

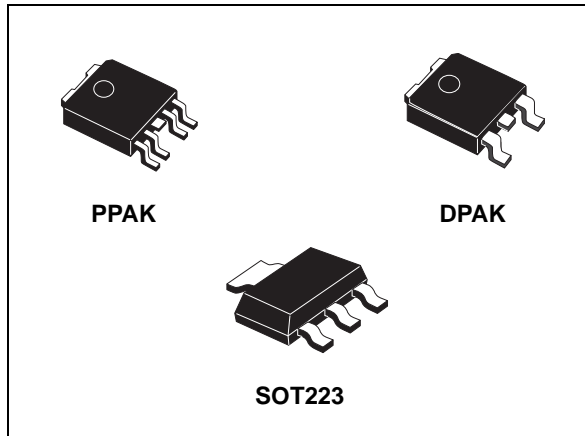


**THE DATASHEET OF
LD29080PTR**



800 mA fixed and adjustable output very low drop voltage regulator

Datasheet - production data



- Fixed and adjustable output voltage ($\pm 1\%$ at 25 °C)
- Internal current and thermal limit
- Logic controlled electronic shutdown

Description

The LD29080 is a medium current, high accuracy, low-dropout voltage regulators series. These regulators feature 400 mV dropout voltage and very low ground current. Designed for medium current loads, these devices also find applications in lower current, extremely low dropout-critical systems, where their tiny dropout voltage and ground current values are important attributes. Typical application are in power supply switching post regulation, series power supply for monitors, series power supply for VCRs and TVs, computer systems and battery powered systems.

Features

- Very low dropout voltage (typ. 0.4 at 800 mA)
- Guaranteed output current up to 800 mA

Table 1. Device summary

| Order codes | | | Output voltages |
|----------------------|----------------------|-------------|-----------------|
| DPAK (tape and reel) | PPAK (tape and reel) | SOT223 | |
| LD29080DT15R | LD29080PT15R | | 1.5 V |
| LD29080DT18R | LD29080PT18R | | 1.8 V |
| LD29080DT25R | LD29080PT25R | | 2.5 V |
| LD29080DT33R | LD29080PT33R | LD29080S33R | 3.3 V |
| LD29080DT50R | LD29080PT50R | | 5.0 V |
| LD29080DT90R | LD29080PT90R | | 9.0 V |
| | LD29080PTR | | ADJ |

Contents

| | | |
|---|----------------------------------|----|
| 1 | Diagram | 3 |
| 2 | Pin configuration | 4 |
| 3 | Maximum ratings | 5 |
| 4 | Electrical characteristics | 6 |
| 5 | Typical characteristics | 14 |
| 6 | Package mechanical data | 17 |
| 7 | Packaging mechanical data | 23 |
| 8 | Revision history | 25 |

1 Diagram

Figure 1. Schematic diagram for adjustable version

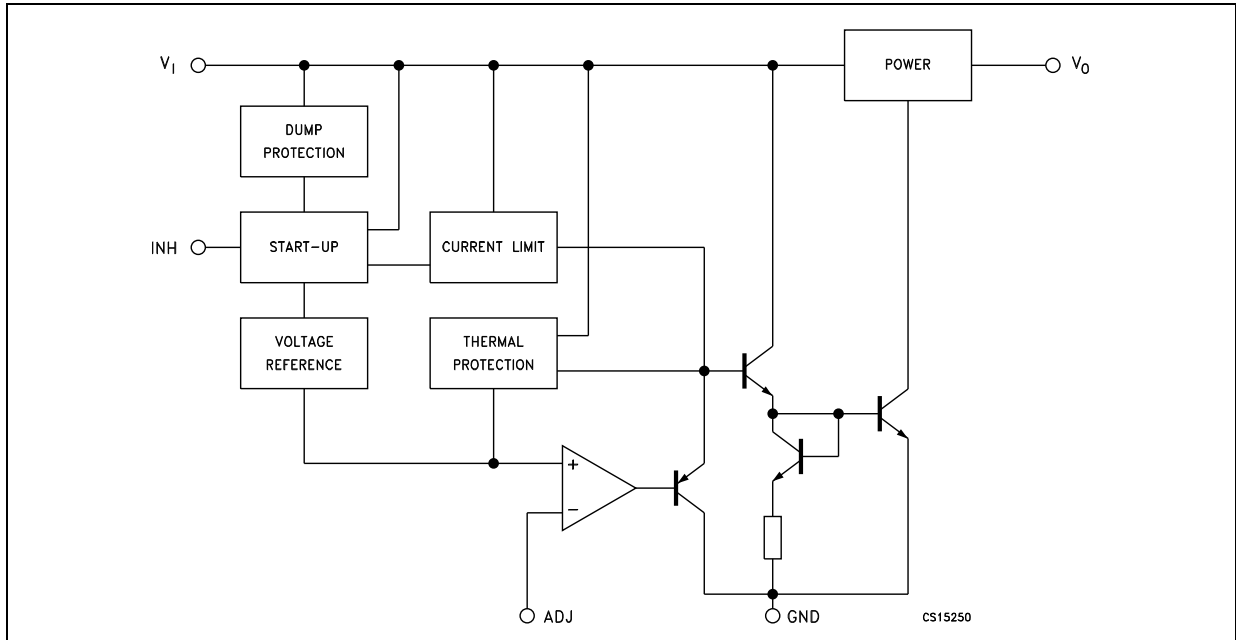
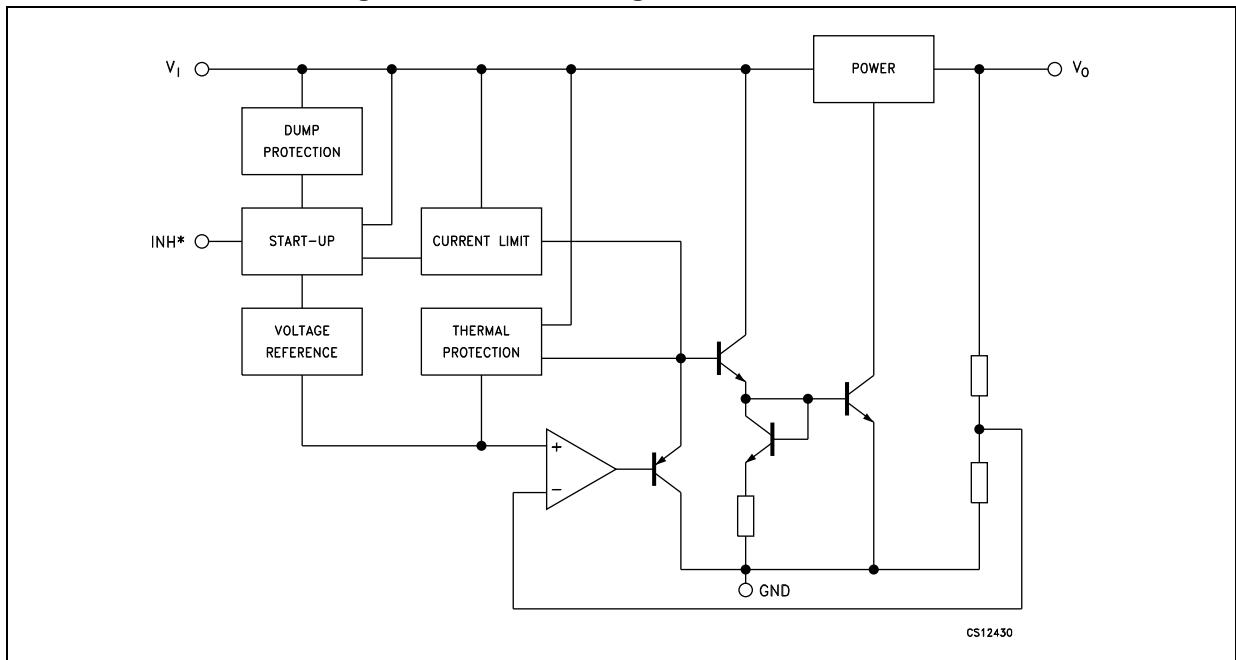


Figure 2. Schematic diagram for fixed version



* Only for version with inhibit function.

