

55/75450A • 55/75451A • 55/75452A 55/75453A • 55/75454A DUAL PERIPHERAL DRIVERS FAIRCHILD LINEAR INTEGRATED CIRCUITS

GENERAL DESCRIPTION — The 55/75450A, 55/75451A, 55/75452A, 55/75453A and 55/75454A are Dual High Speed General Purpose Interface Drivers that convert TTL and DTL logic levels to high current drive capability. The 55450A and 75450A feature two TTL NAND gates and two uncommitted transistors. The 55/75451A, 55/75452A, 55/75453A and 55/75454A feature two standard series 74 TTL gates in AND, NAND, OR and NOR configurations respectively, driving the base of two high voltage, high current, uncommitted collector output transistors.

The 55/75450A 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 AT 20 V
- HIGH OUTPUT CURRENT CAPABILITY
- TTL OR DTL INPUT COMPATIBILITY
- INPUT CLAMP DIODES
- +5 V SUPPLY VOLTAGE

TEST TABLE 1 — Operating Temperature Range and Supply Voltage Range

| | 55450A Series | 75450A Series |
|--------------------------|------------------|--------------------|
| Temperature, T_A | -55°C to +125°C | 0°C to 70°C |
| Supply Voltage, V_{CC} | +4.5 V to +5.5 V | +4.75 V to +5.25 V |

ABSOLUTE MAXIMUM RATINGS

| | 55450A | 75450A | 55451A 55452A 55453A 55454A | 75451A 75452A 75453A 75454A |
|---|-----------------|-----------------|--------------------------------------|--------------------------------------|
| Supply Voltage, V_{CC} (See Note 1) | 7 V | 7 V | 7 V | 7 V |
| Input Voltage (See Note 1) | 5.5 V | 5.5 V | 5.5 V | 5.5 V |
| Interemitter Voltage (See Note 2) | 5.5 V | 5.5 V | 5.5 V | 5.5 V |
| V_{CC} to Substrate Voltage (See Note 6) | 35 V | 35 V | | |
| Collector to Substrate Voltage (See Note 6) | 35 V | 35 V | | |
| Collector to Base Voltage | 35 V | 35 V | | |
| Collector to Emitter Voltage (See Note 3) | 30 V | 30 V | | |
| Emitter to Base Voltage | 5 V | 5 V | | |
| Output Voltage (See Notes 1 and 4) | | | 30 V | 30 V |
| Continuous Collector Current (See Note 5) | 300 mA | 300 mA | | |
| Continuous Output Current (See Note 5) | | | 300 mA | 300 mA |
| Continuous Total Power Dissipation (See Note 7) | 800 mW | 800 mW | 800 mW | 800 mW |
| Operating Ambient Temperature Range | -55°C to +125°C | 0°C to 70°C | -55°C to +125°C | 0°C to 70°C |
| Storage Temperature Range | -65°C to +150°C | -65°C to +150°C | -65°C to +150°C | -65°C to +150°C |
| Pin Temperature | | | | |
| Molded DIP (Soldering, 10 s) | | 260°C | 260°C | 260°C |
| Hermetic DIP (Soldering, 60 s) | 300°C | 300°C | 300°C | 300°C |

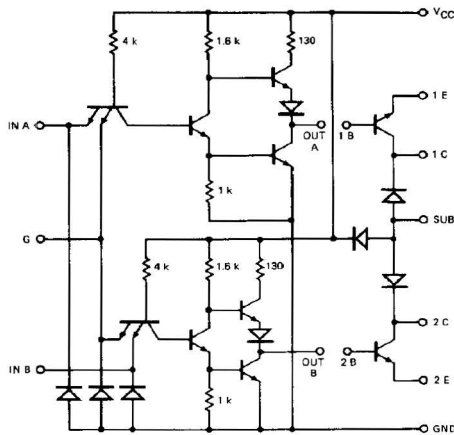
NOTES:

1. Voltage values are with respect to network ground terminal unless otherwise specified.
2. This is the voltage between two emitters of a multiple-emitter input transistor.
3. This value applies when the base-emitter resistance (R_{BE}) is equal to or less than 500 Ω .
4. This is the maximum voltage which should be applied to any output when it is in the off state.
5. Both halves of these dual circuits may conduct rated current simultaneously.
6. For the 55450A and 75450A only, the substrate (Pin 8), must always be at the most negative device voltage for proper operation.
7. Above 60°C ambient temperature, derate linearly at 8.3 mW/°C for Hermetic DIP and Molded DIP. For the Molded Mini DIP and Ceramic Mini DIP, derate at 6.7 mW/°C above 30°C.

FAIRCHILD • 55450A/75450A SERIES

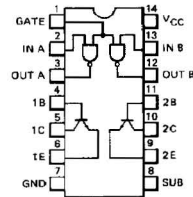
55450A/75450A DUAL POSITIVE AND PERIPHERAL DRIVER

EQUIVALENT CIRCUIT



All resistor values in ohms.

