# THE DATASHEET OF

# SG2821J-883B

# High Voltage Medium Current Driver Arrays

## Description

The SG2800 series integrates eight NPN Darlington pairs with internal suppression diodes to drive lamps, relays, and solenoids in many military, aerospace, and industrial applications that require severe environments.

All units feature open collector outputs with greater than 50V breakdown voltages combined with 500mA current carrying capabilities.

Five different input configurations provide optimized designs for interfacing with DTL, TTL, PMOS, or CMOS drive signals.

These Darlington array are designed to operate from -55°C to 125°C ambient temperature in a 18-pin dual in-line ceramic (J) package and 20-pin leadless chip carrier (LCC).

In addition a plastic version is available in 18 lead SOWB (DW) package with a reduced temperature range of 0°C to 70°C.

## Features

- Eight NPN Darlington Pairs
- Collector Currents to 600mA
- Output Voltages from 50V to 95V
- Internal Clamping Diodes for Inductive loads
- DTL, TTL, PMOS, or CMOS Compatible inputs

## High Reliability Features

- Available To MIL-STD-883 – 883, ¶ 1.2.1
- Available to DSCC
  - Standard Microcircuit Drawing (SMD)
- MIL-M38510/14106BVA - SG2801J-JAN
- MIL-M38510/14107BVA - SG2802J-JAN
- MIL-M38510/14108BVA - SG2803J-JAN
- MIL-M38510/14109BVA - SG2804J-JAN
- MSC-AMS Level "S" Processing Available

## Schematics (each Darlington pair)

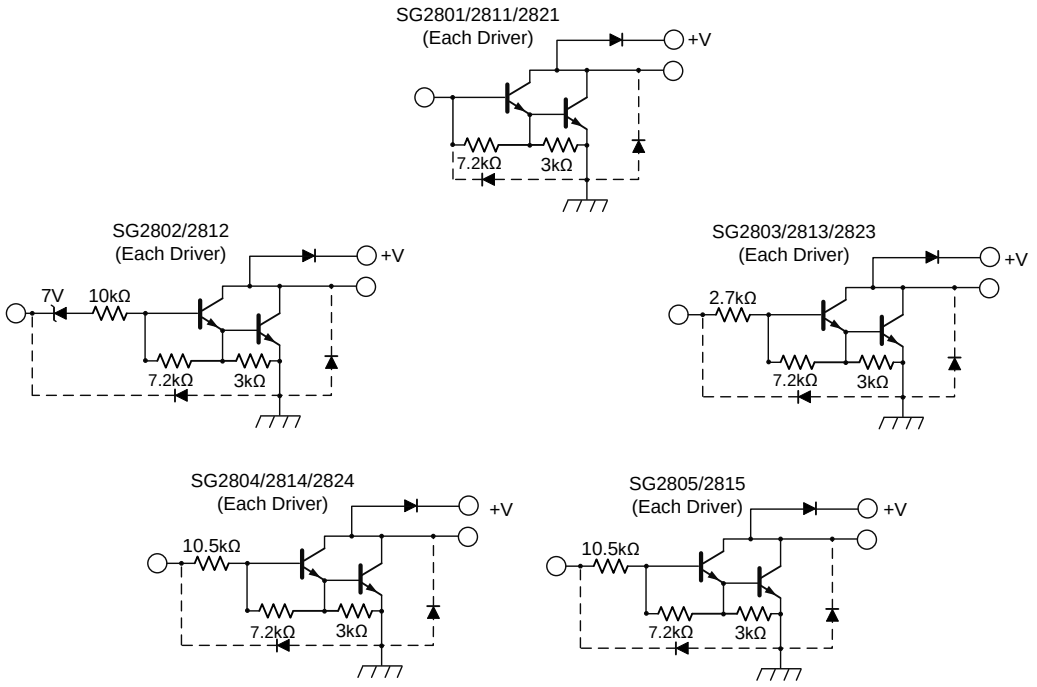
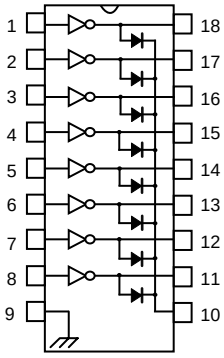
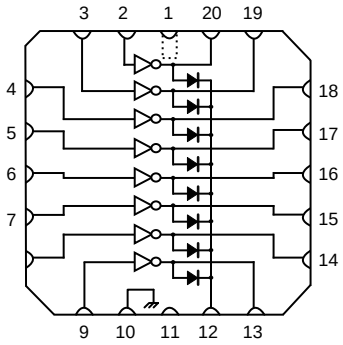



