



The Future of Analog IC Technology®

EV3908DK-00C

High Efficiency Isolated Flyback Converter EV Board

DESCRIPTION

The EV3908DK-00C is an evaluation board for the MP3908DK. It is configured to provide a regulated 3.3V output at up to 7.5A 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_O | 3.3 | V |
| Output Current | I_O | 7.5 | A |

FEATURES

- Isolated high efficiency 25W design
- Current Mode Control
- Under-Voltage Lockout
- Cycle-by-Cycle Current Limiting
- 10µA Shutdown Current
- 180µA Quiescent Current
- 250KHz Constant Frequency Operation

APPLICATIONS

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

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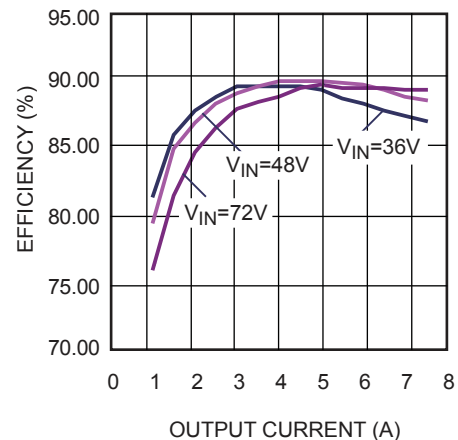
EV3908DK-00C EVALUATION BOARD



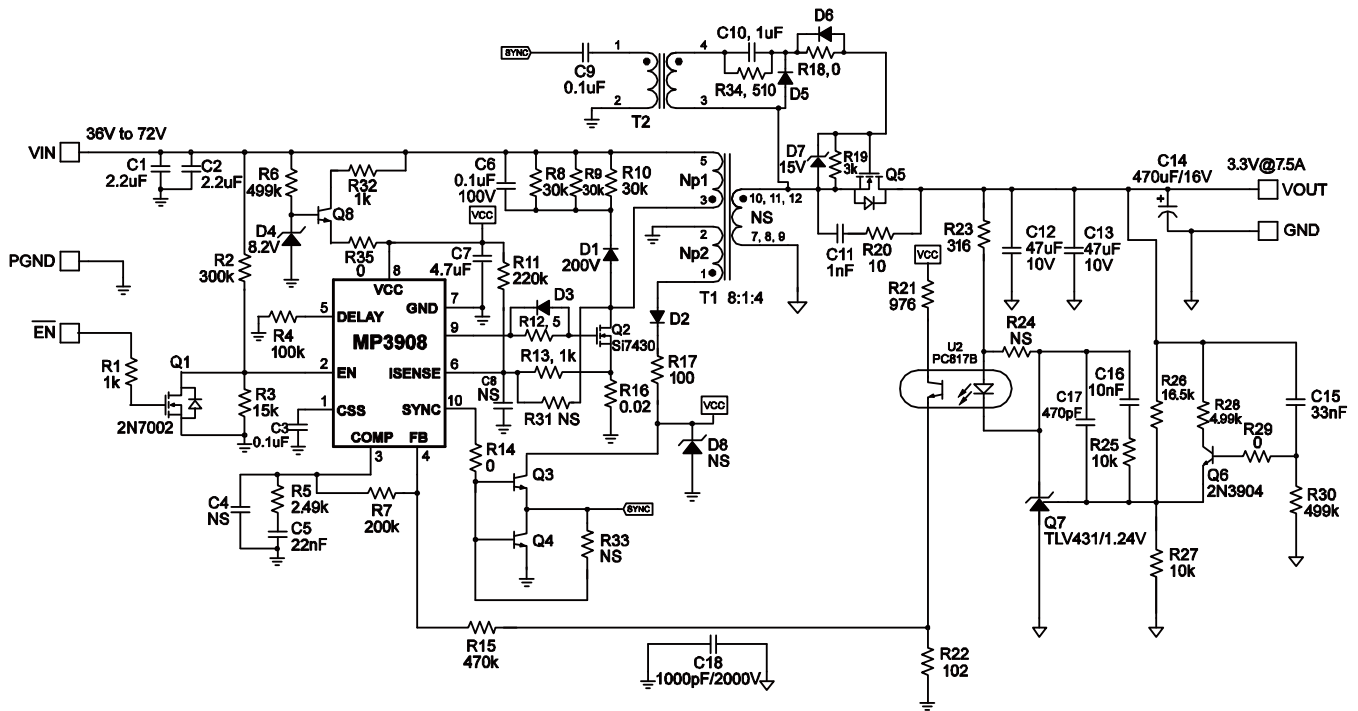
(L x W x H) 2.6" x 1.8" x 0.6"
6.7cm x 4.6cm x 1.4cm

| Board Number | MPS IC Number |
|--------------|---------------|
| EV3908DK-00C | MP3908DK |

