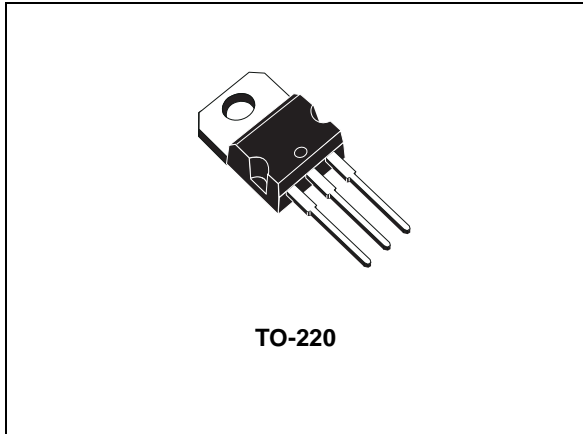


5 A low-drop positive voltage regulator adjustable

Datasheet - production data



LD1084 quiescent current flows into the load, so to increase the efficiency. A minimum capacitor of 10 μ F is needed for stability.

The device is supplied in TO-220. The on-chip trimming allows the regulator to reach a very tight output voltage tolerance, within $\pm 1\%$ at 25 °C.

Table 1. Device summary

| Order code | Output voltage |
|------------|----------------|
| LD1084V | adjustable |

Features

- Typical dropout 1.3 V (at 5 A)
- Three-terminal adjustable output voltage
- Guaranteed output current up to 5 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
- Pinout compatibility with standard adjustable VREG

Description

The LD1084 is a low-drop voltage regulator providing up to 5 A of output current. Dropout is guaranteed at a maximum of 1.5 V at the maximum output current, decreasing at lower loads. The LD1084 is pin-to-pin compatible with the older 3-terminal adjustable regulators, but it has better performances in terms of drop and output tolerance.

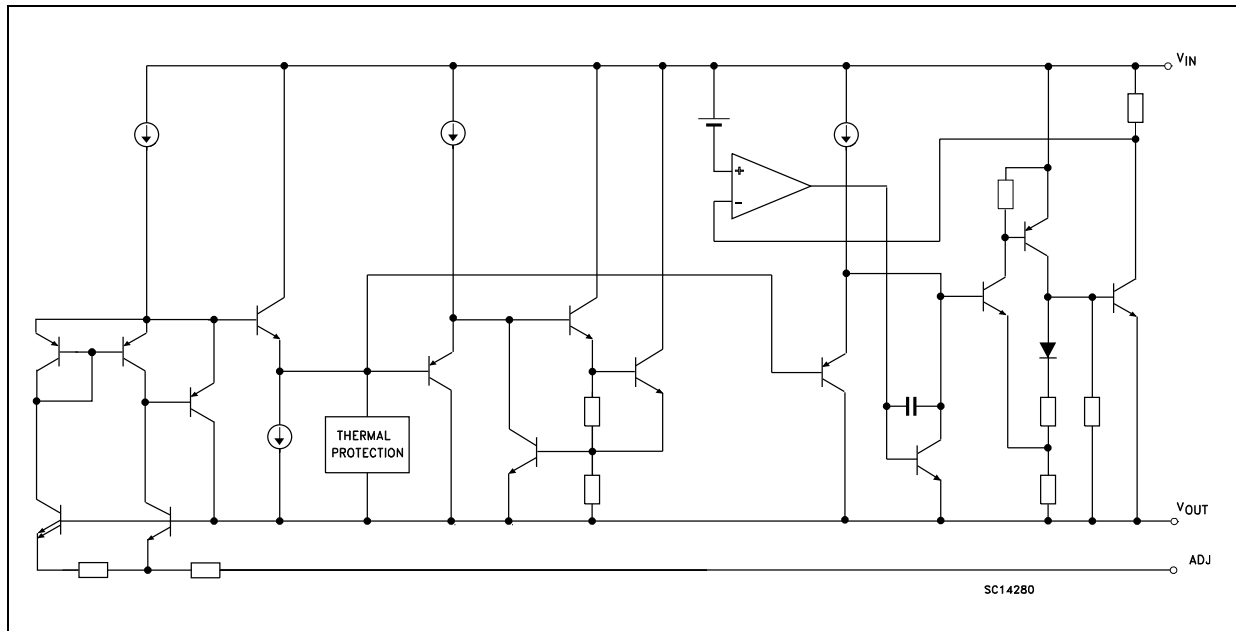
Unlike PNP regulators, where a part of the output current is wasted as quiescent current, the

Contents

| | | |
|---|---|----|
| 1 | Diagram | 3 |
| 2 | Pin configuration | 4 |
| 3 | Maximum ratings | 5 |
| 4 | Schematic application | 6 |
| 5 | Electrical characteristics | 7 |
| 6 | Typical performance characteristics | 8 |
| 7 | Package mechanical data | 13 |
| 8 | Revision history | 15 |

