

**FAIRCHILD**  
SEMICONDUCTOR™

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## DM74S133 13-Input NAND Gate

### General Description

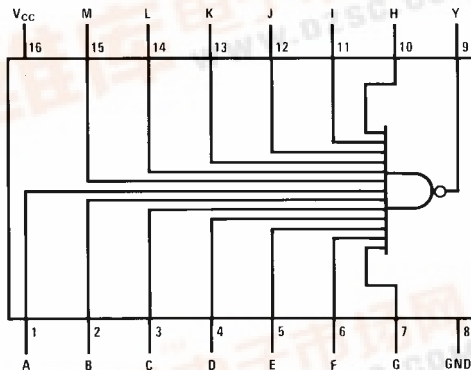
This device contains a single gate which performs the logic NAND function.

### Ordering Code:

Order Number	Package Number	Package Description
DM74S133M	M16A	16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74S133N	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

$$Y = \overline{ABCDEFGHIJKLM}$$

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

H = HIGH Logic Level  
L = LOW Logic Level

DM74S133 13-Input NAND Gate



## Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	5.5V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°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
V <sub>IH</sub>	HIGH Level Input Voltage	2			V
V <sub>IL</sub>	LOW Level Input Voltage			0.8	V
I <sub>OH</sub>	HIGH Level Output Current			-1	mA
I <sub>OL</sub>	LOW Level Output Current			20	mA
T <sub>A</sub>	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 2)	Max	Units
V <sub>I</sub>	Input Clamp Voltage	V <sub>CC</sub> = Min, I <sub>I</sub> = -18 mA			-1.2	V
V <sub>OH</sub>	HIGH Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OH</sub> = Max V <sub>IL</sub> = Max	2.7	3.4		V
V <sub>OL</sub>	LOW Level Output Voltage	V <sub>CC</sub> = Min, I <sub>OL</sub> = Max V <sub>IH</sub> = Min			0.5	V
I <sub>I</sub>	Input Current @ Max Input Voltage	V <sub>CC</sub> = Max, V <sub>I</sub> = 5.5V			1	mA
I <sub>IH</sub>	HIGH Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 2.7V			50	μA
I <sub>IL</sub>	LOW Level Input Current	V <sub>CC</sub> = Max, V <sub>I</sub> = 0.5V			-2	mA
I <sub>OS</sub>	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		3	5	mA
I <sub>CCL</sub>	Supply Current with Outputs LOW	V <sub>CC</sub> = Max		5.5	10	mA

**Note 2:** All typicals are at V<sub>CC</sub> = 5V, T<sub>A</sub> = 25°C.

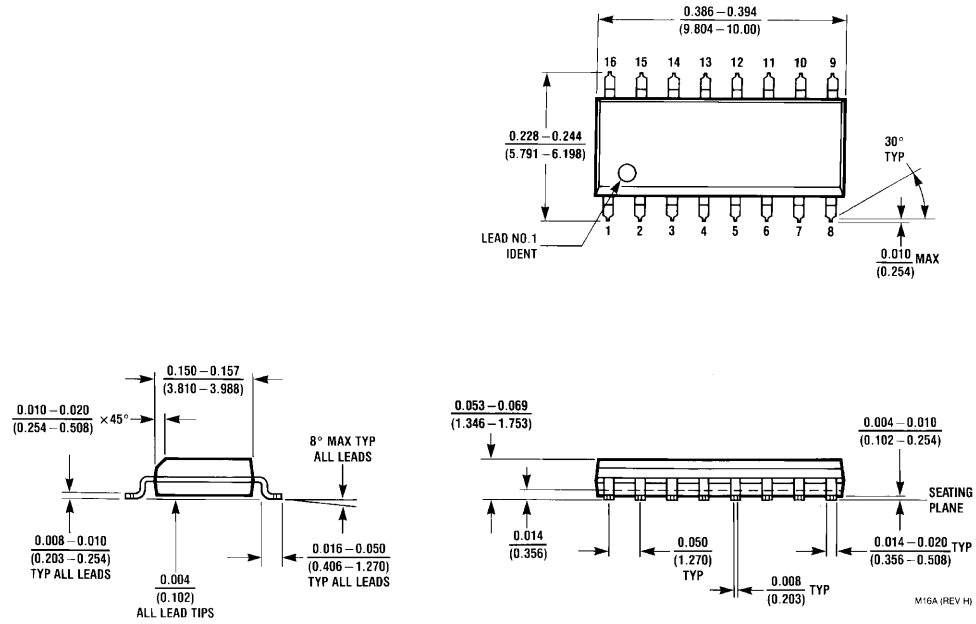
**Note 3:** Not more than one output should be shorted at a time, and the duration should not exceed one second.

## Switching Characteristics

at V<sub>CC</sub> = 5V and T<sub>A</sub> = 25°C

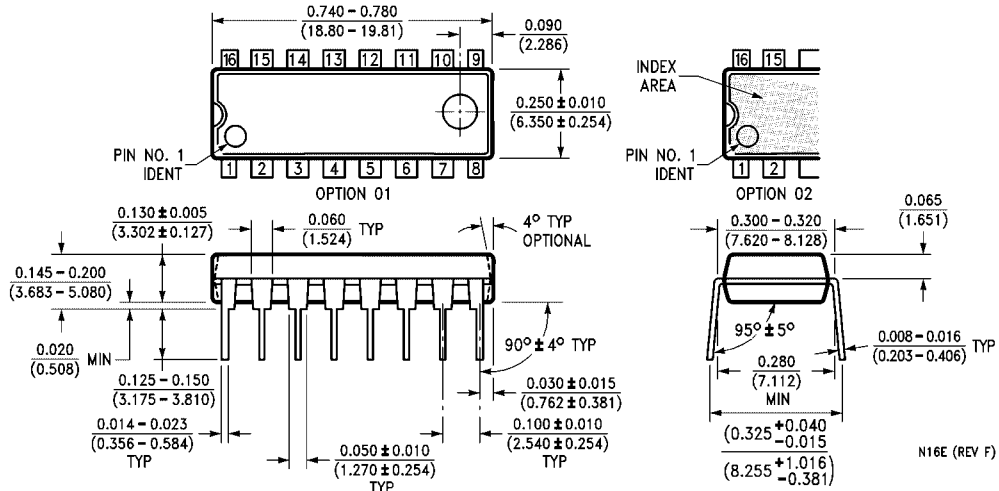
Symbol	Parameter	R <sub>L</sub> = 280Ω				Units
		C <sub>L</sub> = 15 pF		C <sub>L</sub> = 50 pF		
		Min	Max	Min	Max	
t <sub>PLH</sub>	Propagation Delay Time LOW-to-HIGH Level Output	2	6	2	8	ns
t <sub>PHL</sub>	Propagation Delay Time HIGH-to-LOW Level Output	2	7	3	10	ns

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



**16-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow  
Package Number M16A**

**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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