

T-43-15-00

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DM74AS136 Quad 2-Input Exclusive-OR Gate 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

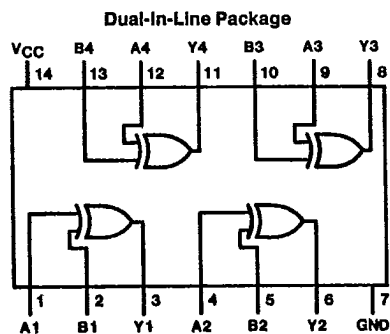
$N_2 (I_{IH})$ = total maximum input high current for all inputs tied to pull-up resistor

$N_3 (I_{IL})$ = total maximum input low current for all inputs tied to pull-up resistor

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, low power Schottky, and advanced low power Schottky TTL counterparts
- Improved AC performance over Schottky, low power Schottky, and advanced low power Schottky counterparts
- Open collector outputs for wired AND cascading
- PNP input design reduces input loading

Connection Diagram



TL/F/6718-1

Order Number DM74AS136N
See NS Package Number N14A*

Function Table

$$Y = A \oplus B$$

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

*Contact your local NSC representative about surface mount (M) package availability.



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Absolute Maximum Ratings

Supply Voltage	7V
Input Voltage	7V
Output Voltage (off-state)	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical θ_{JA} N Package	74.5°C/W

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	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
V _{OH}	High Level Output Voltage			5.5	V
I _{OL}	Low Level Output Current			20	mA
T _A	Free Air Operating Temperature	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 mA			-1.2	V
I _{CEX}	High Level Output Current	V _{CC} = Min, V _O = 5.5V V _{IL} = Max, V _{IH} = Min			100	μA
V _{OL}	Low Level Output Voltage	V _{CC} = Min, I _{OL} = Max V _{IH} = Min, V _{IL} = Max		0.35	0.5	V
I _I	Input Current at Max Input Voltage	V _{CC} = Max, V _I = 7V			0.1	mA
I _{IH}	High Level Input Current	V _{CC} = Max, V _I = 2.7V			20	μA
I _{IL}	Low Level Input Current	V _{CC} = Max, V _I = 0.5V			-0.5	mA
I _{CC}	Supply Current	V _{CC} = Max				
		Outputs High		13	18	mA
		Outputs Low		28	41	

Switching Characteristics

over recommended operating free air temperature range (Note 1)

Symbol	Parameter	Conditions	DM74AS136		Units
			Min	Max	
t _{PLH}	Propagation Delay Time Low to High Level Output	Other Input Low V _{CC} = 4.5V to 5.5V R _L = 500Ω C _L = 50 pF	5	45	ns
t _{PHL}	Propagation Delay Time High to Low Level Output		1	8	ns
t _{PLH}	Propagation Delay Time Low to High Level Output	Other Input Low V _{CC} = 4.5V to 5.5V R _L = 500Ω C _L = 50 pF	5	45	ns
t _{PHL}	Propagation Delay Time High to Low Level Output		1	9	ns

Note 1: See Section 1 for test waveforms and output load.