

SN54ALS841, SN54AS841, SN54ALS842, SN54AS842 SN74ALS841, SN74AS841, SN74ALS842, SN74AS842 10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

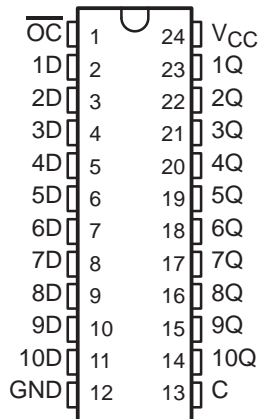
- 3-State Buffer-Type Outputs Drive Bus-Lines Directly
- Bus-Structured Pinout
- Provide Extra Bus Driving Latches Necessary for Wider Address/Data Paths or Buses with Parity
- Buffered Control Inputs to Reduce DC Loading
- Power-Up High-Impedance State
- Package Options Include Plastic Small Outline Packages, Both Plastic and Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

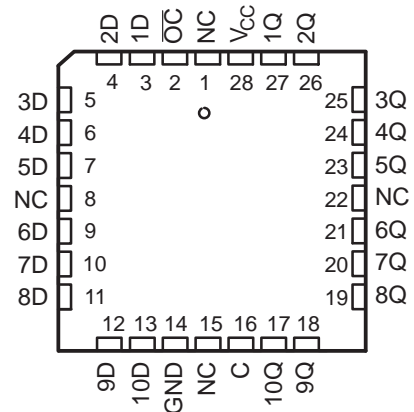
These 10-bit latches feature 3-state outputs designed specifically for driving highly-capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The ten latches are transparent D-type. The 'ALS841 and 'AS841 have noninverting data (D) inputs. The 'ALS842 and 'AS842 have inverting \bar{D} inputs.

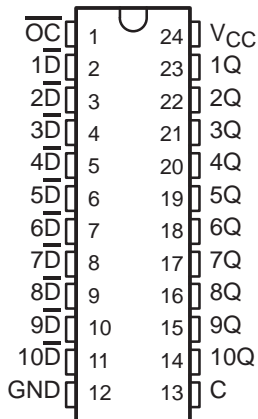
SN54ALS841, SN54AS841 . . . JT PACKAGE
SN74ALS841, SN74AS841 . . . DW OR NT PACKAGE
(TOP VIEW)



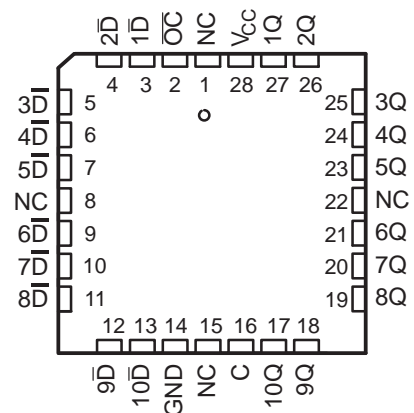
SN54ALS841, SN54AS841 . . . FK PACKAGE
SN74ALS841, SN74AS841 . . . FN PACKAGE
(TOP VIEW)



SN54ALS842, SN54AS842 . . . JT PACKAGE
SN74ALS842, SN74AS842 . . . DW OR NT PACKAGE
(TOP VIEW)



SN54ALS842, SN54AS842 . . . FK PACKAGE
SN74ALS842, SN74AS842 . . . FN PACKAGE
(TOP VIEW)



PRODUCTION DATA information is 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.



SN54ALS841, SN54AS841, SN54ALS842, SN54AS842
SN74ALS841, SN74AS841, SN74ALS842, SN74AS842
10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

description (continued)

A buffered output control (\overline{OC}) input can be used to place the ten outputs in either a normal logic state (high or low 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 pullup components.

The output control does not affect the internal operation of the latches. Old data can be retained or new data can be entered while the outputs are off.

The -1 versions of the SN74ALS841 and SN74ALS842 parts are identical to the standard versions except that the recommended maximum I_{OL} is increased to 48 mA. There are no -1 versions of the SN54ALS841 and SN54ALS842.

The SN54ALS841, SN54AS841, SN54ALS842, and SN54AS842 are characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS841, SN74AS841, SN74ALS842, and SN74AS842 are characterized for operation from 0°C to 70°C .

