EV6605C-R-00A

4-Channel Low-Side Driver with I²C Interface Evaluation Board

DESCRIPTION

The EV6605C-R-00A evaluation board is designed to demonstrate the capabilities of the MP6605C, a 4-channel low-side (LS) driver with an I²C interface. It integrates low-side MOSFETs (LS-FETs) and high-side (HS) clamp diodes to drive inductive loads.

The MP6605C operates from a supply voltage up to 60V, and can deliver output current (I_{OUT}) up to 1.5A. The MP6605C supports a 3.3V and 5V logic supply. Internal safety features include over-current protection (OCP), under-voltage lockout (UVLO), and over-temperature (OT) shutdown.

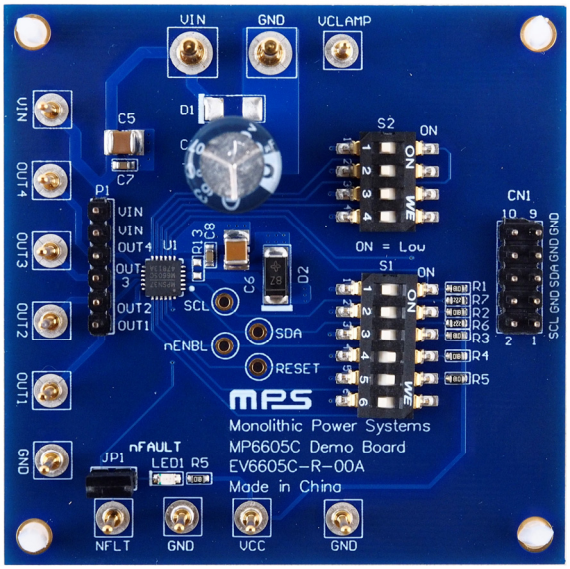
The MP6605C is typically used for unipolar stepper motors and solenoid drivers. The MP6605C is available in a QFN-24 (4mmx4mm) package.

PERFORMANCE SUMMARY

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

Parameters	Conditions	Value
Supply voltage range (V_{IN})	24V TVS diode connected between VIN and VCLAMP	4.5V to 30V
	VCLAMP connected to VIN	4.5V to 60V
High-side (HS) clamp voltage (V_{CLAMP})		≤60V
Maximum low-side (LS) output current (I_{OUT_LS})	For LS-FETs	1.5A
Maximum HS output current (I_{OUT_HS})	For HS diodes	1.5A at duty cycle < 20%

EV6605C-R-00A EVALUATION BOARD



LxWxH (6.35cmx6.35cmx2.5cm)

Board Number	MPS IC Number
EV6605C-R-00A	MP6605CGR

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QUICK START GUIDE

1. Preset the logic power supply voltage (typically 3.3V or 5V).
2. To preset the input power supply voltage, follow the steps below:
   a. Connect the 24V TVS diode between the VIN and VCLAMP pins (where V_{IN} is between 4.5V and 30V).
   b. Connect VCLAMP to VIN (where V_{IN} is between 4.5V and 60V).
3. Connect the I²C communication interface to CN1.
4. Connect the loads to the OUTx terminals.
5. Connect the logic power supply terminals to:
   a. Positive (+): VCC
   b. Negative (-): GND
6. Connect the input power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
7. Set the physical device address via S2.
8. LED1 indicates fault events including over-current protection (OCP), under-voltage lockout (UVLO), and over-temperature (OT) shutdown.

   Figure 1 shows the measurement equipment set-up.

