

## ABSOLUTE MAXIMUM RATINGS (Note 1)

| Device<br>Output Voltage | Input Voltage | Input Voltage Differential<br>(Output shorted to ground) |
|--------------------------|---------------|----------------------------------------------------------|
| -5V                      | -35V          | 35V                                                      |
| -12V                     | -35V          | 35V                                                      |
| -15V                     | -40V          | 35V                                                      |

Operating Junction Temperature ..... 150°C  
 Hermetic (K, T, IG & L - Packages) ..... 150°C  
 Storage Temperature Range ..... -65°C to 150°C  
 Lead Temperature (Soldering, 10 Seconds) ..... 300°C

Note 1. Values beyond which damage may occur.

## THERMAL DATA

K Package:

Thermal Resistance-Junction to Case,  $\theta_{JC}$  ..... 3.0°C/W  
 Thermal Resistance-Junction to Ambient,  $\theta_{JA}$  ..... 35°C/W

T Package:

Thermal Resistance-Junction to Case,  $\theta_{JC}$  ..... 15°C/W  
 Thermal Resistance-Junction to Ambient,  $\theta_{JA}$  ..... 120°C/W

IG Package:

Thermal Resistance-Junction to Case,  $\theta_{JC}$  ..... 3.5°C/W  
 Thermal Resistance-Junction to Ambient,  $\theta_{JA}$  ..... 42°C/W

L Package:

Thermal Resistance-Junction to Case,  $\theta_{JC}$  ..... 35°C/W  
 Thermal Resistance-Junction to Ambient,  $\theta_{JA}$  ..... 120°C/W

Note A. Junction Temperature Calculation:  $T_J = T_A + (P_D \times \theta_{JA})$ .

Note B. The above numbers for  $\theta_{JC}$  are maximums for the limiting thermal resistance of the package in a standard mounting configuration. The  $\theta_{JA}$  numbers are meant to be guidelines for the thermal performance of the device/pc-board system. All of the above assume no ambient airflow.

## RECOMMENDED OPERATING CONDITIONS (Note 2)

Operating Junction Temperature Range:  
 SG7900A/7900 ..... -55°C to 150°C

Note 2. Range over which the device is functional.

