

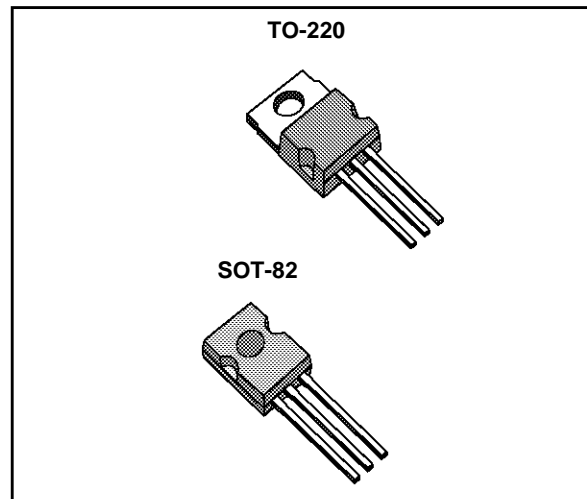
**LOW DROPOUT VOLTAGE REGULATORS**

- OUTPUT VOLTAGE OF 5, 8.5 AND 10 V
- OUTPUT CURRENT UP TO 500 mA
- NO EXTERNAL COMPONENTS
- LOW DROP OUT VOLTAGE
- OVERVOLTAGE PROTECTION ( $\pm 100V$ )
- REVERSE VOLTAGE PROTECTION
- SHORT CIRCUIT PROTECTION
- CURRENT LIMITING
- THERMAL SHUTDOWN

**DESCRIPTION**

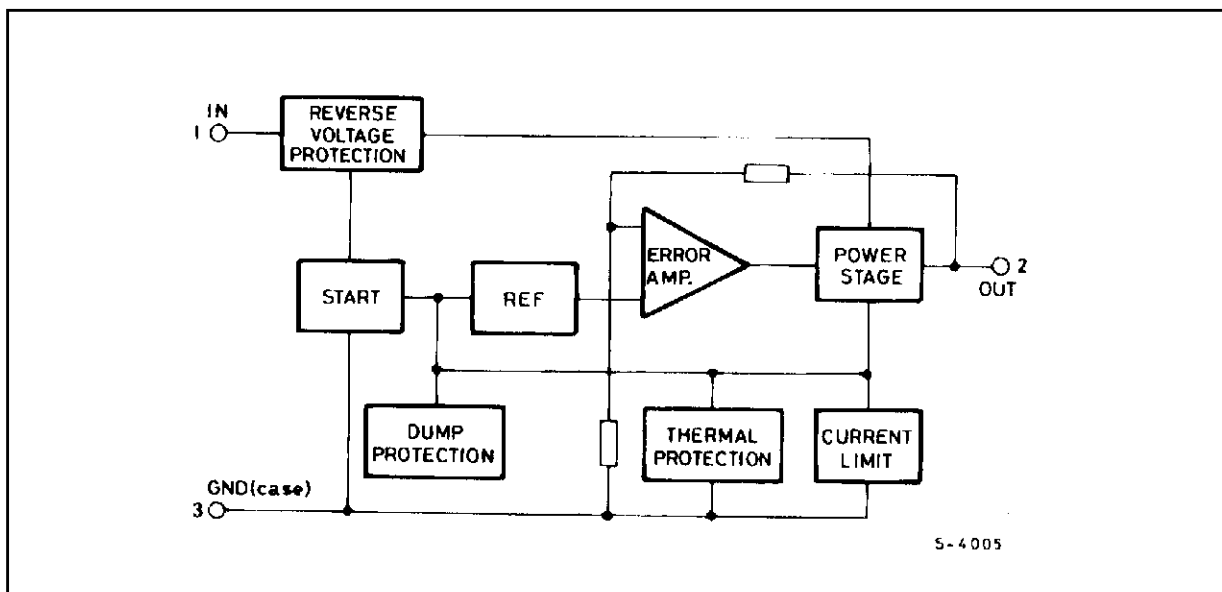
The L2600 series of three terminal positive regulators is specially designed to stabilize power supplies for instrumentation in vehicles with 12V battery. Available with output voltages equal to 5V, 8.5 V, 10V, they can supply an output current to 500mA.