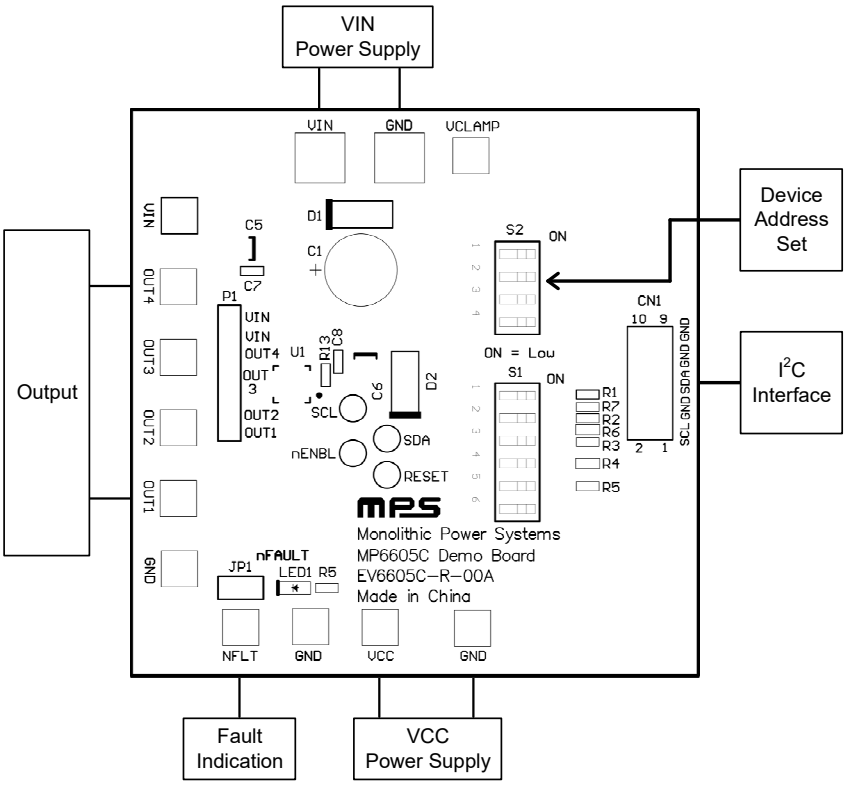


Figure 1: Measurement Equipment Test Set-Up

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GUI OPERATION

To configure the device using the graphic user interface (GUI), refer to Figure 2 and follow the steps below:

1. Set the address byte. The first 3 bits are fixed to 010, the following 4 bits are the address bits, and the last bit is a read/write (R/W) bit.
2. Set the data byte. The first 4 bits are read-only, and the following 4 bits can be used to control the four LS-FETs or read their statuses.
3. Click “Write” or “Loop Write” to write the data (address byte and data byte). If the R/W bit is set to 1, then “Write” and “Loop Write” change to “Read” and “Loop Read,” respectively.

