

## 3 A low drop positive voltage regulator adjustable and fixed

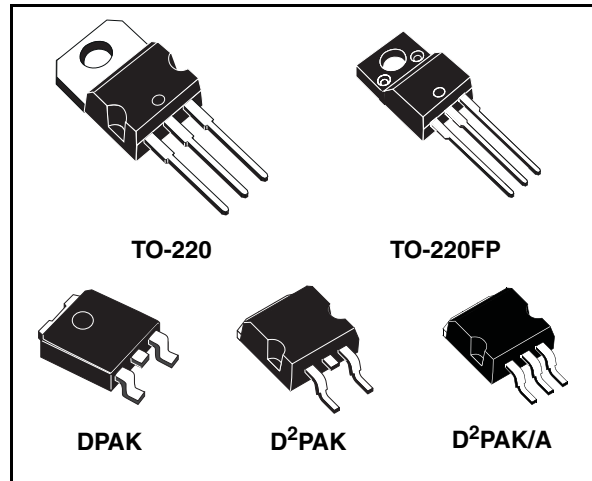
### Features

- Typical dropout 1.3 V (at 3 A)
- Three terminal adjustable or fixed output voltage 1.5 V, 1.8 V, 2.5 V, 3.3 V, 5 V, 12 V.
- Automotive Grade product: adjustable  $V_{OUT}$  only in TO-220 Full Pack package
- Guaranteed output current up to 3 A
- Output tolerance  $\pm 1\%$  at 25°C and  $\pm 2\%$  in full temperature range
- Internal power and thermal limit
- Wide operating temperature range -40 °C to 125 °C
- Package available: TO-220, TO-220FP, DPAK, D<sup>2</sup>PAK, D<sup>2</sup>PAK/A
- Pinout compatibility with standard adjustable VREG

### Description

The LD1085xx is a low drop voltage regulator able to provide up to 3 A of output current. Dropout is guaranteed at a maximum of 1.2 V at the maximum output current, decreasing at lower loads. The LD1085xx is pin to pin compatible with the older 3-terminal adjustable regulators, but has better performances in term of drop and output tolerance.

A 2.85 V output version is suitable for SCSI-2 active termination. Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the LD1085xx quiescent current flows



into the load, so increase efficiency. Only a 10  $\mu$ F minimum capacitor is need for stability.

The device is supplied in TO-220, TO-220FP, DPAK, D<sup>2</sup>PAK and D<sup>2</sup>PAK/A. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within  $\pm 1\%$  at 25 °C.

The LD1085xx is available as Automotive Grade in TO-220FP package only, for the option of adjustable output voltage whose commercial part number is shown in the [Table 11](#) (order codes). This device is qualified according to the specification AEC-Q100 of the Automotive market, in the temperature range -40 °C to 125 °C, and the statistical tests PAT, SYL, SBL are performed.

**Table 1. Device summary**

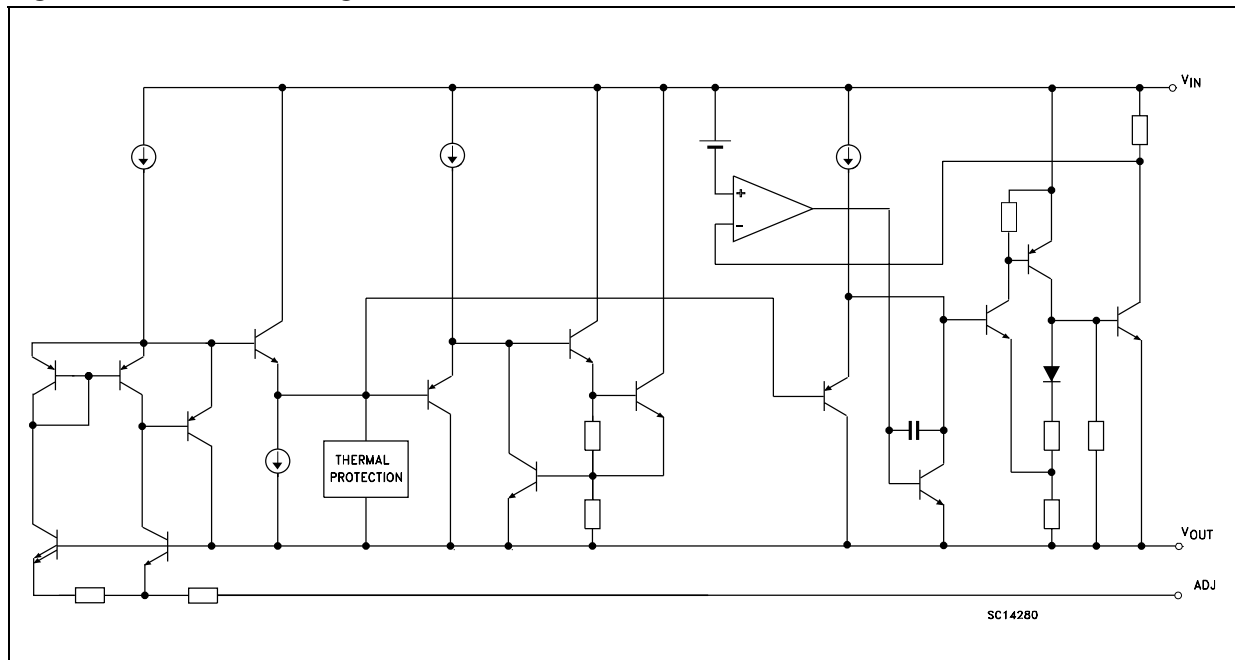
| Part numbers |            |
|--------------|------------|
| LD1085XX     | LD1085XX25 |
| LD1085XX15   | LD1085XX33 |
| LD1085XX18   | LD1085XX50 |

# Contents

|          |   |           |
|----------|---|-----------|
| <b>1</b> | <b>Diagram</b> .....                    | <b>3</b>  |
| <b>2</b> | <b>Pin configuration</b> .....          | <b>4</b>  |
| <b>3</b> | <b>Maximum ratings</b> .....            | <b>5</b>  |
| <b>4</b> | <b>Schematic application</b> .....      | <b>6</b>  |
| <b>5</b> | <b>Electrical characteristics</b> ..... | <b>7</b>  |
| <b>6</b> | <b>Typical application</b> .....        | <b>14</b> |
| <b>7</b> | <b>Package mechanical data</b> .....    | <b>18</b> |
| <b>8</b> | <b>Order codes</b> .....                | <b>26</b> |
| <b>9</b> | <b>Revision history</b> .....           | <b>27</b> |

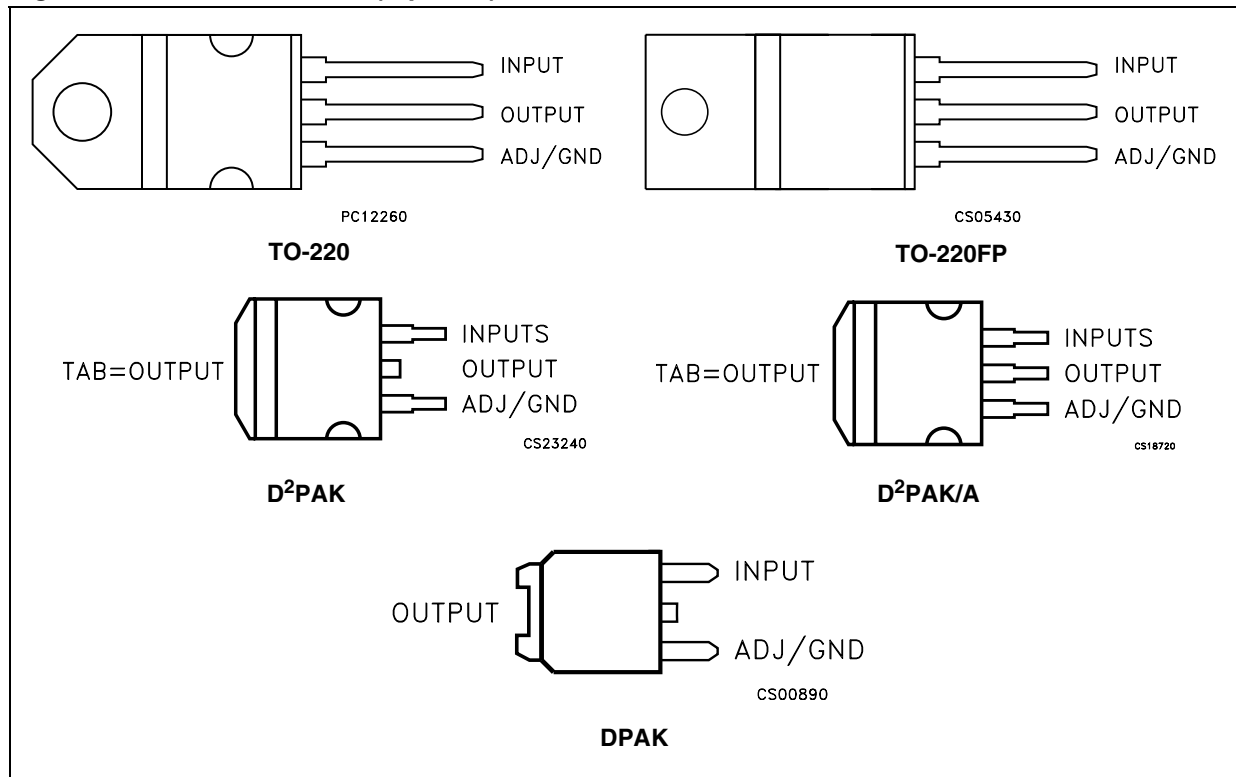
# 1 Diagram

Figure 1. Schematic diagram



## 2 Pin configuration

Figure 2. Pin connections (top view)



### 3 Maximum ratings

**Table 2. Absolute maximum ratings**

| Symbol    | Parameter                            | Value              | Unit |
|-----------|--------------------------------------|--------------------|------|
| $V_I$     | DC input voltage                     | 30                 | V    |
| $I_O$     | Output current                       | Internally limited | mA   |
| $P_D$     | Power dissipation                    | Internally limited | mW   |
| $T_{STG}$ | Storage temperature range            | -55 to +150        | °C   |
| $T_{OP}$  | Operating junction temperature range | -40 to +125        | °C   |

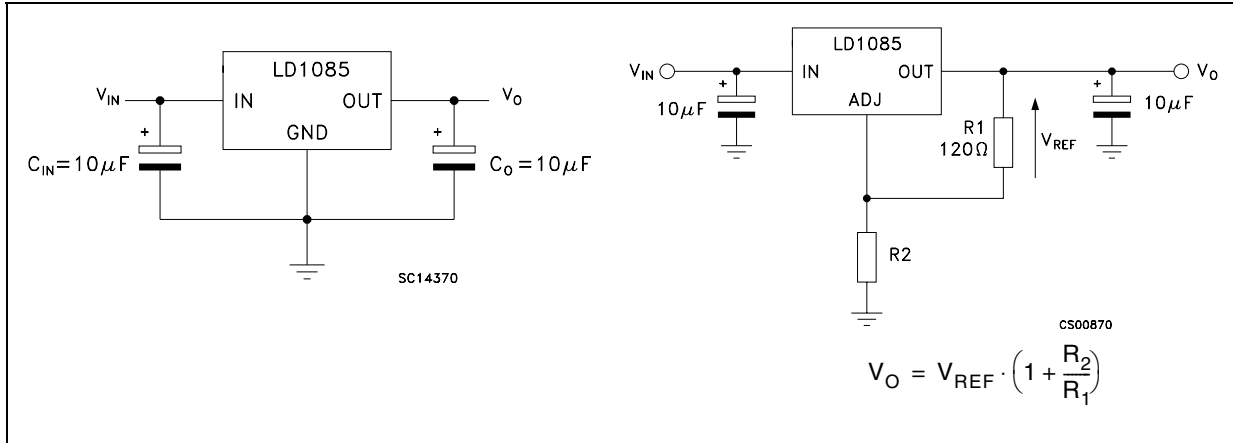
*Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these condition is not implied*

