

## VERY LOW DROP VOLTAGE REGULATORS WITH INHIBIT

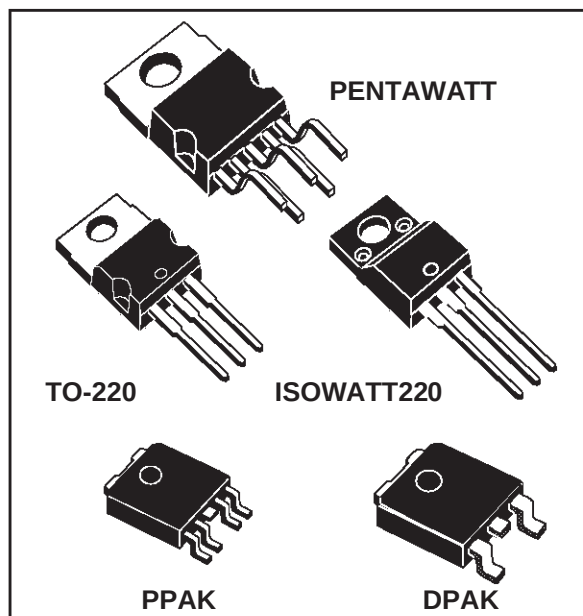
- VERY LOW DROPOUT VOLTAGE (0.45V)
- VERY LOW QUIESCENT CURRENT  
(TYP. 50  $\mu$ A IN OFF MODE, 500 $\mu$ A IN ON MODE)
- OUTPUT CURRENT UP TO 500 mA
- LOGIC-CONTROLLED ELECTRONIC SHUTDOWN
- OUTPUT VOLTAGES OF 1.25; 1.5; 1.8; 2.5; 2.7; 3; 3.3; 3.5; 4; 4.5; 4.7; 5; 5.2; 5.5; 6; 8; 8.5; 9; 12V
- INTERNAL CURRENT AND THERMAL LIMIT
- ONLY 2.2 $\mu$ F FOR STABILITY
- AVAILABLE IN  $\pm 1\%$  (AB) OR  $\pm 2\%$  (C) SELECTION AT 25  $^{\circ}$ C
- SUPPLY VOLTAGE REJECTION: 80 db (TYP.)

- TEMPERATURE RANGE: -40 TO 125  $^{\circ}$ C

### DESCRIPTION

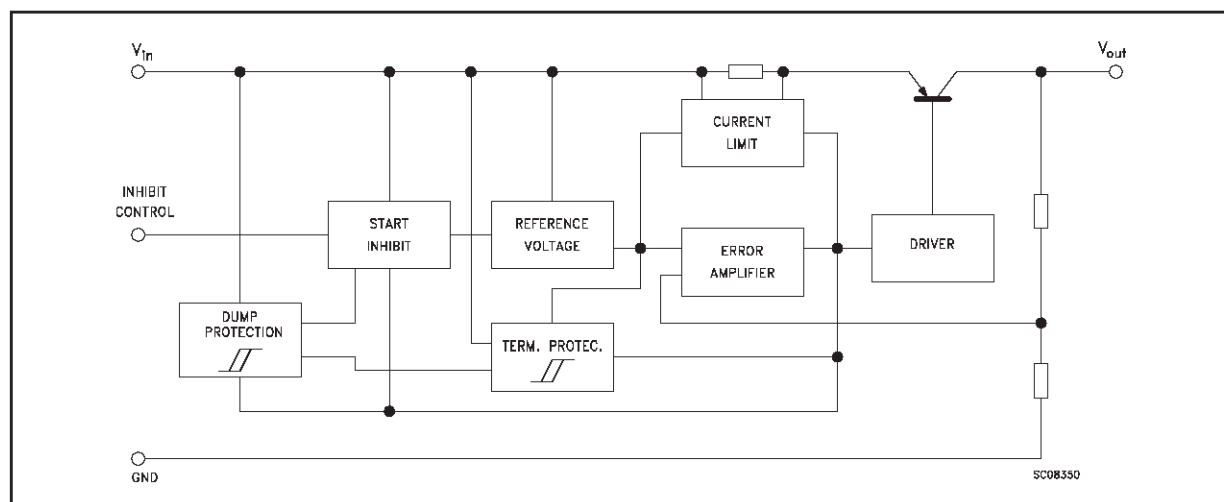
The LF00 series are very Low Drop regulators available in PENTAWATT, TO-220, ISOWATT220, DPAK and PPAK package and in a wide range of output voltages.

The very Low Drop voltage (0.45V) and the very low quiescent current make them particularly suitable for Low Noise, Low Power applications and specially in battery powered systems.



In the 5 pins configuration (PENTAWATT and PPAK) a Shutdown Logic Control function is available (pin 2, TTL compatible). This means that when the device is used as a local regulator, it is possible to put a part of the board in standby, decreasing the total power consumption. In the three terminal configuration the device has the same electrical performance, but is fixed in

### SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATINGS

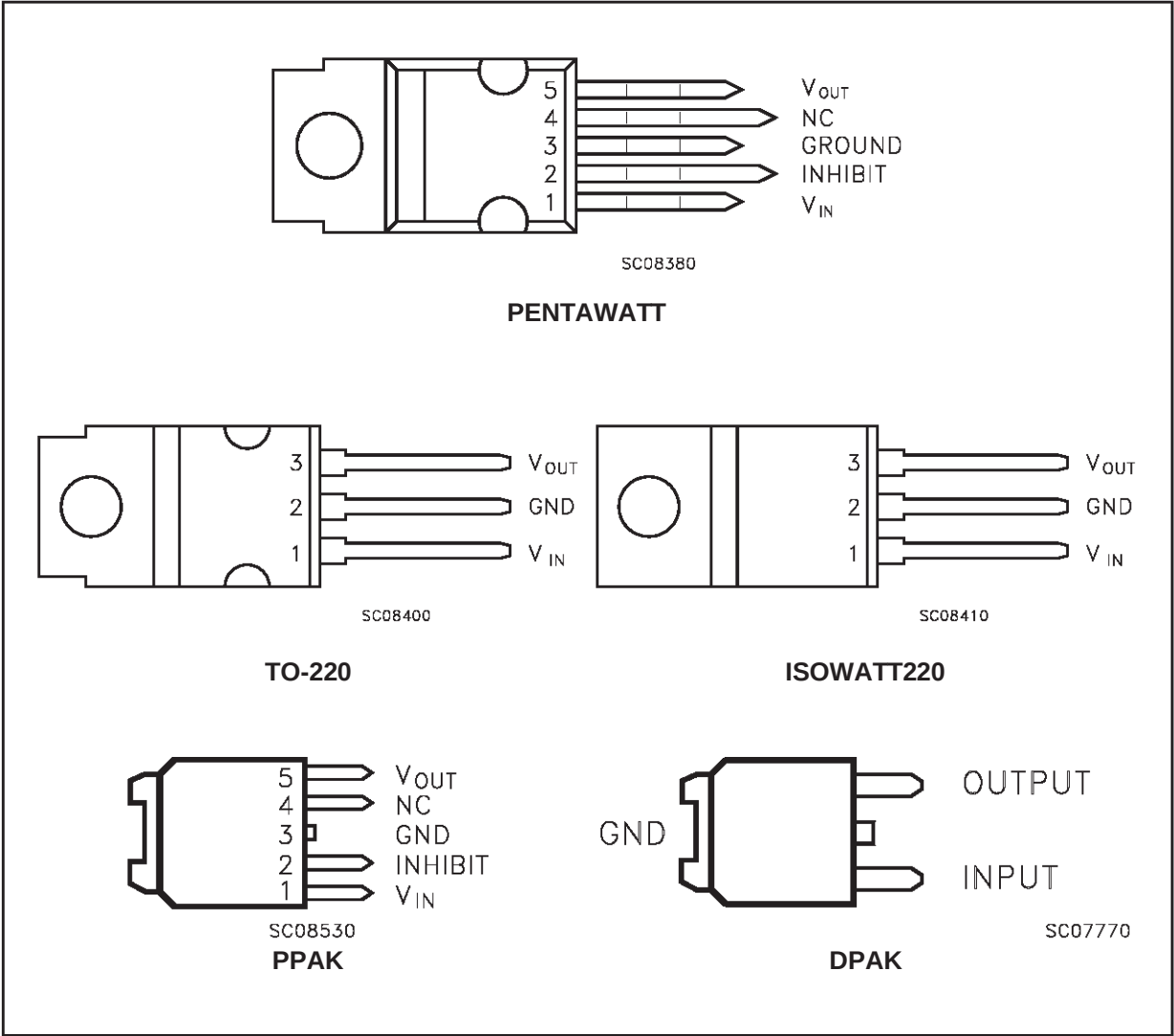
| Symbol    | Parameter                            | Value              | Unit |
|-----------|--------------------------------------|--------------------|------|
| $V_i$     | DC Input Voltage                     | -0.5 to 40 (*)     | V    |
| $I_o$     | Output Current                       | Internally limited |      |
| $P_{tot}$ | Power Dissipation                    | Internally limited |      |
| $T_{stg}$ | Storage Temperature Range            | - 40 to 150        | °C   |
| $T_{op}$  | Operating Junction Temperature Range | - 40 to 125        | °C   |

