

# SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDAS083C – APRIL 1982 – REVISED MARCH 2002

- Eight Latches in a Single Package
- 3-State Bus-Driving True Outputs
- Full Parallel Access for Loading
- Buffered Control Inputs
- pnp Inputs Reduce dc Loading on Data Lines

## description

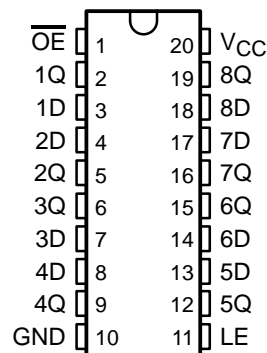
These octal transparent D-type latches feature 3-state outputs designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

While the latch-enable (LE) input is high, the Q outputs follow the data (D) inputs. When LE is taken low, the Q outputs are latched at the logic levels set up at the D inputs.

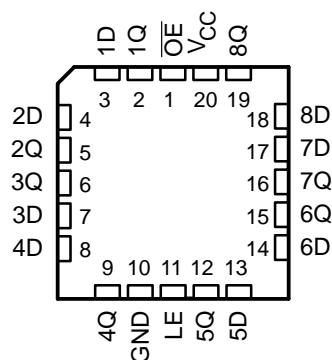
A buffered output-enable ( $\overline{OE}$ ) input can be used to place the eight outputs in either a normal logic state (high or low) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and the increased drive provide the capability to drive bus lines without interface or pullup components.

$\overline{OE}$  does not affect internal operations of the latches. Old data can be retained or new data can be entered while the outputs are off.

SN54ALS373A, . . . J OR W PACKAGE  
SN54AS373 . . . J PACKAGE  
SN74ALS373A, SN74AS373 . . . DW, N, OR NS PACKAGE  
(TOP VIEW)



SN54ALS373A, SN54AS373 . . . FK PACKAGE  
(TOP VIEW)



Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

PRODUCTION DATA information is 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.

 **TEXAS  
INSTRUMENTS**

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On products compliant to MIL-PRF-38535, all parameters are tested unless otherwise noted. On all other products, production processing does not necessarily include testing of all parameters.

**SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373**  
**OCTAL TRANSPARENT D-TYPE LATCHES**  
**WITH 3-STATE OUTPUTS**

SDAS083C – APRIL 1982 – REVISED MARCH 2002

**ORDERING INFORMATION**

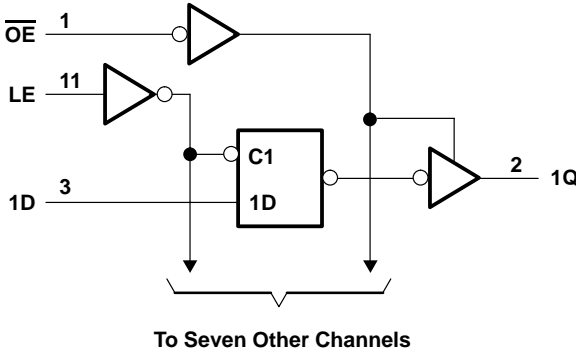
T <sub>A</sub>	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING	
0°C to 70°C	PDIP – N	Tube	SN74ALS373AN	SN74ALS373AN	
			SN74AS373N	SN74AS373N	
	SOIC – DW	Tube	SN74ALS373ADW	ALS373A	
			Tape and reel		SN74ALS373ADWR
			Tube	SN74AS373DW	AS373
				Tape and reel	
	SOP – NS	Tape and reel	SN74ALS373ANSR	ALS373A	
			SN74AS373NSR	74AS373	
–55°C to 125°C	CDIP – J	Tube	SNJ54ALS373AJ	SNJ54ALS373AJ	
			SNJ54AS373J	SNJ54AS373J	
	CFP – W	Tube	SNJ54ALS373AW	SNJ54ALS373AW	
	LCCC – FK	Tube	SNJ54ALS373AFK	SNJ54ALS373AFK	
			SNJ54AS373FK	SNJ54AS373FK	

† Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).

**FUNCTION TABLE**  
(each latch)

INPUTS			OUTPUT
$\overline{OE}$	LE	D	Q
L	H	H	H
L	H	L	L
L	L	X	Q <sub>0</sub>
H	X	X	Z

**logic diagram (positive logic)**



# SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

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**absolute maximum ratings over operating free-air temperature range (SN54ALS373A, SN74ALS373A) (unless otherwise noted)†**

Supply voltage, $V_{CC}$ .....	7 V
Input voltage, $V_I$ .....	7 V
Voltage applied to any output in the high state or power-off state .....	5.5 V
Package thermal impedance, $\theta_{JA}$ (see Note 1): DW package .....	58°C/W
N package .....	69°C/W
NS package .....	60°C/W
Storage temperature range, $T_{stg}$ .....	–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.

