### SN54F373, SN74F373 **OCTAL TRANSPARENT D-TYPE LATCHES** WITH 3-STATE OUTPUTS SDFS076A - D2932, MARCH 1987 - REVISED OCTOBER 1993

- Eight Latches in a Single Package
- 3-State Bus-Driving True Outputs
- Full Parallel Access for Loading
- **Buffered Control Inputs**
- Package Options Include Plastic Small-Outline (SOIC) and Shrink Small-Outline (SSOP) Packages, Ceramic Chip Carriers, and Plastic and Ceramic DIPs

### description

These 8-bit 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.

The eight latches of the 'F373 are transparent D-type latches. While the latch-enable (LE) input is high, the Q outputs will follow the data (D) inputs. When the latch enable is taken low, the Q outputs are latched at the logic levels set up at the D inputs.

A buffered output-enable (OE) input can be used to place the eight outputs in either a normal logic state (high or low logic levels) 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 need for interface or pullup components.

The output-enable (OE) input does not affect the internal operations of the latches. Old data can be retained or new data can be entered while the outputs are in the high-impedance state.

The SN74F373 is available in TI's shrink small-outline package (DB), which provides the same I/O pin count and functionality of standard small-outline packages in less than half the printed-circuit-board area.

The SN54F373 is characterized for operation over the full military temperature range of -55°C to 125°C. The SN74F373 is characterized for operation from 0°C to 70°C.

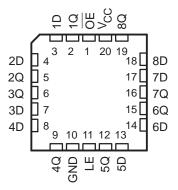
	FUNCTION TABLE (each latch)										
	INPUTS	OUTPUT									
OE	LE	Q									
L	Н	Н	Н								
L	Н	L	L								
L	L	Х	Q <sub>0</sub> Z								
н	Х	Х	Z								

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.



SN54F373 J PACKAGE
SN74F373 DB, DW, OR N PACKAGE
(TOP VIEW)

SN54F373 ... FK PACKAGE (TOP VIEW)

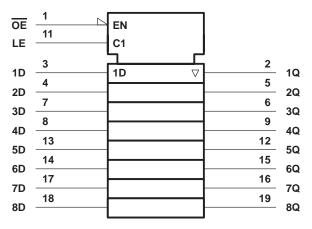


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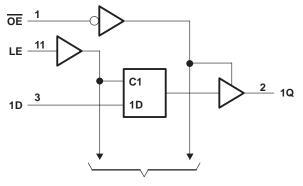
## SN54F373, SN74F373 OCTAL TRANSPARENT D-TYPE LATCHES WITH 3-STATE OUTPUTS

SDFS076A - D2932, MARCH 1987 - REVISED OCTOBER 1993

### logic symbol<sup>†</sup>



logic diagram (positive logic)



**To Seven Other Channels** 

<sup>†</sup> This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

### absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>‡</sup>

Supply voltage range, V <sub>CC</sub> Input voltage range, V <sub>I</sub> (see Note 1) Input current range	$\ldots$
Voltage range applied to any output in the disabled or power-off state	–0.5 V to 5.5 V
Voltage range applied to any output in the high state	$\dots \dots \dots -0.5$ V to V <sub>CC</sub>
Current into any output in the low state: SN54F373	40 mÅ
SN74F373	48 mA
Operating free-air temperature range: SN54F373	–55°C to 125°C
SN74F373	0°C to 70°C
Storage temperature range	–65°C to 150°C

<sup>‡</sup> 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 input voltage ratings may be exceeded provided the input current ratings are observed.

#### recommended operating conditions

		S	N54F37	3	S	3		
		MIN	NOM	MAX	MIN	NOM	MAX	UNIT
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
VIL	Low-level input voltage			0.8			0.8	V
IIK	Input clamp current			-18			-18	mA
ЮН	High-level output current			- 3			- 3	mA
IOL	Low-level output current			20			24	mA
TA	Operating free-air temperature	-55		125	0		70	°C



