

SN5407, SN5417, SN7407, SN7417 HEX BUFFERS/DRIVERS WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS

SDLS032G – DECEMBER 1983 – REVISED MAY 2004

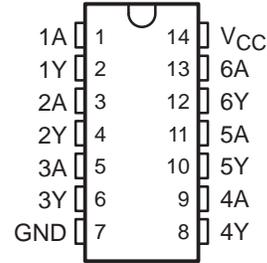
- Convert TTL Voltage Levels to MOS Levels
- High Sink-Current Capability
- Input Clamping Diodes Simplify System Design
- Open-Collector Driver for Indicator Lamps and Relays
- Inputs Fully Compatible With Most TTL Circuits

description/ordering information

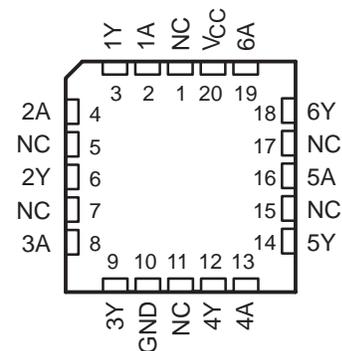
These TTL hex buffers/drivers feature high-voltage open-collector outputs for interfacing with high-level circuits (such as MOS) or for driving high-current loads (such as lamps or relays) and also are characterized for use as buffers for driving TTL inputs. The SN5407 and SN7407 have minimum breakdown voltages of 30 V, and the SN5417 and SN7417 have minimum breakdown voltages of 15 V. The maximum sink current is 30 mA for the SN5407 and SN5417 and 40 mA for the SN7407 and SN7417.

These devices perform the Boolean function $Y = A$ in positive logic.

SN5407, SN5417 . . . J OR W PACKAGE
SN7407, SN7417 . . . D, N, OR NS PACKAGE
(TOP VIEW)



SN5407 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

ORDERING INFORMATION

T _A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING	
0°C to 70°C	SOIC – D	Tube	SN7407D	7407	
		Tape and reel	SN7407DR		
		Tube	SN7417D	7417	
		Tape and reel	SN7417DR		
	PDIP – N	Tube		SN7407N	SN7407N
				SN7417N	SN7417N
SOP – NS	Tape and reel		SN7407NSR	SN7407	
			SN7417NSR	SN7417	
–55°C to 125°C	CDIP – J	Tube	SNJ5407J	SNJ5407J	
			SNJ5417J	SNJ5417J	
	CFP – W	Tube	SNJ5407W	SNJ5407W	
			SNJ5407FK	SNJ5407FK	

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



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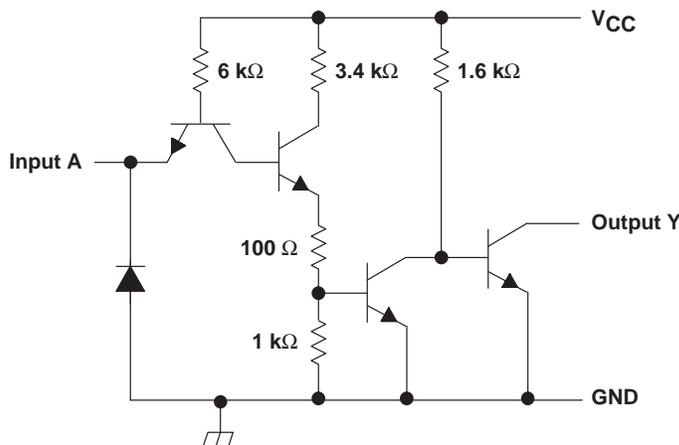
description/ordering information (continued)

These circuits are completely compatible with most TTL families. Inputs are diode clamped to minimize transmission-line effects, which simplifies design. Typical power dissipation is 145 mW, and average propagation delay time is 14 ns.

logic diagram, each buffer/driver (positive logic)



schematic



Resistor values shown are nominal.

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): SN5407, SN7407	30 V
SN5417, SN7417	15 V
Package thermal impedance, θ_{JA} (see Note 3): D package	86°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.



SN5407, SN5417, SN7407, SN7417
HEX BUFFERS/DRIVERS
WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS

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recommended operating conditions (see Note 4)

		MIN	NOM	MAX	UNIT		
V _{CC}	Supply voltage	SN5407, SN5417	4.5	5	5.5	V	
		SN7407, SN7417	4.75	5	5.25		
V _{IH}	High-level input voltage	2			V		
V _{IL}	Low-level input voltage				0.8	V	
V _{OH}	High-level output voltage	SN5407, SN7407			30	V	
		SN5417, SN7417			15		
I _{OL}	Low-level output current	SN5407, SN5417			30	mA	
		SN7407, SN7417			40		
T _A	Operating free-air temperature	SN5407, SN5417	-55			125	°C
		SN7407, SN7417	0			70	

NOTE 4: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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

PARAMETER	TEST CONDITIONS†		MIN	TYP‡	MAX	UNIT	
V _{IK}	V _{CC} = MIN,	I _I = -12 mA			-1.5	V	
I _{OH}	V _{CC} = MIN,	V _{IH} = 2 V	V _{OH} = 30 V (SN5407, SN7407)		0.25	mA	
			V _{OH} = 15 V (SN5417, SN7417)		0.25		
V _{OL}	V _{CC} = MIN,	V _{IL} = 0.8 V	I _{OL} = 16 mA		0.4	V	
			I _{OL} = 30 mA (SN5407, SN5417)		0.7		
			I _{OL} = 40 mA (SN7407, SN7417)		0.7		
I _I	V _{CC} = MAX,	V _I = 5.5 V			1	mA	
I _{IH}	V _{CC} = MAX,	V _{IH} = 2.4 V			40	μA	
I _{IL}	V _{CC} = MAX,	V _{IL} = 0.4 V			-1.6	mA	
I _{CCH}	V _{CC} = MAX				29	41	mA
I _{CCL}	V _{CC} = MAX				21	30	mA

† For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

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}				20	30		
t _{PLH}	A	Y	R _L = 150 Ω, C _L = 50 pF	15		ns	
t _{PHL}				26			

