

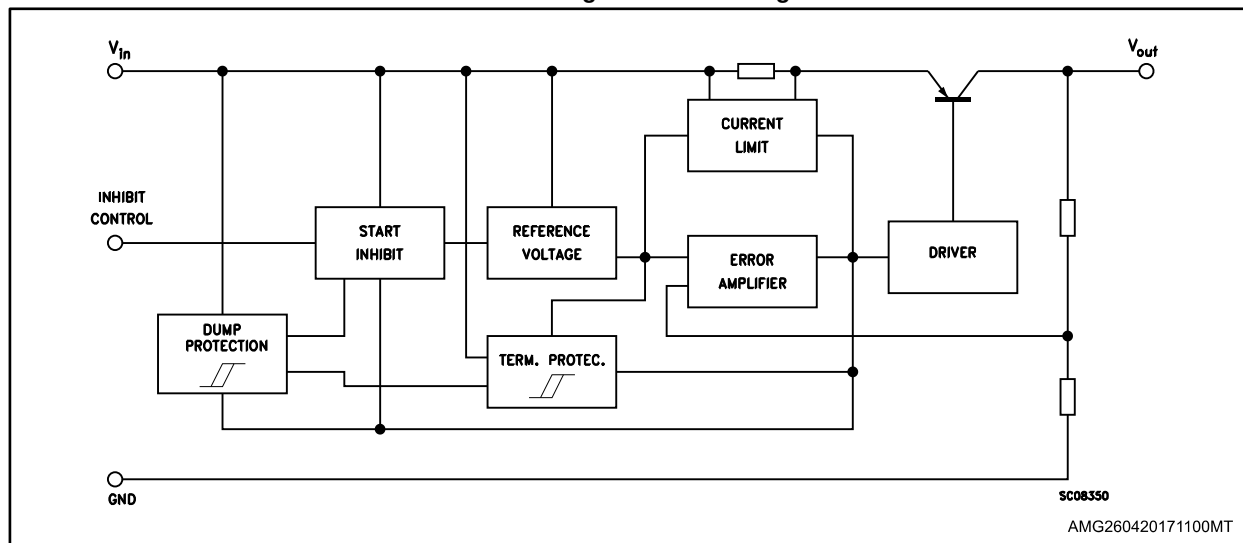
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## Contents

|          |                                                  |           |
|----------|--------------------------------------------------|-----------|
| <b>1</b> | <b>Diagram.....</b>                              | <b>3</b>  |
| <b>2</b> | <b>Pin configuration.....</b>                    | <b>4</b>  |
| <b>3</b> | <b>Maximum ratings.....</b>                      | <b>5</b>  |
| <b>4</b> | <b>Electrical characteristics .....</b>          | <b>6</b>  |
| <b>5</b> | <b>Typical performance characteristics .....</b> | <b>33</b> |
| <b>6</b> | <b>Package information .....</b>                 | <b>38</b> |
| 6.1      | TO-220 (dual gauge) package information.....     | 38        |
| 6.2      | TO-220 (single gauge) package information .....  | 40        |
| 6.3      | TO-220FP package information .....               | 42        |
| 6.4      | TO-220 packing information .....                 | 44        |
| 6.5      | DPAK package information .....                   | 45        |
| 6.6      | PPAK package information .....                   | 47        |
| 6.7      | PPAK and DPAK packing information.....           | 49        |
| <b>7</b> | <b>Ordering information.....</b>                 | <b>51</b> |
| <b>8</b> | <b>Revision history .....</b>                    | <b>52</b> |

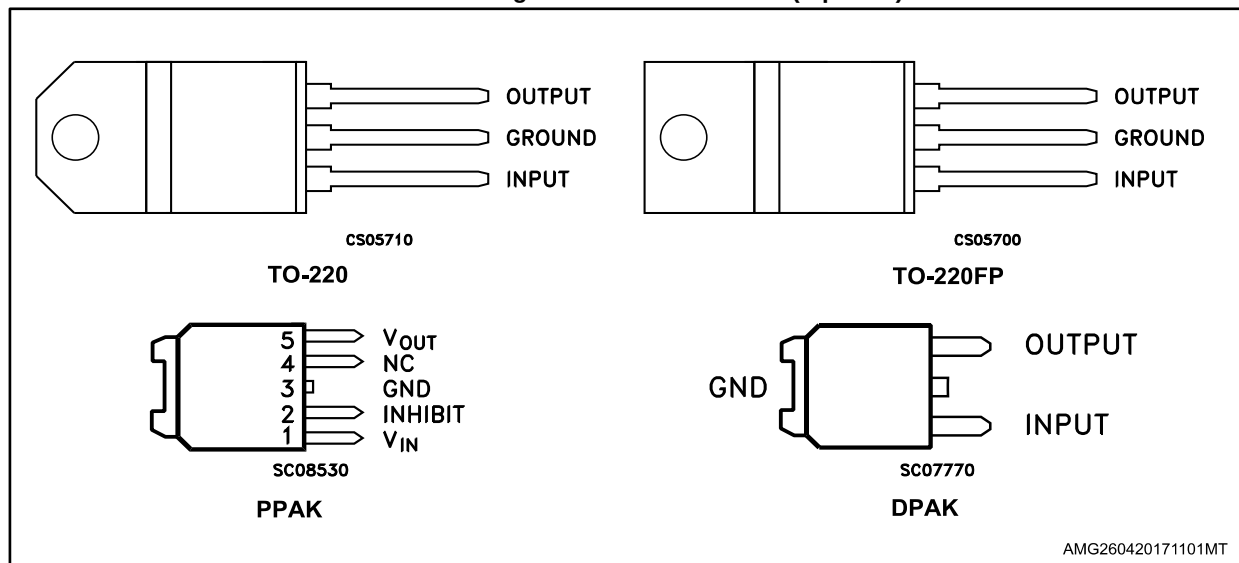
# 1 Diagram

Figure 1: Block diagram



## 2 Pin configuration

Figure 2: Pin connections (top view)



TAB is electrically connected to GND on TO-220, PPAK and DPAK packages.

### 3 Maximum ratings

Table 1: Absolute maximum ratings

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

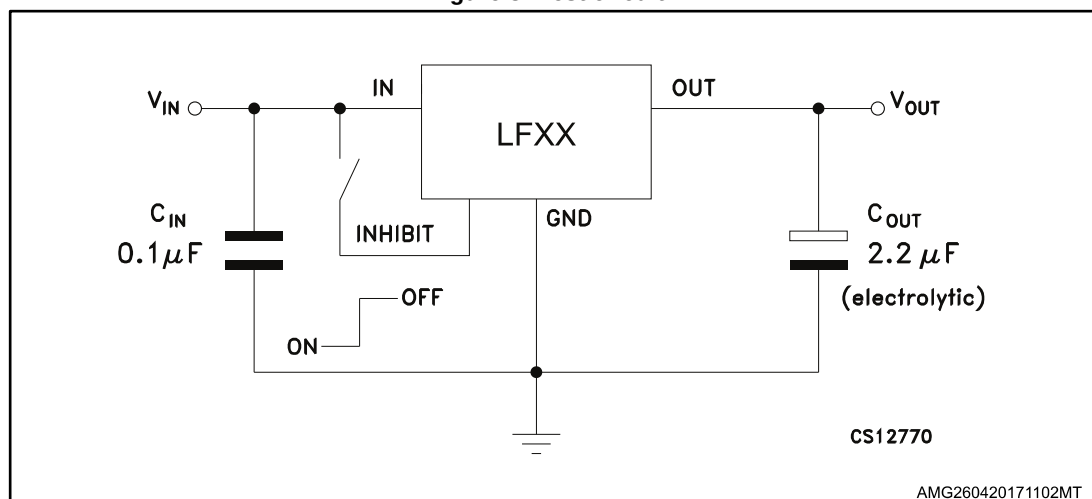
**Notes:**

<sup>(1)</sup>For  $18 < V_I < 40$  the regulator is in shutdown.

Table 2: Thermal data

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

Figure 3: Test circuit



## 4 Electrical characteristics

Refer to 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.

Table 3: LF15AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$                                                     |                     | 1.485 | 1.5  | 1.515 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 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             |
| $\Delta V_O$ | Line regulation           | $V_I = 2.5\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 2    | 10    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 2.8\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 2    | 10    | mV            |
| $I_d$        | Quiescent current         | $V_I = 2.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 2.8\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 3.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                    |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

**Table 4: LF18AB electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 3.3\text{ V}$                                                     |                     | 1.782 | 1.8  | 1.818 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 3.3\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 1.764 |      | 1.836 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     | 3     |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 2.8\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 2    | 12    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 3.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 2    | 10    | mV            |
| $I_d$        | Quiescent current         | $V_I = 2.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 3.1\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 3.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                    |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 5: LF18C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$                                                     |                     | 1.764 | 1.8  | 1.836 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 1.728 |      | 1.872 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     | 3     |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 2.8\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 2    | 12    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 3.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 2    | 10    | mV            |
| $I_d$        | Quiescent current         | $V_I = 2.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 3.1\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 3.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                    |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_I = 0.1\text{ }\mu\text{F}$ ,  $C_O = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

**Table 6: LF18C (automotive grade) electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                          |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-----------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 1.764 | 1.8  | 1.836 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 3.5\text{ V}$                                            |                     | 1.713 |      | 1.887 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                   |                     | 3     |      | 16    | V             |
| $I_O$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                      |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 2.8$ to $16\text{ V}$<br>$I_O = 5\text{ mA}$                                     |                     |       | 2    | 15    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 3.3\text{ V}$<br>$I_O = 5$ to $500\text{ mA}$                                    |                     |       | 2    | 15    | mV            |
| $I_d$        | Quiescent current         | $V_I = 2.5$ to $16\text{ V}$<br>$I_O = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_I = 3.1$ to $16\text{ V}$<br>$I_O = 500\text{ mA}$                                   |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                      | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 3.5 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 82   |       | dB            |
|              |                           |                                                                                         | $f = 1\text{ kHz}$  |       | 77   |       |               |
|              |                           |                                                                                         | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$            |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_O = 0$ to $500\text{ mA}$                       |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 7: LF25AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 4.5\text{ V}$                                                     |                     | 2.475 | 2.5  | 2.525 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 4.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 2.450 |      | 2.550 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 3.5\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 2    | 12    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 3.8\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 2    | 12    | mV            |
| $I_d$        | Quiescent current         | $V_I = 3.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 3.8\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 4.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = $0.1\text{ to }10\text{ }\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                      |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