# SN54F373, SN74F373 **OCTAL TRANSPARENT D-TYPE LATCHES** WITH 3-STATE OUTPUTS

SDFS076A - D2932, MARCH 1987 - REVISED OCTOBER 1993

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

DADAMETED	TEC	TEST CONDITIONS				S	N74F373	3	UNIT	
PARAMETER	IES	ST CONDITIONS	MIN	TYP <sup>†</sup>	MAX	MIN	түр†	MAX	UNIT	
VIK	V <sub>CC</sub> = 4.5 V,	lj = -18 mA			-1.2			-1.2	V	
	V <sub>CC</sub> = 4.5 V	I <sub>OH</sub> = – 1 mA	2.5	3.4		2.5	3.4			
VOH	VCC = 4.3 V	I <sub>OH</sub> = – 3 mA	2.4	3.3		2.4	3.3		V	
	V <sub>CC</sub> = 4.75 V,	$I_{OH} = -1 \text{ mA to } -3 \text{ mA}$				2.7				
	V <sub>CC</sub> = 4.5 V	I <sub>OL</sub> = 20 mA		0.3	0.5				V	
V <sub>OL</sub>	VCC = 4.5 V	I <sub>OL</sub> = 24 mA					0.35	0.5	v	
IOZH	V <sub>CC</sub> = 5.5 V,	V <sub>O</sub> = 2.7 V			50			50	μΑ	
IOZL	V <sub>CC</sub> = 5.5 V,	$V_{O} = 0.5 V$			-50			-50	μA	
lj	V <sub>CC</sub> = 5.5 V,	$V_{I} = 7 V$			0.1			0.1	mA	
ΙΙΗ	V <sub>CC</sub> = 5.5 V,	V <sub>I</sub> = 2.7 V			20			20	μA	
١ <sub>١L</sub>	V <sub>CC</sub> = 5.5 V,	V <sub>I</sub> = 0.5 V			- 0.6			- 0.6	mA	
los‡	V <sub>CC</sub> = 5.5 V,	$V_{O} = 0$	-60		-150	-60		-150	mA	
ICCZ	V <sub>CC</sub> = 5.5 V,	See Note 2		38	55		38	55	mA	

<sup>†</sup> All typical values are at V<sub>CC</sub> = 5 V,  $T_A = 25^{\circ}C$ .

<sup>‡</sup>Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second. NOTE 2: I<sub>CCZ</sub> is measured with OE at 4.5 V and all other inputs grounded.

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

		V <sub>CC</sub> = T <sub>A</sub> = 2 ′F3		SN54F373		SN74	F373	UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>W</sub>	Pulse duration, LE high	6		6		6		ns
t <sub>su</sub>	Setup time, data before LE $\downarrow$	2		2		2		ns
th	Hold time, data after LE $\downarrow$	3		3		3		ns

### switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub> = 5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = 25°C			V <sub>CC</sub> = 4.5 V to 5.5 V, C <sub>L</sub> = 50 pF, R <sub>L</sub> = 500 Ω, T <sub>A</sub> = MIN to MAX§				UNIT
				′F373			F373	SN74F373		
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
<sup>t</sup> PLH	D	0	2.2	4.9	7	2.2	8.5	2.2	8	ns
<sup>t</sup> PHL	D	Q	1.2	3.3	5	1.2	7	1.2	6	115
<sup>t</sup> PLH	LE	0	4.2	8.6	11.5	4.2	15	4.2	13 ns	20
<sup>t</sup> PHL	LL	Q	2.2	4.8	7	2.2	8.5	2.2	8	115
<sup>t</sup> PZH	OE	0	1.2	4.6	11	1.2	13.5	1.2	12	ns
<sup>t</sup> PZL	UE	Q	1.2	5.2	7.5	1.2	10	1.2	8.5	115
<sup>t</sup> PHZ	ŌĒ	0	1.2	4.1	6.5	1.2	10	1.2	7.5	ns
<sup>t</sup> PLZ	ΟL	Q	1.2	3.4	6	1.2	7	1.2	6	115

§ For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions. NOTE 3: Load circuits and waveforms are shown in Section 1.





### PACKAGING INFORMATION

Orderable Device	Status	Package Type		Pins	Package Qty	Eco Plan	Lead/Ball Finish	MSL Peak Temp	Op Temp (°C)	Top-Side Markings	Samples
	(1)		Drawing			(2)		(3)		(4)	
5962-9758901Q2A	ACTIVE	LCCC	FK	20	1	TBD	Call TI	Call TI	-55 to 125	5962- 9758901Q2A SNJ54F 373FK	Samples
5962-9758901QRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	Call TI	-55 to 125	5962-9758901QR A SNJ54F373J	Samples
5962-9758901QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	Call TI	-55 to 125	5962-9758901QS A SNJ54F373W	Samples
JM38510/34601B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	JM38510/ 34601B2A	Samples
JM38510/34601BRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 34601BRA	Samples
JM38510/34601BSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	JM38510/ 34601BSA	Sample
M38510/34601B2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	JM38510/ 34601B2A	Sample
M38510/34601BRA	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	JM38510/ 34601BRA	Sample
M38510/34601BSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	JM38510/ 34601BSA	Sample
SN54F373J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	SN54F373J	Sample
SN74F373DBLE	OBSOLETE	SSOP	DB	20		TBD	Call TI	Call TI	0 to 70		
SN74F373DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Sample
SN74F373DBRE4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Sample
SN74F373DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Sample
SN74F373DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Sample
SN74F373DWG4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Sample