(\*) For  $18 < V_{IN} < 40$  the regulator is in shut-down

THERMAL DATA

| Symbol         | Parameter                           | PENTAWATT | TO-220 | ISOWATT 220 | DPAK/PPAK | Unit |
|----------------|-------------------------------------|-----------|--------|-------------|-----------|------|
| $R_{thj-case}$ | Thermal Resistance Junction-case    | 3         | 3      | 4           | 8         | °C/W |
| $R_{thj-amb}$  | Thermal Resistance Junction-ambient | 50        | 50     | 60          | 100       | °C/W |

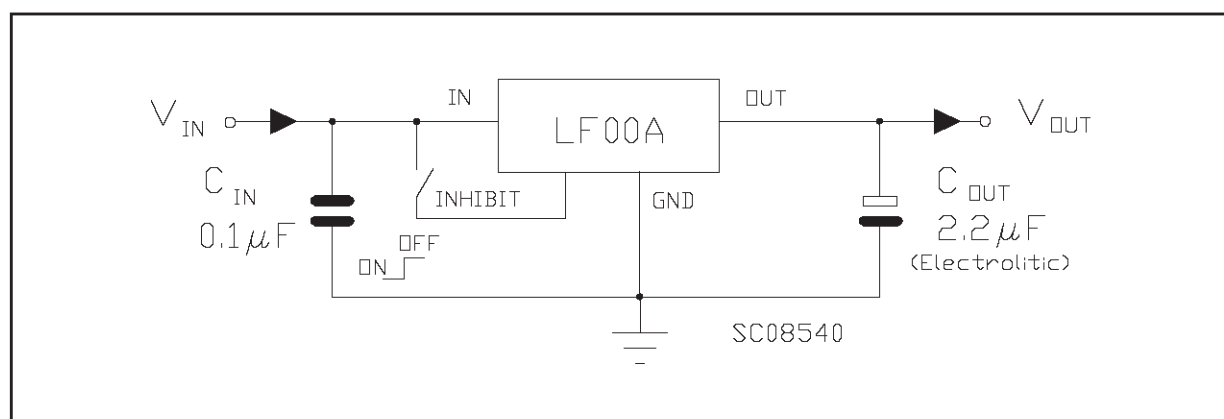
CONNECTION DIAGRAM (top view)



## ORDERING NUMBERS

| Type       | PENTAWATT  | TO-220   | ISOWATT 220 | DPAK      | PPAK      | Output Voltage |
|------------|------------|----------|-------------|-----------|-----------|----------------|
| LF12C (*)  | LF12CV5V   | LF12CV   | LF12CP      | LF12CDT   | LF12CPT   | 1.25 V         |
| LF12AB (*) | LF12ABV5V  | LF12ABV  | LF12ABP     | LF12ABDT  | LF12ABPT  | 1.25 V         |
| LF15C (*)  | LF15CV5V   | LF15CV   | LF15CP      | LF15CDT   | LF15CPT   | 1.5 V          |
| LF15AB (*) | LF15ABV5V  | LF15ABV  | LF15ABP     | LF15ABDT  | LF15ABPT  | 1.5 V          |
| LF18C      | LF18CV5V   | LF18CV   | LF18CP      | LF18CDT   | LF18CPT   | 1.8V           |
| LF18AB     | LF18ABV5V  | LF18ABV  | LF18ABP     | LF18ABDT  | LF18ABPT  | 1.8V           |
| LF25C      | LF25CV5V   | LF25CV   | LF25CP      | LF25CDT   | LF25CPT   | 2.5 V          |
| LF25AB     | LF25ABV5V  | LF25ABV  | LF25ABP     | LF25ABDT  | LF25ABPT  | 2.5 V          |
| LF27C      | LF27CV5V   | LF27CV   | LF27CP      | LF27CDT   | LF27CPT   | 2.7 V          |
| LF27AB     | LF27ABV5V  | LF27ABV  | LF27ABP     | LF27ABDT  | LF27ABPT  | 2.7 V          |
| LF30C      | LF30CV5V   | LF30CV   | LF30CP      | LF30CDT   | LF30CPT   | 3 V            |
| LF30AB     | LF30ABV5V  | LF30ABV  | LF30ABP     | LF30ABDT  | LF30ABPT  | 3 V            |
| LF33C      | LF33CV5V   | LF33CV   | LF33CP      | LF33CDT   | LF33CPT   | 3.3 V          |
| LF33AB     | LF33ABV5V  | LF33ABV  | LF33ABP     | LF33ABDT  | LF33ABPT  | 3.3 V          |
| LF35C      | LF35CV5V   | LF35CV   | LF35CP      | LF35CDT   | LF35CPT   | 3.5 V          |
| LF35AB     | LF35ABV5V  | LF35ABV  | LF35ABP     | LF35ABDT  | LF35ABPT  | 3.5 V          |
| LF40C      | LF40CV5V   | LF40CV   | LF40CP      | LF40CDT   | LF40CPT   | 4 V            |
| LF40AB     | LF40ABV5V  | LF40ABV  | LF40ABP     | LF40ABDT  | LF40ABPT  | 4 V            |
| LF45C (*)  | LF45CV5V   | LF45CV   | LF45CP      | LF45CDT   | LF45CPT   | 4.5 V          |
| LF45AB (*) | LF45ABV5V  | LF45ABV  | LF45ABP     | LF45ABDT  | LF45ABPT  | 4.5 V          |
| LF47C      | LF47CV5V   | LF47CV   | LF47CP      | LF47CDT   | LF47CPT   | 4.75 V         |
| LF47AB     | LF47ABV5V  | LF47ABV  | LF47ABP     | LF47ABDT  | LF47ABPT  | 4.75 V         |
| LF50C      | LF50CV5V   | LF50CV   | LF50CP      | LF50CDT   | LF50CPT   | 5 V            |
| LF50AB     | LF50ABV5V  | LF50ABV  | LF50ABP     | LF50ABDT  | LF50ABPT  | 5 V            |
| LF52C      | LF52CV5V   | LF52CV   | LF52CP      | LF52CDT   | LF52CPT   | 5.2 V          |
| LF52AB     | LF52ABV5V  | LF52ABV  | LF52ABP     | LF52ABDT  | LF52ABPT  | 5.2 V          |
| LF55C      | LF55CV5V   | LF55CV   | LF55CP      | LF55CDT   | LF55CPT   | 5.5 V          |
| LF55AB     | LF55ABV5V  | LF55ABV  | LF55ABP     | LF55ABDT  | LF55ABPT  | 5.5 V          |
| LF60C      | LF60CV5V   | LF60CV   | LF60CP      | LF60CDT   | LF60CPT   | 6 V            |
| LF60AB     | LF60ABV5V  | LF60ABV  | LF60ABP     | LF60ABDT  | LF60ABPT  | 6 V            |
| LF80C      | LF80CV5V   | LF80CV   | LF80CP      | LF80CDT   | LF80CPT   | 8 V            |
| LF80AB     | LF80ABV5V  | LF80ABV  | LF80ABP     | LF80ABDT  | LF80ABPT  | 8 V            |
| LF85C      | LF85CV5V   | LF85CV   | LF85CP      | LF85CDT   | LF85CPT   | 8.5V           |
| LF85AB     | LF85ABV5V  | LF85ABV  | LF85ABP     | LF85ABDT  | LF85ABPT  | 8.5V           |
| LF90C      | LF90CV5V   | LF90CV   | LF90CP      | LF90CDT   | LF90CPT   | 9V             |
| LF90AB     | LF90ABV5V  | LF90ABV  | LF90ABP     | LF90ABDT  | LF90ABPT  | 9V             |
| LF120C     | LF120CV5V  | LF120CV  | LF120CP     | LF120CDT  | LF120CPT  | 12 V           |
| LF120AB    | LF120ABV5V | LF120ABV | LF120ABP    | LF120ABDT | LF120ABPT | 12 V           |

