FAIRCHILD

A Schlumberger Company

μA75450/60/70 Series
Dual Peripheral Drivers

Linear Division Interface Products

Description

The μA75400 series of devices are dual high speed general purpose interface drivers that convert TTL and DTL logic levels to high current drive capability. The μA75450 features two TTL NAND gates and two uncommitted transistors. The μA75451, μA75452, and μA75453 feature two standard series 74 TTL gates in AND, NAND and OR configurations respectively, driving the base of two high voltage, high current, uncommitted collector output transistors.

The μA75400 series offers flexibility in designing high speed logic buffers, power drivers, lamp drivers, line drivers, MOS drivers, clock drivers, and memory drivers.

- **No Latch-Up Up To 55 V**
- **High Output Current Capability**
- **TTL Or DTL Input Compatibility**
- **Input Clamp Diodes**
- **5.0 V Supply Voltage**

Absolute Maximum Ratings

	μA75450	μA75451 μA75461 μA75452 μA75462 μA75453 μA75471 μA75472
Storage Temperature Range[1] Ceramic DIP	−65°C to +175°C	−65°C to +175°C
Molded DIP and SO-8	−65°C to +150°C	−65°C to +150°C
Operating Temperature Range	0°C to +70°C	0°C to +70°C
Lead Temperature Ceramic DIP (soldering, 60 s)	300°C	300°C
Molded DIP and SO-8 (soldering, 10 s)	265°C	265°C
Internal Power Dissipation[2, 3] 14L-Ceramic DIP	1.36 W	
14L-Molded DIP	1.04 W	
8L-Ceramic DIP		1.30 W
8L-Molded DIP		0.93 W
SO-8		0.81 W
Supply Voltage[4]	7.0 V	7.0 V
Input Voltage[4]	5.5 V	5.5 V
Inter-emitter Voltage[5]	5.5 V	5.5 V
V_{CC} to Substrate Voltage[9]	35 V	
Collector to Substrate Voltage[9]	35 V	
Collector to Base Voltage	35 V	
Collector to Emitter Voltage[6]	30 V	
Emitter to Base Voltage	5.0 V	
Output Voltage[4 and 7]		Table 2
Continuous Collector Current[8]	300 mA	
Continuous Output Current[8]		300 mA

Notes

1. μA75452 is Molded DIP and SO-8 only.
2. $T_{J\ Max}$ = 175°C for the Ceramic DIP, and 150°C for the Molded DIP.
3. Ratings apply to ambient temperature at 25°C. Above this temperature, derate the 14L-Ceramic DIP at 9.1 mW/°C, the 14L-Molded DIP at 8.3 mW/°C, the 8L-Ceramic DIP at 8.7 mW/°C, and the 8L-Molded DIP at 7.5 mW/°C.
4. Voltage values are with respect to network ground terminal unless otherwise specified.
5. This is the voltage between two emitters of a mulitiple emitter input transistor.
6. This value applies when the base-emitter resistance (R_{BE}) is equal to or less than 500 Ω.
7. This is the maximum voltage which should be applied to any output when it is in the off state.
8. Both halves of these dual circuits may conduct rated current simultaneously.
9. For the μA75450 only, the substrate (Lead 8), must always be at the most negative device voltage for proper operation.

Test Table 1 Operating Temperature Range and Supply Voltage Range

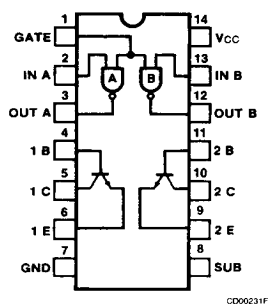| Symbol	Characteristic	µA75000 Series
T_A	Operating Temperature	0°C to 70°C
V_{CC}	Supply Voltage	+4.75 V to +5.25 V

Test Table 2

Symbol	Characteristic	µA7545X	µA75461 µA75462	µA75471 µA75472
V_{OH}	Maximum Output	30 V	35 V	80 V
V_S	Maximum, Latch-up	20 V	30 V	55 V

