



The Future of Analog IC Technology®

EV3908DK-01A

High Efficiency Isolated Flyback Converter EV Board

GENERAL DESCRIPTION

The EV3908DK-01A is an evaluation board for the MP3908DK. It is configured to provide a regulated 5V output at up to 5A load current from a 36V-72V input. The output is adjustable by changing feedback resistors on the evaluation board.

MP3908DK features a synchronous gate output which enables high efficiency design by relating the schottky rectifier by a MOSFET.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	36-72	V
Input Current	I_{IN}	0-1	A
Output Voltage	V_{OUT}	5	V
Output Current	I_{OUT}	5	A

FEATURES

- Isolated High Efficiency 25W Design
- Current Mode Control
- Under-Voltage Lockout
- Cycle-by-Cycle Current Limiting
- 10 μ A Shutdown Current
- 180 μ A Quiescent Current
- 250KHz Constant Frequency Operation

APPLICATIONS

- Power over Ethernet (PoE)
- TV CCFL Power Generation
- Telecom Isolated Power
- Brick Modules

All MPS parts are lead-free and adhere to the RoHS directive. For MPS green status, please visit MPS website under Products, Quality Assurance page.

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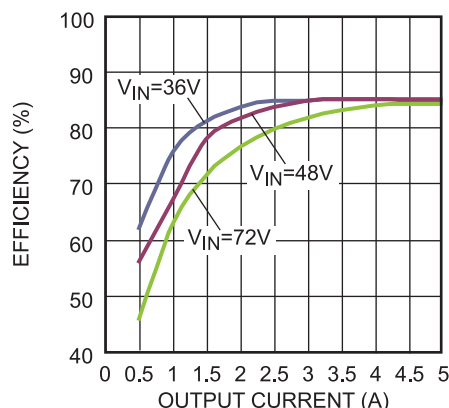
EV3908DK-01A EVALUATION BOARD



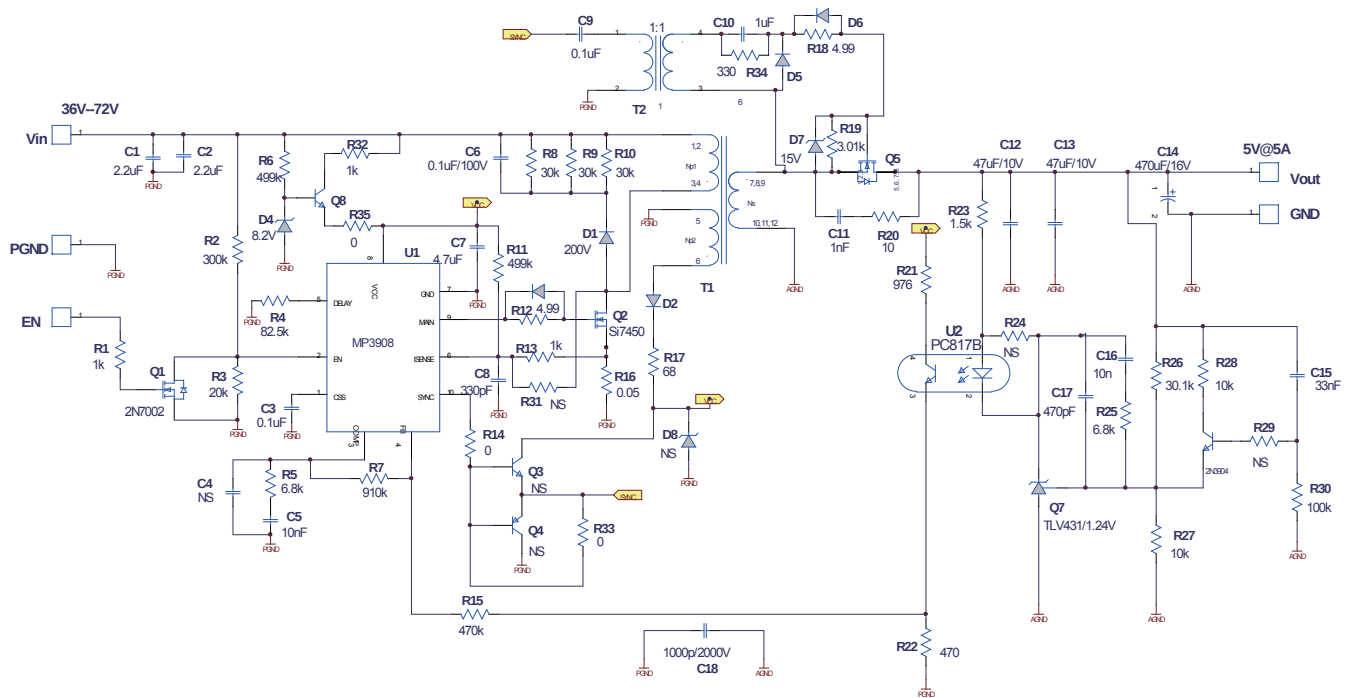
(L x W x H) 2.8" x 1.8" x 0.6"
(7.2cm x 4.5cm x 1.4cm)

