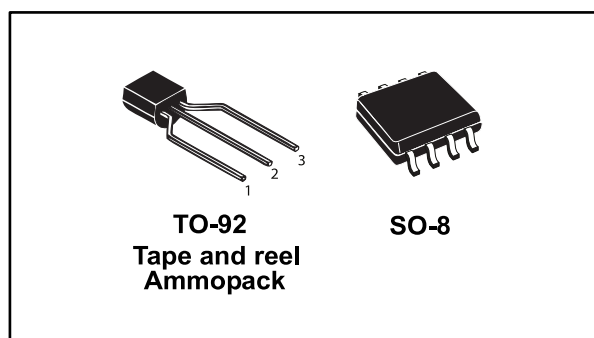


## Very low-dropout voltage regulator with inhibit function

Datasheet - production data



### Description

The LEXX is a very low-dropout voltage regulator available in SO-8, TO-92 packages and over a wide range of output voltages.

The very low-dropout voltage (0.2 V) and low quiescent current make it particularly suitable for low-noise, low-power applications and in battery-powered systems.

This device is pin-to-pin compatible with the L78L series. Furthermore, in the 8-pin configuration (SO-8), it uses a shutdown logic control (pin 5, TTL compatible). This means that when the device is used as a local regulator, a part of the board can be put in standby, decreasing the total power consumption. In the three-terminal configuration (TO-92), the device is always in on-state. It requires a 2.2  $\mu$ F capacitor for stability, reducing the component size and cost.

### Features

- Very low-dropout voltage (0.2 V typ.)
- Very low quiescent current (typ. 50  $\mu$ A in OFF mode, 0.5 mA in ON mode, no load)
- Output current up to 100 mA
- Output voltages: 3 V, 3.3 V, 4.5 V, 5 V, 8 V
- Internal current and thermal limit
- Small 2.2  $\mu$ F capacitor for stability
- Available in  $\pm 1\%$  (A) or  $\pm 2\%$  (C) selection at 25  $^{\circ}$ C
- Supply voltage rejection: 80 dB (typ.)
- Temperature range: -40 to 125  $^{\circ}$ C

Table 1: Device summary

| Order code |                  |                       | Output voltage (V) |
|------------|------------------|-----------------------|--------------------|
| SO-8       | TO-92 (Ammopack) | TO-92 (tape and reel) |                    |
| LE30CD-TR  |                  |                       | 3                  |
| LE33CD-TR  | LE33CZ-AP        | LE33CZ-TR             | 3.3                |
| LE45CD-TR  |                  |                       | 4.5                |
| LE50ABD-TR | LE33ABZ-AP       |                       | 5                  |
| LE50CD-TR  |                  |                       | 5                  |
| LE80CD-TR  |                  |                       | 8                  |

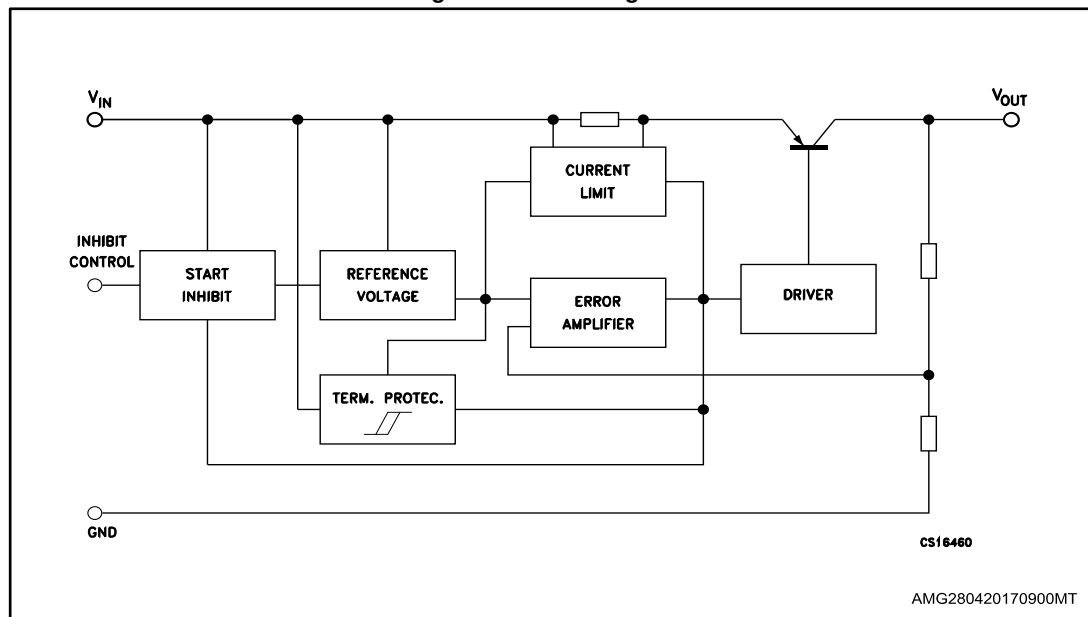
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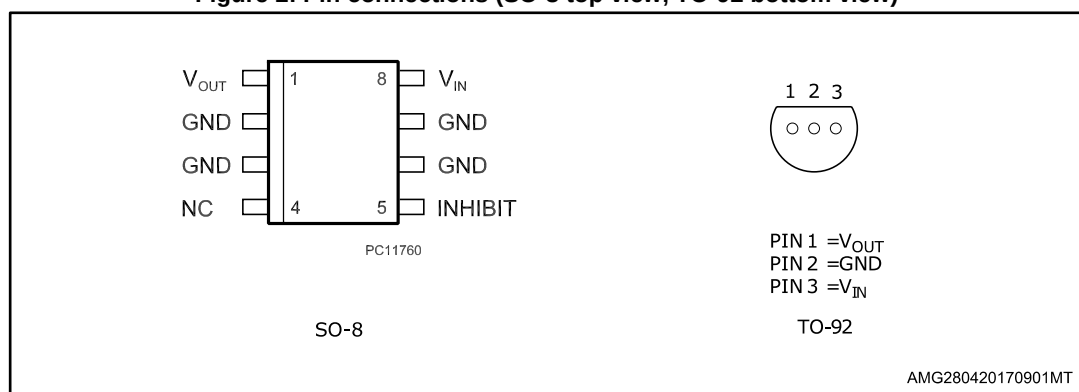
# 1 Diagram

Figure 1: Block diagram



## 2 Pin configuration

Figure 2: Pin connections (SO-8 top view, TO-92 bottom view)