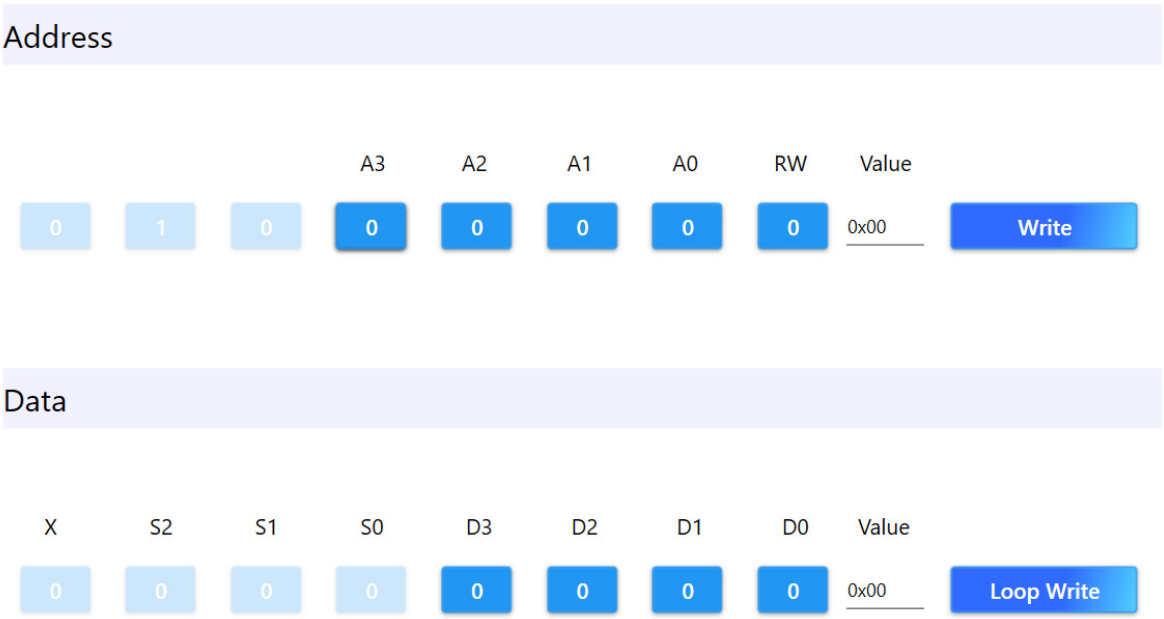


Figure 2: GUI Operation Configuration

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EVALUATION BOARD SCHEMATIC

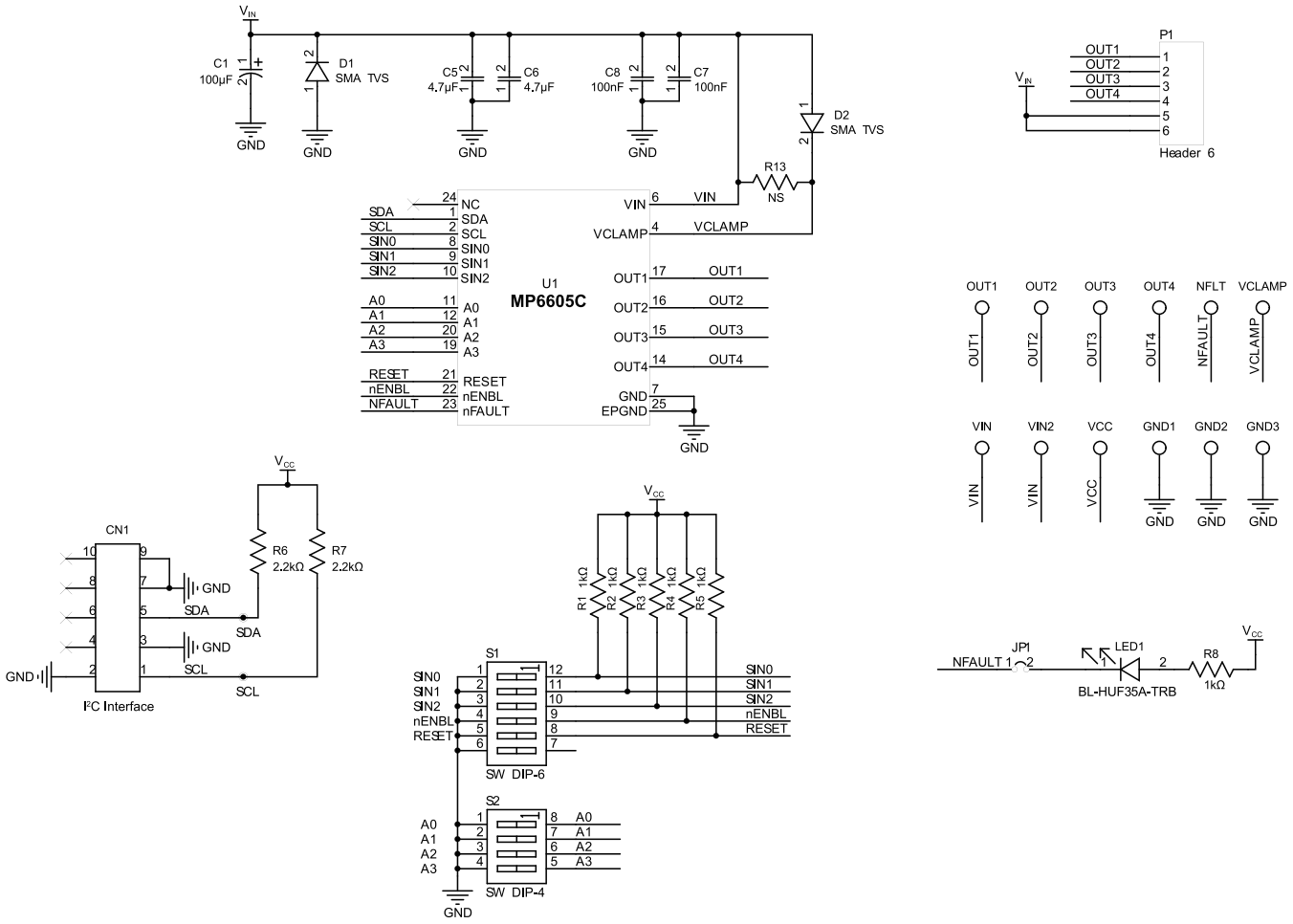


Figure 3: Evaluation Board Schematic

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EV6605C-R-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1	100µF	Electrolytic capacitor, 100V	DIP	Jianghai	CD263-100V100
2	C5, C6	4.7µF	Ceramic capacitor, 100V, X8L	1210	Murata	GCM32DL8EL475KE07L
2	C7, C8	100nF	Ceramic capacitor, 100V, X7R	0603	Murata	GRM188R72A104KA35D
6	R1, R2, R3, R4, R5, R8	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
2	R6, R7	2.2kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-072K2L
1	R13	NS				
1	D2	24V	TVS diode	DO-214C-2	Vishay	SMAJ24A
1	S1	6-bit	Dial switch	SMD	Wurth	418121270806
1	S2	4-bit	Dial switch	SMD	Wurth	418121270804
1	LED1	20mA	Red LED	0805	Baihong	BL-HUE35A-AV-TRB
1	JP1, P1	2.54mm	Single-line connector with jumper	SIP	Custom	
1	P1	2.54mm	Single line connector	SIP	Custom	
1	CN1	2.54mm	Dual-line connector	DIP	Custom	
2	VIN, GND1	2mm	Golden pin	SIP	Custom	
11	VCLAMP, VIN, OUT1, OUT2, OUT3, OUT4, NFLT, GND, VCC	1mm	Golden pin	SIP	Custom	
1	U1	MP6605C	4-channel low-side driver with I²C interface	QFN-24 (4mmx 4mm)	MPS	MP6605CGR

