High Accuracy Ultralow I_Q, 1 A, anyCAP™ Low Dropout Regulator

Preliminary Technical Data — ADP3338

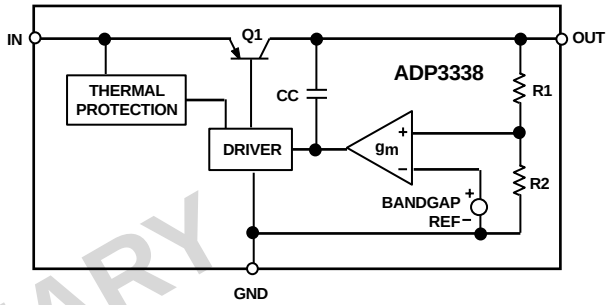
FEATURES

High Accuracy Over Line and Load: ±0.9% @ +25ºC, ±1.5% Over Temperature
Ultralow Dropout Voltage: 700 mV (Typ) @ 1 A
Requires Only C_o = 1.0 µF for Stability
anyCAP = Stable with Any Type of Capacitor (Including MLCC)
Current and Thermal Limiting
Low Noise
+2.6 V to +12 V Supply Range
–40°C to +85°C Ambient Temperature Range
SOT-223 Package

APPLICATIONS

Notebook, Palmtop Computers
SCSI Terminators
Battery Powered Systems
PCMCIA Regulator
Bar Code Scanners
Camcorders, Cameras

FUNCTIONAL BLOCK DIAGRAM



GENERAL DESCRIPTION

The ADP3338 is a member of the ADP330x family of precision low dropout anyCAP voltage regulators. The ADP3338 operates with an input voltage range of +2.6 V to +12 V and delivers a load current up to 1 A. The ADP3338 stands out from the conventional LDOs with a novel architecture and an enhanced process that enables it to offer performance advantages and higher output current than its competition. Its patented design requires only a 1.0 µF output capacitor for stability. This device is insensitive to output capacitor Equivalent Series Resistance (ESR), and is stable with any good quality capacitor, including ceramic (MLCC) types for space-restricted applications. The ADP3338 achieves exceptional accuracy of ±0.9% at room temperature and ±1.5% over temperature, line and load variations. The dropout voltage of the ADP3338 is only 700 mV (typical) at 1 A. This device also includes a safety current limit, thermal overload protection and a shutdown feature. In shutdown mode, the ground current is reduced to less than 2 µA. The ADP3338 has ultralow quiescent current 70 µA (typ) in light load situations.

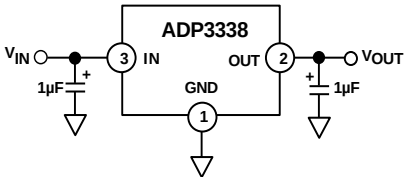


Figure 1. Typical Application Circuit

REV. PrB 1/6/00

One Technology Way, P.O. Box 9106, Norwood, MA 02062-9106, U.S.A.
Tel: 781/329-4700 World Wide Web Site: http://www.analog.com
Fax: 781/326-8703

ADP3338–SPECIFICATIONS[1,2] (V_{IN} = 7.0 V, C_{IN} = C_{OUT} = 1.0µF, T_A = -40°C to +85°C, unless otherwise noted)

Parameter	Symbol	Conditions	Min	Typ	Max	Units
OUTPUT						
Voltage Accuracy[3]	V_{OUT}	V_{IN} = V_{OUTNOM} +0.8 V to +12 V I_L = 0.1 mA to 1 A T_A = +25°C	–0.9		+0.9	%
		V_{IN} = V_{OUTNOM} +0.8 V to +12 V I_L = 0.1 mA to 1 A T_A = -20°C to 85°C	–1.5		+1.5	%
		V_{IN} = V_{OUTNOM} +0.8 V to +12 V I_L = 0.1 mA to 750 mA T_A = -40°C to 85°C	–1.5		+1.5	%
Line Regulation[3]		V_{IN} = V_{OUTNOM} +0.8 V to +12 V T_A = +25°C		0.04		mV/V
Load Regulation		I_L = 0.1 mA to 1 A T_A = +25°C		0.04		mV/mA
Dropout Voltage	V_{DROP}	V_{OUT} = 98% of V_{OUTNOM}				
		I_L = 1 A		500	700	mV
		I_L = 500 mA		250	350	mV
		I_L = 100 mA		120	150	mV
		I_L = 0.1 mA		80	130	mV
Peak Load Current	I_{LDPK}	V_{IN} = V_{OUTNOM} + 1 V		1.4		A
Output Noise	V_{NOISE}	f = 10 Hz–100 kHz, C_L = 10 µF I_L = 1 A, C_{NR} = 10 nF		47		µV rms
		f = 10 Hz–100 kHz, C_L = 10 µF I_L = 1 A, C_{NR} = 0 nF		95		µV rms
GROUND CURRENT						
In Regulation	I_{GND}	I_L = 1 A		10	50	mA
		I_L = 500 mA		5	25	mA
		I_L = 100 mA		1	5	mA
		I_L = 0.1 mA		70	130	µA
In Dropout	I_{GND}	V_{IN} = V_{OUTNOM} – 100 mV I_L = 0.1 mA		80	150	µA
In Shutdown	I_{GNDSD}	$\overline{SD}$ = 0 V, V_{IN} = 12 V		0.01	2	µA
SHUTDOWN						
Threshold Voltage	$V_{\overline{THSD}}$	ON	2.0			V
		OFF			0.4	V
$\overline{SD}$ Input Current	$I_{\overline{SD}}$	0 ≤ $\overline{SD}$ ≤ 5 V		1.4	6	µA
Output Current In Shutdown	$I_{\overline{OSD}}$	T_A = +25°C V_{IN} = 12 V			1	µA
		T_A = +85°C V_{IN} = 12 V			2	µA

