

SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

'90A, 'LS90 . . . Decade Counters

'92A, 'LS92 . . . Divide By-Twelve Counters

'93A, 'LS93 . . . 4-Bit Binary Counters

TYPES	TYPICAL POWER DISSIPATION
'90A	145 mW
'92A, '93A	130 mW
'LS90, 'LS92, 'LS93	45 mW

description

Each of these monolithic counters contains four master-slave flip-flops and additional gating to provide a divide-by-two counter and a three-stage binary counter for which the count cycle length is divide-by-five for the '90A and 'LS90, divide-by-six for the '92A and 'LS92, and the divide-by-eight for the '93A and 'LS93.

All of these counters have a gated zero reset and the '90A and 'LS90 also have gated set-to-nine inputs for use in BCD nine's complement applications.

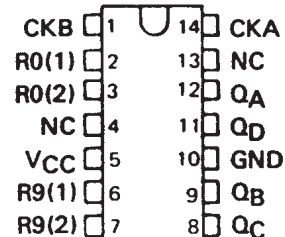
To use their maximum count length (decade, divide-by-twelve, or four-bit binary) of these counters, the CKB input is connected to the Q_A output. The input count pulses are applied to CKA input and the outputs are as described in the appropriate function table. A symmetrical divide-by-ten count can be obtained from the '90A or 'LS90 counters by connecting the Q_D output to the CKA input and applying the input count to the CKB input which gives a divide-by-ten square wave at output Q_A.

SN5490A, SN54LS90 . . . J OR W PACKAGE

SN7490A . . . N PACKAGE

SN74LS90 . . . D OR N PACKAGE

(TOP VIEW)

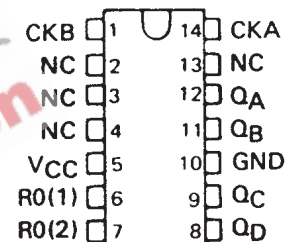


SN5492A, SN54LS92 . . . J OR W PACKAGE

SN7492A . . . N PACKAGE

SN74LS92 . . . D OR N PACKAGE

(TOP VIEW)

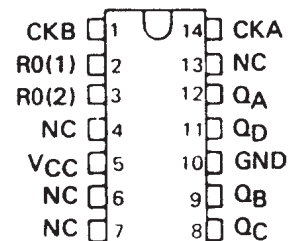


SN5493A, SN54LS93 . . . J OR W PACKAGE

SN7493 . . . N PACKAGE

SN74LS93 . . . D OR N PACKAGE

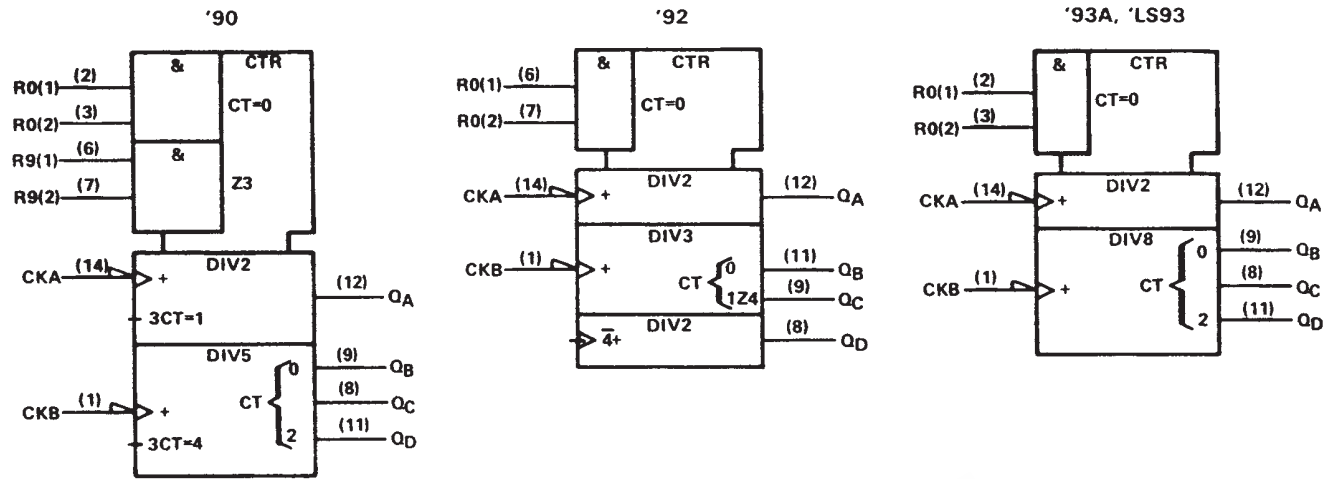
(TOP VIEW)



SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

logic symbols†



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



SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A - MARCH 1974 - REVISED MARCH 1988

'90A, 'LS90
 BCD COUNT SEQUENCE
 (See Note A)

COUNT	OUTPUT			
	Q _D	Q _C	Q _B	Q _A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H

'90A, 'LS90
 BI-QUINARY (5-2)
 (See Note B)

COUNT	OUTPUT			
	Q _A	Q _D	Q _C	Q _B
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	H	L	L	L
6	H	L	L	H
7	H	L	H	L
8	H	L	H	H
9	H	H	L	L

'92A, 'LS92
 COUNT SEQUENCE
 (See Note C)

COUNT	OUTPUT			
	Q _D	Q _C	Q _B	Q _A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	H	L	L	L
7	H	L	L	H
8	H	L	H	L
9	H	L	H	H
10	H	H	L	L
11	H	H	L	H

'90A, 'LS90
 RESET/COUNT FUNCTION TABLE

RESET INPUTS				OUTPUT			
R ₀ (1)	R ₀ (2)	R ₉ (1)	R ₉ (2)	Q _D	Q _C	Q _B	Q _A
H	H	L	X	L	L	L	L
H	H	X	L	L	L	L	L
X	X	H	H	H	L	L	H
X	L	X	L	COUNT			
L	X	L	X	COUNT			
L	X	X	L	COUNT			
X	L	L	X	COUNT			

'93A, 'LS93
 COUNT SEQUENCE
 (See Note C)

COUNT	OUTPUT			
	Q _D	Q _C	Q _B	Q _A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H
10	H	L	H	L
11	H	L	H	H
12	H	H	L	L
13	H	H	L	H
14	H	H	H	L
15	H	H	H	H

'92A, 'LS92, '93A, 'LS93
 RESET/COUNT FUNCTION TABLE

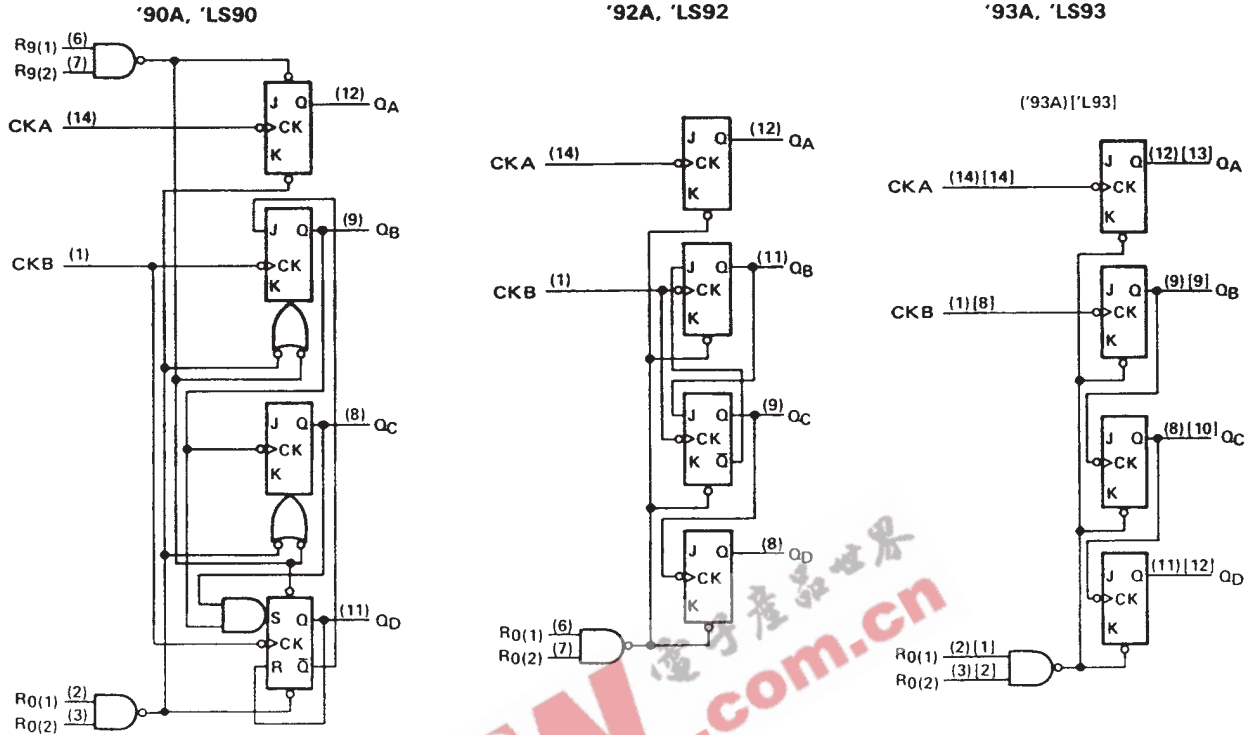
RESET INPUTS		OUTPUT			
R ₀ (1)	R ₀ (2)	Q _D	Q _C	Q _B	Q _A
H	H	L	L	L	L
L	X	COUNT			
X	L	COUNT			