Efficiency vs. Output Current



EVALUATION BOARD SCHEMATIC



EV3908DK-00C BILL OF MATERIALS

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|----------------|-------|------------------------|---------|--------------|------------------|
| 2 | C1,C2 | 2.2uF | Ceramic Cap. 100V X7R | 1210 | TDK | C3225X7R2A225K |
| 2 | C3,C9 | 0.1uF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H104K |
| 2 | C4,C8 | NS | | | | |
| 1 | C5 | 22nF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H223K |
| 1 | C6 | 0.1uF | Ceramic Cap. 100V X7R | 0805 | TDK | C2012X7R2A104K |
| 1 | C7 | 4.7uF | Ceramic Cap. 25V X7R | 1206 | TDK | C3216X7R1E475K |
| 1 | C10 | 1uF | Ceramic Cap. 16V X7R | 0603 | TDK | C1608X7R1C105K |
| 1 | C11 | 1nF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H102K |
| 2 | C12,C13 | 47uF | Ceramic Cap. 10V X5R | 1210 | TDK | C3225X5R1A476M |
| 1 | C14 | 470uF | 16V Electrolytic | DIP | | |
| 1 | C15 | 33nF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H333K |
| 1 | C16 | 10nF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H103K |
| 1 | C17 | 470pF | Ceramic Cap. 50V X7R | 0603 | TDK | C1608X7R1H471K |
| 1 | C18 | 1nF | Ceramic Cap. 2000V X7R | 1812 | TDK | C4520X7R3D102K |
| 3 | R1,R13, R32 | 1k | Film Resistor 1% | 0603 | Yageo | RC0603FR-071KL |
| 1 | R2 | 300k | Film Resistor 1% | 0603 | Yageo | RC0603FR-07300KL |
| 1 | R3 | 15k | Film Resistor 1% | 0603 | Yageo | RC0603FR-0715KL |

EV3908DK-00C BILL OF MATERIALS (continued)

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|---------------------|----------|-------------------------------|------------------|---------------------|------------------|
| 1 | R4 | 100k | Film Resistor 1% | 0603 | Yageo | RC0603FR-07100KL |
| 1 | R5 | 2.49k | Film Resistor 1% | 0603 | Yageo | RC0603FR-072K49L |
| 3 | R24,R31,R33 | NS | | | | |
| 2 | R6,R30 | 499k | Film Resistor 1% | 0603 | Yageo | RC0603FR-07499KL |
| 1 | R7 | 200k | Film Resistor 5% | 0603 | Yageo | RC0603JR-07200KL |
| 3 | R8,R9,R10 | 30k | Film Resistor 5% | 0805 | Yageo | RC0805JR-0730KL |
| 1 | R11 | 220k | Film Resistor 1% | 0603 | Yageo | RC0603FR-07220KL |
| 1 | R12 | 5.1 | Film Resistor 5% | 0603 | Yageo | RC0603JR-075R1L |
| 4 | R14,R18,R29, R35 | 0 | Film Resistor 5% | 0603 | Yageo | RC0603JR-070RL |
| 1 | R15 | 470k | Film Resistor 5% | 0603 | Yageo | RC0603JR-07470KL |
| 1 | R16 | 20mΩ | Strip Resistor 1% | 1206 | Vishay | WSL1206-18 |
| 1 | R17 | 100 | Film Resistor 5% | 0603 | Yageo | RC0603JR-07100RL |
| 1 | R19 | 3.01k | Film Resistor 1% | 0603 | Yageo | RC0603FR-073K01L |
| 1 | R20 | 10 | Film Resistor 5% | 0805 | Yageo | RC0805JR-0710RL |
| 1 | R21 | 976 | Film Resistor 1% | 0603 | | RC0603FR-07976RL |
| 1 | R22 | 102 | Film Resistor 1% | 0603 | Yageo | RC0603FR-07102RL |
| 1 | R23 | 316 | Film Resistor 1% | 0603 | Yageo | RC0603FR-07316RL |
| 2 | R25,R27 | 10k | Film Resistor 1% | 0603 | Yageo | RC0603FR-0710KL |
| 1 | R26 | 16.5k | Film Resistor 1% | 0603 | Yageo | RC0603FR-0716K5L |
| 1 | R28 | 4.99k | Film Resistor 1% | 0603 | Yageo | RC0603FR-074K99L |
| 1 | R34 | 510 | Film Resistor 5% | 0603 | Yageo | RC0603JR-07510RL |
| 1 | D1 | BAV21 | Switching Diode 200V 200mW | SOD-123 | Diodes Inc | BAV21W-7-F |
| 4 | D2,D3,D5,D6 | 1N4148 | Switching Diode 75V 250mW | SOD323 | 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 | | |
| 1 | Q2 | Si7430 | N-CH MOSFET 150V 45mΩ | PowerPAK SO-8 | Vishay Siliconix | Si7430DP |
| 1 | Q4 | PNP | Transistor PNP 40V 350mA | SOT-23 | Fairchild | MMBT3906FSCT |
| 1 | Q5 | Si4166 | N-CH MOSFET 30V 3.2mΩ | SO-8 | Vishay Siliconix | Si4166DY |
| 2 | Q3,Q6 | NPN | Transistor NPN 40V 350mA | SOT-23 | Fairchild | MMBT3904FSCT |
| 1 | Q7 | TLV431A | REG VLT ADJ 1.24V | SOT-23-5 | Zetex Inc | TLV431A |
| 1 | Q8 | NPN | Transistor PNP 80V 500mA | SOT-23 | Diodes Inc | MMBTA06LT1G |
| 1 | U1 | MP3908DK | BOOST | MSOP10 | MPS | MP3908DK |

