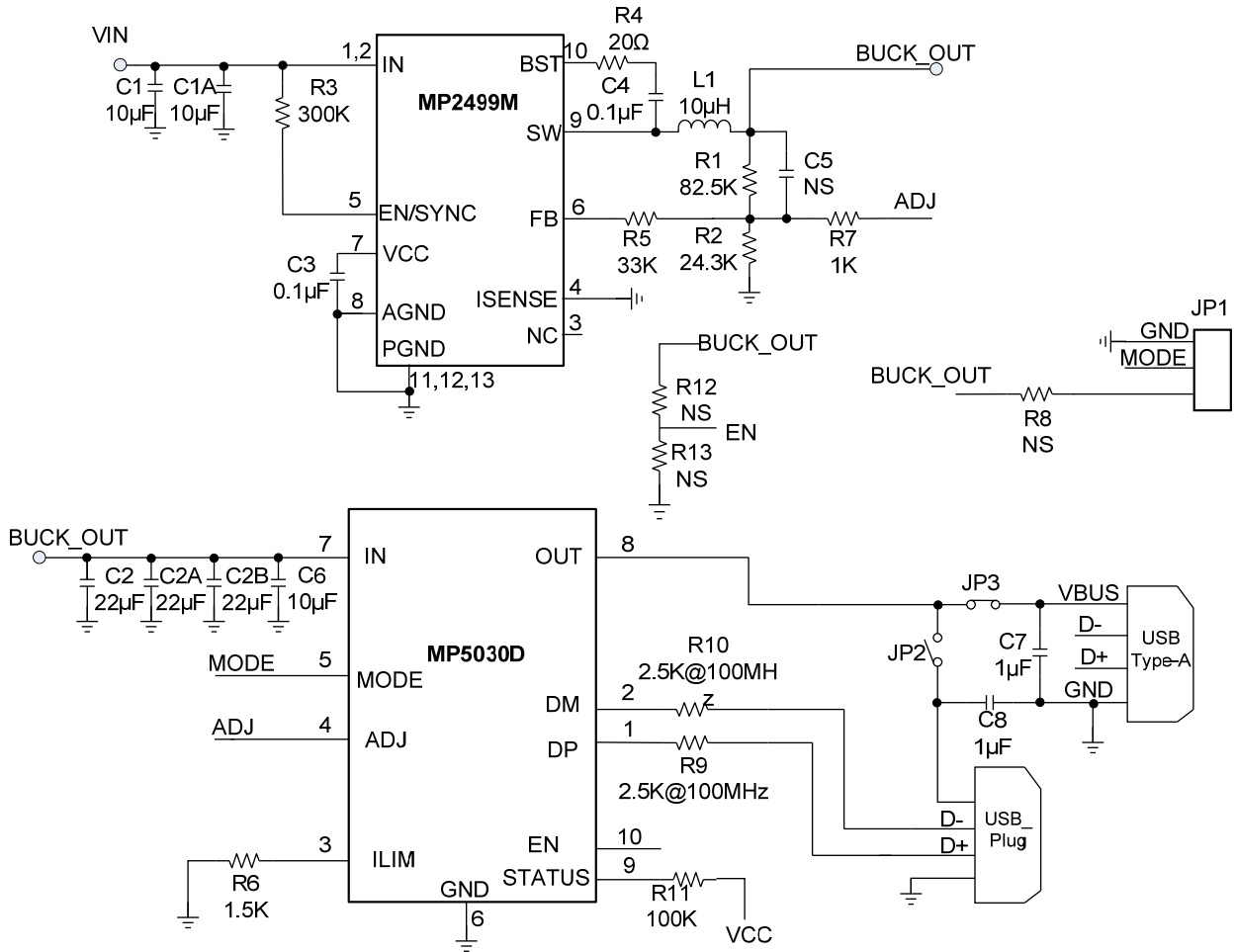
EV5030D-QH-00AEVALUATION BOARD



(L×W)4.38cm× 2.89cm

| Board Number | MPS IC Number |
|----------------|---------------|
| EV5030D-QH-00A | MP5030DGQH |

