EV2720A-RH-00A

I²C-Controlled, 1-Cell, 2.2A Buck Charger with 15mA Termination Current Evaluation Board

DESCRIPTION

The EV2720A-RH-00A evaluation board is designed to demonstrate the capabilities of the MP2720A, a highly integrated, 2.2A, switch-mode battery management device for a single-cell Li-ion or Li-polymer battery, with a termination current as low as 15mA. The narrow-voltage DC (NVDC) power management structure provides a low-impedance power path that optimizes charging efficiency, reduces battery charging time, and extends battery life during discharging.

USB Battery Charging Specification 1.2 (BC1.2) and non-standard adapter detection are supported by the input source type identification algorithm.

The I²C interface provides complete operating control, charging parameter configurations, and status/interrupt monitoring.

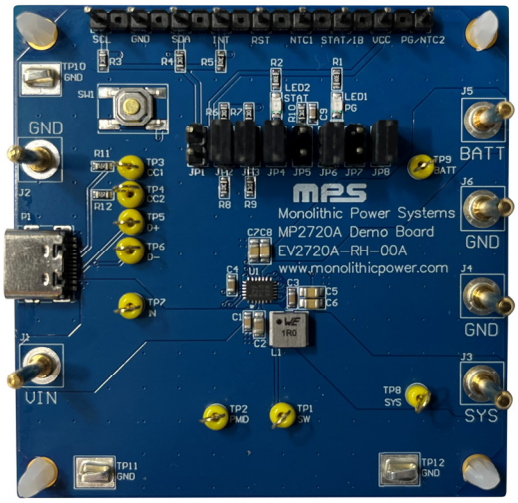
The MP2720A supports a fully customizable JEITA profile with configurable temperature windows and actions.

The EV2720A-RH-00A supports an operating voltage up to 6.3V. It also supports boost mode and USB On-The-Go (OTG) operation by supplying a voltage between 5V and 5.35V at the IN pin.

PERFORMANCE SUMMARY

Parameters	Conditions	Value
Input voltage (V_{IN}) supply		4V to 6.3V
Battery voltage (V_{BATT})		0V to 4.6V
Charge current (I_{CC})		0A to 2.2A
Input current (I_{IN})		0A to 3.2A
Boost output current (I_{BOOST_OUT})		0A to 3A

EV2720A-RH-00A EVALUATION BOARD



LxWxH (6.3cmx6.3cmx1.3cm)

Board Number	MPS IC Number
EV2720A-RH-00A	MP2720AGRH

QUICK START GUIDE

The EV2720A-RH-00A evaluation board is designed for the MP2720A. The layout of the EV2720A-RH-00A accommodates most commonly used capacitors. The default function of this board is preset for charger mode, and the charge-full voltage is preset to 4.2V for a single-cell Li-ion battery.

Table 1 shows the EV2720A-RH-00A's input/output connections.

Table 1: Input/Output Connections

Connectors	Description
J1/VIN	Positive input source terminal.
J2/GND	Negative input source terminal.
J3/SYS	Positive system load terminal.
J4/GND	Negative system load terminal.
J5/BATT	Positive battery pack terminal.
J6/GND	Negative battery pack terminal.
P1	USB Type-C connector.
SCL/SDA/GND	I²C connector.

Table 2 shows the jumper set-ups for the EV2720A-RH-00A.

Table 2: Jumper Installations

Jumper	Description	Default
JP1	I²C pulled up to VCC.	Off
JP2	NTC1 on-board resistor divider.	On
JP3	NTC2 on-board resistor divider	On
JP4	LED indication for STAT/IB.	On
JP5	IB resistor for STAT/IB. Do not install JP4 and JP5 simultaneously.	Off
JP6	LED indication for PG/NTC2.	On
JP7	NTC2 connection to PG/NTC2. Do not install JP6 and JP7 simultaneously.	Off
JP8	BATTSNS connection to BATT.	On

Evaluation Platform Preparation

1. Properly install the MP2720A evaluation software on the computer.
2. Prepare the USB to I²C communication interface (EVKT-USBI2C-02) (see Figure 1).

