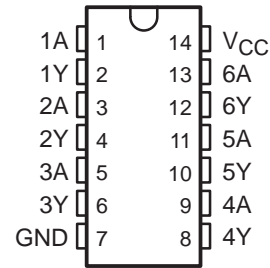


SN5407, SN5417, SN7407, SN7417 HEX BUFFERS/DRIVERS WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS

SDLS032A – DECEMBER 1983 – REVISED NOVEMBER 1997

- Converts 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
- Package Options Include Ceramic Flat (W) Package and Plastic (N) and Ceramic (J) DIPs

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



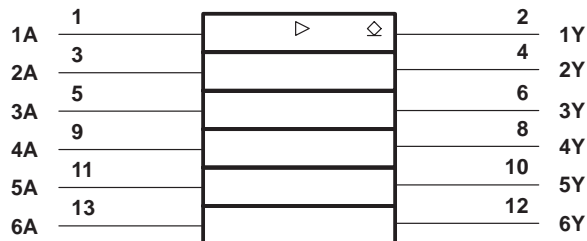
description

These monolithic 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 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.

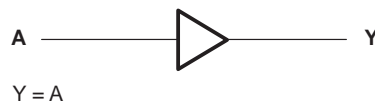
The SN5407 and SN5417 are characterized for operation over the full military temperature range of –55°C to 125°C. The SN7407 and SN7417 are characterized for operation from 0°C to 70°C.

logic symbol†



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

logic diagram, each buffer/driver (positive logic)



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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.

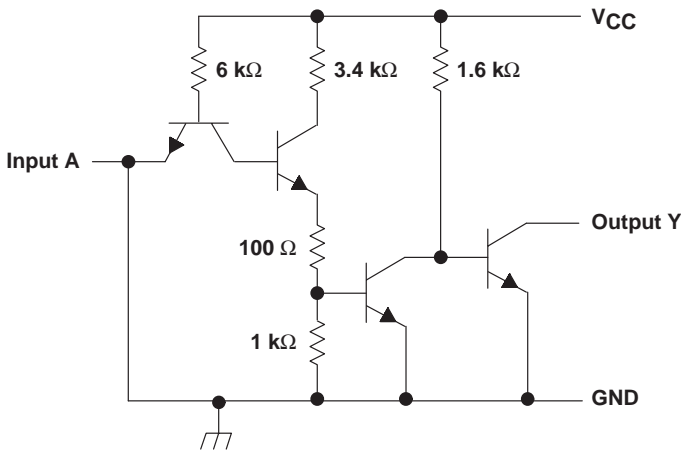
**TEXAS
INSTRUMENTS**

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

Copyright © 1997, Texas Instruments Incorporated

SN5407, SN5417, SN7407, SN7417
HEX BUFFERS/DRIVERS
WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS
SDLS032A – DECEMBER 1983 – REVISED NOVEMBER 1997

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
Operating free-air temperature range, T_A : SN5407, SN5417	–55°C to 125°C
SN7407, SN7417	0°C to 70°C
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.

recommended operating conditions

			SN5407 SN5417			SN7407 SN7417			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	SN5407, SN7407	30			30			V		
		SN5417, SN7417	15			15					
I _{OL}	Low-level output current		30			40			mA		
T _A	Operating free-air temperature		−55			125			0	70	°C

SN5407, SN5417, SN7407, SN7417
HEX BUFFERS/DRIVERS
WITH OPEN-COLLECTOR HIGH-VOLTAGE OUTPUTS
SDLS032A – DECEMBER 1983 – REVISED NOVEMBER 1997