CONNECTION DIAGRAM 14-PIN (TOP VIEW) PACKAGE OUTLINE 6A 9A PACKAGE CODE D P



LOGIC FUNCTION

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

ORDER INFORMATION

| TYPE | PART NO. |
|--------|----------|
| 55450A | 55450ADM |
| 75450A | 75450ADC |
| 75450A | 75450APC |

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated

TTL Gates

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP (Note 8) | MAX | UNIT |
|-----------|--|-------------|--|-----|--------------|------|---------------|
| V_{IH} | Input HIGH Voltage | 1 | | 2 | | | V |
| V_{IL} | Input LOW Voltage | 2 | | | | 0.8 | V |
| V_{CD} | Input Clamp Diode Voltage | 3 | $V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$ | | | -1.5 | V |
| V_{OH} | Output HIGH Voltage | 2 | $V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}$ $I_{OH} = -400 \mu\text{A}$ | 2.4 | 3.3 | | V |
| V_{OL} | Output LOW Voltage | 1 | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}$ $I_{OL} = 16 \text{ mA}$ | | | | V |
| I_I | Input Current at Maximum Input Voltage | Input A | $V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$ | | | 1 | mA |
| | | Input G | | | | 2 | |
| I_{IH} | Input HIGH Current | Input A | $V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$ | | | 40 | μA |
| | | Input G | | | | 80 | |
| I_{IL} | Input LOW Current | Input A | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$ | | | -1.6 | mA |
| | | Input G | | | | -3.2 | |
| I_{OS} | Short Circuit Output Current (Note 9) | 5 | $V_{CC} = \text{MAX}$ | -18 | | -55 | mA |
| I_{CCH} | Supply Current, Output HIGH | 6 | $V_{CC} = \text{MAX}, V_I = 0 \text{ V}$ | | 2 | 4 | mA |
| I_{CCL} | Supply Current, Output LOW | | $V_{CC} = \text{MAX}, V_I = 5 \text{ V}$ | | 6 | 11 | |

NOTES

8. All typical values at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.
9. Not more than one output should be shorted at a time.

FAIRCHILD • 55450A/75450A SERIES

55450A/75450A

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated

Output Transistors

| SYMBOL | CHARACTERISTICS | CONDITIONS | MIN | TYP (Note 10) | MAX | UNITS |
|---------------|--|--|--------|------------------|-----|-------|
| $V_{(BR)CBO}$ | Collector to Base Breakdown Voltage | $I_C = 100 \mu A, I_E = 0$ | 35 | | | V |
| $V_{(BR)CER}$ | Collector to Emitter Breakdown Voltage | $I_C = 100 \mu A, R_{BE} = 500 \Omega$ | 30 | | | V |
| $V_{(BR)EBO}$ | Emitter to Base Breakdown Voltage | $I_E = 100 \mu A, I_C = 0$ | 5 | | | V |
| h_{FE} | Static Forward Current Transfer Ratio (Note 11) | $V_{CE} = 3 V, I_C = 100 mA, T_A = 25^\circ C$ | 25 | | | |
| | | $V_{CE} = 3 V, I_C = 300 mA, T_A = 25^\circ C$ | 30 | | | |
| | | $V_{CE} = 3 V, I_C = 100 mA$ | 10 | | | |
| | | $V_{CE} = 3 V, I_C = 300 mA$ | 20 | | | |
| $V_{BE(sat)}$ | Base to Emitter Voltage (Note 11) | $I_B = 10 mA, I_C = 100 mA$ | 55450A | 0.85 | 1.2 | V |
| | | $I_B = 30 mA, I_C = 300 mA$ | 75450A | 0.85 | 1.0 | V |
| | | $I_B = 10 mA, I_C = 300 mA$ | 55450A | 1.05 | 1.4 | V |
| | | $I_B = 30 mA, I_C = 100 mA$ | 75450A | 1.05 | 1.2 | V |
| $V_{CE(sat)}$ | Collector to Emitter Saturation Voltage (Note 11) | $I_B = 10 mA, I_C = 100 mA$ | 55450A | 0.25 | 0.5 | V |
| | | $I_B = 30 mA, I_C = 300 mA$ | 75450A | 0.25 | 0.4 | V |
| | | $I_B = 10 mA, I_C = 300 mA$ | 55450A | 0.5 | 0.8 | V |
| | | $I_B = 30 mA, I_C = 100 mA$ | 75450A | 0.5 | 0.7 | V |

NOTES:

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

11. These parameters must be measured using the pulse techniques. $t_w = 300 \mu s$, duty cycle $\leq 2\%$.

AC CHARACTERISTICS: $V_{CC} = 5 V, T_A = 25^\circ C$.

TTL Gates

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|--|-------------|---------------------------------|-----|-----|-----|-------|
| t_{PLH} | Propagation Delay Time, Output LOW to HIGH | 12 | $C_L = 15 pF, R_L = 400 \Omega$ | | 12 | | ns |
| t_{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 8 | | ns |

Output Transistors

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS (Note 12) | MIN | TYP | MAX | UNITS |
|--------|-----------------|-------------|---|-----|-----|-----|-------|
| t_d | Delay Time | 13 | $I_C = 200 mA, V_{BE(off)} = -1 V$ $I_{B(1)} = 20 mA, I_{B(2)} = -40 mA$ $C_L = 15 pF, R_L = 50 \Omega$ | | 10 | | ns |
| t_r | Rise Time | | | | 14 | | ns |
| t_s | Storage Time | | | | 10 | | ns |
| t_f | Fall Time | | | | 11 | | ns |

