

Very low drop voltage regulators with inhibit

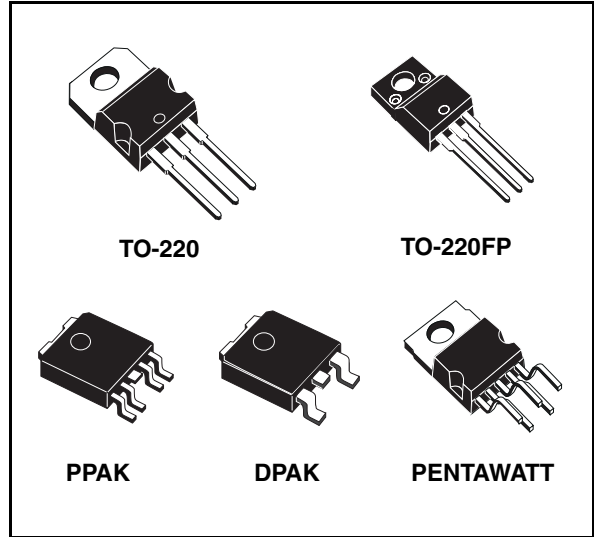
Features

- Very low dropout voltage (0.45V)
- Very low quiescent current (typ. 50 μ A in OFF mode, 500 μ A in ON mode)
- Output current up to 500 mA
- Logic-controlled electronic shutdown
- Output voltages of 1.5; 1.8; 2.5; 3.3; 4.7; 5; 6; 8; 8.5; 9; 12V
- Automotive Grade product: 1.8V, 2.5V, 3.3V, 5.0V, 8.0V, 8.5V V_{OUT} in DPAK and PPAK packages
- Internal current and thermal limit
- Only 2.2 μ F for stability
- Available in $\pm 1\%$ (AB) or $\pm 2\%$ (C) selection at 25°C
- Supply voltage rejection: 80db (typ.)
- Temperature range: -40 to 125 °C

Description

The LFxxAB/LFxxC are very Low Drop regulators available in PENTAWATT, TO-220, TO-220FP, DPAK and PPAK package and in a wide range of output voltages.

The very low drop voltage (0.45 V) and the very low quiescent current make them particularly suitable for low noise, low power applications and specially in battery powered systems. In the 5 pins configuration (PENTAWATT and PPAK) a Shutdown Logic Control function is available (pin 2, TTL compatible). This means that when the device is used as a local regulator, it is possible to



put a part of the board in standby, decreasing the total power consumption. In the three terminal configuration the device has the same electrical performance, but is fixed in the ON state. It requires only a 2.2 μ F capacitor for stability allowing space and cost saving. The LFxx is available as Automotive Grade in DPAK and PPAK packages, for the options of output voltages whose commercial Part Numbers are shown in the [Table 32](#) (order codes). These devices are 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 | | | | | | |
|--------------|--------|--------|--------|--------|--------|---------|
| LF15C | LF18AB | LF33C | LF50C | LF60AB | LF85C | LF90AB |
| LF15AB | LF25C | LF33AB | LF50AB | LF80C | LF85AB | LF120C |
| LF18C | LF25AB | LF47C | LF60C | LF80AB | LF90C | LF120AB |

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Contents

| | | |
|---|---|----|
| 1 | Diagram | 5 |
| 2 | Pin configuration | 6 |
| 3 | Maximum ratings | 7 |
| 4 | Electrical characteristics | 8 |
| 5 | Typical performance characteristics | 36 |
| 6 | Package mechanical data | 40 |
| 7 | Order codes | 47 |
| 8 | Revision history | 48 |

[查询"LF18ABPT-TR"供应商](#)
List of figures

| | | |
|------------|--|----|
| Figure 1. | Block diagram | 5 |
| Figure 2. | Pin connections (top view) | 6 |
| Figure 3. | Test circuit | 7 |
| Figure 4. | Dropout voltage vs output current. | 36 |
| Figure 5. | Dropout voltage vs temperature | 36 |
| Figure 6. | Supply current vs input voltage. | 36 |
| Figure 7. | Supply current vs input voltage. | 36 |
| Figure 8. | Short circuit current vs input voltage. | 36 |
| Figure 9. | Supply current vs temperature | 36 |
| Figure 10. | Logic controlled precision 3.3/5.0 V selectable output | 37 |
| Figure 11. | Sequential multi-output supply | 37 |
| Figure 12. | Multiple supply with ON/OFF toggle switch | 38 |
| Figure 13. | Basic inhibit functions | 38 |
| Figure 14. | Delayed turn-on | 39 |
| Figure 15. | Low voltage bulb blinker | 39 |

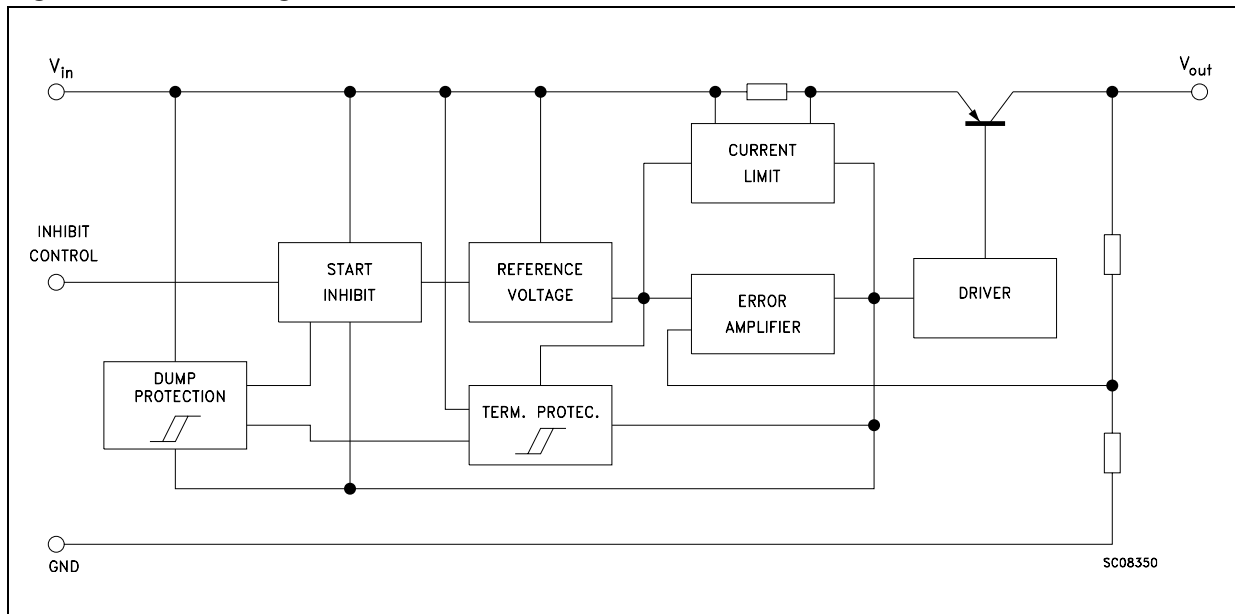
[查询"LF18ABPT-TR"供应商](#)

List of tables

| | | |
|-----------|--|----|
| Table 1. | Device summary | 1 |
| Table 2. | Absolute maximum ratings | 7 |
| Table 3. | Thermal data. | 7 |
| Table 4. | Electrical characteristics for LF15AB | 8 |
| Table 5. | Electrical characteristics for LF15C | 9 |
| Table 6. | Electrical characteristics for LF18AB | 10 |
| Table 7. | Electrical characteristics for LF18C | 11 |
| Table 8. | Electrical characteristics for LF18CDT-TRY (Automotive Grade). | 12 |
| Table 9. | Electrical characteristics for LF25AB | 13 |
| Table 10. | Electrical characteristics for LF25ABDT-TRY (Automotive Grade). | 14 |
| Table 11. | Electrical characteristics for LF25C | 15 |
| Table 12. | Electrical characteristics for LF25CDT-TRY (Automotive Grade). | 16 |
| Table 13. | Electrical characteristics for LF33AB | 17 |
| Table 14. | Electrical characteristics for LF33C | 18 |
| Table 15. | Electrical characteristics for LF33CDT-TRY and LF33CPT-TRY (Automotive Grade). | 19 |
| Table 16. | Electrical characteristics for LF50AB | 20 |
| Table 17. | Electrical characteristics for LF50ABDT-TRY (Automotive Grade). | 21 |
| Table 18. | Electrical characteristics for LF50C | 22 |
| Table 19. | Electrical characteristics for LF50CDT-TRY and LF50CPT-TRY (Automotive Grade). | 23 |
| Table 20. | Electrical characteristics for LF60AB | 24 |
| Table 21. | Electrical characteristics for LF60C | 25 |
| Table 22. | Electrical characteristics for LF80AB | 26 |
| Table 23. | Electrical characteristics for LF80C | 27 |
| Table 24. | Electrical characteristics for LF80CDT-TRY (Automotive Grade). | 28 |
| Table 25. | Electrical characteristics for LF85AB | 29 |
| Table 26. | Electrical characteristics for LF85C | 30 |
| Table 27. | Electrical characteristics for LF85CDT-TRY and LF85CPT-TRY (Automotive Grade). | 31 |
| Table 28. | Electrical characteristics for LF90AB | 32 |
| Table 29. | Electrical characteristics for LF90C | 33 |
| Table 30. | Electrical characteristics for LF120AB | 34 |
| Table 31. | Electrical characteristics for LF120C | 35 |
| Table 32. | Order codes | 47 |
| Table 33. | Document revision history | 48 |

