MEZS6-45V15ABLDCDriver

5V to 45V, Three-Phase, Brushless DC Motor Controller/Driver Board

DESCRIPTION

The MEZS6-45V15ABLDCDriver is a controller and driver for a three-phase brushless motor.

It operates from a supply voltage of up to 45V. It is configured to drive three half-bridges consisting of six N-channel power MOSFETs. The rotor position information is provided by the Hall sensors assembled in the motor. Motor speed and direction are controlled by an on-board microcontroller.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	5 to 45	V

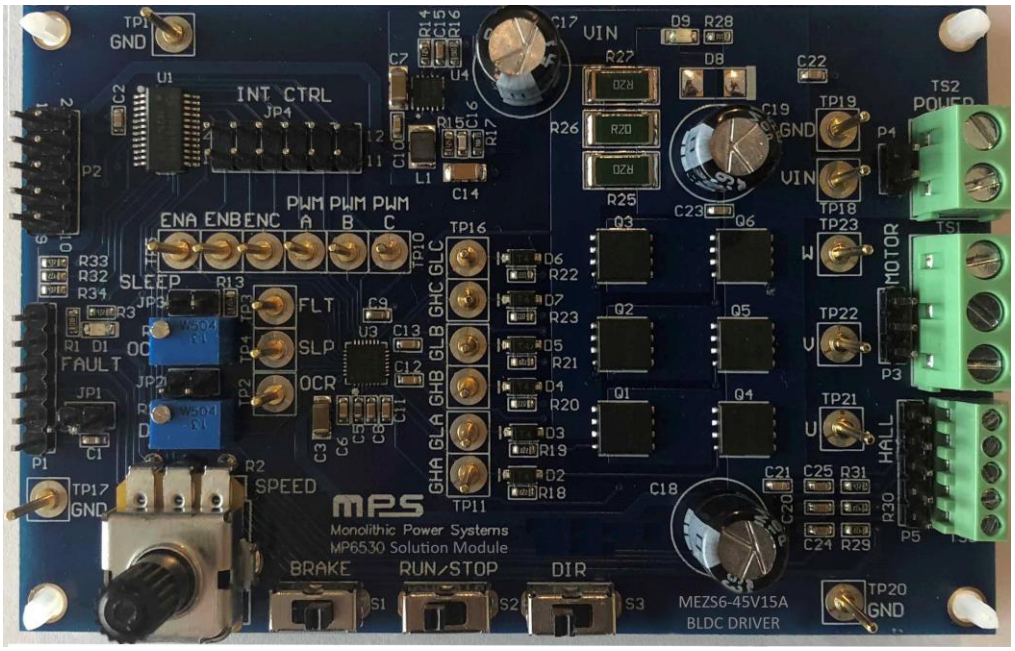
FEATURES

- Wide 5V to 45V Input Voltage Range
- Hall Sensor Inputs
- Programmable OCP Threshold
- Support 100% Duty Cycle Operation
- OCP, OTP
- Fault Indication Output

APPLICATIONS

- 3-Phase Brushless DC Motors and Permanent Magnet Synchronous Motors
- Power Drills
- Impact Drivers
- E-Bike

MEZS6-45V15ABLDCDRIVER BOARD



(LxWxH) 10cmx6.5cmx1cm

Board Number	MPS IC Number
MEZS6-45V15ABLDCDriver	MP6530GR

QUICK START GUIDE

To quickly start using the MEZS6-45V15ABLDCDriver brushless DC (BLDC) motor driver board, follow the steps below:

1. Connect the U, V, and W wires of a BLDC motor to the MOTOR connector on the board.
2. Connect the motor Hall sensors to the HALL connector on the board.
3. Connect a power supply (between 5V and 45V) to the VIN and GND pins.
4. Slide the DIR switch to “FWD” or “REV” to control the direction of the motor.
5. Slide the “RUN/STOP” switch to the right to run the motor.
6. Slide the “BRAKE” switch to the right to apply short braking to the motor.
7. Adjust the motor speed by turning the SPEED pot.
8. Pay careful attention to the correct input polarity connection to avoid damage due to a reversed connection.
9. R25, R26, and R27 (each 200mΩ) limit the peak output current to about 7.5A because of the 0.5V LSS OCP trigger threshold. Using a lower resistance value can provide a larger output current.

