

**SN54ALS574A, SN54ALS575A, SN54AS574, SN54AS575
SN74ALS574B, SN74ALS575A, SN74AS574, SN74AS575**
OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

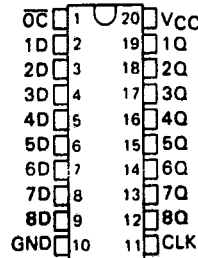
D2661, JUNE 1982—REVISED JANUARY 1989

T-46-07-11

SN54ALS574A, SN54AS574 . . . J PACKAGE
SN74ALS574B, SN74AS574 . . . DW OR N PACKAGE

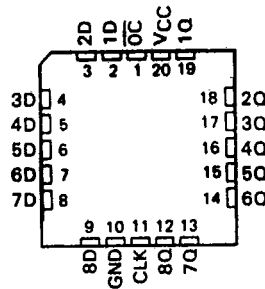
- 3-State Buffer-Type Noninverting Outputs Drive Bus-Lines Directly
- Bus-Structured Pinout
- Buffered Control Inputs
- 'ALS575 and 'AS575 Have Synchronous Clear
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

(TOP VIEW)



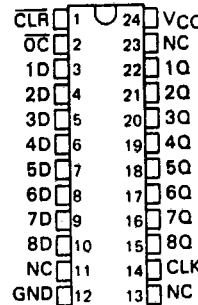
SN54ALS574A, SN54AS574 . . . FK PACKAGE

(TOP VIEW)



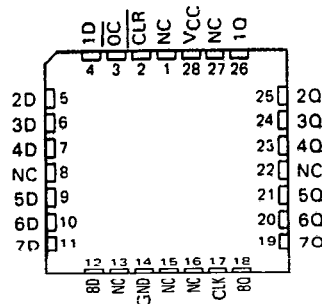
SN54ALS575A, SN54AS575 . . . JT PACKAGE
SN74ALS575A, SN74AS575 . . . DW OR NT PACKAGE

(TOP VIEW)



SN54ALS575A, SN54AS575 . . . FK PACKAGE
SN74ALS575A, SN74AS575 . . . FN PACKAGE

(TOP VIEW)



description

These 8-bit registers feature three-state outputs designed specifically for bus driving. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The eight edge-triggered D-type flip-flops enter data on the low-to-high transition of the clock. The 'ALS575A and 'AS575 may be synchronously cleared by taking the CLR input low.

The output-control does not affect the internal operation of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

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.

FUNCTION TABLES

'ALS574, 'AS574
(EACH FLIP-FLOP)

INPUTS			OUTPUT
OC	CLK	D	Q
L	↑	H	H
L	↑	L	L
L	L	X	Q ₀
H	X	X	Z

'ALS575, 'AS575
(EACH FLIP-FLOP)

INPUTS				OUTPUT
OC	CLR	CLK	D	Q
L	L	↑	X	L
L	H	↑	H	H
L	H	↑	L	L
L	H	L	X	Q ₀
H	X	X	X	Z

NOTICE
SEE ORDER OF DATA FOR ERRATA INFORMATION

3452

B-03

NC—No internal connection

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.

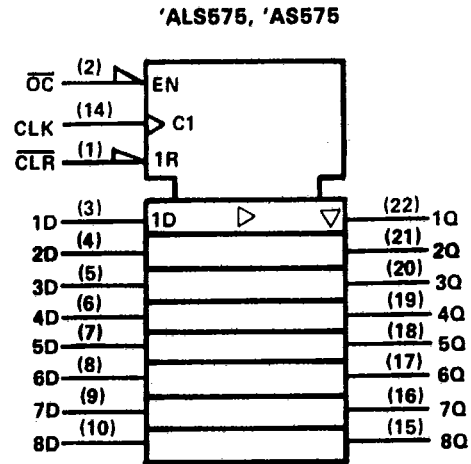
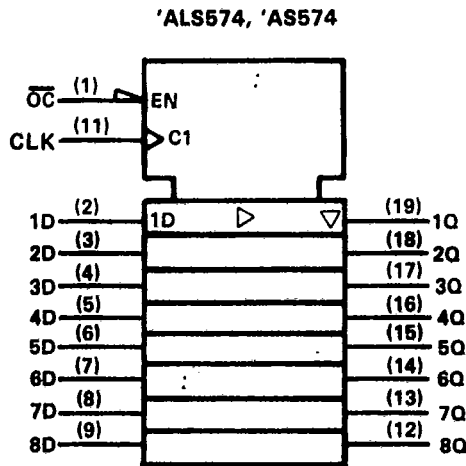