**Table 8: LF25AB (automotive grade) electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                          |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-----------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 4.5\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 2.475 | 2.5  | 2.525 | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 4.5\text{ V}$                                            |                     | 2.435 |      | 2.565 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                   |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                      |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 3.5$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                     |                     |       | 2    | 15    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 3.8\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                    |                     |       | 2    | 15    | mV            |
| $I_d$        | Quiescent current         | $V_i = 3.5$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_i = 3.8$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                   |                     |       |      | 12    |               |
|              |                           | $V_i = 6\text{ V}$                                                                      | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 4.5 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 82   |       | dB            |
|              |                           |                                                                                         | $f = 1\text{ kHz}$  |       | 77   |       |               |
|              |                           |                                                                                         | $f = 10\text{ kHz}$ |       | 65   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$            |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 6\text{ V}$<br>$V_c = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                       |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 9: LF25C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 4.5\text{ V}$                                                     |                     | 2.45 | 2.5  | 2.55 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 4.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 2.4  |      | 2.6  |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 3.5\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |      | 2    | 12   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 3.8\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |      | 2    | 12   | mV            |
| $I_d$        | Quiescent current         | $V_I = 3.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.5  | 1    | mA            |
|              |                           | $V_I = 3.8\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |      |      | 12   |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |      | 50   | 100  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 4.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = $0.1\text{ to }10\text{ }\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                      |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 10: LF25C (automotive grade) electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                          |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-----------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 4.5\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 2.45  | 2.5  | 2.55  | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 4.5\text{ V}$                                            |                     | 2.385 |      | 2.615 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                   |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                      |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 3.5$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                     |                     |       | 2    | 15    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 3.8\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                    |                     |       | 2    | 15    | mV            |
| $I_d$        | Quiescent current         | $V_i = 3.5$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_i = 3.8$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                   |                     |       |      | 12    |               |
|              |                           | $V_i = 6\text{ V}$                                                                      | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 4.5 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 82   |       | dB            |
|              |                           |                                                                                         | $f = 1\text{ kHz}$  |       | 77   |       |               |
|              |                           |                                                                                         | $f = 10\text{ kHz}$ |       | 65   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$            |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 6\text{ V}$<br>$V_c = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                       |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 11: LF33AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 5.3\text{ V}$                                                     |                     | 3.267 | 3.3  | 3.333 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 5.3\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 3.234 |      | 3.366 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 4.3\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 3    | 16    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 4.6\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 3    | 16    | mV            |
| $I_d$        | Quiescent current         | $V_I = 4.3\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 4.6\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 5.3 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                    |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 12: LF33C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 5.3\text{ V}$                                                     |                     | 3.234 | 3.3  | 3.366 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 5.3\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 3.168 |      | 3.432 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                            |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 4.3\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 3    | 16    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 4.6\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                        |                     |       | 3    | 16    | mV            |
| $I_d$        | Quiescent current         | $V_I = 4.3\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 4.6\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                       |                     |       |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 5.3 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                    |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 13: LF33C (automotive grade) electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                          |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-----------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 5.3\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 3.234 | 3.3  | 3.366 | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 5.3\text{ V}$                                            |                     | 3.153 |      | 3.447 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                   |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                      |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 4.3$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                     |                     |       | 3    | 19    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 4.6\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                    |                     |       | 3    | 19    | mV            |
| $I_d$        | Quiescent current         | $V_i = 4.3$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_i = 4.6$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                   |                     |       |      | 12    |               |
|              |                           | $V_i = 6\text{ V}$                                                                      | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 5.3 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 80   |       | dB            |
|              |                           |                                                                                         | $f = 1\text{ kHz}$  |       | 75   |       |               |
|              |                           |                                                                                         | $f = 10\text{ kHz}$ |       | 65   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$            |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 6\text{ V}$<br>$V_c = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                       |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 14: LF50AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                            |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$                                                |                     | 4.95 | 5    | 5.05 | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$<br>$T_a = -25$ to $85\text{ }^{\circ}\text{C}$ |                     | 4.9  |      | 5.1  |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                     |                     |      |      | 16   | V             |
| $I_o$        | Output current limit      |                                                                                           |                     |      | 1    |      | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 6$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                         |                     |      | 5    | 25   | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 6.3\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                      |                     |      | 5    | 25   | mV            |
| $I_d$        | Quiescent current         | $V_i = 6$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                         | ON mode             |      | 0.5  | 1    | mA            |
|              |                           | $V_i = 6.3$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                     |                     |      |      | 12   |               |
|              |                           | $V_i = 6\text{ V}$                                                                        | OFF mode            |      | 50   | 100  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 7 \pm 1\text{ V}$                                           | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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   | $T_a = -40$ to $125\text{ }^{\circ}\text{C}$                                              |                     |      |      | 0.8  | V             |
| $V_{iH}$     | Control input logic high  | $T_a = -40$ to $125\text{ }^{\circ}\text{C}$                                              |                     | 2    |      |      | V             |
| $I_i$        | Control input current     | $V_i = 6\text{ V}$<br>$V_c = 6\text{ V}$                                                  |                     |      | 10   |      | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                         |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 15: LF50AB (automotive grade) electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                        |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|---------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 4.95  | 5    | 5.05  | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$                                            |                     | 4.885 |      | 5.115 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                 |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                    |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 6$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                     |                     |       | 5    | 28    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 6.3\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                  |                     |       | 5    | 28    | mV            |
| $I_d$        | Quiescent current         | $V_i = 6$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_i = 6.3$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                 |                     |       |      | 12    |               |
|              |                           | $V_i = 6\text{ V}$                                                                    | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 7 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 76   |       | dB            |
|              |                           |                                                                                       | $f = 1\text{ kHz}$  |       | 71   |       |               |
|              |                           |                                                                                       | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 6\text{ V}$<br>$V_c = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$        |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                     |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 16: LF50AC electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 | Min.                | Typ. | Max.  | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 7\text{ V}$                                                     | 4.925               | 5    | 5.075 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 7\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ | 4.875               |      | 5.125 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                          |                     |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                |                     | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 6\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     | 5    | 25    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 6.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     | 5    | 25    | mV            |
| $I_d$        | Quiescent current         | $V_I = 6\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             | 0.5  | 1     | mA            |
|              |                           | $V_I = 6.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |      | 12    |               |
|              |                           | $V_I = 6\text{ V}$                                                                             | OFF mode            | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 7 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$             | 2                   | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 17: LF50C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 7\text{ V}$                                                     |                     | 4.9  | 5    | 5.1  | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 7\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 4.8  |      | 5.2  |               |
|              |                           |                                                                                                |                     |      |      |      |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                          |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 6\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |      | 5    | 25   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 6.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |      | 5    | 25   | mV            |
| $I_d$        | Quiescent current         | $V_I = 6\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.5  | 1    | mA            |
|              |                           | $V_I = 6.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |      |      | 12   |               |
|              |                           | $V_I = 6\text{ V}$                                                                             | OFF mode            |      | 50   | 100  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 7 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 6\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                  |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

**Table 18: LF50C (automotive grade) electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                        |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|---------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 4.9   | 5    | 5.1   | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 7\text{ V}$                                            |                     | 4.785 |      | 5.215 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                 |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                    |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 6$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                     |                     |       | 5    | 28    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 6.3\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                  |                     |       | 5    | 28    | mV            |
| $I_d$        | Quiescent current         | $V_i = 6$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                     | ON mode             |       | 0.5  | 2     | mA            |
|              |                           | $V_i = 6.3$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                 |                     |       |      | 12    |               |
|              |                           | $V_i = 6\text{ V}$                                                                    | OFF mode            |       | 50   | 120   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 7 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 76   |       | dB            |
|              |                           |                                                                                       | $f = 1\text{ kHz}$  |       | 71   |       |               |
|              |                           |                                                                                       | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 6\text{ V}$<br>$V_C = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$        |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                     |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 19: LF60AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 8\text{ V}$                                                     |                     | 5.94 | 6    | 6.06 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 8\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 5.88 |      | 6.12 |               |
|              |                           |                                                                                                |                     |      |      |      |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                          |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 7\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |      | 6    | 30   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 7.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |      | 6    | 30   | mV            |
| $I_d$        | Quiescent current         | $V_I = 7\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 7.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |      |      | 12   |               |
|              |                           | $V_I = 9\text{ V}$                                                                             | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 8 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                  |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to 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.

Table 20: LF60C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 8\text{ V}$                                                     |                     | 5.88 | 6    | 6.12 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 8\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 5.76 |      | 6.24 |               |
|              |                           |                                                                                                |                     |      |      |      |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                          |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 7\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |      | 6    | 30   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 7.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |      | 6    | 30   | mV            |
| $I_d$        | Quiescent current         | $V_I = 7\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 7.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |      |      | 12   |               |
|              |                           | $V_I = 9\text{ V}$                                                                             | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 8 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                  |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to 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.

Table 21: LF80AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                  |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 10\text{ V}$                                                     |                     | 7.92 | 8    | 8.08 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 10\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 7.84 |      | 8.16 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                           |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                 |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 9\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                          |                     |      | 8    | 40   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                       |                     |      | 8    | 40   | mV            |
| $I_d$        | Quiescent current         | $V_I = 9\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                          | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 9.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                      |                     |      |      | 12   |               |
|              |                           | $V_I = 9\text{ V}$                                                                              | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 10 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                        |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                   |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to 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.