## CHARACTERISTIC CURVES

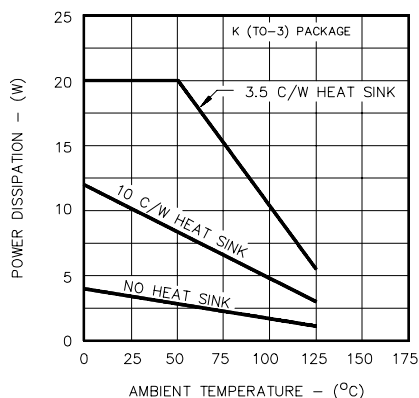


FIGURE 1.  
MAXIMUM AVERAGE POWER DISSIPATION

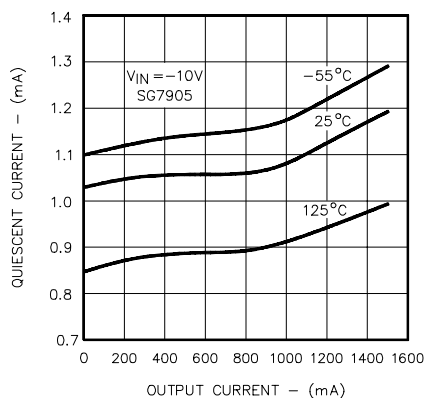


FIGURE 2.  
QUIESCENT CURRENT VS. LOAD

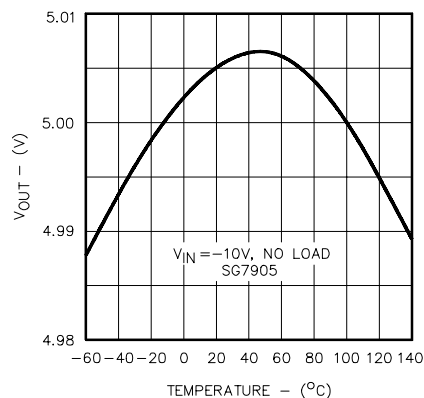


FIGURE 3.  
TEMPERATURE COEFFICIENT

## CHARACTERISTIC CURVES (continued)

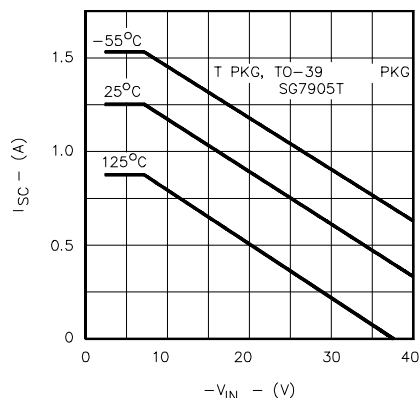


FIGURE 4.  
SHORTCIRCUIT CURRENT VS.  $V_{IN}$

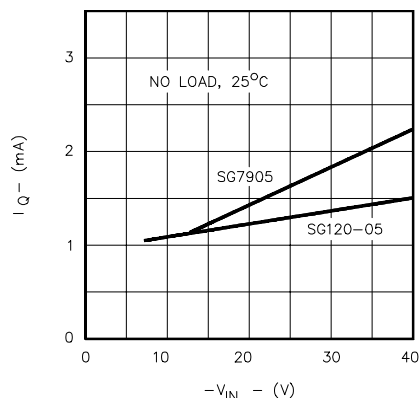


FIGURE 5.  
QUIESCENT CURRENT VS.  $V_{IN}$

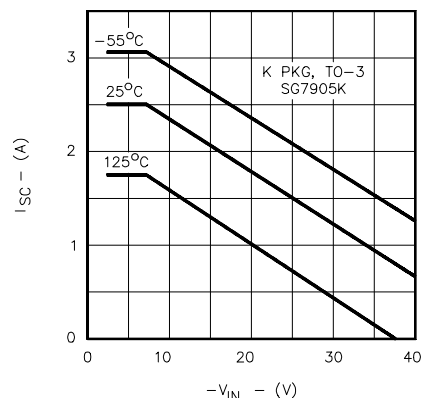


FIGURE 6.  
SHORT CIRCUIT CURRENT VS.  $V_{IN}$

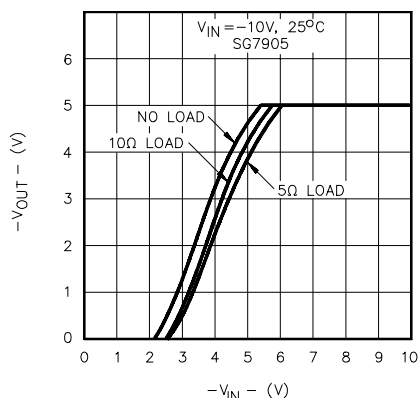


FIGURE 7.  
DROPOUT CHARACTERISTICS

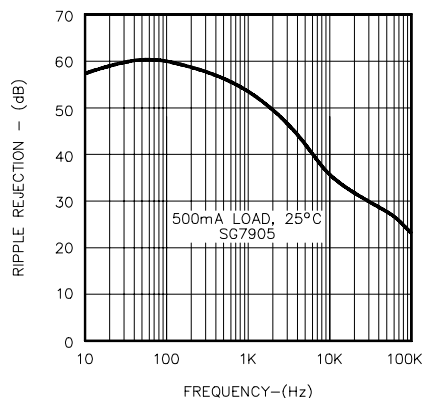


FIGURE 8.  
RIPPLE REJECTION VS. FREQUENCY

## APPLICATIONS

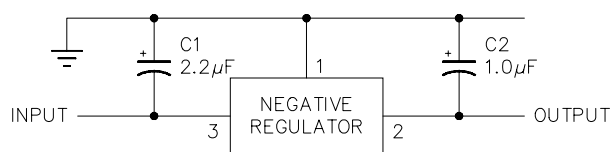


FIGURE 9 - FIXED OUTPUT REGULATOR

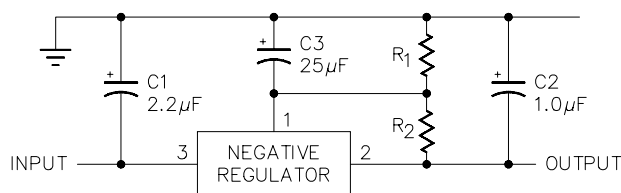


FIGURE 10 - CIRCUIT FOR INCREASING OUTPUT VOLTAGE

- NOTE: 1. C1 is required only if regulator is separated from rectifier filter.  
2. Both C1 and C2 should be low E.S.R. types such as solid tantalum. If aluminum electrolytics are used, at least 10 times values shown should be selected.  
3. If large output capacities are used, the regulators must be protected from momentary input shorts. A high current diode

- NOTE: C3 optional for improved transient response and ripple rejection

$$V_{OUT} = V(\text{REGULATOR}) \frac{R_1 + R_2}{R_1} \quad R_2 = \frac{V(\text{REG})}{15\text{mA}}$$

**ELECTRICAL SPECIFICATIONS** (Note 1)

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG7905A/SG7905 with  $-55^{\circ}\text{C} \leq T_A \leq 150^{\circ}\text{C}$ ,  $V_{\text{IN}} = -10\text{V}$ ,  $I_O = 500\text{mA}$  for the K and IG -Power Packages-,  $I_O = 100\text{mA}$  for the T and L packages,  $C_{\text{IN}} = 2\mu\text{F}$ , and  $C_{\text{OUT}} = 1.0\mu\text{F}$ . Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

**SG7905A/SG7905**

| Parameter                  | Test Conditions                                                                       | SG7905A |       |       | SG7905 |       |       | Units              |
|----------------------------|---------------------------------------------------------------------------------------|---------|-------|-------|--------|-------|-------|--------------------|
|                            |                                                                                       | Min.    | Typ.  | Max.  | Min.   | Typ.  | Max.  |                    |
