



LM341 Series 3-Terminal Positive Regulators

General Description

The LM341-XX series of three terminal regulators is available with several fixed output voltages making them useful in a wide range of applications. One of these is local on card regulation, eliminating the distribution problems associated with single point regulation. The voltages available allow these regulators to be used in logic systems, instrumentation, HiFi, and other solid state electronic equipment. Although designed primarily as fixed voltage regulators these devices can be used with external components to obtain adjustable voltages and currents.

The LM341-XX series is available in TO-202 and TO-220 plastic packages allowing these regulators to deliver over 0.5A if adequate heat sinking is provided. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistor is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shutdown circuit takes over preventing the IC from overheating.

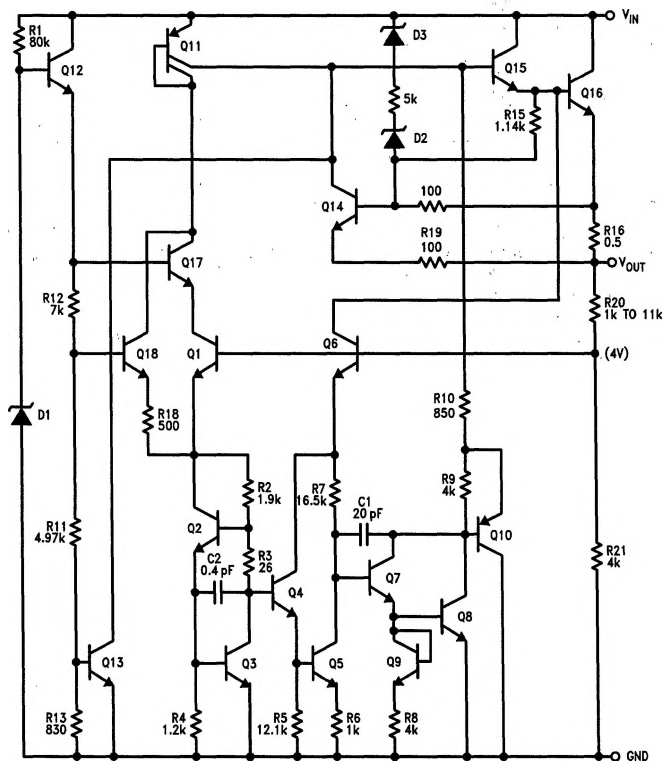
Considerable effort was expended to make the LM341-XX series of regulators easy to use and minimize the number of external components. It is not necessary to bypass the output, although this does improve transient response. Input bypassing is needed only if the regulator is located far from the filter capacitor of the power supply.

For output voltage other than 5V, 12V and 15V the LM117 series provides an output voltage range from 1.2V to 57V.

Features

- Output current in excess of 0.5A
- Internal thermal overload protection
- No external components required
- Output transistor safe area protection
- Internal short circuit current limit
- Available in plastic TO-202 and TO-220 package
- Special circuitry allows start-up even if output is pulled to negative voltage (\pm supplies)

Schematic Diagram



TL/H/10484-1

Absolute Maximum Ratings (Note 1)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Input Voltage	35V
Internal Power Dissipation	Internally Limited
Operating Temperature Range	0°C to +70°C

Maximum Junction Temperature	+ 125°C
Storage Temperature Range	- 65°C to + 150°C
Lead Temperature (Soldering, 10 sec.)	+ 230°C
ESD Susceptibility	TBD

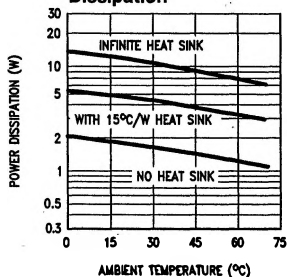
Electrical Characteristics $T_A = 0^\circ\text{C to } +70^\circ\text{C}$, $I_O = 500\text{ mA}$, unless otherwise noted

Output Voltage			5V			12V			15V			Units
Input Voltage (unless otherwise noted)			10V			19V			23V			
Symbol	Parameter	Conditions	Min	Typ	Max	Min	Typ	Min	Min	Typ	Max	
V _O	Output Voltage	T _J = 25°C	4.8	5	5.2	11.5	12	12.5	14.4	15	15.6	V
		P _D ≤ 7.5W, 5 mA ≤ I _O ≤ 500 mA and V _{MIN} ≤ V _{IN} ≤ V _{MAX}	4.75 (7.5 ≤ V _{IN} ≤ 20)		5.25 (14.8 ≤ V _{IN} ≤ 27)	11.4 (14.8 ≤ V _{IN} ≤ 27)		12.6 (18 ≤ V _{IN} ≤ 30)	14.25 (18 ≤ V _{IN} ≤ 30)		15.75 (18 ≤ V _{IN} ≤ 30)	V
ΔV _O	Line Regulation	T _J = 25°C, I _O = 100 mA		50			120			150		mV
		T _J = 25°C, I _O = 500 mA		100 (7.2 ≤ V _{IN} ≤ 25)			240 (14.5 ≤ V _{IN} ≤ 30)			300 (17.6 ≤ V _{IN} ≤ 30)		mV
ΔV _O	Load Regulation	T _J = 25°C, 5 mA ≤ I _O ≤ 500 mA		100			240			300		mV
ΔV _O	Long Term Stability			20			48			60		mV/khrs
I _Q	Quiescent Current	T _J = 25°C	4	10		4	10		4	10		mA
ΔI _Q	Quiescent Current Change	T _J = 25°C 5 mA ≤ I _O ≤ 500 mA		0.5			0.5			0.5		mA
		T _J = 25°C V _{MIN} ≤ V _{IN} ≤ V _{MAX}		1 (7.5 ≤ V _{IN} ≤ 25)			1 (14.8 ≤ V _{IN} ≤ 30)			1 (18 ≤ V _{IN} ≤ 30)		mA
V _n	Output Noise Voltage	T _J = 25°C, f = 10 Hz–100 kHz	40			75			90			μV
$\frac{\Delta V_{IN}}{\Delta V_{OUT}}$	Ripple Rejection	f = 120 Hz	78			71			69			dB
	Input Voltage Required to Maintain Line Regulation	T _J = 25°C, I _O = 500 mA	7.2			14.5			17.6			V
	Thermal Resistance Junction to Case	P Package	12			12			12			°C/W
		T Package	5			5			5			°C/W
	Thermal Resistance Junction to Ambient	P Package	70			70			70			°C/W
		T Package	60			60			60			°C/W

