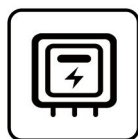
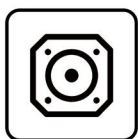


自主封測 品質把控 售後保障

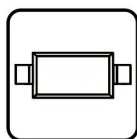
WEB | WWW.TDSEMIC.COM



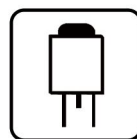
電源管理



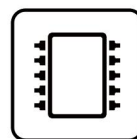
顯示驅動



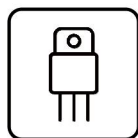
二三極管



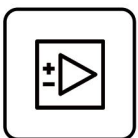
LDO穩壓器



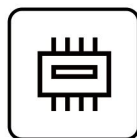
觸摸芯片



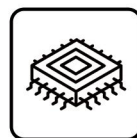
MOS管



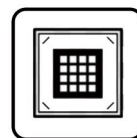
運算放大器



存儲芯片



MCU



串口通信

SN74LS164DR-TD

產品規格說明書

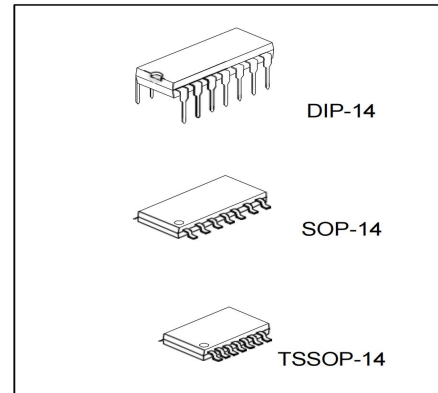
1. DESCRIPTION

The 74LS164 is an 8-bit edge-triggered shift registers with serial input and parallel output. A LOW-to-HIGH transition on the CP will shifts the data one place to the right which is the logical AND of DSA and DSB.

A Low level on the $\overline{MR}$ will clear the registers asynchronously and force the outputs LOW.

2. FEATURES

- Wide Operation Voltage Range: 2~6V
- Asynchronous Reset Input
- Low Input Current: 0.1 μ A
- Latch-up performance $\leq$ 250 mA
- ESD protection:
 - HBM: ANSI/ESDA/JEDEC JS-001 2023 exceeds 1500 V
 - CDM: ANSI/ESDA/JEDEC JS-002 2022 exceeds 1000 V
- Package Options DIP-14, SOP-14 and TSSOP-14



3. ORDERING INFORMATION

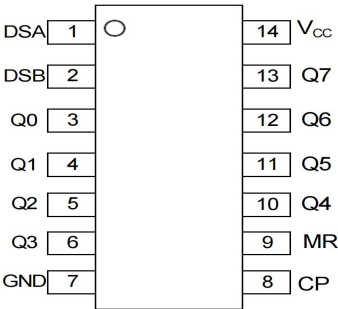
• Tube

Part Number	Marking code	Package	Packing	Pcs/Tube	Pcs/Box
74LS164N	74LS164	DIP-14	Tube	25	1250

• Tape Reel

Part Number	Marking code	Package	Packing	Pcs/Reel	Pcs/ Box
74LS164D-TD	74LS164	SOP-14	Tape Reel	2.5K	50k
74LS164S-R	74LS164	TSSOP-14	Tape Reel	5K	80k

4. PIN CONFIGURATION

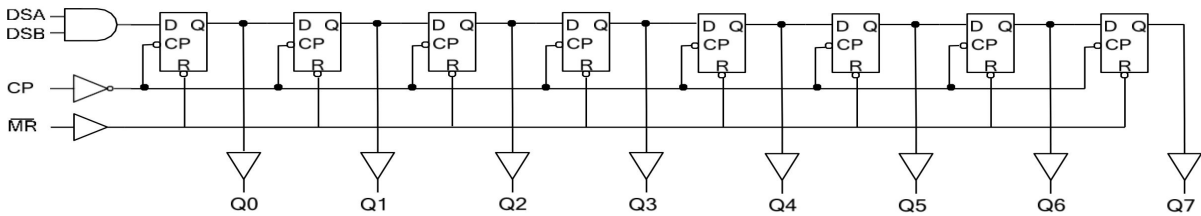


5. FUNCTION TABLE

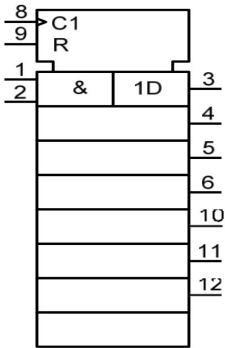
INPUT				OUTPUT	
MR	CP	DSA	DSB	Q0	Q1 to Q7
L	X	X	X	L	L to L
H	L	X	X	Q0	Q1 to Q7
H	↑	H	L	L	Q0 to Q6
H	↑	H	H	H	Q0 to Q6
H	↑	L	H	L	Q0 to Q6
H	↑	L	L	L	Q0 to Q6