2 Pin configuration

Figure 3. Pin connections (top view)

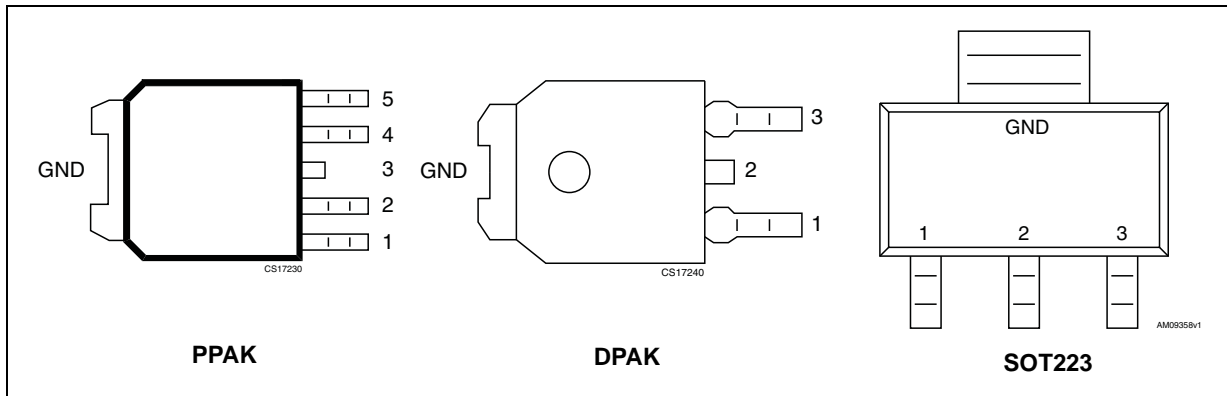
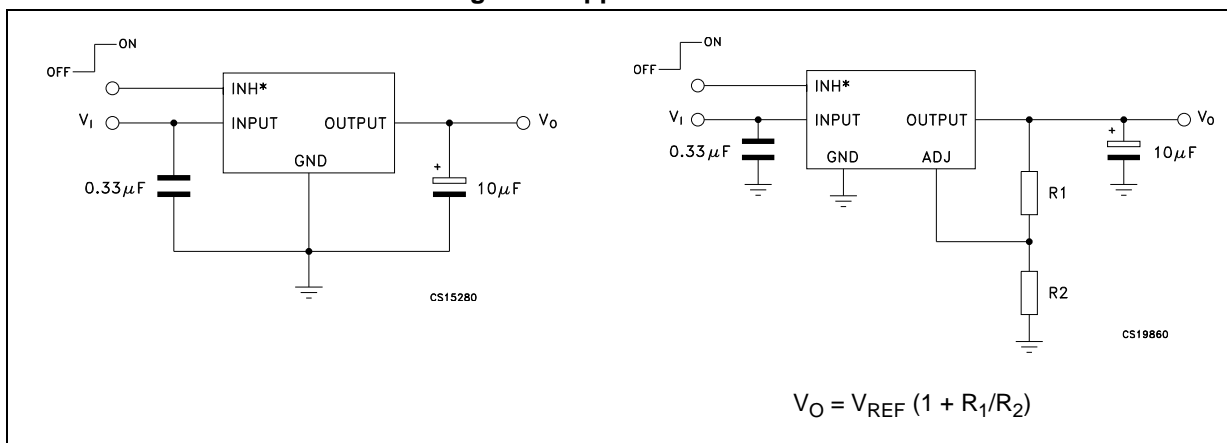


Table 2. Pin description

| Symbol | PPAK | DPAK | SOT223 |
|--------------|------|------|--------|
| V_I | 2 | 1 | 1 |
| GND | 3 | 2 | 2 |
| V_O | 4 | 3 | 3 |
| ADJ/N.C. (1) | 5 | | |
| INHIBIT (2) | 1 | | |

1. Not connected for fixed version.
2. Not internally pulled up; in order to assure the operating condition (device in ON mode), it must be connected to a positive voltage higher than 2 V.

Figure 4. Application circuit



* Only for version with inhibit function.

3 Maximum ratings

Table 3. Absolute maximum ratings

| Symbol | Parameter | Value | Unit |
|-----------|-----------------------------|--------------------|------|
| V_I | DC input voltage | 30 ⁽¹⁾ | V |
| V_{INH} | Inhibit input voltage | 14 | 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 temperature range | - 40 to 125 | °C |

1. Above 14 V the device is automatically in shut-down.

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

Table 4. Thermal data

| Symbol | Parameter | DPAK | PPAK | SOT223 | Unit |
|------------|-------------------------------------|------|------|--------|------|
| R_{thJC} | Thermal resistance junction-case | 8 | 8 | 25 | °C/W |
| R_{thJA} | Thermal resistance junction-ambient | 100 | 100 | 110 | °C/W |

4 Electrical characteristics

$I_O = 10 \text{ mA}$, (*Note 4*) $T_J = 25 \text{ }^\circ\text{C}$, $V_I = 3.5 \text{ V}$, $V_{INH} = 2\text{V}$, $C_I = 330 \text{ nF}$, $C_O = 10 \text{ }\mu\text{F}$, unless otherwise specified.

Table 5. Electrical characteristics of LD29080#15

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|---|-------|------|-------|----------------------------|
| V_I | Operating input voltage | $I_O = 10 \text{ mA}$ to 800 mA | 2.5 | | 13 | V |
| V_O | Output voltage | $I_O = 10 \text{ mA}$ to 800 mA , $V_I = 3$ to 7 V $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 1.485 | 1.5 | 1.515 | V |
| | | | 1.463 | | 1.537 | |
| ΔV_O | Load regulation | $I_O = 10 \text{ mA}$ to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 3$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120 \text{ Hz}$, $V_I = 3.8 \pm 1 \text{ V}$, $I_O = 400 \text{ mA}$ (<i>Note 1</i>) | 65 | 75 | | dB |
| I_q | Quiescent current | $I_O = 10 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 2 | 5 | mA |
| | | $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 8 | 20 | |
| | | $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 14 | 35 | |
| | | $V_I = 13 \text{ V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 130 | 180 | μA |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13\text{V}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 5 | 10 | μA |
| eN | Output noise voltage | $B_P = 10 \text{ Hz}$ to 100 kHz , $I_O = 100 \text{ mA}$ (<i>Note 1</i>) | | 60 | | μV_{RMS} |

- Note:
- 1 Guaranteed by design.
 - 2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1 \text{ V}$ applied to V_I .
 - 3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .
 - 4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10$ mA, (Note 4) $T_J = 25$ °C, $V_I = 3.5$ V, $V_{INH} = 2$ V, $C_I = 330$ nF, $C_O = 10$ μ F, unless otherwise specified.

Table 6. Electrical characteristics of LD29080#18

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|--|----------------|------|----------------|------------------------|
| V_I | Operating input voltage | $I_O = 10$ mA to 800 mA | 2.5 | | 13 | V |
| V_O | Output voltage | $I_O = 10$ mA to 800 mA, $V_I = 3$ to 7.3 V $T_J = -40$ to 125 °C | 1.782 1.755 | 1.8 | 1.818 1.845 | V |
| ΔV_O | Load regulation | $I_O = 10$ mA to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 3$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120$ Hz, $V_I = 3.8 \pm 1$ V, $I_O = 400$ mA (Note 1) | 62 | 72 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.1 | | V |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.2 | | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.4 | 0.7 | |
| I_q | Quiescent current | $I_O = 10$ mA, $T_J = -40$ to 125 °C | | 2 | 5 | mA |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C | | 8 | 20 | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C | | 14 | 35 | |
| | | $V_I = 13$ V, $V_{INH} = GND$, $T_J = -40$ to 125 °C | | 130 | 180 | μ A |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to 125 °C | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to 125 °C | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13$ V, $T_J = -40$ to 125 °C | | 5 | 10 | μ A |
| eN | Output noise voltage | $B_P = 10$ Hz to 100 kHz, $I_O = 100$ mA (Note 1) | | 72 | | μ V _{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1$ V applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10 \text{ mA}$, (Note 4) $T_J = 25 \text{ }^\circ\text{C}$, $V_I = 4.5 \text{ V}$, $V_{INH} = 2 \text{ V}$, $C_I = 330 \text{ nF}$, $C_O = 10 \text{ } \mu\text{F}$, unless otherwise specified.