NOTE 1: The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions

		SN54ALS373A			SN74ALS373A			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
$T_A$	Operating free-air temperature	–55		125	0		70	°C

**timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)**

		SN54ALS373A		SN74ALS373A		UNIT
		MIN	MAX	MIN	MAX	
$f_{clock}$	Clock frequency					MHz
$t_w$	Pulse duration, LE high	12		10		ns
$t_{su}$	Setup time, data before LE↓	10		10		ns
$t_h$	Hold time, data after LE↓	7		7		ns



# SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373

## OCTAL TRANSPARENT D-TYPE LATCHES

### WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS		SN54ALS373A			SN74ALS373A			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$		-1.5			-1.5			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					
		$I_{OH} = -2.6\text{ mA}$				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
		$I_{OL} = 24\text{ mA}$				0.35	0.5		
$I_{OZH}$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 2.7\text{ V}$	20			20			$\mu\text{A}$
$I_{OZL}$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 0.4\text{ V}$	-20			-20			$\mu\text{A}$
$I_I$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 7\text{ V}$	0.1			0.1			mA
$I_{IH}$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$	20			20			$\mu\text{A}$
$I_{IL}$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 0.4\text{ V}$	-0.1			-0.1			mA
$I_{O\ddagger}$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 2.25\text{ V}$	-20	-112	-30	-112			mA
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high	9	16	9	16			mA
		Outputs low	16	25	16	25			
		Outputs disabled	17	27	17	27			

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

‡ 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 Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $C_L = 50\text{ pF}$ , $R_1 = 500\ \Omega$ , $R_2 = 500\ \Omega$ , $T_A = \text{MIN to MAX}\S$				UNIT
			SN54ALS373A		SN74ALS373A		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	D	Q	2	17	2	12	ns
$t_{PHL}$			1	19	4	16	
$t_{PLH}$	LE	Any Q	6	29	6	22	ns
$t_{PHL}$			1	27	7	23	
$t_{PZH}$	$\overline{OE}$	Any Q	6	22	1	18	ns
$t_{PZL}$			5	24	5	20	
$t_{PHZ}$	$\overline{OE}$	Any Q	2	16	1	10	ns
$t_{PLZ}$			2	24	2	12	

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



# SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

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## absolute maximum ratings over operating free-air temperature range (SN54AS373, SN74AS373) (unless otherwise noted)†

Supply voltage, $V_{CC}$ .....	7 V	
Input voltage, $V_I$ .....	7 V	
Voltage applied to any output in the high state or power-off state .....	5.5 V	
Package thermal impedance, $\theta_{JA}$ (see Note 1):	DW package .....	58°C/W
	N package .....	69°C/W
	NS package .....	60°C/W
Storage temperature range, $T_{stg}$ .....	–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.

NOTE 2: The package thermal impedance is calculated in accordance with JESD 51-7.

## recommended operating conditions

		SN54AS373			SN74AS373			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			0.8			0.8	V
$I_{OH}$	High-level output current			–12			–15	mA
$I_{OL}$	Low-level output current			32			48	mA
$T_A$	Operating free-air temperature	–55		125	0		70	°C

## timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

		SN54AS373		SN74AS373		UNIT
		MIN	MAX	MIN	MAX	
$f_{clock}$	Clock frequency					MHz
$t_w$	Pulse duration, LE high	5.5*		4.5*		ns
$t_{su}$	Setup time, data before LE↓	2*		2*		ns
$t_h$	Hold time, data after LE↓	3*		3*		ns

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



# SN54ALS373A, SN54AS373, SN74ALS373A, SN74AS373

## OCTAL TRANSPARENT D-TYPE LATCHES

### WITH 3-STATE OUTPUTS

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

PARAMETER	TEST CONDITIONS		SN54AS373			SN74AS373			UNIT
			MIN	TYP†	MAX	MIN	TYP†	MAX	
$V_{IK}$	$V_{CC} = 4.5\text{ V}$ , $I_I = -18\text{ mA}$		-1.2			-1.2			V
$V_{OH}$	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $I_{OH} = -2\text{ mA}$		$V_{CC}-2$			$V_{CC}-2$			V
	$V_{CC} = 4.5\text{ V}$	$I_{OH} = -12\text{ mA}$	2.4	3.2					
		$I_{OH} = -15\text{ mA}$					2.4	3.3	
$V_{OL}$	$V_{CC} = 4.5\text{ V}$	$I_{OL} = 32\text{ mA}$	0.27	0.5					
		$I_{OL} = 48\text{ mA}$					0.32	0.5	
$I_{OZH}$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 2.7\text{ V}$	50			50			$\mu\text{A}$
$I_{OZL}$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 0.4\text{ V}$	-50			-50			$\mu\text{A}$
$I_I$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 7\text{ V}$	0.1			0.1			mA
$I_{IH}$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 2.7\text{ V}$	20			20			$\mu\text{A}$
$I_{IL}$	$V_{CC} = 5.5\text{ V}$ ,	$V_I = 0.4\text{ V}$	-0.02	-0.5					
$I_{O}^\ddagger$	$V_{CC} = 5.5\text{ V}$ ,	$V_O = 2.25\text{ V}$	-30	-112					
$I_{CC}$	$V_{CC} = 5.5\text{ V}$	Outputs high	55	90	55	90			
		Outputs low	55	85	55	85			
		Outputs disabled	65	100	65	100			