6. FUNCTIONAL DIAGRAM

Logic Diagram



IEC Logic Symbol



7. ABSOLUTE MAXIMUM RATING (T_A=25°C, unless otherwise specified)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V _{CC}	-0.5 ~ 7.0	V
VCC or GND Current	I _{CC}	±50	mA
Output Current	I _{OUT}	±25	mA
Input Diode Current	I _{IK}	±20	mA
Switch Diode Current	I _{OK}	±20	mA
Storage Temperature	T _{STG}	-65 ~ +150	°C

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.
Absolute maximum ratings are stress ratings only and functional device operation is not implied.

8. RECOMMENDED OPERATING COMDITIONS

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Supply Voltage	V _{CC}	-	2.0	5.0	6.0	V
Input Voltage	V _{IN}	-	0	-	V _{CC}	V
Output Voltage	V _{OUT}	-	0	-	V _{CC}	V
Input Transition Rise or Fall Rate	$\Delta t / \Delta v$	V _{CC} =2V	-	-	1000	ns
		V _{CC} =4.5V	-	6.0	500	ns
		V _{CC} =6V	-	-	400	ns
Operating Temperature	T _A	-	-40	-	+125	°C

9. THERMAL DATA

PARAMETER	SYMBOL	RATINGS	UNIT
Ambient to Junction	DIP-14	100	°C/W
	SOP-14U	125	°C/W
	TSSOP-14U	150	°C/W

10. ELECTRICAL CHARACTERISTICS(T_A=25°C, Unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Input Voltage High-Level	V _{IH}	V _{CC} =2.0V	1.5	1.2	-	V
		V _{CC} =4.5V	3.15	2.4	-	V
		V _{CC} =6.0V	4.2	3.2	-	V
Input Voltage Low-Level	V _{IL}	V _{CC} =2.0V	-	0.8	0.5	V
		V _{CC} =4.5V	-	2.1	1.35	V
		V _{CC} =6.0V	-	2.8	1.8	V
Output Voltage High-Level	V _{OH}	V _{CC} =2.0V, I _{OH} =20μA	1.9	2.0	-	V
		V _{CC} =4.5V, I _{OH} =20μA	4.4	4.5	-	V
		V _{CC} =6.0V, I _{OH} =20μA	5.9	6.0	-	V
		V _{CC} =4.5V, I _{OH} =4mA	3.98	4.32	-	V
		V _{CC} =6.0V, I _{OH} = 5.2mA	5.48	5.81	-	V
Output Voltage Low-Level	V _{OL}	V _{CC} =2.0V, I _{OL} =20μA	-	0	0.1	V
		V _{CC} =4.5V, I _{OL} =20μA	-	0	0.1	V
		V _{CC} =6.0V, I _{OL} =20μA	-	0	0.1	V
		V _{CC} =4.5V, I _{OL} =4mA	-	0.15	0.26	V
		V _{CC} =6.0V, I _{OL} =5.2mA	-	0.16	0.26	V
Input Leakage Current	I _{I(LEAK)}	V _{IN} =V _{CC} or GND V _{CC} =6.0V	-	-	±1.0	μA
Quiescent Supply Current	I _Q	V _{IN} =V _{CC} or GND V _{CC} =6.0V, I _{OUT} =0	-	-	8	μA
Input Capacitance	C _{IN}		-	3.5	-	pF