Table 7. Electrical characteristics of LD29080#25

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|---|-------|------|-------|---------------------|
| V_I | Operating input voltage | $I_O = 10 \text{ mA}$ to 800 mA | | | 13 | V |
| V_O | Output voltage | $I_O = 10 \text{ mA}$ to 800 mA , $V_I = 3.5$ to 8 V $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 2.475 | 2.5 | 2.525 | V |
| | | | 2.438 | | 2.562 | |
| ΔV_O | Load regulation | $I_O = 10 \text{ mA}$ to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 3.5$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120 \text{ Hz}$, $V_I = 4.5 \pm 1 \text{ V}$, $I_O = 400 \text{ mA}$ (Note 1) | 55 | 70 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) | | 0.1 | | V |
| | | $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) | | 0.2 | | |
| | | $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) | | 0.4 | 0.7 | |
| I_q | Quiescent current | $I_O = 10 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 2 | 5 | mA |
| | | $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 8 | 20 | |
| | | $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 14 | 35 | |
| | | $V_I = 13 \text{ V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 130 | 180 | μA |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13 \text{ V}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 5 | 10 | μA |
| eN | Output noise voltage | $B_p = 10 \text{ Hz}$ to 100 kHz , $I_O = 100 \text{ mA}$ (Note 1) | | 100 | | μV_{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1 \text{ V}$ applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10 \text{ mA}$, (Note 4) $T_J = 25 \text{ }^\circ\text{C}$, $V_I = 5.3 \text{ V}$, $V_{INH} = 2 \text{ V}$, $C_I = 330 \text{ nF}$, $C_O = 10 \text{ } \mu\text{F}$, unless otherwise specified.

Table 8. Electrical characteristics of LD29080#33

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|--|----------------|---------------------|----------------------|-----------------------------|
| V_I | Operating input voltage | $I_O = 10\text{mA}$ to 800mA | | | 13 | V |
| V_O | Output voltage | $I_O = 10 \text{ mA}$ to 800 mA , $V_I = 4.3$ to 8.8 V $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 3.267 3.218 | 3.3 | 3.333 3.382 | V |
| ΔV_O | Load regulation | $I_O = 10 \text{ mA}$ to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 4.3$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120 \text{ Hz}$, $V_I = 5.3 \pm 1 \text{ V}$, $I_O = 400 \text{ mA}$ (Note 1) | 52 | 67 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) | | 0.1 0.2 0.4 | | V |
| I_q | Quiescent current | $I_O = 10 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $V_I = 13 \text{ V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 2 8 14 130 | 5 20 35 180 | mA μA |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13 \text{ V}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 5 | 10 | μA |
| eN | Output noise voltage | $B_P = 10 \text{ Hz}$ to 100 kHz , $I_O = 100 \text{ mA}$ (Note 1) | | 132 | | μV_{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1 \text{ V}$ applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10 \text{ mA}$, (Note 4) $T_J = 25 \text{ }^\circ\text{C}$, $V_I = 7 \text{ V}$, $V_{INH} = 2 \text{ V}$, $C_I = 330 \text{ nF}$, $C_O = 10 \text{ } \mu\text{F}$, unless otherwise specified.

Table 9. Electrical characteristics of LD29080#50

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|--|---------------|---------------------|----------------------|-----------------------------|
| V_I | Operating input voltage | $I_O = 10 \text{ mA}$ to 800 mA | | | 13 | V |
| V_O | Output voltage | $I_O = 10 \text{ mA}$ to 800 mA , $V_I = 6$ to 10.5 V $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 4.95 4.875 | 5 | 5.05 5.125 | V |
| ΔV_O | Load regulation | $I_O = 10 \text{ mA}$ to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 6$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120 \text{ Hz}$, $V_I = 7 \pm 1 \text{ V}$, $I_O = 400 \text{ mA}$ (Note 1) | 49 | 64 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ (Note 2) | | 0.1 0.2 0.4 | | V |
| I_q | Quiescent current | $I_O = 10 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $I_O = 400 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $I_O = 800 \text{ mA}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ $V_I = 13 \text{ V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 2 8 14 130 | 5 20 35 180 | mA μA |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13 \text{ V}$, $T_J = -40$ to $125 \text{ }^\circ\text{C}$ | | 5 | 10 | μA |
| eN | Output noise voltage | $B_P = 10 \text{ Hz}$ to 100 kHz , $I_O = 100 \text{ mA}$ (Note 1) | | 180 | | μV_{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1 \text{ V}$ applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10$ mA, (Note 4) $T_J = 25$ °C, $V_I = 10$ V, $V_{INH} = 2$ V, $C_I = 330$ nF, $C_O = 10$ μ F, unless otherwise specified)

Table 10. Electrical characteristics of LD29080#80

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|---|--------------|------|--------------|------------------------|
| V_I | Operating input voltage | $I_O = 10$ mA to 800 mA | | | 13 | V |
| V_O | Output voltage | $I_O = 10$ mA to 800 mA, $V_I = 9$ to 13 V $T_J = -40$ to 125 °C | 7.92 7.80 | 8 | 8.08 8.20 | V |
| ΔV_O | Load regulation | $I_O = 10$ mA to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 9$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120$ Hz, $V_I = 10 \pm 1$ V, $I_O = 400$ mA (Note 1) | 45 | 59 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.1 | | V |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.2 | | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.4 | 0.7 | |
| I_q | Quiescent current | $I_O = 10$ mA, $T_J = -40$ to 125 °C | | 2 | 5 | mA |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C | | 8 | 20 | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C | | 14 | 35 | |
| | | $V_I = 13$ V, $V_{INH} = GND$, $T_J = -40$ to 125 °C | | 130 | 180 | μ A |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to 125 °C | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to 125 °C | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13$ V, $T_J = -40$ to 125 °C | | 5 | 10 | μ A |
| eN | Output noise voltage | $B_P = 10$ Hz to 100 kHz, $I_O = 100$ mA (Note 1) | | 320 | | μ V _{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1$ V applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10$ mA, (Note 4) $T_J = 25$ °C, $V_I = 11$ V, $V_{INH} = 2$ V, $C_I = 330$ nF, $C_O = 10$ μ F, unless otherwise specified.

Table 11. Electrical characteristics of LD29080#90

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|---|---------------|------|---------------|------------------------|
| V_I | Operating input voltage | $I_O = 10$ mA to 800 mA | | | 13 | V |
| V_O | Output voltage | $I_O = 10$ mA to 800 mA, $V_I = 9$ to 13 V $T_J = -40$ to 125 °C | 8.91 8.775 | 9 | 9.09 9.225 | V |
| ΔV_O | Load regulation | $I_O = 10$ mA to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 10$ to 13 V | | 0.06 | 0.5 | % |
| SVR | Supply voltage rejection | $f = 120$ Hz, $V_I = 11 \pm 1$ V, $I_O = 400$ mA (Note 1) | 43 | 57 | | dB |
| V_{DROP} | Dropout voltage | $I_O = 150$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.1 | | V |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.2 | | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C (Note 2) | | 0.4 | 0.7 | |
| I_q | Quiescent current | $I_O = 10$ mA, $T_J = -40$ to 125 °C | | 2 | 5 | mA |
| | | $I_O = 400$ mA, $T_J = -40$ to 125 °C | | 8 | 20 | |
| | | $I_O = 800$ mA, $T_J = -40$ to 125 °C | | 14 | 35 | |
| | | $V_I = 13$ V, $V_{INH} = GND$, $T_J = -40$ to 125 °C | | 130 | 180 | μ A |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to 125 °C | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to 125 °C | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13$ V, $T_J = -40$ to 125 °C | | 5 | 10 | μ A |
| eN | Output noise voltage | $B_P = 10$ Hz to 100 kHz, $I_O = 100$ mA (Note 1) | | 330 | | μ V _{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1$ V applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

$I_O = 10 \text{ mA}$, (*Note 4*) $T_J = 25 \text{ °C}$, $V_I = 10 \text{ V}$, $V_{INH} = 2 \text{ V}$, $C_I = 330 \text{ nF}$, $C_O = 10 \text{ }\mu\text{F}$, unless otherwise specified.

