

T-58-1/13

# L7800 Series



3028

Monolithic Linear IC

## 5 to 24V 1A 3-Pin Voltage Regulator

©1179C

**Use**

- General-purpose voltage regulators.

**Features**

- Output voltage L7805:5V L7806:6V L7807:7V L7808:8V  
L7809:9V L7810:10V L7812:12V L7815:15V  
L7818:18V L7820:20V L7824:24V
- 1A output.
- On-chip thermal protector
- On-chip overcurrent limiter
- On-chip ASO protector
- The JEDEC TO-220AB package facilitates easy mounting and thermal design as in case of transistor.

**[Common to L7800 series]**

**Maximum Ratings at Ta=25°C**

|                             |                     |         |             | unit |
|-----------------------------|---------------------|---------|-------------|------|
| Maximum Supply Voltage      | V <sub>CC</sub> max | Pin 1   | 35          | V    |
| Allowable Power Dissipation | Pd max              |         | 1.75        | W    |
|                             | Pd max              | Tc=25°C | 20          | W    |
| Operating Temperature       | Topg                |         | -20 to +80  | °C   |
| Storage Temperature         | Tstg                |         | -40 to +150 | °C   |
| Thermal Resistance          | θj-c                |         | 5           | °C/W |

**[L7805]**

**Recommended Operating Conditions at Ta=25°C**

|                |                  |  | unit      |    |
|----------------|------------------|--|-----------|----|
| Input Voltage  | V <sub>IN</sub>  |  | 7.5 to 20 | V  |
| Output Current | I <sub>OUT</sub> |  | 5 to 1000 | mA |

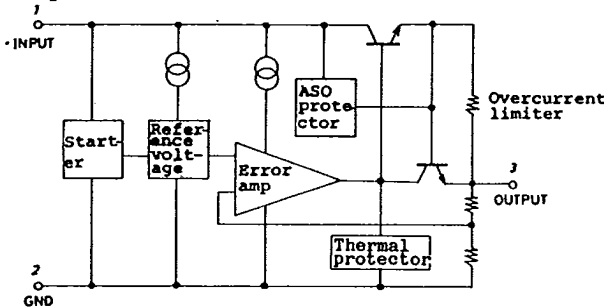
**Operating Characteristics at Ta=25°C, V<sub>IN</sub>=10V, I<sub>OUT</sub>=500mA, See specified Test Circuit.**

|                 |                     |  | min | typ | max | unit |
|-----------------|---------------------|--|-----|-----|-----|------|
| Output Voltage  | V <sub>OUT</sub>    | Tj=25°C                                | 4.8 | 5.0 | 5.2 | V    |
| Line Regulation | ΔV <sub>oline</sub> | Tj=25°C, 7V ≤ V <sub>IN</sub> ≤ 25V    |     | 3.0 | 50  | mV   |
|                 |                     | " 8V ≤ V <sub>IN</sub> ≤ 20V           |     | 1.0 | 25  | mV   |
| Load Regulation | ΔV <sub>oload</sub> | Tj=25°C, 5mA ≤ I <sub>OUT</sub> ≤ 1.5A |     |     | 100 | mV   |
|                 |                     | " 250mA ≤ I <sub>OUT</sub> ≤ 750mA     |     |     | 50  | mV   |

