



**THE DATASHEET OF  
SBC9-220-312**



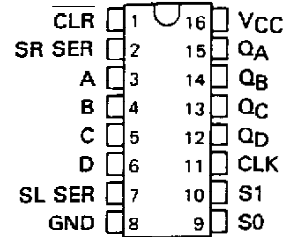
**SN54194, SN54LS194A, SN54S194,  
SN74194, SN74LS194A, SN74S194**  
**4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS**

MARCH 1974—REVISED MARCH 1988

- Parallel Inputs and Outputs
- Four Operating Modes:  
Synchronous Parallel Load  
Right Shift  
Left Shift  
Do Nothing
- Positive Edge-Triggered Clocking
- Direct Overriding Clear

SN54194, SN54LS194A, SN54S194 . . . J OR W PACKAGE  
SN74194 . . . N PACKAGE  
SN74LS194A, SN74S194 . . . D OR N PACKAGE

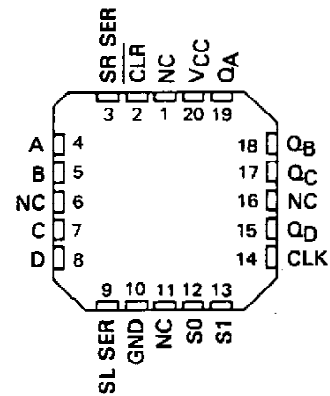
(TOP VIEW)



TYPE	TYPICAL MAXIMUM CLOCK FREQUENCY	TYPICAL POWER DISSIPATION
'194	36 MHz	195 mW
'LS194A	36 MHz	75 mW
'S194	105 MHz	425 mW

SN54LS194A, SN54S194 . . . FK PACKAGE

(TOP VIEW)



NC - No internal connection

**description**

These bidirectional shift registers are designed to incorporate virtually all of the features a system designer may want in a shift register. The circuit contains 46 equivalent gates and features parallel inputs, parallel outputs, right-shift and left-shift serial inputs, operating-mode-control inputs, and a direct overriding clear line. The register has four distinct modes of operation, namely:

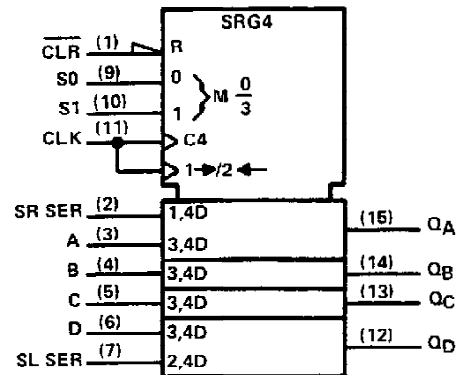
- Inhibit clock (do nothing)
- Shift right (in the direction Q<sub>A</sub> toward Q<sub>D</sub>)
- Shift left (in the direction Q<sub>D</sub> toward Q<sub>A</sub>)
- Parallel (broadside) load

Synchronous parallel loading is accomplished by applying the four bits of data and taking both mode control inputs, S0 and S1, high. The data are loaded into the associated flip-flops and appear at the outputs after the positive transition of the clock input. During loading, serial data flow is inhibited.

Shift right is accomplished synchronously with the rising edge of the clock pulse when S0 is high and S1 is low. Serial data for this mode is entered at the shift-right data input. When S0 is low and S1 is high, data shifts left synchronously and new data is entered at the shift-left serial input.

Clocking of the shift register is inhibited when both mode control inputs are low. The mode controls of the SN54194/SN74194 should be changed only while the clock input is high.

**logic symbol†**



†This symbol is in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12. Pin numbers shown are for D, J, N, and W packages.

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**SN54194, SN54LS194A, SN54S194  
SN74194, SN74LS194A, SN74S194  
4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS**

