

High Efficiency DC-DC Boost Regulator

Features

- Min1.6V Startup @1mA Load
- 600mV Feedback Voltage
- 550KHz Internal Oscillator
- Soft Startup: 10mS Typical
- Peak Current Programmable by Bottom Sensing Resistor
- 300 μ A Typical Iq
- Internal PWM/PFM Auto Mode Switching
- Up to 90% Efficiency
- External Enable
- Power OFF Current<1 μ A
- Over Voltage Protection
- 140 $^{\circ}$ C Thermal Shut Down, 20 $^{\circ}$ C Hysteresis

Applications

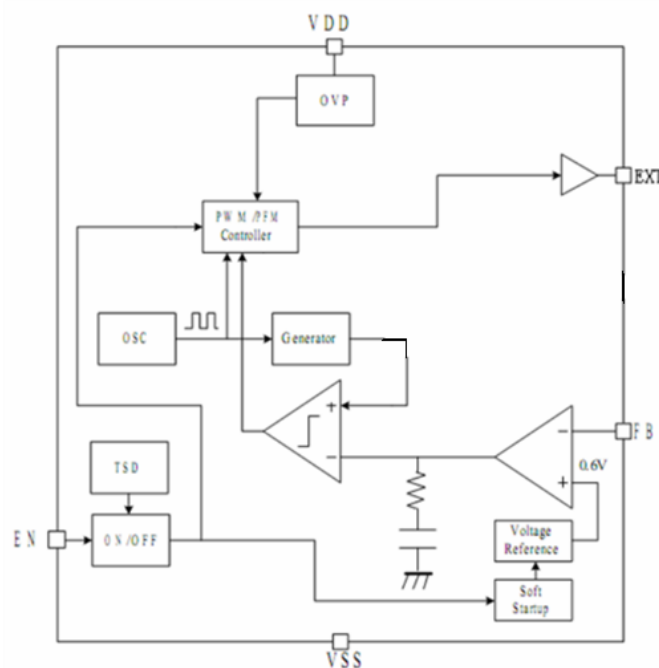
- USB Charger

General Description

The EC9121 using the external NMOSFET. It is a high efficiency boost converter with 600mV feedback voltage. A switching frequency of 550KHz minimizes solution footprint by allowing the use of tiny low profile inductors and ceramic capacitors. The

current mode PWM/PFM design is internally compensated, and the device has a 1.6V startup voltage with 1mA load. It needs few external components, only inductance, resistance and capacitance can meet the driving capacity.

Block Diagram

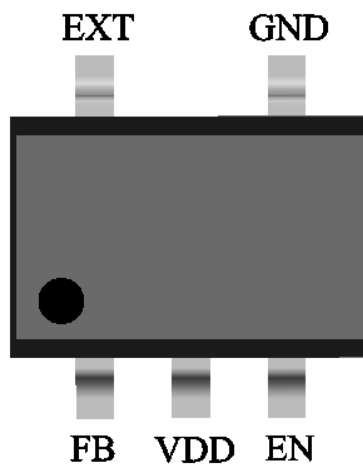


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Pin Assignment

PIN NUMBER	PIN NAME	FUNCTION
1	FB	Feedback Input
2	VDD	Power Supply
3	EN	Enable. High Active
4	GND	Power Ground
5	EXT	Power MOSFET Gate Driver

SOT23-5(Top view)



Absolute Maximum Ratings

Power Supply Voltage 2.8V to 8.5V Quiescent Current 450uA
Feedback Voltage600mV

Note: These are stress ratings only. Stresses exceeding the range specified under “Absolute Maximum Ratings” may cause substantial damage to the device. Functional operation of this device at other conditions beyond those listed in the specification is not implied and prolonged exposure to extreme conditions may affect device reliability.

Thermal Information

Implementation of integrated circuits in low-profile and fine-pitch surface-mount packages typically requires special attention to power dissipation. Many system-dependent issue such as thermal coupling, airflow, added heat sinks and convection surfaces, and the presence of other heat-generating components affect the power-dissipation limits of a given component.

Three basic approaches for enhancing thermal performance follow.

