

SN74ALS573C, SN74ALS580B, SN74AS573A, SN74AS580 SN54ALS573B, SN54ALS580A, SN54AS573A OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

D2861, DECEMBER 1982 - REVISED SEPTEMBER 1989

- 3-State Buffer-Type Outputs Drive Bus-Lines Directly
- Bus-Structured Pinout
- Choice of True or Inverting Logic
 - 'ALS573, 'AS573A True Outputs
 - 'ALS580, 'AS580 Inverting Outputs
- Package-Options Include Ceramic Chip Carriers in Addition to Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

These 8-bit latches feature three-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 are transparent D-type latches. While the enable (C) is high the outputs (Q or \bar{Q}) will respond to the data (D) inputs. When the enable is taken low the outputs will be latched to retain the data that was set up.

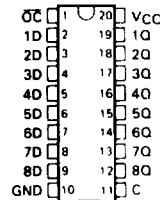
A buffered output-control input can be used to place the eight outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive the bus lines in a bus-organized system without need for interface or pull-up components.

The output control (OC) does not affect the internal operation of the latches. Old data can be retained or new data can be entered while the outputs are at high impedance.

The SN54ALS' and SN54AS' devices are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS' and SN74AS' devices are characterized for operation from 0°C to 70°C .

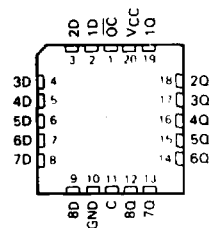
SN54ALS573B, SN54AS573A ... J PACKAGE
SN74ALS573C, SN74AS573 ... DW OR N PACKAGE

(TOP VIEW)



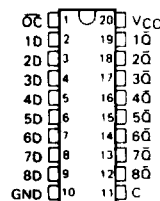
SN54ALS573B, SN54AS573A ... FK PACKAGE

(TOP VIEW)



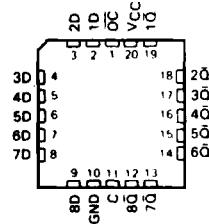
SN54ALS580A ... J PACKAGE
SN74ALS580B, SN74AS580 ... DW OR N PACKAGE

(TOP VIEW)



SN54ALS580A ... FK PACKAGE

(TOP VIEW)



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SN74ALS573C, SN74ALS580B, SN74AS573A, SN74AS580
SN54ALS573B, SN54ALS580A, SN54AS573A
OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

FUNCTION TABLES

'ALS573, 'AS573A
(EACH LATCH)

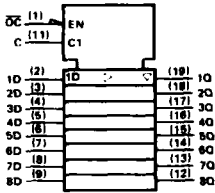
INPUTS			OUTPUT Q
ENABLE	C	D	
\overline{OC}			C
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

'ALS580, 'AS580
(EACH LATCH)

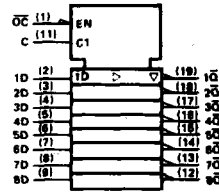
INPUTS			OUTPUT \overline{Q}
ENABLE	C	D	
\overline{OC}			C
L	H	H	L
L	H	L	H
L	L	X	$\overline{Q_0}$
H	X	X	Z

logic symbols†

'ALS573, 'AS573A



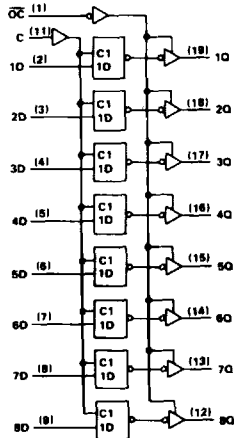
'ALS580, 'AS580



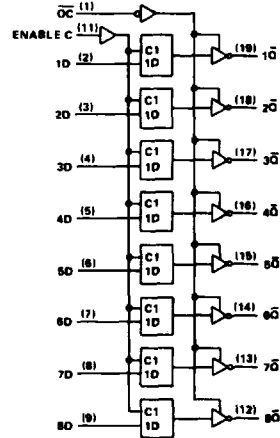
† These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

'ALS573, 'AS573A



'ALS580, 'AS580



Pin numbers shown are for DW, J, and N packages.