**Figure 1** · Schematics (showing each Darlington pair)

# Connection Diagrams and Ordering Information

| Ambient Temperature | Type | Package | Part Number | Packaging Type | Connection Diagram |
|---|---|---|---|---|---|
| -55°C to 125°C | J | 18-Pin Ceramic DIP Package | SG28XXJ-883B<br>SG2801J-JAN<br>SG2802J-JAN<br>SG2803J-JAN<br>SG2804J-JAN<br>SG2803J-DESC<br>SG2821J-DESC<br>SG2823J-DESC<br>SG2824J-DESC<br>SG28XXJ | CERDIP |  |
| 0°C to 70°C | DW | 18-Pin Plastic SOIC Package | SG2803DW | SOWB | DW Package: RoHS Compliant / Pb-free Transition DC: 0516<br>Pinout same as J package<br>DW Package: RoHS / Pb-free 100% Matte Tin Lead Finish |
| -55°C to 125°C | L | 20-Pin Ceramic Leadless Chip Carrier | SG28XXL-883B<br>SG2803L-DESC<br>SG2821L-DESC<br>SG2823L-DESC<br>SG2824L-DESC<br>SG28XXL | CLCC |  |

Note:

1. Contact factory for JAN and DESC product availability.
2. All parts are viewed from the top.
3. See Selection Guide for specific device types.
4. Hermetic Packages J, L use Pb37/Sn63 hot solder lead finish, contact factory for availability of RoHS versions.

# Absolute Maximum Ratings[1]

| Parameter | Value | Units |
|---|---|---|
| Output Voltage, $V_{CE}$ (SG2800, 2810 series) | 50 | V |
| (SG2820 series) | 95 | V |
| Input Voltage, $V_{IN}$ (SG2802,3,4 series) | 30 | V |
| Continuous Input Current, $I_{IN}$ | 25 | mA |
| Continuous Collector Current, IC (SG2800, 2820) | 500 | mA |
| (SG2810) | 600 | mA |
| **Operating Junction Temperature** | | |
| Plastic (DW Package) | 150 | °C |
| Hermetic (J, L Packages) | 150 | °C |
| Storage Temperature Range | -65 to 150 | °C |
| Lead Temperature (Soldering 10 sec.) | 300 | °C |
| RoHS Peak Package Solder Reflow Temperature (40 sec. max. exp.) | 260 (+0, -5) | °C |

Note: 1. Exceeding these ratings could cause damage to the device. All voltages are with respect to ground. Currents are positive into, negative out of specified terminal.

# Thermal Data

| Parameter | Value | Units |
|---|---|---|
| **J Package** | | |
| Thermal Resistance-Junction to Case, $\theta_{JC}$ | 25 | °C/W |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$ | 70 | °C/W |
| **L Package** | | |
| Thermal Resistance-Junction to Case, $\theta_{JC}$ | 35 | °C/W |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$ | 120 | °C/W |
| **DW Package** | | |
| Thermal Resistance-Junction to Ambient, $\theta_{JA}$ | 90 | °C/W |

Note:

1. Junction Temperature Calculation: $T_J = T_A + (P_D \times \theta_{JA})$.
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/pcboard system. All of the above assume no ambient airflow.

# Recommended Operating Conditions[1]

| Symbol | Parameter | Recommended Operating Conditions | | | Units |
|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | |
| $V_{CE}$ | Output Voltage | | | | |
| | SG2800, SG2820 series | | | 50 | V |
| | SG2810 series | | | 95 | V |
| $I_C$ | Peak Collector Current, $I_C$ | | | | |
| | SG2800, SG2820 series | | | 350 | mA |
| | SG2810 series | | | 500 | mA |
| Operating Ambient Temperature Range: | | | | | |
| | J, L Packages | -55 | | 125 | °C |
| | DW Packages | 0 | | 70 | °C |

Note: 1. Range over which the device is functional.

