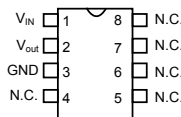
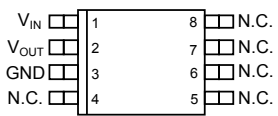
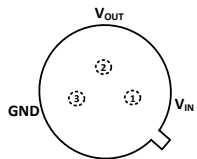


## Connection Diagrams and Ordering Information

| Ambient Temperature                                                                                                                                                             | Type | Package                                                | Part Number  | Packaging Type | Connection Diagram                                                                  |                                                                                      |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------|--------------|----------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| -55°C to 125°C                                                                                                                                                                  | Y    | 8-PIN ceramic DIP                                      | SG1503Y-883B | CERDIP         |  |                                                                                      |
| -25°C to 85°C                                                                                                                                                                   |      |                                                        | SG1503Y-DESC |                |                                                                                     |                                                                                      |
| 0°C to 70°C                                                                                                                                                                     |      |                                                        | SG1503Y      |                |                                                                                     |                                                                                      |
|                                                                                                                                                                                 |      |                                                        | SG2503Y      |                |                                                                                     |                                                                                      |
|                                                                                                                                                                                 |      |                                                        | SG3503Y      |                |                                                                                     |                                                                                      |
| -25°C to 85°C                                                                                                                                                                   | M    | 8-PIN plastic DIP Pb-free / RoHS Transition DC: 0503*  | SG2503M      | PDIP           |                                                                                     | Y Package: PbSn Lead Finish<br>M Package: Pb-free / RoHS 100% Matte Tin Lead Finish  |
| 0°C to 70°C                                                                                                                                                                     |      |                                                        | SG3503M      |                |                                                                                     |                                                                                      |
| -25°C to 85°C                                                                                                                                                                   | DM   | 8-PIN plastic SOIC Pb-free / RoHS Transition DC: 0440* | SG2503DM     | SOIC           |                                                                                     |   |
| 0°C to 70°C                                                                                                                                                                     |      |                                                        | SG3503DM     |                |                                                                                     |                                                                                      |
| -55°C to 125°C                                                                                                                                                                  | T    | 3-PIN METAL CAN                                        | SG1503T-883B | TO-39          |                                                                                     |  |
| -25°C to 85°C                                                                                                                                                                   |      |                                                        | SG1503T-DESC |                |                                                                                     |                                                                                      |
| 0°C to 70°C                                                                                                                                                                     |      |                                                        | SG1503T      |                |                                                                                     |                                                                                      |
|                                                                                                                                                                                 |      |                                                        | SG2503T      |                |                                                                                     |                                                                                      |
|                                                                                                                                                                                 |      |                                                        | SG3503T      |                | T Package: PbSn Lead Finish                                                         |                                                                                      |
| <div>Notes:</div> <div><div>1. Contact factory for JAN and DESC product availability.</div><div>2. All packages are viewed from the top.</div></div> <div>*RoHS compliant</div> |      |                                                        |              |                |                                                                                     |                                                                                      |

## Absolute Maximum Ratings

| Parameter                                                              | Value        | Units |
|------------------------------------------------------------------------|--------------|-------|
| Input Voltage                                                          | 40           | V     |
| Storage Temperature Range                                              | -65 to 150   | °C    |
| <b>Operating Junction Temperature</b>                                  |              |       |
| Hermetic (T, Y Packages)                                               | 150          | °C    |
| Plastic (M, DM Packages)                                               | 150          | °C    |
| Lead Temperature (Soldering, 10 seconds)                               | 300          | °C    |
| Pb-free / RoHS Peak Solder Reflow Temp (40s max. exp.)                 | 260 (+0, -5) | °C    |
| <i>Note: Exceeding these ratings could cause damage to the device.</i> |              |       |