SN74ALS573C, SN74ALS580B, SN54ALS573B, SN54ALS580A OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range; SN54ALS573B, SN54ALS580A	-55°C to 125°C
SN74ALS573C, SN74ALS580B	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54ALS573B SN54ALS580A			SN74ALS573C SN74ALS580B			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
I_{OH}	High-level output current			-1			2.6	mA
I_{OL}	Low-level output current			12			24	mA
t_w	Pulse duration, enable C high	'ALS573	10		10			ns
		'ALS580	15		15			
t_{su}	Setup time, data before enable C1		10			10		ns
t_h	Hold time, data after enable C1	'ALS573	7		7			ns
		'ALS580	10		10			
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	SN54ALS573B SN54ALS580A			SN74ALS573C SN74ALS580B			UNIT
		MIN	TYP ¹	MAX	MIN	TYP ¹	MAX	
V_{IK}	$V_{CC} = 4.5$ V, $I_I = -18$ mA			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5$ V to 5.5 V, $I_{OH} = -0.4$ mA	$V_{CC} - 2$			$V_{CC} - 2$			
	$V_{CC} = 4.5$ V, $I_{OH} = -1$ mA	2.4	3.3					V
	$V_{CC} = 4.5$ V, $I_{OH} = -2.6$ mA				2.4	3.2		
V_{OL}	$V_{CC} = 4.5$ V, $I_{OL} = 12$ mA		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5$ V, $I_{OL} = 24$ mA					0.35	0.5	
I_{OZH}	$V_{CC} = 5.5$ V, $V_O = 2.7$ V			20			20	μA
I_{OZL}	$V_{CC} = 5.5$ V, $V_O = 0.4$ V			-20			-20	μA
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, $V_I = 0.4$ V			-0.1			-0.1	mA
I_{O}^2	$V_{CC} = 5.5$ V, $V_O = 2.25$ V		-30	-112		-30	-112	mA
I_{CC}	$V_{CC} = 5.5$ V	'ALS573	Outputs high	10	17	10	17	mA
			Outputs low	15	24	15	24	
		'ALS580	Outputs disabled	16	27	16	27	
			Outputs high	10	17	10	17	
			Outputs low	16	26	16	26	
			Outputs disabled	17	29	17	29	

¹ All typical values are at $V_{CC} = 5$ V, $T_A = 25$ °C.

² The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, I_{OS} .

SN74ALS573C, SN74ALS580B, SN54ALS573B, SN54ALS580A
OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

'ALS573 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 5 V. CL = 50 pF. R1 = 500 Ω. R2 = 600 Ω. TA = 25°C		VCC = 4.5 V to 5.5 V. CL = 50 pF. R1 = 500 Ω. R2 = 500 Ω. TA = MIN to MAX		UNIT		
			'ALS573		SN54ALS573B			SN74ALS573C	
			TYP	MIN	MAX	MIN		MAX	
tPLH	D	Q	7	2	15	2	14	ns	
tPHL			7	2	15	2	14		
tPLH	C	Q	12	8	25	6	20	ns	
tPHL			12	8	20	6	19		
tPZH	\overline{OC}	Q	9	4	21	3	18	ns	
tPZL			11	4	21	4	18		
tPHZ	\overline{OC}	Q	5	2	12	1	10	ns	
tPLZ			7	3	18	1	15		