SOLUTION KIT SCHEMATIC

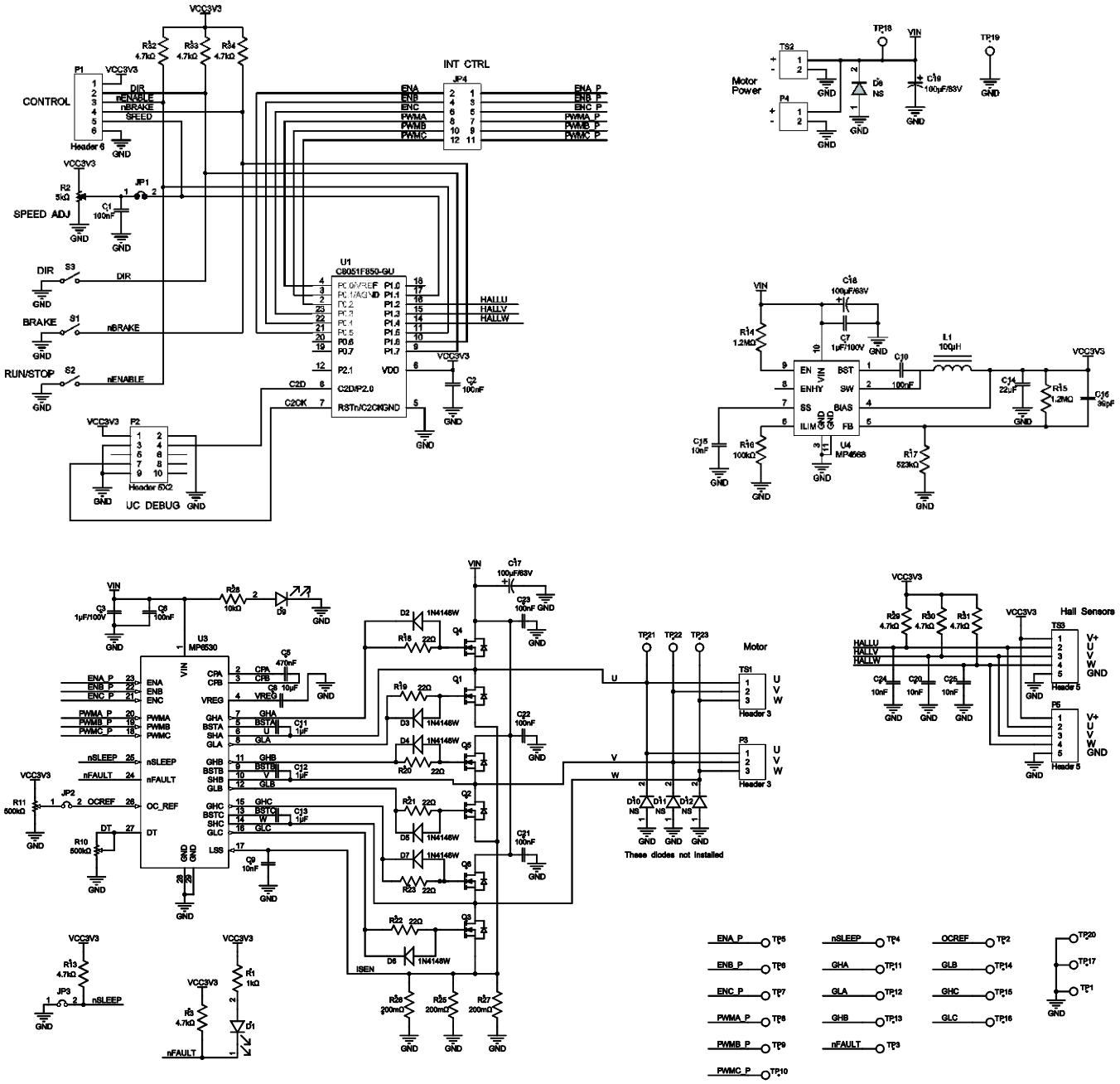


Figure 1: Solution Module Schematic

MEZS6-45V15ABLDCDRIVER BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
7	C1, C2, C6, C10, C21, C22, C23	100nF	Ceramic capacitor, 100V, X7R	0603	Murata	GRM188R72A104KA35D
2	C3, C7	1µF	Ceramic capacitor, 100V, X7R	1206	Murata	GRM31CR72A105KA01L
1	C5	470nF	Ceramic capacitor, 50V, X7R	0603	TDK	C1608X7R1H474K
1	C8	10µF	Ceramic capacitor, 25V, X5R	0603	Murata	GRM188R61E106MA73D
3	C11, C12, C13	1µF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C105KA12D
5	C9, C15, C20, C24, C25	10nF	Ceramic capacitor, 50V, X7R	0603	Murata	GRM188R71H103JA01D
1	C14	22µF	Ceramic capacitor, 10V, X7R	1206	Murata	GRM31CR71A226KE15L
1	C16	39pF	Ceramic capacitor, 50V, C0G	0603	Murata	GRM1885C1H390JA01