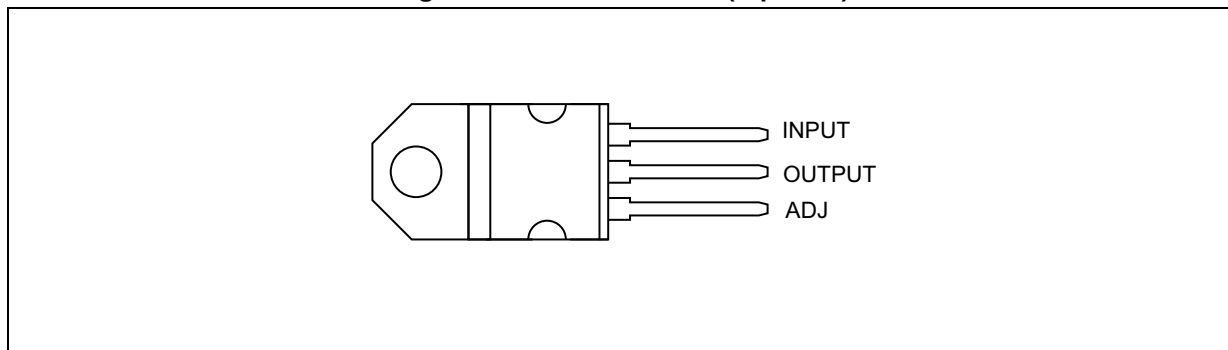
1 Diagram

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 |

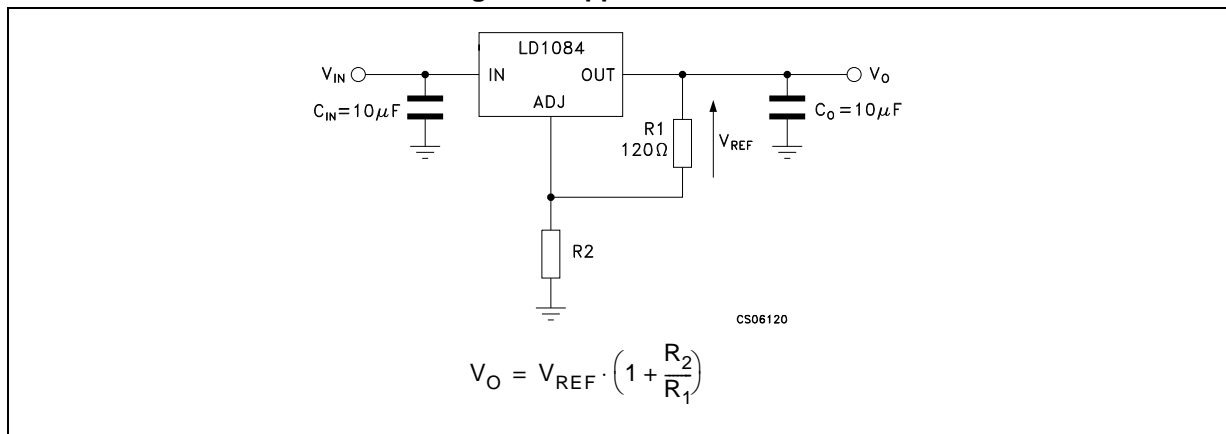
Note: Absolute maximum ratings are those values beyond which damage to the device may occur. Functional operation under these conditions is not implied.

Table 3. Thermal data

| Symbol | Parameter | TO-220 | Unit |
|------------|-------------------------------------|--------|------|
| R_{thJC} | Thermal resistance junction-case | 3 | °C/W |
| R_{thJA} | Thermal resistance junction-ambient | 50 | °C/W |

4 Schematic application

Figure 3. Application circuit



5 Electrical characteristics

$V_I = 4.25\text{ V}$, $C_I = C_O = 10\ \mu\text{F}$, $T_A = -40\text{ to }125\text{ }^\circ\text{C}$, unless otherwise specified.

Table 4. LD1084 electrical characteristics

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|-------------------------|---|---|-------|-------|-------|---------------|
| V_{ref} | Reference voltage ⁽¹⁾ | $I_O = 10\text{ mA}$, $T_J = 25\text{ }^\circ\text{C}$ | 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 |
| ΔV_O | Line regulation | $I_O = 10\text{ mA}$, $V_I = 2.85\text{ to }16.5\text{ V}$, $T_J = 25\text{ }^\circ\text{C}$ | | 0.015 | 0.2 | % |
| | | $I_O = 10\text{ mA}$, $V_I = 2.85\text{ to }16.5\text{ V}$ | | 0.035 | 0.2 | % |
| ΔV_O | Load regulation | $I_O = 10\text{ mA to }5\text{ A}$, $T_J = 25\text{ }^\circ\text{C}$ | | 0.1 | 0.3 | % |
| | | $I_O = 0\text{ to }5\text{ A}$ | | 0.2 | 0.4 | % |
| V_d | Dropout voltage | $I_O = 5\text{ A}$ | | 1.3 | 1.5 | V |
| $I_{O(\text{min})}$ | Minimum load current | $V_I = 30\text{ V}$ | | 3 | 10 | mA |
| I_{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 | $T_A = 25\text{ }^\circ\text{C}$, 30 ms pulse | | 0.003 | 0.015 | %/W |
| SVR | Supply voltage rejection | $f = 120\text{ Hz}$, $C_O = 25\ \mu\text{F}$, $C_{\text{ADJ}} = 25\ \mu\text{F}$, $I_O = 5\text{ A}$, $V_I = 6.25 \pm 3\text{ V}$ | 60 | 72 | | dB |
| I_{ADJ} | Adjust pin current | $V_I = 4.25\text{ V}$, $I_O = 10\text{ mA}$ | | 55 | 120 | μA |
| ΔI_{ADJ} | Adjust pin current change ⁽¹⁾ | $I_O = 10\text{ mA to }5\text{ A}$, $V_I = 2.85\text{ to }16.5\text{ V}$ | | 0.2 | 5 | μA |
| eN | RMS output noise voltage (% of V_O) | $T_A = 25\text{ }^\circ\text{C}$, $f = 10\text{ Hz to }10\text{ kHz}$ | | 0.003 | | % |
| S | Temperature stability | | | 0.5 | | % |
| S | Long term stability | $T_A = 125\text{ }^\circ\text{C}$, 1000 hrs | | 0.5 | | % |

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

6 Typical performance characteristics

Unless otherwise specified $T_J = 25\text{ }^\circ\text{C}$, $C_I = 10\text{ }\mu\text{F}$ (tant.), $C_O = 22\text{ }\mu\text{F}$ (tant.)