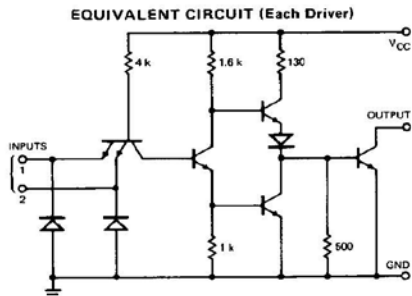
Gates and Transistors Combined

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|--|-------------|---|-------------|-----|-----|-------|
| t_{PLH} | Propagation Delay Time, Output LOW to HIGH | 14 | $I_C = 200 mA, C_L = 15 pF,$ $R_L = 50 \Omega$ | | 22 | 65 | ns |
| t_{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 22 | 50 | ns |
| t_{TLH} | Transition Time, Output LOW to HIGH | | | | 10 | 20 | ns |
| t_{THL} | Transition Time, Output HIGH to LOW | | | | 14 | 20 | ns |
| V_{OH} | HIGH Level Output Voltage After Switching | 15 | $V_S = 20 V, I_C \approx 300 mA$ $R_{BE} = 500 \Omega$ | $V_S - 6.5$ | | | mV |

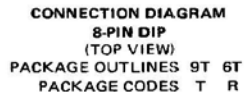
NOTE 12. Voltage and current values shown are nominal, exact values vary slightly with transistor parameters.

7

55451A/75451A
DUAL POSITIVE AND PERIPHERAL DRIVER



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



TRUTH TABLE

| INPUTS | | OUTPUT | |
|--------|---|--------|-------------|
| 1 | 2 | | |
| 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

| TYPE | PART NO. |
|--------|----------|
| 55451A | 55451ARM |
| 75451A | 75451ARC |
| 75451A | 75451ATC |

Positive Logic: Z = XY

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated.

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP (Note 13) | MAX | UNITS | |
|-----------|--|-------------|--|--|--|--------|---------------|-----|
| V_{IH} | Input HIGH Voltage | 7 | | 2 | | | V | |
| V_{IL} | Input LOW Voltage | 7 | | | | 0.8 | V | |
| V_{CD} | Input Clamp Diode Voltage | 8 | $V_{CC} = \text{MIN}, I_1 = -12 \text{ mA}$ | | | -1.5 | V | |
| I_{OH} | Output HIGH Current | 7 | $V_{CC} = \text{MIN}, V_{OH} = 30 \text{ V}$ $V_{IH} = 2 \text{ V}$ | 55451A | | 300 | μA | |
| | | | | 75451A | | 100 | | |
| V_{OL} | Output LOW Voltage | 7 | $V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}$ $I_{OL} = 100 \text{ mA}$ | 55451A | 0.25 | 0.5 | V | |
| | | | | 75451A | | 0.25 | | 0.4 |
| | | | | 55451A | $V_{CC} = \text{MIN}, V_{IL} = 0.8 \text{ V}$ $I_{OL} = 300 \text{ mA}$ | 0.5 | | 0.8 |
| | | | | | | 75451A | | 0.5 |
| I_1 | Input Current at Maximum Input Voltage | 9 | $V_{CC} = \text{MAX}, V_1 = 5.5 \text{ V}$ | | | 1.0 | mA | |
| I_{IH} | Input HIGH Current | 9 | $V_{CC} = \text{MAX}, V_1 = 2.4 \text{ V}$ | | | 40 | μA | |
| I_{IL} | Input LOW Current | 8 | $V_{CC} = \text{MAX}, V_1 = 0.4 \text{ V}$ | | -1.0 | -1.6 | mA | |
| I_{CCH} | Supply Current, Output HIGH | 10 | $V_{CC} = \text{MAX}, V_1 = 5 \text{ V}$ | | 7.0 | 11 | mA | |
| | | | | $V_{CC} = \text{MAX}, V_1 = 0 \text{ V}$ | | 52 | | 65 |

NOTE 13. All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

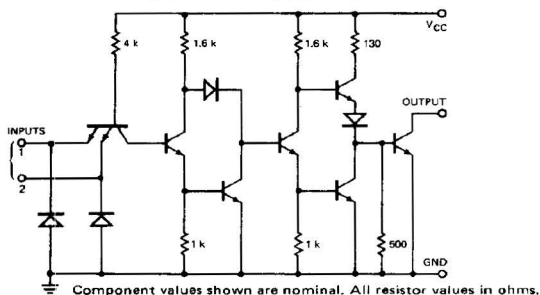
AC CHARACTERISTICS: $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|--|-------------|---|-------------|-----|-----|-------|
| t_{PLH} | Propagation Delay Time, Output LOW to HIGH | 14 | $I_O \approx 200 \text{ mA}, C_L = 15 \text{ pF},$ $R_L = 50 \Omega$ | | 20 | 55 | ns |
| t_{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 20 | 40 | |
| t_{TLH} | Transition Time, Output LOW to HIGH | | | | 8 | 20 | |
| t_{THL} | Transition Time, Output HIGH to LOW | | | | 12 | 20 | |
| V_{OH} | HIGH Level Output Voltage After Switching | 15 | $V_S = 20 \text{ V}, I_O \approx 300 \text{ mA}$ | $V_S - 6.5$ | | | mV |

55452A/75452A

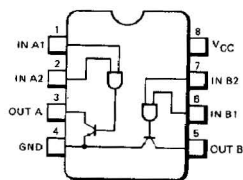
DUAL POSITIVE NAND PERIPHERAL DRIVER

EQUIVALENT CIRCUIT (Each Driver)



CONNECTION DIAGRAM

8-PIN DIP
(TOP VIEW)
PACKAGE OUTLINES 9T 6T
PACKAGE CODES T R



ORDER INFORMATION

| TYPE | PART NO. |
|--------|----------|
| 55452A | 55452ARM |
| 75452A | 75452ARC |
| 75452A | 75452ATC |

Positive Logic: Z = \overline{XY}

| 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.

