HD74LS273 ●Octal D-type Positive-edge-triggered Flip-Flops (with Clear)

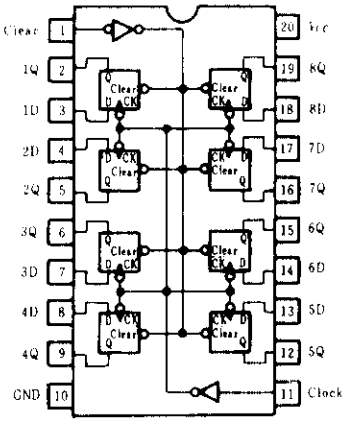
The HD74LS273, positive-edge-triggered flip-flops utilize LS TTL circuitry to implement D-type flip-flop logic with a direct clear input.

Information at the D inputs meeting the setup time requirements is transferred to the Q outputs on the positive-going edge of the clock pulse.

Clock triggering occurs at a particular voltage level and is not directly related to the transition time of the positive-going pulse.

When the clock input is at either the high or low level, the D input signal has no effect at the output.

■PIN ARRANGEMENT



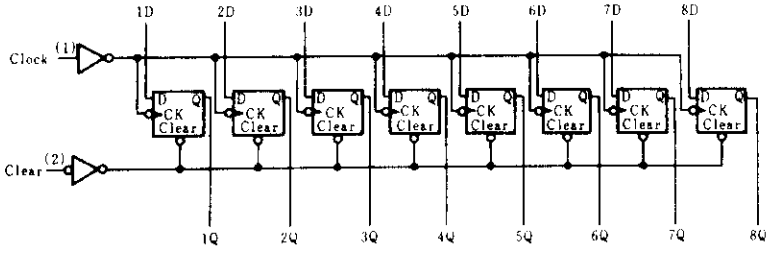
(Top View)

■FUNCTION TABLE

Inputs			Output
Clear	Clock	D	Q
L	×	×	L
H	↑	H	H
H	↑	L	L
H	L	×	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.

■BLOCK DIAGRAM



■RECOMMENDED OPERATING CONDITIONS

Item		Symbol	min	typ	max	Unit
Supply voltage		V_{CC}	4.75	5.00	5.25	V
Output current		I_{OH}	—	—	−400	μA
		I_{OL}	—	—	8	mA
Clock frequency		f_{clock}	0	—	30	MHz
Clock and clear pulse width		t_W	20	—	—	ns
Setup time	Data	t_{su}	20 ↑	—	—	ns
	Clear inactive-state		25 ↑	—	—	
Data hold time		t_h	5 ↑	—	—	ns

Note) ↑ : The arrow indicates the rising edge of clock pulse.

■ELECTRICAL CHARACTERISTICS (Ta = −20 ~ +75°C)

Item	Symbol	Test Conditions		min	typ*	max	Unit
Input voltage	V_{IH}			2.0	—		V
	V_{IL}			—	—	0.8	V
Output voltage	V_{OH}	V_{CC}=4.75V, V_{IH}=2V, V_{IL}=0.8V, I_{OH}=−400μA		2.7	—		V
	V_{OL}	V_{CC}=4.75V, V_{IH}=2V, V_{IL}=0.8V	I_{OL}=8mA	—	—	0.5	V
			I_{OL}=4mA	—	—	0.4	
Input current	I_I	V_{CC}=5.25V, V_I=7V		—	—	0.1	mA
	I_{IH}	V_{CC}=5.25V, V_I=2.7V		—	—	20	μA
	I_{IL}	V_{CC}=5.25V, V_I=0.4V		—	—	−0.4	mA
Short-circuit output current	I_{OS}	V_{CC}=5.25V		−20	—	−100	mA
Supply current	I_{CC}**	V_{CC}=5.25V		—	17	27	mA
Input clamp voltage	V_{IK}	V_{CC}=4.75V, I_{IN}=−18mA		—	—	−1.5	V

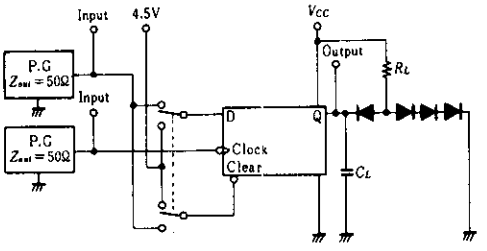
* V_{CC}=5V, Ta=25°C

** : With all outputs open and 4.5V applied to all data and clear inputs, I_{CC} is measured after a momentary ground, then 4.5V is applied to clock.

■SWITCHING CHARACTERISTICS (V_{CC}=5V, Ta=25°C)

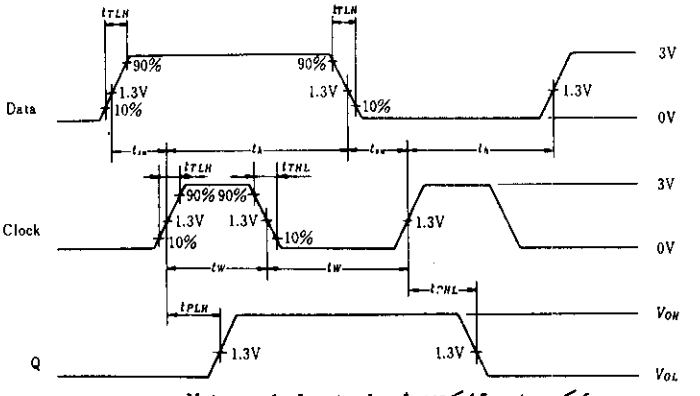
Item	Symbol	Inputs	Test Conditions	min	typ	max	Unit
Maximum clock frequency	f_{max}	Clock	C_L=15pF, R_L=2kΩ	30	—	—	MHz
Propagation Delay Time	t_{PHL}	Clear		—	18	27	ns
	t_{PLH}	Clock		—	17	27	
	t_{PHL}			—	18	27	