**Table 3. Thermal data**

| Symbol     | Parameter                           | TO-220 | TO-220FP | DPAK | D <sup>2</sup> PAK<br>D <sup>2</sup> PAK/A | Unit |
|------------|-------------------------------------|--------|----------|------|--|------|
| $R_{thJC}$ | Thermal resistance junction-case    | 3      | 5        | 8    | 3  | °C/W |
| $R_{thJA}$ | Thermal resistance junction-ambient | 50     | 60       | 100  | 62.5                                       | °C/W |

# 4 Schematic application

Figure 3. Application circuit



## 5 Electrical characteristics

**Table 4. Electrical characteristics of LD1085#15**

( $V_I = 4.5\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified).

| Symbol       | Parameter                              | Test condition   | Min.  | Typ.  | Max.  | Unit |
|--------------|--|--|-------|-------|-------|------|
| $V_O$        | Output voltage <sup>(1)</sup>          | $I_O = 0\text{ mA}$ , $T_J = 25^\circ\text{C}$   | 1.485 | 1.5   | 1.515 | V    |
|              |  | $I_O = 0\text{ to }3\text{ A}$ , $V_I = 3.1\text{ to }30\text{ V}$                               | 1.47  | 1.5   | 1.53  | V    |
| $\Delta V_O$ | Line regulation                        | $I_O = 0\text{ mA}$ , $V_I = 3.1\text{ to }18\text{ V}$ , $T_J = 25^\circ\text{C}$               |       | 0.2   | 4     | mV   |
|              |  | $I_O = 0\text{ mA}$ , $V_I = 3.1\text{ to }15\text{ V}$  |       | 0.4   | 4     | mV   |
| $\Delta V_O$ | Load regulation                        | $I_O = 0\text{ to }3\text{ A}$ , $T_J = 25^\circ\text{C}$  |       | 2     | 10    | mV   |
|              |  | $I_O = 0\text{ to }3\text{ A}$   |       | 4     | 20    | mV   |
| $V_d$        | Dropout voltage                        | $I_O = 3\text{ A}$   |       | 1.3   | 1.5   | V    |
| $I_q$        | Quiescent current                      | $V_I \leq 30\text{ V}$   |       | 5     | 10    | mA   |
| $I_{sc}$     | Short circuit current                  | $V_I - V_O = 5\text{ V}$   | 3.2   | 4.5   |       | A    |
|              |  | $V_I - V_O = 25\text{ V}$  | 0.2   | 0.5   |       | A    |
|              | Thermal regulation                     | $T_A = 25^\circ\text{C}$ , 30ms pulse  |       | 0.008 | 0.04  | %/W  |
| SVR          | Supply voltage rejection               | $f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $I_O = 3\text{ A}$<br>$V_I = 7.5 \pm 3\text{ V}$ | 60    | 72    |       | dB   |
| eN           | RMS output noise voltage (% of $V_O$ ) | $T_A = 25^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$                                   |       | 0.003 |       | %    |
| S            | Temperature stability                  |  |       | 0.5   |       | %    |
| S            | Long term stability                    | $T_A = 125^\circ\text{C}$ , 1000Hrs  |       | 0.5   |       | %    |

1. See short-circuit current curve for available output current at fixed dropout.

**Table 5. Electrical characteristics of LD1085#18**(V<sub>I</sub> = 4.8 V, C<sub>I</sub> = C<sub>O</sub> = 10 μF, T<sub>A</sub> = -40 to 125 °C, unless otherwise specified).

| Symbol          | Parameter                                       | Test condition   | Min.  | Typ.  | Max.  | Unit |
|-----------------|---|--|-------|-------|-------|------|
| V <sub>O</sub>  | Output voltage <sup>(1)</sup>                   | I <sub>O</sub> = 0 mA, T <sub>J</sub> = 25°C   | 1.782 | 1.8   | 1.818 | V    |
|                 |   | I <sub>O</sub> = 0 to 3 A, V <sub>I</sub> = 3.4 to 30 V                                | 1.764 | 1.8   | 1.836 | V    |
| ΔV <sub>O</sub> | Line regulation                                 | I <sub>O</sub> = 0 mA, V <sub>I</sub> = 3.4 to 18 V T <sub>J</sub> = 25°C              |       | 0.2   | 4     | mV   |
|                 |   | I <sub>O</sub> = 0 mA, V <sub>I</sub> = 3.4 to 15 V                                    |       | 0.4   | 4     | mV   |
| ΔV <sub>O</sub> | Load regulation                                 | I <sub>O</sub> = 0 to 3 A, T <sub>J</sub> = 25°C                                       |       | 2     | 10    | mV   |
|                 |   | I <sub>O</sub> = 0 to 3 A  |       | 4     | 20    | mV   |
| V <sub>d</sub>  | Dropout voltage                                 | I <sub>O</sub> = 3 A   |       | 1.3   | 1.5   | V    |
| I <sub>q</sub>  | Quiescent current                               | V <sub>I</sub> ≤ 30 V  |       | 5     | 10    | mA   |
| I <sub>sc</sub> | Short circuit current                           | V <sub>I</sub> - V <sub>O</sub> = 5 V  | 3.2   | 4.5   |       | A    |
|                 |   | V <sub>I</sub> - V <sub>O</sub> = 25 V   | 0.2   | 0.5   |       | A    |
|                 | Thermal regulation                              | T <sub>A</sub> = 25°C, 30 ms pulse   |       | 0.008 | 0.04  | %/W  |
| SVR             | Supply voltage rejection                        | f = 120 Hz, C <sub>O</sub> = 25 μF, I <sub>O</sub> = 3 A<br>V <sub>I</sub> = 7.5 ± 3 V | 60    | 72    |       | dB   |
| eN              | RMS output noise voltage (% of V <sub>O</sub> ) | T <sub>A</sub> = 25°C, f = 10 Hz to 10 kHz   |       | 0.003 |       | %    |
| S               | Temperature stability                           |  |       | 0.5   |       | %    |
| S               | Long term stability                             | T <sub>A</sub> = 125°C, 1000 Hrs   |       | 0.5   |       | %    |

1. See short-circuit current curve for available output current at fixed dropout.



**Table 6. Electrical characteristics of LD1085#25**  
 ( $V_I = 5.5$  V,  $C_I = C_O = 10$   $\mu$ F,  $T_A = -40$  to  $125$   $^{\circ}$ C, unless otherwise specified).

| Symbol       | Parameter                              | Test condition   | Min.  | Typ.  | Max.  | Unit |
|--------------|--|--|-------|-------|-------|------|
| $V_O$        | Output voltage <sup>(1)</sup>          | $I_O = 0$ mA, $T_J = 25^{\circ}$ C                                   | 2.475 | 2.5   | 2.525 | V    |
|              |  | $I_O = 0$ to 3 A, $V_I = 4.1$ to 30 V                                | 2.45  | 2.5   | 2.55  | V    |
| $\Delta V_O$ | Line regulation                        | $I_O = 0$ mA, $V_I = 4.1$ to 18 V, $T_J = 25^{\circ}$ C              |       | 0.2   | 4     | mV   |
|              |  | $I_O = 0$ mA, $V_I = 4.1$ to 18 V                                    |       | 0.4   | 4     | mV   |
| $\Delta V_O$ | Load regulation                        | $I_O = 0$ to 3 A, $T_J = 25^{\circ}$ C                               |       | 2     | 10    | mV   |
|              |  | $I_O = 0$ to 3 A   |       | 4     | 20    | mV   |
| $V_d$        | Dropout voltage                        | $I_O = 3$ A  |       | 1.3   | 1.5   | V    |
| $I_q$        | Quiescent current                      | $V_I \leq 30$ V  |       | 5     | 10    | mA   |
| $I_{sc}$     | Short circuit current                  | $V_I - V_O = 5$ V  | 3.2   | 4.5   |       | A    |
|              |  | $V_I - V_O = 25$ V   | 0.2   | 0.5   |       | A    |
|              | Thermal regulation                     | $T_A = 25^{\circ}$ C, 30ms pulse                                     |       | 0.008 | 0.04  | %/W  |
| SVR          | Supply voltage rejection               | $f = 120$ Hz, $C_O = 25$ $\mu$ F, $I_O = 3$ A<br>$V_I = 7.5 \pm 3$ V | 60    | 72    |       | dB   |
| eN           | RMS output noise voltage (% of $V_O$ ) | $T_A = 25^{\circ}$ C, $f = 10$ Hz to 10 kHz                          |       | 0.003 |       | %    |
| S            | Temperature stability                  |  |       | 0.5   |       | %    |
| S            | Long term stability                    | $T_A = 125^{\circ}$ C, 1000 Hrs                                      |       | 0.5   |       | %    |

1. See short-circuit current curve for available output current at fixed dropout.

**Table 7. Electrical characteristics of LD1085#33**  
 ( $V_I = 6.3\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified).

| Symbol       | Parameter                              | Test condition   | Min.  | Typ.  | Max.  | Unit |
|--------------|--|--|-------|-------|-------|------|
| $V_O$        | Output voltage <sup>(1)</sup>          | $I_O = 0\text{ mA}$ , $T_J = 25^\circ\text{C}$   | 3.267 | 3.3   | 3.333 | V    |
|              |  | $I_O = 0\text{ to }3\text{ A}$ , $V_I = 4.9\text{ to }30\text{ V}$                               | 3.234 | 3.35  | 3.366 | V    |
| $\Delta V_O$ | Line regulation                        | $I_O = 0\text{ mA}$ , $V_I = 4.9\text{ to }18\text{ V}$ , $T_J = 25^\circ\text{C}$               |       | 0.5   | 6     | mV   |
|              |  | $I_O = 0\text{ mA}$ , $V_I = 4.9\text{ to }18\text{ V}$  |       | 1     | 6     | mV   |
| $\Delta V_O$ | Load regulation                        | $I_O = 0\text{ to }3\text{ A}$ , $T_J = 25^\circ\text{C}$  |       | 3     | 15    | mV   |
|              |  | $I_O = 0\text{ to }3\text{ A}$   |       | 7     | 20    | mV   |
| $V_d$        | Dropout voltage                        | $I_O = 3\text{ A}$   |       | 1.3   | 1.5   | V    |
| $I_q$        | Quiescent current                      | $V_I \leq 30\text{ V}$   |       | 5     | 10    | mA   |
| $I_{sc}$     | Short circuit current                  | $V_I - V_O = 5\text{ V}$   | 3.2   | 4.5   |       | A    |
|              |  | $V_I - V_O = 25\text{ V}$  | 0.2   | 0.5   |       | A    |
|              | Thermal regulation                     | $T_A = 25^\circ\text{C}$ , 30 ms pulse   |       | 0.008 | 0.04  | %/W  |
| SVR          | Supply voltage rejection               | $f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $I_O = 3\text{ A}$<br>$V_I = 8.3 \pm 3\text{ V}$ | 60    | 72    |       | dB   |
| eN           | RMS output noise voltage (% of $V_O$ ) | $T_A = 25^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$                                   |       | 0.003 |       | %    |
| S            | Temperature stability                  |  |       | 0.5   |       | %    |
| S            | Long term stability                    | $T_A = 125^\circ\text{C}$ , 1000 Hrs   |       | 0.5   |       | %    |

