

General Description

The ELP6230A is a current mode boost DC-DC converter .It's PWM circuitry with built In 30V,1A Current power MOSFET makes this converter highly power efficiently. Select able high switching frequency allows faster loop response and easy filtering with a low noise output. The non-inverting input and it's error amplifier is connected to an internal 1.25V precision reference voltage .Soft-Start time can be programmed with an external capacitor, which sets the input current ramp rate. Current mode control and external compensation network make it easy and flexible to stabilize the system.

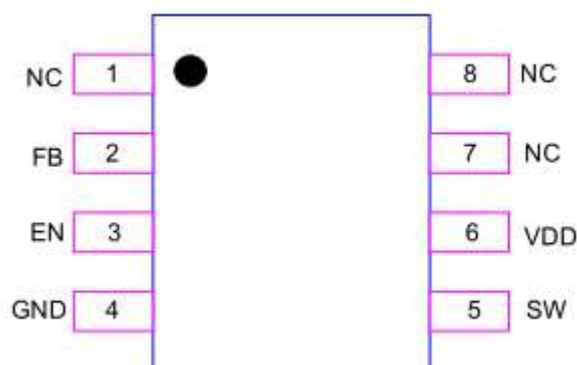
Features

- ◆ Up to 92% efficiency
- ◆ Shut-down current : <1uA
- ◆ Output voltage up to 30V
- ◆ Internal Compensation
- ◆ 1.2MHz fixed frequency switching
- ◆ High switch on current : 1A
- ◆ Available in MSOP-8 Package

Applications

- ◆ Battery products .
- ◆ Host Products .
- ◆ Panel.

Pin Assignments





High Efficiency 1A/30V Boost DC/DC Convertor

Pin Description

PIN	PIN Name	Description
1,7,8	NC	No Connection .
2	FB	Regulation Feedback Input . Connect to an external resistive voltage divider from the output to FB to set the output voltage .
3	EN	Regulator On/off control Input . A logic high input ($V_{EN} > 1.4V$) turns on the Regulator . A logic low input ($V_{EN} < 0.4V$) puts the ELP6230A into low current shut down mode .
4	GND	Ground.
5	SW	Output switching node . SW is the drain of the internal low-side N-Channel MOSFE . Connect the inductor to SW to Complete the step-up converter.
6	VDD	Power Supply pin .

