

3-Amp Adjustable Regulators

FEATURES

- Adjustable Output Down to 1.2V
- Guaranteed 3A output Current
- Guaranteed Thermal Regulation
- Output is Short Circuit Protected
- Current Limit Constant with Temperature
- P+ Product Enhancement Tested
- 86 dB Ripple Rejection
- Ensured 1% Output Voltage Tolerance (LM350A)
- Ensured Max. 0.01%/V Line Regulation (LM350A)
- Ensured Max. 0.3% Load Regulation (LM350A)

APPLICATIONS

- Adjustable Power supplies
- Constant Current Regulators
- Battery Chargers

DESCRIPTION

The LM350 series of adjustable 3-terminal positive voltage regulators is capable of supplying in excess of 3A over a 1.2V to 33V output range. They are exceptionally easy to use and require only 2 external resistors to set the output voltage. Further, both line and load regulation are comparable to discrete designs. Also, the LM350 is packaged in standard transistor packages which are easily mounted and handled.

Connection Diagram

Case is Output

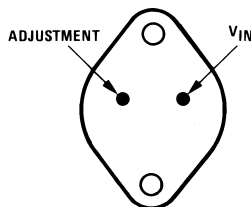


Figure 1. (TO-3 STEEL) Metal Can Package Bottom View

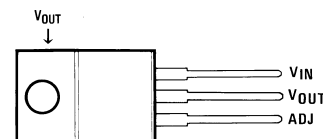


Figure 2. (TO-220) Plastic Package Front View

In addition to higher performance than fixed regulators, the LM350 series offers full overload protection available only in IC's. Included on the chip are current limit, thermal overload protection and safe area protection. All overload protection circuitry remains fully functional even if the adjustment terminal is accidentally disconnected.

Normally, no capacitors are needed unless the device is situated more than 6 inches from the input filter capacitors in which case an input bypass is needed. An output capacitor can be added to improve transient response, while bypassing the adjustment pin will increase the regulator's ripple rejection.

Besides replacing fixed regulators or discrete designs, the LM350 is useful in a wide variety of other applications. Since the regulator is "floating" and sees only the input-to-output differential voltage, supplies of several hundred volts can be regulated as long as the maximum input to output differential is not exceeded, i.e., avoid short-circuiting the output.

By connecting a fixed resistor between the adjustment pin and output, the LM350 can be used as a precision current regulator. Supplies with electronic shutdown can be achieved by clamping the adjustment terminal to ground which programs the output to 1.2V where most loads draw little current.

Absolute Maximum Ratings

Power Dissipation		Internally Limited
Input-Output Voltage Differential		+35V
Storage Temperature		-65°C to +150°C
Lead Temperature	Metal Package (Soldering, 10 sec.)	300°C
	Plastic Package (Soldering, 4 sec.)	260°C
ESD Tolerance		TBD
Operating Temperature Range	LM350A	-40°C ≤ T _J ≤ +125°C
	LM350	0°C ≤ T _J ≤ +125°C

Electrical Characteristics

Specifications with standard type face are for T_J = 25°C, and those with **boldface type** apply over **full Operating Temperature Range**. Unless otherwise specified, V_{IN} - V_{OUT} = 5V, and I_{OUT} = 10 mA.

Parameter	Conditions	LM350A			LM350			Units
		Min	Typ	Max	Min	Typ	Max	
Reference Voltage	I _{OUT} = 10 mA, T _J = 25°C 3V ≤ (V _{IN} - V _{OUT}) ≤ 35V, 10 mA ≤ I _{OUT} ≤ 3A, P ≤ 30W	1.238	1.250	1.262				V
		1.225	1.250	1.270	1.20	1.25	1.30	V
Line Regulation	3V ≤ (V _{IN} - V _{OUT}) ≤ 35V		0.005	0.01		0.005	0.03	%/V
			0.02	0.05		0.02	0.07	%/V
Load Regulation	10 mA ≤ I _{OUT} ≤ 3A		0.1	0.3		0.1	0.5	%
			0.3	1		0.3	1.5	%
Thermal Regulation	20 ms Pulse		0.002	0.01		0.002	0.03	%/W
Adjustment Pin Current			50	100		50	100	μA
Adjustment Pin Current Change	10 mA ≤ I _{OUT} ≤ 3A, 3V ≤ (V _{IN} - V _{OUT}) ≤ 35V		0.2	5		0.2	5	μA
Temperature Stability	T _{MIN} ≤ T _J ≤ T _{MAX}		1			1		%
Minimum Load Current	V _{IN} - V _{OUT} = 35V		3.5	10		3.5	10	mA
Current Limit	V _{IN} - V _{OUT} ≤ 10V	3.0	4.5		3.0	4.5		A
	V _{IN} - V _{OUT} = 30V	0.3	1		0.25	1		A
RMS Output Noise, % of V _{OUT}	10 Hz ≤ f ≤ 10 kHz		0.001			0.001		%
Ripple Rejection Ratio	V _{OUT} = 10V, f = 120 Hz, C _{ADJ} = 0 μF		65			65		dB
	V _{OUT} = 10V, f = 120 Hz, C _{ADJ} = 10 μF	66	86		66	86		dB
Long-Term Stability	T _J = 125°C, 1000 hrs		0.25	1		0.25	1	%
Thermal Resistance, Junction to Case	NDS Package					1.2	1.5	°C/W
	NDE Package		3	4		3	4	°C/W
Thermal Resistance, Junction to Ambient (No Heat Sink)	NDS Package					35		°C/W
	NDE Package		50			50		°C/W

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