

MICROPOWER HIGH EFFICIENCY STEP-UP DC-DC CONVERTER

A7107

Description

The A7107 is a micropower, high efficiency, and low voltage step-up DC/DC converter intended for use in battery powered wireless applications. With the low start-up input voltage below 1V, the device is suitable for applications with 1 or 2 AA cells, providing up to 300mA output current at 3.3V output. The 35µA low quiescent current, zero shutdown current and high efficiency maintains long battery lifetime. A switching frequency of 450KHz minimizes solution footprint by allowing the use of small inductors and ceramic capacitors. The device is offered in a low profile (1mm) small 6-lead SOT-23 package.

The current mode PWM design is optimized for stable and high efficiency operations over a wide range of load currents. With low resistance internal MOSFET switches, the A7107 maintains high efficiency over a wide range of load current. In addition to its high efficiency at moderate and heavy loads, the A7107 includes automatic PFM operation that improves efficiency of the power converter at light loads.

Features

- Low Start-up voltage: 0.85V (typ)
- 35µA Quiescent Supply Current in switch-off mode
- <1µA Shutdown Current
- 90% Efficiency
- Excellent load and line regulation characteristics
- 300mA, 350mΩ Internal MOSFET
- 450KHz Fixed Switching Frequency
- Small SOT-26 package

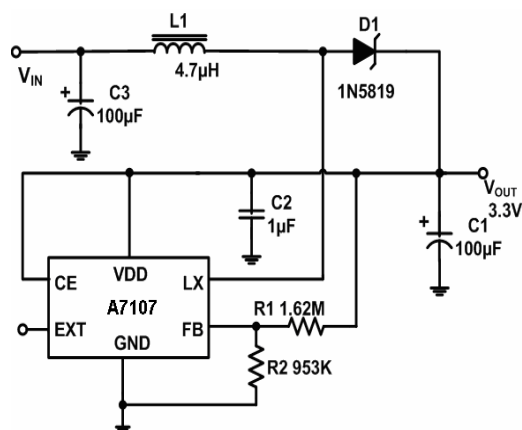
Application

- Wireless key board and mouse
- MP3 Player, PDA, DSC
- LCD Panel
- RF-Tags
- Portable Equipment

Ordering Information

E6	SOT-26	PN: A7107E6
Note	AiT provides all lead free parts	
	AiT provides E6 in Tape & Reel	

Typical Application



Pin Description

<p style="text-align: center;">Top View</p>	Pin No.	Description	Pin Function
	1	CE	Chip enable A7107 gets into shutdown mode when CE pin set to low
	2	EXT	Output pin for driving external NMOS
	3	GND	Ground
	4	LX	Pin for switching
	5	VDD	Input positive power pin
	6	FB	Feedback input pin Internal reference voltage for the error amplifier is 1.25V

Absolute Maximum Ratings

Parameter	
Supply Voltage	-0.3V~6V
LX Pin Switch Voltage	-0.3V~6V
Other I/O Pin Voltage	-0.3V ~ (V _{DD} +0.3V)
LX Pin Switch Current	2.5A
EXT Pin Driver Current	150mA
Operating Junction Temperature (note1)	+125°C
Storage Temperature Range	-65°C ~ +155°C

Note1: T_J is calculated from the ambient temperature T_A and power dissipation P_D according to the following formula:

$$T_J = T_A + P_D \times (220^\circ\text{C}/\text{W})$$

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Electrical Characteristics

$V_{IN}=1.5V$, $V_{OUT}=3.3V$, $I_L=0mA$, $T_A=25^{\circ}C$, unless otherwise noted.