Board Number	MPS IC Number
EV3908DK-01A	MP3908DK

Efficiency



EVALUATION BOARD SCHEMATIC



EV3908DK-01A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Part Number
2	C1, C2	2.2uF	Ceramic Cap. 100V X7R	1210	muRata	GRM32ER72A225KA352
2	C3, C9	0.1uF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H104KA93D
1	C4	NS				
1	C6	0.1uF	Ceramic Cap. 100V X7R	0805	muRata	GRM21BR72A104KAC4 L
1	C7	4.7uF	Ceramic Cap. 25V X7R	1206	muRata	GRM31CR71E475KA88L
1	C8	330pF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H331KA01D
1	C10	1uF	Ceramic Cap. 16V X7R	0603	muRata	GRM188R71C105KA12D
1	C11	1nF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H102KA01D
2	C12, C13	47uF	Ceramic Cap. 10V X5R	1210	muRata	GRM32ER61A476KE20L
1	C14	470uF	16V Electrolytic	DIP	Rubycon	470uF/16V
1	C15	33nF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H333KA61D
2	C5, C16	10nF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H103KA01D
1	C17	470pF	Ceramic Cap. 50V X7R	0603	muRata	GRM188R71H471KA01D
1	C18	1nF	Ceramic Cap. 2000V X7R	1812	muRata	GR442QR73D102KW01L
3	R1, R13, R32	1k	Film Resistor 1%	603	Yageo	RC0603FR-071KL
1	R2	300k	Film Resistor 1%	603	Yageo	RC0603FR-07300KL
1	R3	20k	Film Resistor 1%	603	Yageo	RC0603FR-0720KL
1	R4	82.5k	Film Resistor 1%	603	Yageo	RC0603FR-0782K5L
4	R5, R25	6.8k	Film Resistor 1%	603	Yageo	RC0603FR-076K8L
3	R24, R29, R31	NS				
1	R7	910k	Film Resistor 1%	603	Yageo	RC0603JR-07910KL
3	R8, R9, R10	30k	Film Resistor 5%	805	Yageo	RC0805JR-0730KL
1	R6, R11	499k	Film Resistor 1%	603	Yageo	RC0603FR-07499KL
2	R12, R18	4.99R	Film Resistor 1%	603	Yageo	RC0603FR-074R99L
3	R14, R33, R35	0R	Film Resistor 5%	603	Yageo	RC0603JR-070RL
1	R15	470k	Film Resistor 1%	603	Yageo	RC0603JR-07470KL
1	R16	50mΩ	Strip Resistor 1%	1206	CYNTEC	RL1632H-R050-FN
1	R17	68R	Film Resistor 5%	805	Any	
1	R19	3.01k	Film Resistor 1%	603	Yageo	RC0603FR-073K01L
1	R20	10R	Film Resistor 5%	805	Yageo	RC0805JR-0710RL
1	R21	976R	Film Resistor 1%	603		RC0603FR-07976RL
1	R22	470R	Film Resistor 1%	603	Yageo	RC0603FR-07470RL
1	R23	1.5k	Film Resistor 1%	603	Yageo	RC0603FR-071K5L
4	R27, R28	10k	Film Resistor 1%	603	Yageo	RC0603FR-0710KL
1	R26	30.1k	Film Resistor 1%	603	Yageo	RC0603FR-0730K1L

