

# TYPES SN54ALS05A, SN74ALS05A HEX INVERTERS WITH OPEN-COLLECTOR OUTPUTS

D2661, APRIL 1982—REVISED DECEMBER 1983

- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

## description

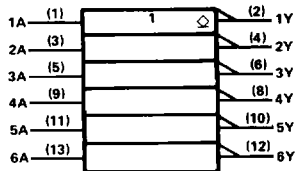
These devices contain six independent inverters. They perform the Boolean function  $Y = \bar{A}$ . The open-collector outputs require pull-up resistors to perform correctly. They may be connected to other open-collector outputs to implement active-low wired-OR or active-high wired-AND functions. Open-collector devices are often used to generate higher  $V_{OH}$  levels.

The SN54ALS05A is characterized for operation over the full military temperature range of  $-55^{\circ}\text{C}$  to  $125^{\circ}\text{C}$ . The SN74ALS05A is characterized for operation from  $0^{\circ}\text{C}$  to  $70^{\circ}\text{C}$ .

FUNCTION TABLE (each inverter)

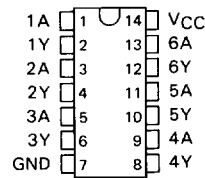
INPUT A	OUTPUT Y
H	L
L	H

## logic symbol

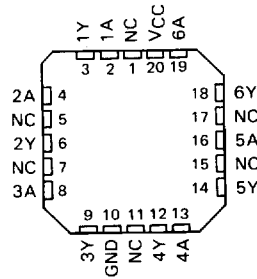


Pin numbers shown are for J and N packages.

SN54ALS05A . . . J PACKAGE  
SN74ALS05A . . . N PACKAGE  
(TOP VIEW)



SN54ALS05A . . . FH PACKAGE  
SN74ALS05A . . . FN PACKAGE  
(TOP VIEW)



NC — No internal connection

2

ALS AND AS CIRCUITS

**TYPES SN54ALS05A, SN74ALS05A  
HEX INVERTERS WITH OPEN-COLLECTOR OUTPUTS**

**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)**

Supply voltage, $V_{CC}$ .....	7 V
Input voltage .....	7 V
Off-state output voltage .....	7 V
Operating free-air temperature range: SN54ALS05A .....	-55 °C to 125 °C
SN74ALS05A .....	0 °C to 70 °C
Storage temperature range .....	-65 °C to 150 °C

**recommended operating conditions**

		SN54ALS05A			SN74ALS05A			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
$V_{CC}$	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
$V_{IH}$	High-level input voltage	2			2			V
$V_{IL}$	Low-level input voltage			0.8			0.8	V
$V_{OH}$	High-level output voltage			5.5			5.5	V
$I_{OL}$	Low-level output current			4			8	mA
$T_A$	Operating free-air temperature	-55		125	0		70	°C

**electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)**

PARAMETER	TEST CONDITIONS	SN54ALS05A		SN74ALS05A		UNIT		
		MIN	TYP†	MAX	MIN		TYP†	MAX
$V_{IK}$	$V_{CC} = 4.5 V, I_I = -18 mA$			-1.5		-1.5	V	
$I_{OH}$	$V_{CC} = 4.5 V, V_{OH} = 5.5 V$			0.1		0.1	mA	
$V_{OL}$	$V_{CC} = 4.5 V, I_{OL} = 4 mA$		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5 V, I_{OL} = 8 mA$					0.35	0.5	
$I_I$	$V_{CC} = 5.5 V, V_I = 7 V$			0.1		0.1	mA	
$I_{IH}$	$V_{CC} = 5.5 V, V_I = 2.7 V$			20		20	μA	
$I_{IL}$	$V_{CC} = 5.5 V, V_I = 0.4 V$			-0.1		-0.1	mA	
$I_{CCH}$	$V_{CC} = 5.5 V, V_I = 0 V$		0.65	1.1		0.65	1.1	mA
$I_{CCL}$	$V_{CC} = 5.5 V, V_I = 4.5 V$		2.9	4.2		2.9	4.2	mA

†All typical values are at  $V_{CC} = 5 V, T_A = 25 °C$

**switching characteristics (see Note 1)**

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5 V$ to $5.5 V,$ $C_L = 50 pF,$ $R_L = 2 k\Omega,$ $T_A = MIN$ to $MAX$				UNIT
			SN54ALS05A		SN74ALS05A		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	A or B	Y	23	59	23	54	ns
$t_{PHL}$	A or B	Y	4	19	4	14	ns

NOTE 1: For load circuit and voltage waveforms, see page 1-12.

2 ALS AND AS CIRCUITS