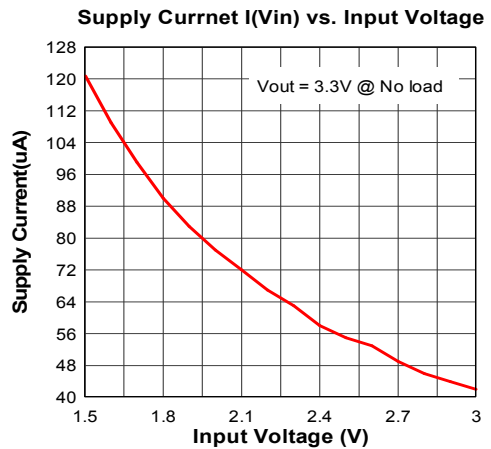
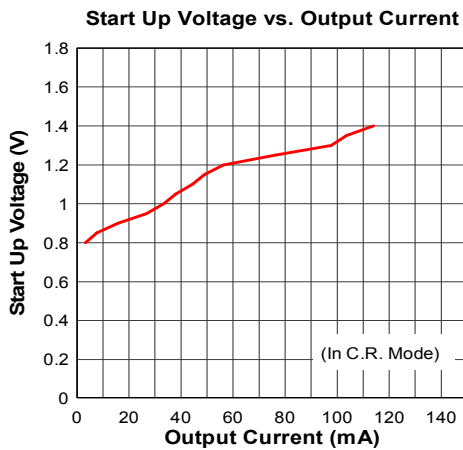
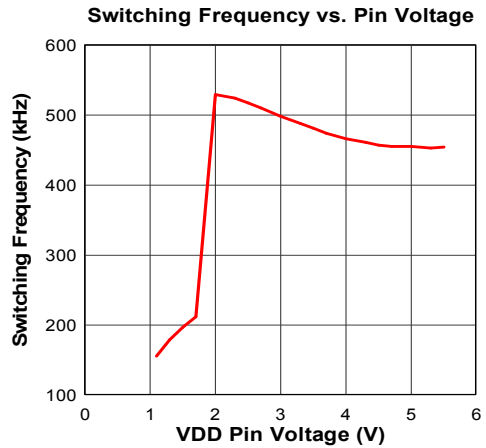
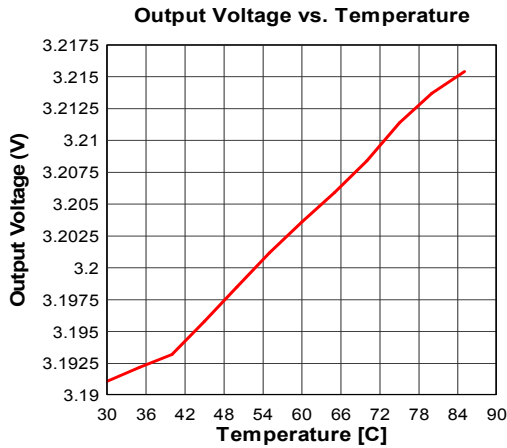
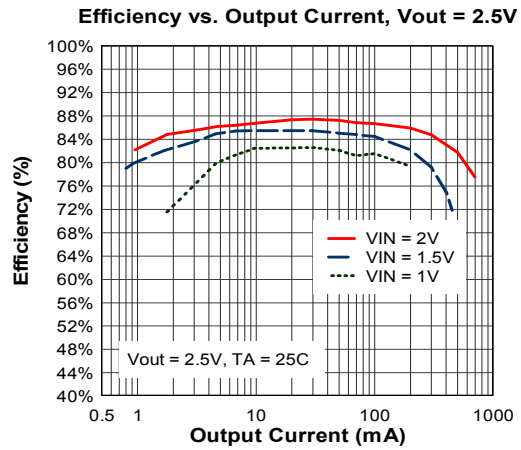
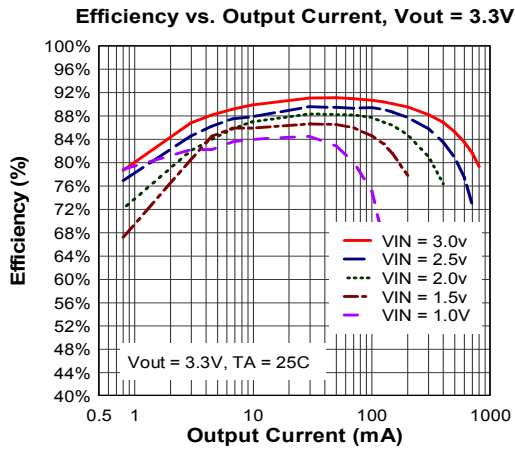
Parameter	Conditions	Min	Typ	Max	Unit
Start-Up Voltage	$I_L=1mA$		0.85	1.05	V
Operating V_{OUT} Range	V_{DD} Pin Voltage	2		4.2	V
Quiescent Current (Shutdown Current)	CE Pin=0V, $V_{IN}=4.5V$		0.01	1	μA
Quiescent Current (Switch-Off Current)	$V_{IN}=6V$		35	50	μA
Quiescent current (No Load Current)			110		μA
Feedback Reference Voltage	$T_A = +25^{\circ}C$	1.195	1.220	1.245	V
	$T_A= 0^{\circ}C \leq T_A \leq 85^{\circ}C$	1.190	1.220	1.250	V
	$T_A= -40^{\circ}C \leq T_A \leq 85^{\circ}C$	1.183	1.220	1.257	V
Switching Frequency		380	450	520	KHz
Maximum Duty		85	90		%
LX ON Resistance			0.3	1.1	Ω
Current Limit Setting			2		A
EXT ON Resistance to V_{DD}			16		Ω
EXT ON Resistance to GND			18		Ω
Output Voltage	$V_{IN}=1.5V$, $I_L = 100mA$ $T_A= -40^{\circ}C \leq T_A \leq 85^{\circ}C$	3.200	3.300	3.400	V
Output Voltage	$V_{IN}=3.0V$, $I_L = 300mA$ $T_A= -40^{\circ}C \leq T_A \leq 85^{\circ}C$	3.200	3.300	3.400	V
Line Regulation	$V_{IN} = 1.0$ to $3.0V$, $I_L = 1mA$		0.3		mV/V
Load Regulation	$V_{IN} = 1.5V$, $I_L = 1$ to $100mA$		0.4		mV/mA
Load Regulation	$V_{IN} = 3.0$, $I_L = 1$ to $300mA$		0.4		mV/mA
CE Pin Trip Level		0.4	0.8	1.2	V
Temperature Stability for V_{OUT}			110		ppm/ $^{\circ}C$
Thermal Shutdown			165		$^{\circ}C$
Thermal Shutdown Hysteresis			10		$^{\circ}C$

