MOTOROLA

Dual 4-5 Input "OR/NOR" Gate

Military 10509

ELECTRICALLY TESTED PER:
MIL-M-38510/06006

The 10509 is a dual 4-5 input **OR/NOR** gate.

- 25 mW Max/Gate (No Load)
- t_{pd} = 2.0 ns typ
- t_r, t_f = 2.0 ns typ (20% - 80%)

AVAILABLE AS

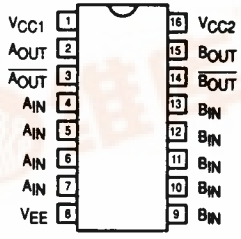
1) JAN: JM 38510/06006
2) SMD: N/A
3) 883: 10509/BXAJC
X = CASE OUTLINE AS FOLLOWS:

PACKAGE: CERDIP: E
CERFLAT: F
LCC: 2

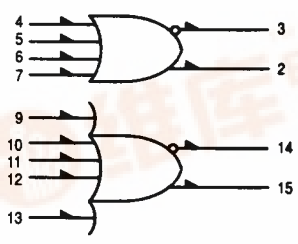
The letter "M" appears before the slash on LCC.

PIN ASSIGNMENTS

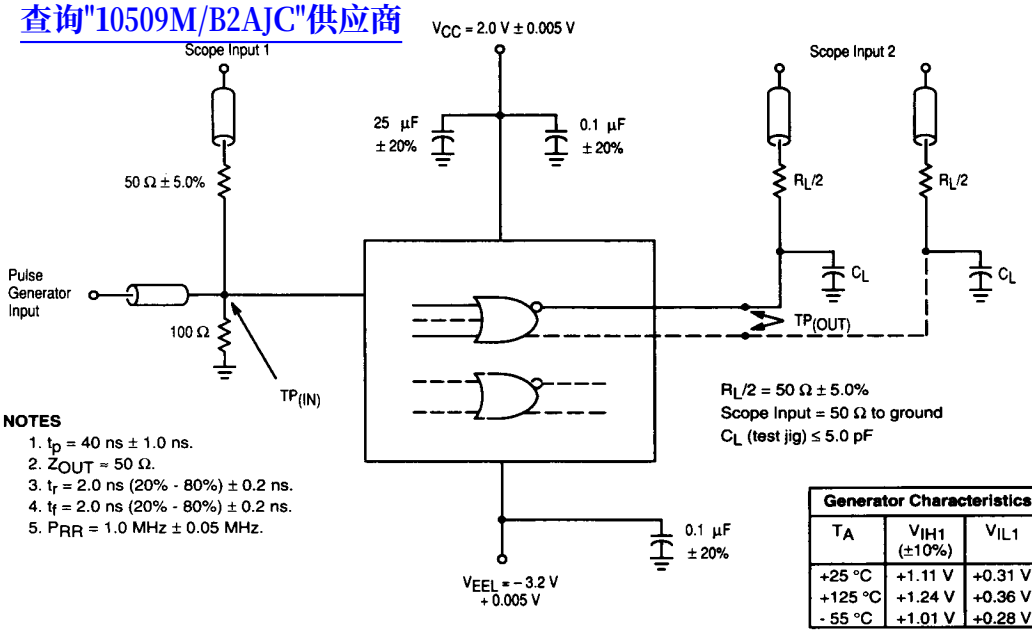
FUNCTION	DIL	FLATS	LCC	BURN-IN (CONDITION C)
V_{CC1}	1	5	2	GND
A_{OUT}	2	6	3	51 Ω to V_{TT}
$\overline{A_{OUT}}$	3	7	4	51 Ω to V_{TT}
A_{IN}	4	8	5	51 Ω to V_{TT}
A_{IN}	5	9	7	GND
A_{IN}	6	10	8	OPEN
A_{IN}	7	11	9	OPEN
V_{EE}	8	12	10	V_{EE}
B_{IN}	9	13	12	OPEN
B_{IN}	10	14	13	OPEN
B_{IN}	11	15	14	OPEN
B_{IN}	12	16	15	GND
B_{IN}	13	1	17	51 Ω to V_{TT}
$\overline{B_{OUT}}$	14	2	18	51 Ω to V_{TT}
B_{OUT}	15	3	19	51 Ω to V_{TT}
V_{CC2}	16	4	20	GND



