SN55326, SN55327
MEMORY CORE DRIVERS

D1496, SEPTEMBER 1973—REVISED SEPTEMBER 1986

T-52-15

Common Features

- Inputs Compatible with TTL Logic Levels
- Minimum Time Skew Between Strobe and Output-Current Rise
- Compatible with High-Speed Magnetic Core Memories

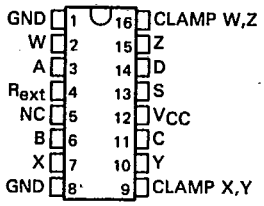
SN55326 Features

- Quad Positive-OR Sink Driver
- 600-mA Output Current Sink Capability
- 24-V Output Capability
- Output Clamp Voltage Variable to 24 V

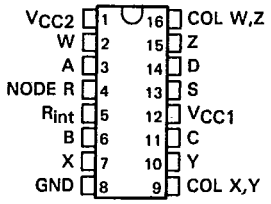
SN55327 Features

- Quad Positive-OR Source Driver
- 600-mA Output Source Capability
- V_{CC2} Voltage Variable to 24 V
- Output Capable of Swinging Between V_{CC2} and Ground

SN55326 . . . J PACKAGE
(TOP VIEW)



SN55327 . . . J PACKAGE
(TOP VIEW)



NC—No internal connection

description

The SN55326 and SN55327 are monolithic integrated circuit quadruple memory core drivers. These devices accept standard TTL decoder input signals and provide high-current and high-voltage output levels suitable for driving magnetic memory elements. Output transistor selection is determined by using one of the four address inputs and the common timing strobe.

FUNCTION TABLE

INPUTS					OUTPUTS			
ADDRESS				STROBE				
A	B	C	D	S	W	X	Y	Z
L	H	H	H	L	ON	OFF	OFF	OFF
H	L	H	H	L	OFF	ON	OFF	OFF
H	H	L	H	L	OFF	OFF	ON	OFF
H	H	H	L	L	OFF	OFF	OFF	ON
H	H	H	H	X	OFF	OFF	OFF	OFF
X	X	X	X	H	OFF	OFF	OFF	OFF

H = high level, L = low level, X = irrelevant
NOTE: Not more than one output is to be on at any one time.

The SN55326 memory core driver can sink up to 600 milliamperes and operate from a single 5-volt supply. Each driver is similar to the sink drivers of the SN55325. The four output transistors share a common base-drive resistor and it is recommended that only one of the four driver gates be selected at a time. Output-transistor base current may be increased by connecting an external resistor between R_{ext} (pin 4) and V_{CC}. Each output collector is protected from voltage surges during inductive switching by a clamping diode in parallel with its internal pull-up resistor. The two clamp pins may be returned to a power supply of from 4.5 volts to 24 volts.

The SN55327 memory core switch can source or sink up to 600 milliamperes and operate from two supplies; one of five volts and the other from 4.5 volts to 24 volts. Each switch is similar to the source drivers of the SN55325. They can function as either sink drivers or source drivers since the voltages at the output transistor terminals are capable of swinging between V_{CC2} and ground. The four output transistors share a common base-drive resistor and it is recommended that only one of the four outputs be selected at a time. An internal base-drive resistor is available on the chip and can be used by connecting Node R (pin 4) to R_{int} (pin 5). This resistor provides adequate base current to the output transistors for output sink currents

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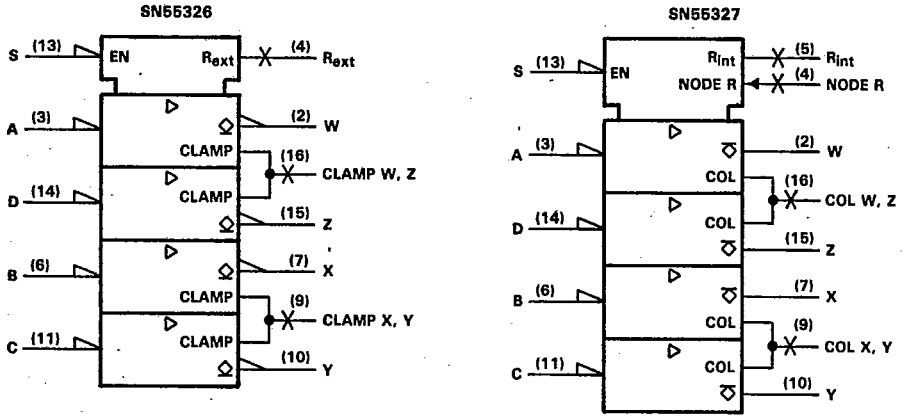
description (continued)