Figure 4. Short-circuit current vs. dropout voltage

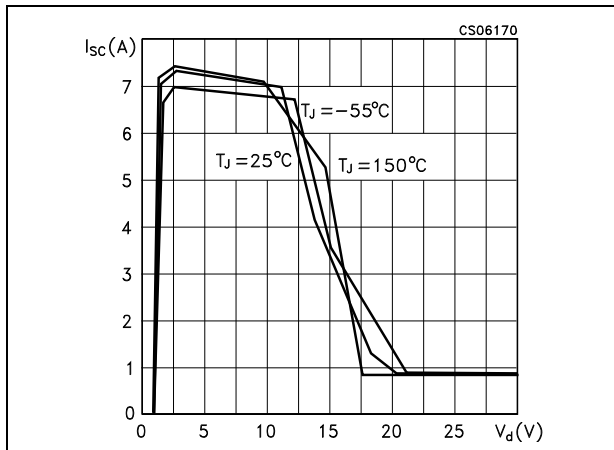


Figure 5. Line regulation vs. temperature

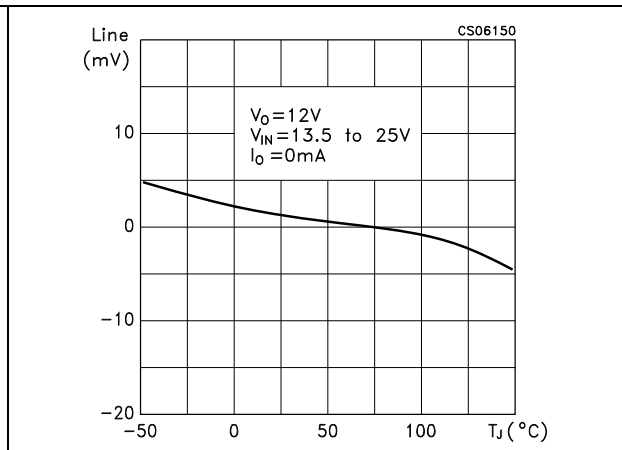


Figure 6. Quiescent current vs. temperature

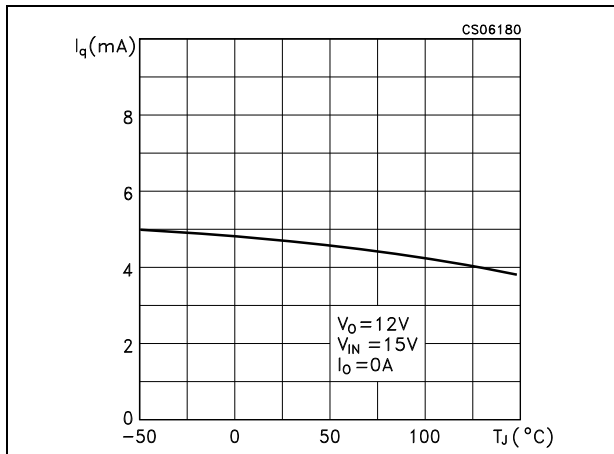


Figure 7. Output voltage vs. temperature

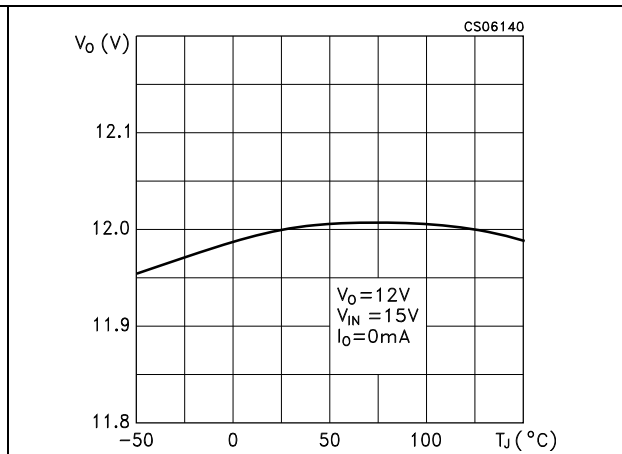


Figure 8. Load regulation vs. temperature

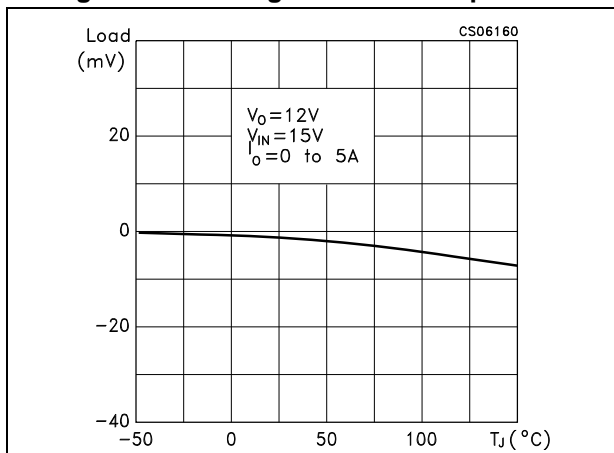


Figure 9. Quiescent current vs. output voltage