1. See short-circuit current curve for available output current at fixed dropout.

**Table 8. Electrical characteristics of LD1085#50**(V<sub>I</sub> = 8 V, C<sub>I</sub> = C<sub>O</sub> = 10 μF, T<sub>A</sub> = -40 to 125 °C, unless otherwise specified).

| Symbol          | Parameter                                       | Test condition  | Min. | Typ.  | Max. | Unit |
|-----------------|---|---|------|-------|------|------|
| V <sub>O</sub>  | Output voltage <sup>(1)</sup>                   | I <sub>O</sub> = 0 mA, T <sub>J</sub> = 25°C  | 4.95 | 5     | 5.05 | V    |
|                 |   | I <sub>O</sub> = 0 to 3 A, V <sub>I</sub> = 6.6 to 30 V                               | 4.9  | 5     | 5.1  | V    |
| ΔV <sub>O</sub> | Line regulation                                 | I <sub>O</sub> = 0 mA, V <sub>I</sub> = 6.6 to 20 V, T <sub>J</sub> = 25°C            |      | 0.5   | 10   | mV   |
|                 |   | I <sub>O</sub> = 0 mA, V <sub>I</sub> = 6.6 to 20 V                                   |      | 1     | 10   | mV   |
| ΔV <sub>O</sub> | Load regulation                                 | I <sub>O</sub> = 0 to 3 A, T <sub>J</sub> = 25°C                                      |      | 5     | 10   | mV   |
|                 |   | I <sub>O</sub> = 0 to 3 A   |      | 10    | 35   | mV   |
| V <sub>d</sub>  | Dropout voltage                                 | I <sub>O</sub> = 3 A  |      | 1.3   | 1.5  | V    |
| I <sub>q</sub>  | Quiescent current                               | V <sub>I</sub> ≤ 30 V   |      | 5     | 10   | mA   |
| I <sub>sc</sub> | Short circuit current                           | V <sub>I</sub> - V <sub>O</sub> = 5 V   | 3.2  | 4.5   |      | A    |
|                 |   | V <sub>I</sub> - V <sub>O</sub> = 25 V  | 0.2  | 0.5   |      | A    |
|                 | Thermal regulation                              | T <sub>A</sub> = 25°C, 30 ms pulse  |      | 0.008 | 0.04 | %/W  |
| SVR             | Supply voltage rejection                        | f = 120 Hz, C <sub>O</sub> = 25 μF, I <sub>O</sub> = 3 A<br>V <sub>I</sub> = 10 ± 3 V | 60   | 72    |      | dB   |
| eN              | RMS output noise voltage (% of V <sub>O</sub> ) | T <sub>A</sub> = 25°C, f = 10 Hz to 10 kHz  |      | 0.003 |      | %    |
| S               | Temperature stability                           |   |      | 0.5   |      | %    |
| S               | Long term stability                             | T <sub>A</sub> = 125°C, 1000 Hrs  |      | 0.5   |      | %    |

1. See short-circuit current curve for available output current at fixed dropout.

**Table 9. Electrical characteristics of LD1085#**  
( $V_I = 4.25\text{ V}$ ,  $C_I = C_O = 10\ \mu\text{F}$ ,  $T_A = -40\text{ to }125\text{ }^\circ\text{C}$ , unless otherwise specified).

| Symbol                  | Parameter                                | Test condition   | Min.  | Typ.  | Max.  | Unit          |
|-------------------------|--|--|-------|-------|-------|---------------|
| $V_O$                   | Output voltage <sup>(1)</sup>            | $I_O = 10\text{ mA}$ , $T_J = 25^\circ\text{C}$  | 1.237 | 1.25  | 1.263 | V             |
|                         |  | $I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.85\text{ to }30\text{ V}$  | 1.225 | 1.25  | 1.275 | V             |
| $\Delta V_O$            | Line regulation                          | $I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$ ,<br>$T_J = 25^\circ\text{C}$  |       | 0.015 | 0.2   | %             |
|                         |  | $I_O = 10\text{ mA}$ , $V_I = 2.85\text{ to }16.5\text{ V}$  |       | 0.035 | 0.2   | %             |
| $\Delta V_O$            | Load regulation                          | $I_O = 10\text{ mA to }3\text{ A}$ , $T_J = 25^\circ\text{C}$  |       | 0.1   | 0.3   | %             |
|                         |  | $I_O = 0\text{ to }3\text{ A}$   |       | 0.2   | 0.4   | %             |
| $V_d$                   | Dropout voltage                          | $I_O = 3\text{ A}$   |       | 1.3   | 1.5   | V             |
| $I_{O(\text{min})}$     | Minimum load current                     | $V_I = 30\text{ V}$  |       | 3     | 10    | mA            |
| $I_{\text{sc}}$         | Short circuit current                    | $V_I - V_O = 5\text{ V}$   | 5.5   | 6.5   |       | A             |
|                         |  | $V_I - V_O = 25\text{ V}$  | 0.5   | 0.7   |       | A             |
|                         | Thermal regulation                       | $T_A = 25^\circ\text{C}$ , 30ms pulse  |       | 0.003 | 0.015 | %/W           |
| SVR                     | Supply voltage rejection                 | $f = 120\text{ Hz}$ , $C_O = 25\ \mu\text{F}$ , $C_{\text{ADJ}} = 25\ \mu\text{F}$ ,<br>$I_O = 3\text{ A}$ , $V_I = 6.25 \pm 3\text{ V}$ | 60    | 72    |       | dB            |
| $I_{\text{ADJ}}$        | Adjust pin current                       | $V_I = 4.25\text{ V}$ , $I_O = 10\text{ mA}$   |       | 55    | 120   | $\mu\text{A}$ |
| $\Delta I_{\text{ADJ}}$ | Adjust pin current change <sup>(1)</sup> | $I_O = 10\text{ mA to }3\text{ A}$ , $V_I = 2.85\text{ to }16.5\text{ V}$  |       | 0.2   | 5     | $\mu\text{A}$ |
| eN                      | RMS output noise voltage (% of $V_O$ )   | $T_A = 25^\circ\text{C}$ , $f = 10\text{ Hz to }10\text{ kHz}$   |       | 0.003 |       | %             |
| S                       | Temperature stability                    |  |       | 0.5   |       | %             |
| S                       | Long term stability                      | $T_A = 125^\circ\text{C}$ , 1000 Hrs   |       | 0.5   |       | %             |

1. See short-circuit current curve for available output current at fixed dropout.

**Table 10. Electrical characteristics of LD1085PY (Automotive Grade)**(V<sub>I</sub> = 4.25 V, C<sub>I</sub> = C<sub>O</sub> = 10 μF, T<sub>A</sub> = -40 to 125 °C, unless otherwise specified).

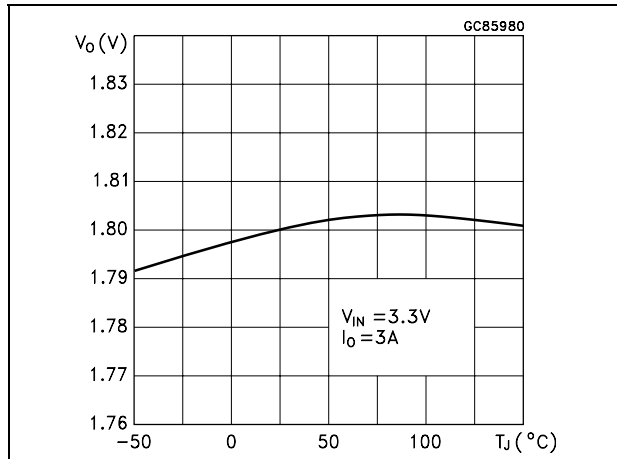
| Symbol              | Parameter                                       | Test condition   | Min.  | Typ.  | Max.  | Unit |
|---------------------|---|--|-------|-------|-------|------|
| V <sub>O</sub>      | Output voltage <sup>(1)</sup>                   | I <sub>O</sub> = 10 mA T <sub>A</sub> = 25°C   | 1.237 | 1.25  | 1.263 | V    |
|                     |   | I <sub>O</sub> = 10 mA to 3 A, V <sub>I</sub> = 2.85 to 30 V   | 1.225 | 1.25  | 1.275 | V    |
| ΔV <sub>O</sub>     | Line regulation                                 | I <sub>O</sub> = 10 mA, V <sub>I</sub> = 2.85 to 16.5 V  |       | 0.035 | 0.2   | %    |
| ΔV <sub>O</sub>     | Load regulation                                 | I <sub>O</sub> = 0 to 3 A  |       | 0.2   | 0.4   | %    |
| V <sub>d</sub>      | Dropout voltage                                 | I <sub>O</sub> = 3 A   |       | 1.3   | 1.5   | V    |
| I <sub>O(min)</sub> | Minimum load current                            | V <sub>I</sub> = 30 V  |       | 3     | 10    | mA   |
| I <sub>sc</sub>     | Short circuit current                           | V <sub>I</sub> - V <sub>O</sub> = 5 V, T <sub>A</sub> = 25°C   | 5.5   | 6.5   |       | A    |
|                     |   | V <sub>I</sub> - V <sub>O</sub> = 25 V, T <sub>A</sub> = 25°C  | 0.5   | 0.7   |       | A    |
|                     | Thermal regulation                              | T <sub>A</sub> = 25°C, 30 ms pulse   |       | 0.003 | 0.015 | %/W  |
| SVR                 | Supply voltage rejection                        | f = 120 Hz, C <sub>O</sub> = 25 μF, C <sub>ADJ</sub> = 25 μF, I <sub>O</sub> = 3 A, V <sub>I</sub> = 6.25 ± 3 V, T <sub>A</sub> = 25°C | 60    | 72    |       | dB   |
| I <sub>ADJ</sub>    | Adjust pin current                              | V <sub>I</sub> = 4.25 V, I <sub>O</sub> = 10 mA  |       | 55    | 120   | μA   |
| ΔI <sub>ADJ</sub>   | Adjust pin current change <sup>(1)</sup>        | I <sub>O</sub> = 10 mA to 3 A, V <sub>I</sub> = 2.85 to 16.5 V   |       | 0.2   | 5     | μA   |
| eN                  | RMS output noise voltage (% of V <sub>O</sub> ) | T <sub>A</sub> = 25°C, f = 10 Hz to 10 kHz   |       | 0.003 |       | %    |
| S                   | Temperature stability                           |  |       | 0.5   |       | %    |
| S                   | Long term stability                             | T <sub>A</sub> = 125°C, 1000 Hrs   |       | 0.5   |       | %    |