| Output Voltage             | $T_J = 25^{\circ}\text{C}$                                                            | -4.92   | -5.00 | -5.08 | -4.8   | -5.0  | -5.2  | V                  |
| Line Regulation (Note 1)   | $V_{\text{IN}} = -7.5\text{V to } -25\text{V}$ , $T_J = 25^{\circ}\text{C}$           |         | 5     | 25    |        | 3     | 50    | mV                 |
|                            | $V_{\text{IN}} = -8\text{V to } -12\text{V}$ , $T_J = 25^{\circ}\text{C}$             |         | 3     | 12    |        | 1     | 25    | mV                 |
|                            | Power Pkgs: $I_O = 5\text{mA to } 1.5\text{A}$ , $T_J = 25^{\circ}\text{C}$           |         | 15    | 75    |        | 15    | 100   | mV                 |
| Load Regulation (Note 1)   | $I_O = 250\text{mA to } 750\text{mA}$ , $T_J = 25^{\circ}\text{C}$                    |         | 15    | 25    |        | 15    | 25    | mV                 |
|                            | T - Pkg: $I_O = 5\text{mA to } 500\text{mA}$ , $T_J = 25^{\circ}\text{C}$             |         | 5     | 30    |        | 5     | 100   | mV                 |
|                            |                                                                                       |         |       |       |        |       |       |                    |
| Total Output Voltage       | $V_{\text{IN}} = -8\text{V to } -20\text{V}$                                          |         |       |       |        |       |       |                    |
| Tolerance                  | Power Pkgs: $I_O = 5\text{mA to } 1.0\text{A}$ , $P \leq 20\text{W}$                  | -4.85   | -5.00 | -5.15 | -4.70  | -5.00 | -5.30 | V                  |
|                            | T - Pkg: $I_O = 5\text{mA to } 500\text{mA}$ , $P \leq 2\text{W}$                     | -4.85   | -5.00 | -5.15 | -4.70  | -5.00 | -5.30 | V                  |
| Quiescent Current          | Over Temperature Range                                                                |         |       | 2.5   |        |       | 2.5   | mA                 |
|                            | $T_J = 25^{\circ}\text{C}$                                                            |         |       | 2.0   |        |       | 2.0   | mA                 |