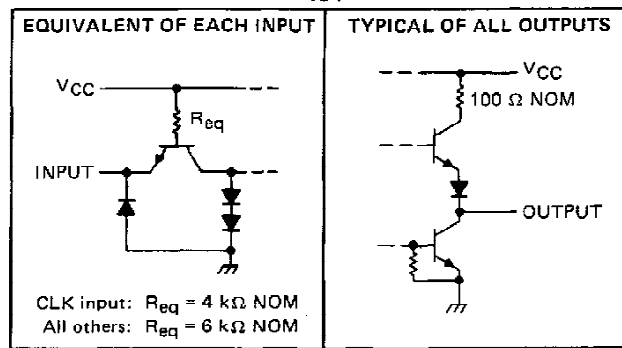
**FUNCTION TABLE**

CLEAR	MODE		CLOCK	INPUTS				OUTPUTS					
				SERIAL		PARALLEL		Q <sub>A</sub>	Q <sub>B</sub>	Q <sub>C</sub>	Q <sub>D</sub>		
	LEFT	RIGHT		A	B	C	D						
L	X	X	X	X	X	X	X	X	X	L	L	L	L
H	X	X	L	X	X	X	X	X	X	Q <sub>A0</sub>	Q <sub>B0</sub>	Q <sub>C0</sub>	Q <sub>D0</sub>
H	H	H	↑	X	X	a	b	c	d	a	b	c	d
H	L	H	↑	X	H	x	x	x	x	H	Q <sub>An</sub>	Q <sub>Bn</sub>	Q <sub>Cn</sub>
H	L	H	↑	X	L	X	X	X	X	L	Q <sub>An</sub>	Q <sub>Bn</sub>	Q <sub>Cn</sub>
H	H	L	↑	H	X	X	X	X	X	Q <sub>Bn</sub>	Q <sub>Cn</sub>	Q <sub>Dn</sub>	H
H	H	L	↑	L	X	X	X	X	X	Q <sub>Bn</sub>	Q <sub>Cn</sub>	Q <sub>Dn</sub>	L
H	L	L	X	X	X	X	X	X	X	Q <sub>A0</sub>	Q <sub>B0</sub>	Q <sub>C0</sub>	Q <sub>D0</sub>

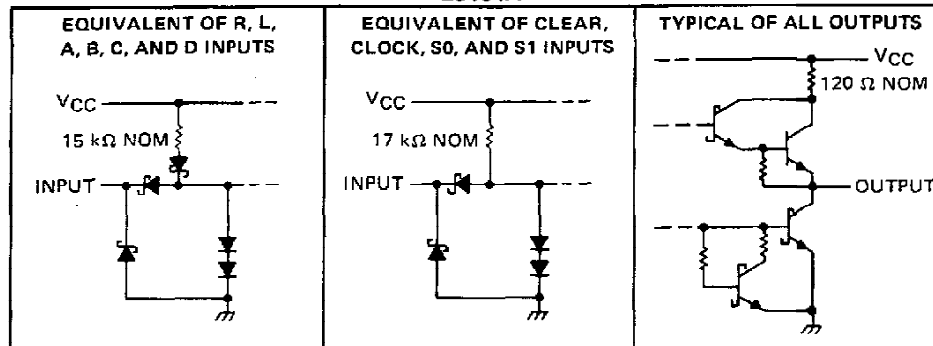
H = high level (steady state)  
L = low level (steady state)  
X = irrelevant (any input, including transitions)  
↑ = transition from low to high level  
a, b, c, d = the level of steady-state input at inputs A, B, C, or D, respectively.  
Q<sub>A0</sub>, Q<sub>B0</sub>, Q<sub>C0</sub>, Q<sub>D0</sub> = the level of Q<sub>A</sub>, Q<sub>B</sub>, Q<sub>C</sub>, or Q<sub>D</sub>, respectively, before the indicated steady-state input conditions were established.  
Q<sub>An</sub>, Q<sub>Bn</sub>, Q<sub>Cn</sub>, Q<sub>Dn</sub> = the level of Q<sub>A</sub>, Q<sub>B</sub>, Q<sub>C</sub>, respectively, before the most-recent ↑ transition of the clock.

