



EV6532-R-01A

5V to 45V, Three-Phase Brushless DC Motor Pre-Driver Evaluation Board

DESCRIPTION

The EV6532-R-01A is an evaluation board for the MP6532GR, a three-phase brushless DC motor pre-driver.

The MP6532 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

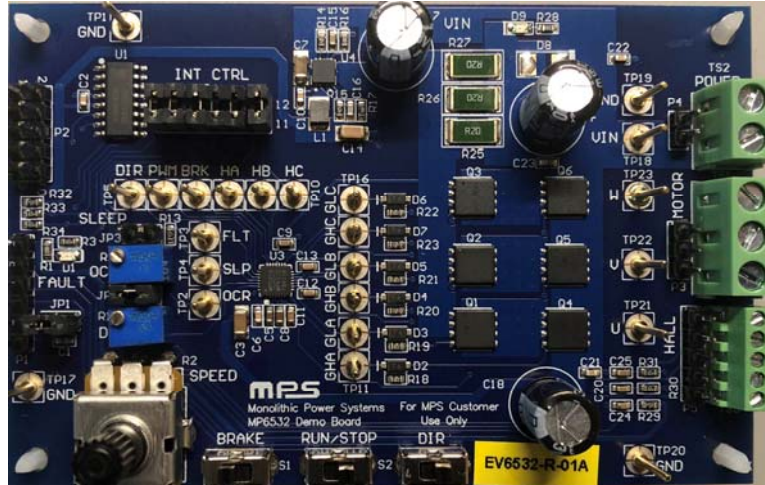
- Wide 5V to 45V Input Voltage Range
- Hall Sensor Inputs
- Configurable OCP Threshold
- Support 100% Duty Cycle Operation
- OCP, OTP
- Fault Indication Output

APPLICATIONS

- Three-Phase Brushless DC Motors and Permanent Magnet Synchronous Motors (PMSMs)
- Power Drills
- Impact Drivers
- E-Bikes

All MPS parts are lead-free, halogen-free, and adhere to the RoHS directive. For MPS green status, please visit the MPS website under Quality Assurance. "MPS", the MPS logo, and "Simple, Easy Solutions" are trademarks of Monolithic Power Systems, Inc. or its subsidiaries.

EV6532-R-01A EVALUATION BOARD



(LxWxH) 10cmx6.5cmx1cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV6532-R-01A | MP6532GR |



QUICK START GUIDE ⁽¹⁾

To quick start the EV6532-R-01A, follow the steps below:

1. Connect the U, V, and W wires of a brushless DC motor to the motor connector. Connect the motor's Hall sensors to the Hall connector.
2. Connect a power supply (between 5V and 45V) to the VIN and GND pins.
3. Slide the DIR switch to "Fwd" or "Rev" to control the direction of the motor. Slide the "Run/Stop" switch to the right to run the motor. Slide the "Brake" switch to the right to apply short braking to the motor.
4. Adjust the motor speed by turning the speed potentiometer.

Note:

- 1) To avoid damage caused by a reversed connection, pay close attention to the correct input polarity connection.

