SN74LS273N

Product Introduction

The SN74LS273N is an Octal D-type Positive-edge-triggered Flip-Flops(with Clear). Internal integration of 8 groups of D flip-flops triggered by rising edge, 8 groups share a zero-clearing input and a clock input.

Product Features

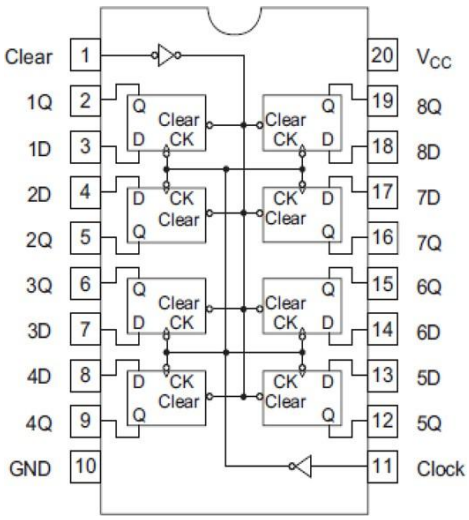
- Octal D-type Positive-edge-triggered Flip-Flops(with Clear)
- Fully compatible with TTL/DTL input and output logic level
- Package format: DIP20, SOP20

Product Applications

- Digital logic driver
- Industrial control application
- Other application areas

Package and Pin Assignment

SOP20 or DIP20.			
Pin NO	Pin Definition	Pin NO	Pin Definition
1	Clear	20	Supply VCC
2	Output 1Q	19	Output 8Q
3	Input 1D	18	Input 8D
4	Input 2D	17	Input 7D
5	Output 2Q	16	Output 7Q
6	Output 3Q	15	Output 6Q
7	Input 3D	14	Input 6D
8	Input 4D	13	Input 5D
9	Output 4Q	12	Output 5Q
10	Supply GND	11	Clock

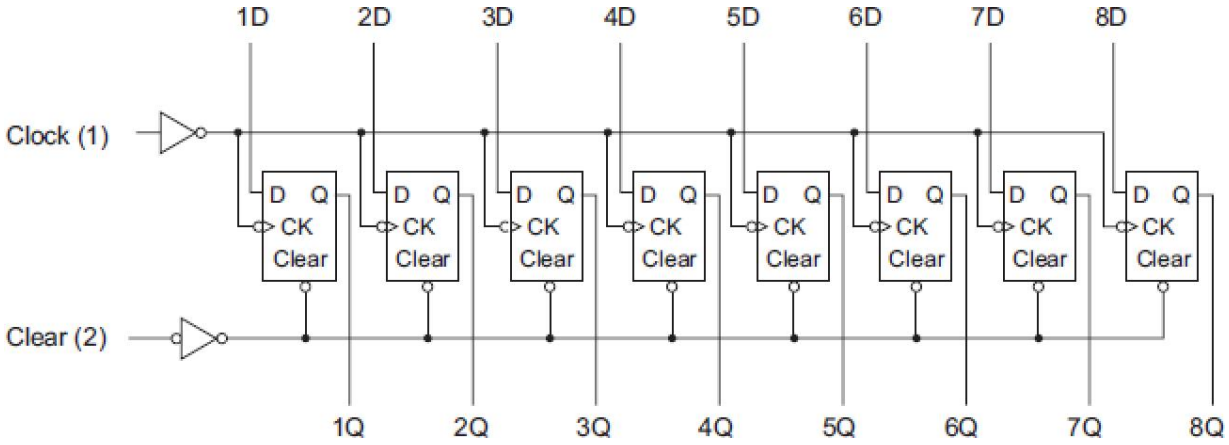


Absolute Maximum Ratings

Item	Symbol	Maximum Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	V_I	7	V
Power dissipation	P_D	500	mW
Operating temperature	T_A	0-70	℃
Storage temperature	T_S	-65-150	℃
Welding temperature	T_W	260,10s	℃

Note: the limit parameter is the limit value that cannot be exceeded under any condition. Once this limit is exceeded, it may cause physical damage such as deterioration of the product. At the same time, the chip can not be guaranteed to work properly when it is close to the limit parameters.

