



**SN55451B, SN55452B, SN55453B, SN55454B  
SN75451B, SN75452B, SN75453B, SN75454B  
DUAL PERIPHERAL DRIVERS**

SLRS021B – DECEMBER 1976 – REVISED SEPTEMBER 1999

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

	SN55'	SN75'	UNIT
Supply voltage, $V_{CC}$ (see Note 1)	7	7	V
Input voltage, $V_I$	5.5	5.5	V
Inter-emitter voltage (see Note 2)	5.5	5.5	V
Off-state output voltage, $V_O$	30	30	V
Continuous collector or output current, $I_{OK}$ (see Note 3)	400	400	mA
Peak collector or output current, $I_I$ ( $t_W \leq 10$ ms, duty cycle $\leq 50\%$ , see Note 4)	500	500	mA
Continuous total power dissipation	See Dissipation Rating Table		
Operating free-air temperature range, $T_A$	-55 to 125	0 to 70	°C
Storage temperature range, $T_{stg}$	-65 to 150	-65 to 150	°C
Case temperature for 60 seconds	FK package	260	°C
Lead temperature 1,6 mm (1/16 inch) from case for 60 seconds	JG package	300	°C
Lead temperature 1,6 mm (1/16 inch) from case for 10 seconds	D or P package	260	°C

- NOTES: 1. Voltage values are with respect to network GND, unless otherwise specified.  
 2. This is the voltage between two emitters of a multiple-emitter transistor.  
 3. This value applies when the base-emitter resistance ( $R_{BE}$ ) is equal to or less than 500  $\Omega$ .  
 4. Both halves of these dual circuits may conduct rated current simultaneously; however, power dissipation averaged over a short time interval must fall within the continuous dissipation rating.

**DISSIPATION RATING TABLE**

PACKAGE	$T_A \leq 25^\circ\text{C}$ POWER RATING	DERATING FACTOR ABOVE $T_A = 25^\circ\text{C}$	$T_A = 70^\circ\text{C}$ POWER RATING	$T_A = 125^\circ\text{C}$ POWER RATING
D	725 mW	5.8 mW/°C	464 mW	—
FK	1375 mW	11.0 mW/°C	880 mW	275 mW
JG	1050 mW	8.4 mW/°C	672 mW	210 mW
P	1000 mW	8.0 mW/°C	640 mW	—

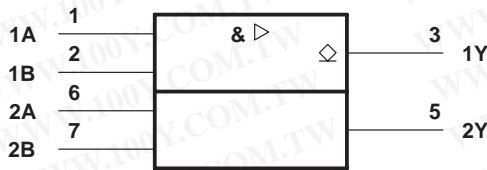
**recommended operating conditions**

	SN55'			SN75'			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
High-level input voltage, $V_{IH}$	2			2			V
Low-level input voltage, $V_{IL}$	0.8			0.8			V
Operating free-air temperature, $T_A$	-55 to 125			0 to 70			°C

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logic symbol†



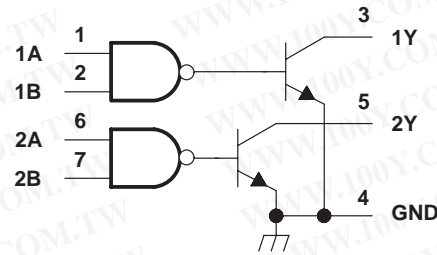
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC publication 617-12.  
 Pin numbers shown are for the D, JG, and P packages.

**FUNCTION TABLE**  
(each driver)

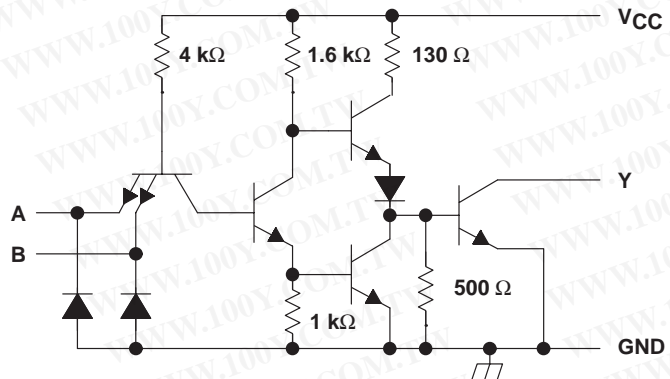
A	B	Y
L	L	L (on state)
L	H	L (on state)
H	L	L (on state)
H	H	H (off state)

positive logic:  
 $Y = AB \text{ or } \overline{A+B}$

logic diagram (positive logic)



schematic (each driver)