## TEST CIRCUITS



**ELECTRICAL CHARACTERISTICS FOR LF12AB** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  
 $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                     | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 3.3\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 3.3\ \text{V}$ $-25 < T_a < 85^\circ\text{C}$       | 1.238<br>1.225 | 1.25           | 1.263<br>1.275 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                              | 2.5            |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                     |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.5\ \text{to}\ 16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                         |                | 2              | 10             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 2.8\ \text{V}$ $I_o = 5\ \text{to}\ 500\ \text{mA}$                                                                          |                | 2              | 10             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\ \text{to}\ 16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 2.6\ \text{to}\ 16\ \text{V}$ $I_o = 500\ \text{mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                        |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 3.5\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$   |                | 82<br>77<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\ \text{Hz to}\ 100\ \text{KHz}$                                                                                             |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\ \text{mA}$                                                                                                              |                | 1.25           |                | V              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125^\circ\text{C}$                                                                                                     |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125^\circ\text{C}$                                                                                                     | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                           |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$ $I_o = 0\ \text{to}\ 500\ \text{mA}$                                                      | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF12C** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  
 $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                     | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 3.3\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 3.3\ \text{V}$ $-25 < T_a < 85^\circ\text{C}$       | 1.225<br>1.2 | 1.25           | 1.275<br>1.3 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                              | 2.5          |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                     |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.5\ \text{to}\ 16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                         |              | 2              | 10           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 2.8\ \text{V}$ $I_o = 5\ \text{to}\ 500\ \text{mA}$                                                                          |              | 2              | 10           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\ \text{to}\ 16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 2.6\ \text{to}\ 16\ \text{V}$ $I_o = 500\ \text{mA}$ |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                        |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 3.5\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$   |              | 82<br>77<br>65 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\ \text{Hz to}\ 100\ \text{KHz}$                                                                                             |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\ \text{mA}$                                                                                                              |              | 1.25           |              | V              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125^\circ\text{C}$                                                                                                     |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125^\circ\text{C}$                                                                                                     | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                           |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\ \text{to}\ 10\ \Omega$ $I_o = 0\ \text{to}\ 500\ \text{mA}$                                                      | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF15AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 1.485<br>1.470 | 1.5            | 1.515<br>1.530 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        | 2.5            |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2              | 10             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 2.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 2              | 10             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 2.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 3.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82<br>77<br>65 |                | dB<br>dB<br>dB |
| 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   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF15C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 1.47<br>1.44 | 1.5            | 1.53<br>1.56 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        | 2.5          |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |              | 2              | 10           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 2.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |              | 2              | 10           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 2.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 3.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |              | 82<br>77<br>65 |              | dB<br>dB<br>dB |
| 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   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF18AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 3.3\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 3.3\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 1.782<br>1.764 | 1.8            | 1.818<br>1.836 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        | 3              |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.8\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2              | 12             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 3.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 2              | 10             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 3.1\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 3.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82<br>77<br>60 |                | dB<br>dB<br>dB |
| 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   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF18C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 3.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 1.764<br>1.728 | 1.8            | 1.836<br>1.872 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        | 3              |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 2.8\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2              | 12             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 3.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 2              | 10             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 2.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 3.1\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 3.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82<br>77<br>60 |                | dB<br>dB<br>dB |
| 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   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF25AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ. | Max.           | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|------|----------------|---------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 4.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 4.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 2.475<br>2.450 | 2.5  | 2.525<br>2.550 | V<br>V        |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |      | 16             | V             |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1    |                | A             |
| $\Delta V_o$ | Line Regulation           | $V_i = 3.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2    | 12             | mV            |
| $\Delta V_o$ | Load Regulation           | $V_i = 3.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 2    | 12             | mV            |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 3.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 3.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5  | 1<br>12        | mA<br>mA      |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50   | 100            | $\mu\text{A}$ |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 4.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82   |                | dB            |
|              |                           |                                                                                                                              |                | 77   |                | dB            |
|              |                           |                                                                                                                              |                | 65   |                | dB            |
|              |                           |                                                                                                                              |                |      |                |               |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50   |                | $\mu\text{V}$ |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.20 | 0.35           | V             |
|              |                           |                                                                                                                              |                | 0.40 | 0.70           | V             |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |      | 0.8            | V             |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |      |                | V             |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10   |                | $\mu\text{A}$ |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10   |                | $\mu\text{F}$ |

**ELECTRICAL CHARACTERISTICS FOR LF25C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.        | Typ. | Max.        | Unit          |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|-------------|------|-------------|---------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 4.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 4.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 2.45<br>2.4 | 2.5  | 2.55<br>2.6 | V<br>V        |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |             |      | 16          | V             |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |             | 1    |             | A             |
| $\Delta V_o$ | Line Regulation           | $V_i = 3.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |             | 2    | 12          | mV            |
| $\Delta V_o$ | Load Regulation           | $V_i = 3.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |             | 2    | 12          | mV            |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 3.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 3.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |             | 0.5  | 1<br>12     | mA<br>mA      |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |             | 50   | 100         | $\mu\text{A}$ |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 4.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |             | 82   |             | dB            |
|              |                           |                                                                                                                              |             | 77   |             | dB            |
|              |                           |                                                                                                                              |             | 65   |             | dB            |
|              |                           |                                                                                                                              |             |      |             |               |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |             | 50   |             | $\mu\text{V}$ |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |             | 0.2  | 0.35        | V             |
|              |                           |                                                                                                                              |             | 0.4  | 0.7         | V             |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |             |      | 0.8         | V             |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2           |      |             | V             |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |             | 10   |             | $\mu\text{A}$ |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2           | 10   |             | $\mu\text{F}$ |

