Preliminary – **LD6336**

400mA Low Dropout Voltage Regulator

Features

- 400mA output within 2% over temperature
- Very low quiescent current
- Low dropout voltage (420 mV Typ)
- Extremely tight load and line regulation
- Very low temperature coefficient
- Current and thermal limiting
- Unregulated DC input can withstand -20V reverse battery and +60V positive transients
- Direct replacement for SGS- L48XX Series

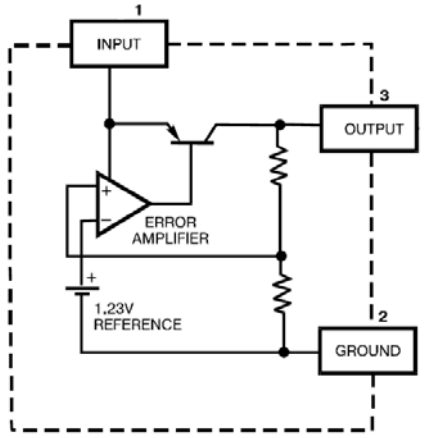
Applications

- High-efficiency linear regulator
- Battery powered systems
- Portable/Palm top/Notebook computers
- Portable consumer equipment
- Portable Instrumentation
- Automotive Electronics
- SMPS Post-Regulator

General Description

This series of fixed-voltage monolithic micro-power voltage regulators is designed for a wide range of applications. This device excellent choice for use in battery-powered application. Furthermore, the quiescent current increases only slightly at dropout, which prolongs battery life.
This series of fixed-voltage regulators features very low quiescent current (100mA Typ.) and very low drop output voltage (Typ. 60mV at light load and 420mV at 400mA). 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.
This series of fixed-voltage regulators is offered in 3-pin TO-220 package compatible with other fixed-voltage regulators. Adjust model is offered in 5-pin TO-220 package and fixed model with shutdown input is offered in 4-pin TO-220 package.
This device can directly replace for SGS-THOMSON-L48XX Series, but has lower ground current, higher accuracy of output voltage and extremely tight load and line regulation. 4-pins versions (fixed model) and 5-pins versions (adjust model) has shutdown input.

Block Diagram

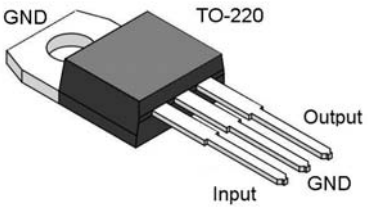


Ordering Information

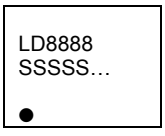
Package: TO-220-3		Packing Options	
Part No.	Output	Tube (TU)	Tape & Reel (TR)
LD6336-033	3.3V	LD6336-033T3-TU	LD6336-033T3-TR
LD6336-050	5V	LD6336-050T3-TU	LD6336-050T3-TR
LD6336-080	8V	LD6336-080T3-TU	LD6336-080T3-TR
LD6336-085	8.5V	LD6336-085T3-TU	LD6336-085T3-TR
LD6336-090	9V	LD6336-090T3-TU	LD6336-090T3-TR
LD6336-100	10V	LD6336-100T3-TU	LD6336-100T3-TR
LD6336-120	12V	LD6336-120T3-TU	LD6336-120T3-TR
LD6336-150	15V	LD6336-150T3-TU	LD6336-150T3-TR
LD6336-000	adj	LD6336-000T3-TU	LD6336-000T3-TR

- Package material default is “Green” package.

Package Pin Out



Product Marking



- Line 1 – “LD” is a fixed character
  8888: product name
- Line 2 – SSSSS…: lot number

Absolute Maximum Ratings

Parameter	Maximum	Unit
Power Dissipation	Internally Limited	
Lead Temperature (Soldering, 5 seconds)	260°C	°C
Storage Temperature Range	-65 to +150	°C
Operating Junction Temperature Range	-55 to +150	°C
Input Supply Voltage	-20 to +35	V
Continuous total dissipation at 25°C free-air temperature	2	W
Continuous total dissipation ≦25°C case temperature	15	W

The values beyond the boundaries of absolute maximum rating may cause the damage to the device. Functional operation in this context is not implied. Continuous use of the device at the absolute rating level might influence device reliability. All voltages have their reference to device ground.