LOGIC DIAGRAM



BURN - IN CONDITIONS:
V_{TT} = – 2.0 V MAX/ – 2.2 V MIN
V_{EE} = – 5.7 V MAX/ – 5.2 V MIN



NOTES
1. t_D = 40 ns ± 1.0 ns.
2. $Z_{OUT} \approx 50\ \Omega$.
3. t_r = 2.0 ns (20% - 80%) ± 0.2 ns.
4. t_f = 2.0 ns (20% - 80%) ± 0.2 ns.
5. P_{RR} = 1.0 MHz ± 0.05 MHz.

$R_L/2 = 50\ \Omega \pm 5.0\%$
Scope Input = 50 Ω to ground
C_L (test jig) ≤ 5.0 pF

Generator Characteristics:		
T_A	V_{IH1} (±10%)	V_{IL1}
+25 °C	+1.11 V	+0.31 V
+125 °C	+1.24 V	+0.36 V
- 55 °C	+1.01 V	+0.28 V

NOTES
1. Perform test in accordance with test table; each output is tested separately.
2. All input and output cables to the scope are equal lengths of 50 Ω coaxial cable. Wire length should be ≤ 0.250 (6.35 mm) from TP_{IN} to input pin and TP_{OUT} to output pin.
3. Outputs not under test should be connected to a 100 Ω resistor to ground.

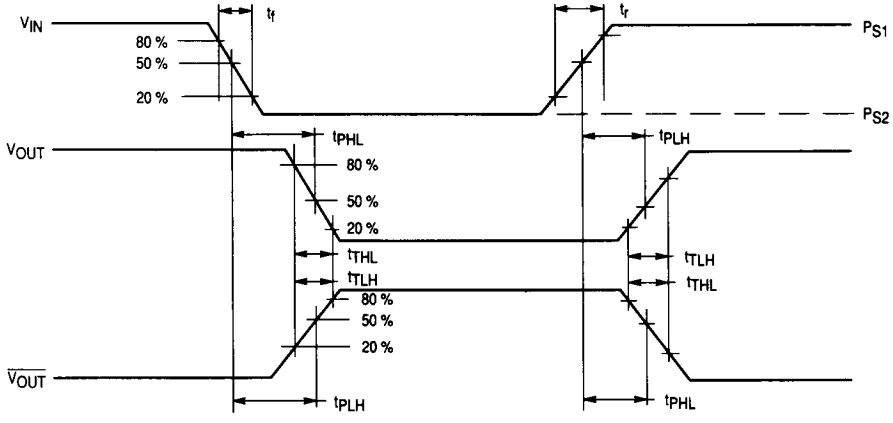


Figure 1. Switching Test Circuit and Waveforms

10509
QUIESCENT LIMIT TABLE *

* ELECTRICAL CHARACTERISTICS

Each MECL 10K series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to - 2.0 volts.

Test Temperature	Test Voltage Values (Volts)							
	V_{IH1}	V_{IL1}	V_{IH2}	V_{IL2}	V_{ITL}	V_{ITH}	V_{CC}	V_{EE1}
T_A = 25 °C	-0.78	-1.85	+1.11	+0.31	-1.475	-1.105		-5.2
T_A = 125 °C	-0.63	-1.82	+1.24	+0.36	-1.400	-1.000		-5.2
T_A = -55 °C	-0.88	-1.92	+1.01	+0.28	-1.510	-1.255		-5.2