- NOTES: A. Output Q_A is connected to input CKB for BCD count.
 B. Output Q_D is connected to input CKA for bi-quinary count.
 C. Output Q_A is connected to Input CKB.
 D. H = high level, L = low level, X = irrelevant

**SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS**

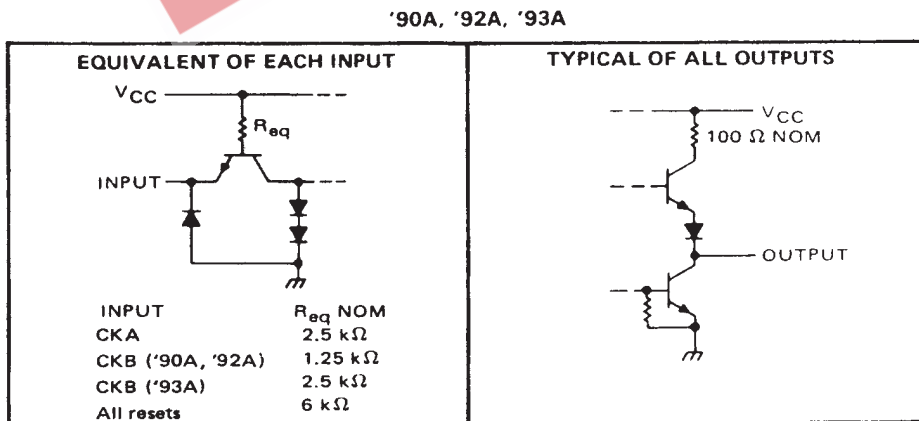
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logic diagrams (positive logic)



The J and K inputs shown without connection are for reference only and are functionally at a high level. Pin numbers shown in () are for the 'LS93 and '93A and pin numbers shown in [] are for the 54LS93.

