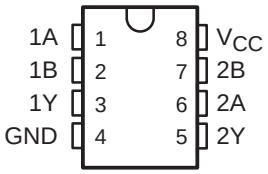
SLRS024 – DECEMBER 1976 – REVISED MAY 1990

PERIPHERAL DRIVERS FOR HIGH-VOLTAGE HIGH-CURRENT DRIVER APPLICATIONS

- **Characterized for Use to 300 mA**
- **High-Voltage Outputs**
- **No Output Latch-Up at 55 V (After Conducting 300 mA)**
- **Medium-Speed Switching**
- **Circuit Flexibility for Varied Applications and Choice of Logic Function**
- **TTL-Compatible Diode-Clamped Inputs**
- **Standard Supply Voltages**
- **Plastic DIP (P) With Copper Lead Frame Provides Cooler Operation and Improved Reliability**

D OR P PACKAGE
(TOP VIEW)



SUMMARY OF SERIES SN75471

DEVICE	LOGIC OF COMPLETE CIRCUIT	PACKAGES
SN75471	AND	D, P
SN75472	NAND	D, P
SN75473	OR	D, P

description

Series SN75471 dual peripheral drivers are functionally interchangeable with series SN75451B and series SN75461 peripheral drivers, but are designed for use in systems that require higher breakdown voltages than either of those series can provide at the expense of slightly slower switching speeds than series 75451B (limits are the same as series SN75461). Typical applications include high-speed logic buffers, power drivers, relay drivers, lamp drivers, MOS drivers, line drivers, and memory drivers.

The SN75471, SN75472, and SN75473 are dual peripheral AND, NAND, and OR drivers, respectively, (assuming positive logic), with the output of the logic gates internally connected to the bases of the npn output transistors.

Series SN75471 drivers are characterized for operation from 0°C to 70°C.

PRODUCTION DATA information is current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

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absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage, V_I . . . . . 5.5 V
Inter-emitter voltage (see Note 2) . . . . . 5.5 V
Off-state output voltage, V_O . . . . . 70 V
Continuous collector or output current (see Note 3) . . . . . 400 mA
Peak collector or output current ($t_w \leq 10$ ms, duty cycle $\leq 50\%$, see Note 3) . . . . . 500 mA
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A . . . . . 0°C to 70°C
Storage temperature range, T_{stg} . . . . . –65°C to 150°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds . . . . . 260°C

NOTES: 1. Voltage values are with respect to the network GND, unless otherwise specified.
2. This is the voltage between two emitters, A and B.
3. Both halves of these dual circuits may conduct rated current simultaneously; however, power dissipation averaged over a short time interval must fall within the continuous dissipation rating.

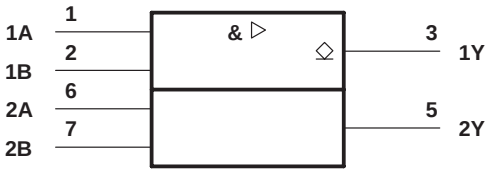
DISSIPATION RATING TABLE

PACKAGE	$T_A \leq 25°C$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25°C$	$T_A = 70°C$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW
P	1000 mW	8.0 mW/°C	640 mW

recommended operating conditions

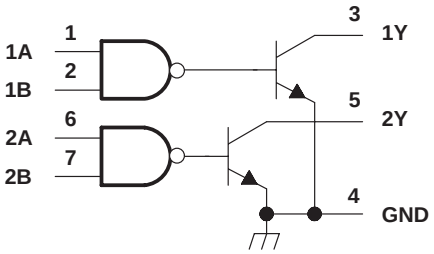
	MIN	NOM	MAX	UNIT
Supply voltage, V_{CC}	4.75	5	5.25	V
High-level input voltage, V_{IH}	2			V
Low-level input voltage, V_{IL}			0.8	V
Operating free-air temperature, T_A	0		70	°C

