

DESCRIPTION

The EV2623-R-00A is an evaluation board for the MP2623, a high performance 1-2 cell LiFePO₄ battery switching charger with the built-in internal power MOSFET.

EV2623-R-00A achieves up to 2A charge current over a wide input supply range. The charge current can be programmed by sensing the current through an accurate sense resistor.

MP2623 regulates the charge current and full charge voltage using two control loops to realize high accuracy CC charge and CV charge.

Fault condition protection includes time out control, battery full terminated control, thermal protection, battery temperature monitoring and protection. The board also indicates AC adapter power good and charge status indications to the system.

ELECTRICAL SPECIFICATION

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	5-24	V
Charge Current	I _{CHG}	2	A

FEATURES

- Charge 1-, 2- Series LiFePO₄ Cell
- Wide Operating Input Range
- Up to 2A Programmable Charging Current
- ±0.75% V_{BATT} Accuracy
- Up to 90% Efficiency
- Fixed 1.1MHz Frequency
- Preconditioning for fully depleted batteries
- Charging Operation Indicator
- Input Supply and battery fault indicator
- Thermal Shutdown
- Battery Temperature Monitor and Protection

APPLICATIONS

- Power Tools and Portable Equipment
- Handheld Terminals
- LiFePO₄ Battery Chargers

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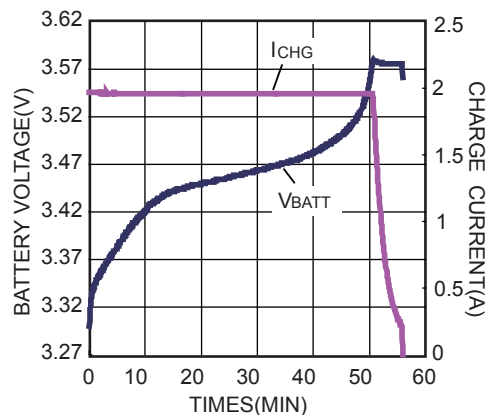
EV2623-R-00A EVALUATION BOARD