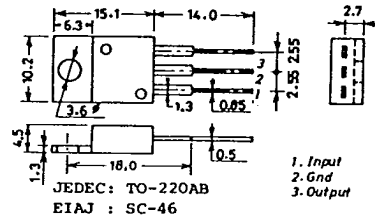


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**Equivalent Circuit**



**Case Outline 3028-S3TR (unit:mm)**



7297KI/7067KI/7315MW/1183KI, TS No. 1179-1/7

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|                                      |                     |  | min  | typ | max  | unit    |
|--------------------------------------|---------------------|--|------|-----|------|---------|
| Output Voltage                       | $V_{OUT}$           | $7V \leq V_{IN} \leq 20V, 5mA \leq I_{OUT} \leq 1A$          | 4.75 |     | 5.25 | V       |
| Current Dissipation                  | $I_{CC}$            | $T_j = 25^\circ C$   |      |     | 8.0  | mA      |
| Current Dissipation Variation (Line) | $\Delta I_{CCline}$ | $7V \leq V_{IN} \leq 25V$                                    |      |     | 1.3  | mA      |
| Current Dissipation Variation (Load) | $\Delta I_{CCload}$ | $5mA \leq I_{OUT} \leq 1A$                                   |      |     | 0.5  | mA      |
| Output Noise Voltage                 | $V_{NO}$            | $10Hz \leq f \leq 100kHz$                                    |      | 40  |      | $\mu V$ |
| Ripple Rejection                     | $R_{rej}$           | $f = 120Hz$<br>$(8V \leq V_{IN} \leq 19V, T_j = 25^\circ C)$ | 62   | 80  |      | dB      |
| Minimum Input-Output Voltage Drop    | $V_{drop}$          | $I_{OUT} = 1A$   |      | 2.0 |      | V       |
| Short Current                        | $I_{OS}$            | $T_j = 25^\circ C, V_{IN} = 35V, \text{to GND}$              |      | 300 |      | mA      |
| Peak Output Current                  | $I_{op}$            | $T_j = 25^\circ C$   |      | 2.2 |      | A       |

[L7806]

Recommended Operating Conditions at  $T_a = 25^\circ C$

|                |           |  | unit      |    |
|----------------|-----------|--|-----------|----|
| Input Voltage  | $V_{IN}$  |  | 8.5 to 21 | V  |
| Output Current | $I_{OUT}$ |  | 5 to 1000 | mA |

Operating Characteristics at  $T_a = 25^\circ C, V_{IN} = 11V, I_{OUT} = 500mA,$

See specified Test Circuit.

|                                      |                     |  | min  | typ | max  | unit    |
|--------------------------------------|---------------------|--|------|-----|------|---------|
| Output Voltage                       | $V_{OUT}$           | $T_j = 25^\circ C$   | 5.75 | 6.0 | 6.25 | V       |
| Line Regulation                      | $\Delta V_{oline}$  | $T_j = 25^\circ C, 8V \leq V_{IN} \leq 25V$                  |      | 5.0 | 60   | mV      |
|                                      |                     | " $9V \leq V_{IN} \leq 20V$                                  |      | 1.5 | 30   | mV      |
| Load Regulation                      | $\Delta V_{oload}$  | $T_j = 25^\circ C, 5mA \leq I_{OUT} \leq 1.5A$               |      |     | 120  | mV      |
|                                      |                     | " $250mA \leq I_{OUT} \leq 750mA$                            |      |     | 60   | mV      |
| Output Voltage                       | $V_{OUT}$           | $8V \leq V_{IN} \leq 21V, 5mA \leq I_{OUT} \leq 1A$          | 5.7  |     | 6.3  | V       |
| Current Dissipation                  | $I_{CC}$            | $T_j = 25^\circ C$   |      |     | 8.0  | mA      |
| Current Dissipation Variation (Line) | $\Delta I_{CCline}$ | $8V \leq V_{IN} \leq 25V$                                    |      |     | 1.3  | mA      |
| Current Dissipation Variation (Load) | $\Delta I_{CCload}$ | $5mA \leq I_{OUT} \leq 1A$                                   |      |     | 0.5  | mA      |
| Output Noise Voltage                 | $V_{NO}$            | $10Hz \leq f \leq 100kHz$                                    |      | 45  |      | $\mu V$ |
| Ripple Rejection                     | $R_{rej}$           | $f = 120Hz$<br>$(9V \leq V_{IN} \leq 20V, T_j = 25^\circ C)$ | 59   | 80  |      | dB      |
| Minimum Input-Output Voltage Drop    | $V_{drop}$          | $I_{OUT} = 1A$   |      | 2.0 |      | V       |
| Short Current                        | $I_{OS}$            | $T_j = 25^\circ C, V_{IN} = 35V, \text{to GND}$              |      | 300 |      | mA      |
| Peak Output Current                  | $I_{op}$            | $T_j = 25^\circ C$   |      | 2.2 |      | A       |

[L7807]

Recommended Operating Conditions at  $T_a = 25^\circ C$

|                |           |  | unit      |    |
|----------------|-----------|--|-----------|----|
| Input Voltage  | $V_{IN}$  |  | 9.5 to 22 | V  |
| Output Current | $I_{OUT}$ |  | 5 to 1000 | mA |