| Quiescent Current Change   | with Line: $V_{\text{IN}} = -8\text{V to } -25\text{V}$                               |         |       | 1.3   |        |       | 1.3   | mA                 |
|                            | with Load: $I_O = 5\text{mA to } 1.0\text{A}$ (Power Packages)                        |         |       | 0.5   |        |       | 0.5   | mA                 |
|                            | $I_O = 5\text{mA to } 500\text{mA}$ (T)                                               |         |       | 0.5   |        |       | 0.5   | mA                 |
| Dropout Voltage            | $\Delta V_O = 100\text{mV}$ , $T_J = 25^{\circ}\text{C}$                              |         |       |       |        |       |       |                    |
|                            | Power Pkgs: $I_O = 1.0\text{A}$ , T - Pkg: $I_O = 500\text{mA}$                       |         | 1.1   | 2.3   |        | 1.1   | 2.3   | V                  |
| Peak Output Current        | Power Pkgs: $T_J = 25^{\circ}\text{C}$                                                | 1.5     |       | 3.3   | 1.5    |       | 3.3   | A                  |
|                            | T - Pkg: $T_J = 25^{\circ}\text{C}$                                                   | 0.5     |       | 1.4   | 0.5    |       | 1.4   | A                  |
| Short Circuit Current      | Power Pkgs: $V_{\text{IN}} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                |         |       | 1.2   |        |       | 1.2   | A                  |
|                            | T - Pkg: $V_{\text{IN}} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                   |         |       | 0.6   |        |       | 0.6   | A                  |
| Ripple Rejection           | $\Delta V_{\text{IN}} = 10\text{V}$ , $f = 120\text{Hz}$ , $T_J = 25^{\circ}\text{C}$ | 54      |       |       | 54     |       |       | dB                 |
| Output Noise Voltage (rms) | $f = 10\text{Hz to } 100\text{KHz}$ (Note 2)                                          |         | 25    | 80    |        | 25    | 80    | $\mu\text{V/V}$    |
| Long Term Stability        | 1000hrs. at $T_J = 125^{\circ}\text{C}$                                               |         | 20    |       |        | 20    |       | mV                 |
| Thermal Shutdown           | $I_O = 5\text{mA}$                                                                    |         | 175   |       |        | 175   |       | $^{\circ}\text{C}$ |