Electrical Characteristics

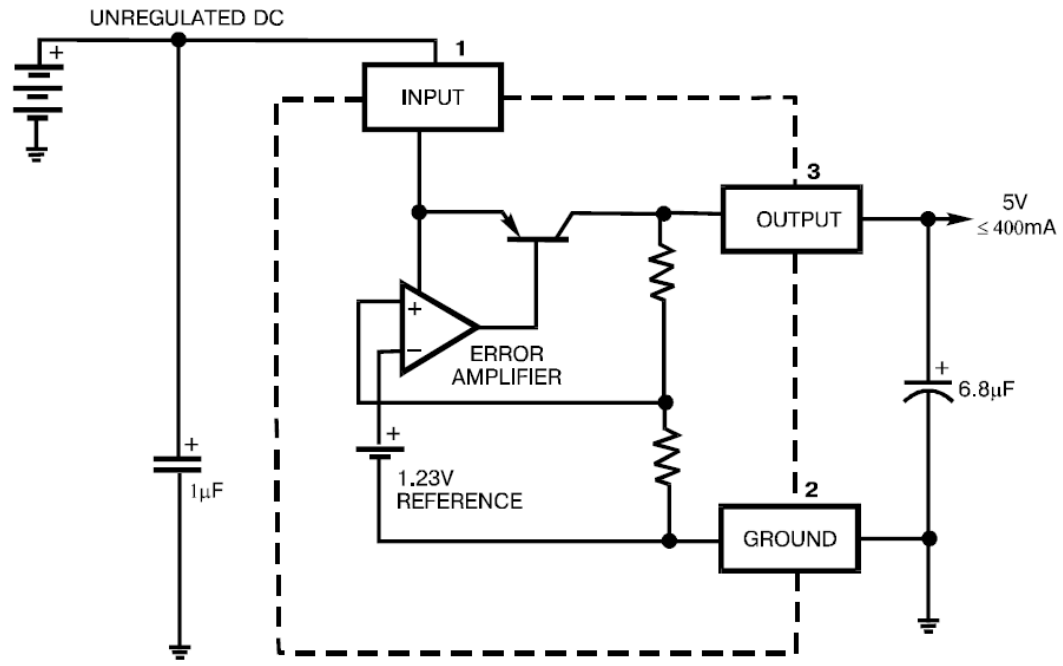
(T_J = 25ºC, V_{IN} = 14.4V, I_L=5mA, C_0=100μF; unless otherwise noted)

Parameter	Symbol	Condition		Min	Typ.	Max	Unit
Output Voltage	V_{OUT}	-25°C≤T_J≤85°C		0.985*|V0|	V0	1.015*|V0|	V
		-55°C≤T_J≤150°C		0.980*|V0|	–	1.020*|V0|	V
		1mA≤I_L≤400mA,≤T_JMAX		0.975*|V0|	V0	1.025*|V0|	V
Input Supply Voltage	V_{IN}	–		–	–	26	V
Output Voltage Temperature Coefficient	C_T	*1		–	50	150	ppm/°C
Line Regulation*2*3	R_{LINE}	13V ≤ V_{IN} ≤ 26V		–	0.1	0.4	%
Load Regulation*2	R_{LOAD}	1mA ≤ I_L ≤ 400mA		–	0.1	0.3	%
Dropout Voltage*4	V_{DROP}	I_L=150 mA		–	200	400	mV
		I_L=400 mA		–	420	700	
Ground Current*5	I_{GND}	I_L=100 μA		–	100	200	μA
		I_L=150 mA		–	12	20	mA
		I_L=400 mA		–	30	50	mA
Dropout Ground Current*5	I_{DROP}	V_{IN}=V_{OUT}−0.5V, I_L=100μA		–	200	300	μA
Current Limit	I_{LIMIT}	V_{OUT}=0		–	600	900	mA
Thermal Regulation*6	R_T			–	0.05	0.2	%/W
Output Noise,	V_{NOISE}	10Hz~100KHz, I_L=100 mA	C_L=2.2μF	–	500	–	μV_{RMS}
			C_L=3.3μF	–	350	–	
			C_L=33μF	–	120	–	
Ripple Rejection Ratio	G_{RR}	*9		60	–	–	dB
Thermal Shutdown	T_{SD}	1mA ≤ I_L ≤ 400mA		–	165	–	°C
adjust model							
Reference voltage	V_{REF}			1.21	1.235	1.26	V
		Over Temperature*7		1.185	–	1.285	
Feedback bias current	I_{FB}			–	20	40	nA
Reference voltage temperature coefficient	T_{REF}	*1		–	50	–	ppm/°C
Feedback bias current temperature coefficient	I_{FBBIAS}			–	0.1	–	nA/°C
Shutdown Input							
Input logic voltage	I_{IL}	Low (Regulator ON)		–	1.3	0.7	V
	I_{IH}	High (Regulator OFF)		2	–	–	V
Shutdown pin Input current	I_{ISD}	V_S=2.4V		–	30	50	μA
		V_S=26V		–	450	600	
Regulator output current in shutdown	I_{OSD}	*8		–		200	μA

