

**Table 1. Device summary**

| Part numbers |          |          |
|--------------|----------|----------|
| L78L33C      | L78L08AC | L78L15C  |
| L78L33AC     | L78L08AB | L78L15AC |
| L78L33AB     | L78L09C  | L78L15AB |
| L78L05C      | L78L09AC | L78L18C  |
| L78L05AC     | L78L09AB | L78L18AC |
| L78L05AB     | L78L10AC | L78L24C  |
| L78L06AC     | L78L12C  | L78L24AC |
| L78L06AB     | L78L12AC | L78L24AB |
| L78L08C      | L78L12AB |          |



## L78LxxAB, L78LxxAC, L78LxxC

Positive voltage regulators

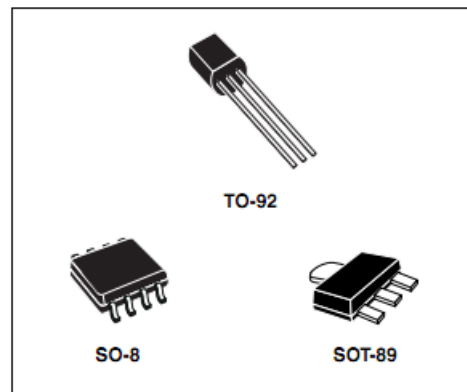
Datasheet — production data

### Features

- Output current up to 100 mA
- Output voltages of 3.3; 5; 6; 8; 9; 10; 12; 15; 18; 24 V
- Thermal overload protection
- Short-circuit protection
- No external components are required
- Available in either  $\pm 4\%$  (AC) or  $\pm 8\%$  (C) selection

### Description

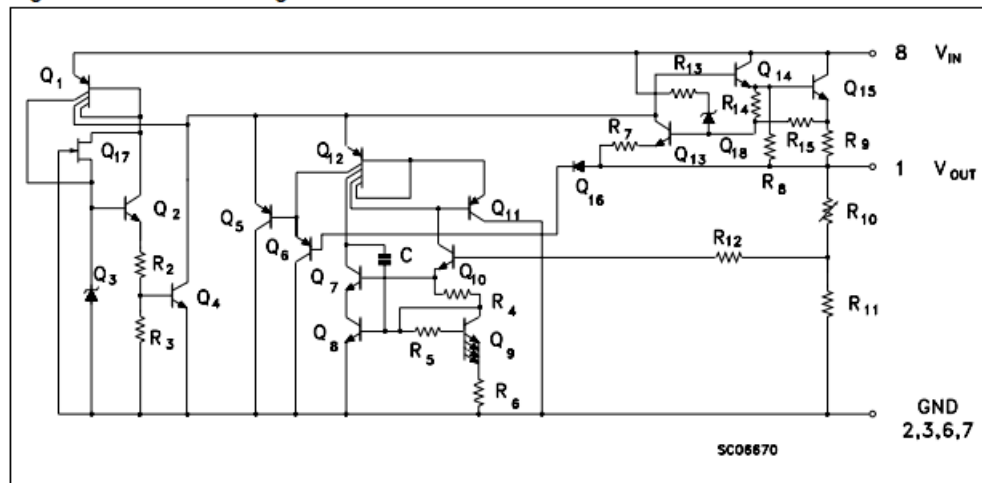
The L78Lxx series of three-terminal positive regulators employ internal current limiting and thermal shutdown, making them essentially indestructible. If adequate heat-sink is provided, they can deliver up to 100 mA output current. They are intended as fixed voltage regulators in a wide range of applications including local or on-card regulation for elimination of noise and distribution problems associated with single-point regulation. In addition, they can be used with power pass elements to make high-current voltage regulators. The L78Lxx series used as Zener diode/resistor combination replacement, offers an effective output impedance improvement



of typically two orders of magnitude, along with lower quiescent current and lower noise.

# 1 Diagram

Figure 1. Schematic diagram



# 2 Pin configuration

Figure 2. Pin connection (top view, bottom view for TO-92)

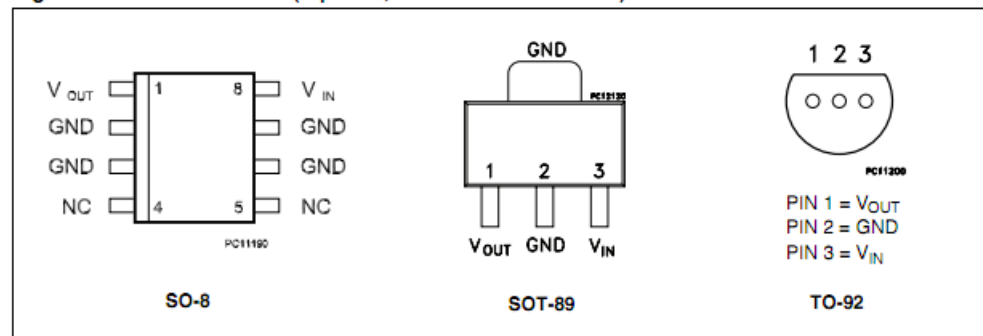
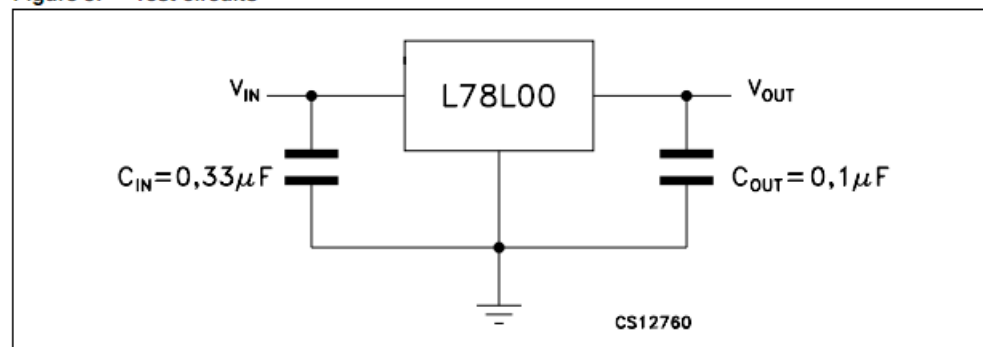


