The SN54LS07 and SN74LS17 are obsolete and are no longer supplied.
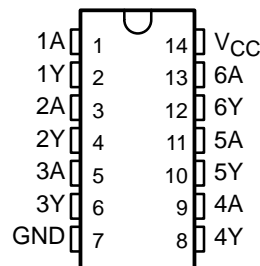
- **Convert TTL Voltage Levels to MOS Levels**
- **High Sink-Current Capability**
- **Input Clamping Diodes Simplify System Design**
- **Open-Collector Driver for Indicator Lamps and Relays**

SN54LS07 . . . J PACKAGE
SN74LS07, SN74LS17 . . . D, DB, N, OR NS PACKAGE
(TOP VIEW)

```
        _____
1A [  1       14  ] V_CC
1Y [  2       13  ] 6A
2A [  3       12  ] 6Y
2Y [  4       11  ] 5A
3A [  5       10  ] 5Y
3Y [  6        9  ] 4A
GND[  7        8  ] 4Y
        _____
```

description

These hex buffers/drivers feature high-voltage open-collector outputs to interface with high-level circuits or for driving high-current loads. They are also characterized for use as buffers for driving TTL inputs. The 'LS07 devices have a rated output voltage of 30 V, and the SN74LS17 has a rated output voltage of 15 V. The maximum sink current is 30 mA for the SN54LS07 and 40 mA for the SN74LS07 and SN74LS17.

These circuits are compatible with most TTL families. Inputs are diode-clamped to minimize transmission-line effects, which simplifies design. Typical power dissipation is 140 mW and average propagation delay time is 12 ns.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
0°C to 70°C	SOIC – D	Tube	SN74LS07D	LS07
		Tape and reel	SN74LS07DR	
	SOIC – DB	Tape and reel	SN74LS07DBR	LS07
	SOP – NS	Tape and reel	SN74LS07NSR	74LS07
	PDIP – N	Tube	SN74LS07N	SN74LS07N

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

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TEXAS INSTRUMENTS

The SN54LS07 and SN74LS17 are obsolete and are no longer supplied.

logic diagram (positive logic)

1A	1 ▷ 2	1Y
2A	3 ▷ 4	2Y
3A	5 ▷ 6	3Y
4A	9 ▷ 8	4Y
5A	11 ▷ 10	5Y
6A	13 ▷ 12	6Y

schematic (each gate)

V_{CC}

9 kΩ 5 kΩ 1 kΩ

Input

Output

2 kΩ

2 kΩ

GND

Resistor values shown are nominal.

2

The SN54LS07 and SN74LS17 are obsolete and are no longer supplied.

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

Supply voltage, V_{CC} .... 7 V
Input voltage, V_I (see Note 1) .... 5.5 V
Output voltage, V_O (see Notes 1 and 2): SN54LS07, SN74LS07 .... 30 V
SN74LS17 .... 15 V
Package thermal impedance, θ_{JA} (see Note 3): D package .... 86°C/W
DB package .... 96°C/W
N package .... 80°C/W
NS package .... 76°C/W
Storage temperature range, T_{stg} .... −65°C to 150°C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTES: 1. All voltage values are with respect to GND.
2. This is the maximum voltage that should be applied to any output when it is in the off state.
3. The package thermal impedance is calculated in accordance with JESD 51-7.

recommended operating conditions

			SN54LS07			SN74LS07 SN74LS17			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage		4.5	5	5.5	4.75	5	5.25	V
V_{IH}	High-level input voltage		2			2			V
V_{IL}	Low-level input voltage				0.8			0.8	V
V_{OH}	High-level output voltage	'LS07			30			30	V
		SN74LS17						15	
I_{OL}	Low-level output current				30			40	mA
T_A	Operating free-air temperature		−55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS‡		SN54LS07		SN74LS07 SN74LS17		UNIT
			MIN	MAX	MIN	MAX	
V_{IK}	V_{CC} = MIN,	I_I = −12 mA		−1.5		−1.5	V
I_{OH}	V_{CC} = MIN,	V_{IH} = 2 V	'LS07, V_{OH} = 30 V		0.25		0.25	mA
			SN74LS17, V_{OH} = 15 V				0.25	
V_{OL}	V_{CC} = MIN,	V_{IL} = 0.8 V	I_{OL} = 16 mA		0.4		0.4	V
			I_{OL} = MAX§		0.7		0.7	
I_I	V_{CC} = MAX,	V_I = 7 V			1		1	mA
I_{IH}	V_{CC} = MAX,	V_I = 2.4 V			20		20	µA
I_{IL}	V_{CC} = MAX,	V_I = 0.4 V			−0.2		−0.2	mA
I_{CCH}	V_{CC} = MAX				14		14	mA
I_{CCL}	V_{CC} = MAX				45		45	mA