Table 12. Electrical characteristics of LD29080#ADJ

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|--------------------------|--|--------|------|--------|---------------------|
| V_I | Operating input voltage | $I_O = 10 \text{ mA}$ to 800 mA | 2.5 | | 13 | V |
| ΔV_O | Load regulation | $I_O = 10 \text{ mA}$ to 800 mA | | 0.2 | 1.0 | % |
| ΔV_O | Line regulation | $V_I = 2.5$ to 13 V , $I_O = 10 \text{ mA}$ | | 0.06 | 0.5 | % |
| V_{REF} | Reference voltage | $I_O = 10 \text{ mA}$ to 800 mA , $V_I = 2.5$ to 6.73 V $T_J = -40$ to 125 °C (<i>Note 3</i>) | 1.2177 | 1.23 | 1.2423 | V |
| | | | 1.1993 | | 1.2607 | |
| SVR | Supply voltage rejection | $f = 120 \text{ Hz}$, $V_I = 3.23 \pm 1 \text{ V}$, $I_O = 400 \text{ mA}$ (<i>Note 1</i>) | 45 | 75 | | dB |
| I_q | Quiescent current | $I_O = 10 \text{ mA}$, $T_J = -40$ to 125 °C | | 2 | 5 | mA |
| | | $I_O = 400 \text{ mA}$, $T_J = -40$ to 125 °C | | 8 | 20 | |
| | | $I_O = 800 \text{ mA}$, $T_J = -40$ to 125 °C | | 14 | 35 | |
| | | $V_I = 13 \text{ V}$, $V_{INH} = \text{GND}$, $T_J = -40$ to 125 °C | | 130 | 180 | μA |
| I_{ADJ} | Adjust pin current | $T_J = -40$ to 125 °C | | | 1 | μA |
| I_{sc} | Short circuit current | $R_L = 0$ | | 1.2 | | A |
| V_{IL} | Control input logic low | OFF MODE, $T_J = -40$ to 125 °C | | | 0.8 | V |
| V_{IH} | Control input logic high | ON MODE, $T_J = -40$ to 125 °C | 2 | | | V |
| I_{INH} | Control input current | $V_{INH} = 13 \text{ V}$, $T_J = -40$ to 125 °C | | 5 | 10 | μA |
| eN | Output noise voltage | $B_P = 10 \text{ Hz}$ to 100 kHz , $I_O = 100 \text{ mA}$ (<i>Note 1</i>) | | 50 | | μV_{RMS} |

Note: 1 Guaranteed by design.

2 Dropout voltage is defined as the input-to-output differential when the output voltage drops to 99% of its nominal value with $V_O + 1 \text{ V}$ applied to V_I .

3 Reference voltage is measured between output and GND pins, with ADJ PIN tied to V_O .

4 In order to avoid any output voltage rise within the whole operating temperature range, due to output leakage current, a minimum load current of 2 mA is required.

5 Typical characteristics

Figure 5. Output voltage vs. temperature

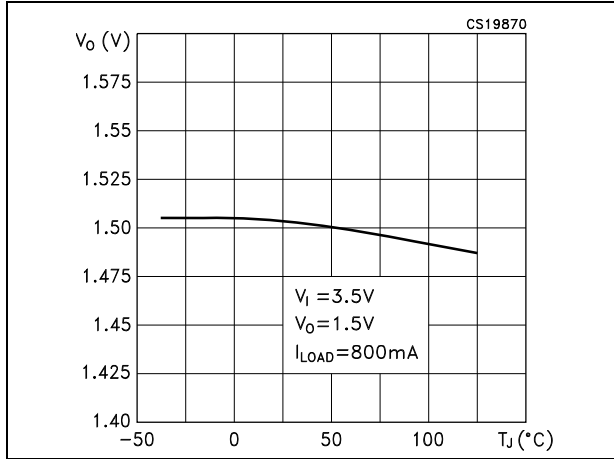


Figure 6. Reference voltage vs. temperature

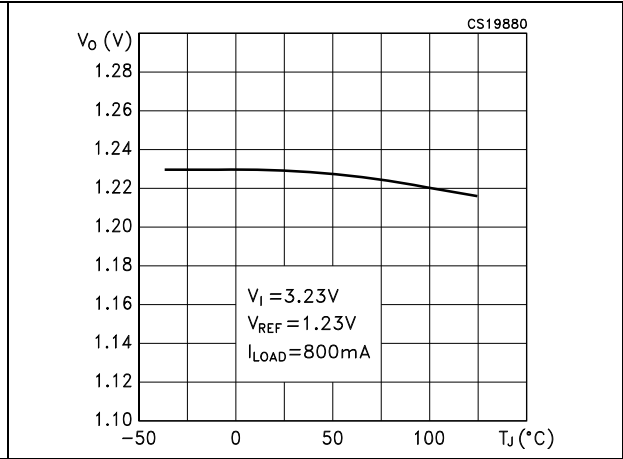


Figure 7. Dropout voltage vs. temperature

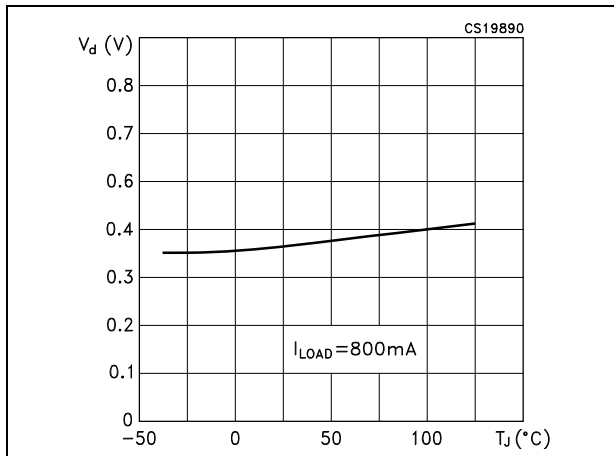


Figure 8. Dropout voltage vs. output current

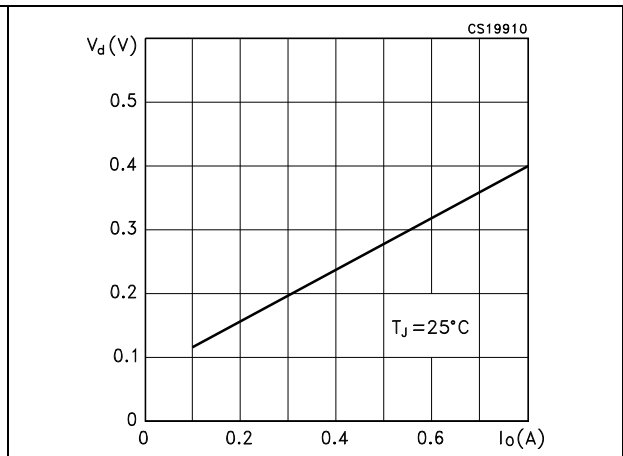


Figure 9. Quiescent current vs. output current

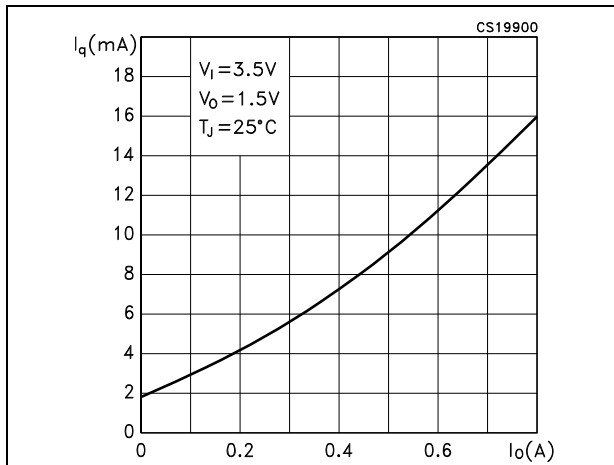


Figure 10. Quiescent current vs. temperature ($I_o = 10\text{ mA}$)

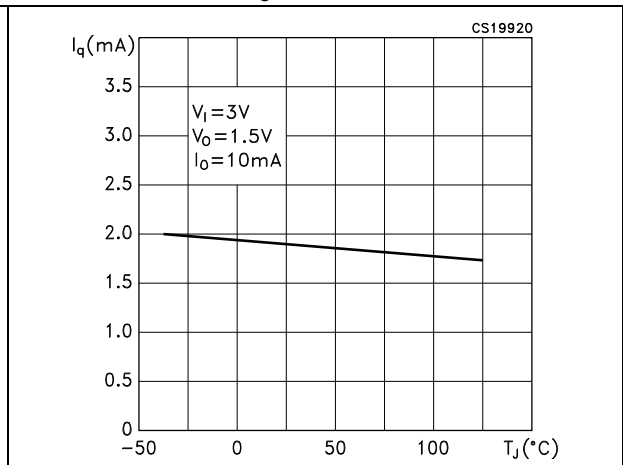


Figure 11. Quiescent current vs. supply voltage Figure 12. Quiescent current vs. temperature ($I_o = 800 \text{ mA}$)