**ELECTRICAL CHARACTERISTICS FOR LF27AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 4.7\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 4.7\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 2.673<br>2.646 | 2.7            | 2.727<br>2.754 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 3.7\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2              | 13             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                         |                | 2              | 13             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 3.7\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$    |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 4.7\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82<br>77<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF27C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 4.7\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 4.7\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 2.646<br>2.592 | 2.7            | 2.754<br>2.808 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 3.7\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 2              | 13             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                         |                | 2              | 13             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 3.7\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$    |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 4.7\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 82<br>77<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF30AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 2.970<br>2.940 | 3              | 3.030<br>3.060 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |                | 3              | 15             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |                | 3              | 15             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |                | 81<br>76<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF30C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 2.94<br>2.88 | 3              | 3.06<br>3.12 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |              | 3              | 15           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |              | 3              | 15           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |              | 81<br>76<br>65 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF33AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5.3\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5.3\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 3.267<br>3.234 | 3.3            | 3.333<br>3.366 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4.3\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 3              | 16             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.6\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 3              | 16             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4.3\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.6\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5.3\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 80<br>75<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF33C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5.3\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5.3\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 3.234<br>3.168 | 3.3            | 3.366<br>3.432 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4.3\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 3              | 16             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.6\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 3              | 16             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4.3\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.6\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5.3\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 80<br>75<br>65 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF35AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 3.465<br>3.430 | 3.5            | 3.535<br>3.570 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 3              | 17             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 3              | 17             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 79<br>74<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF35C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 5.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 5.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 3.43<br>3.36 | 3.5            | 3.57<br>3.64 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 4.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |              | 3              | 17           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 4.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |              | 3              | 17           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 4.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 4.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 5.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |              | 79<br>74<br>60 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF40AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 6\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 6\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 3.960<br>3.920 | 4              | 4.040<br>4.080 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |                | 4              | 20             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 5.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |                | 4              | 20             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 5.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 6\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |                | 78<br>73<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF40C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 6\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 6\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 3.92<br>3.84 | 4              | 4.08<br>4.16 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |              | 4              | 20           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 5.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |              | 4              | 20           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 5.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 6\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |              | 78<br>73<br>60 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF45AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 6.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 6.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 4.455<br>4.410 | 4.5            | 4.545<br>4.590 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 4              | 22             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 5.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 4              | 22             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 5.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 6.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 77<br>72<br>60 |                | dB<br>dB<br>dB |
| 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            | 0.70           | V              |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF45C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 6.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 6.5\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 4.41<br>4.32 | 4.5            | 4.59<br>4.68 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |              | 4              | 22           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 5.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |              | 4              | 22           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 5.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 6.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |              | 77<br>72<br>60 |              | dB<br>dB<br>dB |
| 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            | 0.70         | V              |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF47AB** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 6.7\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 6.7\ \text{V}$ -25< $T_a$ <85 °C                  | 4.653<br>4.606 | 4.7            | 4.747<br>4.794 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                            |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5.7\ \text{to}\ 16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                       |                | 4              | 23             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6\ \text{V}$ $I_o = 5\ \text{to}\ 500\ \text{mA}$                                                                          |                | 4              | 23             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5.7\ \text{to}\ 16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 6\ \text{to}\ 16\ \text{V}$ $I_o = 500\ \text{mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                      |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 6.7\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$ |                | 77<br>72<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\ \text{Hz to}\ 100\ \text{KHz}$                                                                                           |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\ \text{mA}$<br>$I_o = 500\ \text{mA}$                                                                                  |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 °C                                                                                                              |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 °C                                                                                                              | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                         |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\ \text{to}\ 500\ \text{mA}$                                                                     | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF47C** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 6.7\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 6.7\ \text{V}$ -25< $T_a$ <85 °C                  | 4.606<br>4.512 | 4.7            | 4.794<br>4.888 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                            |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 5.7\ \text{to}\ 16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                       |                | 4              | 23             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6\ \text{V}$ $I_o = 5\ \text{to}\ 500\ \text{mA}$                                                                          |                | 4              | 23             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 5.7\ \text{to}\ 16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 6\ \text{to}\ 16\ \text{V}$ $I_o = 500\ \text{mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                      |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 6.7\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$ |                | 77<br>72<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\ \text{Hz to}\ 100\ \text{KHz}$                                                                                           |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\ \text{mA}$<br>$I_o = 500\ \text{mA}$                                                                                  |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 °C                                                                                                              |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 °C                                                                                                              | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                         |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\ \text{to}\ 500\ \text{mA}$                                                                     | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF50AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 7\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 7\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 4.950<br>4.900 | 5              | 5.050<br>5.100 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |                | 5              | 25             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |                | 5              | 25             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 6.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 7\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |                | 76<br>71<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF50C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.       | Typ.           | Max.        | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|------------|----------------|-------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 7\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 7\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 4.9<br>4.8 | 5              | 5.1<br>5.2  | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |            |                | 16          | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |            | 1              |             | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |            | 5              | 25          | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |            | 5              | 25          | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 6.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |            | 0.5            | 1<br>12     | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                               |            | 50             | 100         | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 7\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |            | 76<br>71<br>60 |             | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |            | 50             |             | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |            | 0.2<br>0.4     | 0.35<br>0.7 | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |            |                | 0.8         | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2          |                |             | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |            | 10             |             | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2          | 10             |             | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF52AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 7.2\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 7.2\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 5.148<br>5.096 | 5.2            | 5.252<br>5.304 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6.2\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 5              | 26             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.5\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 5              | 26             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6.2\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 6.5\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 7.2\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 76<br>71<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF52C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                              | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 7.2\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 7.2\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$ | 5.096<br>4.992 | 5.2            | 5.304<br>5.408 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                        |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                              |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6.2\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 5              | 26             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.5\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                       |                | 5              | 26             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6.2\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 6.5\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$  |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\text{ V}$                                                                                                  |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 7.2\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 76<br>71<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                         |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                               |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\text{ V}$ , $V_c = 6\text{ V}$                                                                                      |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF55AB** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  
 $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 7.5\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 7.5\ \text{V}$ -25< $T_a$ <85 °C                  | 5.445<br>5.390 | 5.5            | 5.555<br>5.610 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                            |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6.5$ to $16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                              |                | 5              | 27             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.8\ \text{V}$ $I_o = 5$ to $500\ \text{mA}$                                                                               |                | 5              | 27             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6.5$ to $16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 6.8$ to $16\ \text{V}$ $I_o = 500\ \text{mA}$             |                | 0.5            | 1<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                      |                | 50             | 100            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 7.5\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$ |                | 76<br>71<br>60 |                | dB<br>dB<br>dB |
| 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            | 0.70           | V              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125^\circ\text{C}$                                                                                                   |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125^\circ\text{C}$                                                                                                   | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                         |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1$ to $10\ \Omega$ $I_o = 0$ to $500\ \text{mA}$                                                                  | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF55C** (refer to the test circuits,  $T_j = 25^\circ\text{C}$ ,  
 $C_i = 0.1\ \mu\text{F}$ ,  $C_o = 2.2\ \mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\ \text{mA}$ , $V_i = 7.5\ \text{V}$<br>$I_o = 50\ \text{mA}$ , $V_i = 7.5\ \text{V}$ -25< $T_a$ <85 °C                  | 5.39<br>5.28 | 5.5            | 5.61<br>5.72 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\ \text{mA}$                                                                                                            |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 6.5$ to $16\ \text{V}$ , $I_o = 5\ \text{mA}$                                                                              |              | 5              | 27           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 6.8\ \text{V}$ $I_o = 5$ to $500\ \text{mA}$                                                                               |              | 5              | 27           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 6.5$ to $16\ \text{V}$ $I_o = 0\ \text{mA}$<br>$V_i = 6.8$ to $16\ \text{V}$ $I_o = 500\ \text{mA}$             |              | 0.5            | 1<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 6\ \text{V}$                                                                                                      |              | 50             | 100          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\ \text{mA}$ $V_i = 7.5\ \text{V} \pm 1\ \text{V}$<br>$f = 120\ \text{Hz}$<br>$f = 1\ \text{KHz}$<br>$f = 10\ \text{KHz}$ |              | 76<br>71<br>60 |              | dB<br>dB<br>dB |
| 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            | 0.70         | V              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125^\circ\text{C}$                                                                                                   |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125^\circ\text{C}$                                                                                                   | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 6\ \text{V}$ , $V_c = 6\ \text{V}$                                                                                         |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1$ to $10\ \Omega$ $I_o = 0$ to $500\ \text{mA}$                                                                  | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF60AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 8\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 8\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 5.940<br>5.880 | 6              | 6.060<br>6.120 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 7\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |                | 6              | 30             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 7.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |                | 6              | 30             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 7\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 7.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                | 0.7            | 1.5<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                               |                | 70             | 140            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 8\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |                | 75<br>70<br>60 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF60C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                           | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 8\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 8\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 5.88<br>5.76 | 6              | 6.12<br>6.24 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                     |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                           |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 7\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                     |              | 6              | 30           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 7.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                    |              | 6              | 30           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 7\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 7.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |              | 0.7            | 1.5<br>12    | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                               |              | 70             | 140          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 8\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$ |              | 75<br>70<br>60 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                      |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                            |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                      | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                   |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF80AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 10\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 10\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 7.920<br>7.840 | 8              | 8.080<br>8.160 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                             |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 9\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                             |                | 8              | 40             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 9.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                            |                | 8              | 40             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 9\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 9.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$         |                | 0.7            | 1.5<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                                       |                | 70             | 140            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 10\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$        |                | 72<br>67<br>57 |                | dB<br>dB<br>dB |
| 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              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                           |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                   | 2              | 10             |                | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF80C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 10\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 10\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 7.84<br>7.68 | 8              | 8.16<br>8.32 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                             |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 9\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                             |              | 8              | 40           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 9.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                            |              | 8              | 40           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 9\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 9.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$         |              | 0.7            | 1.5<br>12    | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                                       |              | 70             | 140          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 10\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$        |              | 72<br>67<br>57 |              | dB<br>dB<br>dB |
| 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              |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                           |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF85AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                       | Min.          | Typ.           | Max.          | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------|----------------|---------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 10.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 10.5\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 8.415<br>8.33 | 8.5            | 5.585<br>8.67 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                                 |               |                | 16            | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                       |               | 1              |               | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 9.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                               |               | 8              | 42            | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 9.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                                |               | 8              | 42            | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 9.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 9.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$           |               | 0.7            | 1.5<br>12     | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                                           |               | 70             | 140           | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 10.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$          |               | 72<br>67<br>57 |               | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                                  |               | 50             |               | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                                        |               | 0.2<br>0.4     | 0.35<br>0.7   | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                             |               |                | 0.8           | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                             | 2             |                |               | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                               |               | 10             |               | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                       | 2             | 10             |               | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF85C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                       | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|---------------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 10.5\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 10.5\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 8.33<br>8.16 | 8.5            | 8.67<br>8.84 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                                 |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                       |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 9.5\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                               |              | 8              | 42           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 9.8\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                                |              | 8              | 42           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 9.5\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 9.8\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$           |              | 0.7            | 1.5<br>12    | mA<br>mA       |
|              |                           | OFF MODE $V_i = 9\text{ V}$                                                                                                           |              | 70             | 140          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 10.5\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$          |              | 72<br>67<br>57 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                                  |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                                        |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                             |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                             | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 9\text{ V}$ , $V_c = 6\text{ V}$                                                                                               |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                       | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF90AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 11\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 11\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 8.91<br>8.82 | 9              | 9.09<br>9.18 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                             |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 10\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                            |              | 9              | 45           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 10.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                           |              | 9              | 45           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 10\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 10.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$       |              | 0.7            | 1.5<br>12    | mA<br>mA       |
|              |                           | OFF MODE $V_i = 10\text{ V}$                                                                                                      |              | 70             | 140          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 11\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$        |              | 71<br>66<br>56 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                              |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                                    |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 10\text{ V}$ , $V_c = 6\text{ V}$                                                                                          |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF90C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  
 $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

| Symbol       | Parameter                 | Test Conditions                                                                                                                   | Min.         | Typ.           | Max.         | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------|--------------|----------------|--------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 11\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 11\text{ V}$ $-25 < T_a < 85\text{ }^{\circ}\text{C}$ | 8.82<br>8.64 | 9              | 9.18<br>9.36 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                             |              |                | 16           | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                                   |              | 1              |              | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 10\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                            |              | 9              | 45           | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 10.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                           |              | 9              | 45           | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 10\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 10.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$       |              | 0.7            | 1.5<br>12    | mA<br>mA       |
|              |                           | OFF MODE $V_i = 10\text{ V}$                                                                                                      |              | 70             | 140          | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 11\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$        |              | 71<br>66<br>56 |              | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                              |              | 50             |              | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                                    |              | 0.2<br>0.4     | 0.35<br>0.7  | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         |              |                | 0.8          | V              |
| $V_{ih}$     | Control Input Logic High  | $-40 < T_a < 125\text{ }^{\circ}\text{C}$                                                                                         | 2            |                |              | V              |
| $I_i$        | Control Input Current     | $V_i = 10\text{ V}$ , $V_c = 6\text{ V}$                                                                                          |              | 10             |              | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | $\text{ESR} = 0.1\text{ to }10\text{ }\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                   | 2            | 10             |              | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF120AB** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

