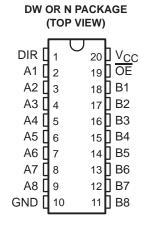
SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639 OCTAL BUS TRANSCEIVERS

SDAS123A - DECEMBER 1983 - REVISED JANUARY 1995

- Bidirectional Bus Transceivers in High-Density 20-Pin Packages
- Choice of True or Inverting Logic
- A-Bus Outputs Are Open Collector;
 B-Bus Outputs Are 3 State
- Package Options Include Plastic Small-Outline (DW) Packages and Standard Plastic (N) 300-mil DIPs

DEVICE	A OUTPUT	B OUTPUT	LOGIC
SN74ALS638A, SN74AS638A	Open collector	3 state	Inverting
SN74ALS639A, SN74AS639	Open collector	3 state	True



description

These octal bus transceivers are designed for asynchronous two-way communication between open-collector and 3-state buses. The devices transmit data from the A bus (open-collector) to the B bus (3 state) or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable (\overline{OE}) input can be used to disable the device so the buses are isolated.

The -1 version of SN74ALS638A is identical to the standard version, except that the recommended maximum I_{OL} is increased to 48 mA.

The SN74ALS638A, SN74ALS639A, SN74AS638A, and SN74AS639 are characterized for operation from 0°C to 70°C.

FUNCTION TABLE

ı	INP	UTS	OPER.	ATION
	OE DIR		SN74ALS638A SN74AS638A	SN74ALS639A SN74AS639
ı	L	L	B data to A bus	B data to A bus
	L	Н	A data to B bus	A data to B bus
	Н	Χ	Isolation	Isolation

logic symbols†

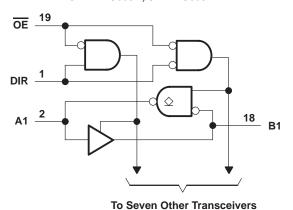
SN74ALS638A, SN74AS638A SN74ALS639A, SN74AS639 19 OE OE G3 G3 DIR 3 EN1 [BA] DIR 3 EN1 [BA] 3 EN2 [AB] 3 EN2 [AB] 18 18 **☆1 B**1 **∆1** ◁ **B**1 \triangleleft 2▽ 17 17 3 B2 B2 16 4 16 В3 **A3 B3** 5 15 5 15 **B4** B4 6 14 6 14 Α5 **B5 A5 B5** 7 13 13 **A6 B6 A6 B6** 8 12 8 12 **B7 B7** Α7 9 11 9 11 **B8 B8 8**A **A8**

To Seven Other Transceivers

logic diagrams (positive logic)

SN74ALS638A, SN74AS638A OE 18

SN74ALS639A, SN74AS639



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

Supply voltage, V _{CC} 7 V
Input voltage, V _I : All inputs 7 V
A-bus I/O ports 7 V
B-bus I/O ports 5.5 V
Operating free-air temperature range, T _A : SN74ALS638A, SN74ALS639A
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.



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

SDAS123A - DECEMBER 1983 - REVISED JANUARY 1995

recommended operating conditions

				N74ALS6 N74ALS6		UNIT
			MI	NOM	MAX	
Vcc	Supply voltage		4.	5 5	5.5	V
VIH	High-level input voltage			2		V
V _{IL}	Low-level input voltage				0.8	V
Vон	High-level output voltage	A ports			5.5	V
IOH	High-level output current	B ports			-15	mA
lo.	Low lovel output current	A or B ports			24	mA
IOL	Low-level output current	A of B ports			48†	IIIA
TA	Operating free-air temperature)	70	°C

[†] Applies only to the SN74ALS638A-1 version and only if V_{CC} is between 4.75 V and 5.25 V

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

PARAMETER		AMETER TEST CONDITIONS			SN74ALS638A SN74ALS639A		
				MIN	TYP‡	MAX	
٧ıK		$V_{CC} = 4.5 V,$	$I_{I} = -18 \text{ mA}$			-1.5	V
loh	A ports	$V_{CC} = 4.5 V,$	V _{OH} = 5.5 V			0.1	mA
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V}, \qquad I_{OH} = -0.4 \text{ mA}$		V _{CC} -2	!		
Vон	B ports	V45V	$I_{OH} = -3 \text{ mA}$	2.4	3.2		V
		$V_{CC} = 4.5 V$	$I_{OH} = -15 \text{ mA}$	2			
			I _{OL} = 12 mA		0.25	0.4	
VOL	A or B ports	V _{CC} = 4.5 V	I _{OL} = 24 mA		0.35	0.5	V
			I _{OL} = 48 mA [†]		0.35		
	Control inputs	V 55V	V _I = 7 V			0.1	^
ll .	A or B ports	$V_{CC} = 5.5 V$	V _I = 5.5 V			0.1	mA
	Control inputs	V 55V				20	^
lН	A or B ports§	$V_{CC} = 5.5 V,$	V _I = 2.7 V			20	μΑ
	Control inputs	V 55V	V 0.4V			-0.1	0
ΙIL	A or B ports§	$V_{CC} = 5.5 V,$	V _I = 0.4 V			-0.1	mA
IOI	B ports	V _{CC} = 5.5 V,	V _O = 2.25 V	-30		-112	mA
			Outputs high		18	30	
	SN74ALS638A	$V_{CC} = 5.5 V$	Outputs low		26	41	
			Outputs disabled		16	30	
ICC			Outputs high		25	40	mA
	SN74ALS639A	$V_{CC} = 5.5 V$	Outputs low		30	50	
			Outputs disabled		33	54	

