Micropower, DC-DC Converter Adjustable and Fixed 3.3 V, 5 V, 12 V

ADP1108

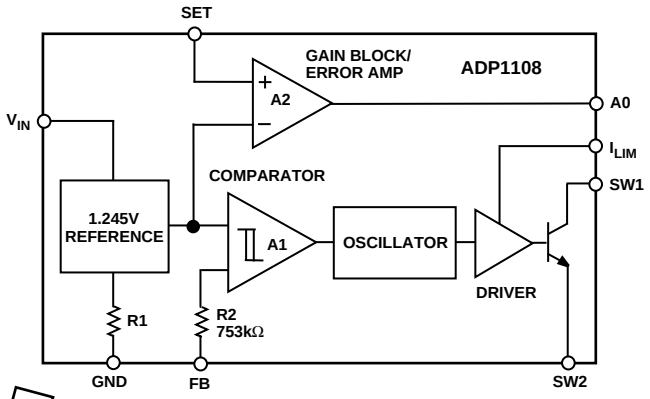
FEATURES

Operates at Supply Voltages From 2.0 V to 30 V
Consumes Only 110 μA Supply Current
Step-Up or Step-Down Mode Operation
Minimum External Components Required
Low Battery Detector Comparator On Chip
User-Adjustable Current Limit
Internal 1A Power Switch
Fixed or Adjustable Output Voltage Versions
8-Pin DIP or SO-8 Package

APPLICATIONS

Notebook/Palmtop Computers
3 V to 5 V, 5 V to 12 V Converters
9 V to 5 V, 12 V to 5 V Converters
LCD Bias Generators
Peripherals and Add-On Cards
Battery Backup Supplies
Cellular Telephones
Portable Instruments

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The ADP1108 is a highly versatile micropower switch-mode dc-dc converter that operates from an input voltage supply as low as 2.7 V and typically starts up from 1.8 V.

The ADP1108 can be programmed into a step-up or step-down dc-to-dc converter with only three external components. The fixed outputs are 3.3 V, 5.0 V, and 12 V; an adjustable version is also available. In step-up mode, supply voltage range is 2.0 V to 12 V, and 30 V in step-down mode. The ADP1108 can deliver 150 mA at 5 V from a 2AA cell input and 5 V at 300 mA from a 9 V in step-down mode. Switch current limit can be programmed with a single resistor.

For battery operated and power-conscious applications, the ADP1108 offers a very low power consumption of less than 110 μA.

The auxiliary gain block available in ADP1108 can be used as a low battery detector, linear post regulator, under voltage lockout circuit or error amplifier.

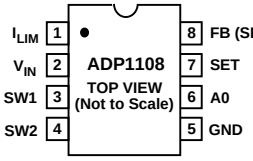
ORDERING GUIDE

Model	Output Voltage	Package Description	Package Option*
ADP1108AN-3.3	3.3 V	PDIP	N-8
ADP1108AR-3.3	3.3 V	SOIC	SO-8
ADP1108AN-5	5 V	PDIP	N-8
ADP1108AR-5	5 V	SOIC	SO-8
ADP1108AN-12	12 V	PDIP	N-8
ADP1108AR-12	12 V	SOIC	SO-8
ADP1108AN	ADJ	PDIP	N-8
ADP1108AR	ADJ	SOIC	SO-8

*For outline information see Package Information section.

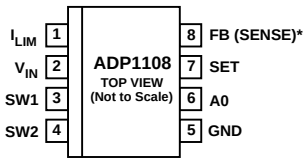
PIN CONFIGURATIONS

8-Lead Plastic DIP (N-8)



*FIXED VERSION

8-Lead SOIC (SO-8)



*FIXED VERSION

ADP1108–SPECIFICATIONS (@ T_A = +25°C, V_{IN} = 3.0 V, unless otherwise noted)

Parameter	Symbol	Conditions[1]	Min	Typ	Max	Units
QUIESCENT CURRENT	I_Q	Switch Off*		110	150	µA
QUIESCENT CURRENT, BOOST MODE CONFIGURATION	I_Q	No Load ADP1108-3 ADP1108-5 ADP1108-12		 100 135 250		
INPUT VOLTAGE	V_{IN}	Step-Up Mode* Step-Down Mode*	2.0		12.6 30	V V
COMPARATOR TRIP POINT VOLTAGE		ADP1108*[1]	1.20	1.245	1.30	V
OUTPUT SENSE VOLTAGE	V_{OUT}	ADP1108-3 ADP1108-5*[2] ADP1108-12*[2]	3.13 4.75 11.4	3.3 5.00 12.0	3.46 5.25 12.6	V V V
COMPARATOR HYSTERESIS		ADP1108*		5	10	mV
OUTPUT HYSTERESIS		ADP1108-3 ADP1108-5* ADP1108-12*		13 20 50	 40 100	mV mV mV
OSCILLATOR FREQUENCY			14	19	25	kHz
DUTY CYCLE		Full Load	63	70	78	%
SWITCH ON TIME	t_{ON}	I_{LIM} Tied to V_{IN}	28	36	48	µs
FEEDBACK PIN BIAS CURRENT		VFB = 0 V*		10	50	nA
SET PIN BIAS CURRENT		$V_{SET} = V_{REF}$*		20	100	nA
GAIN BLOCK OUTPUT LOW	V_{OL}	I_{SINK} = 100 µA, V_{SET} = 1.00 V*		0.15	0.4	V
REFERENCE LINE REGULATION		2.0 V ≤ V_{IN} ≤ 5 V* 5 V ≤ V_{IN} ≤ 30 V*		0.2 0.02	0.4 0.075	%/V %/V

NOTES
*Denotes the specifications that apply over the full operating temperature range.
[1]This specification guarantees that both the high and low trip points of the comparator fall within the 1.20 V to 1.30 V range.
[2]The output voltage waveform will exhibit a sawtooth shape due to the comparator hysteresis. The output voltage on the fixed output versions will always be within the specified range.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS

Supply Voltage (V_{IN}) . . . . . 36 V
SW1 Pin Voltage (V_{SW1}) . . . . . 50 V
SW2 Pin Voltage (V_{SW2}) . . . . . –0.5 V to V_{IN}
Feedback Pin Voltage (ADP1108) . . . . . 5.5 V
Sense Pin Voltage (ADP1108, -5, -12) . . . . . 36 V
Maximum Power Dissipation . . . . . 500 mW
Maximum Switch Current . . . . . 1.5 A
Operating Temperature Range . . . . . 0°C to +70°C
Storage Temperature Range . . . . . –65°C to +150°C
Lead Temperature (Soldering, 10 sec) . . . . . +300°C