Resistor values shown are nominal.

electrical characteristics over recommended operating free-air temperature range

PARAMETER	TEST CONDITIONS‡	SN55451B			SN75451B			UNIT
		MIN	TYP§	MAX	MIN	TYP§	MAX	
V <sub>IK</sub> Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA	-1.2	-1.5		-1.2	-1.5		V
V <sub>OL</sub> Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 100 mA	0.25	0.5		0.25	0.4		V
	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 300 mA	0.5	0.8		0.5	0.7		
I <sub>OH</sub> High-level output current	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>OH</sub> = 30 V			300			100	μA
I <sub>I</sub> Input current at maximum input voltage	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1			1	mA
I <sub>IH</sub> High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40			40	μA
I <sub>IL</sub> Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-1	-1.6		-1	-1.6		mA
I <sub>CCH</sub> Supply current, outputs high	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5 V	7	11		7	11		mA
I <sub>CCL</sub> Supply current, outputs low	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0	52	65		52	65		mA

‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.  
 § All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C

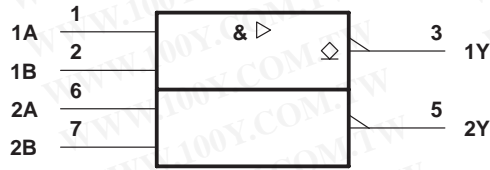
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub> Propagation delay time, low-to-high-level output	I <sub>O</sub> ≈ 200 mA, C <sub>L</sub> = 15 pF, R <sub>L</sub> = 50 Ω, See Figure 1		18	25	ns
t <sub>PHL</sub> Propagation delay time, high-to-low-level output			18	25	
t <sub>TLH</sub> Transition time, low-to-high-level output			5	8	
t <sub>THL</sub> Transition time, high-to-low-level output			7	12	
V <sub>OH</sub> High-level output voltage after switching	SN55451B	V <sub>S</sub> - 6.5			mV
	SN75451B	V <sub>S</sub> - 6.5			

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logic symbol†



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

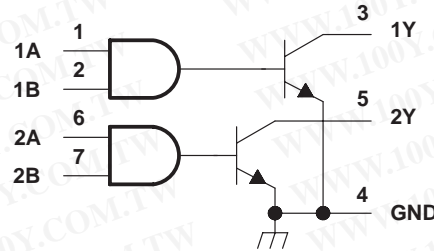
Pin numbers shown are for the D, JG, and P packages.

FUNCTION TABLE  
(each driver)

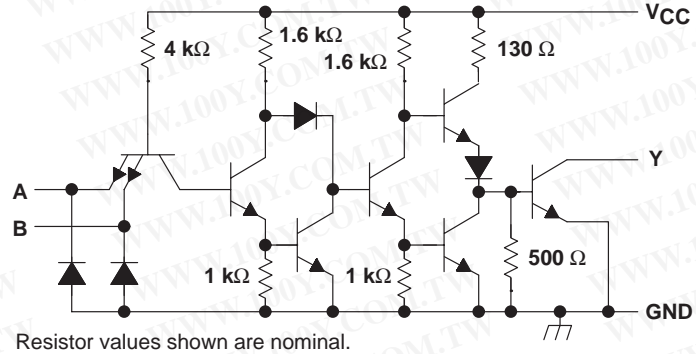
A	B	Y
L	L	H (off state)
L	H	H (off state)
H	L	H (off state)
H	H	L (on state)

positive logic:  
 $Y = \overline{AB}$  or  $\overline{A+B}$

logic diagram (positive logic)



schematic (each driver)