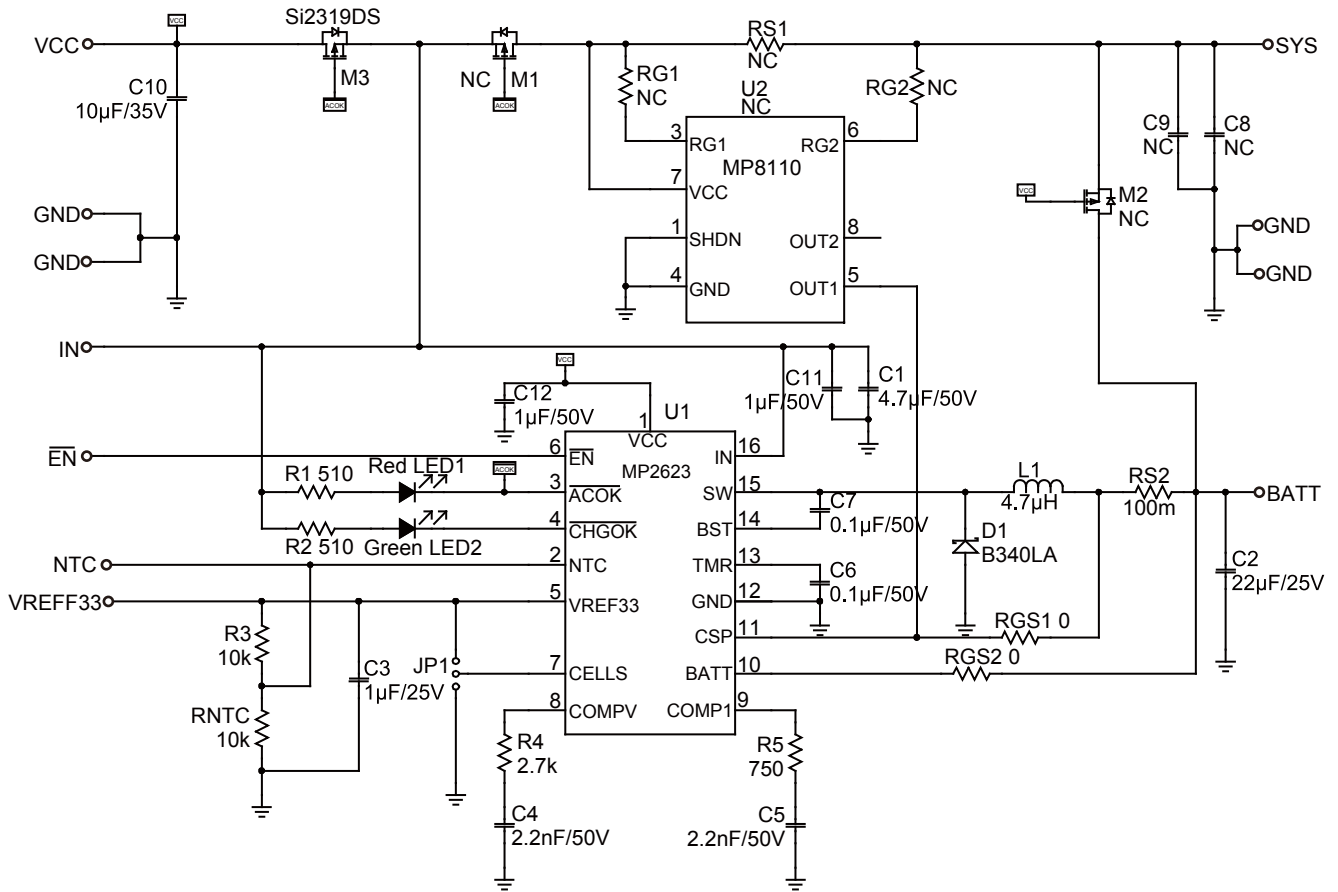


(L x W x H) 2.5" x 2.5" x 0.5"
(6.35cm x 6.35cm x 1.2cm)

Board Number	MPS IC Number
EV2623-R-00A	MP2623GR

1 Cell Battery Charge Curve



EVALUATION BOARD SCHEMATIC


EV2623-R-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	4.7μF	Ceramic Cap., 50V, X7R	1210	Murata	GRM32ER71H475KA88L
1	C2	22μF	Ceramic Cap., 25V, X5R	1210	Murata	GRM32ER61E226KE15L
1	C3	1μF	Ceramic Cap., 25V, X5R	0603	TDK	C1608X5R1E105K
2	C4, C5	2.2nF	Ceramic Cap., 50V, X7R	0603	TDK	C1608X7R1H222K
2	C6, C7	0.1μF	Ceramic Cap., 50V, X7R	0603	Murata	GRM188R71H104KA93D
1	C10	10μF	Ceramic Cap., 35V, X7R	1210	Murata	GRM32ER7YA106KA12L
2	C11, C12	1μF	Ceramic Cap., 50V, X7R	0805	Murata	GRM21BR71H105KA12L
2	R1, R2	510Ω	Film Res., 5%	0805	LIZ	0805J510R
1	R3	10kΩ	Film Res., 1%	0603	Royalohm	0603F1002T5E
1	R4	2.7kΩ	Film Res., 5%	0603	LIZ	CR0603JA0272K
1	R5	750Ω	Film Res., 1%	0603	Yageo	RC0603FR-07750RL
2	RGS1, RGS2	0Ω	Film Res., 5%	0603	Yageo	RC0603JR-070RL
1	RS2	100mΩ	Film Res., 1%	2512	CYNTEC	RL-3624-9-R100-FN
1	RNTC	10kΩ	Film Res., 1%	0603	Royalohm	0603F1002T5E
1	JP1		3-Pin Connector Header, 0.100"		Sullins	PTC03SAAN
1	LED1	Green	Led Green, Surface Mount	0805		
1	LED2	Red	Led Red, Surface Mount	0805		
1	D1		Diode Schottky, 40V, 3A	SMA	Diodes Inc	B340LA-13F
1	L1	4.7μH	Inductor, 3.8A, 38mΩ	SMD	Toko	DS84LC-B1015AS-4R7N
			Inductor, 5.2A, 18mΩ	SMD	muRata	LQH88PN4R7N38
			Inductor, 6.5A, 17mΩ	SMD	Würth	74431490
1	M1,	40V/2.4A	PMOS, 130mΩ	SOT23	Vishay	Si2319DS
1	U1		Switching Charger	QFN16	MPS	MP2623GR
1	U2	NC				
1	RS1	NC				
2	RG1, RG2	NC				
2	C8, C9	NC				
2	M2, M3	NC				

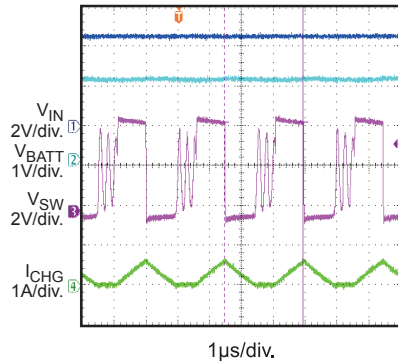
EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

$V_{IN}=5V$, $C1=4.7\mu F$, $C2=22\mu F$, $L=4.7\mu H$, $RS1=100m\Omega$, Real/Simulation Battery Load, $T_A=25^\circ C$, unless otherwise noted.