### 3 Maximum ratings

Table 2: Absolute maximum ratings

| Symbol    | Parameter                            | Value                             | Unit |
|-----------|--------------------------------------|-----------------------------------|------|
| $V_I$     | DC input voltage                     | 20                                | V    |
| $I_O$     | Output current                       | Internally limited <sup>(1)</sup> |      |
| $P_{TOT}$ | Power dissipation                    | Internally limited                |      |
| $T_{STG}$ | Storage temperature range            | -65 to 150                        | °C   |
| $T_{OP}$  | Operating junction temperature range | -40 to 125                        | °C   |

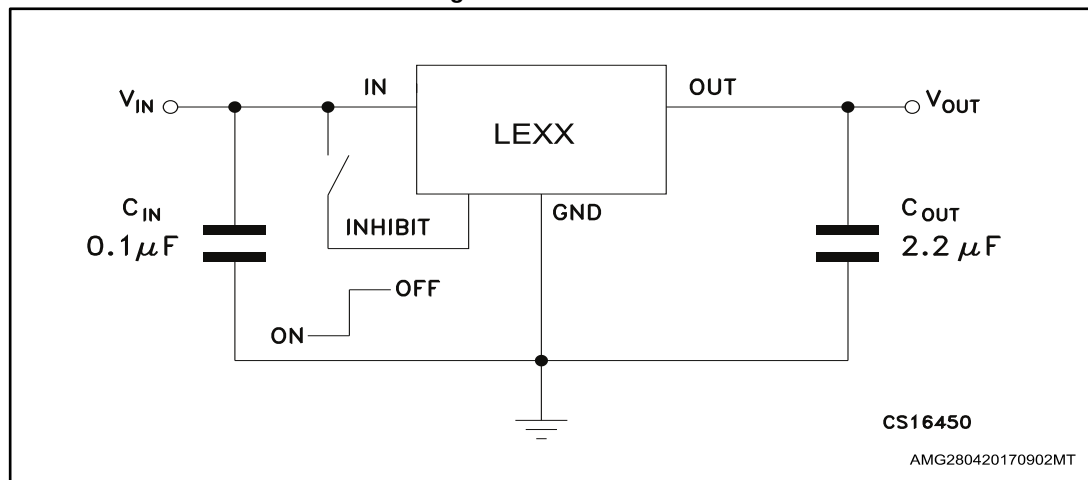
**Notes:**

<sup>(1)</sup>Our SO-8 package, used for voltage regulators, is modified internally to have pins 2, 3, 6 and 7 electrically fused to the die attach pad. This frame decreases the total thermal resistance of the package and increases its ability to dissipate power when an appropriate area of copper on the printed circuit board is available for heatsinking. The external dimensions are the same as SO-8 standard.

Table 3: Thermal data

| Symbol     | Parameter                           | SO-8 | TO-92 | Unit |
|------------|-------------------------------------|------|-------|------|
| $R_{thJC}$ | Thermal resistance junction-case    | 20   |       | °C/W |
| $R_{thJA}$ | Thermal resistance junction-ambient | 55   | 200   | °C/W |

Figure 3: Test circuit



If the INHIBIT pin is left floating, the regulator is in ON mode. However, when the inhibit function is not used, it should be grounded to avoid any noise.

## 4 Electrical characteristics

Refer to test circuits,  $T_J = 25\text{ °C}$ ,  $C_I = 0.1\text{ }\mu\text{F}$ ,  $C_O = 2.2\text{ }\mu\text{F}$  unless otherwise specified.

Table 4: LE30AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|----------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 5\text{ V}$                                       |                     | 2.970 | 3    | 3.030 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 5\text{ V}$<br>$T_J = -25\text{ to }85\text{ °C}$ |                     | 2.940 |      | 3.060 |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                            |                     |       |      | 18    | V             |
| $I_O$        | Output current limit      |                                                                                  |                     | 150   |      |       | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 3.7\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                       |                     |       | 3    | 15    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 4\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                        |                     |       | 3    | 15    | mV            |
| $I_d$        | Quiescent current         | $V_I = 4\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                           | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 4\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                         |                     |       | 1.5  | 3     |               |
|              |                           | $V_I = 6\text{ V}$                                                               | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 5 \pm 1\text{ V}$                                  | $f = 120\text{ Hz}$ |       | 81   |       | dB            |
|              |                           |                                                                                  | $f = 1\text{ kHz}$  |       | 76   |       |               |
|              |                           |                                                                                  | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz to }100\text{ kHz}$                                             |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | Dropout voltage           | $I_O = 100\text{ mA}$                                                            |                     |       | 0.2  | 0.4   | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ °C}$                     |                     |       |      | 0.5   |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ °C}$                                              |                     |       |      | 0.8   | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ °C}$                                              |                     | 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>$I_O = 0\text{ to }100\text{ mA}$                    |                     | 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: LE30C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 5\text{ V}$                                                     |                     | 2.940 | 3    | 3.060 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 5\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 2.880 |      | 3.120 |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                          |                     |       |      | 18    | V             |
| $I_O$        | Output current limit      |                                                                                                |                     | 150   |      |       | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 3.7\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                     |                     |       | 3    | 20    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 4\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                      |                     |       | 3    | 25    | mV            |
| $I_d$        | Quiescent current         | $V_I = 4\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 4\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                       |                     |       | 1.5  | 3     |               |
|              |                           | $V_I = 6\text{ V}$                                                                             | OFF mode            |       | 50   | 100   | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |       | 81   |       | dB            |
|              |                           |                                                                                                | $f = 1\text{ kHz}$  |       | 76   |       |               |
|              |                           |                                                                                                | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz to }100\text{ kHz}$                                                           |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | Dropout voltage           | $I_O = 100\text{ mA}$                                                                          |                     |       | 0.2  | 0.4   | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                     |                     |       |      | 0.5   |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              |                     |       |      | 0.8   | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              |                     | 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>$I_O = 0\text{ to }100\text{ mA}$                    |                     | 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 6: LE33C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min.  | Typ. | Max.  | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|-------|------|-------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 5.3\text{ V}$                                                     |                     | 3.234 | 3.3  | 3.366 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 5.3\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 3.168 |      | 3.432 |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                            |                     |       |      | 18    | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     | 150   |      |       | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 4\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                         |                     |       | 3    | 20    | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 4.3\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                      |                     |       | 3    | 25    | mV            |
| $I_d$        | Quiescent current         | $V_I = 4.3\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |       | 0.5  | 1     | mA            |
|              |                           | $V_I = 4.3\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                       |                     |       | 1.5  | 3     |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | 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   |       |               |
|              |                           |                                                                                                  | $f = 10\text{ kHz}$ |       | 60   |       |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz to }100\text{ kHz}$                                                             |                     |       | 50   |       | $\mu\text{V}$ |
| $V_d$        | Dropout voltage           | $I_O = 100\text{ mA}$                                                                            |                     |       | 0.2  | 0.4   | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                       |                     |       |      | 0.5   |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                                |                     |       |      | 0.8   | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                                |                     | 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>$I_O = 0\text{ to }100\text{ mA}$                                    |                     | 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: LE45C electrical characteristics**

