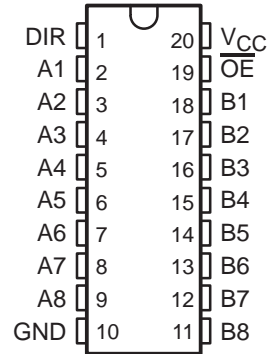


SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639 OCTAL BUS TRANSCEIVERS

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

DW OR N PACKAGE
(TOP VIEW)



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.

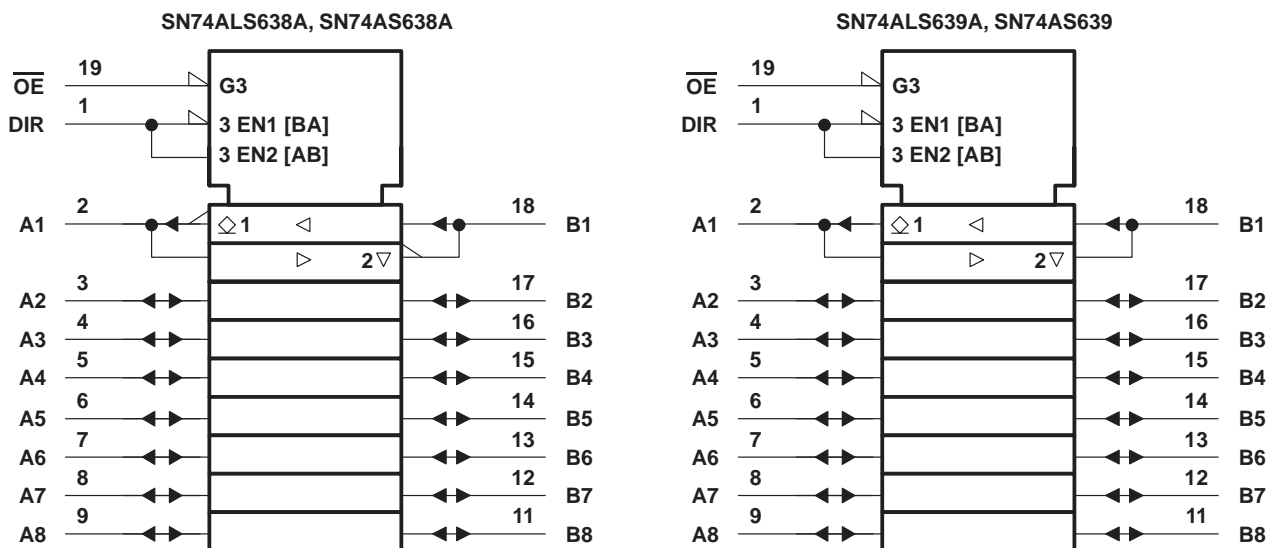
FUNCTION TABLE

INPUTS		OPERATION	
\overline{OE}	DIR	SN74ALS638A SN74AS638A	SN74ALS639A SN74AS639
L	L	\overline{B} data to A bus	B data to A bus
L	H	\overline{A} data to B bus	A data to B bus
H	X	Isolation	Isolation

SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639A OCTAL BUS TRANSCEIVERS

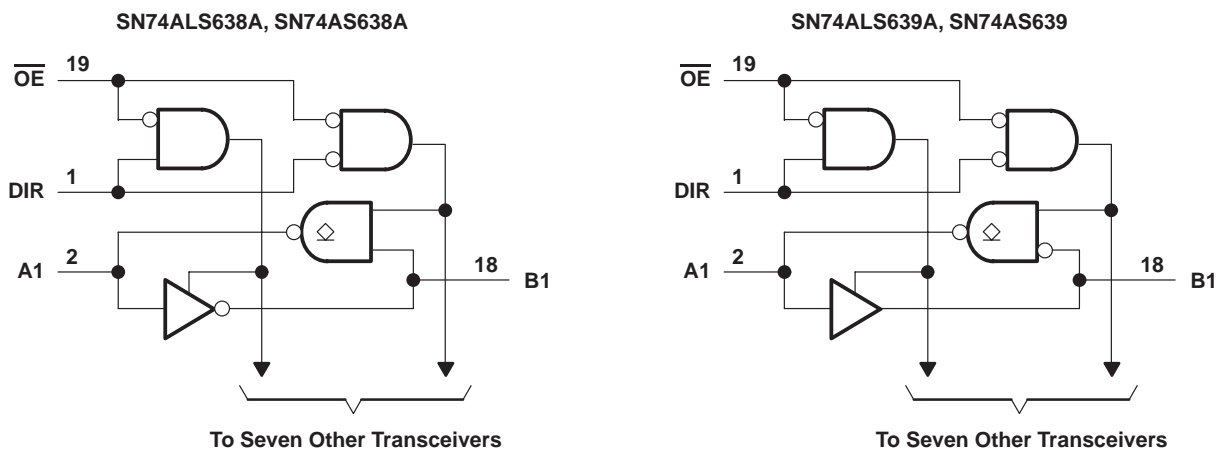
SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

logic symbols†



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

logic diagrams (positive logic)



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	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.

SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639A OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

recommended operating conditions

		SN74ALS638A SN74ALS639A			UNIT
		MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
V_{OH}	High-level output voltage			5.5	V
I_{OH}	High-level output current			-15	mA
I_{OL}	Low-level output current			24	mA
				48†	
T_A	Operating free-air temperature	0		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		TEST CONDITIONS		SN74ALS638A SN74ALS639A		UNIT	
				MIN	TYP‡		MAX
V_{IK}		$V_{CC} = 4.5\text{ V}$,	$I_I = -18\text{ mA}$			-1.5	V
I_{OH}	A ports	$V_{CC} = 4.5\text{ V}$,	$V_{OH} = 5.5\text{ V}$			0.1	mA
V_{OH}	B ports	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$,	$I_{OH} = -0.4\text{ mA}$	$V_{CC} - 2$			V
		$V_{CC} = 4.5\text{ V}$	$I_{OH} = -3\text{ mA}$	2.4	3.2		
			$I_{OH} = -15\text{ mA}$	2			
V_{OL}	A or B ports	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 12\text{ mA}$	0.25	0.4	V	
			$I_{OL} = 24\text{ mA}$	0.35	0.5		
			$I_{OL} = 48\text{ mA}^\dagger$	0.35	0.5		
I_I	Control inputs	$V_{CC} = 5.5\text{ V}$	$V_I = 7\text{ V}$			0.1	mA
	A or B ports		$V_I = 5.5\text{ V}$			0.1	
I_{IH}	Control inputs	$V_{CC} = 5.5\text{ V}$,	$V_I = 2.7\text{ V}$			20	μA
	A or B ports§					20	
I_{IL}	Control inputs	$V_{CC} = 5.5\text{ V}$,	$V_I = 0.4\text{ V}$			-0.1	mA
	A or B ports§					-0.1	
I_{O}^\parallel	B ports	$V_{CC} = 5.5\text{ V}$,	$V_O = 2.25\text{ V}$	-30		-112	mA
I_{CC}	SN74ALS638A	$V_{CC} = 5.5\text{ V}$	Outputs high	18	30	mA	
			Outputs low	26	41		
			Outputs disabled	16	30		
	SN74ALS639A		Outputs high	25	40		
			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 $V_{CC} = 5\text{ V}$, $T_A = 25^\circ\text{C}$.

§ 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, I_{OS} .



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639

OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 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 _L = 680 Ω (A outputs), R ₁ = R ₂ = 500 Ω (B outputs), T _A = MIN to MAX†				UNIT
			SN74ALS638A		SN74ALS639A		
			MIN	MAX	MIN	MAX	
t _{PLH}	A	B	2	12	2	12	ns
t _{PHL}			2	12	2	12	
t _{PLH}	B	A	8	25	10	30	ns
t _{PHL}			8	30	5	22	
t _{PLH}	\overline{OE}	A	5	25	10	30	ns
t _{PHL}			10	45	10	35	
t _{PZH}	\overline{OE}	B	5	20	6	21	ns
t _{PZL}			5	22	8	25	
t _{PHZ}	\overline{OE}	B	2	10	2	10	ns
t _{PLZ}			3	15	3	16	

† 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}	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 : 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

		SN74AS638A SN74AS639			UNIT
		MIN	NOM	MAX	
V _{CC}	Supply voltage	4.5	5	5.5	V
V _{IH}	High-level input voltage	2			V
V _{IL}	Low-level input voltage			0.8	V
V _{OH}	High-level output voltage			5.5	V
I _{OH}	High-level output current			–15	mA
I _{OL}	Low-level output current			64	mA
T _A	Operating free-air temperature	0		70	°C



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639A OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 1995

