SDLS121 - DECEMBER 1983 - REVISED MARCH 1988

- Package Options Include Plastic and Ceramic DIPs and Ceramic Flat Packages
- Dependable Texas Instruments Quality and Reliability

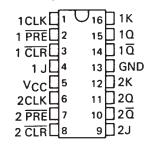
description

The '76 contains two independent J-K flip-flops with individual J-K, clock, preset, and clear inputs. The '76 is a positive-edge-triggered flip-flop. J-K input is loaded into the master while the clock is high and transferred to the slave on the high-to-low transition. For these devices the J and K inputs must be stable while the clock is high.

The 'LS76A contain two independent negativeedge-triggered flip-flops. The J and K inputs must be stable one setup time prior to the highto-low clock transition for predicatble operation. The preset and clear are asynchronous active low inputs. When low they override the clock and data inputs forcing the outputs to the steady state levels as shown in the function table.

The SN5476 and the SN54LS76A are characterized for operation over the full military temperature range of $-55\,^{\circ}\text{C}$ to $125\,^{\circ}\text{C}$. The SN7476 and the SN74LS76A are characterized for operation from $0\,^{\circ}\text{C}$ to $70\,^{\circ}\text{C}$.

SN5476, SN54LS76A . . . J PACKAGE SN7476 . . . N PACKAGE SN74LS76A . . . D OR N PACKAGE (TOP VIEW)



'76
FUNCTION TABLE

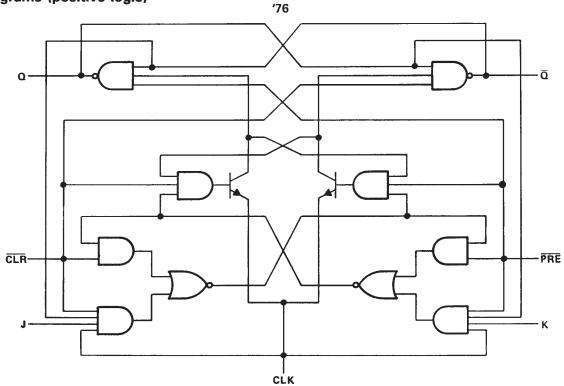
	IN	PUTS			OUT	PUTS
PRE	CLR	CLK	J	K	Q	ā
L	Н	×	Х	Х	Н	L
н	L	×	X	X	L L	н
L	L	×	X	Х	нt	нt
н	Н	Γ	L	L	α ₀	$\overline{\alpha}_0$
н	Н	工	Н	L	н	L
н	Н	T	L	Н	L	н
н	н	小	Н	Н	TOG	GLE

'LS76A FUNCTION TABLE

	IN	PUTS			OUT	
PRE	CLR	CLK	J	K	Q	ā
L	Н	Х	X	Х	Н	L
Н	L	×	X	X	L	н
L	L	×	X	X	Н [†]	нt
Н	н	1	L	L	α_0	$\overline{\alpha}_0$
Н	Н	1	Н	L	н	L
Н	н	1	L	Н	L	н
н	Н	1	Н	Н	TOG	GLE
Н	Н	Н	Х	X	α ₀	$\overline{\alpha}_0$

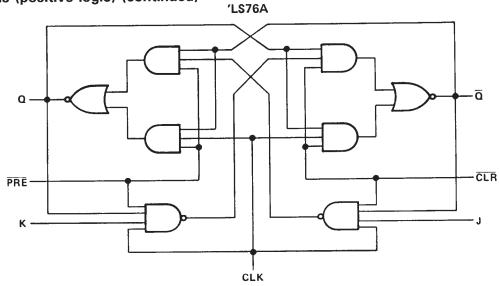
[†] This configuration is nonstable; that is, it will not persist when either preset or clear returns to its inactive (high) level.

logic diagrams (positive logic)

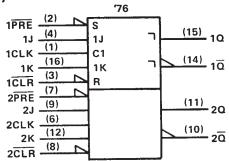


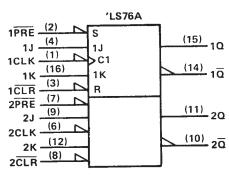


logic diagrams (positive logic) (continued)