[查询"LF18ABPT-TR"供应商](#)
1 **Diagram**

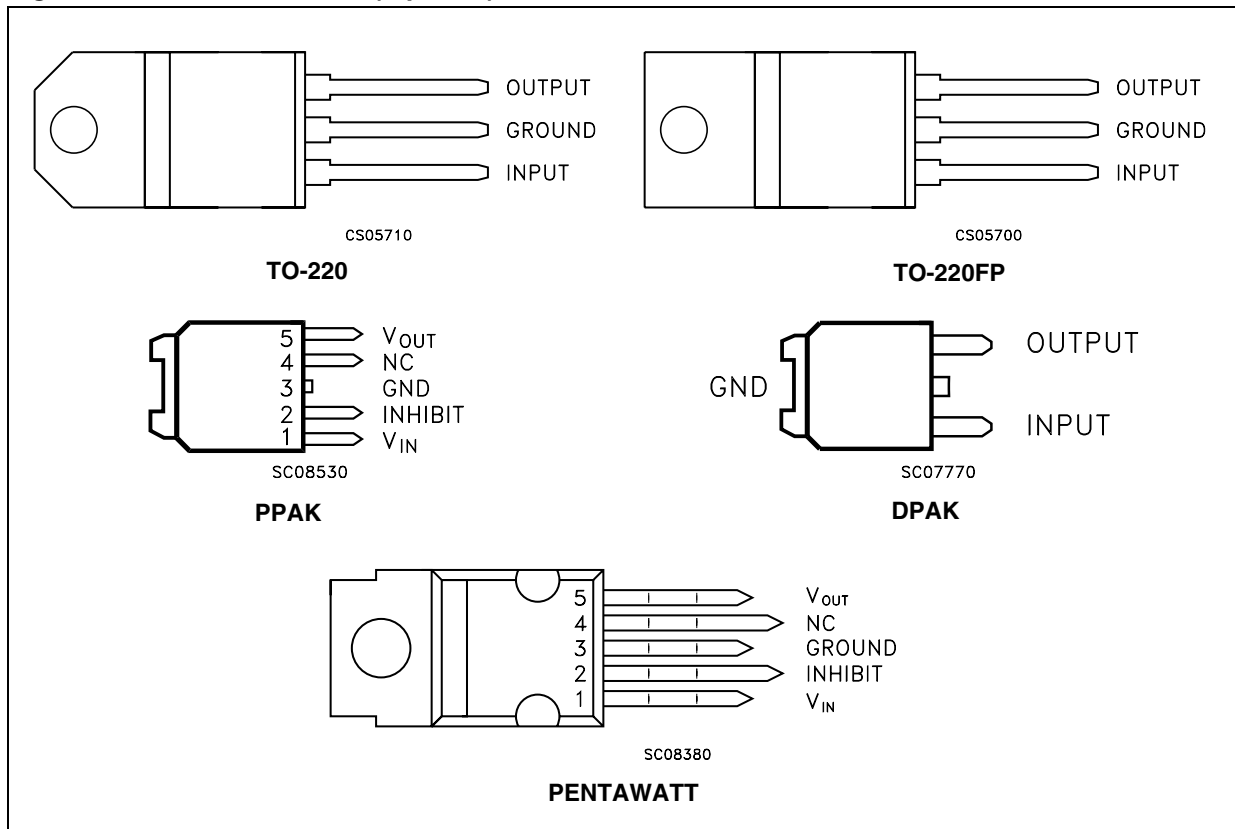
Figure 1. Block diagram



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2 Pin configuration

Figure 2. Pin connections (top view)



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3 Maximum ratings

Table 2. Absolute maximum ratings

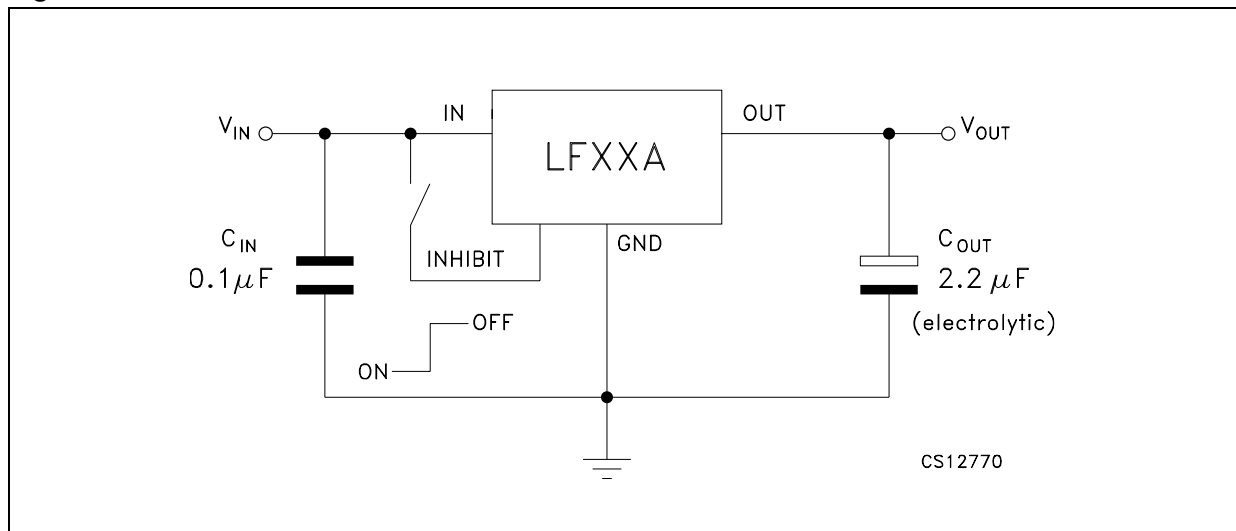
| Symbol | Parameter | Value | Unit |
|-----------|--------------------------------------|---------------------------|------|
| V_I | DC input voltage | -0.5 to 40 ⁽¹⁾ | V |
| I_O | Output current | Internally Limited | |
| P_{TOT} | Power dissipation | Internally Limited | |
| T_{STG} | Storage temperature range | -40 to 150 | °C |
| T_{OP} | Operating junction temperature range | -40 to 125 | °C |

1. For $18 < V_I < 40$ the regulator is in shut-down

Table 3. Thermal data

| Symbol | Parameter | PENTAWATT | TO-220 | TO-220FP | DPAK/PPAK | Unit |
|------------|-------------------------------------|-----------|--------|----------|-----------|------|
| R_{thJC} | Thermal resistance junction-case | 3 | 3 | 5 | 8 | °C/W |
| R_{thJA} | Thermal resistance junction-ambient | 50 | 50 | 60 | 100 | °C/W |

Figure 3. Test circuit



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4 Electrical characteristics