**schematics of inputs and outputs**

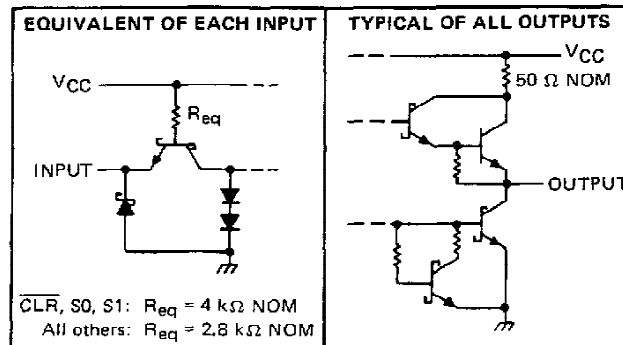
'194



'LS194A

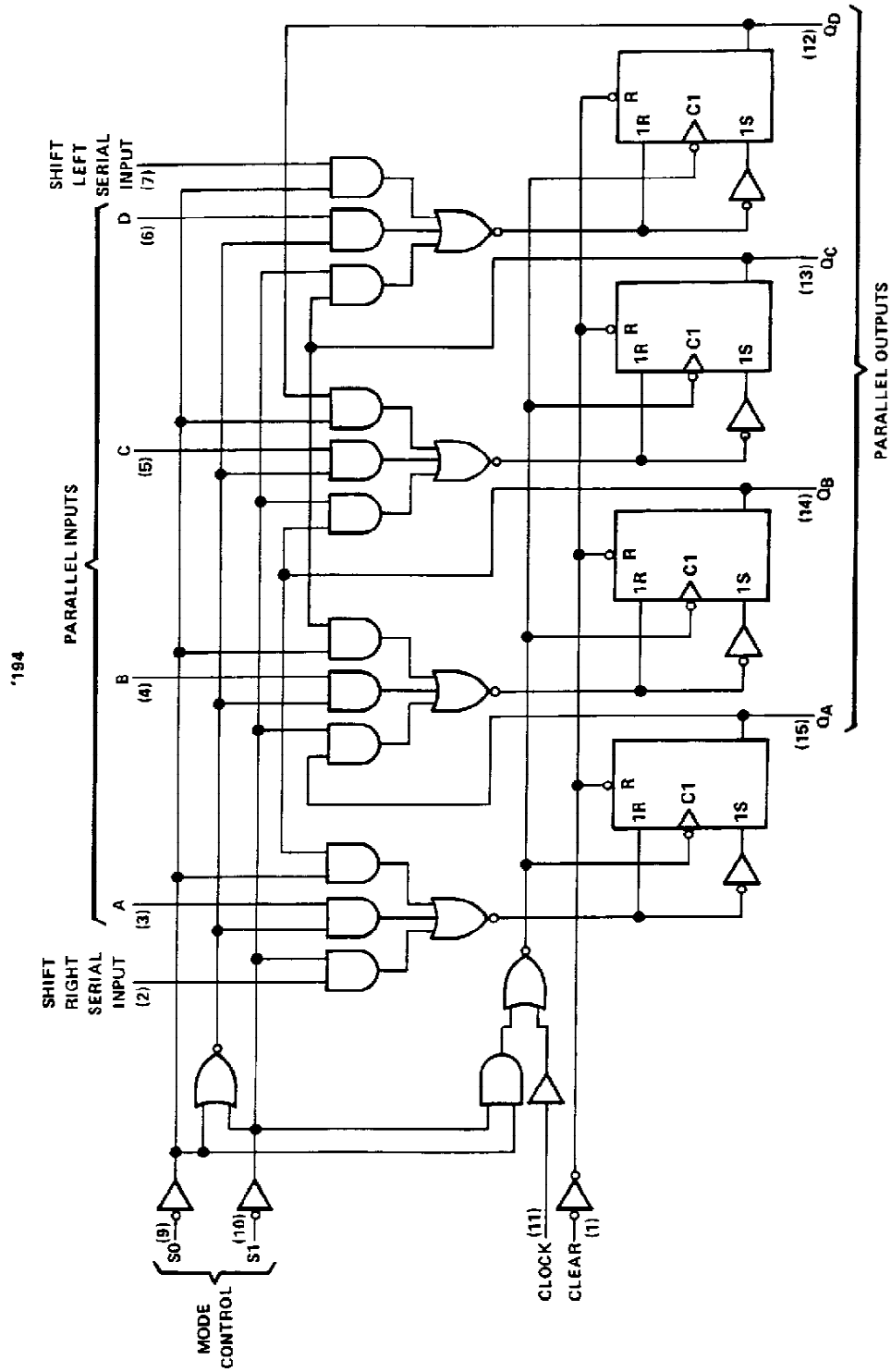


'S194



SN54194, SN74194  
4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

logic diagrams (positive logic)



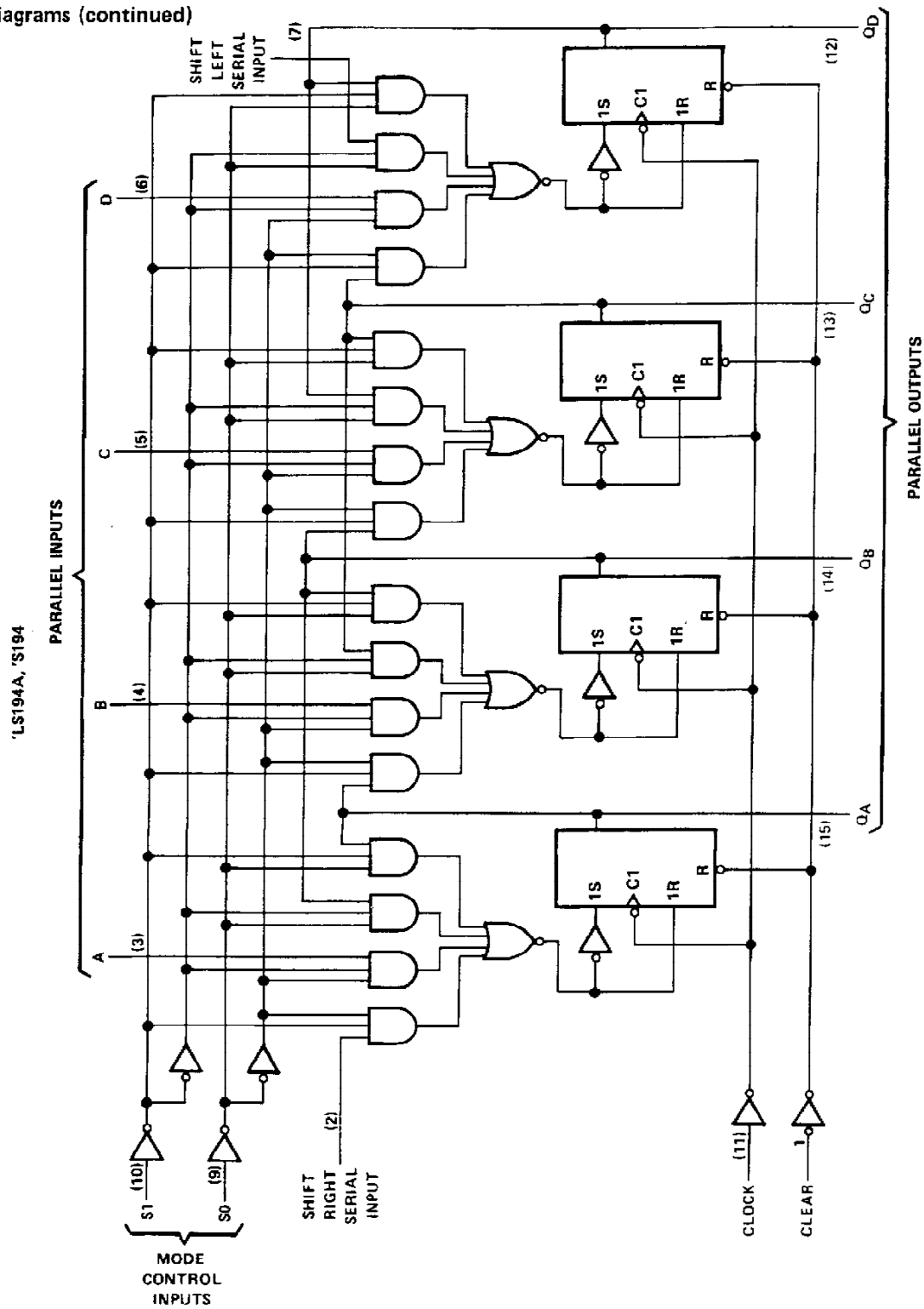
Pin numbers shown are for D, J, N, and W packages.