Table 22: LF80C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                  |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 10\text{ V}$                                                     |                     | 7.84 | 8    | 8.16 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 10\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 7.68 |      | 8.32 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                           |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                 |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 9\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                          |                     |      | 8    | 40   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                       |                     |      | 8    | 40   | mV            |
| $I_d$        | Quiescent current         | $V_I = 9\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                          | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 9.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                      |                     |      |      | 12   |               |
|              |                           | $V_I = 9\text{ V}$                                                                              | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 10 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                        |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                   |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 23: LF80C (automotive grade) electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                         |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|----------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_o$        | Output voltage            | $I_o = 50\text{ mA}$<br>$V_i = 10\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$      |                     | 7.84  | 8    | 8.16  | V             |
|              |                           | $I_o = 50\text{ mA}$<br>$V_i = 10\text{ V}$                                            |                     | 7.665 |      | 8.335 |               |
| $V_i$        | Operating input voltage   | $I_o = 500\text{ mA}$                                                                  |                     |       |      | 16    | V             |
| $I_o$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                     |                     |       | 1    |       | A             |
| $\Delta V_o$ | Line regulation           | $V_i = 9$ to $16\text{ V}$<br>$I_o = 5\text{ mA}$                                      |                     |       | 8    | 44    | mV            |
| $\Delta V_o$ | Load regulation           | $V_i = 9.3\text{ V}$<br>$I_o = 5$ to $500\text{ mA}$                                   |                     |       | 8    | 44    | mV            |
| $I_d$        | Quiescent current         | $V_i = 9$ to $16\text{ V}$<br>$I_o = 0\text{ mA}$                                      | ON mode             |       | 0.7  | 2.5   | mA            |
|              |                           | $V_i = 9.3$ to $16\text{ V}$<br>$I_o = 500\text{ mA}$                                  |                     |       |      | 12    |               |
|              |                           | $V_i = 9\text{ V}$                                                                     | OFF mode            |       | 70   | 160   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_o = 5\text{ mA}$<br>$V_i = 10 \pm 1\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 72   |       | dB            |
|              |                           |                                                                                        | $f = 1\text{ kHz}$  |       | 67   |       |               |
|              |                           |                                                                                        | $f = 10\text{ kHz}$ |       | 57   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$           |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_i = 9\text{ V}$<br>$V_c = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$         |                     |       | 10   |       | $\mu\text{A}$ |
| $C_o$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_o = 0$ to $500\text{ mA}$                      |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 24: LF85AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                    |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$                                                     |                     | 8.415 | 8.5  | 8.585 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 8.33  |      | 8.67  |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                             |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                   |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 9.5\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                          |                     |       | 8    | 42    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9.8\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                         |                     |       | 8    | 42    | mV            |
| $I_d$        | Quiescent current         | $V_I = 9.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                          | ON mode             |       | 0.7  | 1.5   | mA            |
|              |                           | $V_I = 9.8\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                        |                     |       |      | 12    |               |
|              |                           | $V_I = 9\text{ V}$                                                                                | OFF mode            |       | 70   | 140   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 10.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                          |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                     |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 25: LF85C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                    |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$                                                     |                     | 8.33 | 8.5  | 8.67 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 8.16 |      | 8.84 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                             |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                   |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 9.5\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                          |                     |      | 8    | 42   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9.8\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                         |                     |      | 8    | 42   | mV            |
| $I_d$        | Quiescent current         | $V_I = 9.5\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                          | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 9.8\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                        |                     |      |      | 12   |               |
|              |                           | $V_I = 9\text{ V}$                                                                                | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 10.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$                                                          |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                     |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to test circuits,  $T_a = -40$  to  $125\text{ }^{\circ}\text{C}$ ,  $C_I = 0.1\text{ }\mu\text{F}$ ,  $C_O = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 26: LF85C (automotive grade) electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                        |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|---------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$   |                     | 8.33  | 8.5  | 8.67  | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 10.5\text{ V}$                                         |                     | 8.145 |      | 8.855 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                 |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      | $T_a = 25\text{ }^{\circ}\text{C}$                                                    |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 9.5$ to $16\text{ V}$<br>$I_O = 5\text{ mA}$                                   |                     |       | 8    | 44    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9.8\text{ V}$<br>$I_O = 5$ to $500\text{ mA}$                                  |                     |       | 8    | 44    | mV            |
| $I_d$        | Quiescent current         | $V_I = 9.5$ to $16\text{ V}$<br>$I_O = 0\text{ mA}$                                   | ON mode             |       | 0.7  | 2.5   | mA            |
|              |                           | $V_I = 9.8$ to $16\text{ V}$<br>$I_O = 500\text{ mA}$                                 |                     |       |      | 12    |               |
|              |                           | $V_I = 9\text{ V}$                                                                    | OFF mode            |       | 70   | 160   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 10.5 \pm 1\text{ V}$ $T_a = 25\text{ }^{\circ}\text{C}$ | $f = 120\text{ Hz}$ |       | 72   |       | dB            |
|              |                           |                                                                                       | $f = 1\text{ kHz}$  |       | 67   |       |               |
|              |                           |                                                                                       | $f = 10\text{ kHz}$ |       | 57   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz}$ to $100\text{ kHz}$<br>$T_a = 25\text{ }^{\circ}\text{C}$          |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 9\text{ V}$<br>$V_C = 6\text{ V}$<br>$T_a = 25\text{ }^{\circ}\text{C}$        |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = $0.1$ to $10\text{ }\Omega$<br>$I_O = 0$ to $500\text{ mA}$                     |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 27: LF90C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                  |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 11\text{ V}$                                                     |                     | 8.82 | 9    | 9.18 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 11\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 8.64 |      | 9.36 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                           |                     |      |      | 16   | V             |
| $I_O$        | Output current limit      |                                                                                                 |                     |      | 1    |      | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 10\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |      | 9    | 45   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 10.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |      | 9    | 45   | mV            |
| $I_d$        | Quiescent current         | $V_I = 10\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.7  | 1.5  | mA            |
|              |                           | $V_I = 10.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |      |      | 12   |               |
|              |                           | $V_I = 10\text{ V}$                                                                             | OFF mode            |      | 70   | 140  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 11 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 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   |      | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 10\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |      | 10   |      | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                   |                     | 2    | 10   |      | $\mu\text{F}$ |

Refer to 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.

**Table 28: LF120AB electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                                  |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 15\text{ V}$                                                     |                     | 11.88 | 12   | 12.12 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 15\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 11.76 |      | 12.24 |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                           |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                 |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 13\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 12   | 60    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 13.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |       | 12   | 60    | mV            |
| $I_d$        | Quiescent current         | $V_I = 13\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.7  | 1.5   | mA            |
|              |                           | $V_I = 13.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |       |      | 12    |               |
|              |                           | $V_I = 13\text{ V}$                                                                             | OFF mode            |       | 70   | 140   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 14 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 13\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                   |                     | 2     | 10   |       | $\mu\text{F}$ |

Refer to 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.

Table 29: LF120C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                  |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 50\text{ mA}$<br>$V_I = 14\text{ V}$                                                     |                     | 11.76 | 12   | 12.24 | V             |
|              |                           | $I_O = 50\text{ mA}$<br>$V_I = 14\text{ V}$<br>$T_a = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 11.52 |      | 12.48 |               |
|              |                           |                                                                                                 |                     |       |      |       |               |
| $V_I$        | Operating input voltage   | $I_O = 500\text{ mA}$                                                                           |                     |       |      | 16    | V             |
| $I_O$        | Output current limit      |                                                                                                 |                     |       | 1    |       | A             |
| $\Delta V_O$ | Line regulation           | $V_I = 13\text{ to }16\text{ V}$<br>$I_O = 5\text{ mA}$                                         |                     |       | 12   | 60    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 13.3\text{ V}$<br>$I_O = 5\text{ to }500\text{ mA}$                                      |                     |       | 12   | 60    | mV            |
| $I_d$        | Quiescent current         | $V_I = 13\text{ to }16\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.7  | 1.5   | mA            |
|              |                           | $V_I = 13.3\text{ to }16\text{ V}$<br>$I_O = 500\text{ mA}$                                     |                     |       |      | 12    |               |
|              |                           | $V_I = 13\text{ V}$                                                                             | OFF mode            |       | 70   | 140   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 14 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 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   |       | $\mu\text{V}$ |
| $V_d$        | 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     | $V_I = 13\text{ V}$<br>$V_C = 6\text{ V}$                                                       |                     |       | 10   |       | $\mu\text{A}$ |
| $C_O$        | Output bypass capacitance | ESR = 0.1 to 10 $\Omega$<br>$I_O = 0\text{ to }500\text{ mA}$                                   |                     | 2     | 10   |       | $\mu\text{F}$ |

## 5 Typical performance characteristics

Figure 4: Dropout voltage vs output current

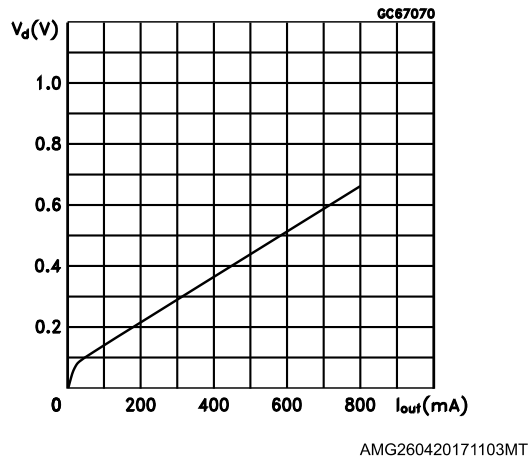


Figure 5: Dropout voltage vs temperature

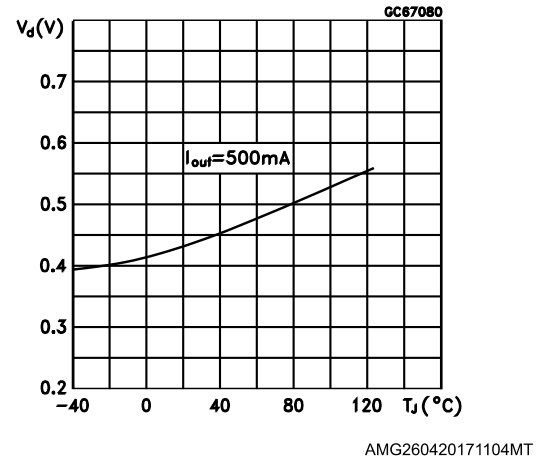


Figure 6: Supply current vs input voltage

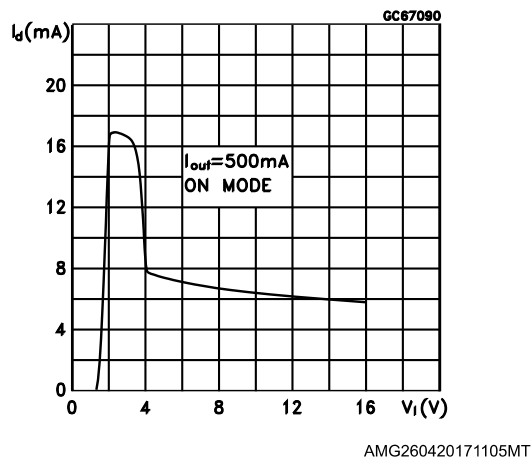


Figure 7: Supply current vs input voltage (no load)