up to 375 milliamperes with V_{CC2} at 15 volts or 600 milliamperes with V_{CC2} at 24 volts. Base current can be regulated to within ±5 percent by substituting for this resistor an external resistor connected between Node R (pin 4) and V_{CC2} with R_{int} (pin 5) remaining open. This method is preferable in high-duty-cycle, high-power applications since the power dissipated in this resistor is outside the package. When a source current and V_{CC2} voltage other than the above values are required, it is recommended that the base drive be supplied through an external resistor of the appropriate value calculated using Equation 1 shown in the SN55325 data sheet.

The SN55326 and SN55327 circuits are characterized for operation over the full military temperature range of −55°C to 125°C.

logic symbols†



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

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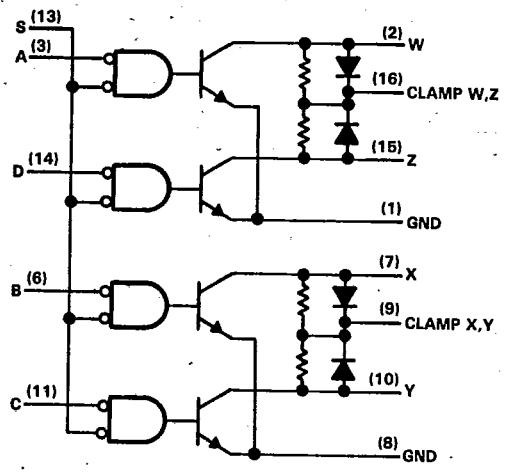
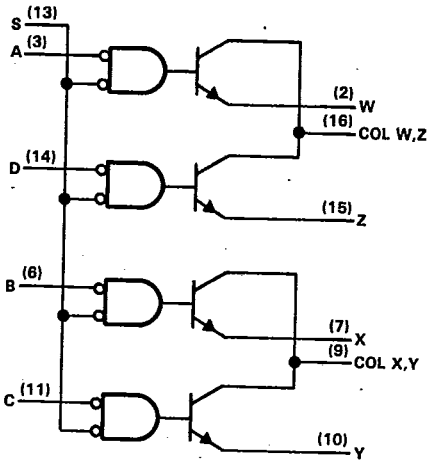
logic diagrams (positive logic)

SN55326



SN55327



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

	SN55326	SN55327	UNIT
Supply voltage, V_{CC} or V_{CC1} (see Note 1)	7	7	V
Supply voltage, V_{CC2}		25	V
Input voltage, any address or strobe	5.5	5.5	V
Output collector voltage	25	25	V
Output clamp voltage	25		V
Output collector current	750	750	mA
Continuous total dissipation at (or below) 25°C free-air temperature (see Note 2)	1375	1375	mW
Operating free-air temperature range	−55 to 125	−55 to 125	°C
Storage temperature range	−65 to 150	−65 to 150	°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	300	300	°C

NOTES: 1. Voltage values are with respect to the network ground terminal(s).
2. For operation above 25°C free-air temperature, derate linearly at the rate of 11.0 mW/°C.

recommended operating conditions

	SN55326			SN55327			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC} or V_{CC1}	4.5	5	5.5	4.5	5	5.5	V
Supply voltage, V_{CC2}				4.5		24	V
High-level input voltage, V_{IH}	2			2			V
Low-level input voltage, V_{IL}			0.8			0.8	V
Output collector voltage			24			24	V
Output clamp voltage, $V_{(clamp)}$	4.5		24				V
Output collector current			600			600	mA
Operating free-air temperature, T_A	−55		125	−55		125	°C

