



MP5038

USB PD Source Controller With 7 Programmable PDOs and Load Shedding

PRELIMINARY SPECIFICATIONS SUBJECT TO CHANGE

DESCRIPTION

The MP5038 is a USB power delivery controller compatible with Type-C 2.1 and USB PD3.0 specifications. It targets DFP (provider) applications, such as charging-only USB PD ports and USB hubs.

The device is backward compatible, supporting DCP schemes for Quick Charge 3.0, battery charging specifications (BC1.2), Apple divider mode, Huawei FCP, and 1.2V/1.2V mode without outside user interaction. It also supports BC1.2 CDP handshaking. The I²C interface and GPIO pins provide good communication with an external power converter.

The MP5038 supports up to 100W PD power and PPS as well. It can flexibly configure the PDO list, select slave devices, configure charging protocols, and set the protection mode.

Two NTC pins can be used to monitor for abnormal temperature rise, such as on the Type-C receptacle and PCB board. Power sharing functionality supports smart power budget management between two USB PD ports. PDO capability is reduced when the car battery or input voltage is low. High-voltage I/O pins support short to battery and short to VBUS protection.

The MP5038 is available in a QFN-20 (4mmx4mm) package with wettable flanks.

FEATURES

- Supports 3.3V to 21V Bus Voltage Range
- 4.6V to 5.5V VCC Supply Voltage Range
- Support Up to 7 Programmable PDO
- Integrated Physical Layer for BMC
- Integrated Protocol Layer
- Integrated Policy Engine
- Low Standby I_Q: 100μA
- Supports One Type-C DFP Port with USB PD3.0 and PPS
- Supports DCP Schemes for BC1.2, 3A Divider, and 1.2V/1.2V Mode
- Supports QC3.0, Huawei FCP
- VBUS Isolation N-Channel MOSFET Driver
- EN Off Timer Up to 120 Minutes
- I²C Master/Slave Interface and Interrupt
- Programmable PDP Management when NTC, Power Share or Input/Battery Low Trips
- Support Programmable Input/Battery Low Detection Threshold and Blank Time
- High-Voltage Pins for CC1, CC2, DP, and DM
- Integrated High-Voltage V_{CONN} Supply Power Switch
- Available in a QFN-20 (4mmx4mm) Package with Wettable Flanks

APPLICATIONS

- USB Power Delivery (Provider) Charging Ports
- USB PD Hubs

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The schematic diagram illustrates the internal components and connections of the MP5038 module. A DC/DC converter is powered by V_{BATT} through resistor $R1$ and provides VCC to the MP5038 IC. The MP5038 IC has pins for $VBUS_P$, $VBUS_N$, VDD , GND , $GPIO7$, $GPIO1$, SCL , SDA , and $I2C_MODE$. It also features a $VDRV$ pin and a DM pin. The USB-C connector provides $VBUS$, GND , and data lines (DM , DP , $CC1$, $CC2$). A thermistor (R_{NTC}) is connected to $VBUS$ and GND through resistor $R2$. Capacitors $C1$, $C2$, and $C3$ are used for decoupling. Resistors $R3$, $R4$, and $R5$ are used for various functions, including pull-up and current sensing.

MP5038 Rev. 0.8
4/19/2024
Preliminary Specifications Subject to Change

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ORDERING INFORMATION

Part Number*	Package	Top Marking	MSL Rating
MP5038GRE-xxxx **	QFN-20 (4mmx4mm)	See Below	1
MP5038GRE-00A1	QFN-20 (4mmx4mm)	See Below	1
EVKT-MP5038	-	-	-

* For Tape & Reel, add suffix -Z (e.g. MP5038GRE-xxxx-Z).

** “xxxx” is the configuration code identifier for the register setting stored in the OTP. Each “x” can be a hexadecimal value between 0 and F. MP5038GRE-00A1 is default code for 100W application, working with MP4248. It's standard code, which cannot be programmed by users.

TOP MARKING

MP5YWW
MP5038
 LLLLLL
 E

MPS: MPS prefix
 Y: Year code
 WW: Week code
 MP5038: Part number
 LLLLLL: Lot number
 E: Wettable lead flank

EVALUATION KIT EVKT-MP5038

EVKT-MP5038 kit contents (items listed below can be ordered separately):

#	Part Number	Item	Quantity
1	EVL5038-4248-RE-00A	MP5038 + MP4248 evaluation board.	1
2	EVKT-USBI2C-02 bag	Includes USB to I ² C communication interface, one USB cable, and one ribbon cable.	1

Order directly from MonolithicPower.com or our distributors.

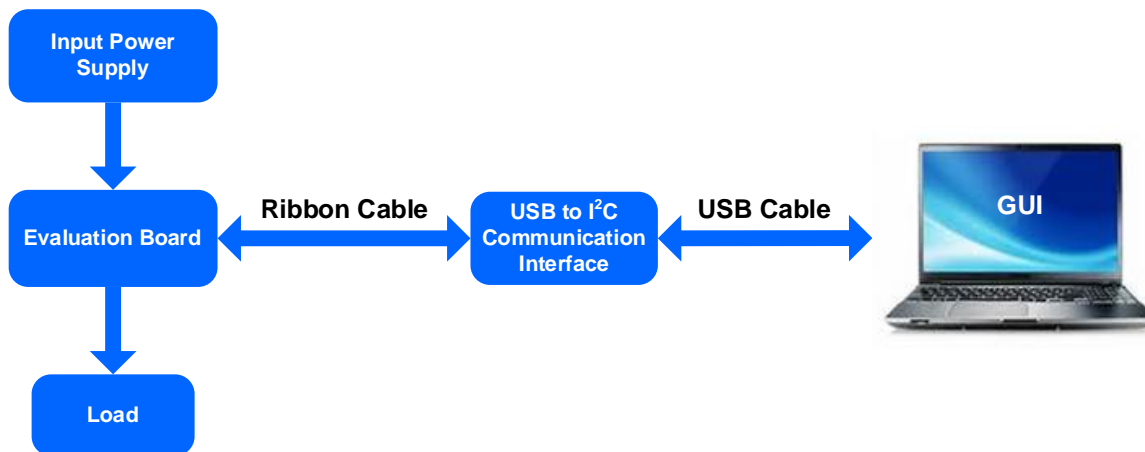


Figure 1: EVKT-MP5038 Evaluation Kit Set-Up

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