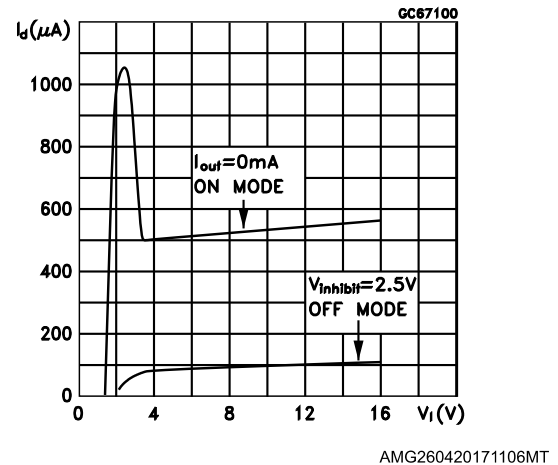


Figure 8: Short-circuit current vs input voltage

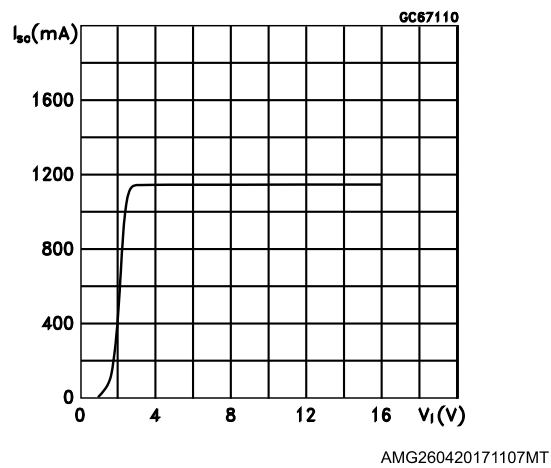
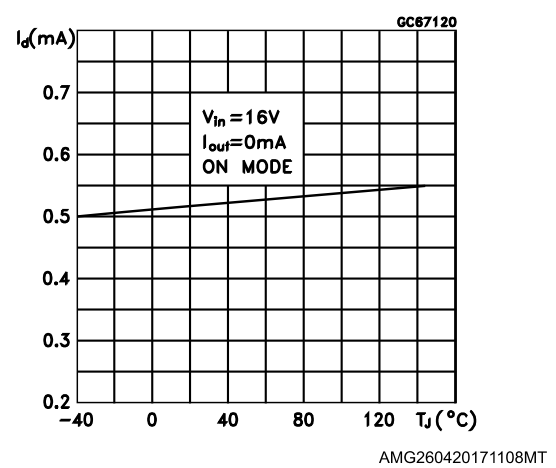


Figure 9: Supply current vs temperature



Unless otherwise specified  $V_{O(NOM)} = 3.3$  V.

6 < VIN < 16 V

VIN

LF50

VIN

VOUT

INH

GND

3

5

3.3V OR 5.0V  
+/- 1% 0.5 A MAX

VOUT

0.22 μF

1

VIN

VOUT

INH

GND

3

5

10 μF

CMOS OR TTL INVERTERS

SC08660

AMG260420171109MT

The diagram shows three identical circuit stages, each designed to produce a specific output voltage (3.3V, 5.0V, and 12.0V) from a battery source. Each stage consists of the following components and connections:

- Power Source:** A battery connected to a Power Switch.
- Resistor Network:** A 1K resistor is connected in series with the battery. The output of this network is connected to the non-inverting input (VIN) of the op-amp.
- Op-Amp:** The op-amp is configured as a comparator. The inverting input (INH) is connected to ground (GND).
- Monostable Multivibrator:** An HCF40106 monostable multivibrator is connected to the output of the op-amp. The output of the HCF40106 is connected to the output of the op-amp.
- Timing Components:** A 1N4148 diode and a 0.1µF capacitor are connected in parallel with the output of the HCF40106.
- Output Filter:** A 10µF capacitor is connected in parallel with the output of the op-amp.
- Output Voltage:** The final output voltage is labeled OUT 3.3V, OUT 5.0V, and OUT 12.0V for the three stages respectively.

**Legend:**

- ⚡: Needed for quick discharge of timing capacitor.
- \*\* : Values to be defined in order to get the needed sequence.

**Component Values:**

- Resistor: 1K
- Capacitor: 0.1µF
- Capacitor: 10µF
- Diode: 1N4148
- Op-Amp: LF33, LF50, LF120
- Monostable Multivibrator: HCF40106