EVALUATION BOARD SCHEMATIC



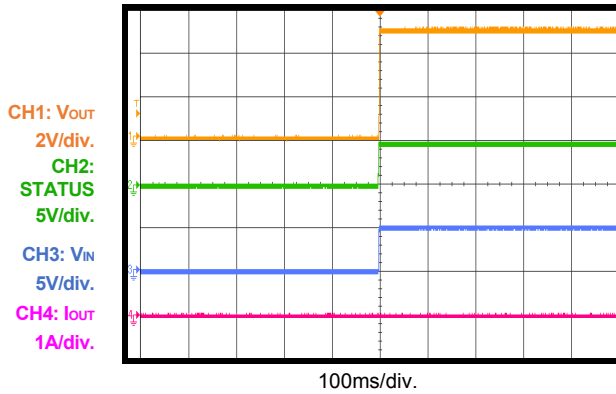
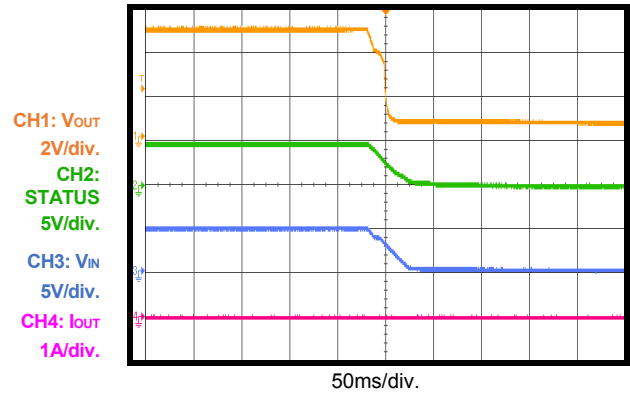
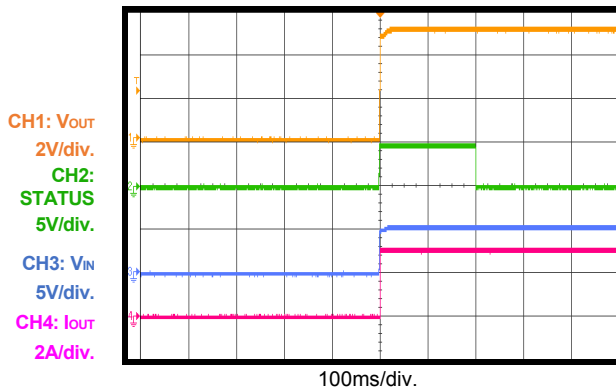
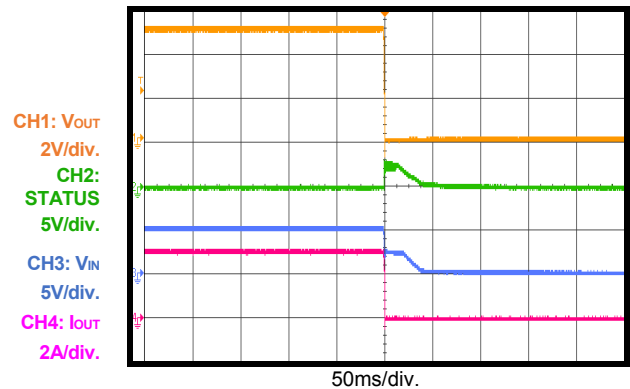
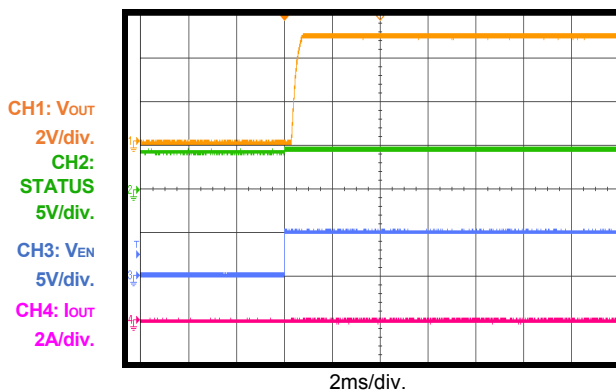
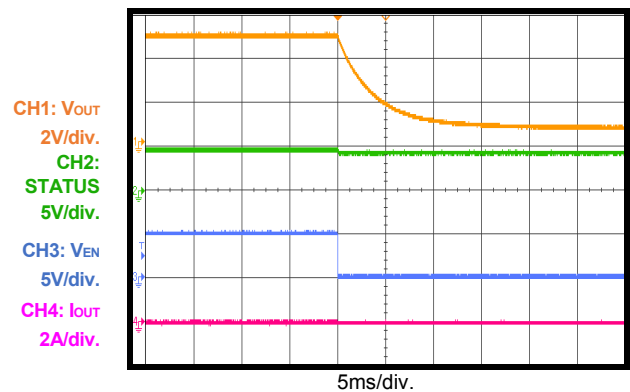
NOTE: In the default settings, MODE pin short to GND for CDP mode.