EV3908DK-01A BILL OF MATERIALS (continued)

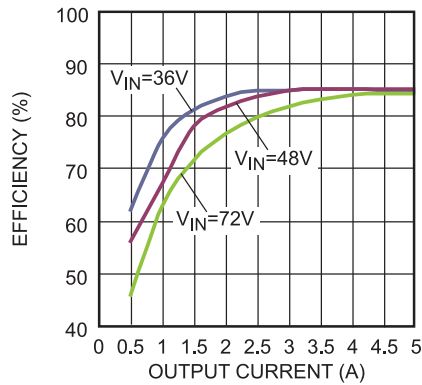
Qty	Ref	Value	Description	Package	Manufacturer	Part Number
1	R30	100k	Film Resistor 1%	603	Yageo	RC0603FR-07100KL
1	R34	330R	Film Resistor 1%	603	Yageo	RC0603JR-07330RL
1	D1	BAV21	Switching Diode 200V 200mW	SOD-123	Diodes Inc	BAV21W-7-F
4	D2, D3, D5, D6	1N4148	Switching Diode 75V 250mW	SOD-323	Diodes Inc	1N4148WS-7
1	D4	8.2V	Diode Zener 8.2V	SOD-123	Diodes Inc	BZT52C8V2
1	D7	15V	Diode Zener 15V	SOD-123	Diodes Inc	BZT52C15
1	D8	NS				
1	Q1	2N7002	N-CH MOSFET	SOT-23	Diodes Inc	2N7002-F
1	Q2	SI7450	N-CH MOSFET 200V 5.3A	PowerPAK SO-8	Vishay Siliconix	Si7450
2	Q3, Q4	NS				
1	Q5	SI4840	N-CH MOSFET 40V 14A	SO-8	Vishay Siliconix	Si4840
2	Q6,Q8	NPN	NPN 40V 350mA	SOT-23	Fairchild	MMBT3904FSCT
1	Q7	TLV431A	REG VLT ADJ 1.24V	SOT-23-5	Zetex Inc	TLV431A
1	U1	MP3908DK	DC-DC Converter	MSOP10	MPS	MP3908DK
1	U2	PC817B	PHOTOCOUP	SMD	SHARP	PC817B
1	T1	Transformer	POWER STAGE TRANSFORMER	SMD	WURTH	7491194501
1	T2	Transformer	DRIVER TRANSFORMER	SMD	WURTH	750340060

EVB TEST RESULTS

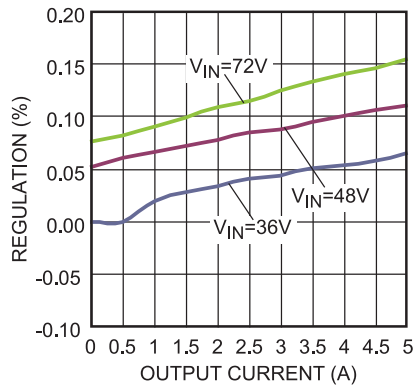
Performance waveforms are tested on the EV3908DK-01A evaluation board.

$V_{IN}=48V$, $V_{OUT}=5V$, $I_{OUT}=5A$, $T_A=25^{\circ}C$, unless otherwise noted.