## Thermal Data

| Parameter                                                                                                                                                                                                                                                                                                                                                                                                  | Value | Units |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|-------|
| <b>T Package</b>                                                                                                                                                                                                                                                                                                                                                                                           |       |       |
| Thermal Resistance-Junction to Case, $\theta_{JC}$                                                                                                                                                                                                                                                                                                                                                         | 15    | °C/W  |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$                                                                                                                                                                                                                                                                                                                                                      | 120   | °C/W  |
| <b>Y Package</b>                                                                                                                                                                                                                                                                                                                                                                                           |       |       |
| Thermal Resistance-Junction to Case, $\theta_{JC}$                                                                                                                                                                                                                                                                                                                                                         | 50    | °C/W  |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$                                                                                                                                                                                                                                                                                                                                                      | 130   | °C/W  |
| <b>M Package</b>                                                                                                                                                                                                                                                                                                                                                                                           |       |       |
| Thermal Resistance-Junction to Case, $\theta_{JC}$                                                                                                                                                                                                                                                                                                                                                         | 60    | °C/W  |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$                                                                                                                                                                                                                                                                                                                                                      | 95    | °C/W  |
| <b>DM Package</b>                                                                                                                                                                                                                                                                                                                                                                                          |       |       |
| Thermal Resistance-Junction to Case, $\theta_{JC}$                                                                                                                                                                                                                                                                                                                                                         | 55    | °C/W  |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$                                                                                                                                                                                                                                                                                                                                                      | 165   | °C/W  |
| <i>Notes:</i><br>1. Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$ .<br>2. 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

| Parameter                                               | Value      | Units |
|---------------------------------------------------------|------------|-------|
| Input Voltage                                           | 4.5 to 40  | V     |
| <b>Operating Ambient Temperature Range</b>              |            |       |
| SG1503                                                  | -55 to 125 | °C    |
| SG2503                                                  | -25 to 85  | °C    |
| SG3503                                                  | 0 to 70    | °C    |
| <i>Note: Range over which the device is functional.</i> |            |       |

## Electrical Characteristics

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG1503 with  $-55^{\circ}\text{C} \leq T_A \leq 125^{\circ}\text{C}$ , SG2503/SG3503 with  $0^{\circ}\text{C} \leq T_A \leq 70^{\circ}\text{C}$ ,  $V_{IN} = 15\text{V}$ , and  $I_L = 0\text{mA}$ . Low duty cycle pulse testing techniques are used that maintains junction and case temperatures equal to the ambient temperature.)

| Parameter              | Test Conditions                                      | SG1503/2503 |       |       | SG3503 |       |       | Units             |
|------------------------|------------------------------------------------------|-------------|-------|-------|--------|-------|-------|-------------------|
|                        |                                                      | Min         | Typ   | Max   | Min    | Typ   | Max   |                   |
| Output Voltage         | $T_A = 25^{\circ}\text{C}$                           | 2.485       | 2.500 | 2.515 | 2.475  | 2.500 | 2.525 | V                 |
| Input Voltage          |                                                      | 4.7         |       | 40    | 4.7    |       | 40    | V                 |
|                        | $T_A = 25^{\circ}\text{C}$                           | 4.5         |       | 40    | 4.5    |       | 40    | V                 |
| Line Regulation        | $V_{IN} = 5\text{V TO } 15\text{V}$                  |             | 1     | 3     |        | 1     | 3     | mV                |
|                        | $V_{IN} = 15\text{V TO } 40\text{V}$                 |             | 3     | 5     |        | 3     | 10    | mV                |
| Load Regulation        | $\Delta I_L = 10\text{mA}$                           |             | 3     | 5     |        | 3     | 10    | mV                |
|                        | $\Delta I_L = 10\text{mA}, V_{IN} = 30\text{V}$      |             | 4     | 8     |        | 4     | 15    | mV                |
| Temperature Regulation | (SG1503 only)                                        |             | 15    | 20    |        |       |       | mV                |
|                        | (SG2503/SG3503 only)                                 |             | 2.5   | 5     |        | 5     | 10    | mV                |
| Quiescent Current      | $V_{IN} = 40\text{V}$                                |             | 1.5   | 2.0   |        | 1.5   | 2.0   | mA                |
| Short Circuit Current  | $T_A = 25^{\circ}\text{C}$                           | 15          | 20    | 30    | 15     | 20    | 30    | mA                |
| Ripple Rejection       | $f = 120\text{Hz}, T_A = 25^{\circ}\text{C}$         |             | 76    |       |        | 76    |       | dB                |
| Output Noise           | $\text{BW} = 10\text{kHz}, T_A = 25^{\circ}\text{C}$ |             | 100   |       |        | 100   |       | $\mu\text{V rms}$ |
| Voltage Stability      |                                                      |             | 250   |       |        | 250   |       | $\mu\text{V/khr}$ |

