D2481, DECEMBER 1978—REVISED DECEMBER 1989

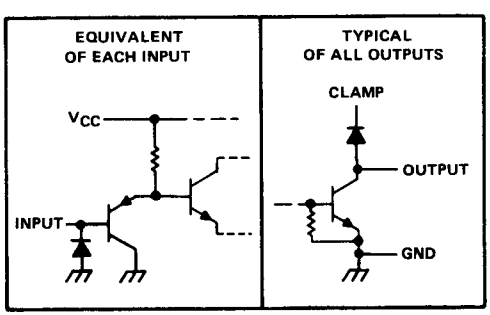
- Very Low Power Requirements
- Very Low Input Current
- Characterized for Use to 350 mA
- No Output Latch-Up at 50 V (After Conducting 300 mA)
- High-Voltage Outputs (70 V Min)
- Output Clamp Diodes for Transient Suppression (350 mA, 70 V)
- TTL- or MOS-Compatible Diode-Clamped Inputs
- Standard Supply Voltage
- Suitable for Hammer-Driver Applications

description

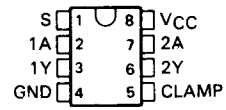
Series SN75446 dual peripheral drivers are designed for use in systems that require high current, high voltage, and fast switching times. The SN75446, SN75447, SN75448, and SN75449 provide AND, NAND, OR, and NOR drivers, respectively. These devices have diode-clamped inputs as well as high-current, high-voltage inductive-clamp diodes on the outputs.

Series SN75446 drivers are characterized for operation from 0°C to 70°C.

schematics of inputs and outputs



D OR P PACKAGE
(TOP VIEW)



FUNCTION TABLES

SN75446
(EACH AND DRIVER)

INPUTS		OUTPUT
A	S	Y
H	H	H
L	X	L
X	L	L

SN75447
(EACH NAND DRIVER)

INPUTS		OUTPUT
A	S	Y
H	H	L
L	X	H
X	L	H

SN75448
(EACH OR DRIVER)

INPUTS		OUTPUT
A	S	Y
H	X	H
X	H	H
L	L	L

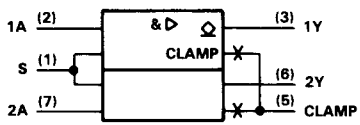
SN75449
(EACH NOR DRIVER)

INPUTS		OUTPUT
A	S	Y
H	X	L
X	H	L
L	L	H

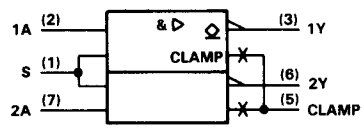
H = high level
L = low level
X = irrelevant

logic symbols†

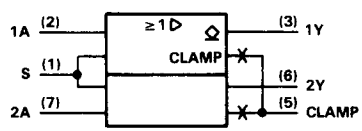
SN75446



SN75447



SN75448



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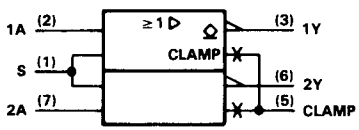
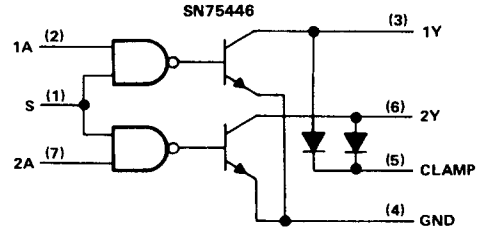


† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

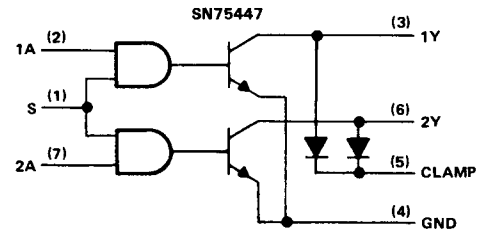
logic diagrams (positive logic)

SN75446



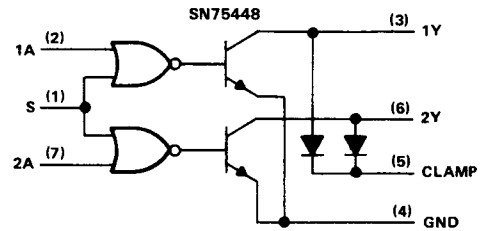
positive logic: $Y = AS$ or $\overline{\overline{A}+\overline{S}}$