| Symbol       | Parameter                 | Test condition                                                                                   |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|--------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 6.5\text{ V}$                                                     |                     | 4.41 | 4.5  | 4.59 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 6.5\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 4.32 |      | 4.68 |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                            |                     |      |      | 18   | V             |
| $I_O$        | Output current limit      |                                                                                                  |                     | 150  |      |      | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 5.2\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                       |                     |      | 4    | 30   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 5.5\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                      |                     |      | 3    | 25   | mV            |
| $I_d$        | Quiescent current         | $V_I = 5.5\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.5  | 1    | mA            |
|              |                           | $V_I = 5.5\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                       |                     |      | 1.5  | 3    |               |
|              |                           | $V_I = 6\text{ V}$                                                                               | OFF mode            |      | 50   | 100  | $\mu\text{A}$ |
| SVR          | Supply voltage rejection  | $I_O = 5\text{ mA}$<br>$V_I = 6.5 \pm 1\text{ V}$                                                | $f = 120\text{ Hz}$ |      | 77   |      | dB            |
|              |                           |                                                                                                  | $f = 1\text{ kHz}$  |      | 72   |      |               |
|              |                           |                                                                                                  | $f = 10\text{ kHz}$ |      | 60   |      |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz to }100\text{ kHz}$                                                             |                     |      | 50   |      | $\mu\text{V}$ |
| $V_d$        | Dropout voltage           | $I_O = 100\text{ mA}$                                                                            |                     |      | 0.2  | 0.4  | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                       |                     |      |      | 0.5  |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                                |                     |      |      | 0.8  | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                                |                     | 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>$I_O = 0\text{ to }100\text{ mA}$                      |                     | 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 8: LE50AB electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 |                     | Min. | Typ. | Max. | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 7\text{ V}$                                                     |                     | 4.95 | 5    | 5.05 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 7\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ |                     | 4.9  |      | 5.1  |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                          |                     |      |      | 18   | V             |
| $I_O$        | Output current limit      |                                                                                                |                     | 150  | 350  | 425  | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 5.7\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                     |                     |      | 4    | 20   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 6\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                      |                     |      | 3    | 15   | mV            |
| $I_d$        | Quiescent current         | $V_I = 6\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             |      | 0.5  | 1    | mA            |
|              |                           | $V_I = 6\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                       |                     |      | 1.5  | 3    |               |
|              |                           | $V_I = 6\text{ V}$                                                                             | 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           | $I_O = 100\text{ mA}$                                                                          |                     |      | 0.2  | 0.4  | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                     |                     |      |      | 0.5  |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              |                     |      |      | 0.8  | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              |                     | 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>$I_O = 0\text{ to }100\text{ mA}$                    |                     | 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: LE50C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                 | Min.                | Typ. | Max. | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------|---------------------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 7\text{ V}$                                                     | 4.9                 | 5    | 5.1  | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 7\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ | 4.8                 |      | 5.2  |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                          |                     |      | 18   | V             |
| $I_O$        | Output current limit      |                                                                                                | 150                 | 350  | 425  | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 5.7\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                     |                     | 4    | 30   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 6\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                      |                     | 3    | 25   | mV            |
| $I_d$        | Quiescent current         | $V_I = 6\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                         | ON mode             | 0.5  | 1    | mA            |
|              |                           | $V_I = 6\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                       |                     | 1.5  | 3    |               |
|              |                           | $V_I = 6\text{ V}$                                                                             | 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           | $I_O = 100\text{ mA}$                                                                          |                     | 0.2  | 0.4  | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                     |                     |      | 0.5  |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              |                     |      | 0.8  | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                              | 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>$I_O = 0\text{ to }100\text{ mA}$             | 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 10: LE80C electrical characteristics

| Symbol       | Parameter                 | Test condition                                                                                  | Min.                | Typ. | Max. | Unit          |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------|---------------------|------|------|---------------|
| $V_O$        | Output voltage            | $I_O = 10\text{ mA}$<br>$V_I = 10\text{ V}$                                                     | 7.84                | 8    | 8.16 | V             |
|              |                           | $I_O = 10\text{ mA}$<br>$V_I = 10\text{ V}$<br>$T_J = -25\text{ to }85\text{ }^{\circ}\text{C}$ | 7.68                |      | 8.32 |               |
| $V_I$        | Operating input voltage   | $I_O = 100\text{ mA}$                                                                           |                     |      | 18   | V             |
| $I_O$        | Output current limit      |                                                                                                 | 150                 |      |      | mA            |
| $\Delta V_O$ | Line regulation           | $V_I = 8.7\text{ to }18\text{ V}$<br>$I_O = 0.5\text{ mA}$                                      |                     | 5    | 35   | mV            |
| $\Delta V_O$ | Load regulation           | $V_I = 9\text{ V}$<br>$I_O = 0.5\text{ to }100\text{ mA}$                                       |                     | 3    | 25   | mV            |
| $I_d$        | Quiescent current         | $V_I = 9\text{ to }18\text{ V}$<br>$I_O = 0\text{ mA}$                                          | ON mode             | 0.7  | 1.6  | mA            |
|              |                           | $V_I = 9\text{ to }18\text{ V}$<br>$I_O = 100\text{ mA}$                                        |                     | 1.7  | 3.6  |               |
|              |                           | $V_I = 9\text{ V}$                                                                              | 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            |
|              |                           |                                                                                                 | $f = 1\text{ kHz}$  | 66   |      |               |
|              |                           |                                                                                                 | $f = 10\text{ kHz}$ | 57   |      |               |
| eN           | Output noise voltage      | $B = 10\text{ Hz to }100\text{ kHz}$                                                            |                     | 50   |      | $\mu\text{V}$ |
| $V_d$        | Dropout voltage           | $I_O = 100\text{ mA}$                                                                           |                     | 0.2  | 0.4  | V             |
|              |                           | $I_O = 100\text{ mA}$<br>$T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                      |                     |      | 0.5  |               |
| $V_{IL}$     | Control input logic low   | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                               |                     |      | 0.8  | V             |
| $V_{IH}$     | Control input logic high  | $T_J = -40\text{ to }125\text{ }^{\circ}\text{C}$                                               | 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 | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$<br>$I_O = 0\text{ to }100\text{ mA}$              | 2                   | 10   |      | $\mu\text{F}$ |