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.
§ I_{OL} = 30 mA for SN54 series parts and 40 mA for SN74 series parts.

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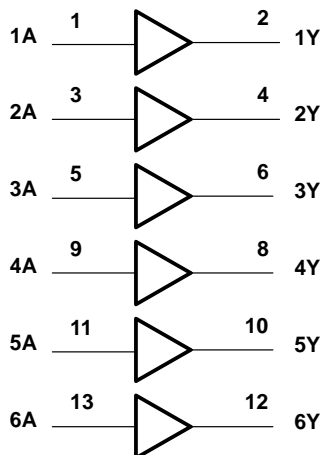
3

SN54LS07, SN74LS07, SN74LS17
HEX BUFFERS/DRIVERS
WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS
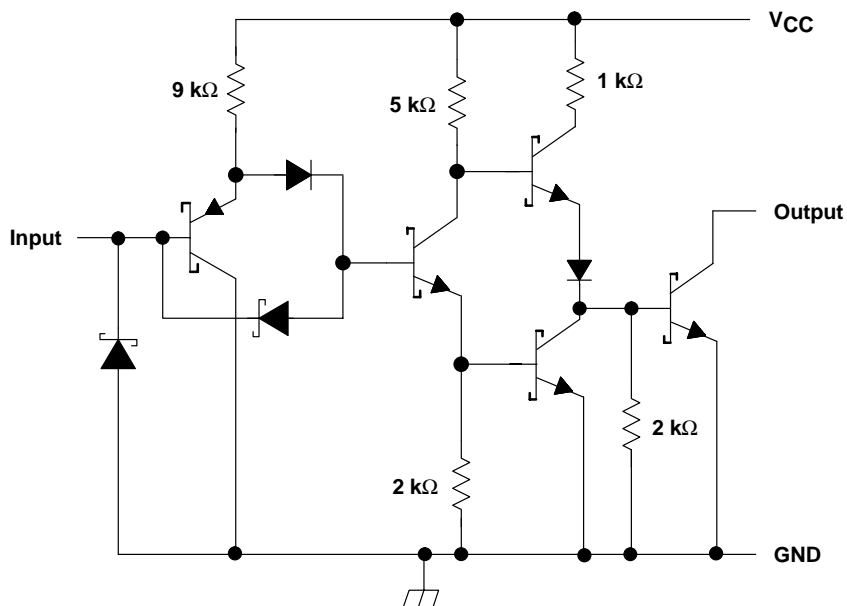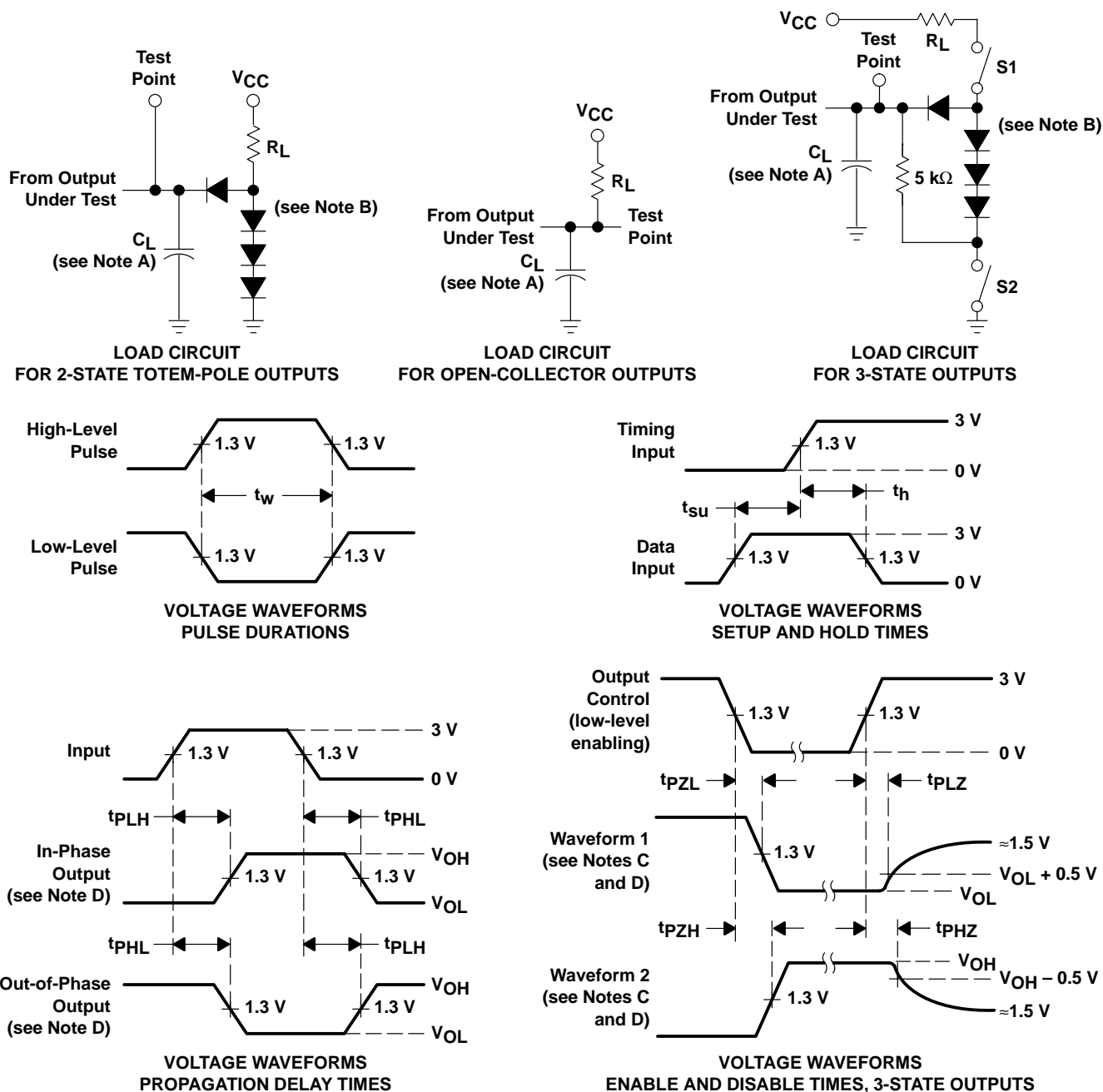SDLS021B – MAY 1990 – REVISED JANUARY 2002

