PWM/PFM DUAL MODE STEP-UP DC/DC CONVERTER

Features

- Input Voltage Range: 2.5~6V
- Output Voltage Range: 3.0~17V (±2.5%)
- PWM/PFM Switching Control
- Oscillator Frequency: 300KHz (±20%)
- High Efficiency: 91% (Typ.)
- Stand-by Current: I_{STB} 1 = μA (Typ.)
- Built-in internal N-Channel MOS
- Lead Free Package: SOP-8L
- SOP-8L: Available in "Green" Molding Compound (No Br, Sb)
- Lead Free Finish/ RoHS Compliant (Note 1)

General Description

The AP1609 is a high efficient step-up DC/DC converter. Large output current is possible having a built in internal N channel MOSFET, and using an external coil and diode.

Output voltage is programmable with 1.23V of standard voltage supply internal, and using externally connected components, output voltage (FB) can be set up at will.

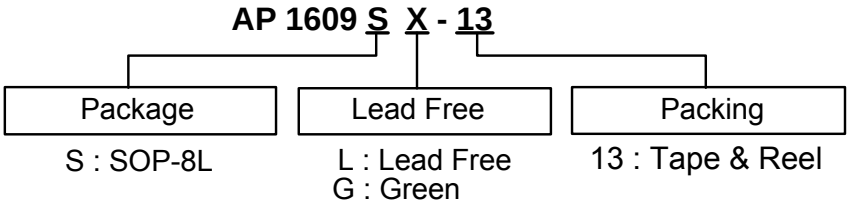
With a 300KHz switching frequency, the size of the external components can be reduced. Control switches from PFM to PWM during light loads with the AP1609 (PWM/PFM switchable) and the series are highly efficient from light loads to large output currents.

During stand-by time (CE pin "Low"), current consumption is reduced to 1μA.

Applications

- Electronic Information Organizers
- Palmtops
- Cellular and Portable Phones
- Portable Audio Systems
- Various Multi-Function Power Supplies

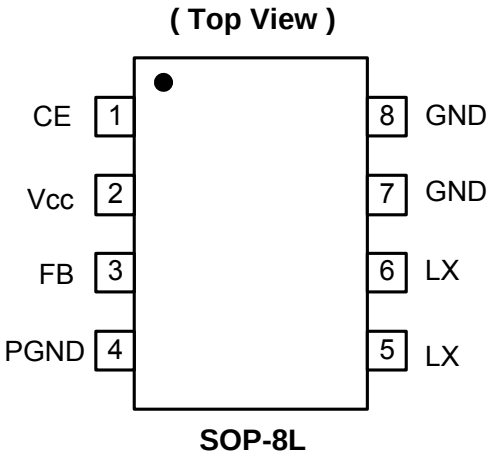
Ordering Information



Device	Package Code	Packaging (Note 2)	13" Tape and Reel	
			Quantity	Part Number Suffix
AP1609SL-13	S	SOP-8L	2500/Tape & Reel	-13
AP1609SG-13	S	SOP-8L	2500/Tape & Reel	-13

Notes: 1. EU Directive 2002/95/EC (RoHS). All applicable RoHS exemptions applied. Please visit our website at http://www.diodes.com/products/lead_free.html.
2. Pad layout as shown on Diodes Inc. suggested pad layout document AP02001, which can be found on our website at http://www.diodes.com/datasheets/ap02001.pdf.