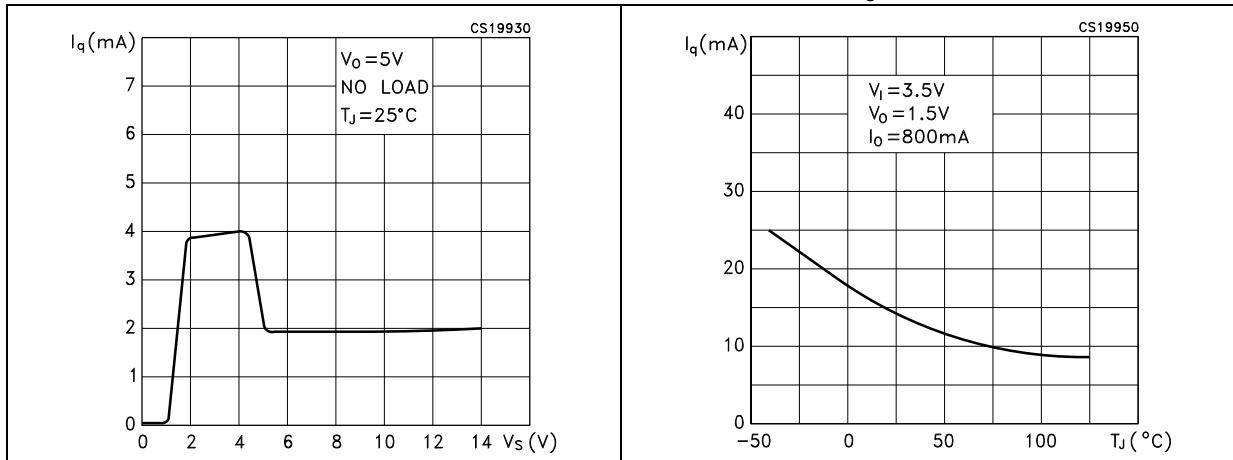


Figure 13. Short circuit current vs. temperature Figure 14. Adjust pin current vs. temperature

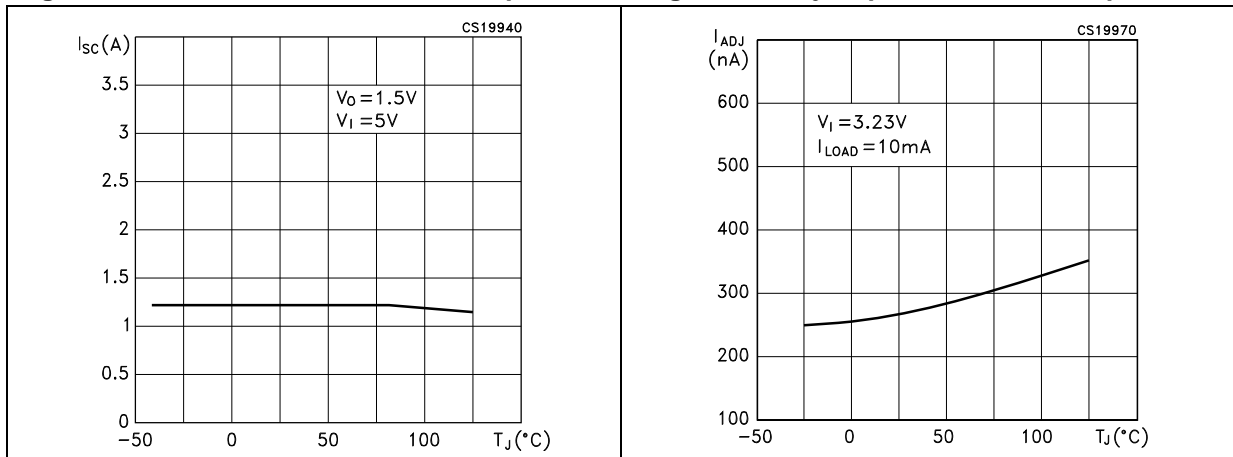


Figure 15. Supply voltage rejection vs. temperature Figure 16. Output voltage vs. input voltage

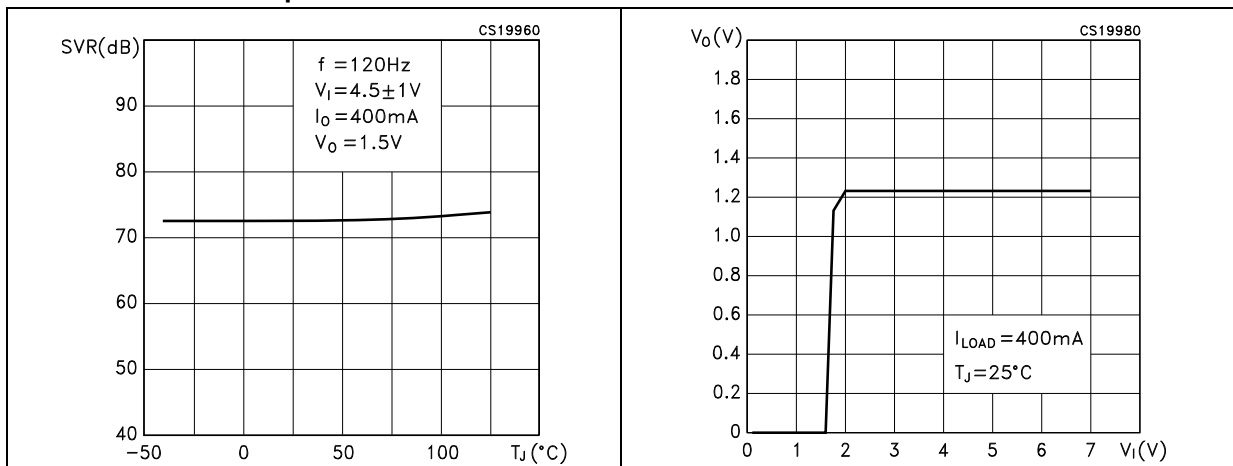


Figure 17. Stability vs. C_O

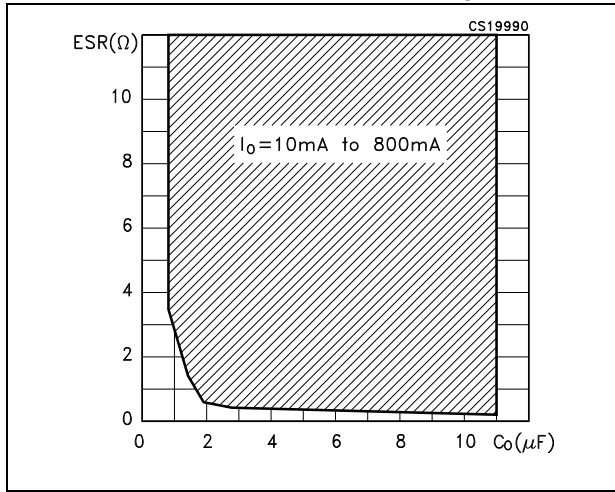


Figure 18. Line transient

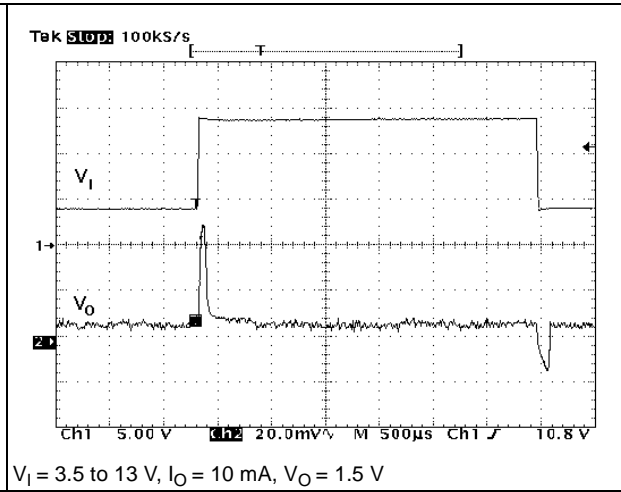
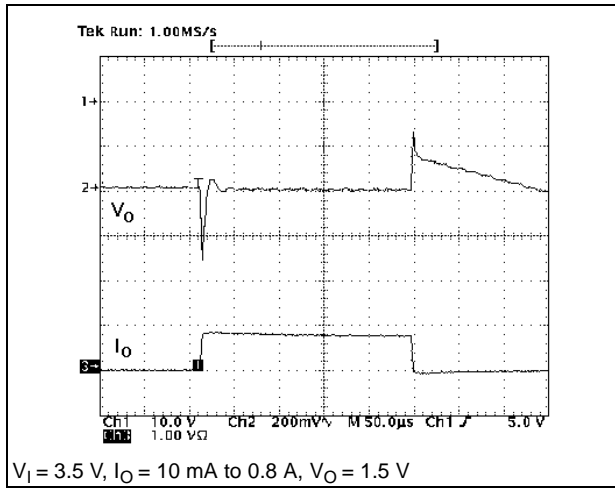