EV5030D-QH-00A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Part Number |
|-----|------------------|----------------|--|-----------------------------|--------------|--------------------|
| 2 | C1, C1A | 10 μ F | Ceramic Capacitor, 35V, X5R | 0805 | Murata | GRM21BR61E106KA43L |
| 3 | C2, C2A, C2B | 22 μ F | Ceramic Capacitor, 25V, X5R | 0805 | Murata | GRM21BR61E226ME44L |
| 2 | C3, C4 | 0.1 μ F | Ceramic Capacitor, 25V, X7R | 0603 | Murata | GRM188R71E104KA01D |
| 0 | C5, R8, R12, R13 | NS | | | | |
| 1 | C6 | 10 μ F | Ceramic Capacitor, 25V, X5R | 0603 | Murata | GRM21BR61E106MA73L |
| 2 | C7, C8 | 1 μ F | Ceramic Capacitor, 25V, X5R | 0603 | Murata | 885012206076 |
| 1 | R1 | 82.5k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-0782K5L |
| 1 | R2 | 24.3k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-0724K3L |
| 1 | R3 | 300k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-07300KL |
| 1 | R4 | 20 Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-0720RL |
| 1 | R5 | 33k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-0733KL |
| 1 | R6 | 1.5k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-071K5L |
| 1 | R7 | 1k Ω | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-071KL |
| 2 | R11 | 100k | Film Resistor, 1% | 0603 | YAGEO | RC0603FR-07100KL |
| 2 | R9,R10 | 2.5k Ω | Magnetic bead, 2.5k Ω @100MHz | 0603 | Würth | 742792695 |
| 1 | L1 | 10 μ H | Inductor, 12.5A Isat, DCR 30m Ω | SMD | Würth | 74437368100 |
| 1 | USB | TYPE-A | TYPE-A USB Port | DIP | Würth | 61400416021 |
| 1 | USB_Plug | USB | Single USB Plug | SMD | Würth | 629004113921 |
| 1 | U1 | MP2499M | Synchronous Step-Down Converter | QFN-13 (2.5mm \times 3mm) | MPS | MP2499M |
| 1 | U2 | MP5030D | Controller with USB Current Limit SW, supporting CDP, DCP. | QFN-10 (1.5mm \times 2mm) | MPS | MP5030DGQH |

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$V_{IN} = 5V$, $V_{OUT} = 5V$, $R_{ILIM} = 1.5k\Omega$, $T_A = 25^\circ C$, unless otherwise noted. Connect MP5030D Input to MP2499M Output, System_VIN=12V is MP2499M Input Voltage.

Start-Up through Input Voltage
 $I_{OUT}=0A$

Shutdown through Input Voltage
 $I_{OUT}=0A$

Start-Up through Input Voltage
 $I_{OUT}=3A$

Shutdown through Input Voltage
 $I_{OUT}=3A$

EN start-up
 $I_{OUT}=0A$

EN shutdown
 $I_{OUT}=0A$


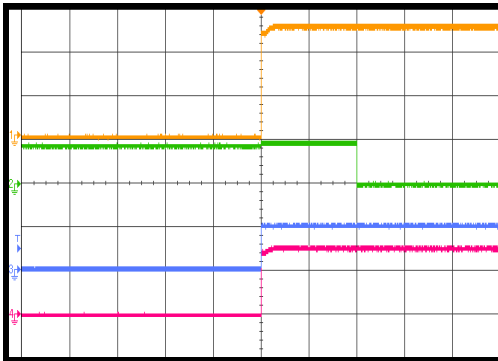
TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$V_{IN} = 5V$, $V_{OUT} = 5V$, $R_{ILIM} = 1.5k\Omega$, $T_A = 25^\circ C$, unless otherwise noted. Connect MP5030D Input to MP2499M Output, System_VIN=12V is MP2499M Input Voltage.

