EV6614-N-00A

35V, H-Bridge DC Motor Driver in SOIC-8 Package Evaluation Board

DESCRIPTION

The EV6614-N-00A is an evaluation board designed to demonstrate the capabilities of the MP6614, an H-bridge DC motor driver.

The MP6614 operates from an input voltage (V_{IN}) up to 35V. The H-bridge consists of four N-channel power MOSFETs, and an internal charge pump generates the required gate-drive voltages. An internal current-sense circuit provides an output voltage (V_{ISEN}) that is proportional to the load current. In addition, the device provides cycle-by-cycle current regulation and limiting. These features do not require the use of a low-ohm shunt resistor.

Internal protections include over-current protection (OCP), short-circuit protection (SCP), under-voltage lockout (UVLO), and over-temperature protection (OTP). The input control signals are generated via the connector on the board.

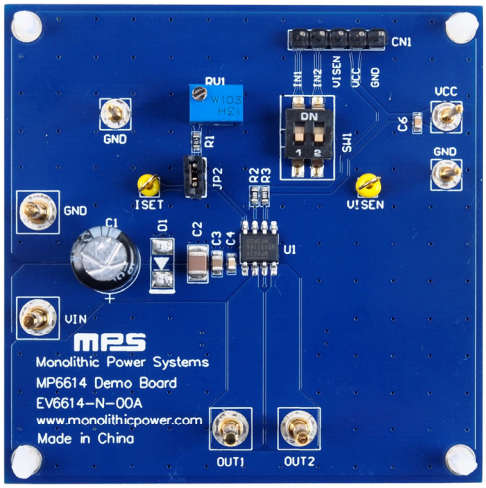
The MP6614 is designed to drive solenoids, brushed DC motors, or other loads, and is available in an SOIC-8EP package.

PERFORMANCE SUMMARY

Specifications are at T_A = 25°C, unless otherwise noted.

Parameters	Conditions	Value
Input power voltage (V_{IN}) range		5V to 35V
Maximum continuous output current (I_{OUT})		2A
Logic input voltage (V_{CC})		3.3V or 5V

EV6614-N-00A EVALUATION BOARD



LxWxH (6.35cmx6.35cmx1.5cm)

Board Number	MPS IC Number
EV6614-N-00A	MP6614GN

QUICK START GUIDE

1. Connect the input voltage (5V ≤ V_{IN} ≤ 35V) and input ground to the VIN and GND connectors, respectively.
2. Connect the VCC voltage (V_{CC} = 3.3V or 5V) and input ground to the VCC and GND connectors, respectively.
3. Set the input control signals through the CN1 connector via the external controller, or manually through SW1. (1)

   Table 1 shows the input logic for IN1 and IN2.

IN1	IN2	OUT1	OUT2
Low	Low	Hi-Z	Hi-Z
Low	High	Low	High
High	Low	High	Low
High	High	Low	Low

4. The output current (I_{OUT}) limit threshold is reached once the ISET pin voltage (V_{ISET}) reaches 1.5V. V_{ISET} scaling is set via R1 and the trimming potentiometer (RV1). For example, when a 10kΩ resistor is connected between ISET and ground, V_{ISET} is 1V/A of I_{OUT}. In this scenario, if I_{OUT} is 1.5A, V_{ISET} reaches 1.5V and a current trip occurs.
5. Figure 1 shows the measurement equipment set-up.

