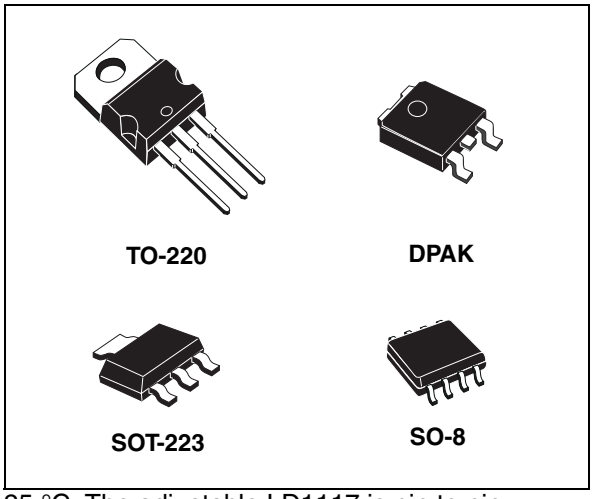
# LD1117xx

## Adjustable and fixed low drop positive voltage regulator

## Features

- Low dropout voltage (1 V typ.)
- 2.85 V device performances are suitable for SCSI-2 active termination
- Output current up to 800 mA
- Fixed output voltage of: 1.2 V, 1.8 V, 2.5 V, 3.3 V, 5.0 V
- Adjustable version availability ($V_{REF}$ = 1.25 V)
- Internal current and thermal limit
- Available in ± 1 % (at 25 °C) and 2 % in full temperature range
- Supply voltage rejection: 75 dB (typ.)




## Description

The LD1117 is a low drop voltage regulator able to provide up to 800 mA of output current, available even in adjustable version ($V_{REF}$ = 1.25 V). Concerning fixed versions, are offered the following output voltages: 1.2 V, 1.8 V, 2.5 V, 2.85 V, 3.3 V and 5.0 V. The 2.85 V type is ideal for SCSI-2 lines active termination. The device is supplied in: SOT-223, DPAK, SO-8 and TO-220. The SOT-223 and DPAK surface mount packages optimize the thermal characteristics even offering a relevant space saving effect. High efficiency is assured by NPN pass transistor. In fact in this case, unlike than PNP one, the quiescent current flows mostly into the load. Only a very common 10 µF minimum capacitor is needed for stability. On chip trimming allows the regulator to reach a very tight output voltage tolerance, within ± 1 % at 25 °C. The adjustable LD1117 is pin to pin compatible with the other standard. Adjustable voltage regulators maintaining the better performances in terms of drop and tolerance.

**Table 1. Device summary**

| Part numbers | | |
|---|---|---|
| LD1117XX12 | LD1117XX25 | LD1117XX50 |
| LD1117XX12C | LD1117XX25C | LD1117XX50C |
| LD1117XX18 | LD1117XX33 | LD1117XX |
| LD1117XX18C | LD1117XX33C | LD1117XXC |

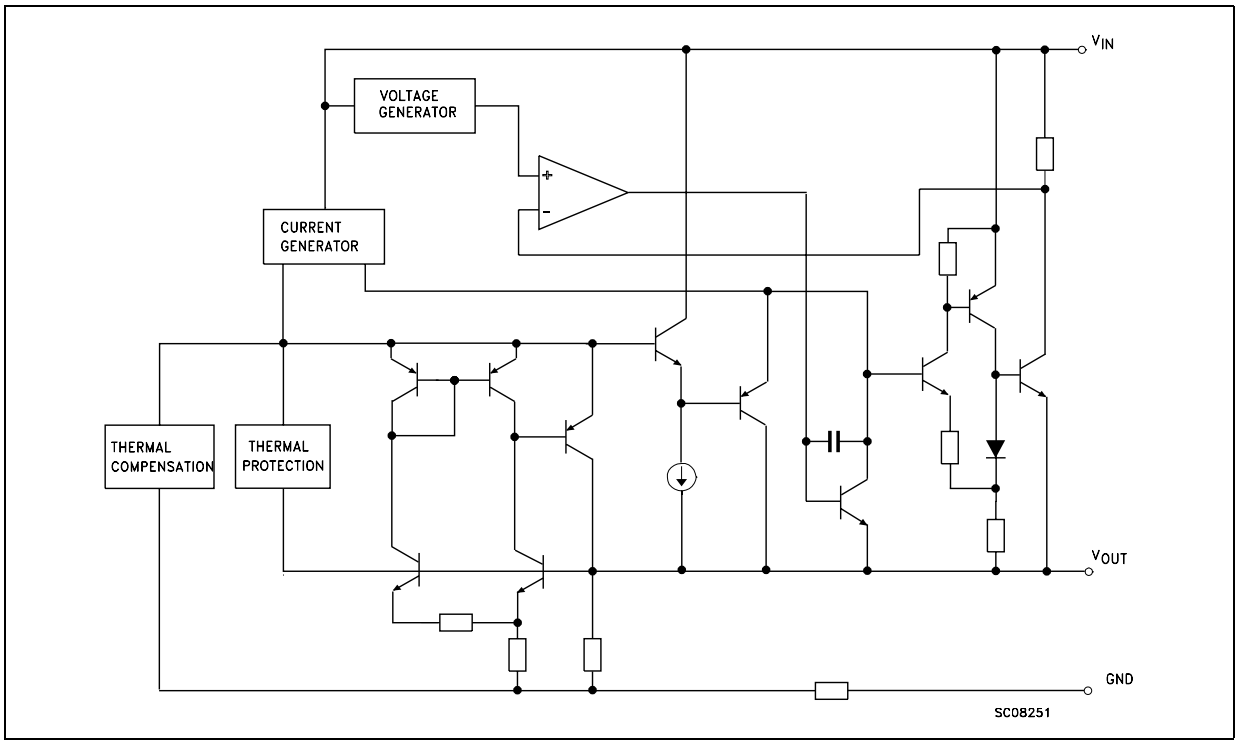
# Contents

# List of tables

# List of figures

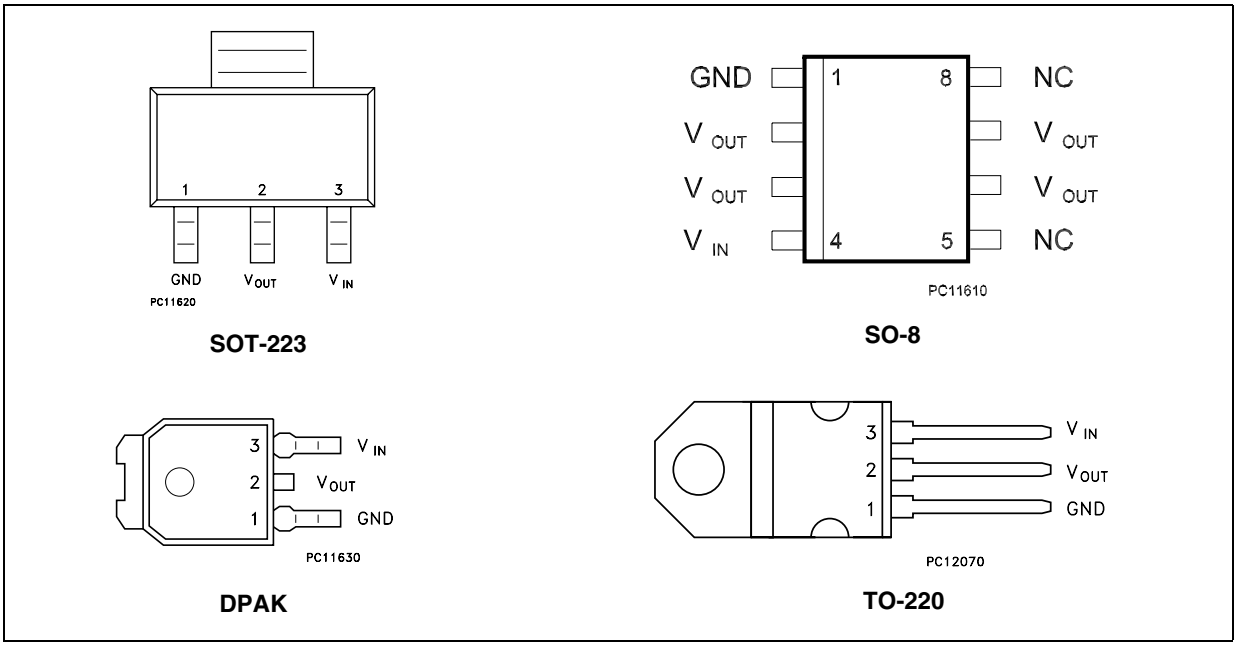
# 1 Diagram

**Figure 1. Block diagram**



# 2 Pin configuration

**Figure 2. Pin connections (top view)**




*Note: The TAB is connected to the $V_{OUT}$.*

# 3 Maximum ratings

**Table 2. Absolute maximum ratings**

| Symbol | Parameter | | Value | Unit |
|---|---|---|---|---|
| $V_{IN}$ (1) | DC input voltage | | 15 | V |
| $P_{TOT}$ | Power dissipation | | 12 | W |
| $T_{STG}$ | Storage temperature range | | -40 to +150 | °C |
| $T_{OP}$ | Operating junction temperature range | for C version | -40 to +125 | °C |
| | | for standard version | 0 to +125 | °C |

1. Absolute maximum rating of $V_{IN}$ = 18 V, when $I_{OUT}$ is lower than 20 mA.

**Table 3. Thermal data**

| Symbol | Parameter | SOT-223 | SO-8 | DPAK | TO-220 | Unit |
|---|---|---|---|---|---|---|
| $R_{thJC}$ | Thermal resistance junction-case | 15 | 20 | 8 | 5 | °C/W |
| $R_{thJA}$ | Thermal resistance junction-ambient | | | | 50 | °C/W |

# 4 Schematic application

**Figure 3. Application circuit (for 1.2 V)**

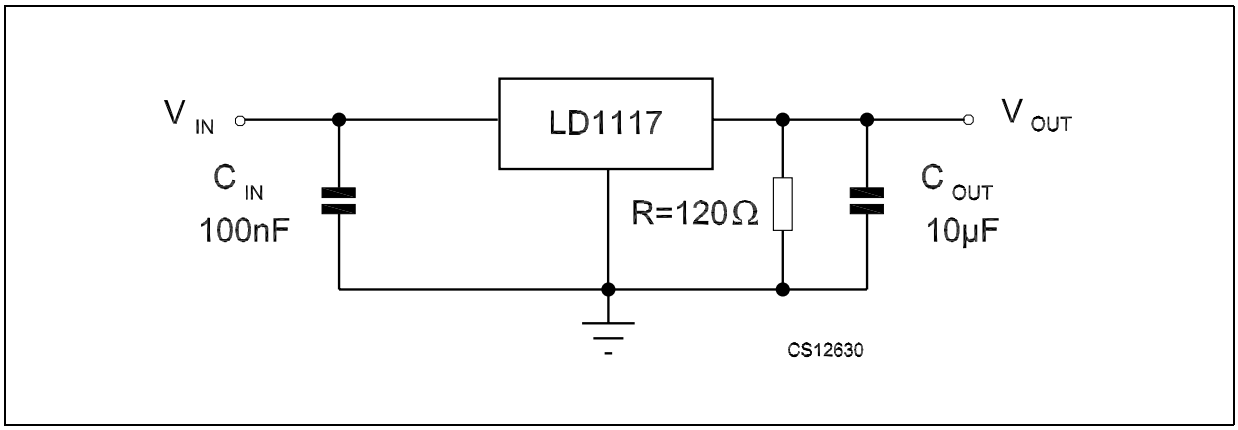
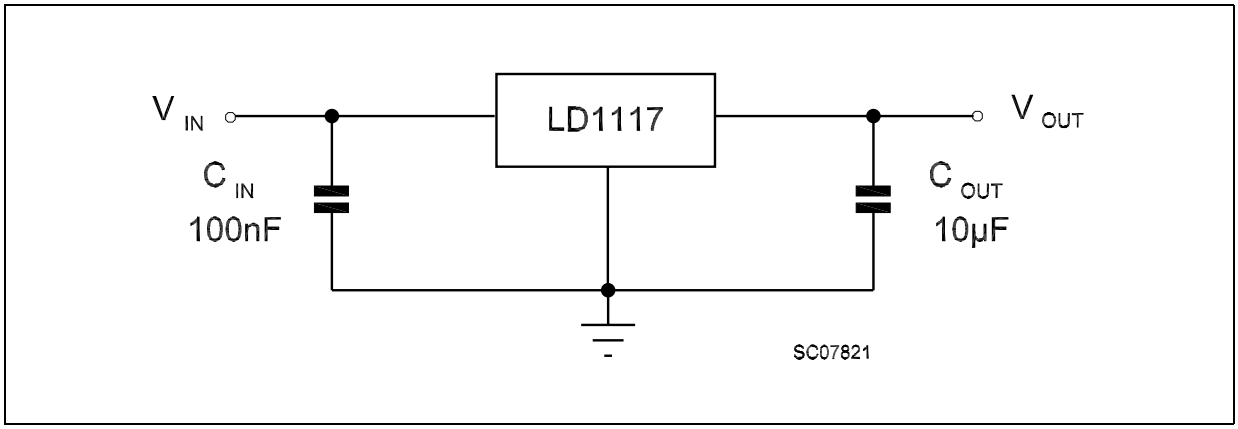



**Figure 4. Application circuit (for other fixed output voltages)**



# 5 Electrical characteristics

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified.