L7805,06,07,08,09,10,12,15,18,20,24

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**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=12\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|   |                     |  | min  | typ | max  | unit          |
|---|---------------------|--|------|-----|------|---------------|
| Output Voltage                          | $V_{OUT}$           | $T_j=25^\circ\text{C}$   | 6.72 | 7.0 | 7.28 | V             |
| Line Regulation                         | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $9\text{V} \leq V_{IN} \leq 25\text{V}$                       |      | 6.0 | 60   | mV            |
|   |                     | " $10\text{V} \leq V_{IN} \leq 20\text{V}$   |      | 2.0 | 30   | mV            |
| Load Regulation                         | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                    |      |     | 140  | mV            |
|   |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$  |      |     | 70   | mV            |
| Output Voltage                          | $V_{OUT}$           | $9\text{V} \leq V_{IN} \leq 22\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$     | 6.6  |     | 7.4  | V             |
| Current Dissipation                     | $I_{CC}$            | $T_j=25^\circ\text{C}$   |      |     | 8.0  | mA            |
| Current Dissipation<br>Variation (Line) | $\Delta I_{CCline}$ | $9\text{V} \leq V_{IN} \leq 25\text{V}$  |      |     | 1.3  | mA            |
| Current Dissipation<br>Variation (Load) | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$   |      |     | 0.5  | mA            |
| Output Noise Voltage                    | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$  |      | 48  |      | $\mu\text{V}$ |
| Ripple Rejection                        | $R_{rej}$           | $f=120\text{Hz}$<br>$10\text{V} \leq V_{IN} \leq 21\text{V}$<br>$T_j=25^\circ\text{C}$ | 58   | 80  |      | dB            |
| Minimum Input-Output<br>Voltage Drop    | $V_{drop}$          | $I_{OUT}=1\text{A}$  |      | 2.0 |      | V             |
| Short Current                           | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                  |      | 300 |      | mA            |
| Peak Output Current                     | $I_{op}$            | $T_j=25^\circ\text{C}$   |      | 2.2 |      | A             |

**[L7808]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |            | unit |
|----------------|-----------|------------|------|
| Input Voltage  | $V_{IN}$  | 10.5 to 23 | V    |
| Output Current | $I_{OUT}$ | 5 to 1000  | mA   |

**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=15\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|   |                     |  | min | typ | max | unit          |
|---|---------------------|--|-----|-----|-----|---------------|
| Output Voltage                          | $V_{OUT}$           | $T_j=25^\circ\text{C}$   | 7.7 | 8.0 | 8.3 | V             |
| Line Regulation                         | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $10.5\text{V} \leq V_{IN} \leq 25\text{V}$                      |     | 6.0 | 60  | mV            |
|   |                     | " $11\text{V} \leq V_{IN} \leq 20\text{V}$   |     | 2.0 | 30  | mV            |
| Load Regulation                         | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                      |     |     | 160 | mV            |
|   |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$  |     |     | 80  | mV            |
| Output Voltage                          | $V_{OUT}$           | $10.5\text{V} \leq V_{IN} \leq 23\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$    | 7.6 |     | 8.4 | V             |
| Current Dissipation                     | $I_{CC}$            | $T_j=25^\circ\text{C}$   |     |     | 8.0 | mA            |
| Current Dissipation<br>Variation (Line) | $\Delta I_{CCline}$ | $10.5\text{V} \leq V_{IN} \leq 25\text{V}$   |     |     | 1.0 | mA            |
| Current Dissipation<br>Variation (Load) | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$   |     |     | 0.5 | mA            |
| Output Noise Voltage                    | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$  |     | 50  |     | $\mu\text{V}$ |
| Ripple Rejection                        | $R_{rej}$           | $f=120\text{Hz}$<br>$11.5\text{V} \leq V_{IN} \leq 22\text{V}$<br>$T_j=25^\circ\text{C}$ | 56  | 80  |     | dB            |
| Minimum Input-Output<br>Voltage Drop    | $V_{drop}$          | $I_{OUT}=1\text{A}$  |     | 2.0 |     | V             |
| Short Current                           | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                    |     | 300 |     | mA            |
| Peak Output Current                     | $I_{op}$            | $T_j=25^\circ\text{C}$   |     | 2.2 |     | A             |

**[L7809]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |           | unit |
|----------------|-----------|-----------|------|
| Input Voltage  | $V_{IN}$  | 12 to 25  | V    |
| Output Current | $I_{OUT}$ | 5 to 1000 | mA   |