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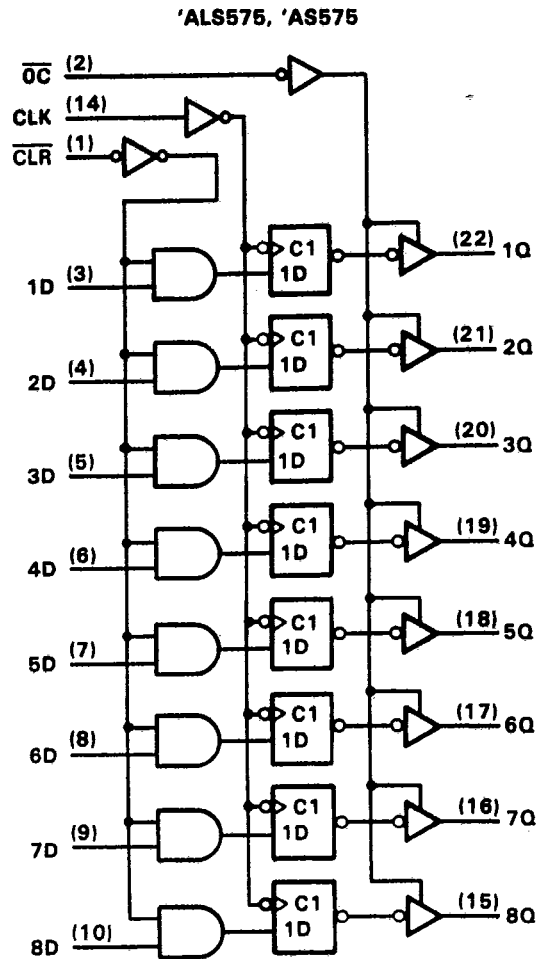
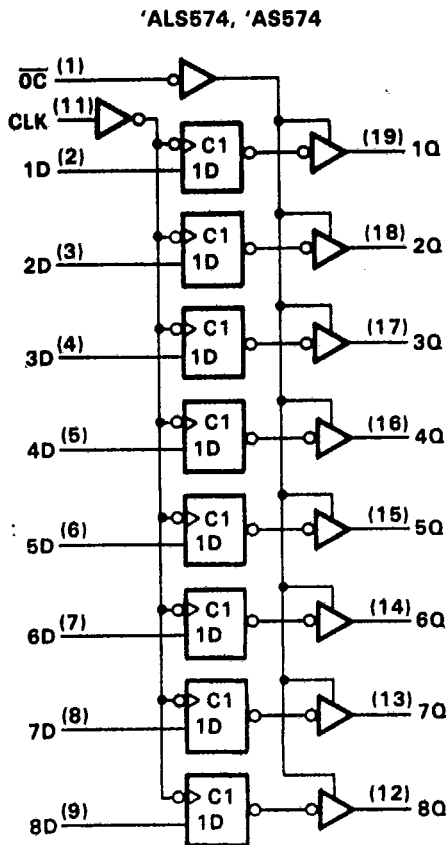
**SN54ALS574A, SN54ALS575A, SN54AS574, SN54AS575
SN74ALS574B, SN74ALS575A, SN74AS574, SN74AS575
OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS**

logic symbols†



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

logic diagrams (positive logic)



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

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

SN54ALS574A, SN54ALS575A, SN74ALS574B, SN74ALS575A
OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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

- Supply voltage, VCC 7 V
- Input voltage 7 V
- Voltage applied to a disabled 3-state output 5.5 V
- Operating free-air temperature range: SN54ALS574A, SN54ALS575A -55°C to 125°C
- SN74ALS574B, SN74ALS575A 0°C to 70°C
- Storage temperature range -65°C to 150°C

recommended operating conditions

		SN54ALS574A SN64ALS575A			SN74ALS574B SN74ALS575A			UNIT	
		MIN	NOM	MAX	MIN	NOM	MAX		
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V	
VIH	High-level input voltage	2			2			V	
VIL	Low-level input voltage	0.7			0.8			V	
IOH	High-level output current	-1			-2.6			mA	
IOL	Low-level output current	12			24			mA	
f _{clock}	Clock frequency	'ALS574		0	28	0	35	MHz	
		'ALS575		0	25	0	30		
t _w	Pulse duration	'ALS574 CLK high or low		16.5		14		ns	
		'ALS575 CLK high or low		20		16.5			
t _{su}	Setup time before CLK	Data		15		15		ns	
		'ALS575 CLR		15		15			
t _h	Hold time after CLK	Data		4		0		ns	
		'ALS575 CLR		0		0			
T _A	Operating free-air temperature	-55		125		0		70	°C