Table 4. Electrical characteristics for LF15AB (refer to the test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$ | 1.485 | 1.5 | 1.515 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$ | 1.470 | | 1.530 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | 2.5 | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 2.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 2 | 10 | mV |
| ΔV_O | Load regulation | $V_I = 2.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 2 | 10 | mV |
| I_d | Quiescent current | $V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 2.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | | |
| | | $V_I = 6\text{ V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 82 | | dB |
| | | | $f = 1\text{ kHz}$ | 77 | | |
| | | | $f = 10\text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 1 | | V |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ °C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ °C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 5. Electrical characteristics for LF15C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$ | 1.47 | 1.5 | 1.53 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 1.44 | | 1.56 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | 2.5 | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 2.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 2 | 10 | mV |
| ΔV_O | Load regulation | $V_I = 2.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 2 | 10 | mV |
| I_d | Quiescent current | $V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 2.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 6\text{ V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 82 | | dB |
| | | | $f = 1\text{ kHz}$ | 77 | | |
| | | | $f = 10\text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 1 | | V |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 6. Electrical characteristics for LF18AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 3.3\ \text{V}$ | 1.782 | 1.8 | 1.818 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 3.3\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 1.764 | | 1.836 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | 3 | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 2.8\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 2 | 12 | mV |
| ΔV_O | Load regulation | $V_I = 3.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 2 | 10 | mV |
| I_d | Quiescent current | $V_I = 2.5\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 3.1\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 6\ \text{V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 3.5 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 82 | | dB |
| | | | $f = 1\ \text{kHz}$ | 77 | | |
| | | | $f = 10\ \text{kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.7 | | V |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 7. Electrical characteristics for LF18C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|---------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$ | 1.764 | 1.8 | 1.836 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 3.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 1.728 | | 1.872 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | 3 | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 2.8\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 2 | 12 | mV |
| ΔV_O | Load regulation | $V_I = 3.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 2 | 10 | mV |
| I_d | Quiescent current | $V_I = 2.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 3.1\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | | |
| | | $V_I = 6\text{ V}$ | | | | |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 3.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 82 | | dB |
| | | | $f = 1\text{ kHz}$ | 77 | | |
| | | | $f = 10\text{ kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.7 | | V |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 8. Electrical characteristics for LF18CDT-TRY (Automotive Grade) (refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 3.5 \text{ V}$, $T_a = 25^\circ\text{C}$ | 1.764 | 1.8 | 1.836 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 3.5 \text{ V}$ | 1.713 | | 1.887 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | 3 | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 2.8$ to 16 V , $I_O = 5 \text{ mA}$ | | 2 | 15 | mV |
| ΔV_O | Load regulation | $V_I = 3.3 \text{ V}$, $I_O = 5$ to 500 mA | | 2 | 15 | mV |
| I_d | Quiescent current | $V_I = 2.5$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 3.1$ to 16 V , $I_O = 500 \text{ mA}$ | | | | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 3.5 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 82 | | dB |
| | | | $f = 1 \text{ kHz}$ | 77 | | |
| | | | $f = 10 \text{ kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 9. Electrical characteristics for LF25AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 4.5\ \text{V}$ | 2.475 | 2.5 | 2.525 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 4.5\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 2.450 | | 2.550 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 3.5\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 2 | 12 | mV |
| ΔV_O | Load regulation | $V_I = 3.8\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 2 | 12 | mV |
| I_d | Quiescent current | $V_I = 3.5\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 3.8\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 6\ \text{V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 4.5 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 82 | | dB |
| | | | $f = 1\ \text{kHz}$ | 77 | | |
| | | | $f = 10\ \text{kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 10. Electrical characteristics for LF25ABDT-TRY (Automotive Grade) (refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 4.5 \text{ V}$, $T_a = 25^\circ\text{C}$ | 2.475 | 2.5 | 2.525 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 4.5 \text{ V}$ | 2.435 | | 2.565 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 3.5$ to 16 V , $I_O = 5 \text{ mA}$ | | 2 | 15 | mV |
| ΔV_O | Load regulation | $V_I = 3.8 \text{ V}$, $I_O = 5$ to 500 mA | | 2 | 15 | mV |
| I_d | Quiescent current | $V_I = 3.5$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 3.8$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 4.5 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 82 | | dB |
| | | | $f = 1 \text{ kHz}$ | 77 | | |
| | | | $f = 10 \text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 11. Electrical characteristics for LF25C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$ | 2.45 | 2.5 | 2.55 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 4.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 2.4 | | 2.6 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 3.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 2 | 12 | mV |
| ΔV_O | Load regulation | $V_I = 3.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 2 | 12 | mV |
| I_d | Quiescent current | $V_I = 3.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 3.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 6\text{ V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 4.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 82 | | dB |
| | | | $f = 1\text{ kHz}$ | 77 | | |
| | | | $f = 10\text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 12. Electrical characteristics for LF25CDT-TRY (Automotive Grade) (refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 4.5 \text{ V}$, $T_a = 25^\circ\text{C}$ | 2.45 | 2.5 | 2.55 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 4.5 \text{ V}$ | 2.385 | | 2.615 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 3.5$ to 16 V , $I_O = 5 \text{ mA}$ | | 2 | 15 | mV |
| ΔV_O | Load regulation | $V_I = 3.8 \text{ V}$, $I_O = 5$ to 500 mA | | 2 | 15 | mV |
| I_d | Quiescent current | $V_I = 3.5$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 3.8$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 4.5 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 82 | | dB |
| | | | $f = 1 \text{ kHz}$ | 77 | | |
| | | | $f = 10 \text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 13. Electrical characteristics for LF33AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 5.3\ \text{V}$ | 3.267 | 3.3 | 3.333 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 5.3\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 3.234 | | 3.366 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 4.3\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 3 | 16 | mV |
| ΔV_O | Load regulation | $V_I = 4.6\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 3 | 16 | mV |
| I_d | Quiescent current | $V_I = 4.3\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 4.6\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 6\ \text{V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 5.3 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 80 | | dB |
| | | | $f = 1\ \text{kHz}$ | 75 | | |
| | | | $f = 10\ \text{kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 14. Electrical characteristics for LF33C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|---------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$ | 3.234 | 3.3 | 3.366 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 5.3\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 3.168 | | 3.432 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 4.3\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 3 | 16 | mV |
| ΔV_O | Load regulation | $V_I = 4.6\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 3 | 16 | mV |
| I_d | Quiescent current | $V_I = 4.3\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 4.6\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 6\text{ V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 5.3 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 80 | | dB |
| | | | $f = 1\text{ kHz}$ | 75 | | |
| | | | $f = 10\text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 15. Electrical characteristics for LF33CDT-TRY and LF33CPT-TRY (Automotive Grade)
(refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 5.3 \text{ V}$, $T_a = 25^\circ\text{C}$ | 3.234 | 3.3 | 3.366 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 5.3 \text{ V}$, | 3.153 | | 3.447 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 4.3$ to 16 V , $I_O = 5 \text{ mA}$ | | 3 | 19 | mV |
| ΔV_O | Load regulation | $V_I = 4.6 \text{ V}$, $I_O = 5$ to 500 mA | | 3 | 19 | mV |
| I_d | Quiescent current | $V_I = 4.3$ to 16V , $I_O = 0\text{mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 4.6$ to 16V , $I_O=500\text{mA}$ | | | 12 | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 5.3 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 80 | | dB |
| | | | $f = 1 \text{ kHz}$ | 75 | | |
| | | | $f = 10 \text{ kHz}$ | 65 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 KHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 16. Electrical characteristics for LF50AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 7\ \text{V}$ | 4.95 | 5 | 5.05 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 7\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 4.9 | | 5.1 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 6\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 5 | 25 | mV |
| ΔV_O | Load regulation | $V_I = 6.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 5 | 25 | mV |
| I_d | Quiescent current | $V_I = 6\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 6.3\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 6\ \text{V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 7 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 76 | | dB |
| | | | $f = 1\ \text{kHz}$ | 71 | | |
| | | | $f = 10\ \text{kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 17. Electrical characteristics for LF50ABDT-TRY (Automotive Grade) (refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 7 \text{ V}$, $T_a = 25^\circ\text{C}$ | 4.95 | 5 | 5.05 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 7 \text{ V}$ | 4.885 | | 5.115 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 6$ to 16 V , $I_O = 5 \text{ mA}$ | | 5 | 28 | mV |
| ΔV_O | Load regulation | $V_I = 6.3 \text{ V}$, $I_O = 5$ to 500 mA | | 5 | 28 | mV |
| I_d | Quiescent current | $V_I = 6$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 6.3$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 7 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 76 | | dB |
| | | | $f = 1 \text{ kHz}$ | 71 | | |
| | | | $f = 10 \text{ kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 18. Electrical characteristics for LF50C (refer to the test circuits, $T_J = 25\text{ °C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 7\text{ V}$ | 4.9 | 5 | 5.1 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 7\text{ V}$, $T_a = -25\text{ to }85\text{ °C}$ | 4.8 | | 5.2 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 6\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 5 | 25 | mV |
| ΔV_O | Load regulation | $V_I = 6.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 5 | 25 | mV |
| I_d | Quiescent current | $V_I = 6\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.5 | 1 | mA |
| | | $V_I = 6.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 6\text{ V}$ | OFF MODE | 50 | 100 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 7 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 76 | | dB |
| | | | $f = 1\text{ kHz}$ | 71 | | |
| | | | $f = 10\text{ kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ °C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ °C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 6\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 19. Electrical characteristics for LF50CDT-TRY and LF50CPT-TRY (Automotive Grade)
(refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 7 \text{ V}$, $T_a = 25^\circ\text{C}$ | 4.9 | 5 | 5.1 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 7 \text{ V}$ | 4.785 | | 5.215 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 6$ to 16 V , $I_O = 5 \text{ mA}$ | | 5 | 28 | mV |
| ΔV_O | Load regulation | $V_I = 6.3 \text{ V}$, $I_O = 5$ to 500 mA | | 5 | 28 | mV |
| I_d | Quiescent current | $V_I = 6$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.5 | 2 | mA |
| | | $V_I = 6.3$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 6 \text{ V}$ | OFF MODE | 50 | 120 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 7 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | f = 120 Hz | 76 | | dB |
| | | | f = 1 kHz | 71 | | |
| | | | f = 10 kHz | 60 | | |
| eN | Output noise voltage | B = 10 Hz to 100 kHz, $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 6 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | ESR = 0.1 to 10 Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 20. Electrical characteristics for LF60AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|----------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 8\ \text{V}$ | 5.94 | 6 | 6.06 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 8\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 5.88 | | 6.12 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 7\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 6 | 30 | mV |
| ΔV_O | Load regulation | $V_I = 7.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 6 | 30 | mV |
| I_d | Quiescent current | $V_I = 7\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 7.3\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 9\ \text{V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 8 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 75 | | dB |
| | | | $f = 1\ \text{kHz}$ | 70 | | |
| | | | $f = 10\ \text{kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 21. Electrical characteristics for LF60C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|--|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 8\text{ V}$ | 5.88 | 6 | 6.12 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 8\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 5.76 | | 6.24 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 7\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 6 | 30 | mV |
| ΔV_O | Load regulation | $V_I = 7.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 6 | 30 | mV |
| I_d | Quiescent current | $V_I = 7\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 7.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 9\text{ V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 8 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 75 | | dB |
| | | | $f = 1\text{ kHz}$ | 70 | | |
| | | | $f = 10\text{ kHz}$ | 60 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 22. Electrical characteristics for LF80AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|----------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 10\ \text{V}$ | 7.92 | 8 | 8.08 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 10\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 7.84 | | 8.16 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 8 | 40 | mV |
| ΔV_O | Load regulation | $V_I = 9.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 8 | 40 | mV |
| I_d | Quiescent current | $V_I = 9\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 9.3\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 9\ \text{V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 10 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 72 | | dB |
| | | | $f = 1\ \text{kHz}$ | 67 | | |
| | | | $f = 10\ \text{kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 23. Electrical characteristics for LF80C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 10\text{ V}$ | 7.84 | 8 | 8.16 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 10\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 7.68 | | 8.32 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 8 | 40 | mV |
| ΔV_O | Load regulation | $V_I = 9.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 8 | 40 | mV |
| I_d | Quiescent current | $V_I = 9\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 9.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 9\text{ V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 10 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 72 | | dB |
| | | | $f = 1\text{ kHz}$ | 67 | | |
| | | | $f = 10\text{ kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 24. Electrical characteristics for LF80CDT-TRY (Automotive Grade) (refer to the test circuits, $T_A = -40$ to 125°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 10 \text{ V}$, $T_a = 25^\circ\text{C}$ | 7.84 | 8 | 8.16 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 10 \text{ V}$ | 7.665 | | 8.335 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9$ to 16 V , $I_O = 5 \text{ mA}$ | | 8 | 44 | mV |
| ΔV_O | Load regulation | $V_I = 9.3 \text{ V}$, $I_O = 5$ to 500 mA | | 8 | 44 | mV |
| I_d | Quiescent current | $V_I = 9$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.7 | 2.5 | mA |
| | | $V_I = 9.3$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 9 \text{ V}$ | OFF MODE | 70 | 160 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 10 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 72 | | dB |
| | | | $f = 1 \text{ kHz}$ | 67 | | |
| | | | $f = 10 \text{ kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 9 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 25. Electrical characteristics for LF85AB (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 10.5\text{ V}$ | 8.415 | 8.5 | 8.585 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 10.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 8.33 | | 8.67 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 8 | 42 | mV |
| ΔV_O | Load regulation | $V_I = 9.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 8 | 42 | mV |
| I_d | Quiescent current | $V_I = 9.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 9.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 9\text{ V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 10.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 72 | | dB |
| | | | $f = 1\text{ kHz}$ | 67 | | |
| | | | $f = 10\text{ kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 26. Electrical characteristics for LF85C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 10.5\text{ V}$ | 8.33 | 8.5 | 8.67 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 10.5\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 8.16 | | 8.84 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9.5\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 8 | 42 | mV |
| ΔV_O | Load regulation | $V_I = 9.8\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 8 | 42 | mV |
| I_d | Quiescent current | $V_I = 9.5\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 9.8\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 9\text{ V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 10.5 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 72 | | dB |
| | | | $f = 1\text{ kHz}$ | 67 | | |
| | | | $f = 10\text{ kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 9\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 27. Electrical characteristics for LF85CDT-TRY and LF85CPT-TRY (Automotive Grade)
(refer to the test circuits, $T_A = -40$ to 25°C , $C_I = 0.1 \mu\text{F}$, $C_O = 2.2 \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|----------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50 \text{ mA}$, $V_I = 10.5 \text{ V}$, $T_a = 25^\circ\text{C}$ | 8.33 | 8.5 | 8.67 | V |
| | | $I_O = 50 \text{ mA}$, $V_I = 10.5 \text{ V}$ | 8.145 | | 8.855 | |
| V_I | Operating input voltage | $I_O = 500 \text{ mA}$ | | | 16 | V |
| I_O | Output current limit | $T_a = 25^\circ\text{C}$ | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 9.5$ to 16 V , $I_O = 5 \text{ mA}$ | | 8 | 44 | mV |
| ΔV_O | Load regulation | $V_I = 9.8 \text{ V}$, $I_O = 5$ to 500 mA | | 8 | 44 | mV |
| I_d | Quiescent current | $V_I = 9.5$ to 16 V , $I_O = 0 \text{ mA}$ | ON MODE | 0.7 | 2.5 | mA |
| | | $V_I = 9.8$ to 16 V , $I_O = 500 \text{ mA}$ | | | 12 | |
| | | $V_I = 9 \text{ V}$ | OFF MODE | 70 | 160 | μA |
| SVR | Supply voltage rejection | $I_O = 5 \text{ mA}$, $V_I = 10.5 \pm 1 \text{ V}$ $T_a = 25^\circ\text{C}$ | $f = 120 \text{ Hz}$ | 72 | | dB |
| | | | $f = 1 \text{ kHz}$ | 67 | | |
| | | | $f = 10 \text{ kHz}$ | 57 | | |
| eN | Output noise voltage | $B = 10 \text{ Hz}$ to 100 kHz , $T_a = 25^\circ\text{C}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200 \text{ mA}$ | | 0.2 | 1.3 | V |
| | | $I_O = 500 \text{ mA}$ | | 0.4 | 1.3 | |
| V_{IL} | Control input logic low | | | | 0.8 | V |
| V_{IH} | Control input logic high | | 2 | | | V |
| I_I | Control input current | $V_I = 9 \text{ V}$, $V_C = 6 \text{ V}$, $T_a = 25^\circ\text{C}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1$ to 10Ω , $I_O = 0$ to 500 mA | 2 | 10 | | μF |

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Table 28. Electrical characteristics for LF90AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|----------------------|------|------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 11\ \text{V}$ | 8.91 | 9 | 9.09 | V |
| | | $I_O = 50\ \text{mA}$, $V_I = 11\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 8.82 | | 9.18 | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 10\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 9 | 45 | mV |
| ΔV_O | Load regulation | $V_I = 10.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 9 | 45 | mV |
| I_d | Quiescent current | $V_I = 10\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 10.3\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | 12 | |
| | | $V_I = 10\ \text{V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 11 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | 71 | | dB |
| | | | $f = 1\ \text{kHz}$ | 66 | | |
| | | | $f = 10\ \text{kHz}$ | 56 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 10\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF |

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Table 29. Electrical characteristics for LF90C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|----------|------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 11\text{ V}$ | 8.82 | 9 | 9.18 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 11\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 8.64 | | 9.36 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 10\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 9 | 45 | mV |
| ΔV_O | Load regulation | $V_I = 10.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 9 | 45 | mV |
| I_d | Quiescent current | $V_I = 10\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | | 0.7 | 1.5 | mA |
| | | $V_I = 10.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | | |
| | | $V_I = 10\text{ V}$ | | OFF MODE | 70 | |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 11 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | | 71 | dB |
| | | | $f = 1\text{ kHz}$ | | 66 | |
| | | | $f = 10\text{ kHz}$ | | 56 | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 10\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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Table 30. Electrical characteristics for LF120AB (refer to the test circuits, $T_J = 25^\circ\text{C}$, $C_I = 0.1\ \mu\text{F}$, $C_O = 2.2\ \mu\text{F}$ unless otherwise specified.)