electrical characteristics over recommended operating free-air temperature range

PARAMETER	TEST CONDITIONS‡	SN55452B			SN75452B			UNIT	
		MIN	TYP§	MAX	MIN	TYP§	MAX		
$V_{IK}$ Input clamp voltage	$V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$	-1.2	-1.5		-1.2	-1.5		V	
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 100 \text{ mA}$	0.25	0.5		0.25	0.4		V	
	$V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 300 \text{ mA}$	0.5	0.8		0.5	0.7		V	
$I_{OH}$ High-level output current	$V_{CC} = \text{MIN}$ , $V_{IL} = 0.8 \text{ V}$ , $V_{OH} = 30 \text{ V}$			300			100	$\mu\text{A}$	
$I_I$ Input current at maximum input voltage	$V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$			1			1	mA	
$I_{IH}$ High-level input current	$V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$			40			40	$\mu\text{A}$	
$I_{IL}$ Low-level input current	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$	-1.1	-1.6		-1.1	-1.6		mA	
$I_{CCH}$ Supply current, outputs high	$V_{CC} = \text{MAX}$ , $V_I = 0$			11	14		11	14	mA
$I_{CCL}$ Supply current, outputs low	$V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$			56	71		56	71	mA

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

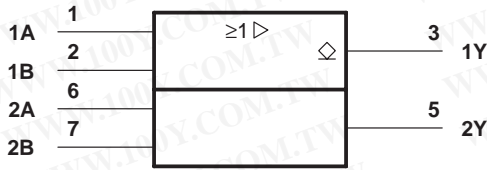
§ All typical values are at  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

switching characteristics,  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$t_{PLH}$ Propagation delay time, low-to-high-level output	$I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1		26	35	ns
$t_{PHL}$ Propagation delay time, high-to-low-level output			24	35	
$t_{TLH}$ Transition time, low-to-high-level output			5	8	
$t_{THL}$ Transition time, high-to-low-level output			7	12	
$V_{OH}$ High-level output voltage after switching	SN55452B	$V_S - 6.5$			mV
	SN75452B	$V_S - 6.5$			



**logic symbol†**



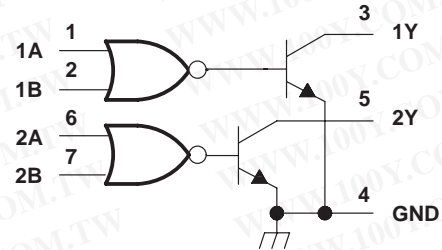
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**FUNCTION TABLE**  
(each driver)

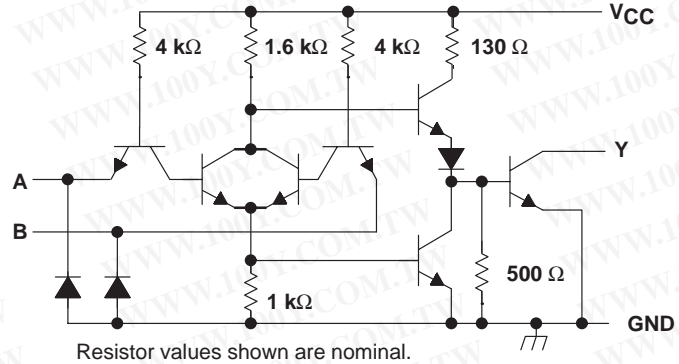
A	B	Y
L	L	L (on state)
L	H	H (off state)
H	L	H (off state)
H	H	H (off state)

positive logic:  
 $Y = A+B$  or  $\overline{A}\overline{B}$

**logic diagram (positive logic)**



**schematic (each driver)**



**electrical characteristics over recommended operating free-air temperature range**

PARAMETER	TEST CONDITIONS‡	SN55453B		SN75453B		UNIT	
		MIN	TYP§	MAX	MIN		TYP§
V <sub>IK</sub> Input clamp voltage	V <sub>CC</sub> = MIN, I <sub>I</sub> = -12 mA	-1.2		-1.5	-1.2		V
V <sub>OL</sub> Low-level output voltage	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 100 mA	0.25		0.5	0.25		V
	V <sub>CC</sub> = MIN, V <sub>IL</sub> = 0.8 V, I <sub>OL</sub> = 300 mA	0.5		0.8	0.5		
I <sub>OH</sub> High-level output current	V <sub>CC</sub> = MIN, V <sub>IH</sub> = MIN, V <sub>OH</sub> = 30 V			300		100	μA
I <sub>I</sub> Input current at maximum input voltage	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5.5 V			1		1	mA
I <sub>IH</sub> High-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 2.4 V			40		40	μA
I <sub>IL</sub> Low-level input current	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0.4 V	-1		-1.6	-1	-1.6	mA
I <sub>CC</sub> H Supply current, outputs high	V <sub>CC</sub> = MAX, V <sub>I</sub> = 5 V	8		11	8	11	mA
I <sub>CC</sub> L Supply current, outputs low	V <sub>CC</sub> = MAX, V <sub>I</sub> = 0	54		68	54	68	mA

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

§ All typical values are at V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C.