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**SN54LS194A, SN54S194  
SN74LS194A, SN74S194  
4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS**

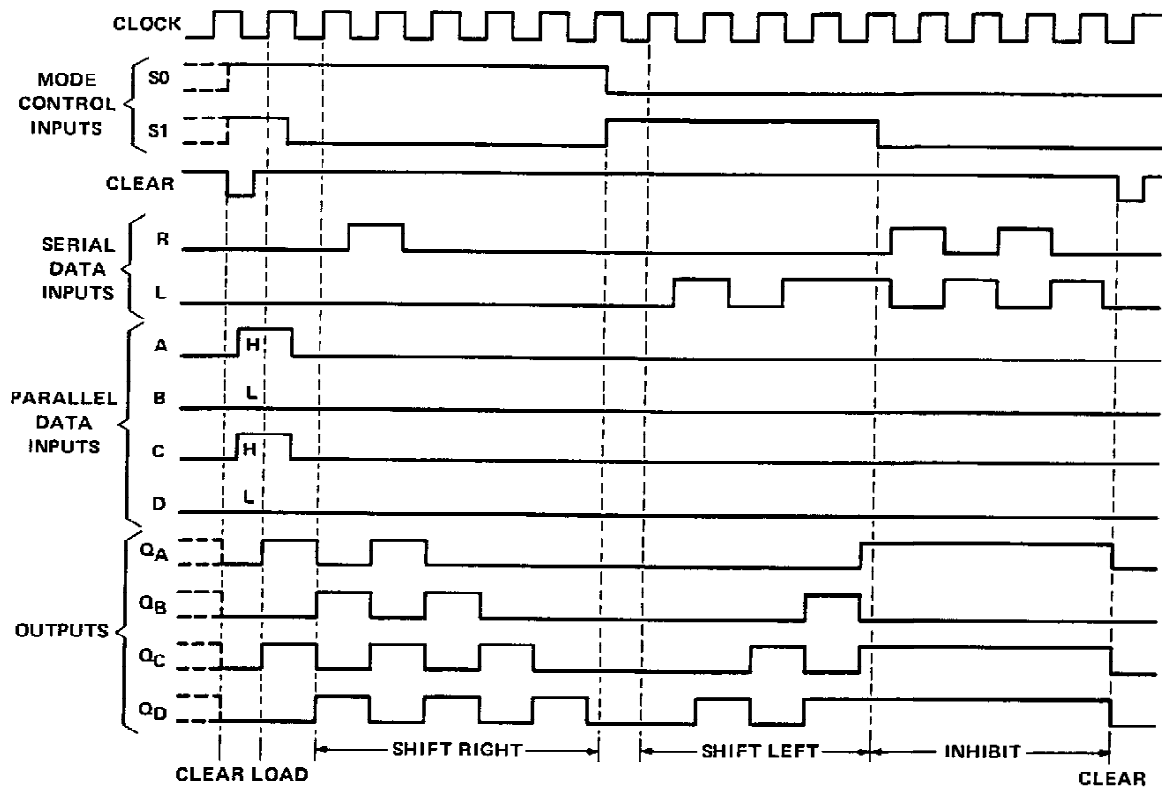
logic diagrams (continued)



Pin numbers shown on logic notation are for D, J, N, and W packages.

