

## DUAL PERIPHERAL POSITIVE-AND DRIVER

### DESCRIPTION

The SG5541B/SG55461/SG55471 (SG75451B/SG75461/SG75471) series of dual peripheral Positive-AND drivers are a family of versatile devices designed for use in systems that employ TTL or DTL logic. This family of drivers are direct replacements for the Texas Instruments SN55451B/61/71 (SN75451B/61/71) series. Diode-clamped inputs simplify circuit design. Typical applications include high-speed logic buffers, power drivers, relay drivers, MOS drivers, line drivers, and memory drivers. The SG55451B/SG55461/SG55471 drivers are characterized for operation over the full military ambient temperature range of -55°C to 125°C and the SG75451B/SG75461/SG75471 drivers are characterized for operation from 0°C to 70°C.

### FEATURES

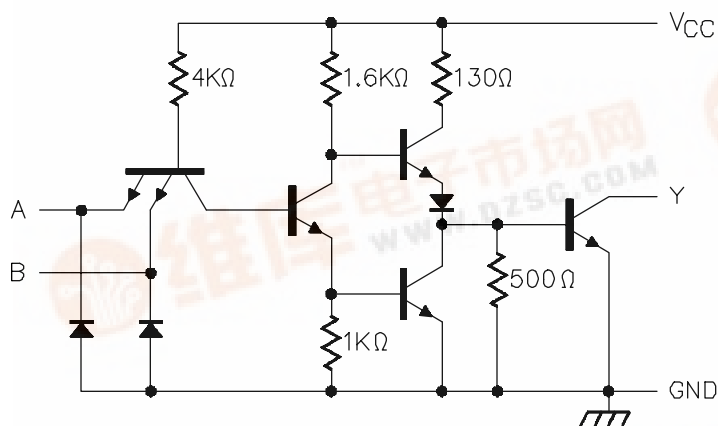
- 300mA output current capability
- High-voltage output
- No output latch-up at 20V
- High speed switching
- TTL or DTL compatible diode-clamped inputs
- Standard supply voltages

### HIGH RELIABILITY FEATURES

- SG55451B/SG55461/SG55471

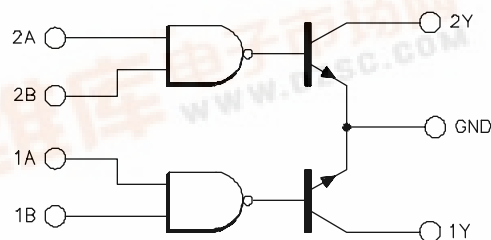
- ◆ Available to MIL-STD-883
- ◆ Scheduled for MIL-M-38510 QPL listing
- ◆ LMI level "S" processing available

### EQUIVALENT CIRCUIT SCHEMATIC (each driver)



### BLOCK DIAGRAM

Positive Logic:  $Y = AB$



### FUNCTION TABLE (each gate)

| A | B | Y             |
|---|---|---------------|
| L | L | L (on-state)  |
| L | H | L (on-state)  |
| H | L | L (on-state)  |
| H | H | H (off-state) |

H = High Level, L = Low Level

# SG55451B/61/71 SERIES

## ABSOLUTE MAXIMUM RATINGS (Note 1)

|                                   |      |                                            |                |
|-----------------------------------|------|--------------------------------------------|----------------|
| Supply Voltage ( $V_{CC}$ ) ..... | 7V   | Output Current .....                       | 400mA          |
| Input Voltage .....               | 5.5V | Continuous Total Dissipation at (or below) |                |
| Intermitter Voltage .....         | 5.5V | 25°C Free-Air Temperature .....            | 800mW          |
| Off-state Output Voltage          |      | Operating Junction Temperature             |                |
| X5451B Series .....               | 30V  | Hermetic (Y, L Packages) .....             | 150°C          |
| X5461 Series .....                | 35V  | Storage Temperature Range .....            | -65°C to 150°C |
| X5471 Series .....                | 70V  | Lead Temperature (1/16 inch from case      |                |
|                                   |      | for soldering 60 sec.) .....               | 300°C          |

Note 1. Exceeding these ratings could cause damage to the device.

## THERMAL DATA

Y Package:

Thermal Resistance-Junction to Case,  $\theta_{JC}$  ..... 50°C/W

Thermal Resistance-Junction to Ambient,  $\theta_{JA}$  ..... 130°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 (Notes 2 & 3)

Supply Voltage ( $V_{CC}$ )

SG55451B, SG55461, SG55471 ..... 4.5V to 5.5V

SG75451B, SG75461, SG75471 ..... 4.75V to 5.25V

Operating Ambient Temperature Range

SG55451B, SG55461, SG55471 ..... -55°C to 125°C

SG75451B, SG75461, SG75471 ..... 0°C to 70°C

Note 2. Range over which device is functional.

Note 3. The substrate (pin 8) must always be at the most-negative device voltage for proper operation.