# Selection Guide

| Device | $V_{CE}$ Max | $I_C$ Max | Logic Inputs |
|---|---|---|---|
| SG2801 | 50V | 500mA | General Purpose PMOS, CMOS |
| SG2802 | | | 14V-25V PMOS |
| SG2803 | | | 5V TTL, CMOS |
| SG2804 | | | 6V-15V CMOS, PMOS |
| SG2811 | | 600mA | General Purpose PMOS, CMOS |
| SG2812 | | | 14V-25V PMOS |
| SG2813 | | | 5V TTL, CMOS |
| SG2814 | | | 6V-15V CMOS, PMOS |
| SG2815 | | | High Output TTL |
| SG2821 | 95V | 500mA | General Purpose PMOS, CMOS |
| SG2823 | | | 5V TTL, CMOS |
| SG2824 | | | 6V-15V CMOS, PMOS |

# Electrical Characteristics

(Unless otherwise specified, these specifications apply over the operating ambient temperatures of -55°C ≤ $T_A$ ≤ 125°C, for the J & L devices and 0°C ≤ $T_A$ ≤ 70°C, for the DW device. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

**Table 1 · SG2801 thru SG2804**

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $I_{CEX}$ | Output Leakage Current (Figure 2a) | All | | $V_{CE}$ = 50V | | | 100 | µA |
| | Output Leakage Current (Figure 2b) | SG2802 | | $V_{CE}$ = 50V, $V_{IN}$ = 6V | | | 500 | µA |
| | | SG2804 | | $V_{CE}$ = 50V, $V_{IN}$ = 1V | | | 500 | µA |
| $V_{CE(SAT)}$ | Collector – Emitter ($V_{CE(SAT)}$) (Figure 3) | All | $T_A = T_{MIN}$ | $I_C$ = 350mA, $I_B$ = 850µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 200mA, $I_B$ = 550µA | | 1.3 | 1.5 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 100mA, $I_B$ = 350µA | | 1.1 | 1.3 | V |
| | | | $T_A$ = 25°C | $I_C$ = 350mA, $I_B$ = 500µA | | 1.25 | 1.6 | V |
| | | | $T_A$ = 25°C | $I_C$ = 200mA, $I_B$ = 350µA | | 1.1 | 1.3 | V |
| | | | $T_A$ = 25°C | $I_C$ = 100mA, $I_B$ = 250µA | | 0.9 | 1.1 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 350mA, $I_B$ = 500µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 200mA, $I_B$ = 350µA | | 1.3 | 1.5 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 100mA, $I_B$ = 250µA | | 1.1 | 1.3 | V |
| $I_{IN(ON)}$ | Input Current (Figure 4) | SG2802 | | $V_{IN}$ = 17V | 480 | 850 | 1300 | µA |
| | | SG2803 | | $V_{IN}$ = 3.85V | 650 | 930 | 1350 | µA |
| | | SG2804 | | $V_{IN}$ = 5V | 240 | 350 | 500 | µA |
| | | | | $V_{IN}$ = 12V | 650 | 1000 | 1450 | µA |
| $I_{IN(OFF)}$ | Input Current (Figure 5) | All | $T_A = T_{MAX}$ | $I_C$ = 500µA | 25 | 50 | | µA |
| $V_{IN(ON)}$ | Input Voltage (Figure 6) | SG2802 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 18 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 13 | V |
| | | SG2803 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 3.3 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 3.6 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.9 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 2.4 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 2.7 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.0 | V |
| | | SG2804 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 125mA | | | 6.0 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 8.0 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 10 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 12 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 125mA | | | 5.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 6.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 7.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 8.0 | V |

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $h_{FE}$ | D-C Forward Current Transfer Ratio (Figure 3) | SG2801 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | 500 | | | |
| | | | $T_A$ = 25°C | $V_{CE}$ = 2V, $I_C$ = 350mA | 1000 | | | |
| $C_{IN}$ | Input Capacitance[1] | All | $T_A$ = 25°C | | | 15 | 25 | pF |
| TPLH | Turn-On Delay | | $T_A$ = 25°C | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| TPHL | Turn-Off Delay | | $T_A$ = 25°C | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| $I_R$ | Clamp Diode Leakage Current (Figure 7) | | | $V_R$ = 50V | | | 50 | µA |
| $V_F$ | Clamp Diode Forward Voltage (Figure 8) | | | $I_F$ = 350mA | | 1.7 | 2.0 | V |
| Note: [1]This parameter, although guaranteed, are not tested in production. | | | | | | | | |

