MOTOROLA

MC75461
MC75462
MC75463
MC75464

DUAL HIGH-VOLTAGE PERIPHERAL DRIVERS

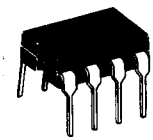
The MC75461 thru MC75464 series is similar to the MC75451 thru MC75454 series peripheral drivers; however, the MC75461 series features greater voltage capability allowing operation with higher output voltages or with inductive loads. These devices are useful as lamp drivers, relay drivers, logic buffers, line drivers, or MOS drivers.

Each of these devices consists of a pair of MTTL gates with the output of each gate internally connected to the base of a transistor.

MC75461 provides the AND function
MC75462 provides the NAND function
MC75463 provides the OR function
MC75464 provides the NOR function

- 300 mA Output Current Capability
- No Output Latch-up at 30 V
- MTTL compatible Inputs

DUAL HIGH-VOLTAGE PERIPHERAL DRIVERS
SILICON MONOLITHIC INTEGRATED CIRCUITS



U SUFFIX
CERAMIC PACKAGE
CASE 693

P SUFFIX
PLASTIC PACKAGE
CASE 626

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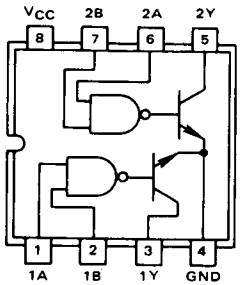
MC75461 – Positive AND



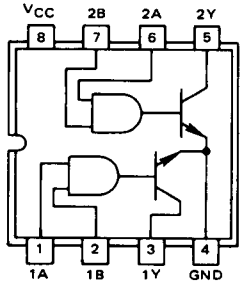
Positive Logic: Y = AB

TRUTH TABLE

A	B	Y
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.

MC75462 – Positive NAND



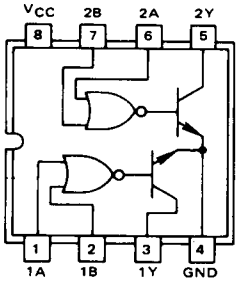
Positive Logic: Y = $\overline{AB}$

TRUTH TABLE

A	B	Y
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

MC75463 – Positive OR



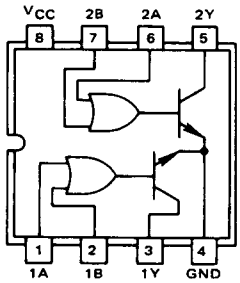
Positive Logic: Y = A + B

TRUTH TABLE

A	B	Y
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

MC75464 – Positive NOR



Positive Logic: Y = $\overline{A + B}$

TRUTH TABLE

A	B	Y
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.

MAXIMUM RATINGS (T_A = 0°C to 70°C unless otherwise noted.)

Rating	Symbol	Value	Unit
Power Supply Voltage(1)	V_{CC}	7.0	Vdc
Input Voltage	V_I	5.5	Vdc
Interemitter Voltage(2)	–	5.5	Vdc
Output Voltage(3)	V_O	35	Vdc
Output Current(4)	I_O	300	mA
Power Dissipation @ T_A = 25°C Derate above T_A = +25°C	P_D	830 6.6	mW mW/°C
Operating Ambient Temperature Range	T_A	0 to +70	°C
Storage Temperature Range	T_{stg}	-65 to +150	°C

(1) Voltage values are with respect to network ground terminal.
(2) This is the voltage between two emitters of a multiple-emitter transistor.
(3) This is the maximum voltage which should be applied to any output when it is in the "off" state.
(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.

