EVQ1922-V-00A

100V, Half-Bridge Pre-Driver with Internal Current-Sense Amplifier Evaluation Board, AEC-Q100 Qualified

DESCRIPTION

The EVQ1922-V-00A is an evaluation board designed for the MPQ1922, a half-bridge gate driver that can be used in motor driver and other power control applications. The device drives two N-channel power MOSFETs in a half-bridge configuration, and operates on power supplies up to 100V.

To prevent shoot-through in the output MOSFETs, the MPQ1922 generates an adaptive dead time by monitoring the gate driver output voltages. This ensures that each MOSFET gate has been fully discharged before the opposing MOSFET turns on. A longer dead time can be generated by providing a delay between the INH and INL input signals.

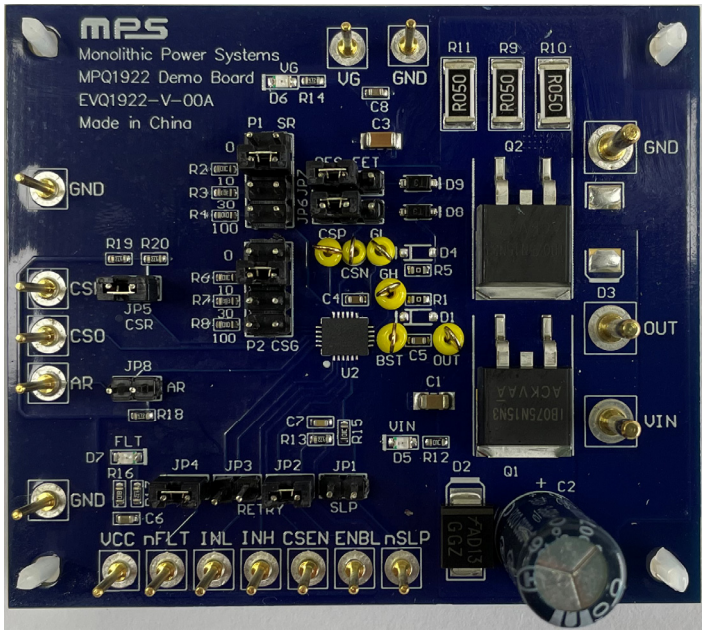
The EVQ1922-V-00A is confirmed for a buck converter. The INH and INL signals are independent of one another.

The MPQ1922 is available in a QFN-22 (4mmx5mm) package.

PERFORMANCE SUMMARY

Parameters	Conditions	Value
Input voltage (V_{IN}) range		5V to 100V
Gate drive supply voltage (V_G) range		5V to 15V
Logic power supply voltage (V_{CC})		3.3V or 5V
CSEN voltage (V_{CSEN})		3.3V or 5V

EVALUATION BOARD



(LxW) 7.5cmx6.5cm

Board Number	MPS IC Number
EVQ1922-V-00A	MPQ1922GVE-AEC1

QUICK START GUIDE

The EVQ1922-V-00A is configured for a buck converter. Follow the steps below to evaluate the device.

1. Preset the gate drive power supply (V_G) between 5V and 15V (12V is recommended).
2. Preset the input power supply (V_{IN}) between V_G and 100V.
3. Connect the gate driver power supply terminals to:
   a. Positive (+): VG
   b. Negative (-): GND
4. Connect the input power supply terminals to:
   a. Positive (+): VIN
   b. Negative (-): GND
5. Connect the logic power supply (V_{CC}) terminals to:
   a. Positive (+): VCC
   b. Negative (-): GND
6. Connect the load to:
   a. Positive (+): OUT
   b. Negative (-): GND
7. Set the INH signal settings:
   a. Logic high: 3.3V or 5V
   b. Logic low: 0V
   c. The recommended switching frequency is 20kHz.

