



The Future of Analog IC Technology®

EV3900DK-00D

High Efficiency Flyback Converter EV Board

DESCRIPTION

The EV3900DK-00D is an evaluation board for the MP3900DK. It is configured to provide a regulated 5V output at up to 3A load current from a 18V-72V input. The output is adjustable by changing feedback resistors on the evaluation board. MOSFET $R_{ds,on}$ can be directly used for current sense purpose without an external sense resistor.

Although the demo board uses the external 50mΩ to sense the current, it also provides the stuffing option for users who want to use the R_{DS-ON} as the sense element.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input voltage	V_{IN}	18–72	V
Input current	I_{IN}	0–1.5	A
Output voltage	V_O	5	V
Output Current	I_o	3	A

FEATURES

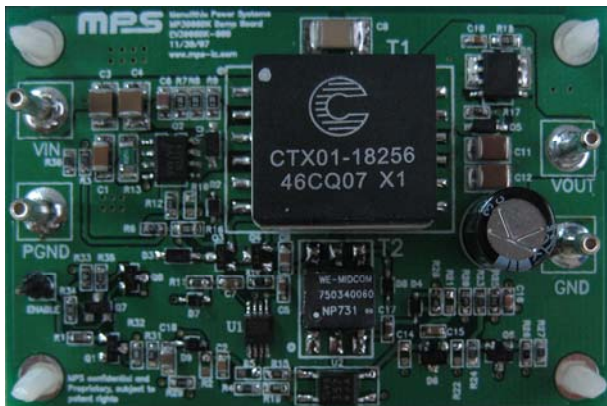
- Current Mode Control
- Under-Voltage Lockout
- Cycle-by-Cycle Current Limiting
- Lossless Current Sense ($V_{ISENSE} < 30V$)
- 10μA Shutdown Current
- 180μA Quiescent Current
- 330KHz Constant Frequency Operation

APPLICATIONS

- TV CCFL Power Generation
- Telecom Isolated Power
- Brick Modules

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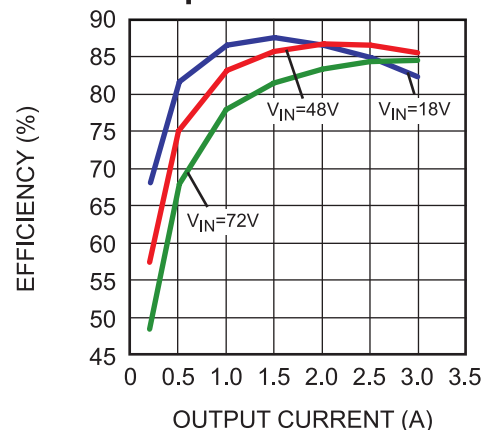
EV3900DK-00D EVALUATION BOARD



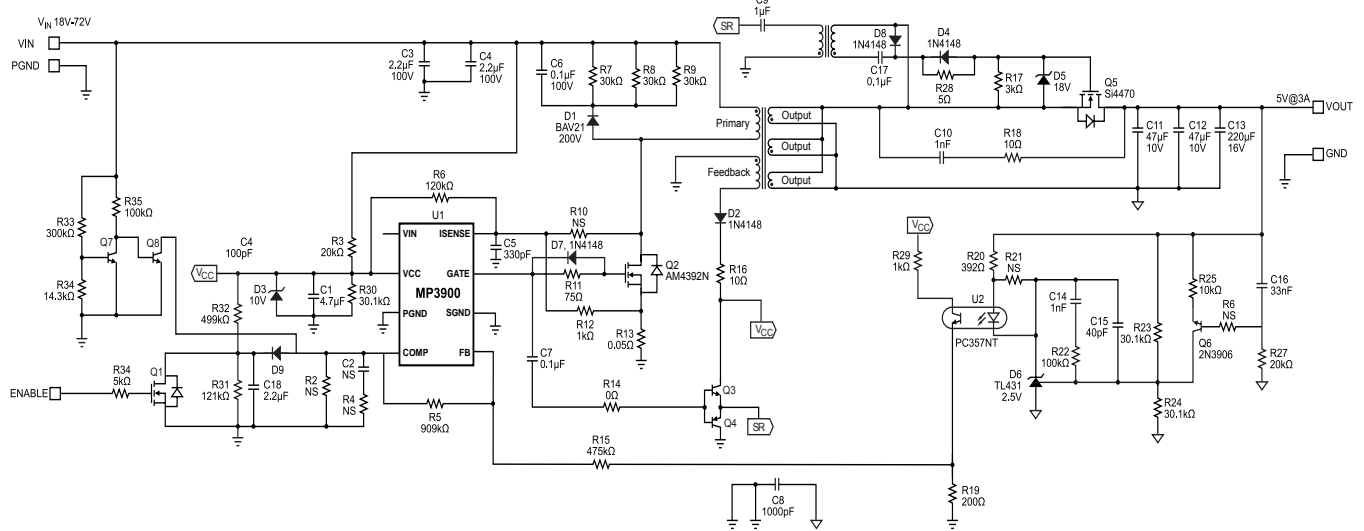
(L x W x H) 2.6" x 1.8" x 0.6"
6.7cm x 4.6cm x 1.4cm

