



The Future of Analog IC Technology®

EVQ1530-Q-00A

Triple Output
TFT Bias Converter EV Board
AEC-Q100 Qualified

DESCRIPTION

The EVQ1530-Q-00A evaluation board is designed to demonstrate the capabilities of MPS' MPQ1530 triple output step-up converter which is capable of powering a TFT panel from a regulated 3.3V or 5V.

The MPQ1530 includes a 1.4MHz fixed-frequency step-up converter and a positive and negative linear regulator. The linear regulators are powered from a charge-pump driven by the step-up converter switch node (SW).

A single on/off control enables all 3 outputs. The outputs are internally sequenced at power on and power off for ease of use. An internal soft-start prevents overloading the input source at startup. Cycle-by-cycle over current protection limits component overstress.

ELECTRICAL SPECIFICATIONS

Parameter	Symbol	Value	Units
Input Voltage	V_{IN}	2.7 – 5.5	V
Output Voltage 1	V_{MAIN}	+13	V
Output Current 1	I_{MAIN}	350	mA
Output Voltage 2	V_{GH}	+27	V
Output Current 2	I_{GH}	20	mA
Output Voltage 3	V_{GL}	-8.5	V
Output Current 3	I_{GL}	20	mA

FEATURES

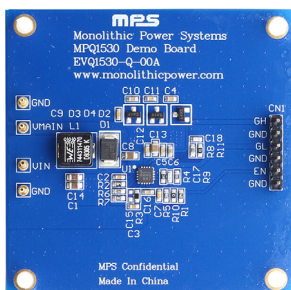
- 2.7 to 5.5V Operating Input Range
- 2.8A Switch Current Limit
- 3 Outputs In Single Package
 - Step-Up Converter up to 22V
 - Positive 20mA Linear Regulator
 - Negative 20mA Linear Regulator
- 250mΩ Internal Power MOSFET Switch
- Up to 95% Efficiency
- 1μA Shutdown Mode
- Fixed 1.4MHz Frequency
- Positive Regulator up to 38V
- Negative Regulator down to -20V
- Internal Power-On Sequencing
- Adjustable Soft-Start/Fault Timer
- Thermal Shutdown
- Cycle-by-Cycle Over Current Protection
- Under Voltage Lockout
- Ready Flag

APPLICATIONS

- TFT LCD Displays
- Portable DVD Players
- Tablet PCs
- Car Navigation Displays

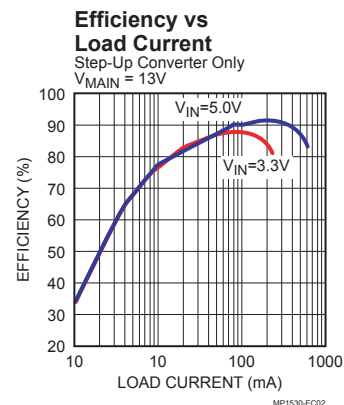
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EVQ1530-Q-00A EVALUATION BOARD

