

General Description

The EV0055 Evaluation Board is designed to demonstrate the capabilities of MPS' MP1530 triple output step-up converter which is capable of powering a TFT panel from a regulated 3.3V or 5V.

The MP1530 includes a 1.2MHz 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, switching node, SW.

A single on/off control drives 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 current limits component overstress.

Ordering Information

Evaluation Board Number	MPS IC Number
EV0055	QFN16

EV0055 Evaluation Board



(Actual Size = 2.375"X x 2.24"Y)

Absolute Maximum Ratings

IN Supply Voltage	-0.3V to 6V
SW Voltage	-0.3V to 28V
IN2 Voltage	-0.3V to 40V
IN3 Voltage	0.3V to -25V
IN2 to IN3 Voltage	-0.3V to 60V
All Other Pins	-0.3V to 6V

Recommended Operating Conditions

Input Voltage	2.7V to 5.5V
Main Output Voltage	V_{IN} to 22V
IN2 Voltage	0V to 36V
IN3 Voltage	0V to -20V

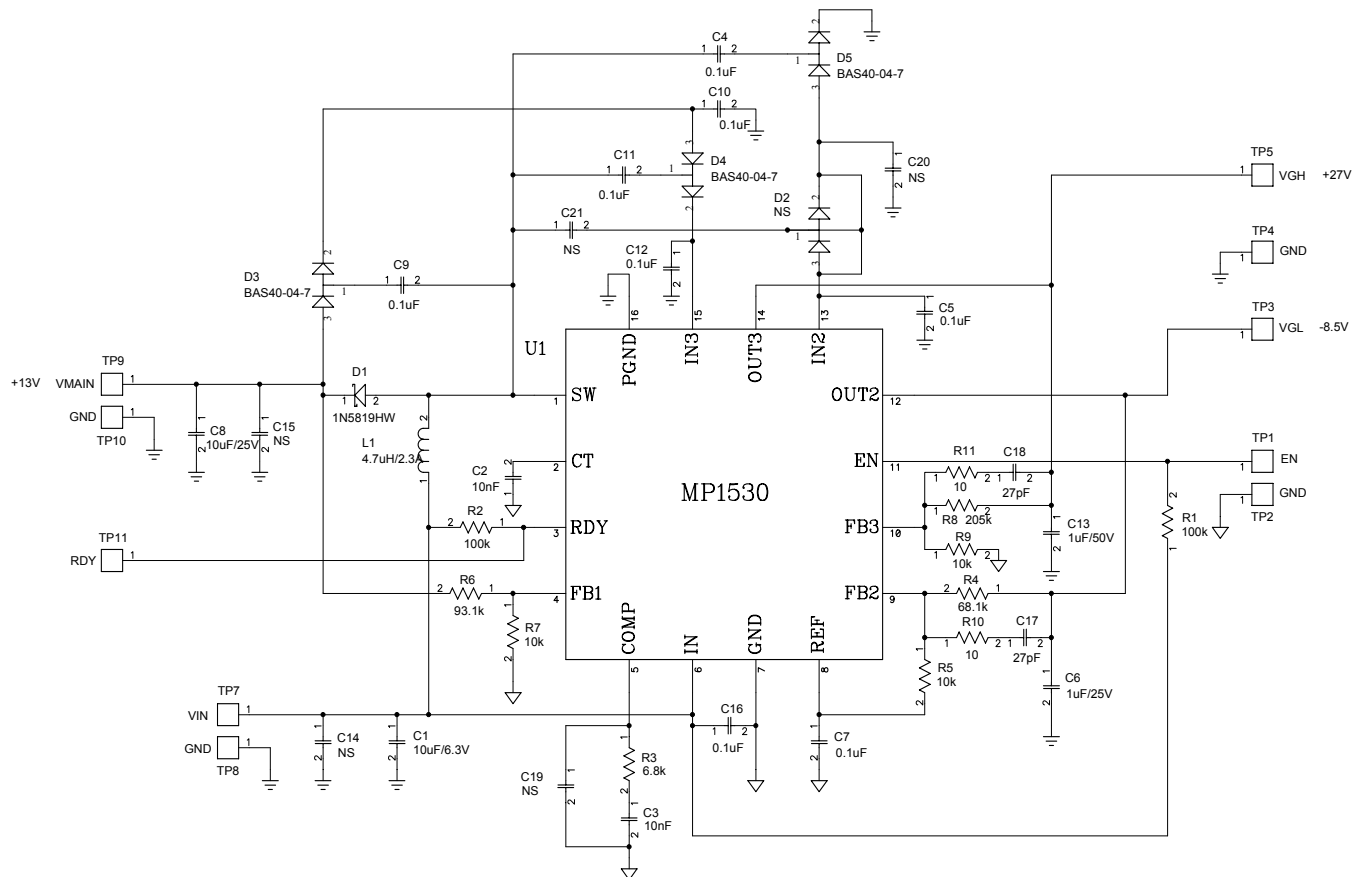
Features

- 2.7 to 5.5V Operating Input Range
- 2A Switch Current Limit
- 3 Outputs In Single Package
 - Step-Up Converter up to 22V
 - Positive 20mA Linear Regulator
 - Negative 20mA Linear Regulator
- 250m Ω Internal Power MOSFET Switch
- Up to 95% Efficiency
- 1 μ A 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