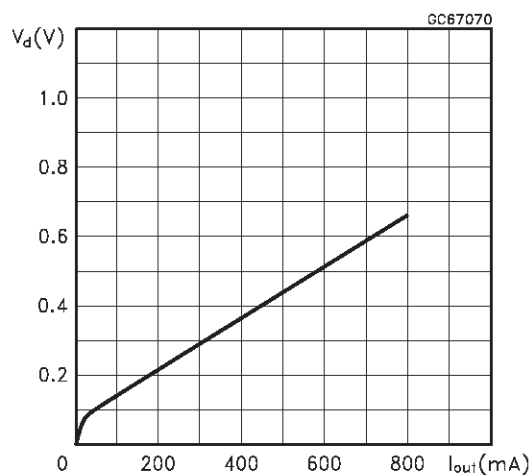
| Symbol       | Parameter                 | Test Conditions                                                                                                             | Min.             | Typ.           | Max.             | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------|------------------|----------------|------------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 15\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 15\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 11.880<br>11.760 | 12             | 12.120<br>12.240 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                       |                  |                | 16               | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                             |                  | 1              |                  | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 13\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                  | 12             | 60               | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 13.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                     |                  | 12             | 60               | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 13\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 13.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                  | 0.7            | 1.5<br>12        | mA<br>mA       |
|              |                           | OFF MODE $V_i = 13\text{ V}$                                                                                                |                  | 70             | 140              | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 14\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                  | 69<br>64<br>54 |                  | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                        |                  | 50             |                  | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                              |                  | 0.2<br>0.4     | 0.35<br>0.7      | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                        |                  |                | 0.8              | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                        | 2                |                |                  | V              |
| $I_i$        | Control Input Current     | $V_i = 13\text{ V}$ , $V_c = 6\text{ V}$                                                                                    |                  | 10             |                  | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                  | 2                | 10             |                  | $\mu\text{F}$  |

**ELECTRICAL CHARACTERISTICS FOR LF120C** (refer to the test circuits,  $T_j = 25\text{ }^{\circ}\text{C}$ ,  $C_i = 0.1\text{ }\mu\text{F}$ ,  $C_o = 2.2\text{ }\mu\text{F}$  unless otherwise specified)

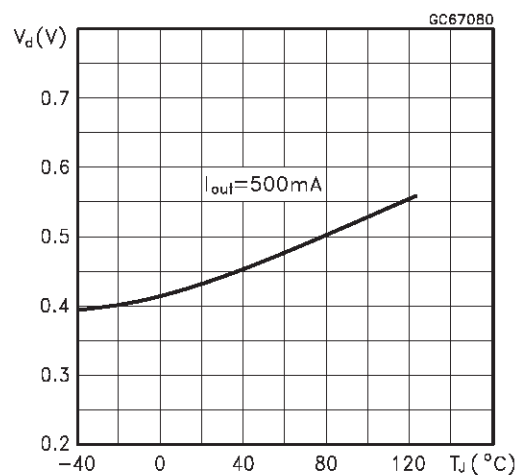
| Symbol       | Parameter                 | Test Conditions                                                                                                             | Min.           | Typ.           | Max.           | Unit           |
|--------------|---------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------|----------------|----------------|----------------|
| $V_o$        | Output Voltage            | $I_o = 50\text{ mA}$ , $V_i = 14\text{ V}$<br>$I_o = 50\text{ mA}$ , $V_i = 14\text{ V}$ -25< $T_a$ <85 $^{\circ}\text{C}$  | 11.76<br>11.52 | 12             | 12.24<br>12.48 | V<br>V         |
| $V_i$        | Operating Input Voltage   | $I_o = 500\text{ mA}$                                                                                                       |                |                | 16             | V              |
| $I_{out}$    | Output Current Limit      |                                                                                                                             |                | 1              |                | A              |
| $\Delta V_o$ | Line Regulation           | $V_i = 13\text{ to }16\text{ V}$ , $I_o = 5\text{ mA}$                                                                      |                | 12             | 60             | mV             |
| $\Delta V_o$ | Load Regulation           | $V_i = 13.3\text{ V}$ $I_o = 5\text{ to }500\text{ mA}$                                                                     |                | 12             | 60             | mV             |
| $I_d$        | Quiescent Current         | ON MODE<br>$V_i = 13\text{ to }16\text{ V}$ $I_o = 0\text{ mA}$<br>$V_i = 13.3\text{ to }16\text{ V}$ $I_o = 500\text{ mA}$ |                | 0.7            | 1.5<br>12      | mA<br>mA       |
|              |                           | OFF MODE $V_i = 13\text{ V}$                                                                                                |                | 70             | 140            | $\mu\text{A}$  |
| SVR          | Supply Voltage Rejection  | $I_o = 5\text{ mA}$ $V_i = 14\text{ V} \pm 1\text{ V}$<br>$f = 120\text{ Hz}$<br>$f = 1\text{ KHz}$<br>$f = 10\text{ KHz}$  |                | 69<br>64<br>54 |                | dB<br>dB<br>dB |
| eN           | Output Noise Voltage      | $B = 10\text{ Hz to }100\text{ KHz}$                                                                                        |                | 50             |                | $\mu\text{V}$  |
| $V_d$        | Dropout Voltage           | $I_o = 200\text{ mA}$<br>$I_o = 500\text{ mA}$                                                                              |                | 0.2<br>0.4     | 0.35<br>0.7    | V<br>V         |
| $V_{il}$     | Control Input Logic Low   | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                        |                |                | 0.8            | V              |
| $V_{ih}$     | Control Input Logic High  | -40 < $T_a$ < 125 $^{\circ}\text{C}$                                                                                        | 2              |                |                | V              |
| $I_i$        | Control Input Current     | $V_i = 13\text{ V}$ , $V_c = 6\text{ V}$                                                                                    |                | 10             |                | $\mu\text{A}$  |
| $C_o$        | Output Bypass Capacitance | ESR = 0.1 to 10 $\Omega$ $I_o = 0\text{ to }500\text{ mA}$                                                                  | 2              | 10             |                | $\mu\text{F}$  |