■TESTING METHOD



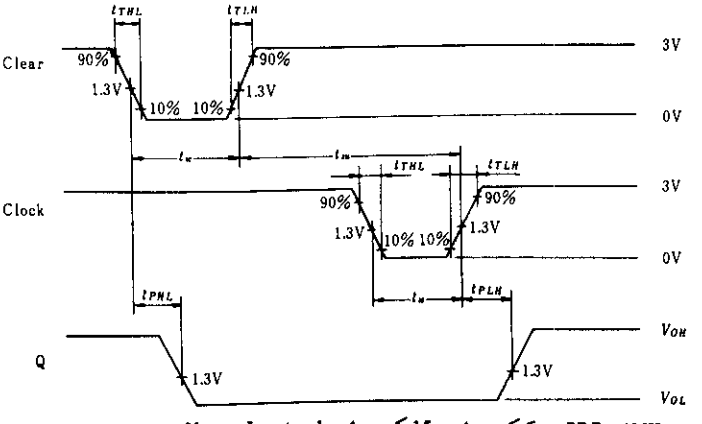
Notes: 1. C_L includes probe and jig capacitance.
2. All diodes are 1S2074 Ⓗ.

Waveform-1



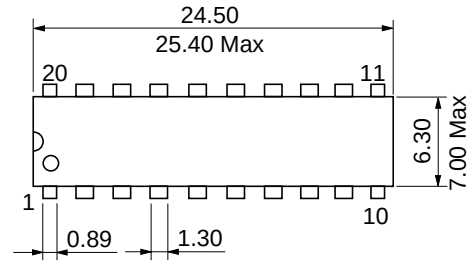
Notes: 1. Input pulse; $t_{TLH} \leqq 15$ns, $t_{TLH} \leqq 6$ns
Clock input; PRR = 1MHz, duty cycle 50%
Data input; PRR = 500kHz, duty cycle 50%

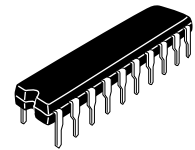
Waveform-2

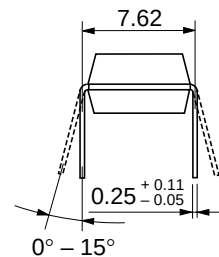


Note: Input pulse; $t_{TLH} \leqq 15$ns, $t_{THL} \leqq 6$ns, PRR = 1MHz.

Unit: mm

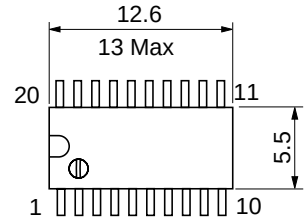


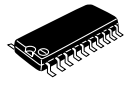


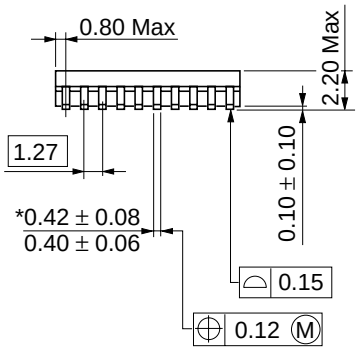


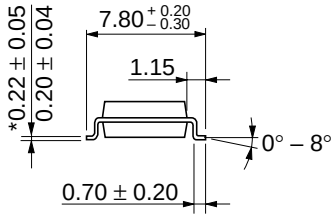
Hitachi Code	DP-20N
JEDEC	—
EIAJ	Conforms
Weight (reference value)	1.26 g

Unit: mm





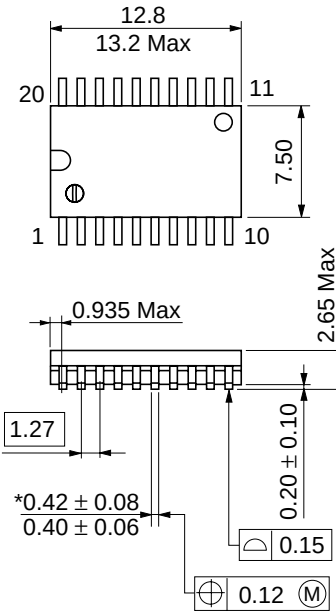


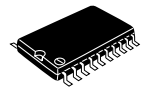


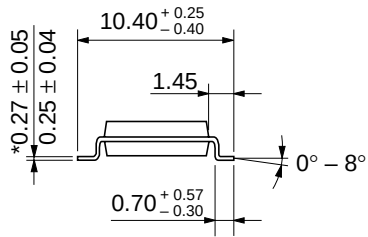
*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.31 g

Unit: mm







*Dimension including the plating thickness
Base material dimension

Hitachi Code	FP-20DB
JEDEC	Conforms
EIAJ	—
Weight (reference value)	0.52 g

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