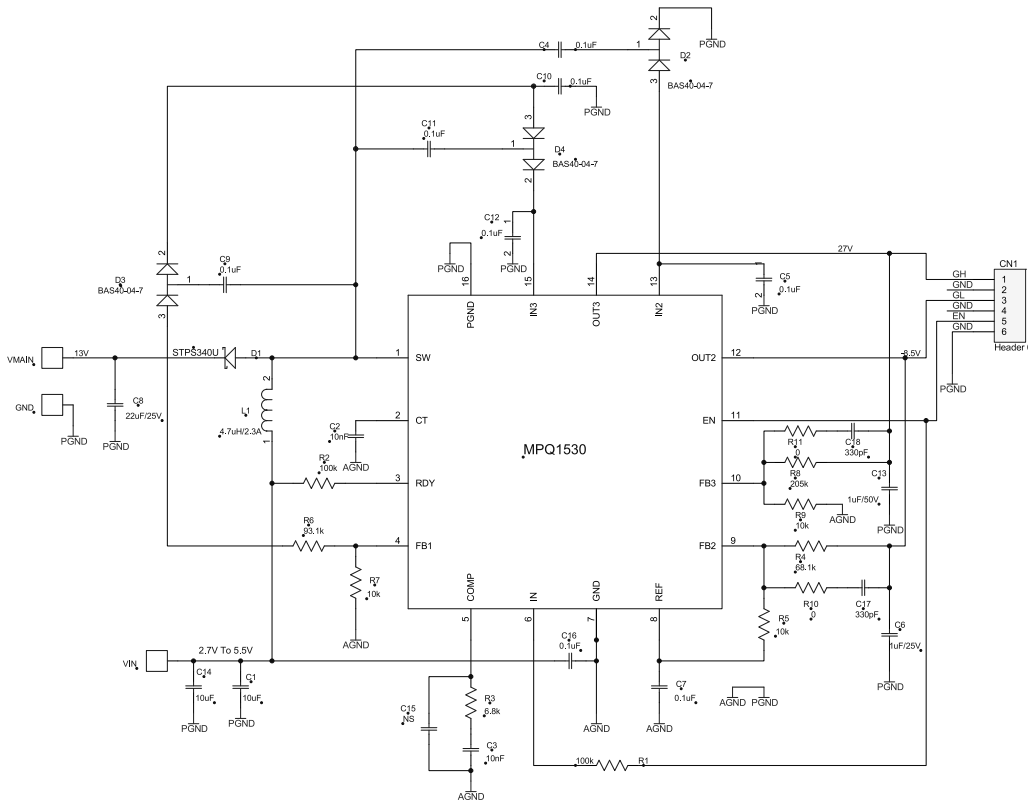


Dimensions (2.4"X x 2.2"Y x 0.5"Z)

Board Number	MPS IC Number
EVQ1530-Q-00A	MPQ1530



EVALUATION BOARD SCHEMATIC



EVQ1530-Q-00A BILL OF MATERIALS

Qty	Ref	Value	Description	Package	Manufacturer	Manufacturer P/N
2	C1, C14	10µF	Ceramic Cap., 16V, X5R	0805	MuRata	GRM21BR61C106KE15L
2	C3, C2	10nF	Ceramic Cap. 50V, X7R	0603	MuRata	GRM188R71H103KA01D
8	C4, C5, C7, C9, C10, C11, C12, C16	0.1µF	Ceramic Cap., 25V, X7R	0603	MuRata	GRM188R71H104KA93D
1	C6	1µF	Ceramic Cap., 25V, X7R	0603	MuRata	GCM188R71E105KA64D
1	C8	22µF	Ceramic Cap., 25V, X5R	0805	MuRata	GRM21BR61E226ME44L
1	C13	1µF	Ceramic Cap. 50V, X7R	0805	MuRata	GRT188R61H105KE13D
1	C15	NS	Ceramic Cap., 25V, X7R	0603		
2	C17, C18	330pF	0603	0603	MuRata	GRM188R71H331MA01D
1	D1	3A	Schottky Diode, 40V, 3A	SMB	ST Microelec	STPS340U
3	D2, D3, D4		Schottky Diode, 40V, 200mA	SOT23	Diodes Inc	BAS40-04DICT-ND
1	L1	4.7µH	SMD, Inductor 20mΩ	7x7x4mm	Würth	744311470
2	R1, R2	100kΩ	Film Resistor, 5%	0603	Yageo	RC0603JR-07100KL
1	R3	6.8kΩ	Film Res., 5%	0603	Yageo	RC0603JR-076K8L
1	R4	68.1kΩ	Film Res., 1%	0603	Yageo	RC0603FR-0768K1L

