

# LM105 LM205 LM305

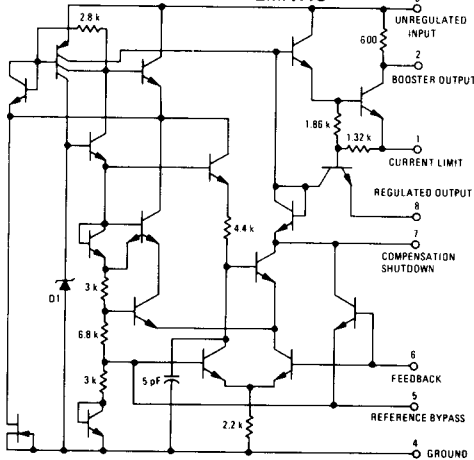
## MONOLITHIC POSITIVE VOLTAGE REGULATOR

The LM105H, LM205H, and LM305H are precision voltage regulators which can be programmed by a single external resistor to supply an output voltage from 4.5 volts to 40 volts.

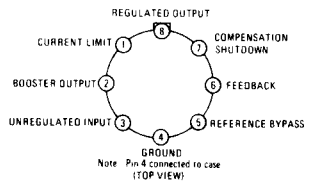
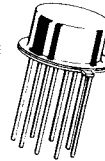
- Output Currents in Excess of 10 A Possible by Addition of External Transistors
- Load Regulation Better than 0.1%, Full Load with Current Limiting
- DC Line Regulation, 0.03%/V
- Ripple Rejection, 0.01%/V

## POSITIVE VOLTAGE REGULATOR SILICON MONOLITHIC INTEGRATED CIRCUIT

### CIRCUIT SCHEMATIC



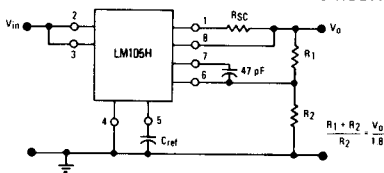
**H SUFFIX**  
METAL PACKAGE  
CASE 601



### ORDERING INFORMATION

Device	Temperature Range	Package
LM105H	-55°C to +125°C	Metal Can
LM205H	-25°C to +85°C	Metal Can
LM305H	0°C to +70°C	Metal Can

FIGURE 1 — BASIC REGULATOR CIRCUIT



### TYPICAL APPLICATIONS

FIGURE 2 — 10 A REGULATOR with FOLDBACK CURRENT LIMITING

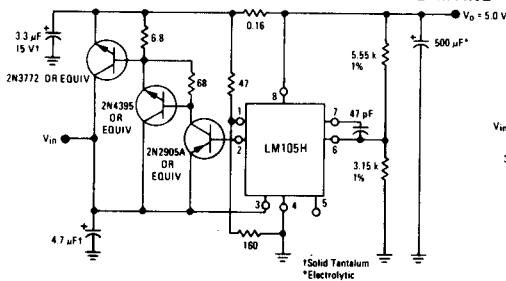
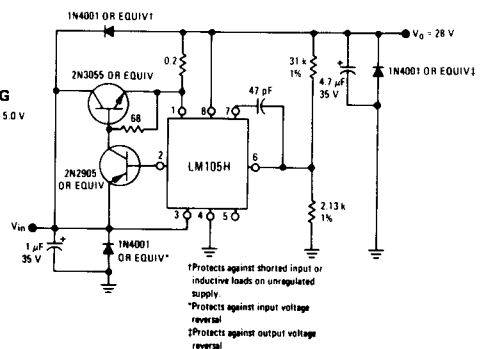


FIGURE 3 — 1.0 A REGULATOR with PROTECTIVE DIODES



- †Protects against shorted input or inductive loads on unregulated supply.
- \*Protects against input voltage reversal.
- ‡Protects against output voltage reversal.