Function Tables

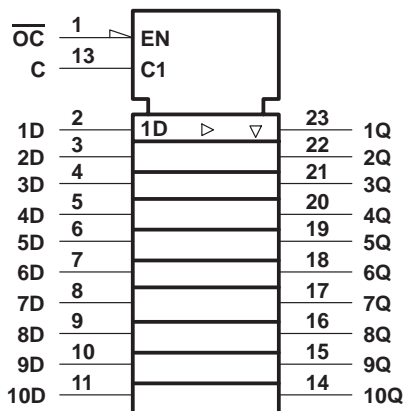
'ALS841, 'AS841			
INPUTS			OUTPUT
\overline{OC}	C	D	Q
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

'ALS842, 'AS842			
INPUTS			OUTPUT
\overline{OC}	C	\overline{D}	Q
L	H	H	L
L	H	L	H
L	L	X	Q_0
H	X	X	Z

SN54ALS841, SN54AS841, SN74ALS841, SN74AS841 10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

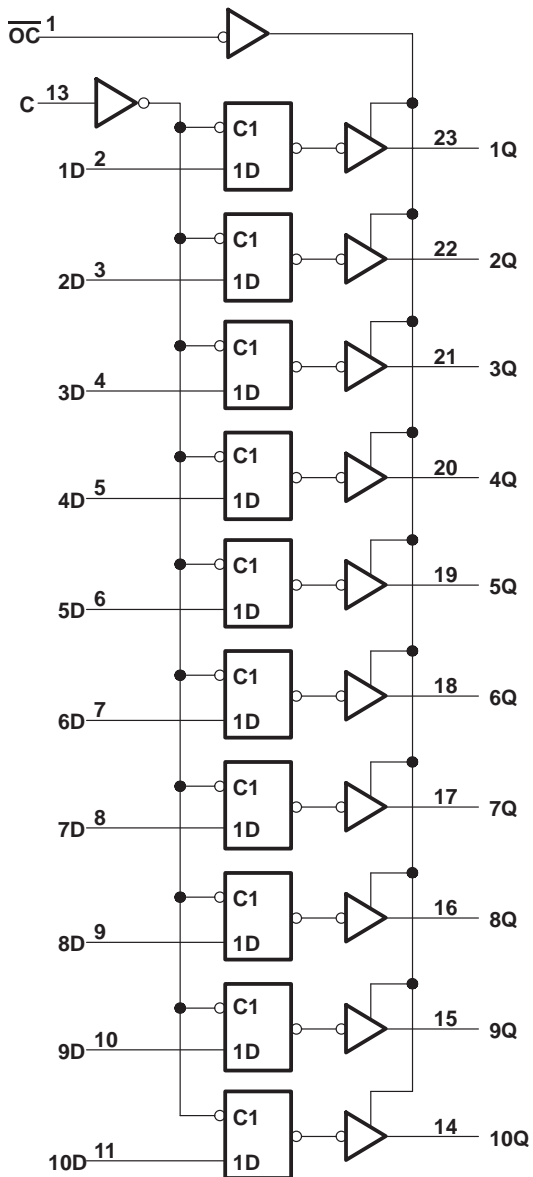
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'ALS841, 'AS841 logic symbol†



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

'ALS841, 'AS841 logic diagram (positive logic)

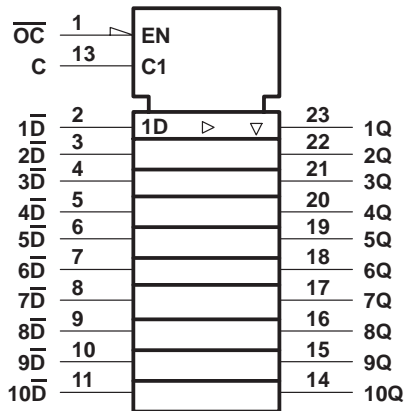


Pin numbers shown are for DW, JT, and NT packages.

SN54ALS841, SN54AS841, SN54ALS842, SN54AS842
SN74ALS841, SN74AS841, SN74ALS842, SN74AS842
10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

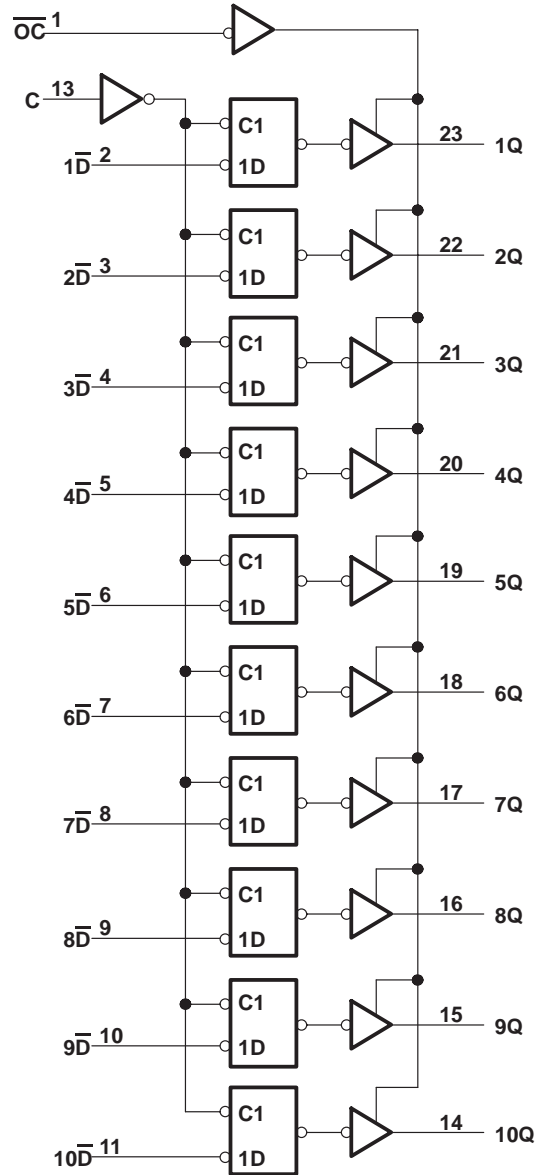
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'ALS842, 'AS842 logic symbol†



