

DUAL PERIPHERAL POSITIVE-AND DRIVER

DESCRIPTION

The SG55451B/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

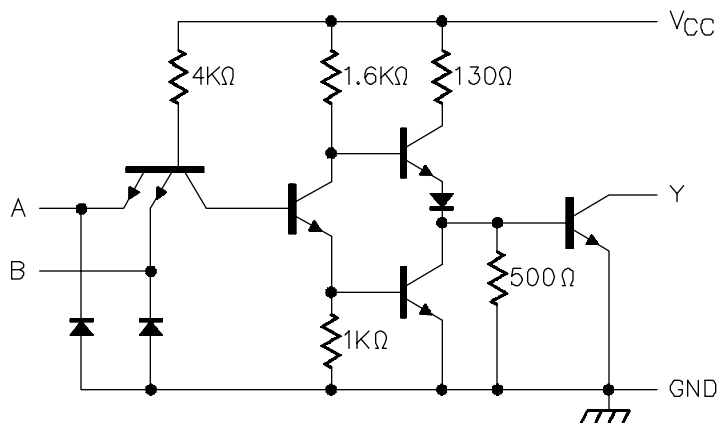
- 300mA output current capability
- High-voltage output
- No output latch-up at 20V
- High speed switching
- TTL or DTL compatible diode-clamped inputs
- Standard supply voltages

HIGH RELIABILITY FEATURES

- SG55451B/SG55461/SG55471

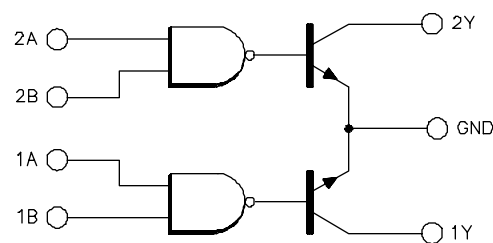
- ◆ Available to MIL-STD-883
- ◆ Scheduled for MIL-M-38510 QPL listing
- ◆ LMI level "S" processing available

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

ABSOLUTE MAXIMUM RATINGS (Note 1)

Supply Voltage (V_{CC})	7V
Input Voltage	5.5V
Interemitter Voltage	5.5V
Off-state Output Voltage	
X5451B Series	30V
X5461 Series	35V
X5471 Series	70V

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

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

THERMAL DATA

Y Package:

Thermal Resistance-Junction to Case, θ_{JC}	50°C/W
Thermal Resistance-Junction to Ambient, θ_{JA}	130°C/W

L Package:

Thermal Resistance-Junction to Case, θ_{JC}	35°C/W
Thermal Resistance-Junction to Ambient, θ_{JA}	120°C/W

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

Note B. The above numbers for θ_{JC} are maximums for the limiting thermal resistance of the package in a standard mounting configuration. The θ_{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 $-55^\circ\text{C} \leq T_A \leq 125^\circ\text{C}$, and SG75451B/461/471 with $0^\circ\text{C} \leq T_A \leq 70^\circ\text{C}$. Typical values are tested at $V_{CC} = 5\text{V}$, and $T_A = 25^\circ\text{C}$. Low duty cycle pulse testing techniques are used which maintains junction and case temperatures equal to the ambient temperature.)

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

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

Parameter	Test Conditions	SG55451B SG75451B			SG55461 SG75461			SG55471 SG75471			Units
		Min.	Typ.	Max.	Min.	Typ.	Max.	Min.	Typ.	Max.	
Propagation Delay Time, Low-to-High Level Output	$I_C = 200mA$, $C_L = 15pF$, $R_L \approx 50\Omega$		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)	$I_C = 300mA$, $V_S = 20V$ 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 Y - PACKAGE	SG55451BY/883B SG55451BY SG55461Y/883B SG55461Y SG55471Y/883B SG55471Y SG75451BY SG75461Y SG75471Y	-55°C to 125°C -55°C to 125°C -55°C to 125°C -55°C to 125°C -55°C to 125°C -55°C to 125°C 0°C to 70°C 0°C to 70°C 0°C to 70°C	
20-PIN CERAMIC LEADLESS CHIP CARRIER L- PACKAGE	SG55451BL/883B SG55451BL SG55461L/883B SG55461L SG55471L/883B SG55471L	-55°C to 125°C -55°C to 125°C -55°C to 125°C -55°C to 125°C -55°C to 125°C -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.