

1.2 μ A Ultra low Iq 1A Synchronous Boost with Fixed 3.3V or 5V Output

DESCRIPTION

ETA1062 is a high efficiency synchronous step-up converter with ultra-low quiescent current down to 1.2 μ A. It is capable of delivering at least 2W of power from a low voltage source, i.e. 0.4A at 5V output. It also features a true-shutoff function that disconnects the input from output, during shutdown and output short-circuit conditions. This eliminates the need for an external MOSFET and its control circuitry to disconnect the input from output and provides robust output overload protection. A switching frequency of 1.4MHz minimizes solution footprint by allowing the use of tiny and low profile inductors and ceramic capacitors. An internal synchronous MOSFET provides highest efficiency and with a current mode control that is internally compensated, external parts count is reduced to minimal. With the ultra-low Iq feature, ETA1062 is ideal for solution that requires low standby power and compact board size such as IoT applications.

ETA1062 is housed in a SOT23-5 package

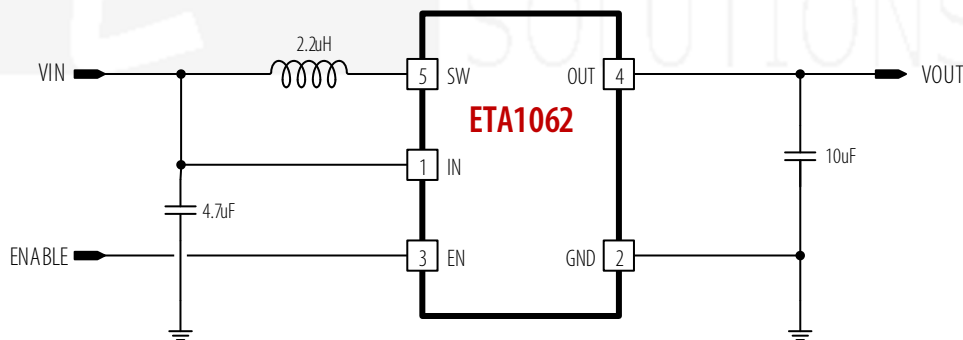
FEATURES

- ◆ Ultra low Iq when No Switching :1.2uA
- ◆ Output Disconnect
- ◆ Short-circuit Protection
- ◆ 2W Output Power when Vout=5V, Vin=3.3V
- ◆ Output to Input Reversed Current Protection
- ◆ Up to 94% Efficiency
- ◆ Internal Synchronous Rectifier
- ◆ Current Mode control
- ◆ Logic Control Shutdown and Thermal shutdown
- ◆ SOT23-5 Package

APPLICATIONS

- ◆ Tablet, MID
- ◆ Smart Phone
- ◆ Power Bank

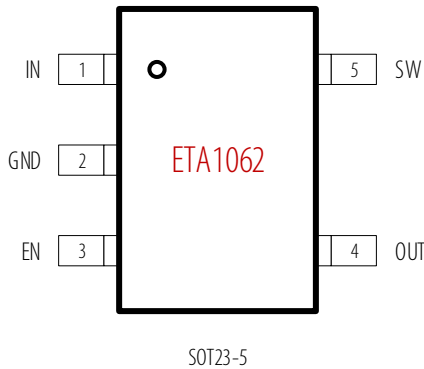
TYPICAL APPLICATION



ORDERING INFORMATION

PART No.	Output Voltage	PACKAGE	TOP MARK	Pcs/Reel
ETA1062V33S2F	3.3V	SOT23-5	PMYW	3000
ETA1062V50S2F	5.0V	SOT23-5	PWYW	3000

PIN CONFIGURATION



ABSOLUTEMAXIMUM RATINGS

(Note: Exceeding these limits may damage the device. Exposure to absolute maximum rating conditions for long periods may affect device reliability.)