µA75450
Dual Positive AND Peripheral Drivers

Connection Diagram
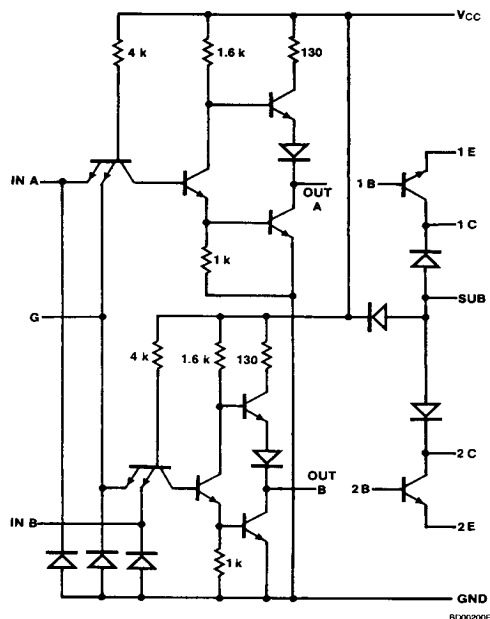**14-Lead DIP**
(Top View)

CD00231F

Logic Function
Positive Logic: Z = $\overline{XY}$ (gate only)
Z = XY (gate and transistor)

Order Information

Device Code	Package Code	Package Description
µA75450DC	6A	Ceramic DIP
µA75450PC	9A	Molded DIP

Equivalent Circuit

All resistor values in ohms

BD00200F

9

µA75450

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

TTL Gates

Symbol	Characteristic		Condition	Test Figure	Min	Typ[1]	Max	Unit
V_{IH}	Input Voltage HIGH			1	2.0			V
V_{IL}	Input Voltage LOW			2			0.8	V
V_{IC}	Input Clamp Diode Voltage		V_{CC} = Min, I_I = −12 mA	3			−1.5	V
V_{OH}	Output Voltage HIGH		V_{CC} = Min, V_{IL} = 0.8 V, I_{OH} = −400 µA	2	2.4	3.3		V
V_{OL}	Output Voltage LOW		V_{CC} = Min, V_{IH} = 2.0 V, I_{OL} = 16 mA	1		0.22	0.4	V
I_I	Input Current at Maximum Input Voltage	Input A	V_{CC} = Max, V_I = 5.5 V	4			1.0	mA
		Input G					2.0	mA
I_{IH}	Input Current HIGH	Input A	V_{CC} = Max, V_I = 2.4 V	4			40	µA
		Input G					80	
I_{IL}	Input Current LOW	Input A	V_{CC} = Max, V_I = 0.4 V	3			−1.6	mA
		Input G					−3.2	
I_{OS}	Output Short Circuit Current[2]		V_{CC} = Max	5	−18		−55	mA
I_{CCH}	Supply Current HIGH		V_{CC} = Max, V_I = 0 V	6		2.0	4.0	mA
I_{CCL}	Supply Current LOW		V_{CC} = Max, V_I = 5.0 V			6.0	11	

Output Transistors (Note 4)

Symbol	Characteristic	Condition	Min	Typ[1]	Max	Unit
$V_{(BR)CBO}$	Collector to Base Breakdown Voltage	I_C = 100 µA, I_E = 0 µA	35			V
$V_{(BR)CER}$	Collector to Base Breakdown Voltage	I_C = 100 µA, R_{BE} = 500 Ω	30			V
$V_{(BR)EBO}$	Emitter to Base Breakdown Voltage	I_E = 100 µA, I_C = 0 µA	5.0			V
h_{FE}	Static Forward Current Transfer Ratio[3]	V_{CE} = 3.0 V, I_C = 100 mA, T_A = 25°C	25			
		V_{CE} = 3.0 V, I_C = 300 mA, T_A = 25°C	30			
		V_{CE} = 3.0 V, I_C = 100 mA	20			
		V_{CE} = 3.0 V, I_C = 300 mA	25			
$V_{BE(sat)}$	Base to Emitter Voltage[3]	I_B = 10 mA, I_C = 100 mA		0.85	1.0	V
		I_B = 30 mA, I_C = 300 mA		1.05	1.2	
$V_{CE(sat)}$	Collector to Emitter Saturation Voltage[3]	I_B = 10 mA, I_C = 100 mA		0.25	0.4	V
		I_B = 30 mA, I_C = 300 mA		0.5	0.7	

μA75450 (Cont.)