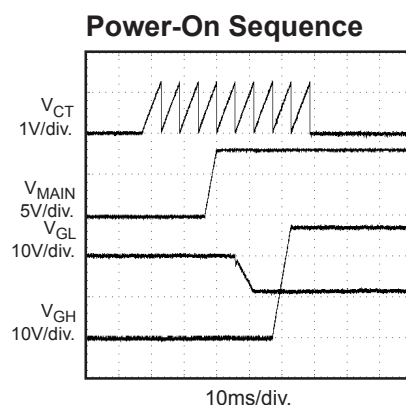
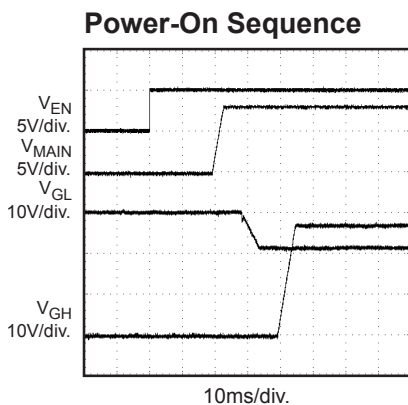
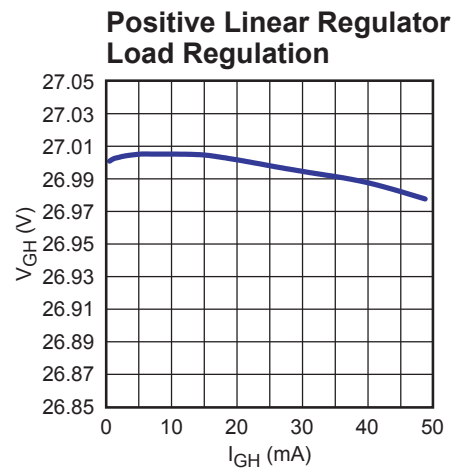
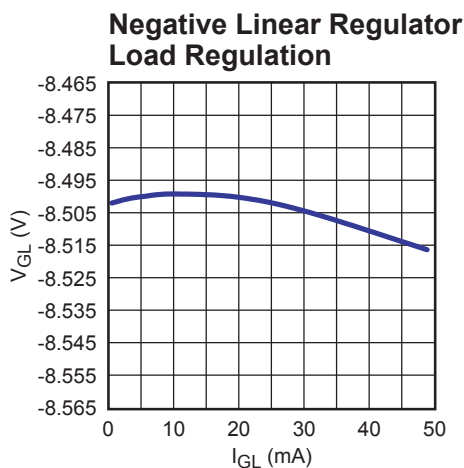
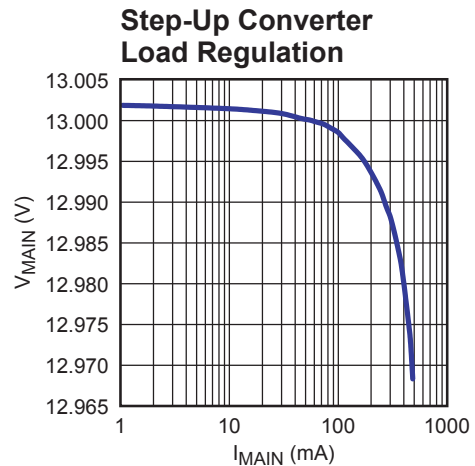
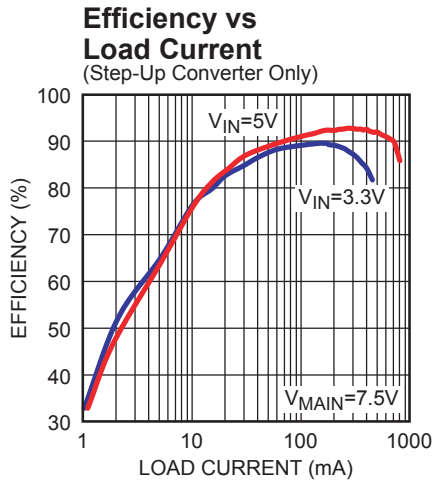
EVQ1530-Q-00A BILL OF MATERIALS (continued)

Qty	Ref	Value	Description	Package	Manufacturer P/N	Distributor P/N
3	R5, R7, R9	10k Ω	Film Res., 5%	0603	Yageo	RC0603JR-0710KL
1	R6	93.1k Ω	Film Res., 1%	0603	Yageo	RC0603FR-0793K1L
1	R8	205k Ω	Film Res., 1%	0603	Yageo	RC0603FR-07205KL
2	R10, R11	0 Ω	Film Res., 1%	0603	Yageo	RC0603JR-070RL
1	CN1	Header	6pins		Any	
4	V _{MAIN} , GND, V _{IN} , GND	TP	Test Point		Any	
1	U1	MPQ1530DQ	MPS	QFN16	MPS	MPQ1530DQ

EVB TEST RESULTS

Performance waveforms are tested on the evaluation board.