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated.

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP (Note 14) | MAX | UNITS |
|-----------|--|-------------|---|--------|---------------|------|---------------|
| V_{IH} | Input HIGH Voltage | 7 | | 2 | | | V |
| V_{IL} | Input LOW Voltage | 7 | | | | 0.8 | V |
| V_{CD} | Input Clamp Diode Voltage | 8 | $V_{CC} = \text{MIN.}, I_I = -12 \text{ mA}$ | | | -1.5 | V |
| I_{OH} | Output HIGH Current | 7 | $V_{CC} = \text{MIN.}, V_{OH} = 30 \text{ V}$ | 55452A | | 300 | μA |
| | | | $V_{IL} = 0.8 \text{ V}$ | 75452A | | 100 | |
| V_{OL} | Output LOW Voltage | 7 | $V_{CC} = \text{MIN.}, V_{IH} = 2 \text{ V}$ | 55452A | 0.25 | 0.5 | V |
| | | | $I_{OL} = 100 \text{ mA}$ | 75452A | 0.25 | 0.4 | |
| | | | $V_{CC} = \text{MIN.}, V_{IH} = 2 \text{ V}$ | 55452A | 0.5 | 0.8 | |
| | | | $I_{OL} = 300 \text{ mA}$ | 75452A | 0.5 | 0.7 | |
| I_I | Input Current at Maximum Input Voltage | 9 | $V_{CC} = \text{MAX.}, V_I = 5.5 \text{ V}$ | | | 1.0 | mA |
| I_{IH} | Input HIGH Current | 9 | $V_{CC} = \text{MAX.}, V_I = 2.4 \text{ V}$ | | | 40 | μA |
| I_{IL} | Input LOW Current | 8 | $V_{CC} = \text{MAX.}, V_I = 0.4 \text{ V}$ | | -1.0 | -1.6 | mA |
| I_{CCH} | Supply Current, Output HIGH | 10 | $V_{CC} = \text{MAX.}, V_I = 0 \text{ V}$ | | 11 | 14 | mA |
| I_{CCL} | Supply Current Output LOW | | $V_{CC} = \text{MAX.}, V_I = 5 \text{ V}$ | | 56 | 71 | mA |

NOTE 14. All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

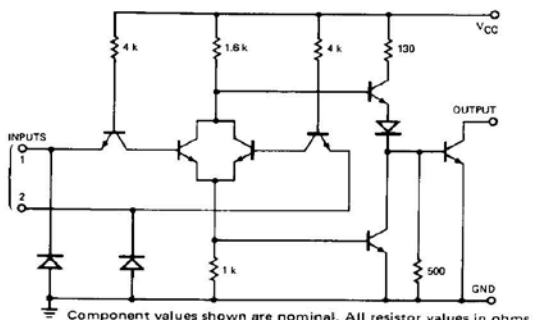
AC CHARACTERISTICS: $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|--|-------------|--|-------------|-----|-----|-------|
| t_{PLH} | Propagation Delay Time, Output LOW to HIGH | 14 | $I_O \approx 200 \text{ mA}, C_L = 15 \text{ pF}, R_L = 50 \Omega$ | | 25 | 65 | ns |
| t_{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 25 | 50 | |
| t_{TLH} | Transition Time, Output LOW to HIGH | | | | 8 | 25 | |
| t_{THL} | Transition Time, Output HIGH to LOW | | | | 12 | 20 | |
| V_{OH} | HIGH Level Output Voltage After Switching | 15 | $V_S = 20 \text{ V}, I_O \approx 300 \text{ mA}$ | $V_S - 6.5$ | | | mV |

55453A/75453A

DUAL POSITIVE OR PERIPHERAL DRIVER

EQUIVALENT CIRCUIT (Each Driver)



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

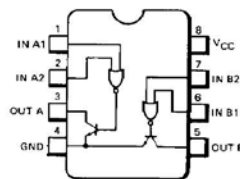
TRUTH TABLE

| 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

CONNECTION DIAGRAM

8-PIN DIP
(TOP VIEW)
PACKAGE OUTLINES 9T 6T
PACKAGE CODES T R



ORDER INFORMATION

| TYPE | PART NO. |
|--------|----------|
| 55453A | 55453ARM |
| 75453A | 75453ARC |
| 75453A | 75453ATC |

Positive Logic: Z = X + Y

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated.

