FAIRCHILD
SEMICONDUCTOR ™

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DM74ALS86
Quad 2-Input Exclusive-OR Gate

General Description

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

Features

■ Switching specifications at 50 pF

■ Switching specifications guaranteed over full temperature and V_{CC} range

■ Advanced oxide-isolated, ion-implanted Schottky TTL process

■ Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart

■ Improved AC performance over Schottky and low power Schottky counterparts

Ordering Code:

Order Number	Package Number	Package Description
DM74ALS86M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS86N	N14A	14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide

Devices also available in Tape and Reel. Specify by appending the suffix letter "X" to the ordering code.

Connection Diagram
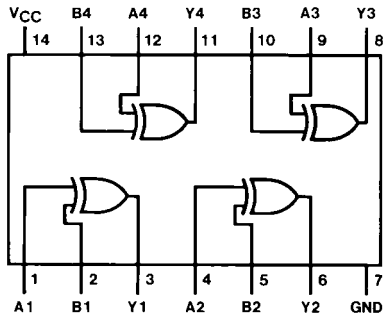
Function Table

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

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	7V
Input Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	−65°C to +150°C
Typical θ_{JA}	
N Package	87.0°C/W
M Package	117.2°C/W

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 tables 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	Min	Nom	Max	Units
V_{CC}	Supply Voltage	4.5	5	5.5	V
V_{IH}	HIGH Level Input Voltage	2			V
V_{IL}	LOW Level Input Voltage			0.8	V
I_{OH}	HIGH Level Output Current			−0.4	mA
I_{OL}	LOW Level Output Current			8	mA
T_A	Free Air Operating Temperature	0		70	°C

Electrical Characteristics

over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25°C$.

Symbol	Parameter	Conditions		Min	Typ	Max	Units
V_{IK}	Input Clamp Voltage	$V_{CC} = 4.5V$, $I_I = −18$ mA				−1.5	V
V_{OH}	HIGH Level Output Voltage	$I_{OH} = −0.4$ mA $V_{CC} = 4.5V$ to 5.5V		$V_{CC} − 2$			V
V_{OL}	LOW Level Output Voltage	$V_{CC} = 4.5V$	$I_{OL} = 4$ mA		0.25	0.4	V
			$I_{OL} = 8$ mA		0.35	0.5	V
I_I	Input Current @ Maximum Input Voltage	$V_{CC} = 5.5V$, $V_{IH} = 7V$				0.1	mA
I_{IH}	HIGH Level Input Current	$V_{CC} = 5.5V$, $V_{IH} = 2.7V$				20	μA
I_{IL}	LOW Level Input Current	$V_{CC} = 5.5V$, $V_{IL} = 0.4V$				−0.1	mA
I_O	Output Drive Current	$V_{CC} = 5.5V$	$V_O = 2.25V$	−30		−112	mA
I_{CCL}	Supply Current with Outputs LOW	$V_{CC} = $ Max, All Inputs at 4.5V			3.9	5.9	mA
I_{CCH}	Supply Current with Outputs HIGH	$V_{CC} = $ Max, A Inputs at 0.0V B Inputs at 4.5V			3.8	4.5	mA

Switching Characteristics

over recommended operating free air temperature range.

Symbol	Parameter	Conditions		Min	Max	Units
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output	(Note 2)	A or B to Y Other Input LOW	3	17	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output			2	12	ns
t_{PLH}	Propagation Delay Time LOW-to-HIGH Level Output		A or B to Y Other Input HIGH	2	17	ns
t_{PHL}	Propagation Delay Time HIGH-to-LOW Level Output			2	10	ns

Note 2: $V_{CC} = 4.5V$ to 5.5V, $R_L = 500\Omega$, $C_L = 50$ pF.

Physical Dimensions inches (millimeters) unless otherwise noted

0.335 − 0.344
(8.509 − 8.738)

14 13 12 11 10 9 8

0.228 − 0.244
(5.791 − 6.198)

LEAD NO. 1
IDENT

1 2 3 4 5 6 7

30°
TYP

0.010 MAX
(0.254)

0.150 − 0.157
(3.810 − 3.988)

0.010 − 0.020
(0.254 − 0.508) ×45°

8° MAX TYP
ALL LEADS

0.008 − 0.010
(0.203 − 0.254)
TYP ALL LEADS

0.004
(0.102)
ALL LEAD TIPS

0.016 − 0.050
(0.406 − 1.270)
TYP ALL LEADS

0.053 − 0.069
(1.346 − 1.753)

0.004 − 0.010
(0.102 − 0.254)

SEATING
PLANE

0.014
(0.356)

0.050
(1.270)
TYP

0.008
(0.203) TYP

0.014 − 0.020
(0.356 − 0.508) TYP

M14A (REV H)

14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
Package Number M14A

Physical Dimensions inches (millimeters) unless otherwise noted (Continued)

OPTION 1

OPTION 02

14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide
Package Number N14A

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2. A critical component in any component of a life support device or system whose failure to perform can be reasonably expected to cause the failure of the life support device or system, or to affect its safety or effectiveness.

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