schematics of inputs and outputs

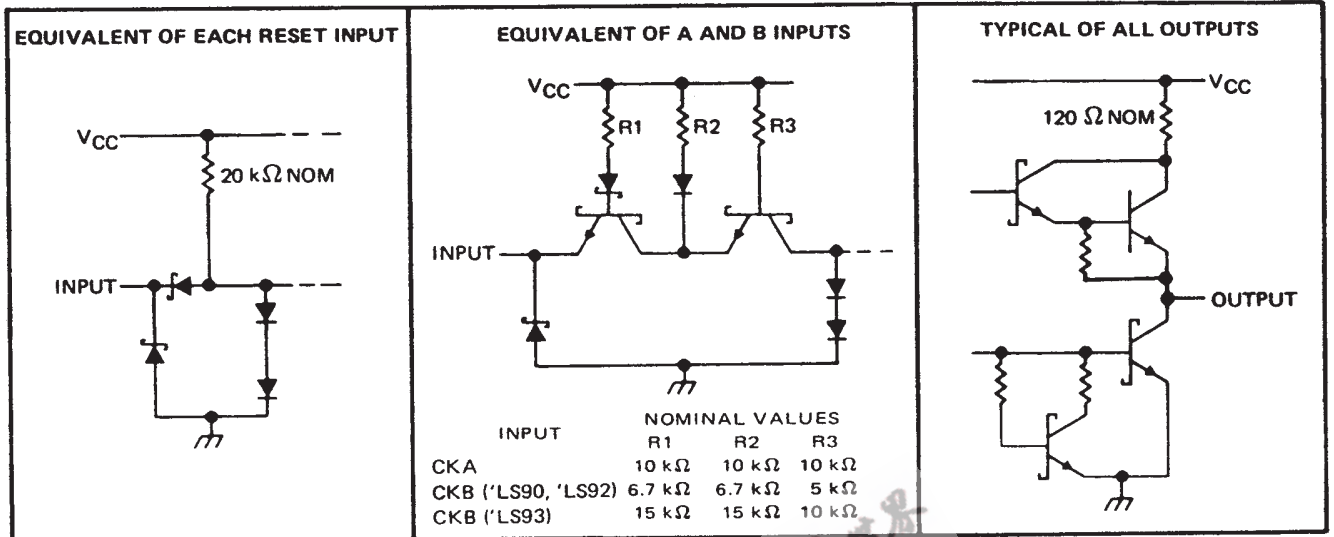


SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A - MARCH 1974 - REVISED MARCH 1988

schematics of inputs and outputs (continued)

'LS90, 'LS92, 'LS93



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SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

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
Interemitter voltage (see Note 2)	5.5 V
Operating free-air temperature range: SN5490A, SN5492A, SN5493A	-55°C to 125°C
SN7490A, SN7492A, SN7493A	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTES: 1. Voltage values, except interemitter voltage, are with respect to network ground terminal.

2. This is the voltage between two emitters of a multiple-emitter transistor. For these circuits, this rating applies between the two R_O inputs, and for the '90A circuit, it also applies between the two R_G inputs.

recommended operating conditions

	SN5490A, SN5492A			SN7490A, SN7492A			UNIT
	SN5493A			SN7493A			
	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	μ A
Low-level output current, I_{OL}			16			16	mA
Count frequency, f_{COUNT} (see Figure 1)	A input	0	32	0	32		MHz
	B input	0	16	0	16		
Pulse width, t_w	A input	15		15			ns
	B input	30		30			
	Reset inputs	15		15			
Reset inactive-state setup time, t_{SU}	25			25			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 [†]	'90A			'92A			'93A			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IH} High-level input voltage		2			2			2			V
V_{IL} Low-level input voltage				0.8			0.8			0.8	V
V_{IK} Input clamp voltage	$V_{CC} = \text{MIN}$, $I_I = -12 \text{ mA}$			-1.5			-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		2.4	3.4		V
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = 0.8 \text{ V}$, $I_{OL} = 16 \text{ mA}^{\S}$		0.2	0.4		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			1	mA
I_{IH} High-level input current	Any reset			40			40			40	μ A
	CKA	$V_{CC} = \text{MAX}$, $V_I = 2.4 \text{ V}$									
	CKB										
I_{IL} Low-level input current	Any reset			-1.6			-1.6			-1.6	mA
	CKA	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$									
	CKB										
I_{OS} Short-circuit output current [§]	$V_{CC} = \text{MAX}$	SN54'	-20	-57	-20	-57	-20	-57	-20	-57	mA
		SN74'	-18	-57	-18	-57	-18	-57	-18	-57	
I_{CC} Supply current	$V_{CC} = \text{MAX}$, See Note 3		29	42		26	39		26	39	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.

