Replacement of

L48-XX

400 mA Low Dropout Voltage Regulator

MIK48-XX

March 1999 - revised September 2002

Description

This series of fixed-voltage monolithic micropower 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.

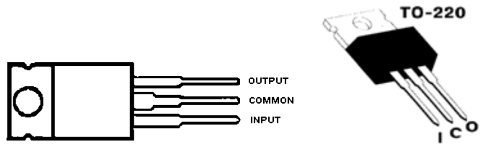
Features

- 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

Applications

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

Package information



Absolute Maximum Ratings

Parameter	Maximum	Units
Power Dissipation	Internally Limited	W
Lead Temperature (Soldering, 5 seconds)	260	°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 at (or below) 25°C case temperature	15	W

Device Selection Guide (Note 1)

Device	Output voltage
MIK4833	3.3V
MIK4805	5V
MIK4808	8V
MIK4885	8.5V
MIK4809	9V
MIK4810	10V
MIK4812	12V
MIK4815	15V
MIK48-adj	adj

Note 1: Other fixed versions are available Vout = 2.0V to 5.0V

Electrical Characteristics

(T_j = 25°C, V_{IN} = 14.4V, I_L=5mA, C_0=100mF; unless otherwise noted)

Parameter	Conditions	Min	Typ	Max	Units
Output Voltage	-25°C≤T_J≤85°C Full Operating Temperature	0.985|V_0| 0.98|V_0|	V_0	1.015|V_0| 1.02|V_0|	V
Output Voltage	1mA ≤ I_L ≤ 400mA, T_J≤T_{JMAX}	0.975|V_0|	V_0	1.025|V_0|	
Input Supply Voltage				26	
Output Voltage Temperature Coefficient	(Note 1)		50	150	ppm/°C
Line Regulation (Note 2)	13V ≤ Vin ≤ 26V (Note 3)		0.1	0.4	%
Load Regulation (Note 2)	1mA ≤ I_L ≤ 400mA		0.1	0.3	%
Dropout Voltage (Note 4)	I_L=150 mA I_L=400 mA		200 420	400 700	mV
Ground Current (Note 5)	I_L=100 mA I_L=150 mA I_L=400 mA		100 12 30	200 20 50	µA mA
Dropout Ground Current(Note 5)	Vin= Vout –0.5V, I_L=100 mA		200	300	µA
Current Limit	Vout=0		600	900	mA
Thermal Regulation (Note 6)			0.05	0.2	%/W
Output Noise, 10Hz to 100KHz I_L=100 mA	C_L=2.2mF C_L=3.3mF C_L=33mF		500 350 120		µV RMS
Ripple Rejection Ratio	I_0=350mA, f = 120Hz, C_0=100mF, Vin = V_0 + 3V +2Vpp	60			dB
Adjust model					
Reference Voltage		1.21	1.235	1.26	V
Reference Voltage	Over Temperature (Note 7)	1.185		1.285	
Feedback Pin Bias Current			20	40	nA
Reference Voltage Temperature Coefficient	(Note 1)		50		ppm/°C
Feedback Pin Bias Current Temperature Coefficient			0.1		nA/°C
Shutdown Input					
Input Logic Voltage	Low (Regulator ON) High (Regulator OFF)	 2	1.3	0.7	V
Shutdown Pin Input Current	V_S=2.4V V_S=26V		30 450	50 600	µA
Regulator Output Current in Shutdown	(Note 8)			200	

Note 1: Output or reference voltage temperature coefficients defined as the worst case voltage change divided by the total temperature range.
Note 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.
Note 3: Line regulation is tested at 150°C for I_L = 5mA. For I_L = 100mA and T_J = 125°C, line regulation is guaranteed by design to 0.2%. For MIK4815 16V ≤ Vin ≤ 26V.
Note 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.
Note 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.
Note 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.
Note 7: Vref ≤ Vout ≤ (Vin - 1V), 2.3V ≤ Vin ≤ 26V, 100mA ≤ I_L ≤ 400mA, T_J ≤ T_{JMAX}.
Note 8: Vshutdown ≥ 2V, Vin ≤ 26V, Vout = 0V.