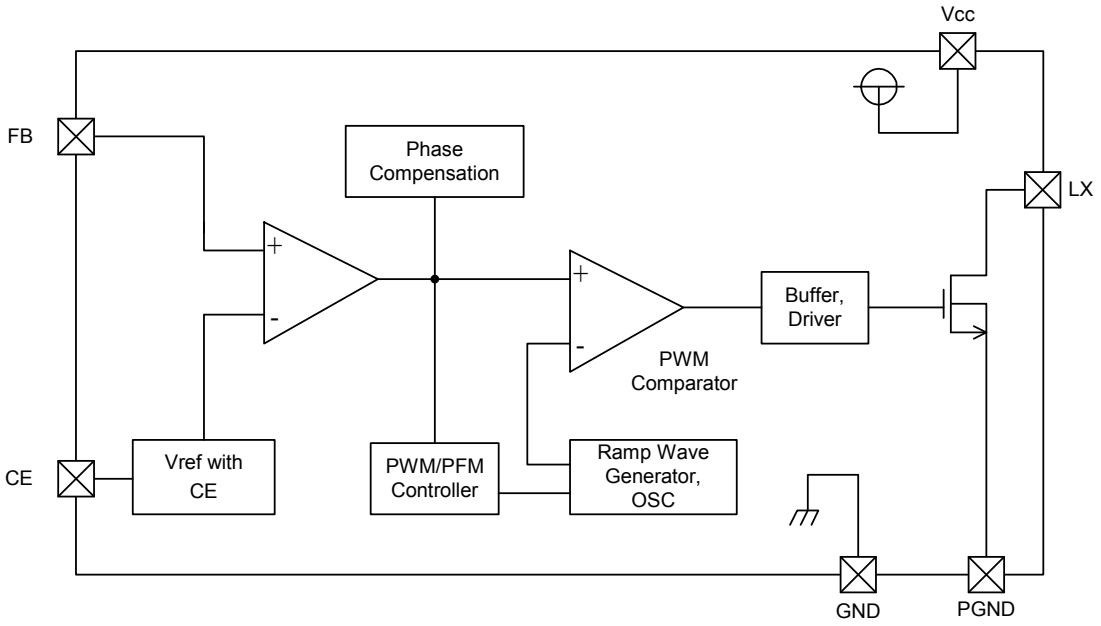
Pin Assignments



Pin Descriptions

Pin Name	Pin Number	Description
CE	1	Chip Enable: H: Enable L: Disable
Vcc	2	IC signal power supply pin
FB	3	Feedback pin
PGND	4	Power MOSFET GND
LX	5, 6	Switch Pin. Connect external inductor/diode here. Minimize trace area at this pin to reduce EMI.
GND	7, 8	GND Pin

Block Diagram



Absolute Maximum Ratings

Symbol	Parameter	Ratings	Units
V_{CC}	V_{IN} Pin Voltage	-0.3 ~ 7	V
V_{FB}	FB Pin Voltage	-0.3 ~ V_{CC} +0.3	V
V_{CE}	CE Pin Voltage	-0.3 ~ V_{CC} +0.3	V
V_{SW}	Switch Voltage (LX to GND)	-0.3 ~ 18	V
I_{LX}	Switch Current	-3 ~ 0.2	A
P_D	Continuous Total Power Dissipation	1200	mW
T_{OPR}	Operating Ambient Temperature	-20 ~ +80	°C
T_{STG}	Storage Temperature	-20 ~ +125	°C