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

AC Characteristics $V_{CC} = 5.0$ V, $T_A = 25°C$

TTL Gates

Symbol	Characteristic	Condition	Test Figure	μA75450B			Unit
				Min	Typ	Max	
t_{PLH}	Propagation Delay Time, LOW to HIGH	$C_L = 15$ pF, $R_L = 400$ Ω	12		12	22	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				8.0	15	ns

Output Transistors

Symbol	Characteristic	Condition[3]	Test Figure	Min	Typ	Max	Unit
t_d	Delay Time	$I_C = 200$ mA, $V_{BE(off)} = -1.0$ V, $I_{B(1)} = 20$ mA, $I_{B(2)} = -40$ mA, $C_L = 15$ pF, $R_L = 50$ Ω	13		8.0	15	ns
t_r	Rise Time				12	20	ns
t_S	Storage Time				7.0	15	ns
t_f	Fall Time				6.0	15	ns

Gates and Transistors Combined

Symbol	Characteristic	Condition	Test Figure	Min	Typ	Max	Unit
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_C = 200$ mA, $C_L = 15$ pF, $R_L = 50$ Ω	14		20	30	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				20	30	ns
t_{TLH}	Transition Time, LOW to HIGH				7.0	12	ns
t_{THL}	Transition Time, HIGH to LOW				9.0	15	ns
V_{OH}	HIGH Level Output Voltage After Switching	$V_I = 20$ V, $I_C \approx 300$ mA, $R_{BE} = 500$ Ω	15	$V_I - 6.5$			mV

Notes

1. All typical values are at $V_{CC} = 5.0$ V, $T_A = 25°C$.
2. Not more than one output should be shorted at a time.
3. These parameters must be measured using the pulse techniques. $t_w = 300$ μs, duty cycle ⩽ 2%.
4. Voltage and current values shown are nominal; exact values vary slightly with transistor parameter.

9

μA75451, μA75461, μA75471
Dual Positive AND Peripheral Drivers

Connection Diagram
8-Lead DIP and SO-8 Package
(Top View)

CD00261F
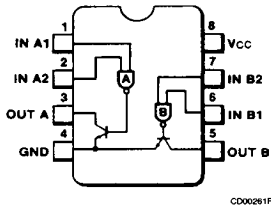
Truth Table

Inputs		Output
X	Y	Z
L	L	L (on state)
L	H	L (on state)
H	L	L (on state)
H	H	H (off state)

H = HIGH Level, L = LOW Level

Order Information

Device Code	Package Code	Package Description
μA75451RC	6T	Ceramic DIP
μA75451SC	KC	Molded Surface Mount
μA75451TC	9T	Molded DIP
μA75461TC	9T	Molded DIP
μA75471TC	9T	Molded DIP

Equivalent Circuit (1/2 of Circuit)
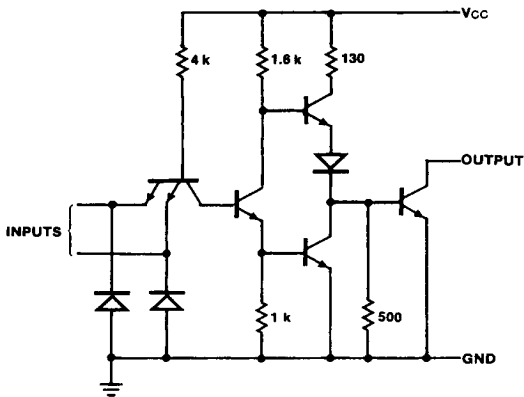
BO00211F

Notes
Component values shown are nominal.
All resistor values in ohms.

μA75451

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

Symbol	Characteristic	Condition	Test Figure	μA75451			Unit
				Min	Typ[1]	Max	
V_{IH}	Input Voltage HIGH		7	2.0			V
V_{IL}	Input Voltage LOW		7			0.8	V
V_{CD}	Input Clamp Diode Voltage	V_{CC} = Min, I_I = −12 mA	8			−1.5	V
I_{OH}	Output Current HIGH[2]	V_{CC} = Min, V_{IH} = 2.0 V	7			100	μA
V_{OL}	Output Voltage LOW	V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 100 mA	7		0.25	0.4	V
		V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 300 mA			0.5	0.7	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5 V	9			1.0	mA
I_{IH}	Input Current HIGH	V_{CC} = Max, V_I = 2.4 V	9			40	μA
I_{IL}	Input Current LOW	V_{CC} = Max, V_I = 0.4 V	8		−1.0	−1.6	mA
I_{CCH}	Supply Current HIGH	V_{CC} = Max, V_I = 5.0 V	10		7.0	11	mA
I_{CCL}	Supply Current LOW	V_{CC} = Max, V_I = 0 V			52	65	mA

AC Characteristics V_{CC} = 5.0 V, T_A = 25°C

Symbol	Characteristic	Condition	Test Figure	Min	Typ	Max	Unit
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω	14		18	25	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				25	25	ns
t_{TLH}	Transition Time, LOW to HIGH				5.0	8.0	ns
t_{THL}	Transition Time, HIGH to LOW				7.0	12	ns
V_{OH}	HIGH Level Output Voltage After Switching[3]	$I_O \approx$ 300 mA	15	V_I−6.5			mV

