



**150 mA Low Dropout Voltage Regulator**

**FEATURES**

- Output current in excess of 150 mA
- 5V, 3V, 3.3, 3.5, 4.0, 4.5 versions available
- Very low quiescent current
- Input-output differential less than 0.6V
- 60V load dump protection
- -50V reverse transient protection
- Internal thermal overload protection
- Reverse battery protection
- Short circuit protection
- Available in TO-220, TO-92, SO-8, SOT-89 packages
- Similar to industry standard LM2930

**APPLICATIONS**

- Cordless Telephones
- Portable Consumer Equipment
- Portable Instrumentation
- Radio Control Systems

**PRODUCT DESCRIPTION**

The AS2930 is a positive low power voltage regulator. This device is an excellent choice for use in battery-powered applications, such as cordless telephones, radio control systems, and automotive applications. The AS2930 was originally designed for automotive applications, all circuitry is protected from reverse battery installations. During line transients, such as a load dump (+60V) when the input voltage to the regulator exceed its maximum operating voltage, this device will automatically shut down to protect both internal circuits and as well as the load. The AS2930 is offered as a 3.0, 3.3, 3.5, 4.5, 5 volt fixed output in 3-pin SOT-89, TO-92/TO-220 packages compatible with other 5V regulators and TO-220/TO-92.

The AS2930 is also offered in 5 volt SO-8 package. Using ALPHA Semiconductor's design, processing and testing techniques make AS2930 superior over similar products.

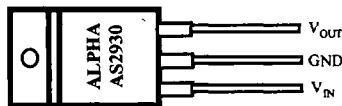
**ORDERING INFORMATION**

| TO-92<br>3-PIN | SO-8       | SOT-89<br>3-PIN | TO-220     | Oper.<br>Temp.<br>Range |
|----------------|------------|-----------------|------------|-------------------------|
| AS2930AN-X     | AS2930AS-X | AS2930AM-X      | AS2930AU-X | IND.                    |
| AS2930N-X      | AS2930S-X  | AS2930M-X       | AS2930U-X  | IND.                    |
|                | AS2930CS-X |                 | AS2930CU-X | IND.                    |

X= OUTPUT VOLTAGE, (FOR OTHER OUTPUT VOLTAGES CONSULT WITH FACTORY)

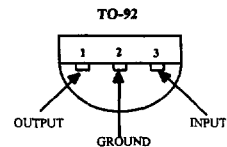
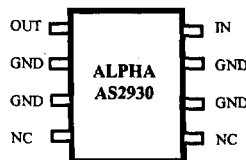
**PIN CONNECTIONS**

**Plastic Package  
TO-220**

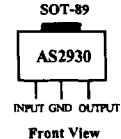


**Front View**

**8-Pin Surface Mount**



**Bottom View**



**Front View**

**ABSOLUTE MAXIMUM RATINGS**

|  |                    |
|--|--------------------|
| Power Dissipation .....                    | Internally Limited |
| Lead Temp. (soldering, 10 Seconds) .....   | 230°C              |
| Storage Temperature Range .....            | -65° to +150°C     |
| Operating Junction Temperature Range ..... | -40° to +85°C      |
| Maximum Junction Temperature .....         | +125°C             |
| ESD Rating .....                           | 2KV                |

|                               |              |
|-------------------------------|--------------|
| Over Voltage Protection ..... | 60V          |
| Reverse Voltage (100mS) ..... | -50V         |
| Reverse Voltage(DC) .....     | -15V         |
| Input Supply Voltage .....    | -0.3 to +26V |

**ELECTRICAL CHARACTERISTICS** at  $V_s=14V$ ,  $T_a=25^\circ C$ ,  $I_o=150mA$ ,  $C_2=100\mu F$ , unless otherwise noted.

