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CMOS Logic

■ GENERAL DESCRIPTION

XC74WL74AASR is d-type flip flop manufactured using silicon gate CMOS processes. The small supply current, which is one of the features of the CMOS logic, gives way to high speed operations which enables LS-TTL.

With wave forming buffers connected internally, stabilized output can be achieved as the series offers high noise immunity.

As the series is integrated into a mini molded, MSOP-8B package, high density mounting is possible.

■ APPLICATIONS

- Palmtops
- Digital equipment

■ FEATURES

High Speed Operations : $f_{max} = 170\text{MHz}$ (TYP.) ($V_{CC}=5\text{V}$)

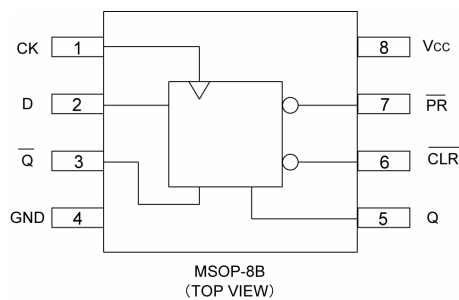
Operating Voltage Range : $2\text{V} \sim 5.5\text{V}$

Low Power Consumption: $1\ \mu\text{A}$ (MAX.)@ $T_a=25^\circ\text{C}$

CMOS Logic D-Type Flip Flop

Small Package : MSOP-8B

■ PIN CONFIGURATION



■ FUNCTIONS

INPUT				OUTPUT	
$\overline{\text{PR}}$	$\overline{\text{CLR}}$	CK	D	Q	$\overline{\text{Q}}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H
H	H	\uparrow	H	H	L
H	H	\downarrow	L	L	H
H	H	\downarrow	X	Q_0	$\overline{Q_0}$

H=High level

L=Low level

X=Don't care

■ ABSOLUTE MAXIMUM RATINGS

Ta=-40°C~85°C

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	V _{CC}	-0.5~+6.0	V
Input Voltage	V _{IN}	-0.5~+6.0	V
Output Voltage	V _{OUT}	-0.5~V _{CC} +0.5	V
Input Diode Current	I _{IK}	-20	mA
Output Diode Current	I _{OK}	±20	mA
Switch Output Current	I _{OUT}	±25	mA
V _{CC} ,GND Current	I _{CC} ,I _{GND}	±50	mA
Power Dissipation (Ta = 25°C)	P _d	300	mW
Storage Temperature Range	T _{stg}	-65~+150	°C

Note; Voltage is all ground standardized.

■ RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	CONDITIONS	UNITS
Supply Voltage	V _{CC}	2~5.5	V
Input Voltage	V _{IN}	0~5.5	V
Output Voltage	V _{OUT}	0~ V _{CC}	V
Operating Temperature Range	T _{opr}	-40~+85	°C
Input Rise and Fall Time	tr, tf	0~200 (V _{CC} =3.3V)	ns
		0~100 (V _{CC} =5V)	

■ DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	V _{CC} (V)	CONDITIONS	Ta=25°C			Ta=-40°C~85°C		UNITS	
				MIN.	TYP.	MAX.	MIN.	MAX.		
Input Voltage	V _{IH}	2.0		1.5	—	—	1.5	—	V	
		3.0		2.1	—	—	2.1	—		
		5.5		3.85	—	—	3.85	—		
	V _{IL}	2.0		—	—	0.5	—	0.5	V	
		3.0		—	—	0.9	—	0.9		
		5.5		—	—	1.65	—	1.65		
Output Voltage	V _{OH}	2.0	V _{IN} =V _{IL}	I _{OH} =-50 μA	1.9	2.0	—	1.9	—	V
		3.0			2.9	3.0	—	2.9	—	
		4.5			4.4	4.5	—	4.4	—	
		3.0		I _{OH} =-4mA	2.58	—	—	2.48	—	
		4.5		I _{OH} =-8mA	3.94	—	—	3.80	—	
	V _{OL}	V _{IN} =V _{IL} or V _{IH}	I _{OL} =50 μA	2.0	—	—	0.1	—	0.1	V
				3.0	—	—	0.1	—	0.1	
				4.5	—	—	0.1	—	0.1	
			3.0	I _{OL} =4mA	—	—	0.36	—	0.44	
			4.5	I _{OL} =8mA	—	—	0.36	—	0.44	
Input Current	I _{IN}	0~5.5	V _{IN} =V _{CC} or GND	-0.1	—	0.1	-1.0	1.0	μA	
Static Supply Current	I _{CC}	5.5	V _{IN} =V _{CC} or GND, I _{OUT} =0 μA	—	—	1.0	—	10.0	μA	

