SN54HCT373, SN74HCT373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

SCLS009D - MARCH 1984 - REVISED AUGUST 2003

- Operating Voltage Range of 4.5 V to 5.5 V
- High-Current 3-State True Outputs Can Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80-µA Max ICC
- Typical t_{pd} = 21 ns
- ±6-mA Output Drive at 5 V
- Low Input Current of 1 μA Max
- Inputs Are TTL-Voltage Compatible
- Eight High-Current Latches in a Single Package
- Full Parallel Access for Loading

description/ordering information

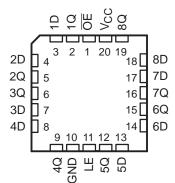
These 8-bit latches feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The eight latches of the 'HCT373 devices are transparent D-type latches. While the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is taken low, the Q outputs are latched at the levels that were set up at the D inputs.

SN54HCT373J OR W PACKAGE									
SN74HCT373DB, DW, N, NS, OR PW PACKAGE									
(TOP VIEW)									

OE		$\mathbf{\nabla}_{i}$	20] v _{cc}
1Q	2		19] 8Q
1D	[] 3		18] 8D
2D	4		17]7D
2Q	5		16] 7Q
3Q	6		15] 6Q
3D	[7		14] 6D
4D	8]		13] 5D
4Q	[9		12] 5Q
GND	[10		11] LE

SN54HCT373 . . .FK PACKAGE (TOP VIEW)



TA	PACKAG	GE†	ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – N	Tube of 20	SN74HCT373N	SN74HCT373N
-40°C to 85°C	SOIC - DW	Tube of 25	SN74HCT373DW	НСТ373
	3010 - 010	Reel of 2000	SN74HCT373DWR	ПС1373
	SOP – NS	Reel of 2000	SN74HCT373NSR	HCT373
-40 C 10 85 C	SSOP – DB	DB Reel of 2000 SN74HCT373DBR		HT373
		Tube of 70	SN74HCT373PW	
	TSSOP – PW	Reel of 2000	SN74HCT373PWR	HT373
		Reel of 250	SN74HCT373PWT	
	CDIP – J	Tube of 20	SNJ54HCT373J	SNJ54HCT373J
–55°C to 125°C	CFP – W	Tube of 85	SNJ54HCT373W	SNJ54HCT373W
	LCCC – FK	Tube of 55	SNJ54HCT373FK	SNJ54HCT373FK

ORDERING INFORMATION

[†] Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.



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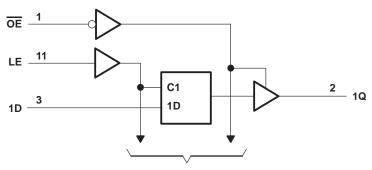
description/ordering information (continued)

An output-enable (\overline{OE}) input places the eight outputs in either a normal logic state (high or low logic levels) or the high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without interface or pullup components.

OE does not affect the internal operations of the latches. Old data can be retained or new data can be entered while the outputs are off.

	FUNCTION TABLE (each latch)										
	INPUTS	OUTPUT									
OE	LE	D	Q								
L	Н	Н	Н								
L	Н	L	L								
L	L	Х	Q ₀								
н	Х	Х	Z								

logic diagram (positive logic)



To Seven Other Channels

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

DW package
N package
NS package
PW package
Storage temperature range, T _{stg} –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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

2. The package thermal impedance is calculated in accordance with JESD 51-7.



SN54HCT373, SN74HCT373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

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recommended operating conditions (see Note 3)

			SN54HCT373			SN	74HCT3	73	UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage		4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	V_{CC} = 4.5 V to 5.5 V	2			2			V
VIL	Low-level input voltage	V_{CC} = 4.5 V to 5.5 V			0.8			0.8	V
VI	Input voltage		0		VCC	0		VCC	V
Vo	Output voltage		0		VCC	0		VCC	V
$\Delta t/\Delta v$	Input transition rise/fall time				500			500	ns
Т _А	Operating free-air temperature		-55		125	-40		85	°C

NOTE 3: All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, Implications of Slow or Floating CMOS Inputs, literature number SCBA004.