[†] Applies only to the SN74ALS638A-1 version and only if V_{CC} is between 4.75 V and 5.25 V



[‡] All typical values are at V_{CC} = 5 V, T_A = 25°C. § For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, IOS.

SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639 OCTAL BUS TRANSCEIVERS

SDAS123A - DECEMBER 1983 - REVISED JANUARY 1995

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	C _L = 50 R _L = 68 R1 = R	30 Ω (A	outputs), Ω (B outpi	uts),	UNIT
			SN74AL	S638A	SN74AL	S639A	
			MIN	MAX	MIN	MAX	
^t PLH	А		2	12	2	12	ns
^t PHL	A	В	2	12	2	12	115
t _{PLH}	В	Δ.	8	25	10	30	ns
^t PHL	В	A	8	30	5	22	115
^t PLH			5	25	10	30	ns
^t PHL	ŌĒ	А	10	45	10	35	110
^t PZH			5	20	6	21	
t _{PZL}	ŌĒ	В	5	22	8	25	ns
^t PHZ	ŌĒ	В	2	10	2	10	
t _{PLZ}	OE .	D	3	15	3	16	ns

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

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

Supply voltage, V _{CC}	
Input voltage, V _I : All inputs	7 V
A-bus I/O ports	
B-bus I/O ports	5.5 V
Operating free-air temperature range, T _A : SN74AS638A, SN74AS639	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.

recommended operating conditions

				74AS638 174AS63		UNIT
			MIN	NOM	MAX	
Vcc	Supply voltage		4.5	5	5.5	V
VIH	V _{IH} High-level input voltage					V
V _{IL}	Low-level input voltage				0.8	V
Vон	High-level output voltage	A ports			5.5	V
ІОН	High-level output current	B ports			-15	mA
l _{OL}	Low-level output current	A or B ports			64	mA
TA	Operating free-air temperature		0		70	°C

SDAS123A - DECEMBER 1983 - REVISED JANUARY 1995

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

PARAMETER		TEST CONDIT	TIONS		74AS638 174AS63	-	UNIT
				MIN	TYP [†]	MAX	
٧ıK		V _{CC} = 4.5 V,	I _I = -18 mA			-1.2	V
loh	A ports	$V_{CC} = 4.5 V,$	V _{OH} = 5.5 V			0.1	mA
		$V_{CC} = 4.5 \text{ V to } 5.5 \text{ V},$	$I_{OH} = -2 \text{ mA}$	VCC -2	<u>)</u>		
Vон	B ports	V45V	IOH = -3 mA	2.4	3.2		V
		V _{CC} = 4.5 V		2.4			
VOL	A or B ports	$V_{CC} = 4.5 V,$	I _{OL} = 64 mA		0.35	0.55	V
1.	Control inputs	V FFV	V _I = 7 V			0.1	A
'1	A or B ports	$V_{CC} = 5.5 \text{ V}$	V _I = 5.5 V			0.1	mA
1	Control inputs	V 55V	V: 0.7.V			20	A
ΊΗ	A or B ports‡	$V_{CC} = 5.5 \text{ V},$	V _I = 2.7 V			70	μΑ
1	Control inputs	V 55V	V: 0.4.V			-0.5	A
¹ı∟	A or B ports [‡]	$V_{CC} = 5.5 V$	V _I = 0.4 V			-0.75	mA
IO§		V _{CC} = 5.5 V,	V _O = 2.25 V	-50		-150	mA
			Outputs high		24	54	
	SN74AS638A	V _{CC} = 5.5 V	Outputs low		75	122	
			Outputs disabled		37	61	A
Icc			Outputs high		56	92	mA
	SN74AS639	V _{CC} = 5.5 V	Outputs low		95	154	
			Outputs disabled		62	100	

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	R1 = R2 T _A = MI	pF, 0 Ω (A α 2 = 500 Ω N to MA	outputs), 2 (B outp X¶	outs),	UNIT
			SN74A		SN74A		
			MIN	MAX	MIN	MAX	
^t PLH	Α	В	2	7	2	9.5	ns
^t PHL	7	В	2	6.5	2	9	113
tpLH	В	А	5	20	5	22	ns
t _{PHL}	Ь		2	7	2	9	115
tPLH	<u>OE</u>	Δ.	5	19	5	21.5	ns
^t PHL	ÜE	А	2	9	2	11.5	115
^t PZH	ŌĒ		2	8	2	10.5	20
tPZL	ÜE	В	2	10	2	10.5	ns
^t PHZ	ŌĒ	В	2	7	2	7	ne
t _{PLZ}	OE .	٥	2	10	2	10.5	ns