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

PARAMETER		TEST CONDITIONS		SN74AS638A SN74AS639		UNIT	
				MIN	TYP†		MAX
V _{IK}		V _{CC} = 4.5 V,	I _I = -18 mA	-1.2		V	
I _{OH}	A ports	V _{CC} = 4.5 V,	V _{OH} = 5.5 V	0.1		mA	
V _{OH}	B ports	V _{CC} = 4.5 V to 5.5 V, I _{OH} = -2 mA		V _{CC} - 2		V	
		V _{CC} = 4.5 V, I _{OH} = -3 mA		2.4	3.2		
		V _{CC} = 4.5 V, I _{OH} = -15 mA		2.4			
V _{OL}	A or B ports	V _{CC} = 4.5 V,	I _{OL} = 64 mA	0.35	0.55	V	
I _I	Control inputs	V _{CC} = 5.5 V, V _I = 7 V		0.1		mA	
	A or B ports	V _{CC} = 5.5 V, V _I = 5.5 V		0.1			
I _{IH}	Control inputs	V _{CC} = 5.5 V, V _I = 2.7 V		20		μA	
	A or B ports‡			70			
I _{IL}	Control inputs	V _{CC} = 5.5 V, V _I = 0.4 V		-0.5		mA	
	A or B ports‡			-0.75			
I _{OS} §		V _{CC} = 5.5 V,	V _O = 2.25 V	-50	-150	mA	
I _{CC}	SN74AS638A	V _{CC} = 5.5 V		Outputs high	24	54	mA
				Outputs low	75	122	
				Outputs disabled	37	61	
	SN74AS639	V _{CC} = 5.5 V		Outputs high	56	92	
				Outputs low	95	154	
				Outputs disabled	62	100	

† 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, I_{OS}.

switching characteristics (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V _{CC} = 4.5 V to 5.5 V, C _L = 50 pF, R _L = 500 Ω (A outputs), R _L = 500 Ω (B outputs), T _A = MIN to MAX††				UNIT
			SN74AS638A		SN74AS639		
			MIN	MAX	MIN	MAX	
t _{PLH}	A	B	2	7	2	9.5	ns
t _{PHL}			2	6.5	2	9	
t _{PLH}	B	A	5	20	5	22	ns
t _{PHL}			2	7	2	9	
t _{PLH}	OE	A	5	19	5	21.5	ns
t _{PHL}			2	9	2	11.5	
t _{PZH}	OE	B	2	8	2	10.5	ns
t _{PZL}			2	10	2	10.5	
t _{PHZ}	OE	B	2	7	2	7	ns
t _{PLZ}			2	10	2	10.5	

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



SN74ALS638A, SN74ALS639A, SN74AS638A, SN74AS639

OCTAL BUS TRANSCEIVERS

SDAS123A – DECEMBER 1983 – REVISED JANUARY 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



PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
SN74ALS638A-1N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS638A-1NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS638A-1NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS638A-1NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS638A-1NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS638AN	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS638ANE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS638ANSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS638ANSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS638ANSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639ADW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639ADWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639ADWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639AN	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS639ANE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Purchase Samples
SN74ALS639ANSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639ANSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74ALS639ANSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	Purchase Samples
SN74AS638AN	NRND	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Samples Not Available
SN74AS638ANE4	NRND	PDIP	N	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	Samples Not Available
SN74AS639DW	OBSOLETE	SOIC	DW	20		TBD	Call TI	Call TI	Samples Not Available

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/ Ball Finish	MSL Peak Temp ⁽³⁾	Samples (Requires Login)
SN74AS639DWR	OBSOLETE	SOIC	DW	20		TBD	Call TI	Call TI	Samples Not Available
SN74AS639N	OBSOLETE	PDIP	N	20		TBD	Call TI	Call TI	Samples Not Available

⁽¹⁾ The marketing status values are defined as follows:

ACTIVE: Product device recommended for new designs.

LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.

NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.

PREVIEW: Device has been announced but is not in production. Samples may or may not be available.

OBSOLETE: TI has discontinued the production of the device.

⁽²⁾ Eco Plan - The planned eco-friendly classification: Pb-Free (RoHS), Pb-Free (RoHS Exempt), or Green (RoHS & no Sb/Br) - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

TBD: The Pb-Free/Green conversion plan has not been defined.

Pb-Free (RoHS): TI's terms "Lead-Free" or "Pb-Free" mean semiconductor products that are compatible with the current RoHS requirements for all 6 substances, including the requirement that lead not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, TI Pb-Free products are suitable for use in specified lead-free processes.

Pb-Free (RoHS Exempt): This component has a RoHS exemption for either 1) lead-based flip-chip solder bumps used between the die and package, or 2) lead-based die adhesive used between the die and leadframe. The component is otherwise considered Pb-Free (RoHS compatible) as defined above.

Green (RoHS & no Sb/Br): TI defines "Green" to mean Pb-Free (RoHS compatible), and free of Bromine (Br) and Antimony (Sb) based flame retardants (Br or Sb do not exceed 0.1% by weight in homogeneous material)

⁽³⁾ MSL, Peak Temp. -- The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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.