Ordering Information

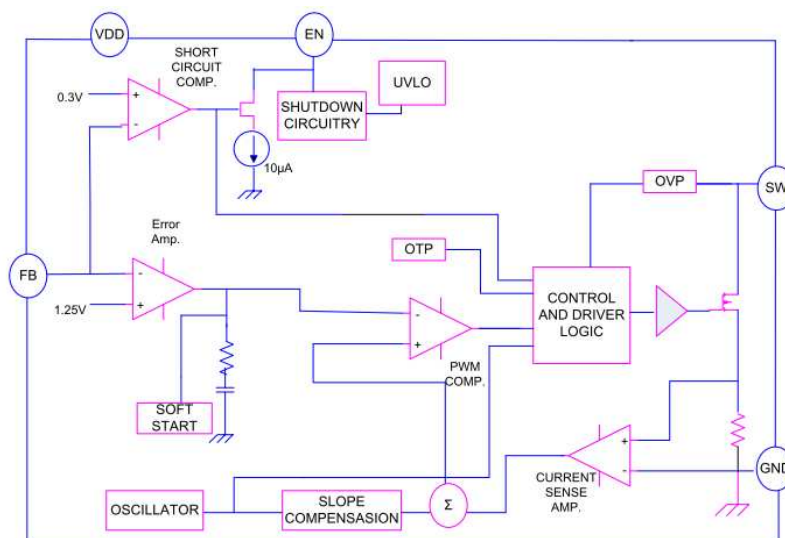
ELP6230 AN XX X

R1 : MSOP 8

R : Tape & Reel

Part Number	Package	Marking	Marking Information
ELP6230ANR1R	MSOP-8L		

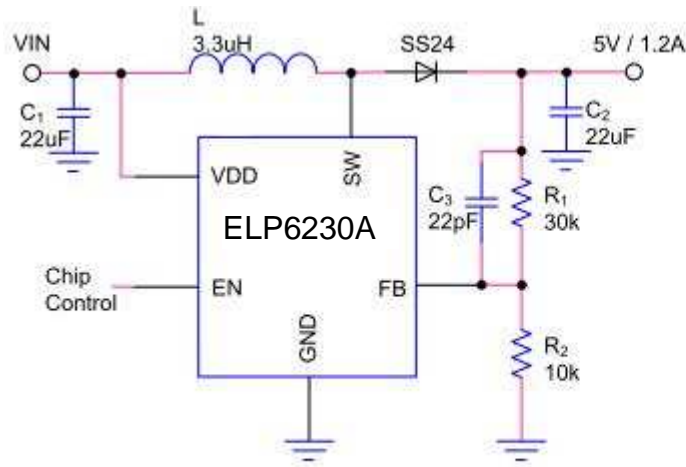
Function Block Diagram



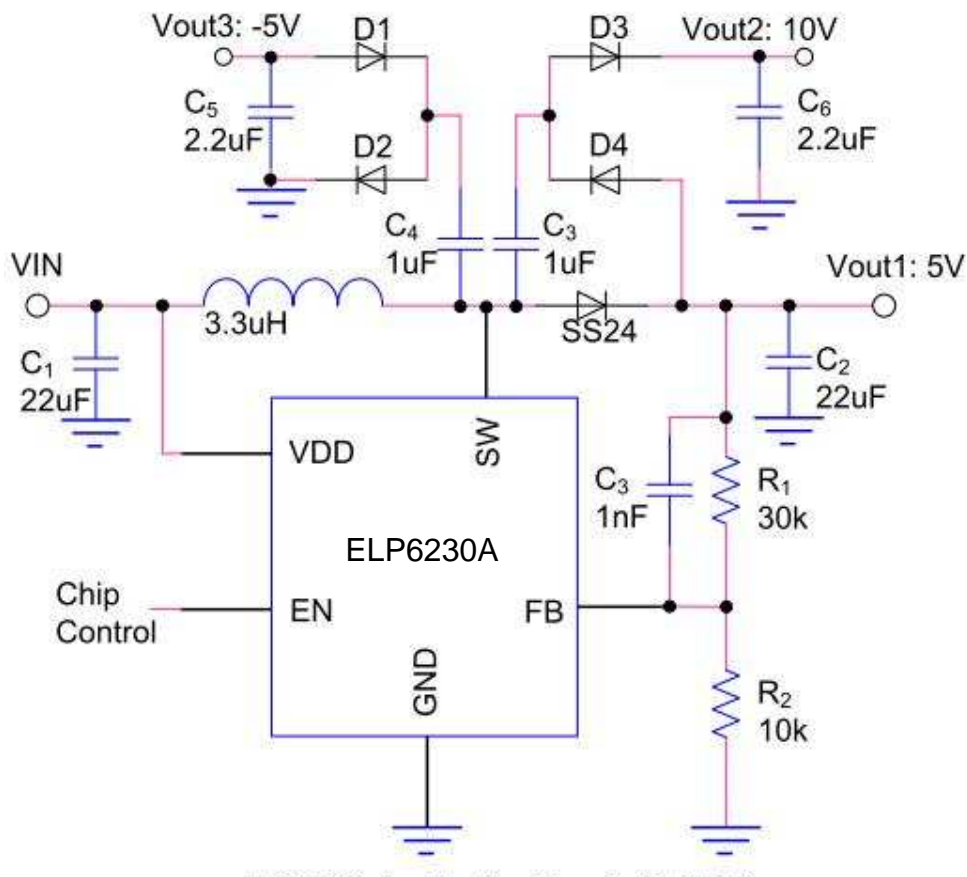


High Efficiency 1A/30V Boost DC/DC Convertor

Typical Application Circuit



Application Circuit



ELP6230A Application Circuit of LCD Bias



High Efficiency 1A/30V Boost DC/DC Convertor

Absolute Maximum Ratings

- ◆ Supply Input Voltage----- 6V
- ◆ **Power Dissipation , PD@TA=25°C**
- ◆ MSOP8-----900mW
- ◆ **Package Thermal Resistance**
- ◆ MSOP 8, θ_{JA} -----165°C/W
- ◆ Lead Temperature (Soldering,10sec.)-----260°C
- ◆ **Recommended Operating Conditions**
- ◆ Supply Input Voltage-----2.2Vto5.5V
- ◆ EN Input Voltage-----0Vto5.5V
- ◆ Operation Junction Temperature Range-----40°Cto125°C