   Set the INL control signal to the reverse INH signal, with a sufficient dead time.
8. Set the current-sense gain using the CSG resistor.
9. Set the output rising/falling edge slew rate using the SR resistor.
10. Turn on the input power supply (V_{IN}) first, then turn on the gate driver power supply (V_G).
11. To turn off the board, follow the steps below:
    a. Turn off the load.
    b. Turn off the gate driver power supply (V_G).
    c. Turn off the input power supply (V_{IN}).

EVALUATION BOARD SCHEMATIC

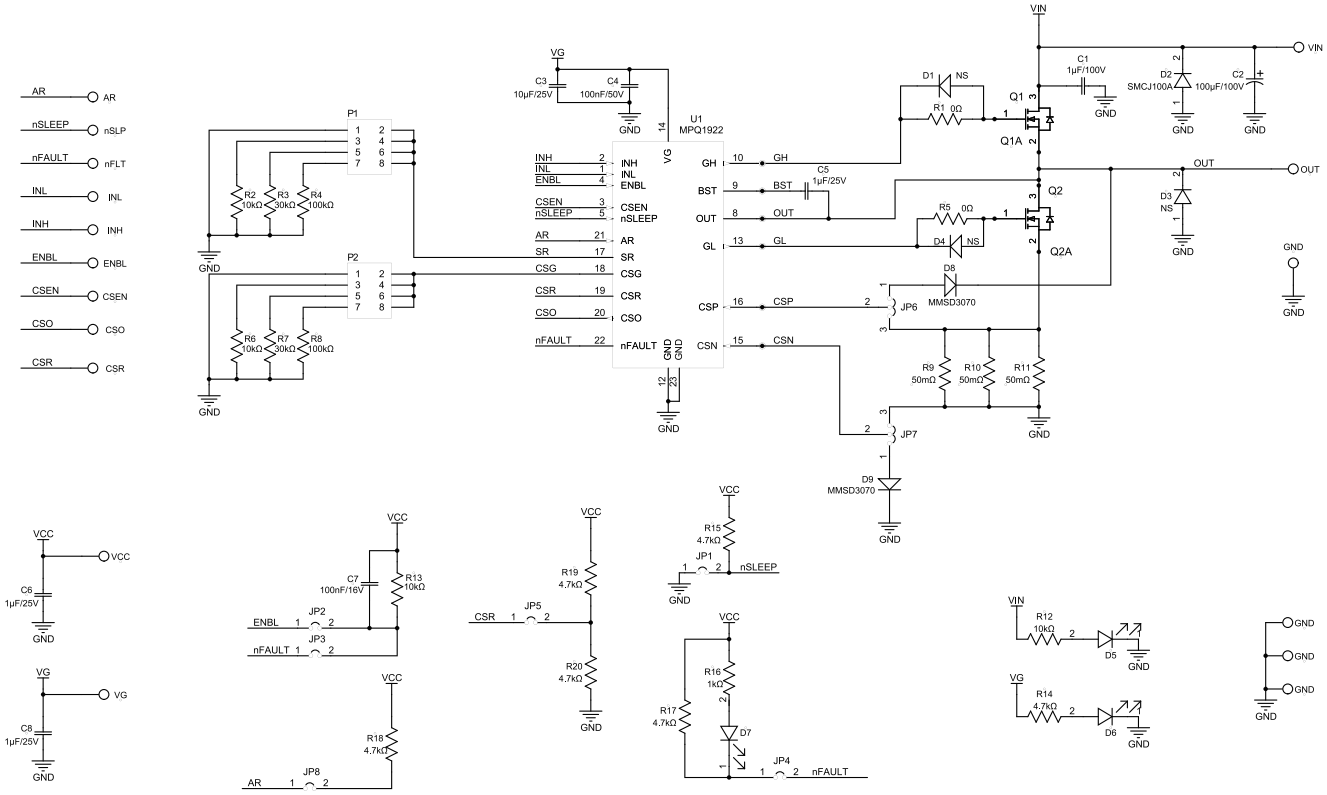


Figure 1: Evaluation Board Schematic

EVQ1922-V-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	C1	1μF	Ceramic capacitor, 100V, X7R	1206	Murata	GRM31CR72A105KA01L
1	C2	100μF	Electrolytic capacitor, 100V	DIP	Jianghai	CD263-100V100
1	C3	10μF	Ceramic capacitor, 25V, X7R	1206	Murata	GRM31CR71E106KA12
1	C4	100nF	Ceramic capacitor, 50V, X7R	0603	Murata	GCJ188R71H104KA12D
3	C5, C6, C8	1μF	Ceramic capacitor, 25V, X5R	0603	Wurth	885012106022
1	C7	100nF	Ceramic capacitor, 16V, X7R	0603	Murata	GRM188R71C104KA01D
2	R1, R5	0Ω	Film resistor, 1%	0603	Yageo	RC0603FR-070RL
4	R2, R6, R12, R13	10kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0710KL
2	R3, R7	30kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-0730KL