Note 1. All regulation tests are made at constant junction temperature with low duty cycle testing.

2. This test is guaranteed but is not tested in production.

## ELECTRICAL SPECIFICATIONS (Note 1)

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG7912A/SG7912 with  $-55^{\circ}\text{C} \leq T_A \leq 150^{\circ}\text{C}$ ,  $V_{IN} = -19\text{V}$ ,  $I_O = 500\text{mA}$  for the K and IG -Power Packages-,  $I_O = 100\text{mA}$  for the T and L packages,  $C_{IN} = 2\mu\text{F}$ , and  $C_{OUT} = 1.0\mu\text{F}$ . Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

### SG7912A/SG7912

| Parameter                      | Test Conditions                                                                | SG7912A |       |       | SG7912 |       |       | Units              |
|--------------------------------|--------------------------------------------------------------------------------|---------|-------|-------|--------|-------|-------|--------------------|
|                                |                                                                                | Min.    | Typ.  | Max.  | Min.   | Typ.  | Max.  |                    |
| Output Voltage                 | $T_J = 25^{\circ}\text{C}$                                                     | -11.8   | -12.0 | -12.2 | -11.5  | -12.0 | -12.5 | V                  |
| Line Regulation (Note 1)       | $V_{IN} = -14.5\text{V to } -30\text{V}$ , $T_J = 25^{\circ}\text{C}$          |         | 4     | 60    |        | 10    | 120   | mV                 |
|                                | $V_{IN} = -16\text{V to } -22\text{V}$ , $T_J = 25^{\circ}\text{C}$            |         | 3     | 30    |        | 3     | 60    | mV                 |
|                                | Power Pkgs: $I_O = 5\text{mA to } 1.5\text{A}$ , $T_J = 25^{\circ}\text{C}$    |         | 20    | 90    |        | 12    | 120   | mV                 |
| Load Regulation (Note 1)       | $I_O = 250\text{mA to } 750\text{mA}$ , $T_J = 25^{\circ}\text{C}$             |         | 10    | 40    |        | 4     | 60    | mV                 |
|                                | T - Pkg: $I_O = 5\text{mA to } 500\text{mA}$ , $T_J = 25^{\circ}\text{C}$      |         | 10    | 40    |        | 10    | 240   | mV                 |
|                                | $V_{IN} = -14.5\text{V to } -27\text{V}$                                       |         |       |       |        |       |       |                    |
| Total Output Voltage Tolerance | Power Pkgs: $I_O = 5\text{mA to } 1.0\text{A}$ , $P \leq 20\text{W}$           | -11.7   | -12.0 | -12.3 | -11.4  | -12.0 | -12.6 | V                  |
|                                | T - Pkg: $I_O = 5\text{mA to } 500\text{mA}$ , $P \leq 2\text{W}$              | -11.7   | -12.0 | -12.3 | -11.4  | -12.0 | -12.6 | V                  |
| Quiescent Current              | Over Temperature Range                                                         |         |       | 4     |        |       | 4     | mA                 |
|                                | $T_J = 25^{\circ}\text{C}$                                                     |         |       | 3     |        |       | 3     | mA                 |
| Quiescent Current Change       | with Line: $V_{IN} = -14.5\text{V to } -30\text{V}$                            |         |       | 1.0   |        |       | 1.0   | mA                 |
|                                | with Load: $I_O = 5\text{mA to } 1.0\text{A}$ (Power Packages)                 |         |       | 0.5   |        |       | 0.5   | mA                 |
|                                | $I_O = 5\text{mA to } 500\text{mA}$ (T)                                        |         |       | 0.5   |        |       | 0.5   | mA                 |
| Dropout Voltage                | $\Delta V_O = 100\text{mV}$ , $T_J = 25^{\circ}\text{C}$                       |         |       |       |        |       |       |                    |
|                                | Power Pkgs: $I_O = 1.0\text{A}$ , T - Pkg: $I_O = 500\text{mA}$                |         | 1.1   | 2.3   |        | 1.1   | 2.3   | V                  |
| Peak Output Current            | Power Pkgs: $T_J = 25^{\circ}\text{C}$                                         | 1.5     |       | 3.3   | 1.5    |       | 3.3   | A                  |
|                                | T - Pkg: $T_J = 25^{\circ}\text{C}$                                            | 0.5     |       | 1.4   | 0.5    |       | 1.4   | A                  |
| Short Circuit Current          | Power Pkgs: $V_{IN} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                |         |       | 1.2   |        |       | 0.2   | A                  |
|                                | T - Pkg: $V_{IN} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                   |         |       | 0.6   |        |       | 0.6   | A                  |
| Ripple Rejection               | $\Delta V_{IN} = 10\text{V}$ , $f = 120\text{Hz}$ , $T_J = 25^{\circ}\text{C}$ | 54      |       |       | 54     |       |       | dB                 |
| Output Noise Voltage (rms)     | $f = 10\text{Hz to } 100\text{KHz}$ (Note 2)                                   |         | 25    | 80    |        | 25    | 80    | $\mu\text{V/V}$    |
| Long Term Stability            | 1000hrs. at $T_J = 125^{\circ}\text{C}$                                        |         | 60    |       |        | 60    |       | mV                 |
| Thermal Shutdown               | $I_O = 5\text{mA}$                                                             |         | 175   |       |        | 175   |       | $^{\circ}\text{C}$ |

Note 1. All regulation tests are made at constant junction temperature with low duty cycle testing.  
2. This test is guaranteed but is not tested in production.

