# DM74ALS133 13-Input NAND Gate

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# DM74ALS133 13-Input NAND Gate

### **General Description**

This device contains a single gate, which performs the logic NAND function.

### Features

- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and V<sub>CC</sub> range

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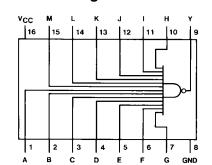
Revised February 2000

- 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		
DM74ALS133M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow		
DM74ALS133N	N16E	16-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 = ABCDEFGHIJKLM

Inputs	Output
A thru M	Y
All Inputs H	L
One or More Input L	н

H = HIGH Logic Level L = LOW Logic Level

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## Absolute Maximum Ratings(Note 1)

Supply Voltage	7V
Input Voltage	7V
Operating Free Air Temperature Range	$0^{\circ}C$ to $+70^{\circ}C$
Storage Temperature Range	$-65^{\circ}C$ to $+150^{\circ}C$
Typical θ <sub>JA</sub>	
N Package	85.0°C/W
M Package	111.0°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 <sub>CC</sub>	Supply Voltage	4.5	5	5.5	V
V <sub>IH</sub>	HIGH Level Input Voltage	2			V
V <sub>IL</sub>	LOW Level Input Voltage			0.8	V
он	HIGH Level Output Current			-0.4	mA
OL	LOW Level Output Current			8	mA
T <sub>A</sub>	Free Air Operating Temperature	0		70	°C

### **Electrical Characteristics**

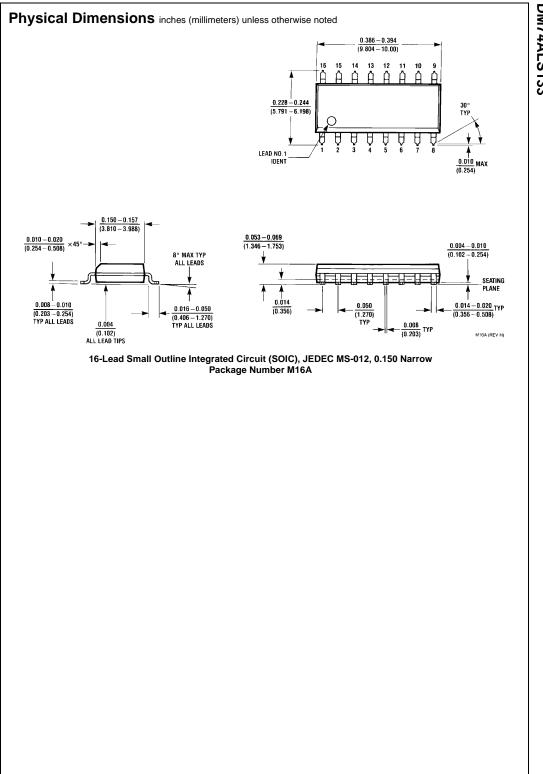
over recommended operating free air temperature range. All typical values are measured at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

Symbol	Parameter	Conditio	ns	Min	Тур	Max	Units	
V <sub>IK</sub>	Input Clamp Voltage	$V_{CC} = 4.5V, I_I = -18 \text{ mA}$				-1.5	V	
V <sub>OH</sub>	HIGH Level	I <sub>OH</sub> = -0.4 mA					v	
	Output Voltage	$V_{CC} = 4.5V$ to 5.5V		V <sub>CC</sub> – 2			v	
V <sub>OL</sub>	LOW Level	$V_{CC} = 4.5V$	$I_{OL} = 4 \text{ mA}$		0.25	0.4	V	
	Output Voltage		$I_{OL} = 8 \text{ mA}$		0.35	0.5	V	
I <sub>I</sub>	Input Current @ Maximum	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 7V	•			0.1	mA	
	Input Voltage	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 7V				0.1	ША	
I <sub>IH</sub>	HIGH Level Input Current	$V_{CC} = 5.5V, V_{IH} = 2.7V$				20	μA	
IIL	LOW Level Input Current	$V_{CC} = 5.5 V, \ V_{IL} = 0.4 V$				-0.1	mA	
I <sub>O</sub>	Output Drive Current	$V_{CC} = 5.5V$	$V_0 = 2.25V$	-30		-112	mA	
I <sub>CC</sub>	Supply Current	$V_{CC} = 5.5V$	Outputs HIGH		0.24	0.34	mA	
			Outputs LOW		0.56	0.8	mA	

## **Switching Characteristics**

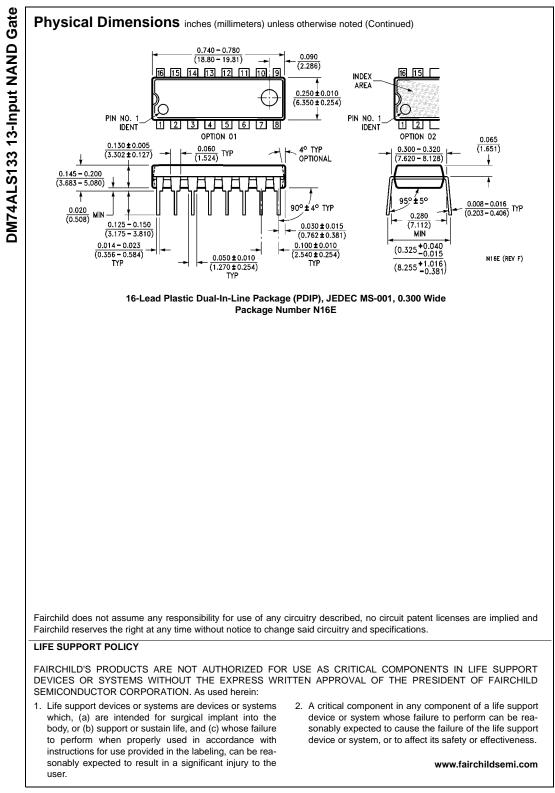
Symbol	Parameter	Conditions	Min	Max	Units
t <sub>PLH</sub>	Propagation Delay Time	$V_{CC} = 4.5V$ to 5.5V	3	11	ns
	LOW-to-HIGH Level Output	$R_L = 500\Omega$	5		
t <sub>PHL</sub>	Propagation Delay Time	$C_L = 50 \text{ pF}$	5	25	ns
	HIGH-to-LOW Level Output		5	20	115

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