SN54194, SN54LS194A, SN54S194,  
SN74194, SN74LS194A, SN74S194  
4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

typical clear, load, right-shift, left-shift, inhibit, and clear sequences



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# SN54194, SN74194 4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	5.5 V
Operating free-air temperature range: SN54194	-55°C to 125°C
SN74194	0°C to 70°C
Storage temperature range	-65°C to 150°C

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

recommended operating conditions

	SN54194			SN74194			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
High-level output current, $I_{OH}$			-800			-800	$\mu$ A
Low-level output current, $I_{OL}$			16			16	mA
Clock frequency, $f_{clock}$	0		25	0		25	MHz
Width of clock or clear pulse, $t_w$	20			20			ns
Setup time, $t_{SU}$	Mode control	30		30			ns
	Serial and parallel data	20		20			ns
	Clear inactive-state	25		25			ns
Hold time at any input, $t_H$	0			0			ns
Operating free-air temperature, $T_A$	-55		125	0		70	°C

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

PARAMETER	TEST CONDITIONS†	SN54194			SN74194			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IH}$ High-level input voltage		2			2			V
$V_{IL}$ Low-level input voltage				0.8			0.8	V
$V_{IK}$ Input clamp voltage	$V_{CC} = \text{MIN}, I_I = -12 \text{ mA}$			-1.5			-1.5	V
$V_{OH}$ High-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OH} = -800 \mu\text{A}$	2.4	3.4		2.4	3.4		V
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = 0.8 \text{ V}, I_{OL} = 16 \text{ mA}$		0.2	0.4		0.2	0.4	V
$I_I$ Input current at maximum input voltage	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			1			1	mA
$I_{IH}$ High-level input current	$V_{CC} = \text{MAX}, V_I = 2.4 \text{ V}$			40			40	$\mu$ A
$I_{IL}$ Low-level input current	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-1.6			-1.6	mA
$I_{OS}$ Short-circuit output current§	$V_{CC} = \text{MAX}$	-20		-57	-18		-57	mA
$I_{CC}$ Supply current	$V_{CC} = \text{MAX}, \text{ See Note 2}$		39	63		39	63	mA

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

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

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

NOTE 2: With all outputs open, inputs A through D grounded, and 4.5 V applied to S0, S1, clear, and the serial inputs,  $I_{CC}$  is tested with a momentary GND, then 4.5 V applied to clock.

switching characteristics,  $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$f_{max}$ Maximum clock frequency		25	36		MHz
$t_{PHL}$ Propagation delay time, high-to-low-level output from clear	$C_L = 15 \text{ pF}, R_L = 400 \Omega, \text{ See Figure 1}$		19	30	ns
$t_{PLH}$ Propagation delay time, low-to-high-level output from clock			14	22	ns
$t_{PHL}$ Propagation delay time, high-to-low-level output from clock			17	26	ns

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# SN54LS194A, SN74LS194A

## 4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	7 V
Operating free-air temperature range: SN54LS194A	$-55^{\circ}\text{C}$ to $125^{\circ}\text{C}$
SN74LS194A	$0^{\circ}\text{C}$ to $70^{\circ}\text{C}$
Storage temperature range	$-65^{\circ}\text{C}$ to $150^{\circ}\text{C}$

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

### recommended operating conditions

	SN54LS194A			SN74LS194A			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
High-level output current, $I_{OH}$			-400			-400	$\mu\text{A}$
Low-level output current, $I_{OL}$			4			8	mA
Clock frequency, $f_{\text{clock}}$	0		25	0		25	MHz
Width of clock or clear pulse, $t_w$	20			20			ns
Setup time, $t_{su}$	Mode control			30			ns
	Serial and parallel data			20			ns
	Clear inactive-state			25			ns
Hold time at any input, $t_h$	0			0			ns
Operating free-air temperature, $T_A$	-55		125	0		70	$^{\circ}\text{C}$

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

PARAMETER	TEST CONDITIONS <sup>†</sup>	SN54LS194A			SN74LS194A			UNIT
		MIN	TYP <sup>‡</sup>	MAX	MIN	TYP <sup>‡</sup>	MAX	
$V_{IH}$ High-level input voltage		2			2			V
$V_{IL}$ Low-level input voltage				0.7			0.8	V
$V_I$ Input clamp voltage	$V_{CC} = \text{MIN}$ , $I_I = -18 \text{ mA}$			-1.5			-1.5	V
$V_{OH}$ High-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = V_{IL \text{ max}}$ , $I_{OH} = -400 \mu\text{A}$	2.5	3.5		2.7	3.5		V
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = V_{IL \text{ max}}$		0.25	0.4		0.25	0.4	V
						0.35	0.5	
$I_I$ Input current at maximum input voltage	$V_{CC} = \text{MAX}$ , $V_I = 7 \text{ V}$			0.1			0.1	mA
$I_{IH}$ High-level input current	$V_{CC} = \text{MAX}$ , $V_I = 2.7 \text{ V}$			20			20	$\mu\text{A}$
$I_{IL}$ Low-level input current	$V_{CC} = \text{MAX}$ , $V_I = 0.4 \text{ V}$			-0.4			-0.4	mA
$I_{OS}$ Short-circuit output current <sup>§</sup>	$V_{CC} = \text{MAX}$	-20		-100	-20		-100	mA
$I_{CC}$ Supply current	$V_{CC} = \text{MAX}$ , See Note 2		15	23		15	23	mA

