CD54HC573, CD74HC573 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

CD54HC573...F PACKAGE

CD74HC573...E OR M PACKAGE

(TOP VIEW)

SCLS454A - FEBRUARY 2001 - REVISED APRIL 2003

- 2-V to 6-V V_{CC} Operation
- Wide Operating Temperature Range of –55°C to 125°C
- 3-State Outputs Directly Drive Bus Lines
- Balanced Propagation Delays and Transition Times
- Bus Driver Outputs Drive Up To 15 LS-TTL Loads
- Significant Power Reduction Compared to LS-TTL Logic ICs

20 D V_{CC} <u>oe</u> l 1D **∏** 2 19**∏** 1Q 2D **∏** 3 18**∏** 2Q 3D **∏** 4 17 🛮 3Q 4D 🛮 5 16 🛮 4Q 5D 🛮 6 15**∏** 5Q 6D Π 14**∏** 6Q 7D **∏** 8 13**∏** 7Q 12 8Q 8D 🛮 9 GND ∏ 11 **∏** LE

description/ordering information

The 'HC573 devices are octal transparent D-type latches designed for 2-V to 6-V V_{CC} operation.

When the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is low, the Q outputs are latched at the logic levels of the D inputs.

A buffered output-enable (\overline{OE}) input can be used to place the eight outputs in either a normal logic state (high or low) 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 in the high-impedance state.

To ensure the high-impedance state during power up or power down, \overline{OE} should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

ORDERING INFORMATION

TA	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
	PDIP – E	Tube	CD74HC573E	CD74HC573E
EE°C to 125°C	SOIC - M	Tube	CD74HC573M	HC573M
–55°C to 125°C	SOIC - W	Tape and reel	CD74HC573M96	HC373W
	CDIP – F	Tube	CD54HC573F3A	CD54HC573F3A

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



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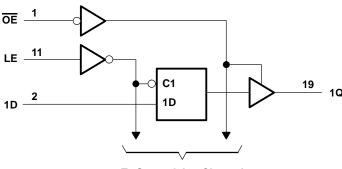


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FUNCTION TABLE (each latch)

	INPUTS	ОИТРИТ	
ŌE	LE	D	Q
L	Н	Н	Н
L	Н	L	L
L	L	Χ	Q_0
Н	X	Χ	Z

logic diagram (positive logic)



To Seven Other Channels

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

Supply voltage range, V _{CC}	–0.5 V to 7 V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$) (see Note 1)	±20 mA
Output clamp current, I _{OK} (V _O < 0 or V _O > V _{CC}) (see Note 1)	±20 mA
Continuous output drain current per output, I_O ($V_O = 0$ to V_{CC})	±35 mA
Continuous output source or sink current per output, I_O ($V_O = 0$ to V_{CC})	±25 mA
Continuous current through V _{CC} or GND	±50 mA
Package thermal impedance, θ _{JA} (see Note 2): E package	69°C/W
M package	58°C/W
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.



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recommended operating conditions (see Note 3)

			T _A = 1	25°C	T _A = -		T _A = -40°C TO 85°C		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
VCC	Supply voltage		2	6	2	6	2	6	V
		V _{CC} = 2 V	1.5		1.5		1.5		
٧ıH	High-level input voltage	$V_{CC} = 4.5 \text{ V}$	3.15		3.15		3.15		V
		V _{CC} = 6 V	4.2		4.2		4.2		
		V _{CC} = 2 V		0.5		0.5		0.5	
٧ _{IL}	Low-level input voltage	$V_{CC} = 4.5 \text{ V}$		1.35		1.35		1.35	V
		VCC = 6 V		1.8		1.8		1.8	
٧ _I	Input voltage		0	VCC	0	VCC	0	VCC	V
٧o	Output voltage		0	VCC	0	VCC	0	VCC	V
		V _{CC} = 2 V		1000		1000		1000	
t _t	Input transition (rise and fall) time	V _{CC} = 4.5 V		500		500		500	ns
		V _{CC} = 6 V		400		400		400	