## ELECTRICAL CHARACTERISTICS

(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG55451B/461/471 with -55°C ≤  $T_A$  ≤ 125°C, and SG75451B/461/471 with 0°C ≤  $T_A$  ≤ 70°C. Typical values are tested at  $V_{CC}$  = 5V, and  $T_A$  = 25°C. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

| Parameter                                  | Test Conditions                                                                                                                                   | SG55451B<br>SG55461<br>SG55471 |      |      | SG75451B<br>SG75461<br>SG75471 |      |      | Units |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|------|------|--------------------------------|------|------|-------|
|                                            |                                                                                                                                                   | Min.                           | Typ. | Max. | Min.                           | Typ. | Max. |       |
| High-level Input Voltage ( $V_{IH}$ )      |                                                                                                                                                   | 2                              |      |      | 2                              |      |      | V     |
| Low-level Input Voltage ( $V_{IL}$ )       |                                                                                                                                                   |                                |      | 0.8  |                                |      | 0.8  | V     |
| Input Clamp Voltage ( $V_{IK}$ )           |                                                                                                                                                   |                                | -1.2 | -1.5 |                                | -1.2 | -1.5 | V     |
| High-level Output Current ( $I_{OH}$ )     | $V_{CC}$ = MIN, $I_{IN}$ = -12mA<br>$V_{CC}$ = MIN, $V_{IH}$ = 2V,<br>$V_{OH}$ = 30V SGX5451B<br>$V_{OH}$ = 35V SGX5461<br>$V_{OH}$ = 70V SGX5471 |                                |      | 300  |                                |      | 100  | μA    |
| Low-level Output Voltage ( $V_{OL}$ )      | $V_{CC}$ = MIN, $V_{IL}$ = 0.8V, $I_{OL}$ = 100mA<br>$V_{CC}$ = MIN, $V_{IL}$ = 0.8V, $I_{OL}$ = 300mA                                            |                                | 0.25 | 0.5  |                                | 0.25 | 0.4  | V     |
|                                            |                                                                                                                                                   |                                | 0.5  | 0.8  |                                | 0.5  | 0.7  | V     |
| Input Current at Max $V_{IN}$ ( $I_{IN}$ ) | $V_{CC}$ = MAX, $V_{IN}$ = 5.5V                                                                                                                   |                                |      | 1.0  |                                |      | 1.0  | mA    |
| High-level Input Current ( $I_{IH}$ )      | $V_{CC}$ = MAX, $V_{IN}$ = 2.4V                                                                                                                   |                                |      | 60   |                                |      | 60   | μA    |
| Low-level Input Current ( $I_{IL}$ )       | $V_{CC}$ = MAX, $V_{IN}$ = 0.4V                                                                                                                   |                                | -1.0 | -1.6 |                                | -1.0 | -1.6 | mA    |
| Supply Current, Outputs High               | $V_{CC}$ = MAX, $V_{IN}$ = 5V                                                                                                                     |                                | 8    | 11   |                                | 8    | 11   | mA    |
| Supply Current, Outputs Low                | $V_{CC}$ = MAX, $V_{IN}$ = 0V                                                                                                                     |                                |      |      |                                |      |      |       |
|                                            | SGX5451B                                                                                                                                          |                                | 52   | 65   |                                | 52   | 65   | mA    |
|                                            | SGX5461                                                                                                                                           |                                | 56   | 76   |                                | 56   | 76   | mA    |
|                                            | SGX5471                                                                                                                                           |                                | 56   | 76   |                                | 56   | 76   | mA    |

# SG55451B/61/71 SERIES

## SWITCHING CHARACTERISTICS ( $V_{CC} = 5V$ , $T_A = 25^\circ C$ )

| Parameter                                          | Test Conditions                                          | SG55451B<br>SG75451B |      |      | SG55461<br>SG75461 |      |      | SG55471<br>SG75471 |      |      | Units |
|----------------------------------------------------|----------------------------------------------------------|----------------------|------|------|--------------------|------|------|--------------------|------|------|-------|
|                                                    |                                                          | Min.                 | Typ. | Max. | Min.               | Typ. | Max. | Min.               | Typ. | Max. |       |
| Propagation Delay Time, Low-to-High Level Output   | $I_C = 200mA$ , $C_L = 15pF$ ,<br>$R_L \approx 50\Omega$ |                      | 18   | 25   |                    | 30   | 110  |                    | 30   | 110  | ns    |
| Propagation Delay Time, High-to-Low Level Output   |                                                          |                      | 18   | 25   |                    | 25   | 80   |                    | 25   | 80   | ns    |
| Transition Time, Low-to-High Output                |                                                          |                      | 5    | 8    |                    | 8    | 25   |                    | 8    | 25   | ns    |
| Transition Time, High-to-Low Level Output          |                                                          |                      | 7    | 12   |                    | 10   | 25   |                    | 10   | 25   | ns    |
| High-Level Output Voltage After Switching (Note 1) | $I_C = 300mA$ ,<br>$V_S = 20V$ SGX5451B                  | $V_S - 6.5$          |      |      |                    |      |      |                    |      |      | mV    |
|                                                    | $V_S = 30V$ SGX5461                                      |                      |      |      | $V_S - 10$         |      |      |                    |      |      | mV    |
|                                                    | $V_S = 55V$ SGX5471                                      |                      |      |      |                    |      |      | $V_S - 18$         |      |      | mV    |

Note 1. These parameters, although guaranteed, are not tested in production.

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

| Package                                               | Part No.                                                                                                                   | Ambient Temperature Range                                                                                                                             | Connection Diagram |
|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------|
| 8-PIN CERAMIC DIP<br>Y - PACKAGE                      | SG55451BY/883B<br>SG55451BY<br>SG55461Y/883B<br>SG55461Y<br>SG55471Y/883B<br>SG55471Y<br>SG75451BY<br>SG75461Y<br>SG75471Y | -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 70°C<br>0°C to 70°C<br>0°C to 70°C |                    |
| 20-PIN CERAMIC<br>LEADLESS CHIP CARRIER<br>L- PACKAGE | SG55451BL/883B<br>SG55451BL<br>SG55461L/883B<br>SG55461L<br>SG55471L/883B<br>SG55471L                                      | -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                                              |                    |

Note 1. Contact factory for JAN and DESC product availability.

2. All parts are viewed from the top.

3. Product is also available in flat pack. Consult factory for price and delivery.