**ELECTRICAL SPECIFICATIONS** (Note 1)

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG7915A/SG7915 with  $-55^{\circ}\text{C} \leq T_A \leq 150^{\circ}\text{C}$ ,  $V_{\text{IN}} = -23\text{V}$ ,  $I_O = 500\text{mA}$  for the K and IG -Power Packages-,  $I_O = 100\text{mA}$  for the T and L packages,  $C_{\text{IN}} = 2\mu\text{F}$ , and  $C_{\text{OUT}} = 1.0\mu\text{F}$ . Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

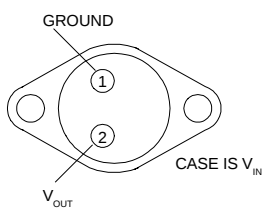
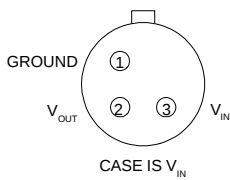
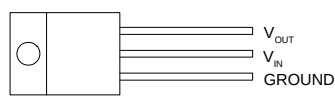
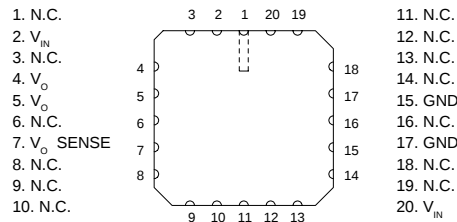
**SG7915A/SG7915**

| Parameter                      | Test Conditions                                                                                                                                                                                 | SG7915A |       |       | SG7915 |        |        | Units              |
|--------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|-------|-------|--------|--------|--------|--------------------|
|                                |                                                                                                                                                                                                 | Min.    | Typ.  | Max.  | Min.   | Typ.   | Max.   |                    |
| Output Voltage                 | $T_J = 25^{\circ}\text{C}$                                                                                                                                                                      | -14.8   | -15.0 | -15.2 | -14.4  | -15.0  | -15.6  | V                  |
| Line Regulation (Note 1)       | $V_{\text{IN}} = -17.5\text{V}$ to $-30\text{V}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                   |         | 5     | 75    |        | 11     | 150    | mV                 |
|                                | $V_{\text{IN}} = -20\text{V}$ to $-25\text{V}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                     |         | 3     | 40    |        | 3      | 75     | mV                 |
| Load Regulation (Note 1)       | Power Pkgs: $I_O = 5\text{mA}$ to $1.5\text{A}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                    |         | 30    | 100   |        | 12     | 150    | mV                 |
|                                | $I_O = 250\text{mA}$ to $750\text{mA}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                             |         | 4     | 50    |        | 4      | 75     | mV                 |
|                                | T - Pkg: $I_O = 5\text{mA}$ to $500\text{mA}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                      |         | 10    | 50    |        | 10     | 240    | mV                 |
| Total Output Voltage Tolerance | $V_{\text{IN}} = -18.5\text{V}$ to $-30\text{V}$<br>Power Pkgs: $I_O = 5\text{mA}$ to $1.0\text{A}$ , $P \leq 20\text{W}$<br>T - Pkg: $I_O = 5\text{mA}$ to $500\text{mA}$ , $P \leq 2\text{W}$ | -14.6   | -15.0 | -15.4 | -14.25 | -15.00 | -15.75 | V                  |
| Quiescent Current              | Over Temperature Range                                                                                                                                                                          |         |       | 4     |        |        | 4      | mA                 |
|                                | $T_J = 25^{\circ}\text{C}$                                                                                                                                                                      |         |       | 3     |        |        | 3      | mA                 |
| Quiescent Current Change       | with Line: $V_{\text{IN}} = -18.5\text{V}$ to $-30\text{V}$                                                                                                                                     |         |       | 1.0   |        |        | 1.0    | mA                 |
|                                | with Load: $I_O = 5\text{mA}$ to $1.0\text{A}$ (Power Packages)                                                                                                                                 |         |       | 0.5   |        |        | 0.5    | mA                 |
|                                | $I_O = 5\text{mA}$ to $500\text{mA}$ (T)                                                                                                                                                        |         |       | 0.5   |        |        | 0.5    | mA                 |
| Dropout Voltage                | $\Delta V_O = 100\text{mV}$ , $T_J = 25^{\circ}\text{C}$<br>Power Pkgs: $I_O = 1.0\text{A}$ , T - Pkg: $I_O = 500\text{mA}$                                                                     |         | 1.1   | 2.3   |        | 1.1    | 2.3    | V                  |
| Peak Output Current            | Power Pkgs: $T_J = 25^{\circ}\text{C}$                                                                                                                                                          | 1.5     |       | 3.3   | 1.5    |        | 3.3    | A                  |
|                                | T - Pkg: $T_J = 25^{\circ}\text{C}$                                                                                                                                                             | 0.5     |       | 1.4   | 0.5    |        | 1.4    | A                  |
| Short Circuit Current          | Power Pkgs: $V_{\text{IN}} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                          |         |       | 1.2   |        |        | 1.2    | A                  |
|                                | T - Pkg: $V_{\text{IN}} = -35\text{V}$ , $T_J = 25^{\circ}\text{C}$                                                                                                                             |         |       | 0.6   |        |        | 0.6    | A                  |
| Ripple Rejection               | $\Delta V_{\text{IN}} = 10\text{V}$ , $f = 120\text{Hz}$ , $T_J = 25^{\circ}\text{C}$                                                                                                           | 54      |       |       | 54     |        |        | dB                 |
| Output Noise Voltage (rms)     | $f = 10\text{Hz}$ to $100\text{KHz}$ (Note 2)                                                                                                                                                   |         | 25    | 80    |        | 25     | 80     | $\mu\text{V/V}$    |
| Long Term Stability            | 1000hrs. at $T_J = 125^{\circ}\text{C}$                                                                                                                                                         |         | 60    |       |        | 60     |        | mV                 |
| Thermal Shutdown               | $I_O = 5\text{mA}$                                                                                                                                                                              |         | 175   |       |        | 175    |        | $^{\circ}\text{C}$ |