## 5 Typical performance characteristics

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

Figure 4: Dropout voltage vs output current

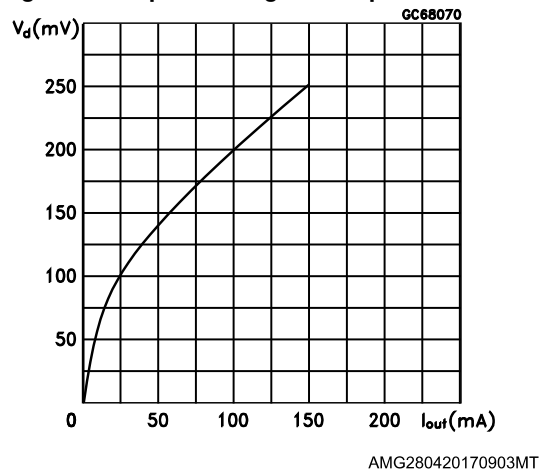


Figure 5: Dropout voltage vs temperature

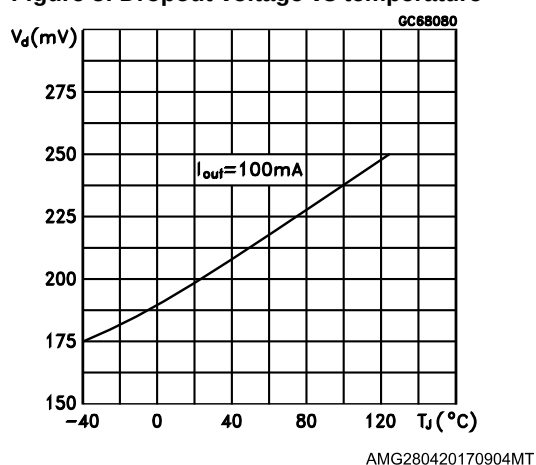


Figure 6: Shutdown current vs temperature

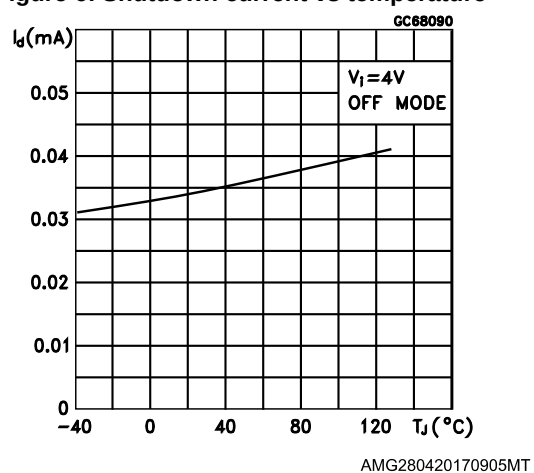


Figure 7: Supply current vs input voltage

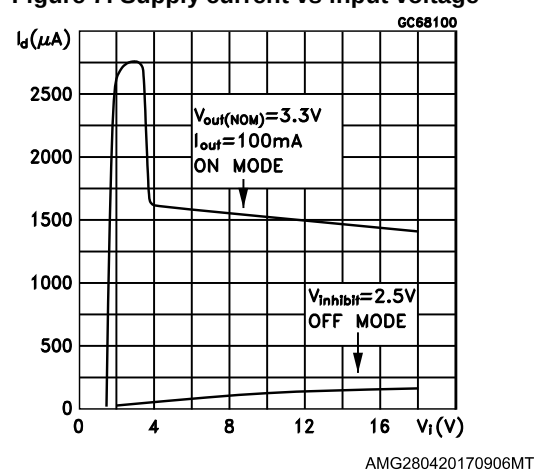