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

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

<sup>§</sup> Not more than one output should be shorted at a time, and duration of the short-circuit should not exceed one second.

NOTE 2: With all outputs open, inputs A through D grounded, and 4.5 V applied to S0, S1, clear, and the serial inputs,  $I_{CC}$  is tested with a momentary GND, then 4.5 V, applied to clock.

### switching characteristics, $V_{CC} = 5 \text{ V}$ , $T_A = 25^{\circ}\text{C}$

PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT
$f_{\text{max}}$ Maximum clock frequency		25	36		MHz
$t_{PHL}$ Propagation delay time, high-to-low-level output from clear	$C_L = 15 \text{ pF}$ , $R_L = 2 \text{ k}\Omega$ , See Figure 1		19	30	ns
$t_{PLH}$ Propagation delay time, low-to-high level output from clock			14	22	ns
$t_{PHL}$ Propagation delay time, high-to-low level output from clock			17	26	ns

  
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# SN54S194, SN74S194 4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

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

Supply voltage, $V_{CC}$ (see Note 1)	7 V
Input voltage	5.5 V
Operating free-air temperature range: SN54S194	-55°C to 125°C
SN74S194	0°C to 70°C
Storage temperature range	-65°C to 150°C

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

recommended operating conditions

	SN54S194			SN74S194			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, $V_{CC}$	4.5	5	5.5	4.75	5	5.25	V
High-level output current, $I_{OH}$			-1			-1	mA
Low-level output current, $I_{OL}$			20			20	mA
Clock frequency, $f_{clock}$	0		70	0		70	MHz
Width of clock pulse, $t_w(\text{clock})$	7			7			ns
Width of clear pulse, $t_w(\text{clear})$	12			12			ns
Setup time, $t_{su}$	Mode control		11			11	ns
	Serial and parallel data		5			5	ns
	Clear inactive-state		9			9	ns
Hold time at any input, $t_h$		3			3		ns
Operating free-air temperature, $T_A$		-55	125		0	70	°C

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

PARAMETER	TEST CONDITIONS†	SN54S194			SN74S194			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
$V_{IH}$ High-level input voltage		2			2			V
$V_{IL}$ Low-level input voltage				0.8			0.8	V
$V_{IK}$ Input clamp voltage	$V_{CC} = \text{MIN}$ , $I_I = -18 \text{ mA}$			-1.2			-1.2	V
$V_{OH}$ High-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OH} = -1 \text{ mA}$	2.5	3.4		2.7	3.4		V
$V_{OL}$ Low-level output voltage	$V_{CC} = \text{MIN}$ , $V_{IH} = 2 \text{ V}$ , $V_{IL} = 0.8 \text{ V}$ , $I_{OL} = 20 \text{ mA}$			0.5			0.5	V
$I_I$ Input current at maximum input voltage	$V_{CC} = \text{MAX}$ , $V_I = 5.5 \text{ V}$			1			1	mA
$I_{IH}$ High-level input current	$V_{CC} = \text{MAX}$ , $V_I = 2.7 \text{ V}$			50			50	µA
$I_{IL}$ Low-level input current	$V_{CC} = \text{MAX}$ , $V_I = 0.5 \text{ V}$			-2			-2	mA
$I_{OS}$ Short-circuit output current§	$V_{CC} = \text{MAX}$	-40		-100	-40		-100	mA
$I_{CC}$ Supply current	$V_{CC} = \text{MAX}$ , See Note 2		85	135		85	135	mA
	$V_{CC} = \text{MAX}$ , $T_A = 125^\circ\text{C}$ , See Note 2			110				
	W package							

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

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

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

NOTE 2: With all outputs open, inputs A through D grounded, and 4.5 V applies to S0, S1, clear, and the serial inputs,  $I_{CC}$  is tested with a momentary GND, then 4.5 V, applied to clock.

