

Clamshell Phone with OLED/LCD Screen Using the TPS61140 Dual Output Boost Regulator

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ABSTRACT

The TPS61140/1 is a dual output boost converter providing regulated voltage and current output with one boost converter. The reference design and application example shown in this document can be used to power a clamshell phone with an organic light-emitting diode (OLED) and a LCD screen. This device is ideal for driving the OLED sub display and WLED backlight for the LCD main display in clamshell phones.

1 Features

- 3 V to 6 V Input Voltage Range
- Two Outputs Each up to 27 V
- 0.7 A Integrated Switch
- Built-in Power Diode
- 1.2 MHz PWM for WLED Driver
- PFM for OLED Supply
- Individually Programmable Output
- Input to Output Isolation
- Short-Circuit Protection
- Built-in Soft Start
- Overvoltage Protection
- Up to 82% Efficiency
- Up to 30 kHz PWM Dimming Frequency
- Available in a 10 Pin, 3 × 3 mm QFN Package

2 TPS61140 EVM Reference Design

The following reference design provides one regulated current output and one regulated voltage output using a single inductor, boost converter. Each output is independently set by external resistors. The voltage output for the device is intended to drive the OLED sub display and the current output is intended to drive the WLED backlight for the LCD main display in clamshell phones.

The current output drives four WLEDs in series.

3 TPS61140 EVM Schematic

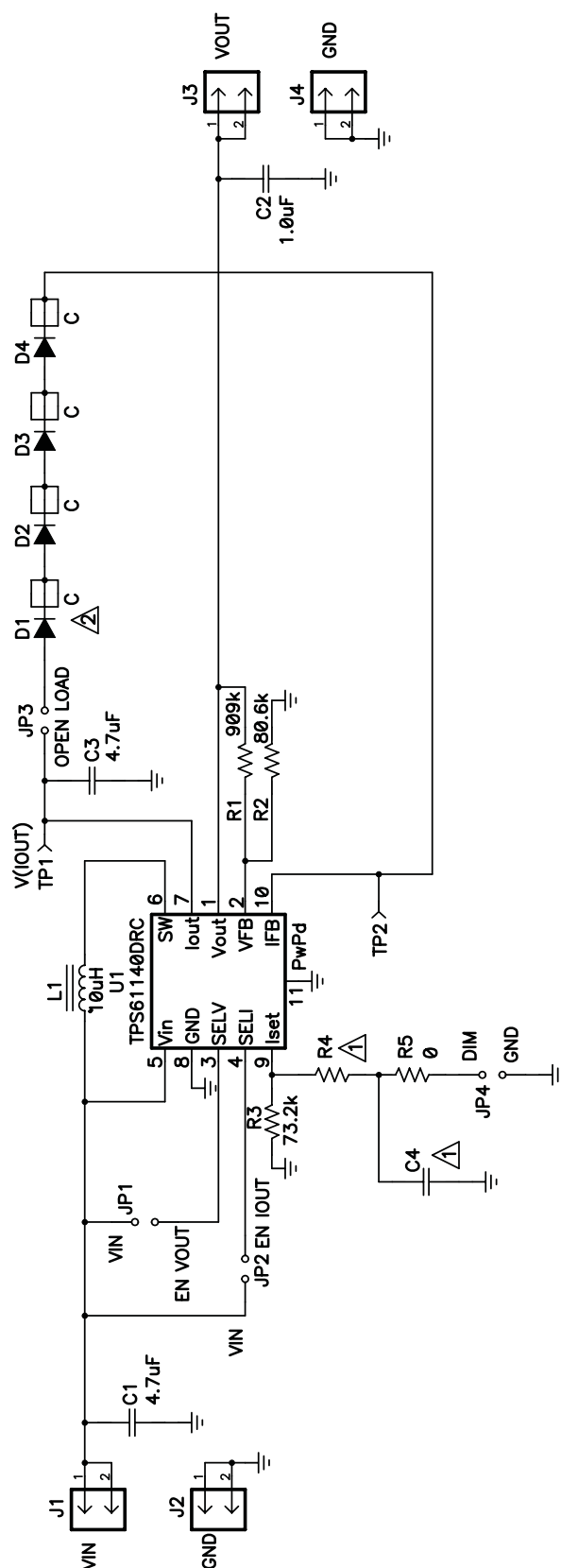


Figure 1. Schematic

4 EVM Bill of Materials

Table 1. HPA157 Bill of Materials

COUNT	REF DES	VALUE	DESCRIPTION	SIZE	PART NUMBER	MFR
1	C1, C2	4.7 μ F	Capacitor, Ceramic, 10 V, X5R, 10%	0603	C1608X5R1A475K	TDK
1	C3	4.7 μ F	Capacitor, Ceramic, 50 V, X5R, 10%	1812	C4532X5R1H475K	TDK
1	C4	Open	Capacitor, Ceramic, vvV	0603		
4	D1–D4		Diode, LED, White, 30 mA, Common Anode	P-LCC-4	LW E67C-U2V2-5K8L-1	Osram
4	J1–J4		Header, 2-pin, 100 mil spacing, (36-pin strip)	0.100 $\times$ 2	PTC36SAAN	Sullins
4	JP1–JP4		Header, 2-pin, 100 mil spacing, (36-pin strip)	0.100 $\times$ 2	PTC36SAAN	Sullins
1	L1	10 μ H	Inductor, SMT, 1.26 A, 163 m Ω	0.137 $\times$ 0.147	VLF4018AT-100MR74-2	TDK
1	R1	909 k	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
1	R2	80.6 k	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
1	R3	73.2 k	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
1	R4	Open	Resistor, Chip, 1/16 W	0603	Std	Std
1	R5	0	Resistor, Chip, 1/16 W, 1%	0603	Std	Std
2	TP1, TP2		Test Point, Red, Thru Hole Color Keyed	0.100 $\times$ 0.100	5000	Keystone
1	U1		IC, Dual Output Boost Regulator Using Single Inductor	DRC10	TPS61140DRC	TI
1	–		PCB, 1.7 In $\times$ 1.35 In $\times$ 0.062 In		HPA157	Any
4	–		Shunt, 100-mil, Black	0.100	929950-00	3M

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