**Table 4. Electrical characteristics of LD1117#12**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 3.2 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.188 | 1.20 | 1.212 | V |
| $V_O$ | Output voltage | $I_O$ = 10 to 800 mA<br>$V_{in}$ - $V_O$ = 1.4 to 10 V | 1.140 | 1.20 | 1.260 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ - $V_O$ = 1.5 to 13.75 V, $I_O$ = 10 mA | | 0.035 | 0.2 | % |
| $\Delta V_O$ | Load regulation | $V_{in}$ - $V_O$ = 3 V, $I_O$ = 10 to 800 mA | | 0.1 | 0.4 | % |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | | | | 15 | V |
| $I_{adj}$ | Adjustment pin current | $V_{in} \leq$ 15 V | | 60 | 120 | µA |
| $\Delta I_{adj}$ | Adjustment pin current change | $V_{in}$ - $V_O$ = 1.4 to 10 V<br>$I_O$ = 10 to 800 mA | | 1 | 5 | µA |
| $I_{O(min)}$ | Minimum load current | $V_{in}$ = 15 V | | 2 | 5 | mA |
| $I_O$ | Output current | $V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise (%$V_O$) | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 0.003 | | % |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ - $V_O$ = 3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 5. Electrical characteristics of LD1117#18**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 3.8 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.78 | 1.8 | 1.82 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 3.3 to 8 V | 1.76 | | 1.84 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 3.3 to 8 V, $I_O$ = 0 mA | | 1 | 6 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 3.3 V, $I_O$ = 0 to 800 mA | | 1 | 10 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq 8$ V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 6.8 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 5.5 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 6. Electrical characteristics of LD1117#25**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 4.5 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 2.475 | 2.5 | 2.525 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 3.9 to 10 V | 2.45 | | 2.55 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 3.9 to 10 V, $I_O$ = 0 mA | | 1 | 6 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 3.9 V, $I_O$ = 0 to 800 mA | | 1 | 10 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 10 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 7.5 V $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 5.5 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 7. Electrical characteristics of LD1117#33**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 5.3 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 3.267 | 3.3 | 3.333 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 4.75 to 10 V | 3.235 | | 3.365 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 4.75 to 15 V, $I_O$ = 0 mA | | 1 | 6 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 4.75 V, $I_O$ = 0 to 800 mA | | 1 | 10 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 15 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 8.3 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 6.3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 8. Electrical characteristics of LD1117#50**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 7 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 4.95 | 5 | 5.05 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 6.5 to 15 V | 4.9 | | 5.1 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 6.5 to 15 V, $I_O$ = 0 mA | | 1 | 10 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 6.5 V, $I_O$ = 0 to 800 mA | | 1 | 15 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 15 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 10 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 8 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = 0 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 9. Electrical characteristics of LD1117 (adjustable)**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{ref}$ | Reference voltage | $V_{in}$ - $V_O$ = 2 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.238 | 1.25 | 1.262 | V |
| $V_{ref}$ | Reference voltage | $I_O$ = 10 to 800 mA, $V_{in}$ - $V_O$ = 1.4 to 10 V | 1.225 | | 1.275 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ - $V_O$ = 1.5 to 13.75 V, $I_O$ = 10 mA | | 0.035 | 0.2 | % |
| $\Delta V_O$ | Load regulation | $V_{in}$ - $V_O$ = 3 V, $I_O$ = 10 to 800 mA | | 0.1 | 0.4 | % |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | | | | 15 | V |
| $I_{adj}$ | Adjustment pin current | $V_{in} \leq$ 15 V | | 60 | 120 | µA |
| $\Delta I_{adj}$ | Adjustment pin current change | $V_{in}$ - $V_O$ = 1.4 to 10 V, $I_O$ = 10 to 800 mA | | 1 | 5 | µA |
| $I_{O(min)}$ | Minimum load current | $V_{in}$ = 15 V | | 2 | 5 | mA |
| $I_O$ | Output current | $V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise (%$V_O$) | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 0.003 | | % |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ - $V_O$ = 3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA | | 1.10 | 1.2 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, R = 120 Ω between GND and OUT pins, unless otherwise specified.

**Table 10. Electrical characteristics of LD1117#12C**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ - $V_O$ = 2 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.176 | 1.20 | 1.224 | V |
| $V_O$ | Output voltage | $I_O$ = 10 to 800 mA, $V_{in}$ - $V_O$ = 1.4 to 10 V | 1.120 | 1.20 | 1.280 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ - $V_O$ = 1.5 to 13.75 V, $I_O$ = 10 mA | | | 1 | % |
| $\Delta V_O$ | Load regulation | $V_{in}$ - $V_O$ = 3 V, $I_O$ = 10 to 800 mA | | | 1 | % |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | | | | 15 | V |
| $I_{adj}$ | Adjustment pin current | $V_{in} \leq$ 15 V | | 60 | 120 | µA |
| $\Delta I_{adj}$ | Adjustment pin current change | $V_{in}$ - $V_O$ = 1.4 to 10 V<br>$I_O$ = 10 to 800 mA | | 1 | 5 | µA |
| $I_{O(min)}$ | Minimum load current | $V_{in}$ = 15 V | | 2 | 5 | mA |
| $I_O$ | Output current | $V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise (%$V_O$) | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 0.003 | | % |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ - $V_O$ = 3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.2 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 11. Electrical characteristics of LD1117#18C**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 3.8 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.76 | 1.8 | 1.84 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 3.9 to 10 V | 1.73 | | 1.87 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 3.3 to 8 V, $I_O$ = 0 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 3.3 V, $I_O$ = 0 to 800 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq 8$ V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 6.8 V $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 5.5 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.2 | |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | | 1.1 | V |
| | | $I_O$ = 500 mA | | | 1.2 | |
| | | $I_O$ = 800 mA | | | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 12. Electrical characteristics of LD1117#25C**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 4.5 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 2.45 | 2.5 | 2.55 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 3.9 to 10 V | 2.4 | | 2.6 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 3.9 to 10 V, $I_O$ = 0 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 3.9 V, $I_O$ = 0 to 800 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 10 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 7.5 V $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 5.5 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.2 | |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | | 1.1 | V |
| | | $I_O$ = 500 mA | | | 1.2 | |
| | | $I_O$ = 800 mA | | | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 13. Electrical characteristics of LD1117#33C**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 5.3 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 3.24 | 3.3 | 3.36 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 4.75 to 10 V | 3.16 | | 3.44 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 4.75 to 15 V, $I_O$ = 0 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 4.75 V, $I_O$ = 0 to 800 mA | | 1 | 30 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 15 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 8.3 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 6.3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.2 | |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | | 1.1 | V |
| | | $I_O$ = 500 mA | | | 1.2 | |
| | | $I_O$ = 800 mA | | | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 14. Electrical characteristics of LD1117#50C**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_O$ | Output voltage | $V_{in}$ = 7 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 4.9 | 5 | 5.1 | V |
| $V_O$ | Output voltage | $I_O$ = 0 to 800 mA, $V_{in}$ = 6.5 to 15 V | 4.8 | | 5.2 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ = 6.5 to 15 V, $I_O$ = 0 mA | | 1 | 50 | mV |
| $\Delta V_O$ | Load regulation | $V_{in}$ = 6.5 V, $I_O$ = 0 to 800 mA | | 1 | 50 | mV |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | $I_O$ = 100 mA | | | 15 | V |
| $I_d$ | Quiescent current | $V_{in} \leq$ 15 V | | 5 | 10 | mA |
| $I_O$ | Output current | $V_{in}$ = 10 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise voltage | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 100 | | µV |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ = 8 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.2 | |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | | 1.1 | V |
| | | $I_O$ = 500 mA | | | 1.2 | |
| | | $I_O$ = 800 mA | | | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

Refer to the test circuits, $T_J$ = -40 to 125 °C, $C_O$ = 10 µF, unless otherwise specified.

**Table 15. Electrical characteristics of LD1117C (adjustable)**

| Symbol | Parameter | Test condition | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| $V_{ref}$ | Reference voltage | $V_{in}$ - $V_O$ = 2 V, $I_O$ = 10 mA, $T_J$ = 25 °C | 1.225 | 1.25 | 1.275 | V |
| $V_{ref}$ | Reference voltage | $I_O$ = 10 to 800 mA, $V_{in}$ - $V_O$= 1.4 to 10 V | 1.2 | | 1.3 | V |
| $\Delta V_O$ | Line regulation | $V_{in}$ - $V_O$ = 1.5 to 13.75 V, $I_O$ = 10 mA | | | 1 | % |
| $\Delta V_O$ | Load regulation | $V_{in}$ - $V_O$ = 3 V, $I_O$ = 10 to 800 mA | | | 1 | % |
| $\Delta V_O$ | Temperature stability | | | 0.5 | | % |
| $\Delta V_O$ | Long term stability | 1000 hrs, $T_J$ = 125 °C | | 0.3 | | % |
| $V_{in}$ | Operating input voltage | | | | 15 | V |
| $I_{adj}$ | Adjustment pin current | $V_{in} \leq$ 15 V | | 60 | 120 | µA |
| $\Delta I_{adj}$ | Adjustment pin current change | $V_{in}$ - $V_O$ = 1.4 to 10 V, $I_O$ = 10 to 800 mA | | 1 | 10 | µA |
| $I_{O(min)}$ | Minimum load current | $V_{in}$ = 15 V | | 2 | 5 | mA |
| $I_O$ | Output current | $V_{in}$ - $V_O$ = 5 V, $T_J$ = 25 °C | 800 | 950 | 1300 | mA |
| eN | Output noise (%$V_O$) | B = 10 Hz to 10 kHz, $T_J$ = 25 °C | | 0.003 | | % |
| SVR | Supply voltage rejection | $I_O$ = 40 mA, f = 120 Hz, $T_J$ = 25 °C<br>$V_{in}$ - $V_O$ = 3 V, $V_{ripple}$ = 1 $V_{PP}$ | 60 | 75 | | dB |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA, $T_J$ = 0 to 125 °C | | 1 | 1.1 | V |
| | | $I_O$ = 500 mA, $T_J$ = 0 to 125 °C | | 1.05 | 1.15 | |
| | | $I_O$ = 800 mA, $T_J$ = 0 to 125 °C | | 1.10 | 1.2 | |
| $V_d$ | Dropout voltage | $I_O$ = 100 mA | | | 1.1 | V |
| | | $I_O$ = 500 mA | | | 1.2 | |
| | | $I_O$ = 800 mA | | | 1.3 | |
| | Thermal regulation | $T_a$ = 25 °C, 30 ms Pulse | | 0.01 | 0.1 | %/W |