- ◆ Operation Ambient Temperature Range-----40°Cto85°C

Electrical Characteristics

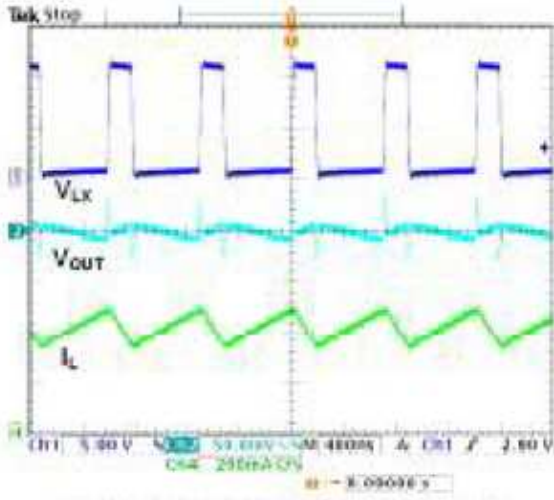
(Vin=2.4V, Vout=5V, Cin=10uF, Cout=22uF, L1=4.7uH)

Parameter	Conditions	Min	Typ	Max	Units
Supply Voltage		2.7		6	V
Output Voltage Range		2.5		30	V
Supply Current (Shut down)	$V_{EN}=V_{OUT}=0V, V_{SW}=5V$		0.1	1	uA
Supply Current			430	550	uA
Feedback Voltage		1.22	1.25	1.28	V
Feedback Input Current	$V_{FB}=1.25V$		50		nA
Switching Frequency			1200		KHz
Maximum Duty Cycle		93			%
EN Input Low Voltage				0.3	V
EN Input High Voltage		1.0			V
Low-side Current Limit			1		A
High-side On Resistance	$V_{out} = 3.3V$		0.4		Ω
Mosfet voltage			30		V



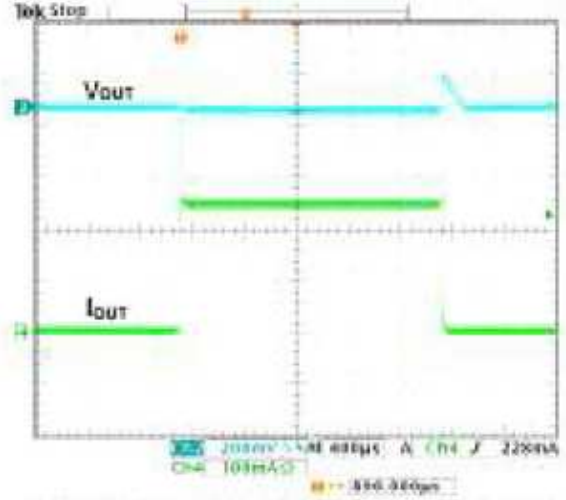
High Efficiency 1A/30V Boost DC/DC Convertor

Typical Operation Characteristics



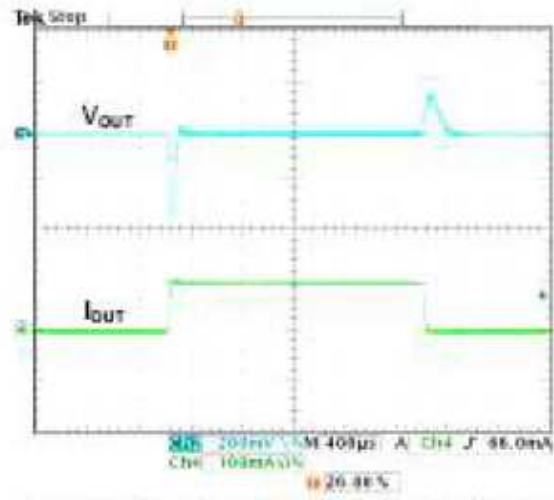
$V_{IN}=3.3V, V_o=10V, I_o=100mA, L1=10\mu H$