switching characteristics,  $V_{CC} = 5 \text{ V}$ ,  $T_A = 25^\circ\text{C}$

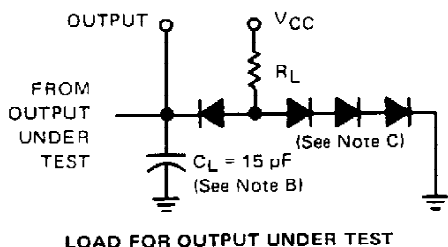
PARAMETER	TEST CONDITIONS	MIN	TYP	MAX	UNIT	
$f_{max}$ Maximum clock frequency	$C_L = 15 \text{ pF}$ , $R_L = 280 \Omega$ , See Figure 1	70	106		MHz	
$t_{PHL}$ Propagation delay time, high-to-low-level output from clear			12.5	18.5	ns	
$t_{PLH}$ Propagation delay time, low-to-high-level output from clock			4	8	12	ns
$t_{PHL}$ Propagation delay time, high-to-low-level output from clock			4	11	16.5	ns

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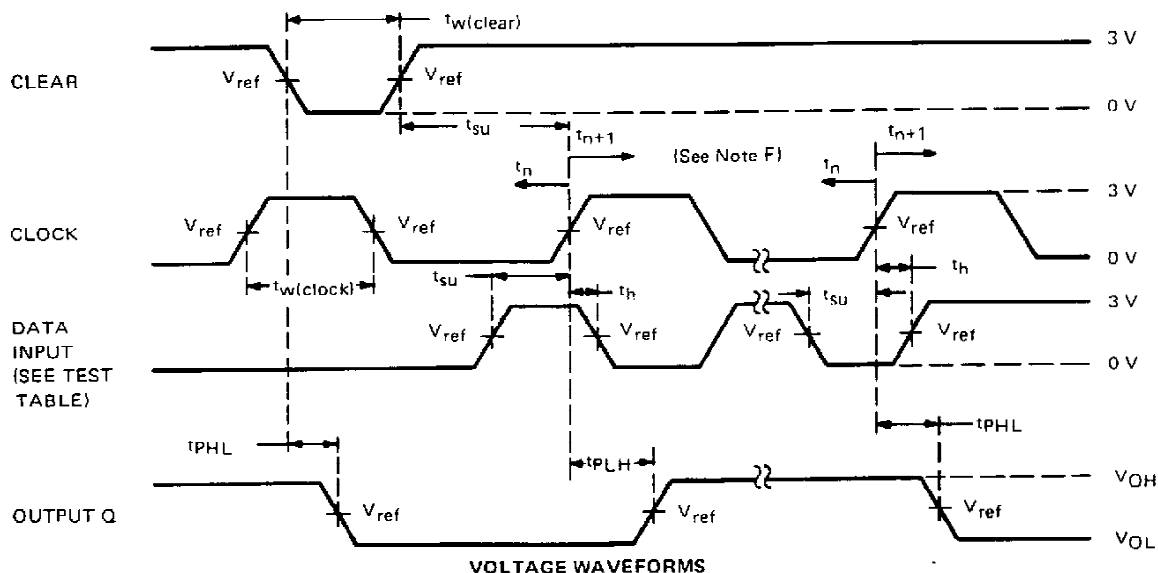
# SN54194, SN54LS194A, SN54S194, SN74194, SN74LS194A, SN74S194 4-BIT BIDIRECTIONAL UNIVERSAL SHIFT REGISTERS

## PARAMETER MEASUREMENT INFORMATION



TEST TABLE FOR SYNCHRONOUS INPUTS

DATA INPUT FOR TEST	S1	S0	OUTPUT TESTED (SEE NOTE E)
A	4.5 V	4.5 V	QA at $t_{n+1}$
B	4.5 V	4.5 V	QB at $t_{n+1}$
C	4.5 V	4.5 V	QC at $t_{n+1}$
D	4.5 V	4.5 V	QD at $t_{n+1}$
L Serial Input	4.5 V	0 V	QA at $t_{n+4}$
R Serial Input	0 V	4.5 V	QD at $t_{n+4}$



- NOTES:**
- A. The clock pulse generator has the following characteristics:  $Z_{out} \approx 50 \Omega$  and  $PRR \leq 1 \text{ MHz}$ . For '194,  $t_r \leq 7 \text{ ns}$  and  $t_f \leq 7 \text{ ns}$ . For 'LS194A,  $t_r \leq 15 \text{ ns}$  and  $t_f \leq 6 \text{ ns}$ . For 'S194,  $t_r \leq 2.5 \text{ ns}$  and  $t_f \leq 2.5 \text{ ns}$ . When testing  $f_{max}$ , vary PRR.
  - B.  $C_L$  includes probe and jig capacitance.
  - C. All diodes are 1N3064 or 1N916.
  - D. A clear pulse is applied prior to each test.
  - E. For '194 and 'S194,  $V_{ref} = 1.5 \text{ V}$ ; for 'LS194A,  $V_{ref} = 1.3 \text{ V}$ .
  - F. Propagation delay times ( $t_{PLH}$  and  $t_{PHL}$ ) are measured at  $t_{n+1}$ . Proper shifting of data is verified at  $t_{n+4}$  with a functional test.
  - G.  $t_n$  = bit time before clocking transition.  
 $t_{n+1}$  = bit time after one clocking transition.  
 $t_{n+4}$  = bit time after four clocking transitions.