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switching characteristics, V_{CC} = 5 V, T_A = 25°C (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	A	Y	R_L = 110 Ω,	C_L = 15 pF		6	10	ns
t_{PHL}						19	30	

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PARAMETER MEASUREMENT INFORMATION

**LOAD CIRCUIT
FOR 2-STATE TOTEM-POLE OUTPUTS**

**LOAD CIRCUIT
FOR OPEN-COLLECTOR OUTPUTS**

**LOAD CIRCUIT
FOR 3-STATE OUTPUTS**

**VOLTAGE WAVEFORMS
PULSE DURATIONS**

**VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES**

**VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES**

**VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES, 3-STATE OUTPUTS**

NOTES: A. C_L includes probe and jig capacitance.
B. All diodes are 1N3064 or equivalent.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. S1 and S2 are closed for t_{PLH}, t_{PHL}, t_{PHZ}, and t_{PLZ}; S1 is open and S2 is closed for t_{PZH}; S1 is closed and S2 is open for t_{PZL}.
E. Phase relationships between inputs and outputs have been chosen arbitrarily for these examples.
F. All input pulses are supplied by generators having the following characteristics: PRR $\leq$ 1 MHz, $Z_O \approx$ 50 Ω, $t_r \leq$ 1.5 ns, $t_f \leq$ 2.6 ns.
G. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

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5

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