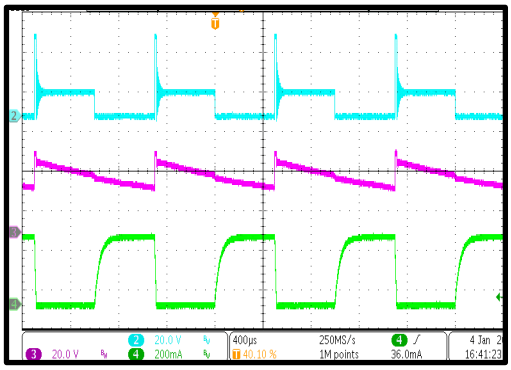
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EVB TEST RESULTS

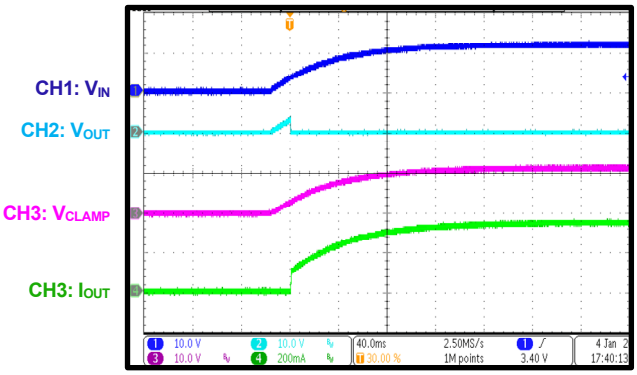
V_{IN} = 12V, V_{CLAMP} = 24V TVS to V_{IN}, T_A = 25°C, resistor + inductor load: R = 33Ω, L = 1.5mH per channel, unless otherwise noted.

