

**Features**

- Input Voltage Range: 2.5~6V
- Output Voltage Range: 3.0~17V ( $\pm 2.5\%$ )
- PWM/PFM Switching Control
- Oscillator Frequency: 300KHz ( $\pm 20\%$ )
- High Efficiency: 91% (Typ.)
- Stand-by Current:  $I_{STB} = 1 \mu A$  (Typ.)
- Built-in internal N-Channel MOS
- Lead-Free and Green Package: SOP-8L
- Lead Free Finish/RoHS Compliant for Lead Free products (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.

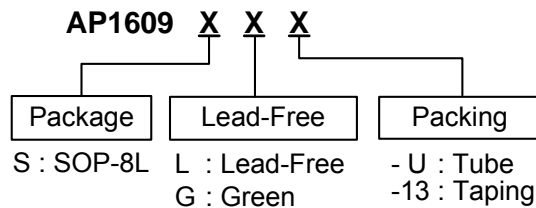
With a 300KHz switching frequency, the size of the external components can be reduced. Control switches from PFM to PWM during light loads with the AP1609 (PWM/PFM switchable) and the series are highly efficient from light loads to large output currents.

During stand-by time (CE pin "Low"), current consumption is reduced to 1 $\mu A$ .


**Applications**

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

**Ordering Information**

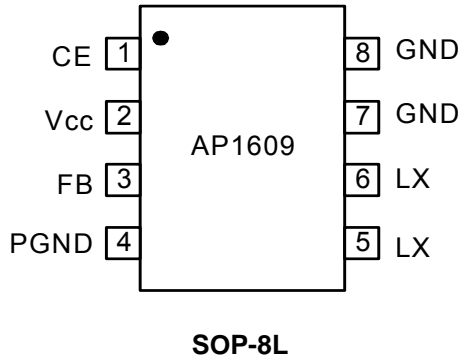


Note: 1. RoHS revision 13.2.2003. Glass and High Temperature Solder Exemptions Applied, see *EU Directive Annex Notes 5 and 7*.

Device (Note 2)	Package Code	Packaging	Tube		13" Tape and Reel	
			Quantity	Part Number Suffix	Quantity	Part Number Suffix
 AP1609S	S	SOP-8L	100	-U	2500/Tape & Reel	-13

Note: 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>.