IN OUT, SW, EN Voltage.....	-0.3V to 6.5V	
SW to ground current	Internally limited	
Operating Temperature Range	-40°C to 85°C	
Storage Temperature Range	-55°C to 150°C	
Thermal Resistance	θ_{JA}	θ_{JC}
SOT23-5.....	180.....	90..... °C/W
Lead Temperature (Soldering 10sec)	260°C	
ESD HBM (Human Body Mode)	2KV	
ESD MM (Machine Mode)	200V	

ELECTRICAL CHACRACTERISTICS

($V_{IN}=3.6V, V_{OUT}=5V$, unless otherwise specified. Typical values are at $T_A=25^\circ C$.)

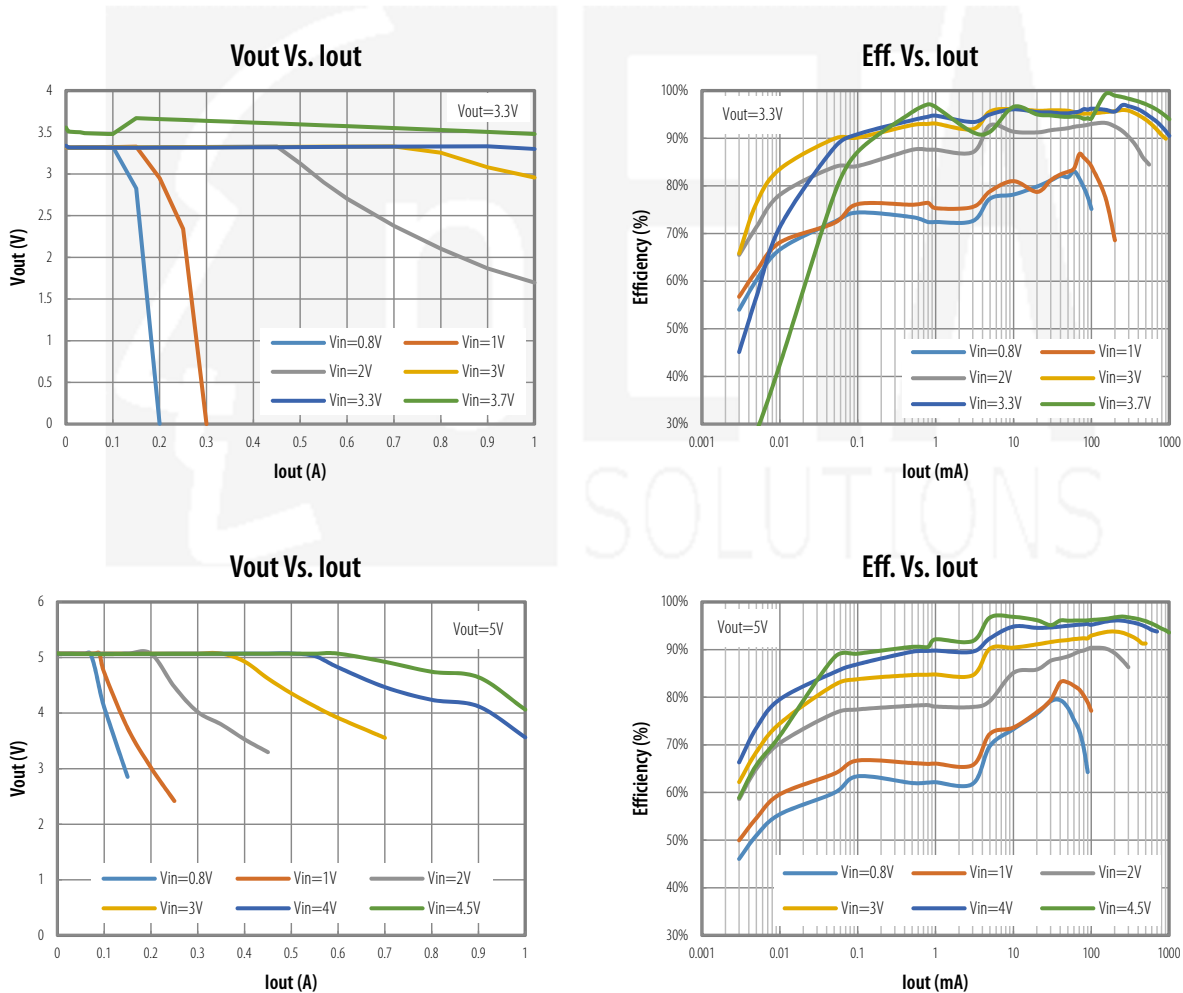
PARAMETER	CONDITIONS	MIN	TYP	MAX	UNITS
Quiescent Current at OUT	$V_{EN}=IN$, No load, Not switching		1.2	2.5	μA
Shutdown Supply Current at IN	$V_{EN}=GND$		0.32		μA
IN Startup Voltage	$I_{OUT}=1mA$		0.8		V
IN Operation Voltage	After Start-up	0.6		5	V
Output Voltage at 3.3V		3.2	3.3	3.4	V
Output Voltage at 5.0V		4.85	5.0	5.15	V
Switching Frequency			1.4		MHz
NMOS Switch On Resistance	$I_{SW}=100mA$		250		m Ω
PMOS Switch On Resistance	$I_{SW}=100mA$		160		m Ω
SW Leakage Current	$V_{OUT}=5.2V, V_{EN}=GND, V_{SW}=5.2V$ or $V_{SW}=0V$			10	μA
NMOS Switch Current Limit			1		A
Start-up Current Limit			1		A
Short Circuit Hiccup time	ON		1.3		ms
	OFF		33		ms
EN Input Current	$V_{EN}=5V$ or $0V$	-1	0	1	μA
EN High Voltage	$V_{OUT}=5V$	1.2			V
EN low Voltage	$V_{OUT}=5V$			0.3	V
Thermal Shutdown	Rising, Hysteresis= $25^\circ C$		155		$^\circ C$