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ELECTRICAL CHARACTERISTICS (Unless otherwise noted, specifications apply for 4.75 ≥ V_{CC} ≥ 5.25 V and 0°C ≤ T_A ≤ 70°C)

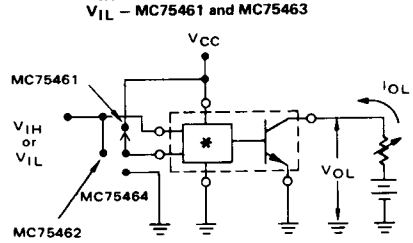
Characteristic		Figure	Symbol	Min	Typ(1)	Max	Unit
Input Voltage – High Logic State		1,2	V_{IH}	2.0	–	–	Vdc
Input Voltage – Low Logic State		1,2	V_{IL}	–	–	0.8	Vdc
Input Clamp Voltage (V_{CC} = 4.75 V, I_I = -12 mA)		4	V_I	–	-1.2	-1.5	Vdc
Output Current – High Logic State (V_{CC} = 4.75 V, V_{OH} = 35 V, V_{IH} = 2.0 V) (V_{CC} = 4.75 V, V_{OH} = 35 V, V_{IL} = 0.8 V)	MC75461, MC75463 MC75462, MC75464	2	I_{OH}	–	–	100	μA
Output Voltage – Low Logic State (V_{CC} = 4.75 V, V_{IL} = 0.8 V) (V_{CC} = 4.75 V, V_{IH} = 2.0 V) I_{OL} = 100 mA I_{OL} = 300 mA	MC75461, MC75463 MC75462, MC75464	1	V_{OL}	 – –	 0.15 0.35	 0.4 0.7	Vdc
Input Current – High Logic State (V_{CC} = 5.25 V, V_I = 2.4 V) (V_{CC} = 5.25 V, V_I = 5.5 V)		3	I_{IH}	 – –	 – –	40 1.0	μA mA
Input Current – Low Logic State (V_{CC} = 5.25 V, V_I = 0.4 V)		4	I_{IL}	–	-1.0	-1.6	mA
Power Supply Current – Output High Logic State (V_{CC} = 5.25 V, V_{IH} = 5.0 V) (V_{CC} = 5.25 V, V_{IL} = 0) (V_{CC} = 5.25 V, V_{IH} = 5.0 V) (V_{CC} = 5.25 V, V_{IL} = 0)	 MC75461 MC75462 MC75463 MC75464	5	I_{CCH}	 – – – –	 8.0 13 8.0 14	 11 17 11 19	mA
Power Supply Current – Output Low Logic State (V_{CC} = 5.25 V, V_{IL} = 0) (V_{CC} = 5.25 V, V_{IH} = 5.0 V) (V_{CC} = 5.25 V, V_{IL} = 0) (V_{CC} = 5.25 V, V_{IH} = 5.0 V)	 MC75461 MC75462 MC75463 MC75464	5	I_{CCL}	 – – – –	 61 65 63 72	 76 76 76 85	mA

(1) Typical Values Measured with V_{CC} = 5.0 V, T_A = 25°C

TEST CIRCUITS

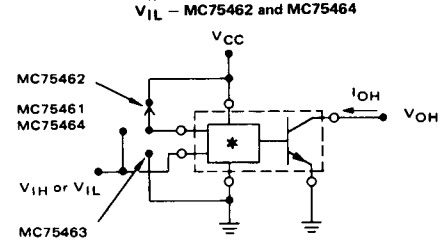
(Current into terminal is shown as a positive value.
Arrows indicate actual direction of current flow.)

FIGURE 1 – V_{OL}
V_{IH} – MC75462 and MC75464
V_{IL} – MC75461 and MC75463



*See Page 1 for specific gate type.

FIGURE 2 – I_{OH},
V_{IH} – MC75461 and MC75463
V_{IL} – MC75462 and MC75464



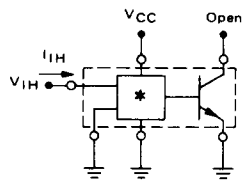
Each input is tested separately.

SWITCHING CHARACTERISTICS (V_{CC} = 5.0 V, T_A = +25°C unless otherwise noted.)