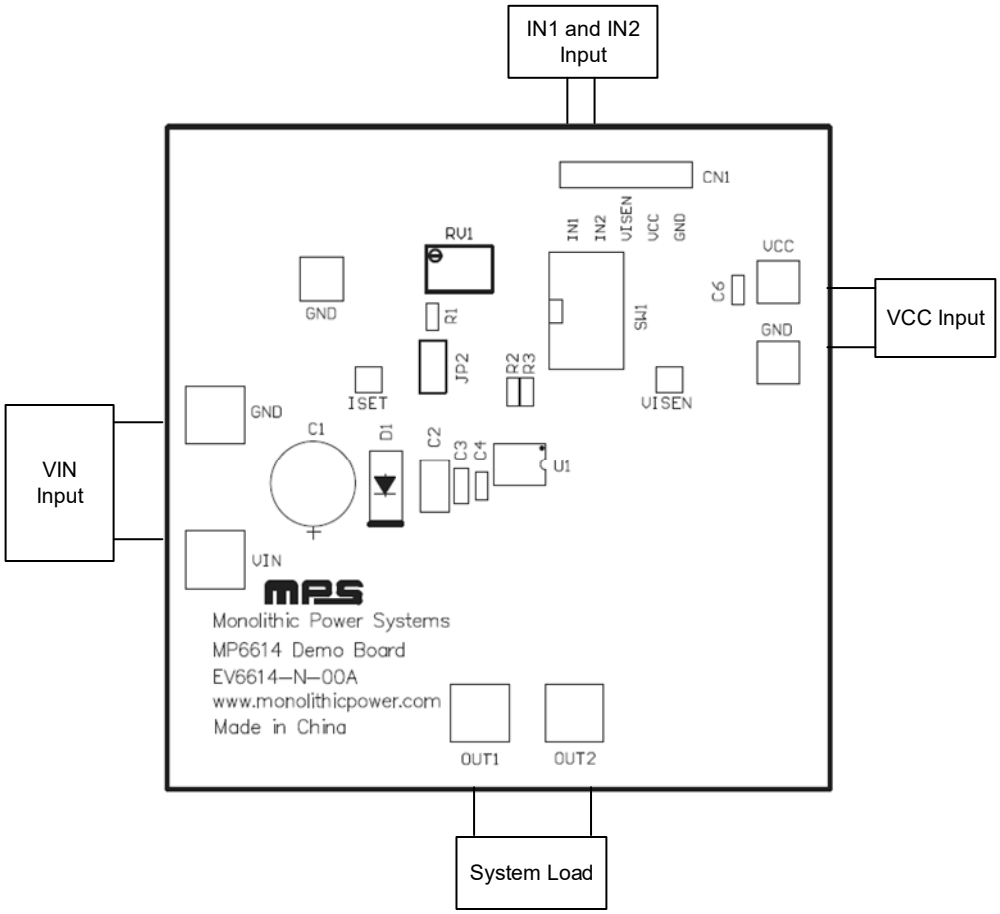


Figure 1: Measurement Equipment Set-Up

Note:

1) When the input control signals are set through the CN1 connector via the external controller, turn off all the switches on SW1.