[¶] '90A outputs are tested at $I_{OL} = 16 \text{ mA}$ plus the limit value for I_{IL} for the CKB input. This permits driving the CKB input while maintaining full fan-out capability.

NOTE 3: I_{CC} is measured with all outputs open, both R_O inputs grounded following momentary connection to 4.5 V, and all other inputs grounded.

SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

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

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'90A			'92A			'93A			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
f_{\max}	CKA	Q_A	$C_L = 15\text{ pF}$, $R_L = 400\ \Omega$, See Figure 1	32	42		32	42		32	42		MHz
	CKB	Q_B		16			16			16			
t_{PLH}	CKA	Q_A		10	16		10	16		10	16		ns
t_{PHL}				12	18		12	18		12	18		
t_{PLH}	CKA	Q_D		32	48		32	48		46	70		ns
t_{PHL}				34	50		34	50		46	70		
t_{PLH}	CKB	Q_B		10	16		10	16		10	16		ns
t_{PHL}				14	21		14	21		14	21		
t_{PLH}	CKB	Q_C		21	32		10	16		21	32		ns
t_{PHL}				23	35		14	21		23	35		
t_{PLH}	CKB	Q_D		21	32		21	32		34	51		ns
t_{PHL}				23	35		23	35		34	51		
t_{PHL}	Set-to-0	Any		26	40		26	40		26	40		ns
t_{PLH}	Set-to-9	Q_A, Q_D		20	30								ns
t_{PHL}		Q_B, Q_C		26	40								

† f_{\max} = maximum count frequency

t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

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**SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS**

SDLS940A – MARCH 1974 – REVISED MARCH 1988

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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: R inputs	7 V
A and B inputs	5.5 V
Operating free-air temperature range: SN54LS' Circuits	-55°C to 125°C
SN74LS' Circuits	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

	SN54LS90 SN54LS92 SN54LS93			SN74LS90 SN74LS92 SN74LS93			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			μ A		
Low-level output current, I_{OL}	4			8			mA		
Count frequency, f_{count} (see Figure 1)	A input	0	32	0	32		MHz		
	B input	0	16	0	16				
Pulse width, t_w	A input	15		15			ns		
	B input	30		30					
	Reset inputs	30		30					
Reset inactive-state setup time, t_{SU}	25			25			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†	SN54LS90 SN54LS92			SN74LS90 SN74LS92			UNIT
		MIN	TYP‡	MAX	MIN	TYP‡	MAX	
		V_{IH} High-level input voltage	2			2		
V_{IL} Low-level input voltage	0.7			0.8			V	
V_{IK} 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	3.4		2.7	3.4	V	
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = V_{IL \text{ max}},$	$I_{OL} = 4 \text{ mA}^\S$	0.25	0.4	0.25	0.4	V	
		$I_{OL} = 8 \text{ mA}^\S$			0.35	0.5		
I_I Input current at maximum input voltage	Any reset	$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$			0.1			mA
	CKA	$V_{CC} = \text{MAX}, V_I = 5.5 \text{ V}$			0.2			
	CKB				0.4			
I_{IH} High-level input current	Any reset	$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$			20			μ A
	CKA				40			
	CKB				80			
I_{IL} Low-level input current	Any reset	$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$			-0.4			mA
	CKA				-2.4			
	CKB				-3.2			
I_{OS} Short-circuit output current §	$V_{CC} = \text{MAX}$	-20	-100		-20	-100	mA	
I_{CC} Supply current	$V_{CC} = \text{MAX},$ See Note 3	'LS90	9	15	9	15	mA	
		'LS92	9	15	9	15		

† 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.

¶ I_{QA} outputs are tested at specified I_{OL} plus the limit value of I_{IL} for the CKB input. This permits driving the CKB input while maintaining full fan-out capability.

NOTE 3: I_{CC} is measured with all outputs open, both R_O inputs grounded following momentary connection to 4.5 V, and all other inputs grounded.



SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

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

PARAMETER		TEST CONDITIONS†	SN54LS93			SN74LS93			UNIT
			MIN	TYP‡	MAX	MIN	TYP‡	MAX	
V _{IH}	High-level input voltage		2			2			V
V _{IL}	Low-level input voltage		0.7			0.8			V
V _{IK}	Input clamp voltage	V _{CC} = MIN, I _I = -18 mA	-1.5			-1.5			V
V _{OH}	High-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL max} , I _{OH} = -400 µA	2.5	3.4		2.7	3.4		V
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL max}	I _{OL} = 4 mA¶		0.25	0.4	0.25	0.4	V
			I _{OL} = 8 mA¶				0.35	0.5	
I _I	Input current at maximum input voltage	Any reset	V _{CC} = MAX, V _I = 7 V		0.1		0.1		mA
		CKA or CKB	V _{CC} = MAX, V _I = 5.5 V		0.2		0.2		
I _{IH}	High-level input current	Any reset	V _{CC} = MAX, V _I = 2.7 V		20		20		µA
		CKA or CKB			40		80		
I _{IL}	Low-level input current	Any reset	V _{CC} = MAX, V _I = 0.4 V		-0.4		-0.4		mA
		CKA			-2.4		-2.4		
		CKB			-1.6		-1.6		
I _{OS}	Short-circuit output current§	V _{CC} = MAX	-20	-100	-20	-100		mA	
I _{CC}	Supply current	V _{CC} = MAX, See Note 3	9 15		9 15		15		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 V, T_A = 25°C.

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

¶ Q_A outputs are tested at specified I_{OL} plus the limit value for I_{IL} for the CKB input. This permits driving the CKB input while maintaining full fan-out capability.

NOTE 3: I_{CC} is measured with all outputs open, both R₀ inputs grounded following momentary connection to 4.5 V, and all other inputs grounded.

switching characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER#	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS90			'LS92			'LS93			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	MIN	TYP	MAX	
f _{max}	CKA	Q _A	C _L = 15 pF, R _L = 2 kΩ See Figure 1	32	42		32	42		32	42	MHz	
	CKB	Q _B		16			16			16			
t _{PLH}	CKA	Q _A		10	16		10	16		10	16	ns	
t _{PHL}				12	18		12	18		12	18		
t _{PLH}	CKA	Q _D		32	48		32	48		46	70	ns	
t _{PHL}				34	50		34	50		46	70		
t _{PLH}	CKB	Q _B		10	16		10	16		10	16	ns	
t _{PHL}				14	21		14	21		14	21		
t _{PLH}	CKB	Q _C		21	32		10	16		21	32	ns	
t _{PHL}				23	35		14	21		23	35		
t _{PLH}	CKB	Q _D		21	32		21	32		34	51	ns	
t _{PHL}				23	35		23	35		34	51		
t _{PHL}	Set-to-0	Any		26	40		26	40		26	40	ns	
t _{PLH}	Set-to-9	Q _A , Q _D		20	30							ns	
t _{PHL}		Q _B , Q _C		26	40								