# LM105, LM205, LM305 (continued)

## MAXIMUM RATINGS ( $T_A = +25^{\circ}\text{C}$ unless otherwise noted)

Rating	Symbol	LM105	LM205	LM305	Unit
Input Voltage	$V_{in}$	50	50	40	Vdc
Input-Output Voltage Differential	$ V_{in}-V_o $	40	40	40	Vdc
Power Dissipation (See Note 1)	$P_D$	680	680	680	mW
Operating Temperature Range	$T_A$	-55 to +125	-25 to +85	0 to +70	$^{\circ}\text{C}$
Storage Temperature Range	$T_{stg}$	-65 to +150	-65 to +150	-65 to +150	$^{\circ}\text{C}$
Lead Temperature (soldering, $t = 10$ s)	$T_S$	300	300	300	$^{\circ}\text{C}$

## ELECTRICAL CHARACTERISTICS (See Note 2)

Characteristic	Symbol	LM105 LM205			LM305			Unit
		Min	Typ	Max	Min	Typ	Max	
Input Voltage Range	$V_{in}$	8.5	—	50	8.5	—	40	Volts
Output Voltage Range	$V_o$	4.5	—	40	4.5	—	30	Volts
Output-Input Voltage Differential	$ V_{in}-V_o $	3.0	—	30	3.0	—	30	Volts
Load Regulation (See Figure 1) $(0 \leq I_o \leq 12 \text{ mA})$ $R_{SC} = 18 \Omega, T_A = +25^{\circ}\text{C}$ $R_{SC} = 10 \Omega, T_A = T_{high}^*$ $R_{SC} = 18 \Omega, T_A = T_{low}^{**}$	$Reg_{load}$	—	0.02 0.03 0.03	0.05 0.1 0.1	—	0.02 0.03 0.03	0.05 0.1 0.1	%
Line Regulation $V_{in}-V_o \leq 5.0 \text{ V}$ $V_{in}-V_o > 5.0 \text{ V}$	$Reg_{in}$	—	0.025 0.015	0.06 0.03	—	0.025 0.015	0.06 0.03	%/V
Ripple Rejection (See Figure 1) $C_{Ref} = 10 \mu\text{F}, f = 120 \text{ Hz}$	$\frac{\Delta V_o}{V_o \Delta V_i}$	—	0.003	0.01	1.0	0.003	0.01	%/V
Temperature Stability $T_{low}^{**} \leq T_A \leq T_{high}^*$	$TCV_o$	—	0.3	1.0	—	0.3	1.0	%
Feedback Sense Voltage	$V_{ref}$	1.63	1.7	1.81	1.63	1.7	1.81	Volts
Output Noise Voltage (See Figure 1) $(10 \text{ Hz} \leq f \leq 10 \text{ kHz})$ $C_{Ref} = 0$ $C_{Ref} > 0.1 \mu\text{F}$	$V_n$	—	0.005 0.002	—	—	0.005 0.002	—	%
Standby Current Drain $V_{in} = 50 \text{ V}$ $V_{in} = 40 \text{ V}$	$I_B$	—	0.8	2.0	—	—	0.8 2.0	mA
Long Term Stability	$S$	—	0.1	1.0	—	0.1	1.0	%

\* $T_{high} = +125^{\circ}\text{C}$  for LM105  
+85 $^{\circ}\text{C}$  for LM205  
+70 $^{\circ}\text{C}$  for LM305

\*\* $T_{low} = -55^{\circ}\text{C}$  for LM105  
-25 $^{\circ}\text{C}$  for LM205  
0 $^{\circ}\text{C}$  for LM305

### Note 1:

The maximum junction temperature of the LM105 is +150 $^{\circ}\text{C}$ , for the LM205 — +100 $^{\circ}\text{C}$ , and for the LM305 — +85 $^{\circ}\text{C}$ . For operating at elevated temperatures, the package must be derated based on a thermal resistance of 150 $^{\circ}\text{C}/\text{W}$  — junction to ambient, or 45 $^{\circ}\text{C}/\text{W}$  junction to case.

### Note 2:

These specifications apply for junction temperatures of -55 $^{\circ}\text{C}$  to +150 $^{\circ}\text{C}$  for the LM105, -25 $^{\circ}\text{C}$  to +85 $^{\circ}\text{C}$  for the LM205, and 0 to +70 $^{\circ}\text{C}$  for the LM305. Specifications also apply for input and output voltages within the indicated ranges and for a divider impedance sensed by the feedback terminal of 2.0 kilohms (unless otherwise specified). Load and line regulation specifications given are for constant junction temperature. Temperature drift effects must be taken into account separately when the device is operating under conditions of high power dissipation.