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit | |
|--------------|---------------------------|---|----------------------|------|-------|---------------|---------------|
| V_O | Output voltage | $I_O = 50\ \text{mA}$, $V_I = 15\ \text{V}$ | 11.88 | 12 | 12.12 | V | |
| | | $I_O = 50\ \text{mA}$, $V_I = 15\ \text{V}$, $T_a = -25\ \text{to}\ 85^\circ\text{C}$ | 11.76 | | 12.24 | | |
| V_I | Operating input voltage | $I_O = 500\ \text{mA}$ | | | 16 | V | |
| I_O | Output current limit | | | 1 | | A | |
| ΔV_O | Line regulation | $V_I = 13\ \text{to}\ 16\ \text{V}$, $I_O = 5\ \text{mA}$ | | 12 | 60 | mV | |
| ΔV_O | Load regulation | $V_I = 13.3\ \text{V}$, $I_O = 5\ \text{to}\ 500\ \text{mA}$ | | 12 | 60 | mV | |
| I_d | Quiescent current | $V_I = 13\ \text{to}\ 16\ \text{V}$, $I_O = 0\ \text{mA}$ | ON MODE | | 0.7 | 1.5 | mA |
| | | $V_I = 13.3\ \text{to}\ 16\ \text{V}$, $I_O = 500\ \text{mA}$ | | | | 12 | |
| | | $V_I = 13\ \text{V}$ | OFF MODE | | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\ \text{mA}$, $V_I = 14 \pm 1\ \text{V}$ | $f = 120\ \text{Hz}$ | | 69 | dB | |
| | | | $f = 1\ \text{kHz}$ | | 64 | | |
| | | | $f = 10\ \text{kHz}$ | | 54 | | |
| eN | Output noise voltage | $B = 10\ \text{Hz to}\ 100\ \text{kHz}$ | | 50 | | μV | |
| V_d | Dropout voltage | $I_O = 200\ \text{mA}$ | | 0.2 | 0.35 | V | |
| | | $I_O = 500\ \text{mA}$ | | 0.4 | 0.7 | | |
| V_{IL} | Control input logic low | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | | | 0.8 | V | |
| V_{IH} | Control input logic high | $T_a = -40\ \text{to}\ 125^\circ\text{C}$ | 2 | | | V | |
| I_I | Control input current | $V_I = 13\ \text{V}$, $V_C = 6\ \text{V}$ | | 10 | | μA | |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$, $I_O = 0\ \text{to}\ 500\ \text{mA}$ | 2 | 10 | | μF | |

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Table 31. Electrical characteristics for LF120C (refer to the test circuits, $T_J = 25\text{ }^\circ\text{C}$, $C_I = 0.1\text{ }\mu\text{F}$, $C_O = 2.2\text{ }\mu\text{F}$ unless otherwise specified).

| Symbol | Parameter | Test conditions | Min. | Typ. | Max. | Unit |
|--------------|---------------------------|---|---------------------|------|-------|---------------|
| V_O | Output voltage | $I_O = 50\text{ mA}$, $V_I = 14\text{ V}$ | 11.76 | 12 | 12.24 | V |
| | | $I_O = 50\text{ mA}$, $V_I = 14\text{ V}$, $T_a = -25\text{ to }85\text{ }^\circ\text{C}$ | 11.52 | | 12.48 | |
| V_I | Operating input voltage | $I_O = 500\text{ mA}$ | | | 16 | V |
| I_O | Output current limit | | | 1 | | A |
| ΔV_O | Line regulation | $V_I = 13\text{ to }16\text{ V}$, $I_O = 5\text{ mA}$ | | 12 | 60 | mV |
| ΔV_O | Load regulation | $V_I = 13.3\text{ V}$, $I_O = 5\text{ to }500\text{ mA}$ | | 12 | 60 | mV |
| I_d | Quiescent current | $V_I = 13\text{ to }16\text{ V}$, $I_O = 0\text{ mA}$ | ON MODE | 0.7 | 1.5 | mA |
| | | $V_I = 13.3\text{ to }16\text{ V}$, $I_O = 500\text{ mA}$ | | | 12 | |
| | | $V_I = 13\text{ V}$ | OFF MODE | 70 | 140 | μA |
| SVR | Supply voltage rejection | $I_O = 5\text{ mA}$, $V_I = 14 \pm 1\text{ V}$ | $f = 120\text{ Hz}$ | 69 | | dB |
| | | | $f = 1\text{ kHz}$ | 64 | | |
| | | | $f = 10\text{ kHz}$ | 54 | | |
| eN | Output noise voltage | $B = 10\text{ Hz to }100\text{ kHz}$ | | 50 | | μV |
| V_d | Dropout voltage | $I_O = 200\text{ mA}$ | | 0.2 | 0.35 | V |
| | | $I_O = 500\text{ mA}$ | | 0.4 | 0.7 | |
| V_{IL} | Control input logic low | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | | | 0.8 | V |
| V_{IH} | Control input logic high | $T_a = -40\text{ to }125\text{ }^\circ\text{C}$ | 2 | | | V |
| I_I | Control input current | $V_I = 13\text{ V}$, $V_C = 6\text{ V}$ | | 10 | | μA |
| C_O | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$, $I_O = 0\text{ to }500\text{ mA}$ | 2 | 10 | | μF |

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5 Typical performance characteristics

(unless otherwise specified $V_{O(NOM)} = 3.3\text{ V}$)

Figure 4. Dropout voltage vs output current **Figure 5. Dropout voltage vs temperature**

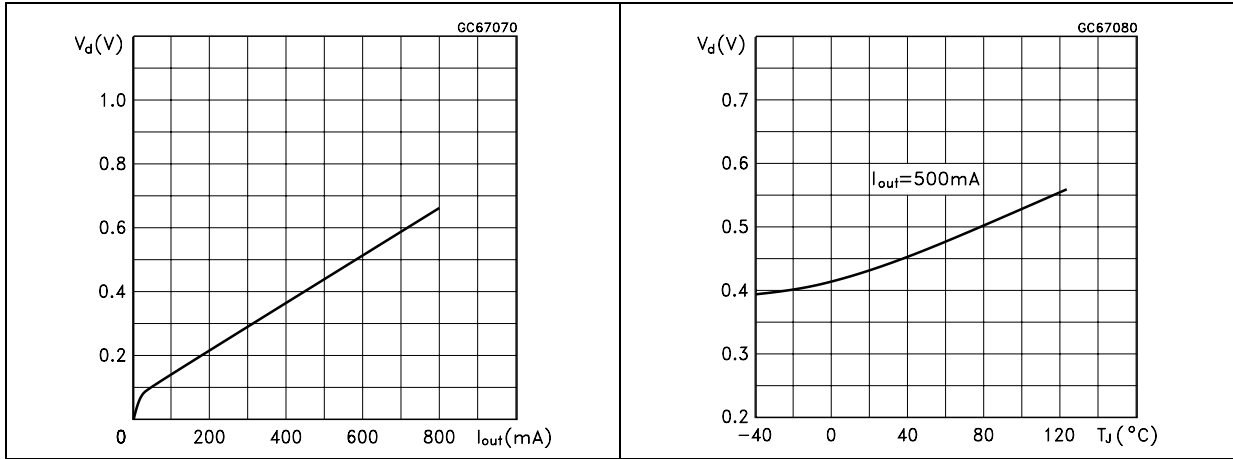


Figure 6. Supply current vs input voltage **Figure 7. Supply current vs input voltage**

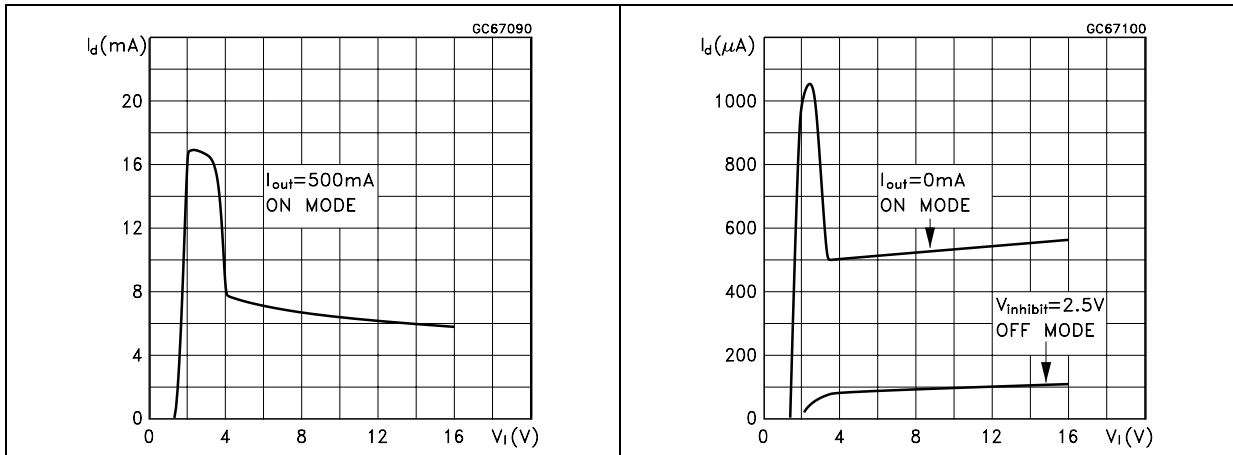
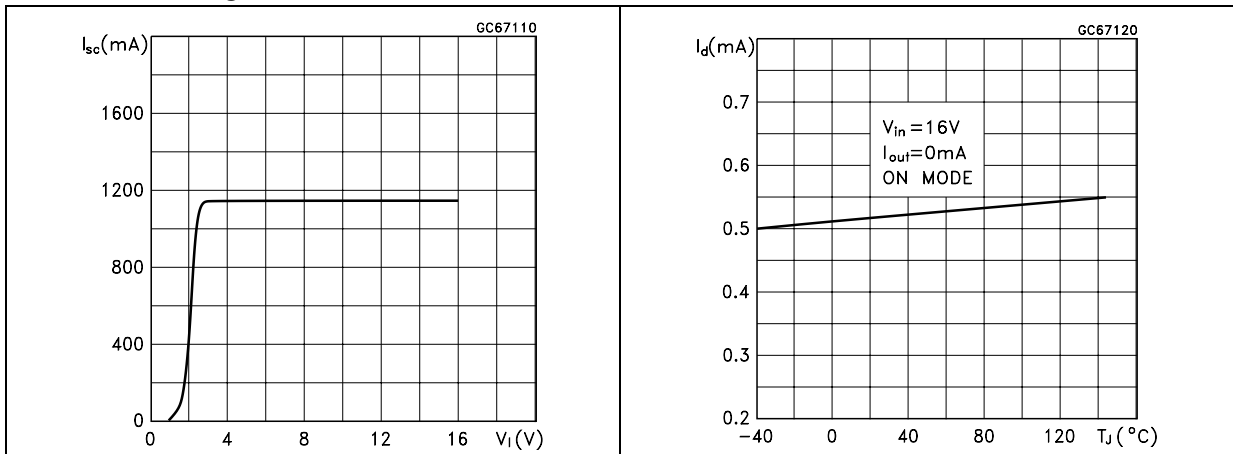