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

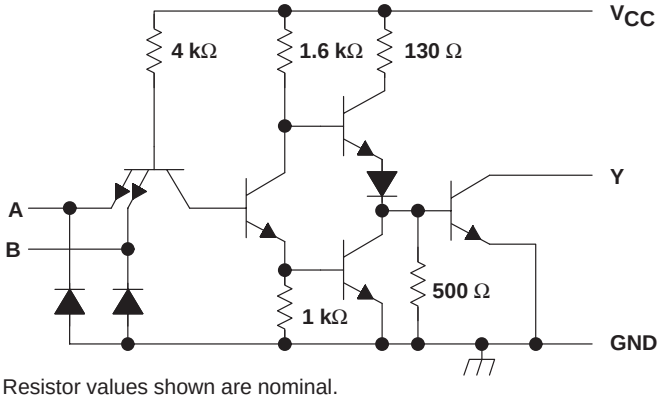


SN75471 FUNCTION TABLE (each driver)

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

positive logic: $Y = AB$ or $\overline{A} + \overline{B}$

SN75471 schematic (each driver)



Resistor values shown are nominal.

electrical characteristics over recommended operating free-air temperature range

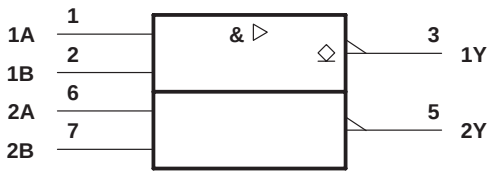
PARAMETER		TEST CONDITIONS	SN75471			UNIT
			MIN	TYP‡	MAX	
V_{IK}	Input clamp voltage	V_{CC} = 4.75 V, I_I = –12 mA		–1.2	–1.5	V
I_{OH}	High-level output current	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{OH} = 70 V			100	μA
V_{OL}	Low-level output voltage	V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 100 mA		0.25	0.4	V
		V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 300 mA		0.5	0.7	
I_I	Input current at maximum input voltage	V_{CC} = 5.25 V, V_I = 5.5 V			1	mA
I_{IH}	High-level input current	V_{CC} = 5.25 V, V_I = 2.4 V			40	μA
I_{IL}	Low-level input current	V_{CC} = 5.25 V, V_I = 0.4 V		–1	–1.6	mA
I_{CCH}	Supply current, outputs high	V_{CC} = 5.25 V, V_I = 5 V		7	11	mA
I_{CCL}	Supply current, outputs low	V_{CC} = 5.25 V, V_I = 0		52	65	mA

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

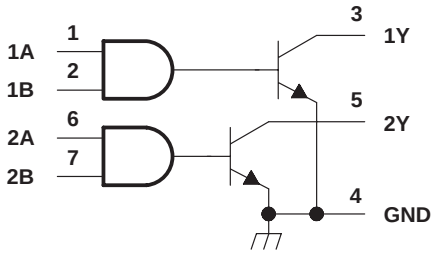
PARAMETER		TEST CONDITIONS	SN75471			UNIT
			MIN	TYP	MAX	
t_{PLH}	Propagation delay time, low-to-high-level output	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω, See Figure 1		30	55	ns
t_{PHL}	Propagation delay time, high-to-low-level output			25	40	
t_{TLH}	Transition time, low-to-high-level output			8	20	
t_{THL}	Transition time, high-to-low-level output			10	20	
V_{OH}	High-level output voltage after switching	V_S = 55 V, $I_O \approx$ 300 mA, See Figure 2	V_S–18			mV