1. See short-circuit current curve for available output current at fixed dropout.

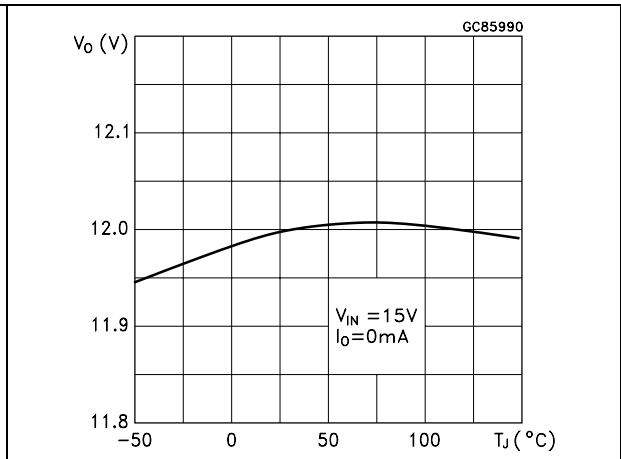
# 6 Typical application

(Unless otherwise specified  $T_J = 25\text{ }^\circ\text{C}$ ,  $C_I = C_O = 10\text{ }\mu\text{F}$ )

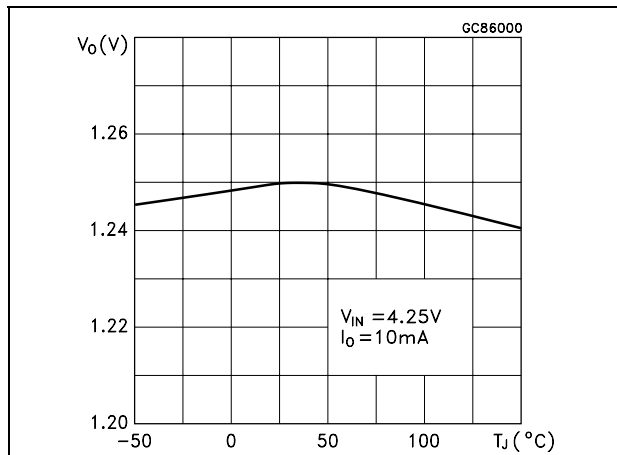
**Figure 4. Output voltage vs temperature**



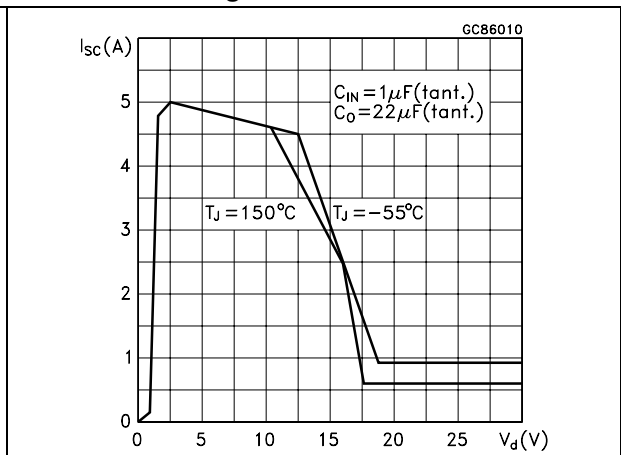
**Figure 5. Output voltage vs temperature**



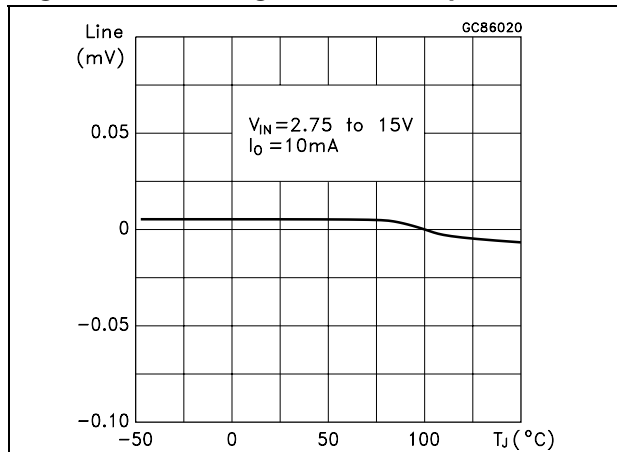
**Figure 6. Output voltage vs temperature**