9

μA75461, μA75471

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

Symbol	Characteristic	Condition	Test Figure	μA75461			μA75471			Unit
				Min	Typ[1]	Max	Min	Typ[1]	Max	
V_{IH}	Input Voltage HIGH		7	2.0			2.0			V
V_{IL}	Input Voltage LOW		7			0.8			0.8	V
V_{IC}	Input Clamp Diode Voltage	V_{CC} = Min, I_I = −12 mA	8		−1.2	−1.5		−1.2	−1.5	V
I_{OH}	Output Current HIGH[2]	V_{CC} = Min, V_{IH} = 2.0 V	7			100			100	μA
V_{OL}	Output Voltage LOW	V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 100 mA	7		0.16	0.4		0.16	0.4	V
		V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 300 mA			0.35	0.7		0.35	0.7	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5 V	9			1.0			1.0	mA
I_{IH}	Input Current HIGH	V_{CC} = Max, V_I = 2.4 V	9			40			40	μA
I_{IL}	Input Current LOW	V_{CC} = Max, V_I = 0.4 V	8		−1.0	−1.6		−1.0	−1.6	mA
I_{CCH}	Supply Current HIGH	V_{CC} = Max, V_I = 5.0 V	10		8.0	11		8.0	11	mA
I_{CCL}	Supply Current LOW	V_{CC} = Max, V_I = 0 V			61	76		61	76	mA

AC Characteristics V_{CC} = 5.0 V, T_A = 25°C

Symbol	Characteristic	Condition	Test Figure	μA75461			μA75471			Unit
				Min	Typ	Max	Min	Typ	Max	
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω	14		35	55		35	55	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				25	40		25	40	ns
t_{TLH}	Transition Time, LOW to HIGH				8	20		8.0	20	ns
t_{THL}	Transition Time, HIGH to LOW				10	20		10	20	ns
V_{OH}	HIGH Level Output Voltage After Switching[3]	$I_O \approx$ 300 mA	15	V_I − 10			V_I − 18			mV

Notes
1. All typical values are at V_{CC} = 5.0 V, T_A = 25°C.
2. V_{OH} = 30 V for μA75451, 35 V for μA75461, 80 V for μA75471.
3. V_I = 20 V for μA75451, 30 V for μA75461, 55 V for μA75471.

µA75452, µA75462, µA75472
Dual Positive NAND Peripheral Driver

Connection Diagram
8-Lead DIP and SO-8 Package
(Top View)

CD00241F

Order Information

Device Code	Package Code	Package Description
µA75452SC	KC	Molded Surface Mount
µA75452TC	9T	Molded DIP
µA75462TC	9T	Molded DIP
µA75472TC	9T	Molded DIP
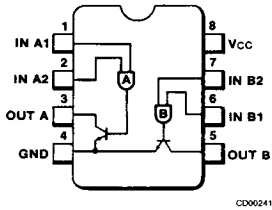
Truth Table

Inputs		Output	
1	2		
L	L	H	(off state)
L	H	H	(off state)
H	L	H	(off state)
H	H	L	(on state)

H = HIGH Level, L = LOW Level

Equivalent Circuit (1/2 of Circuit)
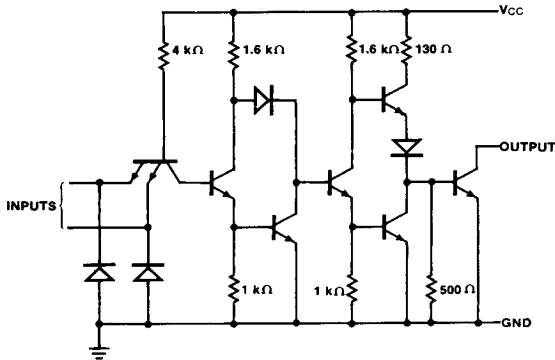
BD00221F

Notes
Component values shown are nominal.
All resistor values in ohms.