FIGURE 1—SWITCHING TIMES



**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
7604001EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001EA SNJ54S194J	<a href="#">Samples</a>
7604001FA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001FA SNJ54S194W	<a href="#">Samples</a>
7604001FA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001FA SNJ54S194W	<a href="#">Samples</a>
JM38510/07601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 07601BEA	<a href="#">Samples</a>
JM38510/07601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 07601BEA	<a href="#">Samples</a>
JM38510/30601B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601B2A	<a href="#">Samples</a>
JM38510/30601B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601B2A	<a href="#">Samples</a>
JM38510/30601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BEA	<a href="#">Samples</a>
JM38510/30601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BEA	<a href="#">Samples</a>
JM38510/30601BFA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BFA	<a href="#">Samples</a>
JM38510/30601BFA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BFA	<a href="#">Samples</a>
M38510/07601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 07601BEA	<a href="#">Samples</a>
M38510/07601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 07601BEA	<a href="#">Samples</a>
M38510/30601B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601B2A	<a href="#">Samples</a>
M38510/30601B2A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601B2A	<a href="#">Samples</a>
M38510/30601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BEA	<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
M38510/30601BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BEA	<a href="#">Samples</a>
M38510/30601BFA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BFA	<a href="#">Samples</a>
M38510/30601BFA	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 30601BFA	<a href="#">Samples</a>
SN54LS194AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54LS194AJ	<a href="#">Samples</a>
SN54LS194AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54LS194AJ	<a href="#">Samples</a>
SN54S194J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54S194J	<a href="#">Samples</a>
SN54S194J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54S194J	<a href="#">Samples</a>
SN74LS194AD	ACTIVE	SOIC	D	16	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS194A	<a href="#">Samples</a>
SN74LS194AD	ACTIVE	SOIC	D	16	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	0 to 70	LS194A	<a href="#">Samples</a>
SN74LS194AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN74LS194AN	<a href="#">Samples</a>
SN74LS194AN	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	0 to 70	SN74LS194AN	<a href="#">Samples</a>
SNJ54LS194AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SNJ54LS194AJ	<a href="#">Samples</a>
SNJ54LS194AJ	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SNJ54LS194AJ	<a href="#">Samples</a>
SNJ54S194J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001EA SNJ54S194J	<a href="#">Samples</a>
SNJ54S194J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001EA SNJ54S194J	<a href="#">Samples</a>
SNJ54S194W	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001FA SNJ54S194W	<a href="#">Samples</a>
SNJ54S194W	ACTIVE	CFP	W	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	7604001FA SNJ54S194W	<a href="#">Samples</a>

(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.

<sup>(2)</sup> **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.

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

<sup>(5)</sup> 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.

<sup>(6)</sup> 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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**OTHER QUALIFIED VERSIONS OF SN54LS194A, SN74LS194A :**

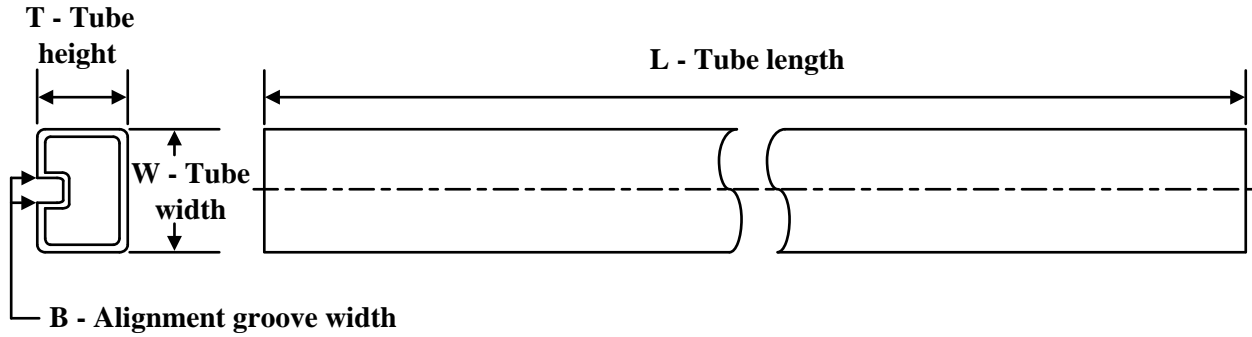
● Catalog : [SN74LS194A](#)

● Military : [SN54LS194A](#)

NOTE: Qualified Version Definitions:

● Catalog - TI's standard catalog product

- Military - QML certified for Military and Defense Applications

**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
JM38510/30601B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/30601BFA	W	CFP	16	25	506.98	26.16	6220	NA
M38510/30601B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
M38510/30601BFA	W	CFP	16	25	506.98	26.16	6220	NA
SN74LS194AD	D	SOIC	16	40	507	8	3940	4.32
SN74LS194AN	N	PDIP	16	25	506	13.97	11230	4.32
SN74LS194AN	N	PDIP	16	25	506	13.97	11230	4.32

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