

February 1991 Revised February 2000

DM74ALS133 13-Input NAND Gate

General Description

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

Features

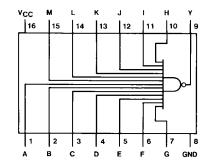
- Switching specifications at 50 pF
- \blacksquare Switching specifications guaranteed over full temperature and V_{CC} range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over Schottky and low power Schottky counterparts

Ordering Code:

Order Number	Package Number	Package Description				
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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DS006201

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Absolute Maximum Ratings(Note 1)

Supply Voltage 7V Input Voltage 7V Operating Free Air Temperature Range $0^{\circ}\text{C to } + 70^{\circ}\text{C}$

Storage Temperature Range -65°C to +150°C

Typical θ_{JA}

N Package 85.0°C/W The "Recommended Opera for actual device operation."

N 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.

85.0°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 the absolute maximum ratings.

The "Recommended Operating Conditions" table will define the conditions

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

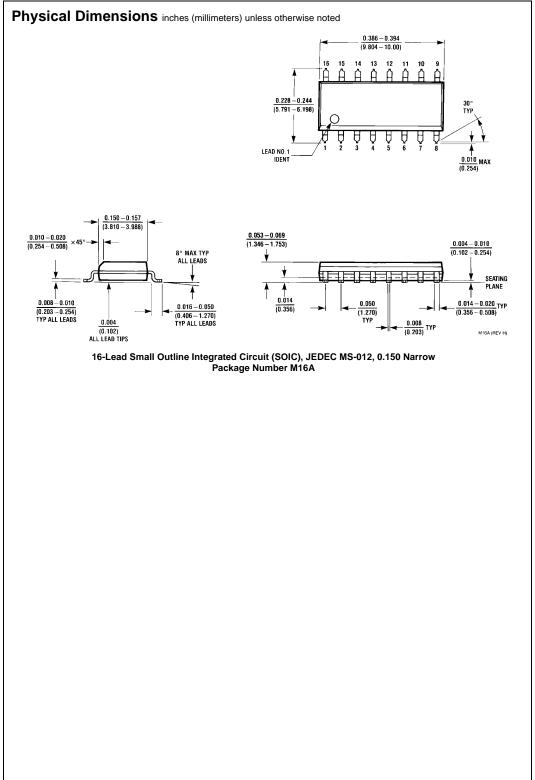
over recommended operating free air temperature range. All typical values are measured at $V_{CC} = 5V$, $T_A = 25^{\circ}C$.

Symbol	Parameter	Conditions		Min	Тур	Max	Units
V _{IK}	Input Clamp Voltage	V _{CC} = 4.5V, I _I = -18 mA				-1.5	V
V _{OH}	HIGH Level	$I_{OH} = -0.4 \text{ mA}$ $V_{CC} = 4.5 \text{V to } 5.5 \text{V}$		V 2			V
	Output Voltage			V _{CC} – 2			v
V _{OL}	LOW Level	V _{CC} = 4.5V	$I_{OL} = 4 \text{ mA}$		0.25	0.4	٧
	Output Voltage		I _{OL} = 8 mA		0.35	0.5	V
I _I	Input Current @ Maximum	V _{CC} = 5.5V, V _{IH} = 7V				0.1	mA
	Input Voltage	VCC = 3.5 V, VIH = 7 V			0.1	IIIA	
I _{IH}	HIGH Level Input Current	$V_{CC} = 5.5V, V_{IH} = 2.7V$				20	μΑ
I _{IL}	LOW Level Input Current	$V_{CC} = 5.5V, V_{IL} = 0.4V$				-0.1	mA
Io	Output Drive Current	V _{CC} = 5.5V	V _O = 2.25V	-30		-112	mA
I _{CC}	Supply Current	V _{CC} = 5.5V	Outputs HIGH		0.24	0.34	mA
			Outputs LOW		0.56	0.8	mA

Switching Characteristics

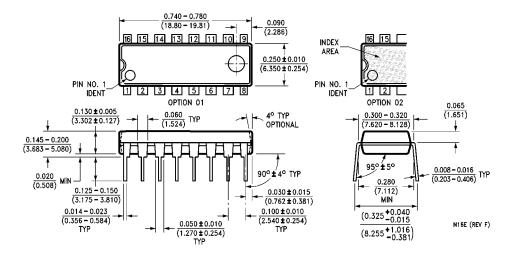
over recommended operating free air temperature range

Symbol	Parameter	Conditions	Min	Max	Units
t _{PLH}	Propagation Delay Time	V _{CC} = 4.5V to 5.5V	2	11	
	LOW-to-HIGH Level Output	$R_L = 500\Omega$	3	"	ns
t _{PHL}	Propagation Delay Time	C _L = 50 pF	F	25	
	HIGH-to-LOW Level Output		5	25	ns



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



16-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N16E

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