# 6 Typical application

**Figure 5. Negative supply**

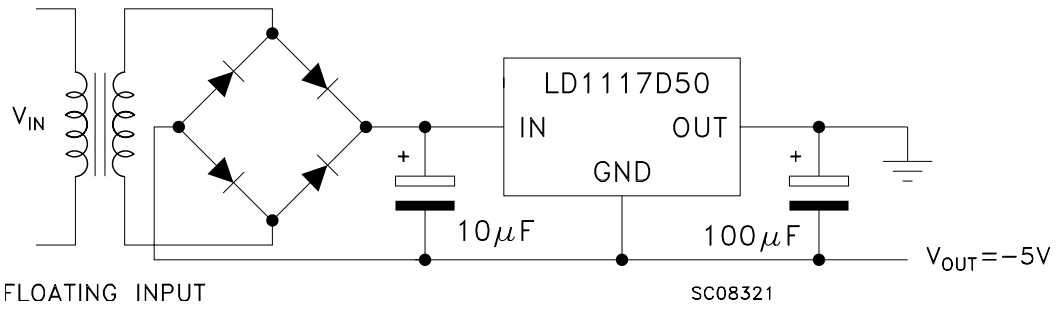



**Figure 6. Active terminator for SCSI-2 bus**

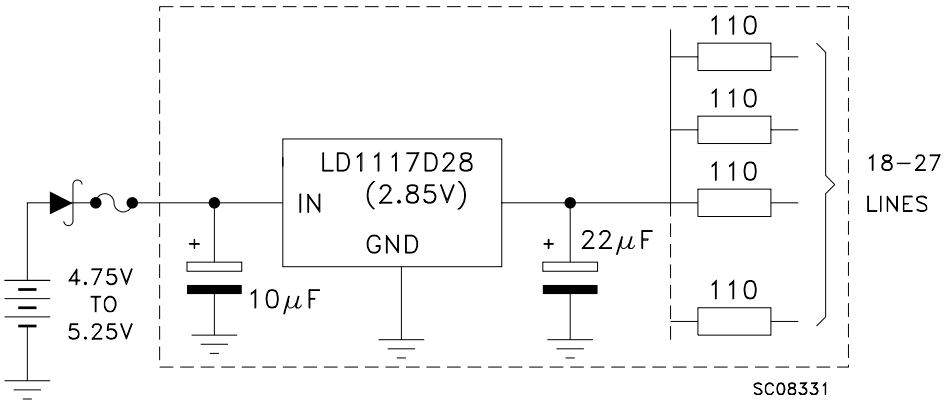



**Figure 7. Circuit for increasing output voltage**

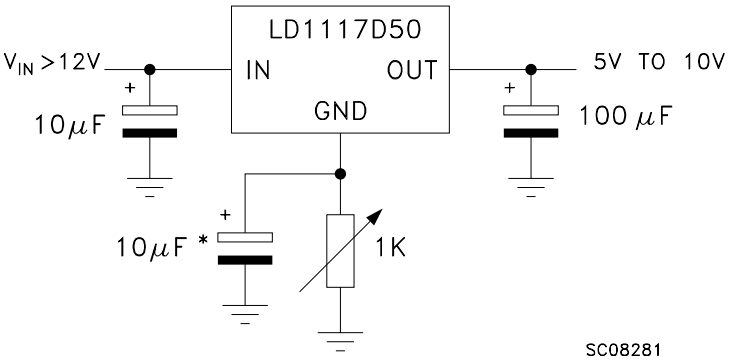


**Figure 8. Voltage regulator with reference**

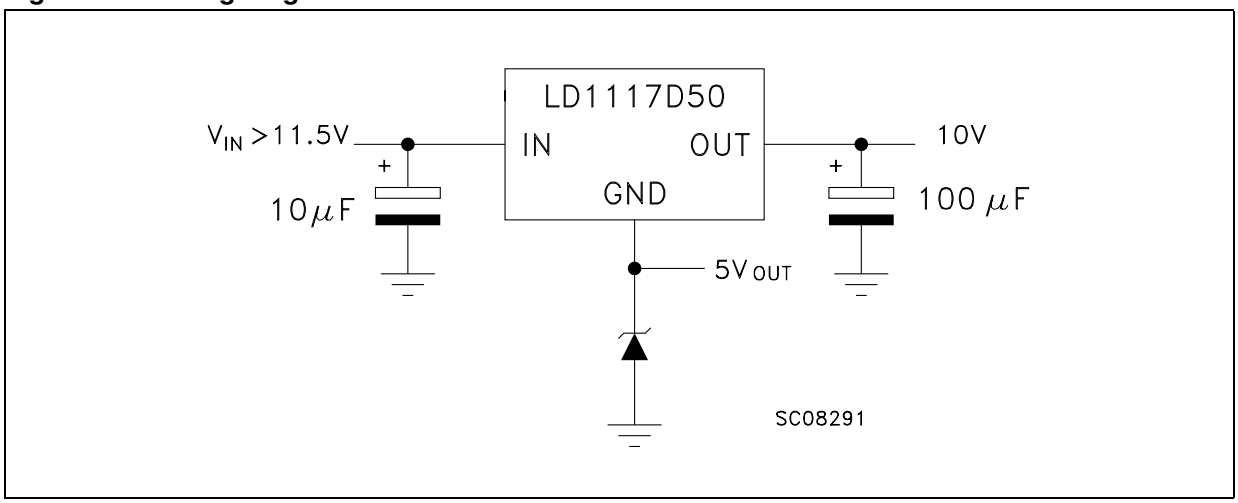



**Figure 9. Battery backed-up regulated supply**

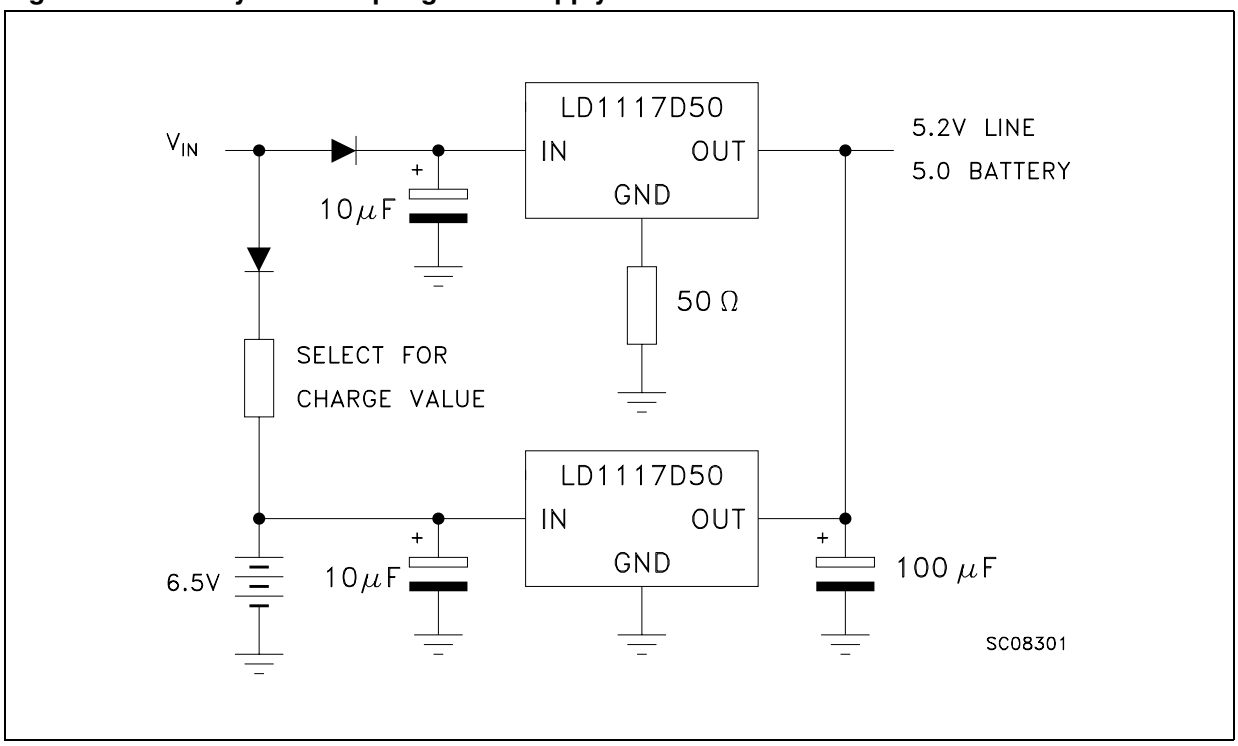
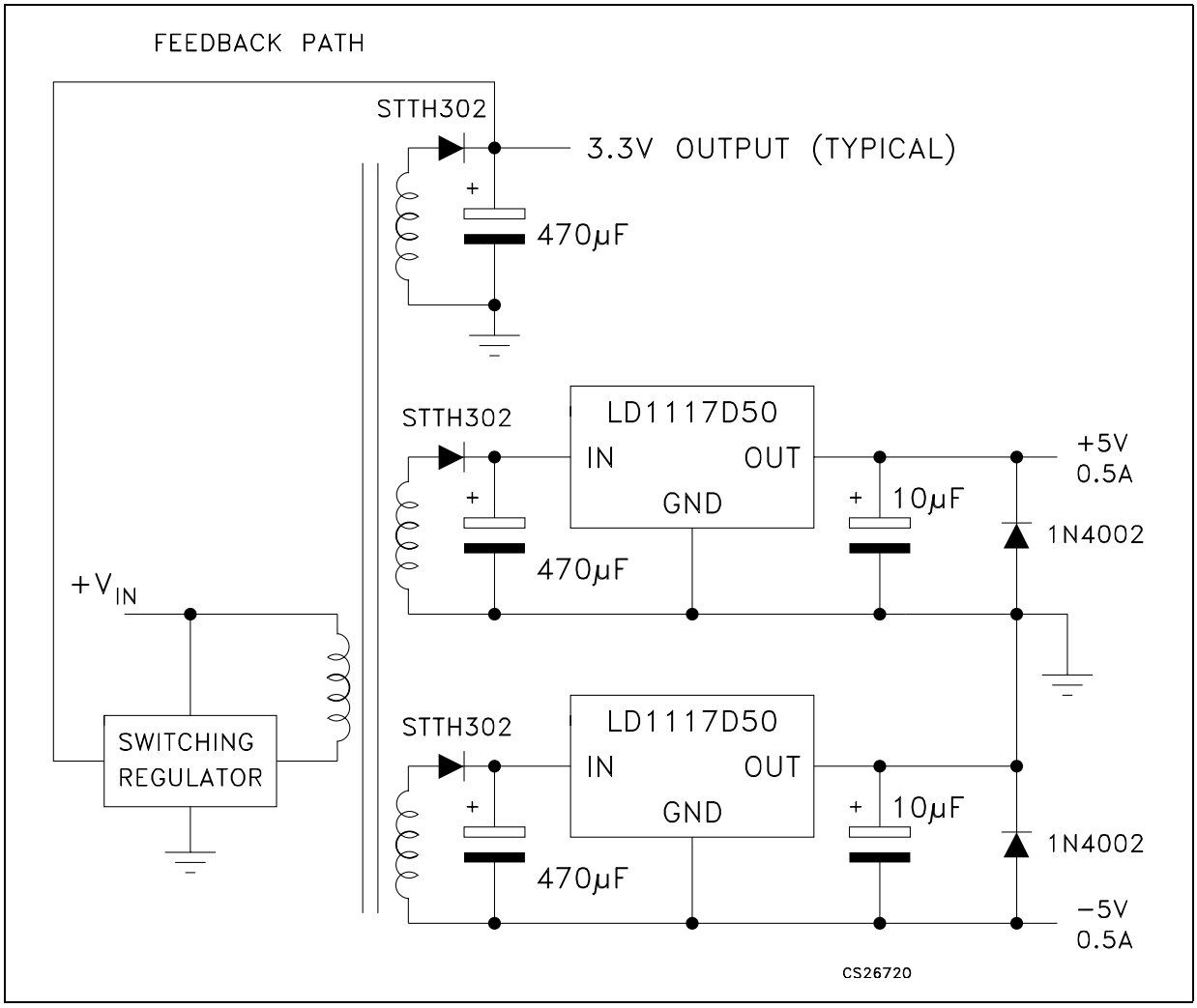


**Figure 10. Post-regulated dual supply**



# 7 LD1117 adjustable: application note

The LD1117 adjustable has a thermal stabilized 1.25 ± 0.012 V reference voltage between the OUT and ADJ pins. $I_{ADJ}$ is 60 µA typ. (120 µA max.) and $\Delta I_{ADJ}$ is 1 µA typ. (5 µA max.).

$R_1$ is normally fixed to 120 Ω. From *Figure 10* we obtain:

$V_{OUT} = V_{REF} + R_2 (I_{ADJ} + I_{R1}) = V_{REF} + R_2 (I_{ADJ} + V_{REF} / R_1) = V_{REF} (1 + R_2 / R_1) + R_2 \times I_{ADJ}$.