μA75452

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

Symbol	Characteristic	Condition	Test Figure	μA75452B			Unit
				Min	Typ[1]	Max	
V_{IH}	Input Voltage HIGH		7	2.0			V
V_{IL}	Input Voltage LOW		7			0.8	V
V_{IC}	Input Clamp Diode Voltage	V_{CC} = Min, I_I = −12 mA	8			−1.5	V
I_{OH}	Output Current HIGH[2]	V_{CC} = Min, V_{IL} = 0.8 V	7			100	μA
V_{OL}	Output Voltage LOW	V_{CC} = Min, V_{IH} = 2.0 V, I_{OL} = 100 mA	7		0.25	0.4	V
		V_{CC} = Min, V_{IH} = 2.0 V, I_{OL} = 300 mA			0.5	0.7	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5 V	9			1.0	mA
I_{IH}	Input Current HIGH	V_{CC} = Max, V_I = 2.4 V	9			40	μA
I_{IL}	Input Current LOW	V_{CC} = Max, V_I = 0.4 V	8		−1.0	−1.6	mA
I_{CCH}	Supply Current HIGH	V_{CC} = Max, V_I = 0 V	10		11	14	mA
I_{CCL}	Supply Current LOW	V_{CC} = Max, V_I = 5.0 V			56	71	mA

μA75452

AC Characteristics V_{CC} = 5.0 V, T_A = 25°C

Symbol	Characteristic	Condition	Test Figure	Min	Typ	Max	Unit
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω	14		25	35	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				22	35	ns
t_{TLH}	Transition Time, LOW to HIGH				5.0	8.0	ns
t_{THL}	Transition Time, HIGH to LOW				7.0	12	ns
V_{OH}	HIGH Level Output Voltage After Switching[3]	$I_O \approx$ 300 mA	15	V_I − 6.5			mV

µA75462/µA75472

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

Symbol	Characteristic	Condition	Test Figure	µA75462			µA75472			Unit
				Min	Typ[1]	Max	Min	Typ[1]	Max	
V_{IH}	Input Voltage HIGH		7	2.0			2.0			V
V_{IL}	Input Voltage LOW		7			0.8			0.8	V
V_{CD}	Input Clamp Diode Voltage	V_{CC} = Min, I_I = −12 mA	8		−1.2	−1.5		−1.2	−1.5	V
I_{OH}	Output Current HIGH[2]	V_{CC} = Min, V_{IL} = 0.8 V	7			100			100	µA
V_{OL}	Output Voltage LOW	V_{CC} = Min, V_{IH} = 2.0 V, I_{OL} = 100 mA	7		0.16	0.4		0.16	0.4	V
		V_{CC} = Min, V_{IH} = 2.0 V, I_{OL} = 300 mA			0.35	0.7		0.35	0.7	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5 V	9			1.0			1.0	mA
I_{IH}	Input Current HIGH	V_{CC} = Max, V_I = 2.4 V	9			40			40	µA
I_{IL}	Input Current LOW	V_{CC} = Max, V_I = 0.4 V	8		−1.0	−1.6		−1.0	−1.6	mA
I_{CCH}	Supply Current HIGH	V_{CC} = Max, V_I = 0 V	10		13	17		13	17	mA
I_{CCL}	Supply Current LOW	V_{CC} = Max, V_I = 5.0 V			65	76		65	76	mA

AC Characteristics V_{CC} = 5.0 V, T_A = 25°C

Symbol	Characteristic	Condition	Test Figure	µA75462			µA75472			Unit
				Min	Typ	Max	Min	Typ	Max	
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω	14		50	65		45	65	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				40	50		30	50	ns
t_{TLH}	Transition Time, LOW to HIGH				12	25		13	25	ns
t_{THL}	Transition Time, HIGH to LOW				15	20		10	20	ns
V_{OH}	HIGH Level Output Voltage After Switching[3]	$I_O \approx$ 300 mA	15	V_I − 10			V_I − 18			mV

Notes
1. All typical values are at V_{CC} = 5.0 V, T_A = 25°C.
2. V_{OH} = 30 V for µA75452, 35 V for µA75462, 80 V for µA75472.
3. V_S = 20 V for µA75452, 30 V for µA75462 and 55 V for µA75472.

9

μA75453
Dual Positive OR Peripheral Drivers

Connection Diagram
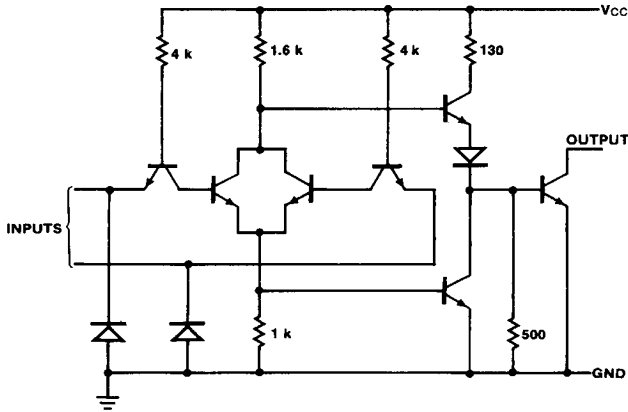**8-Lead DIP and SO-8 Package**
(Top View)

CD00251F

Order Information

Device Code	Package Code	Package Description
μA75453RC	6T	Ceramic DIP
μA75453SC	KC	Molded Surface Mount
μA75453TC	9T	Molded DIP

Equivalent Circuit (1/2 of Circuit)

BD00261F

Notes
Component values shown are nominal.
All resistor values in ohms.