Figure 12: Multiple supply with ON/OFF toggle switch

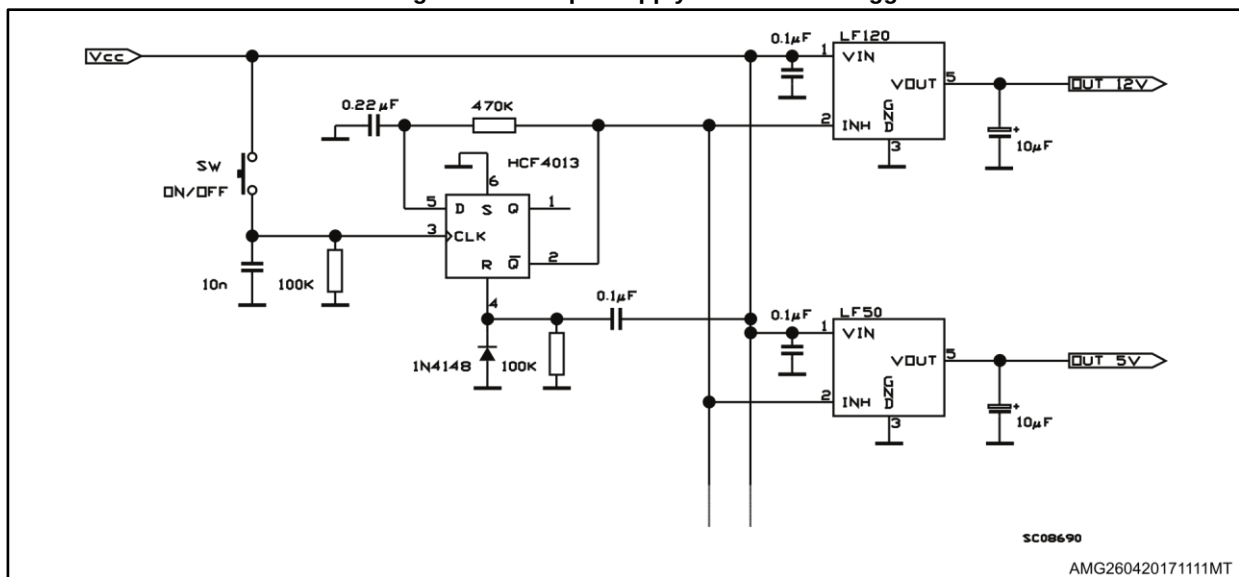


Figure 13: Basic inhibit functions

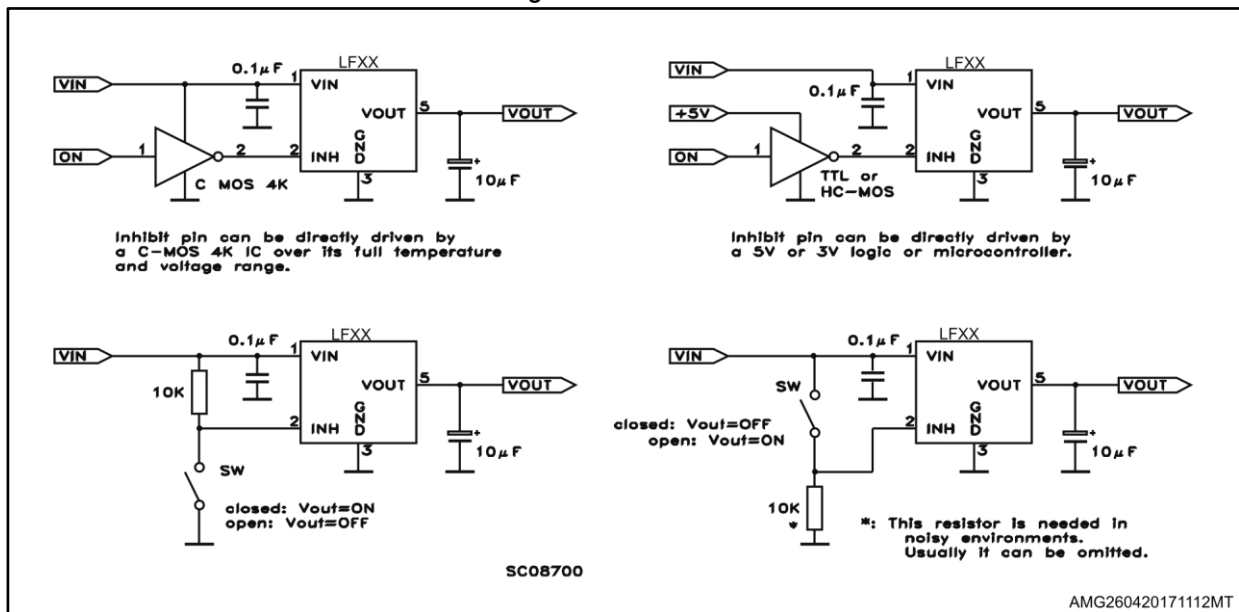


Figure 14: Delayed turn-on

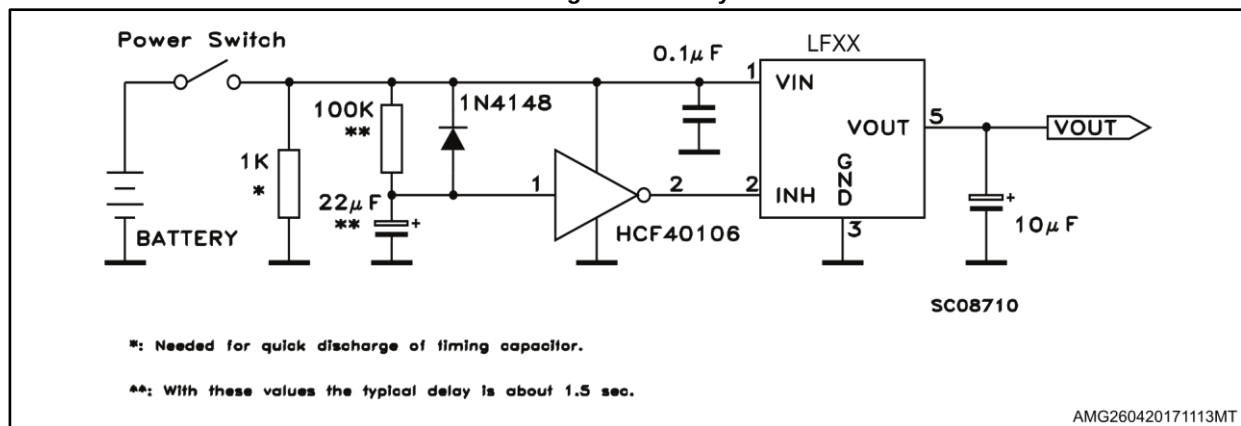
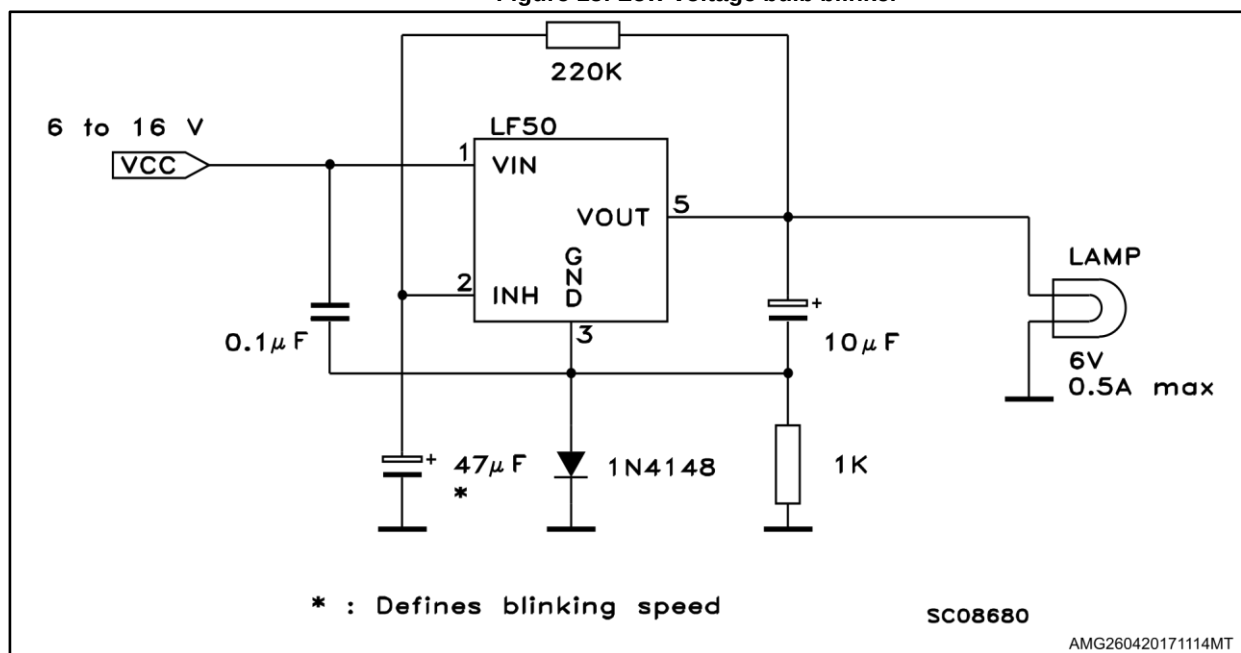


Figure 15: Low voltage bulb blinker



## 6 Package information

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](http://www.st.com). ECOPACK® is an ST trademark.

### 6.1 TO-220 (dual gauge) package information

Figure 16: TO-220 (dual gauge) package outline

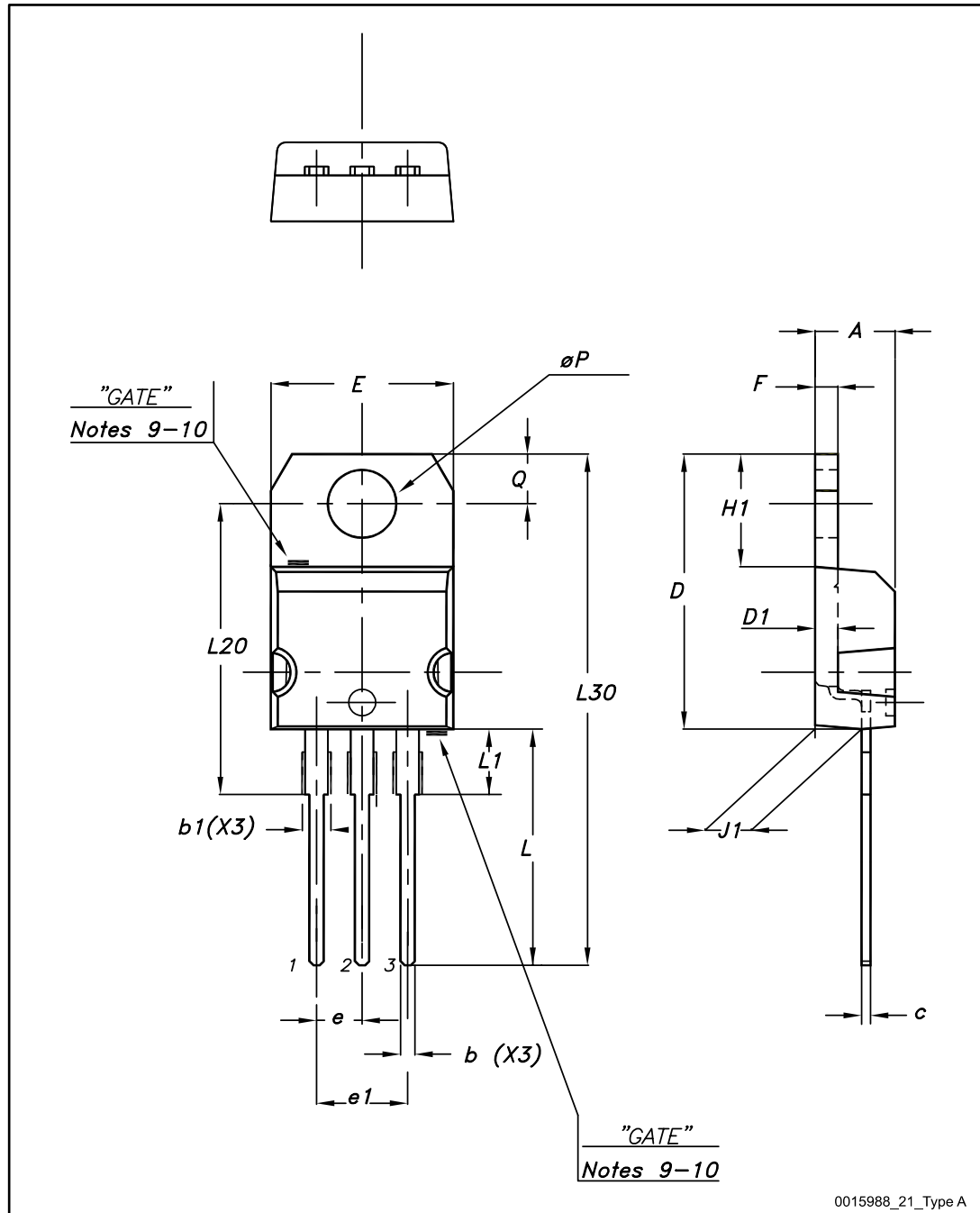


Table 30: TO-220 (dual gauge) mechanical data

| 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 |
| D1   |       | 1.27  |       |
| E    | 10    |       | 10.40 |
| e    | 2.40  |       | 2.70  |
| e1   | 4.95  |       | 5.15  |
| F    | 1.23  |       | 1.32  |
| 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  |