**Table 2 · SG2811 thru SG2815**

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $I_{CEX}$ | Output Leakage Current (Figure 2a) | All | | $V_{CE}$ = 50V | | | 100 | µA |
| | Output Leakage Current (Figure 2b) | SG2812 | | $V_{CE}$ = 50V, $V_{IN}$ = 6V | | | 500 | µA |
| | | SG2814 | | $V_{CE}$ = 50V, $V_{IN}$ = 1V | | | 500 | µA |
| $V_{CE(SAT)}$ | Collector – Emitter ($V_{CE(SAT)}$) (Figure 3) | All | $T_A = T_{MIN}$ | $I_C$ = 500mA, $I_B$ = 1100µA | | 1.8 | 1.1 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 350mA, $I_B$ = 850µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 200mA, $I_B$ = 550µA | | 1.3 | 1.5 | V |
| | | | $T_A$ = 25°C | $I_C$ = 500mA, $I_B$ = 600µA | | 1.7 | 1.9 | V |
| | | | $T_A$ = 25°C | $I_C$ = 350mA, $I_B$ = 500µA | | 1.25 | 1.6 | V |
| | | | $T_A$ = 25°C | $I_C$ = 200mA, $I_B$ = 350µA | | 1.1 | 1.3 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 500mA, $I_B$ = 600µA | | 1.8 | 2.1 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 350mA, $I_B$ = 500µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 200mA, $I_B$ = 350µA | | 1.3 | 1.5 | V |
| $I_{IN(ON)}$ | Input Current (Figure 4) | SG2812 | | $V_{IN}$ = 17V | 480 | 850 | 1300 | µA |
| | | SG2813 | | $V_{IN}$ = 3.85V | 650 | 930 | 1350 | µA |
| | | SG2814 | | $V_{IN}$ = 5V | 240 | 350 | 500 | µA |
| | | | | $V_{IN}$ = 12V | 650 | 1000 | 1450 | µA |
| | | SG2815 | | $V_{IN}$ = 3V | 1180 | 1500 | 2400 | µA |
| $I_{IN(OFF)}$ | Input Current (Figure 5) | All | $T_A = T_{MAX}$ | $I_C$ = 500µA | 25 | 50 | | µA |
| $V_{IN(ON)}$ | Input Voltage (Figure 6) | SG2812 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 23.5 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 17 | V |

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $V_{IN(ON)}$ | Input Voltage (Figure 6) | SG2813 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 3.6 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.9 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 6.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 2.7 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 3.5 | V |
| | | SG2814 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 10 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 12 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 17 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 7.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 8.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 9.5 | V |
| | | SG2815 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 3.0 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 3.5 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 2.4 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | | | 2.6 | V |
| $h_{FE}$ | D-C Forward Current Transfer Ratio (Figure 3) | SG2811 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 500mA | 450 | | | |
| | | | $T_A$ = 25°C | $V_{CE}$ = 2V, $I_C$ = 500mA | 900 | | | |
| $C_{IN}$ | Input Capacitance[1] | All | $T_A$ = 25°C | | | 15 | 25 | pF |
| TPLH | Turn-On Delay | | $T_A$ = 25°C | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| TPHL | Turn-Off Delay | | $T_A$ = 25°C | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| $I_R$ | Clamp Diode Leakage Current (Figure 7) | | | $V_R$ = 50V | | | 50 | µA |
| $V_F$ | Clamp Diode Forward Voltage (Figure 8) | | | $I_F$ = 350mA | | 1.7 | 2.0 | V |
| | | | | $I_F$ = 500mA | | | 2.5 | V |
| Note: [1]This parameter, although guaranteed, are not tested in production. | | | | | | | | |