In normal application $R_2$ value is in the range of few kΩ, so the $R_2 \times I_{ADJ}$ product could not be considered in the $V_{OUT}$ calculation; then the above expression becomes:

$V_{OUT} = V_{REF} (1 + R_2 / R_1)$.

In order to have the better load regulation it is important to realize a good Kelvin connection of $R_1$ and $R_2$ resistors. In particular $R_1$ connection must be realized very close to OUT and ADJ pin, while $R_2$ ground connection must be placed as near as possible to the negative Load pin. Ripple rejection can be improved by introducing a 10 µF electrolytic capacitor placed in parallel to the $R_2$ resistor (see *Figure 11*).

**Figure 11. Adjustable output voltage application**

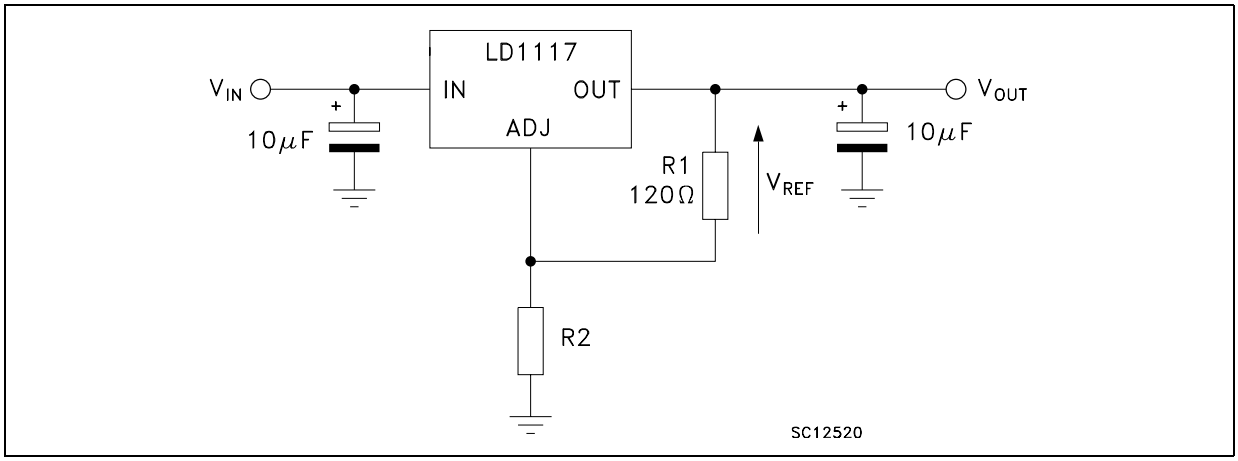
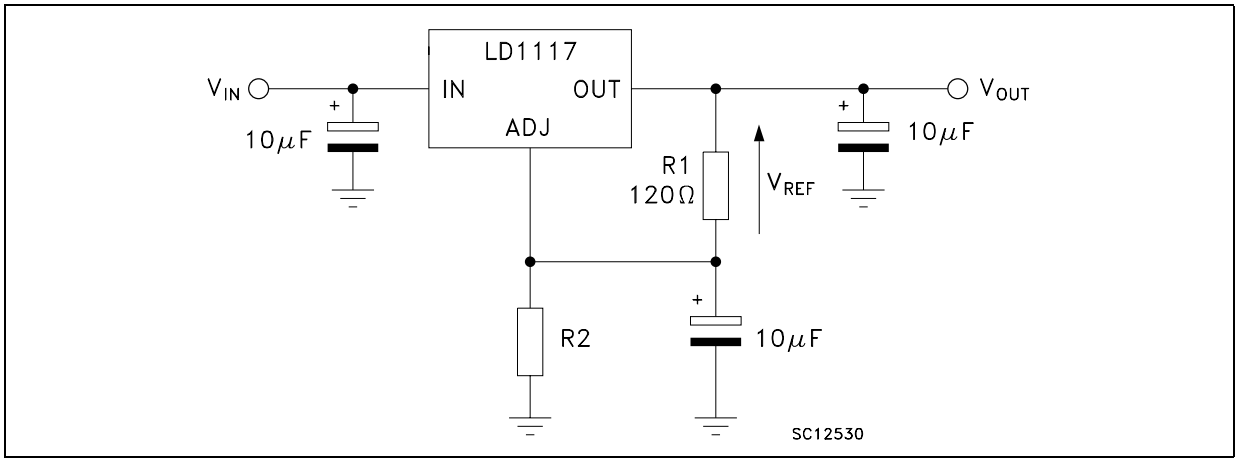



**Figure 12. Adjustable output voltage application with improved ripple rejection**



# 8 Package mechanical data

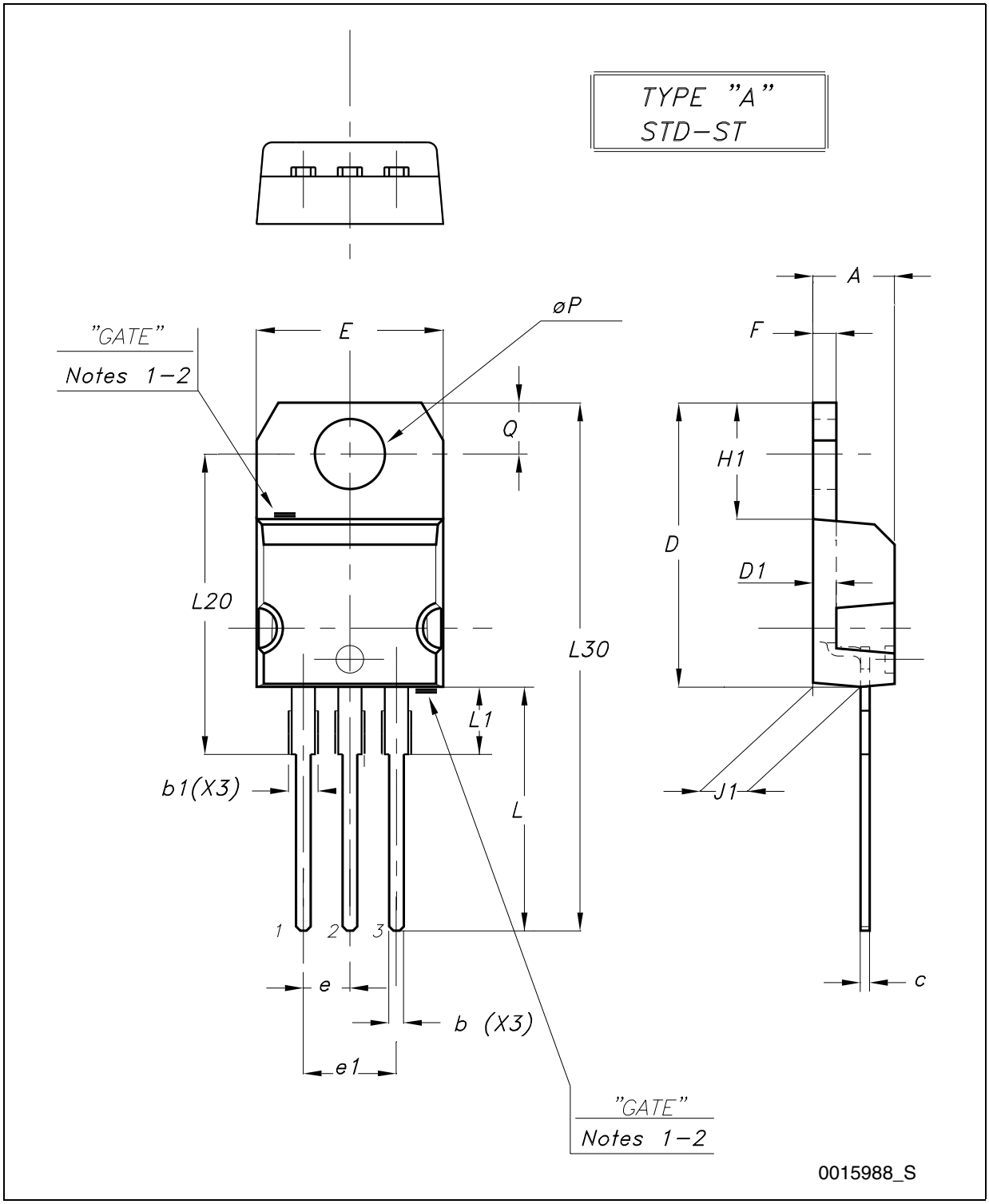
In order to meet environmental requirements, ST offers these devices in different grades of ECOPACK® packages, depending on their level of environmental compliance. ECOPACK® specifications, grade definitions and product status are available at: *www.st.com*. ECOPACK® is an ST trademark.

**Table 16. TO-220 mechanical data**

| Dim. | Type STD - ST Dual Gauge | | | Type STD - ST Single Gauge | | |
|---|---|---|---|---|---|---|
| | mm. | | | mm. | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 4.40 | | 4.60 |
| b | 0.61 | | 0.88 | 0.61 | | 0.88 |
| b1 | 1.14 | | 1.70 | 1.14 | | 1.70 |
| c | 0.48 | | 0.70 | 0.48 | | 0.70 |
| D | 15.25 | | 15.75 | 15.25 | | 15.75 |
| D1 | | 1.27 | | | | |
| E | 10.00 | | 10.40 | 10.00 | | 10.40 |
| e | 2.40 | | 2.70 | 2.40 | | 2.70 |
| e1 | 4.95 | | 5.15 | 4.95 | | 5.15 |
| F | 1.23 | | 1.32 | 0.51 | | 0.60 |
| H1 | 6.20 | | 6.60 | 6.20 | | 6.60 |
| J1 | 2.40 | | 2.72 | 2.40 | | 2.72 |
| L | 13.00 | | 14.00 | 13.00 | | 14.00 |
| L1 | 3.50 | | 3.93 | 3.50 | | 3.93 |
| L20 | | 16.40 | | | 16.40 | |
| L30 | | 28.90 | | | 28.90 | |
| ∅P | 3.75 | | 3.85 | 3.75 | | 3.85 |
| Q | 2.65 | | 2.95 | 2.65 | | 2.95 |

*In spite of some difference in tolerances, the packages are compatible.*

**Figure 13. Drawing dimension TO-220 (type STD-ST Dual Gauge)**




*Note: 1 Maximum resin gate protrusion: 0.5 mm.*

*2 Resin gate position is accepted in each of the two positions shown on the drawing, or their symmetrical.*