These devices are protected against load dump and field decay transients ( $\pm 100V$ ), reverse battery, short circuit and thermal overload.



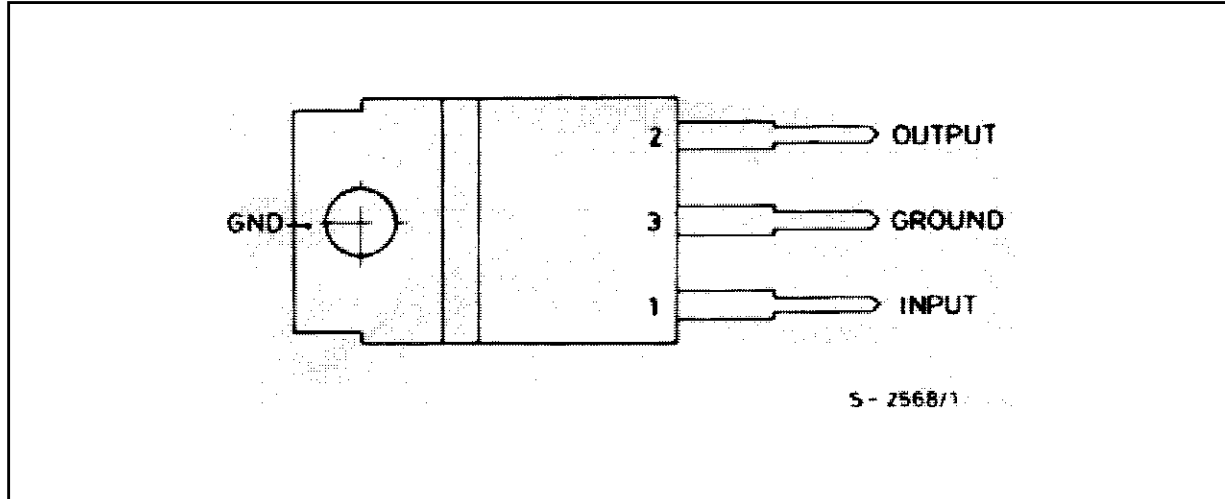
| Order codes |        | Output Voltage |
|-------------|--------|----------------|
| TO-220      | SOT-82 |                |
| L2605V      | L2605X | 5 V            |
| L2685V      | L2685X | 8.5 V          |
| L2610V      | L2610X | 10 V           |

