



DM54S136/DM74S136 Quad 2-Input EXCLUSIVE-OR Gates with Open-Collector Outputs

General Description

This device contains four independent gates each of which performs the logic EXCLUSIVE-OR function. The open-collector outputs require external pull-up resistors for proper logical operation.

Pull-Up Resistor Equations

$$R_{MAX} = \frac{V_{CC} (Min) - V_{OH}}{N_1 (I_{OH}) + N_2 (I_{IH})}$$

$$R_{MIN} = \frac{V_{CC} (Max) - V_{OL}}{I_{OL} - N_3 (I_{IL})}$$

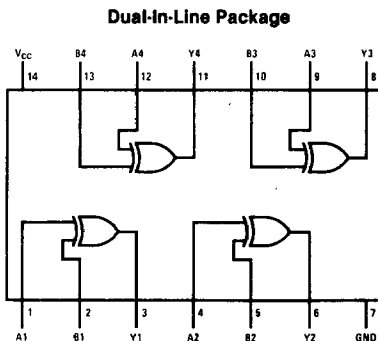
Where: $N_1 (I_{OH})$ = total maximum output high current for all outputs tied to pull-up resistor
 $N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor
 $N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Output Voltage	7V
Storage Temperature Range	-65°C to 150°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device can not be guaranteed. The device should not be operated at these limits. The parametric values defined in the "Electrical Characteristics" table are not guaranteed at the absolute maximum ratings. The "Recommended Operating Conditions" table will define the conditions for actual device operation.

Connection Diagram



TL/F/6465-1

DM54S136 (J) DM74S136 (N)

Function Table

$$Y = A \oplus B = \bar{A}B + A\bar{B}$$

Inputs		Output
A	B	Y
L	L	L
L	H	H
H	L	H
H	H	L

H = High Logic Level
L = Low Logic Level

Recommended Operating Conditions

Sym	Parameter	DM54S136			DM74S136			Units
		Min	Nom	Max	Min	Nom	Max	
V _{CC}	Supply Voltage	4.5	5	5.5	4.75	5	5.25	V
V _{IH}	High Level Input Voltage	2			2			V
V _{IL}	Low Level Input Voltage			0.8			0.8	V
V _{OH}	High Level Output Voltage			5.5			5.5	mA
I _{OL}	Low Level Output Current			20			20	mA
T _A	Free Air Operating Temperature	-55		125	0		70	°C

Electrical Characteristics over recommended operating free air temperature (unless otherwise noted)

Sym	Parameter	Conditions	Min	Typ (Note 1)	Max	Units
V _I	Input Clamp Voltage	V _{CC} = Min, I _I = -18 mA			-1.2	V
I _{CEX}	High Level Output Current	V _{CC} = Min, V _O = 5.5V V _{IL} = Max, V _{IH} = Min			250	μA
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max			0.5	V
I _I	Input Current @ Max Input Voltage	V _{CC} = Max, V _I = 5.5V			1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			50	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.5V			-2	mA
I _{CC}	Supply Current	V _{CC} = Max (Note 2)		50	75	mA

Note 1: All typicals are at V_{CC} = 5V, T_A = 25°C.

Note 2: I_{CC} is measured with one input of each gate at 4.5V, the other inputs grounded, and the outputs open.

Switching Characteristics at V_{CC} = 5V and T_A = 25°C

Parameter	From (Input) to (Output)	R _L = 280Ω						Units
		C _L = 15 pF			C _L = 50 pF			
		Min	Typ	Max	Min	Typ	Max	
t _{PLH} Propagation Delay Time Low to High Level Output	A or B to Y		8	12.5		10	14.5	ns
t _{PHL} Propagation Delay Time High to Low Level Output			7.5	12		9.5	14	ns