3	C17, C18, C19	100µF	Electrolytic capacitor, 63V	DIP	Rubycon	63PX100MEFC8X11.5 100µF 63V
2	D1, D9	Red	LED	0805	Baihong	BL-HUE35A-AV-TRB
6	D2, D3, D4, D5, D6, D7	0.15A	Diode, 75V, 0.15A	SOD-123	Changdian	1N4148W
4	D8, D10, D11, D12	NS				
4	JP1, JP2, JP3, P4	2 bits, 2.54mm	Connector	DIP	Any	61304011121
1	JP4	6 bits, 2.54mm, dual row	Connector	DIP	Any	
8	JP1, JP2, JP4	2.54mm	Short jumper	DIP	Any	60900213421
1	L1	100µH	Inductor, 2.7Ω, 180mA	SMD	Murata	LQH32PN101MN0L
1	P1	6 bits, 2.54mm	Connector	DIP	Any	61304011121
1	P2	5 bits, 2.54mm, dual row	Connector	DIP	Any	
1	P3	3 bits, 2.54mm	Connector	DIP	Any	61304011121
1	P5	5 bits, 2.54mm	Connector	DIP	Any	61304011121
6	Q1, Q2, Q3, Q4, Q5, Q6 (1)		N-channel MOSFET, 80V, 19A, 9mΩ, Q_G = 52nC	SOIC-8PP	Analog Power	AM7484N
			N-channel MOSFET, 80V, 18A, 13mΩ, Q_G = 72nC	SOIC-8PP	Analog Power	AM7482N