## Characteristics Curves

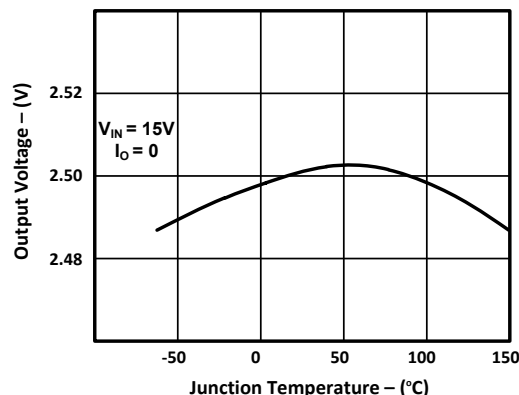


Figure 2 · Output Voltage versus Temperature

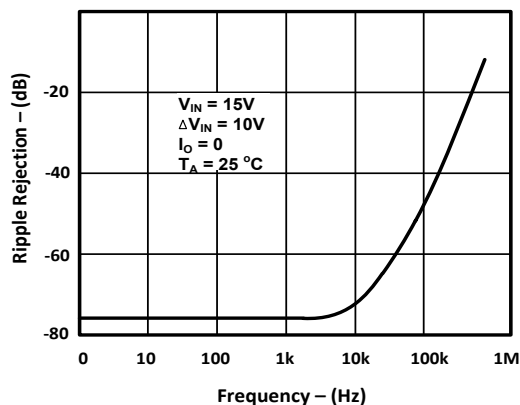
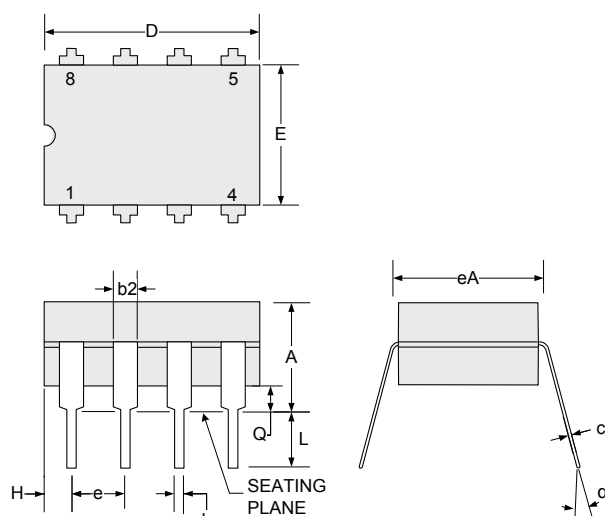


Figure 3. Ripple Rejection

## Package Outline Dimensions

Controlling dimensions are in inches; metric equivalents are shown for general information.