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

'ALS842, 'AS842 logic diagram (positive logic)



Pin numbers shown are for DW, JT, and NT packages.

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:	
SN54ALS841, SN54AS841, SN54ALS842, SN54AS842	–55°C to 125°C
SN74ALS841, SN74AS841, SN74ALS842, SN74AS842	0°C to 70°C
Storage temperature range	–65°C to 150°C

SN54ALS841, SN74ALS841 10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

recommended operating conditions

	SN54ALS841			SN74ALS841			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
						48†	
t_w Pulse duration, C high	25			20			ns
t_{su} Setup time, data before C↓	16			10			ns
t_h Hold time, data after C↓	7			5			ns
T_A Operating free-air temperature	-55		125	0		70	°C

† The 48-mA limit applies only to the -1 versions and only if V_{CC} is maintained between 4.75 V and 5.25 V.

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

PARAMETER	TEST CONDITIONS	SN54ALS841			SN74ALS841			UNIT	
		MIN	TYP‡	MAX	MIN	TYP‡	MAX		
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2			-1.2	V	
V_{OH}	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$, $I_{OH} = -0.4\text{ mA}$	$V_{CC}-2$			$V_{CC}-2$			V	
	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -1\text{ mA}$	2.4	3.3						
	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -2.6\text{ mA}$				2.4	3.2			
V_{OL}	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 12\text{ mA}$		0.25	0.4		0.25	0.4	V	
	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 24\text{ mA}$					0.35	0.5		
	$V_{CC} = 4.75\text{ V}$, $I_{OL} = 48\text{ mA}$ (-1 versions)					0.35	0.5		
I_{OZH}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.7\text{ V}$			20			20	μA	
I_{OZL}	$V_{CC} = 5.5\text{ V}$, $V_O = 0.4\text{ V}$			-20			-20	μA	
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1			0.1	mA	
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.7\text{ V}$			20			20	μA	
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$			-0.1			-0.1	mA	
$I_O^§$	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$	-30		-112	-30		-112	mA	
I_{CC}	$V_{CC} = 5.5\text{ V}$	Outputs high		19	30		19	30	mA
		Outputs low		38	62		38	62	
		Outputs disabled		23	40		23	40	

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

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

SN54ALS841, SN74ALS841

10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

'ALS841 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, C _L = 50 pF, R ₁ = 500 Ω, R ₂ = 500 Ω, T _A = 25°C			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	
			'ALS841			SN54ALS841		SN74ALS841		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
t _{PLH}	D	Q	8.5	11	2	15	2	13	ns	
t _{PHL}			8.5	11	2	15	2	13		
t _{PLH}	C	Q	14	18	7	25	7	21	ns	
t _{PHL}			17	23	8	30	8	26		
t _{PZH}	\overline{OC}	Q	7.5	10	2	14	2	12	ns	
t _{PZL}			7.5	10	2	14	2	12		
t _{PHZ}	\overline{OC}	Q	6	8	2	12	2	10	ns	
t _{PLZ}			7	9	2	14	2	12		

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

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

SN54ALS842, SN74ALS842 10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

recommended operating conditions

	SN54ALS842			SN74ALS842			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
						48†	
t_w Pulse duration, C high	25			20			ns
t_{su} Setup time, data before C↓	16			10			ns
t_h Hold time, data after C↓	7			5			ns
T_A Operating free-air temperature	-55		125	0		70	°C

† The 48-mA limit applies only to the -1 versions and only if V_{CC} is maintained between 4.75 V and 5.25 V.