EVALUATION BOARD SCHEMATIC

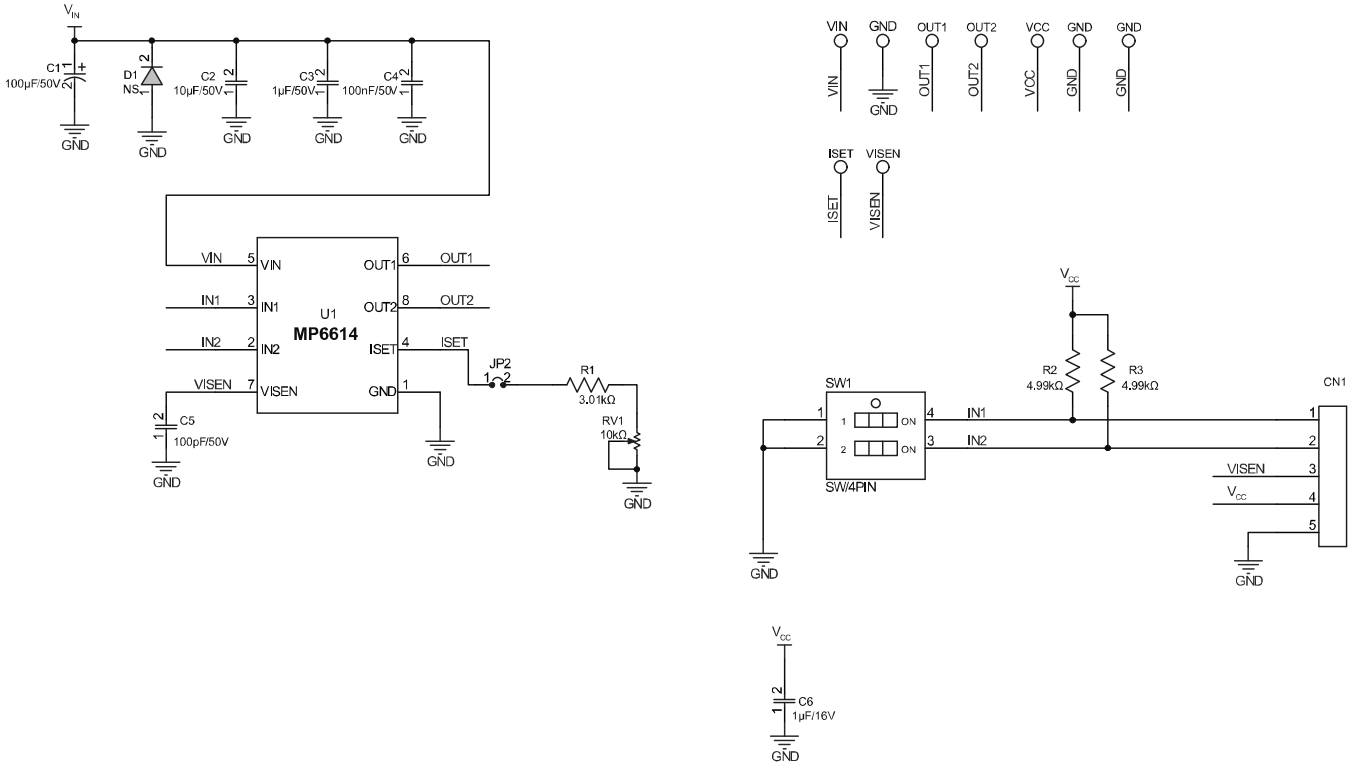


Figure 2: Evaluation Board Schematic

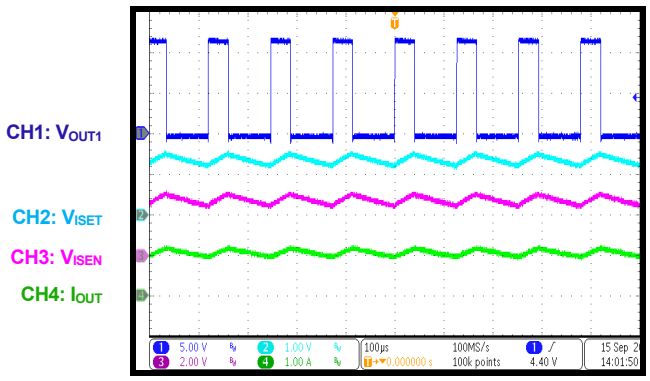
EV6614-N-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1	100µF	Electrolytic capacitor, 50V	DIP	Rubycon	50YXF100MEFC
1	C2	10µF	Ceramic capacitor, 50V, X7R	1210	Murata	GRM32ER71H106KA12L
1	C3	1µF	Ceramic capacitor, 50V, X7R	0805	Wurth	885012207103
1	C4	100nF	Ceramic capacitor, 50V, X7R	0603	Wurth	885012206095
1	C5	100pF	Ceramic capacitor, 50V, NPO	0603	Wurth	885012006057
1	C6	1µF	Ceramic capacitor, 16V, X7R	0603	Wurth	885012206052
1	R1	3.01kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-073K01L
2	R2, R3	4.99kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K99L
1	RV1	10kΩ	Adjustable resistor	DIP		3266W-1-103LF
1	D1	NS				
1	SW1	2.54mm	Button, 2-bit	SMD	Wangtong	WT11-SMD-02
1	JP2	2.54mm	Connector, 2-bit	DIP	Any	
1	JP2	2.54mm	Short jumper	DIP	Any	
1	CN1	2.54mm	Connector, 5-bit	DIP	Any	
4	VIN, GND, OUT1, OUT2	2mm	Connector	DIP	Any	
3	VCC, GND, GND	1mm	Connector	DIP	Any	
2	ISET, VISEN	1mm	Test point, yellow	DIP	Any	
1	U1	MP6614	35V, H-bridge motor driver in SOIC-8 package	SOIC-8EP	MPS	MP6614GN