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 (TEST CONDITIONS			25°C	T _A = -		T _A = -		UNIT
			VCC	MIN	MAX	MIN	MAX	MIN	MAX	
			2 V	1.9		1.9		1.9		
		$I_{OH} = -20 \mu A$	4.5 V	4.4		4.4		4.4		
V_{OH}	$V_I = V_{IH}$ or V_{IL}		6 V	5.9		5.9		5.9		V
		$I_{OH} = -6 \text{ mA}$	4.5 V	3.98		3.7		3.84		
		$I_{OH} = -7.8 \text{ mA}$	6 V	5.48		5.2		5.34		
			2 V		0.1		0.1		0.1	
		I _{OL} = 20 μA	4.5 V		0.1		0.1		0.1	
V_{OL}	$V_I = V_{IH} \text{ or } V_{IL}$		6 V		0.1		0.1		0.1	V
		I _{OL} = 6 mA	4.5 V		0.26		0.4		0.33	
		I _{OL} = 7.8 mA	6 V		0.26		0.4		0.33	
lj	$V_I = V_{CC}$ or 0		6 V		±0.1		±1		±1	μΑ
loz	VO = VCC or 0		6 V		±0.5		±10		±5	μΑ
Icc	$V_I = V_{CC}$ or 0,	IO = 0	6 V		8		160		80	μΑ
Ci					10		10		10	pF
Co					20		20		20	pF

CD54HC573, CD74HC573 **OCTAL TRANSPARENT D-TYPE LATCHES** WITH 3-STATE OUTPUTS

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timing requirements over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

		Vcc		V_{CC} $T_A = 25^{\circ}C$		55°C :5°C	T _A = -40°C TO 85°C		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
		2 V	80		120		100		
t _W	Pulse duration, LE high	4.5 V	16		24		20		ns
		6 V	14		20		17		
		2 V	50		75		65		ns
t _{su}	Setup time, data before LE↓	4.5 V	10		15		13		
		6 V	9		13		11		
		2 V	40		60		50		
t _h	Hold time, data after LE↓	4.5 V	8		12		10		ns
		6 V	7		10		9	_	

switching characteristics over recommended operating free-air temperature range (unless otherwise noted) (see Figure 1)

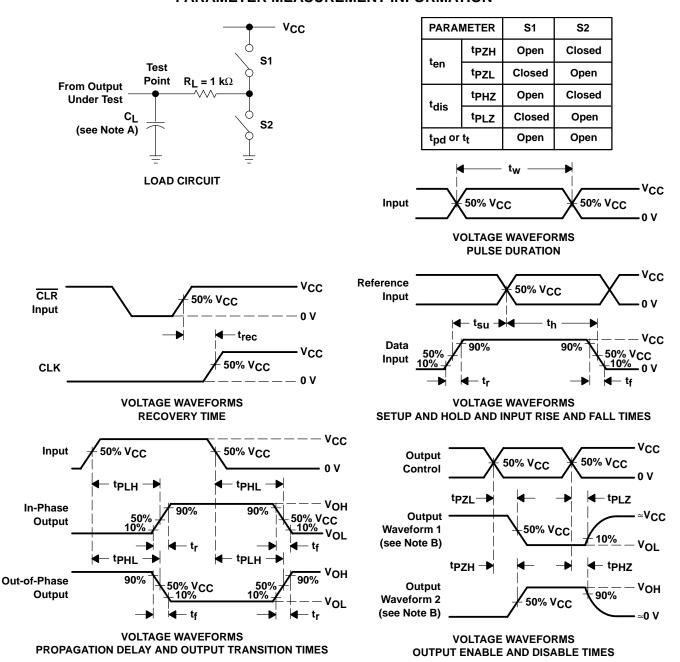
PARAMETER	FROM (INPUT)	TO (OUTPUT)	LOAD CAPACITANCE	v _{cc}	T _A = 25°C	T _A = -55°C TO 125°C	T _A = -40°C TO 85°C	UNIT																													
	(1141 01)	(001101)	CALACITANCE		MIN MAX	MIN MAX	MIN MAX																														
				2 V	175	265	220																														
	D	Q	Q	C _L = 50 pF	4.5 V	35	53	44																													
. .				6 V	30	45	37																														
^t pd				2 V	175	265	220	ns																													
	LE	Q	Q	Q	$C_{L} = 50 \text{ pF}$	4.5 V	35	53	44																												
				6 V	30	45	37																														
		Q		C _L = 50 pF	2 V	150	225	190																													
t _{en}	ŌĒ		Q (4.5 V	30	45	38	ns																												
				6 V	26	38	33	1																													
			C _L = 50 pF		2 V	150	225	190																													
^t dis	ŌĒ	Q		4.5 V	30	45	38	ns																													
				6 V	26	38	33																														
				2 V	60	90	75																														
t _t		Q	C _L = 50 pF	$C_L = 50 pF$	C _L = 50 pF	$C_L = 50 \text{ pF}$	C _L = 50 pF	C _L = 50 pF	C _L = 50 pF	C _L = 50 pF	C _L = 50 pF	C _L = 50 pF	$C_L = 50 pF$	C _L = 50 pF	$C_L = 50 pF$	C _L = 50 pF	4.5 V	12	18	15	ns																
				6 V	10	15	13																														