## 6.2 TO-220 (single gauge) package information

Figure 17: TO-220 (single gauge) package outline

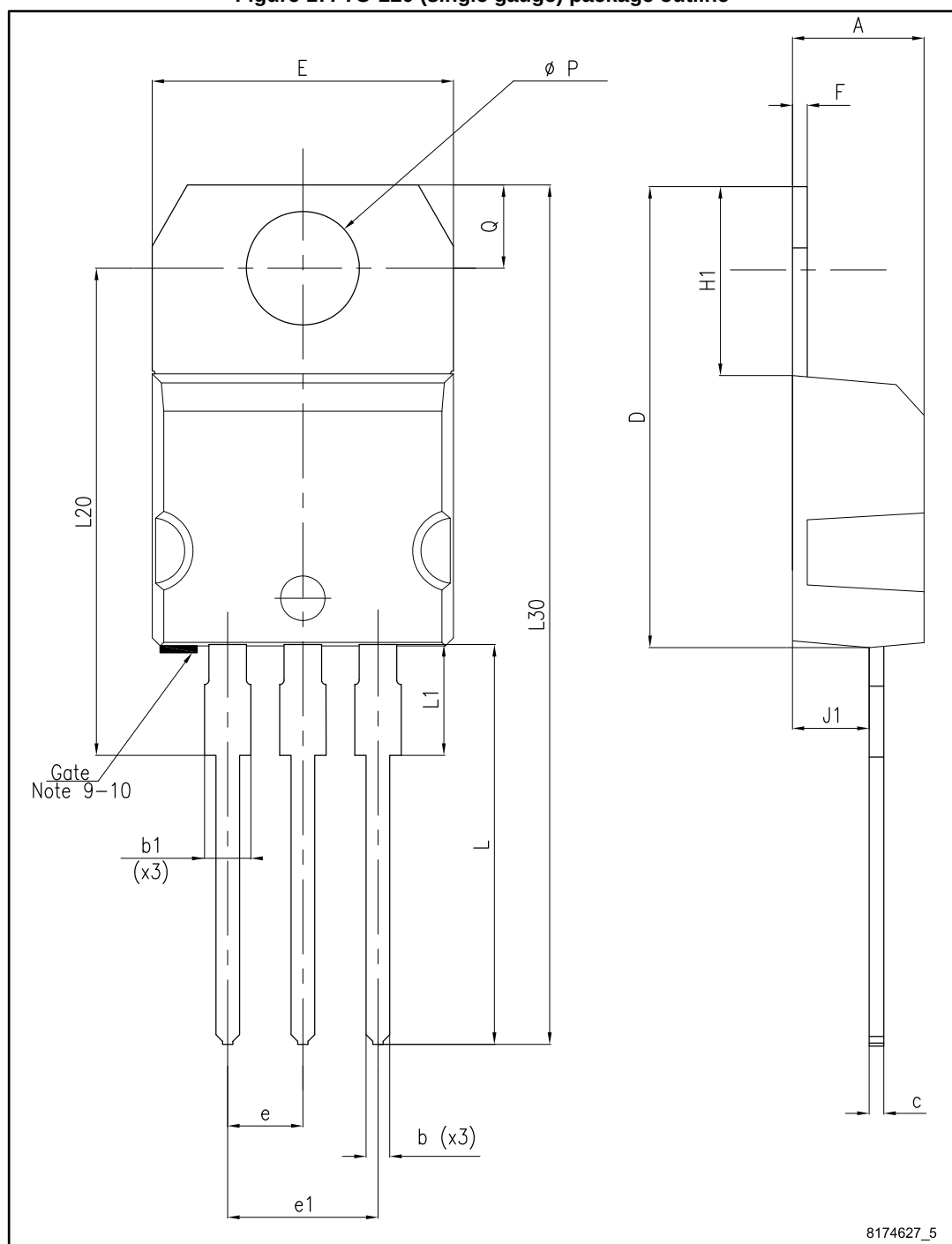
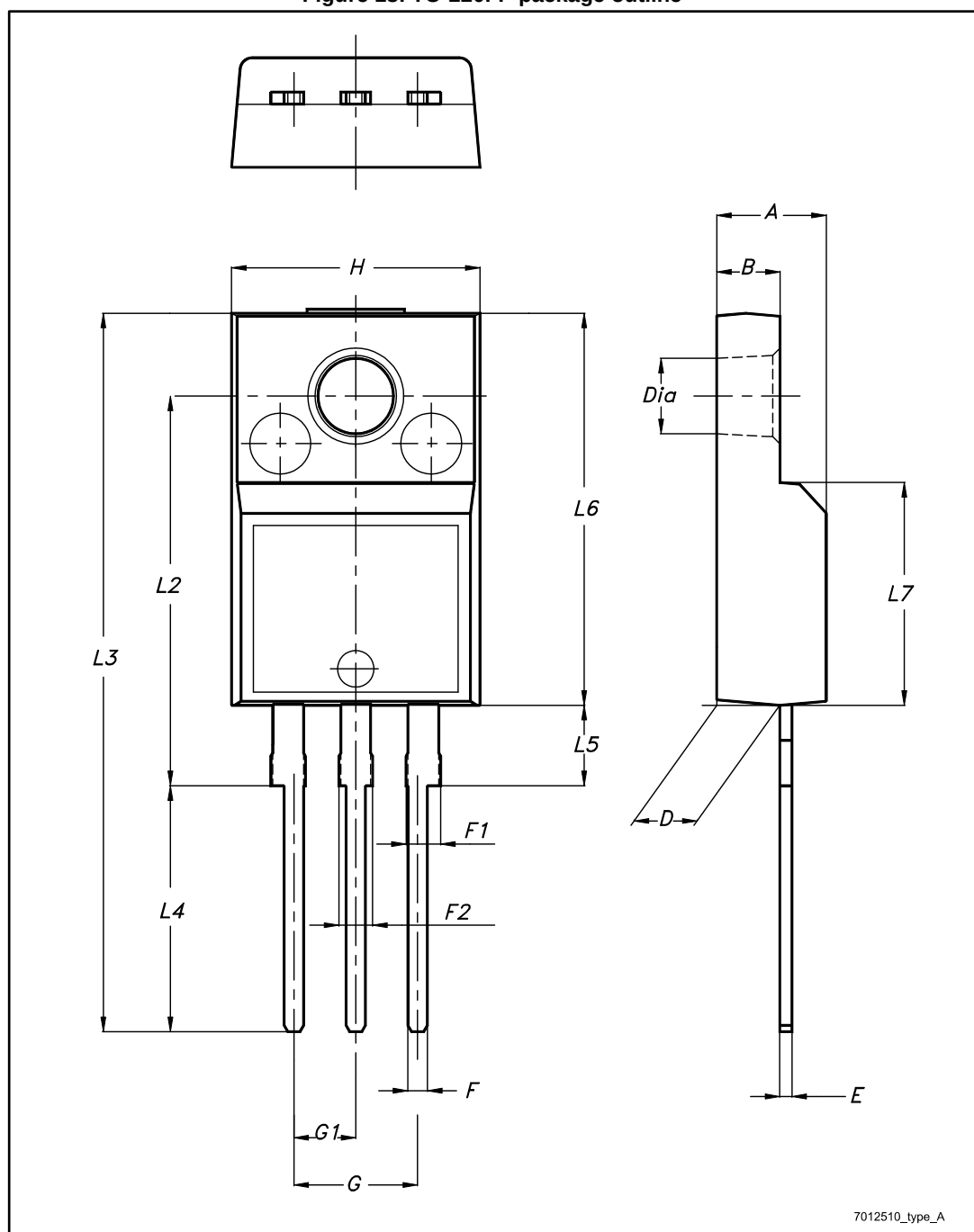


Table 31: TO-220 (single gauge) mechanical data

| 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    | 10.00 |       | 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    | 13.00 |       | 14.00 |
| L1   | 3.50  |       | 3.93  |
| L20  |       | 16.40 |       |
| L30  |       | 28.90 |       |
| ØP   | 3.75  |       | 3.85  |
| Q    | 2.65  |       | 2.95  |

## 6.3 TO-220FP package information

Figure 18: TO-220FP package outline



7012510\_type\_A

Table 32: TO-220FP package mechanical data

| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    | 4.4  |      | 4.6  |
| B    | 2.5  |      | 2.7  |
| D    | 2.5  |      | 2.75 |
| E    | 0.45 |      | 0.7  |
| F    | 0.75 |      | 1    |
| F1   | 1.15 |      | 1.70 |
| F2   | 1.15 |      | 1.70 |
| G    | 4.95 |      | 5.2  |
| G1   | 2.4  |      | 2.7  |
| H    | 10   |      | 10.4 |
| L2   |      | 16   |      |
| L3   | 28.6 |      | 30.6 |
| L4   | 9.8  |      | 10.6 |
| L5   | 2.9  |      | 3.6  |
| L6   | 15.9 |      | 16.4 |
| L7   | 9    |      | 9.3  |
| Dia  | 3    |      | 3.2  |

## 6.4 TO-220 packing information

Figure 19: Tube for TO-220 (dual gauge) (mm.)

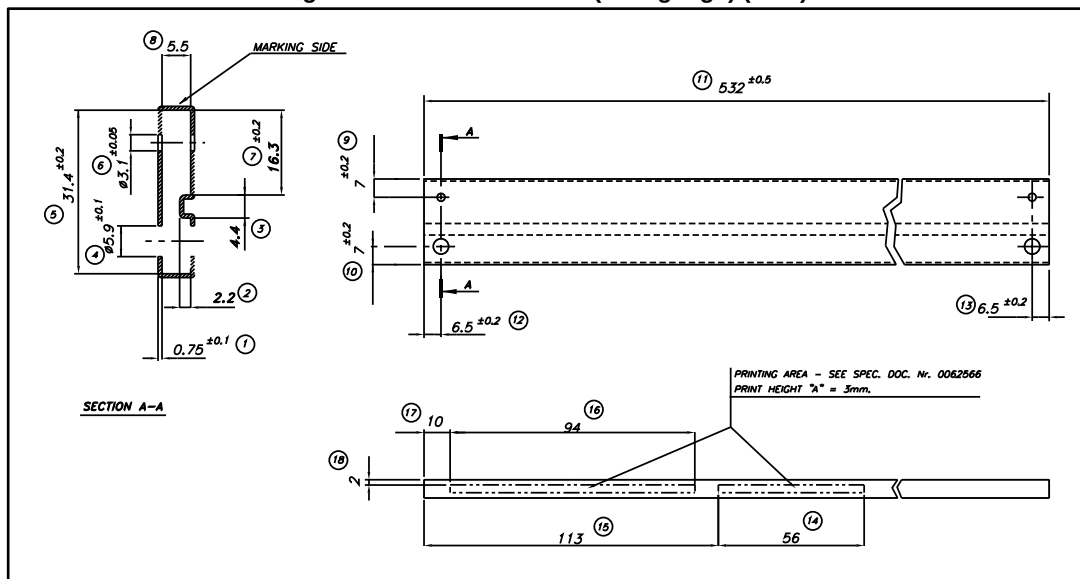
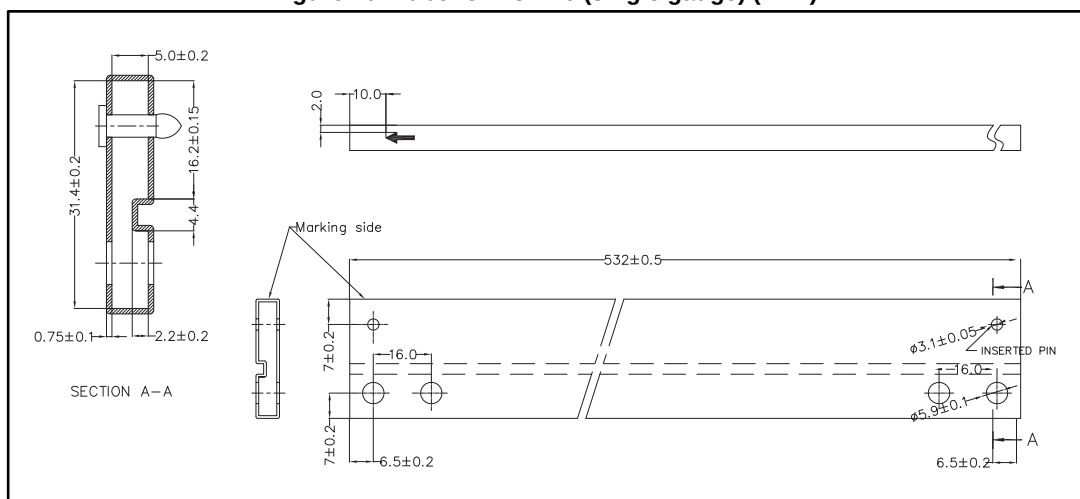


Figure 20: Tube for TO-220 (single gauge) (mm.)