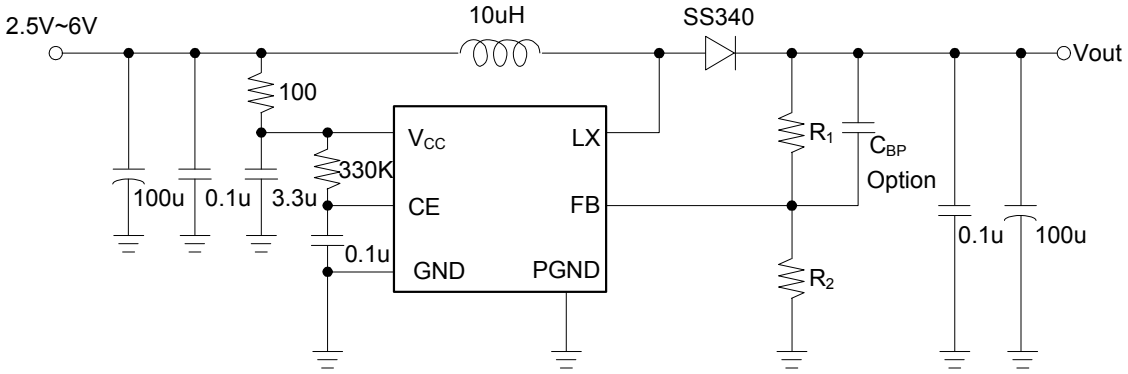
Electrical Characteristics

AP1609 (F_{OSC} = 300kHz, V_{OUT} = 5V) T_A = 25°C

Symbol	Parameter	Conditions	Min	Typ.	Max	Units
V_{FB}	FB Voltage		1.20	1.23	1.26	V
V_{CC}	Input Voltage		2.5	-	6	V
V_{OUT}	Output Voltage		3.0	-	17	V
I_{OUT}	Maximum Switching Output Current		2.4	-	-	A
$R_{DS\ (ON)}$	Drain-Source On-State Resistance	I_D = 2.4A	-	100	-	mΩ
I_{CCQ}	Quiescent Current	No Load, FB = 2V, CE = High	-	80	130	μA
I_{SD}	Shutdown Current	No Load, CE = Low	-	1	-	μA
Fosc	Oscillator Frequency	Measuring of EXT Waveform, V_{IN} = Output Voltage +0.3V	240	300	360	kHz
MAXDTY	Maximum Duty Ratio		80	-	-	%
PFMDTY	PFM Duty Ratio	No Load	15	25	35	%
V_{CEH}	CE “High” Voltage	No External Components, V_{FB} = 0V, Apply 0.65V_{CC} (min.) to CE, Chip Enable	0.65	-	-	*V_{CC}
V_{CEL}	CE “Low” Voltage	Same as V_{CEH}, Chip Disable	-	-	0.20	*V_{CC}
EFFI	Efficiency		-	91	-	%

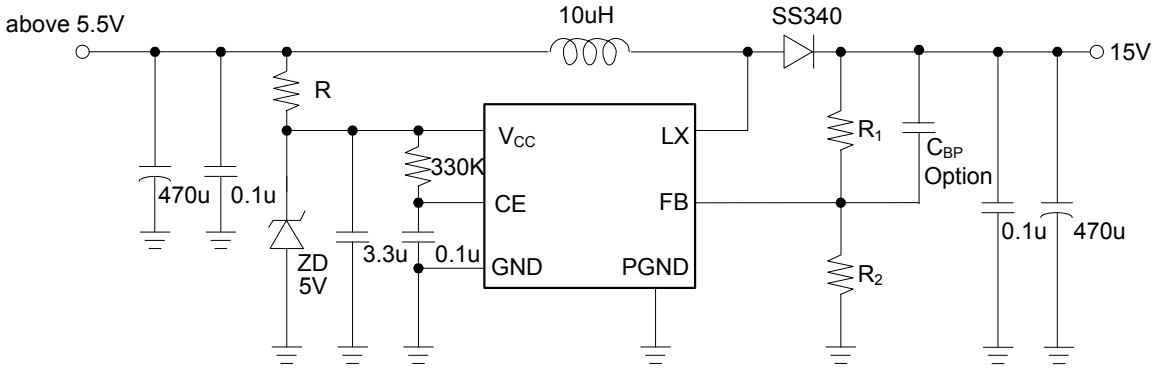
Typical Application Circuit

(1) Normal Circuit



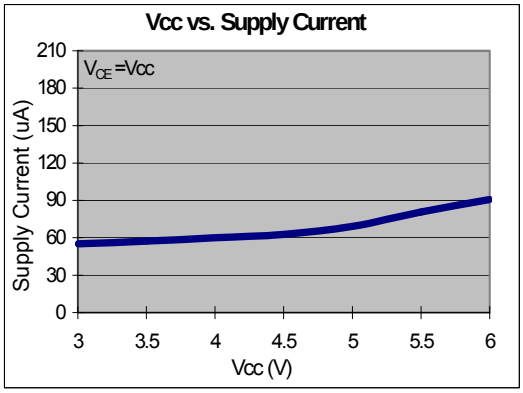
$$V_{out} = 1.23\times (1+\frac{R_1}{R_2}),\ R_2 = 10K\sim 100K$$