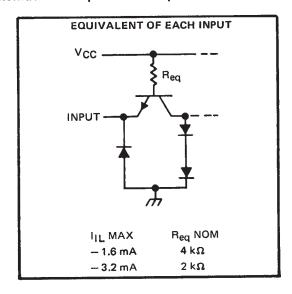
logic symbols†

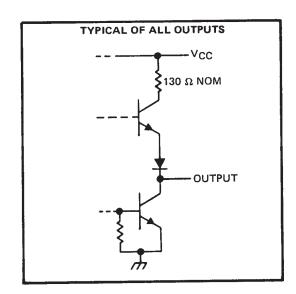




[†]These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

schematics of inputs and outputs



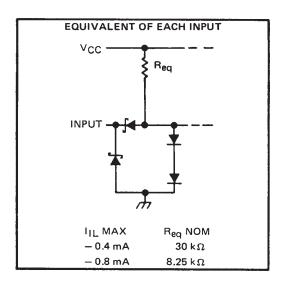


76

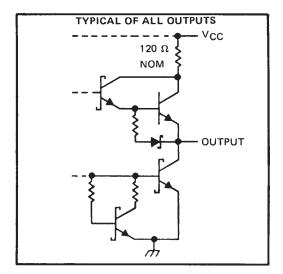
DUAL J-K FLIP-FLOPS WITH PRESET AND CLEAR

SDLS121 - DECEMBER 1983 - REVISED MARCH 1988

schematics of inputs and outputs (continued)







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

Supply voltage, VCC (see Note 1)	
Input voltage: '76	5 V
'LS76A	7 V
Operating free-air temperature range: SN54'	5°C
SN74' 0°C to 70	o°C
Storage temperature range65°C to 150	o°C

NOTE 1: Voltage values are with respect to network ground terminal.



recommended operating conditions

				SN5476	3		SN7476	3	
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage		4.5	5	5.5	4.75	5	5.25	٧
VIH	High-level input voltage		2			2			V
VIL	Low-level input voltage				0.8			8.0	V
Іон	High-level output current				0.4			- 0.4	mA
loL	Low-level output current				16			16	mA
		CLK high	20			20			
tw	Pulse duration	CLK low	47			47			ns
		PRE or CLR low	25			25			
t _{su}	Input setup time before CLK †		0			0			ns
th	Input hold time-data after CLK↓		0			0			ns
TA	Operating free-air temperature		- 55		125	0		70	°C

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

			aua†		SN5476			SN7476		UNIT
PARAMETER		TEST CONDITIO	י פאוט	MIN	TYP‡	MAX	MIN	TYP‡	MAX	CIVIT
VIK	V _{CC} = MIN,	I _I = - 12 mA				- 1.5			– 1.5	٧
V _{OH}	V _{CC} = MIN, I _{OH} = - 0.4 mA	V _{IH} = 2 V,	V _{1L} = 0.8 V,	2.4	3.4		2.4	3.4		٧
VoL	V _{CC} = MiN, I _{OL} = 16 mA	V _{IH} = 2 V,	V ₁ L = 0.8 V,		0.2	0.4		0.2	0.4	٧
1 ₁	V _{CC} = MAX,	V _I = 5.5 V				1			1	mA
J or K	1/ - 144 /	V = 2.4.V				40			40	μА
IIH All other	V _{CC} = MAX,	V _I = 2.4 V				80			80	#^
J or K						- 1.6			- 1.6	mA
All other¶	V _{CC} = MAX,	V ₁ = 0.4 V				- 3.2			- 3.2	IIIA
los§	V _{CC} = MAX			- 20		- 57	- 18		- 57	mA
I _{CC} #	V _{CC} = MAX,	See Note 2			10	20		10	20	mA

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

NOTE 2: With all outputs open, ICC is measured with the Q and $\overline{\mathbf{Q}}$ outputs high in turn. At the time of measurement, the clock input is grounded.

switching characteristics, VCC = 5 V, TA = 25°C (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	TYP	MAX	UNIT
fmax				15	20		MHz
^t PLH	PRE or CLR	Q or Q			16	25	ns
^t PHL	PREGICEN	a or a	$R_L = 400 \Omega$, $C_L = 15 pF$		25	40	ns
tPLH	CLK	Q or Q			16	25	ns
tPHL	CLK	Q or Q			25	40	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



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

[§] Not more than one output should be shorted at a time.

[¶]Clear is tested with preset high and preset is tested with clear high.