## 6.5 DPAK package information

Figure 21: DPAK package outline

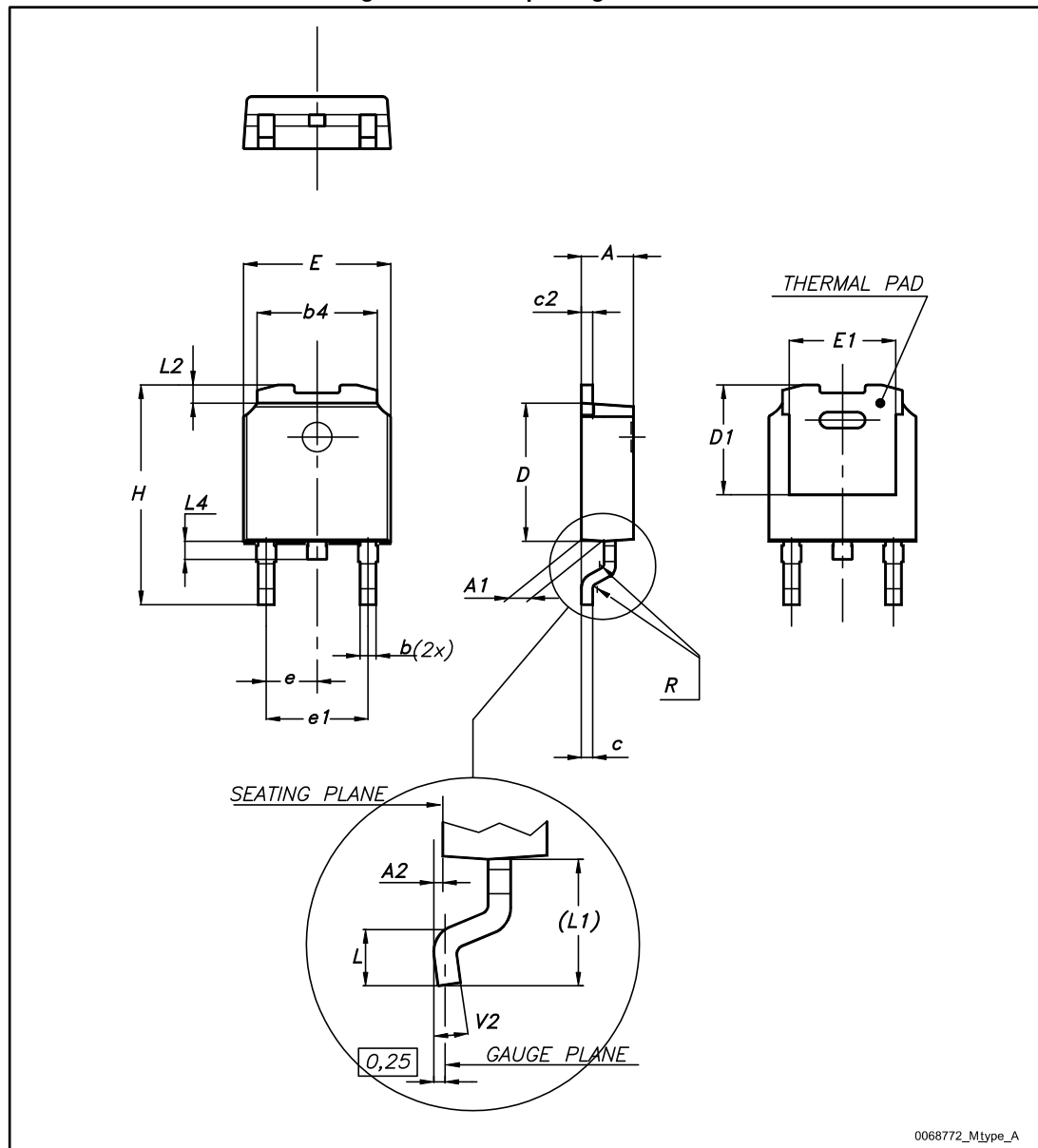
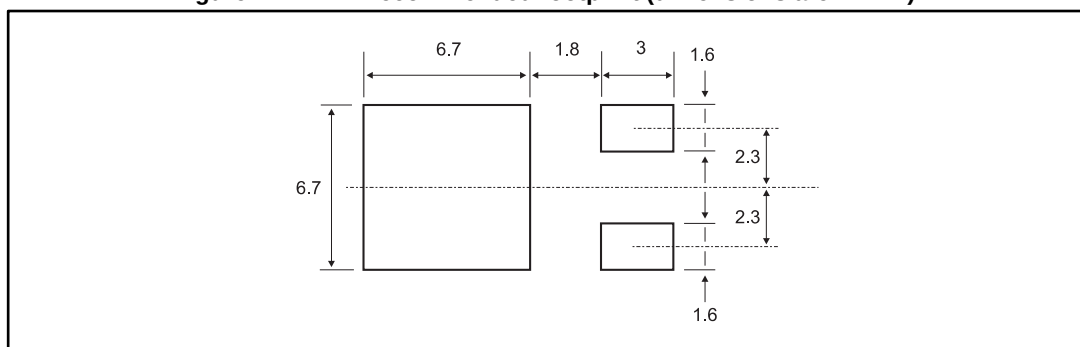


Table 33: DPAK mechanical data

| 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 22: DPAK recommended footprint (dimensions are in mm)