PIN DESCRIPTION

PIN #	NAME	DESCRIPTION
1	IN	Input Supply Voltage. Bypass with a 4.7μF ceramic capacitor to GND
2	GND	Ground Pin
3	EN	Enable pin for the IC. Drive this pin high to enable the part, low to disable.
4	OUT	Output pin. Bypass with a 10μF or larger ceramic capacitor closely between this pin and GND
5	SW	Inductor Connection. Connect an inductor Between SW and the regulator output.

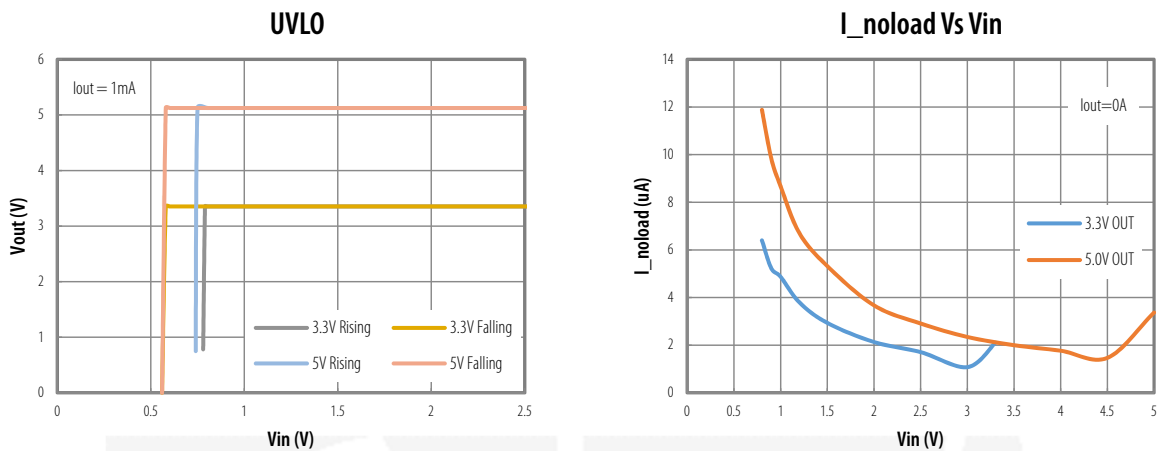
TYPICAL CHARACTERISTICS

(Typical values are at $T_A = 25^\circ\text{C}$ unless otherwise specified.)



