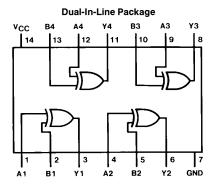


DM54LS86/DM74LS86 Quad 2-Input Exclusive-OR Gates

General Description

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

Connection Diagram



TL/F/6380-

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

Function Table

$$\mathbf{Y} = \mathbf{A} \oplus \mathbf{B} = \overline{\mathbf{A}}\mathbf{B} + \mathbf{A}\overline{\mathbf{B}}$$

Inputs		Output
Α	В	Y
L	L	Г
L	Н	Н
Н	L	Н
Η	Η	L

H = High Logic Level

 $\mathsf{L} = \mathsf{Low} \; \mathsf{Logic} \; \mathsf{Level}$

Absolute Maximum Ratings (Note)

If Military/Aerospace specified devices are required, please contact the National Semiconductor Sales Office/Distributors for availability and specifications.

Supply Voltage 7V
Input Voltage 7V
Operating Free Air Temperature Range

DM54LS −55°C to +125°C DM74LS 0°C to +70°C

Storage Temperature Range -65°C to $+150^{\circ}\text{C}$

Note: 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.

Recommended Operating Conditions

Symbol	Parameter	DM54LS86			DM74LS86			Units
	i didiletei	Min	Nom	Max	Min	Nom	Max	Office
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
l _{OL}	Low Level Output Current			4			8	mA
T _A	Free Air Operating Temperature	-55		125	0		70	°C

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

		•	•	•	• ,		
Symbol	Parameter	Conditions		Min	Typ (Note 1)	Max	Units
V_{I}	Input Clamp Voltage	$V_{CC} = Min, I_I = -18 \text{ mA}$				-1.5	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	$V_{CC} = Min, I_{OL} = Max,$ $V_{IL} = Max, V_{IH} = Min$	DM54		0.25	0.4	V	
		DM74		0.35	0.5		
		$I_{OL} = 4 \text{ mA}, V_{CC} = Min$	DM74		0.25	0.4	
I _I	Input Current @ Max Input Voltage	$V_{CC} = Max, V_I = 7V$				0.2	mA
I _{IH}	High Level Input Current	$V_{CC} = Max, V_I = 2.7V$				40	μΑ
I _{IL}	Low Level Input Current	$V_{CC} = Max, V_I = 0.4V$				-0.6	mA
I _{OS} Short Circuit Output Current	V _{CC} = Max	DM54	-20		-100	mA	
	Output Current	(Note 2)	DM74	-20		-100	"
I _{CCH}	Supply Current with Outputs High	V _{CC} = Max (Note 3)			6.1	10	mA
I _{CCL}	Supply Current with Outputs Low	V _{CC} = Max (Note 4)			9	15	mA

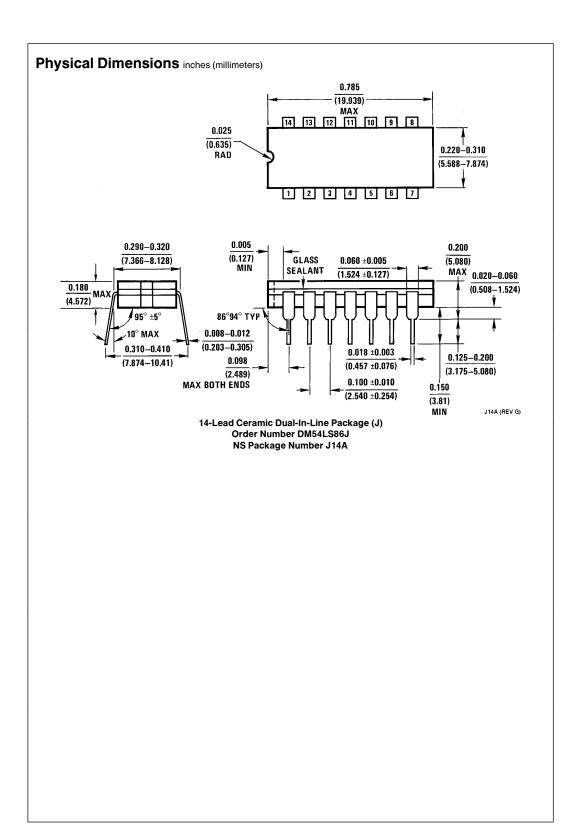
Note 1: All typicals are at $V_{CC} = 5V$, $T_A = 25^{\circ}C$.

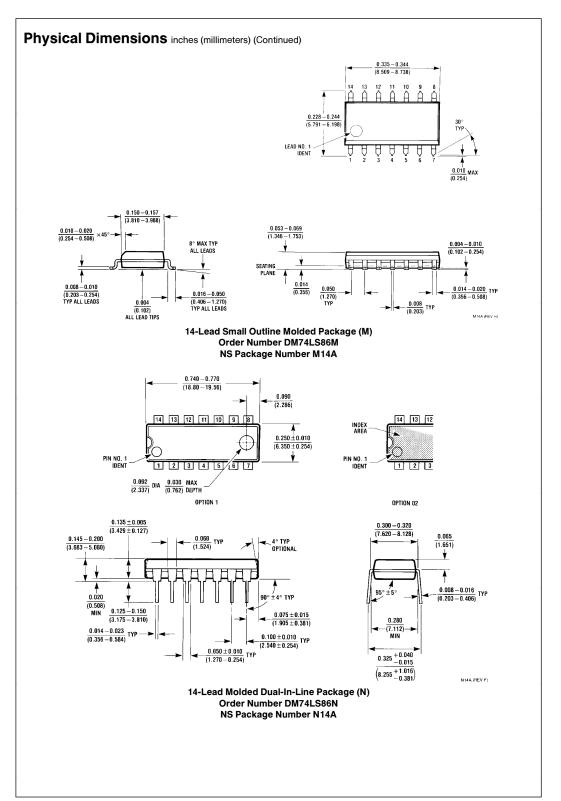
Note 2: Not more than one output should be shorted at a time, and the duration should not exceed one second.

Note 3: I_{CCH} is measured with all outputs open, one input at each gate at 4.5V, and the other inputs grounded.

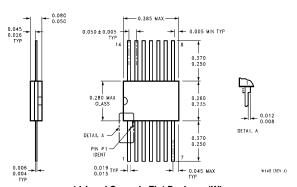
Note 4: I_{CCL} is measured with all outputs open and all inputs grounded.

Symbol	Parameter	Conditions					
			C _L =	15 pF	C _L =	Units	
			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) (Continued)



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

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