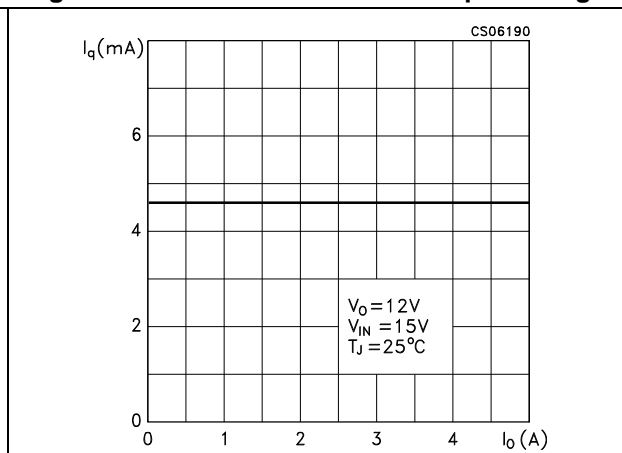


Figure 10. Quiescent current vs. input voltage

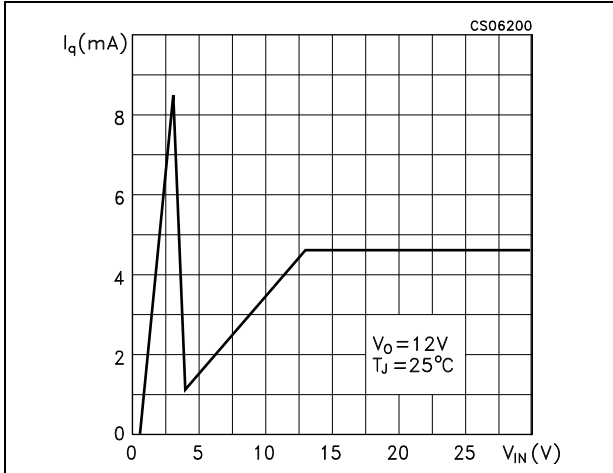


Figure 11. Dropout voltage vs. output current

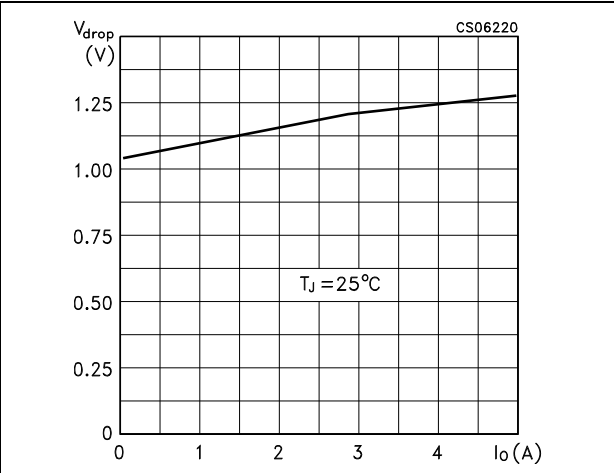


Figure 12. Supply voltage rejection vs. output current

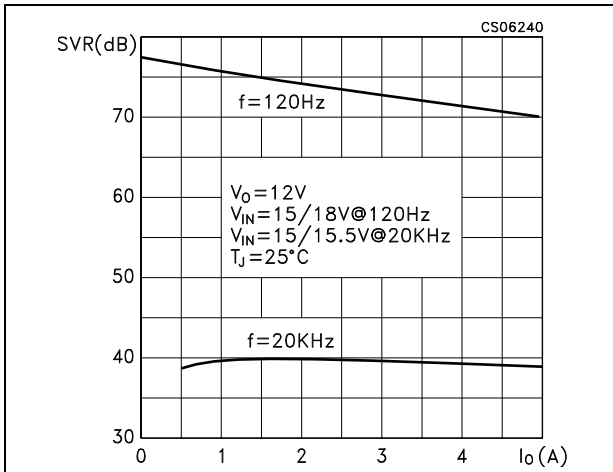


Figure 13. Dropout voltage vs. temperature

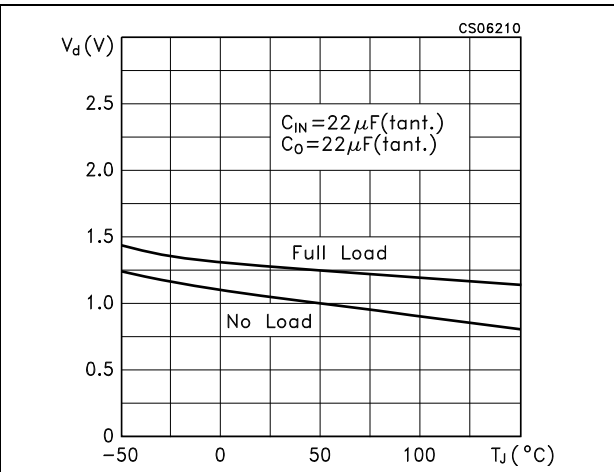


Figure 14. Supply voltage rejection vs. temperature

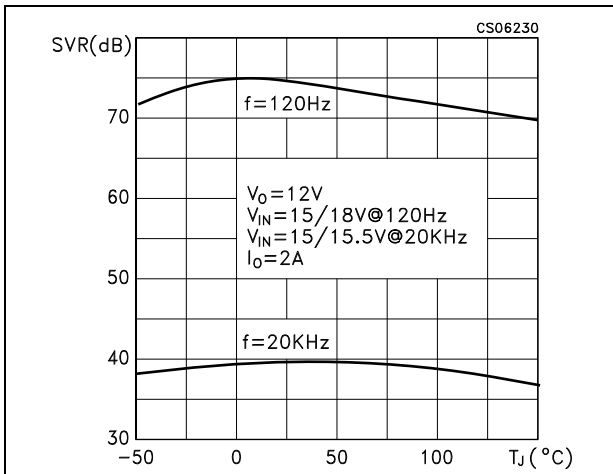