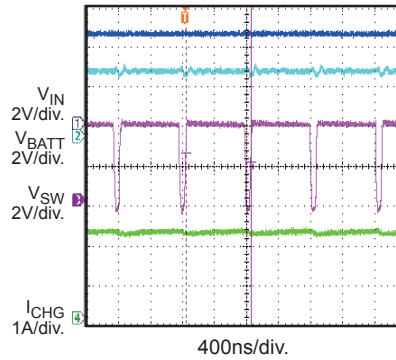
Steady State Waveform

1 Cell, $V_{BATT}=2V$



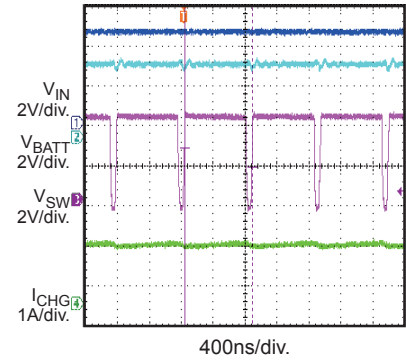
Steady State Waveform

1 Cell, $V_{BATT}=3.2V$



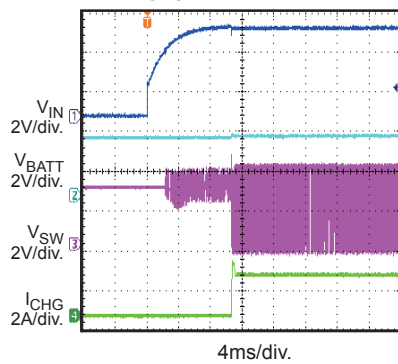
Steady State Waveform

1 Cell, $V_{BATT}=3.6V$



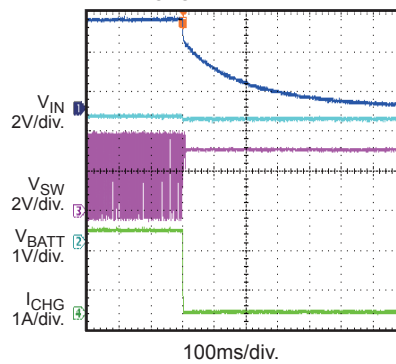
Power On Waveform

1 Cell, $I_{CHG}=2A$, $V_{BATT}=3V$



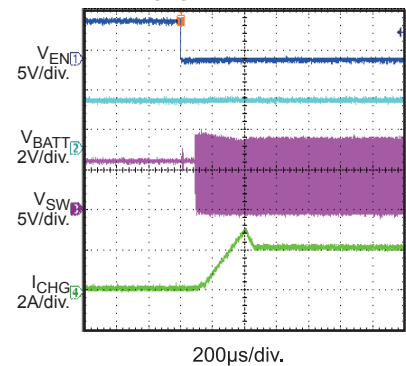
Power Off Waveform

1 Cell, $I_{CHG}=2A$, $V_{BATT}=3V$



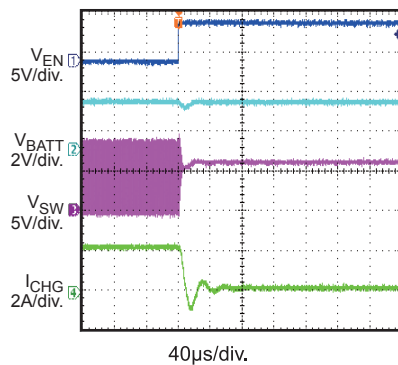
EN On Waveform

1 Cell, $I_{CHG}=2A$, $V_{BATT}=3V$



EN Off Waveform

1 Cell, $I_{CHG}=2A$, $V_{BATT}=3V$



PRINTED CIRCUIT BOARD LAYOUT

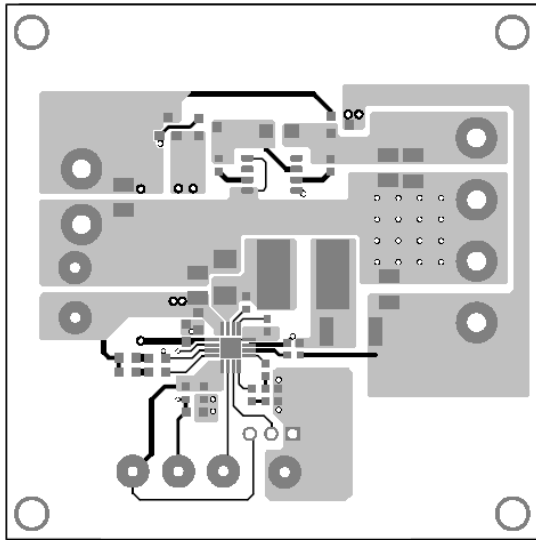


Figure 1—Top Layer

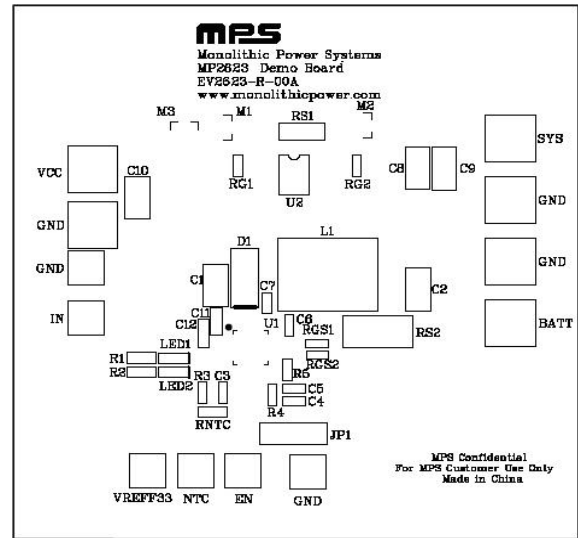


Figure 2—Top Silk Layer

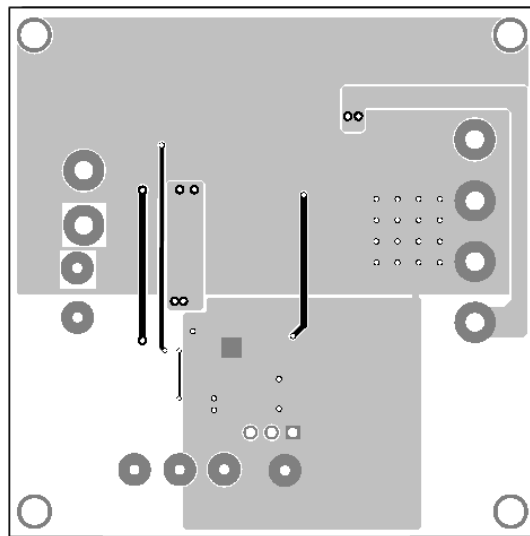


Figure 3—Bottom Layer

QUICK START GUIDE

This board is used for the MP2623 application of standalone switching charger which can charge 1- or 2-cell LiFePO₄ batteries. The board layout accommodates most commonly used capacitors.

The default output voltage on this board is preset to 3.6V for 1-cell LiFePO₄ battery. Connect CELLS pin to VREF33 to regulate the output to 7.2V for 2-cell LiFePO₄ battery.

The two LEDs are operating status indicators. When the input is OK for charging the battery load, LED1 will be on. Otherwise it is off. When the charging operation is normal, the LED2 is on. And if any event including battery full, NTC fault, timer out, thermal protection and EN disabled occurs, LED2 will be off.

Particularly, LED2 will be twinkling if BATT is floated.

1. Charge current setting:

The charge current can be programmed by the sense resistor RS2, the formula is as:

$$I_{\text{CHG}}(\text{A}) = \frac{200\text{mV}}{\text{RS2}(\text{m}\Omega)}$$

2. Preset the power supply output to 5V, and then turn off. Attach the positive and negative ends of the power supply output to the VIN and GND pins, respectively.
3. Attach the positive and negative ends of the battery to the BATT and GND pins, respectively.
4. Turn the power supply on. The board will automatically startup if EN is pulled to GND.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 1.8V to turn off the charger, drive EN less then 0.4V to turn it on.

Please see the datasheet of MP2623 for further detailed information.

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