SILICON GENERAL

LINEAR INTEGRATED CIRCUITS

# SG55452B/SG55462/SG55472
# SG75452B/SG75462/SG75472

## DUAL PERIPHERAL POSITIVE-NAND DRIVER

### DESCRIPTION

The SG55452B/SG55462/SG55472 (SG75452B/SG75462/SG75472) series of dual peripheral Positive-NAND 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 SN55452B/62/72 (SN75452B/62/72) 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 SG55452B/SG55462/SG55472 drivers are characterized for operation over the full military ambient temperature range of -55°C to 125°C and the SG75452B/SG75462/SG75472 drivers are characterized for operation from 0°C to 70°C.

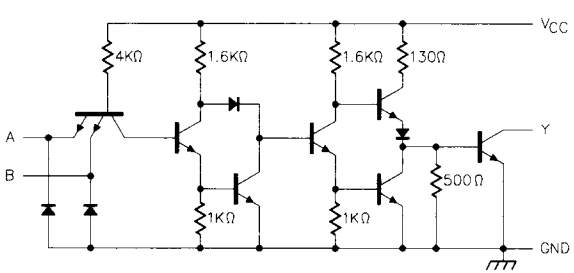
### FEATURES

- **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
**- SG55452B/SG55462/SG55472**

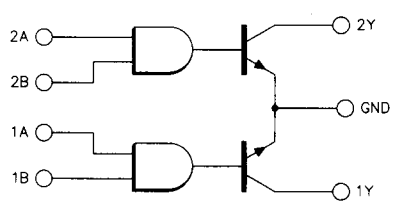
- **Available to MIL-STD-883 and DESC SMD**
- **Scheduled for MIL-M-38510 QPL listing**
- **SG level "S"processing available**

### EQUIVALENT CIRCUIT SCHEMATIC (each driver)




### BLOCK DIAGRAM

**Positive Logic: Y = AB**




### FUNCTION TABLE (each gate)

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

H = High Level, L = Low Level

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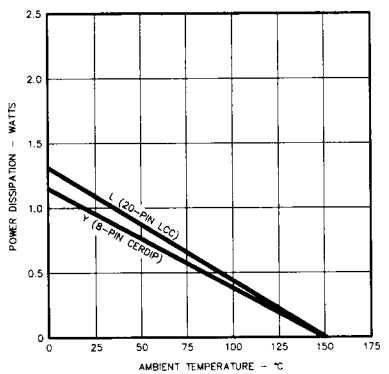
## ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage ($V_{CC}$) ..... 7V
Input Voltage ..... 5.5V
Interemitter Voltage ..... 5.5V
Off-state Output Voltage
X5452B Series ..... 30V
X5462 Series ..... 35V
X5472 Series ..... 70V

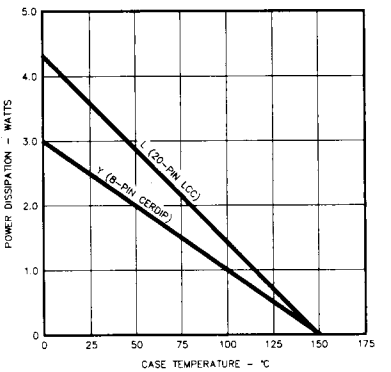
Note 1. Exceeding these ratings could cause damage to the device.

Output Current ..... 400mA
Continuous Total Dissipation at (or below)
25°C Free-Air Temperature ..... 800mW
Operating Junction Temperature
Hermetic (Y, L Packages) ..... 150°C
Storage Temperature Range ..... -65°C to 150°C
Lead Temperature (1/16 inch from case
for soldering 60 sec.) ..... 300°C

THERMAL DERATING CURVES




MAXIMUM POWER DISSIPATION vs AMBIENT TEMPERATURE




MAXIMUM POWER DISSIPATION vs CASE TEMPERATURE

## RECOMMENDED OPERATING CONDITIONS (Notes 2 & 3)

Supply Voltage ($V_{CC}$)
SG55452B, SG55462, SG55472 ..... 4.5V to 5.5V
SG75452B, SG75462, SG75472 ..... 4.75V to 5.25V

Operating Ambient Temperature Range
SG55452B, SG55462, SG55472 ..... -55°C to 125°C
SG75452B, SG75462, SG75472 ..... 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 SPECIFICATIONS