**switching characteristics, V<sub>CC</sub> = 5 V, T<sub>A</sub> = 25°C**

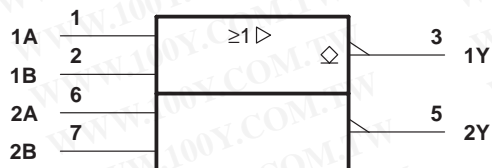
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t <sub>PLH</sub> Propagation delay time, low-to-high-level output	I <sub>O</sub> ≈ 200 mA, C <sub>L</sub> = 15 pF, R <sub>L</sub> = 50 Ω, See Figure 1		18	25	ns
t <sub>PHL</sub> Propagation delay time, high-to-low-level output			18	25	
t <sub>TLH</sub> Transition time, low-to-high-level output			5	8	
t <sub>THL</sub> Transition time, high-to-low-level output			7	12	
V <sub>OH</sub> High-level output voltage after switching	SN55453B	V <sub>S</sub> - 6.5		mV	
	SN75453B	V <sub>S</sub> - 6.5			

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## logic symbol†



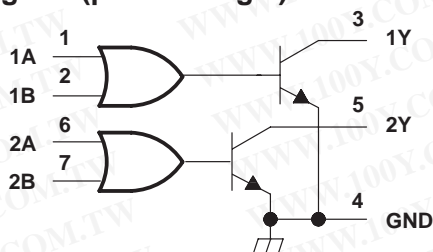
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**FUNCTION TABLE**  
(each driver)

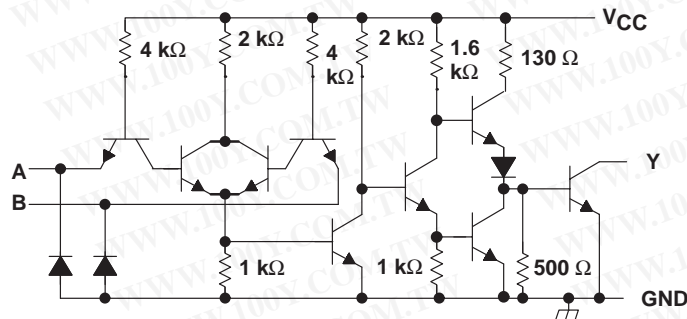
A	B	Y
L	L	H (off state)
L	H	L (on state)
H	L	L (on state)
H	H	L (on state)

positive logic:  
 $Y = A+B$  or  $\overline{AB}$

## logic diagram (positive logic)



## schematic (each driver)



Resistor values shown are nominal.

## electrical characteristics over recommended operating free-air temperature range

PARAMETER	TEST CONDITIONS‡	SN55454B			SN75454B			UNIT
		MIN	TYP§	MAX	MIN	TYP§	MAX	
$V_{IK}$ Input clamp voltage	$V_{CC} = \text{MIN}$ , $I_I = -12 \text{ mA}$	-1.2	-1.5		-1.2	-1.5		V
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 100 \text{ mA}$	0.25	0.5		0.25	0.4		V
	$V_{CC} = \text{MIN}$ , $V_{IH} = \text{MIN}$ , $I_{OL} = 300 \text{ mA}$	0.5	0.8		0.5	0.7		
$I_{OH}$ High-level output current	$V_{CC} = \text{MIN}$ , $V_{OH} = 30 \text{ V}$ , $V_{IL} = 0.8 \text{ V}$			300			100	$\mu\text{A}$
$I_I$ Input current at maximum input voltage	$V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$			1			1	mA
$I_{IH}$ High-level input current	$V_{CC} = \text{MAX}$ , $V_I = 2.4 \text{ V}$			40			40	$\mu\text{A}$
$I_{IL}$ Low-level input current	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$	-1	-1.6		-1	-1.6		mA
$I_{CCH}$ Supply current, outputs high	$V_{CC} = \text{MAX}$ , $V_I = 0$	13	17		13	17		mA
$I_{CCL}$ Supply current, outputs low	$V_{CC} = \text{MAX}$ , $V_I = 5 \text{ V}$	61	79		61	79		mA