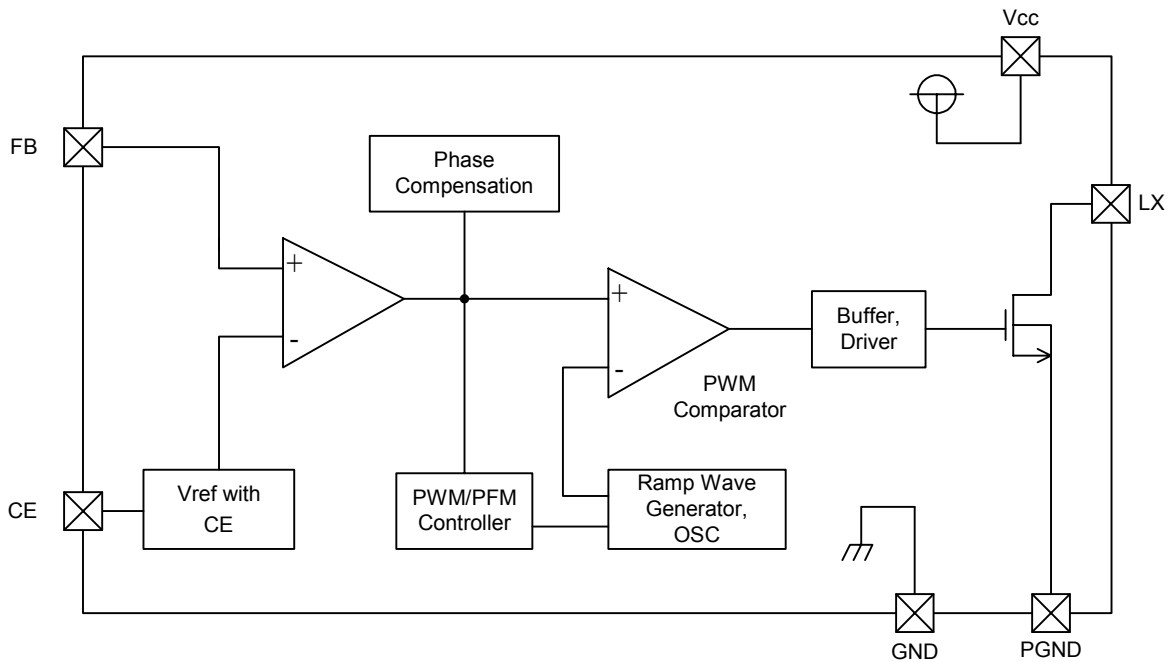
**Pin Assignments**



**Pin Descriptions**

Pin Name	Pin Number	Description
CE	1	Chip Enable: H: Enable L: Disable
V <sub>CC</sub>	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**

Parameter	Symbol	Ratings	Units
V <sub>IN</sub> Pin Voltage	V <sub>CC</sub>	-0.3 ~ 7	V
FB Pin Voltage	V <sub>FB</sub>	-0.3 ~ V <sub>CC</sub> +0.3	V
CE Pin Voltage	V <sub>CE</sub>	-0.3 ~ V <sub>CC</sub> +0.3	V
Switch Voltage (LX to GND)	V <sub>SW</sub>	-0.3 ~ 18	V
Switch Current	I <sub>LX</sub>	-3 ~ 0.2	A
Continuous Total Power Dissipation	P <sub>d</sub>	1200	mW
Operating Ambient Temperature	T <sub>opr</sub>	-20 ~ +80	°C
Storage Temperature	T <sub>stg</sub>	-20 ~ +125	°C

**Electrical Characteristics**

AP1609

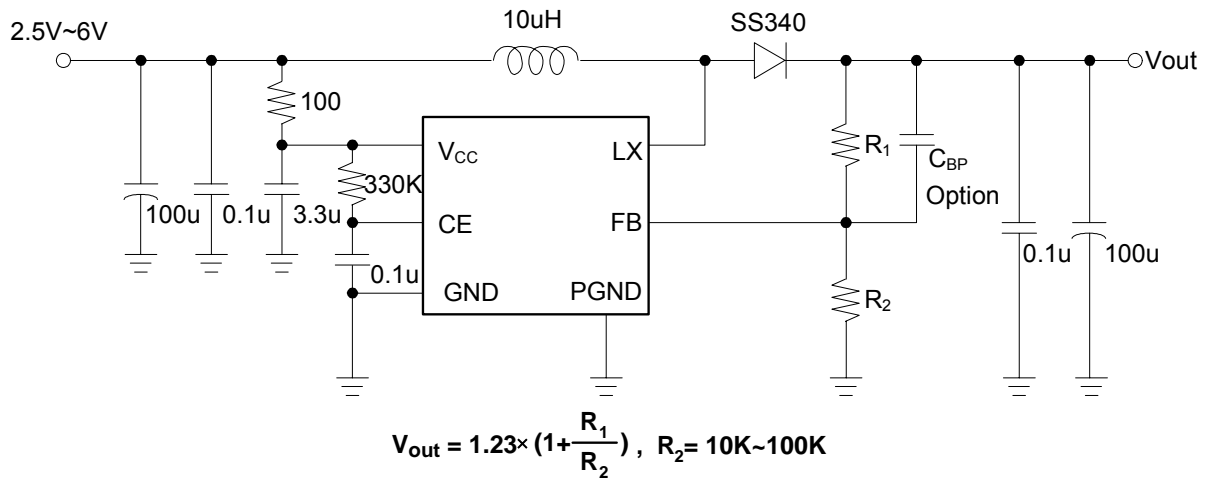
 ( F<sub>OSC</sub> = 300kHz, V<sub>OUT</sub> = 5V )