## TYPICAL PERFORMANCE CHARACTERISTICS

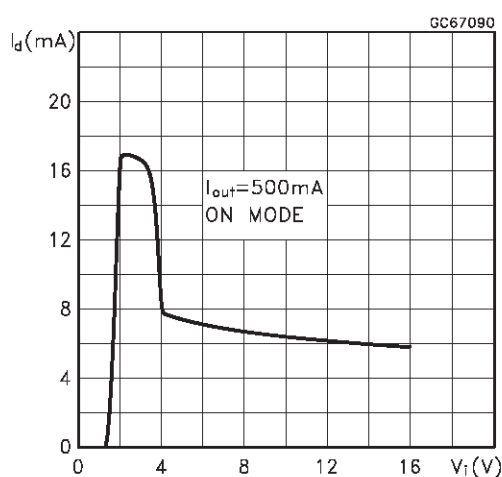
Dropout Voltage vs Output Current



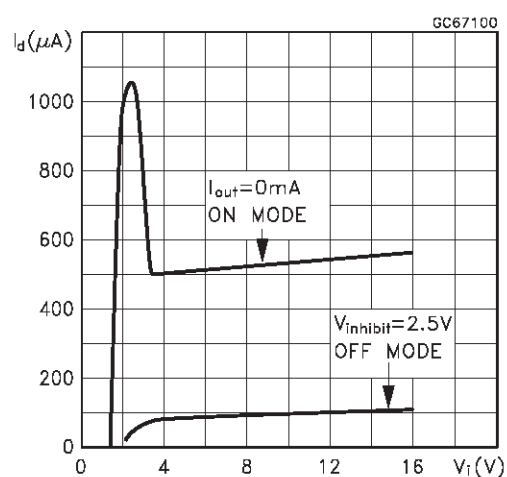
Dropout Voltage vs Temperature



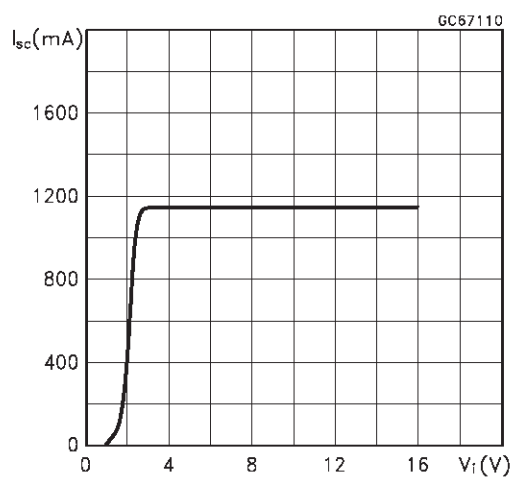
Supply Current vs Input Voltage



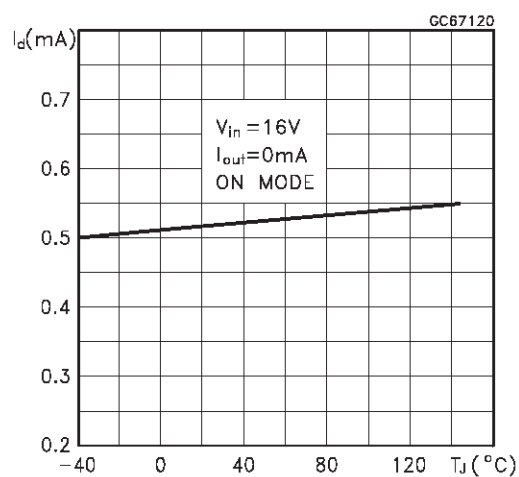
Supply Current vs Input Voltage



Short Circuit Current vs Input Voltage

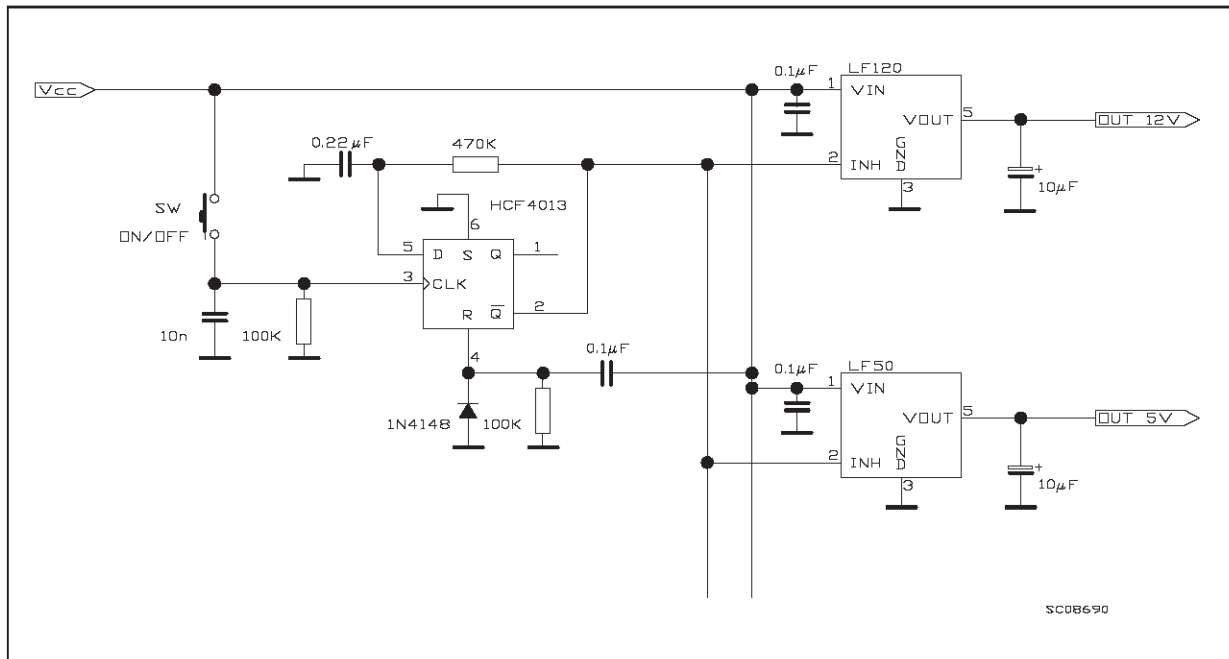


Supply Current vs Temperature

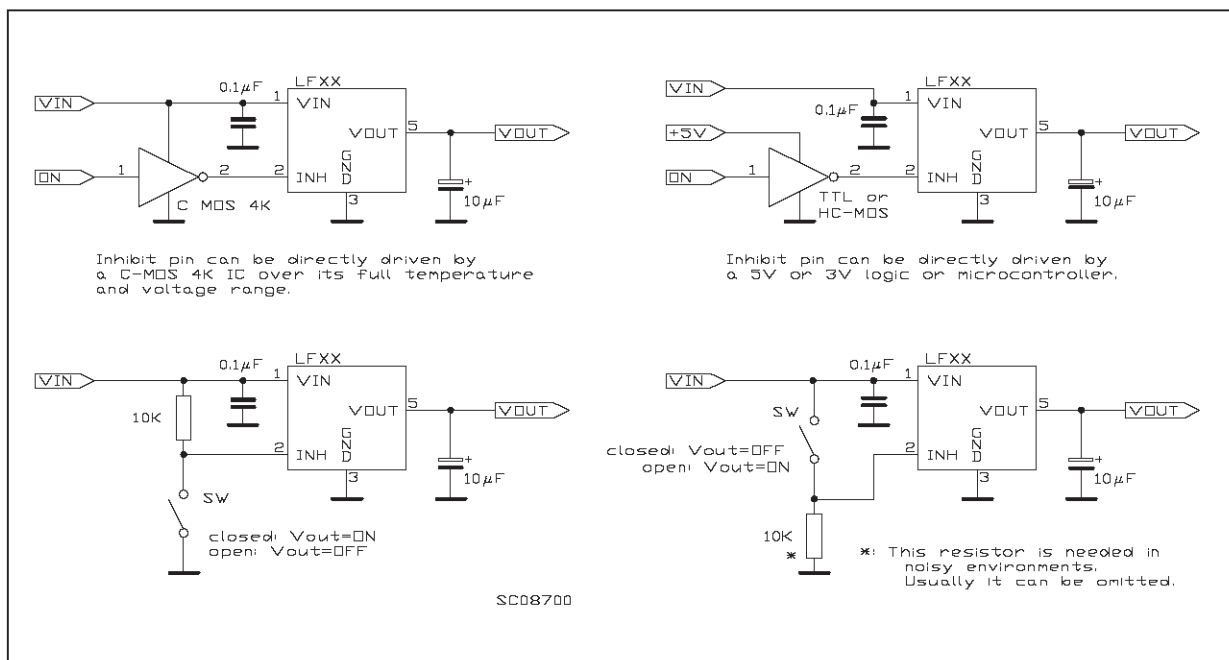




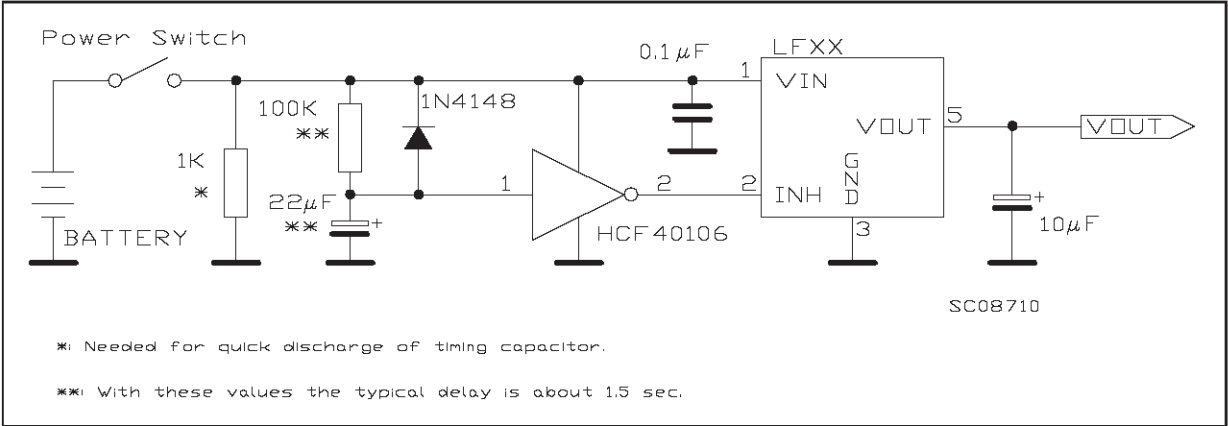
## Multiple Supply With ON/OFF Toggle Switch



