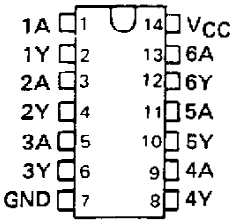
SDLS032

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

DECEMBER 1983—REVISED MARCH 1988

- 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

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

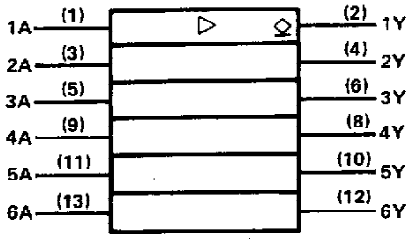


description

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 are also characterized for use as buffers for driving TTL inputs. The SN5407 and SN7407 have minimum breakdown voltages of 30 volts and the SN5417 and SN7417 have minimum breakdown voltages of 15 volts. The maximum sink current is 30 milliamperes for the SN5407 and SN5417, and 40 milliamperes for the SN7407 and SN7417.

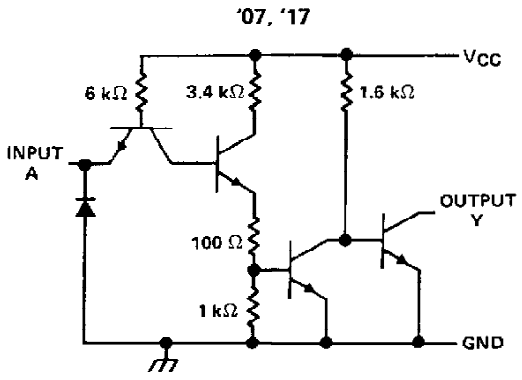
These circuits are completely compatible with most TTL families. Inputs are diode-clamped to minimize transmission-line effects which simplifies design. Typical power dissipation is 145 milliwatts and average propagation delay time is 14 nanoseconds. The SN5407 and SN5417 are characterized for operation 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†



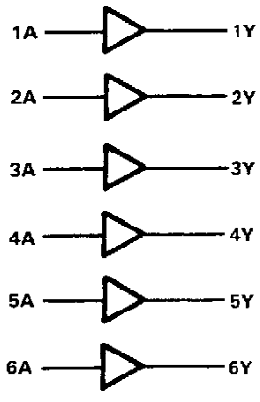
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

schematic



Resistor values shown are nominal.

logic diagram (positive logic)



$Y = \overline{A}$

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

Supply voltage V_{CC} (see Note 1) . . . . . 7 V
Input voltage (see Note 1) . . . . . 5.5 V
Output voltage (see Notes 1 and 2): SN5407, SN7407 Circuits . . . . . 30 V
SN5417, SN7417 Circuits . . . . . 15 V
Operating free-air temperature range: SN5407, SN5417 Circuits . . . . . −55°C to 125°C
SN7407, SN7417 Circuits . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

NOTES: 1. Voltage values are with respect to network ground terminal.
2. This is the maximum voltage which 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	'07			30			30	V
		'17			15			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†		SN5407 SN5417			SN7407 SN7417			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	V_{CC} = MIN, I_I = −12 mA				−1.5			−1.5	V
I_{OH}	V_{CC} = MIN, V_{IL} = 0.8 V, V_{OH} = §				0.25			0.25	mA
V_{OL}	V_{CC} = MIN, V_{IH} = 2 V	I_{OL} = 16 mA			0.4			0.4	V
		I_{OL} = ¶			0.7			0.7	
I_I	V_{CC} = MAX, V_I = 5.5 V				1			1	mA
I_{IH}	V_{CC} = MAX, V_{IH} = 2.4 V				40			40	μA
I_{IL}	V_{CC} = MAX, V_{IL} = 0.4 V				−1.6			−1.6	mA
I_{CCH}	V_{CC} = MAX			29	41		29	41	mA
I_{CCL}	V_{CC} = 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 V, T_A = 25°C.
§ V_{OH} = 30 V for '07 and 15 V for '17.
¶ I_{OL} = 30 mA for SN54' and 40 mA for SN74'.

switching characteristics, V_{CC} = 5 V, T_A = 25°C (see Note 3)

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

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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