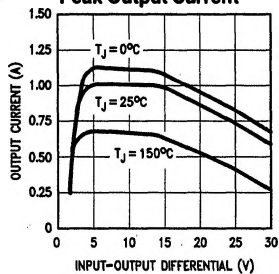
Note 1: Absolute Maximum Ratings indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is intended to be functional, but do not guarantee specific performance limits. For guaranteed specifications and test conditions, see the Electrical Characteristics.

Typical Performance Characteristics

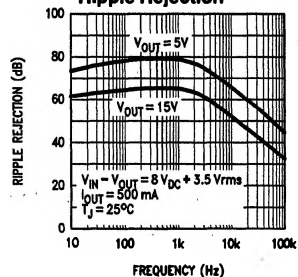
Maximum Average Power Dissipation



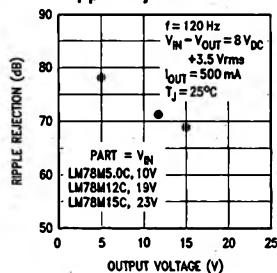
Peak Output Current



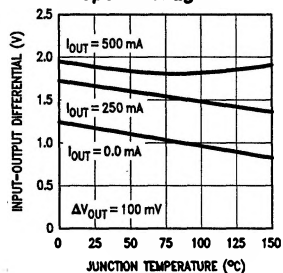
Ripple Rejection



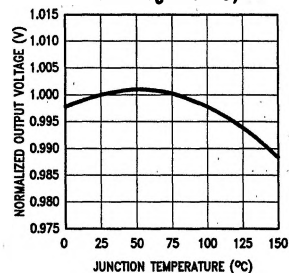
Ripple Rejection



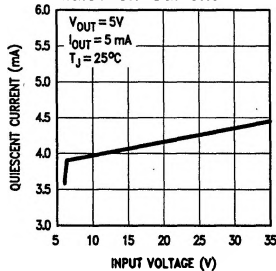
Dropout Voltage



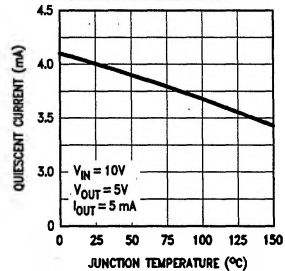
Output Voltage (Normalized to 1V at $T_J = 25^\circ\text{C}$)



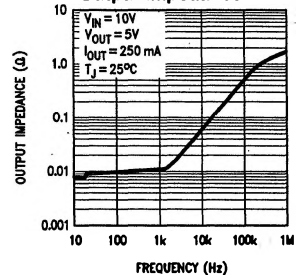
Quiescent Current



Quiescent Current

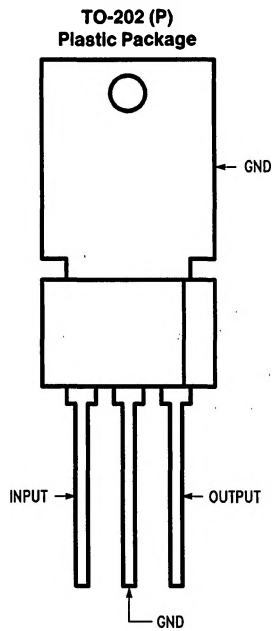


Output Impedance



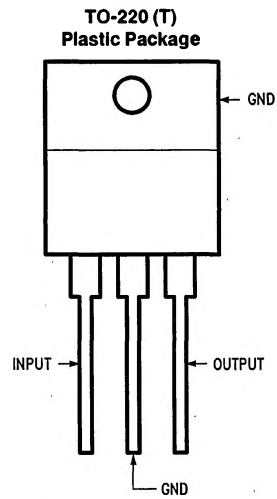
TL/H/10484-4

Connection Diagrams



Order Numbers
LM341P-5.0
LM341P-12
LM341P-15
See NS Package Number P03A

TL/H/10484-2



Order Numbers
LM341T-5.0
LM341T-12
LM341T-15
See NS Package Number T03B

TL/H/10484-3