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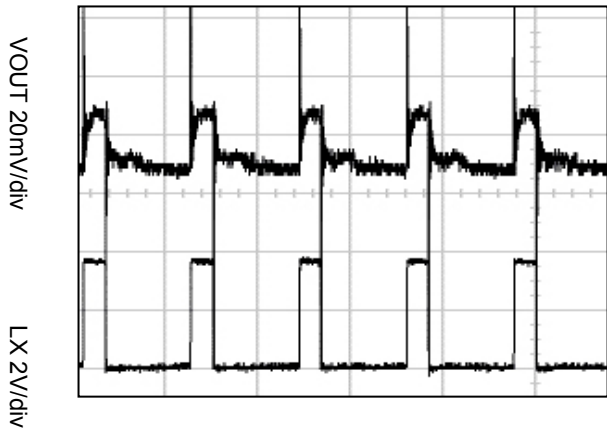
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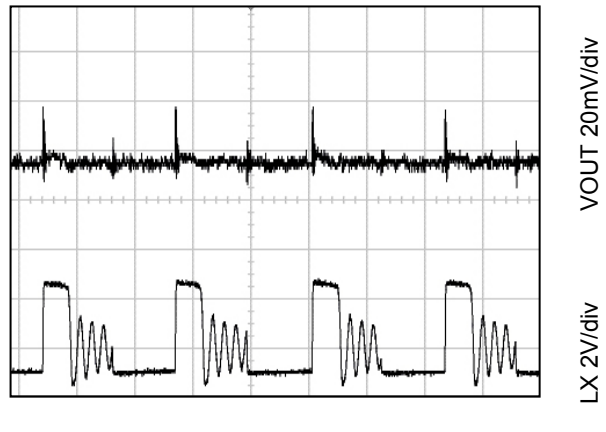
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LX Pin Wave Form & Output Ripple