Figure 19. Load transient



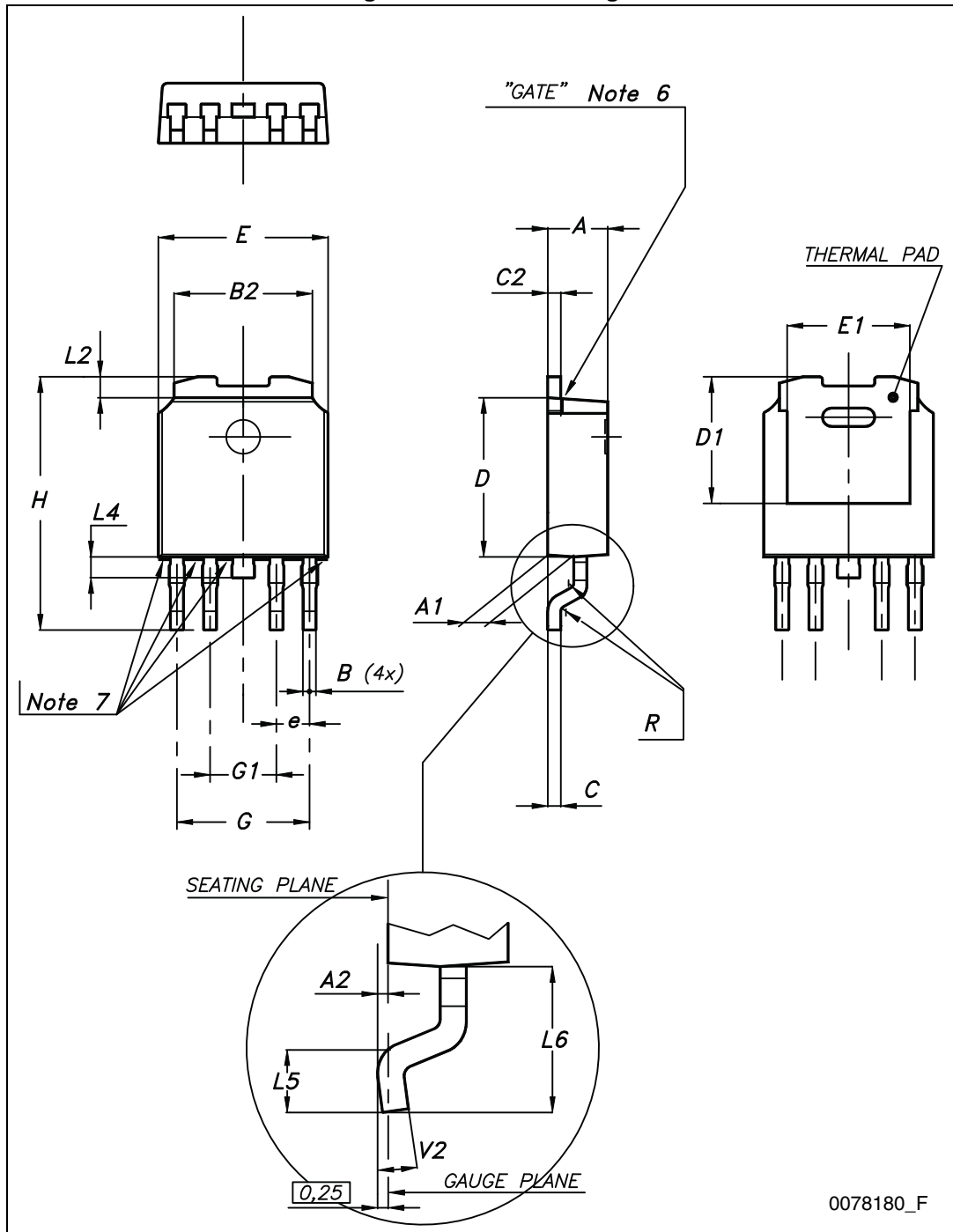
6 Package mechanical data

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 13. PPAK mechanical data

| Dim. | mm | | |
|------|------|------|------|
| | Min. | Typ. | Max. |
| A | 2.2 | | 2.4 |
| A1 | 0.9 | | 1.1 |
| A2 | 0.03 | | 0.23 |
| B | 0.4 | | 0.6 |
| B2 | 5.2 | | 5.4 |
| C | 0.45 | | 0.6 |
| C2 | 0.48 | | 0.6 |
| D | 6 | | 6.2 |
| D1 | | 5.1 | |
| E | 6.4 | | 6.6 |
| E1 | | 4.7 | |
| e | | 1.27 | |
| G | 4.9 | | 5.25 |
| G1 | 2.38 | | 2.7 |
| H | 9.35 | | 10.1 |
| L2 | | 0.8 | 1 |
| L4 | 0.6 | | 1 |
| L5 | 1 | | |
| L6 | | 2.8 | |
| R | | 0.20 | |
| V2 | 0° | | 8° |