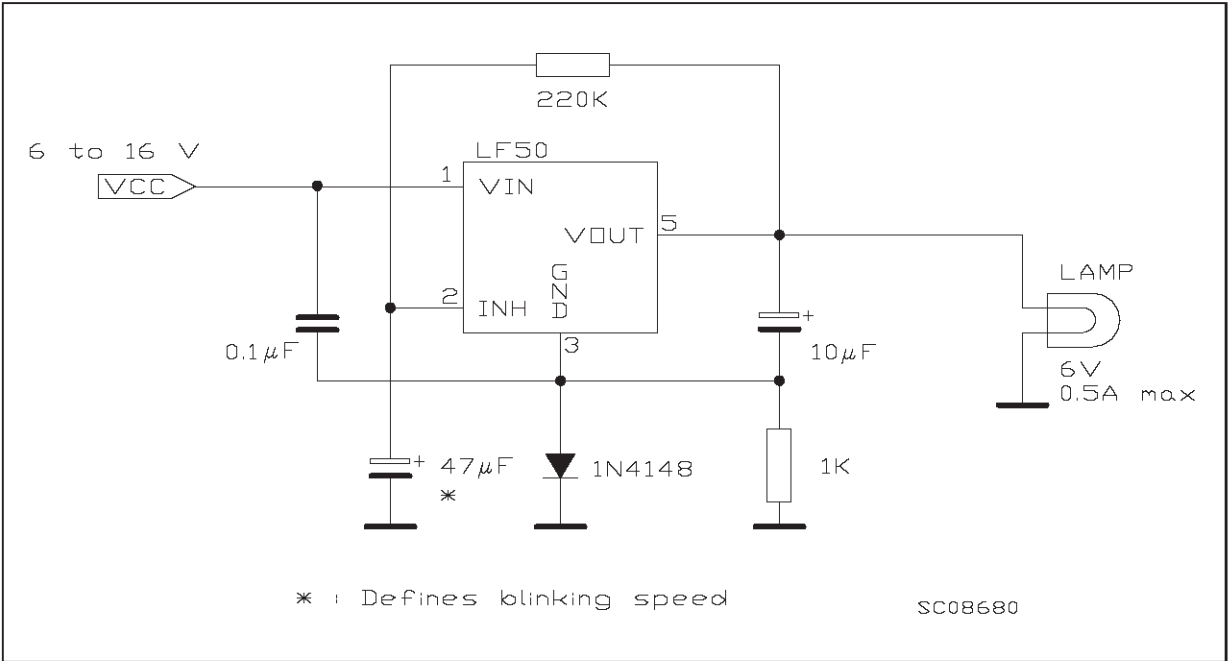
## Basic Inhibit Functions



Delayed Turn-On

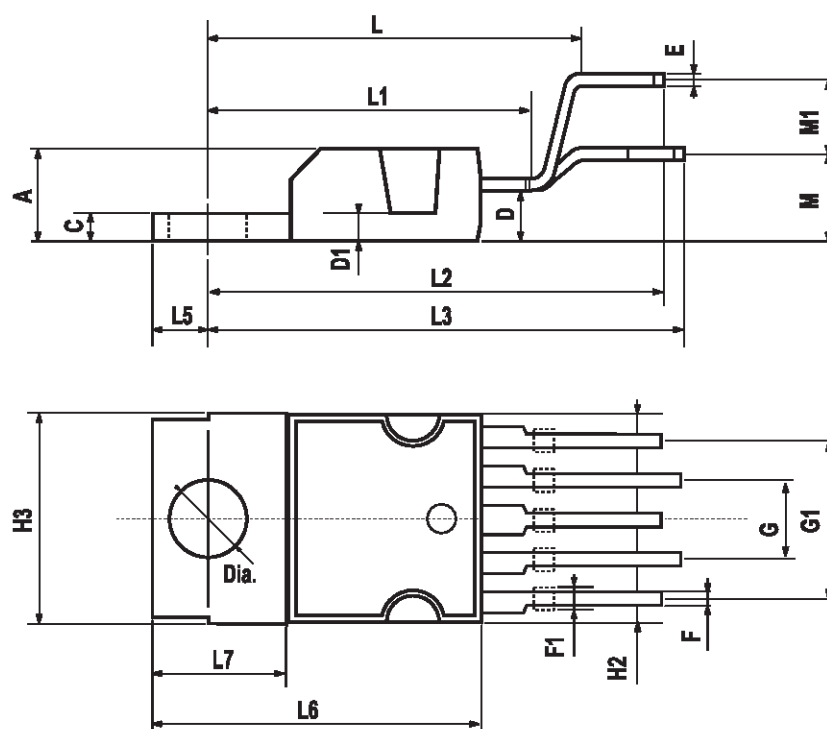


Low Voltage Bulb Blinker



# PENTAWATT (VERTICAL) MECHANICAL DATA

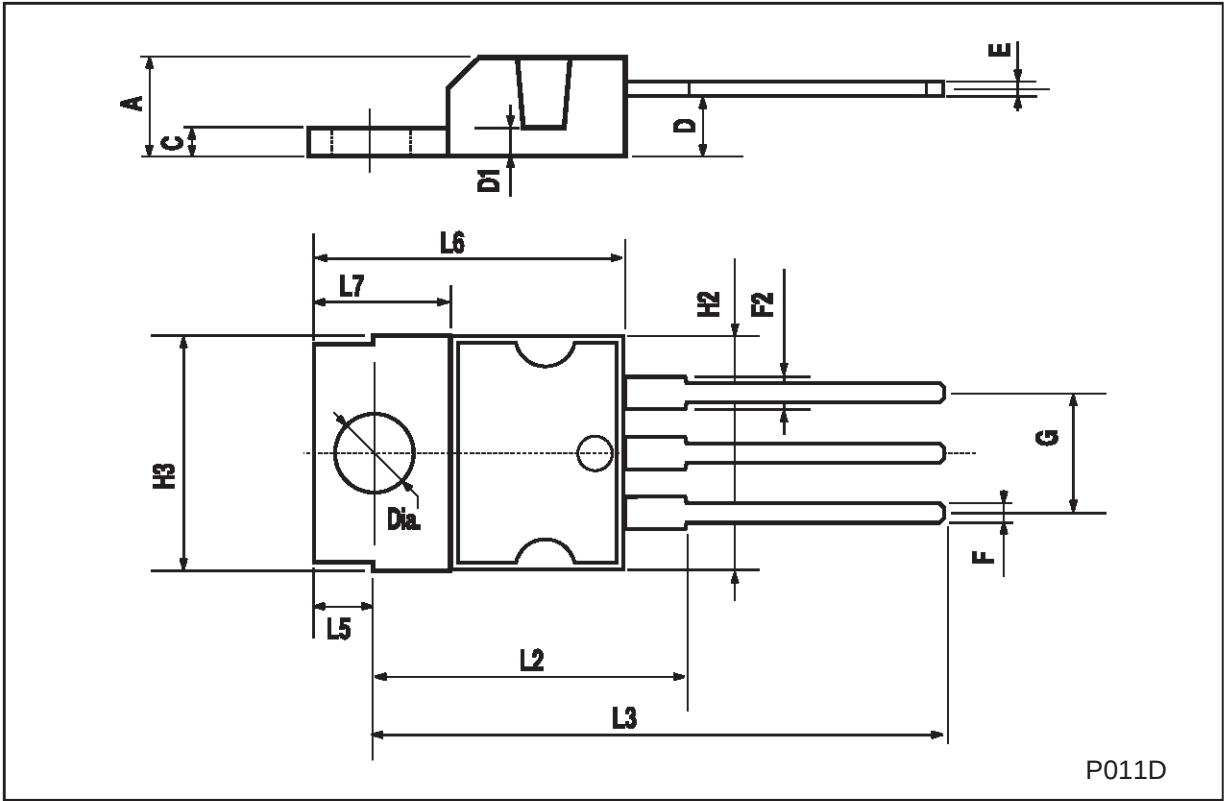
| DIM. | mm    |       |      | inch  |       |       |
|------|-------|-------|------|-------|-------|-------|
|      | MIN.  | TYP.  | MAX. | MIN.  | TYP.  | MAX.  |
| A    |       |       | 4.8  |       |       | 0.189 |
| C    |       |       | 1.37 |       |       | 0.054 |
| D    | 2.4   |    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



P010E

TO-220 MECHANICAL DATA

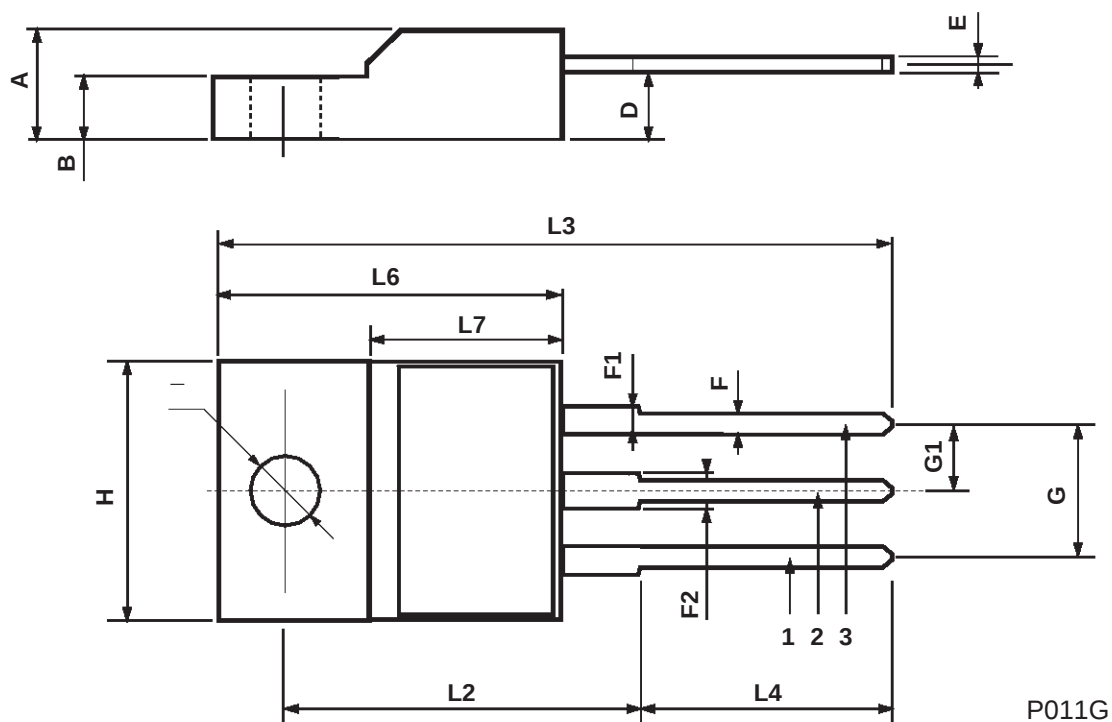
| DIM. | mm    |      |      | inch  |       |       |
|------|-------|------|------|-------|-------|-------|
|      | MIN.  | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    |       |      | 4.8  |       |       | 0.189 |
| C    |       |      | 1.37 |       |       | 0.054 |
| D    | 2.4   |      | 2.8  | 0.094 |       | 0.110 |
| D1   | 1.2   |      | 1.35 | 0.047 |       | 0.053 |
| E    | 0.35  |      | 0.55 | 0.014 |       | 0.022 |
| F    | 0.61  |      | 0.94 | 0.024 |       | 0.037 |
| F2   | 1.15  |      | 1.4  | 0.045 |       | 0.055 |
| G    | 4.95  | 5.08 | 5.21 | 0.195 | 0.200 | 0.205 |
| H2   |       |      | 10.4 |       |       | 0.409 |
| H3   | 10.05 |      | 10.4 | 0.396 |       | 0.409 |
| L2   |       | 16.2 |      |       | 0.638 |       |
| L3   | 26.3  | 26.7 | 27.1 | 1.035 | 1.051 | 1.067 |
| L5   | 2.6   |      | 3    | 0.102 |       | 0.118 |
| L6   | 15.1  |      | 15.8 | 0.594 |       | 0.622 |
| L7   | 6     |      | 6.6  | 0.236 |       | 0.260 |
| Dia. | 3.65  |      | 3.85 | 0.144 |       | 0.152 |



