

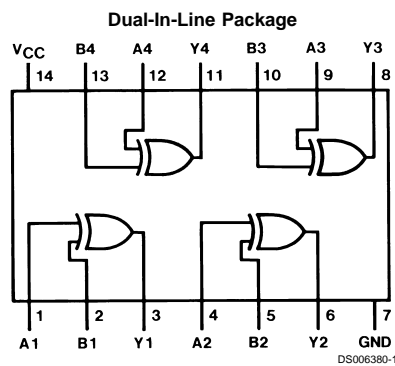
DM74LS86

Quad 2-Input Exclusive-OR Gates

General Description

This device contains four independent gates each of which performs the logic exclusive-OR function.

Connection Diagram



Order Number DM54LS86J, DM54LS86W, DM74LS86M or DM74LS86N
See Package Number J14A, M14A, N14A or W14B

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

Absolute Maximum Ratings (Note 1)

Supply Voltage

Input Voltage

Operating Free Air Temperature Range

7V

7V

DM54LS

DM74LS

Storage Temperature Range

–55°C to +125°C

0°C to +70°C

–65°C to +150°C

Recommended Operating Conditions

Symbol	Parameter	DM54LS86			DM74LS86			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			0.7			0.8	V
I_{OH}	High Level Output Current			–0.4			–0.4	mA
I_{OL}	Low Level Output Current			4			8	mA
T_A	Free Air Operating Temperature	–55		125	0		70	°C

Note 1: The "Absolute Maximum Ratings" are those values beyond which the safety of the device cannot 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.

Electrical Characteristics

over recommended operating free air temperature range (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
V_I	Input Clamp Voltage	$V_{CC} = \text{Min}, I_I = -18 \text{ mA}$			–1.5	V
V_{OH}	High Level Output Voltage	$V_{CC} = \text{Min}, I_{OH} = \text{Max},$ $V_{IL} = \text{Max}, V_{IH} = \text{Min}$	DM54 2.5	3.4		V
			DM74 2.7	3.4		
V_{OL}	Low Level Output Voltage	$V_{CC} = \text{Min}, I_{OL} = \text{Max},$ $V_{IL} = \text{Max}, V_{IH} = \text{Min}$	DM54	0.25	0.4	V
			DM74	0.35	0.5	
		$I_{OL} = 4 \text{ mA}, V_{CC} = \text{Min}$	DM74	0.25	0.4	
I_I	Input Current @ Max Input Voltage	$V_{CC} = \text{Max}, V_I = 7 \text{ V}$			0.2	mA
I_{IH}	High Level Input Current	$V_{CC} = \text{Max}, V_I = 2.7 \text{ V}$			40	μA
I_{IL}	Low Level Input Current	$V_{CC} = \text{Max}, V_I = 0.4 \text{ V}$			–0.6	mA
I_{OS}	Short Circuit Output Current	$V_{CC} = \text{Max}$ (Note 3)	DM54 –20		–100	mA
			DM74 –20		–100	
I_{CCH}	Supply Current with Outputs High	$V_{CC} = \text{Max}$ (Note 4)		6.1	10	mA
I_{CCL}	Supply Current with Outputs Low	$V_{CC} = \text{Max}$ (Note 5)		9	15	mA

Note 2: All typicals are at $V_{CC} = 5 \text{ V}, T_A = 25^\circ \text{C}$.

Note 3: Not more than one output should be shorted at a time, and the duration should not exceed one second.