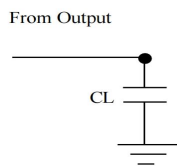
11. DYNAMIC CHARACTERISTICS (GND=0V; $t_R=t_F=6\text{ns}$; $C_L=50\text{pF}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Propagation Delay From CP to Qn	t_{PHL}, t_{PLH}	$V_{CC}=2.0\text{V}$	-	41	255	ns
		$V_{CC}=4.5\text{V}$	-	15	51	ns
		$V_{CC}=6.0\text{V}$	-	12	43	ns
Propagation Delay From $\overline{\text{MR}}$ to Qn	t_{PHL}	$V_{CC}=2.0\text{V}$	-	39	210	ns
		$V_{CC}=4.5\text{V}$	-	14	42	ns
		$V_{CC}=6.0\text{V}$	-	11	36	ns
Output Transition Time	t_{THL}, t_{TLH}	$V_{CC}=2.0\text{V}$	-	19	110	ns
		$V_{CC}=4.5\text{V}$	-	7	22	ns
		$V_{CC}=6.0\text{V}$	-	6	19	ns
Clock Pulse Width High or Low	t_w	$V_{CC}=2.0\text{V}$	80	14	-	ns
		$V_{CC}=4.5\text{V}$	16	5	-	ns
		$V_{CC}=6.0\text{V}$	14	4	-	ns
Master Reset Pulse Width Low	t_w	$V_{CC}=2.0\text{V}$	60	17	-	ns
		$V_{CC}=4.5\text{V}$	12	6	-	ns
		$V_{CC}=6.0\text{V}$	10	5	-	ns
Removal Time $\overline{\text{MR}}$ to CP	t_{rem}	$V_{CC}=2.0\text{V}$	60	17	-	ns
		$V_{CC}=4.5\text{V}$	12	6	-	ns
		$V_{CC}=6.0\text{V}$	10	5	-	ns
Setup Time DSA and DSB to CP	t_{SU}	$V_{CC}=2.0\text{V}$	60	8	-	ns
		$V_{CC}=4.5\text{V}$	12	3	-	ns
		$V_{CC}=6.0\text{V}$	10	2	-	ns
Hold Time DSA and DSB to CP	t_h	$V_{CC}=2.0\text{V}$	+4	-6	-	ns
		$V_{CC}=4.5\text{V}$	+4	-2	-	ns
		$V_{CC}=6.0\text{V}$	+4	-2	-	ns
Maximum Clock Pulse Frequency	f_{MAX}	$V_{CC}=2.0\text{V}$	6	23	-	MHZ
		$V_{CC}=4.5\text{V}$	30	71	-	MHZ
		$V_{CC}=6.0\text{V}$	35	85	-	MHZ
Clock Frequency	f_{CLOCK}	$V_{CC}=2.0\text{V}$	-	-	6	MHz
		$V_{CC}=4.5\text{V}$	-	-	31	MHz
		$V_{CC}=6.0\text{V}$	-	-	36	MHz

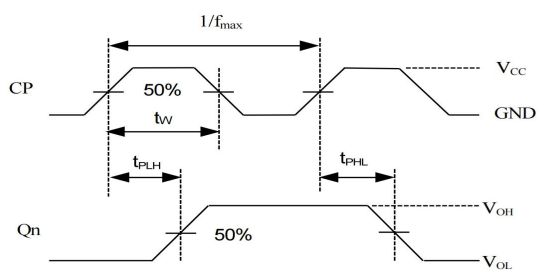
12. OPERATING CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
Power Dissipation Capacitance	C_{PD}	No load	-	40	-	pF

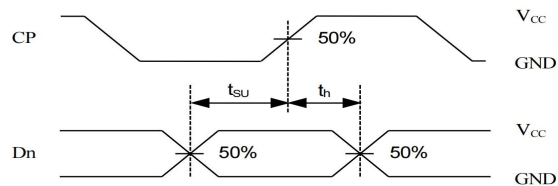
13. TEST CIRCUIT AND WAVEFORMS



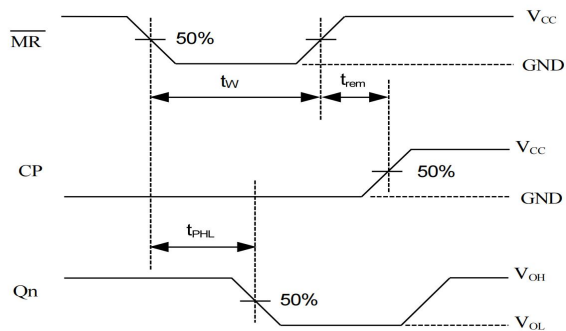
TEST CIRCUIT



PROPAGATION DELAY TIMES FROM CP TO Qn



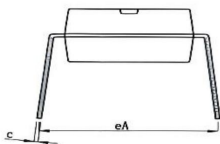
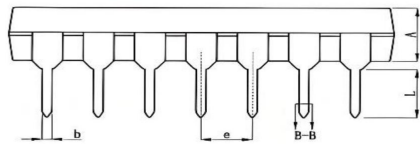
SETUP TIME AND HOLD TIME