**BLOCK DIAGRAM**



## L2605-L2685-L2610

### PIN CONNECTION (top view)



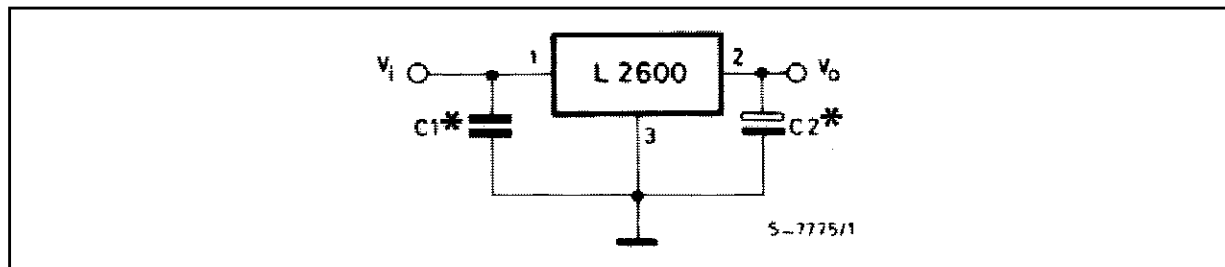
### ABSOLUTE MAXIMUM RATINGS

| Symbol                | Parameter  | Value              | Unit               |
|-----------------------|--|--------------------|--------------------|
| $V_i$                 | DC Input Voltage   | 35                 | V                  |
|                       | DC Input Reverse Voltage   | -28                | V                  |
|                       | Transient Input Overvoltage:<br>Load Dump:<br>$5\text{ms} \leq t_{\text{rise}} \leq 10\text{ms}$   | + 100              | V                  |
|                       | $\tau_f$ Fall Time Constant = 100ms,<br>$R_{\text{source}} \geq 0.5 \Omega$  |                    |                    |
|                       | Field Decay:<br>$5\text{ms} \leq t_{\text{fall}} \leq 10\text{ms}$<br>$\tau_r$ Rise Time Constant = 33ms,<br>$R_{\text{source}} \geq 10\Omega$ | - 100              | V                  |
| $P_D$                 | Power Dissipation  | Internally Limited |                    |
| $T_j, T_{\text{stg}}$ | Junction and Storage Temperature Range   | - 55 to 150        | $^{\circ}\text{C}$ |

### THERMAL DATA

| Symbol                 | Parameter                           |     | SOT-82                   | TO-220                  |
|------------------------|-------------------------------------|-----|--------------------------|-------------------------|
| $R_{\text{th-j-case}}$ | Thermal resistance junction-case    | Max | 8 $^{\circ}\text{C/W}$   | 4 $^{\circ}\text{C/W}$  |
| $R_{\text{th-j-amb}}$  | Thermal resistance junction-ambient | Max | 100 $^{\circ}\text{C/W}$ | 75 $^{\circ}\text{C/W}$ |

### APPLICATION CIRCUIT



(\*) **Note** :  $C_1$  and  $C_2$  are only needed if the load capacitance exceeds 1000 pF, Recommended values are  $C_1 = 0.1 \mu\text{F}$  and  $C_2 \geq 100 \mu\text{F}$ .

**ELECTRICAL CHARACTERISTICS** ( $T_j = 25\text{ }^\circ\text{C}$ ,  $V_i = 14\text{V}$ , unless otherwise specified)

| Symbol                        | Parameter                    | Test Condition                              |  | Min.                 | Typ.                   | Max.                  | Unit          |
|-------------------------------|------------------------------|---|--|----------------------|------------------------|-----------------------|---------------|
| $V_o$                         | Output Voltage               | $I_o = 500\text{ mA}$                       | $V_i = 12\text{ to }16\text{ V (L2605)}$<br>$V_i = 12\text{ to }16\text{ V (L2685)}$<br>$V_i = 12\text{ to }16\text{ V (L2610)}$ | 4.80<br>8.15<br>9.60 | 5.00<br>8.50<br>10.00* | 5.20<br>8.85<br>10.40 | V             |
| $V_i$                         | Operating Input Voltage      | See Note (*)                                |  |                      |                        | 28                    | V             |
| $\frac{\Delta V_o}{V_o}$      | Line Regulation              | $I_o = 50\text{ mA}$                        | $V_i = 12\text{ to }20\text{ V}$   |                      | 2                      | 8                     | mV/V          |
| $\frac{\Delta V_o}{V_o}$      | Load Regulation              | $V_i = 14\text{ V}$                         | $I_o = 50\text{ to }500\text{ mA}$   |                      | 4                      | 9                     | mV/V          |
| $\Delta V_{i-o}$              | Dropout Voltage              | $I_o = 500\text{ mA}$                       |  |                      |                        | 1.9                   | V             |
| $I_d$                         | Quiescent Current            | $I_o = 50\text{ mA}$                        |  |                      | 20                     | 45                    | mA            |
| $\frac{\Delta V_o}{\Delta T}$ | Output Voltage Drift         | $I_o = 50\text{ mA}$<br>$V_i = 14\text{ V}$ | $T_{amb} = -12\text{ to }80\text{ }^\circ\text{C}$   |                      | -1                     |                       | mV/°C         |
| $I_{sc}$                      | Output Short Circuit Current |   |  |                      | 1.1                    | 1.8                   | A             |
| SVR                           | Supply Voltage Rejection     | $V_i = 16$<br>$f = 100\text{ Hz}$           | $V_i = 2\text{ V}$<br>$I_o = 500\text{ mA}$  |                      | 60                     |                       | dB            |
| $R_o$                         | Output Resistance            | $I_o = 500\text{ mA}$                       |  |                      | 0.05                   |                       | $\Omega$      |
| $e_N$                         | Output Noise Voltage         | BW = 100 Hz to 10 KHz                       |  |                      | 20                     |                       | $\mu\text{V}$ |