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

‡ 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 Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 4.5\text{ V to }5.5\text{ V}$ , $C_L = 50\text{ pF}$ , $R_1 = 500\ \Omega$ , $R_2 = 500\ \Omega$ , $T_A = \text{MIN to MAX}^\S$				UNIT
			SN54AS373		SN74AS373		
			MIN	MAX	MIN	MAX	
$t_{PLH}$	D	Q	3	9	3.5	6	ns
$t_{PHL}$			3	8	3.5	6	
$t_{PLH}$	LE	Any Q	6.5	14.5	6.5	11.5	ns
$t_{PHL}$			5	9	5	7.5	
$t_{PZH}$	$\overline{OE}$	Any Q	2	7.5	2	6.5	ns
$t_{PZL}$			4.5	10.5	4.5	9.5	
$t_{PHZ}$	$\overline{OE}$	Any Q	3	10	3	6.5	ns
$t_{PLZ}$			3	8	3	7	

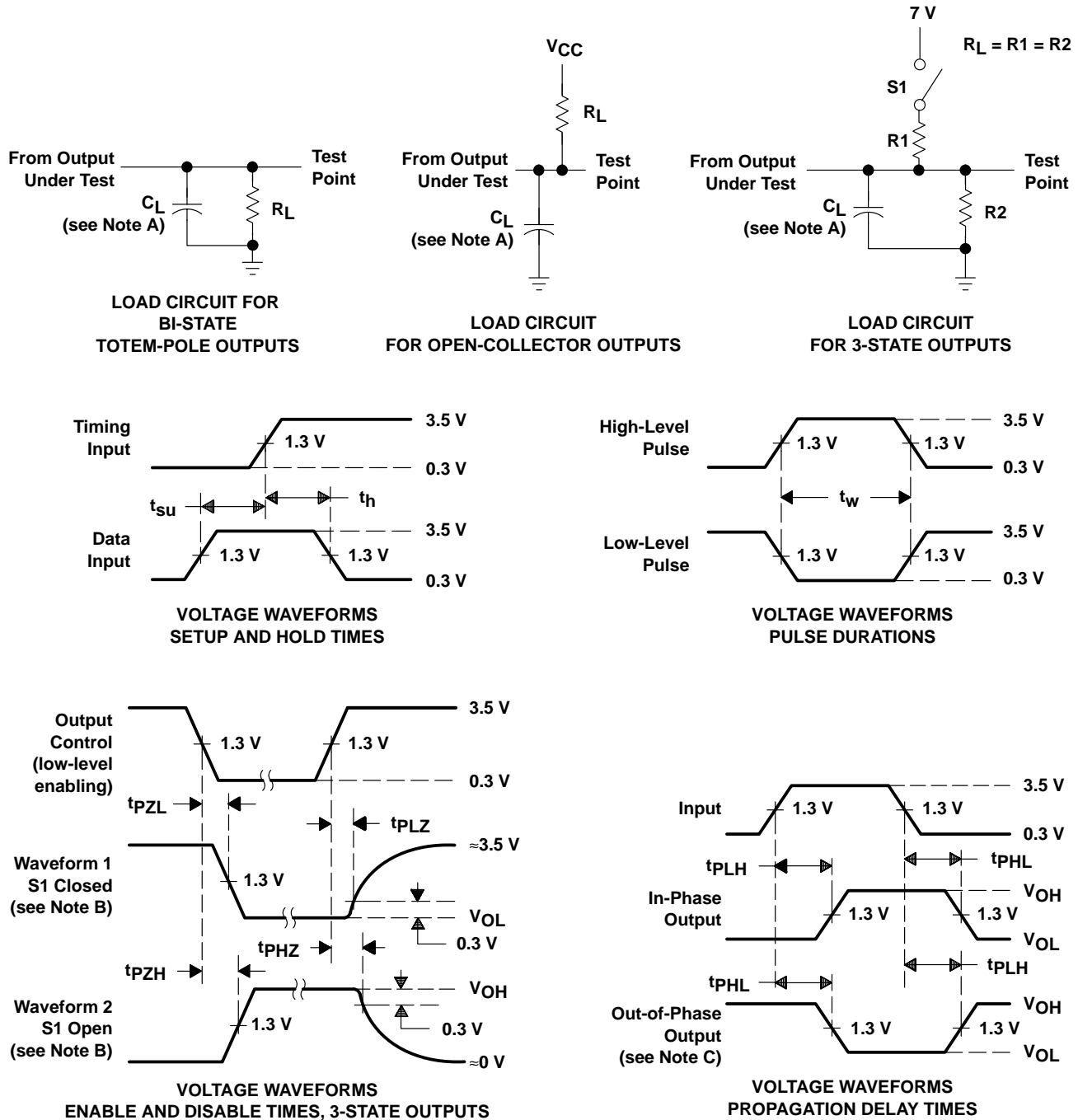
§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.