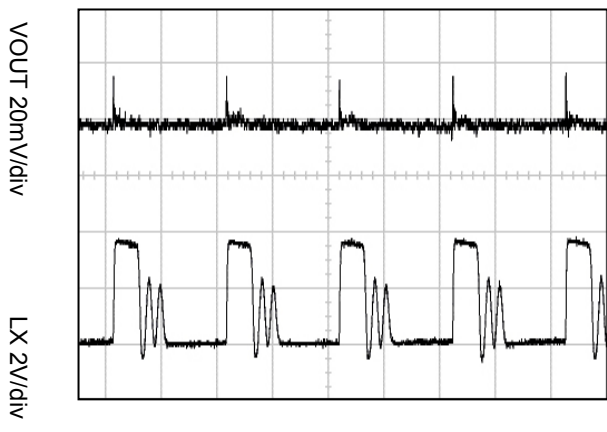
Vin = 1V, Vout = 3.3V @ 100mA

LX Pin Wave Form & Output Ripple



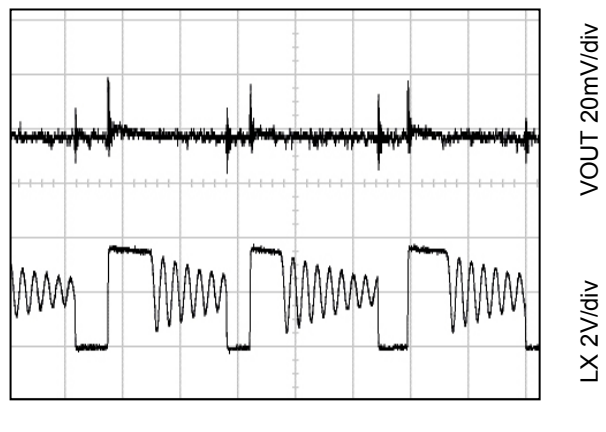
VIN=1V, VOUT=3.3V @10mA

LX Pin Wave Form & Output Ripple



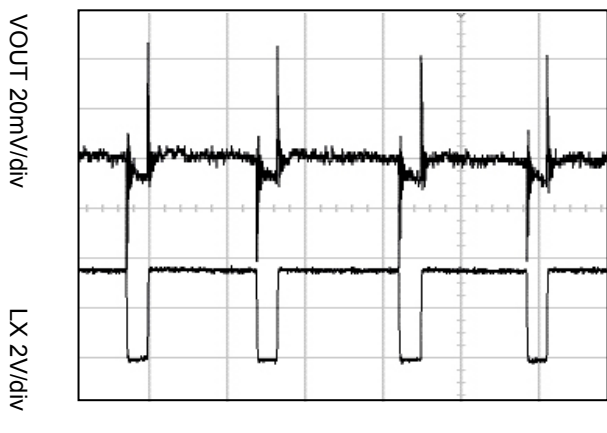
VIN=2V, VOUT = 3.3V @ 200mA

LX Pin Wave Form & Output Ripple



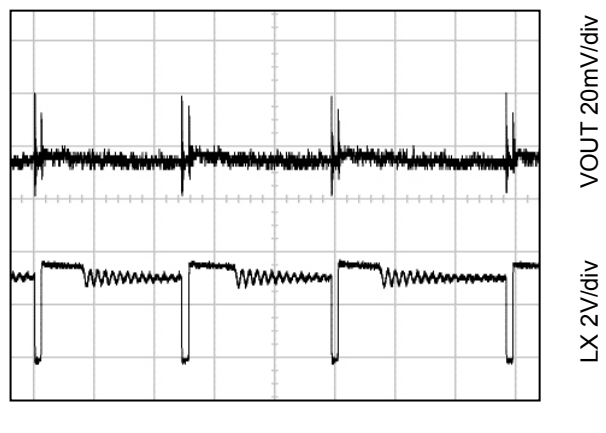
VIN=2V, VOUT3.3V @ 10mA

LX Pin Wave Form & Output Ripple



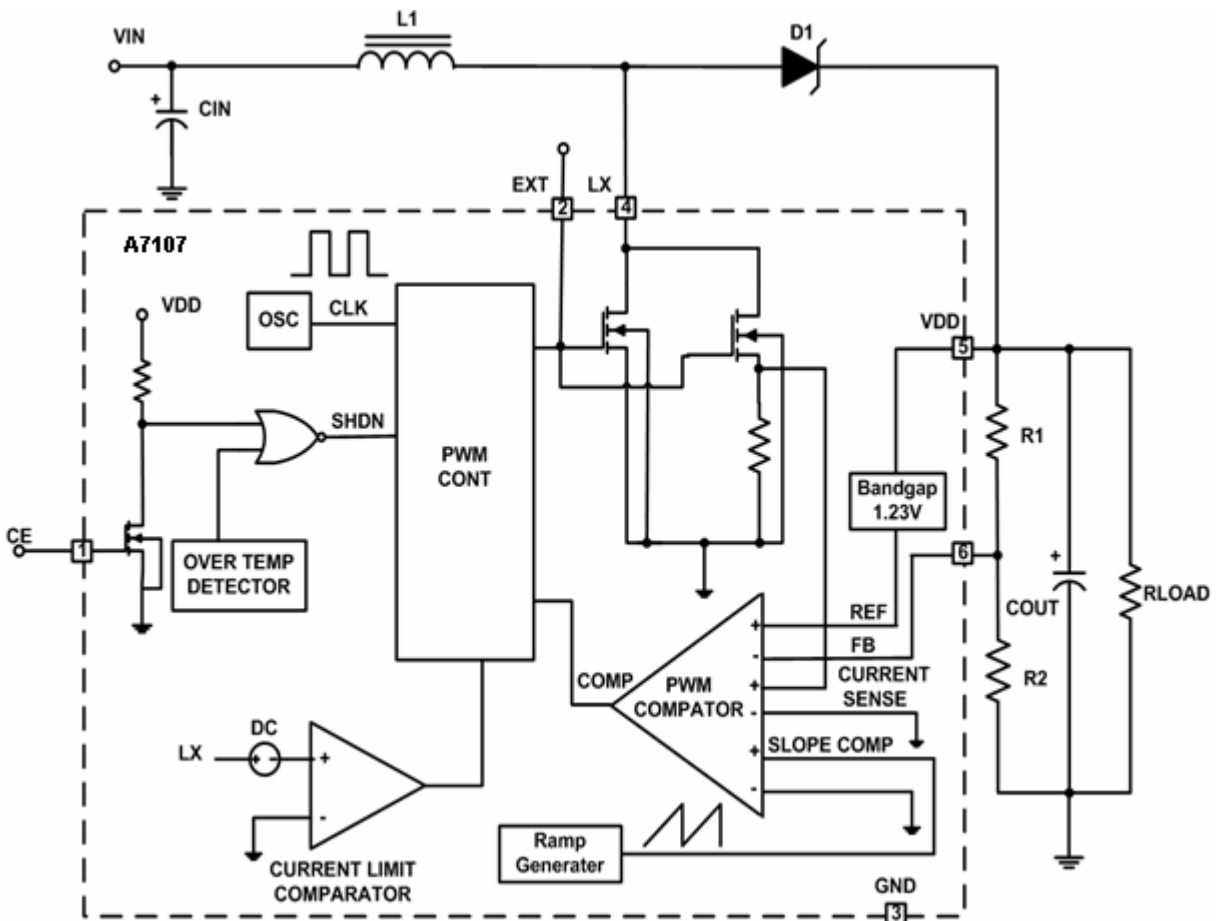
VIN=3V, VOUT=3.3v @ 200mA