(\*) **Note:** For DC input voltage  $28\text{ V} < V_i < 35\text{ V}$  the device is not operating

**ELECTRICAL CHARACTERISTICS** ( $-40 \leq T_j \leq 125\text{ }^\circ\text{C}$  (note 2),  $V_i = 14\text{ V}$ , unless otherwise specified)

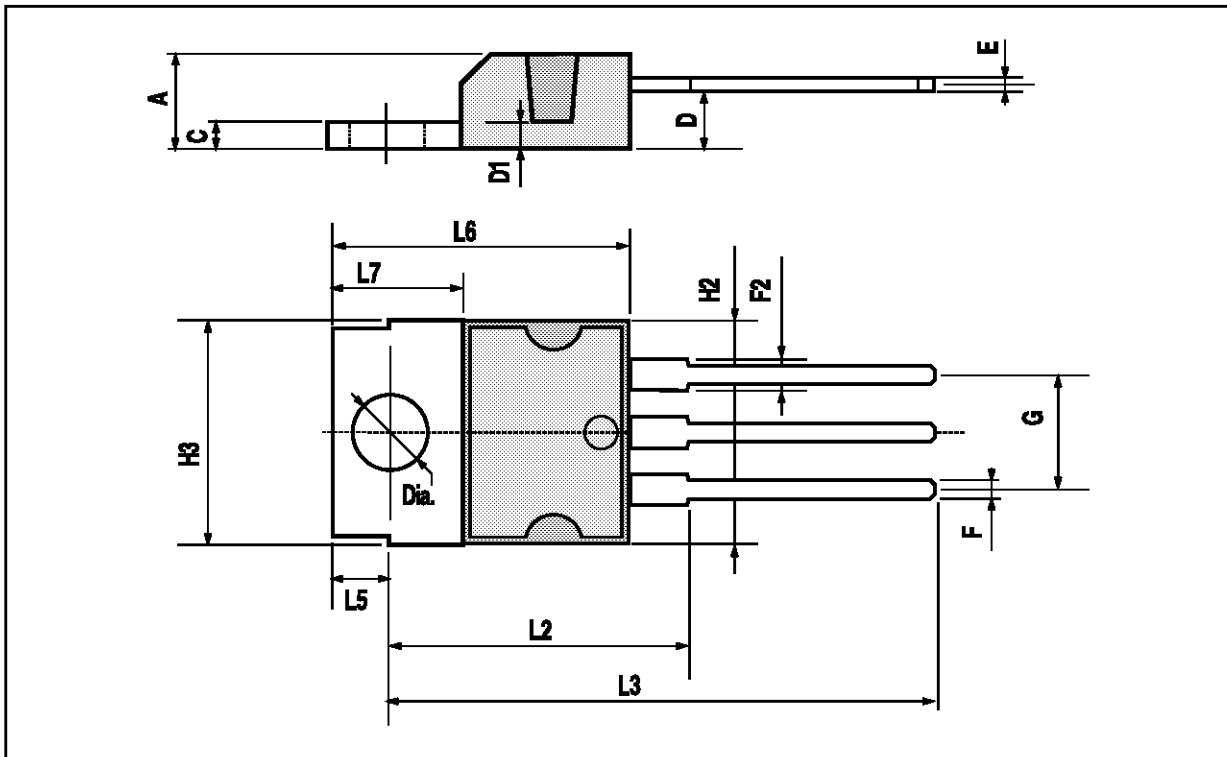
| Symbol                   | Parameter                    | Test Conditions       |  | Min.                 | Typ.                  | Max.                  | Unit |
|--------------------------|------------------------------|-----------------------|--|----------------------|-----------------------|-----------------------|------|
| $V_o$                    | Output Voltage               | $I_o = 500\text{ mA}$ | $V_i = 12.5\text{ to }16\text{ V (L2605)}$<br>$V_i = 12.5\text{ to }16\text{ V (L2685)}$<br>$V_i = 12.5\text{ to }16\text{ V (L2610)}$ | 4.70<br>8.00<br>9.40 | 5.00<br>8.50<br>10.00 | 5.30<br>9.00<br>10.60 | V    |
| $V_i$                    | Operating Input Voltage      | See Note (°)          |  |                      |                       | 26                    | V    |
| $\frac{\Delta V_o}{V_o}$ | Line Regulation              | $I_o = 50\text{ mA}$  | $V_i = 12.5\text{ to }20\text{ V}$   |                      | 3                     | 12                    | mV/V |
| $\frac{\Delta V_o}{V_o}$ | Load Regulation              | $V_i = 14\text{ V}$   | $I_o = 50\text{ to }500\text{ mA}$ ,   | 5                    | 13                    |                       | mV/V |
| $\Delta V_{i-o}$         | Dropout Voltage              | $I_o = 500\text{ mA}$ |  |                      |                       | 2.5                   | V    |
| $I_d$                    | Quiescent Current            | $I_o = 50\text{ mA}$  |  |                      | 29                    | 65                    | mA   |
| $I_{sc}$                 | Output Short Circuit Current |                       |  |                      | 1.1                   | 2.1                   | A    |