Figure 15. Supply voltage rejection vs. frequency

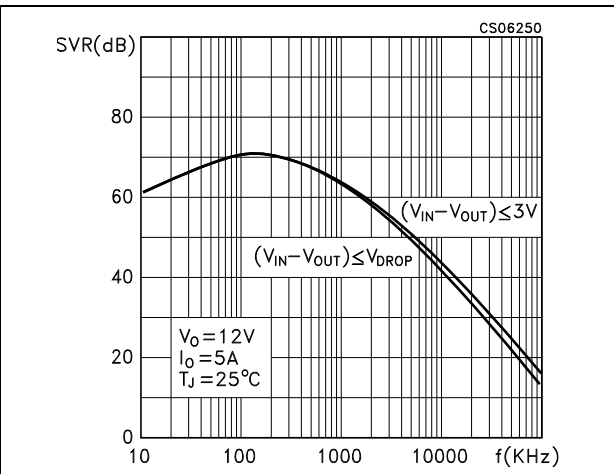


Figure 16. Adjust pin current vs. output current

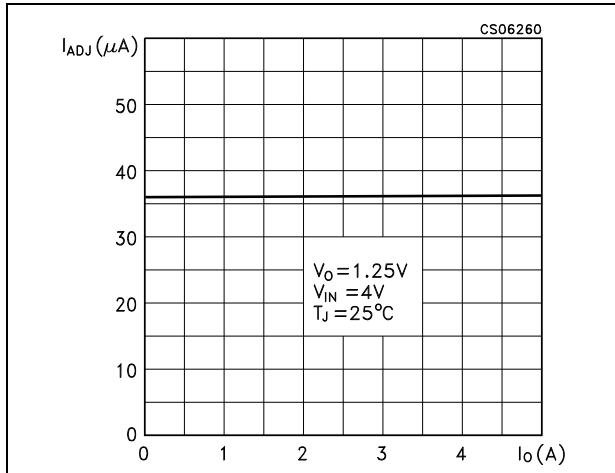


Figure 17. Reference voltage vs. temperature

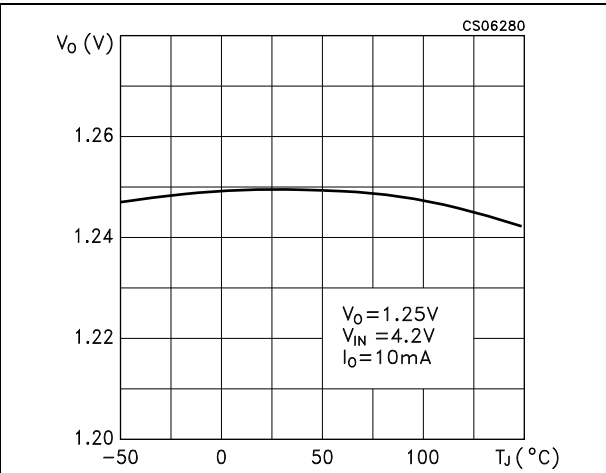


Figure 18. Load regulation vs. temperature

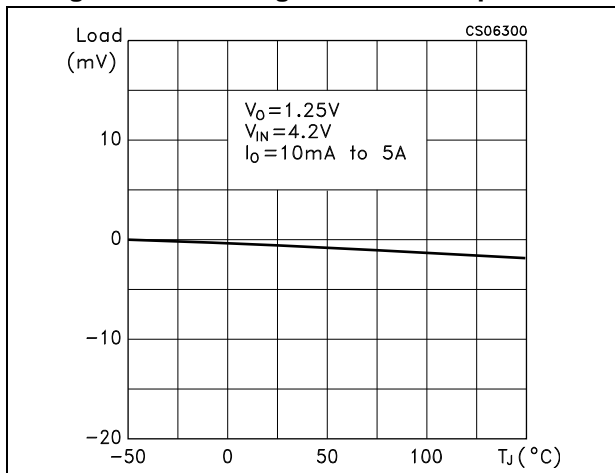


Figure 19. Adjust pin current vs. temperature

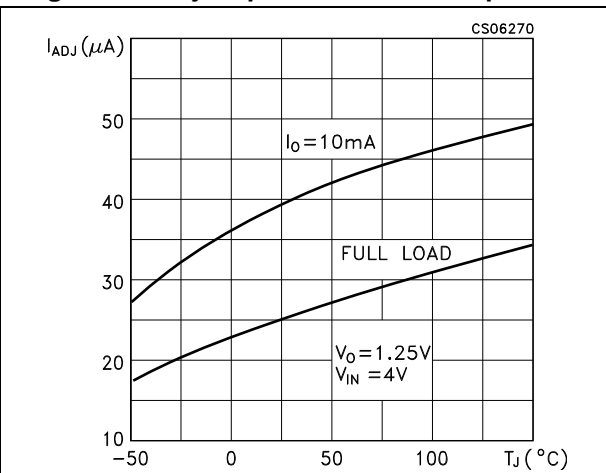


