

SN54ALS05A, SN74ALS05A HEX INVERTERS WITH OPEN-COLLECTOR OUTPUTS

SDAS190A – APRIL 1982 – REVISED DECEMBER 1994

- Package Options Include Plastic Small-Outline (D) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (N) and Ceramic (J) 300-mil DIPs

description

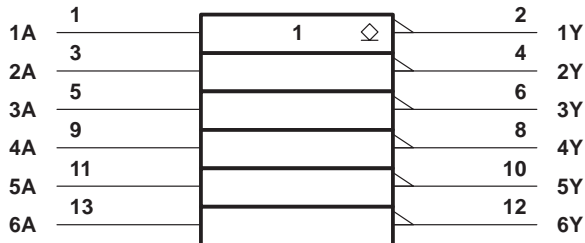
These devices contain six independent hex inverters with open-collector outputs. They perform the Boolean function $Y = \bar{A}$. The open-collector outputs require pullup resistors to perform correctly. These outputs can be connected to other open-collector outputs to implement active-low wired-OR or 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°C to 125°C . The SN74ALS05A is characterized for operation from 0°C to 70°C .

FUNCTION TABLE
(each inverter)

INPUT A	OUTPUT Y
H	L
L	H

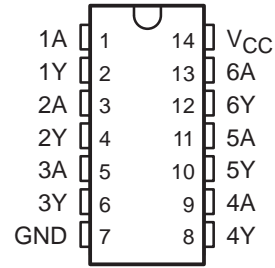
logic symbol†



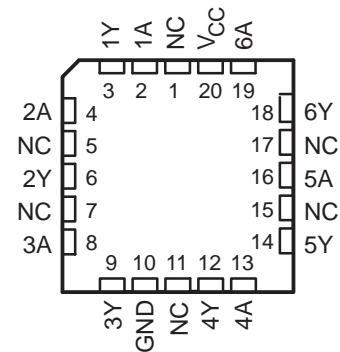
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

Pin numbers shown are for the D, J, and N packages.

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

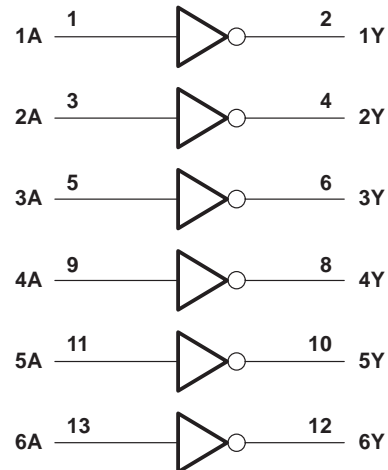


SN54ALS05A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

logic diagram (positive logic)



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

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

† Stresses beyond those listed under “absolute maximum ratings” may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under “recommended operating conditions” is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

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			0.7			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}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			–1.2			–1.2	V
V_{OL}	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 4\text{ mA}$		0.25	0.4	0.25	0.4	V
		$I_{OL} = 8\text{ mA}$				0.35	0.5	
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$			20			20	μA
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$			–0.1			–0.1	mA
I_{OH}	$V_{CC} = 4.5\text{ V}$, $V_{OH} = 5.5\text{ V}$			0.1			0.1	mA
I_{CCH}	$V_{CC} = 5.5\text{ V}$, $V_I = 0$		0.65	1.1		0.65	1.1	mA
I_{CCL}	$V_{CC} = 5.5\text{ V}$, $V_I = 4.5\text{ V}$		2.9	4.2		2.9	4.2	mA

‡ All typical values are at $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$, $C_L = 50\text{ pF}$, $R_L = 2\text{ k}\Omega$, $T_A = \text{MIN to MAX}\S$				UNIT
			SN54ALS05A		SN74ALS05A		
			MIN	MAX	MIN	MAX	
t_{PLH}	A	Y	23	84	23	54	ns
t_{PHL}			4	24	4	14	

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
5962-88540012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-8854001CA	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
5962-8854001DA	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC
SN54ALS05AJ	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SN74ALS05AD	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ALS05ADBLE	OBSOLETE	SSOP	DB	14		TBD	Call TI	Call TI
SN74ALS05ADBR	ACTIVE	SSOP	DB	14	2000	Pb-Free (RoHS)	Call TI	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ALS05ADBRE4	ACTIVE	SSOP	DB	14	2000	Pb-Free (RoHS)	Call TI	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ALS05ADR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ALS05AN	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74ALS05AN3	OBSOLETE	PDIP	N	14		TBD	Call TI	Call TI
SN74ALS05ANSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74ALS05ANSRE4	ACTIVE	SO	NS	14	2000	TBD	Call TI	Call TI
SNJ54ALS05AFK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54ALS05AJ	ACTIVE	CDIP	J	14	1	TBD	Call TI	Level-NC-NC-NC
SNJ54ALS05AW	ACTIVE	CFP	W	14	1	TBD	Call TI	Level-NC-NC-NC

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS) or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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