

DM54S135/DM74S135 Quad Exclusive-OR/NOR Gates

General Description

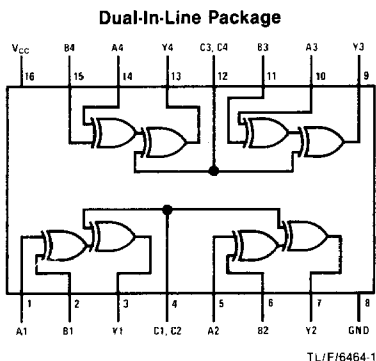
This device contains two combinations of gates which performs the logic Exclusive-OR/NOR function.

Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
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



DM54S135 (J)

DM74S135 (N)

Function Table

$$Y = (A \oplus B) \oplus C = \overline{A} \overline{B} C + \overline{A} B \overline{C} + A \overline{B} \overline{C} + ABC$$

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

H = High Logic Level

L = Low Logic Level

Recommended Operating Conditions

Sym	Parameter	DM54S135			DM74S135			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
I _{OH}	High Level Output Current			-1			-1	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	
V _{OH}	High Level Output Voltage	V _{CC} = Min I _{OH} = Max V _{IL} = Max V _{IH} = Min	DM54	2.5	3.4	V	
			DM74	2.7	3.4		
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 _{OS}	Short Circuit Output Current	V _{CC} = Max (Note 2)	DM54	-40		-100	mA
			DM74	-40		-100	
I _{CC}	Supply Current	V _{CC} = Max (Note 3)		65	99	mA	

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

Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CC} is measured with the inputs grounded and the outputs open.

Switching Characteristics at $V_{CC} = 5V$ and $T_A = 25^\circ C$ (See Section 1 for Test Waveforms and Output Load)

Parameter	From (Input) To (Output)	$R_L = 280\Omega$						Units
		$C_L = 15\text{ pF}$			$C_L = 50\text{ pF}$			
		Min	Typ	Max	Min	Typ	Max	
t_{PLH} Propagation Delay Time Low to High Level Output	A or B to Y (A or B = H, C = H)		8.5	13		12	16	ns
t_{PHL} Propagation Delay Time High to Low Level Output	A or B to Y (A or B = H, C = H)		11	15		14	18	ns
t_{PLH} Propagation Delay Time Low to High Level Output	A or B to Y (A or B = L, C = H)		8.0	12		11	15	ns
t_{PHL} Propagation Delay Time High to Low Level Output	A or B to Y (A or B = L, C = H)		9.0	13.5		12	16.5	ns
t_{PLH} Propagation Delay Time Low to High Level Output	A or B to Y (A or B = H, C = L)		10	15		13	18	ns
t_{PHL} Propagation Delay Time High to Low Level Output	A or B to Y (A or B = H, C = L)		6.5	10		9.5	13	ns
t_{PLH} Propagation Delay Time Low to High Level Output	A or B to Y (A or B = L, C = L)		8.5	12		12	15	ns
t_{PLH} Propagation Delay Time High to Low Level Output	A or B to Y (A or B = L, C = L)		7.0	11		10	14	ns
t_{PLH} Propagation Delay Time Low to High Level Output	C to Y (A \neq B)		8.0	12		11	15	ns
t_{PHL} Propagation Delay Time High to Low Level Output	C to Y (A \neq B)		9.5	14.5		13	17.5	ns
t_{PLH} Propagation Delay Time Low to High Level Output	C to Y (A = B)		7.5	11.5		11	14.5	ns
t_{PHL} Propagation Delay Time High to Low Level Output	C to Y (A = B)		8.0	12		11	15	ns