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

PARAMETER			TEST CONDITIONS†		SN55326 MIN	SN55326 TYP‡	SN55326 MAX	UNIT
V_{IK}	Input clamp voltage		V_{CC} = 4.5 V, T_A = 25°C	I_I = −10 mA,		−1	−1.7	V
V_{OH}	High-level output voltage		V_{CC} = 4.5 V,	I_O = 0	19	23		V
$V_{(sat)}$	Saturation voltage		V_{CC} = 4.5 V, R_L = 23 Ω to V_{CC},	Full range			0.9	V
			$I_{(sink)}$ ≈ 600 mA§, See Notes 3 and 4	T_A = 25°C		0.43	0.7	
$V_{F(clamp)}$	Output-clamp-diode forward voltage		$V_{(clamp)}$ = 0, T_A = 25°C	$I_{(clamp)}$ = −10 mA,			1.5	V
$I_{(clamp)}$	Output-clamp-current, one output on		$I_{(sink)}$ = 50 mA,	T_A = 25°C		6	7	mA
I_I	Input current at maximum input voltage	Address	V_I = 5.5 V				1	mA
		Strobe					4	
I_{IH}	High-level input current	Address	V_I = 2.4 V				40	μA
		Strobe					160	
I_{IL}	Low-level input current	Address	V_I = 0.4 V			−1	−1.6	mA
		Strobe				−4	−6.4	
$I_{CC(off)}$	Supply current, all outputs off		All inputs at 5 V,	T_A = 25°C		18	25	mA
$I_{CC(on)}$	Supply current, one output on		$I_{(sink)}$ = 50 mA,	T_A = 25°C		58	75	mA

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

PARAMETER¶	TO (OUTPUT)	TEST CONDITIONS§	MIN	TYP	MAX	UNIT
t_{PLH}	W, X, Y, or Z	V_S = $V_{(clamp)}$ = 15 V, R_L = 24 Ω, C_L = 25 pF, See Figure 3		40	50	ns
t_{PHL}				35	50	
t_{TLH}	W, X, Y, or Z			10	15	ns
t_{THL}				15	20	
t_s	W, X, Y, or Z			30	35	ns
V_{OH}	W, X, Y, or Z	V_S = $V_{(clamp)}$ = 24 V, R_L = 47 Ω, C_L = 25 pF, $I_{(sink)}$ ≈ 500 mA, See Figure 3		V_S−1		mV

† Unless otherwise noted, V_{CC} = 5.5 V, $V_{(clamp)}$ = 24 V. See Figure 1.
‡ All typical values are at T_A = 25°C.
§ Under these conditions, not more than one output is to be on at any one time.
¶ t_{PLH} = propagation delay time, low-to-high-level output
t_{PHL} = propagation delay time, high-to-low-level output
t_{TLH} = transition time, low-to-high-level output
t_{THL} = transition time, high-to-low-level output
t_s = storage time
V_{OH} = high-level output voltage (after switching)

NOTES: 3. These parameters must be measured using pulse techniques. t_w = 200 μs, duty cycle ≤ 2%.
4. R_{ext} is connected to V_{CC} through a 40-Ω resistor.

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

PARAMETER			TEST CONDITIONS†		SN55327 MIN	SN55327 TYP‡	SN55327 MAX	UNIT
V_{IK}	Input clamp voltage		V_{CC} = 4.5 V, T_A = 25°C	I_I = −10 mA,		−1	−1.7	V
$I_{(off)}$	Collectors terminal off-state current		V_{CC1} = 4.5 V, $V_{(col)}$ = 24 V	Full range			500	μA
				T_A = 25°C			150	
$V_{(sat)}$	Saturation voltage		V_{CC1} = 4.5 V, V_O = 0, R_L = 25 Ω to 15 V, $I_{(source)}$ ≈ −600 mA§, See Notes 3 and 5	Full range			0.9	V
				T_A = 25°C		0.43	0.7	
I_I	Input current at maximum input voltage	Address	V_I = 5.5 V				1	mA
		Strobe					4	
I_{IH}	High-level input current	Address	V_I = 2.4 V				40	μA
		Strobe					160	
I_{IL}	Low-level input current	Address	V_I = 0.4 V			−1	−1.6	mA
		Strobe				−4	−6.4	
$I_{CC(off)}$	Supply current, all outputs off	From V_{CC1}	All inputs at 5 V,	T_A = 25°C		7	10	mA
		From V_{CC2}				13	20	
$I_{CC(on)}$	Supply current, one output on	From V_{CC1}	$V_{(col)}$ = 6 V, T_A = 25°C,	$I_{(source)}$ = −50 mA, See Note 3		8	12	mA
		From V_{CC2}				36	55	

switching characteristics, V_{CC1} = 5 V, T_A = 25°C

PARAMETER¶	TO (OUTPUT)	TEST CONDITIONS§	MIN	TYP	MAX	UNIT
t_{PLH}	Collectors W, Z or X, Y	V_S = V_{CC2} = 15 V, R_L = 24 Ω, C_L = 25 pF, See Figure 3 and Note 5		35	55	ns
t_{PHL}				30	55	
t_{TLH}	W, X, Y, or Z	$V_{(col)}$ = V_{CC2} = 20 V, R_L = 100 Ω, C_L = 25 pF, See Figure 4 and Note 5		30		ns
t_{THL}				10		
V_{OH}	Collectors W, Z or X, Y	V_S = V_{CC2} = 24 V, R_L = 47 Ω, C_L = 25 pF, $I_{(sink)}$ ≈ 500 mA, See Figure 3 and Note 5		V_S−1		mV