Truth Table

Inputs		Output	
1	2		
L	L	L	(on state)
L	H	H	(off state)
H	L	H	(off state)
H	H	H	(off state)

H = HIGH Level, L = LOW Level

μA75453

Electrical Characteristics Over recommended operating temperature and supply voltage ranges, (use Test Table 1), unless otherwise indicated.

DC Characteristics

Symbol	Characteristic	Condition	Test Figure	Min	Typ[1]	Max	Unit
V_{IH}	Input Voltage HIGH		7	2.0			V
V_{IL}	Input Voltage LOW		7			0.8	V
V_{IC}	Input Clamp Diode Voltage	V_{CC} = Min, I_I = –12 mA	8			–1.5	V
I_{OH}	Output Current HIGH	V_{CC} = Min, V_{OH} = 30 V, V_{IH} = 2.0 V	7			100	μA
V_{OL}	Output Voltage LOW	V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 100 mA	7		0.25	0.4	V
		V_{CC} = Min, V_{IL} = 0.8 V, I_{OL} = 300 mA			0.5	0.7	
I_I	Input Current at Maximum Input Voltage	V_{CC} = Max, V_I = 5.5 V	9			1.0	mA
I_{IH}	Input Current HIGH	V_{CC} = Max, V_I = 2.4 V	9			40	μA
I_{IL}	Input Current LOW	V_{CC} = Max, V_I = 0.4 V	8		–1.0	–1.6	mA
I_{CCH}	Supply Current HIGH	V_{CC} = Max, V_I = 5.0 V	11		8.0	11	mA
I_{CCL}	Supply Current LOW	V_{CC} = Max, V_I = 0 V			54	68	mA

AC Characteristics V_{CC} = 5.0 V, T_A = 25°C

Symbol	Characteristic	Condition	Test Figure	μA75453			Unit
				Min	Typ	Max	
t_{PLH}	Propagation Delay Time, LOW to HIGH	$I_O \approx$ 200 mA, C_L = 15 pF, R_L = 50 Ω	14		18	25	ns
t_{PHL}	Propagation Delay Time, HIGH to LOW				16	25	ns
t_{TLH}	Transition Time, LOW to HIGH				5.0	8.0	ns
t_{THL}	Transition Time, HIGH to LOW				7.0	12	ns
V_{OH}	HIGH Level Output Voltage After Switching	V_I = 20 V, $I_O \approx$ 300 mA	15	V_I – 6.5			mV

Notes
1. All typical values are at V_{CC} = 5.0 V, T_A = 25°C.

Characteristics Measurement Information

DC Test Circuits (Note 1)

Figure 1 V_{IH}, V_{OL} (Note 2)
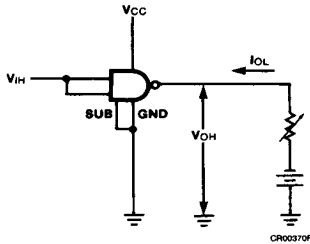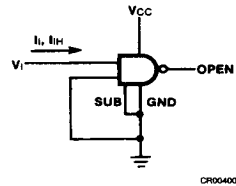

Figure 2 V_{IL}, V_{OH} (Note 3)
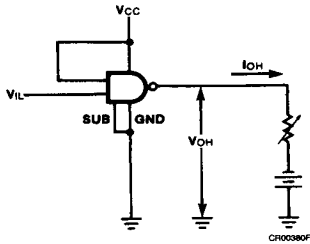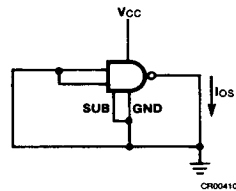

Figure 3 V_{IC}, I_{IL} (Notes 3 and 4)

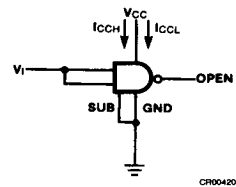
Figure 4 I_I, I_{IH} (Note 3)

Figure 5 I_{OS} (Note 5)

Figure 6 I_{CCH}, I_{CCL} (Note 6)