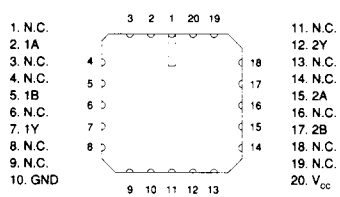
(Unless otherwise specified, these specifications apply over the operating ambient temperatures for SG55452B/462/472 with -55°C ≤ $T_A$ ≤ 125°C, and SG75452B/462/472 with 0°C ≤ $T_A$ ≤ 70°C. Typical values are tested at $V_{CC}$ = 5V, and $T_A$ = 25°C. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

| Parameter | Test Conditions | SG55452B SG55462 SG55472 | | | SG75452B SG75462 SG75472 | | | 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 ($V_{IK}$)** | **$V_{CC}$ = MIN, $I_{IN}$ = -12mA** | | **-1.2** | **-1.5** | | **-1.2** | **-1.5** | **V** |
| High-level Output Current ($I_{OH}$) | $V_{CC}$ = MIN, $V_{IL}$ = 0.8V, | | | 300 | | | 100 | µA |
| | **$V_{OH}$ = 30V SGX5452B** | | | | | | | |
| | $V_{OH}$ = 35V SGX5462 | | | | | | | |
| | **$V_{OH}$ = 70V SGX5472** | | | | | | | |
| Low-level Output Voltage ($V_{OL}$) | $V_{CC}$ = MIN, $V_{IH}$ = 2.0V, $I_{OL}$ = 100mA | | 0.25 | 0.5 | | 0.25 | 0.4 | V |
| | **$V_{CC}$ = MIN, $V_{IH}$ = 2.0V, $I_{OL}$ = 300mA** | | **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** | | | **40** | | | **40** | **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, $V_{IN}$ = 0V** | | | | | | | |
| | SGX5452B | | 11 | 14 | | 11 | 14 | mA |
| | **SGX5462, SGX5472** | | **13** | **17** | | **13** | **17** | **mA** |
| Supply Current, Outputs Low | $V_{CC}$ = MAX, $V_{IN}$ = 5V | | | | | | | |
| | **SGX5452B** | | **56** | **71** | | **56** | **71** | **mA** |
| | SGX5462, SGX5472 | | 61 | 76 | | 61 | 76 | mA |

## SWITCHING SPECIFICATIONS ($V_{CC}$ = 5V, $T_A$ = 25°C)

| Parameter | Test Conditions | SG55452B SG75452B | | | SG55462 SG75462 | | | SG55472 SG75472 | | | Units |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Min. | Typ. | Max. | Min. | Typ. | Max. | Min. | Typ. | Max. | |
| **Propagation Delay Time, Low-to-High Level Output** | $I_C$ = 200mA, $C_L$ = 15pF, $R_L \approx 50\Omega$ | | 26 | 35 | | 45 | 65 | | 45 | 65 | ns |
| **Propagation Delay Time, High-to-Low Level Output** | | | 24 | 35 | | 30 | 50 | | 30 | 50 | ns |
| **Transition Time, Low-to-High** Output | | | 5 | 8 | | 13 | 25 | | 13 | 25 | ns |
| **Transition Time, High-to-Low** Level Output | | | 7 | 12 | | 10 | 20 | | 10 | 20 | ns |
| **High-Level Output Voltage** After Switching | **$I_C$ = 300mA,** | | | | | | | | | | |
| | $V_S$ = 20V SGX5452B | $V_S$-6.5 | | | | | | | | | mV |
| | **$V_S$ = 30V SGX5462** | | | | **$V_S$-10** | | | | | | **mV** |
| | $V_S$ = 55V SGX5472 | | | | | | | $V_S$-18 | | | mV |

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

| Package | Part No. | Ambient Temperature Range | Connection Diagram |
|---|---|---|---|
| 8-PIN CERAMIC DIP<br>Y - PACKAGE | SG55452BY/883B | -55°C to 125°C |  |
| | SG55452BY | -55°C to 125°C | |
| | SG55462Y/883B | -55°C to 125°C | |
| | SG55462Y | -55°C to 125°C | |
| | SG55472Y/883B | -55°C to 125°C | |
| | SG55472Y | -55°C to 125°C | |
| | SG75452BY | 0°C to 70°C | |
| | SG75462Y | 0°C to 70°C | |
| | SG75472Y | 0°C to 70°C | |
| 20-PIN CERAMIC<br>LEADLESS CHIP CARRIER<br>L- PACKAGE | SG55452BL/883B | -55°C to 125°C |  |
| | SG55452BL | -55°C to 125°C | |
| | SG55462L/883B | -55°C to 125°C | |
| | SG55462L | -55°C to 125°C | |
| | SG55472L/883B | -55°C to 125°C | |
| | SG55472L | -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.