**Figure 14. Drawing dimension TO-220 (type STD-ST Single Gauge)**

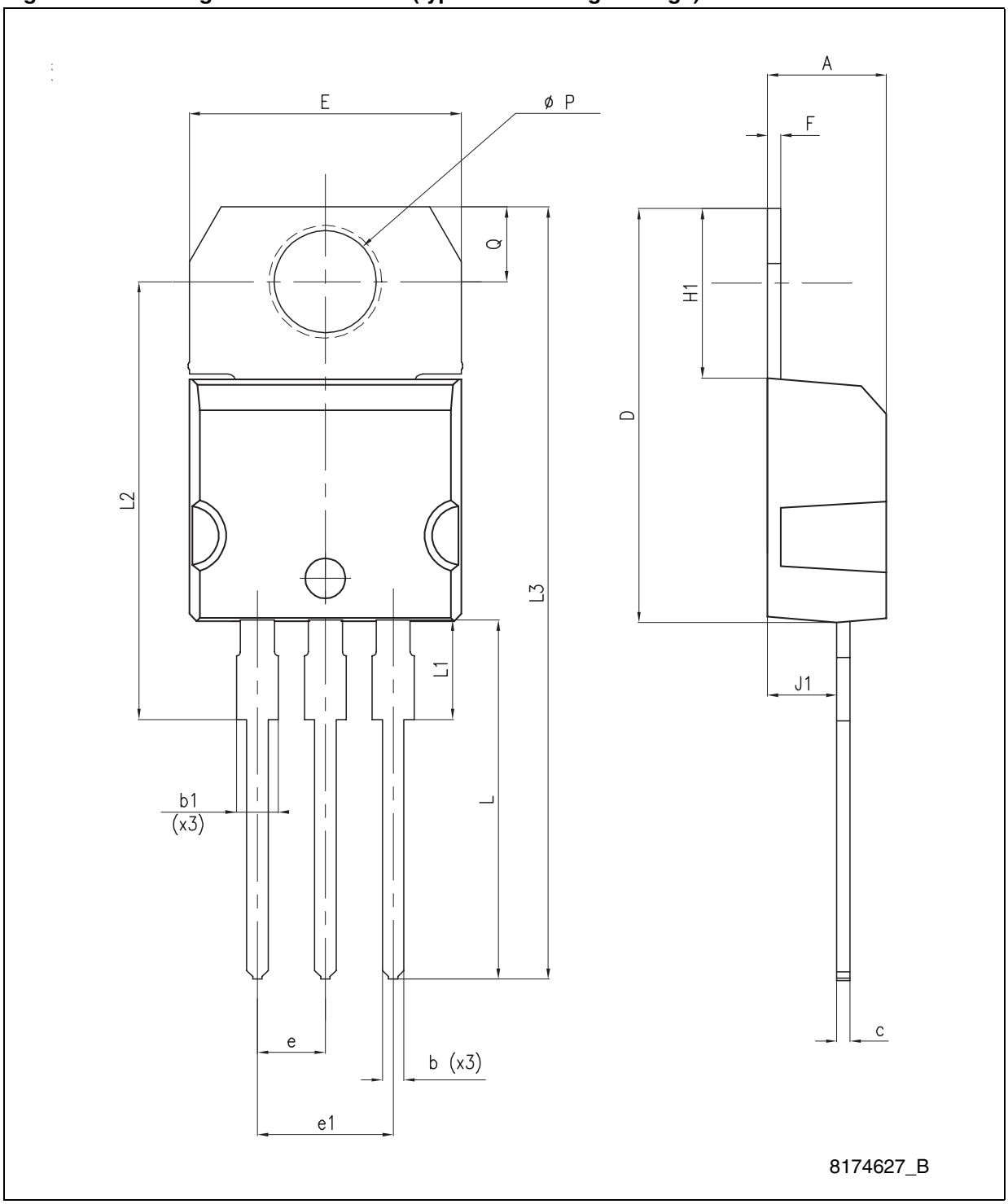


**Figure 15. Drawing dimension tube for TO-220 Dual Gauge (mm.)**

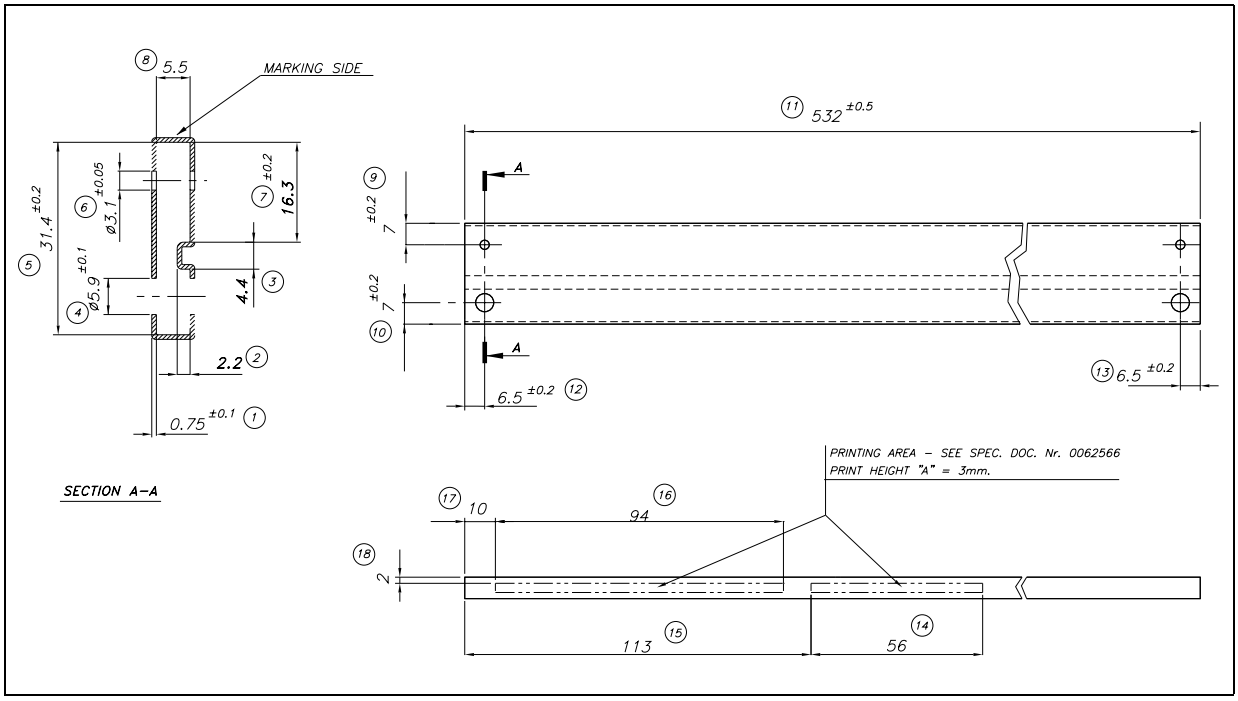
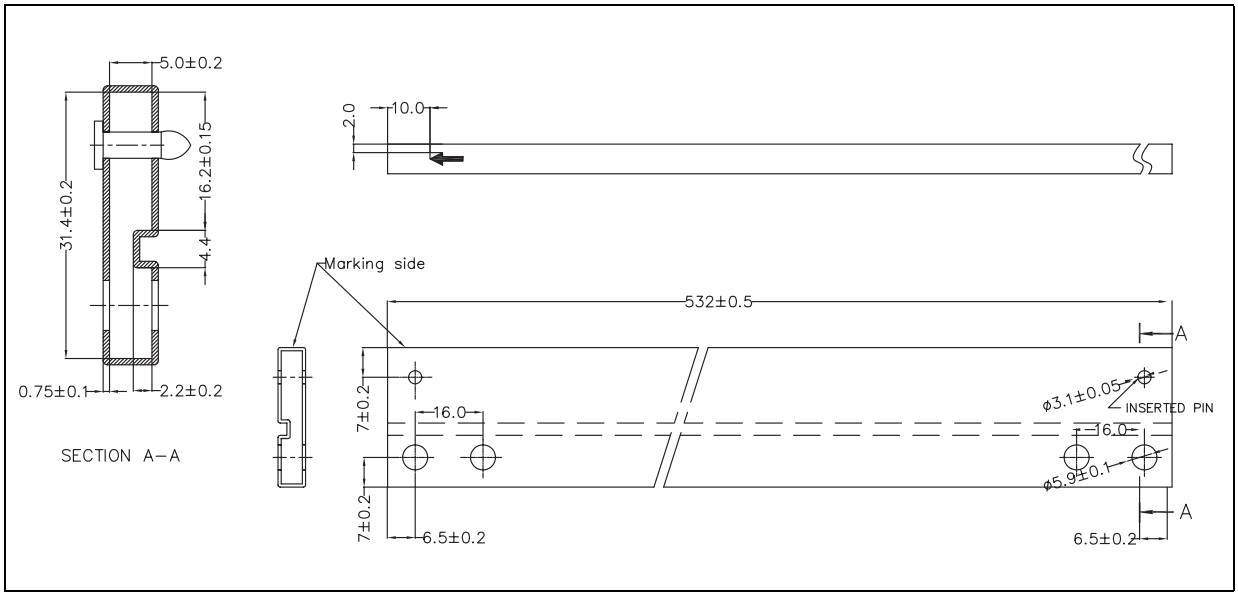
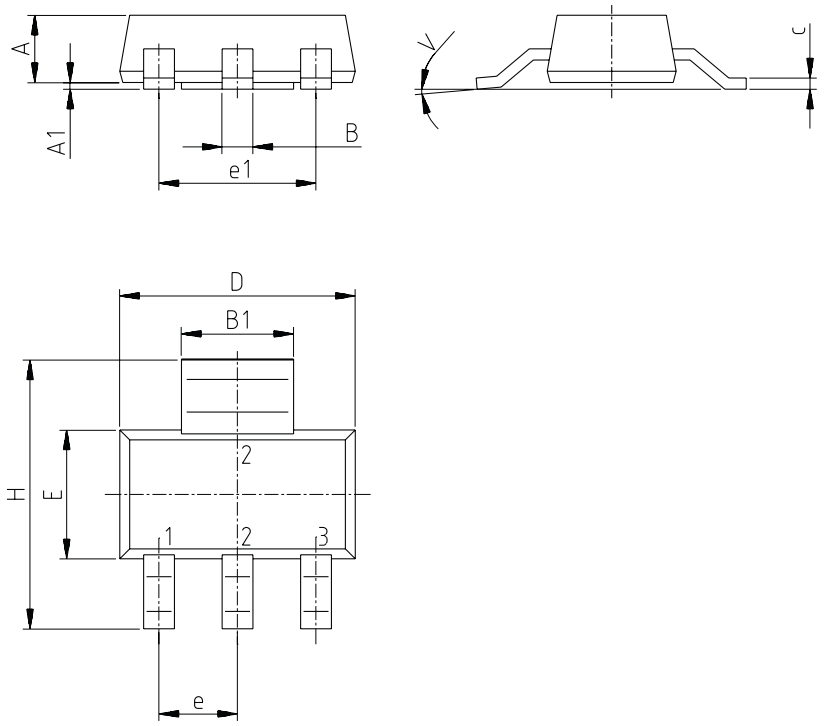



**Figure 16. Drawing dimension tube for TO-220 Single Gauge (mm.)**



## SOT-223 mechanical data

| Dim. | mm. | | | mils. | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 1.8 | | | 70.9 |
| A1 | 0.02 | | 0.1 | 0.8 | | 3.9 |
| B | 0.6 | 0.7 | 0.85 | 23.6 | 27.6 | 33.5 |
| B1 | 2.9 | 3 | 3.15 | 114.2 | 118.1 | 124.0 |
| c | 0.24 | 0.26 | 0.35 | 9.4 | 10.2 | 13.8 |
| D | 6.3 | 6.5 | 6.7 | 248.0 | 255.9 | 263.8 |
| e | | 2.3 | | | 90.6 | |
| e1 | | 4.6 | | | 181.1 | |
| E | 3.3 | 3.5 | 3.7 | 129.9 | 137.8 | 145.7 |
| H | 6.7 | 7 | 7.3 | 263.8 | 275.7 | 287.5 |
| V | | | 10° | | | 10° |




0046067/H

## SO-8 mechanical data

| Dim. | mm. | | | inch. | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 1.35 | | 1.75 | 0.053 | | 0.069 |
| A1 | 0.10 | | 0.25 | 0.04 | | 0.010 |
| A2 | 1.10 | | 1.65 | 0.043 | | 0.065 |
| B | 0.33 | | 0.51 | 0.013 | | 0.020 |
| C | 0.19 | | 0.25 | 0.007 | | 0.010 |
| D | 4.80 | | 5.00 | 0.189 | | 0.197 |
| E | 3.80 | | 4.00 | 0.150 | | 0.157 |
| e | | 1.27 | | | 0.050 | |
| H | 5.80 | | 6.20 | 0.228 | | 0.244 |
| h | 0.25 | | 0.50 | 0.010 | | 0.020 |
| L | 0.40 | | 1.27 | 0.016 | | 0.050 |
| k | 8° (max.) | | | | | |
| ddd | | | 0.1 | | | 0.04 |