TAPE AND REEL INFORMATION

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ALS638A-1NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1
SN74ALS638ANSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1
SN74ALS639ANSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ALS638A-1NSR	SO	NS	20	2000	346.0	346.0	41.0
SN74ALS638ANSR	SO	NS	20	2000	346.0	346.0	41.0
SN74ALS639ANSR	SO	NS	20	2000	346.0	346.0	41.0

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.
 - \triangle Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 - \triangle The 20 pin end lead shoulder width is a vendor option, either half or full width.

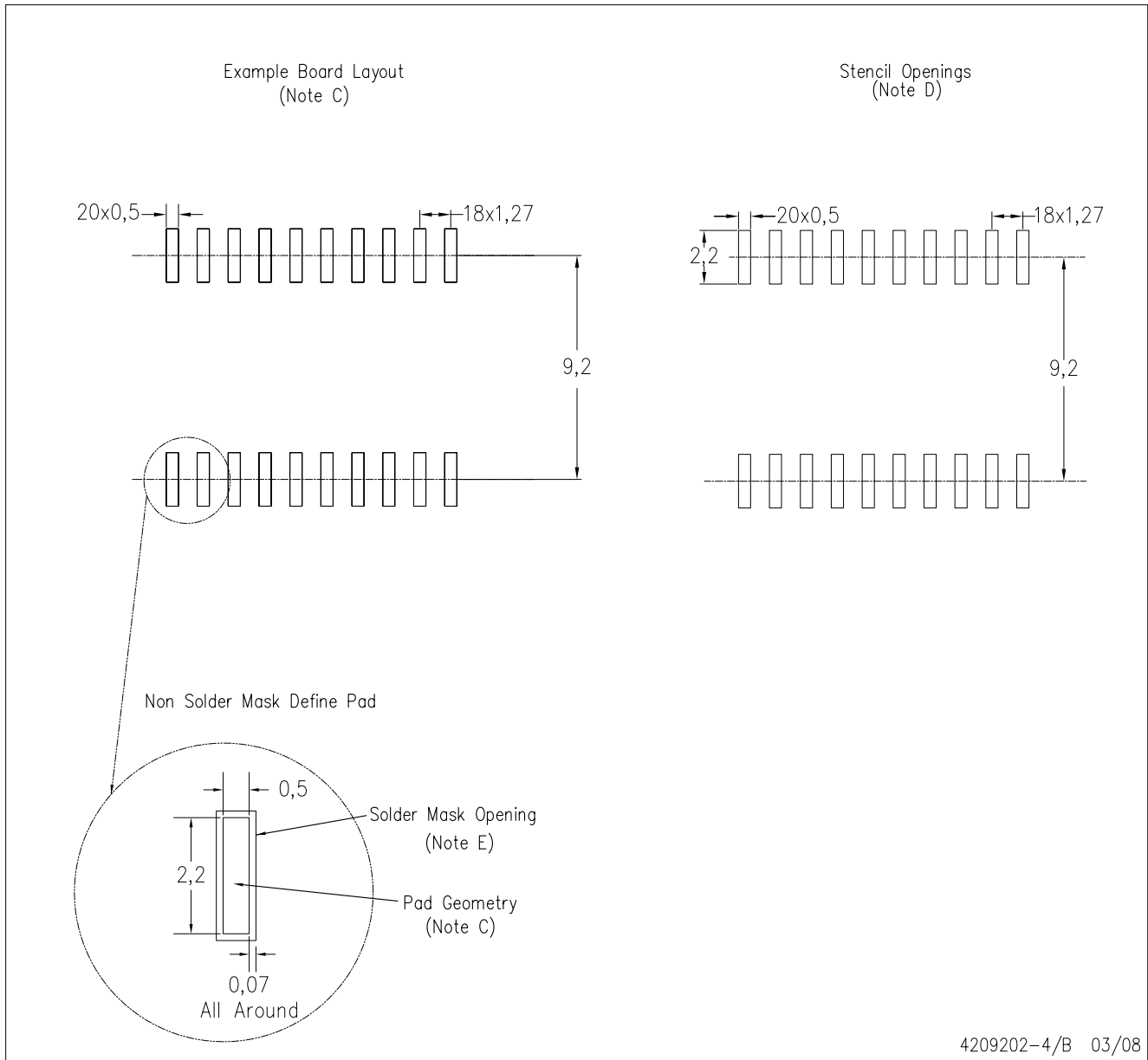
DW (R-PDSO-G20)

PLASTIC SMALL-OUTLINE PACKAGE



- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
 - D. Falls within JEDEC MS-013 variation AC.