# PACKAGE OPTION ADDENDUM

24-Jan-2013

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish	MSL Peak Temp (3)	Op Temp (°C)	Top-Side Markings	Samples
SN74F373DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Samples
SN74F373DWRG4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	F373	Samples
SN74F373N	ACTIVE	PDIP	Ν	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74F373N	Samples
SN74F373N3	OBSOLETE	PDIP	Ν	20		TBD	Call TI	Call TI	0 to 70		
SN74F373NE4	ACTIVE	PDIP	Ν	20	20	Pb-Free (RoHS)	CU NIPDAU	N / A for Pkg Type	0 to 70	SN74F373N	Sample
SN74F373NSR	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	74F373	Sample
SN74F373NSRE4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	74F373	Sample
SN74F373NSRG4	ACTIVE	SO	NS	20	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	0 to 70	74F373	Sample
SNJ54F373FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962- 9758901Q2A SNJ54F 373FK	Sample
SNJ54F373J	ACTIVE	CDIP	J	20	1	TBD	A42	N / A for Pkg Type	-55 to 125	5962-9758901QR A SNJ54F373J	Sample
SNJ54F373W	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9758901QS A SNJ54F373W	Sample

<sup>(1)</sup> 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.



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24-Jan-2013

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)

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

<sup>(4)</sup> Only one of markings shown within the brackets will appear on the physical device.

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#### OTHER QUALIFIED VERSIONS OF SN54F373, SN74F373 :

• Catalog: SN74F373

• Military: SN54F373

NOTE: Qualified Version Definitions:

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

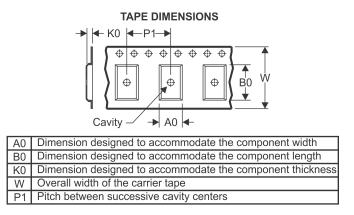
# PACKAGE MATERIALS INFORMATION

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### TAPE AND REEL INFORMATION





### QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nomin	al											
Device	Package Type	Package Drawing		SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74F373DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74F373DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.0	2.7	12.0	24.0	Q1
SN74F373NSR	SO	NS	20	2000	330.0	24.4	8.2	13.0	2.5	12.0	24.0	Q1

TEXAS INSTRUMENTS

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# PACKAGE MATERIALS INFORMATION

26-Jan-2013



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74F373DBR	SSOP	DB	20	2000	367.0	367.0	38.0
SN74F373DWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74F373NSR	SO	NS	20	2000	367.0	367.0	45.0

J (R-GDIP-T\*\*) 14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



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.

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- NOTES: A. All linear dimensions are in inches (millimeters).
  - B. This drawing is subject to change without notice.
  - C. This package can be hermetically sealed with a ceramic lid using glass frit.
  - D. Index point is provided on cap for terminal identification only.
  - E. Falls within Mil-Std 1835 GDFP2-F20



LEADLESS CERAMIC CHIP CARRIER

FK (S-CQCC-N\*\*) 28 TERMINAL SHOWN



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

- C. This package can be hermetically sealed with a metal lid.
- D. Falls within JEDEC MS-004



# 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).
- $\triangle$  The 20 pin end lead shoulder width is a vendor option, either half or full width.



DW (R-PDSO-G20)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.

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.



### MECHANICAL DATA

### PLASTIC SMALL-OUTLINE PACKAGE

#### 0,51 0,35 ⊕0,25⊛ 1,27 8 14 0,15 NOM 5,60 8,20 5,00 7,40 $\bigcirc$ Gage Plane ₽ 0,25 7 1 1,05 0,55 0°-10° Δ 0,15 0,05 Seating Plane — 2,00 MAX 0,10PINS \*\* 14 16 20 24 DIM 10,50 10,50 12,90 15,30 A MAX A MIN 9,90 9,90 12,30 14,70 4040062/C 03/03

NOTES: A. All linear dimensions are in millimeters.

NS (R-PDSO-G\*\*)

**14-PINS SHOWN** 

- B. This drawing is subject to change without notice.
- C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



# **MECHANICAL DATA**

MSSO002E - JANUARY 1995 - REVISED DECEMBER 2001

## DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 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.
- D. Falls within JEDEC MO-150



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DLP® Products	www.dlp.com	Consumer Electronics	www.ti.com/consumer-apps
DSP	dsp.ti.com	Energy and Lighting	www.ti.com/energy
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