Figure 20. Line regulation vs. temperature

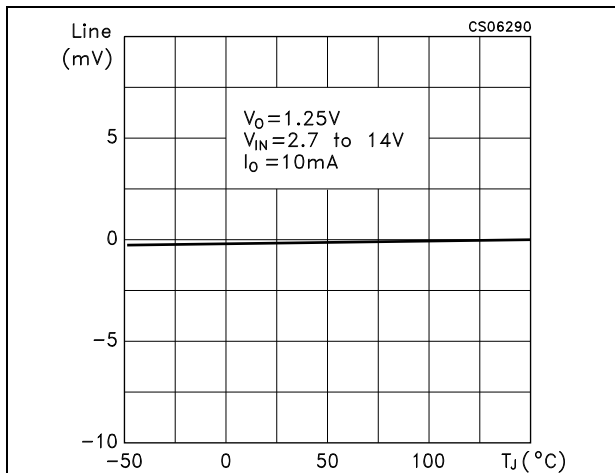


Figure 21. Minimum load current vs. temperature

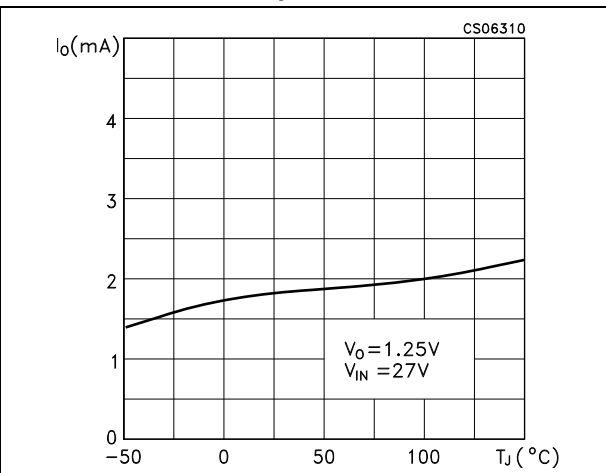


Figure 22. Supply voltage rejection vs. temperature

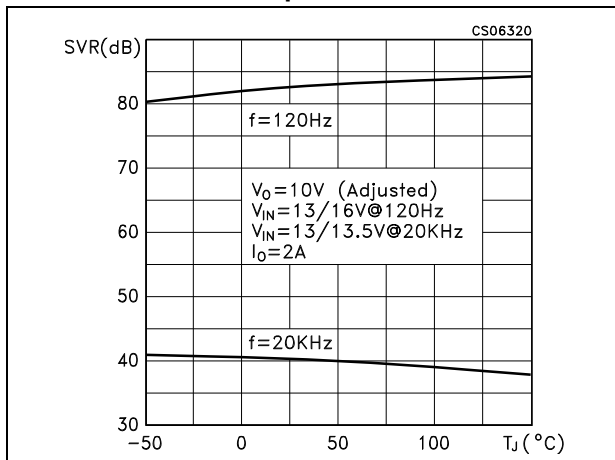


Figure 24. Stability

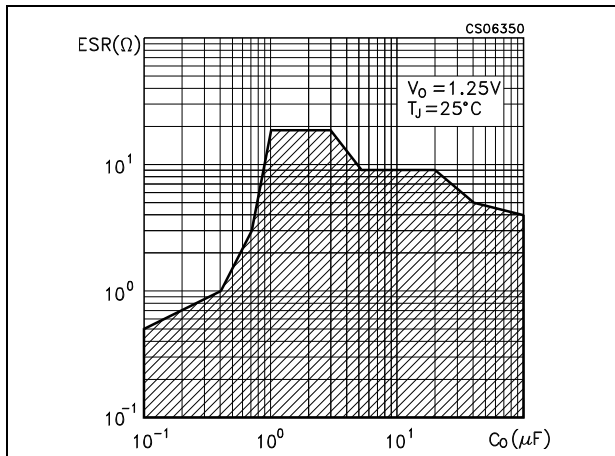


Figure 26. Stability

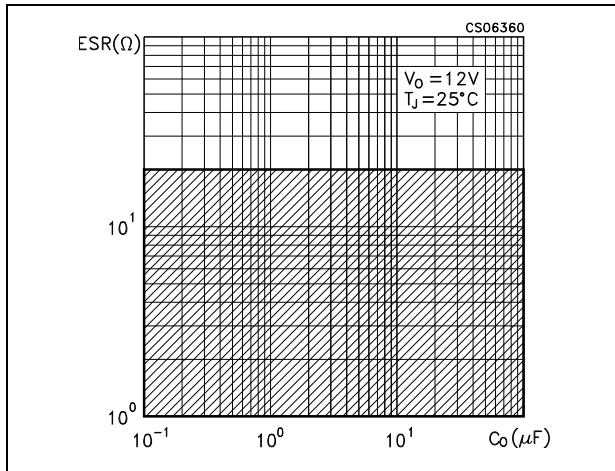


Figure 23. Supply voltage rejection vs. frequency

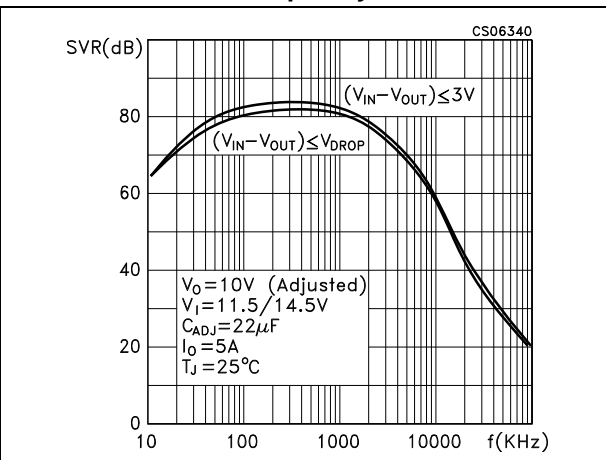