2	R4, R8	100kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-07100KL
3	R9, R10, R11	50mΩ	Film resistor, 1%	2512	Yageo	RL2512FK-070R05L
6	R14, R15, R17, R18, R19, R20	4.7kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-074K7L
1	R16	1kΩ	Film resistor, 1%	0603	Yageo	RC0603FR-071KL
3	D1, D3, D4	NS				
1	D2	100V, 9.3A	TVS	DO-214AB	Fairchild	SMCJ100A
3	D5, D6, D7	Red	LED	0805	Baihong	BL-HUE35A-AV-TRB
2	D8, D9	200V, 0.2A	Small signal diode	SOD-123	Fairchild	MMSD3070
2	Q1, Q2	150V, 90A	N-channel MOSFET, 150V, 90A, R_{ON} = 12mΩ, Q_G = 55nC	TO-263	Analog power	AMIB075N15N3-T1-PF
2	Q1A, Q2A	NS				

EVQ1922-V-00A BILL OF MATERIALS *(continued)*

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer PN
1	U1	MPQ1922	100V, half-bridge pre-driver	QFN-22 (4mmx 5mm)	MPS	MPQ1922GVE-AEC1
6	JP1, JP2, JP3, JP4, JP5, JP8	2 bits/ 2.54mm	Connector	DIP	Any	
7	JP2, JP4, JP5, JP6(RES), JP7(RES), P1(second row), P2(second row)	2.54mm	Short jumper	DIP	Any	
2	JP6, JP7	3 bits/ 2.54mm	Connector	DIP	Any	
2	P1, P2	4 bits/ 2.54mm	Double row connector	DIP	Any	
3	VIN, OUT, GND	Φ = 2mm	Connector	DIP	Any	
14	VG, CSR, CSO, AR, VCC, nFLT, INL, INH, CSEN, ENBL, nSLP, GND, GND, GND	Φ = 1mm	Connector	DIP	Any	
6	CSP, CSN, GL, GH, BST, OUT	Yellow	Test point	DIP	Any	

