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

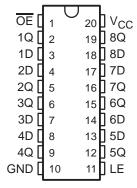
description

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.

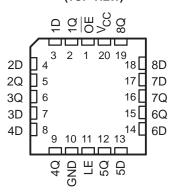
The eight latches of the 'F373 are transparent D-type latches. While the latch-enable (LE) input is high, the Q outputs will follow the data (D) inputs. When the latch enable is taken low, the Q outputs are latched at the logic levels set up at the D inputs.

A buffered output-enable (\overline{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.

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



SN54F373 . . . FK PACKAGE (TOP VIEW)



The output-enable (\overline{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 Tl'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)

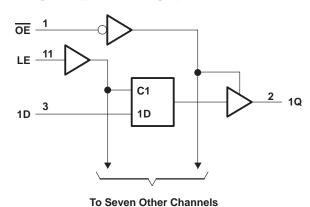
1				
		INPUTS	OUTPUT	
	OE	LE	Q	
	L	Н	Н	Н
	L	Н	L	L
	L	L	Χ	Q_0
	Н	Χ	Χ	Z



logic symbol†

OE ΕN LE C1 3 2 1D 1D 1Q 5 4 2D 2Q 7 6 3D **3Q** 8 9 4D **4Q** 13 12 5D 5Q 14 15 6D 6Q 17 16 7D 7Q 18 19 8D 8Q

logic diagram (positive logic)



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

Supply voltage range, V _{CC}	0.5 V to 7 V
Input voltage range, V _I (see Note 1)	1.2 V to 7 V
Input current range	-30 mA to 5 mA
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 -0.5 V to V _{CC}
Current into any output in the low state: SN54F373	40 mA
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

[‡] 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

		s	N54F373	3	S	N74F373	3	UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	UNII
VCC	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
VIH	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
liK	Input clamp current			-18			-18	mA
ІОН	High-level output current			-3			-3	mA
loL	Low-level output current			20			24	mA
TA	Operating free-air temperature	-55		125	0		70	°C



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

NOTE 1: The input voltage ratings may be exceeded provided the input current ratings are observed.

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

PARAMETER	TES	T CONDITIONS	s	N54F37	3	S	N74F37	3	UNIT
PARAMETER	IES	I CONDITIONS	MIN	TYP [†]	MAX	MIN	TYP [†]	MAX	UNIT
VIK	$V_{CC} = 4.5 \text{ V},$	$I_{I} = -18 \text{ mA}$			-1.2			-1.2	V
	V00 = 45 V	I _{OH} = - 1 mA	2.5	3.4		2.5	3.4		
VOH	V _{CC} = 4.5 V V _{CC} = 4.75 V,	$I_{OH} = -3 \text{ mA}$	2.4	3.3		2.4	3.3		V
		$I_{OH} = -1 \text{ mA to } -3 \text{ mA}$				2.7			
V _{OL}	V _{CC} = 4.5 V	$I_{OL} = 20 \text{ mA}$		0.3	0.5				V
VOL	VCC = 4.3 V	$I_{OL} = 24 \text{ mA}$					0.35	0.5	V
lozh	$V_{CC} = 5.5 \text{ V},$	$V_0 = 2.7 \text{ V}$			50			50	μΑ
lozL	$V_{CC} = 5.5 \text{ V},$	V _O = 0.5 V			-50			-50	μΑ
lį	V _{CC} = 5.5 V,	V _I = 7 V			0.1			0.1	mA
lіН	$V_{CC} = 5.5 \text{ V},$	V _I = 2.7 V			20			20	μΑ
Ι _Ι L	$V_{CC} = 5.5 \text{ V},$	V _I = 0.5 V			- 0.6			- 0.6	mA
los [‡]	$V_{CC} = 5.5 \text{ V},$	V _O = 0	-60		-150	-60		-150	mA
lccz	$V_{CC} = 5.5 \text{ V},$	See Note 2		38	55		38	55	mA

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

NOTE 2: I_{CCZ} is measured with $\overline{\text{OE}}$ 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 _{CC} = T _A = 7		SN54	SN54F373		F373	UNIT
		MIN	MAX	MIN	MAX	MIN	MAX	
t _W	Pulse duration, LE high	6		6		6		ns
t _{su}	Setup time, data before LE↓	2		2		2		ns
th	Hold time, data after LE↓	3		3		3		ns

switching characteristics (see Note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	C _I R _I	CC = 5 V L = 50 pl L = 500 s A = 25°C	F, Ω,	C _L R _L	= 50 pF = 500 Ω		V,	UNIT
	, ,	l '		′F373		SN54	F373	SN74	F373	
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t _{PLH}	D LE	Q	2.2	4.9	7	2.2	8.5	2.2	8	ns
^t PHL			1.2	3.3	5	1.2	7	1.2	6	115
^t PLH		0	4.2	8.6	11.5	4.2	15	4.2	13	ns
^t PHL	LL	Q	2.2	4.8	7	2.2	8.5	2.2	8	115
^t PZH	ŌĒ	0	1.2	4.6	11	1.2	13.5	1.2	12	ns
tPZL	UE UE	Q	1.2	5.2	7.5	1.2	10	1.2	8.5	115
^t PHZ	ŌĒ	Q	1.2	4.1	6.5	1.2	10	1.2	7.5	ns
^t PLZ		~	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.