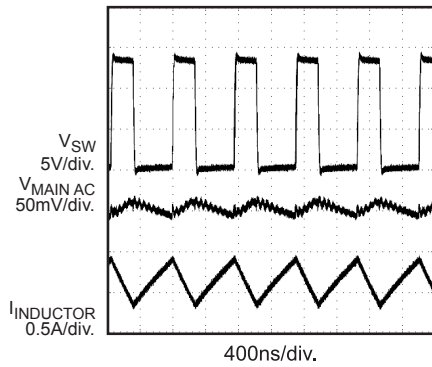
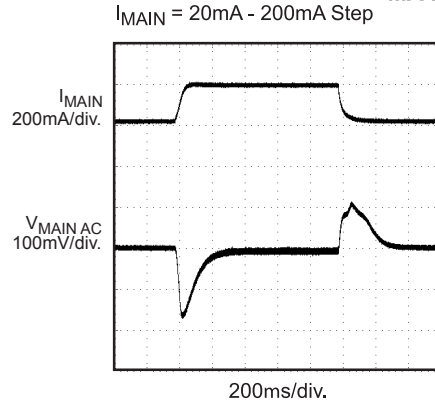
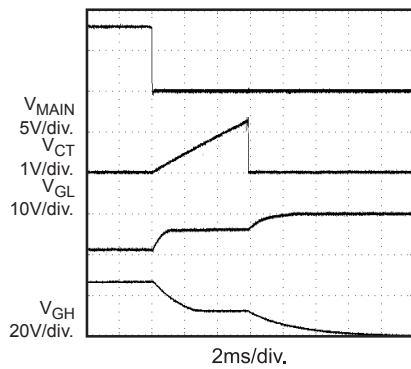
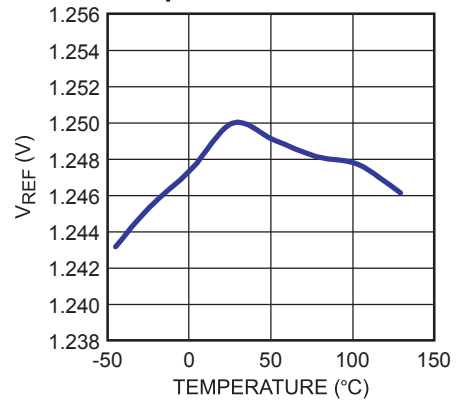
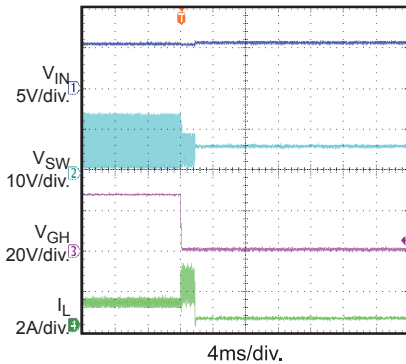
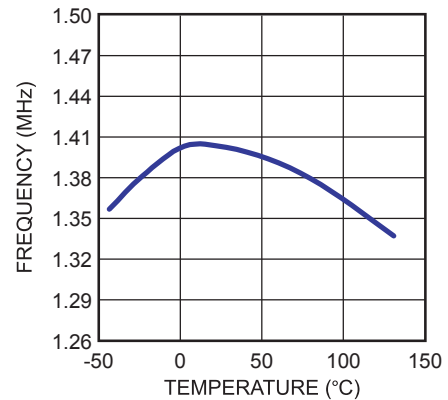
$V_{IN} = 5V$, $V_{MAIN} = 13V$, $I_{MAIN} = 200mA$, $V_{GL} = -8.5V$, $I_{GL} = 10mA$, $V_{GH} = 27V$, $I_{GH} = 10mA$, $T_A = +25^{\circ}C$, unless otherwise noted.