Block Diagram



Function Table

Inputs			Output
Clear	Clock	D	Q
L	X	X	L
H	↑	H	H
H	↑	L	L
H	L	X	Q_0

Notes: H; high level, L; low level, X; irrelevant; ↑; transition from low to high level

Q_0; level of Q before the indicated steady-state input conditions were established.

Recommended Operating Conditions

Item		Symbol	Min	Tpy	Max	Unit
Supply voltage		V_{CC}	4.75	5.00	5.25	V
Output current		I_{OH}	—	—	-400	uA
		I_{OL}	—	—	8	mA
Operating temperature		T_{opr}	0	—	60	℃
Clock frequency		fclock	0	—	30	MHz
Clock pulse width		$T_{W(CLK)}$	20	—	—	ns
Clear pulse width		$T_{W(CLR)}$	20	—	—	ns
Data hold time		th	5	—	—	ns
setup time	Data	tsu	20	—	—	ns
	Clear (inactive-state)		25	—	—	ns

Electrical Characteristics

(T_A=25℃, Unless specified)

Item	Symbol	Min	Tpy	Max	Unit	Conditions	
Input voltage	V_{IH}	2	—	—	V		
	V_{IL}	—	—	0.8	V		
Output voltage	V_{OH}	2.7	3.3	—	V	I_{OH}=-400uA	VCC=4.75V,V_{IH}=2V V_{IL}=0.8V
	V_{OL}	—	0.13	0.4	V	I_{OL}=4mA	
		—	0.23	0.5		I_{OL}=8mA	
Input current	I_{IH}	—	0.01	20	uA	VCC=5.25V, V_I=2.7V	
	I_{IL}	—	0.25	-0.4	mA	VCC=5.25V, V_I=0.4V	
	I_I	—	0.1	100	uA	VCC=5.25V, V_I=7V	
Short-circuit output current *	I_{OS}	-20	-34	-100	mA	VCC=5.25V	
Supply current**	I_{CC}	—	19	27	mA	VCC=5.25V	
Input clamp voltage	V_{IK}	—	0.9	-1.5	V	VCC=4.75V, I_I =–18mA	

Notes: *only one output port is short circuited each time, and the short circuit time is not more than one second.

** With all outputs open and 4.5 V applied to all data and clear inputs, ICC is measured after a momentary ground, then 4.5V is applied to clock.

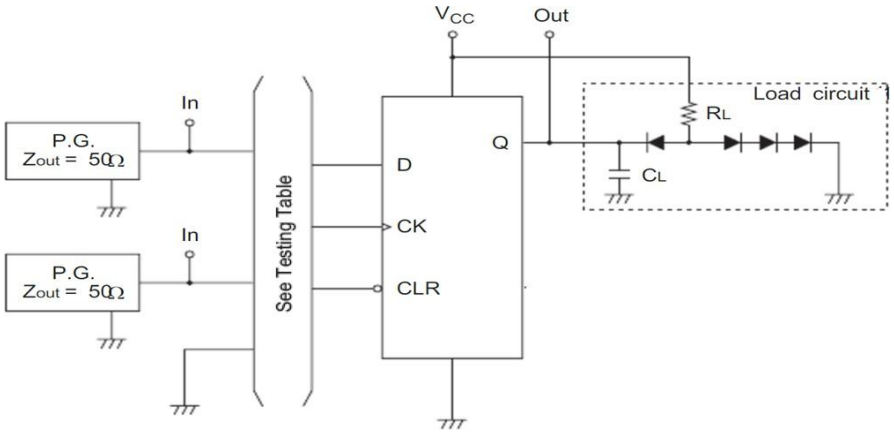
Switching Characteristics

(T_A=25℃, Unless specified)