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

PARAMETER	TEST CONDITIONS		v _{cc}	Т	A = 25°C	;	SN54HCT373		SN74HCT373		UNIT
FARAMETER	TEST CO	VCC	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT	
VOH	$\lambda = \lambda = 0$	I _{OH} = -20 μA	4.5 V	4.4	4.499		4.4		4.4		V
VOH	$V_{I} = V_{IH} \text{ or } V_{IL}$	I _{OH} =6 mA	4.5 V	3.98	4.3		3.7		3.84		v
	$\lambda = \lambda = 0$	I _{OL} = 20 μA	4.5 V		0.001	0.1		0.1		0.1	V
VOL	$V_{I} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 6 \text{ mA}$			0.17	0.26		0.4		0.33	v
Ц	$V_I = V_{CC} \text{ or } 0$		5.5 V		±0.1	±100		±1000		±1000	nA
IOZ	AO = ACC or 0		5.5 V		±0.01	±0.5		±10		±5	μΑ
ICC	$V_I = V_{CC} \text{ or } 0,$	$I_{O} = 0$	5.5 V			8		160		80	μΑ
∆lCC‡	One input at 0.5 V Other inputs at 0 or		5.5 V		1.4	2.4		3		2.9	mA
Ci			4.5 V to 5.5 V		3	10		10		10	pF

[†] This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or V_{CC}.

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

		Vaa	T _A = 25°C		SN54H	CT373	SN74HCT373		UNIT
		Vcc	MIN	MAX	MIN	MAX	MIN	MAX	UNIT
	Pulse duration, LE high	4.5 V	20		30		25		20
tw	Fuise duration, LE nigh	5.5 V	17		27		23		ns
	Catura time, data batana I E	4.5 V	10		15		13		ns
t _{su}	Setup time, data before LE \downarrow	5.5 V	9		14		12		
+.	Hold time, data after LE↓	4.5 V	10		10		10		
^t h		5.5 V	10		10		10		ns



SN54HCT373, SN74HCT373 **OCTAL TRANSPARENT D-TYPE LATCHES** WITH 3-STATE OUTPUTS SCLS009D - MARCH 1984 - REVISED AUGUST 2003

switching characteristics over recommended operating free-air temperature range, $C_L = 50 \text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	то	Vee	Τ ₄	λ = 25°C	;	SN54H	CT373	SN74H0	CT373	UNIT
FARAMETER	(INPUT)	(OUTPUT)	Vcc	MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
	D	Q	4.5 V		25	35		53		44	
^t pd	D	Q	5.5 V		21	32		48		40	ns
	LE	Any Q	4.5 V		28	35		53		44	115
	LL	Ally Q	5.5 V		25	32		48		40	
+	OE	Any O	4.5 V		26	35		53		44	ns
ten	ÛE	Any Q	5.5 V		23	32		48		40	115
*	OE	A	4.5 V		23	35		53		44	ns
^t dis	ÛE	Any Q	5.5 V		22	32		48		40	115
+.		Any Q	4.5 V		10	12		18		15	ns
t			5.5 V		9	11		16		14	115

switching characteristics over recommended operating free-air temperature range, $C_L = 150 \text{ pF}$ (unless otherwise noted) (see Figure 1)

PARAMETER	FROM	то	Vcc	Тį	ς = 25°C	;	SN54H	СТ373	SN74H	CT373	UNIT
PARAMETER	(INPUT)	(OUTPUT)		MIN	TYP	MAX	MIN	MAX	MIN	MAX	UNIT
	D	Q	4.5 V		32	52		79		65	
• .	tpd LE	Q	5.5 V		27	47		71		59	-
чрd		Any Q	4.5 V		38	52		79		65	ns
	LL			5.5 V		36	47		71		59
+	5	Any O	4.5 V		33	52		79		65	00
^t en	ŌĒ	Any Q	5.5 V		28	47		71		59	ns
+.		Any 0	4.5 V		18	42		63		53	00
tt		Any Q	5.5 V		16	38		57		48	ns

operating characteristics, $T_A = 25^{\circ}C$

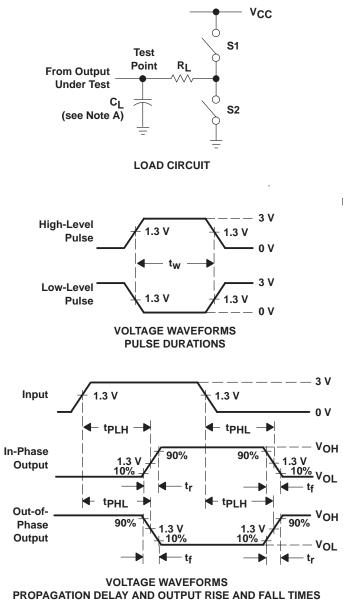
	PARAMETER	TEST CONDITIONS	TYP	UNIT
C _{pd}	Power dissipation capacitance per latch	No load	50	pF

