

54164/74164 8-Parallel-Out Serial Shift Register

	Schottky TTL				High-Speed TTL				Low-Power Schottky TTL				Standard TTL				Low-Power TTL															
	Device Type		Package		Device Type		Package		Device Type		Package		Device Type		Package		Device Type		Package													
	C	P	M	CF	C	P	M	CF	C	P	M	CF	C	P	M	CF	C	P	M	CF												
T.I.									SN54LS164	J	Ⓛ		W				SN54164	J	Ⓛ		W				SN54L164	J	Ⓛ		W			
FAIRCHILD									SN74LS164	J	Ⓛ		N	Ⓛ			SN74164	J	Ⓛ		N	Ⓛ			SN74L164	J	Ⓛ		N	Ⓛ		
MOTOROLA									FM54LS164/FM9LS164	D	Ⓛ						F54164/FM93164	D	Ⓛ						F74164/FC93164	D	Ⓛ					
N.S.C.									SN74LS164	P	Ⓛ					MC74164	P	Ⓛ														
PHILIPS									DM74LS164	Ⓛ						DM74164	N	Ⓛ						DM54L164	J	Ⓛ		N	Ⓛ			
SIGNETICS									DM54L164	Ⓛ														DM74L164	J	Ⓛ		N	Ⓛ			
SIEMENS									N74LS164	Ⓛ						N74164	Ⓛ															
FUJITSU									N74LS164	A	Ⓛ					N74164	F	Ⓛ	A	Ⓛ			W									
HITACHI									FLJ441	Ⓛ																						
MITSUBISHI									74LS164	M	Ⓛ																					
HITACHI									HD74LS164	P	Ⓛ					HD74164	Ⓛ															
MITSUBISHI									M74LS164	P	Ⓛ					M53364	P	Ⓛ														
NEC									AM74LS	C	Ⓛ					μPB2164	D	Ⓛ														
TOSHIBA																TD3503A	P	Ⓛ														
AMD									Am74LS164																							

Electrical Characteristics SN54LS164/SN74LS164

absolute maximum ratings over operating free-air temperature range

Supply voltage, V _{CC}	7 V	Operating free-air temperature range	SN54 ¹	-55°C to 125°C
Input voltage	7V	temperature range	SN74 ²	0°C to 70°C
		Storage temperature range		-65°C to 150°C

recommended operating conditions

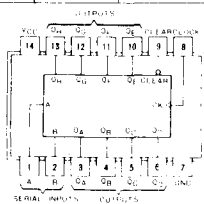
	SN54LS164			SN74LS164			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V _{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I _{OH}			-400			-400	μA
Low-level output current, I _{OL}			4			8	mA
Clock frequency, f _{clock}	0		25	0		25	MHz
Width of clock or clear input pulse, t _w	20			20			ns
Data setup time, t _{setup}	15			15			ns
Data hold time, t _{hold}	5			5			ns
Operating free-air temperature, T _A	-55		125	0		70	°C

electrical characteristics over recommended operating free-air temperature range

PARAMETER	TEST CONDITIONS †	MIN	TYP ‡	MAX †	UNIT	
V _{IH}	High-level input voltage		2		V	
V _{IL}	Low-level input voltage			0.8	V	
V _I	Input clamp voltage	V _{CC} = MIN, I _I = 18mA		-1.5	V	
V _{OH}	High-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8V, I _{OH} = -400μA	2.7	3.5	V	
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8V, I _{OL} = 8mA	0.35	0.5	V	
I _I	Input current maximum input voltage	V _{CC} = MAX, V _I = 7V		0.1	mA	
I _{IH}	High-level input current	V _{CC} = MAX, V _I = 2.7V		20	μA	
I _{IL}	Low-level input current	V _{CC} = MAX, V _I = 0.4V		0.4	mA	
I _{OS}	Short-circuit output current ♦	V _{CC} = MAX	SN54LS -20	100	mA	
I _{CC}	Supply current	V _{CC} = MAX, See Note 1		16	21	mA
f _{max}	Maximum clock frequency	V _{CC} = 5V, C _L = 15pF	25	36	MHz	
t _{PHL}	Propagation delay time, high to low level 0 outputs from clear input	V _{CC} = 5V, T _A = 25°C, R _L = 2k ¹		24	36	ns
t _{PLH}	Propagation delay time, low to high level 0 outputs from clock input			17	27	ns
t _{PHL}	Propagation delay time, high to low level 0 outputs from clock input			21	32	ns

Pin Assignment (Top View)

①



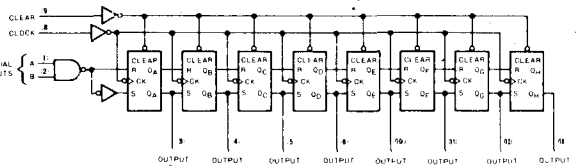
positive logic: see function table

Function Table

164, LS164, L164 (see Note 2)

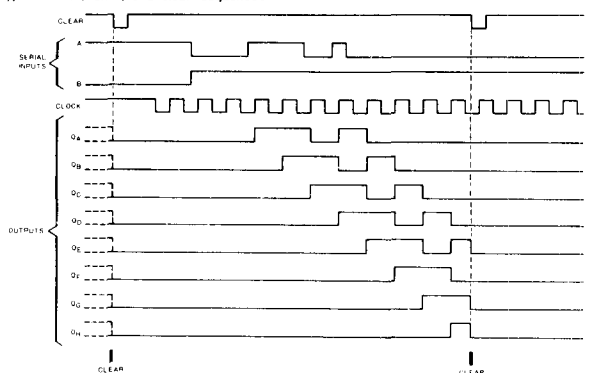
CLEAS	CLOCK	INPUTS		OUTPUTS		
		A	B	QA	QB	QH
L	X	X	X	L	L	L
L	L	X	X	QA ₀	QB ₀	QH ₀
H	↑	H	H	QA _n	QB _n	QH _n
H	↑	L	X	QA _n	QB _n	QH _n
H	↑	X	L	QA _n	QB _n	QH _n

Functional Block Diagram



164, LS164, L164 8-BIT PARALLEL-OUT SHIFT REGISTER

typical clear, shift, and clear sequences



- NOTES: 1. I_{CC} is measured with outputs open, serial inputs grounded, and a momentary ground, then 4.5V, applied to clear.
 2. H = high level (steady state), L = low level (steady state)
 X = irrelevant (any input, including transitions)
 † = transition from low to high level.
 QA₀, QB₀, QH₀ = the level of QA, QB, or QH, respectively, before the indicated steady-state input conditions were established.
 QA_n, QB_n = the level of QA or QB before the most-recent transition of the clock; indicates a one-bit shift.

† For conditions shown at MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

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

♦ Not more than two outputs should be shorted at a time.