Figure 8. Short circuit current vs input voltage **Figure 9. Supply current vs temperature**



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Figure 10. Logic controlled precision 3.3/5.0 V selectable output

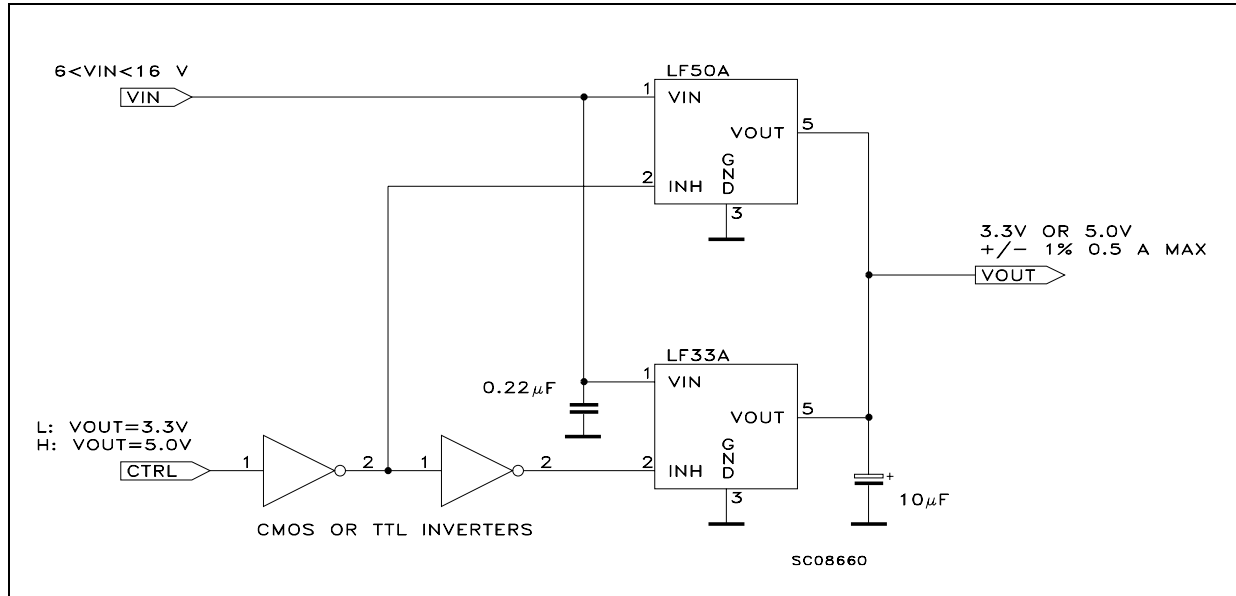
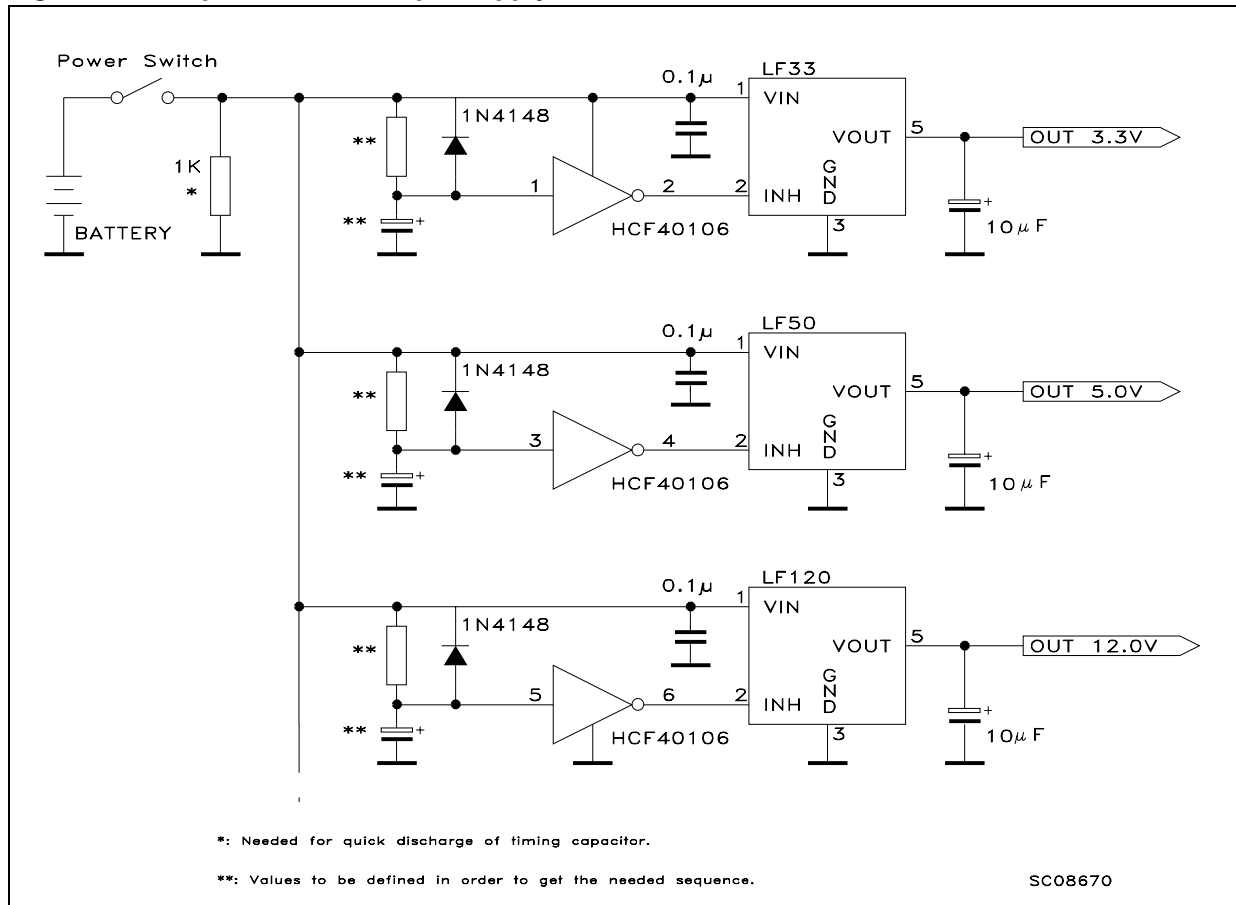


Figure 11. Sequential multi-output supply



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Figure 12. Multiple supply with ON/OFF toggle switch

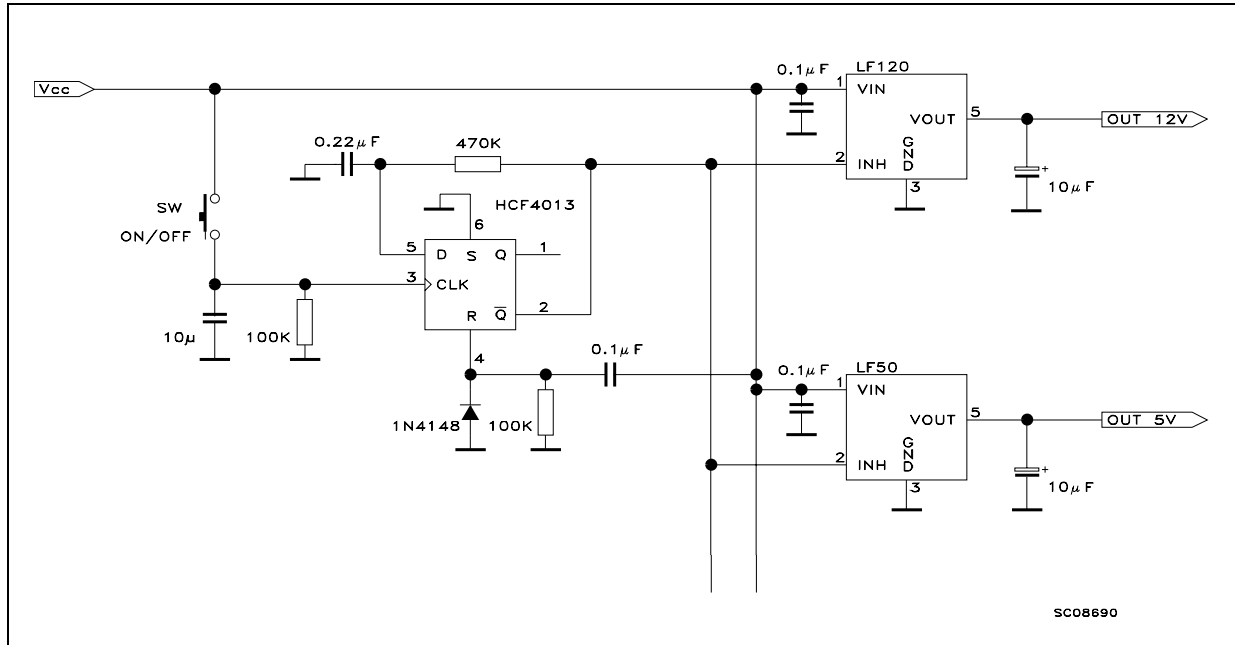
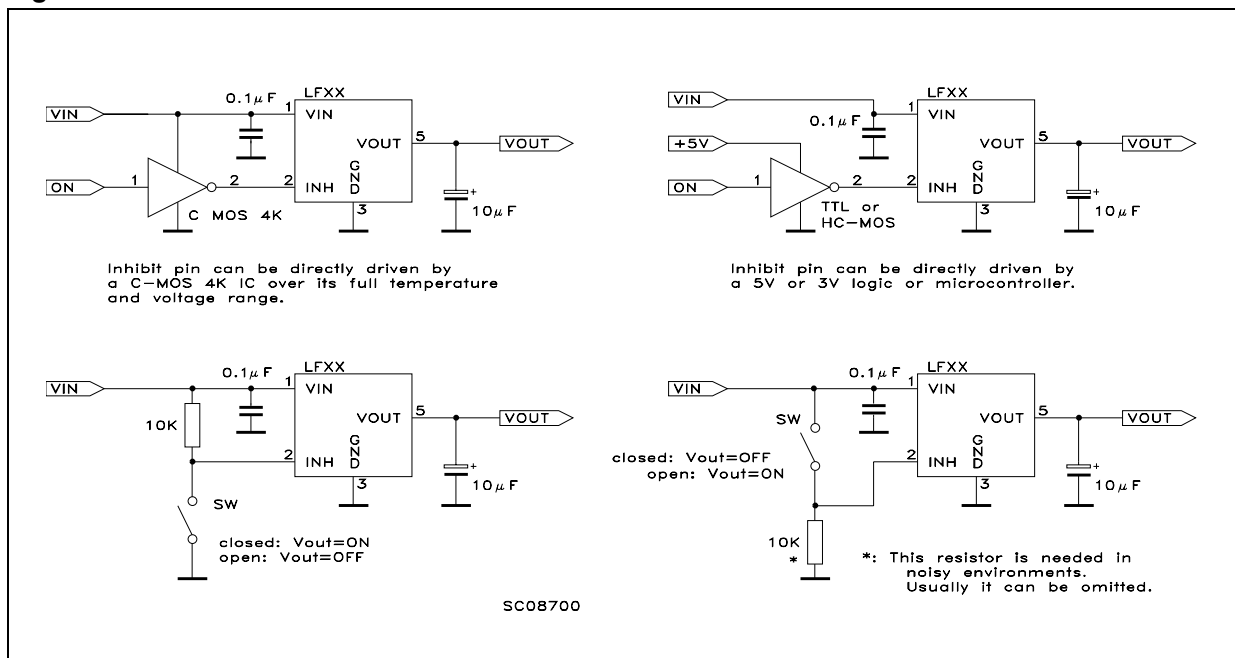