**Table 3 · SG2821 thru SG2824**

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $I_{CEX}$ | Output Leakage Current (Figure 2a) | All | | $V_{CE}$ = 95V | | | 100 | µA |
| | Output Leakage Current (Figure 2b) | SG2824 | | $V_{CE}$ = 95V, $V_{IN}$ = 1V | | | 500 | µA |

| Symbol | Parameter | Applicable Devices | Temp. | Test Conditions | Limits | | | Units |
|---|---|---|---|---|---|---|---|---|
| | | | | | Min | Type | Max | |
| $V_{CE(SAT)}$ | Collector – Emitter ($V_{CE(SAT)}$) (Figure 3) | All | $T_A = T_{MIN}$ | $I_C$ = 350mA, $I_B$ = 850µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 200mA, $I_B$ = 550µA | | 1.3 | 1.5 | V |
| | | | $T_A = T_{MIN}$ | $I_C$ = 100mA, $I_B$ = 350µA | | 1.1 | 1.3 | V |
| | | | $T_A$ = 25°C | $I_C$ = 350mA, $I_B$ = 500µA | | 1.25 | 1.6 | V |
| | | | $T_A$ = 25°C | $I_C$ = 200mA, $I_B$ = 350µA | | 1.1 | 1.3 | V |
| | | | $T_A$ = 25°C | $I_C$ = 100mA, $I_B$ = 250µA | | 0.9 | 1.1 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 350mA, $I_B$ = 500µA | | 1.6 | 1.8 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 200mA, $I_B$ = 350µA | | 1.3 | 1.5 | V |
| | | | $T_A = T_{MAX}$ | $I_C$ = 100mA, $I_B$ = 250µA | | 1.1 | 1.3 | V |
| $I_{IN(ON)}$ | Input Current (Figure 4) | SG2823 | | $V_{IN}$ = 3.85V | 650 | 930 | 1350 | µA |
| | | SG2824 | | $V_{IN}$ = 5V | 240 | 350 | 500 | µA |
| | | | | $V_{IN}$ = 12V | 650 | 1000 | 1450 | µA |
| $I_{IN(OFF)}$ | Input Current (Figure 5) | All | $T_A = T_{MAX}$ | $I_C$ = 500µA | 25 | 50 | | µA |
| $V_{IN(ON)}$ | Input Voltage (Figure 6) | SG2823 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 3.3 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 3.6 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.9 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 2.4 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 250mA | | | 2.7 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 300mA | | | 3.0 | V |
| | | SG2824 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 125mA | | | 6.0 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 8.0 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 10 | V |
| | | | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 12 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 125mA | | | 5.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 200mA | | | 6.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 275mA | | | 7.0 | V |
| | | | $T_A = T_{MAX}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | | | 8.0 | V |
| $h_{FE}$ | D-C Forward Current Transfer Ratio (Figure 3) | SG2821 | $T_A = T_{MIN}$ | $V_{CE}$ = 2V, $I_C$ = 350mA | 500 | | | |
| | | | $T_A$ = 25°C | $V_{CE}$ = 2V, $I_C$ = 350mA | 1000 | | | |
| $C_{IN}$ | Input Capacitance[1] | All | $T_A$ = 25°C | | | 15 | 25 | pF |
| TPLH | Turn-On Delay | | | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| TPHL | Turn-Off Delay | | | 0.5 $E_{IN}$ to 0.5 $E_{OUT}$ | | 250 | 1000 | ns |
| $I_R$ | Clamp Diode Leakage Current (Figure 7) | | | $V_R$ = 95V | | | 50 | µA |
| $V_F$ | Clamp Diode Forward Voltage (Figure 8) | | | $I_F$ = 350mA | | 1.7 | 2.0 | V |

Note: [1]This parameter, although guaranteed, are not tested in production.

# Parameter Test Figures

(See figure numbers in Electrical Characteristics Tables 1 to 3)