**Notes:** (°). For a DC input voltage  $26\text{ V} < V_i < 35\text{ V}$  the device is not operating.

2. The limits are guaranteed by design correlation and statistical control on production samples over the indicated temperature and supply voltage ranges.

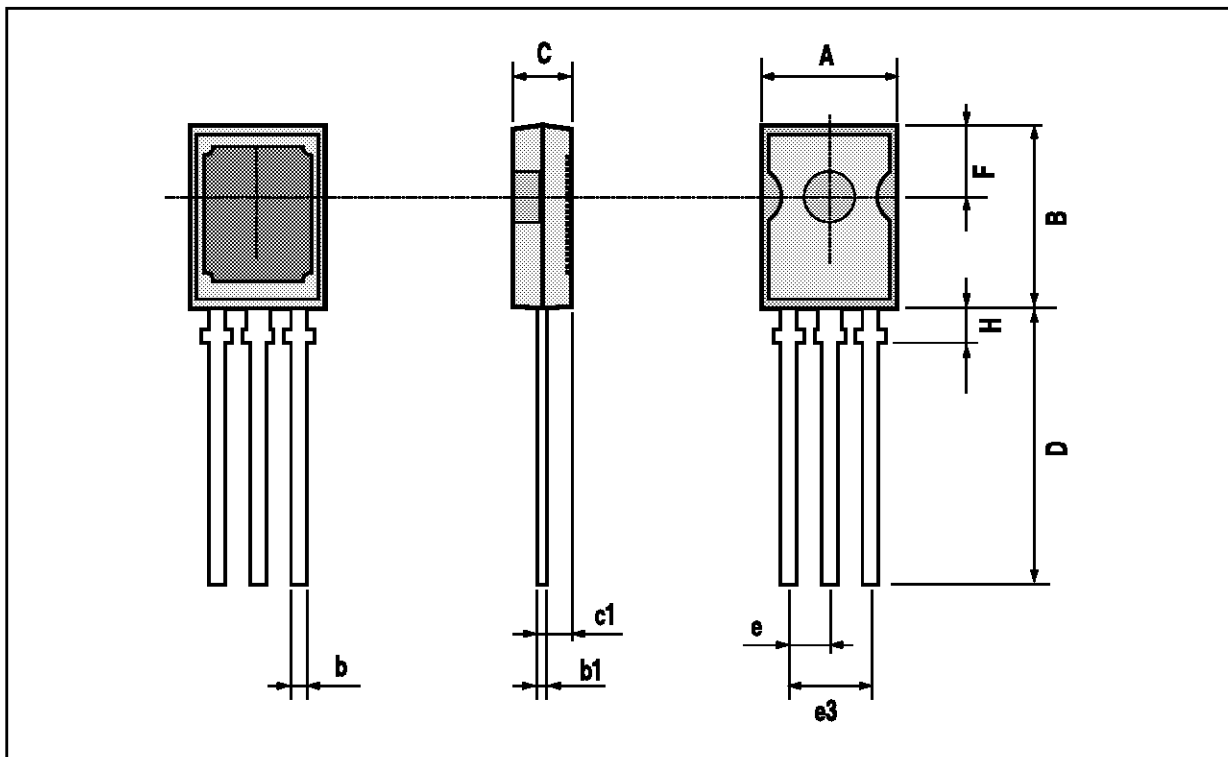
TO220 PACKAGE MECHANICAL DATA

| DIM. | mm    |      |      | inch  |       |       |
|------|-------|------|------|-------|-------|-------|
|      | MIN.  | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |       |      | 4.8  |       |       | 0.189 |
| C    |       |      | 1.37 |       |       | 0.054 |
| D    | 2.4   |      | 2.8  | 0.094 |       | 0.110 |
| D1   | 1.2   |      | 1.35 | 0.047 |       | 0.053 |
| E    | 0.35  |      | 0.55 | 0.014 |       | 0.022 |
| F    | 0.8   |      | 1.05 | 0.031 |       | 0.041 |
| F2   | 1.15  |      | 1.4  | 0.045 |       | 0.055 |
| G    | 4.95  | 5.08 | 5.21 | 0.195 | 0.200 | 0.205 |
| H2   |       |      | 10.4 |       |       | 0.409 |
| H3   | 10.05 |      | 10.4 | 0.396 |       | 0.409 |
| L2   |       | 16.2 |      |       | 0.638 |       |
| L3   | 26.3  | 26.7 | 27.1 | 1.035 | 1.051 | 1.067 |
| L5   | 2.6   |      | 3    | 0.102 |       | 0.118 |
| L6   | 15.1  |      | 15.8 | 0.594 |       | 0.622 |
| L7   | 6     |      | 6.6  | 0.236 |       | 0.260 |
| Dia  | 3.65  |      | 3.85 | 0.144 |       | 0.152 |



## SOT82 PACKAGE MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 7.4  |      | 7.8  | 0.291 |       | 0.307 |
| B    | 10.5 |      | 10.8 | 0.413 |       | 0.425 |