MEZS6-45V15ABLDCDRIVER BILL OF MATERIALS *(continued)*

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	R1	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
1	R2	5.1kΩ	Square trimming potentiometer	DIP	CTS	296UD502B1N
8	R3, R13, R29, R30, R31, R32, R33, R34	4.7kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K7L
2	R10, R11	500kΩ	Square trimming potentiometer	DIP	Any	3266W-1-504LF
2	R14, R15	1.2MΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071M2L
1	R16	100kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
1	R17	523kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07523KL
6	R18, R19, R20, R21, R22, R23	22Ω	Film resistor, 1%	0603	Yageo	RC0603FR-0722L
3	R25, R26, R27	200mΩ	Sense resistor, 1%, 2W	2512	CTS	73L7R20J
1	R28	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
3	S1, S2, S3	SPDT	Button	DIP	Any	SS-12D01EG4
23	TP1, TP2, TP3, TP4, TP5, TP6, TP7, TP8, TP9, TP10, TP11, TP12, TP13, TP14, TP15, TP16, TP17, TP18, TP19, TP20, TP21, TP22, TP23	Φ = 1mm	Connector, Φ = 1mm needle	DIP	Any	
1	TS1	3 pins	Header	DIP	Wurth	691236510003
1	TS2	2 pins	Header	DIP	Wurth	691236510002
1	TS3	5 pins	Header	DIP	Wurth	691210910005
1	U1		Microcontroller C8051F850	QSOP-24	Silicon	C8051F850-C-GU
1	U3	MP6530	3-phase BLDC motor pre-driver	QFN-28 (4mmx4mm)	MPS	MP6530GR
1	U4	MP4568	Buck converter	QFN-10 (3mmx3mm)	MPS	MP4568GQ

Note:

1) Some boards are assembled with AM7484N; the others are assembled with AM7482N.

PCB LAYOUT

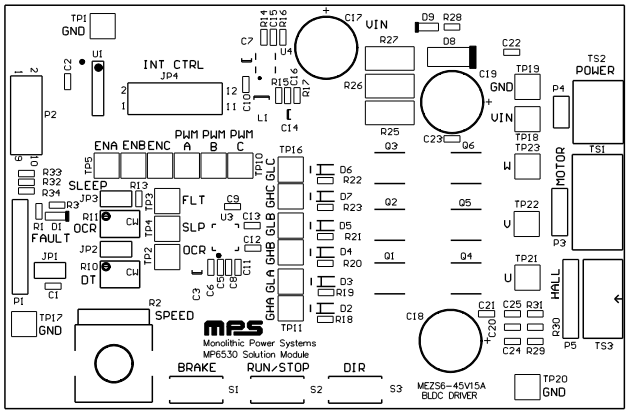


Figure 2: Top Silk

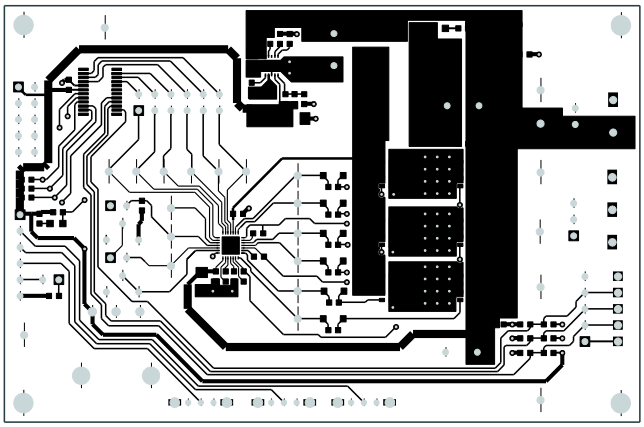


Figure 3: Top Layer

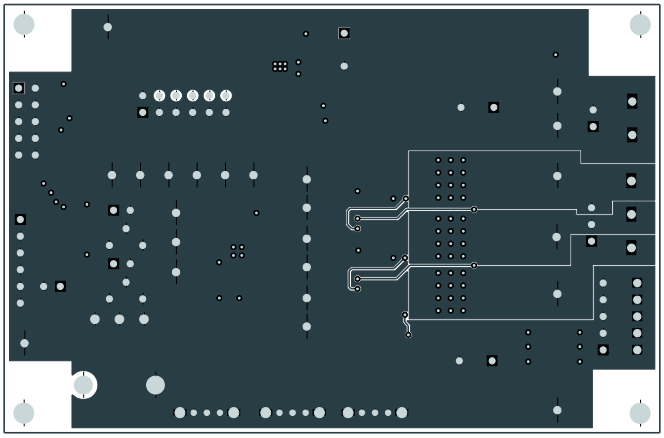


Figure 4: Bottom Layer

Revision History

Revision #	Revision Date	Description	Pages Updated
1.0	6/17/2020	Initial Release	-