100mA LOW DROPOUT VOLTAGE REGULATORS LM2950/1

FEATURES

- High accuracy output voltage
- Guaranteed 100 mA output
- Very low quiescent current
- Extremely tight load and line regulation
- Very low temperature coefficient
- Current and thermal limiting
- Low dropout voltage
- Need only 1uF for stability
- Error flag warns of output dropout
- Logi-control electronic shutdown
- Output programmable from 1.24 to 29V
- Moisture Sensitivity Level 3

TO- 92 PKG **SOP- 8 PKG**





Pin 1 : Output
Pin 2 : Ground
Pin 3 : Input

Pin : 1. Output
2. Sense
3. Shutdown
4. Ground
5. Error
6. Tap
7. Feedback
8. Input

Applications

- High-efficiency linear regulator, voltage reference
- Battery powered systems
- Portable consumer equipment
- Portable / Parm, Desktop / Notebook computers
- Portable Instrumentation, cordless telephones
- Automotive Electronics, Radio control systems
- SMPS Post-Regulator, Avionics

ORDERING INFORMATION

DEVICE	PKG
LM2950-XX	TO-92
LM2951D-XX	SOP-8

(XX= 1.5, 1.8, 2.8, 2.85, 3.0, 3.3, 5.0V, Adjustable)

DESCRIPTION

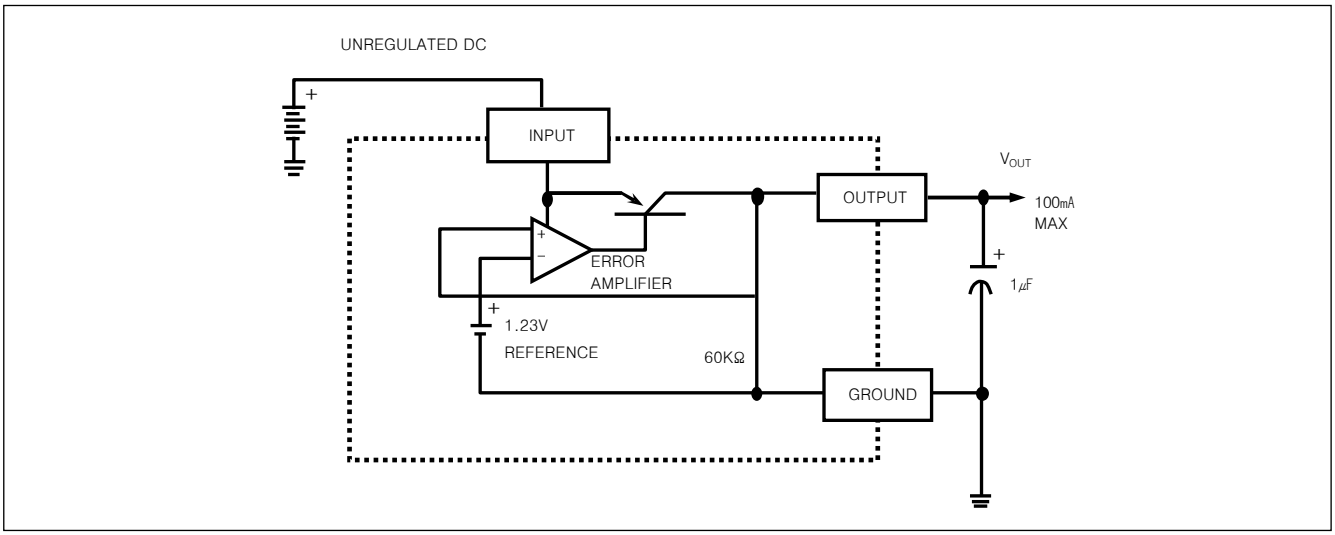
The LM2950/1 is a low power voltage regulator. This device excellent choice for use in battery powered application such as cordless telephone, radio control systems, and portable computers.

The LM2950/1 features very low quiescent current (75μA Typ.) and very low drop output voltage (Typ. 400mV at light load and 380mV at 100mA).