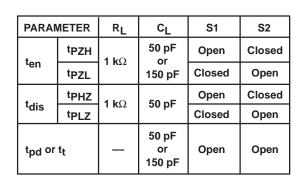


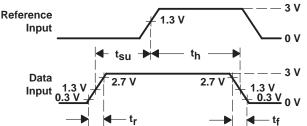
SN54HCT373, SN74HCT373 **OCTAL TRANSPARENT D-TYPE LATCHES** WITH 3-STATE OUTPUTS

SCLS009D - MARCH 1984 - REVISED AUGUST 2003

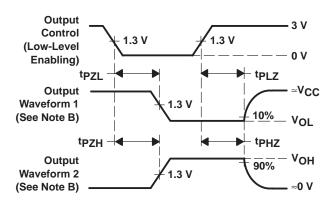
PARAMETER MEASUREMENT INFORMATION





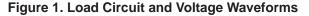


VOLTAGE WAVEFORMS SETUP AND HOLD AND INPUT RISE AND FALL TIMES



VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES FOR 3-STATE OUTPUTS

- NOTES: A. CL includes probe and test-fixture capacitance.
 - B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control. C. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following
 - characteristics: PRR \leq 1 MHz, Z_O = 50 Ω , t_r = 6 ns, t_f = 6 ns.
 - D. The outputs are measured one at a time with one input transition per measurement.
 - E. tPLZ and tPHZ are the same as tdis.
 - F. tp71 and tp7H are the same as ten.
 - G. tPLH and tPHL are the same as tpd.





30-May-2005

PACKAGING INFORMATION

TEXAS RUMENTS

www.ti.com

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	e Eco Plan ⁽²⁾	Lead/Ball Finis	h MSL Peak Temp ⁽³⁾
5962-86867012A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
5962-8686701RA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
5962-8686701VRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
5962-8686701VSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/65453BRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
JM38510/65453BSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Level-NC-NC-NC
SN54HCT373J	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
SN74HCT373DW	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373DWE4	ACTIVE	SOIC	DW	20	25	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373DWR	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373DWRE4	ACTIVE	SOIC	DW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-250C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373N	ACTIVE	PDIP	Ν	20	20	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74HCT373N3	OBSOLETE	PDIP	Ν	20		TBD	Call TI	Call TI
SN74HCT373NSR	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373NSRE4	ACTIVE	SO	NS	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74HCT373PW	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HCT373PWE4	ACTIVE	TSSOP	PW	20	70	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HCT373PWLE	OBSOLETE	TSSOP	PW	20		TBD	Call TI	Call TI
SN74HCT373PWR	ACTIVE	TSSOP	PW	20	2000	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HCT373PWRG4	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM
SN74HCT373PWT	ACTIVE	TSSOP	PW	20	250	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SN74HCT373PWTE4	ACTIVE	TSSOP	PW	20	250	Pb-Free (RoHS)	CU NIPDAU	Level-1-250C-UNLIM
SNJ54HCT373FK	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54HCT373J	ACTIVE	CDIP	J	20	1	TBD	Call TI	Level-NC-NC-NC
SNJ54HCT373W	ACTIVE	CFP	W	20	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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J (R-GDIP-T**) 14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- C. This package is hermetically sealed with a ceramic lid using glass frit.
- D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
- E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES: A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. This package can be hermetically sealed with a ceramic lid using glass frit.
 - D. Index point is provided on cap for terminal identification only.
 - E. Falls within Mil-Std 1835 GDFP2-F20



MLCC006B - OCTOBER 1996

FK (S-CQCC-N**)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NOTES: A. All linear dimensions are in inches (millimeters).

- B. This drawing is subject to change without notice.
- C. This package can be hermetically sealed with a metal lid.
- D. The terminals are gold plated.
- E. Falls within JEDEC MS-004



N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- \triangle The 20 pin end lead shoulder width is a vendor option, either half or full width.



DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).

D. Falls within JEDEC MS-013 variation AC.



MECHANICAL DATA

PLASTIC SMALL-OUTLINE PACKAGE

0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 \bigcirc Gage Plane ₽ 0,25 7 1 1,05 0,55 0°-10° Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS ** 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G**)

14-PINS SHOWN

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



MECHANICAL DATA

MTSS001C - JANUARY 1995 - REVISED FEBRUARY 1999

PW (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14 PINS SHOWN



NOTES: A. All linear dimensions are in millimeters.

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion not to exceed 0,15.
- D. Falls within JEDEC MO-153



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