EVALUATION BOARD SCHEMATIC

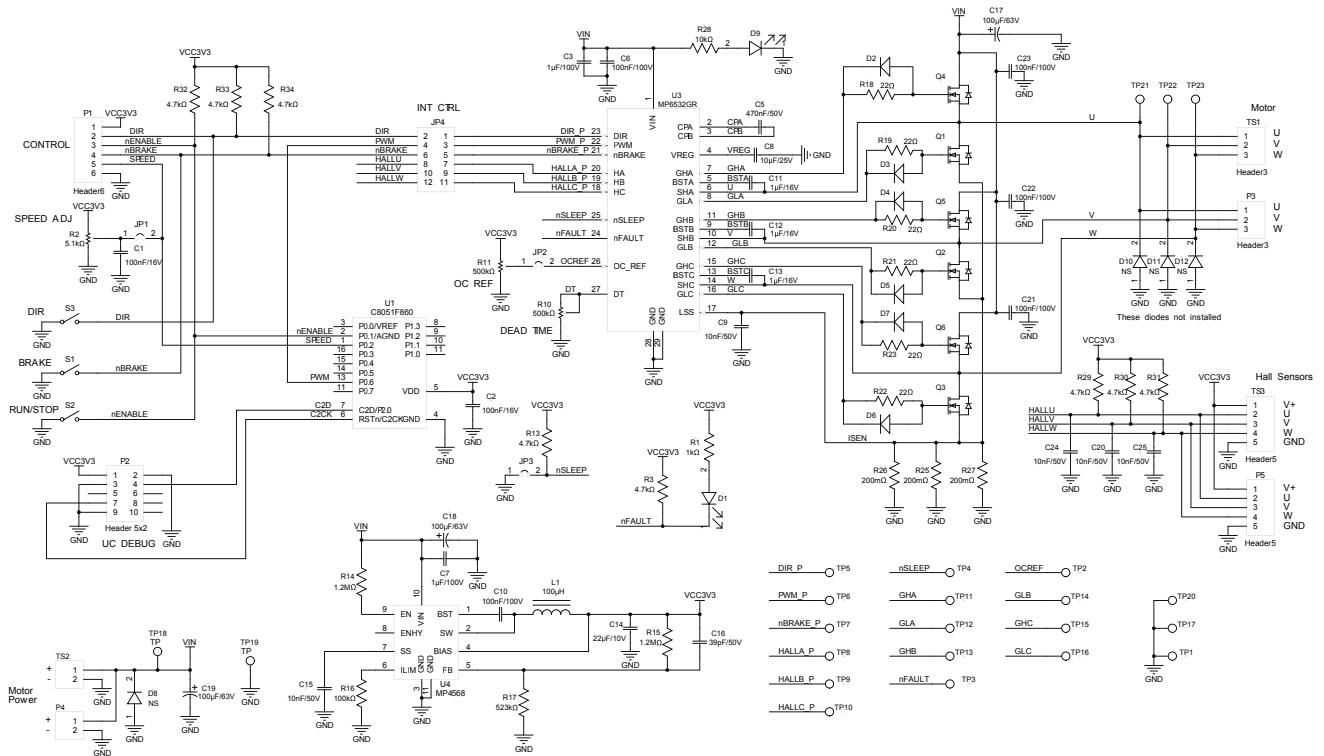


Figure 1: Evaluation Board Schematic

EV6532-R-01A BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|---------------------------------------|--------------------------------|--|----------|--------------|--------------------------------|
| 2 | C1, C2 | 100nF | Ceramic capacitor, 16V, X7R | 0603 | Murata | GRM188R71C104KA01D |
| 5 | C6, C10, C21, C22, C23 | 100nF | Ceramic capacitor, 100V, X7R | 0603 | Murata | GRM188R72A104KA35D |
| 2 | C3, C7 | 1 μ F | Ceramic capacitor, 100V, X7R | 1206 | Murata | GRM31CR72A105KA01L |
| 1 | C5 | 470nF | Ceramic capacitor, 50V, X7R | 0603 | TDK | C1608X7R1H474K |
| 1 | C8 | 10 μ F | Ceramic capacitor, 25V, X5R | 0603 | Murata | GRM188R61E106MA73D |
| 3 | C11, C12, C13 | 1 μ F | Ceramic capacitor, 16V, X7R | 0603 | Murata | GRM188R71C105KA12D |
| 5 | C9, C15, C20, C24, C25 | 10nF | Ceramic capacitor, 50V, X7R | 0603 | Murata | GRM188R71H103JA01D |
| 1 | C14 | 22 μ F | Ceramic capacitor, 10V, X7R | 1206 | Murata | GRM31CR71A226KE15L |
| 1 | C16 | 39pF | Ceramic capacitor, 50V, C0G | 0603 | Murata | GRM1885C1H390JA01 |
| 3 | C17, C18, C19 | 100 μ F | Electrolytic capacitor, 63V | DIP | Rubycon | 63PX100MEFC8X11.5 100uF 63V |
| 2 | D1, D9 | Red | LED | 0805 | Baihong | BL-HUE35A-AV-TRB |
| 6 | D2, D3, D4, D5, D6, D7 | 75V, 0.15A | Diode | SOD-123 | Changdian | 1N4148W |
| 4 | D8, D10, D11, D12 | NS | | | | |
| 4 | JP1, JP2, JP3, P4 | 2-bits/ 2.54mm | Connector | DIP | Any | |
| 1 | JP4 | 2-bits/ 2.54mm, dual row | Connector | DIP | Any | |
| 8 | JP1, JP2, JP4 | 2.54mm | Short jumper | DIP | Any | |
| 1 | L1 | 100 μ H | Inductor, 2.7 Ω , 180mA | SMD | Murata | LQH32PN101MN0L |
| 1 | P1 | 6-bits/ 2.54mm | Connector | DIP | Any | |
| 1 | P2 | 5-bits/ 2.54mm, dual row | Connector | DIP | Any | |
| 1 | P3 | 3-bits/ 2.54mm | Connector | DIP | Any | |
| 1 | P5 | 5-bits/ 2.54mm | Connector | DIP | Any | |
| 6 | Q1, Q2, Q3, Q4, Q5, Q6 ⁽²⁾ | | N-channel MOSFET, 80V, 19A, 9m Ω , Q _G = 52nC | SOIC-8PP | Analog Power | AM7484N |
| | | | N-channel MOSFET, 80V, 18A, 13m Ω , Q _G = 72nC | SOIC-8PP | Analog Power | AM7482N |

EV6532-R-01A BILL OF MATERIALS (continued)

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|---|---------|-----------------------------------|------------------|--------------|------------------|
| 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 | | 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 | |
| 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 | Würth | 691236510003 |
| 1 | TS2 | 2 pins | Header | DIP | Würth | 691236510002 |
| 1 | TS3 | 5 pins | Header | DIP | Würth | 691210910005 |
| 1 | U1 | | Microcontroller C8051F860 | SOIC-16 | Silicon | C8051F860-C-GSR |
| 1 | U3 | MP6532 | Three-phase BLDC motor pre-driver | QFN-28 (4mmx4mm) | MPS | MP6532GR |
| 1 | U4 | MP4568 | Buck converter | QFN-10 (3mmx3mm) | MPS | MP4568GQ |

Note:

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