Efficiency

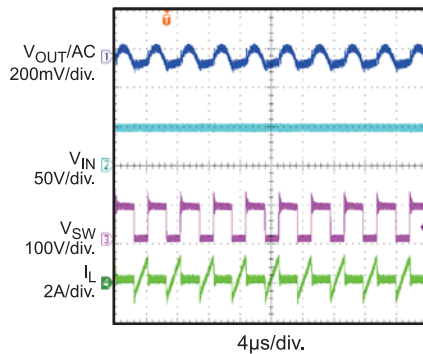


Load Regulation



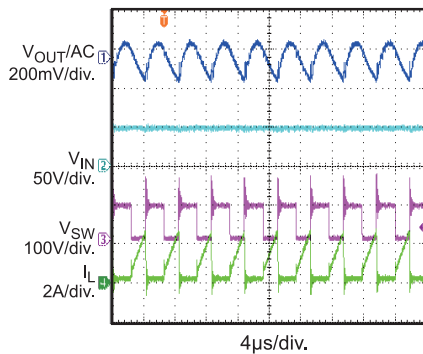
Steady State

$I_{OUT} = 0A$



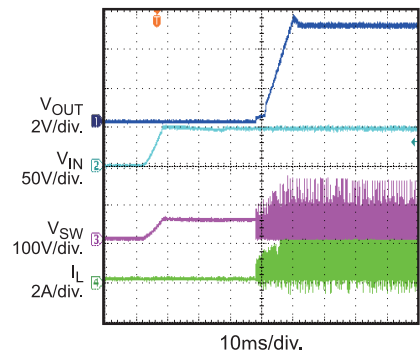
Steady State

$I_{OUT} = 5A$



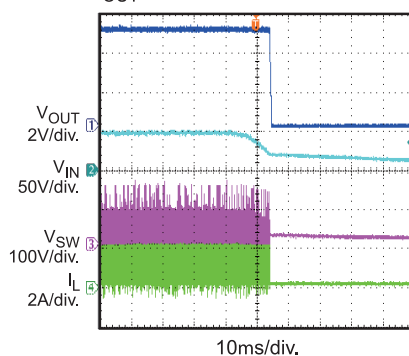
VIN Startup

$I_{OUT} = 5A$



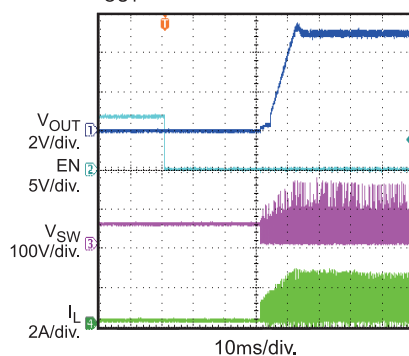
VIN Shutdown

$I_{OUT} = 5A$



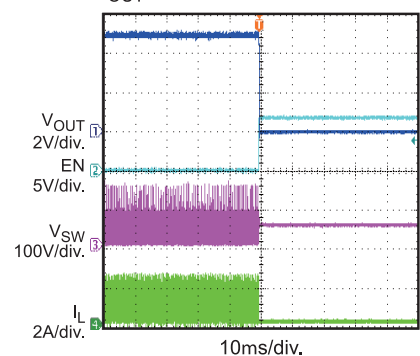