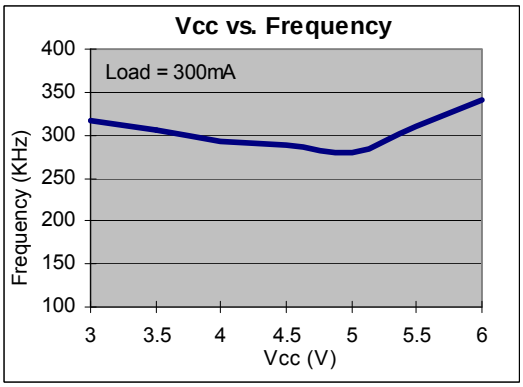
(2) HV Circuit

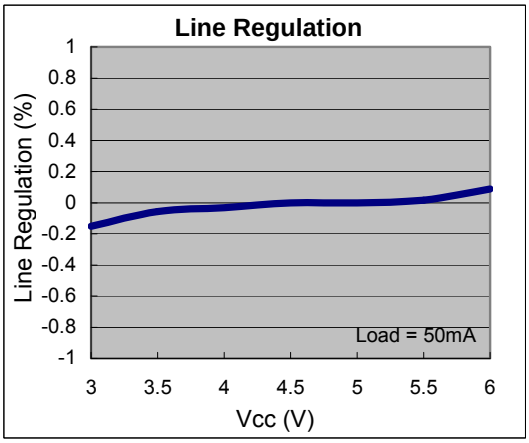


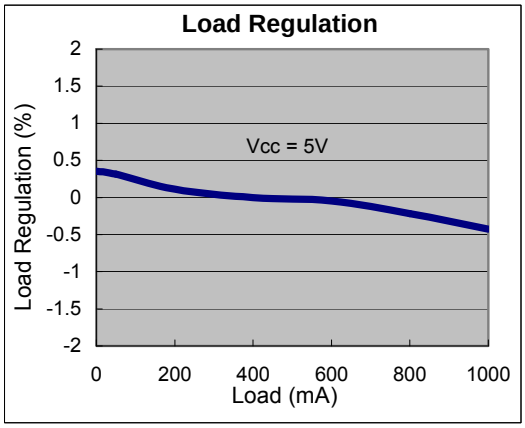
$$V_{out} = 1.23\times (1+\frac{R_1}{R_2}),\ R_2 = 10K\sim 100K$$