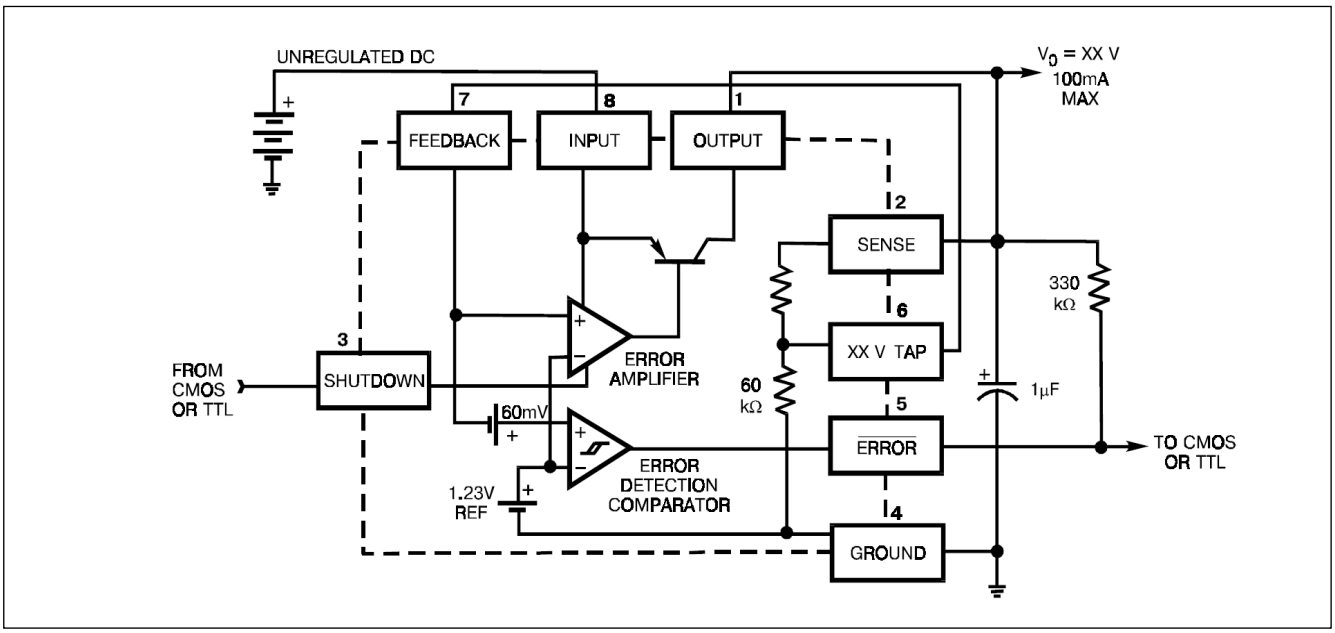
This includes a tight initial tolerance of 0.5% Typ., extremely good load and line regulation of 0.05% Typ., and very low output temperature coefficient, making the LM2950/1 useful as a low-power voltage reference. The error flag output feature is used as power-on reset for warn of a low output voltage, due to following batteries on input. Other feature is the logic-compatible shutdown input which enable the regulator to be switched on and off. The LM2950/1 is available in 8-pin plastic packages.

The regulator output voltage may be pin-strapped for a -XX volt or programmed from 1.24 volt to 29 volts with external pair of resistors. The LM2950/1 is offered in 3-pin to-92 package compatible with other fixed regulator.

BLOCK DIAGRAM AND TYPICAL APPLICATIONS (LM2950)



BLOCK DIAGRAM AND TYPICAL APPLICATIONS (LM2951)



ABSOLUTE MAXIMUM RATINGS

POWER DISSIPATION	INTERNALLY LIMITED
Lead Temperature (Soldering, 5 seconds)	260℃
Storage Temperature Range	-65℃ to +150℃
Operating Junction Temperature Range	-55℃ to +150℃
Input Supply Voltage	-0.3 to +30V
Feedback Input Voltage	-1.5 to +30V
Shutdown Input Voltage	-0.3 to +30V
Error Comparator Output	-0.3 to +30V

ELECTRICAL CHARACTERISTICS (at T_a=25℃, V_{IN}=15V, unles otherwise specified)

PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Output Voltage	-25℃ ≤T_J ≤85℃	0.985 | V_0 |	V_0	1.015 | V_0 |	V
	Full Operating Temperature	0.980 | V_0 |		1.020 | V_0 |	
Output Voltage	100μA≤I_L≤100mA, T_J≤T_{JMAX}	0.976 | V_0 |	V_0	1.024 | V_0 |	
Output Voltage Temperature Coefficient	(Note 1)		50	150	ppm/℃
Line Regulation (Note 3)	V_0+1V≤V_{IN}≤30V		0.04	0.4	%
Load Regulation (Note 3)	100μA≤I_L≤100mA		0.1	0.3	%
Dropout Voltage (Note 4)	I_L=100μA		50	80	mV
	I_L=100mA		380	450	

ELECTRICAL CHARACTERISTICS (at T_a=25℃, V_{IN}=15V, unles otherwise specified)

PARAMETER	CONDITIONS (Note 2)	MIN	TYP	MAX	UNITS
Ground Current	I_L=100μA		75	120	μA
	I_L=100mA		8	12	mA
Dropout Ground Current	V_{IN}=V_0-0.5V, I_L=100μA		110	170	μA
Current Limit	V_{OUT}=0		160	250	mA
Thermal Regulation			0.05	0.2	%/W
Output Noise, 10Hz to 100kHz	C_L=1μF		430		μVrms
	C_L=200μF		160		
	C_L=3.3μF		100		
	(Bypass=0.01μF pins 7 to 1				
Error Comparator					
Output Leakage Current	V_{OH}=30V		0.01	1.0	μA
Output Low Voltage	V_{IN}=4.5V, I_{OL}=400μA		150	250	mV
Upper Threshold Voltage	(Note 6)	40	60		
Lower Threshold Voltage	(Note 6)		75	15	
Hysteresis	(Note 6)		15		
Shutdown Input					
Input Logic Voltage	Low (Regulator ON)		1.3	0.7	V
	High (Regulator OFF)	2			
Shutdown Pin Input Current	V_S=2.4V		30	50	μA
	V_S=30V		450	600	
Regulator Output Current Shutdown	(Note 7)				
	V_{OUT}=5.0V		3	10	
	3.3V≤V_{OUT}＜5.0V			20	
	2.0V≤V_{OUT}＜3.3V			30	

Note 1 : Output or reference voltage temperature coefficients defined as the worst case voltage change divided by the total temperature range.

Note 2 : Unless otherwise specified all limits guaranteed for T_J = 25℃, $V_{IN} = V_0$+1V, I_L = 100μA and C_L = 1μF. Additional condition for the 8-pin versions are feedback tied to -XX V tap and output tied to output Sense (V_{OUT}=XX V) and $V_{SHOUTDOWN} \leq 0.8V$

Note 3 : Regulations is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation.

Note 4 : Dropout voltage is defined as the input to output differential at which the output voltage drops 100mV below its nominal value measured at 1V differential. At very low values of programmed output voltage, the minimum input supply voltage(2.3V over temperature) must be taken into account.

Note 5 : $V_{REF} \leq V_{OUT} \leq (V_{IN}-1V)$, $2.3V \leq V_{IN} \leq 30V$, $100\mu A \leq I_L \leq 100mA$, $T_J \leq T_{JMAX}$

Note 6 : Comparator thresholds are expressed in terms of a voltage differential at the feedback terminal below the nominal reference voltage measured at V_{OUT}+1V input. To express these thresholds in terms of output voltage changed, multiply by the error amplifier gain = V_{OUT}/V_{REF} = (R1+R2)/R2. For example, at a programmed output voltage of 5V, the error output is guaranteed to go low when the output drops by 95mV x 5V / 1.235V = 384 mV. Thresholds remain constant as a percent V_{OUT} as V_{OUT} is varied, with the dropout warning occurring at typically 5% below nominal, 7.5% guaranteed.

Note 7 : $V_{SHUTDOWN} \geq 2V$, $V_{IN} \leq 30V$, V_{OUT}=0, Feed-back pin tied to -XX V Tap.