†Unless otherwise noted, V_{CC1} = 5.5 V, V_{CC2} = 24 V. See Figure 2.
‡All typical values are at T_A = 25°C.
§Under these conditions, not more than one output is to be on at any one time.
¶t_{PLH} = propagation delay time, low-to-high-level output
t_{PHL} = propagation delay time, high-to-low-level output
t_{TLH} = transition time, low-to-high-level output
t_{THL} = transition time, high-to-low-level output
V_{OH} = high-level output voltage (after switching)

NOTES: 3. These parameters must be measured using pulse techniques. t_w = 200 μs, duty cycle ≤ 2%.
5. A 350-Ω resistor is connected between node R (pin 4) and V_{CC2} (pin 1) with R_{int} (pin 5) open.

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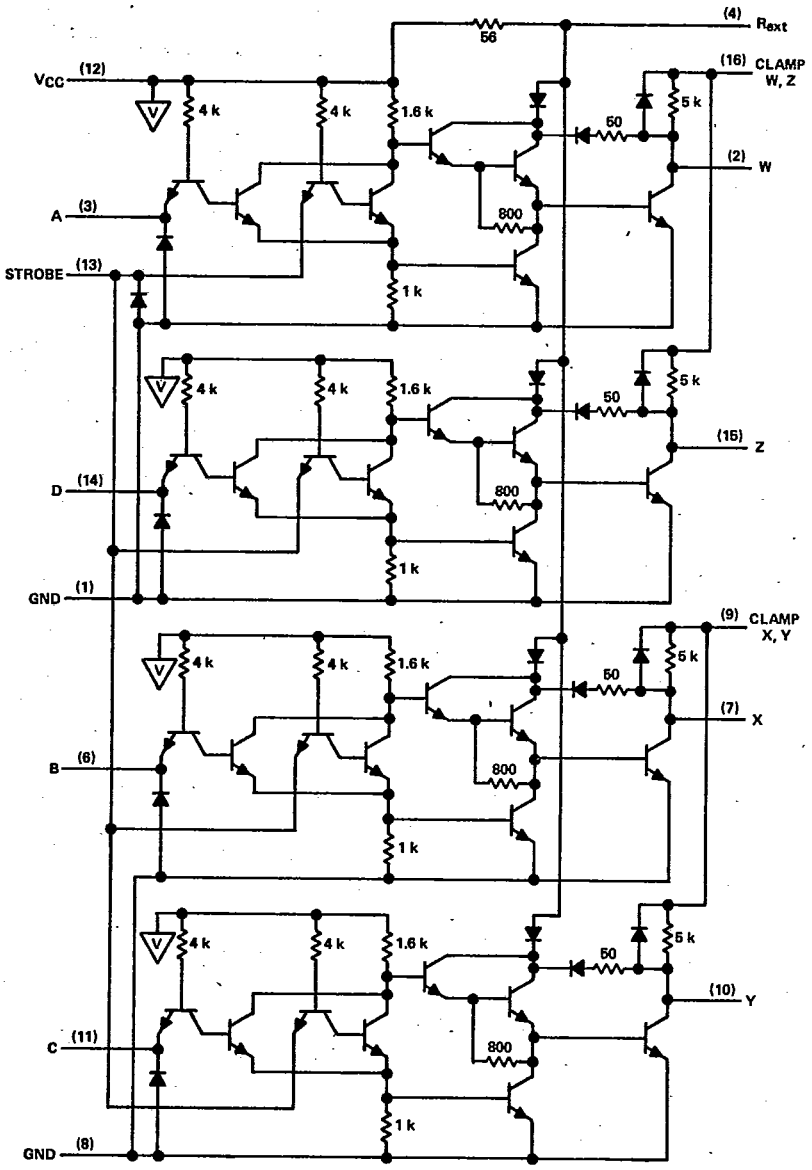
schematic

SN55326



Resistor values shown are nominal and in ohms.