Figure 13. Basic inhibit functions



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Figure 14. Delayed turn-on

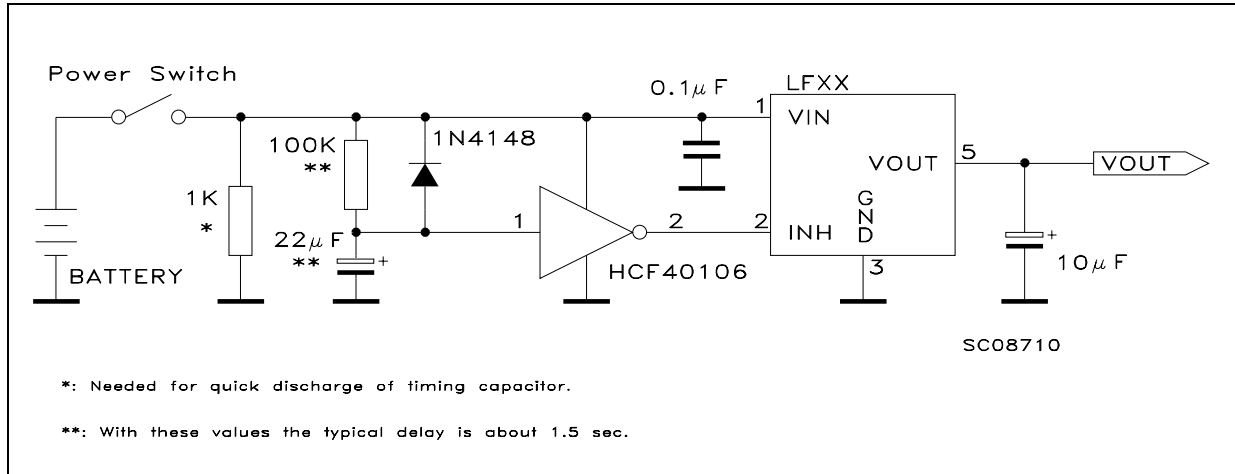
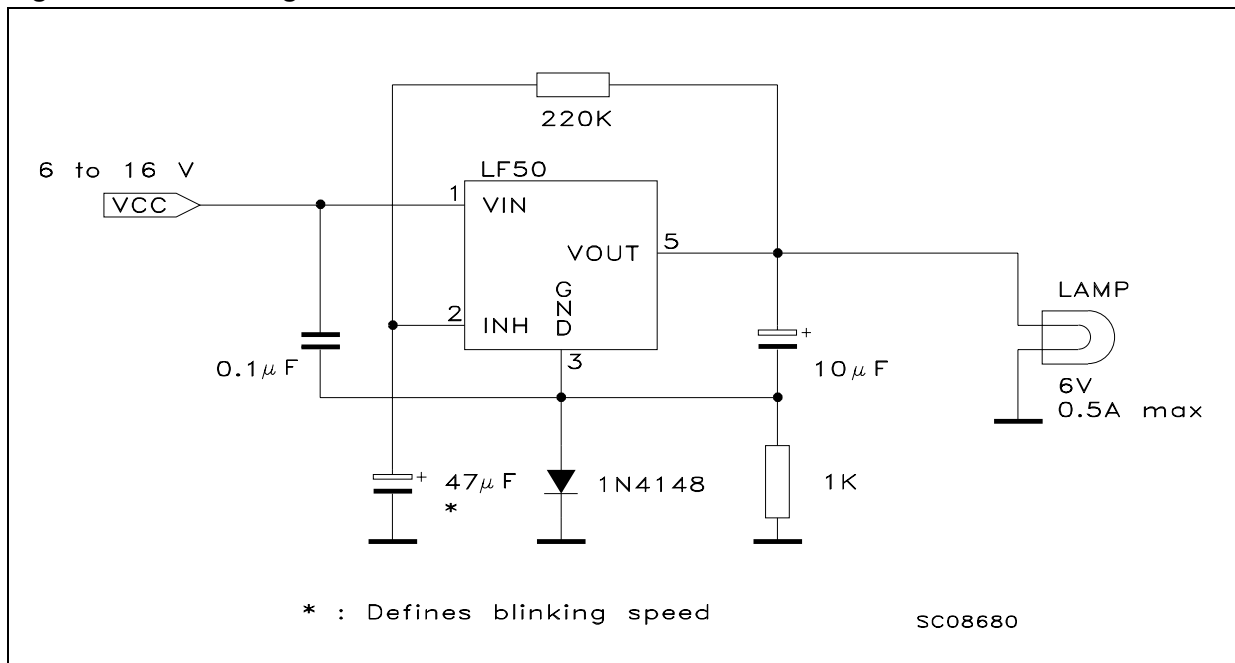


Figure 15. Low voltage bulb blinker



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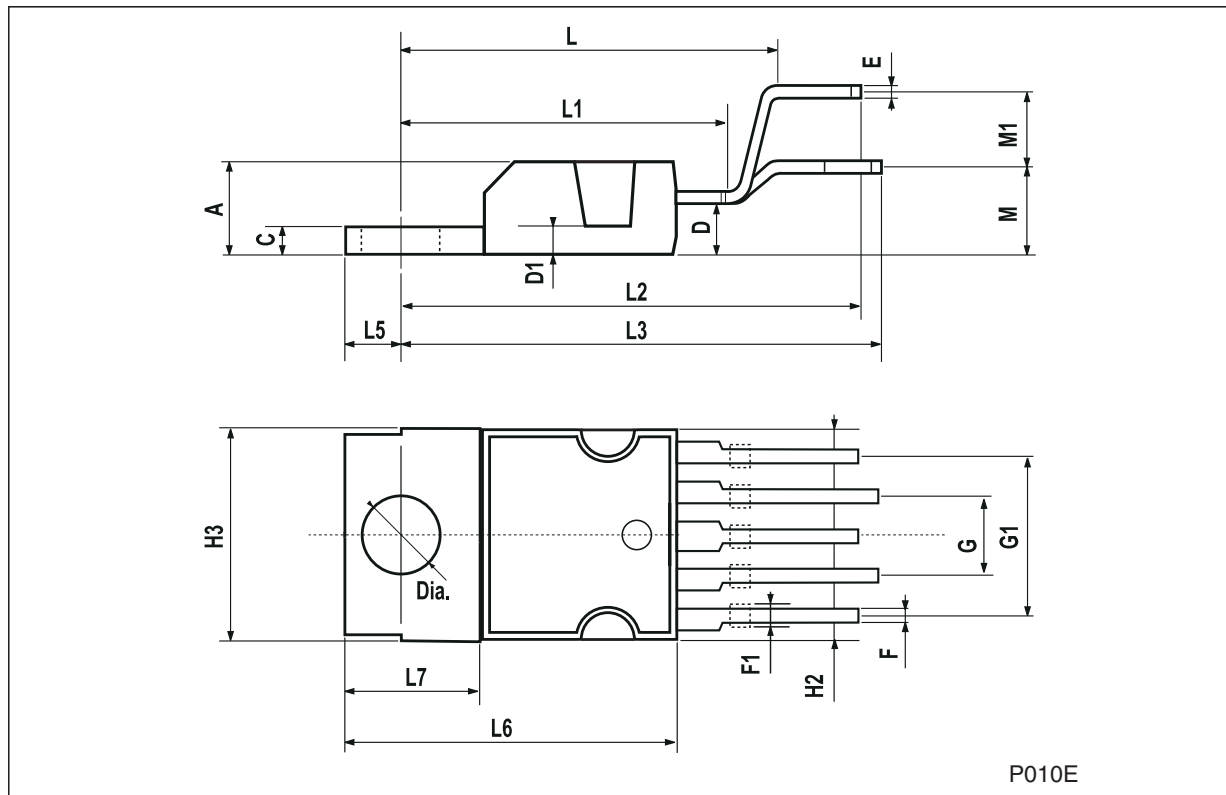
6 Package mechanical data

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.