SN75447



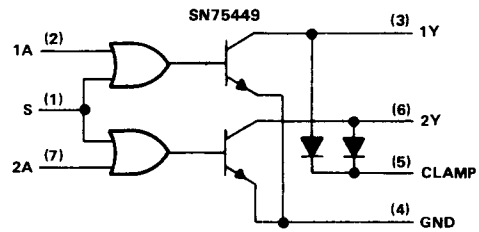
positive logic: $Y = \overline{AS}$ or $\overline{A} + \overline{S}$

SN75448



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

SN75449



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

TEXAS INSTRUMENTS
POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

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

Supply voltage, V_{CC} (see Note 1) . . . . . 7 V
Input voltage . . . . . 5.5 V
Output current (see Note 2) . . . . . 400 mA
Output clamp diode current . . . . . 400 mA
Continuous total power dissipation . . . . . See Dissipation Rating Table
Operating free-air temperature range, T_A . . . . . 0°C to 70°C
Storage temperature range . . . . . −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 network ground terminal.
2. Both halves of this dual circuit may conduct rated current simultaneously; however, power dissipation averaged over a short time interval must fall within the continuous dissipation ratings.

DISSIPATION RATING TABLE

PACKAGE	$T_A \le 25°C$ 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

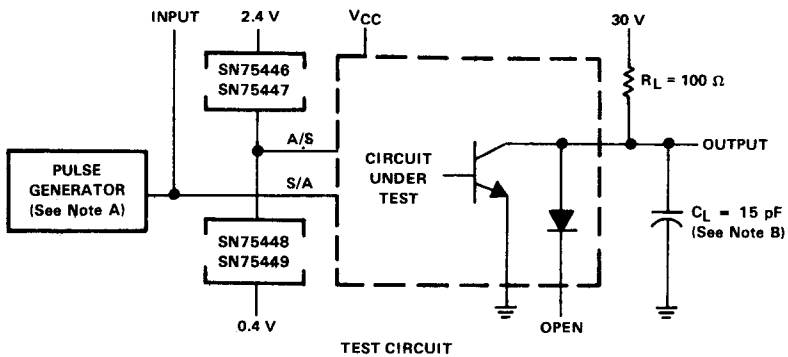
electrical characteristics over recommended operating free-air temperature range

PARAMETER			TEST CONDITIONS		MIN	TYP†	MAX	UNIT
V_{IK}	Input clamp voltage		$I_I = -12$ mA			−0.9	−1.5	V
I_{OH}	High-level output current		$V_{CC} = 4.75$ V, $V_{IL} = 0.8$ V,	$V_{IH} = 2$ V, $V_{OH} = 70$ V		1	100	μA
V_{OL}	Low-level output voltage		$V_{CC} = 4.75$ V, $V_{IH} = 2$ V, $V_{IL} = 0.8$ V	$I_{OL} = 100$ mA		0.10	0.3	V
				$I_{OL} = 200$ mA		0.22	0.45	
				$I_{OL} = 300$ mA		0.45	0.65	
				$I_{OL} = 350$ mA		0.55	0.75	
$V_{(BR)O}$	Output breakdown voltage		$V_{CC} = 4.75$ V,	$I_{OH} = 100$ μA	70	100		V
$V_{R(K)}$	Output clamp diode reverse voltage		$V_{CC} = 4.75$ V,	$I_R = 100$ μA	70	100		V
$V_{F(K)}$	Output clamp diode forward voltage		$V_{CC} = 4.75$ V,	$I_F = 350$ mA	0.6	1.2	1.6	V
I_{IH}	High-level input current		$V_{CC} = 5.25$ V,	$V_I = 5.25$ V		0.01	10	μA
I_{IL}	Low-level input current	A input	$V_{CC} = 5.25$ V,	$V_I = 0.8$ V		−0.5	−10	μA
		Strobe S				−1	−20	
I_{CCH}	Supply current, outputs high	SN75446	$V_{CC} = 5.25$ V	$V_I = 5$ V		11	18	mA
		SN75447		$V_I = 0$		11	18	
		SN75448		$V_I = 5$ V		18	25	
		SN75449		$V_I = 0$		18	25	
I_{CCL}	Supply current, outputs low	SN75446	$V_{CC} = 5.25$ V	$V_I = 0$		11	18	mA
		SN75447		$V_I = 5$ V		11	18	
		SN75448		$V_I = 0$		18	25	
		SN75449		$V_I = 5$ V		18	25	