SWITCHING ELECTRICAL CHARACTERISTICS

(tr=tf=3ns)

PARAMETER	SYMBOL	CONDITIONS		Ta=25°C			Ta=-40°C~85°C		UNITS	
		CL	Vcc(V)	MIN.	TYP.	MAX.	MIN.	MAX.		
Delay Time (CK-Q, \bar{Q})	t _{PLH}	15pF	3.3		—	6.7	11.9	1.0	14.0	ns
			5.0		—	4.6	7.3	1.0	8.5	
		50pF	3.3		—	9.2	15.4	1.0	17.5	ns
			5.0		—	6.1	9.3	1.0	10.5	
	t _{PHL}	15pF	3.3		—	6.7	11.9	1.0	14.0	ns
			5.0		—	4.6	7.3	1.0	8.5	
		50pF	3.3		—	9.2	15.4	1.0	17.5	ns
			5.0		—	6.1	9.3	1.0	10.5	
Delay Time (PR, CLR-Q, \bar{Q})	t _{PLH}	15pF	3.3		—	7.6	12.3	1.0	14.5	ns
			5.0		—	4.8	7.7	1.0	9.0	
		50pF	3.3		—	10.1	15.8	1.0	18.0	ns
			5.0		—	6.3	9.7	1.0	11.0	
	t _{PHL}	15pF	3.3		—	7.6	12.3	1.0	14.5	ns
			5.0		—	4.8	7.7	1.0	9.0	
		50pF	3.3		—	10.1	15.8	1.0	18.0	ns
			5.0		—	6.3	9.7	1.0	11.0	
Minimum Set Up Time	ts(L)	—	3.3		6.0	—	—	7.0	—	ns
	ts(H)	—	5.0		5.0	—	—	5.0	—	
Minimum Hold Time	th(L)	—	3.3		2.0	—	—	2.0	—	ns
	th(H)	—	5.0		2.0	—	—	2.0	—	
Minimum Pulse Width (CK)	tw(L)	—	3.3		7.0	—	—	7.0	—	ns
	tw(H)	—	5.0		5.0	—	—	5.0	—	
Minimum Pulse Width (\bar{PR} , \bar{CLR})	Tw	—	3.3		7.0	—	—	7.0	—	ns
		—	5.0		5.0	—	—	5.0	—	
Minimum Removal Time (\bar{PR} , \bar{CLR})	trem	—	3.3		5.0	—	—	5.0	—	ns
		—	5.0		3.0	—	—	3.0	—	
Maximum Clock Frequency	fmax	15pF	3.3		80	125	—	70	—	MHz
			5.0		130	170	—	110	—	
	50pF	3.3		50	75	—	45	—	MHz	
		5.0		90	115	—	75	—		
Input Capacitance	C _{IN}	—	5.0	V _{IN} =V _{CC} or GND	—	4	10	—	10	pF
Power Dissipation Capacitance	C _{pd}	No Load, f=1MHz			—	9.3	—	—	—	pF