Note 1. All regulation tests are made at constant junction temperature with low duty cycle testing.

2. This test is guaranteed but is not tested in production.

## CONNECTION DIAGRAMS & ORDERING INFORMATION (See Notes Below)

| Package                                         | Part No.                                                                                                                                               | Ambient Temperature Range                                                                                                                                                                        | Connection Diagram                                                                                        |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| 3-TERMINAL TO-3 METAL CAN K-PACKAGE             | SG79XXAK/883B<br>SG7905AK/DESC<br>SG7912AK/DESC<br>SG7915AK/DESC<br>SG79XXAK<br>SG79XXK/883B<br>JAN7905K<br>JAN7912K<br>JAN7915K<br>SG79XXK<br>SG79XXK | -55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>0°C to 125°C |                        |
| 3-PIN TO-39 METAL CAN T-PACKAGE                 | SG79XXAT/883B<br>SG7905AT/DESC<br>SG7912AT/DESC<br>SG7915AT/DESC<br>SG79XXAT<br>SG79XXT/883B<br>JAN7905T<br>JAN7912T<br>JAN7915T<br>SG79XXT            | -55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C                 |                        |
| 3-PIN HERMETIC TO-257 IG-PACKAGE (Isolated)     | SG79XXAIG/883B<br>SG7905AIG/DESC<br>SG7912AIG/DESC<br>SG7915AIG/DESC<br>SG79XXAIG<br>SG79XXIG/883B<br>SG79XXIG                                         | -55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C                                                                       |                      |
| 20-PIN CERAMIC LEADLESS CHIP CARRIER L- PACKAGE | SG79XXL/883B<br>SG79XXL<br>SG7905AL/DESC<br>SG7912AL/DESC<br>SG7915AL/DESC                                                                             | -55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C<br>-55°C to 125°C                                                                                                           | (See Notes 5 & 6)<br> |

- Note 1. Contact factory for JAN and DESC product availability.  
 2. All parts are viewed from the top.  
 3. "XX" to be replaced by output voltage of specific fixed regulator.  
 4. Some products will be available in hermetic flat pack (F). Consult factory for price and availability.  
 5. Both inputs and outputs must be externally connected together at the device terminals.  
 6. For normal operation, the  $V_O$  SENSE pin must be externally connected to the load.