'ALS580 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	VCC = 5 V. CL = 50 pF. R1 = 500 Ω. R2 = 500 Ω. TA = 25°C		VCC = 4.5 V to 5.5 V. CL = 50 pF. R1 = 500 Ω. R2 = 500 Ω. TA = MIN to MAX		UNIT		
			'ALS580		SN54ALS580A			SN74ALS580B	
			TYP	MIN	MAX	MIN		MAX	
tPLH	D	\overline{Q}	10	3	21	3	18	ns	
tPHL			8	3	15	3	14		
tPLH	C	\overline{Q}	8	8	29	6	22	ns	
tPHL			14	8	22	6	21		
tPZH	\overline{OC}	\overline{Q}	8	4	21	3	18	ns	
tPZL			10	4	21	4	18		
tPHZ	\overline{OC}	\overline{Q}	5	2	12	1	10	ns	
tPLZ			7	3	18	1	15		

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

SN74AS573A, SN74AS580, SN54AS573A OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

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

Supply voltage, V_{CC}	7 V
Input voltage	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range: SN54AS573A	-55°C to 125°C
SN74AS573A, SN74AS580	0°C to 70°C
Storage temperature range	-65°C to 150°C

recommended operating conditions

		SN54AS573A			SN74AS573A SN74AS580			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_{OH}	High-level output current			-12			15	mA
I_{OL}	Low-level output current			32			48	mA
t_w	Pulse duration, enable C high	AS573A	5	5	4	5		ns
		AS580			2			
t_{SU}	Setup time, data before enable C _i		2			2		ns
t_h	Hold time, data after enable C _i		3			3		ns
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		SN54AS573A			SN74AS573A SN74AS580			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 to 5.5 V,	$I_{OH} = -2$ mA	$V_{CC} - 2$			$V_{CC} - 2$			V
		$V_{CC} = 4.5$ V,	$I_{OH} = -12$ mA	2.4	3.2					
		$V_{CC} = 4.5$ V,	$I_{OH} = -2.6$ mA				2.4	3.3		
V_{OL}		$V_{CC} = 4.5$ V,	$I_{OL} = 32$ mA	0.28	0.5					V
		$V_{CC} = 4.5$ V,	$I_{OL} = 48$ mA				0.33	0.5		
I_{OZH}		$V_{CC} = 5.5$ V,	$V_O = 2.7$ V			50				μA
I_{OZL}		$V_{CC} = 5.5$ V,	$V_O = 0.4$ V			50				μA
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,	$V_I = 0.4$ V			-0.5			0.5	mA
I_O^{\ddagger}		$V_{CC} = 5.5$ V,	$V_O = 2.25$ V	-30		-112	-30		112	mA
I_{CC}	AS573A	$V_{CC} = 5.5$ V	Outputs high	56	93	56	93	mA		
			Outputs low	55	90	55	90			
			Outputs disabled	65	106	65	106			
	AS580		Outputs high			62	100			
			Outputs low			65	106			
			Outputs disabled			71	115			

[†]All typical values are at $V_{CC} = 5$ V, $T_A = 25$ °C.

[‡]The output conditions have been chosen to produce a current that closely approximates one half of the true short circuit output current, I_{OS} .

SN74AS573A, SN74AS580, SN54AS573A
OCTAL D-TYPE TRANSPARENT LATCHES WITH 3-STATE OUTPUTS

'AS573A switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX				UNIT
			SN54AS573A		SN74AS573A		
			MIN	MAX	MIN	MAX	
t _{PLH}	D	Q	3	11	3	8	ns
t _{PHL}			3	8	3	7	
t _{PLH}	C	Q	6	16.5	6	13	ns
t _{PHL}			4	9	4	7.5	
t _{PZH}	OC	Q	2	8	2	6.5	ns
t _{PZL}			4	11	4	9.5	
t _{PHZ}	OC	Q	2	8	2	6.5	ns
t _{PLZ}			2	8	2	7	

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

'AS580 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = MIN to MAX		UNIT
			SN74AS580		
			MIN	MAX	
t _{PLH}	D	Q	3	7.5	ns
t _{PHL}			3	7	
t _{PLH}	C	Q	5	9	ns
t _{PHL}			4	8	
t _{PZH}	OC	Q	2	6.5	ns
t _{PZL}			4	9.5	
t _{PHZ}	OC	Q	2	6.5	ns
t _{PLZ}			2	7	

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