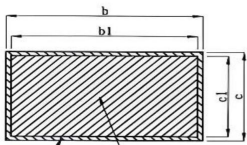
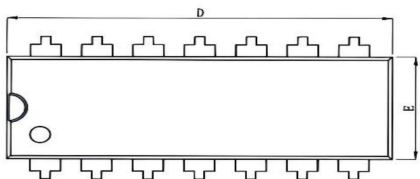
PROPAGATION DELAY TIMES FROM MR TO Qn

14. PACKAGE INFORMATION

DIP 14 package information

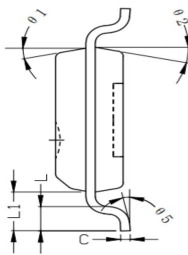
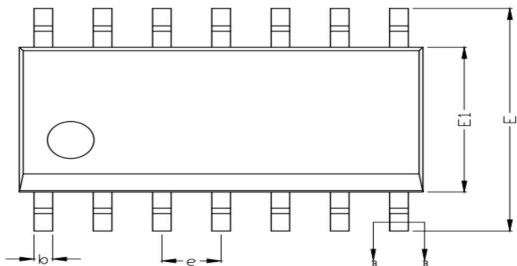


Symbol	Millimeter		
	Min	Nom	Max
A	3.20	3.30	3.40
b	0.44	-----	0.53
b1	0.43	0.46	0.49
c	0.25	-----	0.30
c1	0.24	0.25	0.26
D	18.95	19.05	19.15
E	6.25	6.35	6.45
e	2.54BSC		
eA	7.62	-----	9.50
L	3.00	-----	-----

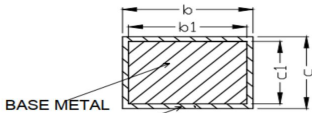
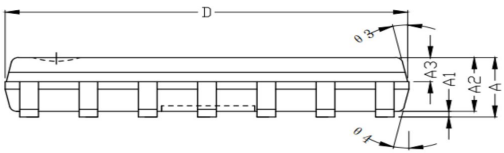


SECTION B-B

SOP 14 package information

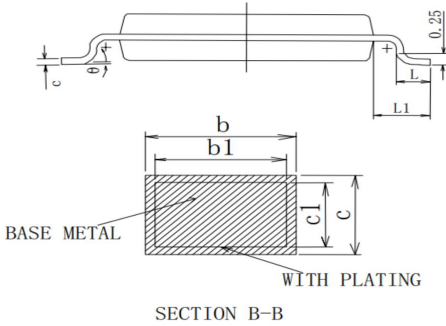
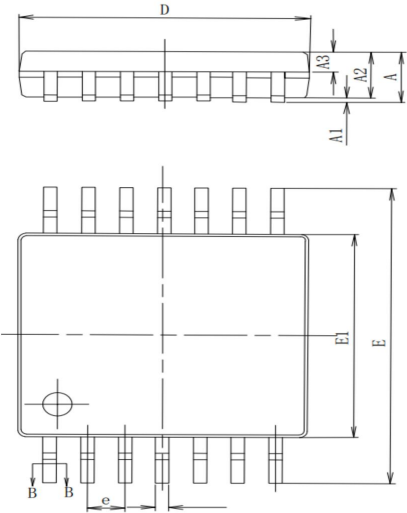


SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	---	---	1.70
A1	0.10	0.15	0.21
A2	1.40	1.45	1.50
A3	0.60	0.65	0.70
b	0.33	---	0.47
b1	0.32	0.41	0.44
c	0.20	---	0.24
c1	0.19	0.20	0.21
D	8.45	8.60	8.75
E	5.80	6.00	6.20
E1	3.85	3.90	4.00
e	1.27(BSC)		
L	0.50	0.60	0.70
L1	1.10(BSC)		
θ 1	8°	~	15°
θ 2	8°	~	15°
θ 3	8°	~	15°
θ 4	8°	~	15°
θ 5	0°	~	6°



SECTION B-B

TSSOP 14 package information



SYMBOL	MILLIMETER		
	MIN	NOM	MAX
A	—	—	1.20
A1	0.05	—	0.15
A2	0.90	1.00	1.05
A3	0.39	0.44	0.49
b	0.20	—	0.28
b1	0.19	0.22	0.25
c	0.13	—	0.17
c1	0.12	0.13	0.14
D	4.90	5.00	5.10
E1	4.30	4.40	4.50
E	6.20	6.40	6.60
e	0.65BSC		
L	0.45	0.60	0.75
L1	1.00BSC		
θ	0	—	8°