

DESCRIPTION

The EV86963DUT-00A is an evaluation board for the MP86963, a monolithic Half Bridge with built in internal power MOSFETs and gate drivers.

It achieves 20A continuous output current over a wide input supply range of 5V to 21V. Integration of the Driver and MOSFETs results in high efficiency due to optimal dead time control and parasitic inductance reduction.

The MP86963, available in an 18-pin QFN, is ideal for notebook applications where efficiency and small size are a premium.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V _{IN}	5 – 21	V
Output Voltage	V _{OUT}	1.2	V
Output Current	I _{OUT}	20	A
Switching Frequency	F _s	600	kHz

FEATURES

- Wide 5V to 21V Operating Input Range
- 20A Output Current
- Operation from 100kHz to 1MHz
- Adjustable output from 0.85V to 1.8V
- Fully assembled and tested

APPLICATIONS

- Notebook CPU Core Regulators
- Graphic Card Core Regulators

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EV86963DUT-00A EVALUATION BOARD

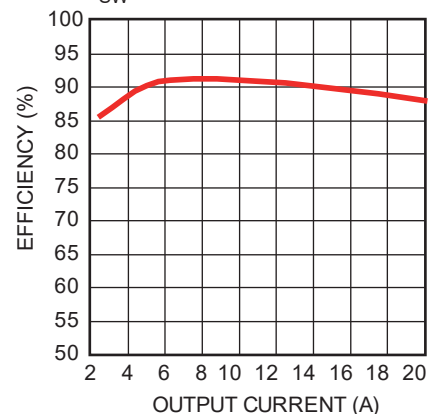


(L x W x H) 2.75" x 2.3" x 0.5"
(7.0cm x 5.8cm x 1.3cm)

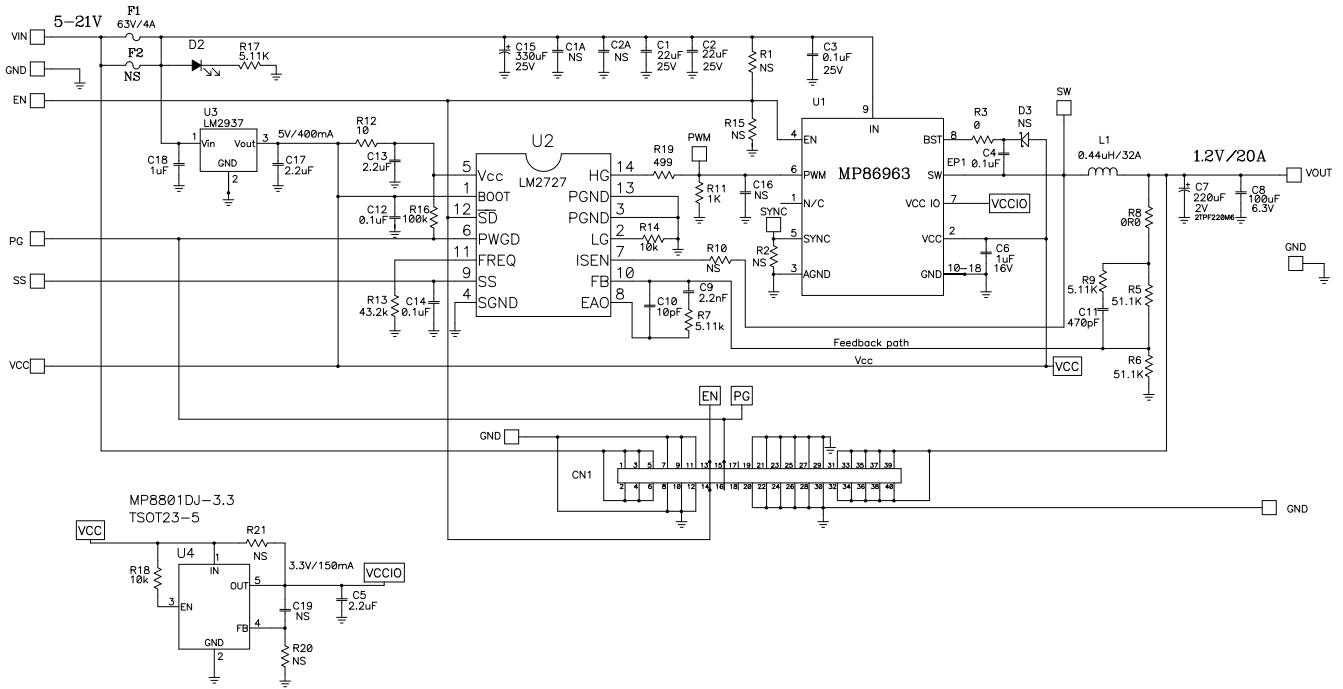
Board Number	MPS IC Number
EV86963DUT-00A	MP86963DUT

