

## Excellent Integrated System Limited

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[Fairchild Semiconductor](#)  
[DM74ALS1005N](#)

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September 1986  
Revised February 2000

## DM74ALS1005 Hex Inverting Driver with Open Collector Outputs

### General Description

These devices contain six independent drivers, each of which performs the logic INVERT/Complement function. The outputs require external pull-up resistors for proper logical operation. The DM74ALS1005 is a driver version of the DM74ALS05A.

#### 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

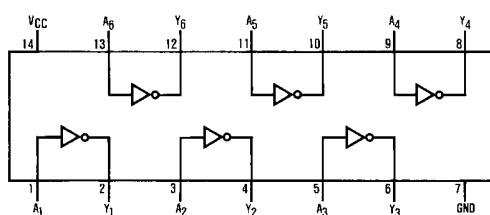
- Switching specifications at 50 pF
- Switching specifications guaranteed over full temperature and  $V_{CC}$  range
- Advanced oxide-isolated, ion-implanted Schottky TTL process
- Functionally and pin for pin compatible with Schottky and low power Schottky TTL counterpart
- Improved AC performance over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

### Ordering Code:

Order Number	Package Number	Package Description
DM74ALS1005M	M14A	14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow
DM74ALS1005N	N14A	14-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

$$Y = \bar{A}$$

Input A	Output Y
H	L
L	H

L = LOW Logic Level  
H = HIGH Logic Level

DM74ALS1005

### Absolute Maximum Ratings (Note 1)

Supply Voltage	7V
Input Voltage	7V
OFF-State Output Voltage	7V
Operating Free Air Temperature Range	0°C to +70°C
Storage Temperature Range	-65°C to +150°C
Typical $\theta_{JA}$	
N Package	76.0°C/W
M Package	106.5°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
V <sub>OH</sub>	HIGH Level Output Voltage			5.5	V
I <sub>OL</sub>	LOW Level Output Current			24	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.

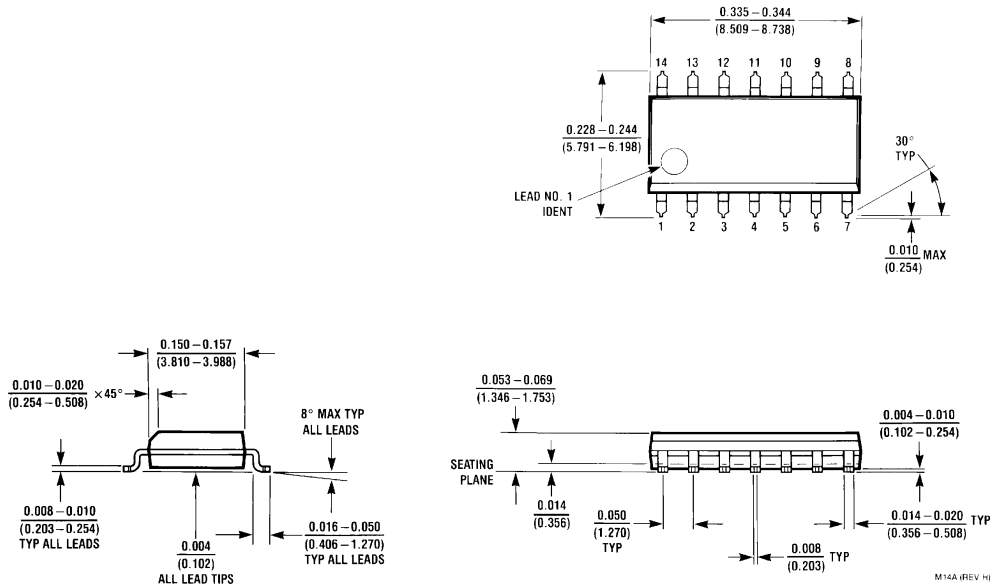
Symbol	Parameter	Conditions	Min	Typ	Max	Units
V <sub>IK</sub>	Input Clamp Voltage	V <sub>CC</sub> = 4.5V, I <sub>I</sub> = -18 mA			-1.5	V
I <sub>OH</sub>	HIGH Level Output Current	V <sub>CC</sub> = 4.5V, V <sub>OH</sub> = 5.5V			100	μA
V <sub>OL</sub>	LOW Level Output Voltage	V <sub>CC</sub> = 4.5V	I <sub>OL</sub> = 12 mA	0.25	0.4	V
			I <sub>OL</sub> = 24 mA		0.35	0.5
I <sub>I</sub>	Input Current at Maximum Input Voltage	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 7V			0.1	mA
I <sub>IH</sub>	HIGH Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IH</sub> = 2.7V			20	μA
I <sub>IL</sub>	LOW Level Input Current	V <sub>CC</sub> = 5.5V, V <sub>IL</sub> = 0.4V			-0.1	mA
I <sub>CC</sub>	Supply Current	V <sub>CC</sub> = 5.5V	Outputs HIGH	0.9	3	mA
			Outputs LOW	7	12	mA

### Switching Characteristics

over recommended operating free air temperature range

Symbol	Parameter	Conditions	Min	Max	Units	
t <sub>PLH</sub>	Propagation Delay Time LOW-to-HIGH Level Output	V <sub>CC</sub> = 4.5V to 5.5V R <sub>L</sub> = 680Ω		5	30	ns
t <sub>PHL</sub>	Propagation Delay Time HIGH-to-LOW Level Output	C <sub>L</sub> = 50 pF		2	10	ns

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



14-Lead Small Outline Integrated Circuit (SOIC), JEDEC MS-012, 0.150 Narrow  
 Package Number M14A

DM74ALS1005 Hex Inverting Driver with Open Collector Outputs

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

**14-Lead Plastic Dual-In-Line Package (PDIP), JEDEC MS-001, 0.300 Wide Package Number N14A**

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