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP (Note 15) | MAX | UNITS |
|------------------|--|-------------|--|--------|---------------|------|-------|
| V _{IH} | Input HIGH Voltage | 7 | | 2 | | | V |
| V _{IL} | Input LOW Voltage | 7 | | | | 0.8 | V |
| V _{CD} | Input Clamp Diode Voltage | 8 | V _{CC} = MIN, I _I = -12 mA | | | -1.5 | V |
| I _{OH} | Output HIGH Current | 7 | V _{CC} = MIN, V _{OH} = 30 V V _{IH} = 2 V | 55453A | | 300 | μA |
| | | | | 75453A | | 100 | |
| V _{OL} | Output LOW Voltage | 7 | V _{CC} = MIN, V _{IL} = 0.8 V I _{OL} = 100 mA | 55453A | 0.25 | 0.5 | V |
| | | | | 75453A | 0.25 | 0.4 | |
| | | | | 55453A | 0.5 | 0.8 | |
| | | | | 75453A | 0.5 | 0.7 | |
| I _I | Input Current at Maximum Input Voltage | 9 | V _{CC} = MAX, V _I = 5.5 V | | | 1.0 | mA |
| I _{IH} | Input HIGH Current | 9 | V _{CC} = MAX, V _I = 2.4 V | | | 40 | μA |
| I _{IL} | Input LOW Current | 8 | V _{CC} = MAX, V _I = 0.4 V | | -1.0 | -1.6 | mA |
| I _{CCH} | Supply Current, Output HIGH | 11 | V _{CC} = MAX, V _I = 5 V | | 8.0 | 11 | mA |
| I _{CCL} | Supply Current Output LOW | | V _{CC} = MAX, V _I = 0 V | | 54 | 68 | mA |

NOTE 15 All typical values are at V_{CC} = 5 V, T_A = 25°C.

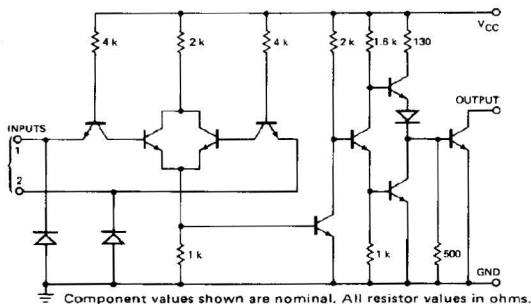
AC CHARACTERISTICS: V_{CC} = 5 V, T_A = 25°C

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|------------------|--|-------------|---|----------------------|-----|-----|-------|
| t _{PLH} | Propagation Delay Time, Output LOW to HIGH | 14 | I _O ≈ 200 mA, C _L = 15 pF, R _L = 50 Ω | | 20 | 55 | ns |
| t _{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 20 | 40 | |
| t _{TLH} | Transition Time, Output LOW to HIGH | | | | 8 | 25 | |
| t _{THL} | Transition Time, Output HIGH to LOW | | | | 12 | 25 | |
| V _{OH} | HIGH Level Output Voltage After Switching | 15 | V _S = 20 V, I _O ≈ 300 mA | V _S - 6.5 | | | mV |

55454A/75454A

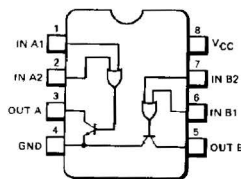
DUAL POSITIVE NOR PERIPHERAL DRIVER

EQUIVALENT CIRCUIT (Each Driver)



CONNECTION DIAGRAM

8-PIN FLATPAK
(TOP VIEW)
PACKAGE OUTLINES 9T 6T
PACKAGE CODES T R



TRUTH TABLE

| INPUTS | | OUTPUT | |
|--------|---|--------|-------------|
| 1 | 2 | | |
| L | L | H | (off state) |
| L | H | L | (on state) |
| H | L | L | (on state) |
| H | H | L | (on state) |

H = HIGH Level, L = LOW Level

ORDER INFORMATION
TYPE PART NO.
55454A 55454ARM
75454A 75454ARC
75454A 75454ATC

Positive Logic: $Z = \overline{X + Y}$

ELECTRICAL CHARACTERISTICS: Guaranteed over Operating Temperature Range and Supply Voltage Range, use Test Table 1, pg. 1, unless otherwise indicated.

| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP (Note 16) | MAX | UNITS |
|-----------|--|-------------|--|--------|---------------|------|---------------|
| V_{IH} | Input HIGH Voltage | 7 | | 2 | | | V |
| V_{IL} | Input LOW Voltage | 7 | | | | 0.8 | V |
| V_{CD} | Input Clamp Diode Voltage | 8 | $V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$ | | | -1.5 | V |
| I_{OH} | Output HIGH Current | 7 | $V_{CC} = \text{MIN}, V_{OH} = 30 \text{ V}$ $V_{IL} = 0.8 \text{ V}$ | 55454A | | 300 | μA |
| | | | | 75454A | | 100 | |
| V_{OL} | Output LOW Voltage | 7 | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}$ $I_{OL} = 100 \text{ mA}$ | 55454A | 0.25 | 0.5 | V |
| | | | | 75454A | 0.25 | 0.4 | |
| | | | $V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}$ $I_{OL} = 300 \text{ mA}$ | 55454A | 0.5 | 0.8 | |
| | | | | 75454A | 0.5 | 0.7 | |
| I_I | Input Current at Maximum Input Voltage | 9 | $V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$ | | | 1.0 | mA |
| I_{IH} | Input HIGH Current | 9 | $V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$ | | | 40 | μA |
| I_{IL} | Input LOW Current | 8 | $V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$ | | -1.0 | -1.6 | mA |
| I_{CCH} | Supply Current, Output HIGH | 11 | $V_{CC} = \text{MAX}, V_I = 0 \text{ V}$ | | 13 | 17 | mA |
| I_{CCL} | Supply Current Output LOW | | | | 61 | 79 | mA |

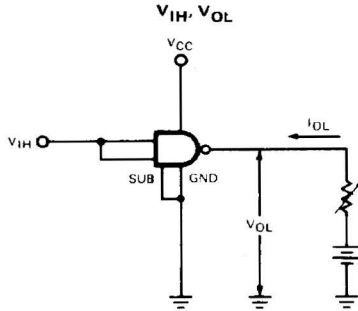
NOTE 16. All typical values are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

AC CHARACTERISTICS: $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$.