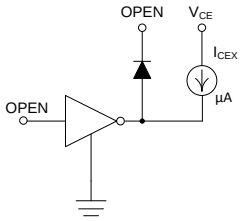



Figure 2a
$I_{CEX}$ Test Circuit

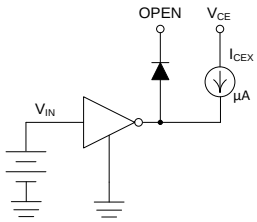



Figure 2b
$I_{CEX}$ Test Circuit

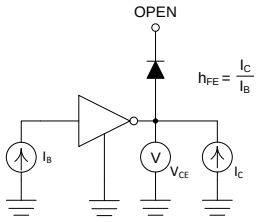



Figure 3
$h_{FE}$, $V_{CE(sat)}$ Test Circuit

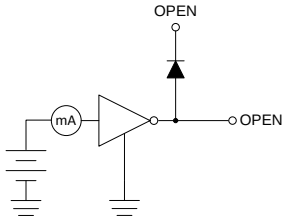



Figure 4
$I_{IN\ (ON)}$ Test Circuit

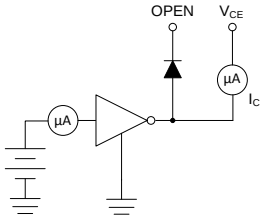



Figure 5
$I_{IN\ (OFF)}$ Test Circuit

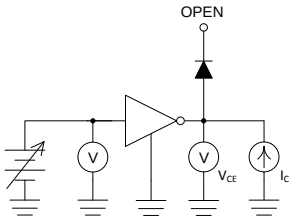



Figure 6
$V_{IN(ON)}$ Test Circuit

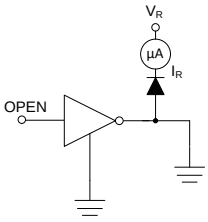



Figure 7
$I_R$ Test Circuit

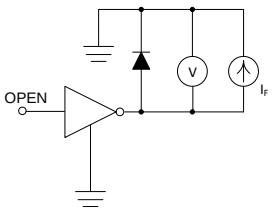



Figure 8
$V_F$ Test Circuit

# Characteristic Curves

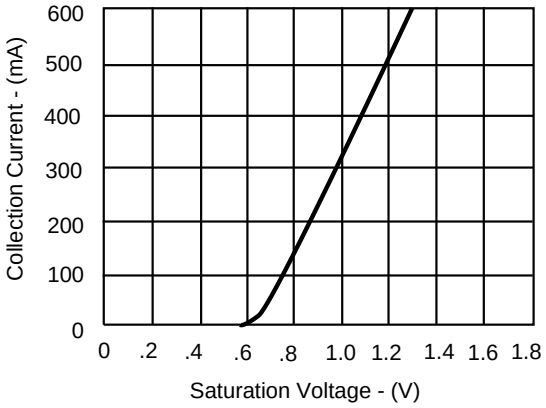



**Figure 8 ·** Output Characteristics

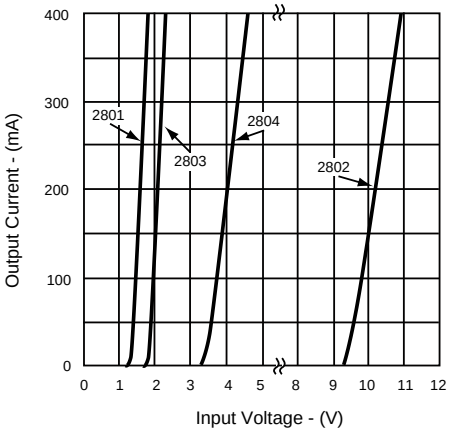



**Figure 9 ·** Output Current Vs. Input Voltage

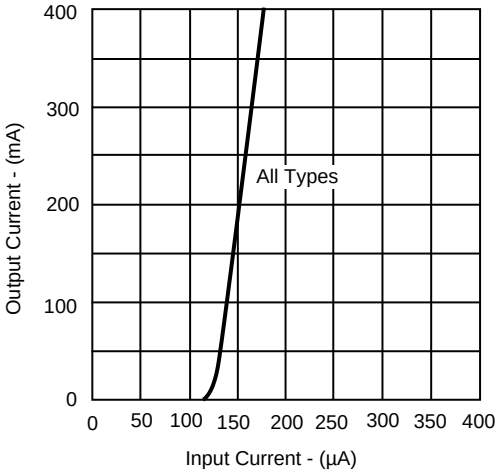



**Figure 10 ·** Output Current Vs. Input Current

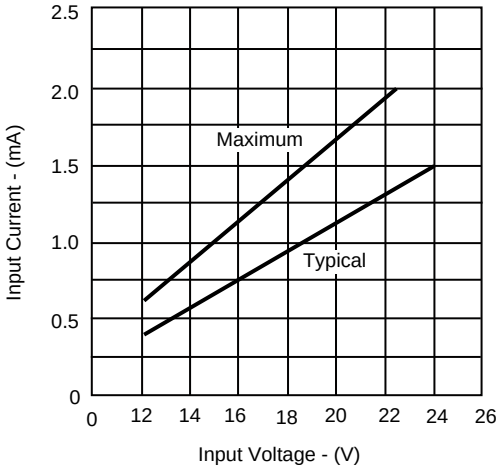



