MOTOROLA

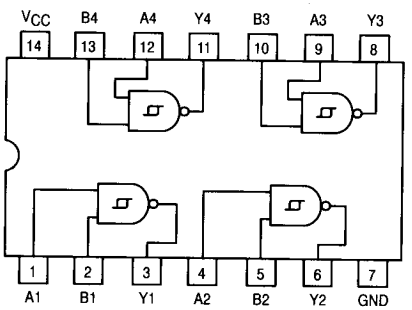
Quad 2-Input Schmitt-Trigger Positive NAND Gate

ELECTRICALLY TESTED PER:
MIL-M-38510/31303

The 54LS132 contains four 2-input NAND Gates which accept standard TTL input signals and provide standard TTL output levels. They are capable of transforming slowly changing input signals into sharply defined, jitter-free output signals. Additionally, they have greater noise margin than conventional NAND Gates.

Each circuit contains a 2-input Schmitt trigger followed by a darlington level shifter and a phase splitter driving a TTL totem pole output. The Schmitt trigger uses positive feedback to effectively speed-up slow input transitions, and provide different input threshold voltages for positive and negative-going transitions. This hysteresis between the positive-going and negative-going input thresholds is determined internally by resistor ratios and is essentially insensitive to temperature and supply voltage variations. As long as one input remains at a more positive voltage than V_{T+} (MAX).

LOGIC DIAGRAM



Military 54LS132

MPO

AVAILABLE AS:

1) JAN: JM38510/31303BXA
2) SMD: N/A
3) 883: 54LS132/BXAJC

X = CASE OUTLINE AS FOLLOWS:
PACKAGE: CERDIP: C
CERFLAT: D
LCC: 2

THE LETTER "M" APPEARS BEFORE THE / ON LCC.

PIN ASSIGNMENTS

FUNCT.	DIL 632-08	FLATS 717-04	LCC 756A-02	BURN-IN (COND. A)
A1	1	1	2	V_{CC}
B1	2	2	3	GND
Y1	3	3	4	V_{CC}
A2	4	4	6	V_{CC}
B2	5	5	8	GND
Y2	6	6	9	V_{CC}
GND	7	7	10	GND
Y3	8	8	12	V_{CC}
A2	9	9	13	V_{CC}
B3	10	10	14	GND
Y4	11	11	16	V_{CC}
A4	12	12	18	V_{CC}
B4	13	13	19	GND
V_{CC}	14	14	20	V_{CC}

BURN-IN CONDITIONS:
V_{CC} = 5.0 V MIN/6.0 V MAX

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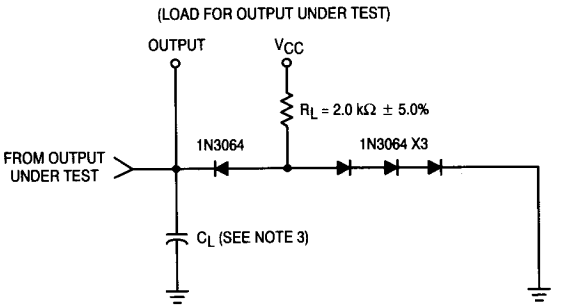
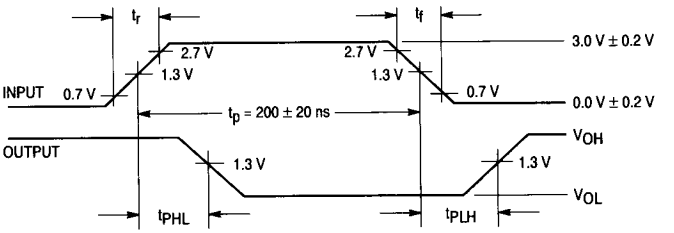
AC TEST CIRCUIT



WAVEFORMS



NOTES:
1. The pulse generator has the following characteristics: $t_r \leq 15$ ns, $t_f \leq 6.0$ ns, PRR ≤ 1.0 MHz, and $Z_{OUT} \approx 50\ \Omega$.
2. All diodes are 1N3064 or equivalent.
3. C_L = 50 pF ± 10%, including scope probe and jig capacitance.
4. R_L = 2.0 kΩ ± 5.0%.
5. Voltage measurements are to be made with respect to network ground terminal.