LX Pin Wave Form & Output Ripple



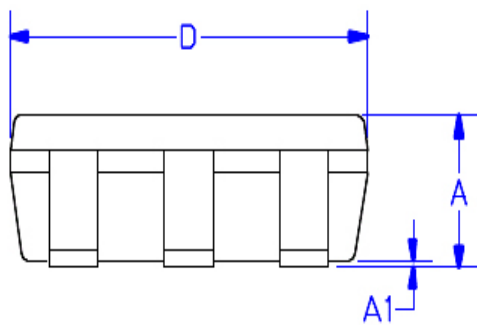
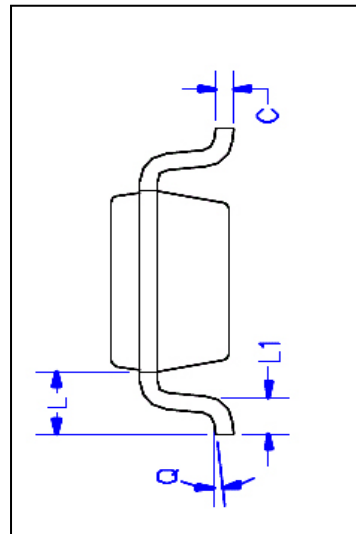
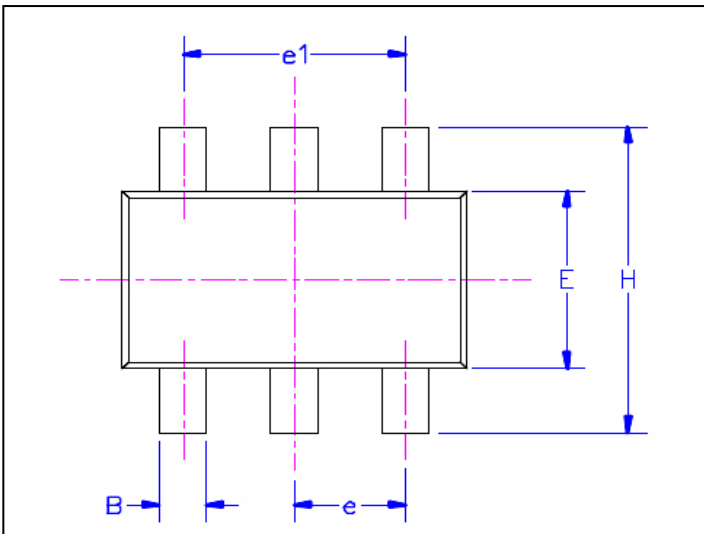
VIN=3V, VOUT=3.3v @ 10mA

Block Diagram



Package Information

Dimension in SOT-26 (Unit: mm)



Dimension	Min.	Max.
A	0.90	1.10
A1	0.01	0.13
B	0.30	0.50
C	0.09	0.20
D	2.80	3.10
H	2.50	3.10
E	1.50	1.70
e	0.95 REF.	
e1	1.90 REF.	
L1	0.20	0.55
L	0.35	0.80
Q	0°	10°

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