 T<sub>a</sub> = 25 °C

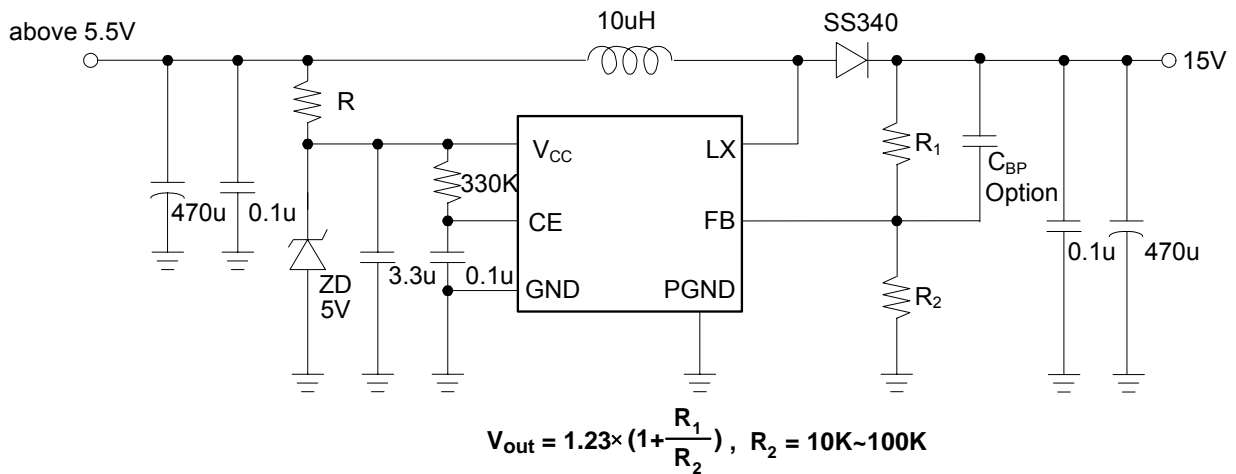
Parameter	Symbol	Conditions	Min.	Typ.	Max.	Units
FB Voltage	V <sub>FB</sub>		1.20	1.23	1.26	V
Input Voltage	V <sub>CC</sub>		2.5	-	6	V
Output Voltage	V <sub>OUT</sub>		3.0	-	17	V
Maximum Switching Output Current	I <sub>OUT</sub>		2.4	-	-	A
Drain-Source On-State Resistance	R <sub>DS(ON)</sub>	I <sub>D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