**Figure 11 ·** Input Characteristics - SG2802

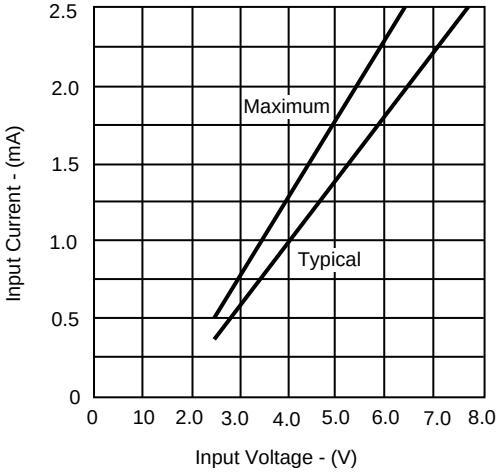



**Figure 12 ·** Input Characteristics - SG2803

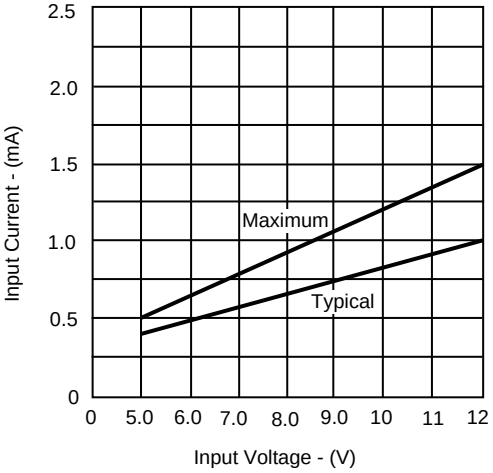



**Figure 13 ·** Input Characteristics - SG2804

# Characteristic Curves - Continued

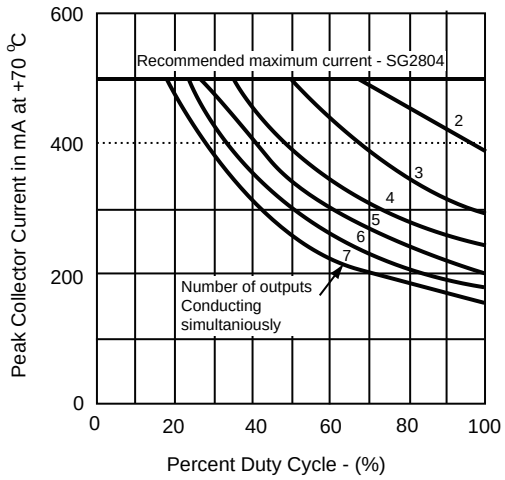
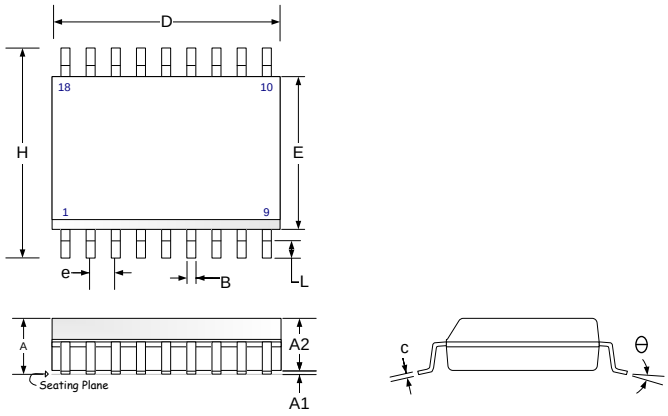



**Figure 14 ·** Peak Collector Current Vs. Duty Cycle

# Package Outline Dimensions

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




| Dim | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | 2.06 | 2.65 | 0.081 | 0.104 |
| A1 | 0.10 | 0.30 | 0.004 | 0.012 |
| A2 | 2.03 | 2.55 | 0.080 | 0.100 |
| B | 0.25 | 0.51 | 0.010 | 0.020 |
| c | 0.23 | 0.32 | 0.009 | 0.013 |
| D | - | 13.21 | - | 0.520 |
| E | 7.40 | 7.75 | 0.291 | 0.305 |
| e | 1.27 BSC | | 0.50 BSC | |
| H | 10.00 | 10.65 | 0.394 | 0.419 |
| L | 0.4 | 1.27 | 0.016 | 0.050 |
| Θ | 0 | 8 | 0 | 8 |
| *LC | - | 0.10 | - | 0.004 |