Figure 8: Short-circuit current vs dropout voltage

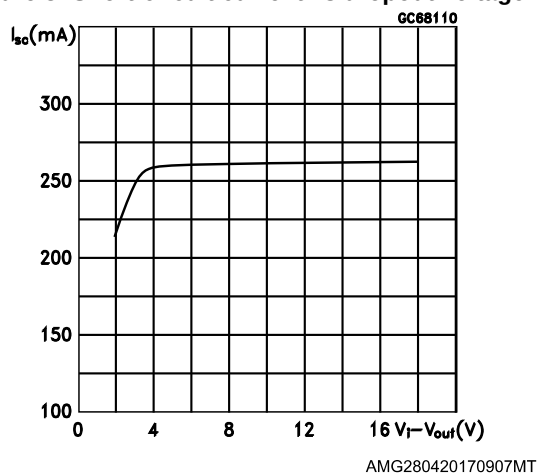


Figure 9: SVR vs frequency

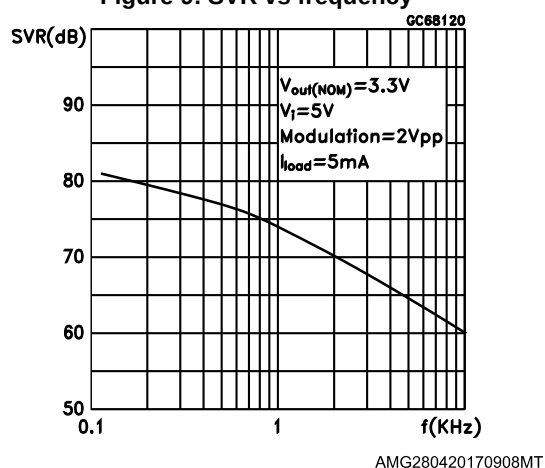


Figure 10: Logic-controlled precision 3.3/5.0 V selectable output

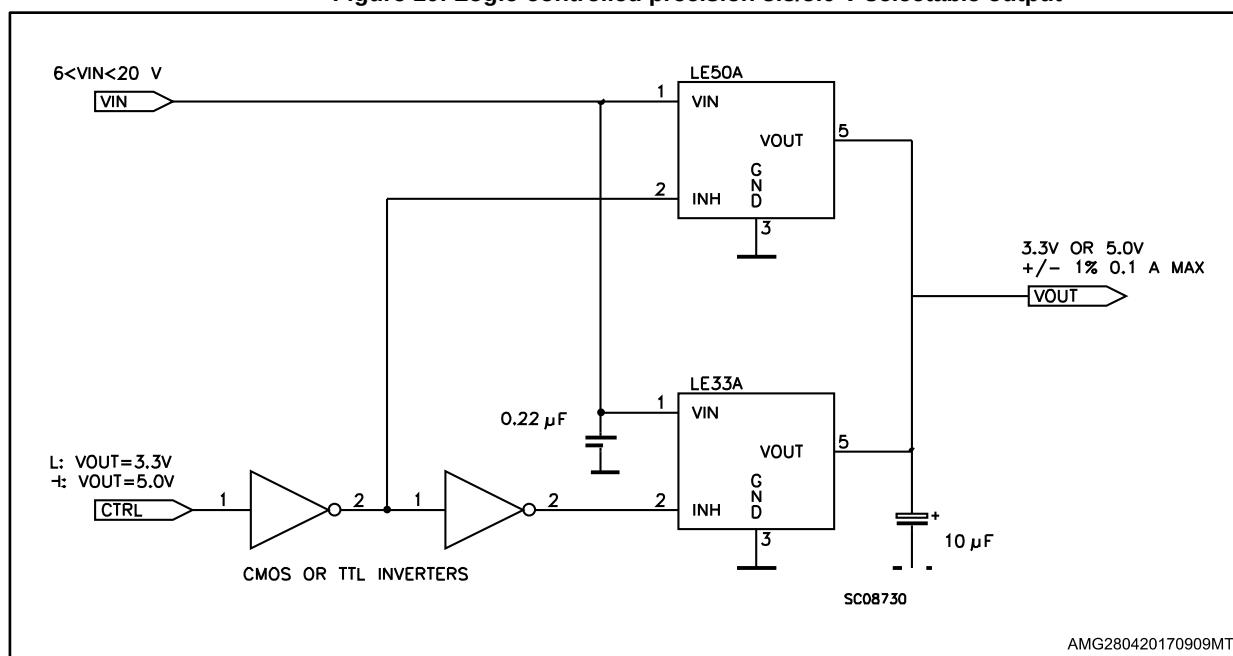


Figure 11: Sequential multi-output supply

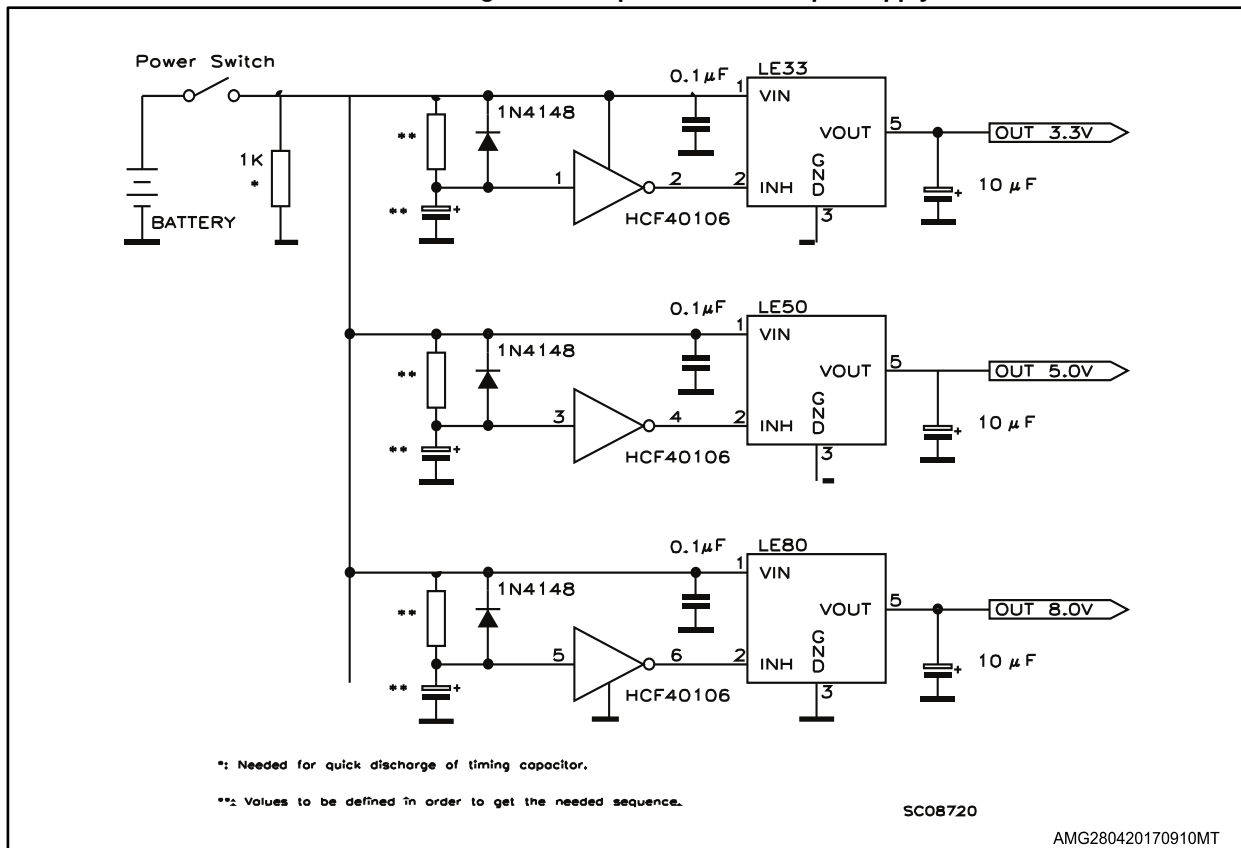
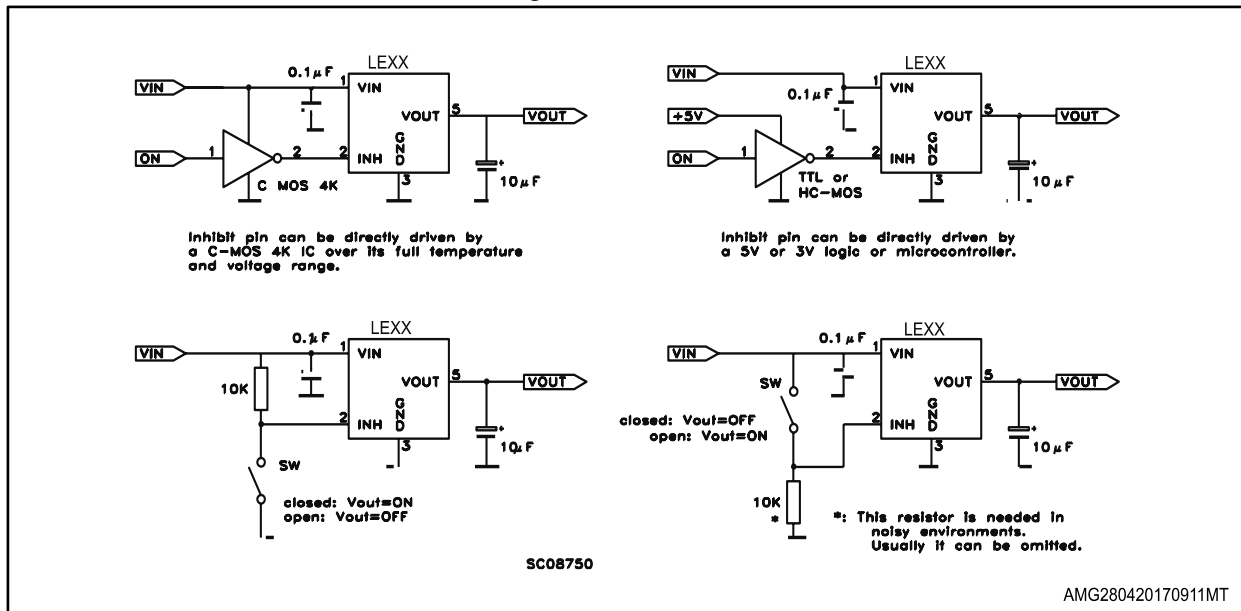


