

SN54ALS564A, SN74ALS564B OCTAL D-TYPE EDGE-TRIGGERED FLIP-FLOPS WITH 3-STATE OUTPUTS

SDAS164A – APRIL 1982 – REVISED JANUARY 1989

- 3-State Buffer-Type Inverting Outputs Drive Bus-Lines Directly
- Bus-Structured Pinout
- Buffered Control Inputs
- Package Options Include Plastic Small Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs
- Dependable Texas Instruments Quality and Reliability

description

These 8-bit registers feature inverting 3-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 8-bit edge-triggered D-type flip-flops enter data on the low-to-high transition of the clock.

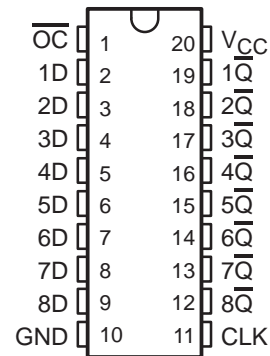
The output control does not affect the internal operation of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

The SN54ALS564A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74ALS564B is characterized for operation from 0°C to 70°C .

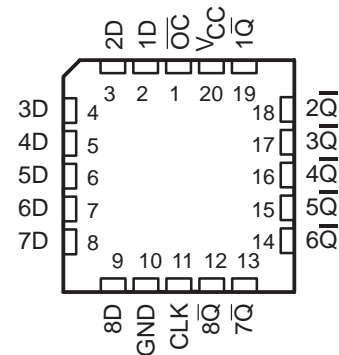
FUNCTION TABLE
(each flip-flop)

INPUTS			OUTPUT
OC	CLK	D	\bar{Q}
L	\uparrow	H	L
L	\uparrow	L	H
L	L	X	\bar{Q}_0
H	X	X	Z

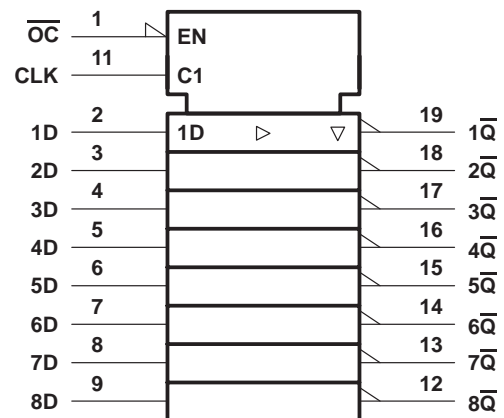
SN54ALS564A . . . J PACKAGE
SN74ALS564B . . . DW OR N PACKAGE
(TOP VIEW)



SN54ALS564A . . . FK PACKAGE
(TOP VIEW)



logic symbol†

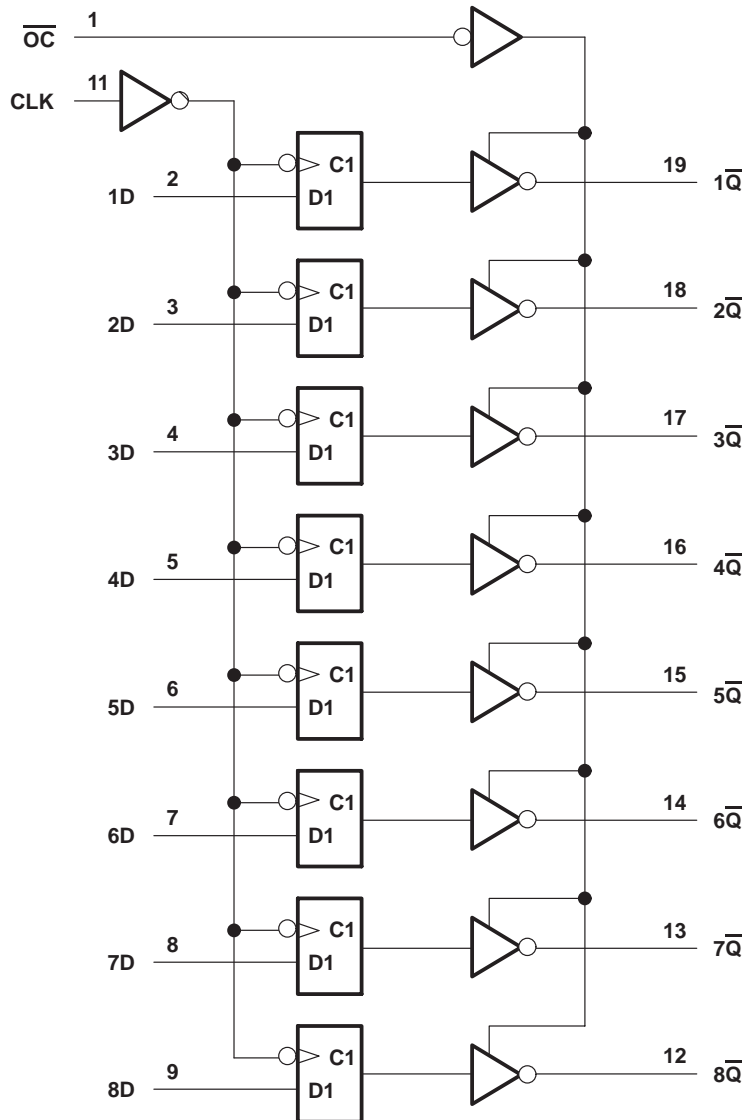


† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for DW, J, and N packages.

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logic diagram (positive logic)



Pin numbers shown are for DW, J, and N 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: SN54ALS564A	-55°C to 125°C
SN74ALS564B	0°C to 70°C
Storage temperature range	-65°C to 150°C

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recommended operating conditions

		SN54ALS564A			SN74ALS564B			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
f_{clock}	Clock frequency	0		25	0		30	MHz
t_w	Pulse duration, CLK high or low	16.5			14			ns
t_{su}	Setup time, data before CLK \uparrow	15			15			ns
t_h	Hold time, data after CLK \uparrow	4			0			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	SN54ALS564A			SN74ALS564B			UNIT	
		MIN	TYP \dagger	MAX	MIN	TYP \dagger	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		
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}	$V_{CC} = 5.5\text{ V}$, $V_I = 2.7\text{ V}$			20			20	μA	
I_{IL}	$V_{CC} = 5.5\text{ V}$, $V_I = 0.4\text{ V}$			-0.2			-0.2	mA	
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$, $V_O = 2.25\text{ V}$			-30			-112	mA	
I_{CC}	$V_{CC} = 5.5\text{ V}$	Outputs high		10	18		10	18	mA
		Outputs low		15	24		15	24	
		Outputs disabled		16	30		16	30	

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

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

SN54ALS564A, SN74ALS564B
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switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = 25^\circ\text{C}$	$V_{CC} = 4.5\text{ V to }5.5\text{ V},$ $C_L = 50\text{ pF},$ $R_1 = 500\ \Omega,$ $R_2 = 500\ \Omega,$ $T_A = \text{MIN to MAX}^\dagger$		UNIT		
			'ALS564	SN54ALS564A			SN74ALS564B	
			TYP	MIN	MAX		MIN	MAX
f_{\max}			50	25	30	MHz		
t_{PLH}	CLK	Any \bar{Q}	9	4	15	3	14	ns
t_{PHL}			9	4	15	4	14	
t_{PZH}	\overline{OC}	Any \bar{Q}	11	4	21	3	18	ns
t_{PZL}			11	4	21	4	18	
t_{PHZ}	\overline{OC}	Any \bar{Q}	6	2	12	1	10	ns
t_{PLZ}			8	3	17	2	15	

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

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



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