Board Number	MPS IC Number
EV3900DK-00D	MP3900DK

Efficiency vs. Output Current



EVALUATION BOARD SCHEMATIC



EV3900DK-00D BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	C1	4.7 μ F	Ceramic Cap., 25V X7R	CAP1206	TDK	C3216X7R1E475K
1	C2	NS	Not Stuffed			
2	C3, C4	2.2 μ F	Ceramic Cap., 100V X7R	CAP1210	muRata	GRM32ER72A225K A352
1	C5	330pF	Ceramic Cap., 50V X7R	CAP0603	TDK	C1608X7R1H331K
1	C6	0.1 μ F	Ceramic Cap., 100V X7R	CAP0805	TDK	C2012X7R2A104K
1	C8	1000pF	Ceramic Cap., 2000V X7R	CAP1812	TDK	C4520X7R3D102K
1	C9	1 μ F	Ceramic Cap., 16V X7R	CAP0603	TDK	C1608X7R1H105K
2	C10, C14	1nF	Ceramic Cap., 50V X7R	CAP0603	TDK	C2012X7R1H102K
2	C11, C12	47 μ F	Ceramic Cap., 10V X5R	CAP1210	TDK	C3225X5R1C475K
1	C13	220 μ F	16V Electrolytic	DIP		
1	C15	40pF	Ceramic Cap., 50V X7R	CAP0603	TDK	C1608X7R1H400K
1	C16	33nF	Ceramic Cap., 50V X7R	CAP0603	TDK	C1608X7R1H333K
2	C7, C17	0.1 μ F	Ceramic Cap., 50V X7R	CAP0603	TDK	C1608X7R1H104K
1	C18	2.2 μ F	Ceramic Cap., 25V X7R	CAP0805	TDK	C2012X7R1H225K
1	R1	5k Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-075KL
5	R2, R4, R10, R17, R21	NS	Not Stuffed			
1	R3	40k Ω	Film Resistor 5%	RES0603	Yageo	RC0603FR-0740KL
1	R5	909k Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-07909KL
1	R6	120k Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-07120KL

EV3900DK-00D BILL OF MATERIALS (continued)

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
3	R7, R8, R9	30kΩ	Film Resistor 5%	RES0805	Yageo	RC0805JR-0730KL
2	R11, R28	4.99Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-074R99L
2	R12, R29	1kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-071KL
1	R13	50mΩ	Strip Resistor 1%	RES1206	CYNTEC	RL1632H-R050-FN
3	R14, R16, R18	10Ω	Film Resistor 5%	RES0805	Yageo	RC0805JR-0710RL
1	R15	475kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-07475KL
1	R17	3.01kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-073K01L
1	R19	200Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-07200RL
1	R20	392Ω	Film Resistor 1%	RES0603	Yageo	RC0603FR-07392RL
2	R22, R35	100kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-07100KL
4	R23, R24, R27, R30	30.1kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-0730K1L
1	R25	10kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-0710KL
1	R26	0Ω	Film Resistor 5%	RES0603	Yageo	RC0805JR-070RL
1	R31	121kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-07121KL
1	R32	499kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-07499KL
1	R33	300kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-07300KL
1	R34	14.3kΩ	Film Resistor 1%	RES0603	Yageo	RC0603FR-0714K3L
1	D1	BAV21	Switching Diode 200V 200mW	SOD-123	Diodes Inc	BAV21W-7-F
5	D2, D4, D7, D8, D9	1N4148	Switching Diode 75V 250mW	SOT-23	Diodes Inc	1N4148WS-7
1	D3	10V	DIODE ZENER 10V	SOD-123	Diodes Inc	BZT52C10
1	D5	18V	DIODE ZENER 18V	SOD-123	Diodes Inc	BZT52C18
1	D6	TL431	REG VLT ADJ 2.5V	SOT-23	Zetex Inc	TL431
1	Q1	2N7002	N-CH MOSFET	SOT-23		
1	Q2	AM4392N	N-CH MOSFET 150V 3.9A	SO-8	ANALOG POWER	AM4392N
4	Q3, Q6, Q7, Q8	NPN	Transistor NPN 40V 350mA	SOT-23	Fairchild	MMBT3904FSCT
1	Q4	PNP	Transistor PNP 40V 200mA	SOT-23	Fairchild	MMBT3906FSCT

