EV2615B-Q-00A

18V, 2A, 4.03V or 3.93V V_{BATT}, Single-Cell, Lithium-Ion Battery Charger Evaluation Board

DESCRIPTION

The EV2615B-Q-00A is an evaluation board designed to demonstrate the capabilities of the MP2615B, a monolithic switching charger with integrated power MOSFETs designed for single-cell lithium-ion or lithium-polymer batteries. It can achieve up to 2A of charge current across a 4.5V to 18V input voltage range. The charge current can be configured via an accurate current-sense resistor.

The MP2615B regulates the charge current (I_{CHG}) and battery voltage (V_{BATT}) with two control loops to enable high-accuracy constant current (CC) and constant voltage (CV) charging.

Constant-off-time (COT) control can achieve 99% duty cycle once V_{BATT} reaches the input voltage (V_{IN}) to maintain a high I_{CHG}.

The battery temperature and charging status are monitored. Two status-monitoring output pins (ACOK and CHGOK) are provided to indicate the battery charge status and input power status. The MP2615B also features internal reverse blocking protection.

The MP2615B is available in a QFN-16 (3mmx3mm) package.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	4.5 to 18	V
Battery voltage	V_{BATT}	4.03 or 3.93	V
Charge current	I_{CHG}	2	A

FEATURES

- 4.5V to 18V Operating Input Voltage
- Up to 99% Duty Cycle
- Up to 2A Configurable Charge Current (I_{CHG})
- Up to 4.03V or 3.93V Battery Voltage (V_{BATT})
- ±0.75% V_{BATT} Accuracy
- Fully Integrated Power MOSFETs
- Internal Loop Compensation
- Does Not Require an External Reverse-Blocking Diode
- Preconditioning for Depleted Batteries
- Charge Indication
- Configurable Safety Timer
- Thermal Shutdown
- Cycle-by-Cycle Over-Current Protection (OCP)
- Battery Temperature Monitoring and Battery Temperature Protection

APPLICATIONS

- Smartphones
- Portable Handheld Solutions
- Portable Media Players

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”, the MPS logo, and “Simple, Easy Solutions” are trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

EV2615B-Q-00A EVALUATION BOARD



LxWxH (6.3cmx6.3cmx0.16cm)

Board Number	MPS IC Number
EV2615B-Q-00A	MP2615BGQ

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

QUICK START GUIDE

The EV2615B-Q-00A board layout accommodates most commonly used capacitors.

1. Float the CELL pin or connect CELL to GND via JP1. Do not connect CELL to a high logic voltage.
2. JP2 sets the SEL pin logic, which can regulate the terminal battery voltage (V_{BATT}). Pull SEL high to set the terminal V_{BATT} to 3.93V; float SEL or pull SEL low to set it to 4.03V. Table 1 shows the terminal V_{BATT} specifications set via SEL.

Table 1: Terminal V_{BATT} for Each SEL State

SEL State	Terminal V_{BATT}
High	3.93V
Low or floating	4.03V

3. JP3 sets the EN pin logic, which can shut down the battery charger while an input voltage (V_{IN}) is present. Float EN or connect EN to GND to turn the charger on; pull EN up to VCC via JP3 to turn it off.
4. The sense resistor (RS1) sets the constant charge (CC) current (I_{CC}). I_{CC} can be calculated with Equation (1):

$$I_{CC}\ (A) = 100(mV) / RS1(m\Omega) \quad (1)$$

   For example, if RS1 is 50mΩ, then I_{CC} is 2A.

5. The trickle charge current (I_{TC}) can be calculated with Equation (2):

$$I_{TC} = 10\% \times I_{CC} = 10(mV) / RS1(m\Omega) \quad (2)$$

Note:

1) For more information, refer to the MP2615B datasheet.