*Lead coplanarity

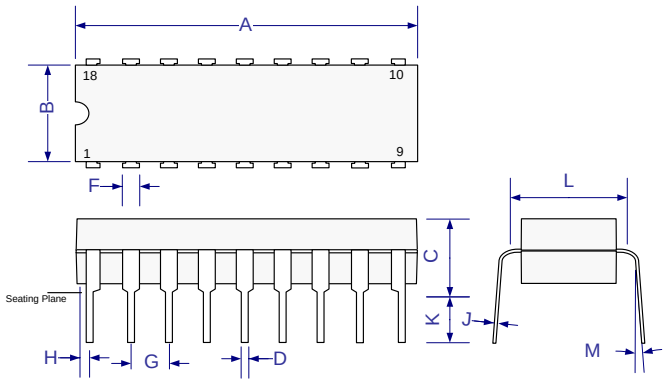
**Note:**

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

**Figure 15 · DW Package Dimensions**

# Package Outline Dimensions

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

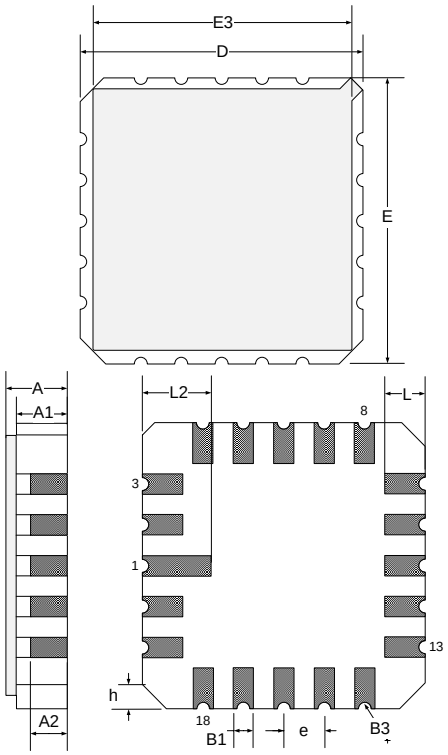



| Dim | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| A | - | 24.38 | - | 0.960 |
| B | 5.59 | 7.11 | 0.220 | 0.280 |
| C | - | 5.08 | - | 0.200 |
| D | 0.38 | 0.51 | 0.015 | 0.020 |
| F | 1.02 | 1.77 | 0.040 | 0.070 |
| G | 2.54 BSC | | 0.100 BSC | |
| H | - | 2.03 | - | 0.080 |
| J | 0.20 | 0.38 | 0.008 | 0.015 |
| K | 3.18 | 5.08 | 0.125 | 0.200 |
| L | 7.37 | 7.87 | 0.290 | 0.310 |
| M | - | 15° | - | 15° |

**Note:**

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

**Figure 16 · J** 18-Pin Ceramic Dual Inline Package Dimensions

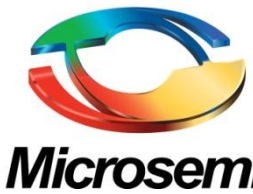



| Dim | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN | MAX | MIN | MAX |
| D/E | 8.64 | 9.14 | 0.340 | 0.360 |
| E3 | - | 8.128 | - | 0.320 |
| e | 1.270 BSC | | 0.050 BSC | |
| B1 | 0.635 TYP | | 0.025 TYP | |
| L | 1.02 | 1.52 | 0.040 | 0.060 |
| A | 1.626 | 2.286 | 0.064 | 0.090 |
| h | 1.016 TYP | | 0.040 TYP | |
| A1 | 1.372 | 1.68 | 0.054 | 0.066 |
| A2 | - | 1.168 | - | 0.046 |
| L2 | 1.91 | 2.41 | 0.075 | 0.95 |
| B3 | 0.203R | | 0.008R | |

**Note:**

1. All exposed metalized area shall be gold plated 60 micro-inch minimum thickness over nickel plated unless otherwise specified in purchase order.

**Figure 17 · L** 20-Pin Ceramic Leadless Chip Carrier (LCC) Package Outline Dimensions



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