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**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=16\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |  | min | typ | max | unit          |
|----------------------|---------------------|--|-----|-----|-----|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$   | 8.6 | 9.0 | 9.4 | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $11.5\text{V} \leq V_{IN} \leq 25\text{V}$                    |     | 6.0 | 100 | mV            |
|                      |                     | " $12\text{V} \leq V_{IN} \leq 20\text{V}$   |     | 2.0 | 50  | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                    |     |     | 180 | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$  |     |     | 90  | mV            |
| Output Voltage       | $V_{OUT}$           | $11.5\text{V} \leq V_{IN} \leq 24\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  | 8.5 |     | 9.5 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$   |     |     | 8.0 | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $11.5\text{V} \leq V_{IN} \leq 25\text{V}$   |     |     | 1.0 | mA            |
| Variation (Line)     |                     |  |     |     |     |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$   |     |     | 0.5 | mA            |
| Variation (Load)     |                     |  |     |     |     |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$  |     | 60  |     | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$<br>$12\text{V} \leq V_{IN} \leq 23\text{V}$<br>$T_j=25^\circ\text{C}$ | 56  | 80  |     | dB            |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$  |     | 2.0 |     | V             |
| Voltage Drop         |                     |  |     |     |     |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                  |     | 300 |     | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$   |     | 2.2 |     | A             |

## [L7810]

Recommended Operating Conditions at  $T_a=25^\circ\text{C}$ 

|                |           |           | unit |
|----------------|-----------|-----------|------|
| Input Voltage  | $V_{IN}$  | 13 to 25  | V    |
| Output Current | $I_{OUT}$ | 5 to 1000 | mA   |

**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=17\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |  | min | typ  | max  | unit          |
|----------------------|---------------------|--|-----|------|------|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$   | 9.6 | 10.0 | 10.4 | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $12.5\text{V} \leq V_{IN} \leq 25\text{V}$                    |     | 7.0  | 100  | mV            |
|                      |                     | " $13\text{V} \leq V_{IN} \leq 22\text{V}$   |     | 2.0  | 50   | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                    |     |      | 200  | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$  |     |      | 100  | mV            |
| Output Voltage       | $V_{OUT}$           | $12.5\text{V} \leq V_{IN} \leq 25\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  | 9.5 |      | 10.5 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$   |     |      | 8.0  | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $12.5\text{V} \leq V_{IN} \leq 25\text{V}$   |     |      | 1.0  | mA            |
| Variation (Line)     |                     |  |     |      |      |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$   |     |      | 0.5  | mA            |
| Variation (Load)     |                     |  |     |      |      |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$  |     | 65   |      | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$<br>$13\text{V} \leq V_{IN} \leq 25\text{V}$<br>$T_j=25^\circ\text{C}$ | 55  | 80   |      | dB            |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$  |     | 2.0  |      | V             |
| Voltage Drop         |                     |  |     |      |      |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                  |     | 300  |      | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$   |     | 2.2  |      | A             |

## [L7812]

Recommended Operating Conditions at  $T_a=25^\circ\text{C}$ 

|                |           |           | unit |
|----------------|-----------|-----------|------|
| Input Voltage  | $V_{IN}$  | 15 to 25  | V    |
| Output Current | $I_{OUT}$ | 5 to 1000 | mA   |

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**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=19\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |   | min  | typ  | max  | unit          |
|----------------------|---------------------|---|------|------|------|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$  | 11.5 | 12.0 | 12.5 | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $14.5\text{V} \leq V_{IN} \leq 30\text{V}$                   |      | 8.0  | 100  | mV            |
|                      |                     | " $16\text{V} \leq V_{IN} \leq 25\text{V}$  |      | 2.0  | 50   | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                   |      |      | 240  | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$                                       |      |      | 120  | mV            |
| Output Voltage       | $V_{OUT}$           | $14.5\text{V} \leq V_{IN} \leq 27\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$ | 11.4 |      | 12.6 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$  |      |      | 8.0  | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $14.5\text{V} \leq V_{IN} \leq 30\text{V}$  |      |      | 1.0  | mA            |
| Variation (Line)     |                     |   |      |      |      |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  |      |      | 0.5  | mA            |
| Variation (Load)     |                     |   |      |      |      |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$   |      | 75   |      | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$  | 55   | 80   |      | dB            |
|                      |                     | $15\text{V} \leq V_{IN} \leq 25\text{V}$  |      |      |      |               |
|                      |                     | $T_j=25^\circ\text{C}$  |      |      |      |               |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$   |      | 2.0  |      | V             |
| Voltage Drop         |                     |   |      |      |      |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                 |      | 300  |      | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$  |      | 2.2  |      | A             |