EN start-up

$I_{OUT}=3A$

CH1: V_{OUT}
2V/div.
CH2: STATUS
5V/div.
CH3: V_{EN}
5V/div.
CH4: I_{OUT}
2A/div.

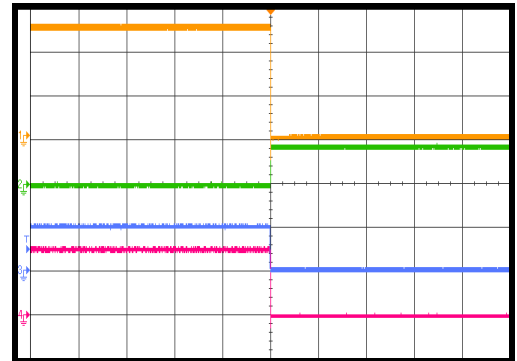


100ms/div.

EN shutdown

$I_{OUT}=3A$

CH1: V_{OUT}
2V/div.
CH2: STATUS
5V/div.
CH3: V_{EN}
5V/div.
CH4: I_{OUT}
2A/div.

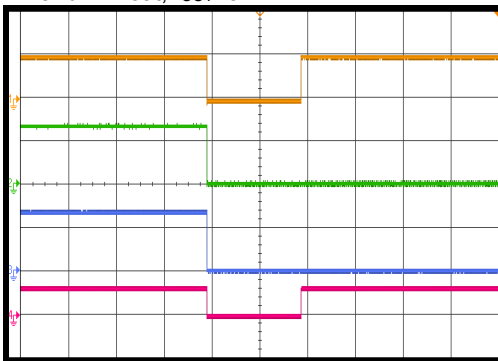


100ms/div.

Mode Pin changes from Float to GND

D+ and D- float, $I_{OUT}=3A$

CH1: V_{OUT}
5V/div.
CH2: V_{D+}
2V/div.
CH3: V_{D-}
2V/div.
CH4: I_{OUT}
5A/div.

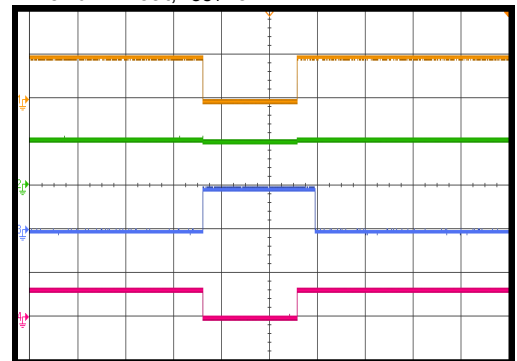


500ms/div.

Mode Pin changes from Float to GND

D+ and D- float, $I_{OUT}=3A$

CH1: V_{OUT}
5V/div.
CH2: V_{IN}
5V/div.
CH3: STATUS
5V/div.
CH4: I_{OUT}
5A/div.

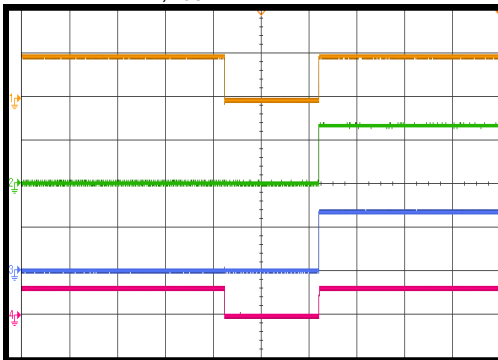


500ms/div.

Mode Pin changes from GND to Float

D+ and D- float, $I_{OUT}=3A$

CH1: V_{OUT}
5V/div.
CH2: V_{D+}
2V/div.
CH3: V_{D-}
2V/div.
CH4: I_{OUT}
5A/div.

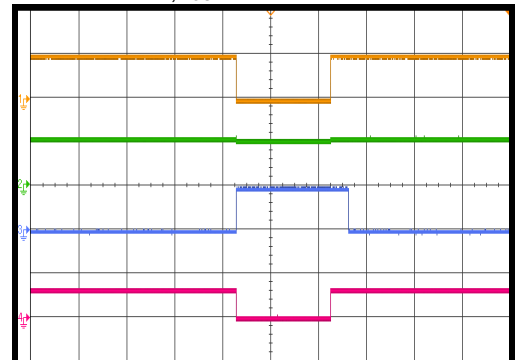


500ms/div.