**Figure 7. Short circuit current vs dropout voltage**



**Figure 8. Line regulation vs temperature**



**Figure 9. Load regulation vs temperature**

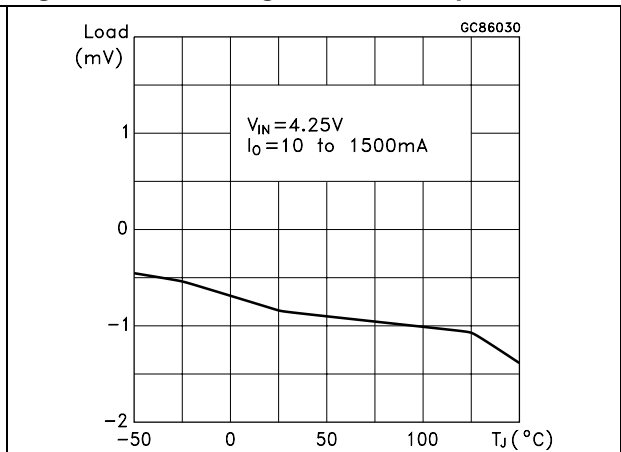


Figure 10. Dropout voltage vs temperature

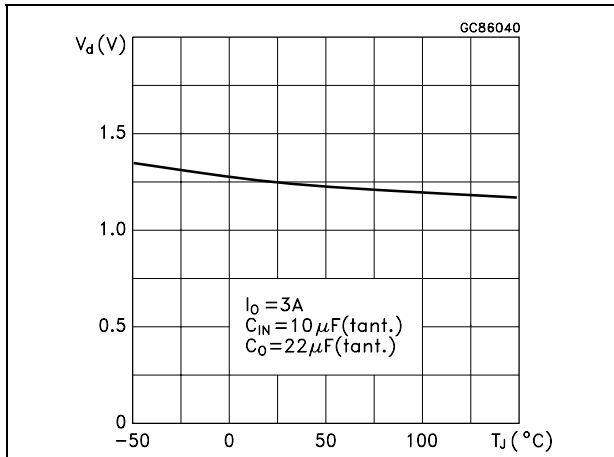


Figure 11. Dropout voltage vs output current

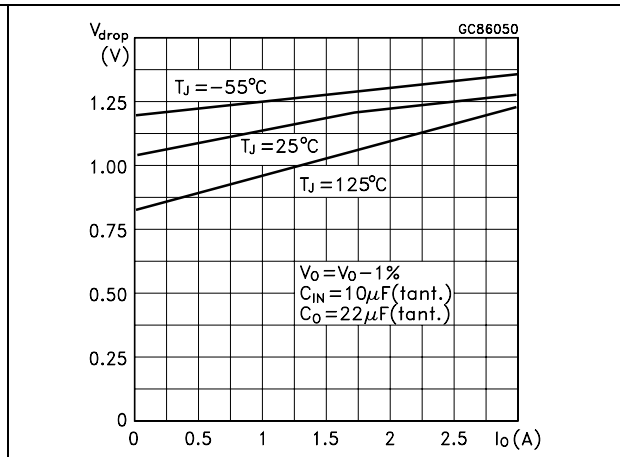


Figure 12. Adjust pin current vs temperature

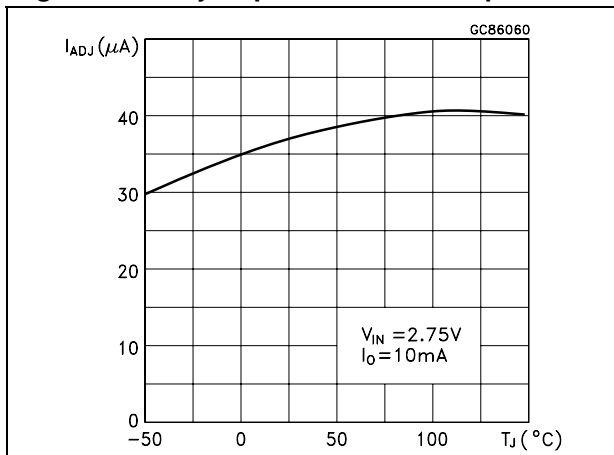


Figure 13. Quiescent current vs temperature

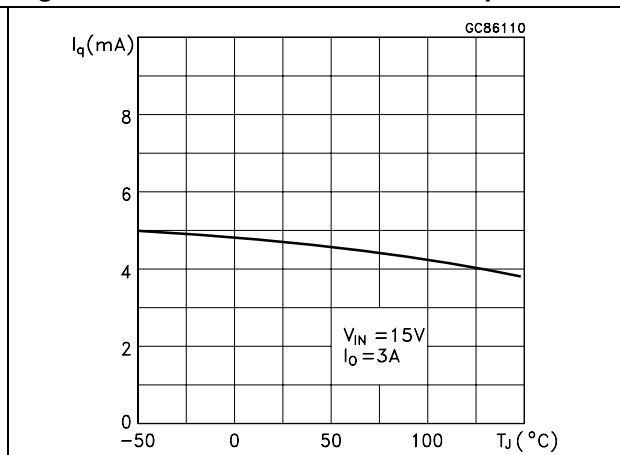


Figure 14. Line regulation vs temperature

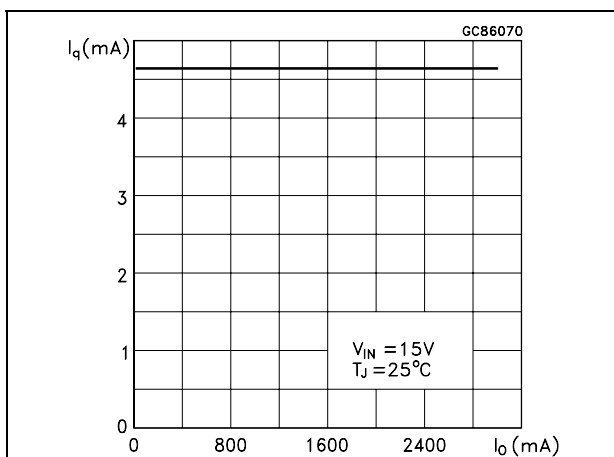


Figure 15. Supply voltage rejection vs output current

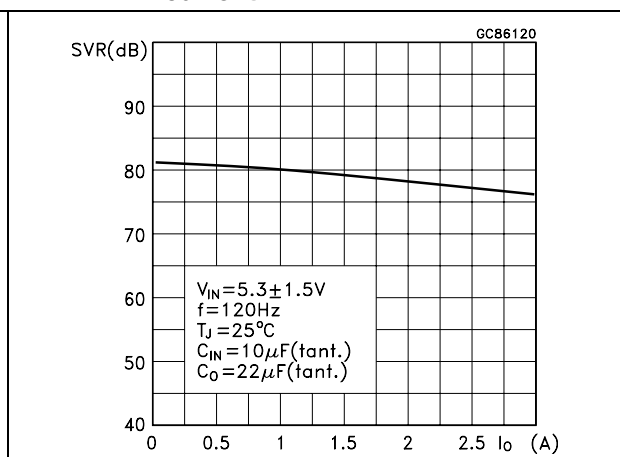


Figure 16. Supply voltage rejection vs frequency

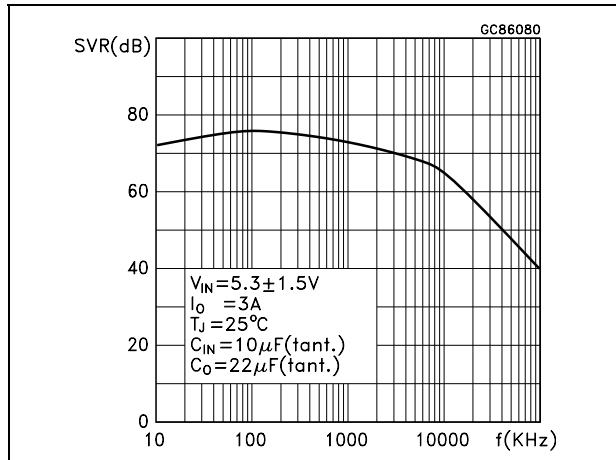


Figure 17. Supply voltage rejection vs temperature

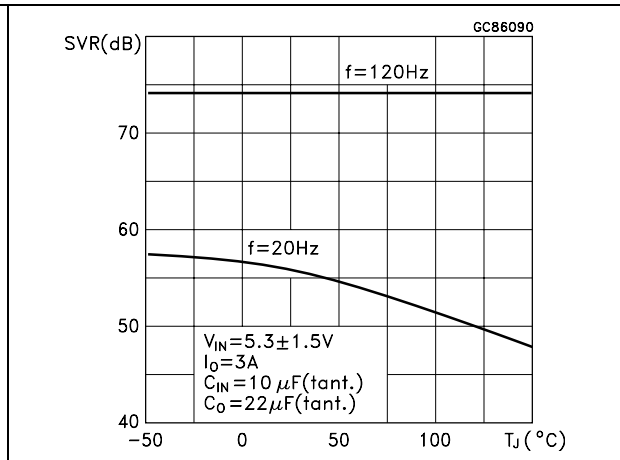


Figure 18. Minimum load current vs temperature

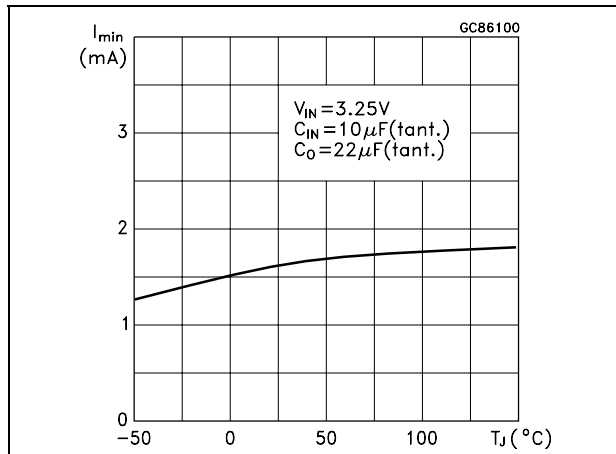


Figure 19. Stability

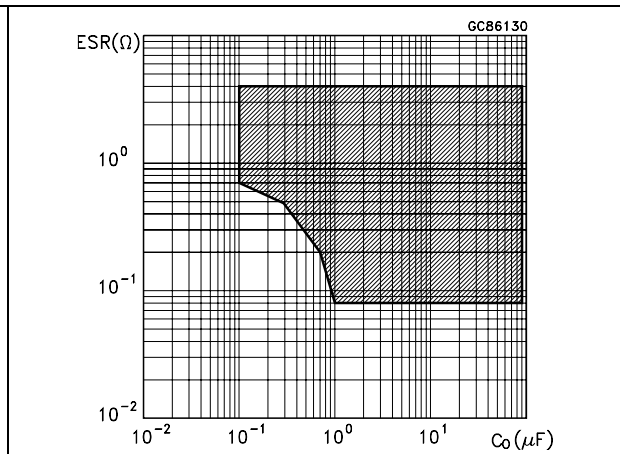


Figure 20. Stability

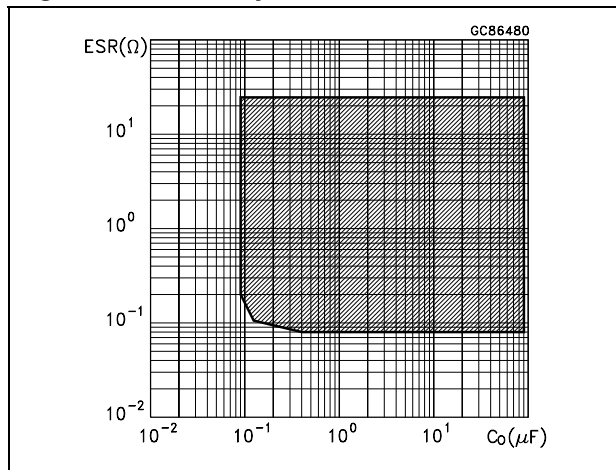


Figure 21. Line transient

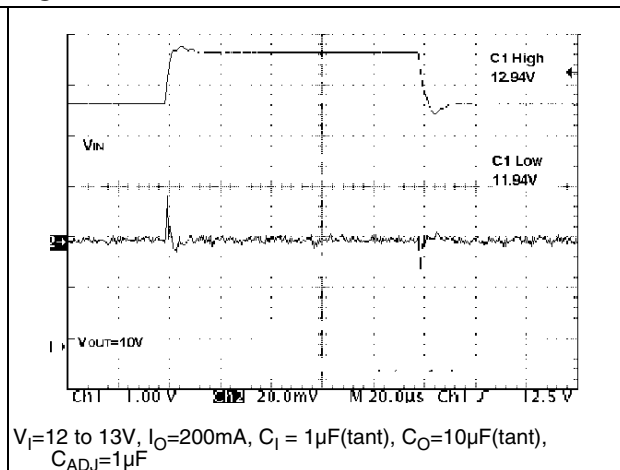




Figure 22. Line transient

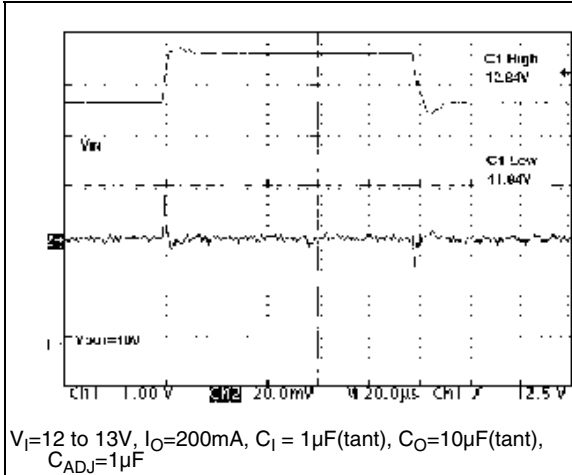


Figure 23. Load transient

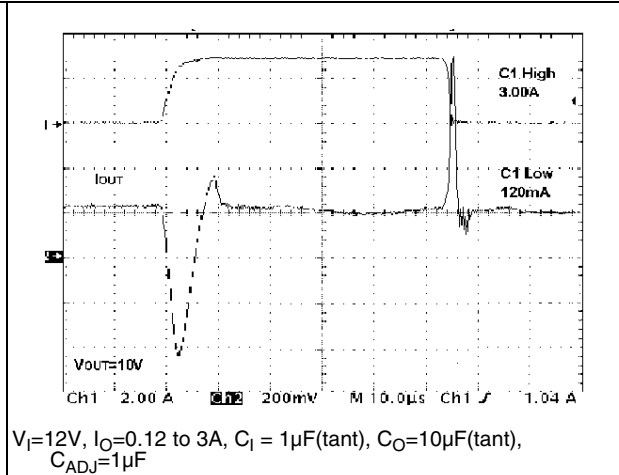
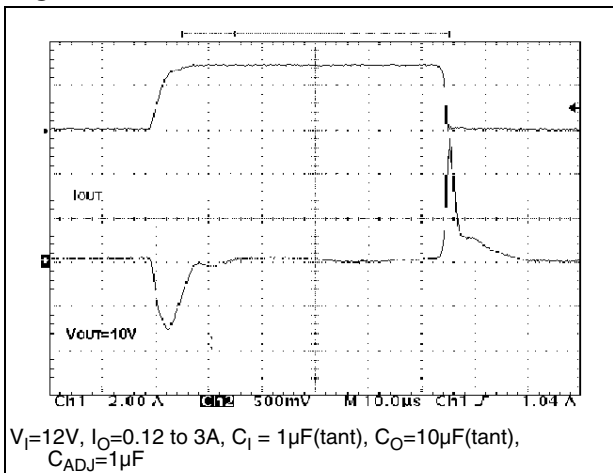


Figure 24. Load transient

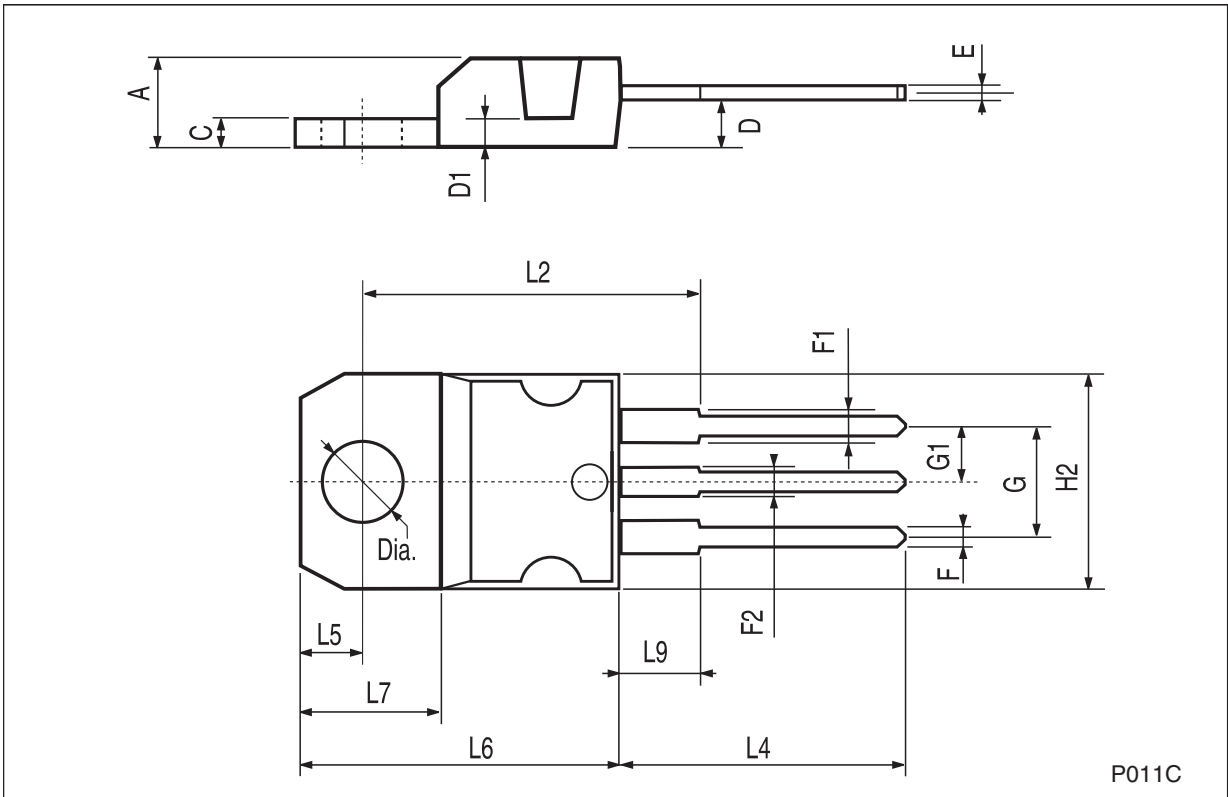


## 7 Package mechanical data

In order to meet environmental requirements, ST offers these devices in ECOPACK® packages. These packages have a lead-free second level interconnect. The category of second Level Interconnect is marked on the package and on the inner box label, in compliance with JEDEC Standard JESD97. The maximum ratings related to soldering conditions are also marked on the inner box label. ECOPACK is an ST trademark. ECOPACK specifications are available at: [www.st.com](http://www.st.com).