Figure 25. Supply voltage rejection vs. output current

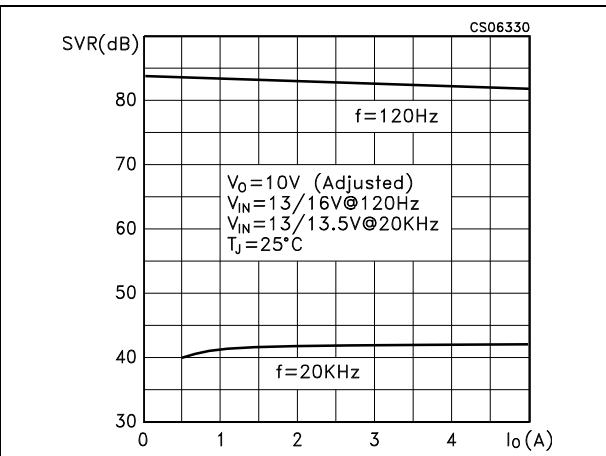


Figure 27. Line transient

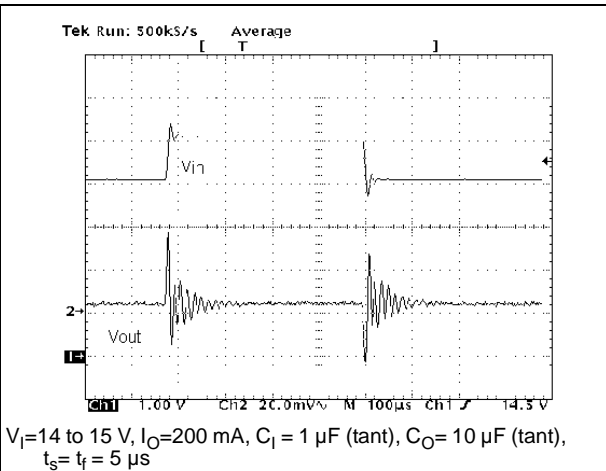


Figure 28. Line transient

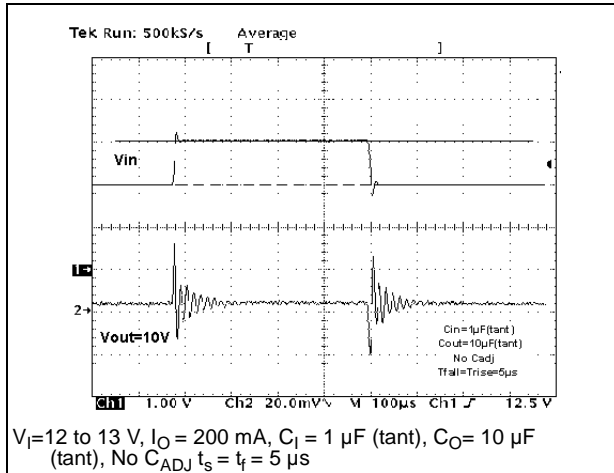


Figure 29. Load transient

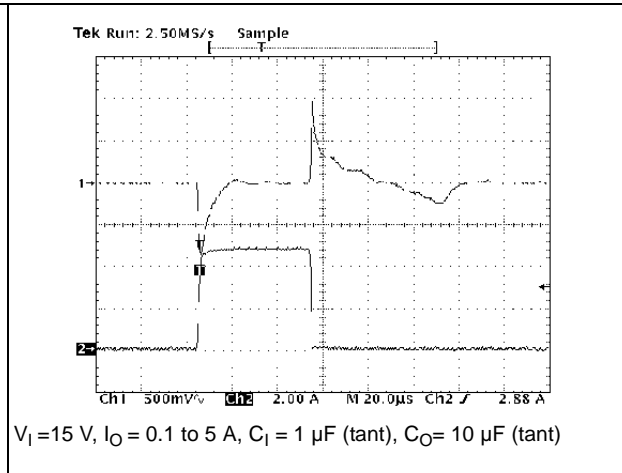


Figure 30. Load transient

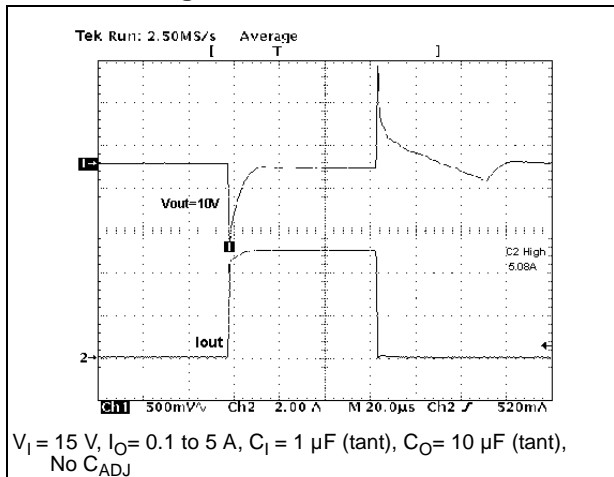


Figure 31. Line transient

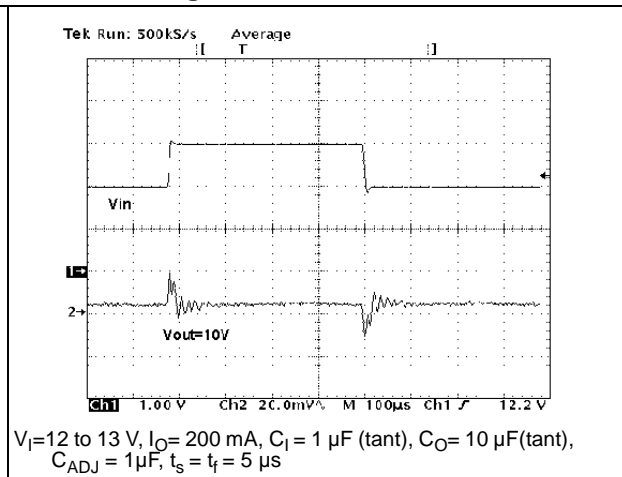
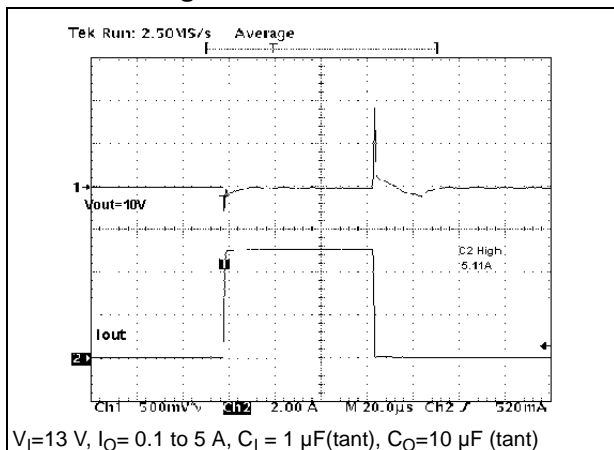