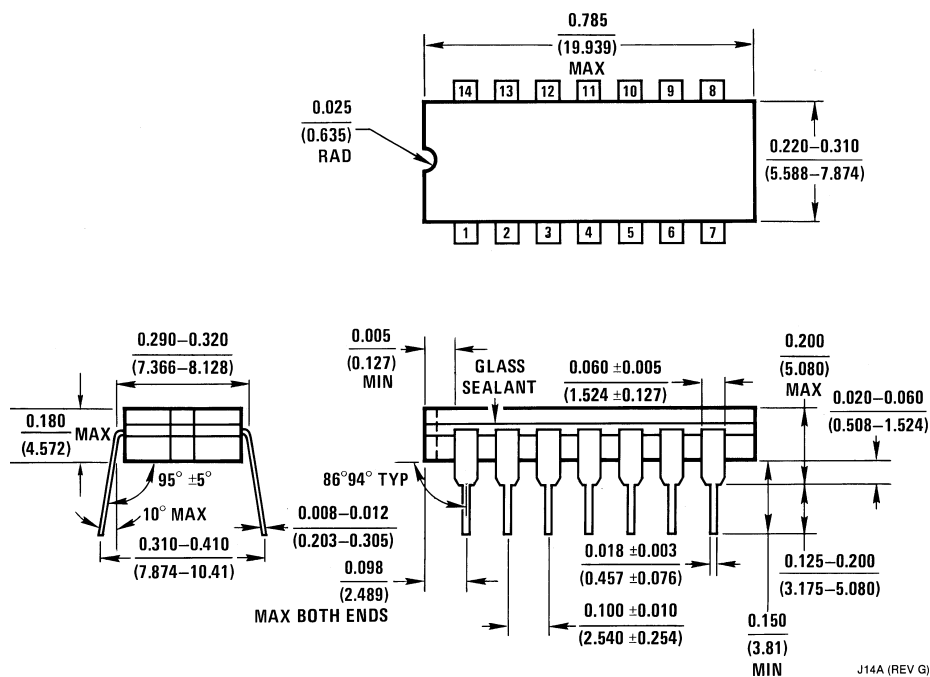
Note 4: I_{CCH} is measured with all outputs open, one input at each gate at 4.5V, and the other inputs grounded.

Note 5: I_{CCL} is measured with all outputs open and all inputs grounded.

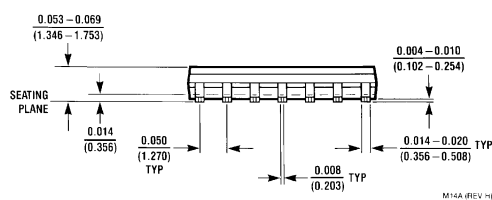
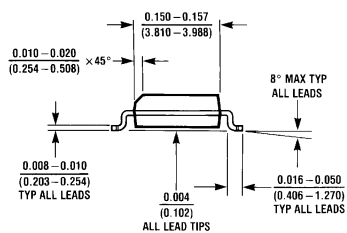
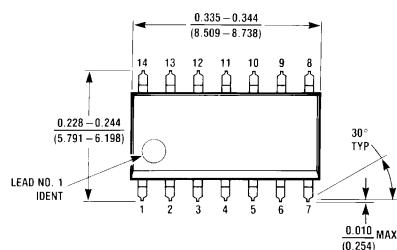
Switching Characteristics

at $V_{CC} = 5V$ and $T_A = 25^\circ C$

Symbol	Parameter	Conditions	R _L = 2 kΩ				Units
			C _L = 15 pF		C _L = 50 pF		
			Min	Max	Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	Other Input Low		18		23	ns
t _{PHL}	Propagation Delay Time High to Low Level Output			17		21	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	Other Input High		10		15	ns
t _{PHL}	Propagation Delay Time High to Low Level Output			12		15	ns

Physical Dimensions inches (millimeters) unless otherwise noted

14-Lead Ceramic Dual-In-Line Package (J)
Order Number DM54LS86J
Package Number J14A



14-Lead Small Outline Molded Package (M)
Order Number DM74LS86M
Package Number M14A

inches (millimeters) unless otherwise noted (Continued)



14-Lead Molded Dual-In-Line Package (N)
Order Number DM74LS86N
Package Number N14A



14-Lead Ceramic Flat Package (W)
Order Number DM74LS86W
Package Number W14B

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