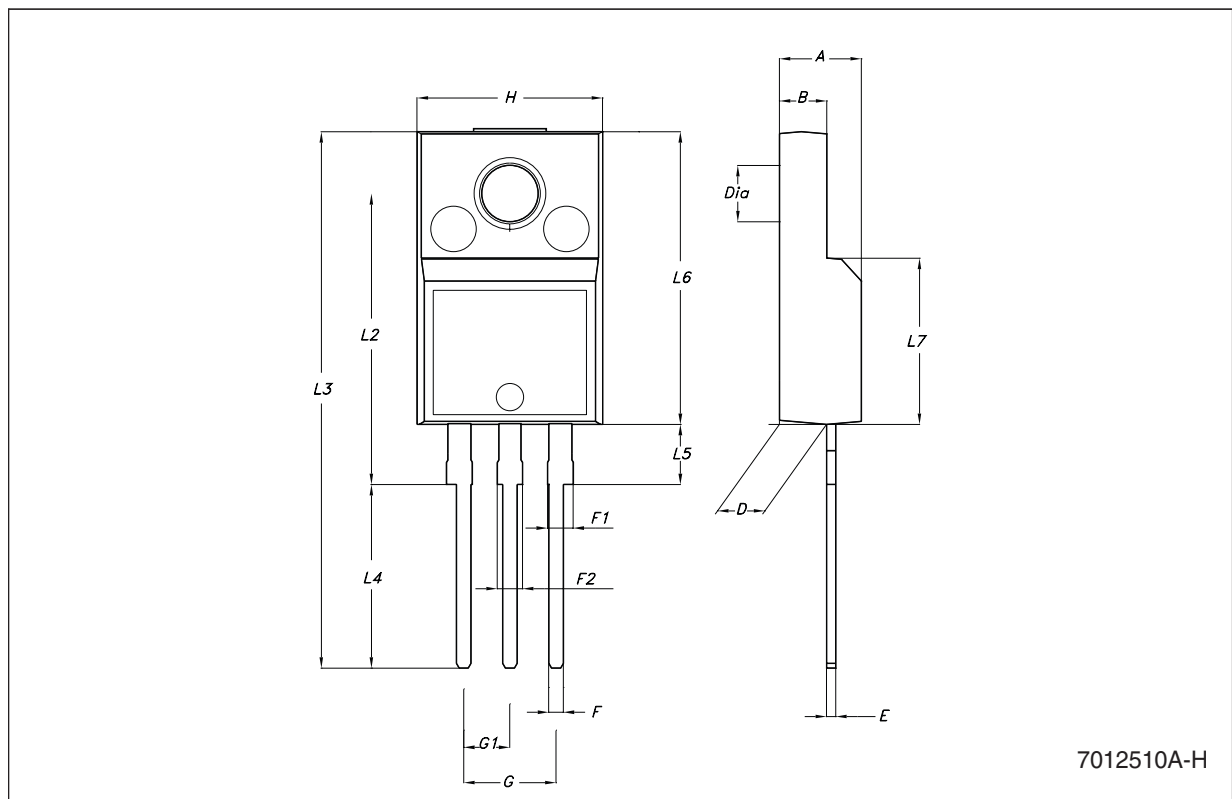
**TO-220 mechanical data**

| Dim. | mm.   |      |       | inch. |       |       |
|------|-------|------|-------|-------|-------|-------|
|      | Min.  | Typ. | Max.  | Min.  | Typ.  | Max.  |
| A    | 4.40  |      | 4.60  | 0.173 |       | 0.181 |
| C    | 1.23  |      | 1.32  | 0.048 |       | 0.051 |
| D    | 2.40  |      | 2.72  | 0.094 |       | 0.107 |
| D1   |       | 1.27 |       |       | 0.050 |       |
| E    | 0.49  |      | 0.70  | 0.019 |       | 0.027 |
| F    | 0.61  |      | 0.88  | 0.024 |       | 0.034 |
| F1   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| F2   | 1.14  |      | 1.70  | 0.044 |       | 0.067 |
| G    | 4.95  |      | 5.15  | 0.194 |       | 0.203 |
| G1   | 2.4   |      | 2.7   | 0.094 |       | 0.106 |
| H2   | 10.0  |      | 10.40 | 0.393 |       | 0.409 |
| L2   |       | 16.4 |       |       | 0.645 |       |
| L4   | 13.0  |      | 14.0  | 0.511 |       | 0.551 |
| L5   | 2.65  |      | 2.95  | 0.104 |       | 0.116 |
| L6   | 15.25 |      | 15.75 | 0.600 |       | 0.620 |
| L7   | 6.2   |      | 6.6   | 0.244 |       | 0.260 |
| L9   | 3.5   |      | 3.93  | 0.137 |       | 0.154 |
| DIA. | 3.75  |      | 3.85  | 0.147 |       | 0.151 |



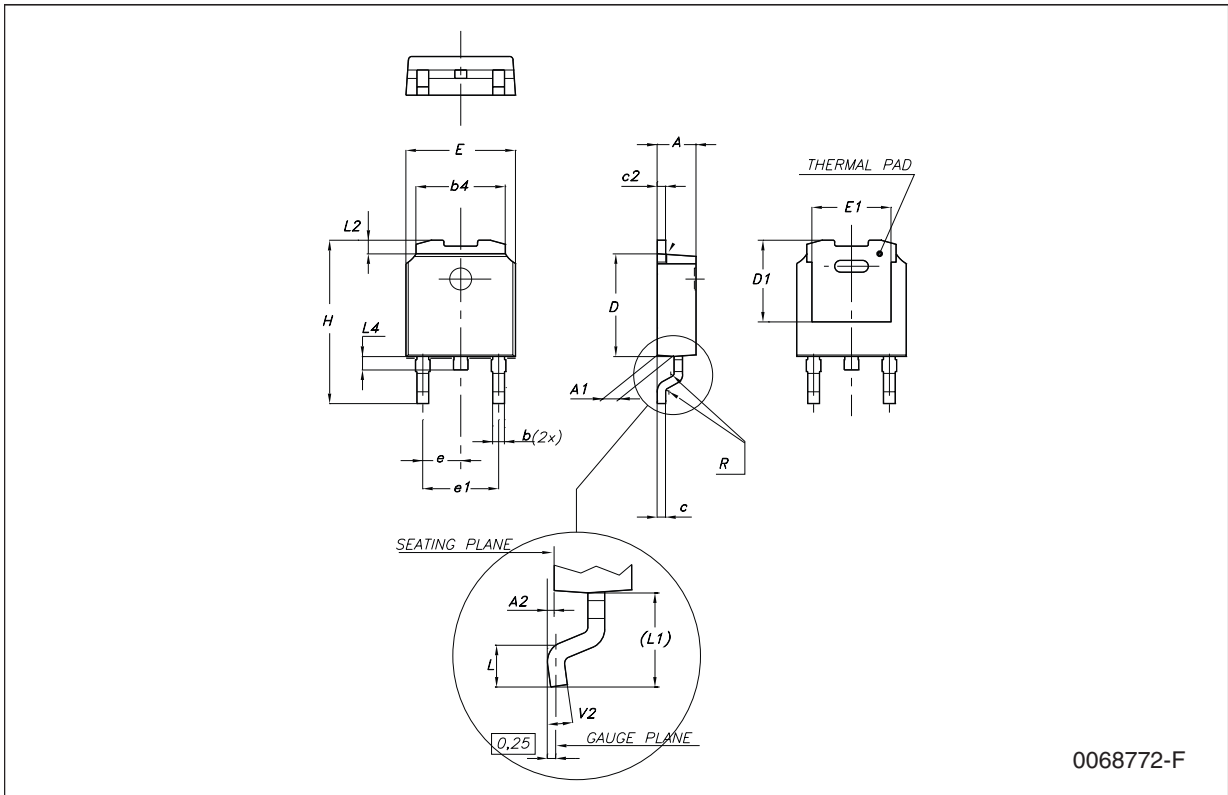
**TO-220FP mechanical data**

| Dim. | mm.  |     |       | inch. |       |       |
|------|------|-----|-------|-------|-------|-------|
|      | Min. | Typ | Max.  | Min.  | Typ.  | Max.  |
| A    | 4.40 |     | 4.60  | 0.173 |       | 0.181 |
| B    | 2.5  |     | 2.7   | 0.098 |       | 0.106 |
| D    | 2.5  |     | 2.75  | 0.098 |       | 0.108 |
| E    | 0.45 |     | 0.70  | 0.017 |       | 0.027 |
| F    | 0.75 |     | 1     | 0.030 |       | 0.039 |
| F1   | 1.15 |     | 1.50  | 0.045 |       | 0.059 |
| F2   | 1.15 |     | 1.50  | 0.045 |       | 0.059 |
| G    | 4.95 |     | 5.2   | 0.194 |       | 0.204 |
| G1   | 2.4  |     | 2.7   | 0.094 |       | 0.106 |
| H    | 10.0 |     | 10.40 | 0.393 |       | 0.409 |
| L2   |      | 16  |       |       | 0.630 |       |
| L3   | 28.6 |     | 30.6  | 1.126 |       | 1.204 |
| L4   | 9.8  |     | 10.6  | 0.385 |       | 0.417 |
| L5   | 2.9  |     | 3.6   | 0.114 |       | 0.142 |
| L6   | 15.9 |     | 16.4  | 0.626 |       | 0.645 |
| L7   | 9    |     | 9.3   | 0.354 |       | 0.366 |
| DIA. | 3    |     | 3.2   | 0.118 |       | 0.126 |