#f_{max} = maximum count frequency

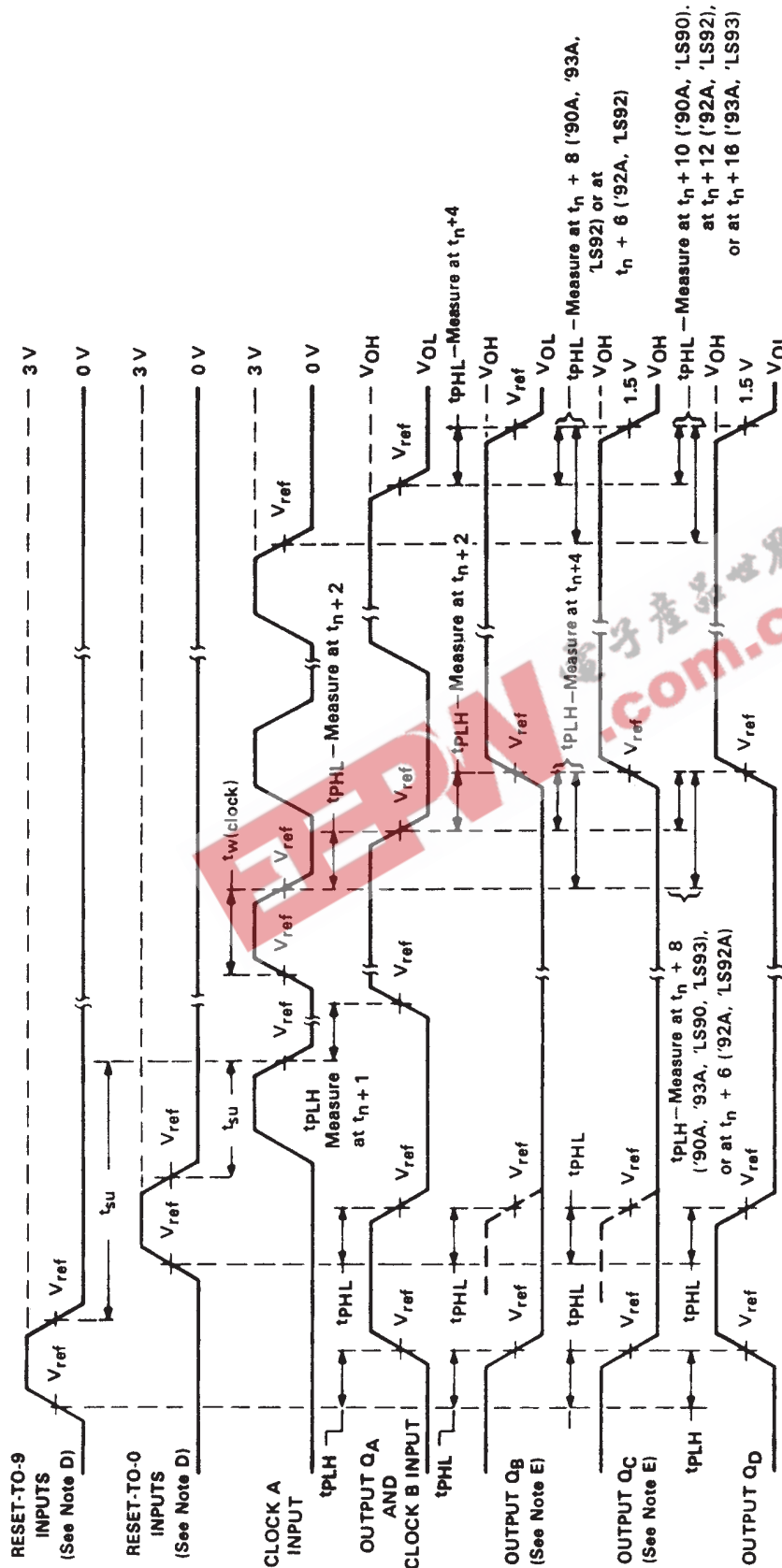
t_{PLH} = propagation delay time, low-to-high-level output

t_{PHL} = propagation delay time, high-to-low-level output

SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
 SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
 DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

PARAMETER MEASUREMENT INFORMATION



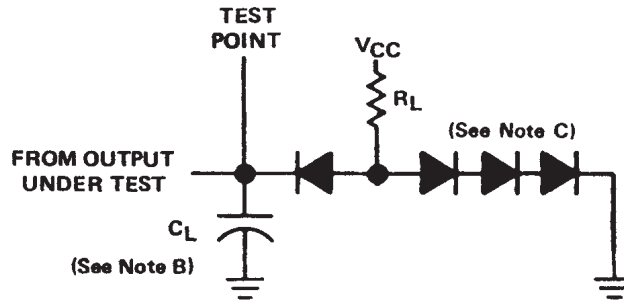
- NOTES: A. Input pulses are supplied by a generator having the following characteristics:
 for '90A, '92A, '93A, $t_r \leq 5$ ns, $t_f \leq 5$ ns, PRR = 1 MHz, duty cycle = 50%, $Z_{out} \approx 50$ ohms;
 for 'LS90, 'LS92, 'LS93, $t_r \leq 15$ ns, $t_f \leq 5$ ns, PRR = 1 MHz, duty cycle = 50%, $Z_{out} \approx 50$ ohms.
- B. C_L includes probe and jig capacitance.
- C. All diodes are 1N3064 or equivalent.
- D. Each reset input is tested separately with the other reset at 4.5 V.
- E. Reference waveforms are shown with dashed lines.
- F. For '90A, '92A, and '93A; $V_{ref} = 1.5$ V. For 'LS90, 'LS92, and 'LS93; $V_{ref} = 1.3$ V.