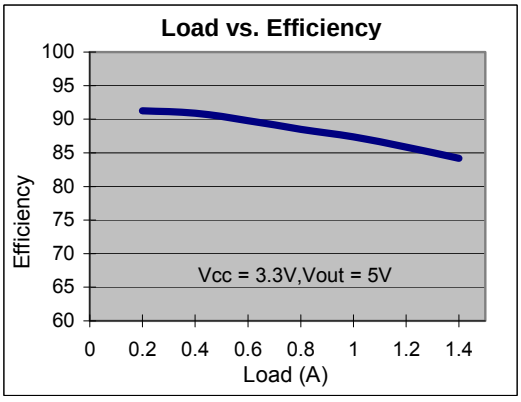
Typical Performance Characteristics

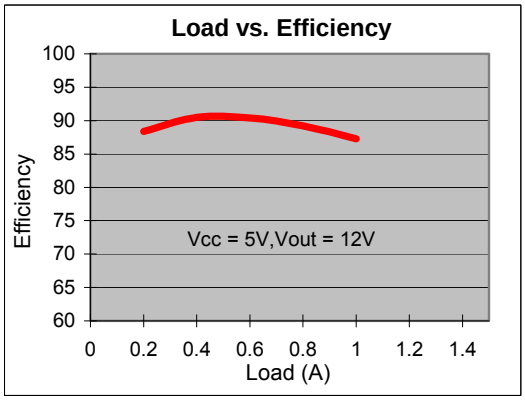




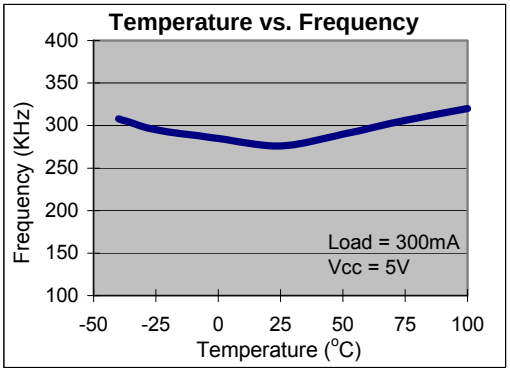


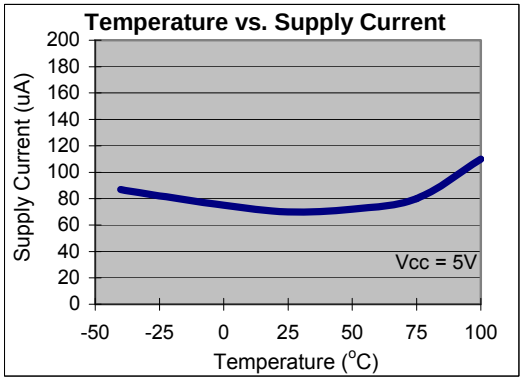


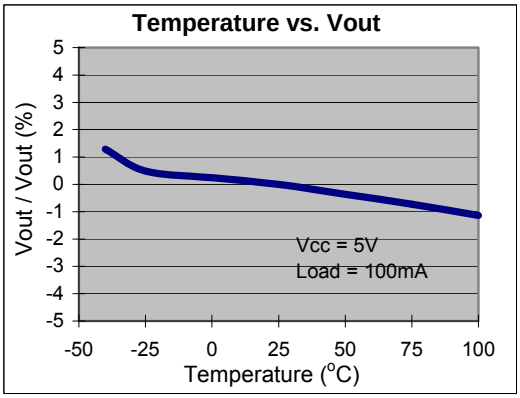




Typical Performance Characteristics (Continued)

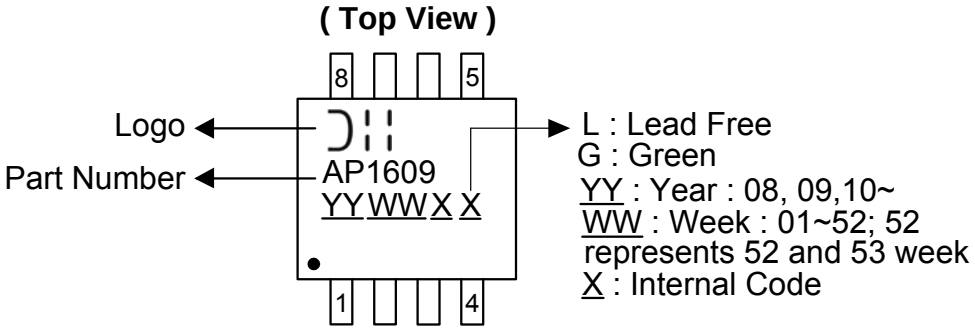






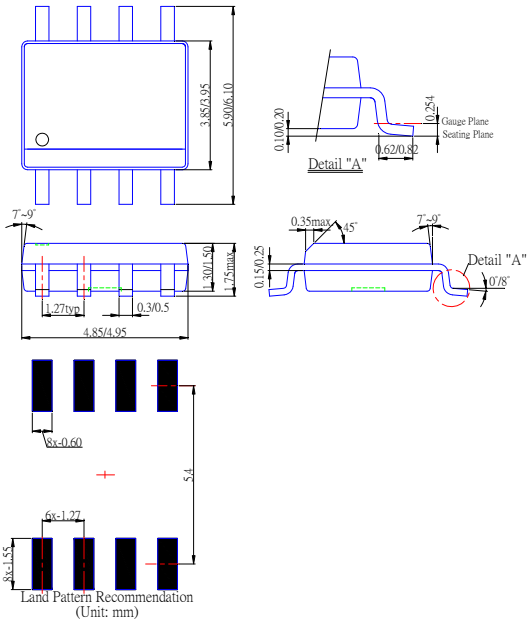
Marking Information

(1) SOP-8L



Package Information (All Dimensions in mm)

(1) Package Type: SOP-8L



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