operating characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

	PARAMETER	TYP	UNIT
Ср	Power dissipation capacitance	51	pF



PARAMETER MEASUREMENT INFORMATION



NOTES: A. C_L 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_f = 6 ns.
- D. For clock inputs, f_{max} is measured with the input duty cycle at 50%.
- E. The outputs are measured one at a time with one input transition per measurement.
- F. tpLz and tpHz are the same as tdis.
- G. tpzL and tpzH are the same as ten.
- H. tpLH and tpHL are the same as tpd.

Figure 1. Load Circuit and Voltage Waveforms







11-Apr-2013

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
CD54HC573F	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	CD54HC573F	Samples
CD54HC573F3A	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	8512801RA CD54HC573F3A	Samples
CD74HC573E	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC573E	Samples
CD74HC573EE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	-55 to 125	CD74HC573E	Samples
CD74HC573M	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC573M	Samples
CD74HC573M96	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC573M	Samples
CD74HC573M96G4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC573M	Samples
CD74HC573MG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-55 to 125	HC573M	Samples

⁽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.

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.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

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)

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

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



PACKAGE OPTION ADDENDUM

11-Apr-2013

(4) Multiple Top-Side Markings will be inside parentheses. Only one Top-Side Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Top-Side Marking for that device.

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OTHER QUALIFIED VERSIONS OF CD54HC573, CD74HC573:

Catalog: CD74HC573

Military: CD54HC573

NOTE: Qualified Version Definitions:

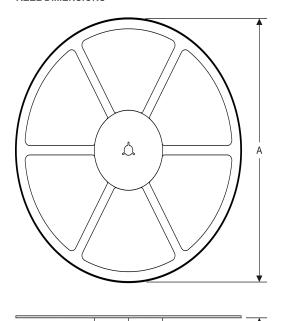
- Catalog TI's standard catalog product
- Military QML certified for Military and Defense Applications

PACKAGE MATERIALS INFORMATION

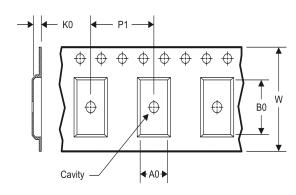
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TAPE AND REEL INFORMATION

REEL DIMENSIONS



TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

TAPE AND REEL INFORMATION

*All dimensions are nominal

Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
CD74HC573M96	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
CD74HC573M96	SOIC	DW	20	2000	367.0	367.0	45.0

14 LEADS SHOWN



- 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.

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- 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).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.







- 1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

 2. This drawing is subject to change without notice.

 3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not
- exceed 0.15 mm per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
- 5. Reference JEDEC registration MS-013.





NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.





NOTES: (continued)

- 8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 9. Board assembly site may have different recommendations for stencil design.







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NOTES: (continued)

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