

ADP1073

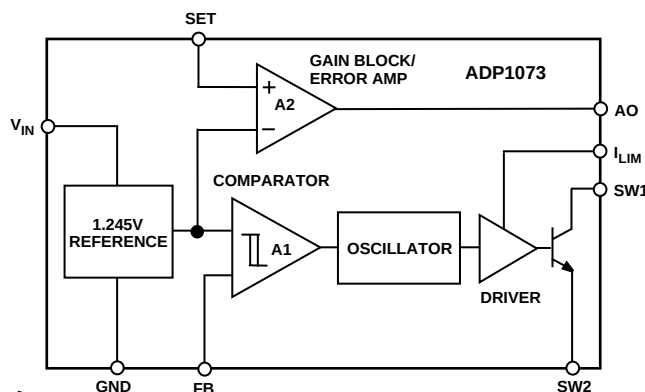
FEATURES

Operates at Supply Voltages from 1.0 V to 30 V
 Ground Current: 95 μ A
 Works in Step-Up or Step-Down Mode
 Very Few External Components Required
 Low-Battery Detector On Chip
 User-Adjustable Current Limit
 Internal 1 A Power Switch
 Fixed and Adjustable Output Voltage Versions
 8-Pin DIP or SO-8 Package

APPLICATIONS

Single-Cell to 5 V Converters
 Laptop and Palmtop Computers
 Pagers
 Cameras
 Battery Backup Supplies
 Cellular Telephones
 Portable Instruments
 4 mA–20 mA Loop Powered Instruments
 Hand-Held Inventory Computers
 Battery-Powered α , β , γ Particle Detectors

FUNCTIONAL BLOCK DIAGRAM



ORDERING GUIDE

Model	Output Voltage	Package Description	Package Option*
ADP1073AN	ADJ	PDIP	N-8
ADP1073AR	ADJ	SOIC	SO-8
ADP1073AN-5	5 V	PDIP	N-8
ADP1073AR-5	5 V	SOIC	SO-8
ADP1073AN-12	12 V	PDIP	N-8
ADP1073AR-12	12 V	SOIC	SO-8

*For outline information see Package Information section.

GENERAL DESCRIPTION

The ADP1073 is part of a family of step-up/step-down switching regulators which operates from an input supply voltage of as little as 1.0 V. This extremely low input voltage allows the ADP1073 to be used in applications that require using a single cell battery as the primary power source.

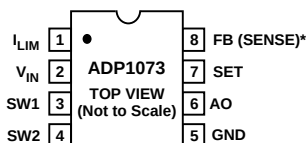
The ADP1073 can be configured to operate in either step-up or step-down mode; but for input voltages greater than 3 V, the ADP1173 is recommended.

An auxiliary gain amplifier can serve as a low-battery detector or linear regulator. Quiescent current on the ADP1073-5 is only 135 μ A unloaded, making it ideal for systems where long battery life is required.

The ADP1073 can deliver 40 mA at 5 V from an input voltage range as low as 1.25 V, or 10 mA at 5 V from a 1.0 V input. Current limiting is available by adding an external resistor. Battery protection circuitry keeps reverse currents to safe levels at reverse supply voltages of up to 1.6 V.

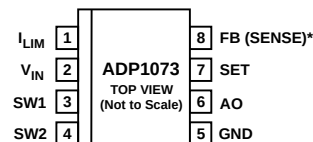
PIN CONFIGURATIONS

Plastic DIP Package (N-8)



*FIXED VERSIONS

Small Outline Package (SO-8)



*FIXED VERSIONS

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ADP1073—SPECIFICATIONS (@ T_A = +25°C, V_{IN} = 1.5 V, unless otherwise noted)

Model	Conditions ¹	V _S	ADP1073			Units
			Min	Typ	Max	
QUIESCENT CURRENT*	Switch Off	I _Q		95	130	μA
QUIESCENT CURRENT, STEP-UP MODE CONFIGURATION	No Load, ADP1073-5 ADP1073-12	I _Q		135 250		μA
INPUT VOLTAGE*	Step-Up Mode	V _{IN}	1.15		12.6	V
			1.0		12.6	V
	Step-Down Mode				30	V
COMPARATOR TRIP POINT VOLTAGE*	ADP1073 ¹		202	212	222	mV
OUTPUT SENSE VOLTAGE*	ADP1073-5 ²	V _{OUT}	4.75	5.00	5.25	V
	ADP1073-12 ²		11.4	12.00	12.6	V
COMPARATOR HYSTERESIS*	ADP1073			5	10	mV
OUTPUT HYSTERESIS*	ADP1073-5			125	250	mV
	ADP1073-12			300	600	mV
OSCILLATOR FREQUENCY*		f _{OSC}	15	19	23	kHz
DUTY CYCLE*	Full Load (V _{FB} < V _{REF})	DC	65	72	80	%
SWITCH ON TIME*		t _{ON}	30	38	50	μs
FEEDBACK PIN BIAS CURRENT*	ADP1073 V _{FB} = 0 V	I _{FB}		10	50	nA
SET PIN BIAS CURRENT*	V _{SET} = V _{REF}	I _{SET}		60	120	nA
AO OUTPUT LOW*	I _{AO} = 100 μA	V _{AO}		0.15	0.4	V
REFERENCE LINE REGULATION*	1.0 V ≤ V _{IN} ≤ 1.5 V			0.85	1.0	%/V
	1.5 V ≤ V _{IN} ≤ 12 V			0.05	0.1	%/V
SWITCH SATURATION VOLTAGE* STEP-UP MODE	V _{IN} = 1.5 V, I _{SW} = 400 mA	V _{CESAT}		300	400	mV
					600	mV
	V _{IN} = 1.5 V, I _{SW} = 500 mA			400	550	mV
					750	mV
	V _{IN} = 5 V, I _{SW} = 1 A			700	1000 1500	mV mV
A2 ERROR AMP GAIN*	R _L = 100 kΩ ³	A _V	400	1000		V/V
REVERSE BATTERY CURRENT	(Note 4)	I _{REV}		750		mA
CURRENT LIMIT	220 Ω Between I _{LIM} and V _{IN}			400		mA
CURRENT LIMIT TEMPERATURE COEFFICIENT				−0.3		%/°C
SWITCH OFF LEAKAGE CURRENT	Measured at SW1 Pin	I _{LEAK}		1	10	μA
MAXIMUM EXCURSION BELOW GND	I _{SW1} ≤ 10 μA, Switch Off	V _{SW2}		−400	−350	mV

NOTES

*Denotes the specifications that apply over the full operating temperature range.

¹This specification guarantees that both the high and low trip point of the comparator fall within the 210 mV to 230 mV range.

²This specification guarantees that the output voltage of the fixed versions will always fall within the specified range. The waveform at the sense pin will exhibit a sawtooth shape due to the comparator hysteresis.

³100 kΩ resistor connected between a 5 V source and the AO pin.

⁴The ADP1110 is guaranteed to withstand continuous application of +1.6 V applied to the GND and SW2 pins while V_{IN}, I_{LIM}, and SW1 pins are grounded.

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