PCB LAYOUT

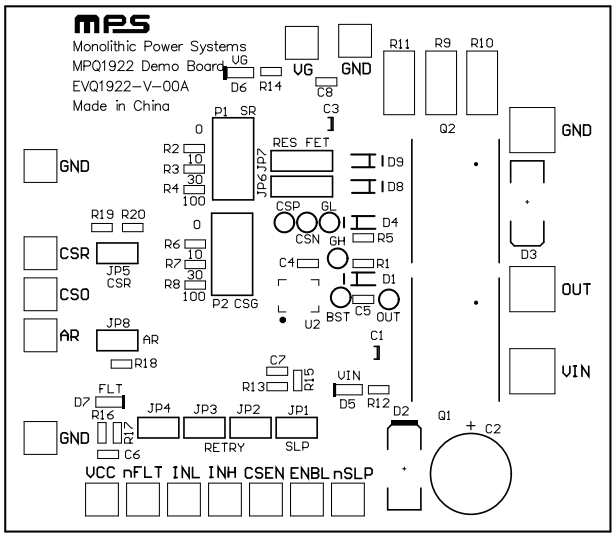


Figure 2: Top Silk

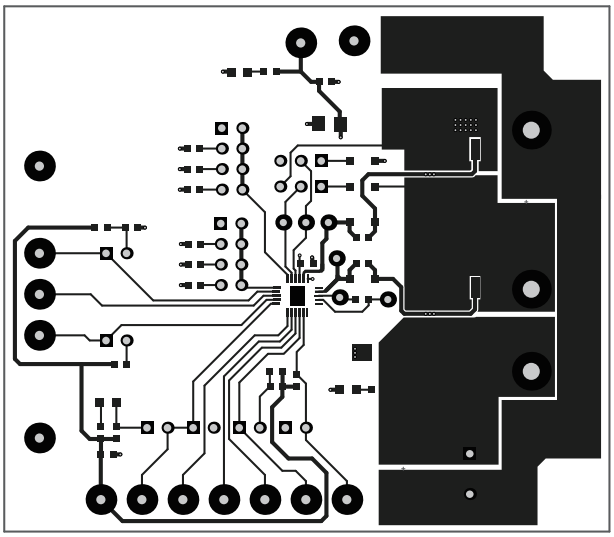


Figure 3: Top Layer

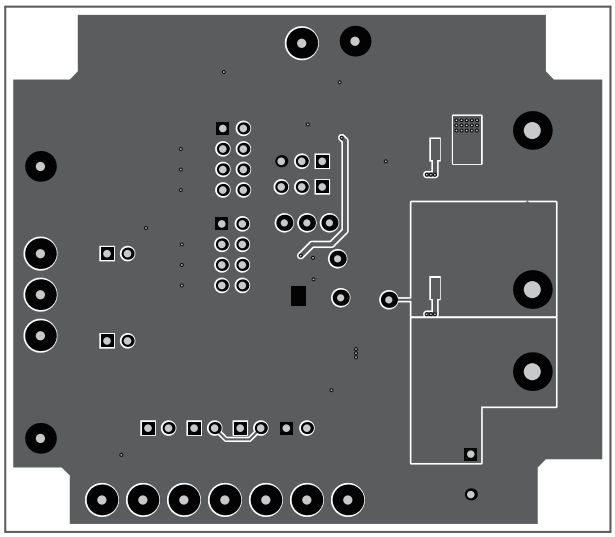


Figure 4: Bottom Layer

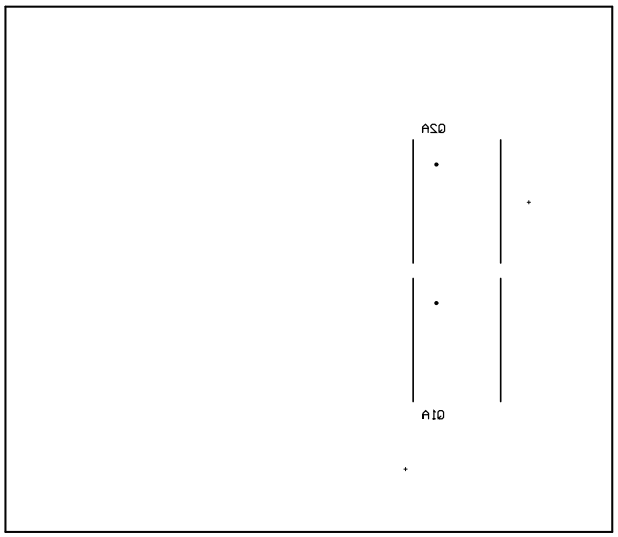


Figure 5: Bottom Silk

REVISION HISTORY

Revision #	Revision Date	Description	Pages Updated
1.0	10/08/2021	Initial Release	-