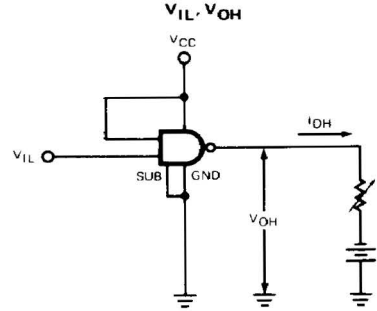
| SYMBOL | CHARACTERISTICS | TEST FIGURE | CONDITIONS | MIN | TYP | MAX | UNITS |
|-----------|--|-------------|---|-------------|-----|-----|-------|
| t_{PLH} | Propagation Delay Time, Output LOW to HIGH | 14 | $I_O \approx 200 \text{ mA}, C_L = 15 \text{ pF},$ $R_L = 50 \Omega$ | | 25 | 65 | ns |
| t_{PHL} | Propagation Delay Time, Output HIGH to LOW | | | | 25 | 50 | ns |
| t_{TLH} | Transition Time, Output LOW to HIGH | | | | 8 | 20 | ns |
| t_{THL} | Transition Time, Output HIGH to LOW | | | | 12 | 20 | ns |
| V_{OH} | HIGH Level Output Voltage After Switching | 15 | $V_S = 20 \text{ V}, I_O \approx 300 \text{ mA}$ | $V_S - 6.5$ | | | mV |

CHARACTERISTICS MEASUREMENT INFORMATION

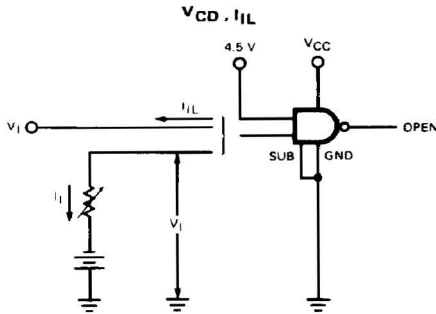
DC TEST CIRCUIT†



Both inputs are tested simultaneously.
Fig. 1

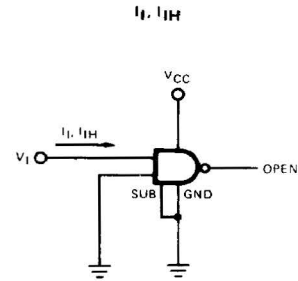


Each input is tested separately.
Fig. 2

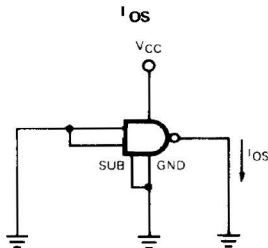


NOTES:
A. Each input is tested separately.
B. When testing V_{CD} , input not under test is open.

Fig. 3

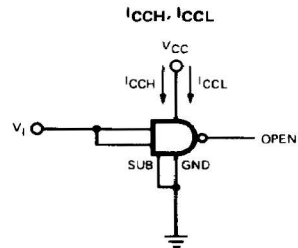


Each input is tested separately.
Fig. 4



Each gate is tested separately.
(55450A/75450A only)

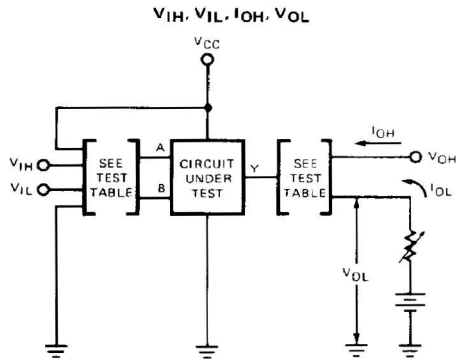
Fig. 5



Both gates are tested simultaneously.

Fig. 6

CHARACTERISTICS MEASUREMENT INFORMATION

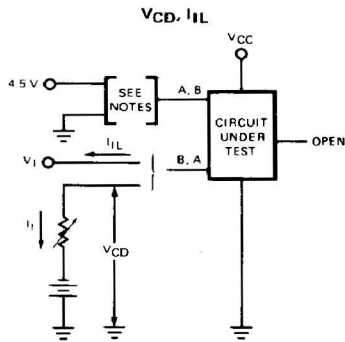


NOTE: Each input is tested separately.

Fig. 7

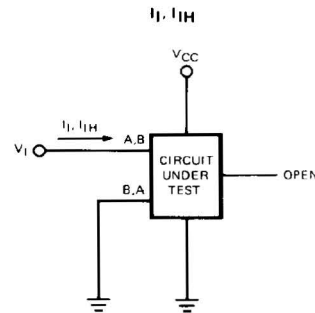
TEST TABLE II

| CIRCUIT | INPUT UNDER TEST | OTHER INPUT | OUTPUT | |
|-----------|------------------------------------|------------------------------------|------------------------------------|------------------------------------|
| | | | APPLY | MEASURE |
| 55/75451A | V _{IH} V _{IL} | V _{IH} V _{CC} | V _{OH} I _{OL} | I _{OH} V _{OL} |
| 55/75452A | V _{IH} V _{IL} | V _{IH} V _{CC} | I _{OL} V _{OH} | V _{OL} I _{OH} |
| 55/75453A | V _{IH} V _{IL} | GND V _{IL} | V _{OH} I _{OL} | I _{OH} V _{OL} |
| 55/75454A | V _{IH} V _{IL} | GND V _{IL} | I _{OL} V _{OH} | V _{OL} I _{OH} |