FIGURE 1A

SN5490A, SN5492A, SN5493A, SN54LS90, SN54LS92, SN54LS93
SN7490A, SN7492A, SN7493A, SN74LS90, SN74LS92, SN74LS93
DECADE, DIVIDE-BY-TWELVE AND BINARY COUNTERS

SDLS940A – MARCH 1974 – REVISED MARCH 1988

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT

- NOTES: A. Input pulses are supplied by a generator having the following characteristics:
for '90A, '92A, '93A, $t_r \leq 5$ ns, $t_f \leq 5$ ns, PRR = 1 MHz, duty cycle = 50%, $Z_{out} \approx 50$ ohms;
for 'LS90, 'LS92, 'LS93, $t_r \leq 15$ ns, $t_f \leq 5$ ns, PRR = 1 MHz, duty cycle = 50%, $Z_{out} \approx 50$ ohms.
- B. C_L includes probe and jig capacitance.
- C. All diodes are 1N3064 or equivalent.
- D. Each reset input is tested separately with the other reset at 4.5 V.
- E. Reference waveforms are shown with dashed lines.
- F. For '90A, '92A, and '93A; $V_{ref} = 1.5$ V. For 'LS90, 'LS92, and 'LS93; $V_{ref} = 1.3$ V.

FIGURE 1B

PACKAGING INFORMATION

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
7603201CA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
7603201DA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
7700101CA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
7700101DA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31501BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31501BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31502BCA	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
JM38510/31502BDA	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SN5490AJ	LIFEBUY	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN5492AJ	OBSOLETE	CDIP	J	14		None	Call TI	Call TI
SN54LS90J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN54LS93J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SN7490AN	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN7492AN	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN7493AN	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74LS90D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS90DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS90N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS92D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS92DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS92N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS92N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74LS92NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS93D	ACTIVE	SOIC	D	14	50	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS93DR	ACTIVE	SOIC	D	14	2500	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SN74LS93N	ACTIVE	PDIP	N	14	25	Pb-Free (RoHS)	CU NIPDAU	Level-NC-NC-NC
SN74LS93N3	OBSOLETE	PDIP	N	14		None	Call TI	Call TI
SN74LS93NSR	ACTIVE	SO	NS	14	2000	Pb-Free (RoHS)	CU NIPDAU	Level-2-260C-1 YEAR/ Level-1-235C-UNLIM
SNJ5490AJ	LIFEBUY	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ5490AW	LIFEBUY	CFP	W	14	1	None	Call TI	Level-NC-NC-NC
SNJ5492AJ	OBSOLETE	CDIP	J	14		None	Call TI	Call TI
SNJ5492AW	OBSOLETE	CFP	W	14		None	Call TI	Call TI
SNJ54LS90J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54LS90W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

Orderable Device	Status ⁽¹⁾	Package Type	Package Drawing	Pins	Package Qty	Eco Plan ⁽²⁾	Lead/Ball Finish	MSL Peak Temp ⁽³⁾
SNJ54LS93J	ACTIVE	CDIP	J	14	1	None	Call TI	Level-NC-NC-NC
SNJ54LS93W	ACTIVE	CFP	W	14	1	None	Call TI	Level-NC-NC-NC

⁽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⁾ Eco Plan - May not be currently available - please check <http://www.ti.com/productcontent> for the latest availability information and additional product content details.

None: Not yet available Lead (Pb-Free).

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.

Green (RoHS & no Sb/Br): TI defines "Green" to mean "Pb-Free" and in addition, uses package materials that do not contain halogens, including bromine (Br) or antimony (Sb) above 0.1% of total product weight.

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

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