DW (R-PDSO-G20)



4209202-4/B 03/08

- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
 - D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC-7525
 - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

MECHANICAL DATA

NS (R-PDSO-G)**

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



- NOTES:
- A. All linear dimensions are in millimeters.
 - B. This drawing is subject to change without notice.
 - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

IMPORTANT NOTICE

Texas Instruments Incorporated and its subsidiaries (TI) reserve the right to make corrections, modifications, enhancements, improvements, and other changes to its products and services at any time and to discontinue any product or service without notice. Customers should obtain the latest relevant information before placing orders and should verify that such information is current and complete. All products are sold subject to TI's terms and conditions of sale supplied at the time of order acknowledgment.

TI warrants performance of its hardware products to the specifications applicable at the time of sale in accordance with TI's standard warranty. Testing and other quality control techniques are used to the extent TI deems necessary to support this warranty. Except where mandated by government requirements, testing of all parameters of each product is not necessarily performed.

TI assumes no liability for applications assistance or customer product design. Customers are responsible for their products and applications using TI components. To minimize the risks associated with customer products and applications, customers should provide adequate design and operating safeguards.

TI does not warrant or represent that any license, either express or implied, is granted under any TI patent right, copyright, mask work right, or other TI intellectual property right relating to any combination, machine, or process in which TI products or services are used. Information published by TI regarding third-party products or services does not constitute a license from TI to use such products or services or a warranty or endorsement thereof. Use of such information may require a license from a third party under the patents or other intellectual property of the third party, or a license from TI under the patents or other intellectual property of TI.

Reproduction of TI information in TI data books or data sheets is permissible only if reproduction is without alteration and is accompanied by all associated warranties, conditions, limitations, and notices. Reproduction of this information with alteration is an unfair and deceptive business practice. TI is not responsible or liable for such altered documentation. Information of third parties may be subject to additional restrictions.

Resale of TI products or services with statements different from or beyond the parameters stated by TI for that product or service voids all express and any implied warranties for the associated TI product or service and is an unfair and deceptive business practice. TI is not responsible or liable for any such statements.

TI products are not authorized for use in safety-critical applications (such as life support) where a failure of the TI product would reasonably be expected to cause severe personal injury or death, unless officers of the parties have executed an agreement specifically governing such use. Buyers represent that they have all necessary expertise in the safety and regulatory ramifications of their applications, and acknowledge and agree that they are solely responsible for all legal, regulatory and safety-related requirements concerning their products and any use of TI products in such safety-critical applications, notwithstanding any applications-related information or support that may be provided by TI. Further, Buyers must fully indemnify TI and its representatives against any damages arising out of the use of TI products in such safety-critical applications.

TI products are neither designed nor intended for use in military/aerospace applications or environments unless the TI products are specifically designated by TI as military-grade or "enhanced plastic." Only products designated by TI as military-grade meet military specifications. Buyers acknowledge and agree that any such use of TI products which TI has not designated as military-grade is solely at the Buyer's risk, and that they are solely responsible for compliance with all legal and regulatory requirements in connection with such use.

TI products are neither designed nor intended for use in automotive applications or environments unless the specific TI products are designated by TI as compliant with ISO/TS 16949 requirements. Buyers acknowledge and agree that, if they use any non-designated products in automotive applications, TI will not be responsible for any failure to meet such requirements.

Following are URLs where you can obtain information on other Texas Instruments products and application solutions:

Products		Applications	
Amplifiers	amplifier.ti.com	Audio	www.ti.com/audio
Data Converters	dataconverter.ti.com	Automotive	www.ti.com/automotive
DLP® Products	www.dlp.com	Communications and Telecom	www.ti.com/communications
DSP	dsp.ti.com	Computers and Peripherals	www.ti.com/computers
Clocks and Timers	www.ti.com/clocks	Consumer Electronics	www.ti.com/consumer-apps
Interface	interface.ti.com	Energy	www.ti.com/energy
Logic	logic.ti.com	Industrial	www.ti.com/industrial
Power Mgmt	power.ti.com	Medical	www.ti.com/medical
Microcontrollers	microcontroller.ti.com	Security	www.ti.com/security
RFID	www.ti-rfid.com	Space, Avionics & Defense	www.ti.com/space-avionics-defense
RF/IF and ZigBee® Solutions	www.ti.com/lprf	Video and Imaging	www.ti.com/video
		Wireless	www.ti.com/wireless-apps

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265
Copyright © 2010, Texas Instruments Incorporated