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schematic

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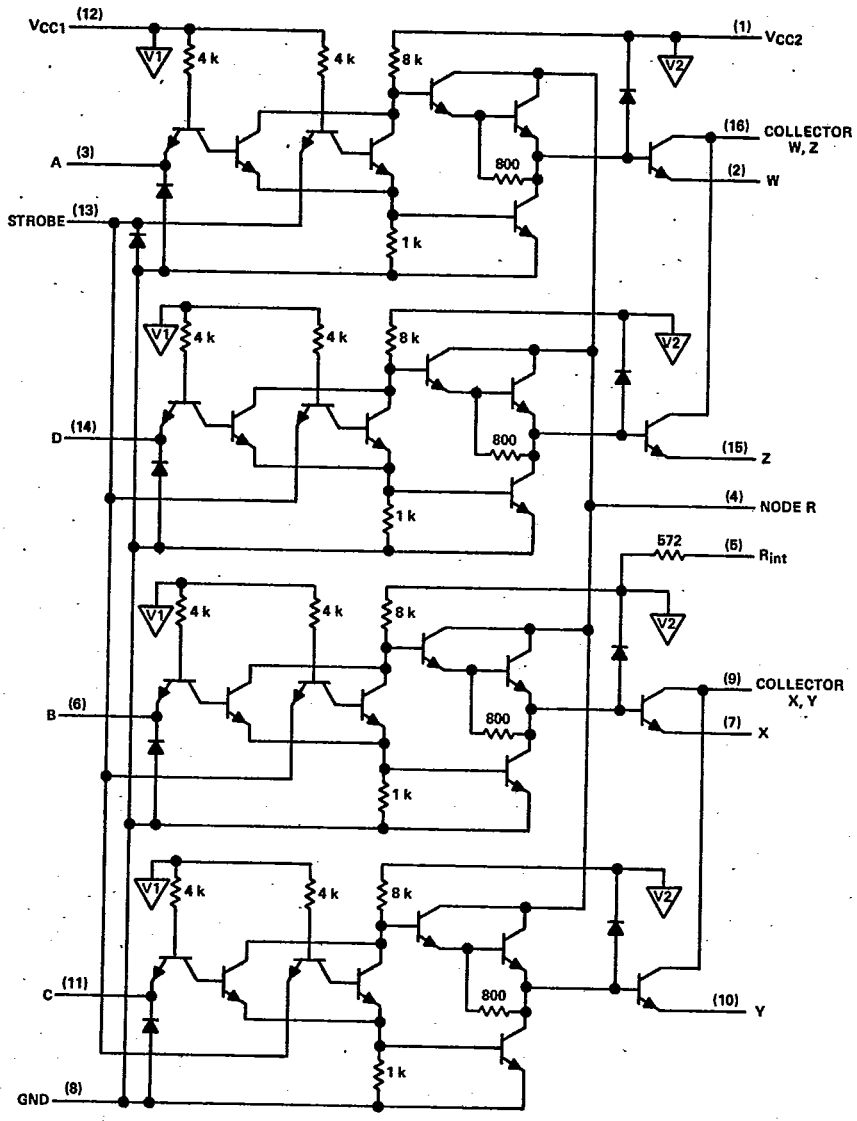


Resistor values shown are nominal and in ohms.