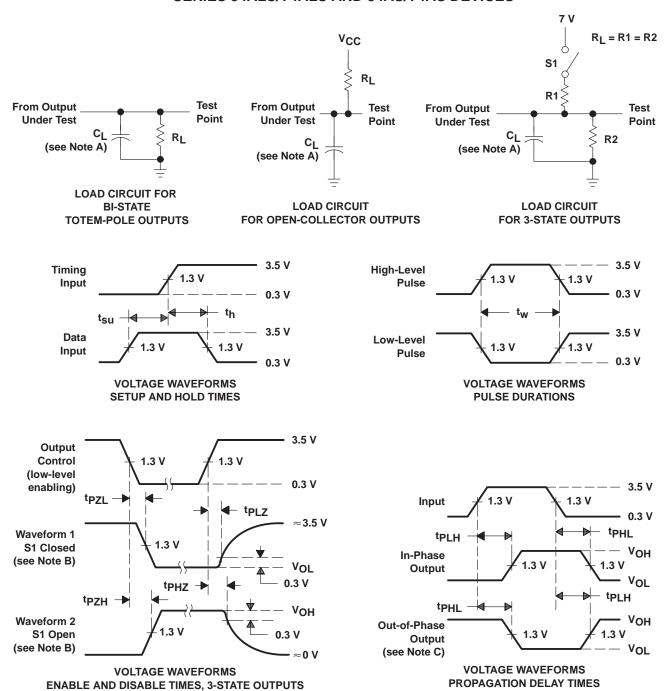
[¶] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



[†] All typical values are at V_{CC} = 5 V, T_A = 25°C. ‡ For I/O ports, the parameters I_{IH} and I_{IL} include the off-state output current.

[§] The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit output current, los.

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, $t_f = t_f = 2$ 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



www.ti.com 11-Nov-2025

PACKAGING INFORMATION

Orderable part number	Status	Material type	Package Pins	Package qty Carrier	RoHS	Lead finish/	MSL rating/	Op temp (°C)	Part marking
	(1)	(2)			(3)	Ball material	Peak reflow		(6)
						(4)	(5)		
SN74ALS638AN	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS638AN
SN74ALS638AN.A	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS638AN
SN74ALS639ADW	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS639A
SN74ALS639ADW.A	Active	Production	SOIC (DW) 20	25 TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS639A
SN74ALS639AN	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS639AN
SN74ALS639AN.A	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74ALS639AN

⁽¹⁾ Status: For more details on status, see our product life cycle.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

⁽²⁾ Material type: When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ RoHS values: Yes, No, RoHS Exempt. See the TI RoHS Statement for additional information and value definition.

⁽⁴⁾ Lead finish/Ball material: Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ MSL rating/Peak reflow: The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ Part marking: There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.



PACKAGE OPTION ADDENDUM

www.ti.com 11-Nov-2025

PACKAGE MATERIALS INFORMATION

www.ti.com 23-May-2025

TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74ALS638AN	N	PDIP	20	20	506	13.97	11230	4.32
SN74ALS638AN.A	N	PDIP	20	20	506	13.97	11230	4.32
SN74ALS639ADW	DW	SOIC	20	25	507	12.83	5080	6.6
SN74ALS639ADW.A	DW	SOIC	20	25	507	12.83	5080	6.6
SN74ALS639AN	N	PDIP	20	20	506	13.97	11230	4.32
SN74ALS639AN.A	N	PDIP	20	20	506	13.97	11230	4.32

N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



NOTES:

- A. All linear dimensions are in inches (millimeters).
- B. This drawing is subject to change without notice.
- Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
- The 20 pin end lead shoulder width is a vendor option, either half or full width.





SOIC



NOTES:

- 1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.

 2. This drawing is subject to change without notice.

 3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not
- exceed 0.15 mm per side.
- 4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.43 mm per side.
- 5. Reference JEDEC registration MS-013.



SOIC



NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOIC



NOTES: (continued)

- 8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
- 9. Board assembly site may have different recommendations for stencil design.



IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATASHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES "AS IS" AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you fully indemnify TI and its representatives against any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI's products are provided subject to TI's Terms of Sale, TI's General Quality Guidelines, or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI's provision of these resources does not expand or otherwise alter TI's applicable warranties or warranty disclaimers for TI products. Unless TI explicitly designates a product as custom or customer-specified, TI products are standard, catalog, general purpose devices.

TI objects to and rejects any additional or different terms you may propose.

Copyright © 2025, Texas Instruments Incorporated

Last updated 10/2025