Figure 2: EV0063 Schematic



EV0055 / MP1530 Evaluation Board Schematic
 ev0055_mp1530_rev_D.sch 2/6/04
 Reference Number: MP1530-020604-1

Board Operation

The three output voltages of this board are set to +27V, +13V and -8.5V. The board layout accommodates most commonly used inductors and output capacitors.

1. Attach positive end of loads to VMAIN, VGH and VGL pins respectively. Attach negative end of loads to GND pins.
2. Attach input voltage $2.7V \leq V_{IN} \leq 5.5V$ and input ground to VIN and GND pins respectively.
3. To enable the MP1530 apply a voltage, $1.5V \leq V_{EN} \leq 6V$, to the EN pin. To disable the MP1530 connect the EN pin to ground.
4. During startup **RDY** will be left HIGH. Once the turn-on sequence is complete, this pin will be pulled low if all regulators exceed 80% of their specified voltages. After all regulators are turned-on, a fault in any regulator will cause **RDY** to go LOW after approximately 15 μ S. If the fault persists for more than approximately 6mS (for CT=10nF), the entire chip will shut down.
5. To adjust the output voltages:

Table 1: EV0063 Bill of Materials

Component	Description	Manufacturer Part No.	Qty
U1	MP1530, QFN16-3X3	MPS: MP1530DQ	1
L1	4.7 μ H, 2.26A, SMD, Unshielded	Toko: 817FY-4R7M-P3	1
D1	Schottky Diode, 40V, 1A, SOD-123	Diodes Inc: 1N5819HW-7	1
D2	NS		0
D3, D4, D5	Schottky Diodes, Dual, 40V, 200mA, SOT23	Diodes Inc: BAS40-04-7	3
C1	10 μ F, Ceramic Capacitor, 10V, 1210, X5R	Panasonic: ECJ-4YB1A106K	1
C2, C3	10nF, Ceramic Capacitor, 50V, 0805, X7R	Panasonic: ECJ-2VB1H103K	2
C4, C5, C7, C9, C10, C11, C12, C16	0.1 μ F, Ceramic Capacitor, 50V, 0805, X7R	Panasonic: ECJ-2YB1H104K	8
C6	1 μ F, Ceramic Capacitor, 25V, 1206, X7R	Panasonic: ECJ-3YB1E105K	1
C8	10 μ F, Ceramic Capacitor, 25V, 1210, X5R	Panasonic: ECJ-4YB1E106M	1
C13	1 μ F, Ceramic Capacitor, 50V, 1210, X7R		1
C14, C15, C19, C20, C21	NS		0
C17, C18	27pF, Ceramic Capacitor, 50V, 0805, NPO	Panasonic: ECJ-2VC1H270J	2
R1, R2	100K Ω , Resistor, 0805, 5%	Panasonic: ERJ-6GEYJ104V	2
R3	6.8K Ω , Resistor, 0805, 5%	Panasonic: ERJ-6GEYJ682V	1
R4	68.1K Ω , Resistor, 0805, 1%	Panasonic: ERJ-6ENF6812V	1
R5, R7, R9	10K Ω , Resistor, 0805, 5%	Panasonic: ERJ-6GEYJ103V	3
R6	93.1K Ω , Resistor, 0805, 1%	Panasonic: ERJ-6ENF9312V	1
R8	205K Ω , Resistor, 0805, 1%	Panasonic: ERJ-6ENF2053V	1
R10, R11	10 Ω , Resistor, 0805, 5%	Panasonic: ERJ-6GEYJ100V	2
		Total	33