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

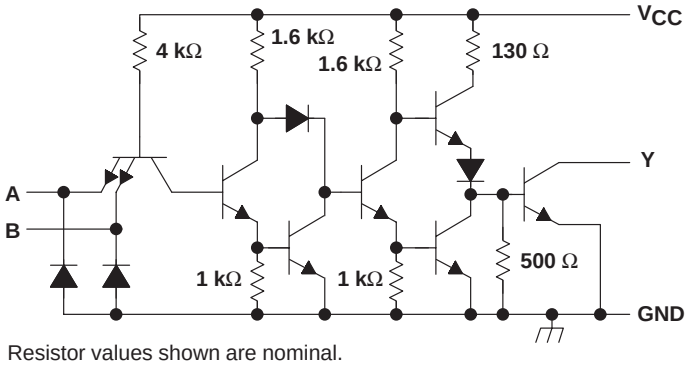


SN75472 FUNCTION TABLE (each driver)

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

positive logic:
$Y = \overline{AB}$ or $\overline{A} + \overline{B}$

SN75472 schematic (each driver)



Resistor values shown are nominal.

electrical characteristics over recommended operating free-air temperature range

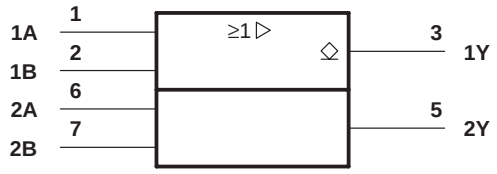
PARAMETER		TEST CONDITIONS	SN75472			UNIT
			MIN	TYP‡	MAX	
V_{IK}	Input clamp voltage	V_{CC} = 4.75 V, I_I = –12 mA		–1.2	–1.5	V
I_{OH}	High-level output current	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{OH} = 70 V			100	μA
V_{OL}	Low-level output voltage	V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 100 mA		0.25	0.4	V
		V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 300 mA		0.5	0.7	
I_I	Input current at maximum input voltage	V_{CC} = 5.25 V, V_I = 5.5 V			1	mA
I_{IH}	High-level input current	V_{CC} = 5.25 V, V_I = 2.4 V			40	μA
I_{IL}	Low-level input current	V_{CC} = 5.25 V, V_I = 0.4 V		–1	–1.6	mA
I_{CCH}	Supply current, outputs high	V_{CC} = 5.25 V, V_I = 5 V		13	17	mA
I_{CCL}	Supply current, outputs low	V_{CC} = 5.25 V, V_I = 0		61	76	mA

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

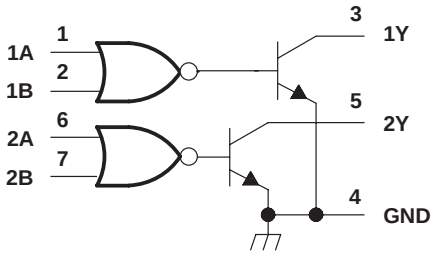
PARAMETER		TEST CONDITIONS	SN75472			UNIT
			MIN	TYP	MAX	
t_{PLH}	Propagation delay time, low-to-high-level output	$I_O \approx$ 200 mA, R_L = 50 Ω, C_L = 15 pF, See Figure 1		45	65	ns
t_{PHL}	Propagation delay time, high-to-low-level output			30	50	
t_{TLH}	Transition time, low-to-high-level output			13	25	
t_{THL}	Transition time, high-to-low-level output			10	20	
V_{OH}	High-level output voltage after switching	V_S = 55 V, $I_O \approx$ 300 mA, See Figure 2	V_S–18			mV

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

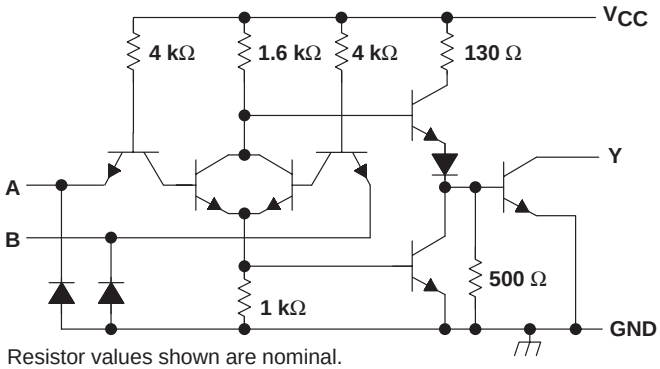


FUNCTION TABLE (each driver)