Mode Pin changes from GND to Float

D+ and D- float, $I_{OUT}=3A$

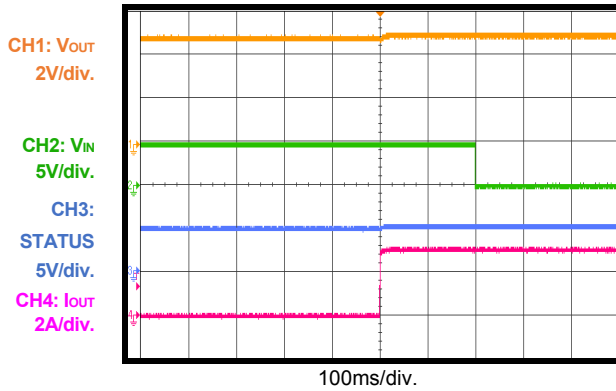
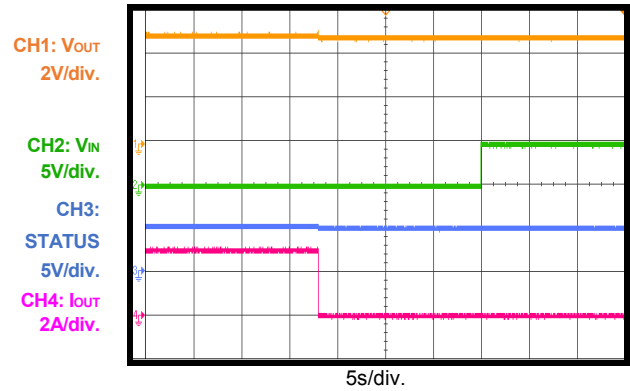
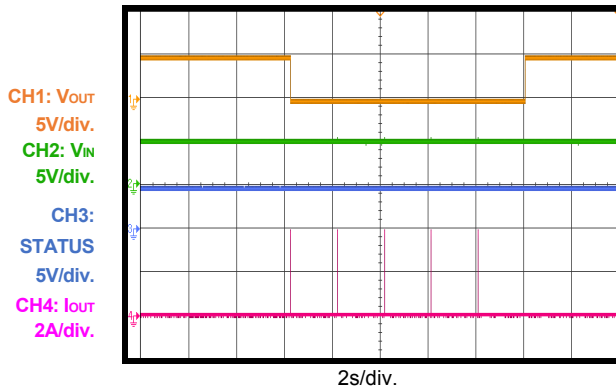
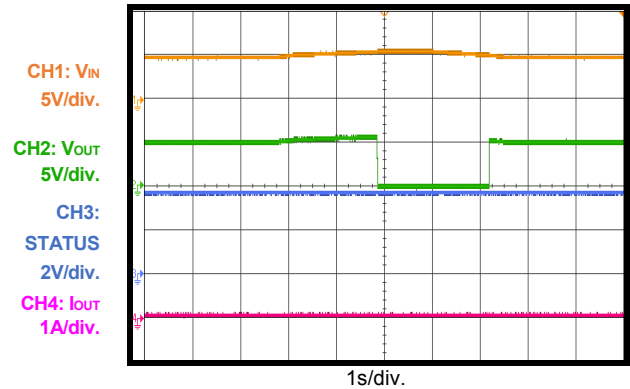
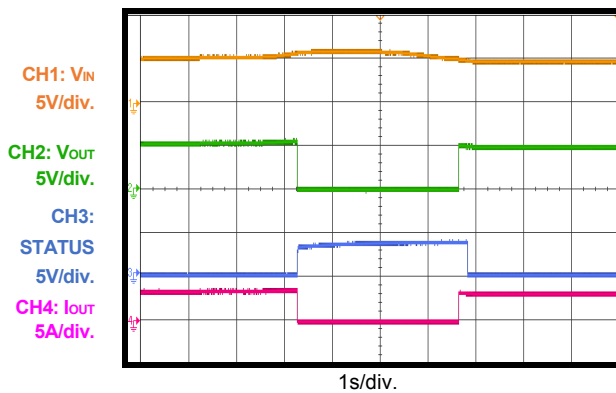
CH1: V_{OUT}
5V/div.
CH2: V_{IN}
5V/div.
CH3: STATUS
5V/div.
CH4: I_{OUT}
5A/div.