Figure 12: Basic inhibit functions



## 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 SO-8 package information

Figure 13: SO-8 package outline

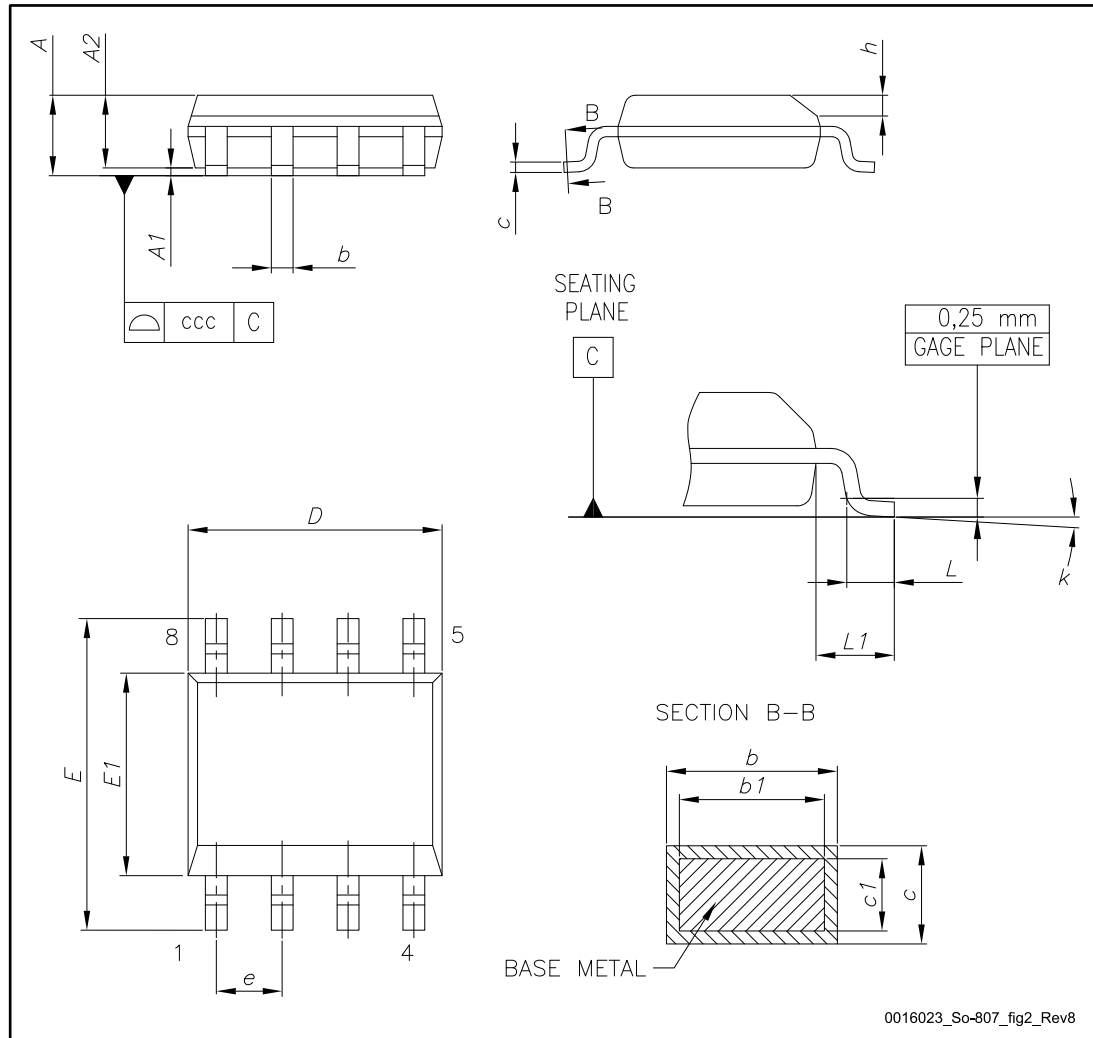
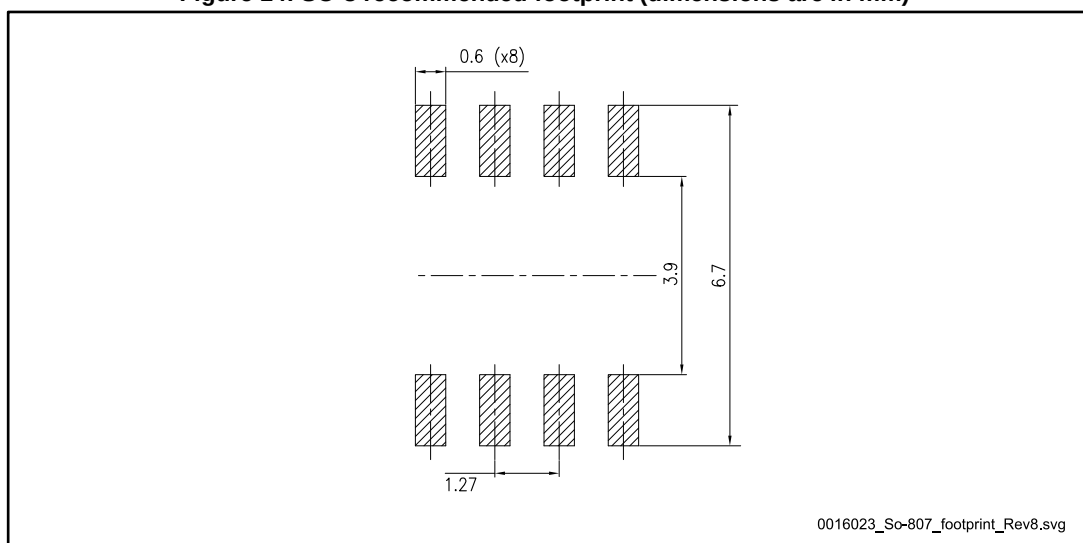