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

PARAMETER	TEST CONDITIONS	SN54ALS842			SN74ALS842			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V_{IK}	$V_{CC} = 4.5\text{ V}$, $I_I = -18\text{ mA}$			-1.2			-1.2	V
V_{OH}	$V_{CC} = 4.5\text{ V to } 5.5\text{ V}$, $I_{OH} = -0.4\text{ mA}$	$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -1\text{ mA}$	2.4	3.3					
	$V_{CC} = 4.5\text{ V}$, $I_{OH} = -2.6\text{ mA}$				2.4	3.2		
V_{OL}	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 12\text{ mA}$		0.25	0.4		0.25	0.4	V
	$V_{CC} = 4.5\text{ V}$, $I_{OL} = 24\text{ mA}$					0.35	0.5	
	$V_{CC} = 4.75\text{ V}$, $I_{OL} = 48\text{ mA (-1 versions)}$					0.35	0.5	
I_{OZH}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.7\text{ V}$			20			20	μA
I_{OZL}	$V_{CC} = 5.5\text{ V}$, $V_O = 0.4\text{ V}$			-20			-20	μA
I_I	$V_{CC} = 5.5\text{ V}$, $V_I = 7\text{ V}$			0.1			0.1	mA
I_{IH}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.7\text{ V}$			20			20	μA
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$			-0.1			-0.1	mA
I_{O}^{\S}	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$	-30		-112	-30		-112	mA
I_{CC}	$V_{CC} = 5.5\text{ V}$	Outputs high	20	35	20	35	mA	
		Outputs low	48	74	48	74		
		Outputs disabled	27	44	27	44		

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

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

SN54ALS842, SN74ALS842

10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

'ALS842 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 5 V, C _L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T _A = 25°C			V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R1 = 500 Ω, R2 = 500 Ω, T _A = MIN to MAX†			UNIT	
			'ALS842			SN54ALS842		SN74ALS842		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
t _{PLH}	D	Q	11	15	4	22	4	18	ns	
t _{PHL}			8	11	3	17	3	13		
t _{PLH}	C	Q	17	23	8	31	8	27	ns	
t _{PHL}			13	18	6	24	6	20		
t _{PZH}	\overline{OC}	Q	8	10	2	14	2	12	ns	
t _{PZL}			8	11	2	14	2	12		
t _{PHZ}	\overline{OC}	Q	6	8	1	12	1	10	ns	
t _{PLZ}			7	9	2	14	2	12		

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

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

SN54AS841, SN54AS842, SN74AS841, SN74AS842 10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

recommended operating conditions

		SN54AS841 SN54AS842			SN74AS841 SN74AS842			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			-24			-24	mA
I _{OL}	Low-level output current			32			48	mA
t _w	Pulse duration, C high	5			4			ns
t _{su}	Setup time, data before C↓	3.5			2.5			ns
t _h	Hold time, data after C↓	3.5			2.5			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	SN54AS841 SN54AS842			SN74AS841 SN74AS842			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} = -15 mA	2.4	3.2		2.4	3.2		
	V _{CC} = 4.5 V, I _{OH} = -24 mA	2			2			
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 32 mA		0.25	0.5				V
	V _{CC} = 4.5 V, I _{OL} = 48 mA					0.35	0.5	
I _{OZH}	V _{CC} = 5.5 V, V _O = 2.7 V			50			50	μA
I _{OZL}	V _{CC} = 5.5 V, V _O = 0.4 V			-50			-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 _O = 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[‡]}	V _{CC} = 5.5 V, V _O = 2.25 V	-30		-112	-30		-112	mA
I _{CC}	V _{CC} = 5.5 V		Outputs high	36	60	36	60	mA
			Outputs low	58	94	58	94	
			Outputs disabled	56	92	56	92	
			Outputs high	38	62	38	62	
			Outputs low	60	97	60	97	
			Outputs disabled	58	95	58	95	

[†] 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}.

SN54AS841, SN54AS842, SN74AS841, SN54AS842

10-BIT BUS INTERFACE D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS059B – D2910, DECEMBER 1983 – REVISED MAY 1986

'AS841 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54AS841		SN74AS841		
			MIN	MAX	MIN	MAX	
t_{PLH}	D	Q	1	8.5	1	6.5	ns
t_{PHL}			1	10	1	9	
t_{PLH}	C	Q	2	13	2	12	ns
t_{PHL}			2	13	2	12	
t_{PZH}	\overline{OC}	Q	2	13.5	2	10.5	ns
t_{PZL}			2	15	2	13.5	
t_{PHZ}	\overline{OC}	Q	1	10	1	8	ns
t_{PLZ}			1	10	1	8	

'AS842 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = \text{MIN to MAX}^\dagger$				UNIT
			SN54AS842		SN74AS842		
			MIN	MAX	MIN	MAX	
t_{PLH}	D	Q	1	11	1	8.5	ns
t_{PHL}			1	10	1	9	
t_{PLH}	C	Q	2	13	2	12	ns
t_{PHL}			2	13	2	12	
t_{PZH}	OC	Q	2	14.5	2	12	ns
t_{PZL}			2	15	2	12.5	
t_{PHZ}	\overline{OC}	Q	1	10	1	8	ns
t_{PLZ}			1	10	1	8	

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

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

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