**DPAK mechanical data**

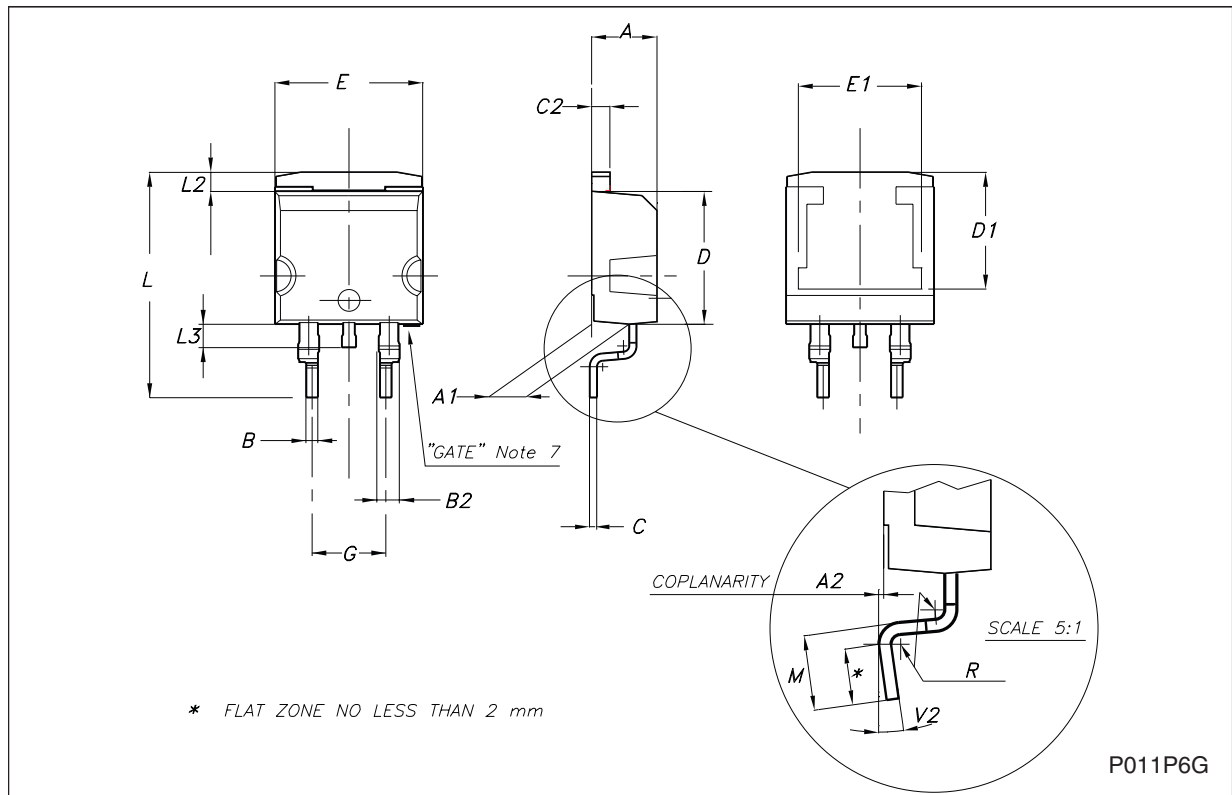
| Dim. | mm.  |      |      | inch. |       |       |
|------|------|------|------|-------|-------|-------|
|      | Min. | Typ. | Max. | Min.  | Typ.  | Max.  |
| A    | 2.2  |      | 2.4  | 0.086 |       | 0.094 |
| A1   | 0.9  |      | 1.1  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23 | 0.001 |       | 0.009 |
| B    | 0.64 |      | 0.9  | 0.025 |       | 0.035 |
| b4   | 5.2  |      | 5.4  | 0.204 |       | 0.212 |
| C    | 0.45 |      | 0.6  | 0.017 |       | 0.023 |
| C2   | 0.48 |      | 0.6  | 0.019 |       | 0.023 |
| D    | 6    |      | 6.2  | 0.236 |       | 0.244 |
| D1   |      | 5.1  |      |       | 0.200 |       |
| E    | 6.4  |      | 6.6  | 0.252 |       | 0.260 |
| E1   |      | 4.7  |      |       | 0.185 |       |
| e    |      | 2.28 |      |       | 0.090 |       |
| e1   | 4.4  |      | 4.6  | 0.173 |       | 0.181 |
| H    | 9.35 |      | 10.1 | 0.368 |       | 0.397 |
| L    | 1    |      |      | 0.039 |       |       |
| (L1) |      | 2.8  |      |       | 0.110 |       |
| L2   |      | 0.8  |      |       | 0.031 |       |
| L4   | 0.6  |      | 1    | 0.023 |       | 0.039 |
| R    |      | 0.2  |      |       | 0.008 |       |
| V2   | 0°   |      | 8°   | 0°    |       | 8°    |



0068772-F

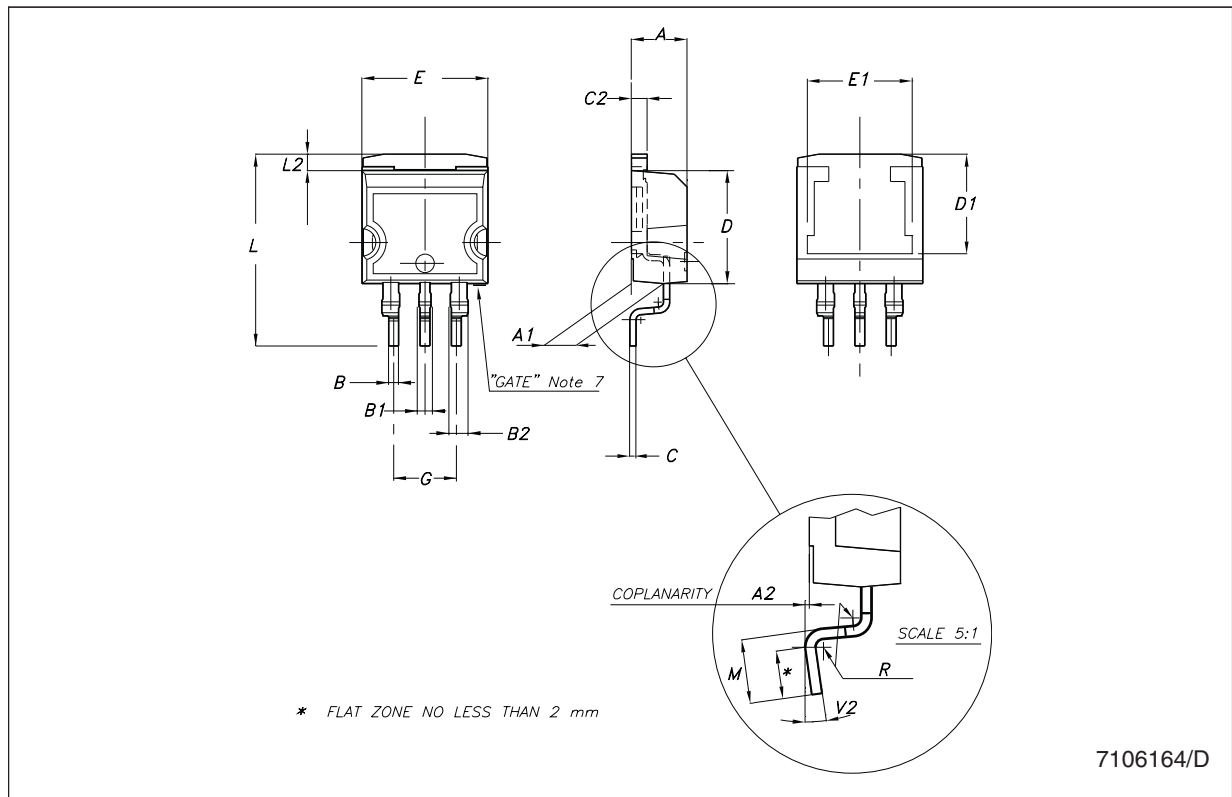
**D<sup>2</sup>PAK mechanical data**

| Dim. | mm.  |      |       | inch. |       |       |
|------|------|------|-------|-------|-------|-------|
|      | Min. | Typ. | Max.  | Min.  | Typ.  | Max.  |
| A    | 4.4  |      | 4.6   | 0.173 |       | 0.181 |
| A1   | 2.49 |      | 2.69  | 0.098 |       | 0.106 |
| A2   | 0.03 |      | 0.23  | 0.001 |       | 0.009 |
| B    | 0.7  |      | 0.93  | 0.027 |       | 0.036 |
| B2   | 1.14 |      | 1.7   | 0.044 |       | 0.067 |
| C    | 0.45 |      | 0.6   | 0.017 |       | 0.023 |
| C2   | 1.23 |      | 1.36  | 0.048 |       | 0.053 |
| D    | 8.95 |      | 9.35  | 0.352 |       | 0.368 |
| D1   |      | 8    |       |       | 0.315 |       |
| E    | 10   |      | 10.4  | 0.393 |       | 0.409 |
| E1   |      | 8.5  |       |       | 0.335 |       |
| G    | 4.88 |      | 5.28  | 0.192 |       | 0.208 |
| L    | 15   |      | 15.85 | 0.590 |       | 0.624 |
| L2   | 1.27 |      | 1.4   | 0.050 |       | 0.055 |
| L3   | 1.4  |      | 1.75  | 0.055 |       | 0.068 |
| M    | 2.4  |      | 3.2   | 0.094 |       | 0.126 |
| R    |      | 0.4  |       |       | 0.016 |       |
| V2   | 0°   |      | 8°    | 0°    |       | 8°    |