NOTES
1 Ambient temperature of +85°C corresponds to a junction temperature of +125°C under typical full load test conditions.
2 Application stable with no load.
3 V_{IN} = 2.6V for models with V_{OUTNOM} ≤ 1.85V.

Specifications subject to change without notice.

ABSOLUTE MAXIMUM RATINGS*

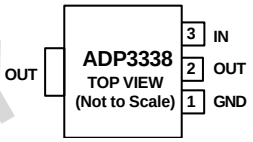
Input Supply Voltage ..... –0.3 V to +16 V
Power Dissipation ..... Internally Limited
Operating Ambient Temperature Range . –40°C to +85°C
Operating Junction Temperature Range –40°C to +125°C
θ_{JA} ..... +62.3°C/W
θ_{JC} ..... TBD
Storage Temperature Range ..... –65°C to +150°C
Lead Temperature Range (Soldering 10 sec) ..... +300°C
Vapor Phase (60 sec) ..... +215°C
Infrared (15 sec) ..... +220°C

*This is a stress rating only; operation beyond these limits can cause the device to be permanently damaged.

PIN DESCRIPTION

Pin	Name	Function
1	GND	Ground Pin.
2	OUT	Output of the Regulator. Bypass to ground with a 1.0 µF or larger capacitor.
3	IN	Regulator Input.

PIN CONFIGURATION



ORDERING GUIDE

Model	Output Voltage*	Package Option	Marking Code
ADP3338ARM-1.8	1.8 V	RT (SOT-223)	LGA
ADP3338ARM-2.5	2.5 V	RT (SOT-223)	LGC
ADP3338ARM-2.85	2.85 V	RT (SOT-223)	LGD
ADP3338ARM-3.3	3.3 V	RT (SOT-223)	LGE
ADP3338ARM-5	5 V	RT (SOT-223)	LGF

*Contact the factory for other output voltage options.

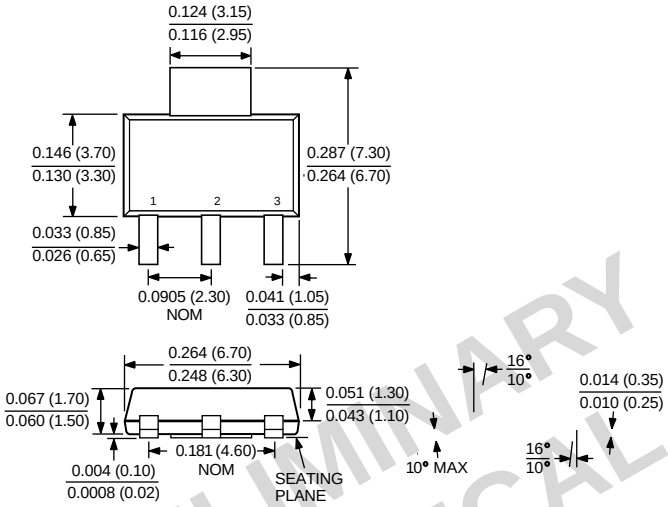
CAUTION

ESD (electrostatic discharge) sensitive device. Electrostatic charges as high as 4000 V readily accumulate on the human body and test equipment and can discharge without detection. Although this device features proprietary ESD protection circuitry, permanent damage may occur on devices subjected to high energy electrostatic discharges. Therefore, proper ESD precautions are recommended to avoid performance degradation or loss of functionality.

OUTLINE DIMENSIONS

Dimensions shown in inches and (mm).

3-Lead Surface Mount
RT-3 (SOT-223)



6/18/99

PRINTED IN U.S.A.