EV3900DK-00D BILL OF MATERIALS (continued)

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
1	Q5	Si4470EY	N-CH MOSFET 60V 12.7A	SO-8	Vishay Siliconix	Si4470EY
1	U1		BOOST	MSOP8	MPS	MP3900DK
1	U2	PC357NT	PHOTOCOUP	SMD	SHARP	PC357NT
1	T1	POWER STAGE TRANSFO RMER	Np:Ns:Aux=3:1:2	SMD	Cooper	CTX01-18256-R
1	T2	Gatedriver Transform er		SMD	Würth	750340060

PRINTED CIRCUIT BOARD LAYOUT

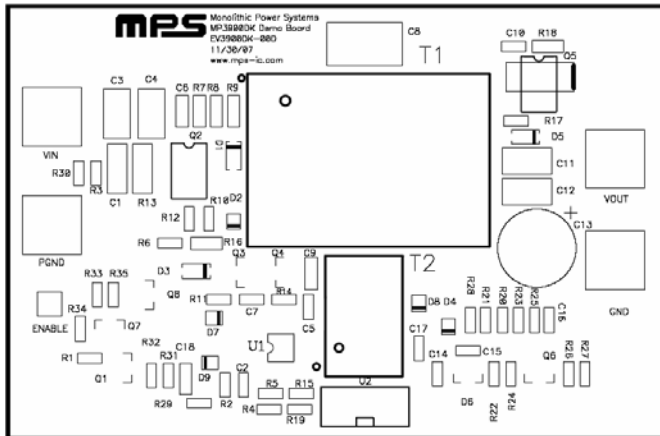


Figure 1—Top Silk Layer

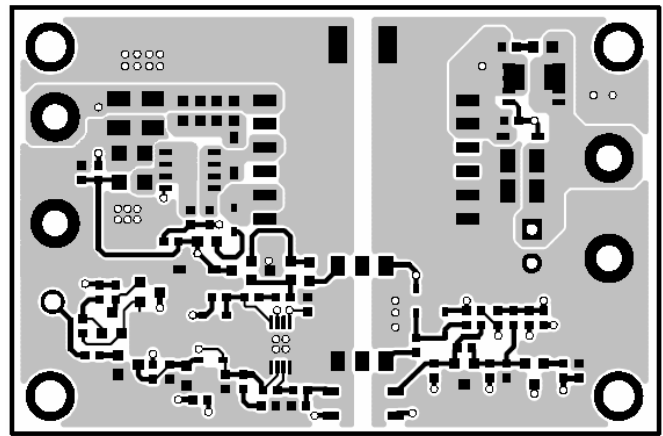


Figure 2—Top Layer

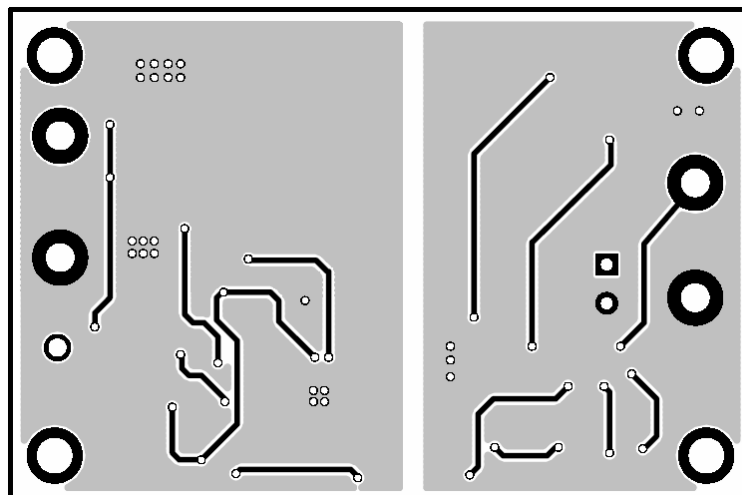


Figure 3—Bottom Layer

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 18V – 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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