Figure 3. Test circuits



### 3 Maximum ratings

**Table 2. Absolute maximum ratings**

| Symbol           | Parameter                            | Value                             | Unit       |    |
|------------------|--------------------------------------|-----------------------------------|------------|----|
| V <sub>I</sub>   | DC Input voltage                     | V <sub>O</sub> = 3.3 to 9 V       | 30         | V  |
|                  |                                      | V <sub>O</sub> = 12 to 15 V       | 35         |    |
|                  |                                      | V <sub>O</sub> = 18 to 24 V       | 40         |    |
| I <sub>O</sub>   | Output current                       | 100                               | mA         |    |
| P <sub>D</sub>   | Power dissipation                    | Internally limited <sup>(1)</sup> | mW         |    |
| T <sub>STG</sub> | Storage temperature range            | -65 to 150                        | °C         |    |
| T <sub>OP</sub>  | Operating junction temperature range | for L78L00AC                      | 0 to 125   | °C |
|                  |                                      | for L78L00AB                      | -40 to 125 |    |

1. Our SO-8 package used for voltage regulators is modified internally to have pins 2, 3, 6 and 7 electrically communed to the die attach flag. This particular frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heat-sinking. The external dimensions are the same as for the standard SO-8.

**Table 3. Thermal data**

| Symbol            | Parameter                                  | SO-8              | TO-92 | SOT-89            | Unit |
|-------------------|--|-------------------|-------|-------------------|------|
| R <sub>thJC</sub> | Thermal resistance junction-case. (max)    | 20                |       | 15                | °C/W |
| R <sub>thJA</sub> | Thermal resistance junction-ambient. (max) | 55 <sup>(1)</sup> | 200   | 55 <sup>(1)</sup> | °C/W |

1. Considering 6 cm<sup>2</sup> of copper Board heat-sink.

T<sub>J</sub> = 0 to 125 °C for L78L12AC, T<sub>J</sub> = -40 to 125 °C for L78L12AB.

**Table 19. Electrical characteristics of L78L12AB and L78L12AC (V<sub>I</sub> = 19 V)**

| Symbol          | Parameter                | Test conditions   | Min. | Typ. | Max. | Unit |
|-----------------|--------------------------|---|------|------|------|------|
| V <sub>O</sub>  | Output voltage           | T <sub>J</sub> = 25 °C  | 11.5 | 12   | 12.5 | V    |
| V <sub>O</sub>  | Output voltage           | I <sub>O</sub> = 1 to 40 mA, V <sub>I</sub> = 14.5 to 27 V                                | 11.4 |      | 12.6 | V    |
|                 |                          | I <sub>O</sub> = 1 to 70 mA, V <sub>I</sub> = 19 V  | 11.4 |      | 12.6 |      |
| ΔV <sub>O</sub> | Line regulation          | V <sub>I</sub> = 14.5 to 27 V, T <sub>J</sub> = 25 °C                                     |      |      | 250  | mV   |
|                 |                          | V <sub>I</sub> = 16 to 27 V, T <sub>J</sub> = 25 °C                                       |      |      | 200  |      |
| ΔV <sub>O</sub> | Load regulation          | I <sub>O</sub> = 1 to 100 mA, T <sub>J</sub> = 25 °C                                      |      |      | 100  | mV   |
|                 |                          | I <sub>O</sub> = 1 to 40 mA, T <sub>J</sub> = 25 °C                                       |      |      | 50   |      |
| I <sub>d</sub>  | Quiescent current        | T <sub>J</sub> = 25 °C  |      |      | 6.5  | mA   |
|                 |                          | T <sub>J</sub> = 125 °C   |      |      | 6    | mA   |
| ΔI <sub>d</sub> | Quiescent current change | I <sub>O</sub> = 1 to 40 mA   |      |      | 0.1  | mA   |
|                 |                          | V <sub>I</sub> = 16 to 27 V   |      |      | 1.5  |      |
| e <sub>N</sub>  | Output noise voltage     | B = 10 Hz to 100 kHz, T <sub>J</sub> = 25 °C  |      | 80   |      | μV   |
| SVR             | Supply voltage rejection | V <sub>I</sub> = 15 to 25 V, f = 120 Hz<br>I <sub>O</sub> = 40 mA, T <sub>J</sub> = 25 °C | 37   | 42   |      | dB   |
| V <sub>d</sub>  | Dropout voltage          |   |      | 1.7  |      | V    |