Efficiency vs. Output Current

F_{SW}=600kHz



EVALUATION BOARD SCHEMATIC



EV86963DUT-00A BILL OF MATERIALS

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1,C2	22 μ F	Ceramic Cap, 25V, X7R	1210	MuRata	GRM32ER71E226KA
0	C1A,C2A,C16,C19	NS				
1	C3	0.1 μ F	Ceramic Cap, 25V, X7R	0805	MuRata	GRM21BR71E104KA
3	C4,C12,C14	0.1 μ F	Ceramic Cap, 25V, X7R	0603	MuRata	GRM188R71E104KA
3	C5,C13,C17	2.2 μ F	Ceramic Cap, 6.3V, X7R	0603	MuRata	GRM188R70J225KA
2	C6,C18	1 μ F	Ceramic Cap, 25V, X7R	0805	MuRata	GRM21BR71C105KA
1	C7	220 μ F	2V PosCap, ESR=6m Ω	D2E	SANYO	2TPF220M6
1	C8	100 μ F	Ceramic Cap, 6.3V, X7R	1210	MuRata	GRM32ER60J107ME
1	C9	2.2nF	Ceramic Cap, 16V, X7R	0603	MuRata	GRM188R71C222KA
1	C10	10pF	Ceramic Cap, 16V, X7R	0603	MuRata	GRM188R71C100KA
1	C11	470pF	Ceramic Cap, 16V, X7R	0603	MuRata	GRM188R71C471KA
1	C15	330 μ F	25V Elec. Alu. Cap	JA0	Chemicon	EMZE250ADA331MJA0G
0	R1,R2,R10, R15,R20,R21	NS		0603		
2	R3,R8	0R0	Film Res., 5%	0603	Yageo	RC0603JR-070RL
2	R5,R6	51.1k	Film Res., 1%	0603	Yageo	RC0603FR-0751K1L
2	R7,R9	5.11k	Film Res., 1%	0603	Yageo	RC0603FR-075K11L
1	R11	1k	Film Res., 1%	0603	Yageo	RC0603FR-071KL
1	R12	10 Ω	Film Res., 5%	0603	Yageo	RC0603JR-0710RL
1	R13	43.2k	Film Res., 1%	0805	Yageo	RC0805FR-0743K2L
2	R14, R18	10k	Film Res., 1%	0603	Yageo	RC0603FR-0710KL
1	R16	100k	Film Res., 5%	0603	Yageo	RC0603JR-07100KL
1	R17	5.11k	Film Res., 1%	0805	Yageo	RC0805FR-075K11L
1	R19	499	Film Res., 1%	0603	Yageo	RC0603FR-07499RL
1	D2	Vin indicator	LED Green, Surface Mount	0805	Panasonic	LNJ306G5URA
0	D3	NS		SOD123		
1	F1	4A	63V/4A Fast SMD 1206 Fuse	1206	VISHAY	MFU1206FF04000P100
0	F2	NS				
1	L1	0.44 μ H	Ferrite Inductor DCR=0.32m Ω , Isat=37A	SML 13x14mm	Cooper	FP1308R1-R44-R

EV86963DUT -00A BILL OF MATERIALS (continued)

Qty	RefDes	Value	Description	Package	Manufacturer	Manufacturer P/N
1	U1	MP86963	Intelli-Phase	FCQFN-18-L 5X5MM	MPS	MP86963DUT
1	U2	LM2727	Synchronous Buck Controller	TSSOP-14	National Semiconductor	LM2727-MTC14
1	U3	LM2937	Voltage Regulator	SOT223	National Semiconductor	LM2937IMP-5.0
1	U4	MP8801	Voltage Regulator	TSOT23-5	MPS	MP8801DJ-3.3