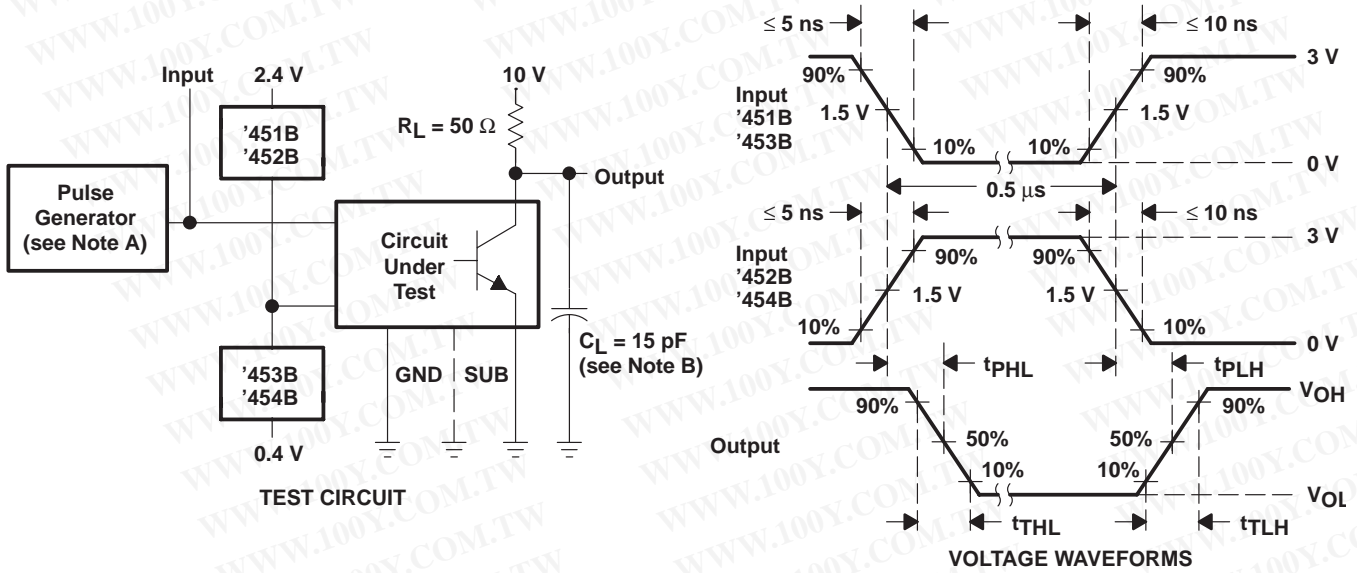
‡ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