Figure 3: Top Silk Layer

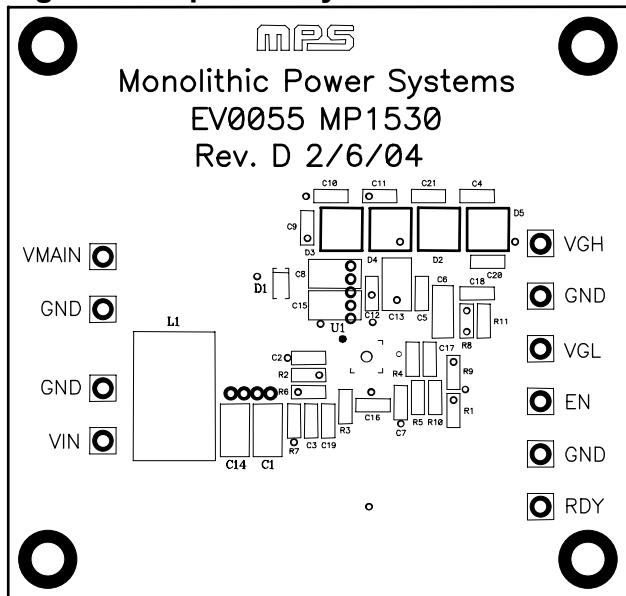


Figure 4: Top Layer

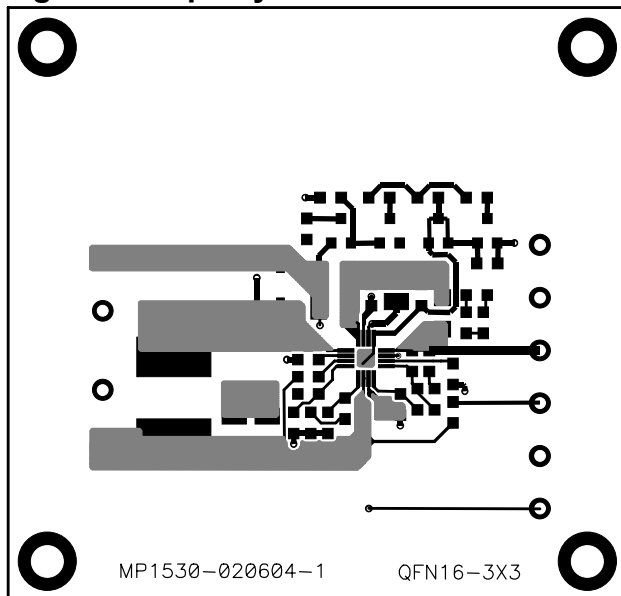


Figure 5: Bottom Layer

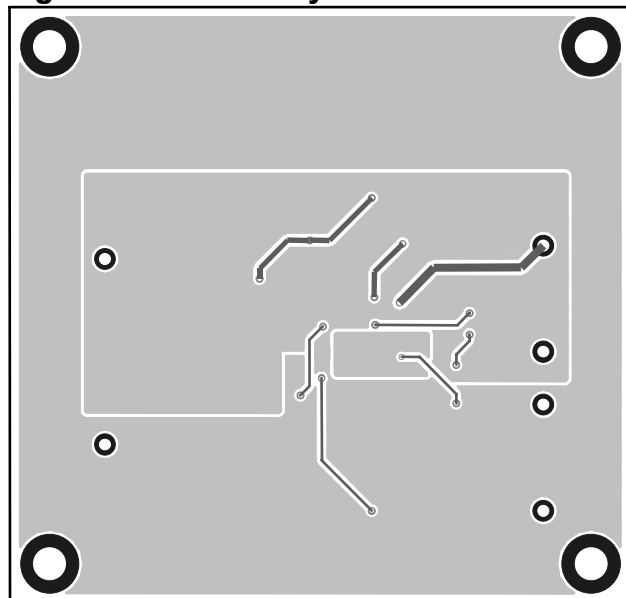
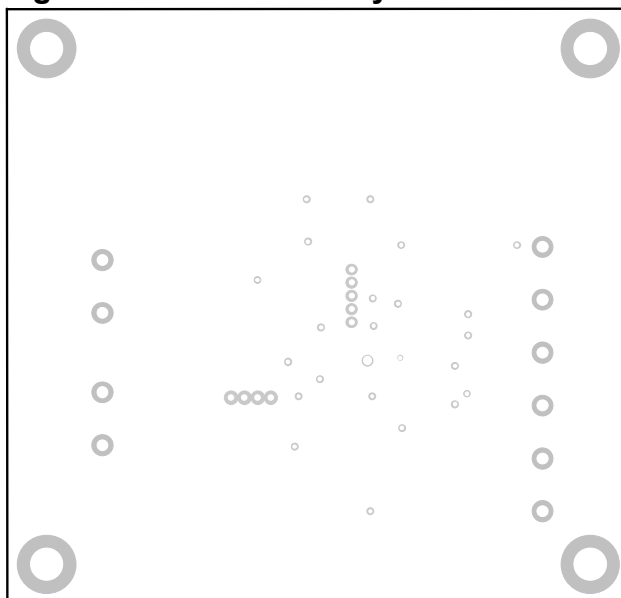


Figure 6: Bottom Silk Layer



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