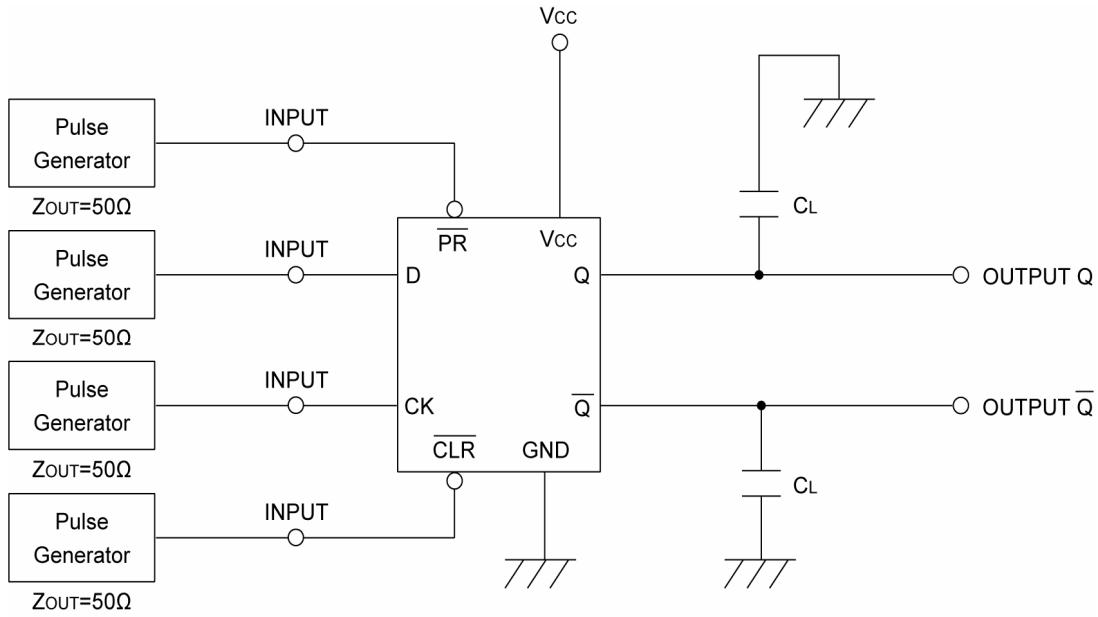
NOISE CHARACTERISTICS

(tr=tf=3ns)

PARAMETER	SYMBOL	CONDITIONS		Ta=25°C			UNITS	
		CL	Vcc(V)	MIN.	TYP.	MAX.		
Non Functional Output Maximum Dynamic V _{OL}	V _{OLP}	50pF	5.0		—	0.3	0.8	V
Non Functional Output Minimum Dynamic V _{OL}	V _{OLV}	50pF	5.0		-0.8	-0.3	—	V
Minimum Dynamic V _{IH}	V _{IHD}	50pF	5.0		—	—	3.5	V
Maximum Dynamic V _{IL}	V _{ILD}	50pF	5.0		—	—	1.5	V

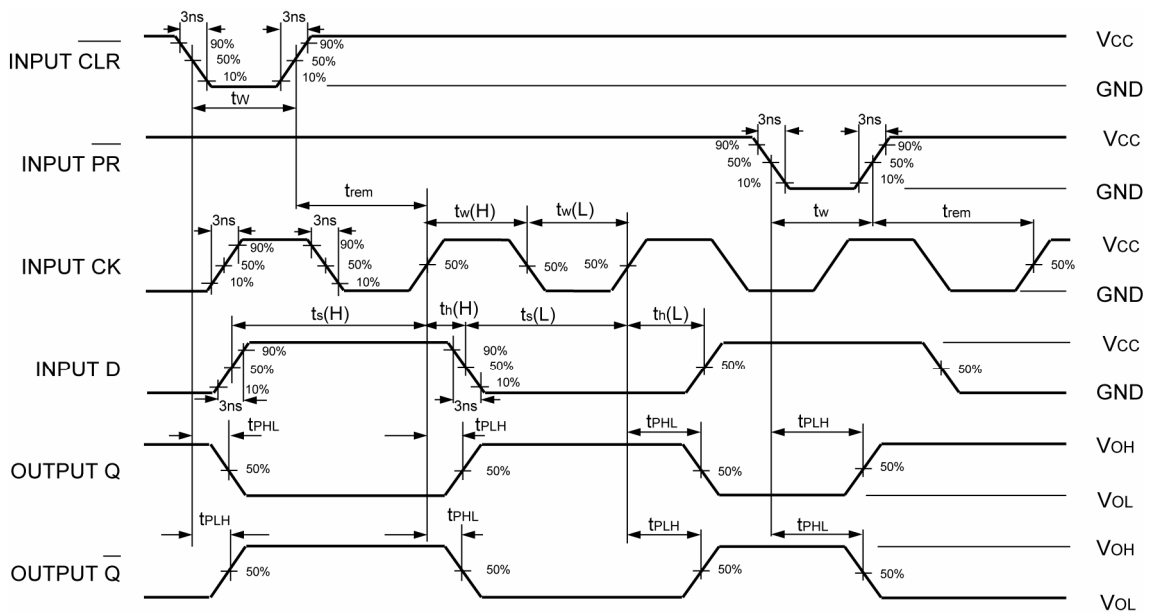
XC74WL74AASR

TEST CIRCUIT



Notes: V_{OUT} =open when measuring supply current

WAVEFORM



Notes: 1. Input Clock Frequency: 10MHz
2. D Input Frequency: 5MHz

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