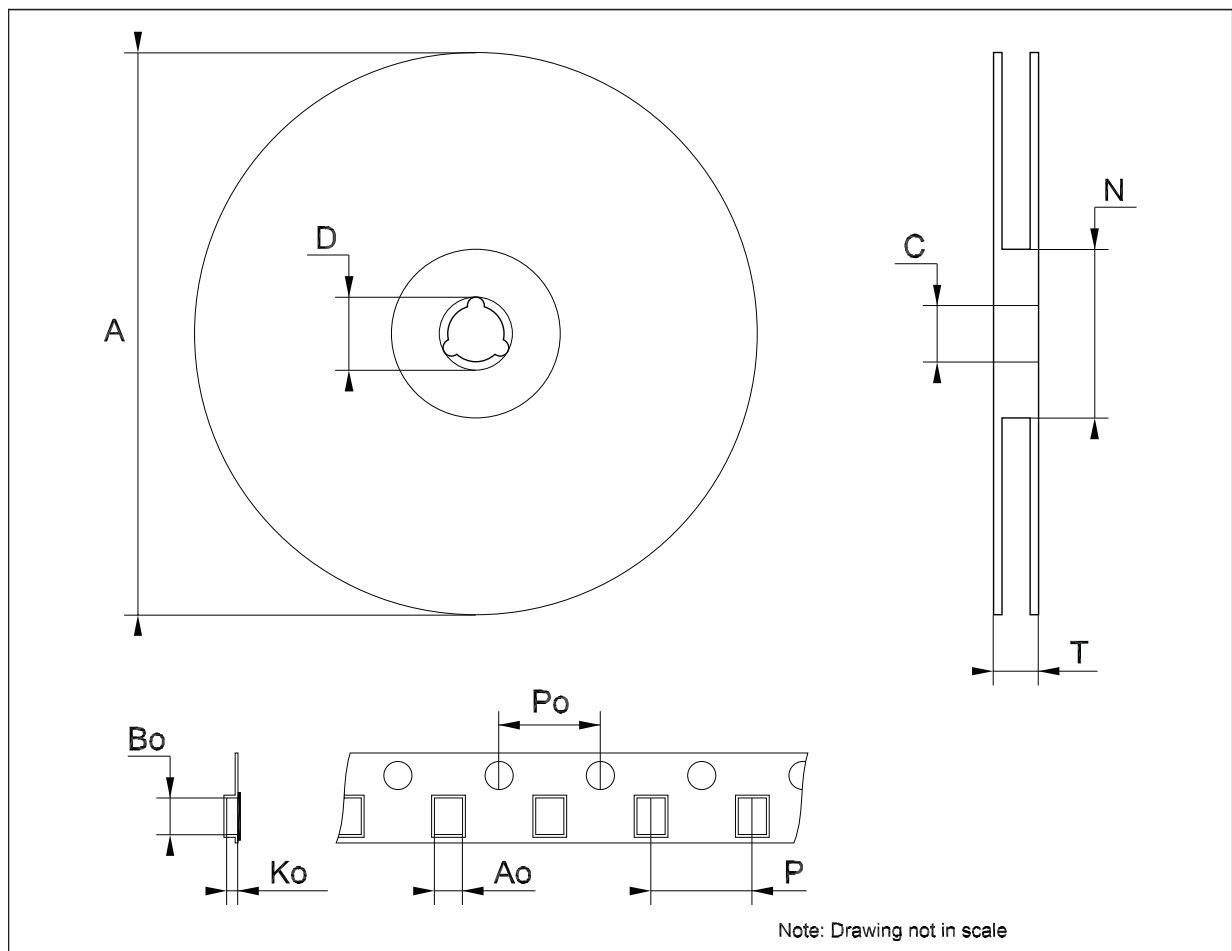
**D<sup>2</sup>PAK/A mechanical data**

| Dim. | mm.  |      |       | inch. |       |       |
|------|------|------|-------|-------|-------|-------|
|      | Min. | Typ. | Max.  | Min.  | Typ.  | Max.  |
| A    | 4.40 |      | 4.60  | 0.173 |       | 0.181 |
| A1   | 2.49 |      | 2.69  | 0.098 |       | 0.106 |
| A2   | 0.03 |      | 0.23  | 0.001 |       | 0.009 |
| B    | 0.7  |      | 0.93  | 0.028 |       | 0.037 |
| B1   | 0.8  |      | 1.3   | 0.031 |       | 0.051 |
| B2   | 1.14 |      | 1.7   | 0.045 |       | 0.067 |
| C    | 0.45 |      | 0.60  | 0.018 |       | 0.024 |
| C2   | 1.23 |      | 1.36  | 0.048 |       | 0.054 |
| D    | 8.95 |      | 9.35  | 0.352 |       | 0.368 |
| D1   |      | 8    |       |       | 0.315 |       |
| E    | 10   |      | 10.4  | 0.394 |       | 0.409 |
| E1   |      | 8.5  |       |       | 0.335 |       |
| G    | 4.88 |      | 5.28  | 0.192 |       | 0.208 |
| L    | 15   |      | 15.85 | 0.591 |       | 0.624 |
| L2   | 1.27 |      | 1.4   | 0.050 |       | 0.055 |
| M    | 2.4  |      | 3.2   | 0.094 |       | 0.126 |
| R    |      | 0.4  |       |       | 0.016 |       |
| V2   | 0°   |      | 8°    | 0°    |       | 8°    |



**Tape & reel DPAK-PPAK mechanical data**

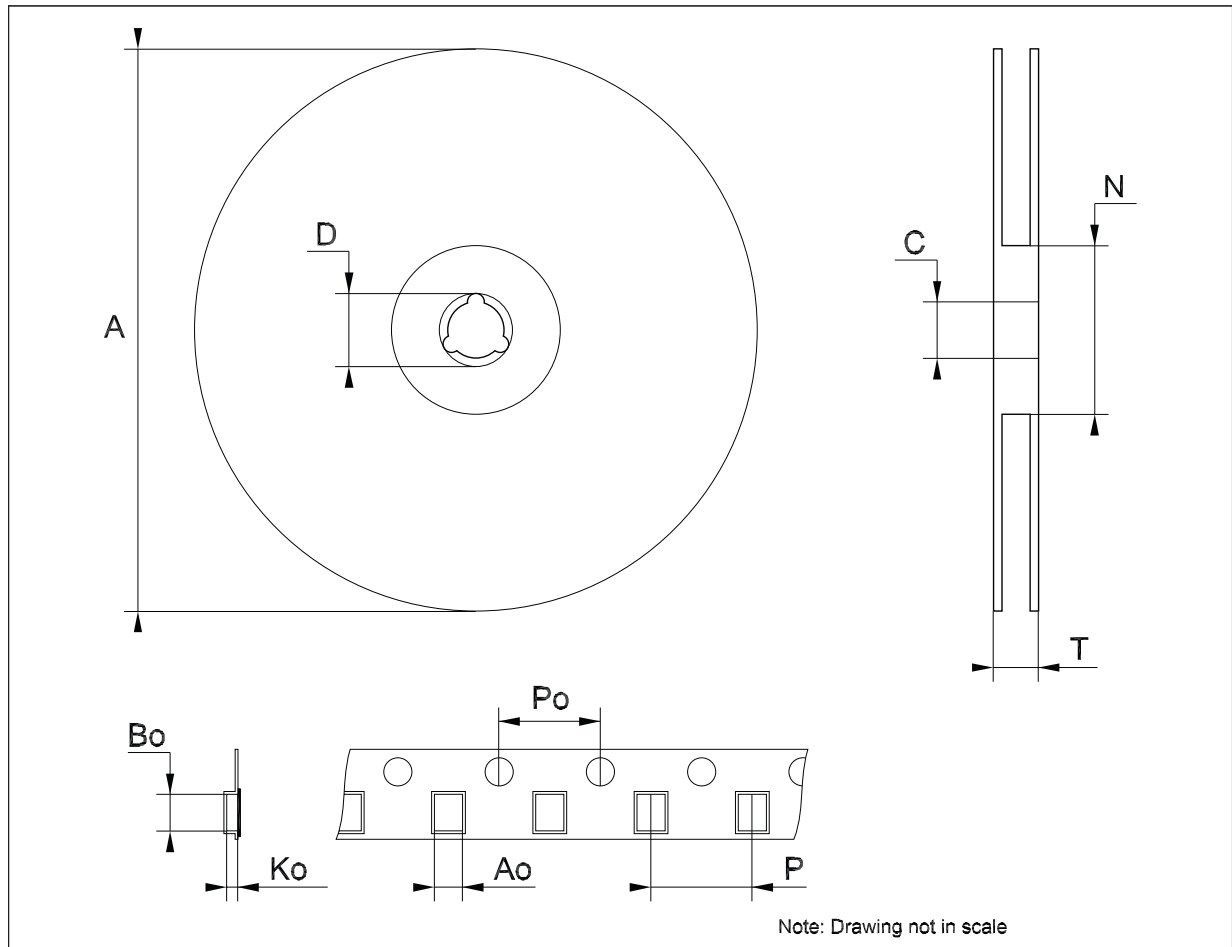
| Dim. | mm.   |       |       | inch. |       |        |
|------|-------|-------|-------|-------|-------|--------|
|      | Min.  | Typ.  | Max.  | Min.  | Typ.  | Max.   |
| A    |       |       | 330   |       |       | 12.992 |
| C    | 12.8  | 13.0  | 13.2  | 0.504 | 0.512 | 0.519  |
| D    | 20.2  |       |       | 0.795 |       |        |
| N    | 60    |       |       | 2.362 |       |        |
| T    |       |       | 22.4  |       |       | 0.882  |
| Ao   | 6.80  | 6.90  | 7.00  | 0.268 | 0.272 | 0.276  |
| Bo   | 10.40 | 10.50 | 10.60 | 0.409 | 0.413 | 0.417  |
| Ko   | 2.55  | 2.65  | 2.75  | 0.100 | 0.104 | 0.105  |
| Po   | 3.9   | 4.0   | 4.1   | 0.153 | 0.157 | 0.161  |
| P    | 7.9   | 8.0   | 8.1   | 0.311 | 0.315 | 0.319  |





**Tape & reel D<sup>2</sup>PAK-P<sup>2</sup>PAK-D<sup>2</sup>PAK/A-P<sup>2</sup>PAK/A mechanical data**

| Dim. | mm.   |       |       | inch. |       |       |
|------|-------|-------|-------|-------|-------|-------|
|      | Min.  | Typ.  | Max.  | Min.  | Typ.  | Max.  |
| A    |       |       | 180   |       |       | 7.086 |
| C    | 12.8  | 13.0  | 13.2  | 0.504 | 0.512 | 0.519 |
| D    | 20.2  |       |       | 0.795 |       |       |
| N    | 60    |       |       | 2.362 |       |       |
| T    |       |       | 14.4  |       |       | 0.567 |
| Ao   | 10.50 | 10.6  | 10.70 | 0.413 | 0.417 | 0.421 |
| Bo   | 15.70 | 15.80 | 15.90 | 0.618 | 0.622 | 0.626 |
| Ko   | 4.80  | 4.90  | 5.00  | 0.189 | 0.193 | 0.197 |
| Po   | 3.9   | 4.0   | 4.1   | 0.153 | 0.157 | 0.161 |
| P    | 11.9  | 12.0  | 12.1  | 0.468 | 0.472 | 0.476 |



## 8 Order codes

Table 11. Order codes

| Packages  |                         |                    |             |                            | Output voltage |
|-----------|-------------------------|--------------------|-------------|----------------------------|----------------|
| TO-220    | TO-220FP                | D <sup>2</sup> PAK | DKAK (T&R)  | D <sup>2</sup> PAK/A (T&R) |                |
|           |                         |                    | LD1085DT15R |                            | 1.5 V          |
|           |                         | LD1085D2T18R       | LD1085DT18R | LD1085D2M18R               | 1.8 V          |
|           |                         |                    |             | LD1085D2M25R               | 2.5 V          |
|           |                         | LD1085D2T33R       |             | LD1085D2M33R               | 3.3 V          |
| LD1085V50 |                         |                    |             |                            | 5.0 V          |
| LD1085V   | LD1085P                 | LD1085D2T-R        |             | LD1085D2M-R                | ADJ            |
|           | LD1085PY <sup>(1)</sup> |                    |             |                            | ADJ            |

1. Automotive Grade products.

## 9 Revision history

**Table 12. Document revision history**

| Date        | Revision | Changes   |
|-------------|----------|---|
| 07-Oct-2004 | 12       | Mistake order codes - Table 1.  |
| 08-Feb-2005 | 13       | Mistake U.M. load regulation - V ==> mV.  |
| 01-Mar-2005 | 14       | Version 1.2 V removed.  |
| 22-May-2006 | 15       | Order codes has been updated and new template.  |
| 10-Nov-2006 | 16       | Add package DPAK, typo on V <sub>O</sub> test value in tables 3, 4 and 11.                    |
| 04-Apr-2007 | 17       | Order codes updated.  |
| 07-Jun-2007 | 18       | Order codes updated.  |
| 05-Dec-2007 | 19       | Modified: <a href="#">Table 11</a> .  |
| 29-Jan-2008 | 20       | Added new order codes for Automotive grade products see <a href="#">Table 11 on page 26</a> . |
| 18-Feb-2008 | 21       | Modified: <a href="#">Table 11 on page 26</a> .   |
| 09-Apr-2008 | 22       | Modified: <a href="#">Table 11 on page 26</a> .   |
| 14-Jul-2008 | 23       | Modified: <a href="#">Table 11 on page 26</a> .   |
| 22-Aug-2008 | 24       | Modified: <a href="#">Table 3 on page 5</a> .   |

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