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

positive logic:
$Y = A + B$ or $\overline{A}\,\overline{B}$

schematic (each driver)



Resistor values shown are nominal.

electrical characteristics over recommended operating free-air temperature range

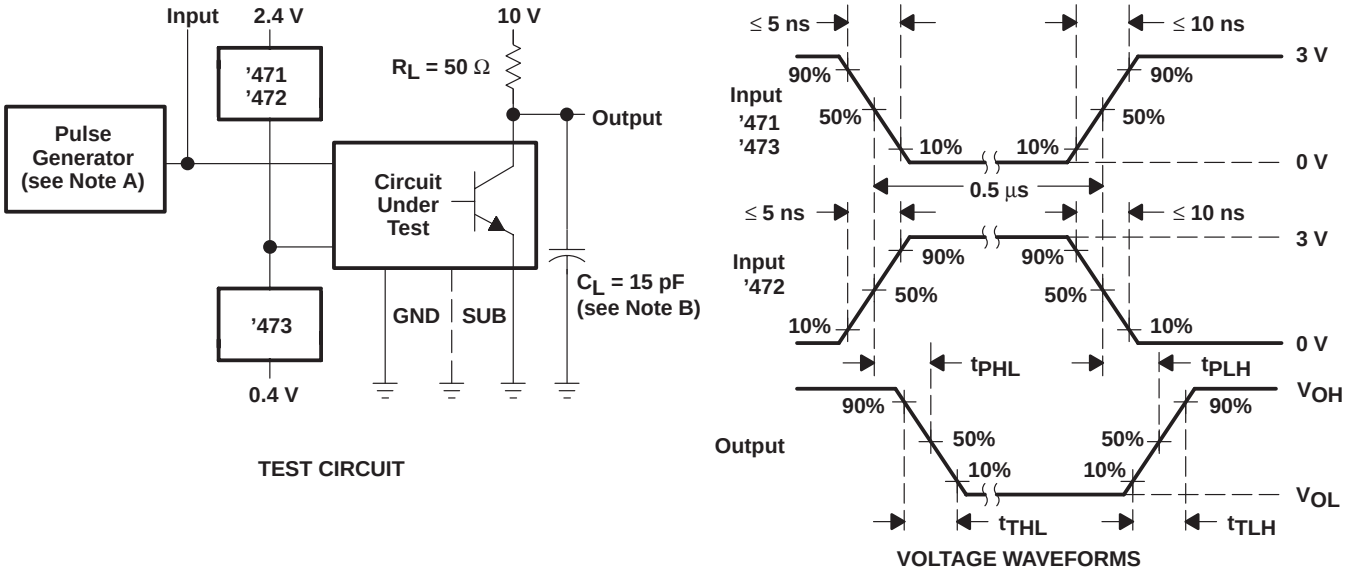
PARAMETER		TEST CONDITIONS	SN75473 MIN	SN75473 TYP‡	SN75473 MAX	UNIT
V_{IK}	Input clamp voltage	V_{CC} = 4.75 V, I_I = –12 mA		–1.2	–1.5	V
I_{OH}	High-level output current	V_{CC} = 4.75 V, V_{IH} = 2 V, V_{OH} = 70 V			100	µA
V_{OL}	Low-level output voltage	V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 100 mA		0.25	0.4	V
		V_{CC} = 4.75 V, V_{IL} = 0.8 V, I_{OL} = 300 mA		0.5	0.7	
I_I	Input current at maximum input voltage	V_{CC} = 5.25 V, V_I = 5.5 V			1	mA
I_{IH}	High-level input current	V_{CC} = 5.25 V, V_I = 2.4 V			40	µA
I_{IL}	Low-level input current	V_{CC} = 5.25 V, V_I = 0.4 V		–1	–1.6	mA
I_{CCH}	Supply current, outputs high	V_{CC} = 5.25 V, V_I = 5 V		8	11	mA
I_{CCL}	Supply current, outputs low	V_{CC} = 5.25 V, V_I = 0		58	76	mA

