

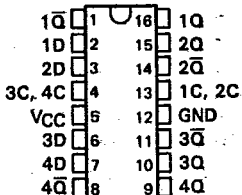
SN54HC75, SN74HC75
4-BIT BISTABLE LATCHES

T-46-07-09

U2084, DECEMBER 1982 — REVISED SEPTEMBER 1987

- Complimentary Q and \bar{Q} Outputs
- Package Options Include Plastic "Small Outline" Packages, Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

SN54HC75 . . . J PACKAGE
SN74HC75 . . . D OR N PACKAGE
(TOP VIEW)

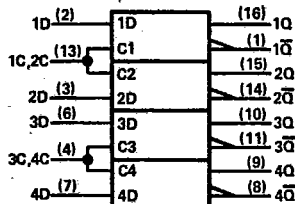


description

These latches are ideally suited for use as temporary storage for binary information between processing units and input/output or indicator units. Information present at a data (D) input is transferred to the Q output when the enable (C) is high, and the Q output will follow the data input as long as the enable remains high. When the enable goes low, the information, which was present at the data input at the time the transition occurred, is retained at the Q output until the enable is permitted to go high.

The SN54HC75 is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74HC75 is characterized for operation from -40°C to 85°C .

logic symbol†

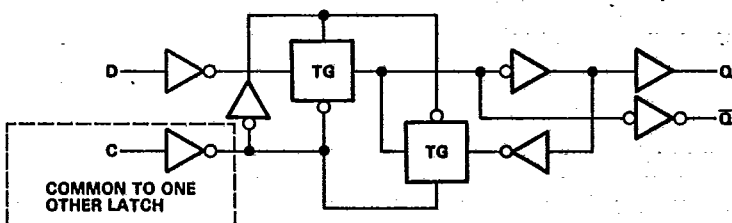


†This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

FUNCTION TABLE
(each latch)

INPUTS		OUTPUT	
D	C	Q	\bar{Q}
L	H	L	H
H	H	H	L
X	L	Q_0	\bar{Q}_0

logic diagram, each latch (positive logic)



NOTICE
SEE ORDER OF DATA FOR ERRATA INFORMATION

2

HCMOS Devices

PRODUCTION DATA documents contain information current as of publication date. Products conform to specifications per the terms of Texas Instruments standard warranty. Production processing does not necessarily include testing of all parameters.

TEXAS INSTRUMENTS
POST OFFICE BOX 655012 • DALLAS, TEXAS 75265

Copyright © 1982, Texas Instruments Incorporated

2-109

SN54HC75, SN74HC75
4-BIT BISTABLE LATCHES

T-46-07-09

absolute maximum ratings over operating free-air temperature range†

Supply voltage, VCC	-0.5 V to 7 V
Input clamp current, I _{IK} (V _I < 0 or V _I > VCC)	±20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > VCC)	±20 mA
Continuous output current, I _O (V _O = 0 to VCC)	±25 mA
Continuous current through VCC or GND pins	±50 mA
Lead temperature 1,6 mm (1/16 in) from case for 60 s: J package	300°C
Lead temperature 1,6 mm (1/16 in) from case for 10 s: D or N package	260°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

		SN54HC75			SN74HC75			UNIT		
		MIN	NOM	MAX	MIN	NOM	MAX			
VCC	Supply voltage	2	5	6	2	5	6	V		
V _{IH}	High-level input voltage	VCC = 2 V		1.5	VCC = 2 V		1.5	V		
		VCC = 4.5 V		3.15	VCC = 4.5 V		3.15			
		VCC = 6 V		4.2	VCC = 6 V		4.2			
V _{IL}	Low-level input voltage	VCC = 2 V		0	VCC = 2 V		0	V		
		VCC = 4.5 V		0	VCC = 4.5 V		0			
		VCC = 6 V		0	VCC = 6 V		0			
V _I	Input voltage			0	VCC		0	V		
V _O	Output voltage			0	VCC		0	V		
t _t	Input transition (rise and fall) times	VCC = 2 V		0	1000		0	ns		
		VCC = 4.5 V		0	500		0			
		VCC = 6 V		0	400		0			
T _A	Operating free-air temperature	-55			125			-40	85	°C

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

PARAMETER	TEST CONDITIONS	VCC	T _A = 25°C		SN54HC77		SN74HC77		UNIT	
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
V _{OH}	V _I = V _{IH} or V _{IL} , I _{OH} = -20 μA	2 V	1.9	1.998		1.9		1.9	V	
		4.5 V	4.4	4.499		4.4		4.4		
		6 V	5.9	5.999		5.9		5.9		
	4.5 V	3.98	4.30		3.7		3.84			
	V _I = V _{IH} or V _{IL} , I _{OH} = -5.2 mA	6 V	5.48	5.80		5.2		5.34		
V _{OL}	V _I = V _{IH} or V _{IL} , I _{OL} = 20 μA	2 V		0.002	0.1		0.1	0.1	V	
		4.5 V		0.001	0.1		0.1	0.1		
		6 V		0.001	0.1		0.1	0.1		
	4.5 V		0.17	0.26		0.4	0.33			
	V _I = V _{IH} or V _{IL} , I _{OL} = 4 mA	4.5 V		0.15	0.28		0.4	0.33		
	V _I = V _{IH} or V _{IL} , I _{OL} = 5.2 mA	6 V		0.15	0.28		0.4	0.33		
I _I	V _I = VCC or 0	6 V	±0.1		±100	±1000		±1000	nA	
I _{CC}	V _I = VCC or 0, I _O = 0	6 V			4			80	40	μA
C _i		2 to 6 V	3		10	10		10	10	pF

SN54HC75, SN74HC75
4-BIT BISTABLE LATCHES

T-46-07-09

timing requirements over recommended operating free-air temperature range (unless otherwise noted)

	V _{CC}	T _A = 25°C		SN54HC75		SN74HC75		UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t _w Pulse duration, C high	2 V	80		120		100		ns
	4.5 V	16		24		20		
	6 V	14		20		17		
t _{su} Setup time, data before CI	2 V	100		150		125		ns
	4.5 V	20		30		25		
	6 V	17		26		21		
t _h Hold time, data after CI	2 V	5		5		5		ns
	4.5 V	5		5		5		
	6 V	5		5		5		

switching characteristics over recommended operating free-air temperature range (unless otherwise noted), C_L = 50 pF (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC}	T _A = 25°C			SN54HC75		SN74HC75		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{pd}	D	Q or \bar{Q}	2 V	40	120		180		150		ns
			4.5 V	14	24		36		30		
			6 V	11	20		31		26		
t _{pd}	C	Q or \bar{Q}	2 V	44	130		195		165		ns
			4.5 V	15	26		39		33		
			6 V	12	22		33		28		
t _t		Any	2 V	38	75		110		95		ns
			4.5 V	8	15		22		19		
			6 V	6	13		19		16		

C _{pd}	Power dissipation capacitance per latch	No load, T _A = 25°C	46 pF typ
-----------------	---	--------------------------------	-----------

NOTE 1: Load circuit and voltage waveforms are shown in Section 1.

2

HCMOS Devices