| Parameter                                 | Conditions  | AS2930A            |                     |                   | AS2930            |                     |                   | Units         |
|---|---|--------------------|---------------------|-------------------|-------------------|---------------------|-------------------|---------------|
|   |   | Min                | Typ                 | Max               | Min               | Typ                 | Max               |               |
| <b>3.0 Volt Version</b>                   |   | <b>AS2930A-3</b>   |                     |                   | <b>AS2930-3</b>   |                     |                   |               |
| Output Voltage                            | $6V < V_{in} < 26V$ ,<br>$I_o = 150mA$ Over Temp.   | 2.94               | 3.00                | 3.06              | 2.91              | 3.00                | 3.09              | V             |
|   |   | <b>2.88</b>        | 3.00                | <b>3.12</b>       | <b>2.85</b>       | 3.00                | <b>3.15</b>       | V             |
| <b>3.3 Volt Version</b>                   |   | <b>AS2930A-3.3</b> |                     |                   | <b>AS2930-3.3</b> |                     |                   |               |
| Output Voltage                            | $6V < V_{in} < 26V$ ,<br>$I_o = 150mA$ Over Temp.   | 3.23               | 3.30                | 3.36              | 3.20              | 3.30                | 3.39              | V             |
|   |   | <b>3.20</b>        | 3.30                | <b>3.39</b>       | <b>3.16</b>       | 3.30                | <b>3.43</b>       | V             |
| <b>4.0 Volt Version</b>                   |   | <b>AS2930A-4.0</b> |                     |                   | <b>AS2930-4.0</b> |                     |                   |               |
| Output Voltage                            | $6V < V_{in} < 26V$ ,<br>$I_o = 150mA$ Over Temp.   | 3.92               | 4.0                 | 4.08              | 3.90              | 4.0                 | 4.1               | V             |
|   |   | <b>3.90</b>        | 4.0                 | <b>4.1</b>        | <b>3.86</b>       | 4.0                 | <b>4.14</b>       | V             |
| <b>5 Volt Version</b>                     |   | <b>AS2930A-5</b>   |                     |                   | <b>AS2930-5</b>   |                     |                   |               |
| Output Voltage                            | $6V < V_{in} < 26V$ ,<br>$I_o = 150mA$ Over Temp.   | 4.81               | 5.00                | 5.19              | 4.75              | 5.00                | 5.25              | V             |
|   |   | <b>4.75</b>        |                     | <b>5.25</b>       | <b>4.5</b>        |                     | <b>5.5</b>        | V             |
| <b>All Voltage Options</b>                |   |                    |                     |                   |                   |                     |                   |               |
| Long Term Stability                       |   |                    | 20                  |                   |                   | 20                  |                   | mV/1000       |
| Line Regulation                           | $9V < V_{in} < 16V$<br>$6V < V_{in} < 26V$  |                    | 2.0<br>4.0          | 10<br>30          |                   | 4.0                 | 30                | mV            |
| Load Regulation                           | $5mA < I_o < 150mA$   |                    | 14                  | 50                |                   | 14                  | 50                | mV            |
| Dropout Voltage                           | $I_o = 10mA$<br>$I_o = 50mA$<br>$I_o = 150mA$   |                    | 0.05<br>0.07<br>0.3 | 0.2<br>0.1<br>0.6 |                   | 0.05<br>0.07<br>0.3 | 0.2<br>0.1<br>0.6 | V<br>V<br>V   |
| Quiescent Current                         | $I_o < 10mA$ , $6V < V_{in} < 26V$<br>$-40^\circ C < T_j < 125^\circ C$<br>$I_o = 150mA$ , $V_{in} = 14V$ ,<br>$T_j = 25^\circ C$ |                    | 0.4<br>15           | 1.0               |                   | 0.4<br>15           | 1.0               | mA<br>mA      |
| Maximum Operational Input Voltage         |   | 26                 | 33                  |                   | 26                | 33                  |                   | V             |
| Maximum Line Transient                    | $R_L = 500\Omega$ , $V_o < 5.5V$ ,<br>100ms   | 60                 | 70                  |                   | 70                | 50                  |                   | V             |
| Reverse Polarity Input Voltage, DC        | $V_o > -0.3V$ , $R_L = 500\Omega$   | -15                | -30                 |                   | -15               | 30                  |                   | V             |
| Reverse Polarity Input Voltage, Transient | 1% Duty Cycle, $\tau < 100ms$ ,<br>$R_L = 500\Omega$  | -50                | -80                 |                   | -50               | -80                 |                   | V             |
| Current Limit                             |   | 150                | 400                 | 450               | 150               | 400                 | 450               | mA            |
| Output Noise Voltage                      | 10Hz-100kHz, $C_{out} = 100\mu F$   |                    | 500                 |                   |                   | 500                 |                   | $\mu V_{rms}$ |
| Ripple Rejection                          | $f_o = 120Hz$   |                    | 80                  |                   |                   | 80                  |                   | dB            |

TYPICAL CHARACTERISTICS