Figure 32. Load transient



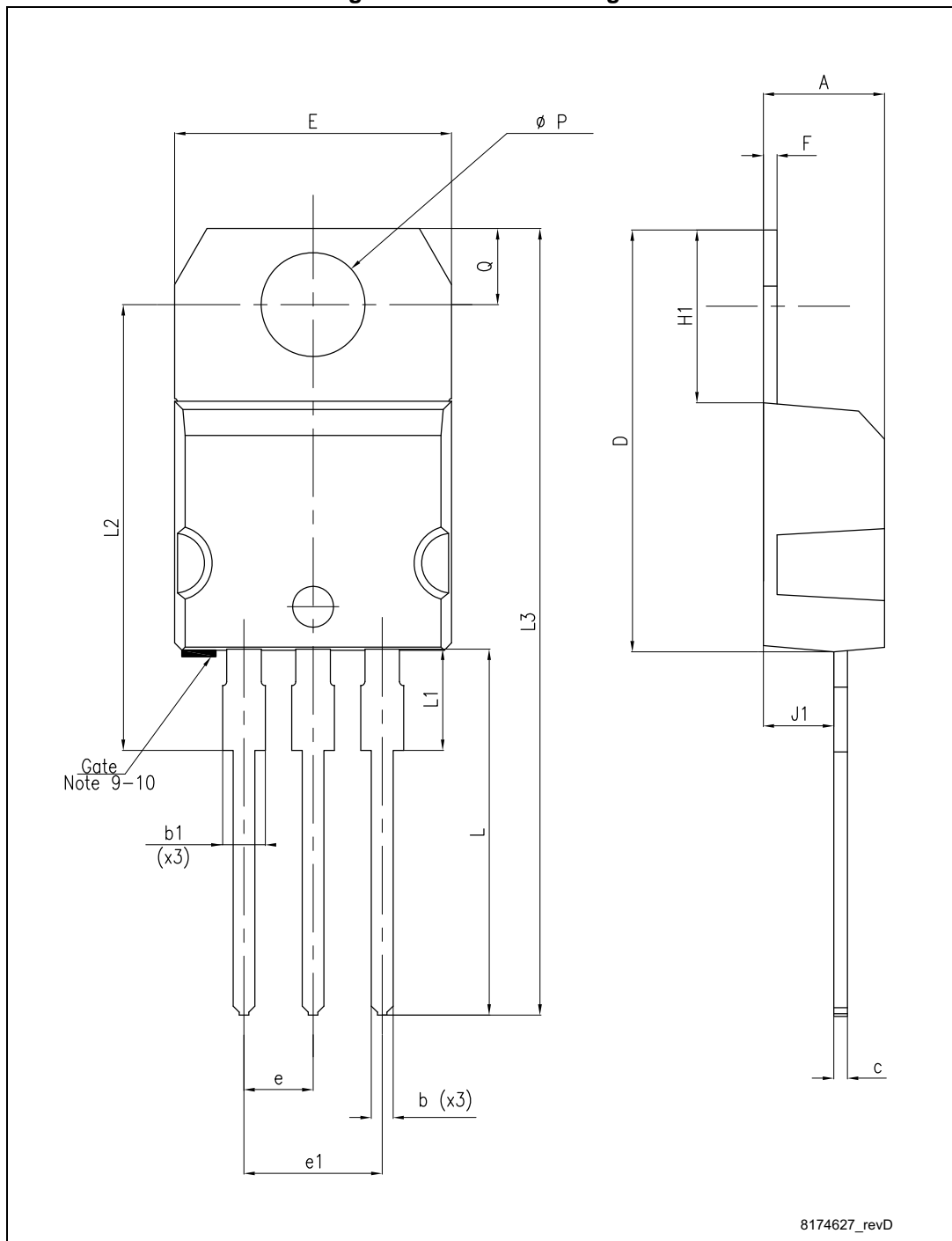
7 Package mechanical data

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 5. TO-220 mechanical data

| Dim. | mm | | |
|------|-------|-------|-------|
| | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 |
| b | 0.61 | | 0.88 |
| b1 | 1.14 | | 1.70 |
| c | 0.48 | | 0.70 |
| D | 15.25 | | 15.75 |
| E | 10 | | 10.40 |
| e | 2.40 | | 2.70 |
| e1 | 4.95 | | 5.15 |
| F | 0.51 | | 0.60 |
| H1 | 6.20 | | 6.60 |
| J1 | 2.40 | | 2.72 |
| L | 13 | | 14 |
| L1 | 3.50 | | 3.93 |
| L20 | | 16.40 | |
| L30 | | 28.90 | |
| ØP | 3.75 | | 3.85 |
| Q | 2.65 | | 2.95 |

Figure 33. TO-220 drawings



8174627_revD

8 Revision history

Table 6. Document revision history

| Date | Revision | Changes |
|-------------|----------|--|
| 07-Oct-2004 | 3 | Mistake order codes - Table 1. |
| 08-Feb-2005 | 4 | Mistake U.M. Load Regulation - V ==> mV. |
| 16-Jun-2005 | 5 | Order codes updated. |
| 04-Apr-2007 | 6 | Order code updated. |
| 07-Jun-2007 | 7 | Order codes updated. |
| 08-Apr-2008 | 8 | Modified: Table 1 on page 1 . Removed: packages D ² PAK, D ² PAK/A and mechanical data. |
| 29-Jul-2009 | 9 | Modified: Table 1 on page 1 . |
| 04-Sep-2013 | 10 | RPN LD1084XX changed to LD1084. Updated the Description in cover page, Section 7: Package mechanical data , Figure 2: Pin connections (top view) and Figure 3: Application circuit . Minor text changes. |

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[TCR3DG12,LF](#) [MIC5514-3.3YMT-T5](#) [MIC5512-1.2YMT-T5](#) [MIC5317-2.8YM5-T5](#) [SCD7912BTG](#) [NCP154MX180270TAG](#) [SCD33269T-](#)
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[MC33269T-3.5G](#) [CAT6243-ADJCMT5T](#) [TCR3DG33,LF](#) [AP2127N-1.0TRG1](#) [TCR4DG35,LF](#) [LT1117CST-3.3](#) [TAR5S15U\(TE85L,F\)](#)
[TAR5S18U\(TE85L,F\)](#) [TCR3UG19A,LF](#) [TCR4DG105,LF](#) [NCV8170AMX360TCG](#) [MIC94310-NYMT-T5](#)