**[L7815]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |           | unit |
|----------------|-----------|-----------|------|
| Input Voltage  | $V_{IN}$  | 18 to 30  | V    |
| Output Current | $I_{OUT}$ | 5 to 1000 | mA   |

**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=23\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |   | min   | typ  | max   | unit          |
|----------------------|---------------------|---|-------|------|-------|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$  | 14.4  | 15.0 | 15.6  | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $17.5\text{V} \leq V_{IN} \leq 30\text{V}$                   |       | 10.0 | 100   | mV            |
|                      |                     | " $19\text{V} \leq V_{IN} \leq 30\text{V}$  |       | 3.0  | 50    | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                   |       |      | 300   | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$                                       |       |      | 150   | mV            |
| Output Voltage       | $V_{OUT}$           | $17.5\text{V} \leq V_{IN} \leq 30\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$ | 14.25 |      | 15.75 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$  |       |      | 8.0   | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $17.5\text{V} \leq V_{IN} \leq 30\text{V}$  |       |      | 1.0   | mA            |
| Variation (Line)     |                     |   |       |      |       |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  |       |      | 0.5   | mA            |
| Variation (Load)     |                     |   |       |      |       |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$   |       | 90   |       | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$  | 54    | 70   |       | dB            |
|                      |                     | $18.5\text{V} \leq V_{IN} \leq 28.5\text{V}$  |       |      |       |               |
|                      |                     | $T_j=25^\circ\text{C}$  |       |      |       |               |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$   |       | 2.0  |       | V             |
| Voltage Drop         |                     |   |       |      |       |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                                 |       | 300  |       | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$  |       | 2.1  |       | A             |

**[L7818]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |           | unit |
|----------------|-----------|-----------|------|
| Input Voltage  | $V_{IN}$  | 21 to 33  | V    |
| Output Current | $I_{OUT}$ | 5 to 1000 | mA   |

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**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=27\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |   | min  | typ  | max  | unit          |
|----------------------|---------------------|---|------|------|------|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$  | 17.3 | 18.0 | 18.7 | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $21\text{V} \leq V_{IN} \leq 35\text{V}$                   |      | 10.0 | 100  | mV            |
|                      |                     | " $22\text{V} \leq V_{IN} \leq 35\text{V}$  |      | 5.0  | 50   | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                 |      |      | 360  | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$                                     |      |      | 180  | mV            |
| Output Voltage       | $V_{OUT}$           | $21\text{V} \leq V_{IN} \leq 33\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$ | 17.1 |      | 18.9 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$  |      |      | 8.0  | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $21\text{V} \leq V_{IN} \leq 33\text{V}$  |      |      | 1.0  | mA            |
| Variation (Line)     |                     |   |      |      |      |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  |      |      | 0.5  | mA            |
| Variation (Load)     |                     |   |      |      |      |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$   |      |      | 100  | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$  | 53   | 70   |      | dB            |
|                      |                     | $22\text{V} \leq V_{IN} \leq 33\text{V}$  |      |      |      |               |
|                      |                     | $T_j=25^\circ\text{C}$  |      |      |      |               |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$   |      |      | 2.0  | V             |
| Voltage Drop         |                     |   |      |      |      |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                               |      |      | 300  | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$  |      |      | 2.1  | A             |

**[L7820]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |  |           | unit |
|----------------|-----------|--|-----------|------|
| Input Voltage  | $V_{IN}$  |  | 23 to 35  | V    |
| Output Current | $I_{OUT}$ |  | 5 to 1000 | mA   |