Table 11: SO-8 mechanical data

| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    |      |      | 1.75 |
| A1   | 0.10 |      | 0.25 |
| A2   | 1.25 |      |      |
| b    | 0.31 |      | 0.51 |
| b1   | 0.28 |      | 0.48 |
| c    | 0.10 |      | 0.25 |
| c1   | 0.10 |      | 0.23 |
| D    | 4.80 | 4.90 | 5.00 |
| E    | 5.80 | 6.00 | 6.20 |
| E1   | 3.80 | 3.90 | 4.00 |
| e    |      | 1.27 |      |
| h    | 0.25 |      | 0.50 |
| L    | 0.40 |      | 1.27 |
| L1   |      | 1.04 |      |
| L2   |      | 0.25 |      |
| k    | 0°   |      | 8°   |
| ccc  |      |      | 0.10 |

Figure 14: SO-8 recommended footprint (dimensions are in mm)



## 6.2 SO-8 packing information

Figure 15: SO-8 tape and reel dimensions

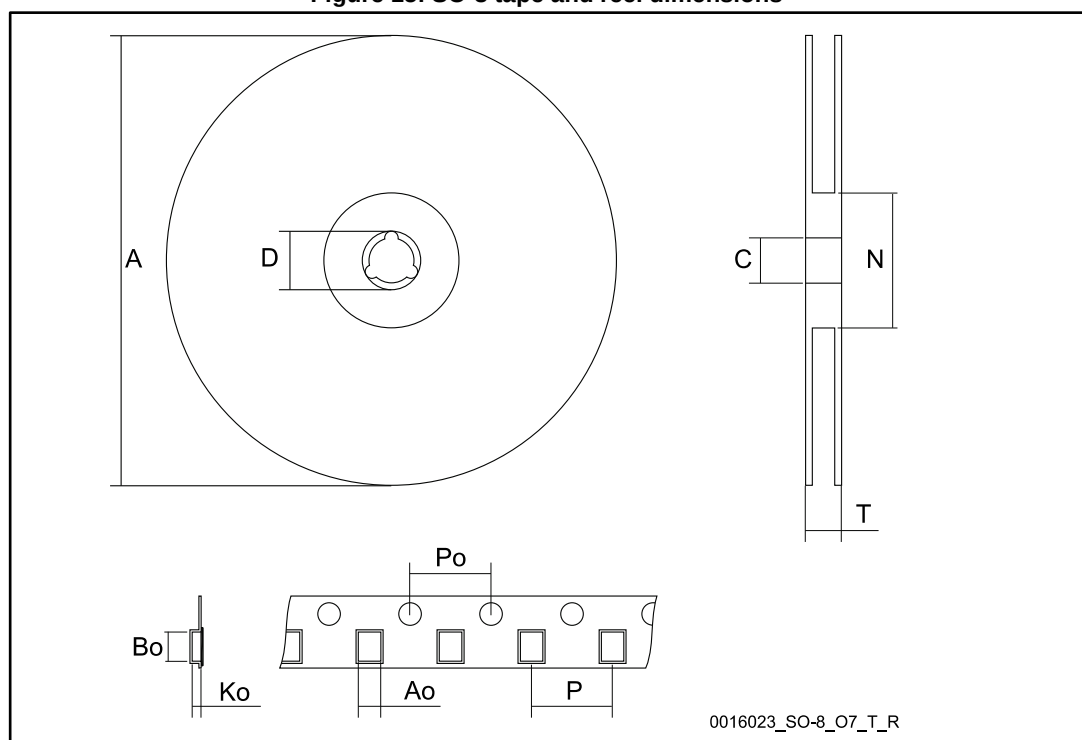


Table 12: SO-8 tape and reel mechanical data

| Dim. | mm   |      |      |
|------|------|------|------|
|      | Min. | Typ. | Max. |
| A    |      | -    | 330  |
| C    | 12.8 |      | 13.2 |
| D    | 20.2 |      |      |
| N    | 60   |      |      |
| T    |      |      | 22.4 |
| Ao   | 8.1  |      | 8.5  |
| Bo   | 5.5  |      | 5.9  |
| Ko   | 2.1  |      | 2.3  |
| Po   | 3.9  |      | 4.1  |
| P    | 7.9  |      | 8.1  |