TYPICAL CHARACTERISTICS cont'

(Typical values are at $T_A = 25^\circ\text{C}$ unless otherwise specified.)



APPLICATION INFORMATION

Loop Operation

ETA1062 is a high efficiency synchronous step-up converter with ultra-low quiescent current down to $1.2\mu\text{A}$. It integrates a $250\text{m}\Omega$ Low Side Main MOSFET and $160\text{m}\Omega$ synchronous MOSFET. It uses a PWM current-mode control scheme. An error amplifier integrates error between the FB signal and the internal reference voltage. The output of the integrator is then compared to the sum of a current-sense signal and the slope compensation ramp. This operation generates a PWM signal that modulates the duty cycle of the power MOSFETs to achieve regulation for output voltage.

The peak current of the NMOS switch is also sensed to limit the maximum current flowing through the switch and the inductor. The typical peak current limit is set to 1A. An internal temperature sensor prevents the device from getting overheated in case of excessive power dissipation.

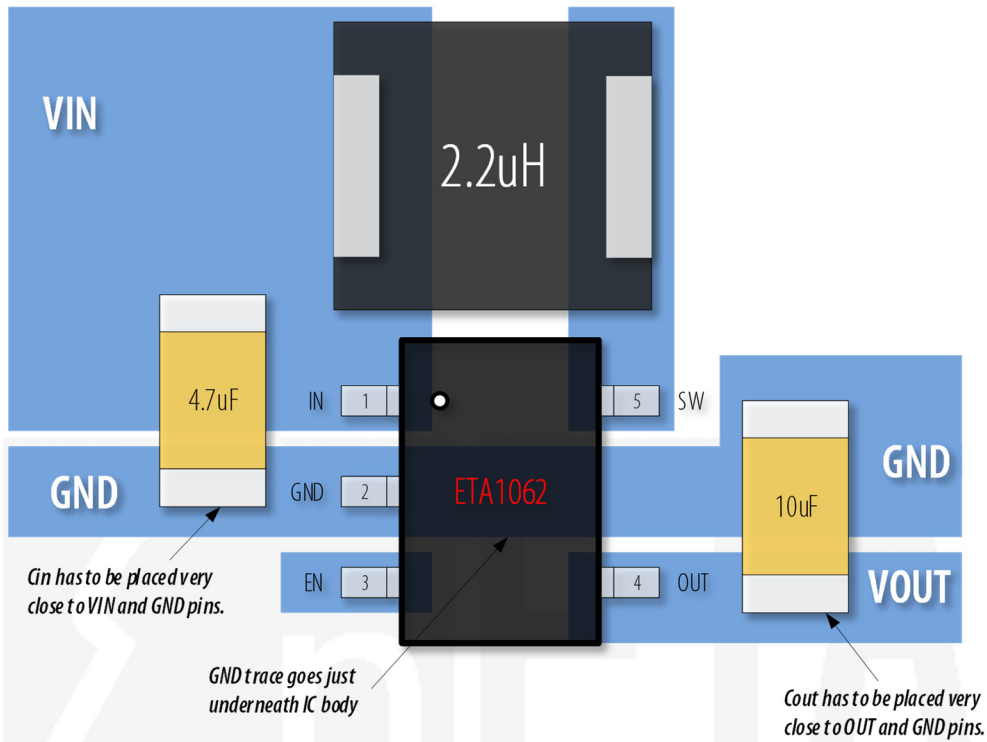
Ultra low current consumption at Light Load Operation

Traditionally, a fixed constant frequency PWM DC/DC regulator always switches even when the output load is small. When energy is shuffling back and forth through the power MOSFETs, power is lost due to the finite RDSOns of the MOSFETs and parasitic capacitances. At light load, this loss is prominent and efficiency is therefore very low. ETA1062 employs a proprietary control scheme that improves efficiency in this situation by enabling the device into a power saving mode during light load and the no load quiescent current can be as low as $1.2\mu\text{A}$.