EV3908DK-00C BILL OF MATERIALS *(continued)*

| Qty | Ref | Value | Description | Package | Manufacturer | Manufacturer P/N |
|-----|-----|--------|--|---------|--------------|------------------|
| 1 | U2 | PC817B | PHOTOCOUP | SMD | SHARP | PC817B |
| 1 | T1 | | Power Transformer Lm=120uH Pri:Sec:Aux=8:1:4 | SMD | Cooper | CTX01-18290-R |
| 1 | T2 | | DRIVER TRANSFORMER | SMD | WURTH | 750340060 |

PRINTED CIRCUIT BOARD LAYOUT

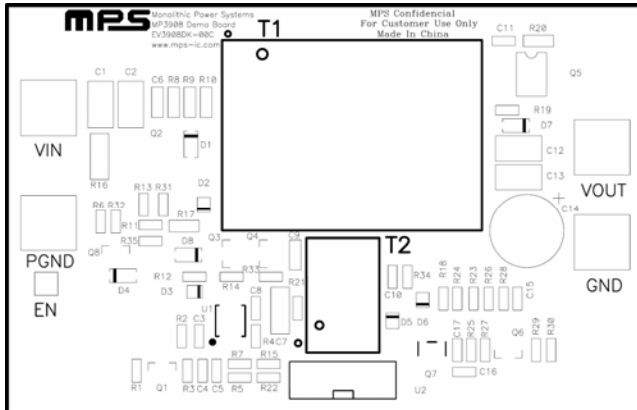


Figure 1—Top Silk Layer

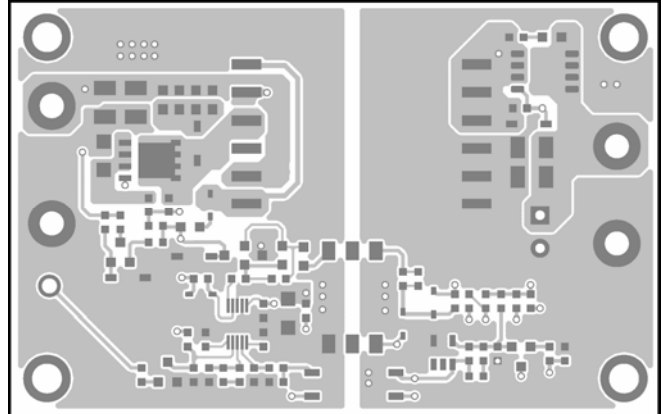


Figure 2—Top Layer

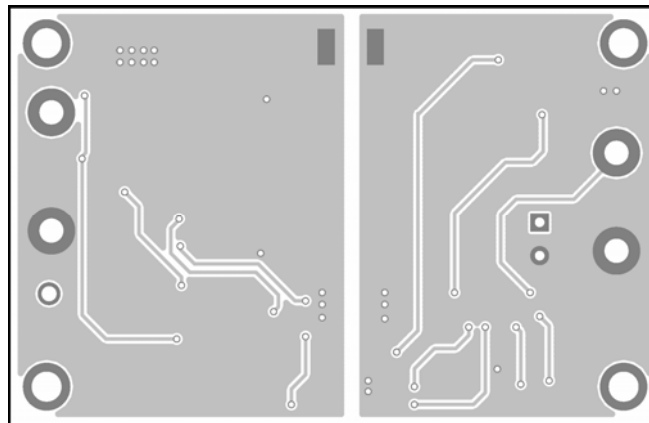


Figure 3—Bottom Layer

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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