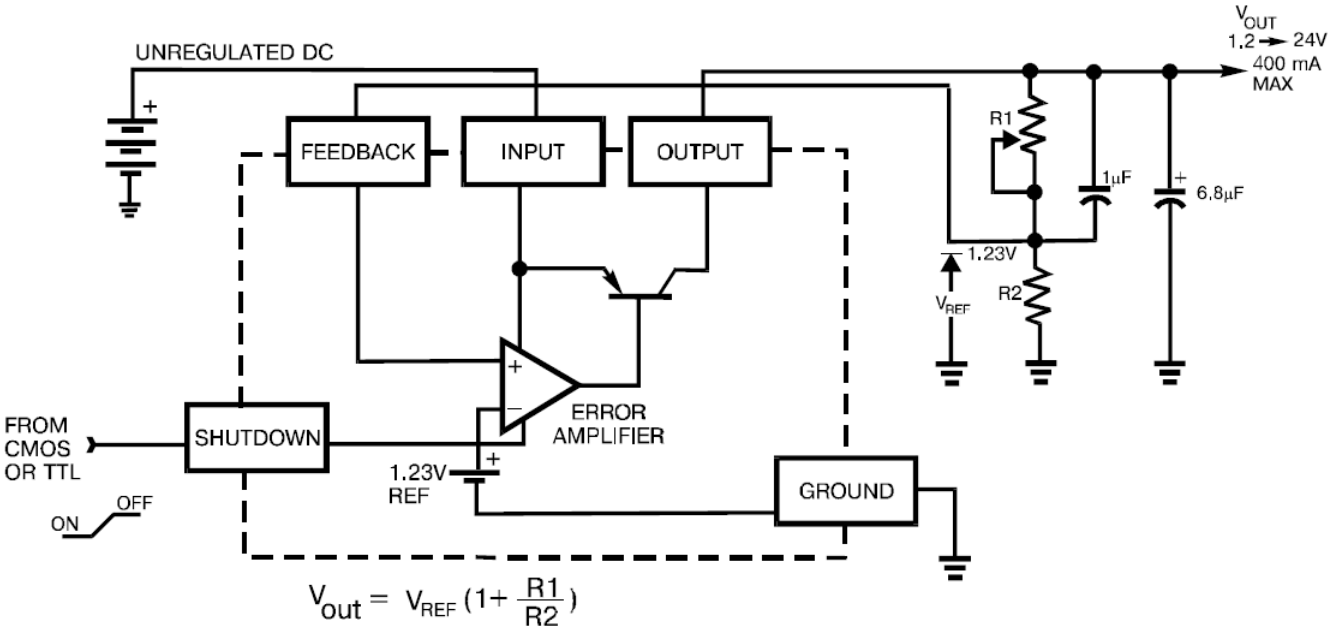
Notes: 1. Output or reference voltage temperature coefficients defined as the worst case voltage change divided by the total temperature range. 2. Regulations is measured at constant junction temperature, using pulse testing with a low duty cycle. Changes in output voltage due to heating effects are covered under the specification for thermal regulation. 3. Line regulation is tested at 150ºC for I_L = 5mA. For I_L = 100μA and T_J = 125ºC, line regulation is guaranteed by design to 0.2%. For L4815 16V ≤ Vin ≤ 26V. 4. Dropout voltage is defined as the input to output differential at which the output voltage drops 2% below its nominal value measured at 1V differential. 5. Ground pin current is the regulator quiescent current. The total current drawn from the source is the sum of the ground pin current and output load current. 6. Thermal regulation is the change in output voltage at a time T after a change in power dissipation, excluding load or line regulation effects. Specifications are for a 200mA load pulse (3W pulse) for T = 10ms. 7. I0=350mA, f = 120Hz, C0=100μF, V_{IN}=V0+3V+2Vpp 8. Vref ≤ Vout ≤ (Vin - 1V), 2.3V ≤ Vin ≤ 26V, 100μA ≤ I_L ≤ 400mA, T_J ≤ T_{JMAX}. 9. Vshutdown ≥ 2V, Vin ≤ 26V, Vout = 0V.

Typical Application Circuits

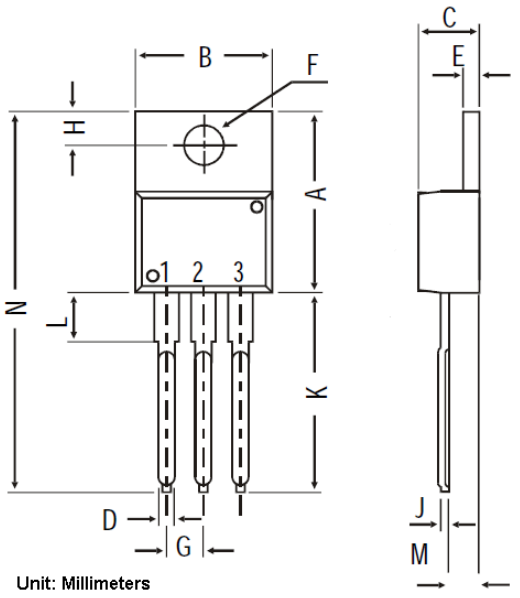
1. Fixed Regulator



2. Adjustable Regulator



Package Outline
TO-252:



Unit: Millimeters

Symbols	Minimum	Normal	Maximum
A	14.42	15.47	16.51
B	9.63	10.15	10.67
C	3.56	4.20	4.83
D	-	0.90	-
E	1.15	1.28	1.4
F	3.75	3.82	3.88
G	2.29	2.54	2.79
H	2.54	2.99	3.43
J	-	0.56	-
K	12.7	13.72	14.73
L	2.8	3.44	4.07
M	2.03	2.48	2.92
N	-	31.24	-

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