Figure 1: USB to I²C Communication Interface

3. Configure the test set-up for the MP2720A (see Figure 2 on page 3).

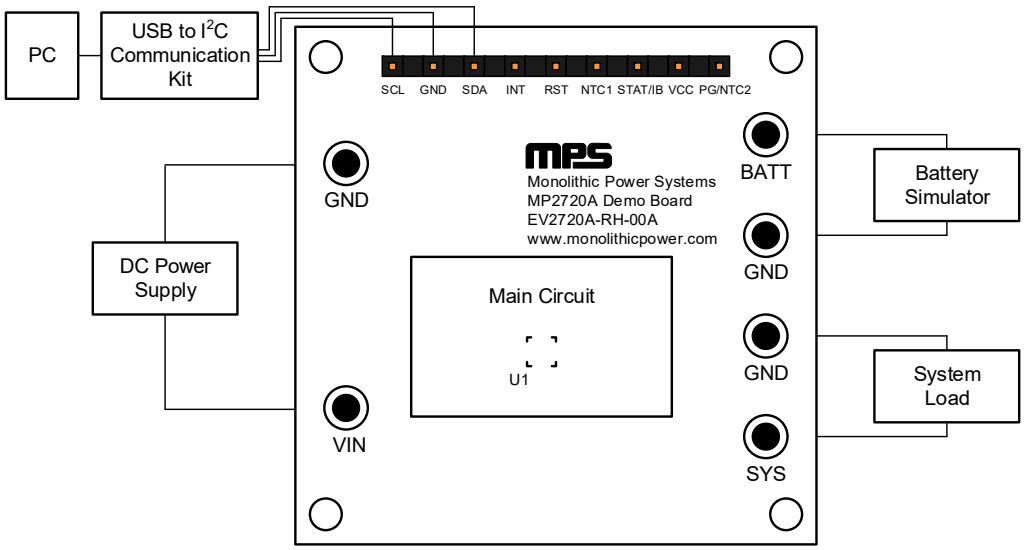


Figure 2: Measurement Equipment Set-Up

Start-Up Procedure

1. Set the battery simulator output to 3.8V and the charge/discharge current limit to 5A, then turn off the battery simulator.
2. Connect the battery simulator to BATT and GND.
3. Set the DC power source output to 5V and the output current limit to 5A, then turn off the DC power source.
4. Connect the DC power source to VIN and GND.
5. Connect the system load (typically an e-load device) to SYS and GND, then set the system load to 0A.
6. Turn on the battery simulator.
7. Turn on the DC power source.
8. If necessary, turn on the system load.
9. Launch the MP2720A evaluation software. Figure 3 shows the GUI software's main window.

Figure 3: MP2720A Evaluation Software

GUI Operation

1. Ensure that all the connections are successful, including the connection between the USB to I²C communication interface and the EV2720A-RH-00A. Successful connections are indicated in green on the lower-left side of the window (see Figure 3 on page 3). Once all of the connections are successfully made, the program is ready to be used.
2. After all connections are successful, click the “Read All” button to update the GUI to the default settings.
3. Change the settings as needed.
4. After making the modifications, click the “Update All” button to write the setting(s) to the MP2720A’s registers.