Characteristic	Symbol	Test Fig.	Min	Typ	Max	Unit
Propagation Delay Time ($I_O \approx 200$ mA, C_L = 15 pF, R_L = 50 ohms)						
MC75461						
Low-to-High-Level Output	t_{PLH}	6	–	45	55	ns
High-to-Low-Level Output	t_{PHL}		–	30	40	
MC75462						
Low-to-High-Level Output	t_{PLH}	6	–	50	65	ns
High-to-Low-Level Output	t_{PHL}		–	40	50	
MC75463						
Low-to-High-Level Output	t_{PLH}	6	–	45	55	ns
High-to-Low-Level Output	t_{PHL}		–	30	40	
MC75464						
Low-to-High-Level Output	t_{PLH}	6	–	50	65	ns
High-to-Low-Level Output	t_{PHL}		–	40	50	
Transition Time ($I_O \approx 200$ mA, C_L = 15 pF, R_L = 50 ohms)						
MC75461						
Low-to-High-Level Output	t_{TLH}	6	–	8.0	20	ns
High-to-Low-Level Output	t_{THL}		–	10	20	
MC75462						
Low-to-High-Level Output	t_{TLH}	6	–	12	25	ns
High-to-Low-Level Output	t_{THL}		–	15	20	
MC75463						
Low-to-High-Level Output	t_{TLH}	6	–	8.0	25	ns
High-to-Low-Level Output	t_{THL}		–	10	25	
MC75464						
Low-to-High-Level Output	t_{TLH}	6	–	12	20	ns
High-to-Low-Level Output	t_{THL}		–	15	20	
Output Voltage – High Logic Level after Switching (Latch-up Test) (V_S = 30 V $I_O \approx 300$ mA)	V_{OH}	7	V_S-10	–	–	mV

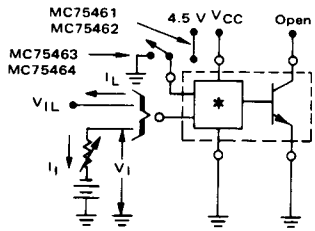
TEST CIRCUITS (Continued)
(Current into terminal is shown as a positive value.
Arrows indicate actual direction of current flow.)

FIGURE 3 – I_{IH} (ALL DEVICE TYPES)



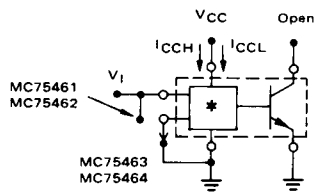
Each input is tested separately.

FIGURE 4 – I_{IL},V_I (ALL DEVICE TYPES)



Each input is tested separately.

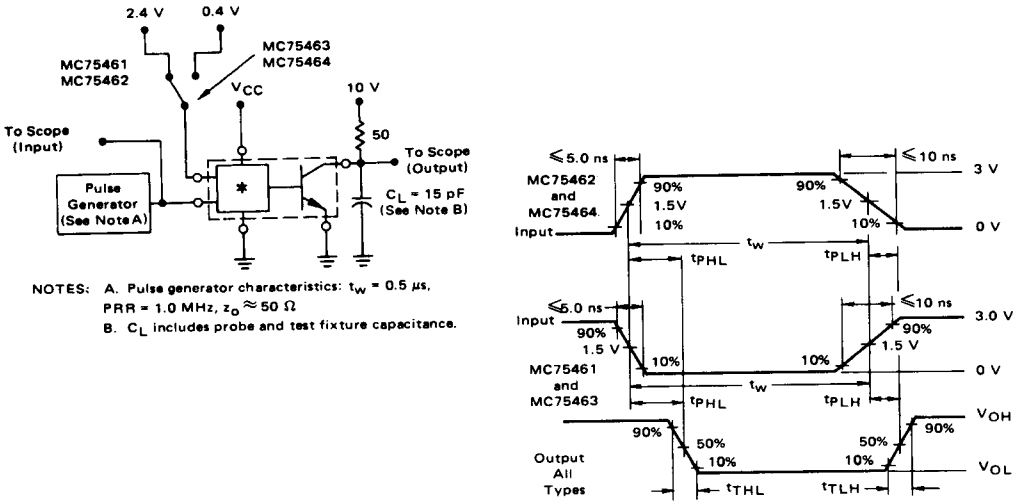
FIGURE 5 – I_{CCH}, I_{CCL} (ALL DEVICE TYPES)



*See page 1 for specific gate type.

Both gates are tested simultaneously.