## 6.3 TO-92 packing information

Figure 16: TO-92 tape and reel outline

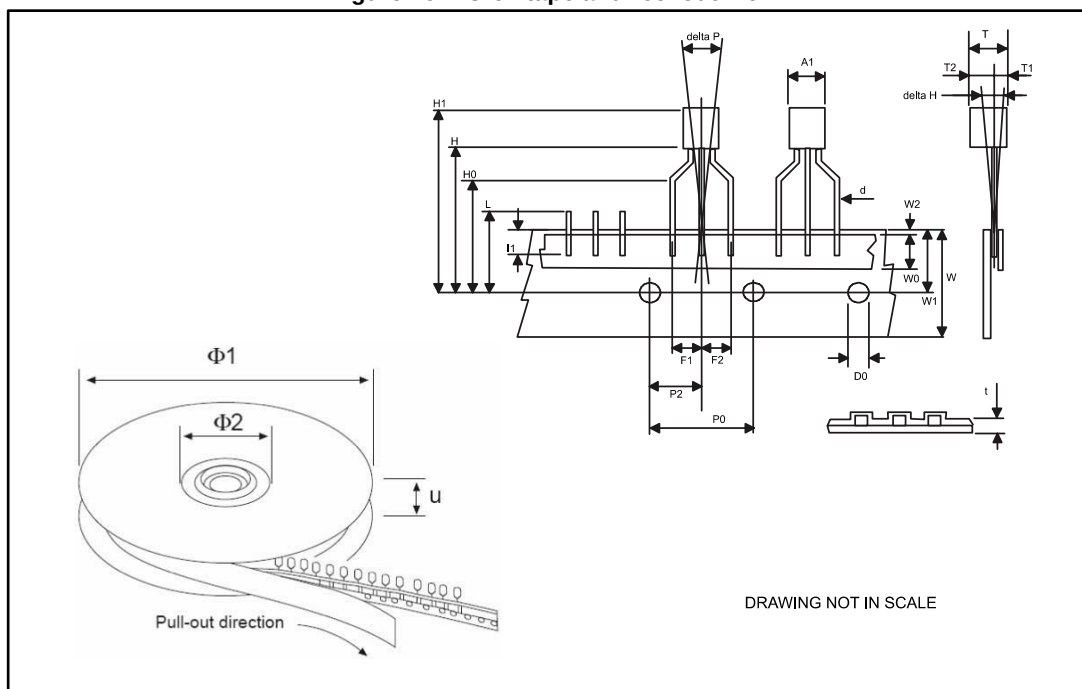


Table 13: TO-92 tape and reel mechanical data

| Dim.    | mm    |       |       |
|---------|-------|-------|-------|
|         | Min.  | Typ.  | Max.  |
| A1      |       |       | 4.80  |
| T       |       |       | 3.80  |
| T1      |       |       | 1.60  |
| T2      |       |       | 2.30  |
| d       | 0.45  | 0.47  | 0.48  |
| P0      | 12.50 | 12.70 | 12.90 |
| P2      | 5.65  | 6.35  | 7.05  |
| F1, F2  | 2.40  | 2.50  | 2.94  |
| F3      | 4.98  | 5.08  | 5.48  |
| delta H | -2.00 |       | 2.00  |
| W       | 17.50 | 18.00 | 19.00 |
| W0      | 5.5   | 6.00  | 6.5   |
| W1      | 8.50  | 9.00  | 9.25  |
| W2      |       |       | 0.50  |
| H       |       | 18.50 | 21    |
| H3      | 0.5   | 1     | 2     |
| H0      | 15.50 | 16.00 | 18.8  |
| H1      |       | 25.0  | 27.0  |
| D0      | 3.80  | 4.00  | 4.20  |
| t       |       |       | 0.90  |
| L       |       |       | 11.00 |
| l1      | 3.00  |       |       |
| delta P | -1.00 |       | 1.00  |
| Ø1      | 352   | 355   | 358   |
| Ø2      | 28    | 30    | 32    |
| u       | 44    | 47    | 50    |

## 6.4 TO-92 Ammopak packing information

Figure 17: TO-92 Ammopak tape and reel outline

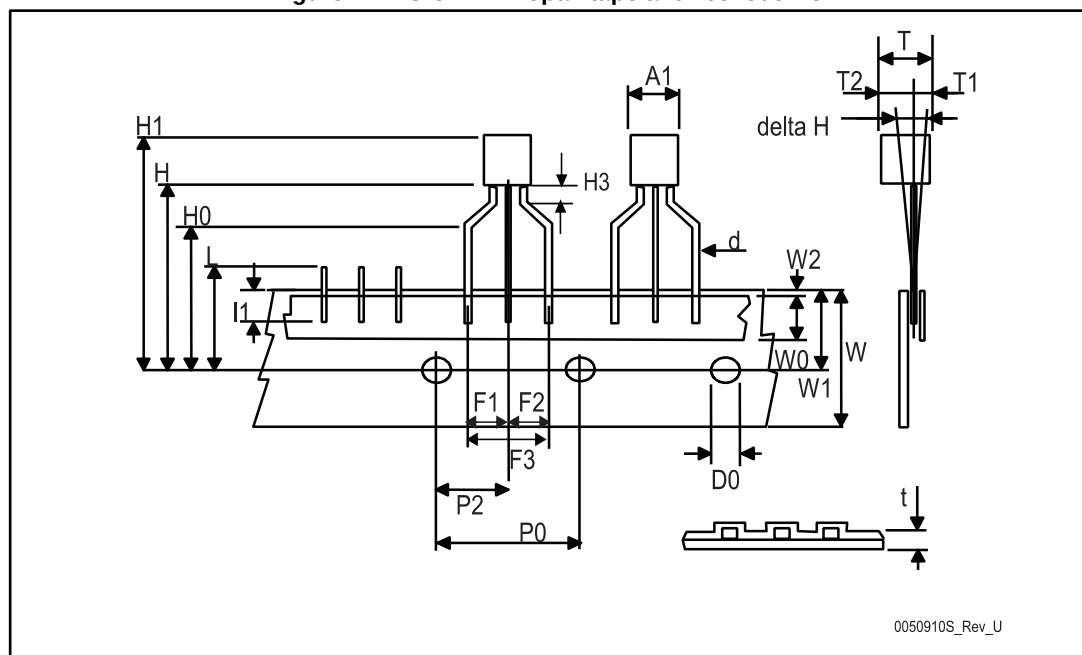


Table 14: TO-92 Ammopak tape and reel mechanical data

| Dim.    | mm    |       |       |
|---------|-------|-------|-------|
|         | Min.  | Typ.  | Max.  |
| A1      |       |       | 4.80  |
| T       |       |       | 3.80  |
| T1      |       |       | 1.60  |
| T2      |       |       | 2.30  |
| d       | 0.45  | 0.47  | 0.48  |
| P0      | 12.50 | 12.70 | 12.90 |
| P2      | 5.65  | 6.35  | 7.05  |
| F1, F2  | 2.40  | 2.50  | 2.94  |
| F3      | 4.98  | 5.08  | 5.48  |
| delta H | -2.00 |       | 2.00  |
| W       | 17.50 | 18.00 | 19.00 |
| W0      | 5.5   | 6.00  | 6.5   |
| W1      | 8.50  | 9.00  | 9.25  |
| W2      |       |       | 0.50  |
| H       |       | 18.50 | 21    |
| H3      | 0.5   | 1     | 2     |
| H0      | 15.50 | 16.00 | 18.8  |
| H1      |       | 25.0  | 27.0  |
| D0      | 3.80  | 4.00  | 4.20  |
| t       |       |       | 0.90  |
| L       |       |       | 11.00 |
| l1      | 3.00  |       |       |
| delta P | -1.00 |       | 1.00  |

## 7 Revision history

**Table 15: Document revision history**

| Date        | Revision | Changes                                                                                                                                                                                                                                                               |
|-------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 09-Jul-2004 | 6        | Io typ. and max. are changed in tab. 24 and 25 - pag. 14.                                                                                                                                                                                                             |
| 16-Mar-2005 | 7        | Add Tape & Reel for TO-92 - Note on Table 3.                                                                                                                                                                                                                          |
| 12-Feb-2007 | 8        | Change value T <sub>OP</sub> on Table 2.                                                                                                                                                                                                                              |
| 26-Jul-2007 | 9        | Add Table 1 in cover page.                                                                                                                                                                                                                                            |
| 29-Nov-2007 | 10       | Modified: Table 25.                                                                                                                                                                                                                                                   |
| 12-Feb-2008 | 11       | Modified: Table 25.                                                                                                                                                                                                                                                   |
| 10-Jul-2008 | 12       | Modified: Table 1 and Table 25.                                                                                                                                                                                                                                       |
| 22-May-2012 | 13       | Updated: Table 1 on page 1. Changed: TA in TJ test conditions from table 4 to table 10.                                                                                                                                                                               |
| 14-Mar-2014 | 14       | Changed the part numbers LExxAB and LExxC to LEXX. Updated the title. Added the ammopack package to the figure in cover page. Updated the Table 1: Device summary. Updated the Description. Updated Figure 3. Changed the title of Figure 6. Updated mechanical data. |
| 03-May-2017 | 15       | Updated <a href="#">Table 1: "Device summary"</a> and <a href="#">Section 6: "Package information"</a> .<br>Minor text changes.                                                                                                                                       |

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