[‡] Not more than one output should be shorted at a time, and the duration of the short circuit should not exceed one second.

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PACKAGING INFORMATION

Orderable part number	Status	Material type	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
5962-9758901Q2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9758901Q2A SNJ54F 373FK
5962-9758901QRA	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QR A SNJ54F373J
5962-9758901QSA	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QS A SNJ54F373W
JM38510/34601B2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601B2A
JM38510/34601B2A.A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601B2A
JM38510/34601BRA	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BRA
JM38510/34601BRA.A	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BRA
JM38510/34601BSA	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BSA
JM38510/34601BSA.A	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BSA
M38510/34601B2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601B2A
M38510/34601BRA	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BRA
M38510/34601BSA	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 34601BSA
SN54F373J	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54F373J
SN54F373J.A	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54F373J
SN74F373DBR	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F373
SN74F373DBR.A	Active	Production	SSOP (DB) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F373
SN74F373DW	Obsolete	Production	SOIC (DW) 20	-	-	Call TI	Call TI	0 to 70	F373





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Orderable part number	Status (1)	Material type	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material	MSL rating/ Peak reflow	Op temp (°C)	Part marking (6)
SN74F373DWR	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F373
SN74F373DWR.A	Active	Production	SOIC (DW) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	F373
SN74F373N	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F373N
SN74F373N.A	Active	Production	PDIP (N) 20	20 TUBE	Yes	NIPDAU	N/A for Pkg Type	0 to 70	SN74F373N
SN74F373NSR	Active	Production	SOP (NS) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	74F373
SN74F373NSR.A	Active	Production	SOP (NS) 20	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	0 to 70	74F373
SNJ54F373FK	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9758901Q2A SNJ54F 373FK
SNJ54F373FK.A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962- 9758901Q2A SNJ54F 373FK
SNJ54F373J	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QR A SNJ54F373J
SNJ54F373J.A	Active	Production	CDIP (J) 20	20 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QR A SNJ54F373J
SNJ54F373W	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QS A SNJ54F373W
SNJ54F373W.A	Active	Production	CFP (W) 20	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9758901QS A SNJ54F373W

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

⁽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.

PACKAGE OPTION ADDENDUM

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(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.

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.

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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





A0	Dimension designed to accommodate the component width
В0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

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	13.3	2.7	12.0	24.0	Q1
SN74F373NSR	SOP	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1

PACKAGE MATERIALS INFORMATION

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*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74F373DBR	SSOP	DB	20	2000	353.0	353.0	32.0
SN74F373DWR	SOIC	DW	20	2000	356.0	356.0	45.0
SN74F373NSR	SOP	NS	20	2000	356.0	356.0	45.0

PACKAGE MATERIALS INFORMATION

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TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-9758901Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9758901QSA	W	CFP	20	25	506.98	26.16	6220	NA
JM38510/34601B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/34601B2A.A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/34601BSA	W	CFP	20	25	506.98	26.16	6220	NA
JM38510/34601BSA.A	W	CFP	20	25	506.98	26.16	6220	NA
M38510/34601B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
M38510/34601BSA	W	CFP	20	25	506.98	26.16	6220	NA
SN74F373N	N	PDIP	20	20	506	13.97	11230	4.32
SN74F373N.A	N	PDIP	20	20	506	13.97	11230	4.32
SNJ54F373FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54F373FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54F373W	W	CFP	20	25	506.98	26.16	6220	NA
SNJ54F373W.A	W	CFP	20	25	506.98	26.16	6220	NA

W (R-GDFP-F20)

CERAMIC DUAL FLATPACK



- A. All linear dimensions are in inches (millimeters).
- 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





SMALL OUTLINE PACKAGE



- 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.



SMALL OUTLINE PACKAGE



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.



SMALL OUTLINE PACKAGE



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**)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



- 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.



14 LEADS SHOWN



- 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.

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary. Refer to the product data sheet for package details.



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N (R-PDIP-T**)

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



- 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



- 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.



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Last updated 10/2025