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

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

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

‡ All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

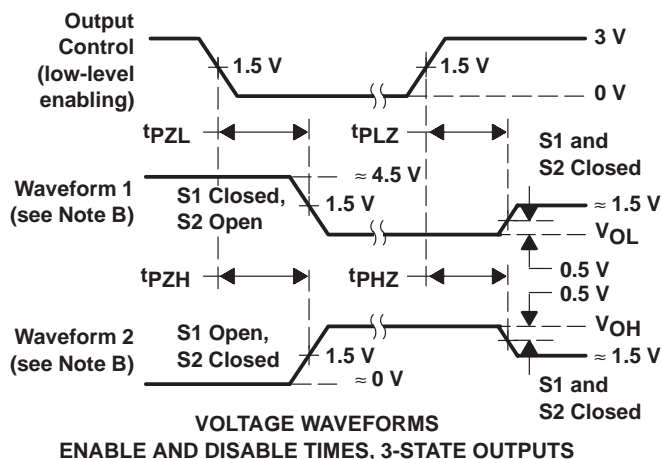
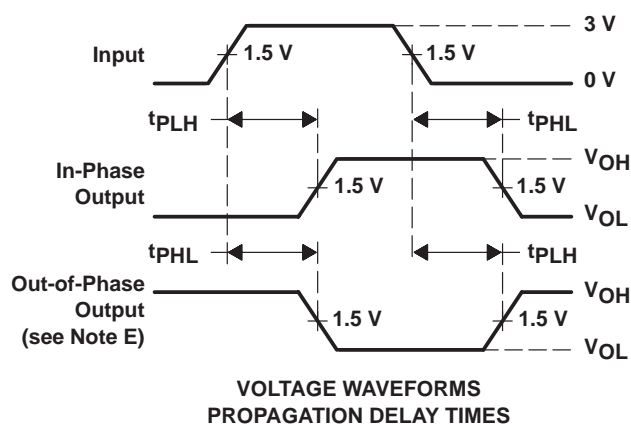
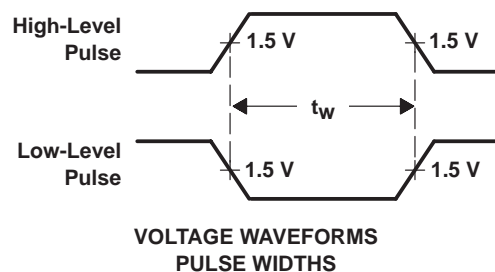
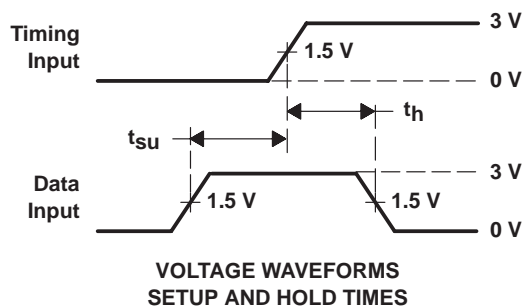
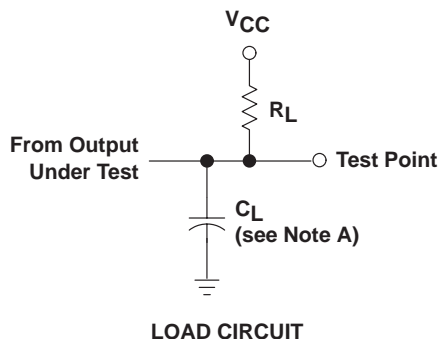
switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$ (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS		MIN	TYP	MAX	UNIT
t_{PLH}	A	Y	$R_L = 110 \Omega,$	$C_L = 15 \text{ pF}$		6	15	ns
t_{PHL}						20	26	
t_{PLH}	A	Y	$R_L = 150 \Omega,$	$C_L = 50 \text{ pF}$			15	ns
t_{PHL}							26	

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

SDLS032A – DECEMBER 1983 – REVISED NOVEMBER 1997

PARAMETER MEASUREMENT INFORMATION



- NOTES: A. C_L includes probe and jig capacitance.
B. 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.
C. In the examples above, the phase relationships between inputs and outputs have been chosen arbitrarily.
D. All input pulses are supplied by generators having the following characteristics: $PRR \leq 1 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 7 \text{ ns}$, $t_f \leq 7 \text{ ns}$.
E. When measuring propagation delay times of 3-state outputs, switches S1 and S2 are closed.
F. The outputs are measured one at a time with one input transition per measurement.

Figure 1. Load Circuit and Voltage Waveforms

IMPORTANT NOTICE

Texas Instruments and its subsidiaries (TI) reserve the right to make changes to their products or to discontinue any product or service without notice, and advise customers to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgement, including those pertaining to warranty, patent infringement, and limitation of liability.

TI warrants performance of its semiconductor products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are utilized to the extent TI deems necessary to support this warranty. Specific testing of all parameters of each device is not necessarily performed, except those mandated by government requirements.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). TI SEMICONDUCTOR PRODUCTS ARE NOT DESIGNED, AUTHORIZED, OR WARRANTED TO BE SUITABLE FOR USE IN LIFE-SUPPORT DEVICES OR SYSTEMS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF TI PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK.

In order to minimize risks associated with the customer's applications, adequate design and operating safeguards must be provided by the customer to minimize inherent or procedural hazards.

TI assumes no liability for applications assistance or customer product design. TI does not warrant or represent that any license, either express or implied, is granted under any patent right, copyright, mask work right, or other intellectual property right of TI covering or relating to any combination, machine, or process in which such semiconductor products or services might be or are used. TI's publication of information regarding any third party's products or services does not constitute TI's approval, warranty or endorsement thereof.



“电子爱好者”网站是一个面向广大电子爱好者、大专院校学生、中小型企业工程技术人员的技术应用、推广专业网站。主要内容有：电子技术应用交流，器件资料、电子设计软件下载，电子技术支持服务，电子产品发布、转让和引进等信息。

本资料由“电子爱好者”网站收集整理，版权属原作者

在使用本资料或软件时，有什么问题，欢迎到“电子爱好者”网站内的 BBS “技术论坛”中发表，我站的热心网友会帮助你的。

技术论坛：<http://www.etuni.com/bbs>

需要更多的电子技术相关资料或软件，欢迎到“电子爱好者”网站下载。

“电子爱好者”网站：<http://www.etuni.com>