Normal Operation

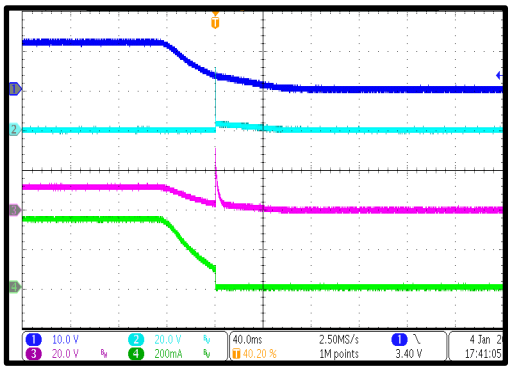
f_{SW} = 1kHz



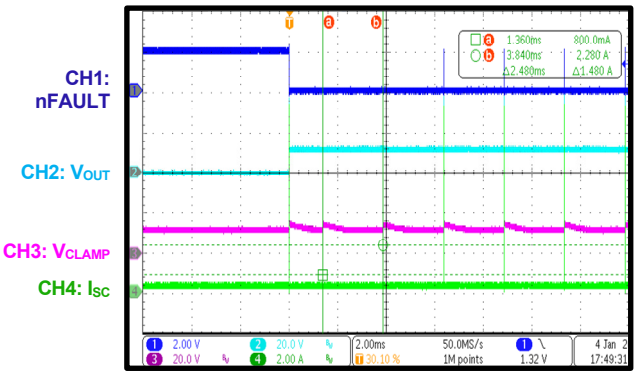
Start-Up through VIN



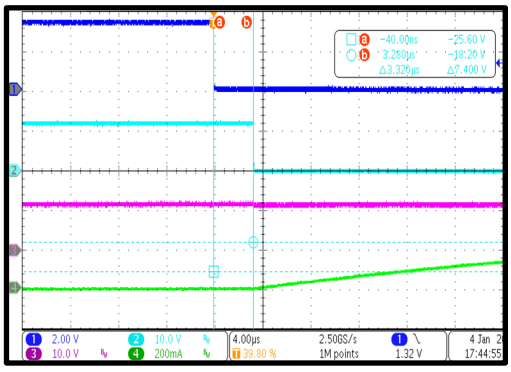
Shutdown through VIN



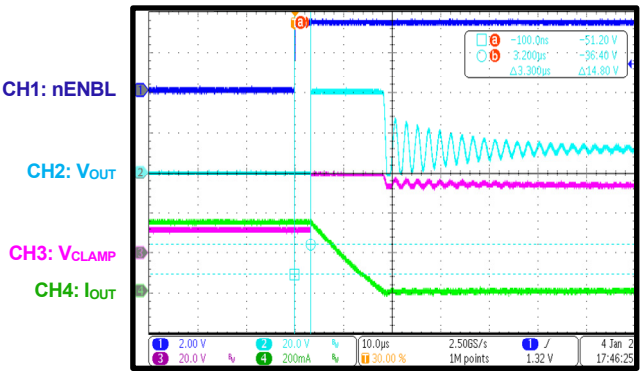
SCP



Chip Enabled



Chip Disabled



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PCB LAYOUT

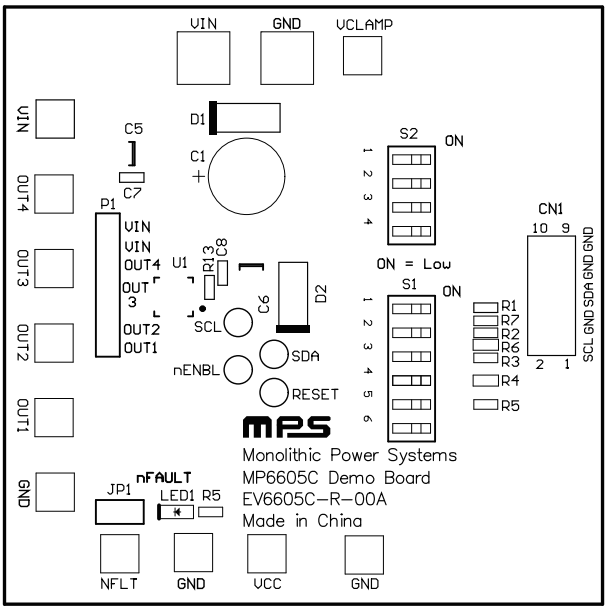


Figure 4: Top Silk

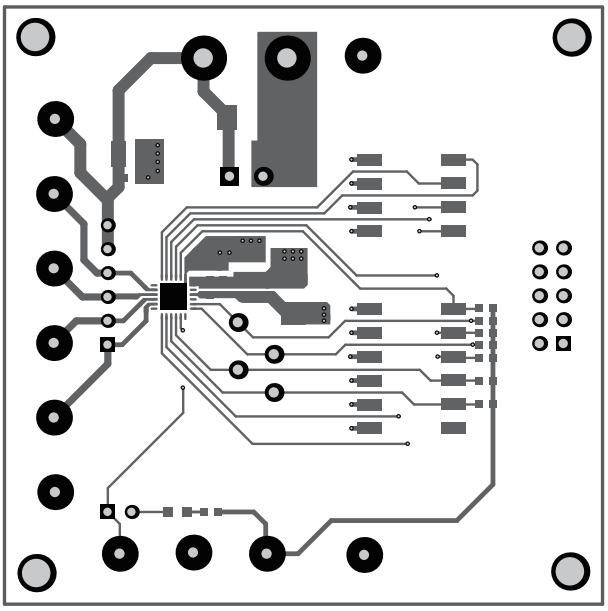


Figure 5: Top Layer

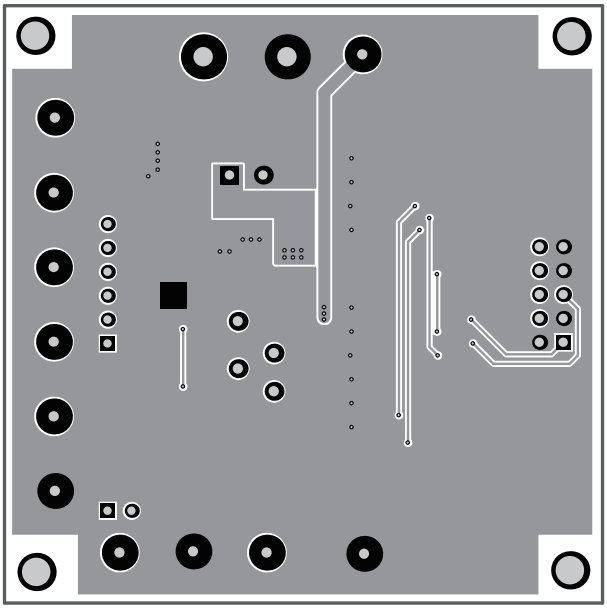


Figure 6: Bottom Layer

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REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	6/14/2022	Initial Release	-

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