EVALUATION BOARD SCHEMATIC

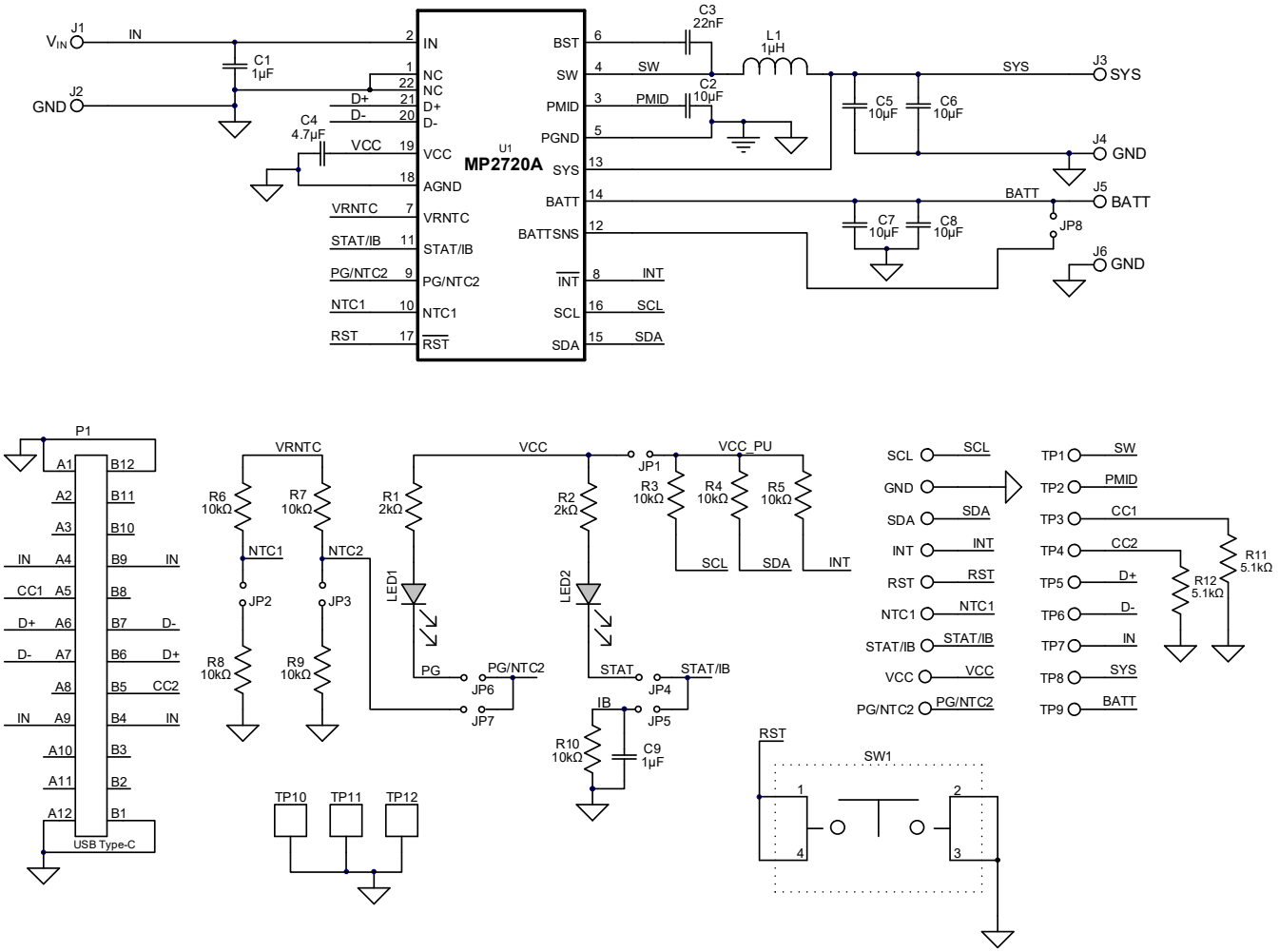


Figure 4: Evaluation Board Schematic

EV2720A-RH-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1	1µF	Ceramic capacitor, 25V, X7R	0603	Murata	GRM188R71E105KA12D
1	C2	10µF	Ceramic capacitor, 25V, X5R	0805	Murata	GRM21BR61E106KA73
1	C3	22nF	Ceramic capacitor, 100V, X7R	0603	Murata	GRM188R72A223KAC4D
1	C4	4.7µF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R61C475KAAJD
4	C5, C6, C7, C8	10µF	Ceramic capacitor, 16V, X5R	0805	Murata	GRM21BR61C106KE15L
1	C9	1µF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C105KA12D
1	L1	1µH	Inductor, R_{DC} = 12mΩ, I_{SAT} = 9A	SMD	Wurth	78438356010
2	R1, R2	2kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-072KL
3	R3, R4, R5	10kΩ	Film resistor, 5%	0603	Yageo	RC0603JR-0710K
5	R6, R7, R8, R9, R10	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
2	R11, R12	5.1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-075K1L
1	LED1	50mW	Red LED	0805	Baihong	BL-HUE35A-AV-TRB
1	LED2	50mW	Green LED	0805	Baihong	BL-HGE35A-AV-TRB
1	SW1	4mmx 10mm	Push button	SMD	Any	
1	P1	5A	USB Type-C connector	SMD	Any	
6	J1, J2, J3, J4, J5, J6	2mm	Connector	DIP	Any	
9	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9	1mm	Test point yellow	DIP	Any	
3	TP10, TP11, TP12	2.8mmx 3.8mm	Test point ground	SMD	Any	
9	GND, INT, NTC1, PG/NTC2, RST, SCL, SDA, STAT/IB, VCC	2.54mm	Row connector	DIP	Any	
8	JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8	2.54mm	Row connector	DIP	Any	
5	JP2, JP3, JP4, JP6, JP8	2.54mm	Shunt connector	DIP	Any	
1	U1	MP2720A	I²C-controlled, 1-cell, 2.2A, NVDC buck charger	QFN-22 (2.5mmx 3.5mm)	MPS	MP2720AGRH

