



## 3V to 12V, LS & HS Input, Three-Phase **Brushless DC Motor Driver Evaluation Board**

### **DESCRIPTION**

The EV6543A-L-01A is an evaluation board for the MP6543AGL, a three-phase, brushless DC motor driver.

The EV6543A-L-01A operates from a maximum 12V supply voltage. It integrates three halfbridges consisting of six N-channel power MOSFETs. The rotor position information is provided by the Hall sensors assembled in the motor. The driving control signals are generated by an external controller, such as an MCU or FPGA.

#### **ELECTRICAL SPECIFICATIONS**

Parameter	Symbol Value		Units
Input voltage	$V_{IN}$	3 to 12	V
LDO input voltage	$V_{\text{IN\_LDO}}$	3 to 12	V
VREF voltage	$V_{REF}$	3.3	V
VCC voltage	Vcc	3.3	V

#### **FEATURES**

- Wide 3V to 12V Input Voltage Range
- Built-In 3.3V, 100mA LDO Regulator
- **Integrated Bidirectional Current-Sense Amplifiers**
- Supports 100% Duty Cycle Operation
- Low-Side/High-Side Logic Input
- Over-Current Protection (OCP), Over-Temperature Protection (OTP)
- **Fault Indication Output**

#### **APPLICATIONS**

- Three-Phase Brushless DC Motors and Permanent Magnet Synchronous Motors (PMSMs)
- **Drones**
- Robotics

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#### **EV6543A-L-01A EVALUATION BOARD**



(LxW) 6.35cmx6.35cm

Board Number	MPS IC Number	
EV6543A-L-01A	MP6543AGL	

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#### **QUICK START GUIDE**

- 1. Attach the input voltage (3V  $\leq$  V<sub>IN</sub>  $\leq$  12V) to the VIN connector, and attach the input ground to the GND connector.
- 2. Attach the LDO input voltage ( $3V \le V_{IN\_LDO} \le 12V$ ) to the VIN\_LDO connector, and attach the input ground to the GND connector.
- 3. Attach a 3.3V constant voltage to the VCC connector and switch SW1 to position 1 (top side) to enable the chip.
- 4. Attach a 3.3V constant voltage to the VREF connector to set the current-sense output reference voltage.
- 5. Attach the motor's Hall signals to the Hall sensor connector.
- 6. Attach the driving control signals generated by the external controller to the CN1 connector.



### **EVALUATION BOARD SCHEMATIC**

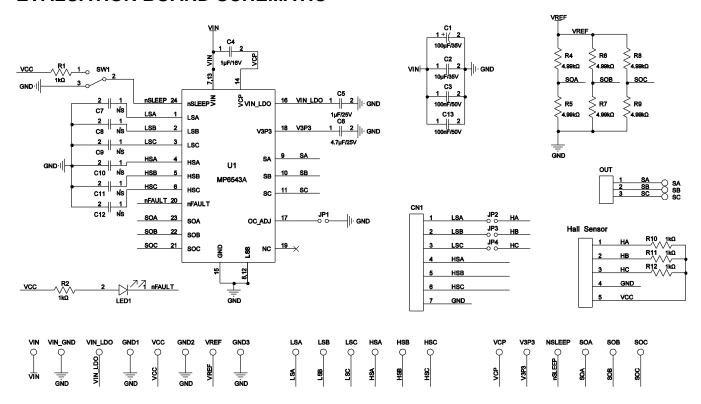


Figure 1: Evaluation Board Schematic



# **EV6543A-L-01A BILL OF MATERIALS**

	Γ	Г	OI WATERIALS	Т	T	T
Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
5	R1, R2, R10, R11, R12	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
6	R4, R5, R6, R7, R8, R9	4.99kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K99L
1	C1	100µF	Electrolytic capacitor, 35V	DIP	Jianghai	CD287-35V100
1	C2	10µF	Ceramic capacitor, 35V, X7R	1210	Murata	GRM32ER7YA106K A12L
2	C3, C13	100nF	Ceramic capacitor, 50V, X7R	0603	Wurth	885012206095
1	C4	1µF	Ceramic capacitor, 16V, X7R	0603	Wurth	885012206052
1	C5	1µF	Ceramic capacitor, 25V, X5R	0603	Wurth	885012106022
1	C6	4.7µF	Ceramic capacitor, 25V, X5R	0603	Murata	GRM188R61E475KE 11D
6	C7, C8, C9, C10, C11, C12	NS				
1	LED1	Red	LED	0805	Baihong	BL-HUE35A-AV-TRB
1	U1	MP6543A	12V, 2A, three-phase brushless DC motor driver	QFN-24 (3mmx 4mm)	MPS	MP6543AGL
1	SW1	SPDT	Button	DIP	Wurth	450301014042
4	JP1, JP2, JP3, JP4	2 bits/ 2.54mm	Connector	DIP	Any	
1	JP1	2 bits/ 2.54mm	Short jumper	DIP	Any	
1	CN1	7 bits/ 2.54mm	Connector	DIP	Any	
1	Hall sensor	5 bits/ 2.54mm	Connector	DIP	Any	
1	PWMA, PWMB, PWMC, ENA, ENB, ENC	6 bits/ 2.54mm	Connector	DIP	Any	
1	OUT	3 bits/ 2.54mm	Connector	DIP	Any	
6	VCP, V3P3, SOA, SOB, SOC, NSLEEP	Yellow	Test point	DIP	Any	
2	VIN, VIN_GND	Φ = 2mm	Connector, $\Phi = 2mm$ needle	DIP	Any	
9	VIN_LDO, VREF, VCC, GND, GND, GND, SA, SB, SC	Φ = 1mm	Connector, $\Phi = 1$ mm needle	DIP	Any	



### **PCB LAYOUT**

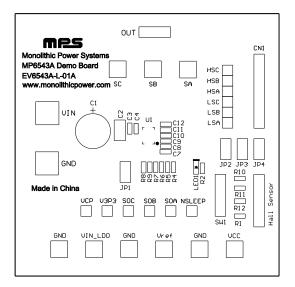


Figure 2: Top Silk Layer

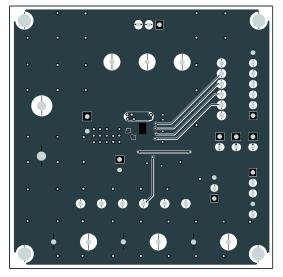


Figure 4: Bottom Layer

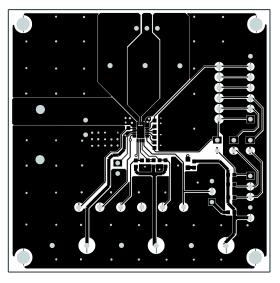


Figure 3: Top Layer

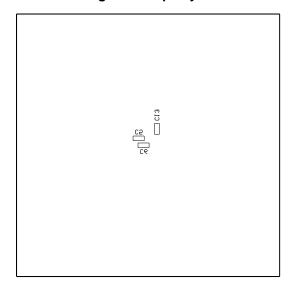


Figure 5: Bottom Silk Layer



# **Revision History**

Revision #	Revision Date	Description	Pages Updated
1.0	12/1/2020	Initial Release	

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