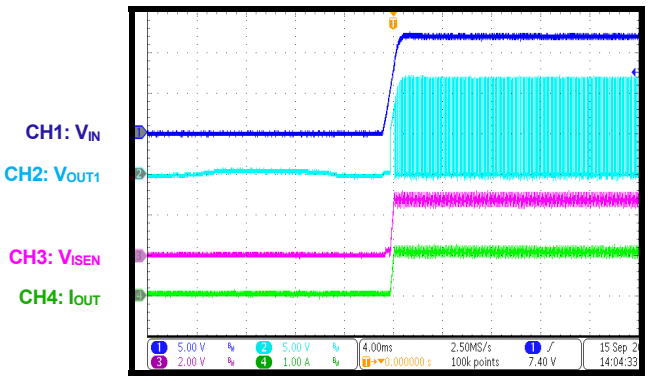
EVB TEST RESULTS

V_{IN} = 12V, IN1 = 3.3V, IN2 = 0V, I_{OUT} = 1.2A, I_{OUT} configuring resistor = 12.5kΩ, T_A = 25°C, resistor + inductor load: 3Ω + 1.5mH between OUT1 and OUT2, unless otherwise noted.

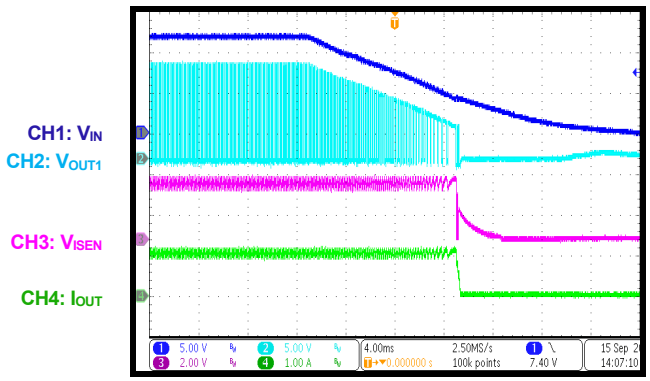
Steady State



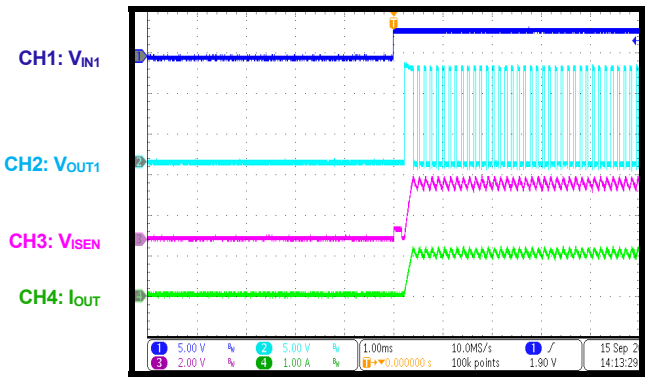
Power Ramping Up



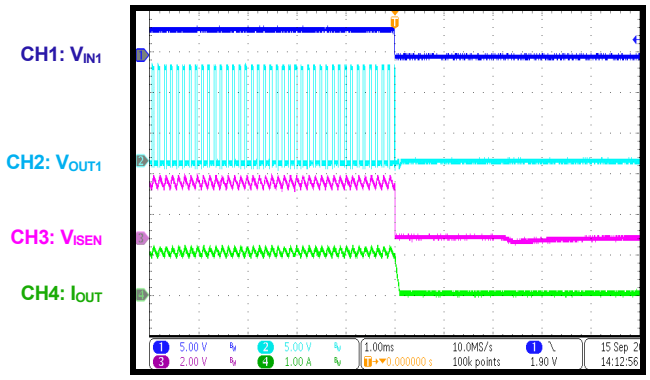