EVB TEST RESULTS (continued)

Performance waveforms are tested on the evaluation board.

 $V_{IN} = 5V$, $V_{MAIN} = 13V$, $I_{MAIN} = 200mA$, $V_{GL} = -8.5V$, $I_{GL} = 10mA$, $V_{GH} = 27V$, $I_{GH} = 10mA$, $T_A = +25^{\circ}C$, unless otherwise noted.

Normal Operation

Load Transient on V_{MAIN}

Fault Timer
 V_{MAIN} Shorted to V_{IN}

Reference Voltage vs Temperature

Short Protection for Main Output
 $V_{IN} = 5.5V$, $I_{MAIN} = 0.35A$, $I_{GH} = I_{GL} = 20mA$

Oscillator Frequency vs Temperature


PRINTED CIRCUIT BOARD LAYOUT

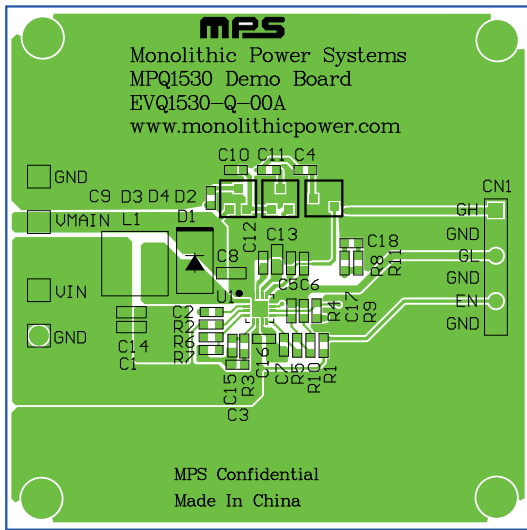


Figure 1: Top Layer & Top Silk Layer

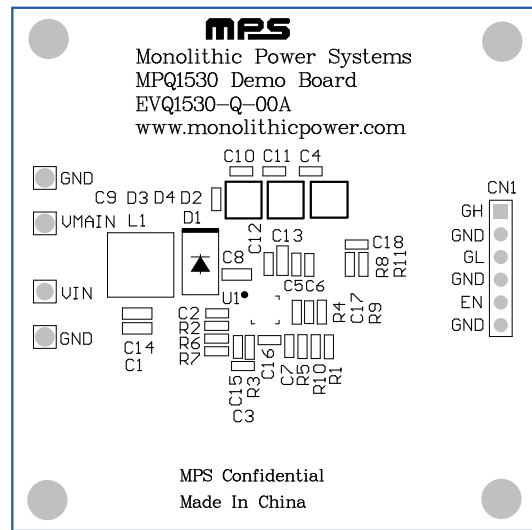


Figure 2: Top Silk Layer

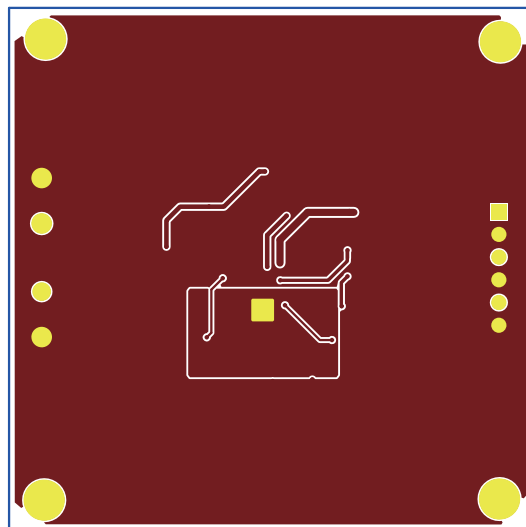


Figure 3: Bottom Layer