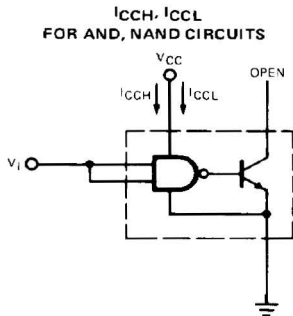
NOTES: A. Each input is tested separately.
 B. When testing I_{IL} 55/75453A and 55/75454A, the input not under test is grounded. For all other circuits it is at 4.5 V.
 C. When testing V_{CD} , input not under test is open.

Fig. 8



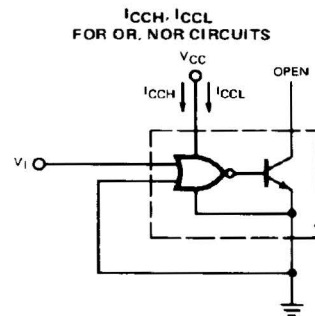
Each input is tested separately.

Fig. 9



Both gates are tested simultaneously.

Fig. 10



Both gates are tested simultaneously.

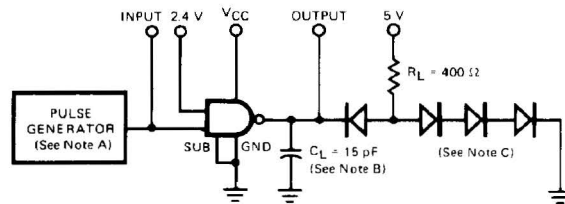
Fig. 11

[†]Arrows indicate actual direction of current flow. Current into a terminal is a positive value.

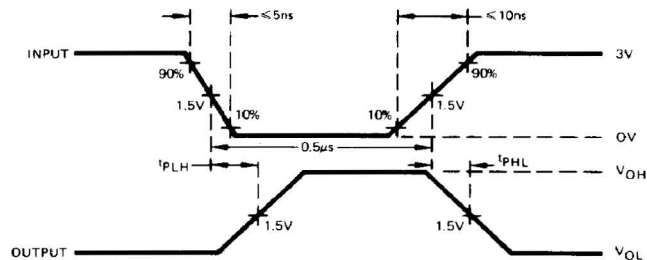
CHARACTERISTICS MEASUREMENT INFORMATION SWITCHING CHARACTERISTICS

PROPAGATION DELAY TIMES, EACH GATE (55450A, 75450A ONLY)

TEST CIRCUIT



VOLTAGE WAVEFORMS



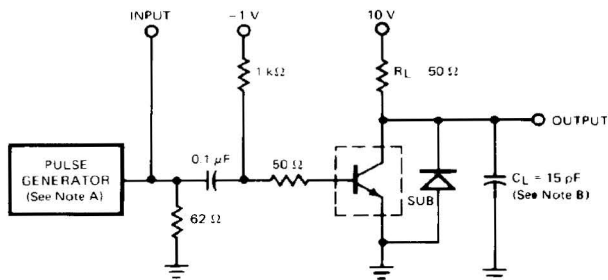
- NOTES: A. The pulse generator has the following characteristics:
 PRR = 1 MHz, $Z_{out} \approx 50 \Omega$.
 B. C_L include probe and jig capacitance.
 C. All diodes are FD777.

Fig. 12

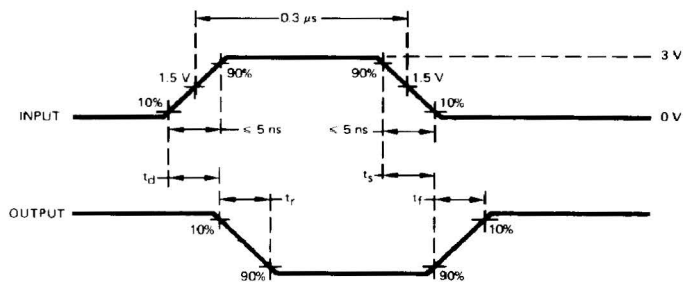
CHARACTERISTICS MEASUREMENT INFORMATION
SWITCHING CHARACTERISTICS

SWITCHING TIMES, EACH TRANSISTOR
(55450A, 75450A ONLY)

TEST CIRCUIT



VOLTAGE WAVEFORMS



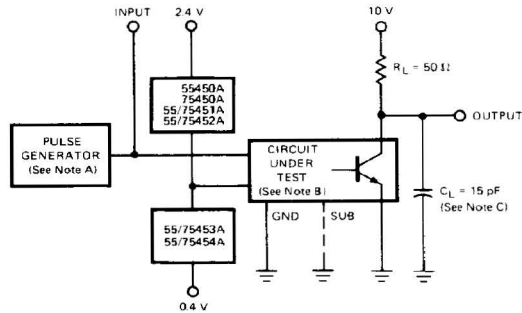
- NOTES: A. The pulse generator has the following characteristics:
duty cycle $\leq 1\%$, $Z_{OUT} \approx 50 \Omega$.
B. C_L includes probe and jig capacitance.