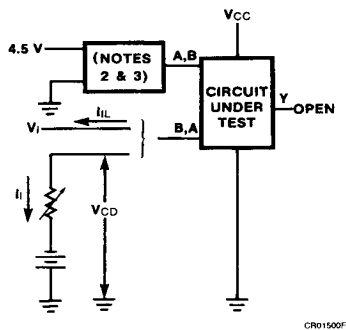**Figure 7** V_{IH}, V_{IL}, I_{OH}, V_{OL} (Note 3)

Notes
1. Arrows indicate actual direction of current flow. Current into a terminal is a positive value.
2. Both inputs are tested simultaneously.
3. Each input is tested separately.
4. When testing V_{IC}, input not under test is open.
5. Each gate is tested separately.
6. Both gates are tested simultaneously.
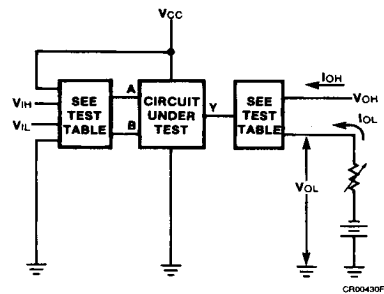
Characteristics Measurement Information (Cont.)

DC Test Circuits (Note 5)

Test Table 2

Circuit	Input Under Test	Other Input	Output	
			Apply	Measure
μA754X1	V_{IH}	V_{IH}	V_{OH}	I_{OH}
	V_{IL}	V_{CC}	I_{OL}	V_{OL}
μA754X2	V_{IH}	V_{IH}	I_{OL}	V_{OL}
	V_{IL}	V_{CC}	V_{OH}	I_{OH}
μA754X3	V_{IH}	GND	V_{OH}	I_{OH}
	V_{IL}	V_{IL}	I_{OL}	V_{OL}

Figure 8 V_{IC}, I_{IL} (Note 1)

CR01500F

Notes
1. Each input is tested separately.
2. When testing I_{IL} μA75400, the input not under test is grounded. For all other circuits it is at 4.5 V.
3. When testing V_{IC}, input not under test is open.
4. Both gates are tested simultaneously.
5. Arrows indicate actual direction of current flow. Current into a terminal is a position value.

Figure 9 I_I, I_{IH} (Note 1)

CR00450F
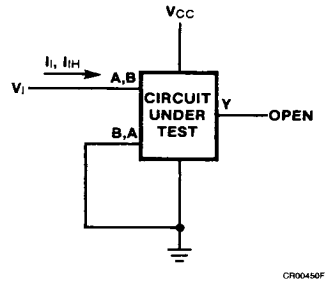
Figure 10 I_{CCH}, I_{CCL} for AND, NAND Circuits (Note 4)
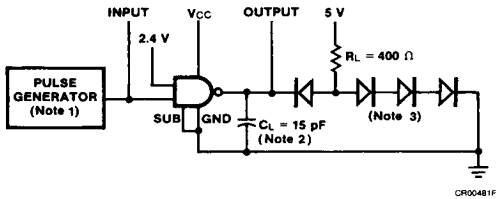

CR00460F
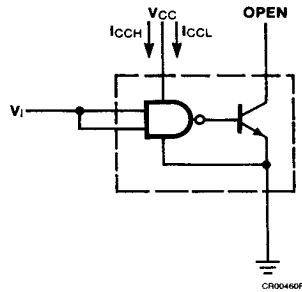
Figure 11 I_{CCH}, I_{CCL} for OR, NOR Circuits (Note 4)

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9
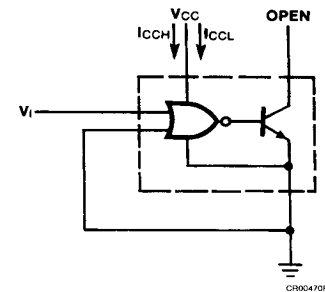
Characteristics Measurement Information (Cont.)