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PENTAWATT (Vertical) mechanical data

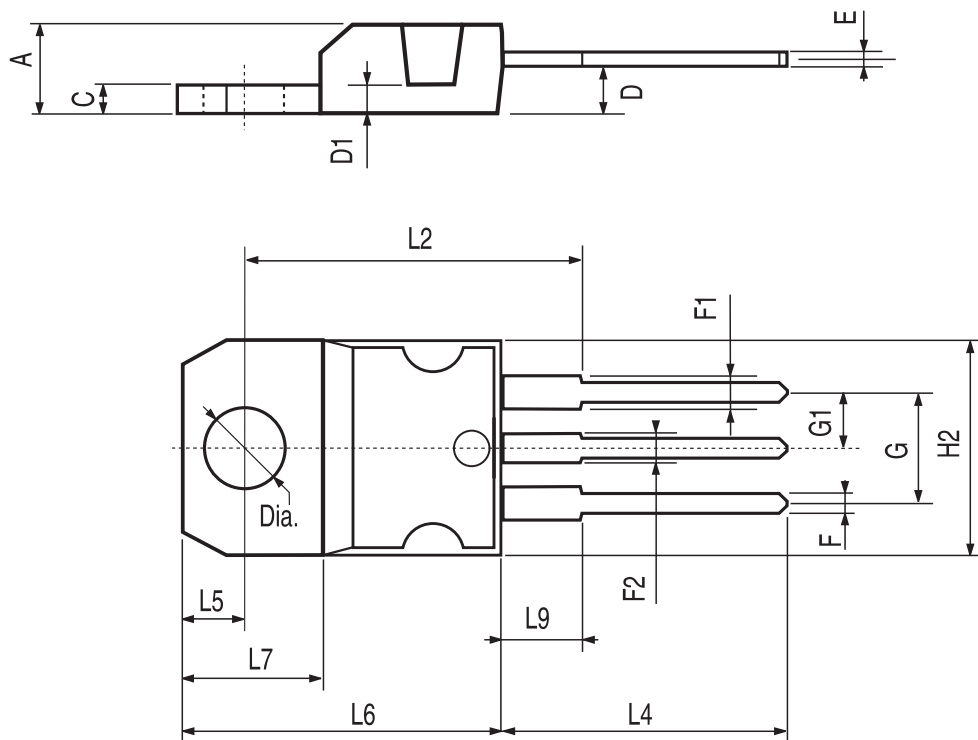
| Dim. | mm. | | | inch. | | |
|------|-------|-------|------|-------|-------|-------|
| | Min. | Typ. | Max. | Min. | Typ. | Max. |
| A | | | 4.8 | | | 0.189 |
| C | | | 1.37 | | | 0.054 |
| D | 2.4 | | 2.8 | 0.094 | | 0.110 |
| D1 | 1.2 | | 1.35 | 0.047 | | 0.053 |
| E | 0.35 | | 0.55 | 0.014 | | 0.022 |
| F | 0.8 | | 1.05 | 0.031 | | 0.041 |
| F1 | 1 | | 1.4 | 0.039 | | 0.055 |
| G | 3.2 | 3.4 | 3.6 | 0.126 | 0.134 | 0.142 |
| G1 | 6.6 | 6.8 | 7 | 0.260 | 0.268 | 0.276 |
| H2 | | | 10.4 | | | 0.409 |
| H3 | 10.05 | | 10.4 | 0.396 | | 0.409 |
| L | | 17.85 | | | 0.703 | |
| L1 | | 15.75 | | | 0.620 | |
| L2 | | 21.4 | | | 0.843 | |
| L3 | | 22.5 | | | 0.886 | |
| L5 | 2.6 | | 3 | 0.102 | | 0.118 |
| L6 | 15.1 | | 15.8 | 0.594 | | 0.622 |
| L7 | 6 | | 6.6 | 0.236 | | 0.260 |
| M | | 4.5 | | | 0.177 | |
| M1 | | 4 | | | 0.157 | |
| Dia1 | 3.65 | | 3.85 | 0.144 | | 0.152 |



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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 |

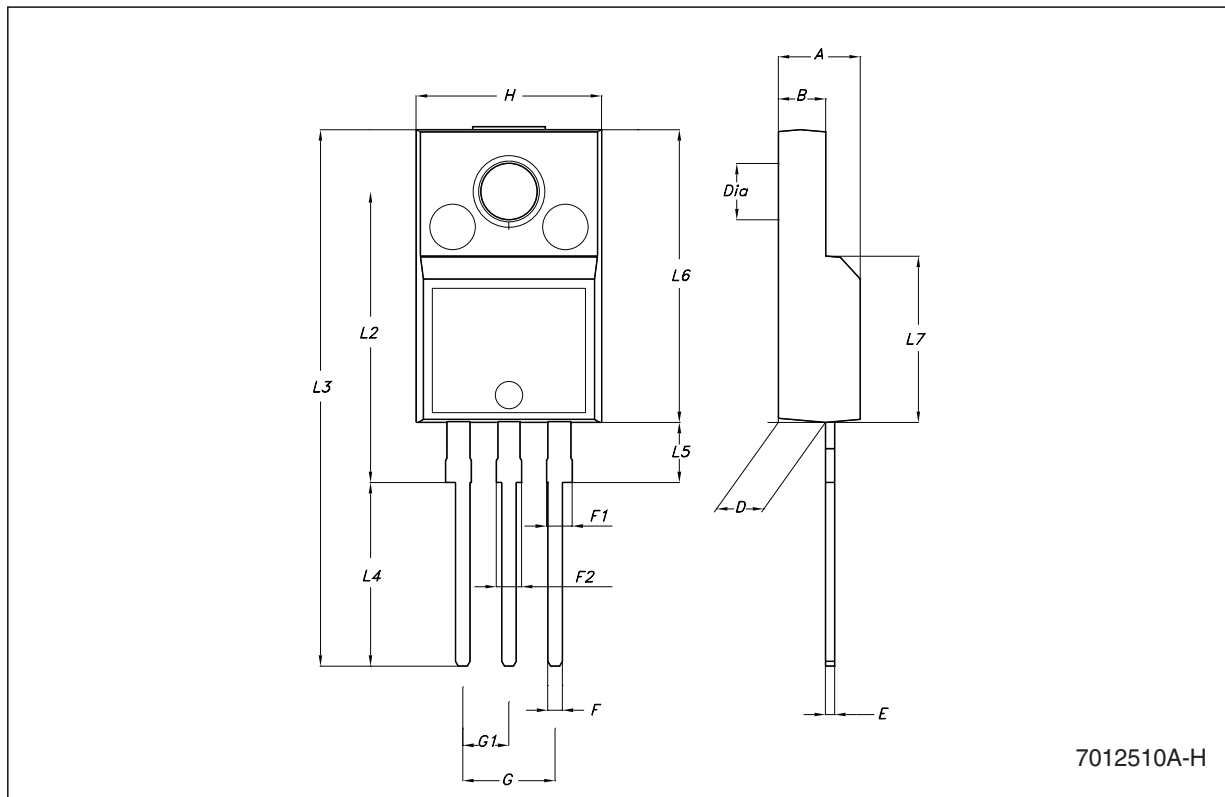


P011C

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TO-220FP mechanical data

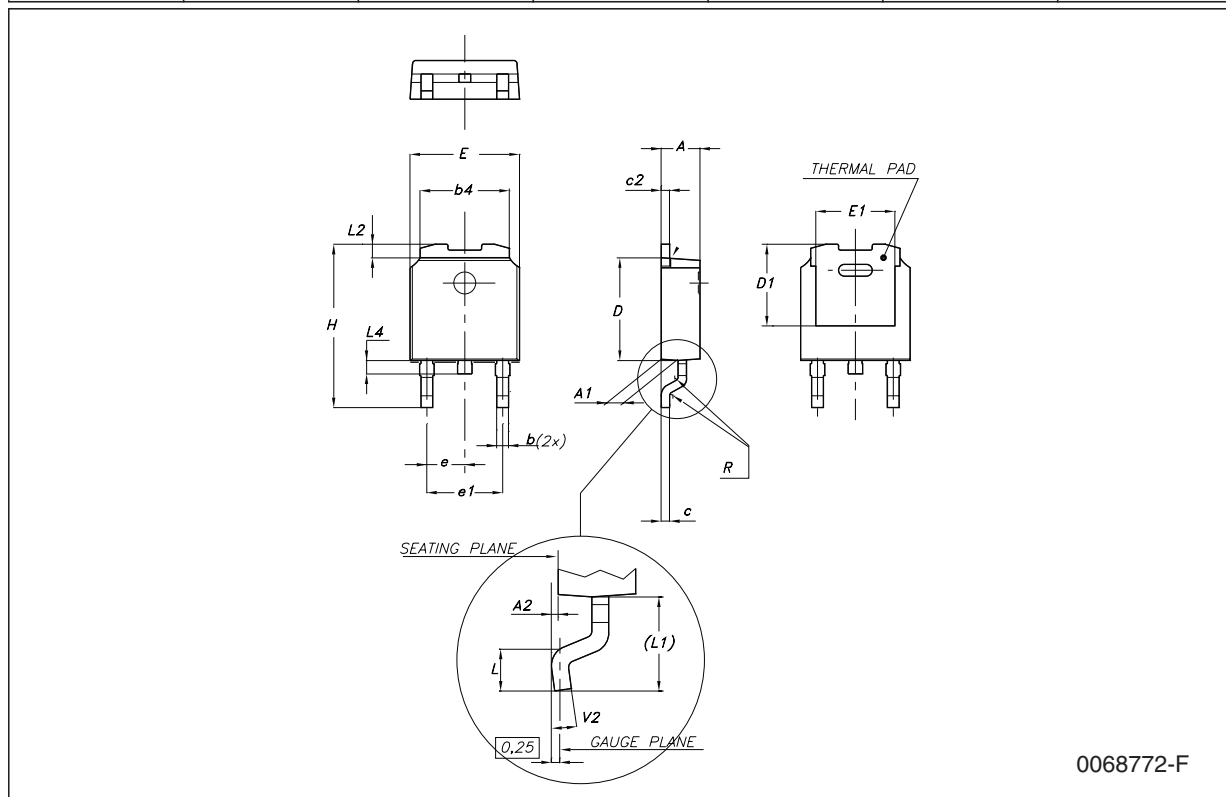
| Dim. | mm. | | | inch. | | |
|------|------|-----|-------|-------|-------|-------|
| | Min. | Typ | Max. | Min. | Typ. | Max. |
| A | 4.40 | | 4.60 | 0.173 | | 0.181 |
| B | 2.5 | | 2.7 | 0.098 | | 0.106 |
| D | 2.5 | | 2.75 | 0.098 | | 0.108 |
| E | 0.45 | | 0.70 | 0.017 | | 0.027 |
| F | 0.75 | | 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 |



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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° |