Operation Waveform



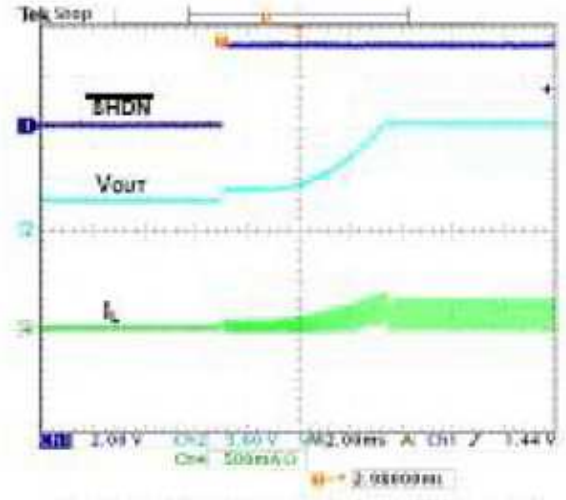
$V_{IN}=3.6V, V_o=5V, I_o=5 \text{ to } 250mA, CFF=220pF$

Load Step Response



$V_{IN}=3.3V, V_o=10V, I_o=5 \text{ to } 250mA, CFF=220pF$

Load Step Response

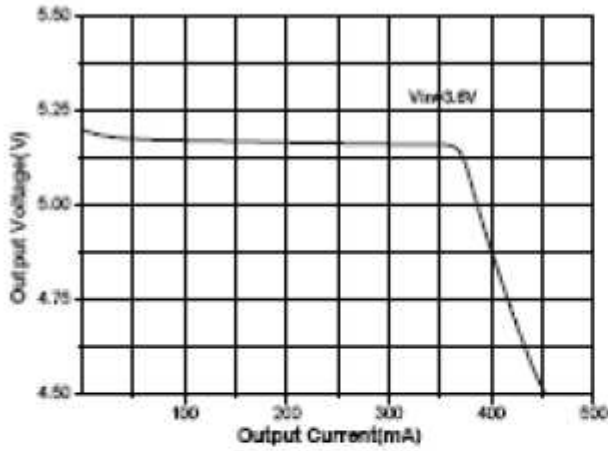


$V_{IN}=3.3V, V_{OUT}=10V, I_o=50mA, C88=33nF$

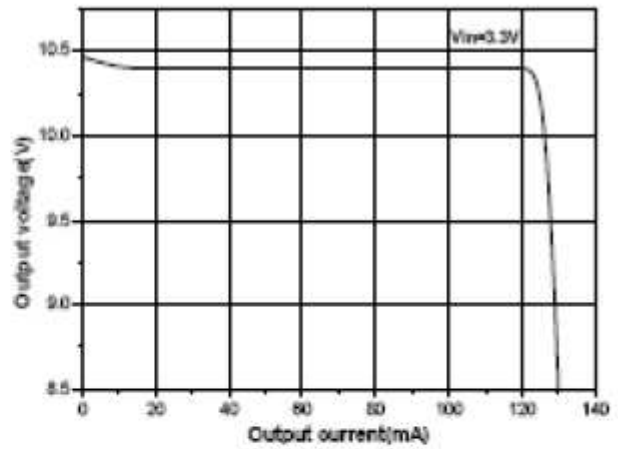
Start-Up from Shutdown



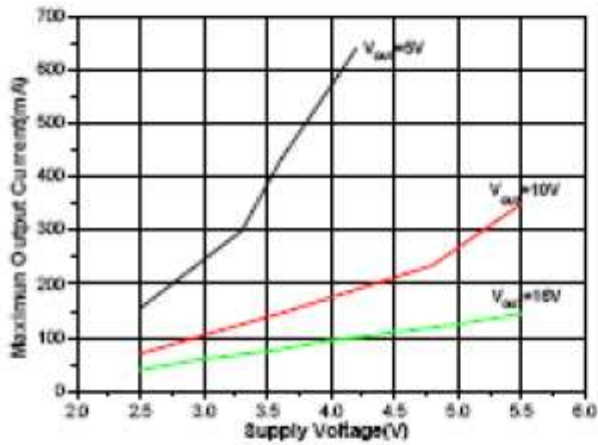
High Efficiency 1A/30V Boost DC/DC Convertor