PCB LAYOUT

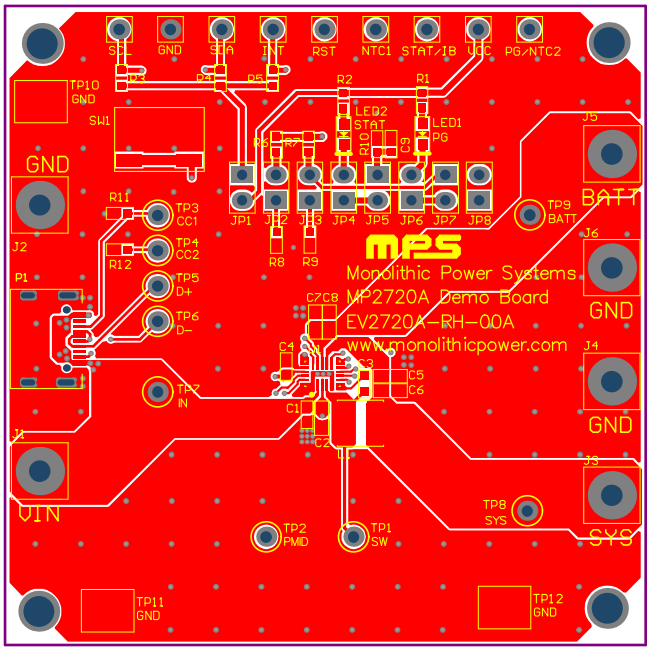


Figure 5: Top Layer

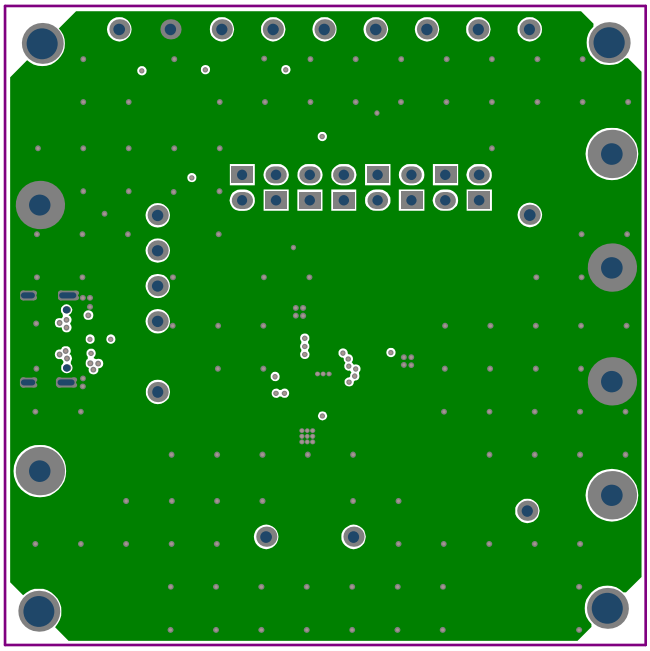


Figure 6: Mid-Layer 1

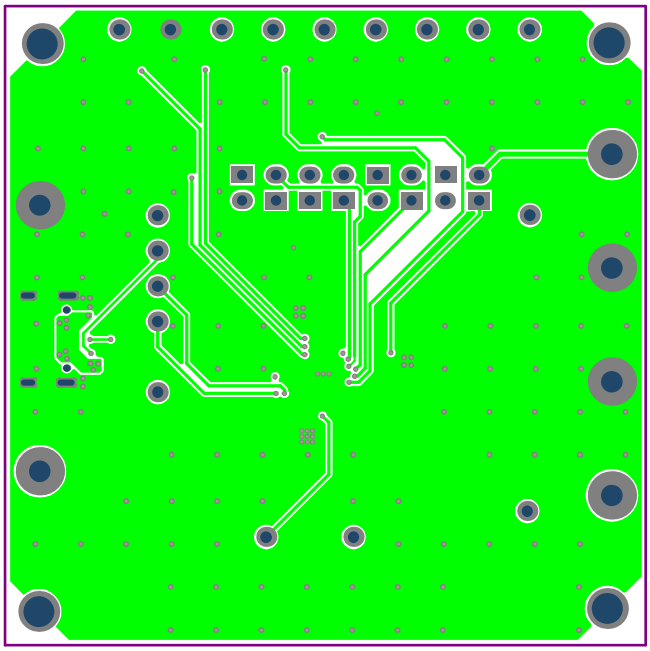


Figure 7: Mid-Layer 2

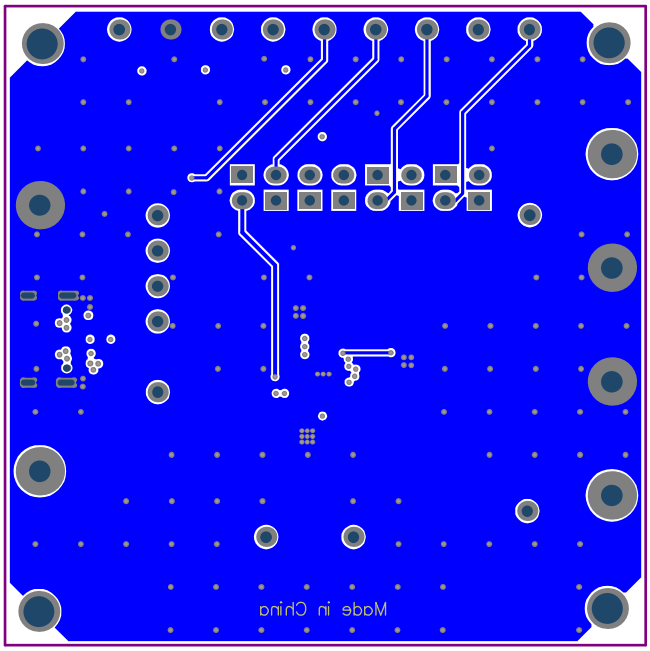


Figure 8: Bottom Layer

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	6/22/2022	Initial Release	-
1.1	4/19/2023	Updated the BST capacitor (C3) information	5–6