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

EVALUATION BOARD SCHEMATIC

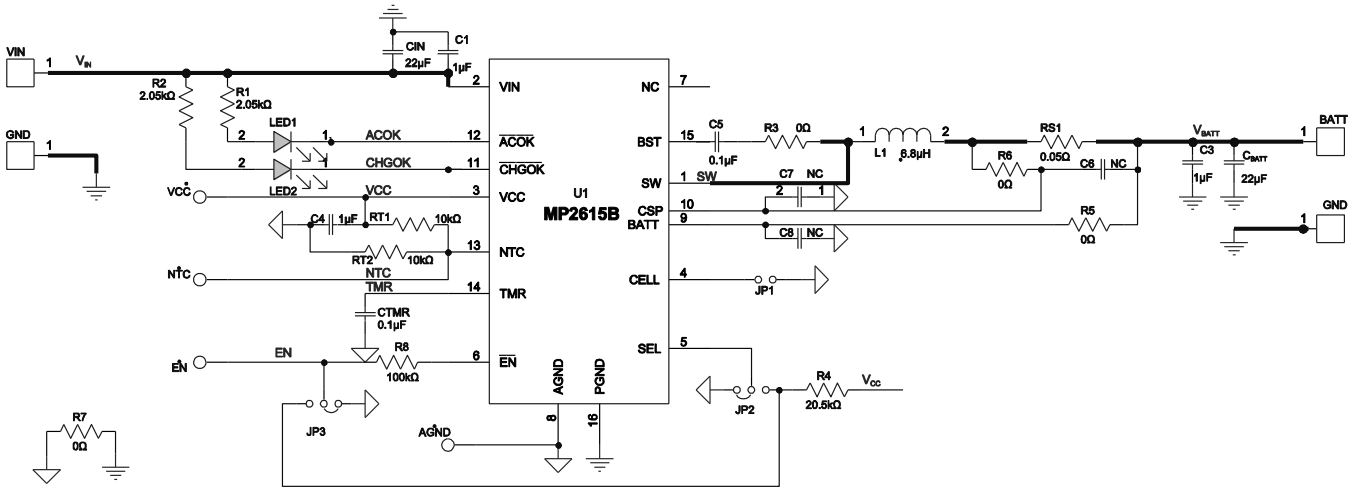


Figure 1: Evaluation Board Schematic

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

EV2615B-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
4	C1, C3, C4, CTMR	1μF	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E105KA12D
3	C6, C7, C8	NC				
1	C5	0.1μF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C104KA01D
2	RT1, RT2	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
2	R1, R2	2.05kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-072K05L
1	R4	20.5kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0720K5L
4	R3, R5, R6, R7	0Ω	Film resistor, 5%	0603	Yageo	RC0603JR-070RL
1	R8	100kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	LED2	Red	Red LED	0805	Bright LED	BL-HUF35A-TRB
1	LED1	Green	Green LED	0805	Bright LED	BL-HGB35A-TRB
2	CBATT, CIN	22μF	Ceramic capacitor, 25V, X5R	1206	Murata	GRM31CR61E226KE15
1	RS1	0.05Ω	Film resistor, 1%, 1/4W	1206	Yageo	RL1206FR-070R05L
1	L1	6.2μH	Inductor, 24mΩ, 4.3A	SMD	Wurth	7440660062
2	BATT, VIN	2mm	Connector	DIP	Any	
3	JP1, JP2, JP3	2.54mm	Connector	DIP	Any	
1	U1	MP2615B	Single-cell, lithium-ion battery charger, 18V, 2A	QFN-16 (3mmx 3mm)	MPS	MP2615BGQ

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

PCB LAYOUT

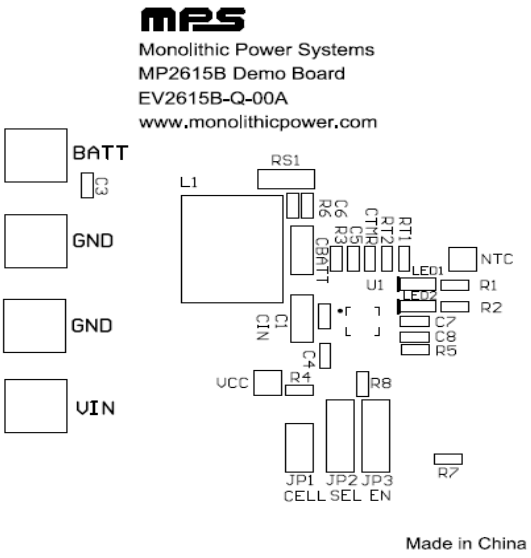


Figure 2: Top Silk

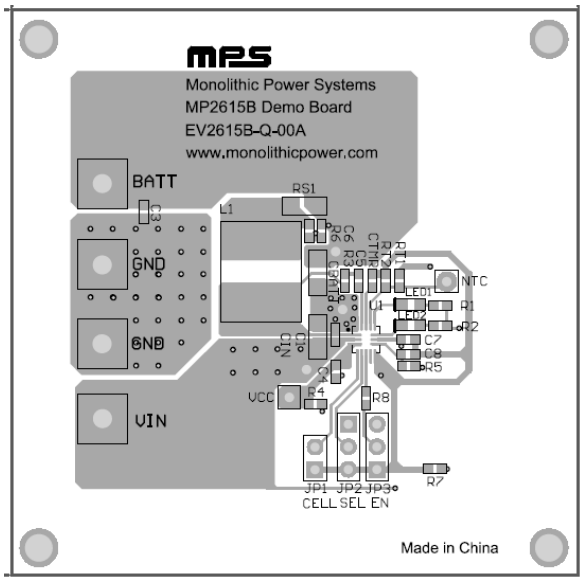


Figure 3: Top Layer

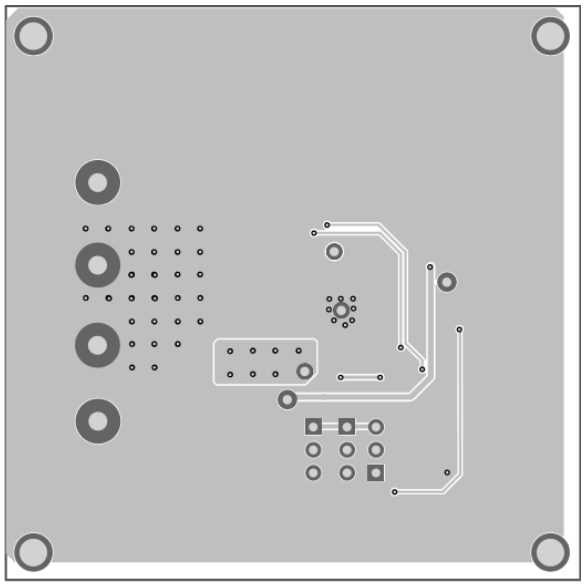


Figure 4: Bottom Layer

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	07/01/2021	Initial Release	-
1.1	7/7/2023	Updated 3.99V to 3.93V in header	All
		Updated “4.75V” to “4.5V” in the Description section; updated “4.75” to “4.5” and “3.99” to “3.93” in the Electrical Specifications section; updated “4.75V” to “4.5V” and “3.99V” to “3.93V” in the Features section	1
		Updated “3.99” to “3.93” in the Quick Start Guide section and Table 1	3

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.

MPS Proprietary Information. Patent Protected. Unauthorized Photocopy and Duplication Prohibited.
© 2023 MPS. All Rights Reserved.