### Y 8-Pin Cerdip Package Dimensions



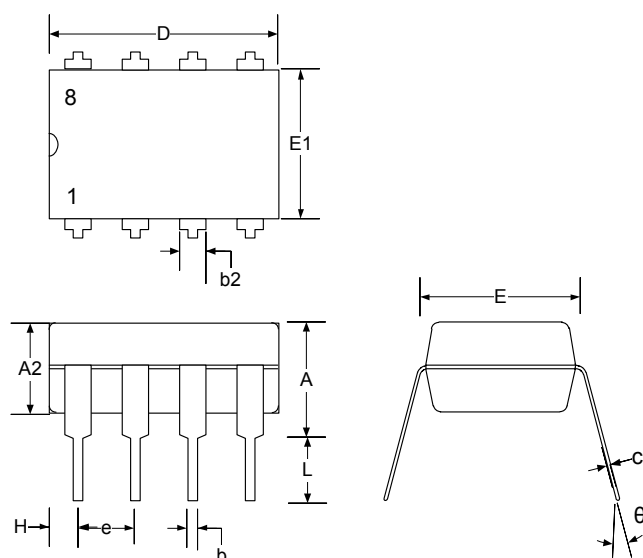
| Dim      | MILLIMETERS |       | INCHES    |       |
|----------|-------------|-------|-----------|-------|
|          | MIN         | MAX   | MIN       | MAX   |
| A        | 4.32        | 5.08  | 0.170     | 0.200 |
| b        | 0.38        | 0.51  | 0.015     | 0.020 |
| b2       | 1.04        | 1.65  | 0.045     | 0.065 |
| c        | 0.20        | 0.38  | 0.008     | 0.015 |
| D        | 9.52        | 10.29 | 0.375     | 0.405 |
| E        | 5.59        | 7.11  | 0.220     | 0.280 |
| e        | 2.54 BSC    |       | 0.100 BSC |       |
| eA       | 7.37        | 7.87  | 0.290     | 0.310 |
| H        | 0.63        | 1.78  | 0.025     | 0.070 |
| L        | 3.18        | 4.06  | 0.125     | 0.160 |
| $\alpha$ | -           | 15°   | -         | 15°   |
| Q        | 0.51        | 1.02  | 0.020     | 0.040 |

**Note:**

Dimensions do not include protrusions; these shall not exceed 0.155mm (.006") on any side. Lead dimension shall not include solder coverage.

Figure 4 · Y 8-Pin Cerdip Package Dimensions

### M 8-Pin PDIP Package Dimensions



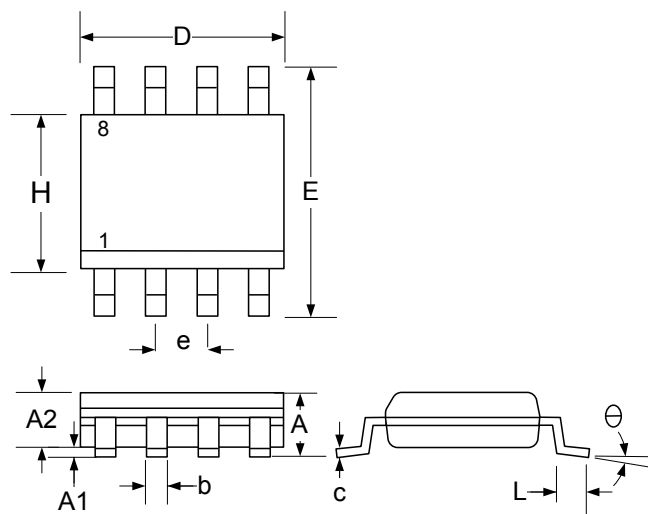
| Dim      | MILLIMETERS |       | INCHES    |       |
|----------|-------------|-------|-----------|-------|
|          | MIN         | MAX   | MIN       | MAX   |
| A        | -           | 5.08  | -         | 0.200 |
| A2       | 3.30 Typ.   |       | 1.30 Typ. |       |
| b        | 0.38        | 0.51  | 0.145     | 0.020 |
| b2       | 0.76        | 1.65  | 0.030     | 0.065 |
| c        | 0.20        | 0.38  | 0.008     | 0.015 |
| D        | -           | 10.16 | -         | 0.400 |
| E        | 7.62 BSC    |       | 0.300 BSC |       |
| e        | 2.54 BSC    |       | 0.100 BSC |       |
| E1       | 6.10        | 6.86  | 0.240     | 0.270 |
| L        | 3.05        | -     | 0.120     | -     |
| $\theta$ | 0°          | 15°   | 0°        | 15°   |

**Note:**

Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm (.006") on any side. Lead dimension shall not include solder coverage.