PRINTED CIRCUIT BOARD LAYOUT

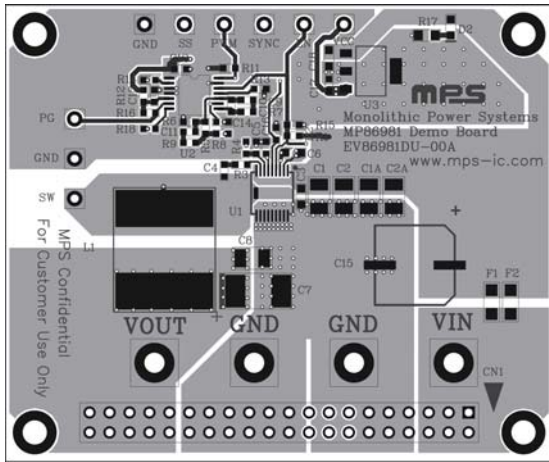


Figure 1— Top and Top Silk Layer

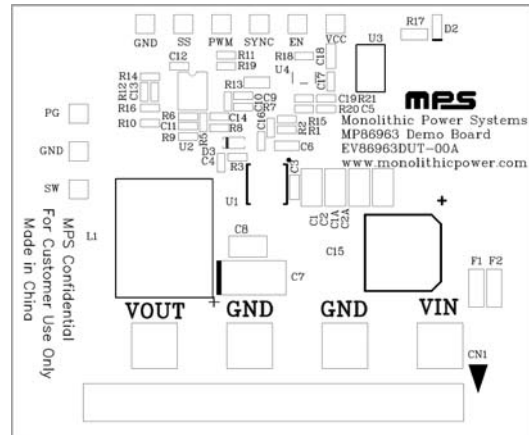


Figure 2—Top Silk Layer

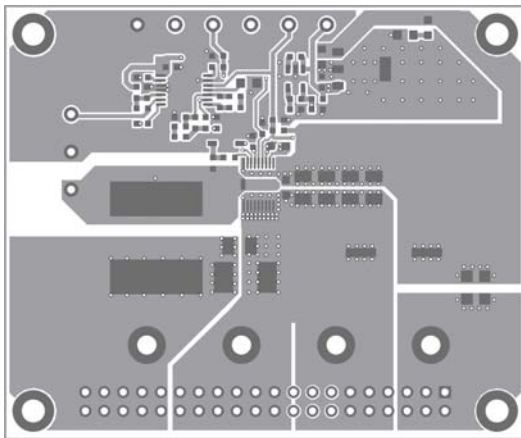


Figure 3—Top Layer

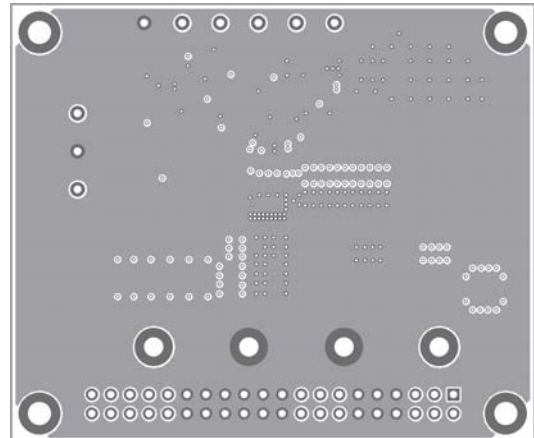


Figure 4—Inner Layer 1

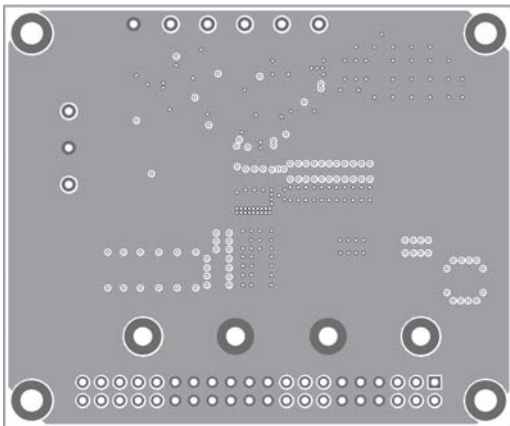


Figure 5—Inner Layer 2

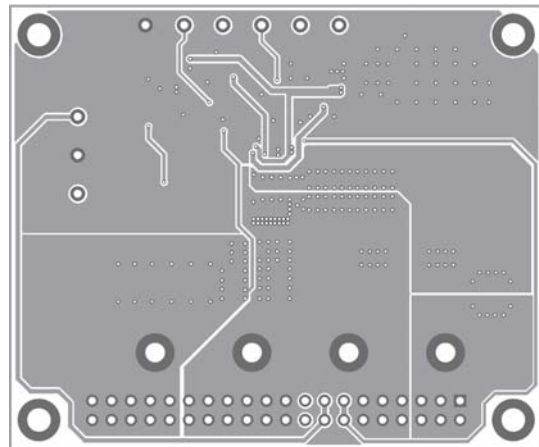


Figure 6—Bottom Layer

QUICK START GUIDE

1. Connect the positive and negative terminals of the load to the VOUT and GND pins, respectively.
2. Preset the power supply output to between 5V and 21V, then turn off the power supply.
3. Connect the positive and negative terminals of the power supply output to VIN and GND pins, respectively.
4. Turn on the power supply, and the board will automatically startup.
5. To use the Enable function, apply a digital input to the EN pin. Drive EN higher than 3.5V to turn on the regulator or less than 0.4V to turn it off.
6. Turn off the power supply to turn off the board.
7. The output voltage VOUT can be changed by varying R6. Calculate the new value using the formula:

$$R6 = \frac{R5}{\frac{V_{OUT}}{V_{FB}} - 1}$$

Where $V_{FB}=0.6V$ and $R5=51.1k\Omega$.

For example, for $V_{OUT}=1.8V$

$$R6 = \frac{51.1k\Omega}{\frac{1.8V}{0.6V} - 1} = 25.55k\Omega$$

Therefore use a 25.5k Ω standard 1% value.

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