Power Ramping Down



Sleep Recovery



Sleep Entry



PCB LAYOUT

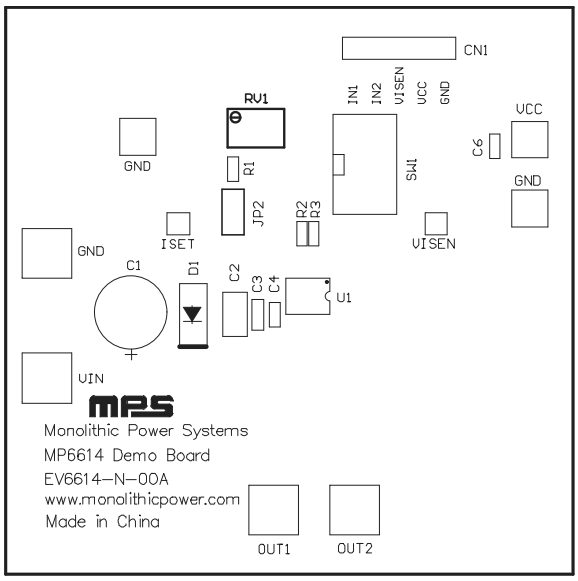


Figure 3: Top Silk

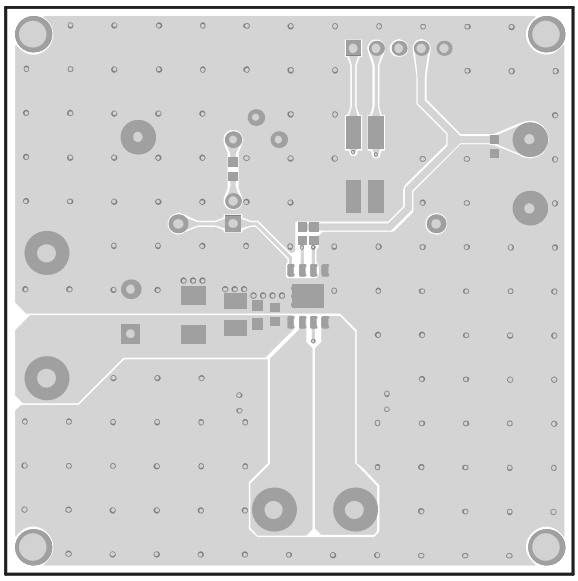


Figure 4: Top Layer

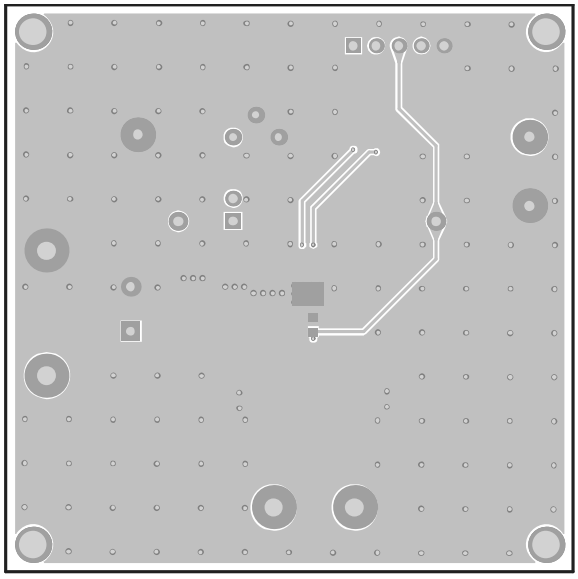


Figure 5: Bottom Layer

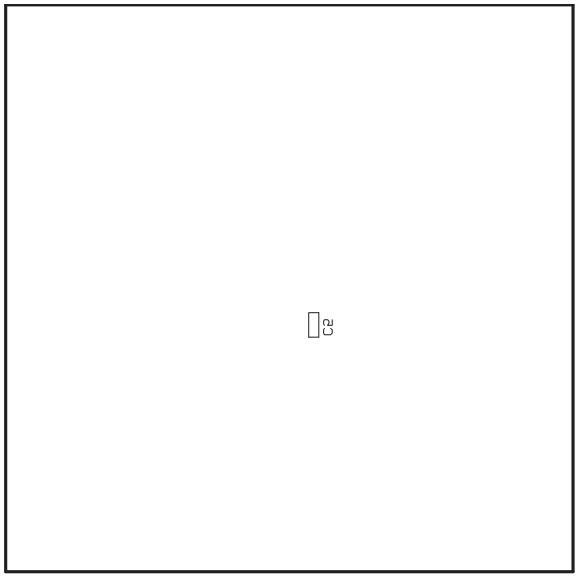


Figure 6: Bottom Silk

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	3/3/2023	Initial Release	-