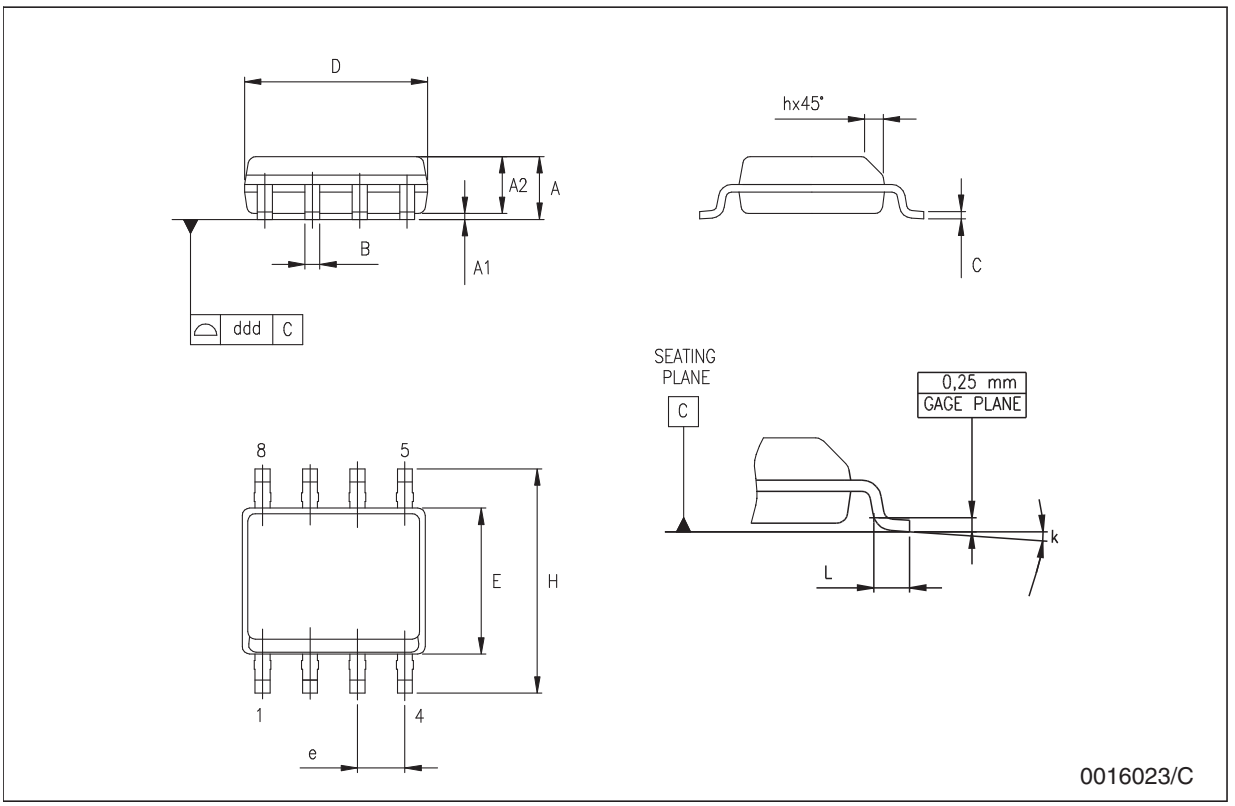
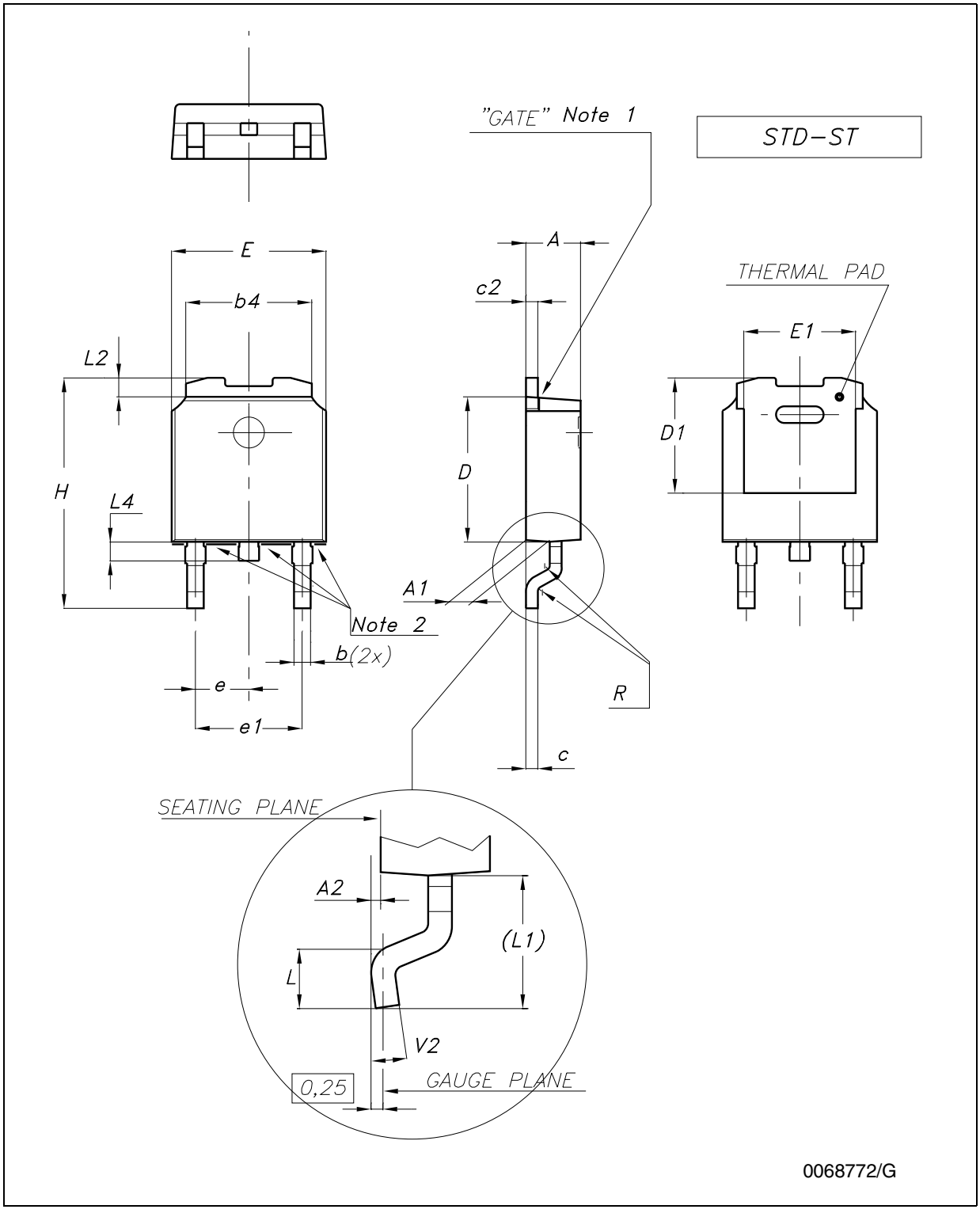