Item	Symbol	Min	Tpy	Max	Unit	Conditions
Maximum clock frequency	fmax	0	25	—	MHz	V_{CC}=5V,C_L=16pF R_L=2K
Propagation delay time Clock to Q	t_{PLH}	—	19	—	ns	
	t_{PHL}	—	15	—	ns	
Propagation delay time Clear to Q	t_{PHL}	—	25	—	ns	

Testing Method

1、Test Circuit



Notes:

A. Input signal pulse: f=1MHzD=50%tTLH=tTHL is less than 20ns. except for special regulations.

B. The CL capacitor is an external patch capacitor (0603), which is connected to the output pin and the capacitor is near the chip GND.

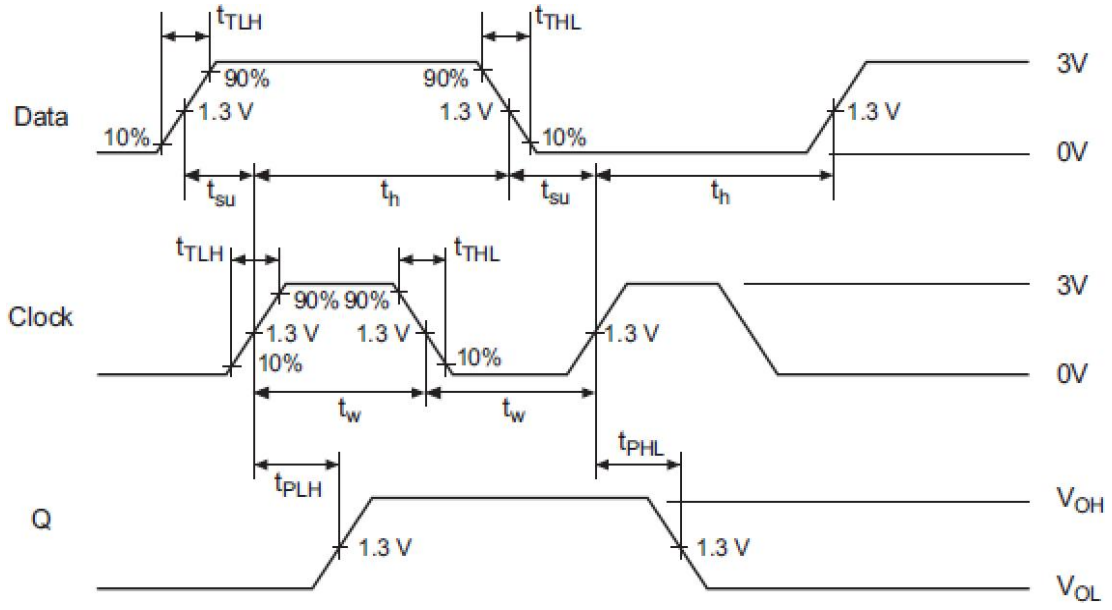
C. All diode models are 1S2074 (H).