Figure 20. PPAK drawing

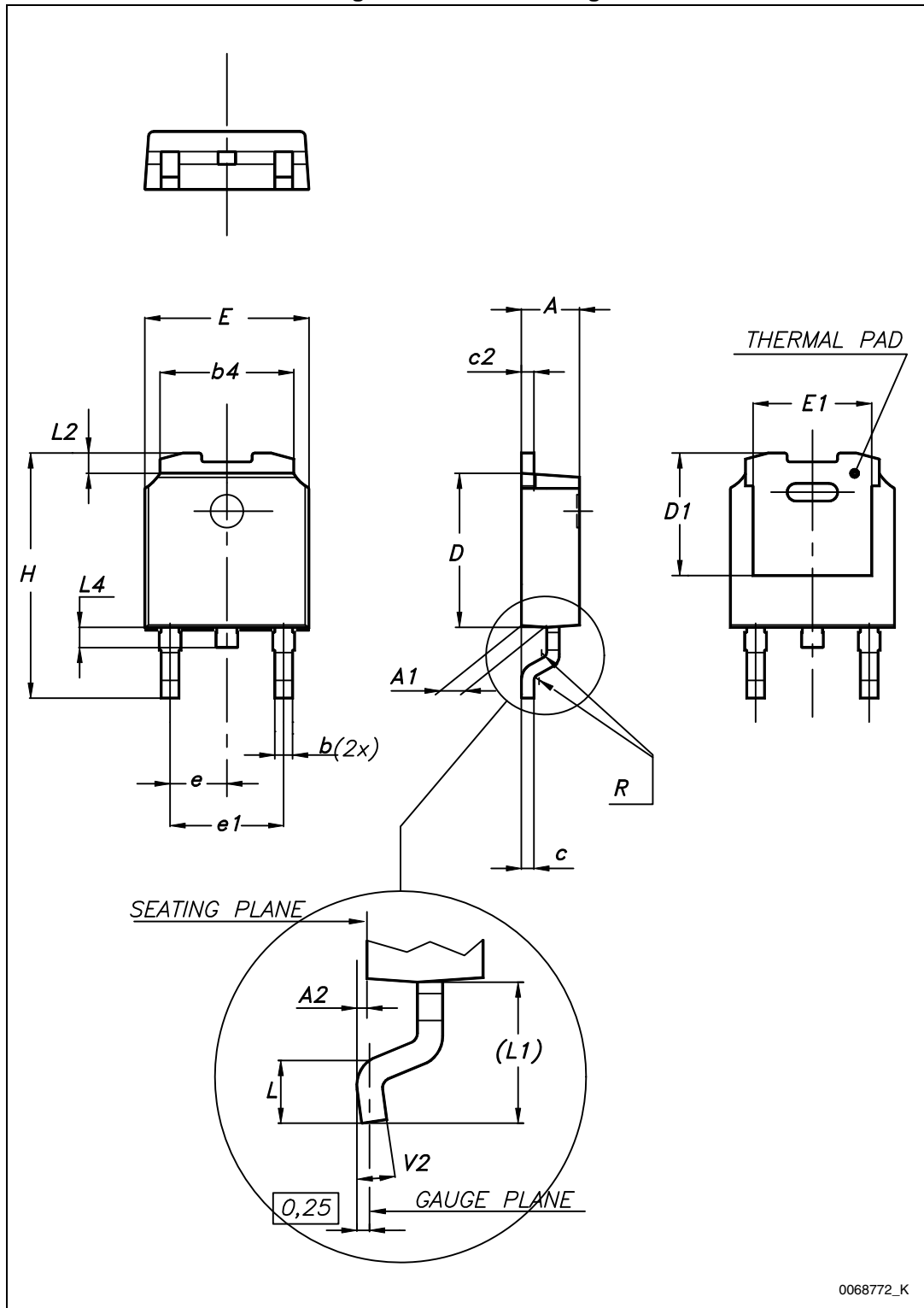


0078180_F

Table 14. DPAK mechanical data

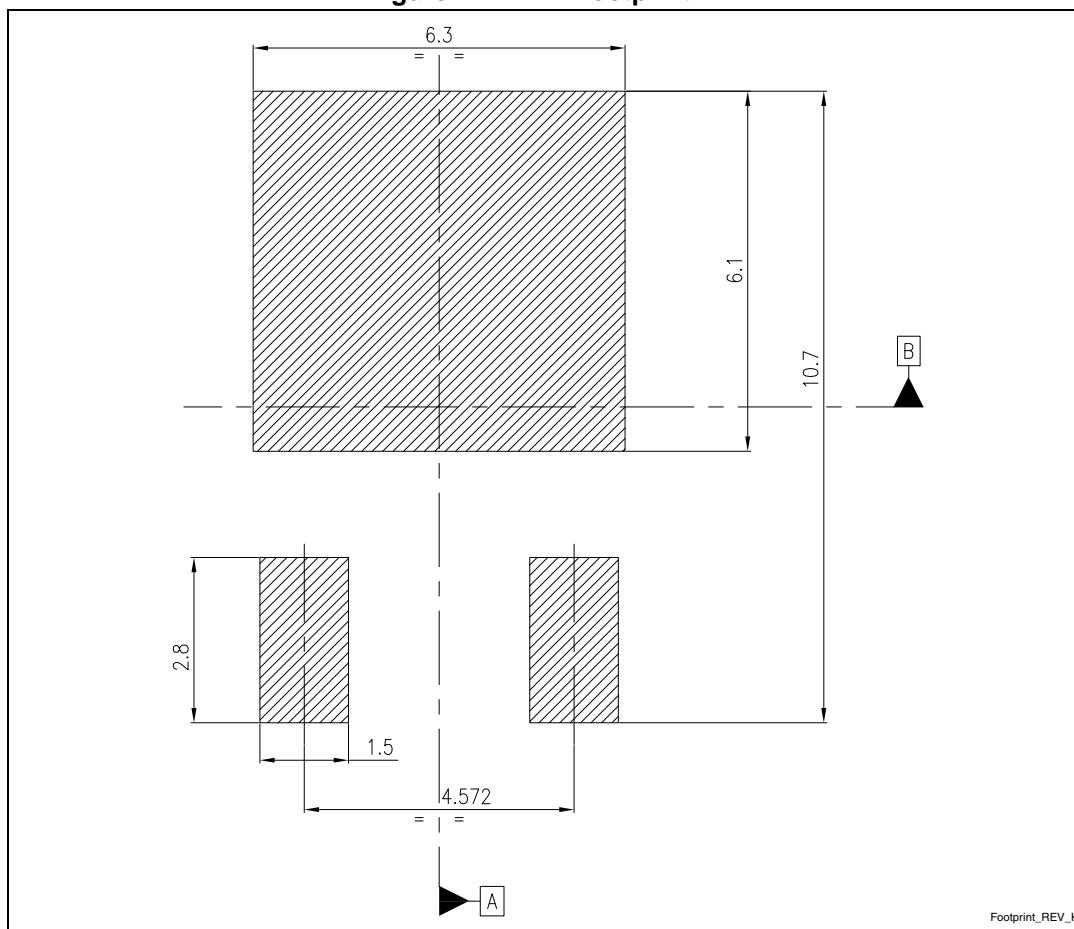
| Dim. | mm | | |
|------|------|------|-------|
| | Min. | Typ. | Max. |
| A | 2.20 | | 2.40 |
| A1 | 0.90 | | 1.10 |
| A2 | 0.03 | | 0.23 |
| b | 0.64 | | 0.90 |
| b4 | 5.20 | | 5.40 |
| c | 0.45 | | 0.60 |
| c2 | 0.48 | | 0.60 |
| D | 6.00 | | 6.20 |
| D1 | | 5.10 | |
| E | 6.40 | | 6.60 |
| E1 | | 4.70 | |
| e | | 2.28 | |
| e1 | 4.40 | | 4.60 |
| H | 9.35 | | 10.10 |
| L | 1.00 | | 1.50 |
| (L1) | | 2.80 | |
| L2 | | 0.80 | |
| L4 | 0.60 | | 1.00 |
| R | | 0.20 | |
| V2 | 0° | | 8° |

Figure 21. DPAK drawing



0068772_K

Figure 22. DPAK footprint (a)

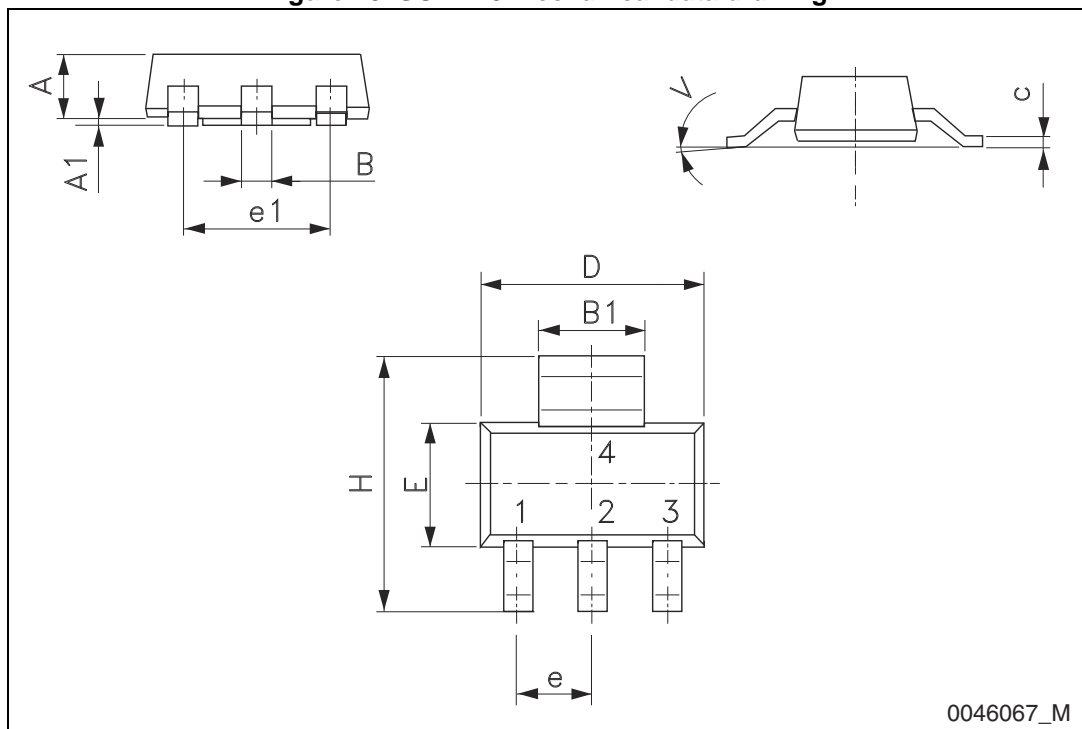


a. All dimensions are in millimeters

Table 15. SOT-223 mechanical data

| Dim. | mm | | |
|------|------|------|------|
| | Min. | Typ. | Max. |
| A | | | 1.80 |
| A1 | 0.02 | | 0.1 |
| B | 0.60 | 0.70 | 0.85 |
| B1 | 2.90 | 3.00 | 3.15 |
| c | 0.24 | 0.26 | 0.35 |
| D | 6.30 | 6.50 | 6.70 |
| e | | 2.30 | |
| e1 | | 4.60 | |
| E | 3.30 | 3.50 | 3.70 |
| H | 6.70 | 7.00 | 7.30 |
| V | | | 10° |