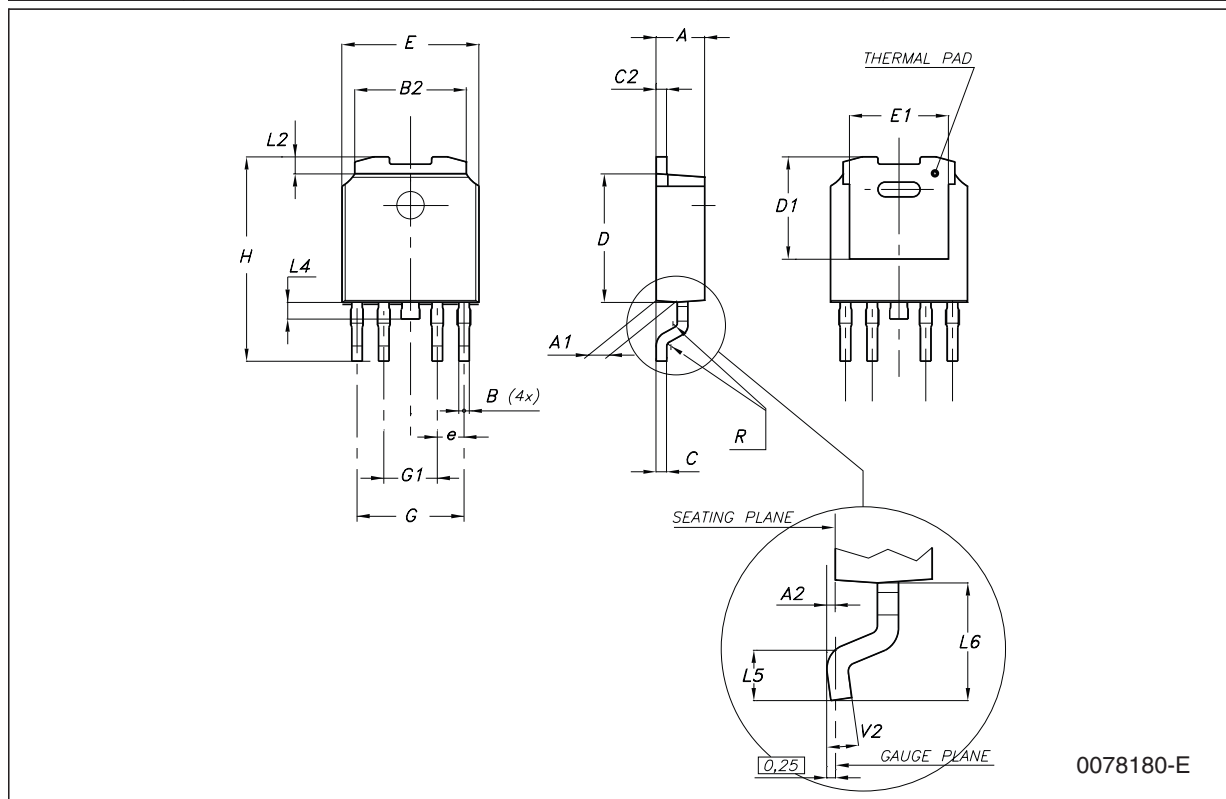


0068772-F

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PPAK 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 | 0.4 | | 0.6 | 0.015 | | 0.023 |
| B2 | 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 | | | 0.201 | |
| E | 6.4 | | 6.6 | 0.252 | | 0.260 |
| E1 | | 4.7 | | | 0.185 | |
| e | | 1.27 | | | 0.050 | |
| G | 4.9 | | 5.25 | 0.193 | | 0.206 |
| G1 | 2.38 | | 2.7 | 0.093 | | 0.106 |
| H | 9.35 | | 10.1 | 0.368 | | 0.397 |
| L2 | | 0.8 | 1 | | 0.031 | 0.039 |
| L4 | 0.6 | | 1 | 0.023 | | 0.039 |
| L5 | 1 | | | 0.039 | | |
| L6 | | 2.8 | | | 0.110 | |

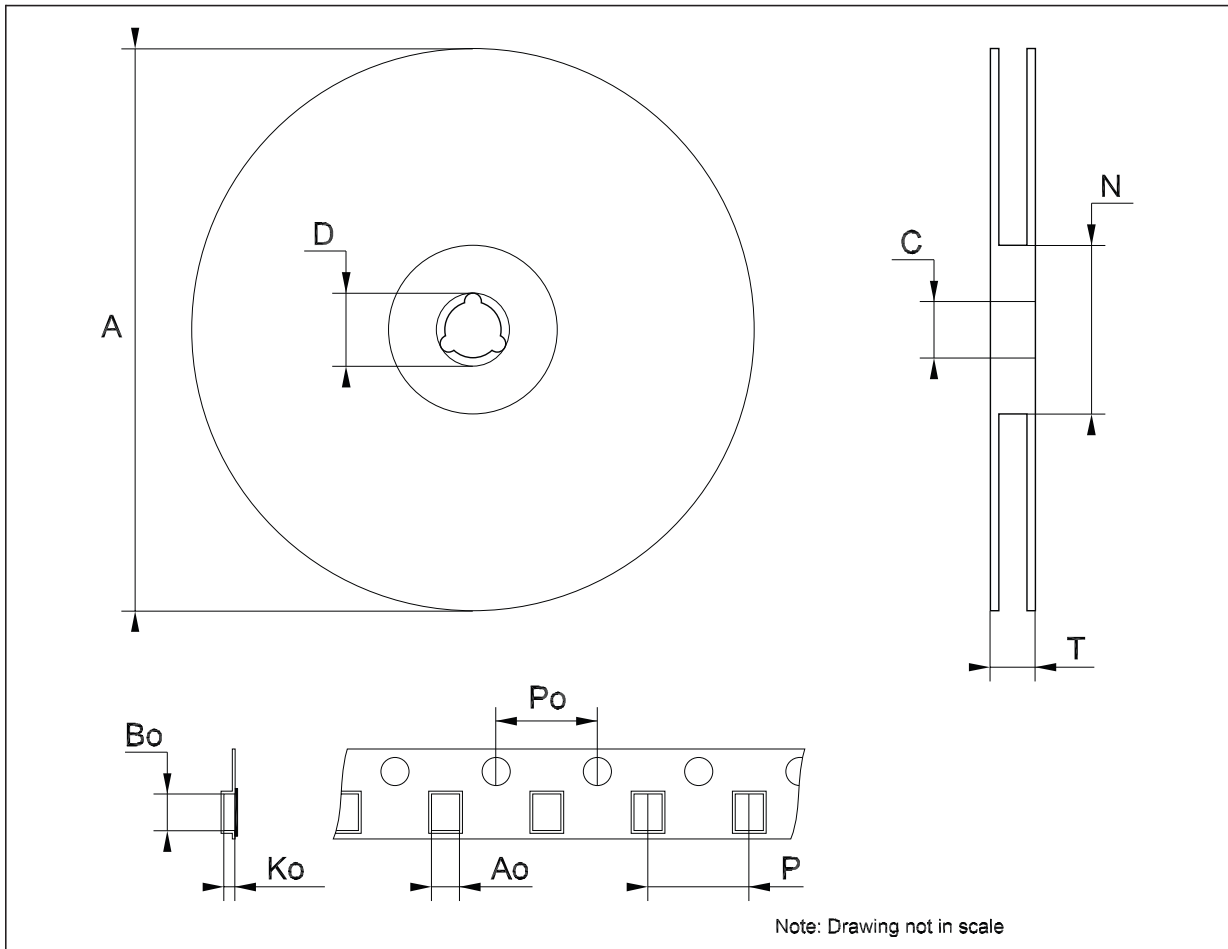


0078180-E

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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 |



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7 **Order codes**

Table 32. Order codes

| Packages | | | | | | Output voltage |
|------------------------|------------------------|-------------------------|-----------------------------|--------------------------|----------------------------|----------------|
| TO-220 | TO-220FP | DDPAK | DDPAK (T&R) | PPAK | PPAK (T&R) | |
| LF15CV ⁽¹⁾ | LF15CP ⁽¹⁾ | | | LF15CPT ⁽¹⁾ | LF15CPT-TR ⁽¹⁾ | 1.5 V |
| LF15ABV ⁽¹⁾ | LF15ABP ⁽¹⁾ | | LF15ABDT-TR | LF15ABPT ⁽¹⁾ | | 1.5 V |
| | LF18CP ⁽¹⁾ | | LF18CDT-TR | | LF18CPT-TR | 1.8 V |
| | | | LF18CDT-TRY ⁽²⁾ | | | 1.8 V |
| | LF18ABP ⁽¹⁾ | | LF18ABDT-TR | | LF18ABPT-TR | 1.8 V |
| | LF25CP ⁽¹⁾ | | LF25CDT-TR | | LF25CPT-TR | 2.5 V |
| | | | LF25CDT-TRY ⁽²⁾ | | | 2.5 V |
| | LF25ABP ⁽¹⁾ | | LF25ABDT-TR | LF25ABPT ⁽¹⁾ | | 2.5 V |
| | | | LF25ABDT-TRY ⁽²⁾ | | | 2.5 V |
| LF33CV | | | LF33CDT-TR | | LF33CPT-TR | 3.3 V |
| | | | LF33CDT-TRY ⁽²⁾ | | LF33CPT-TRY ⁽²⁾ | 3.3 V |
| LF33ABV | | | LF33ABDT-TR | | | 3.3 V |
| LF47CV | | | | | | 4.7 V |
| LF50CV | LF50CP | | LF50CDT-TR | | LF50CPT-TR | 5 V |
| | | | LF50CDT-TRY ⁽²⁾ | | LF50CPT-TRY ⁽²⁾ | 5 V |
| LF50ABV | LF50ABP | | LF50ABDT-TR | | LF50ABPT-TR | 5 V |
| | | | LF50ABDT-TRY ⁽²⁾ | | | 5 V |
| LF60CV | LF60CP ⁽¹⁾ | | LF60CDT-TR | | LF60CPT-TR ⁽¹⁾ | 6 V |
| LF60ABV | LF60ABP ⁽¹⁾ | | LF60ABDT-TR | LF60ABPT ⁽¹⁾ | LF60ABPT-TR ⁽¹⁾ | 6 V |
| LF80CV | LF80CP ⁽¹⁾ | | LF80CDT-TR | | LF80CPT-TR | 8 V |
| | | | LF80CDT-TRY ⁽²⁾ | | | 8 V |
| LF80ABV | LF80ABP ⁽¹⁾ | | LF80ABDT-TR | | LF80ABPT-TR | 8 V |
| | LF85CP | | LF85CDT-TR | | LF85CPT-TR | 8.5 V |
| | | | LF85CDT-TRY ⁽²⁾ | | LF85CPT-TRY ⁽²⁾ | 8.5 V |
| | LF85ABP | | | LF85ABPT ⁽¹⁾ | LF85ABPT-TR | 8.5 V |
| LF90CV | LF90CP ⁽¹⁾ | | LF90CDT-TR | | LF90CPT-TR | 9 V |
| LF90ABV | LF90ABP ⁽¹⁾ | LF90ABDT ⁽¹⁾ | LF90ABDT-TR | | LF90ABPT-TR | 9 V |
| | LF120CP ⁽¹⁾ | | LF120CDT-TR | | | 12 V |
| LF120ABV | | | LF120ABDT-TR | LF120ABPT ⁽¹⁾ | | 12 V |

1. Available on request.

2. Automotive Grade products.

[查询"LF18ABPT-TR"供应商](#)

8 Revision history

Table 33. Document revision history

| Date | Revision | Changes |
|-------------|----------|---|
| 21-Jun-2004 | 14 | Document updating. |
| 24-May-2006 | 15 | Order codes updated. |
| 02-Apr-2007 | 16 | Order codes updated. |
| 14-May-2007 | 17 | Order codes updated. |
| 26-Jul-2007 | 18 | Add Table 1 in cover page. |
| 26-Nov-2007 | 19 | Modified: Table 32 . |
| 16-Jan-2008 | 20 | Added new order codes for Automotive grade products see Table 32 on page 47 . |
| 12-Feb-2008 | 21 | Modified: Table 32 on page 47 . |

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