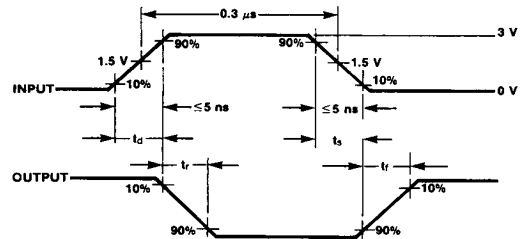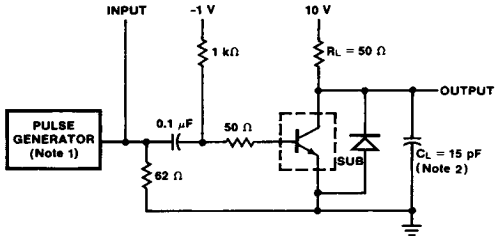### Switching Characteristics

Figure 12 Propagation Delay Times, Each Gate (μA75450 Only)
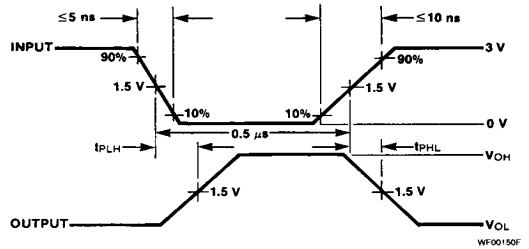
Notes
1. The pulse generator has the following characteristics:
   PRR = 1.0 MHz, $Z_O \approx 50\ \Omega$.
2. C_L includes probe and jig capacitance.
3. All diodes are FD777.

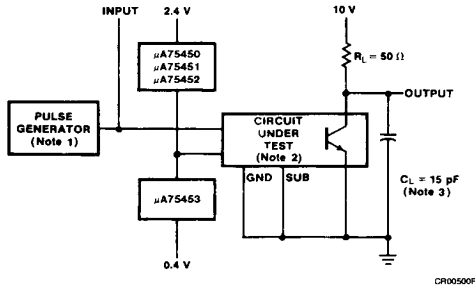**Figure 13 Switching Times, Each Transistor (μA75450 Only)**

Notes
1. The pulse generator has the following characteristics:
   duty cycle ≤ 1%, $Z_O \approx 50\ \Omega$.
2. C_L includes probe and jig capacitance.

Characteristics Measurement Information (Cont.)
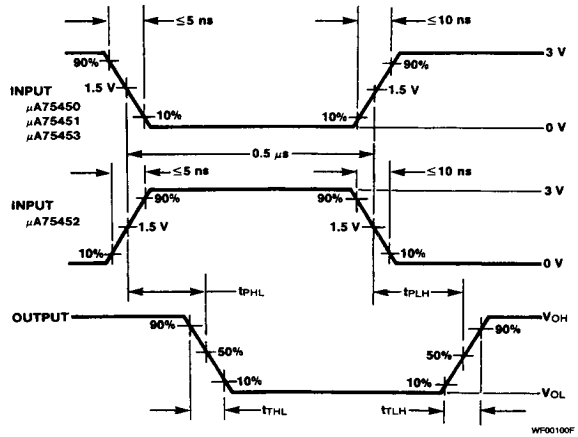
Switching Characteristics

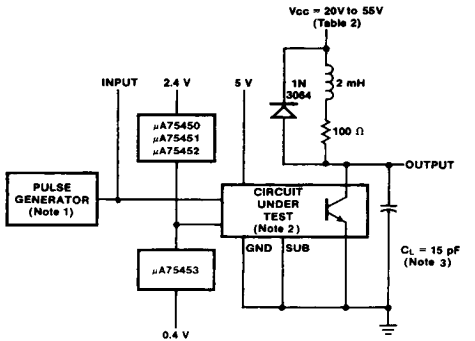#### Figure 14 Switching Times of Complete Drivers

Notes
1. The pulse generator has the following characteristics:
   PRR = 1.0 MHz, $Z_O \approx 50 \; \Omega$.
2. When testing μA75450, connect output Y to transistor base with a 500 Ω resistor to ground.
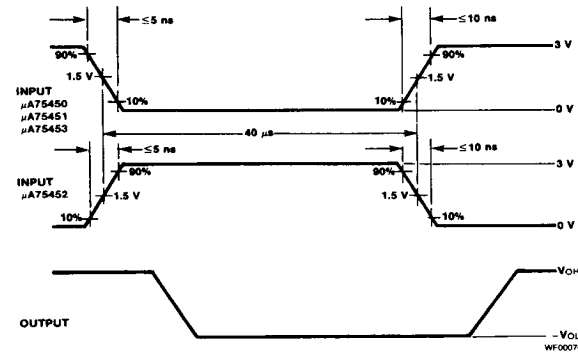3. C_L includes probe and jig capacitance.

Figure 15 Latch-up Test of Complete Drivers

Notes
1. The pulse generator has the following characteristics:
   PRR = 12.5 kHz, $Z_O \approx 50 \; \Omega$.
2. When testing μA75450, connect output Y to transistor base with a 500 Ω resistor from there to ground, and ground the substrate terminal.
3. C_L includes probe and jig capacitance.

9