**Typical Application Circuit**

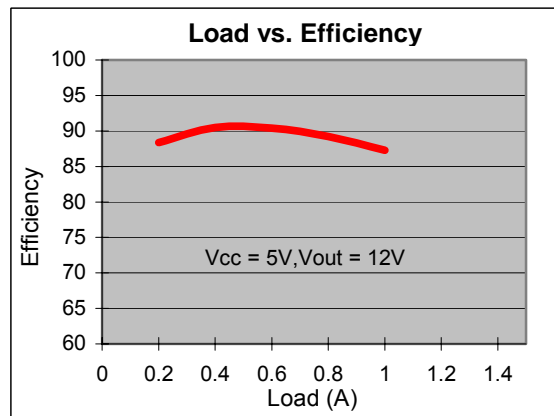
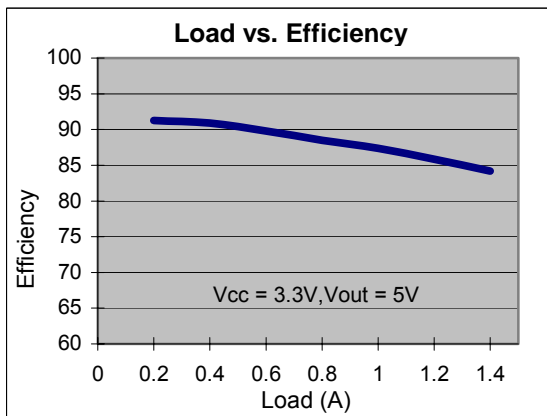
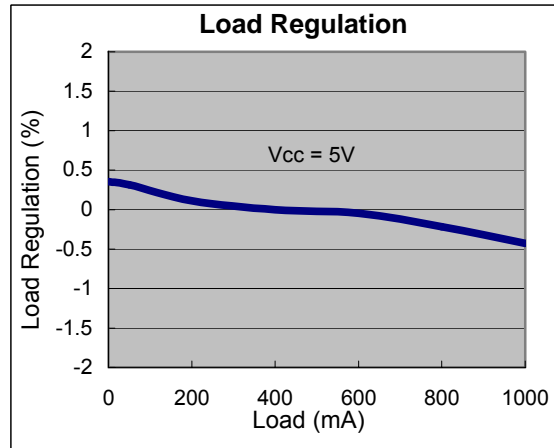
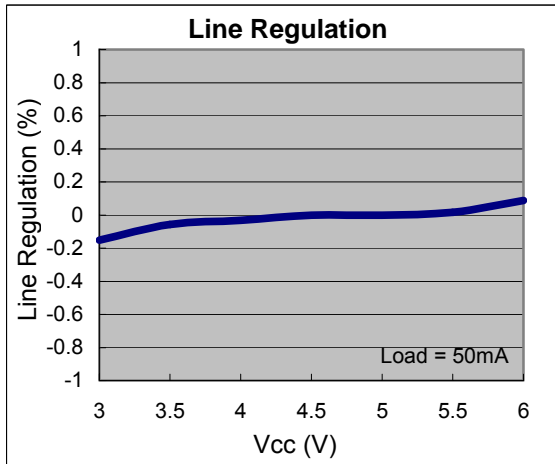
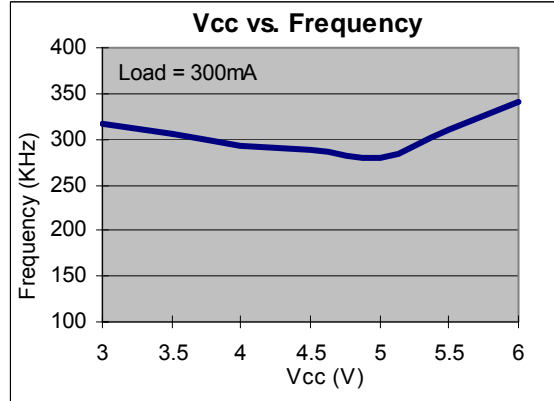
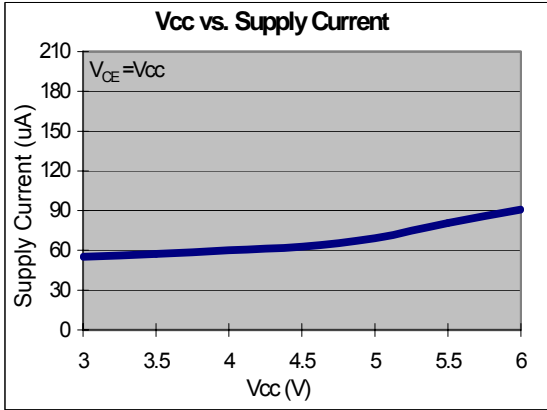
**(1) Normal Circuit**