- Improving the power dissipation capability of the PCB design
- Improving the thermal coupling of the component to the PCB
- Introducing airflow in the system

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Electrical Characteristics

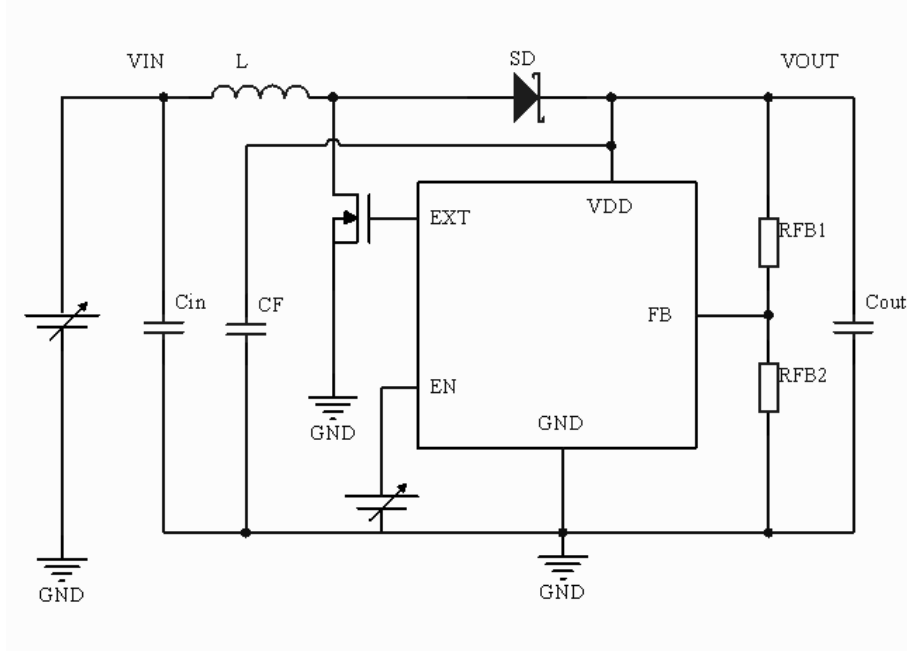
(VDD = 5 V, Ta = 25°C, Unless otherwise specified)

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS	CONDITION
Power Supply Voltage for normal operation	V _{DD}	2.8		7	V	For normal operation after start-up
Min Input Startup Voltage	V _{ST1}		1.6		V	1mA load, VDD tied to VOUT
Input Startup Voltage with Heavy Load	V _{ST2}		2.6		V	VDD tied to VOUT
Min Input Hold Voltage	V _{HLD}	0.9			V	VDD tied to VOUT
Feedback Voltage	V _{FB}		600		mV	
Feedback Voltage Temperature Coefficient	V _{FBTC}		130		ppm/°C	
Feedback Voltage Supply Regulation	V _{REG}		0.2		%/V	Close Loop. Varying VDD by adjusting Resistor Divider Ratio
Load Regulation	I _{REG}		0.3		%/A	
Quiescent Current	I _q		350		uA	No Switching
OFF current	I _{off}		1		uA	
Oscillator Frequency	f _{osc}		550		KHz	
Max Duty	D _{max}		90		%	
Duty boundary for PWM/PFM	D _{min}		15		%	
Current Limit Set Voltage	V _{lim}		250		mV	
DRV PMOS On Resistor	R _{onp}		10		Ohm	Min measured at 3V VDD
DRV NMOS On Resistor	R _{onn}		7.5		Ohm	Min measured at 3V VDD
DRV PMOS Max Output Current	I _{maxp}		230		mA	Min measured at 3V VDD
DRV NMOS MAX Output Current	I _{maxn}		190		mA	Min measured at 3V VDD
FB OVP Threshold	V _{ovp}		720		mV	Measured at FB
FB OVP Hysteresis	V _{ophys}		100		mV	Measured at FB
TSD Threshold	TSD		140		degc	
TSD Hysteresis	TSD _{hys}		20		degc	
EN High Level	V _H	1			V	
EN Low Level	V _L			0.3	V	
Soft Start Time	T _{ss}		10		m S	VIN=1.5V, VOUT=5V, LOAD=1mA