**Figure 17. Drawing dimension DPAK (type STD-ST)**




*Note: 1 Maximum resin gate protrusion: 0.5 mm.*

*2 Maximum resin protrusion: 0.25 mm.*

**Figure 18. Drawing dimension DPAK (type Fujitsu-subcon.)**

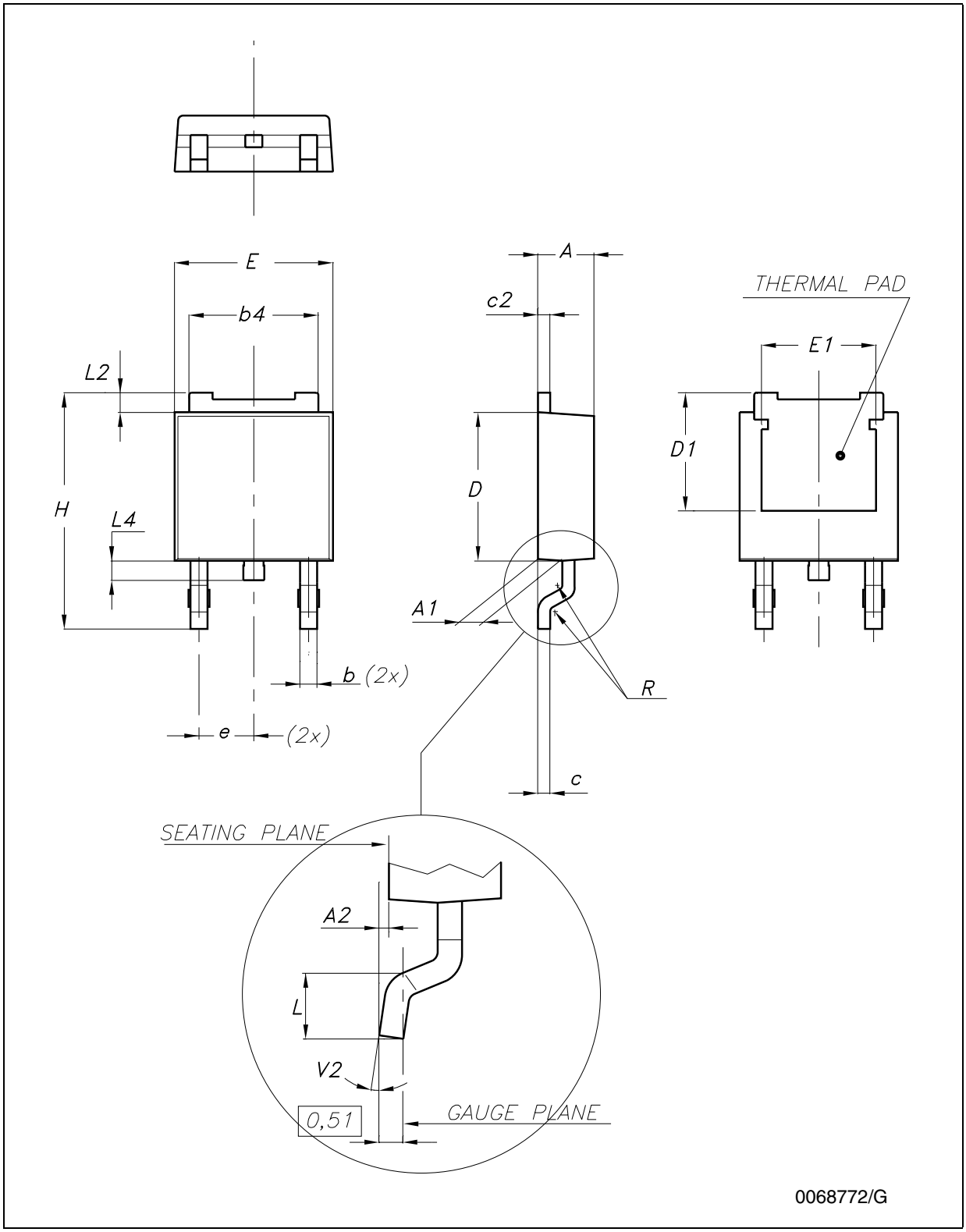


**Figure 19. Drawing dimension DPAK (type IDS-subcon.)**

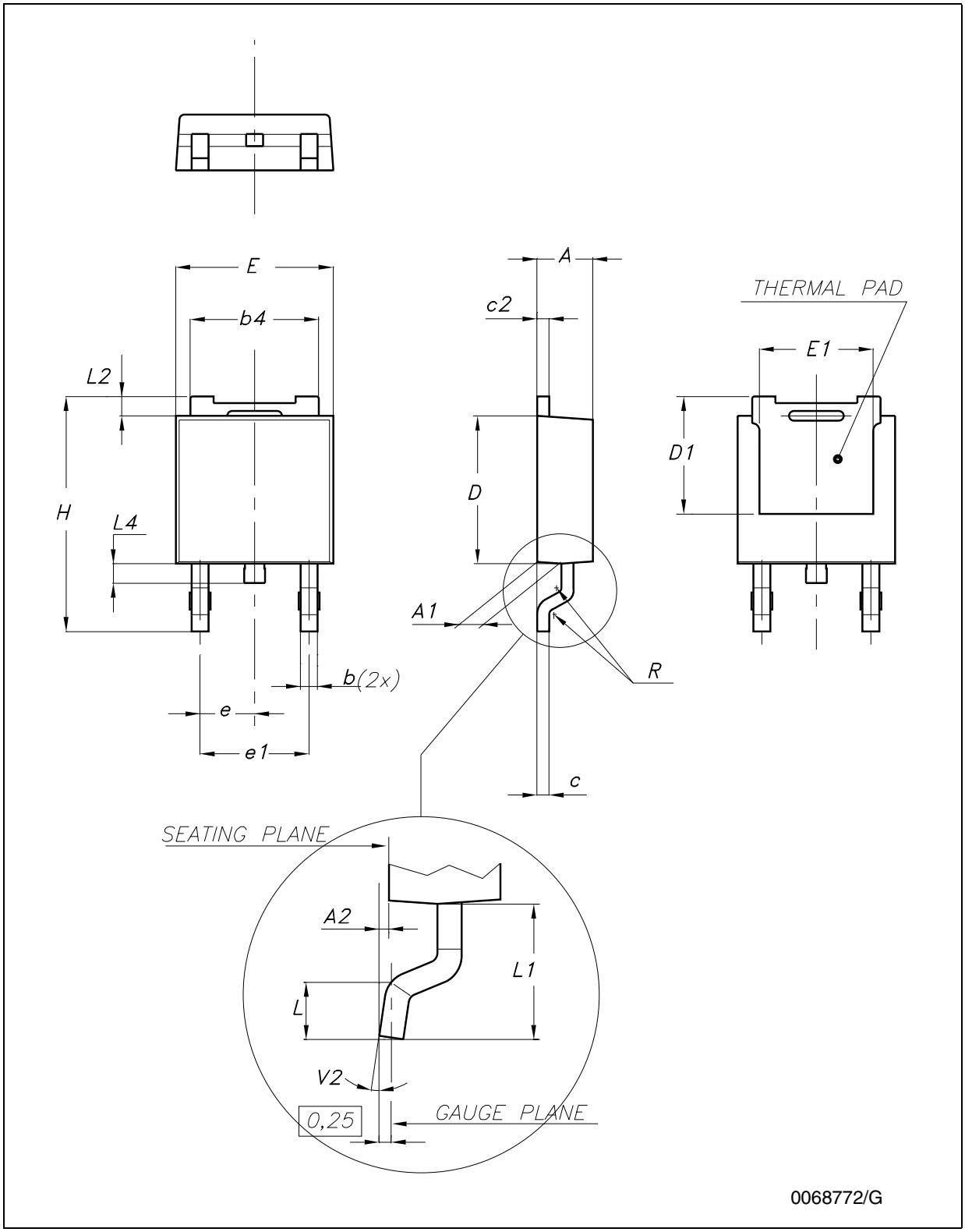


**Table 17. DPAK mechanical data**

| Dim. | Type STD-ST | | | Type Fujitsu-subcon. | | | Type IDS-subcon | | |
|---|---|---|---|---|---|---|---|---|---|
| | mm. | | | mm. | | | mm. | | |
| | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 | 2.25 | 2.30 | 2.35 | 2.19 | | 2.38 |
| A1 | 0.90 | | 1.10 | 0.96 | | 1.06 | 0.89 | | 1.14 |
| A2 | 0.03 | | 0.23 | 0 | | 0.10 | 0.03 | | 0.23 |
| b | 0.64 | | 0.90 | 0.76 | | 0.86 | 0.64 | | 0.88 |
| b4 | 5.20 | | 5.40 | 5.28 | | 5.38 | 5.21 | | 5.46 |
| c | 0.45 | | 0.60 | 0.46 | | 0.56 | 0.46 | | 0.58 |
| c2 | 0.48 | | 0.60 | 0.46 | | 0.56 | 0.46 | | 0.58 |
| D | 6.00 | | 6.20 | 6.05 | | 6.15 | 5.97 | | 6.22 |
| D1 | | 5.10 | | 5.27 | | 5.47 | | 5.20 | |
| E | 6.40 | | 6.60 | 6.55 | 6.60 | 6.65 | 6.35 | | 6.73 |
| E1 | | 4.70 | | | 4.77 | | | 4.70 | |
| e | | 2.28 | | 2.23 | 2.28 | 2.33 | | 2.28 | |
| e1 | 4.40 | | 4.60 | | | | 4.51 | | 4.61 |
| H | 9.35 | | 10.10 | 9.90 | | 10.30 | 9.40 | | 10.42 |
| L | 1.00 | | | 1.40 | | 1.60 | 0.90 | | |
| L1 | | 2.80 | | | | | 2.50 | | 2.65 |
| L2 | | 0.80 | | 1.03 | | 1.13 | 0.89 | | 1.27 |
| L4 | 0.60 | | 1.00 | 0.70 | | 0.90 | 0.64 | | 1.02 |
| R | | 0.20 | | | 0.40 | | | 0.20 | |
| V2 | 0° | | 8° | 0° | | 8° | 0° | | 8° |

*Note: The DPAK package coming from the two subcontractors (Fujitsu and IDS) are fully compatible with the ST's package suggested footprint.*

**Figure 20. DPAK footprint recommended data**

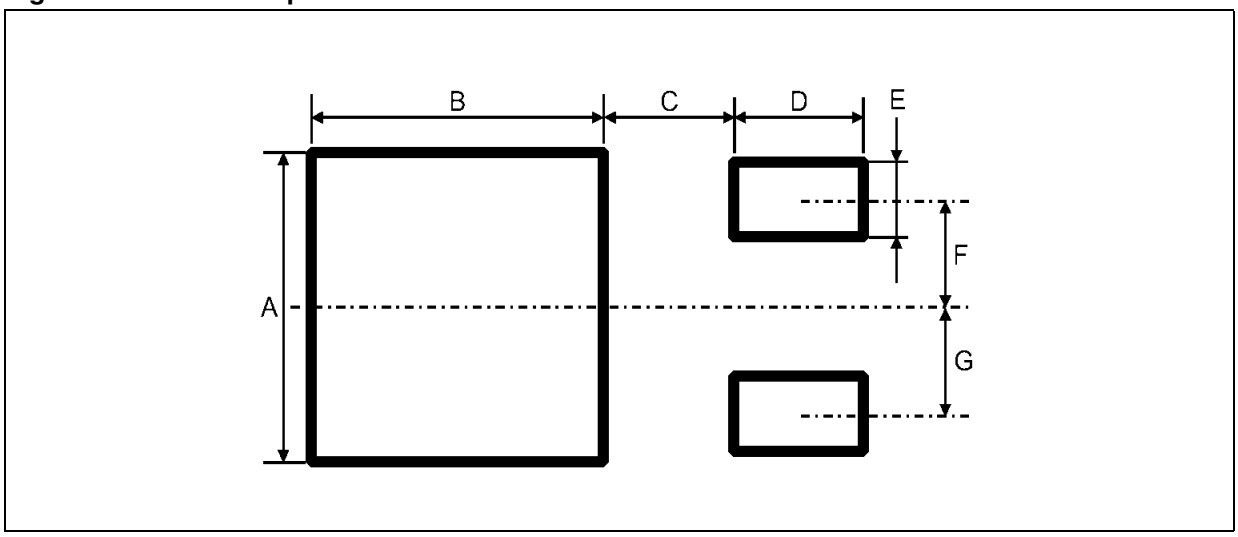
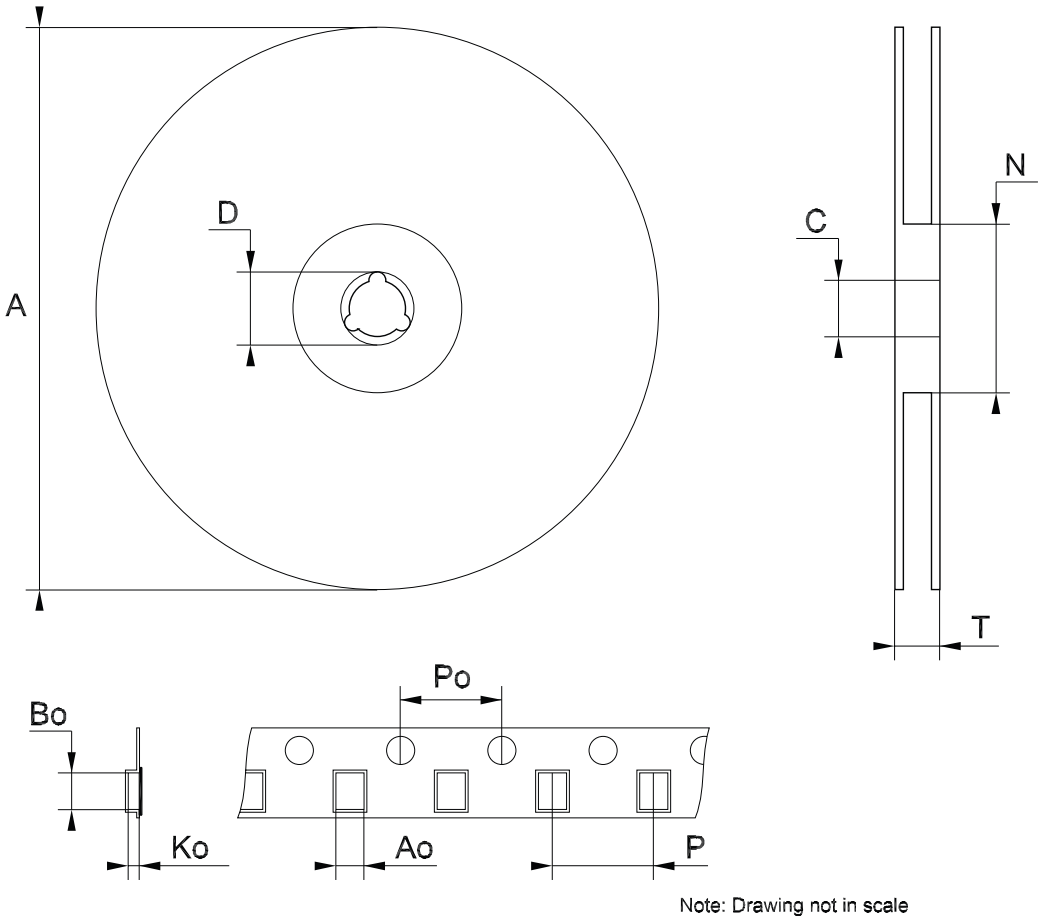



**Table 18. Footprint data**

| Values | | |
|---|---|---|
| | **mm.** | **inch.** |
| A | 6.70 | 0.264 |
| B | 6.70 | 0.64 |
| C | 1.8 | 0.070 |
| D | 3.0 | 0.118 |
| E | 1.60 | 0.063 |
| F | 2.30 | 0.091 |
| G | 2.30 | 0.091 |

## Tape & reel SOT223 mechanical data

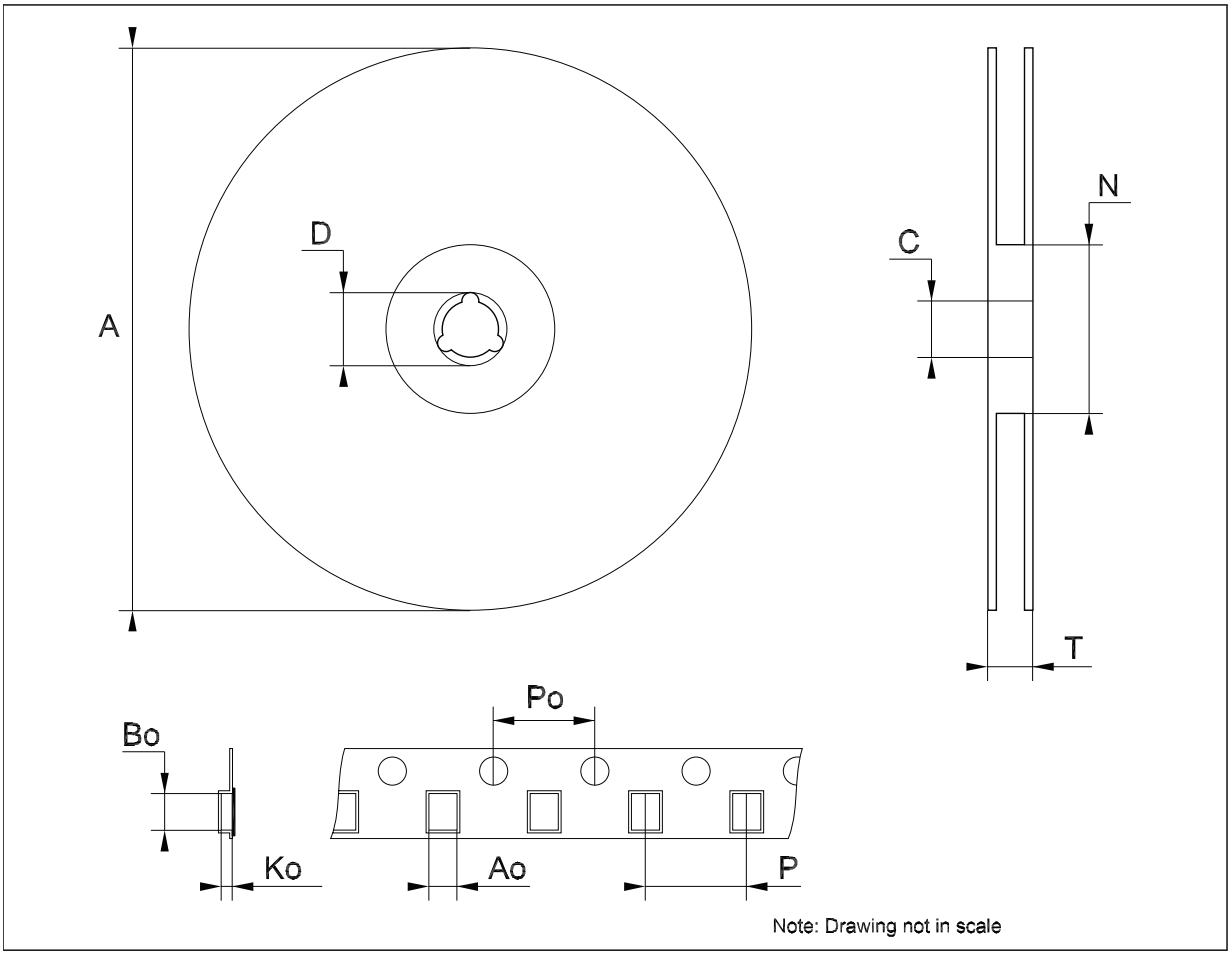
| Dim. | mm. | | | inch. | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 330 | | | 12.992 |
| C | 12.8 | 13.0 | 13.2 | 0.504 | 0.512 | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 60 | | | 2.362 | | |
| T | | | 14.4 | | | 0.567 |
| Ao | 6.73 | 6.83 | 6.93 | 0.265 | 0.269 | 0.273 |
| Bo | 7.32 | 7.42 | 7.52 | 0.288 | 0.292 | 0.296 |
| Ko | 1.78 | | 2 | 0.070 | | 0.078 |
| 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 |