[#]Average per flip-flop.

recommended operating conditions

			S	N54LS7	6A	SI	N74LS7	6A	UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	UNIT
Vcc	Supply voltage		4.5	5	5.5	4.75	5	5.75	V
VIH	High-level input voltage		2			2			V
VIL	Low-level input voltage				0.7			0.8	
ЮН	High-level output current				- 0.4			- 0.4	mA
loL	Low-level output current				4			8	mA
fclock	Clock frequency		0		30	0		30_	MHz
	Dulas divisation	CLK high	20			20			ns
t _w	Pulse duration	PRE or CLR low	25			25			113
		data high or low	20			20			
t _{su}	Setup time before CLK↓	CLR inactive	20			20			ns
		PRE inactive	25			25			
th	Hold time-data after CLK↓		0			0			ns
TA	Operating free-air temperature		- 55		125	0		70	°C

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

				+	S	N54LS7	6A	S	N74LS7	6A	UNIT
	PARAMETER		TEST CONDITIO	onsi	MIN	TYP‡	MAX	MIN	TYP‡	MAX	UNIT
VIK		V _{CC} = MIN,	I ₁ = - 18 mA				– 1.5			- 1.5	V
Vон		V _{CC} = MIN, I _{OH} = - 0.4 mA	V _{IH} = 2 V,	VIL = MAX,	2.5	3.4		2.7	3.4		٧
		V _{CC} = MIN, I _{OL} = 4 mA	VIL = MAX,	V _{IH} = 2 V,		0.25	0.4		0.25	0.4	V
VOL		V _{CC} = MIN, I _{OL} = 8 mA	VIL = MAX,	V _{IH} = 2 V,					0.35	0.5	V
	J or K						0.1			0.1	
I _E	CLR or PRE	V _{CC} = MAX,	V ₁ = 7 V				0.3			0.3	mA
	CLK						0.4			0.4	
	J or K						20			20	
ΉН	CLR or PRE	V _{CC} = MAX,	V ₁ = 2.7 V				60			60	μΑ
• • • •	CLK						80			80	
	J or K						- 0.4			- 0.4	mA
HL	All other	V _{CC} = MAX,	V ₁ = 0.4 V				- 0.8			- 0.8	IIIA
los§	1	V _{CC} = MAX,	See Note 4		- 20		- 100	- 20		– 100	mA
	Total)	V _{CC} = MAX,	See Note 2			4	6		4	6	mA

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

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$ (see note 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	MIN	ТҮР	MAX	UNIT
fmax				30	45		MHz
tPLH	555 515 611	0 -	$R_{\perp} = 2 k\Omega$, $C_{\perp} = 15 pF$		15	20	ns
tPHL	PRE, CLR or CLK	Q or Q			15	20	ns

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.



[‡] All typical values are at V_{CC} = 5 V, T_A = 25°C.

[§]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: With all outputs open, I_{CC} is measured with the Q and \overline{Q} outputs high in turn. At the time of measurement, the clock input is

NOTE 4: For certain devices where state commutation can be caused by shorting an output to ground, an equivalent test may be performed with $V_0 = 2.25$ V and 2.125 V for the 54 family and the 74 family, respectively, with the minimum and maximum limits reduced to one half of their stated values.

www.ti.com

20-Nov-2025

PACKAGING INFORMATION

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)
5962-9557501QEA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QE A SNJ5476J
5962-9557501QFA	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
5962-9557501QFA	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
7601301EA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ
7601301EA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ
JM38510/00204BEA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
JM38510/00204BEA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
JM38510/00204BEA.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
JM38510/00204BEA.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
M38510/00204BEA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
M38510/00204BEA	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 00204BEA
SN5476J	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN5476J
SN5476J	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN5476J
SN5476J.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN5476J
SN5476J.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN5476J
SN54LS76AJ	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54LS76AJ
SN54LS76AJ	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54LS76AJ
SN54LS76AJ.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54LS76AJ
SN54LS76AJ.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54LS76AJ





www.ti.com 20-Nov-2025

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)
SNJ5476J	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QE A SNJ5476J
SNJ5476J	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QE A SNJ5476J
SNJ5476J.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QE A SNJ5476J
SNJ5476J.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QE A SNJ5476J
SNJ5476W	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
SNJ5476W	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
SNJ5476W.A	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
SNJ5476W.A	Active	Production	CFP (W) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9557501QF A SNJ5476W
SNJ54LS76AJ	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ
SNJ54LS76AJ	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ
SNJ54LS76AJ.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ
SNJ54LS76AJ.A	Active	Production	CDIP (J) 16	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	7601301EA SNJ54LS76AJ

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



PACKAGE OPTION ADDENDUM

www.ti.com 20-Nov-2025

- (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.

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.

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)
5962-9557501QFA	W	CFP	16	25	506.98	26.16	6220	NA
SNJ5476W	W	CFP	16	25	506.98	26.16	6220	NA
SNJ5476W.A	W	CFP	16	25	506.98	26.16	6220	NA

W (R-GDFP-F16)

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-F16



14 LEADS SHOWN



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.

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