**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=29\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                      |                     |   | min  | typ  | max  | unit          |
|----------------------|---------------------|---|------|------|------|---------------|
| Output Voltage       | $V_{OUT}$           | $T_j=25^\circ\text{C}$  | 19.2 | 20.0 | 20.8 | V             |
| Line Regulation      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $23\text{V} \leq V_{IN} \leq 35\text{V}$                   |      | 10.0 | 100  | mV            |
|                      |                     | " $24\text{V} \leq V_{IN} \leq 35\text{V}$  |      | 5.0  | 50   | mV            |
| Load Regulation      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                 |      |      | 400  | mV            |
|                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$                                     |      |      | 200  | mV            |
| Output Voltage       | $V_{OUT}$           | $23\text{V} \leq V_{IN} \leq 35\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$ | 19.0 |      | 21.0 | V             |
| Current Dissipation  | $I_{CC}$            | $T_j=25^\circ\text{C}$  |      |      | 8.0  | mA            |
| Current Dissipation  | $\Delta I_{CCline}$ | $23\text{V} \leq V_{IN} \leq 35\text{V}$  |      |      | 1.0  | mA            |
| Variation (Line)     |                     |   |      |      |      |               |
| Current Dissipation  | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  |      |      | 0.5  | mA            |
| Variation (Load)     |                     |   |      |      |      |               |
| Output Noise Voltage | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$   |      |      | 110  | $\mu\text{V}$ |
| Ripple Rejection     | $R_{rej}$           | $f=120\text{Hz}$  | 53   | 70   |      | dB            |
|                      |                     | $24\text{V} \leq V_{IN} \leq 34\text{V}$  |      |      |      |               |
|                      |                     | $T_j=25^\circ\text{C}$  |      |      |      |               |
| Minimum Input-Output | $V_{drop}$          | $I_{OUT}=1\text{A}$   |      |      | 2.0  | V             |
| Voltage Drop         |                     |   |      |      |      |               |
| Short Current        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                               |      |      | 300  | mA            |
| Peak Output Current  | $I_{op}$            | $T_j=25^\circ\text{C}$  |      |      | 2.1  | A             |

**[L7824]****Recommended Operating Conditions at  $T_a=25^\circ\text{C}$** 

|                |           |  |           | unit |
|----------------|-----------|--|-----------|------|
| Input Voltage  | $V_{IN}$  |  | 27 to 35  | V    |
| Output Current | $I_{OUT}$ |  | 5 to 1000 | mA   |

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**Operating Characteristics at  $T_a=25^\circ\text{C}$ ,  $V_{IN}=33\text{V}$ ,  $I_{OUT}=500\text{mA}$ ,  
See specified Test Circuit.**

|                                      |                     |   | min  | typ  | max  | unit          |
|--------------------------------------|---------------------|---|------|------|------|---------------|
| Output Voltage                       | $V_{OUT}$           | $T_j=25^\circ\text{C}$  | 23.0 | 24.0 | 25.0 | V             |
| Line Regulation                      | $\Delta V_{oline}$  | $T_j=25^\circ\text{C}$ , $27\text{V} \leq V_{IN} \leq 35\text{V}$                   |      | 10.0 | 100  | mV            |
|                                      |                     | " $28\text{V} \leq V_{IN} \leq 35\text{V}$  |      | 5.0  | 50   | mV            |
| Load Regulation                      | $\Delta V_{oload}$  | $T_j=25^\circ\text{C}$ , $5\text{mA} \leq I_{OUT} \leq 1.5\text{A}$                 |      |      | 480  | mV            |
|                                      |                     | " $250\text{mA} \leq I_{OUT} \leq 750\text{mA}$                                     |      |      | 240  | mV            |
| Output Voltage                       | $V_{OUT}$           | $27\text{V} \leq V_{IN} \leq 35\text{V}$ , $5\text{mA} \leq I_{OUT} \leq 1\text{A}$ | 22.8 |      | 25.2 | V             |
| Current Dissipation                  | $I_{CC}$            | $T_j=25^\circ\text{C}$  |      |      | 8.0  | mA            |
| Current Dissipation Variation (Line) | $\Delta I_{CCline}$ | $27\text{V} \leq V_{IN} \leq 35\text{V}$  |      |      | 1.0  | mA            |
| Current Dissipation Variation (Load) | $\Delta I_{CCload}$ | $5\text{mA} \leq I_{OUT} \leq 1\text{A}$  |      |      | 0.5  | mA            |
| Output Noise Voltage                 | $V_{NO}$            | $10\text{Hz} \leq f \leq 100\text{kHz}$   |      | 170  |      | $\mu\text{V}$ |
| Ripple Rejection                     | $R_{rej}$           | $f=120\text{Hz}$  | 50   | 70   |      | dB            |
|                                      |                     | $28\text{V} \leq V_{IN} \leq 35\text{V}$<br>$T_j=25^\circ\text{C}$                  |      |      |      |               |
| Minimum Input-Output Voltage Drop    | $V_{drop}$          | $I_{OUT}=1\text{A}$   |      | 2.0  |      | V             |
| Short Current                        | $I_{OS}$            | $T_j=25^\circ\text{C}$ , $V_{IN}=35\text{V}$ , to GND                               |      | 300  |      | mA            |
| Peak Output Current                  | $I_{op}$            | $T_j=25^\circ\text{C}$  |      | 2.1  |      | A             |

**Test Circuit (Common to L7800 Series)**