## 6.6 PPAK package information

Figure 23: PPAK package outline

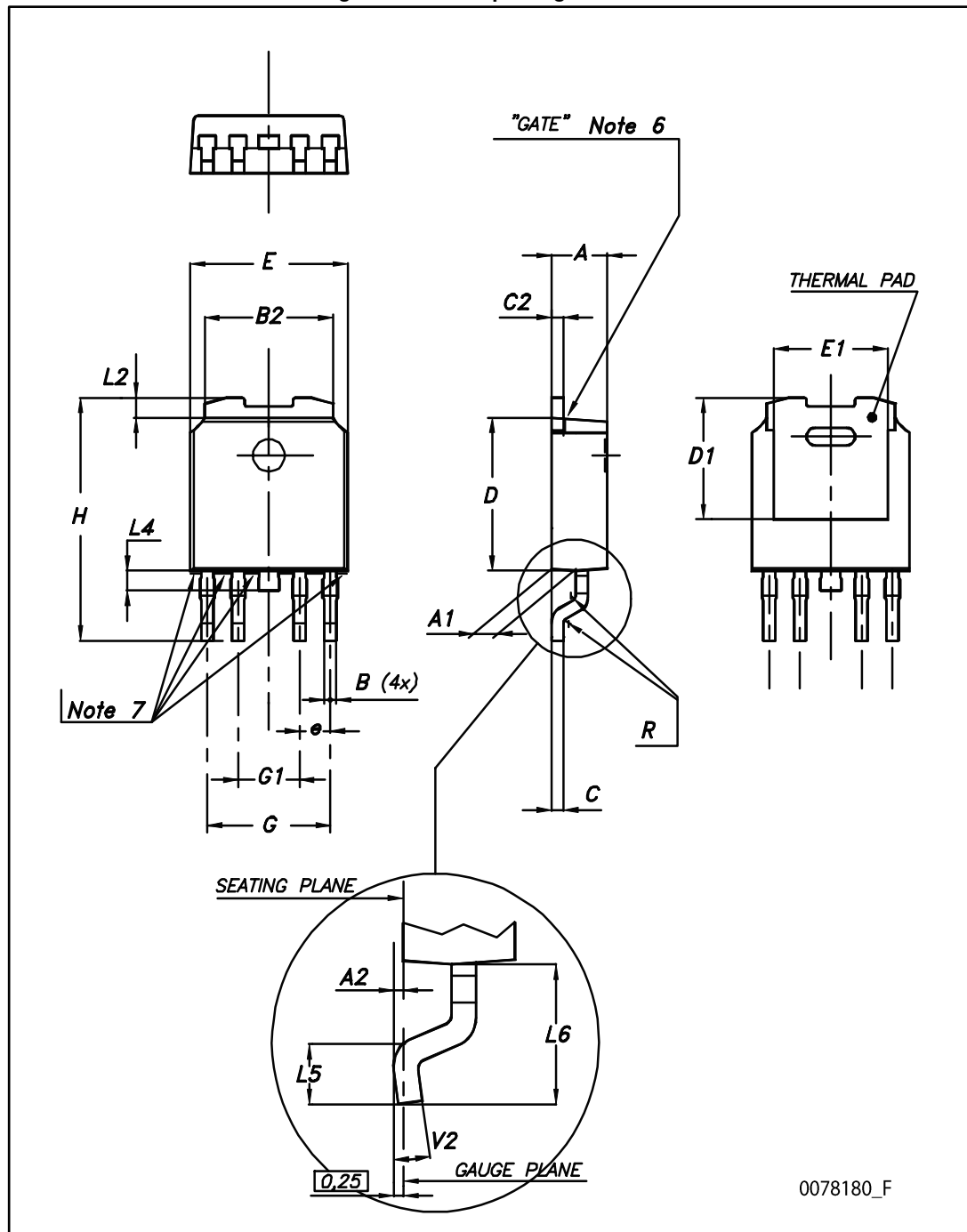


Table 34: PPAK mechanical data

| 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°   |

## 6.7 PPAK and DPAK packing information

Figure 24: PPAK and DPAK tape

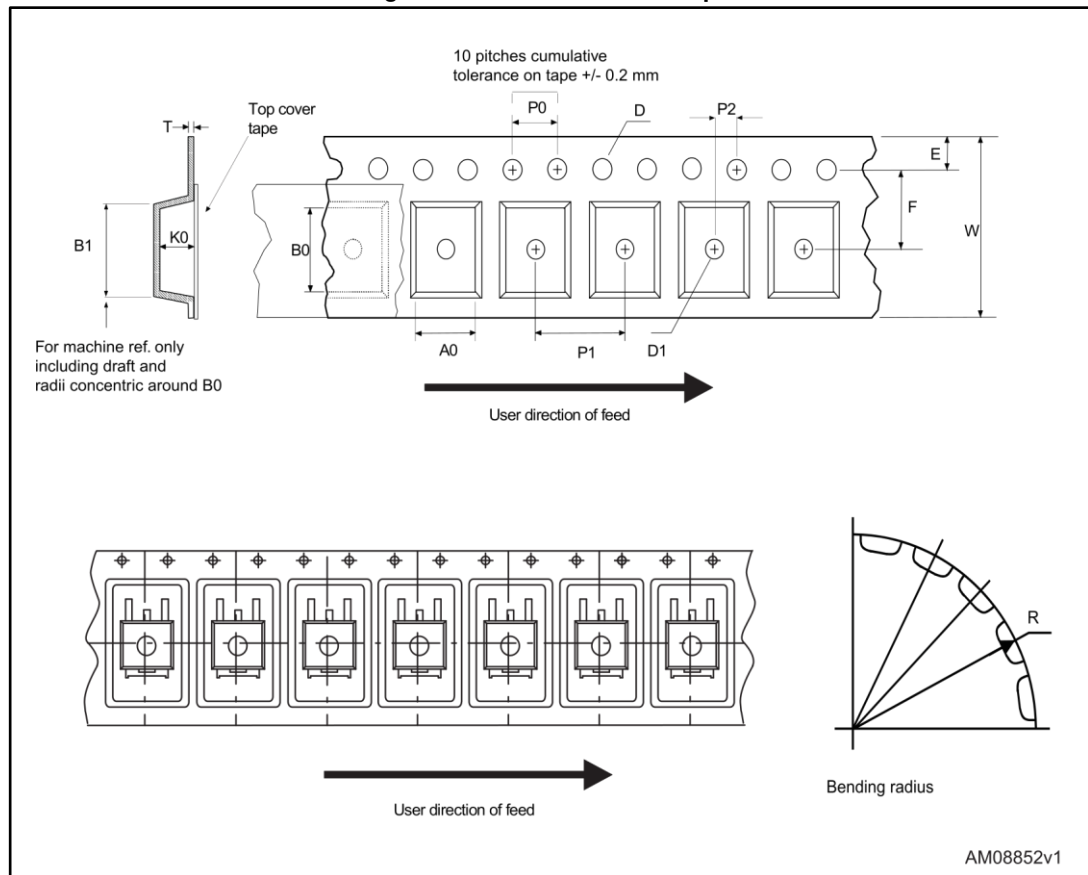


Figure 25: PPAK and DPAK reel

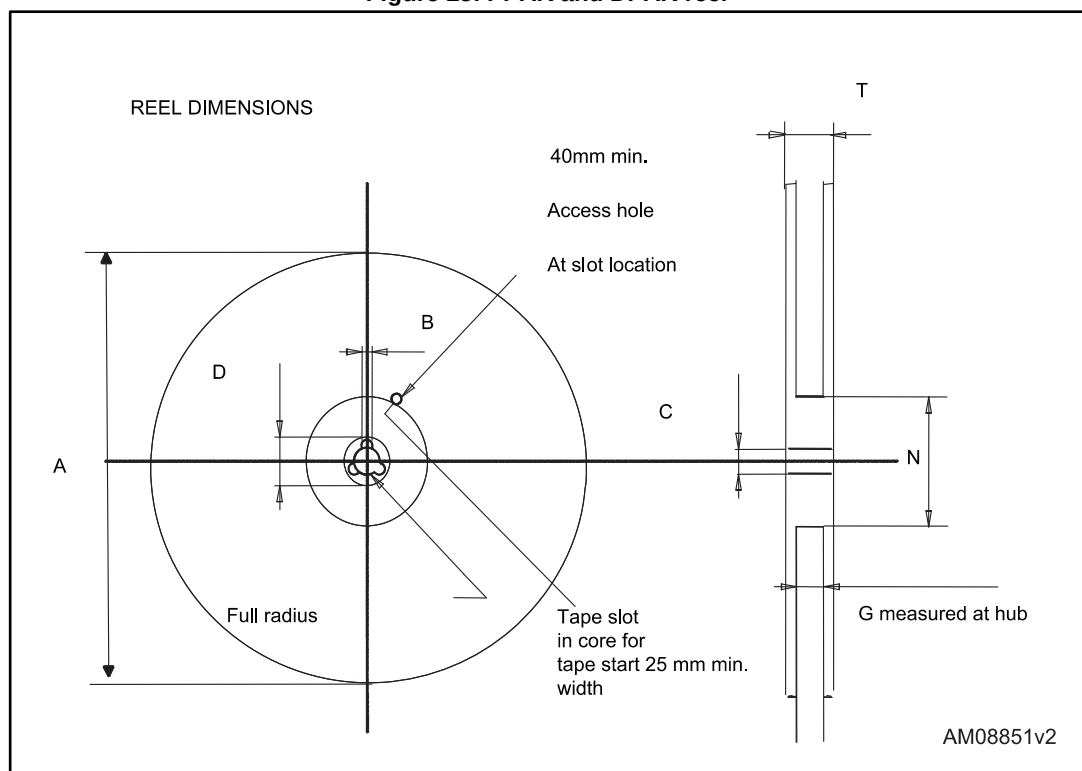


Table 35: PPAK and DPAK tape and reel mechanical data

| 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 |           |      |      |

## 7 Ordering information

Table 36: Order code

| Package |                        |          |                             |                            | Output voltage<br>(V) |
|---------|------------------------|----------|-----------------------------|----------------------------|-----------------------|
| TO-220  | TO-220<br>(dual gauge) | TO-220FP | DPAK<br>(tape and reel)     | PPAK<br>(tape and reel)    |                       |
|         |                        |          | LF15ABDT-TR                 |                            | 1.5                   |
|         |                        |          | LF18CDT-TR                  | LF18CPT-TR                 | 1.8                   |
|         |                        |          | LF18CDT-TRY <sup>(1)</sup>  |                            | 1.8                   |
|         |                        |          | LF18ABDT-TR                 | LF18ABPT-TR                | 1.8                   |
|         |                        |          | LF25CDT-TR                  | LF25CPT-TR                 | 2.5                   |
|         |                        |          | LF25CDT-TRY <sup>(1)</sup>  |                            | 2.5                   |
|         |                        |          | LF25ABDT-TR                 |                            | 2.5                   |
|         |                        |          | LF25ABDT-TRY <sup>(1)</sup> |                            | 2.5                   |
| LF33CV  | LF33CV-DG              |          | LF33CDT-TR                  | LF33CPT-TR                 | 3.3                   |
|         |                        |          | LF33CDT-TRY <sup>(1)</sup>  | LF33CPT-TRY <sup>(1)</sup> | 3.3                   |
| LF33ABV | LF33ABV-DG             |          | LF33ABDT-TR                 |                            | 3.3                   |
| LF50CV  | LF50CV-DG              |          | LF50CDT-TR                  | LF50CPT-TR                 | 5                     |
|         |                        |          | LF50CDT-TRY <sup>(1)</sup>  | LF50CPT-TRY <sup>(1)</sup> | 5                     |
| LF50ABV | LF50ABV-DG             |          | LF50ABDT-TR                 | LF50ABPT-TR                | 5                     |
|         |                        | LF50ACP  |                             |                            | 5                     |
|         |                        |          | LF50ABDT-TRY <sup>(1)</sup> |                            | 5                     |
| LF60CV  |                        |          | LF60CDT-TR                  |                            | 6                     |
| LF60ABV |                        |          | LF60ABDT-TR                 |                            | 6                     |
|         |                        |          | LF80CDT-TR                  |                            | 8                     |
|         |                        |          | LF80CDT-TRY <sup>(1)</sup>  |                            | 8                     |
|         |                        |          | LF80ABDT-TR                 |                            | 8                     |
|         |                        |          | LF85CDT-TR                  | LF85CPT-TR                 | 8.5                   |
|         |                        |          | LF85CDT-TRY <sup>(1)</sup>  | LF85CPT-TRY <sup>(1)</sup> | 8.5                   |
| LF90CV  |                        |          |                             | LF90CPT-TR                 | 9                     |
|         |                        |          | LF120CDT-TR                 |                            | 12                    |
|         |                        |          | LF120ABDT-TR                |                            | 12                    |

### Notes:

<sup>(1)</sup>Qualified and characterized according to AEC Q100 and Q003 or equivalent, advanced screening according to AEC Q001 and Q002 or equivalent.

## 8 Revision history

Table 37: 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 34.                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 16-Jan-2008 | 20       | Added new order codes for automotive grade products see Table 34 on page 51.                                                                                                                                                                                                                                                                                                                                                                  |
| 12-Feb-2008 | 21       | Modified: Table 34 on page 51.                                                                                                                                                                                                                                                                                                                                                                                                                |
| 10-Jul-2008 | 22       | Modified: Table 34 on page 51.                                                                                                                                                                                                                                                                                                                                                                                                                |
| 05-May-2010 | 23       | Added: Table 29 on page 41, fig 16, fig 17, fig 18 and fig 19.                                                                                                                                                                                                                                                                                                                                                                                |
| 16-Nov-2010 | 24       | Modified: $R_{thJC}$ value for TO-220 Table 2 on page 7.                                                                                                                                                                                                                                                                                                                                                                                      |
| 10-Feb-2012 | 25       | Added: order code LF33CV-DG and LF33ABV-DG Table 34 on page 51.                                                                                                                                                                                                                                                                                                                                                                               |
| 09-Mar-2012 | 26       | Added: order code LF50ABV-DG Table 34 on page 51.                                                                                                                                                                                                                                                                                                                                                                                             |
| 28-Feb-2014 | 27       | <p>Changed the part numbers LFxxAB and LFxxC to LFXX.</p> <p>Changed the title.</p> <p>Removed table from cover page.</p> <p>Removed PENTAWATT package from the figure in cover page, the Description and Figure 2.</p> <p>Updated the Description.</p> <p>Updated: Table 2, Table 6, Table 8, Table 10, Table 13, Table 15, Table 17, Table 22, Table 25 and Table 34.</p> <p>Changed title of Figure 7.</p> <p>Updated mechanical data.</p> |
| 03-Mar-2015 | 28       | <p>Updated Table 34: Order code.</p> <p>Minor text changes.</p>                                                                                                                                                                                                                                                                                                                                                                               |
| 19-Jan-2017 | 29       | <p>Updated output voltage values in Table 16 and added new commercial type in TO-220FP in Table 35.</p> <p>Minor text changes.</p>                                                                                                                                                                                                                                                                                                            |
| 27-Jan-2017 | 30       | Updated features in cover page. Added Table 14 and updated Table 35.                                                                                                                                                                                                                                                                                                                                                                          |
| 22-May-2017 | 31       | <p>Updated <a href="#">Table 36: "Order code"</a>.</p> <p>Minor text changes.</p>                                                                                                                                                                                                                                                                                                                                                             |

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