Fig. 13

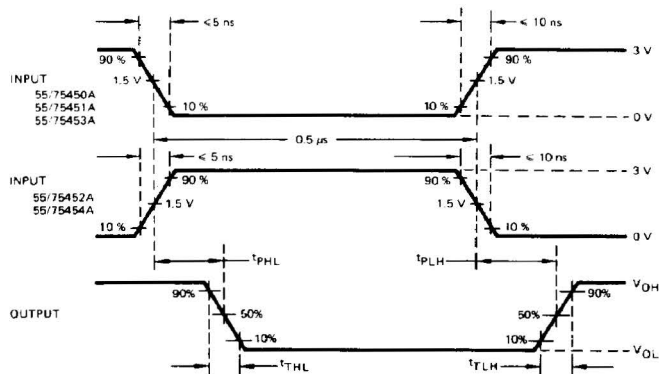
CHARACTERISTICS MEASUREMENT INFORMATION
SWITCHING CHARACTERISTICS

SWITCHING TIMES OF COMPLETE DRIVERS

TEST CIRCUIT



VOLTAGE WAVEFORMS



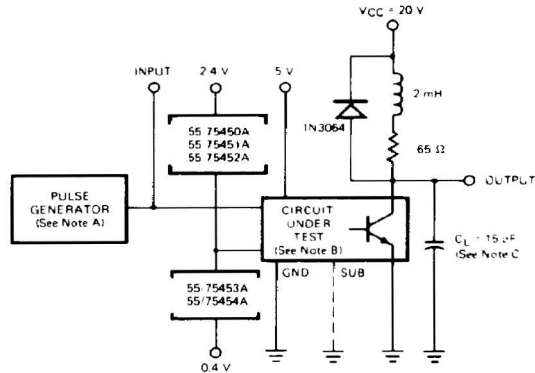
- NOTES: A. The pulse generator has the following characteristics:
 PRR = 1 MHz, $Z_{out} \approx 50 \Omega$.
 B. When Testing 55450A/75450A, connect output Y to transistor base and ground the substrate terminal.
 C. C_L includes probe and jig capacitance.

Fig. 14

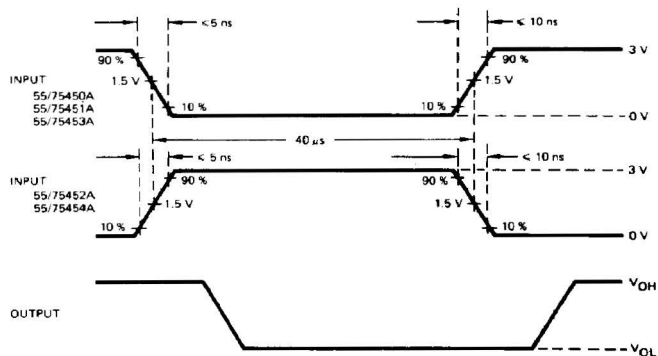
CHARACTERISTICS MEASUREMENT INFORMATION
SWITCHING CHARACTERISTICS

LATCH-UP TEST OF COMPLETE DRIVERS

TEST CIRCUIT



VOLTAGE WAVEFORMS

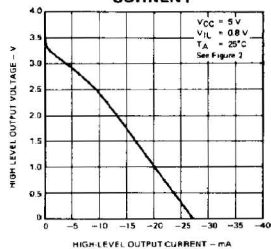


- NOTES: A. The pulse generator has the following characteristics:
PRR = 12.5 kHz, $Z_{out} = 50 \Omega$.
B. When testing 55450A or 75450A, connect output Y to transistor base with a $500\text{-}\Omega$ resistor from there to ground, and ground the substrate terminal.
C. C_L includes probe and jig capacitance.

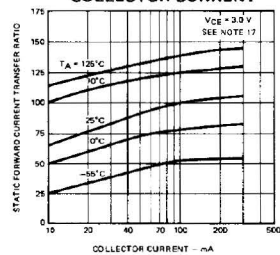
Fig. 15

TYPICAL PERFORMANCE CURVES FOR 75450A SERIES

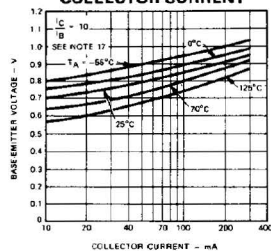
**55450A/75450A TTL GATE
HIGH-LEVEL OUTPUT
VOLTAGE AS A FUNCTION
OF HIGH-LEVEL OUTPUT
CURRENT**



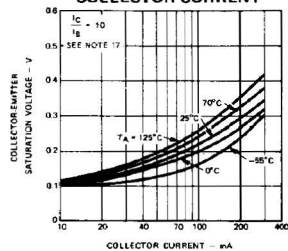
**55450A/75450A TRANSISTOR
STATIC FORWARD CURRENT
TRANSFER RATIO AS A
FUNCTION OF
COLLECTOR CURRENT**



**55450A/75450A TRANSISTOR
BASE-EMITTER VOLTAGE
AS A FUNCTION OF
COLLECTOR CURRENT**



**TRANSISTOR COLLECTOR-
EMITTER SATURATION
VOLTAGE AS A FUNCTION OF
COLLECTOR CURRENT**



NOTE 17: These parameters must be measured using pulse techniques. $t_w = 300 \mu s$, duty cycle $< 2\%$.