D. See Testing Table refers to the corresponding test items in the switch characteristic table.

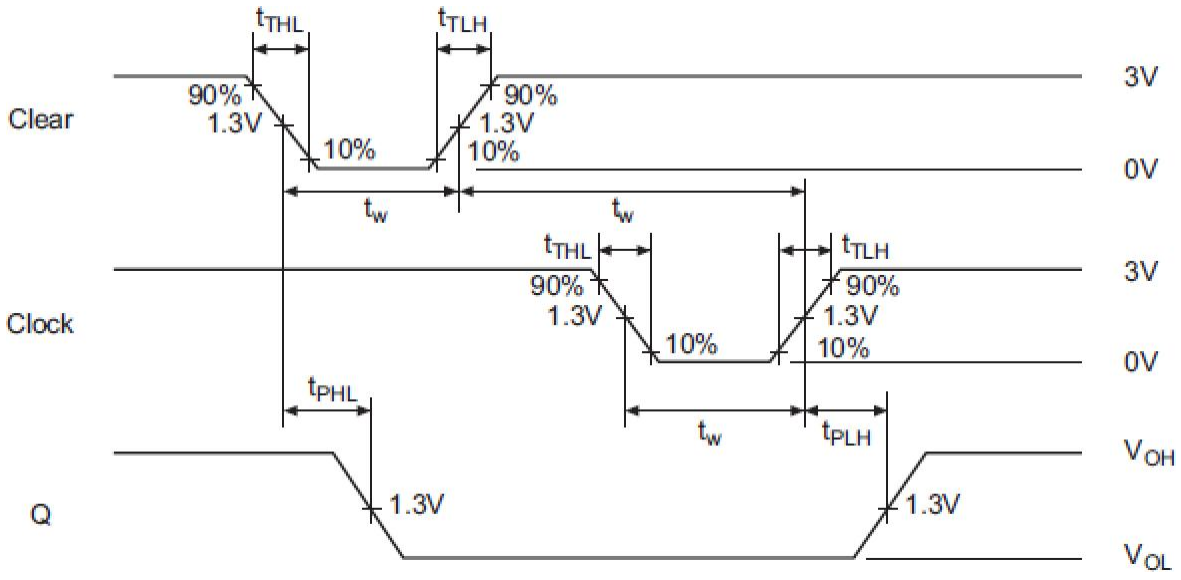
2、Test item list

Item	From input to output	Inputs			Outputs
		CLR	CK	D	Q
f_{max}	CK→Q	4.5 V	IN	IN	OUT
t_{PLH}	CK→Q	4.5 V	IN	IN	
t_{PHL}	CLR→Q	IN	IN	4.5 V	