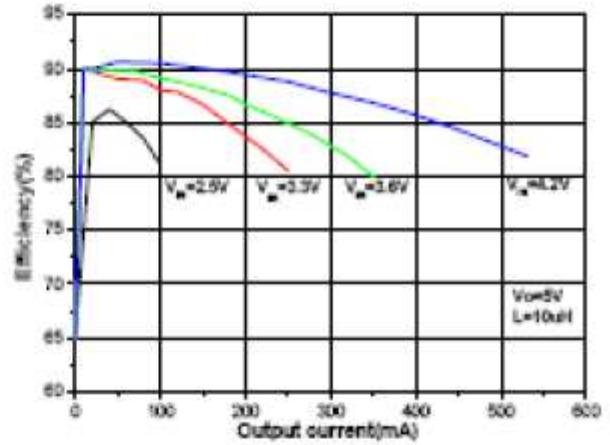
Load Regulation (Vo=5V)



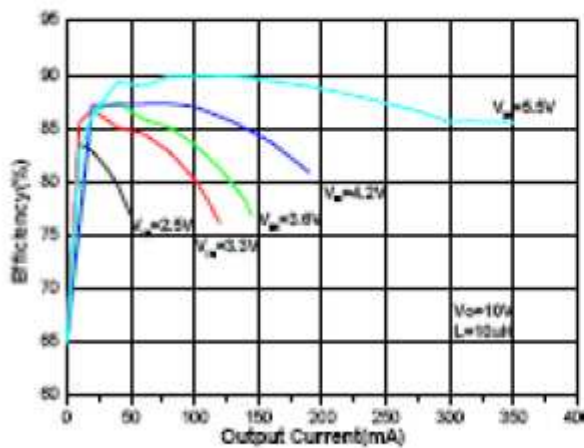
Load Regulation (Vo=10V)



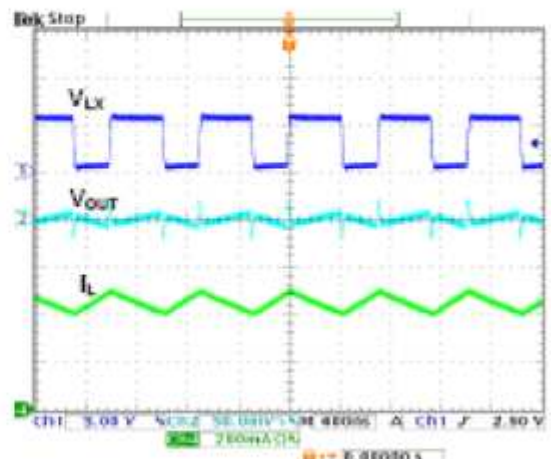
Maximum Output Current vs. Supply Voltage



Efficiency vs. Output Current (Vo=5V)



Efficiency vs. Output Current (Vo=10V)



$V_{in}=3.6V, V_o=5V, I_o=250mA, L1=10\mu H$

Operation Waveform



High Efficiency 1A/30V Boost DC/DC Convertor

Operation Information

The ELP6230A uses a 1200KHz fixed frequency, current-mode regulation architecture to regulate the output voltage. The ELP6230A measures the output voltage through an external resistive voltage divider and compares that to the internal 1.25V reference to generate the error voltage to the inductor current to regulate the output voltage. The use of current-mode regulation improves transient response and control loop stability. When the ELP6230A is disabled (EN=Low), both power switches are off. There is no current path from SW to OUT. Therefore, the output voltage discharges to ground. When the ELP6230A is Enabled (EN=High), a limited start-current charges the output voltage rising to SW, then the part operates in force PWM mode for regulating the output voltage to the target value. At the beginning of each cycle, the N-channel MOSFET switch is turned on, forcing the inductor current to rise, The current at the source of the switch is internally measured and converted to a voltage by the current sense amplifier. That voltage is compared to the error voltage. When the inductor current rises sufficiently, the PWM comparator turns off the switch, forcing the inductor current to the output capacitor through the internal P-Channel MOSFET rectifier, which forces the inductor current to decrease. The peak inductor current is controlled by the error voltage. Thus the output voltage controls the inductor current to satisfy the load.