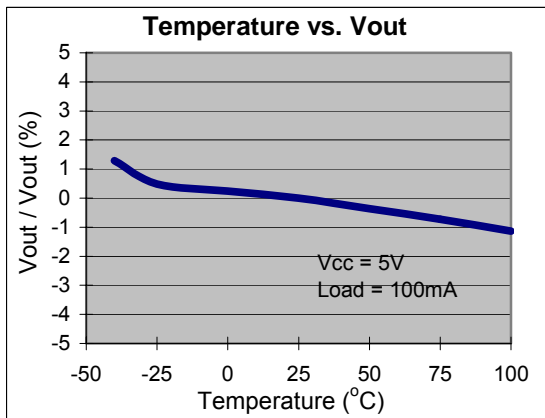
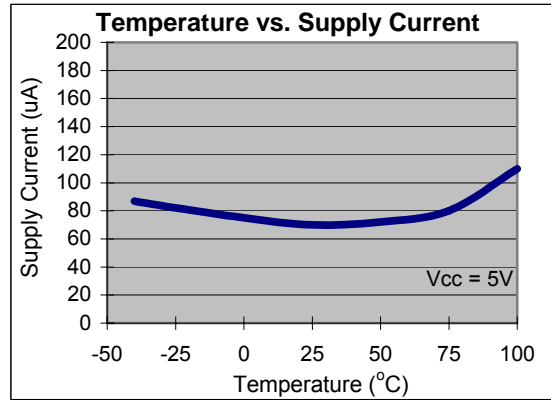
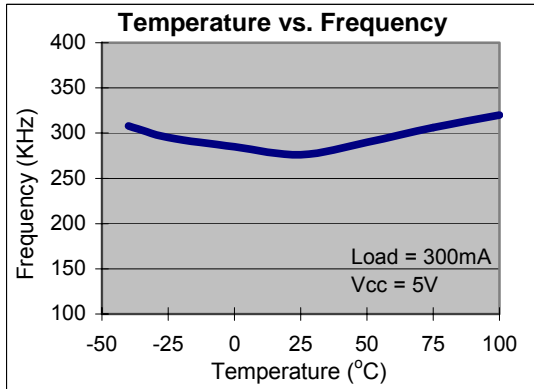
**(2) HV Circuit**



**Typical Performance Characteristics**

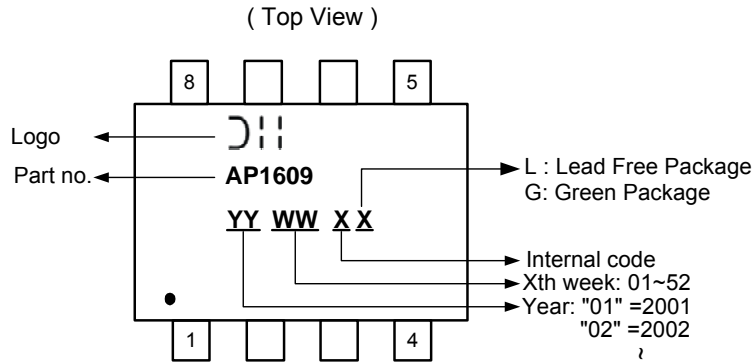


**Typical Performance Characteristics** (Continued)



**Marking Information**

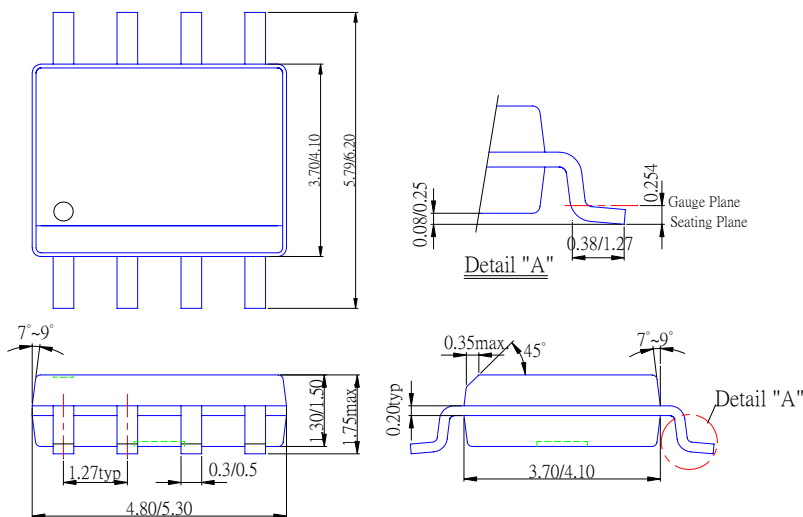
(1) SOP-8L



Device	Package	Identification Code
AP1609S	SOP-8L	AP1609

**Package Information** ( All Dimensions in mm )

Package Type: SOP-8L



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