3、Waveform



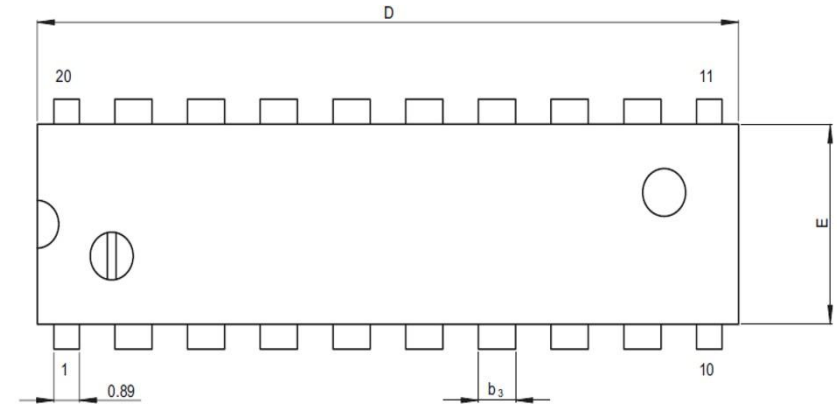
4、Waveform

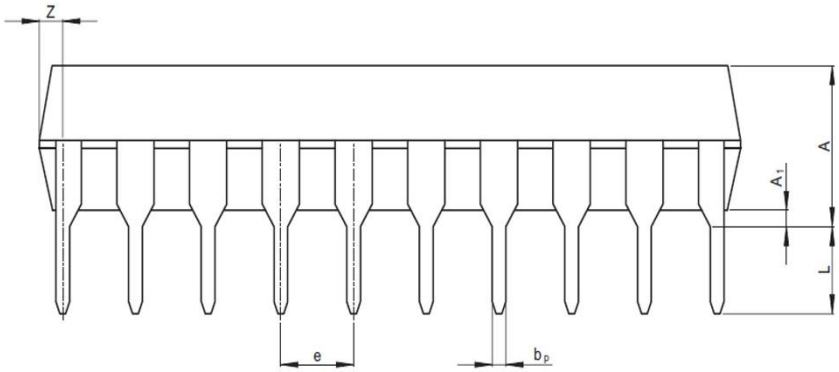


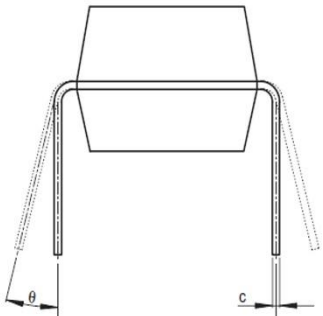
■ Package Dimensions

Unit : mm /inch

DIP20

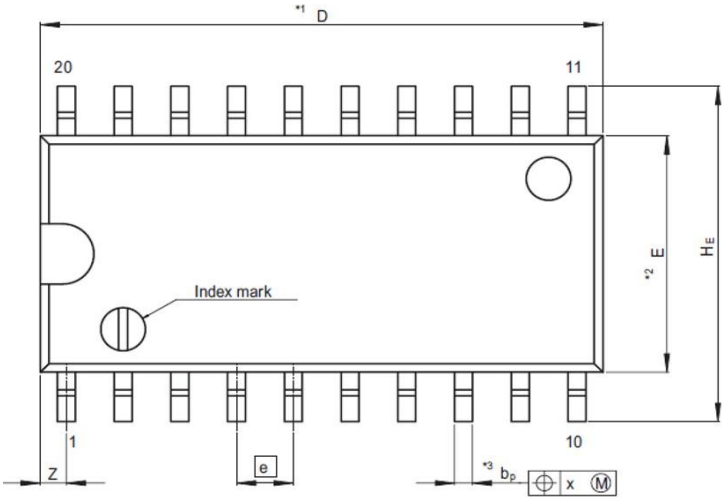


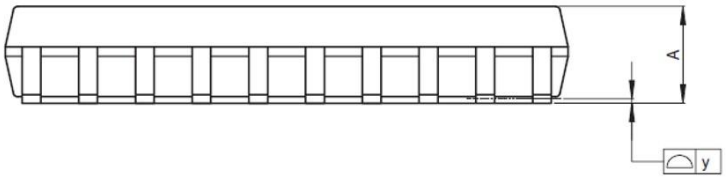


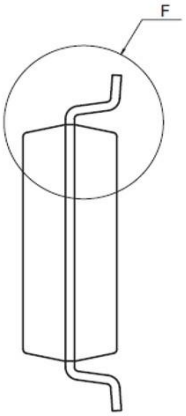


Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
e_1	——	7.62	——
D	——	24.50	25.40
E	——	6.30	7.00
A	——	——	5.08
A_1	0.51	——	——
b_p	0.40	0.48	0.56
b_3	——	1.30	——
c	0.19	0.25	0.31
θ	0°	——	15°
e	2.29	2.54	2.79
Z	——	——	1.27
L	2.54	——	——

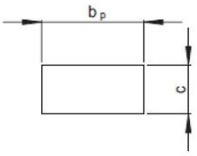
SOP20



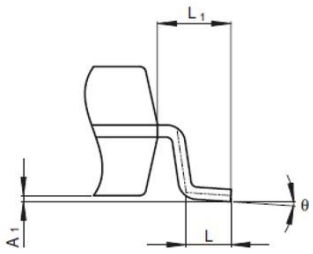




NOTE)
1. DIMENSIONS"*1 (Nom)"AND"*2" DO NOT INCLUDE MOLD FLASH.
2. DIMENSION"*3"DOES NOT INCLUDE TRIM OFFSET.



Terminal cross section
(Ni/Pd/Au plating)



Reference Symbol	Dimension in Millimeters		
	Min	Nom	Max
D	——	12.60	13.0
E	——	5.50	——
A_2	——	——	——
A_1	0.00	0.10	0.20
A	——	——	2.20
b_p	0.34	0.40	0.46
b_1	——	——	——
c	0.15	0.20	0.25
c_1	——	——	——
θ	0°	——	8°
H_E	7.50	7.80	8.00
e	——	1.27	——
x	——	——	0.12
y	——	——	0.15
Z	——	——	0.80
L	0.50	0.70	0.90
L_1	——	1.15	——