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW						
	Functional Parameters:	+ 25 °C		+ 125 °C		- 55 °C			Pinouts referenced are for DIL package, check Pin Assignments V_{CC} = 0 V, Output Load = 100 Ω to - 2.0 V						
		Subgroup 1		Subgroup 2		Subgroup 3									
		Min	Max	Min	Max	Min	Max		V_{IH1}	V_{IL1}	V_{ITL}	V_{ITH}	V_{CC}	V_{EE1}	P. U. T.
V_{OH}	High Output Voltage	-0.93	-0.78	-0.825	-0.63	-1.06	-0.88	V	4 - 7, 9 - 13	4 - 7, 9 - 13			1, 16	8	2, 3, 14, 15
V_{OL}	Low Output Voltage	-1.86	-1.62	-1.82	-1.545	-1.92	-1.655	V	4 - 7, 9 - 13	4 - 7, 9 - 13			1, 16	8	2, 3, 14, 15
V_{OTH}	High Output Voltage	-0.96		-0.845		-1.1		V			4 - 7, 9 - 13	4 - 7, 9 - 13	1, 16	8	2, 3, 14, 15
V_{OTL}	Low Output Voltage		-1.6		-1.525		-1.635	V			4 - 7, 9 - 13	4 - 7, 9 - 13	1, 16	8	2, 3, 14, 15
I_{EE}	Power Supply Current	-14		-16		-16		mA					1, 16	8	8
I_{IH}	Input Current High		265		450		450	µA	4 - 7, 9 - 13				1, 16	8	4 - 7, 9 - 13
I_{IL}	Input Current Low	0.5		0.3		0.5		µA		4 - 7, 9 - 13			1, 16	8	4 - 7, 9 - 13

10509
QUIESCENT LIMIT TABLE *

* ELECTRICAL CHARACTERISTICS

Each MECL 10K series circuit has been designed to meet the dc specifications shown in the test table, after thermal equilibrium has been established. The circuit is in a test socket or mounted on a printed circuit board and transverse air flow greater than 500 linear fpm is maintained. Outputs are terminated through a 100 Ω resistor to - 2.0 volts.

Test Temperature	Test Voltage Values (Volts)							
	V_{IH1}	V_{IL1}	V_{IH2}	V_{IL2}	V_{ITL}	V_{ITH}	V_{CC}	V_{EEL}
T_A = 25 °C	-0.78	-1.85	+1.11	+0.31	-1.475	-1.105	+2.0	-3.2
T_A = 125 °C	-0.63	-1.82	+1.24	+0.36	-1.400	-1.000	+2.0	-3.2
T_A = -55 °C	-0.88	-1.92	+1.01	+0.28	-1.510	-1.255	+2.0	-3.2

Symbol	Parameter	Limits						Units	TEST VOLTAGE APPLIED TO PINS BELOW:				
	Functional Parameters:	+ 25° C		+ 125 ° C		- 55 ° C			Pinouts referenced are for DIL package, check Pin Assignments V_{CC} = 2.0 V, Output Load = 100 Ω to GND				
		Subgroup 9		Subgroup 10		Subgroup 11							
		Min	Max	Min	Max	Min	Max		V_{IN}	V_{OUT}	V_{CC}	V_{EEL}	P. U. T.
t_{TLH}	Rise Time	1.1	3.3	1.0	4.0	1.0	4.0	ns	6, 11	2, 3, 14	1, 16	8	2, 3, 14, 15
t_{THL}	Fall Time	1.1	3.3	1.0	4.0	1.0	4.0	ns	6, 11	2, 3, 14	1, 16	8	2, 3, 14, 15
t_{PLH}	Propaganda Delay Low to High	1.0	2.9	1.0	3.7	1.0	3.7	ns	6, 11	2, 3, 14	1, 16	8	2, 3, 14, 15
t_{PHL}	Propaganda Delay High to Low	1.0	2.9	1.0	3.7	1.0	3.7	ns	6, 11	2, 3, 14	1, 16	8	2, 3, 14, 15