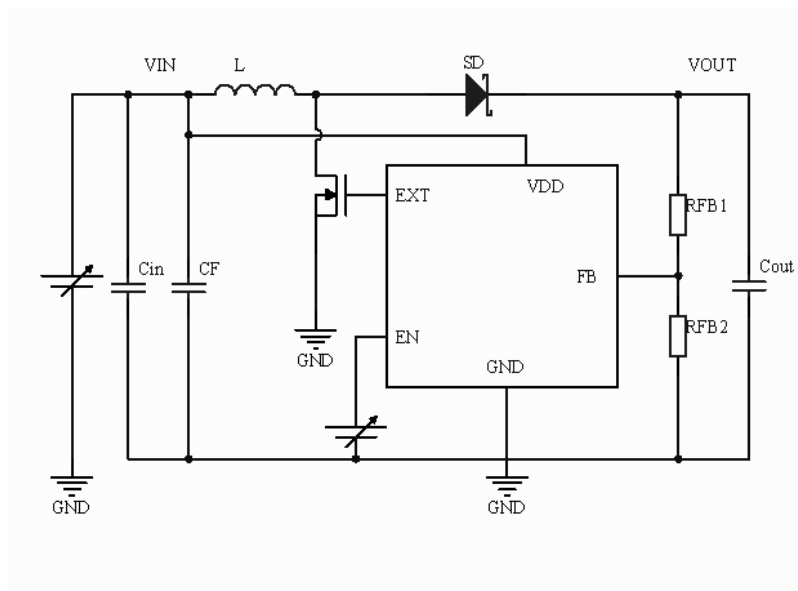
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Application Circuits

1) Power supply tied to VOUT



2) Power supply tied to VIN (VIN > 2.8V)



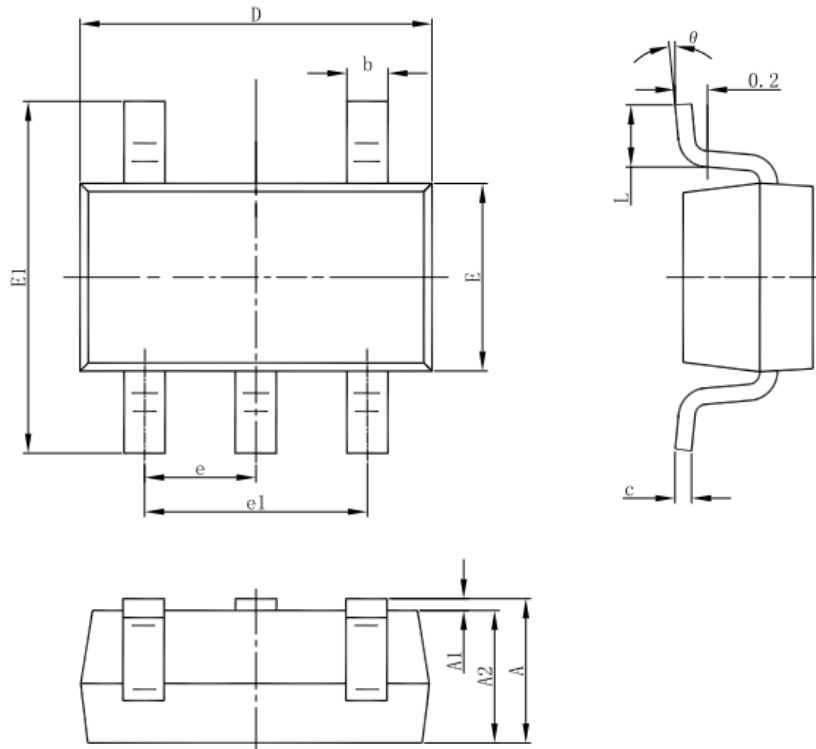
3) External Component Recommendation:

- 1) $C_{in}=22\mu F$
- 2) $C_{out}=22\mu F$
- 3) $L=2.2\mu H$
- 4) $C_F=1\mu F$

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Package Information

5-pin SOT23-5L Outline Dimensions



Symbol	Dimensions In Millimeters		Dimensions In Inches	
	Min	Max	Min	Max
A	1.050	1.250	0.041	0.049
A1	0.000	0.100	0.000	0.004
A2	1.050	1.150	0.041	0.045
b	0.300	0.500	0.012	0.020
c	0.100	0.200	0.004	0.008
D	2.820	3.020	0.111	0.119
E	1.500	1.700	0.059	0.067
E1	2.650	2.950	0.104	0.116
e	0.950(BSC)		0.037(BSC)	
e1	1.800	2.000	0.071	0.079
L	0.300	0.600	0.012	0.024
θ	0°	8°	0°	8°