

SN54AS825A, SN74AS825A 8-BIT BUS-INTERFACE FLIP-FLOPS WITH 3-STATE OUTPUTS

SDAS020B – JUNE 1984 – REVISED AUGUST 1995

- Functionally Equivalent to AMD's AM29825
- Improved I_{OH} Specifications
- Multiple Output Enables Allow Multiuser Control of the Interface
- Outputs Have Undershoot-Protection Circuitry
- Power-Up High-Impedance State
- Buffered Control Inputs Reduce dc Loading Effects
- Package Options Include Plastic Small-Outline (DW) Packages, Ceramic Chip Carriers (FK), and Standard Plastic (NT) and Ceramic (JT) 300-mil DIPs

description

These 8-bit flip-flops feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. These devices are particularly suitable for implementing multiuser registers, I/O ports, bidirectional bus drivers, and working registers.

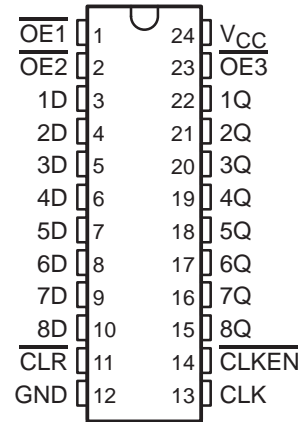
With the clock-enable (\overline{CLKEN}) input low, the eight D-type edge-triggered flip-flops enter data on the low-to-high transitions of the clock (CLK) input. Taking \overline{CLKEN} high disables the clock buffer, latching the outputs. These devices have noninverting data (D) inputs. Taking the clear (\overline{CLR}) input low causes the eight Q outputs to go low independently of the clock.

Multiuser buffered output-enable ($\overline{OE1}$, $\overline{OE2}$, and $\overline{OE3}$) inputs can be used to place the eight outputs in either a normal logic state (high or low logic level) 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 bus lines without interface or pullup components.

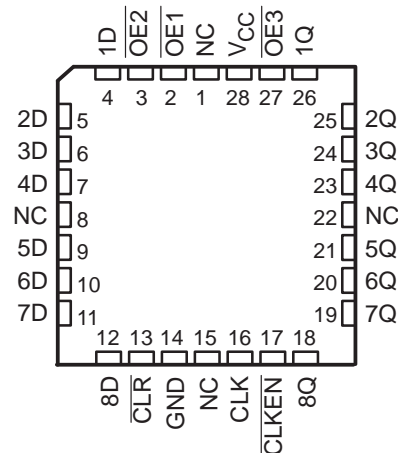
The output enables do not affect the internal operation of the flip-flops. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

The SN54AS825A is characterized for operation over the full military temperature range of -55°C to 125°C . The SN74AS825A is characterized for operation from 0°C to 70°C .

SN54AS825A . . . JT PACKAGE
SN74AS825A . . . DW OR NT PACKAGE
(TOP VIEW)



SN54AS825A . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

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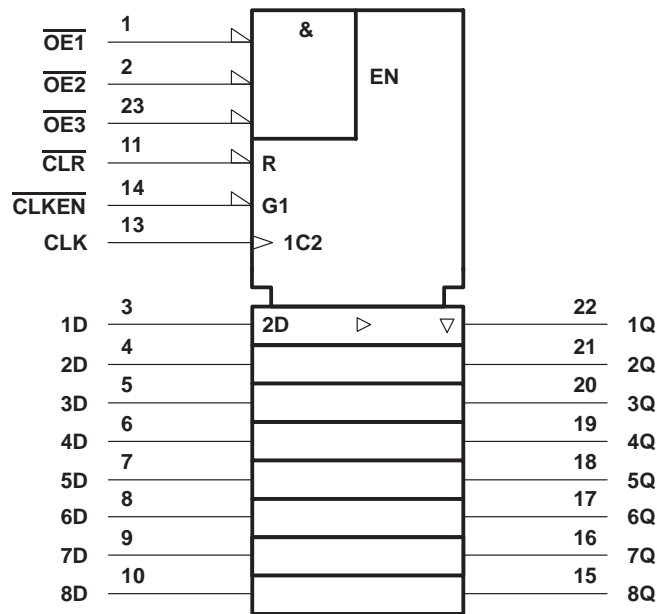
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FUNCTION TABLE
(each flip-flop)