| b    | 0.7  |      | 0.9  | 0.028 |       | 0.035 |
| b1   | 0.49 |      | 0.75 | 0.019 |       | 0.030 |
| C    | 2.4  |      | 2.7  | 0.094 |       | 0.106 |
| c1   |      | 1.2  |      |       | 0.047 |       |
| D    |      | 15.7 |      |       | 0.618 |       |
| e    |      | 2.2  |      |       | 0.087 |       |
| e3   |      | 4.4  |      |       | 0.173 |       |
| F    |      | 3.8  |      |       | 0.150 |       |
| H    |      |      | 2.54 |       | 0.100 |       |



Information furnished is believed to be accurate and reliable. However, SGS-THOMSON Microelectronics assumes no responsibility for the consequences of use of such information nor for any infringement of patents or other rights of third parties which may result from its use. No license is granted by implication or otherwise under any patent or patent rights of SGS-THOMSON Microelectronics. Specifications mentioned in this publication are subject to change without notice. This publication supersedes and replaces all information previously supplied. SGS-THOMSON Microelectronics products are not authorized for use as critical components in life support devices or systems without express written approval of SGS-THOMSON Microelectronics.

© 1994 SGS-THOMSON Microelectronics - All Rights Reserved

SGS-THOMSON Microelectronics GROUP OF COMPANIES

Australia - Brazil - France - Germany - Hong Kong - Italy - Japan - Korea - Malaysia - Malta - Morocco - The Netherlands - Singapore - Spain - Sweden - Switzerland - Taiwan - Thailand - United Kingdom - U.S.A.