Figure 23. SOT-223 mechanical data drawing



0046067_M

7 Packaging mechanical data

Table 16. PPAK and DPAK tape and reel mechanical data

| Tape | | | Reel | | |
|------|------|------|-----------|------|------|
| Dim. | mm | | Dim. | mm | |
| | Min. | Max. | | Min. | Max. |
| A0 | 6.8 | 7 | A | | 330 |
| B0 | 10.4 | 10.6 | B | 1.5 | |
| B1 | | 12.1 | C | 12.8 | 13.2 |
| D | 1.5 | 1.6 | D | 20.2 | |
| D1 | 1.5 | | G | 16.4 | 18.4 |
| E | 1.65 | 1.85 | N | 50 | |
| F | 7.4 | 7.6 | T | | 22.4 |
| K0 | 2.55 | 2.75 | | | |
| P0 | 3.9 | 4.1 | Base qty. | | 2500 |
| P1 | 7.9 | 8.1 | Bulk qty. | | 2500 |
| P2 | 1.9 | 2.1 | | | |
| R | 40 | | | | |
| T | 0.25 | 0.35 | | | |
| W | 15.7 | 16.3 | | | |

Figure 24. Tape for PPAK and DPAK

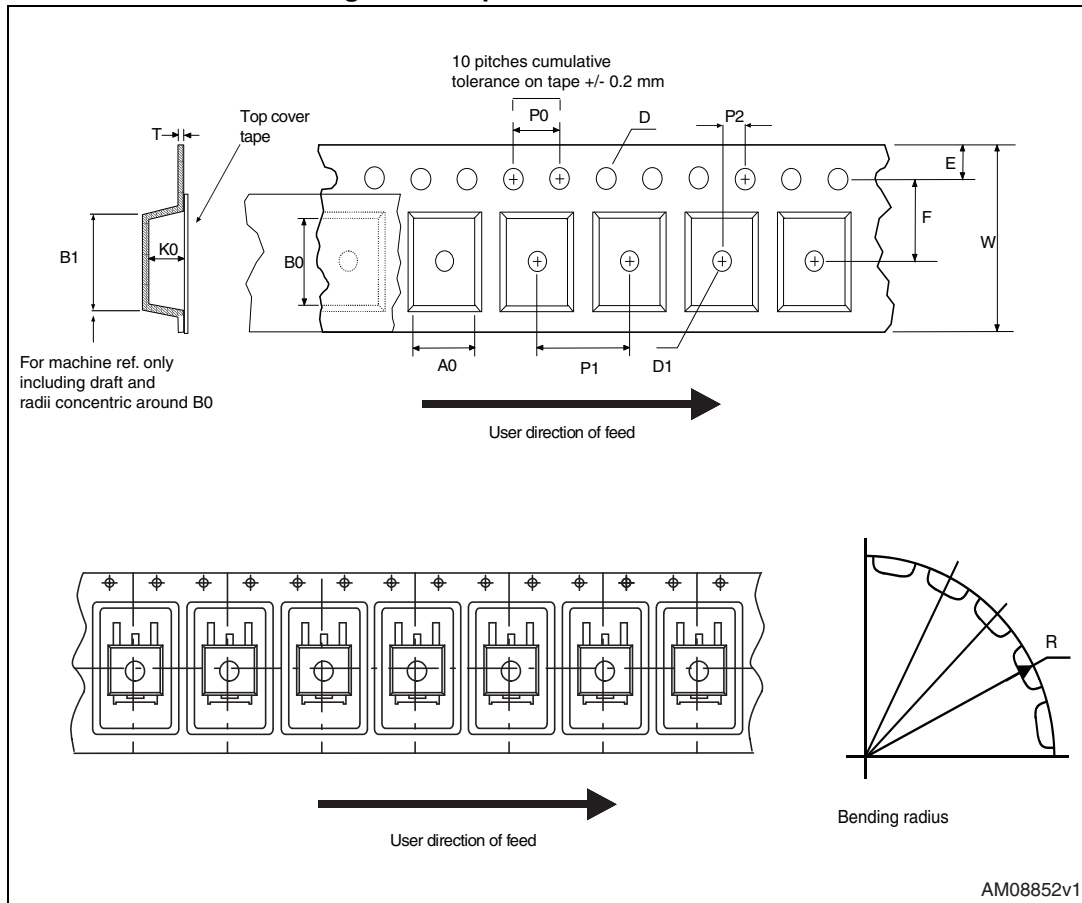
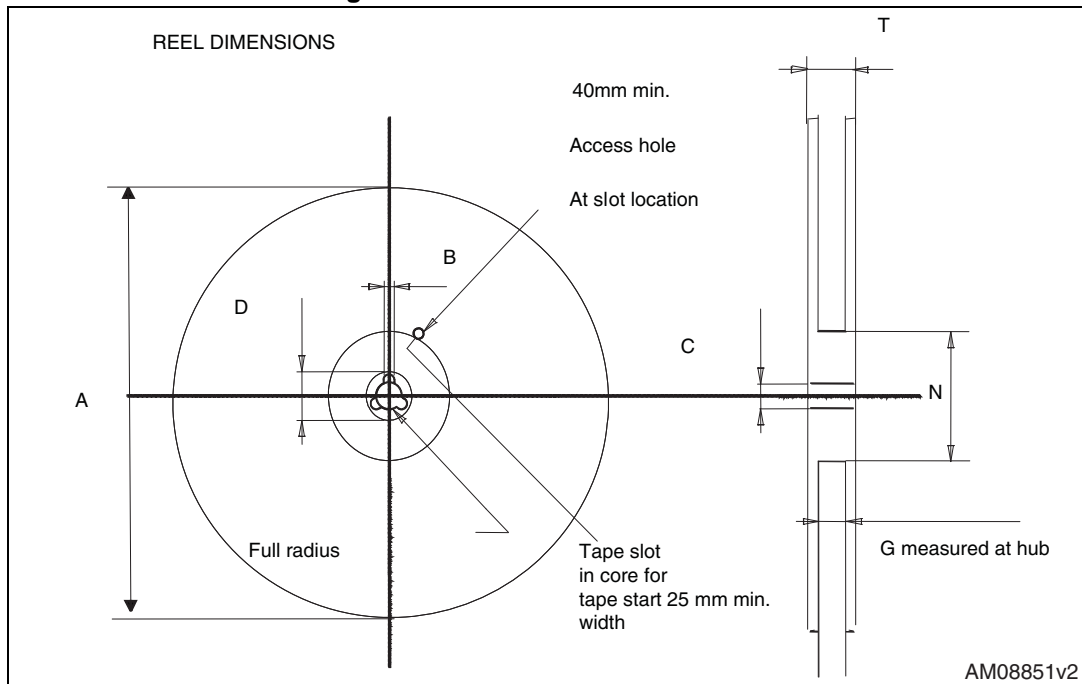


Figure 25. Reel for PPAK and DPAK



8 Revision history

Table 17. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 15-Oct-2004 | 1 | First release. |
| 20-Oct-2005 | 2 | Order codes updated. |
| 14-May-2007 | 3 | Order codes updated. |
| 26-Jan-2009 | 4 | Modified: eN value in Table 9 on page 10 . |
| 22-Feb-2011 | 5 | Added: new order code Table 1 on page 1 and mechanical data. |
| 12-Jan-2012 | 6 | Modified: R_{thJA} and R_{thJC} value for SOT223 Table 4 on page 5 . |
| 08-May-2012 | 7 | Modified: pin connections for PPAK, DPAK and SOT223 Figure 3 on page 4 . |
| 22-Nov-2013 | 8 | Part number LD29080xx changed to LD29080. Updated the Description in cover page, Table 1: Device summary . Updated Section 5: Typical characteristics and Section 6: Package mechanical data . Added Section 7: Packaging mechanical data . Minor text changes. |

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