Figure 5 · M 8-Pin PDIP Package Dimensions

## DM 8-Pin SOIC Package Dimensions



| Dim | MILLIMETERS |      | INCHES    |       |
|-----|-------------|------|-----------|-------|
|     | MIN         | MAX  | MIN       | MAX   |
| A   | 1.35        | 1.75 | 0.053     | 0.069 |
| A1  | 0.10        | 0.25 | 0.004     | 0.010 |
| A2  | 1.25        | 1.52 | 0.049     | 0.060 |
| b   | 0.33        | 0.51 | 0.013     | 0.020 |
| c   | 0.19        | 0.25 | 0.007     | 0.010 |
| D   | 4.83        | 5.21 | 0.189     | 0.205 |
| E   | 5.79        | 6.20 | 0.228     | 0.244 |
| e   | 1.27 BSC    |      | 0.050 BSC |       |
| H   | 3.81        | 4.01 | 0.150     | 0.158 |
| L   | 0.40        | 1.27 | 0.016     | 0.050 |
| θ   | 0°          | 8°   | 0°        | 8°    |
| *LC | -           | .010 | -         | 0.004 |

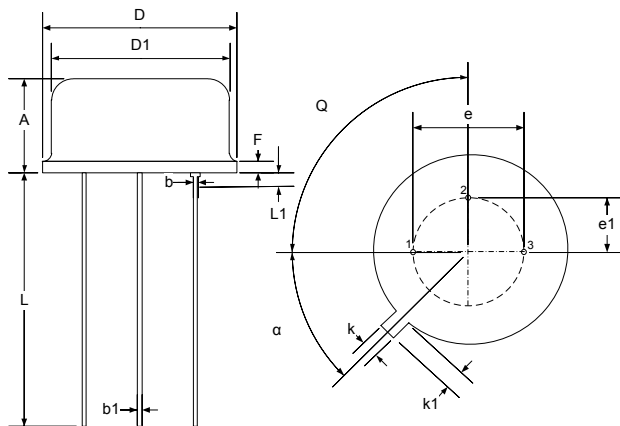
\*Lead Co-planarity

### Note:

Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm (.006") on any side. Lead dimension shall not include solder coverage.

Figure 6 • DM 8-Pin SOIC Package Dimensions

## T 3-Pin Metal Can TO-39



| Dim | MILLIMETERS |       | INCHES    |       |
|-----|-------------|-------|-----------|-------|
|     | MIN         | MAX   | MIN       | MAX   |
| A   | 4.19        | 4.70  | 0.165     | 0.185 |
| b   | 0.41        | 0.48  | 0.016     | 0.019 |
| b1  | 0.41        | 0.53  | 0.016     | 0.021 |
| D   | 8.89        | 9.40  | 0.350     | 0.370 |
| D1  | 8.13        | 8.51  | 0.320     | 0.335 |
| e   | 5.08 BSC    |       | 0.200 BSC |       |
| e1  | 2.54 TYP    |       | 0.100 TYP |       |
| F   | -           | 1.02  | -         | 0.040 |
| k   | 0.71        | 0.86  | 0.028     | 0.034 |
| k1  | 0.74        | 1.14  | 0.029     | 0.045 |
| L   | 12.70       | 14.48 | 0.500     | 0.570 |
| L1  | -           | 1.27  | -         | 0.050 |
| Q   | 90° TYP     |       | 90° TYP   |       |
| α   | 45° TYP     |       | 45° TYP   |       |

### Note:

Dimensions do not include mold flash or protrusions; these shall not exceed 0.155mm (.006") on any side. Lead dimension shall not include solder coverage.

Figure 7 • T 3-Pin Metal Can TO-39



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