Note: Drawing not in scale

## Tape & reel SO-8 mechanical data

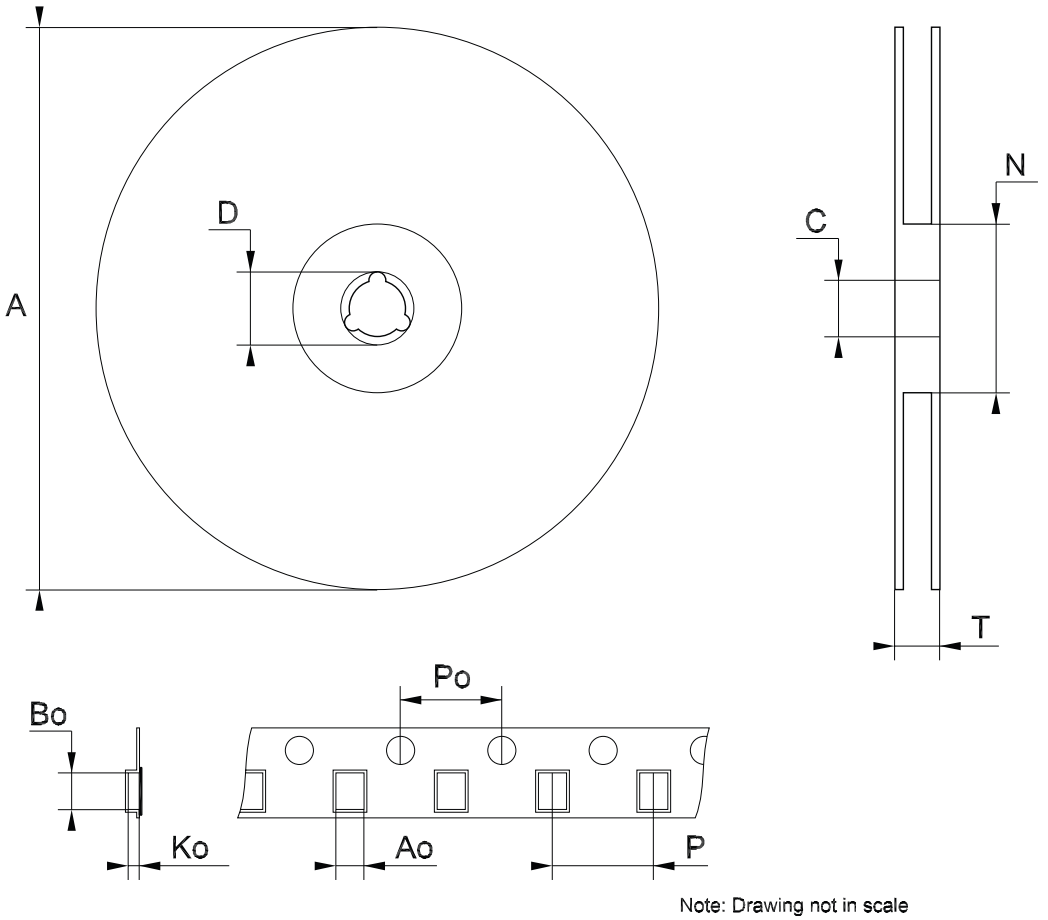
| Dim. | mm. | | | inch. | | |
|---|---|---|---|---|---|---|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 330 | | | 12.992 |
| C | 12.8 | | 13.2 | 0.504 | | 0.519 |
| D | 20.2 | | | 0.795 | | |
| N | 60 | | | 2.362 | | |
| T | | | 22.4 | | | 0.882 |
| Ao | 8.1 | | 8.5 | 0.319 | | 0.335 |
| Bo | 5.5 | | 5.9 | 0.216 | | 0.232 |
| Ko | 2.1 | | 2.3 | 0.082 | | 0.090 |
| Po | 3.9 | | 4.1 | 0.153 | | 0.161 |
| P | 7.9 | | 8.1 | 0.311 | | 0.319 |




Note: Drawing not in scale

## 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 | 0.2.76 |
| 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 |




Note: Drawing not in scale

# 9 Order codes

**Table 19. Order codes**

| Packages | | | | | |
|---|---|---|---|---|---|
| **SOT-223** | **SO-8** | **DPAK** | **DPAK (tape and reel)** | **TO-220** | **Output voltages** |
| LD1117S12TR | LD1117D12TR (1) | LD1117DT12 (1) | LD1117DT12TR | | 1.2 V |
| LD1117S12CTR | LD1117D12CTR (1) | LD1117DT12C (1) | LD1117DT12CTR | LD1117V12C (1) | 1.2 V |
| LD1117S18TR | LD1117D18TR (1) | | LD1117DT18TR | LD1117V18 | 1.8 V |
| LD1117S18CTR | LD1117D18CTR (1) | | LD1117DT18CTR | LD1117V18C (1) | 1.8 V |
| LD1117S25TR | LD1117D25TR (1) | | LD1117DT25TR | | 2.5 V |
| LD1117S25CTR | LD1117D25CTR (1) | | LD1117DT25CTR | | 2.5 V |
| LD1117S33TR | LD1117D33TR | | LD1117DT33TR | LD1117V33 | 3.3 V |
| | | | | LD1117V33-DG (2) | 3.3 V |
| LD1117S33CTR | LD1117D33CTR | | LD1117DT33CTR | LD1117V33C | 3.3 V |
| LD1117S50TR | | | LD1117DT50TR | LD1117V50 | 5 V |
| | | | | LD1117V50-DG (2) | 5 V |
| LD1117S50CTR | | | LD1117DT50CTR | LD1117V50C | 5 V |
| LD1117STR | | | LD1117DTTR | LD1117V | ADJ from 1.25 to 15V |
| | | | | LD1117V-DG (2) | ADJ from 1.25 to 15V |
| LD1117SC-R | LD1117DC-R (1) | LD1117DTC (1) | LD1117DTC-R | LD1117VC (1) | ADJ from 1.25 to 15V |

1. Available on request.
2. TO-220 Dual Gauge frame.

# 10 Revision history

**Table 20. Document revision history**

| Date | Revision | Changes |
|---|---|---|
| 22-Sep-2004 | 15 | Add new part number #12C; typing error: note on table 2. |
| 25-Oct-2004 | 16 | Add $V_{ref}$ reference voltage on table 12. |
| 18-Jul-2005 | 17 | The DPAK mechanical data updated. |
| 25-Nov-2005 | 18 | The TO220FM package removed. |
| 14-Dec-2005 | 19 | The $T_{op}$ on table 2 updated. |
| 06-Dec-2006 | 20 | DPAK mechanical data updated and added footprint data. |
| 05-Apr-2007 | 21 | Order codes updated. |
| 30-Nov-2007 | 22 | Added *Table 1*. |
| 16-Apr-2008 | 23 | Modified: *Table 19 on page 39*. |
| 08-Jul-2008 | 24 | Added note *1. on page 7*. |
| 30-Mar-2009 | 25 | Modified: $V_{IN}$ max value *Table 5 on page 10* and *Figure 10 on page 23*. |
| 29-Jul-2009 | 26 | Modified: *Table 19 on page 39*. |
| 03-Feb-2010 | 27 | Modified *Table 10 on page 15*. |
| 22-Mar-2010 | 28 | Added: *Table 16 on page 25*, *Figure 13 on page 26*, *Figure 14 on page 27*, *Figure 15* and *Figure 16 on page 28*. |
| 15-Nov-2010 | 29 | Modified: $R_{thJC}$ value for TO-220 *Table 3 on page 7*. |
| 30-Nov-2011 | 30 | Added: order code LD1117V33-DG *Table 19 on page 39*. |
| 13-Feb-2012 | 31 | Added: order codes LD1117V50-DG and LD1117V-DG *Table 19 on page 39*. |

**Please Read Carefully:**

Information in this document is provided solely in connection with ST products. STMicroelectronics NV and its subsidiaries (“ST”) reserve the right to make changes, corrections, modifications or improvements, to this document, and the products and services described herein at any time, without notice.

All ST products are sold pursuant to ST’s terms and conditions of sale.

Purchasers are solely responsible for the choice, selection and use of the ST products and services described herein, and ST assumes no liability whatsoever relating to the choice, selection or use of the ST products and services described herein.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted under this document. If any part of this document refers to any third party products or services it shall not be deemed a license grant by ST for the use of such third party products or services, or any intellectual property contained therein or considered as a warranty covering the use in any manner whatsoever of such third party products or services or any intellectual property contained therein.

**UNLESS OTHERWISE SET FORTH IN ST’S TERMS AND CONDITIONS OF SALE ST DISCLAIMS ANY EXPRESS OR IMPLIED WARRANTY WITH RESPECT TO THE USE AND/OR SALE OF ST PRODUCTS INCLUDING WITHOUT LIMITATION IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE (AND THEIR EQUIVALENTS UNDER THE LAWS OF ANY JURISDICTION), OR INFRINGEMENT OF ANY PATENT, COPYRIGHT OR OTHER INTELLECTUAL PROPERTY RIGHT.**

**UNLESS EXPRESSLY APPROVED IN WRITING BY TWO AUTHORIZED ST REPRESENTATIVES, ST PRODUCTS ARE NOT RECOMMENDED, AUTHORIZED OR WARRANTED FOR USE IN MILITARY, AIR CRAFT, SPACE, LIFE SAVING, OR LIFE SUSTAINING APPLICATIONS, NOR IN PRODUCTS OR SYSTEMS WHERE FAILURE OR MALFUNCTION MAY RESULT IN PERSONAL INJURY, DEATH, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE. ST PRODUCTS WHICH ARE NOT SPECIFIED AS "AUTOMOTIVE GRADE" MAY ONLY BE USED IN AUTOMOTIVE APPLICATIONS AT USER’S OWN RISK.**

Resale of ST products with provisions different from the statements and/or technical features set forth in this document shall immediately void any warranty granted by ST for the ST product or service described herein and shall not create or extend in any manner whatsoever, any liability of ST.

ST and the ST logo are trademarks or registered trademarks of ST in various countries.

Information in this document supersedes and replaces all information previously supplied.

The ST logo is a registered trademark of STMicroelectronics. All other names are the property of their respective owners.



STMicroelectronics group of companies

Australia - Belgium - Brazil - Canada - China - Czech Republic - Finland - France - Germany - Hong Kong - India - Israel - Italy - Japan - Malaysia - Malta - Morocco - Philippines - Singapore - Spain - Sweden - Switzerland - United Kingdom - United States of America

**www.st.com**