August 1986 Revised April 2000 DM74S51 Dual 2-Wide 2-Input AND-OR-INVERT Gate

# DM74S51 Dual 2-Wide 2-Input AND-OR-INVERT Gate

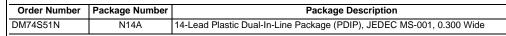
### **General Description**

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This device contains two independent combinations of gates each of which performs the logic AND-OR-INVERT function.

# **Ordering Code:**



# Connection Diagram

Function	Table
	$\mathbf{Y} = \mathbf{AB} + \mathbf{CD}$

Inputs			Output	
Α	В	С	D	Y
Н	Н	Х	Х	L
Х	Х	Н	н	L
All other			Н	
combinations				

H = HIGH Logic Level L = LOW Logic Level

X = Either LOW or HIGH Logic Level

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# Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	$0^{\circ}C$ to $+70^{\circ}C$
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$

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 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 <sub>CC</sub>	Supply Voltage	4.75	5	5.25	V
/ <sub>IH</sub>	HIGH Level Input Voltage	2			V
/ <sub>IL</sub>	LOW Level Input Voltage			0.8	V
ОН	HIGH Level Output Current			-1	mA
OL	LOW Level Output Current			20	mA
Γ <sub>A</sub>	Free Air Operating Temperature	0		70	°C

### **Electrical Characteristics**

over recommended operating free air temperature (unless otherwise noted)

Symbol	Parameter	Conditions	Min	Typ (Note 2)	Max	Units
VI	Input Clamp Voltage	$V_{CC} = Min, I_I = -18 \text{ mA}$			-1.2	V
V <sub>OH</sub>	HIGH Level Output Voltage	$V_{CC} = Min, I_{OH} = Max$ $V_{IL} = Max$	2.7	3.4		V
V <sub>OL</sub>	LOW Level Output Voltage	$V_{CC} = Min, I_{OL} = Max$ $V_{IH} = Min$			0.5	V
l <sub>l</sub>	Input Current @ Max Input Voltage	$V_{CC} = Max, V_1 = 5.5V$			1	mA
I <sub>IH</sub>	HIGH Level Input Current	$V_{CC} = Max, V_I = 2.7V$			50	μΑ
I <sub>IL</sub>	LOW Level Input Current	$V_{CC} = Max, V_I = 0.5V$			-2	mA
los	Short Circuit Output Current	V <sub>CC</sub> = Max (Note 3)	-40		-100	mA
I <sub>CCH</sub>	Supply Current with Outputs HIGH	V <sub>CC</sub> = Max		8.2	17.8	mA
I <sub>CCL</sub>	Supply Current with Outputs LOW	V <sub>CC</sub> = Max		14	22	mA

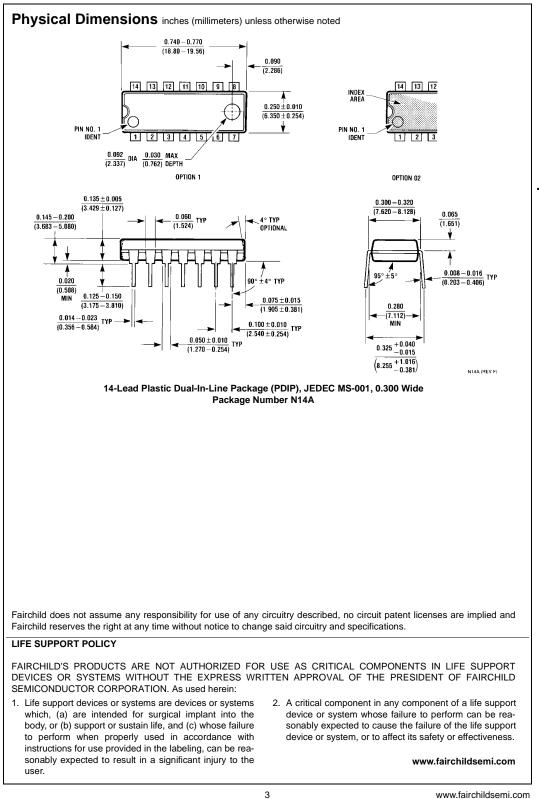
Note 2: All typicals are at V\_{CC} = 5V, T\_A = 25^{\circ}C.

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

### **Switching Characteristics**

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

-	Parameter	R <sub>L</sub> = 280Ω				
Symbol		C <sub>L</sub> = 15 pF		$C_L = 50 \text{ pF}$		Units
		Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Time	2	5.5	3	8	ns
	LOW-to-HIGH Level Output	2	5.5	5	0	115
t <sub>PHL</sub>	Propagation Delay Time	2	5.5	3	8	20
	HIGH-to-LOW Level Output	2	5.5	3	0	ns



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