Setting the Output Voltage

Set the output voltage by selecting the resistive voltage divider ratio. The voltage divider drops the output voltage to the 1.24V feedback voltage. Use a 100K resistor for R2 of the voltage divider. Determine the high-side resistor R1 by the equation:

$$V_{out} = (R1/R2 + 1) \times V_{FB}$$

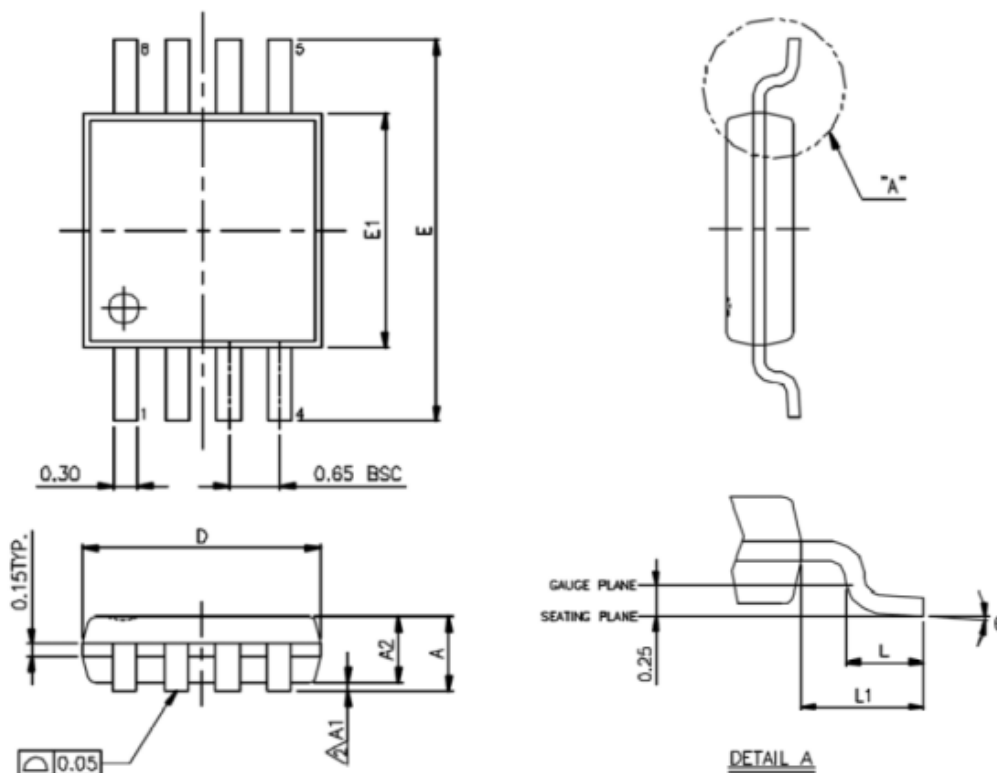
$$V_{out} = (R1/R2 + 1) \times 1.25V$$



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Package Information

MSOP-8L



Symbols	Min. (mm)	Max. (mm)
A		1.100
A1	0.000	0.150
A2	0.750	0.950
D	3.000 BSC	
E	4.900 BSC	
E1	3.000 BSC	
L	0.400	0.800
L1	0.950 REF	
θ°	0°	8°

Note:

1. Package dimensions are in compliance with JEDEC outline: MO-187 AA.
2. Dimension "D" does not include molding flash, protrusions or gate burrs.
3. Dimension "E1" does not include inter-lead flash or protrusions.