‡ All typical values are at V_{CC} = 5 V, T_A = 25°C.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

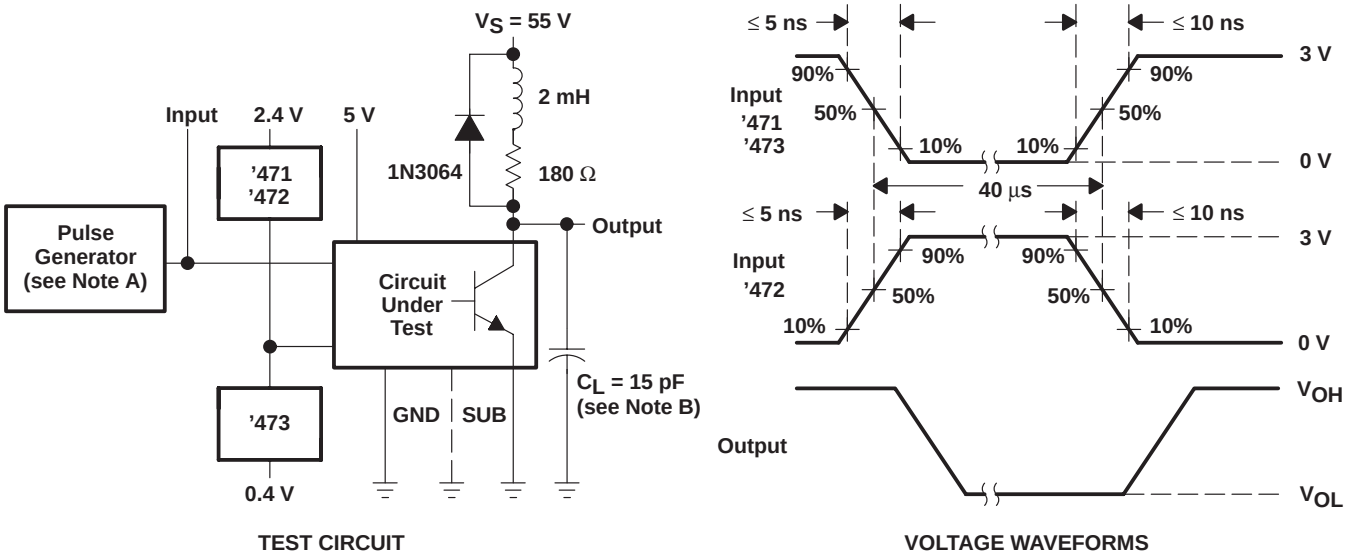
PARAMETER		TEST CONDITIONS	SN75473 MIN	SN75473 TYP	SN75473 MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	$I_O \approx$ 200 mA, R_L = 50 Ω, C_L = 15 pF, See Figure 1		30	55	ns
t_{PHL}	Propagation delay time, high-to-low-level output			25	40	
t_{TLH}	Transition time, low-to-high-level output			8	25	
t_{THL}	Transition time, high-to-low-level output			10	25	
V_{OH}	High-level output voltage after switching	V_S = 55 V, $I_O \approx$ 300 mA, See Figure 2	V_S–18			mV

PARAMETER MEASUREMENT INFORMATION



NOTES: A. The pulse generator has the following characteristics: PRR ≤ 1 MHz, Z_O ≈ 50 Ω.
B. C_L includes probe and jig capacitance.

Figure 1. Switching Times



NOTES: A. The pulse generator has the following characteristics: PRR ≤ 12.5 kHz, Z_O ≈ 50 Ω.
B. C_L includes probe and jig capacitance.

Figure 2. Latch-Up Test

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