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 OCTAL TRANSPARENT D-TYPE LATCHES  
 WITH 3-STATE OUTPUTS

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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 finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
83020012A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	83020012A SNJ54ALS 373AFK	<a href="#">Samples</a>
8302001RA	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8302001RA SNJ54ALS373AJ	<a href="#">Samples</a>
JM38510/37203B2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 37203B2A	<a href="#">Samples</a>
JM38510/37203BRA	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 37203BRA	<a href="#">Samples</a>
M38510/37203B2A	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 37203B2A	<a href="#">Samples</a>
M38510/37203BRA	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 37203BRA	<a href="#">Samples</a>
SN54ALS373AJ	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54ALS373AJ	<a href="#">Samples</a>
SN74ALS373ADBR	ACTIVE	SSOP	DB	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	G373A	<a href="#">Samples</a>
SN74ALS373ADW	ACTIVE	SOIC	DW	20	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS373A	<a href="#">Samples</a>
SN74ALS373ADWR	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS373A	<a href="#">Samples</a>
SN74ALS373ADWRG4	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS373A	<a href="#">Samples</a>
SN74ALS373AN	ACTIVE	PDIP	N	20	20	RoHS & Non-Green	NIPDAU	N / A for Pkg Type	0 to 70	SN74ALS373AN	<a href="#">Samples</a>
SN74ALS373ANSR	ACTIVE	SO	NS	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	ALS373A	<a href="#">Samples</a>
SN74AS373DW	ACTIVE	SOIC	DW	20	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	AS373	<a href="#">Samples</a>
SN74AS373N	ACTIVE	PDIP	N	20	20	RoHS & Non-Green	NIPDAU	N / A for Pkg Type	0 to 70	SN74AS373N	<a href="#">Samples</a>
SN74AS373NSR	ACTIVE	SO	NS	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	74AS373	<a href="#">Samples</a>
SNJ54ALS373AFK	ACTIVE	LCCC	FK	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	83020012A SNJ54ALS 373AFK	<a href="#">Samples</a>



Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SNJ54ALS373AJ	ACTIVE	CDIP	J	20	1	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8302001RA SNJ54ALS373AJ	Samples

(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) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".

**RoHS Exempt:** TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.

**Green:** TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

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

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

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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.

**OTHER QUALIFIED VERSIONS OF SN54ALS373A, SN74ALS373A :**

- Catalog : [SN74ALS373A](#)
- Military : [SN54ALS373A](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

**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
SN74ALS373ADBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74ALS373ADWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74ALS373ANSR	SO	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1
SN74AS373NSR	SO	NS	20	2000	330.0	24.4	8.4	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)
SN74ALS373ADBR	SSOP	DB	20	2000	853.0	449.0	35.0
SN74ALS373ADWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74ALS373ANSR	SO	NS	20	2000	367.0	367.0	45.0
SN74AS373NSR	SO	NS	20	2000	367.0	367.0	45.0

FK (S-CQCC-N\*\*)

LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)



4040140/D 01/11

- NOTES:
- All linear dimensions are in inches (millimeters).
  - This drawing is subject to change without notice.
  - This package can be hermetically sealed with a metal lid.
  - Falls within JEDEC MS-004

# DB0020A



# PACKAGE OUTLINE

## SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



4214851/B 08/2019

### NOTES:

1. All linear dimensions are in millimeters. Any 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 0.25 mm per side.
5. Reference JEDEC registration MO-150.

# EXAMPLE BOARD LAYOUT

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4214851/B 08/2019

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.

# EXAMPLE STENCIL DESIGN

DB0020A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE: 10X

4214851/B 08/2019

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.



# 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.

J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	—	—	—	—
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)



4040083/F 03/03

- NOTES:
- A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package is hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
  - E. Falls within MIL STD 1835 GDIP1-T14, GDIP1-T16, GDIP1-T18 and GDIP1-T20.

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.

# DW0020A



# PACKAGE OUTLINE

## SOIC - 2.65 mm max height

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.

# EXAMPLE BOARD LAYOUT

DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

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.

# EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:6X

4220724/A 05/2016

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.

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