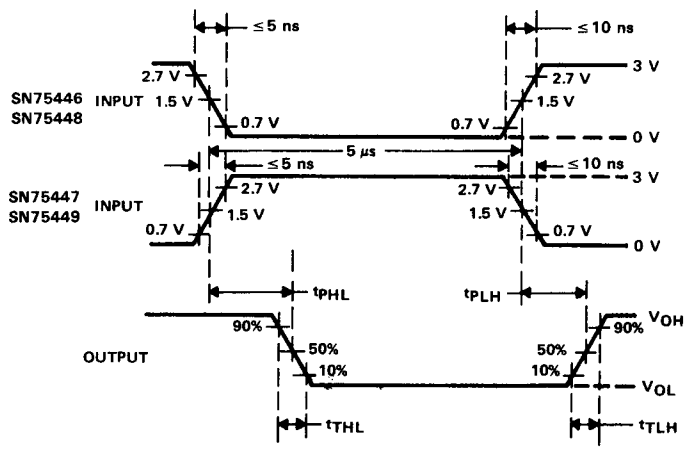
switching characteristics, V_{CC} = 5 V, T_A = 25°C

	PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t_{PLH}	Propagation delay time, low-to-high-level output	C_L = 15 pF, R_L = 100 Ω, See Figure 1		300	750	ns
t_{PHL}	Propagation delay time, high-to-low-level output			200	500	ns
t_{TLH}	Transition time, low-to-high-level output			50	100	ns
t_{THL}	Transition time, high-to-low-level output			50	100	ns
V_{OH}	High-level output voltage after switching	V_S = 55 V, I_O ≈ 300 mA, See Figure 2	V_S − 0.018			V

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT

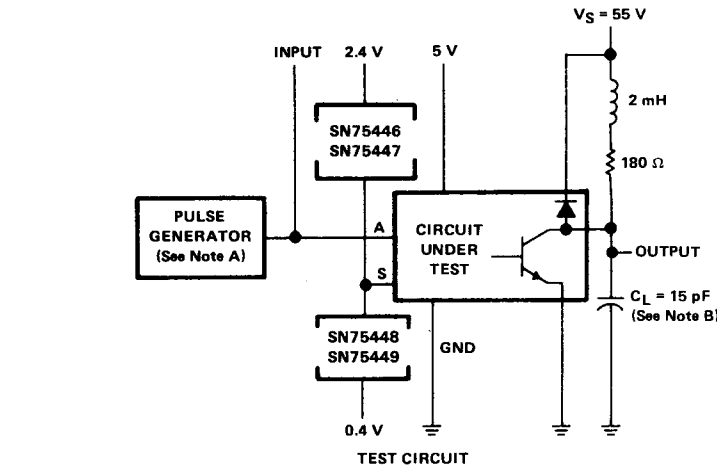


VOLTAGE WAVEFORMS

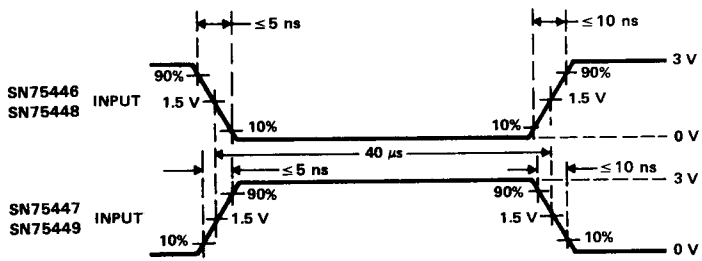
NOTES: A. The pulse generator has the following characteristics: PRR = 100 kHz, Z_{out} = 50 Ω.
B. C_L includes probe and jig capacitance.

FIGURE 1. SWITCHING CHARACTERISTICS

PARAMETER MEASUREMENT INFORMATION



TEST CIRCUIT



VOLTAGE WAVEFORMS

NOTES: A. The pulse generator has the following characteristics: PRR = 12.5 kHz, Z_{out} = 50 Ω.
B. C_L includes probe and jig capacitance.

FIGURE 2. LATCH-UP TEST