INPUTS					OUTPUT
$\overline{OE}\dagger$	\overline{CLR}	\overline{CLKEN}	CLK	D	Q
L	L	X	X	X	L
L	H	L	↑	H	H
L	H	L	↑	L	L
L	H	H	X	X	Q_0
H	X	X	X	X	Z

$\dagger \overline{OE} = H$ if any of $\overline{OE1}$, $\overline{OE2}$, or $\overline{OE3}$ are high.
 $\overline{OE} = L$ if all of $\overline{OE1}$, $\overline{OE2}$, or $\overline{OE3}$ are low.

logic symbol‡

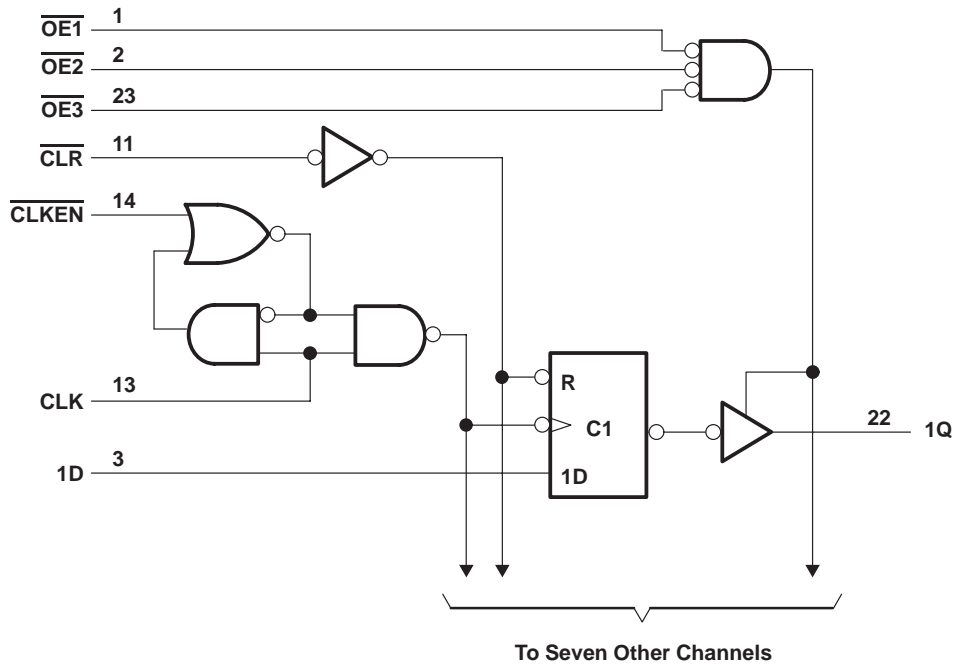


‡ This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
 Pin numbers shown are for the DW, JT, and NT packages.

SN54AS825A, SN74AS825A
8-BIT BUS-INTERFACE FLIP-FLOPS
WITH 3-STATE OUTPUTS

SDAS020B – JUNE 1984 – REVISED AUGUST 1995

logic diagram (positive logic)



Pin numbers shown are for the 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, V_I	7 V
Voltage applied to a disabled 3-state output	5.5 V
Operating free-air temperature range, T_A : SN54AS825A	-55°C to 125°C
SN74AS825A	0°C to 70°C
Storage temperature range	-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.

SN54AS825A, SN74AS825A 8-BIT BUS-INTERFACE FLIP-FLOPS WITH 3-STATE OUTPUTS

SDAS020B – JUNE 1984 – REVISED AUGUST 1995

recommended operating conditions

		SN54AS825A			SN74AS825A			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			-24			-24	mA
I_{OL}	Low-level output current			32			48	mA
t_w^*	Pulse duration	CLR low		7	4		ns	
		CLK high or low		9.5	8			
t_{su}^*	Setup time before CLK \uparrow	CLR inactive		8	8		ns	
		Data		7	6			
		CLKEN high or low		10	6			
t_h^*	Hold time after CLK \uparrow	CLKEN low or data		0	0		ns	
T_A	Operating free-air temperature	-55		125	0		70	$^{\circ}$ C

* On products compliant to MIL-STD-883, Class B, this parameter is based on characterization data but is not production tested.

