

SN54F04, SN74F04 HEX INVERTERS

SDFS037A – MARCH 1987 – REVISED OCTOBER 1993

- Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs

description

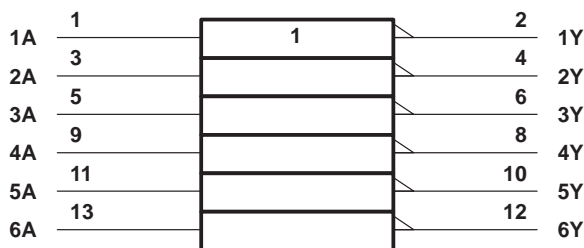
These devices contain six independent inverters. They perform the Boolean function $Y = \bar{A}$.

The SN54F04 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74F04 is characterized for operation from 0°C to 70°C .

FUNCTION TABLE
(each inverter)

INPUT A	OUTPUT Y
H	L
L	H

logic symbol†



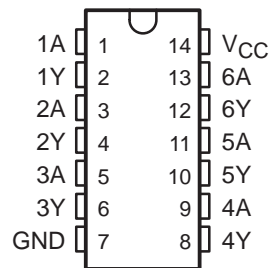
† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram, each inverter (positive logic)

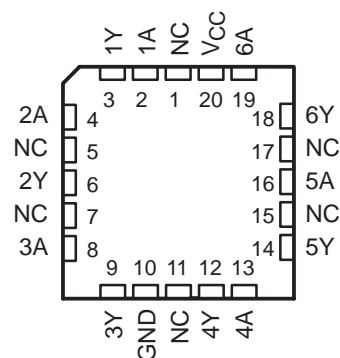


Pin numbers shown are for the D, J, and N packages.

SN54F04 . . . J PACKAGE
SN74F04 . . . D OR N PACKAGE
(TOP VIEW)



SN54F04 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

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

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input voltage range, V_I (see Note 1)	-1.2 V to 7 V
Input current range	-30 mA to 5 mA
Voltage range applied to any output in the high state	-0.5 V to V_{CC}
Current into any output in the low state	40 mA
Operating free-air temperature range: SN54F04	-55°C to 125°C
SN74F04	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.

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

recommended operating conditions

		SN54F04			SN74F04			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
I_{IK}	Input clamp current			-18			-18	mA
I_{OH}	High-level output current			-1			-1	mA
I_{OL}	Low-level output current			20			20	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	SN54F04			SN74F04			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	$V_{CC} = 4.5$ V, $I_I = -18$ mA			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5$ V, $I_{OH} = -1$ mA	2.5	3.4		2.5	3.4		V
	$V_{CC} = 4.75$ V, $I_{OH} = -1$ mA				2.7			
V_{OL}	$V_{CC} = 4.5$ V, $I_{OL} = 20$ mA		0.3	0.5		0.3	0.5	V
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, $V_I = 0.5$ V			-0.6			-0.6	mA
I_{OS}^{\S}	$V_{CC} = 5.5$ V, $V_O = 0$	-60		-150	-60		-150	mA
I_{CCH}	$V_{CC} = 5.5$ V, $V_I = 0$		2.8	4.2		2.8	4.2	mA
I_{CCL}	$V_{CC} = 5.5$ V, $V_I = 4.5$ V		10.2	15.3		10.2	15.3	mA

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

§ Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.



switching characteristics (see Note 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, C _L = 50 pF, R _L = 500 Ω, T _A = 25°C			V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω, T _A = MIN to MAX†				UNIT
			'F04			SN54F04		SN74F04		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	A	Y	1.6	3.3	5	1.2	7	1.6	6	ns
t _{PHL}			1	2.8	4.3	1	6.5	1	5.3	

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

NOTE 2: Load circuits and waveforms are shown in Section 1.

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PRODUCT SUPPORT: [TRAINING](#)

SN74F04, Hex inverters

DEVICE STATUS: **ACTIVE**

PARAMETER NAME	SN74F04
Voltage Nodes (V)	5
Vcc range (V)	4.5 to 5.5
Input Level	TTL
Output Level	TTL
Output Drive (mA)	-1/20
No. of Gates	6
Static Current	9.75
tpd(max) (ns)	6

FEATURES

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DESCRIPTION

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TECHNICAL DOCUMENTS

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DATASHEET

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Full datasheet in Acrobat PDF: [sdfs037a.pdf](#) (66 KB) (Updated: 10/01/1993)

Full datasheet in Zipped PostScript: [sdfs037a.psz](#) (64 KB)

APPLICATION NOTES

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View Application Reports for [Digital Logic](#)

- [Bus-Interface Devices With Output-Damping Resistors Or Reduced-Drive Outputs](#) (SCBA012A - Updated: 08/01/1997)
- [Designing With Logic](#) (SDYA009C - Updated: 06/01/1997)
- [Input and Output Characteristics of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)

RELATED DOCUMENTS

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- [Documentation Rules \(SAP\) And Ordering Information](#) (SZZU001B, 4 KB - Updated: 05/06/1999)
- [Logic Selection Guide Second Half 2000](#) (SDYU001N, 5035 KB - Updated: 04/17/2000)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 167 KB - Updated: 07/28/2000)
- [More Power In Less Space - Technical Article](#) (SCAU001A, 850 KB - Updated: 03/01/1996)

PRICING/AVAILABILITY

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<u>ORDERABLE DEVICE</u>	<u>PACKAGE</u>	<u>PINS</u>	<u>TEMP (°C)</u>	<u>STATUS</u>	<u>BUDGETARY PRICE US\$/UNIT QTY=1000+</u>	<u>PACK QTY</u>	<u>PRICING/AVAILABILITY</u>
SN74F04D	<u>D</u>	14	0 TO 70	ACTIVE	0.28	50	Check stock or order
SN74F04DR	<u>D</u>	14	0 TO 70	ACTIVE	0.32	2500	Check stock or order
SN74F04N	<u>N</u>	14	0 TO 70	ACTIVE	0.28	25	Check stock or order
SN74F04N3	<u>N</u>	14	0 TO 70	OBSOLETE			
SN74F04NSR	<u>NS</u>	14	0 TO 70	ACTIVE	0.37	2000	Check stock or order

MODELS

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- [IBIS Model of SN74F04](#) (SDFM002, 49 KB - Updated: 08/18/2000)
- [IBIS Model of SN74F04](#) (SDFM002, 8 KB, ZIP - Updated: 08/18/2000)

Table Data Updated on: 11/15/2000