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Symbol	Parameter	Limits						Unit	Test Condition (Unless Otherwise Specified)
	Static Parameters:	+ 25°C		+ 125°C		− 55°C			
		Subgroup 1		Subgroup 2		Subgroup 3			
		Min	Max	Min	Max	Min	Max		
V_{OH1}	Logical "1" Output Voltage	2.5		2.5		2.5		V	V_{CC} = 4.5 V, I_{OH} = −0.4 mA, V_{IL} = 0.5 V, V_{IN} = 1.9 V on other inputs.
V_{OL1}	Logical "0" Output Voltage		0.4		0.4		0.4	V	V_{CC} = 4.5 V, I_{OL} = 4.0 mA, V_{IH} = 1.9 V on both inputs.
V_{OH2}	Logical "1" Output Voltage	2.5		2.5		2.5		V	V_{CC} = 5.0 V, I_{OH} = −0.4 mA, V_{IL} = 1.9 V, other input = (See Note 2).
V_{OL2}	Logical "0" Output Voltage		0.4		0.4		0.4	V	V_{CC} = 5.0 V, I_{OL} = 4.0 mA, V_{IN} = (See Note 3).
V_{IC}	Input Clamping Voltage		−1.5					V	V_{CC} = 4.5 V, I_{IN} = −18 mA, other inputs are open.
I_{IH}	Logical "1" Input Current		20		20		20	µA	V_{CC} = 5.5 V, V_{IH} = 2.7 V, other input = 0 V.
I_{IHH}	Logical "1" Input Current		100		100		100	µA	V_{CC} = 5.5 V, V_{IHH} = 5.5 V, other input = 0 V.
I_{IL}	Logical "0" Input Current	−0.12	−0.36	−0.12	−0.36	−0.12	−0.36	mA	V_{CC} = 5.5 V, V_{IL} = 0.4 V, other input = 5.5 V.
I_{OS}	Output Short Circuit Current	−15	−100	−15	−100	−15	−100	mA	V_{CC} = 5.5 V, V_{IN} = 0 V (both inputs), V_{OUT} = 0 V.
I_{CCH}	Power Supply Current		11		11		11	mA	V_{CC} = 5.5 V, V_{IN} = 0 V (both inputs).
I_{CCL}	Power Supply Current		14		14		14	mA	V_{CC} = 5.5 V, V_{IN} = 5.5 V (both inputs).
V_{IH}	Logical "1" Input Voltage	1.9		1.9		1.9		V	V_{CC} = 4.5 V.
V_{IL}	Logical "0" Input Voltage		0.5		0.5		0.5	V	V_{CC} = 4.5 V.
	Functional Tests	Subgroup 7		Subgroup 8A		Subgroup 8B			per Truth Table with V_{CC} = 5.0 V, V_{INL} = 0.4 V, and V_{INH} = 2.5 V.

Symbol	Parameter	Limits						Unit	Test Condition (Unless Otherwise Specified)
	Switching Parameters:	+ 25°C		+ 125°C		− 55°C			
		Subgroup 9		Subgroup 10		Subgroup 11			
		Min	Max	Min	Max	Min	Max		
t_{PHL} t_{PHL}	Propagation Delay /Data-Output Output High-Low	5.0 —	32 22	5.0 —	52 47	5.0 —	52 47	ns	V_{CC} = 5.0 V, C_L = 50 pF, R_L = 2.0 kΩ. V_{CC} = 5.0 V, C_L = 15 pF, R_L = 2.0 kΩ.
t_{PLH} t_{PLH}	Propagation Delay /Data-Output Output Low-High	5.0 —	32 22	5.0 —	52 47	5.0 —	52 47	ns	V_{CC} = 5.0 V, C_L = 50 pF, R_L = 2.0 kΩ. V_{CC} = 5.0 V, C_L = 15 pF, R_L = 2.0 kΩ.

NOTES:
1. The limits specified for C_L = 15 pF are guaranteed but not tested.
2. Momentary 0.5 V, then 1.4 V without overshoot during test.
3. Momentary 1.9 V, then 1.0 V without undershoot during test.

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