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

PARAMETER	TEST CONDITIONS		SN54AS825A			SN74AS825A			UNIT
			MIN	TYP \dagger	MAX	MIN	TYP \dagger	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		
		$I_{OH} = -24$ mA	2			2			
V_{OL}	$V_{CC} = 4.5$ V	$I_{OL} = 32$ mA		0.3	0.5				V
		$I_{OL} = 48$ mA				0.35	0.5		
I_{OZH}	$V_{CC} = 5.5$ V,	$V_O = 2.7$ V			50			50	μ A
I_{OZL}	$V_{CC} = 5.5$ V,	$V_I = 0.4$ V			-50			-50	μ A
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	μ A
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}	$V_{CC} = 5.5$ V	Outputs high	45	73		45	73		mA
		Outputs low	56	90		56	90		
		Outputs disabled	59	95		59	95		

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

SN54AS825A, SN74AS825A
8-BIT BUS-INTERFACE FLIP-FLOPS
WITH 3-STATE OUTPUTS

SDAS020B – JUNE 1984 – REVISED AUGUST 1995

switching characteristics (see Figure 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
			SN54AS825A		SN74AS825A		
			MIN	MAX	MIN	MAX	
t _{PLH}	CLK	Any Q	3.5	9	3.5	7.5	ns
t _{PHL}			3.5	13.5	3.5	13	
t _{PHL}	$\overline{\text{CLR}}$	Any Q	3.5	16.5	3.5	15.5	ns
t _{PZH}	$\overline{\text{OE}}$	Any Q	4	12	4	11	ns
t _{PZL}			4	13	4	12	
t _{PHZ}	$\overline{\text{OE}}$	Any Q	1	10	1.5	8	ns
t _{PLZ}			1	10	1.5	8	

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

SN54AS825A, SN74AS825A 8-BIT BUS-INTERFACE FLIP-FLOPS WITH 3-STATE OUTPUTS

SDAS020B – JUNE 1984 – REVISED AUGUST 1995

PARAMETER MEASUREMENT INFORMATION SERIES 54ALS/74ALS AND 54AS/74AS DEVICES



- NOTES: A. C_L includes probe and jig 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. When measuring propagation delay items of 3-state outputs, switch S1 is open.
 D. All input pulses have the following characteristics: $PRR \leq 1$ MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.
 E. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

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SN54AS825A, 8-Bit Bus-Interface Flip-Flops With 3-State Outputs

DEVICE STATUS: **ACTIVE**

FEATURES

[▲ Back to Top](#)

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[▲ Back to Top](#)

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TECHNICAL DOCUMENTS

[▲ Back to Top](#)

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Full datasheet in Zipped PostScript: [sdas020b.psz](#) (99 KB)

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[▲ Back to Top](#)

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- [Advanced Schottky Load Management](#) (SDYA016 - Updated: 02/01/1997)
- [Designing With Logic](#) (SDYA009C - Updated: 06/01/1997)
- [Input and Output Characteristics of Digital Integrated Circuits](#) (SDYA010 - Updated: 10/01/1996)
- [Live Insertion](#) (SDYA012 - Updated: 10/01/1996)

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- [Documentation Rules \(SAP\) And Ordering Information](#) (SZZU001B, 4 KB - Updated: 05/06/1999)
- [Logic Selection Guide Second Half 2000](#) (SDYU001N, 5035 KB - Updated: 04/17/2000)
- [MicroStar Junior BGA Design Summary](#) (SCET004, 167 KB - Updated: 07/28/2000)
- [More Power In Less Space - Technical Article](#) (SCAU001A, 850 KB - Updated: 03/01/1996)

PRICING/AVAILABILITY

[▲ Back to Top](#)

<u>ORDERABLE DEVICE</u>	<u>PACKAGE</u>	<u>PINS</u>	<u>TEMP (°C)</u>	<u>STATUS</u>	<u>BUDGETARY PRICE US\$/UNIT QTY=1000+</u>	<u>PACK QTY</u>	<u>DSCC NUMBER</u>	<u>PRICING/AVAILABILITY</u>
SN54AS825AJT	<u>JT</u>	24	-55 TO 125	ACTIVE	5.36	1		Check stock or order
SNJ54AS825AFK	<u>FK</u>	28	-55 TO 125	ACTIVE	13.23	168	5962-9078003M3A	Check stock or order
			-55					

SNJ54AS825AJT	<u>JT</u>	24	TO 125	ACTIVE	6.36	1	5962- 9078003MLA	<u>Check stock or order</u>
SNJ54AS825AW	<u>W</u>	24	-55 TO 125	ACTIVE	12.24	170	5962- 9078003MKA	<u>Check stock or order</u>

Table Data Updated on: 11/19/2000

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