## switching characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^\circ\text{C}$

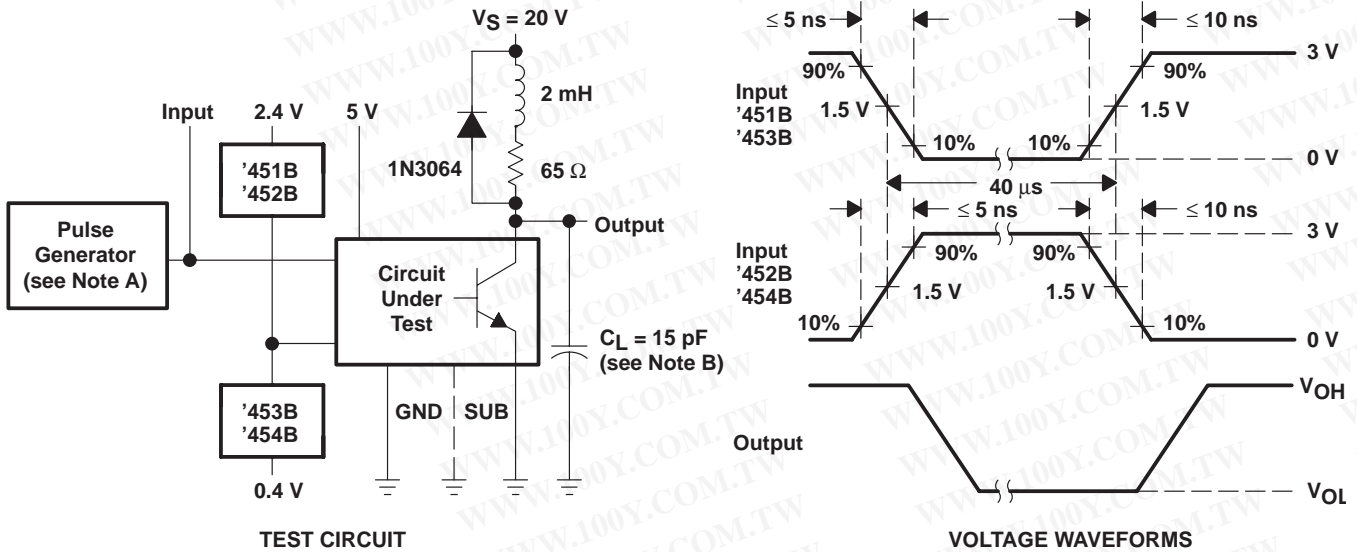
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
		$t_{PLH}$ Propagation delay time, low-to-high-level output				27
$t_{PHL}$ Propagation delay time, high-to-low-level output	$I_O \approx 200 \text{ mA}$ , $C_L = 15 \text{ pF}$ , $R_L = 50 \Omega$ , See Figure 1		24	35		
$t_{TLH}$ Transition time, low-to-high-level output			5	8		
$t_{THL}$ Transition time, high-to-low-level output			7	12		
$V_{OH}$ High-level output voltage after switching		SN55454B	$V_S = 20 \text{ V}$ , $I_O \approx 300 \text{ mA}$ , See Figure 2			$V_S - 6.5$
	SN75454B				$V_S - 6.5$	

**PARAMETER MEASUREMENT INFORMATION**



NOTES: A. The pulse generator has the following characteristics: PRR ≤ 1 MHz, Z<sub>O</sub> = 50 Ω.  
 B. C<sub>L</sub> includes probe and jig capacitance.

**Figure 1. Test Circuit and Voltage Waveforms, Complete Drivers**

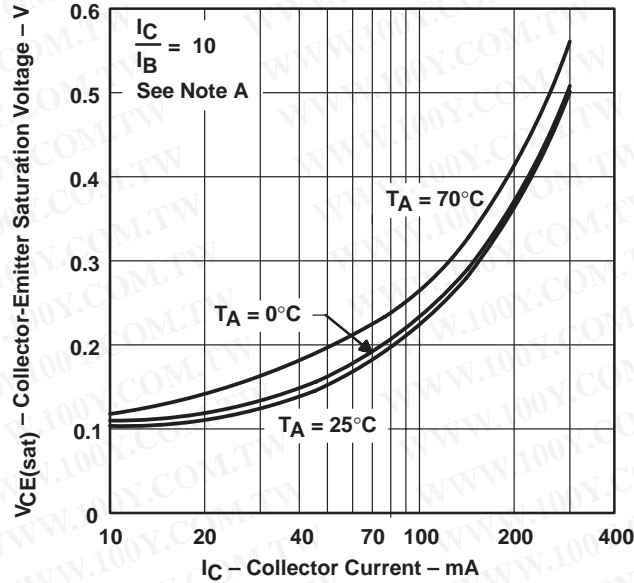


NOTES: A. The pulse generator has the following characteristics: PRR ≤ 12.5 kHz, Z<sub>O</sub> = 50 Ω.  
 B. C<sub>L</sub> includes probe and jig capacitance.

**Figure 2. Test Circuit and Voltage Waveforms for Latch-Up Test of Complete Drivers**

### TYPICAL CHARACTERISTICS

#### TRANSISTOR COLLECTOR-EMITTER SATURATION VOLTAGE vs COLLECTOR CURRENT



NOTE A: These parameters must be measured using pulse techniques,  
 $t_w = 300 \mu\text{s}$ , duty cycle  $\leq 2\%$ .

Figure 3