PARAMETER MEASUREMENT INFORMATION

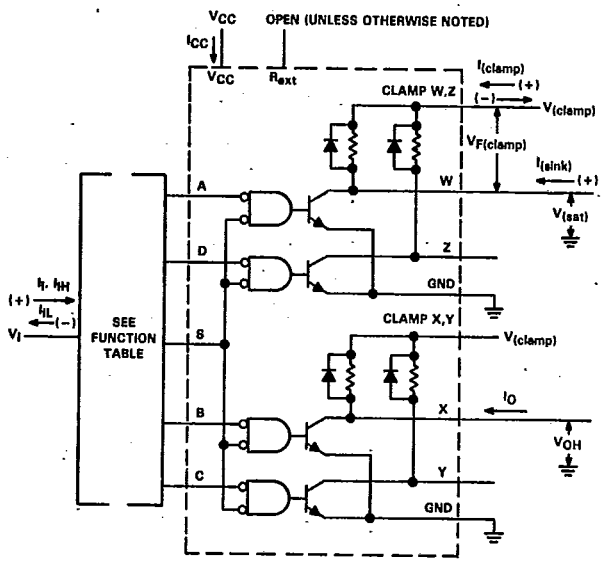
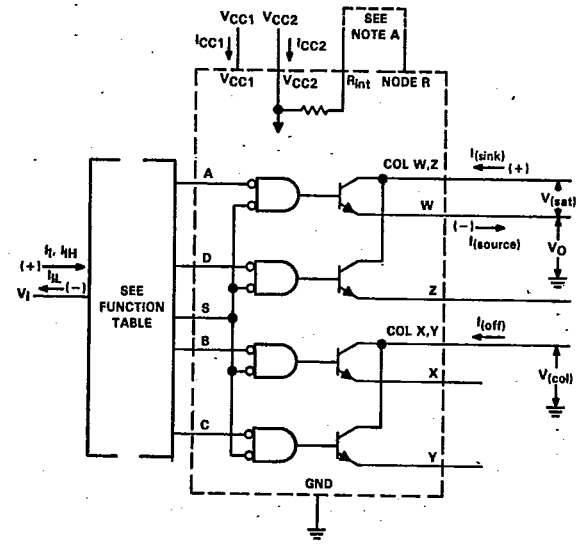


FIGURE 1. GENERALIZED TEST CIRCUIT FOR SN55326



NOTE A: R_{int} is connected to Node R unless otherwise noted.

FIGURE 2. GENERALIZED TEST CIRCUIT FOR SN55327

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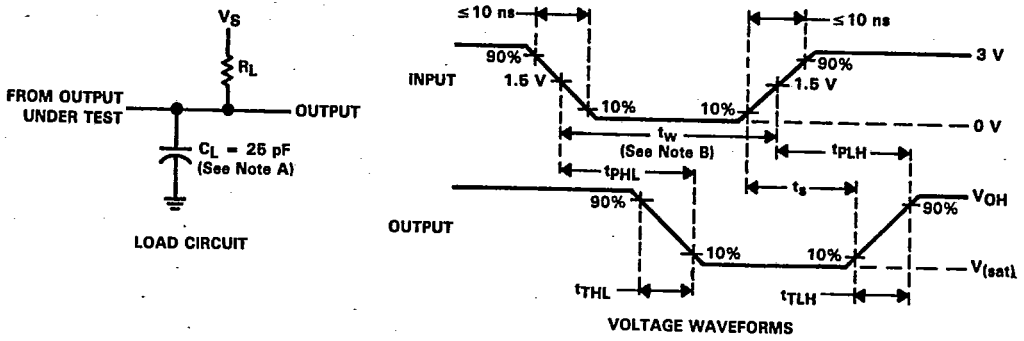
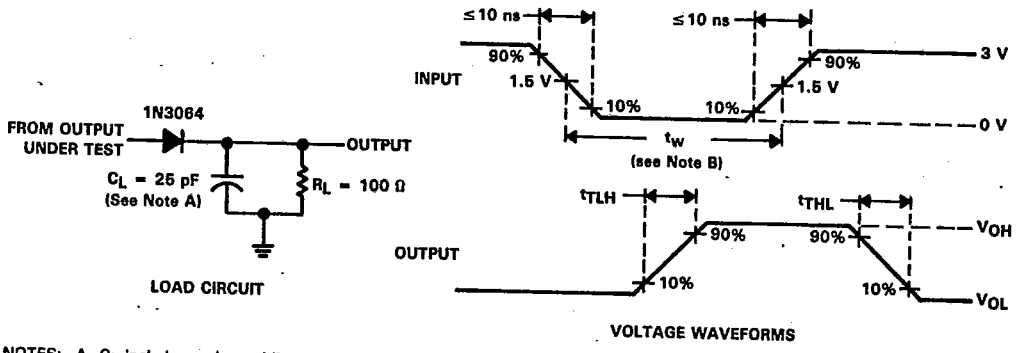
PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: $Z_{out} \approx 50\ \Omega$. For testing V_{OH} (after switching), $t_w = 40\ \mu s$, PRR ≤ 12.5 kHz. For all other tests, $t_w = 200$ ns, duty cycle ≤ 1%.

FIGURE 3. SWITCHING TIMES



NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: $Z_{out} \approx 50\ \Omega$, $t_w = 200$ ns, duty cycle ≤ 1%.

FIGURE 4. SWITCHING TIMES