FIGURE 6 – SWITCHING TIMES TEST CIRCUIT AND WAVEFORMS



NOTES: A. Pulse generator characteristics: t_w = 0.5 μs, PRR = 1.0 MHz, $z_o \approx 50\ \Omega$
B. C_L includes probe and test fixture capacitance.

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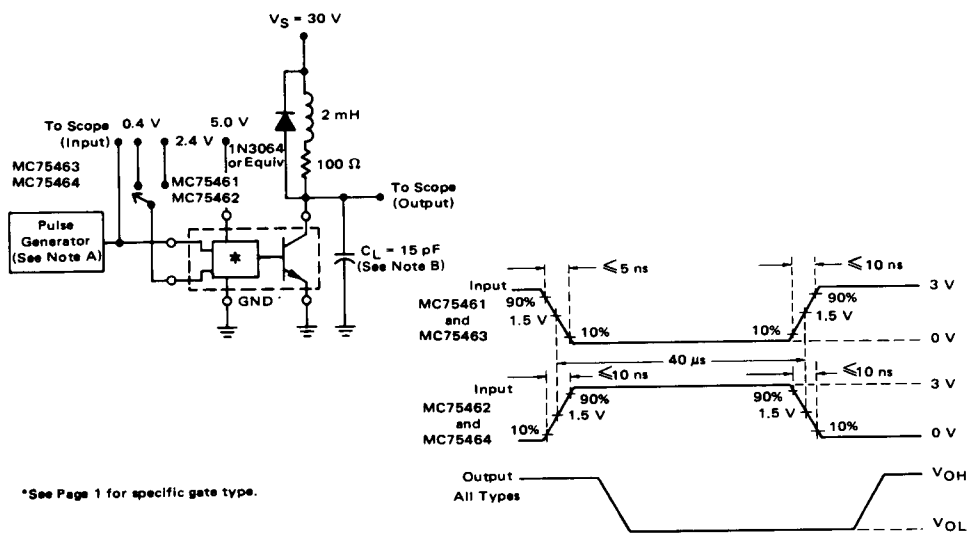
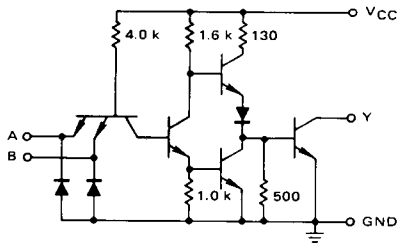
FIGURE 7 – OUTPUT VOLTAGE AFTER SWITCHING TEST CIRCUIT AND WAVEFORMS (LATCH-UP TEST)



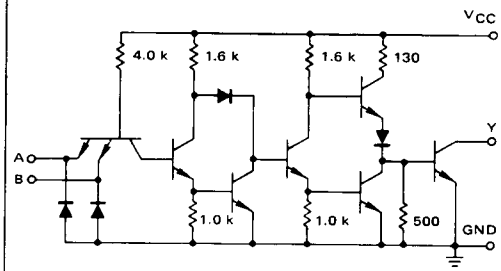
NOTES: A. The pulse generator has the following characteristics: PRR = 12.5 kHz, Z_{out} = 50 Ω
B. C_L includes probe and jig capacitance.

REPRESENTATIVE SCHEMATIC DIAGRAMS
(1/2 Circuits Shown)

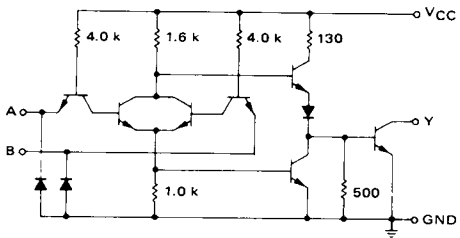
MC75461



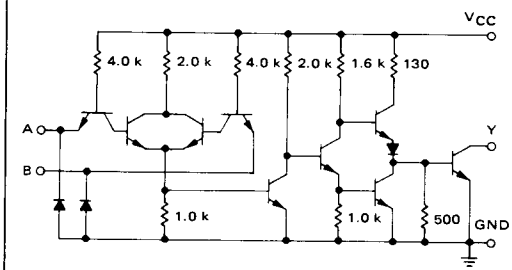
MC75462



MC75463



MC75464



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