

LM105 LM205 LM305

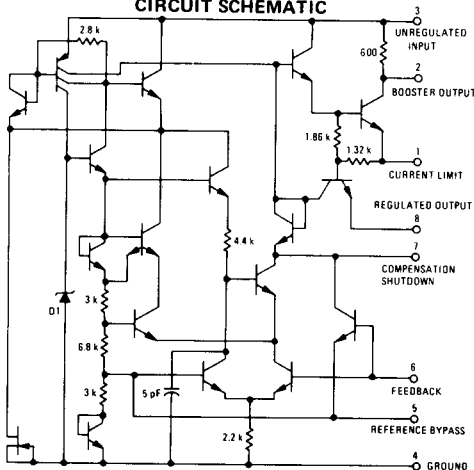
MONOLITHIC POSITIVE VOLTAGE REGULATOR

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.

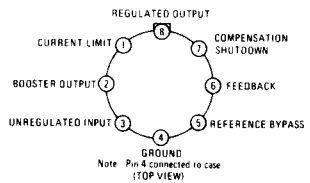
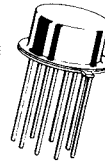
- Output Currents in Excess of 10 A Possible by Addition of External Transistors
- Load Regulation Better than 0.1%, Full Load with Current Limiting
- DC Line Regulation, 0.03%/V
- Ripple Rejection, 0.01%/V

POSITIVE VOLTAGE REGULATOR
SILICON MONOLITHIC
INTEGRATED CIRCUIT

CIRCUIT SCHEMATIC



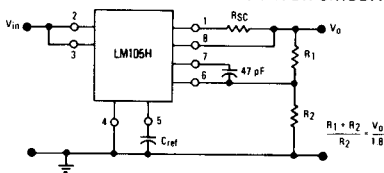
H SUFFIX
METAL PACKAGE
CASE 601



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

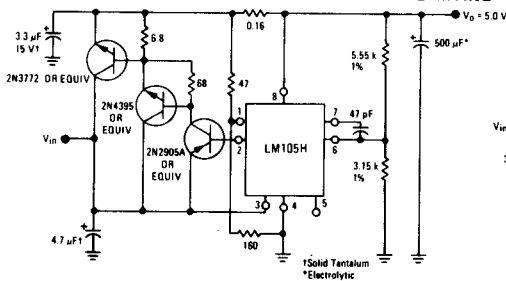
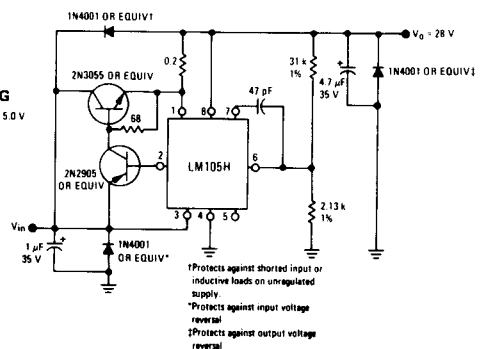


FIGURE 3 - 1.0 A REGULATOR with PROTECTIVE DIODES



- *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) ($0 \leq I_o \leq 12$ 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 $V_{in}-V_o \leq 5.0$ V $V_{in}-V_o > 5.0$ 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) $C_{Ref} = 10 \mu\text{F}$, $f = 120$ 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 Hz $\leq f \leq 10$ kHz) $C_{Ref} = 0$ $C_{Ref} > 0.1 \mu\text{F}$ | V_n | — | 0.005 0.002 | — | — | 0.005 0.002 | — | % |
| Standby Current Drain $V_{in} = 50$ V $V_{in} = 40$ V | I_B | — | 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°C for LM205
 0°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°C to $+150^{\circ}\text{C}$ for the LM105, -25°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.