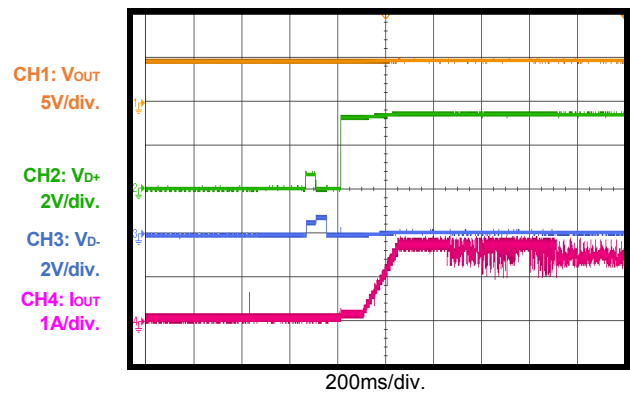
500ms/div.

TYPICAL PERFORMANCE CHARACTERISTICS (continued)

$V_{IN} = 5V$, $V_{OUT} = 5V$, $R_{ILIM} = 1.5k\Omega$, $T_A = 25^\circ C$, unless otherwise noted. Connect MP5030D Input to MP2499M Output, System_VIN=12V is MP2499M Input Voltage.

Status function
 $I_{OUT}=0A$ to 3A

Status function
 $I_{OUT}=3A$ to 0A

Short-Circuit Protection Entry and Recovery

Input Over-Voltage Protection
 $I_{OUT}=0A$

Input Over-Voltage Protection
 $I_{OUT}=3A$

CDP Mode Detection

Mobile Phone Plug In

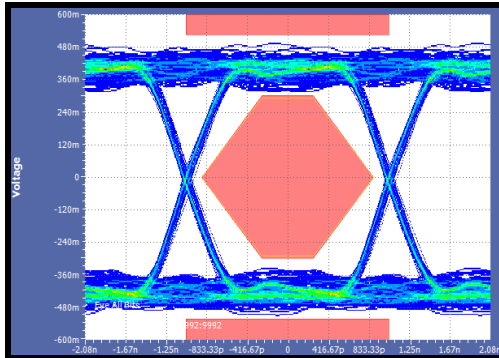


TYPICAL PERFORMANCE CHARACTERISTICS *(continued)*

$V_{IN} = 5V$, $V_{OUT} = 5V$, $R_{LIM} = 1.5k\Omega$, $T_A = 25^\circ C$, unless otherwise noted. Connect MP5030D Input to MP2499M Output, System_VIN=12V is MP2499M Input Voltage.

Eye Pattern Test

Recommended CDP Mode Setup



QUICK START GUIDE

1. Preset Power Supply to 12V.
2. Turn Power Supply off.
3. Connect Power Supply terminals to:
 - a. Positive (+): VIN
 - b. Negative (-): GND
4. EN pin for MP5030D: pull high or float enables the IC; pull low to disable the IC. EN is float in the demo board. STATUS pin for MP5030D is open drain output.
5. For default CDP mode, JP2 should open, MODE pin short to GND by JP1, USB_plug connect to USB host. Turn power supply on after making connections, the board will automatically start up. Connect different mobile phones to Type-A USB port for CDP mode test.
6. For DCP mode, JP2 should open, MODE pin should be float, R9 and R10 should be replaced by 0Ω resistor. Do not use USB_Plug port.

NOTICE: The information in this document is subject to change without notice. Please contact MPS for current specifications. Users should warrant and guarantee that third party Intellectual Property rights are not infringed upon when integrating MPS products into any application. MPS will not assume any legal responsibility for any said applications.

Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

- ⊖ [View EV5030D-QH-00A on WIN SOURCE](#)
- ⊖ [Monolithic Power Systems Inc. Information](#)

Optimize Your Supply Chain with WIN SOURCE Solutions

- ✓ Global Sourcing Solution
- ✓ Obsolete Management
- ✓ Cost Control Management
- ✓ Shortage Management
- ✓ Alternative Solution
- ✓ Excess Inventory Management