EN Start Up

$I_{OUT} = 5A$



EN Shutdown

$I_{OUT} = 5A$



PRINTED CIRCUIT BOARD LAYOUT

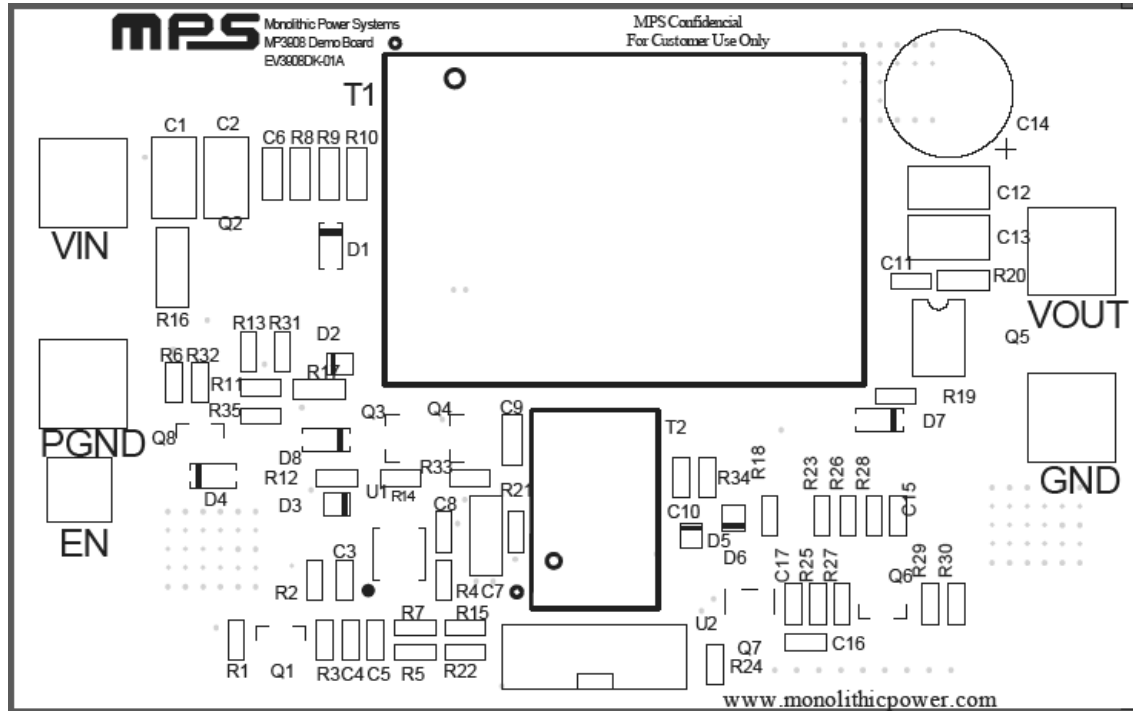


Figure 1: Top Silk Layer

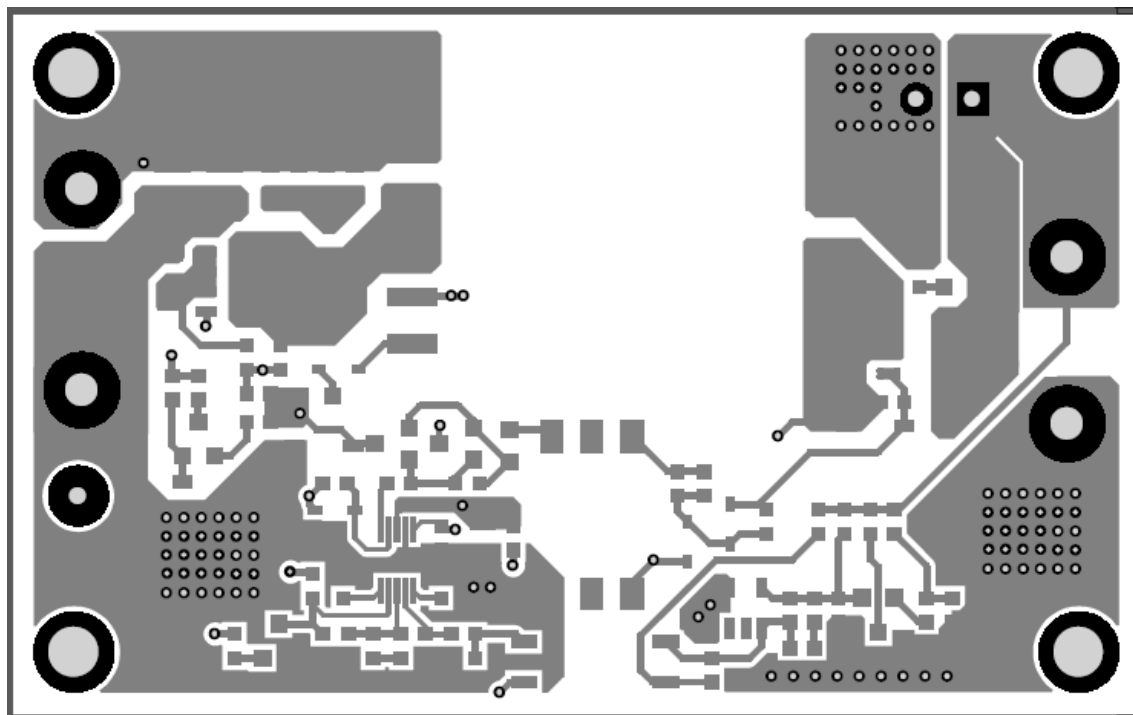


Figure 2: Top Layer

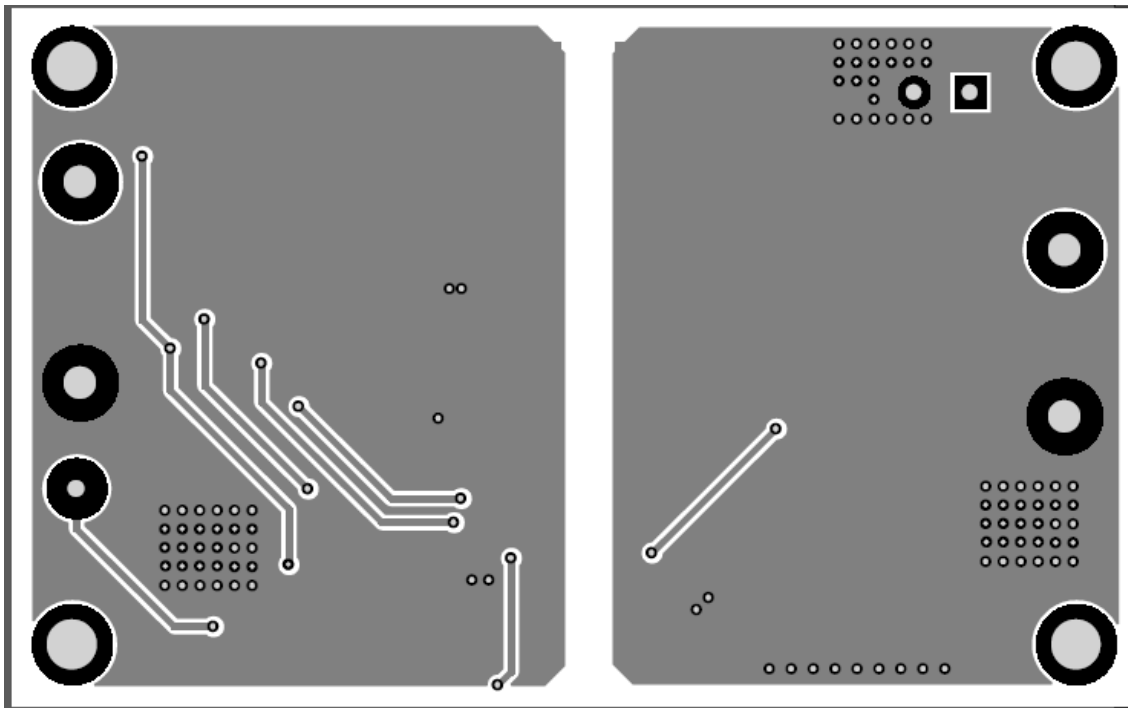


Figure 3: Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to VOUT and GND pins, respectively.
2. Preset the power supply output to 36V – 72V and turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to the VIN and GND pins, respectively.
4. Turn the power supply on. The board will automatically startup.
5. To use the Enable function, apply a digital input to EN pin. Drive EN higher than 2V to turn off the regulator, drive EN less than 2V to turn it on.

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