Block Diagram and Typical Applications

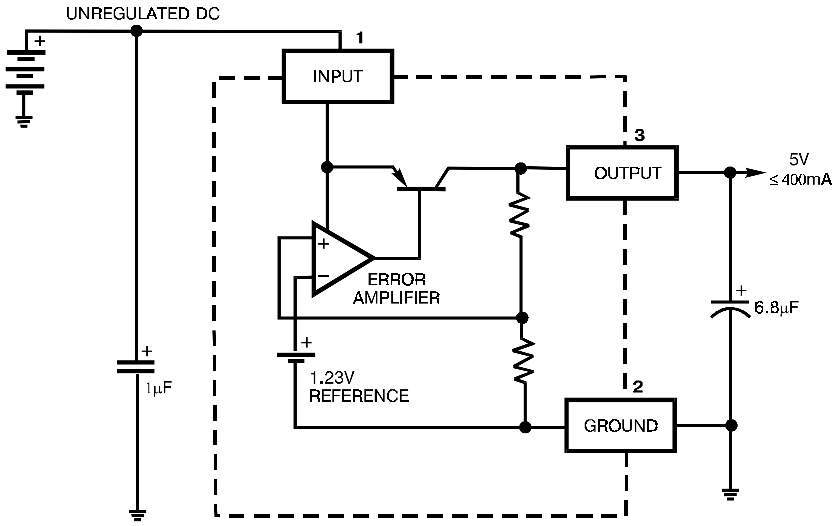
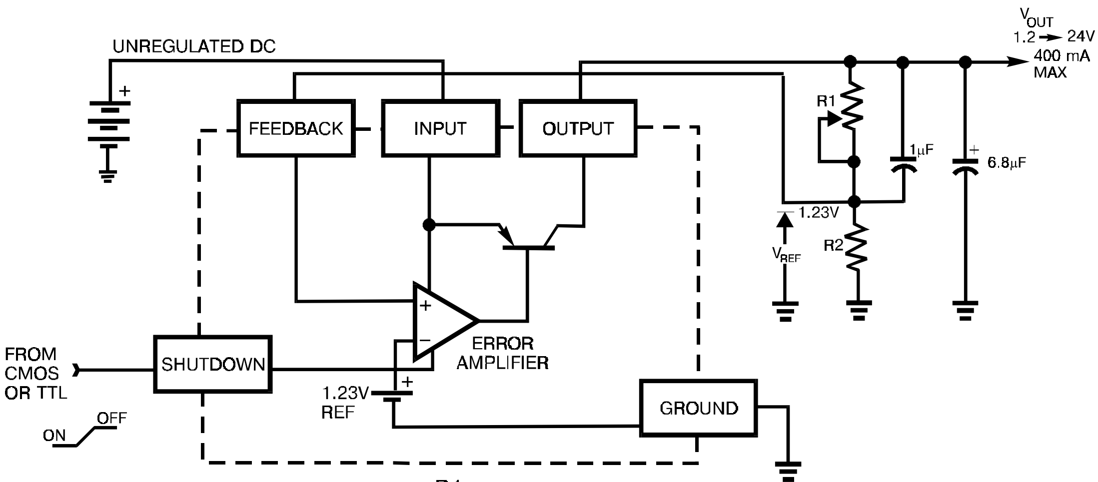


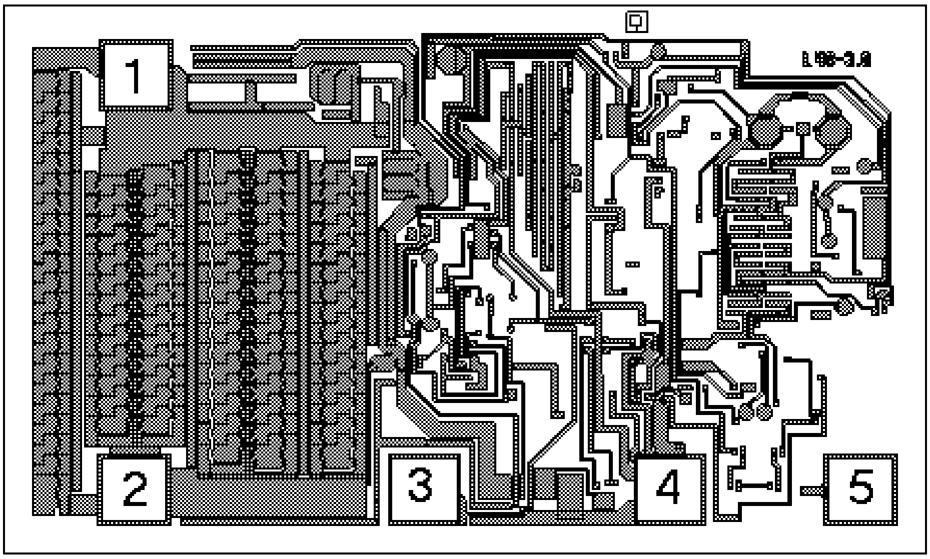
Figure 1. Fixed Regulator (MIK4805)



$$V_{out} = V_{REF}\,(1 + \frac{R1}{R2})$$

Figure 2. Adjustable Regulator

Pad Location MIK48-XX



Chip Size: 2.57 x 1.57mm

Pad Location Coordinates

N	Pad Name	Coordinates (mm)	
		X	Y
1	Input	275	1280
2	Output	275	90
3	Output (fixed model) Feedback (adjust model)	1080	90
4	GND	1765	90
5	Shutdown	2295	90