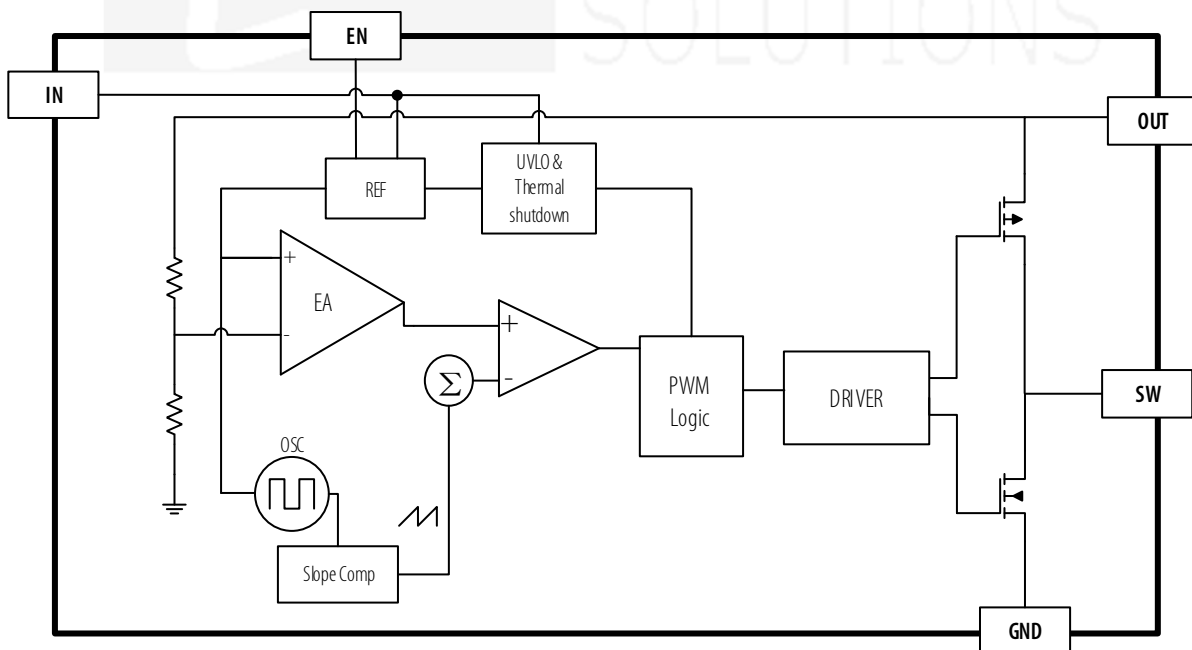
Short-Circuit Protection

Unlike most step-up converters, the ETA1062 allows for short circuits on the output. In the event of a short circuit, the device first turns off the NMOS when the sensed current reaches the current limit. When OUT drops below IN, the device then enters a linear charge period with the current limited same as with the start-up period. In addition, the thermal shutdown circuits disable switching if the die temperature rises above 155°C .

PCB GUIDELINES

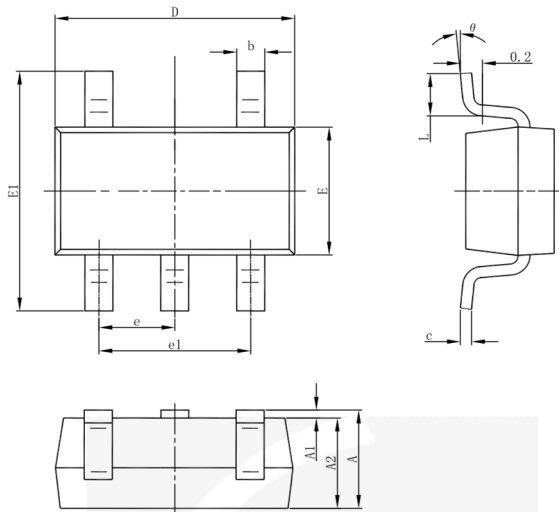


BLOCK DIAGRAM



PACKAGE OUTLINE

Package: SOT23-5



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°