SN54ALS574A, SN54ALS575A, SN74ALS574B, SN74ALS575A
OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS		SN54ALS574A SN54ALS575A			SN74ALS574B SN74ALS575A			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} = -0.4 mA	V _{CC} -2			V _{CC} -2			V
	V _{CC} = 4.5 V,	I _{OH} = -1 mA	2.4	3.3					
	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	-0.2			-0.2			mA
I _O ‡	V _{CC} = 5.5 V,	V _O = 2.25 V	-30		-112	-30		-112	mA
I _{CC}	'ALS574	V _{CC} = 5.5 V	Outputs high		11	18	11 18		mA
			Outputs low		17	27	17 27		
	Outputs disabled		17	28	17 28				
	'ALS575		Outputs high		10	17	10 17		
			Outputs low		15	24	15 24		
			Outputs disabled		16	30	16 30		

†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}.

'ALS574 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		
			'ALS574		SN54ALS574A			SN74ALS574B	
			TYP	MIN	MAX	MIN		MAX	
f _{max}			50	28		35	MHz		
t _{PLH}	CLK	Q	8	4	22	3	14	ns	
t _{PHL}			8	4	17	4	14		
t _{PZH}	OC	Q	9	4	21	3	18	ns	
t _{PZL}			12	4	26	4	18		
t _{PHZ}	OC	Q	5	2	16	1	10	ns	
t _{PLZ}			5	2	25	2	12		

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the ALS/AS Logic Data Book, 1986.

OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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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	
			'ALS575			SN54ALS575A		SN74ALS575A		
			MIN	TYP	MAX	MIN	MAX	MIN		MAX
fmax			40	50		25		30	MHz	
tPLH	CLK	Q		8	11	4	15	4	14	ns
tPHL				9	11.5	4	15	4	14	
tPZH	\overline{OC}	Q		11	14	4	21	4	18	ns
tPZL				12	15	4	21	4	18	
tPHZ	\overline{OC}	Q		6	8	2	12	2	10	ns
tPLZ				8	11	3	15	3	13	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the *ALS/AS Logic Data Book, 1986*.

SN54AS574, SN54AS575, SN74AS574, SN74AS575
OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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

- Supply voltage, VCC 7 V
- Input voltage 7 V
- Voltage applied to a disabled 3-state output 5.5 V
- Operating free-air temperature range: SN54AS574, SN54AS575 -55°C to 125°C
- SN74AS574, SN74AS575 0°C to 70°C
- Storage temperature range -65°C to 150°C

recommended operating conditions

		SN54AS574 SN54AS575			SN74AS574 SN74AS575			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			0.8			0.8	V
IOH	High-level output current			-12			-15	mA
IOL	Low-level output current			32			48	mA
f _{clock}	Clock frequency	0		100	0		125	MHz
t _w	Pulse duration	CLK high		5	4		ns	
		CLK low		4	2			
t _{su}	Setup time before CLK↑	Data		3	2		ns	
		'AS575	CLR high or low	6.5	5.5			
t _h	Hold time after CLK↑	Data		3	2		ns	
		'AS575	CLR	0	0			
T _A	Operating free-air temperature	-55		125	0		70	°C

OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS	SN54AS574 SN54AS575		SN74AS574 SN74AS575		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} = -15 mA			2.4	3.3					
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 32 mA	0.29	0.5			V				
	V _{CC} = 4.5 V, I _{OL} = 48 mA			0.34	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 _I = 2.7 V			20		20	μA			
I _{IL}	OC, CLK, CLR D	V _{CC} = 5.5 V, V _I = 0.4 V			-0.5		-0.5	mA		
					-3		-2			
I _{O[‡]}	V _{CC} = 5.5 V, V _O = 2.25 V	-30		-112	-30	-112	mA			
I _{CC}	'AS574	V _{CC} = 5.5 V	Outputs high		73	116	73	116	mA	
			Outputs low		85	134	85	134		
			Outputs disabled		84	134	84	134		
			'AS575	Outputs high		78	126	78		126
				Outputs low		89	142	89		142
				Outputs disabled		88	142	88		142

†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}.

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
			SN54AS574 SN54AS575		SN74AS574 SN74AS575		
			MIN	MAX	MIN	MAX	
f _{max}			100		125	MHz	
t _{PLH}	CLK	Any Q	3	11	3	8	ns
t _{PHL}			4	11	4	9	
t _{PZH}	OC	Any Q	2	7	2	6	ns
t _{PZL}			3	11	3	10	
t _{PHZ}	OC	Any Q	2	7	2	6	ns
t _{PLZ}			2	7	2	6	

NOTE 1: Load circuit and voltage waveforms are shown in Section 1 of the ALS/AS Logic Data Book, 1986.