P011D

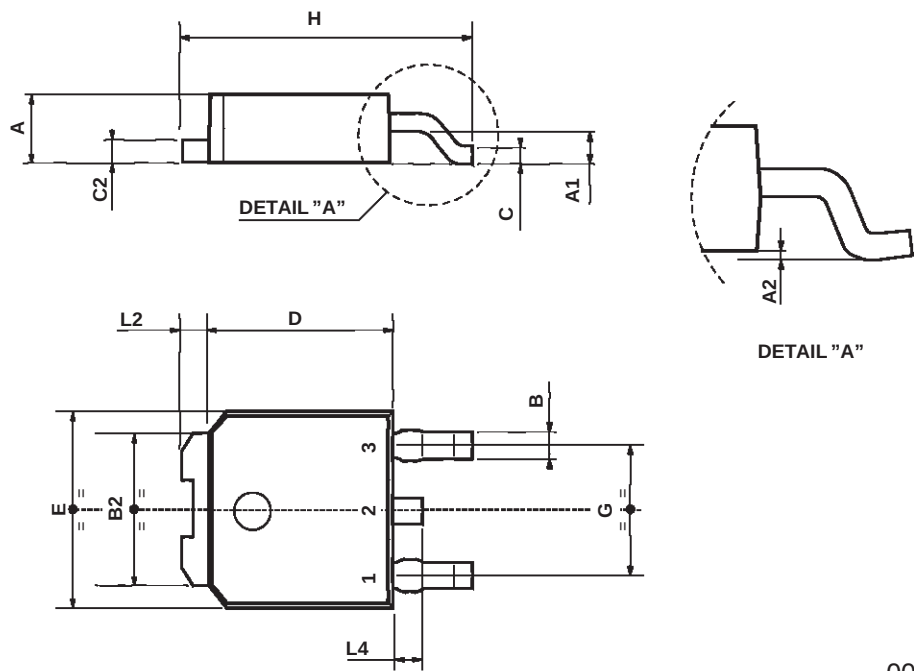
## ISOWATT220 MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 4.4  |      | 4.6  | 0.173 |       | 0.181 |
| B    | 2.5  |      | 2.7  | 0.098 |       | 0.106 |
| D    | 2.5  |      | 2.75 | 0.098 |       | 0.108 |
| E    | 0.4  |      | 0.7  | 0.015 |       | 0.027 |
| F    | 0.75 |      | 1    | 0.030 |       | 0.039 |
| F1   | 1.15 |      | 1.7  | 0.045 |       | 0.067 |
| F2   | 1.15 |      | 1.7  | 0.045 |       | 0.067 |
| G    | 4.95 |      | 5.2  | 0.195 |       | 0.204 |
| G1   | 2.4  |      | 2.7  | 0.094 |       | 0.106 |
| H    | 10   |      | 10.4 | 0.393 |       | 0.409 |
| L2   |      | 16   |      |       | 0.630 |       |
| L3   | 28.6 |      | 30.6 | 1.126 |       | 1.204 |
| L4   | 9.8  |      | 10.6 | 0.385 |       | 0.417 |
| L6   | 15.9 |      | 16.4 | 0.626 |       | 0.645 |
| L7   | 9    |      | 9.3  | 0.354 |       | 0.366 |
| Ø    | 3    |      | 3.2  | 0.118 |       | 0.126 |



TO-252 (DPAK) MECHANICAL DATA

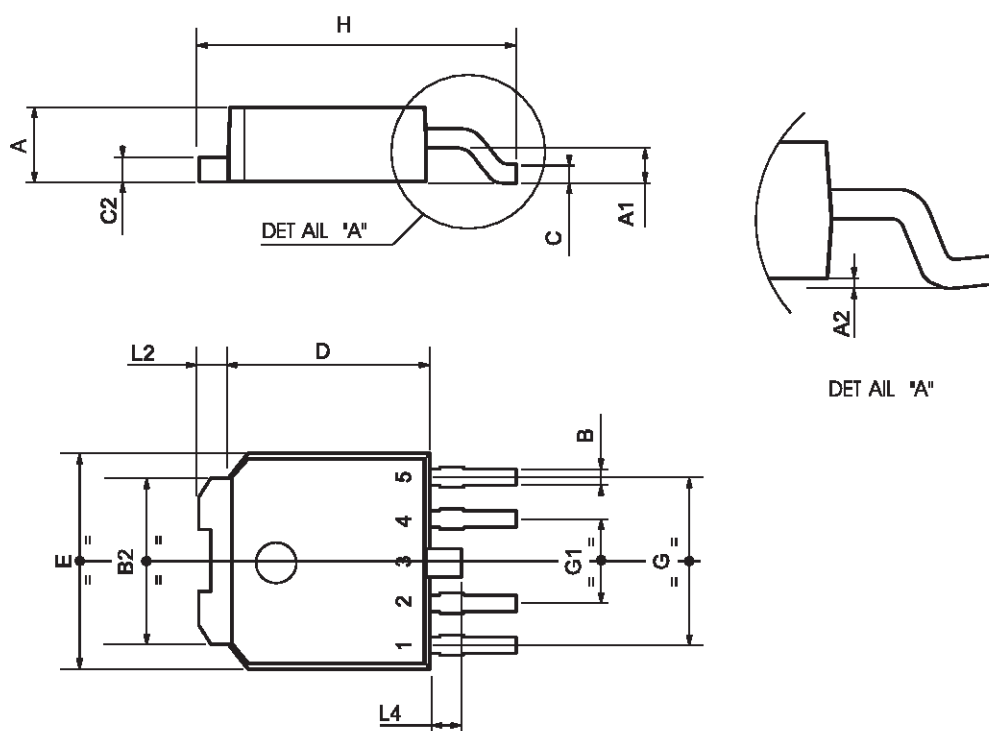
| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 2.2  |      | 2.4  | 0.086 |       | 0.094 |
| A1   | 0.9  |      | 1.1  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23 | 0.001 |       | 0.009 |
| B    | 0.64 |      | 0.9  | 0.025 |       | 0.035 |
| B2   | 5.2  |      | 5.4  | 0.204 |       | 0.212 |
| C    | 0.45 |      | 0.6  | 0.017 |       | 0.023 |
| C2   | 0.48 |      | 0.6  | 0.019 |       | 0.023 |
| D    | 6    |      | 6.2  | 0.236 |       | 0.244 |
| E    | 6.4  |      | 6.6  | 0.252 |       | 0.260 |
| G    | 4.4  |      | 4.6  | 0.173 |       | 0.181 |
| H    | 9.35 |      | 10.1 | 0.368 |       | 0.397 |
| L2   |      | 0.8  |      |       | 0.031 |       |
| L4   | 0.6  |      | 1    | 0.023 |       | 0.039 |



0068772-B

## PPAK MECHANICAL DATA

| DIM. | mm   |      |      | inch  |       |       |
|------|------|------|------|-------|-------|-------|
|      | MIN. | TYP. | MAX. | MIN.  | TYP.  | MAX.  |
| A    | 2.2  |      | 2.4  | 0.086 |       | 0.094 |
| A1   | 0.9  |      | 1.1  | 0.035 |       | 0.043 |
| A2   | 0.03 |      | 0.23 | 0.001 |       | 0.009 |
| B    | 0.4  |      | 0.6  | 0.015 |       | 0.023 |
| B2   | 5.2  |      | 5.4  | 0.204 |       | 0.212 |
| C    | 0.45 |      | 0.6  | 0.017 |       | 0.023 |
| C2   | 0.48 |      | 0.6  | 0.019 |       | 0.023 |
| D    | 6    |      | 6.2  | 0.236 |       | 0.244 |
| E    | 6.4  |      | 6.6  | 0.252 |       | 0.260 |
| G    | 4.9  |      | 5.25 | 0.193 |       | 0.206 |
| G1   | 2.38 |      | 2.7  | 0.093 |       | 0.106 |
| H    | 9.35 |      | 10.1 | 0.368 |       | 0.397 |
| L2   |      | 0.8  | 1    |       | 0.031 | 0.039 |
| L4   | 0.6  |      | 1    | 0.023 |       | 0.039 |



0078180/B

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