

EVVOSEMI[®]

THINK CHANGE DO



ESD



TVS



MOS



LDO



Diode



Sensor



DC-DC

Product Specification

▶ Domestic	Part Number	74HC74D / 74HCT74D
▶ Overseas	Part Number	74HC74D / 74HCT74D
▶ Equivalent	Part Number	74HC74D / 74HCT74D

EV is the abbreviation of name EVVO

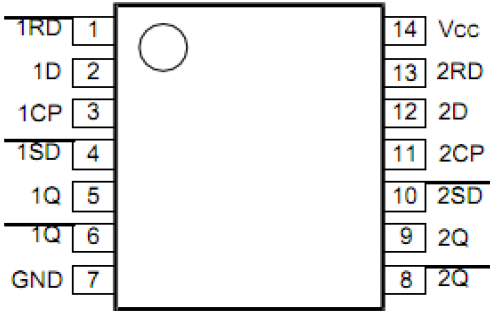
描述

74HC/HCT74是双路上升沿触发的D型触发器。它们具有单独的数据（nD），时钟（nCP），置数（nSD）和复位（nRD）输入以及互补的nQ和nQ输出。满足从低电平到高电平时钟转换的建立和保持时间要求的nD输入处的数据存储在触发器中，并出现在nQ输出中。输入内置钳位二极管。这样就可以使用限流电阻将输入接口连接到超过V_{CC}的电压。

特点

- 对称输出阻抗
- 低功耗
- 均衡的传输延时

引脚定义



引脚	符 号	功 能
1	1RD	异步复位输入（低电平有效）
2	1D	数据输入
3	1CP	时钟输入（低电平到高电平，边缘触发）
4	1SD	异步置数输入（低电平有效）
5	1Q	输出
6	1Q	反相输出
7	GND	地（0V）
8	2Q	反相输出
9	2Q	输出
10	2SD	异步置数输入（低电平有效）
11	2CP	时钟输入（低电平到高电平，边缘触发）
12	2D	数据输入
13	2RD	异步复位输入（低电平有效）
14	V _{CC}	电源电压

极限参数

参数	符号	极限值	单位
工作电压	V_{CC}	7	V
输入/输出电压	V_{IN} 、 V_{OUT}	$-0.3-V_{CC}+0.3V$	V
单个管脚输出电流	I_{OUT}	± 25	mA
V_{CC} 或 GND 电流	I_{CC}	± 50	mA
耗散功率	P_D	500	mW
工作温度	T_A	0-70	°C
存储温度	T_S	-65-150	°C
引脚焊接温度	T_W	260, 10s	°C

工作条件

项目	符号	最小值	典型值	最大值	单位
工作电压	V_{CC}	2	5	6	V
输入输出电压	V_{IN} 、 V_{out}	0		V_{CC}	V
输入上升/ 下降时间	$T_{r/f}$	$V_{CC}=2.0V$		1000	ns
		$V_{CC}=4.5V$		500	ns
		$V_{CC}=6.0V$		400	ns
工作温度	T_A	0		60	°C

功能框图

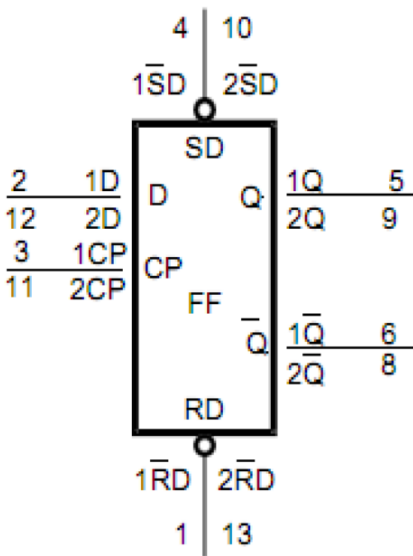


图 1 逻辑符号

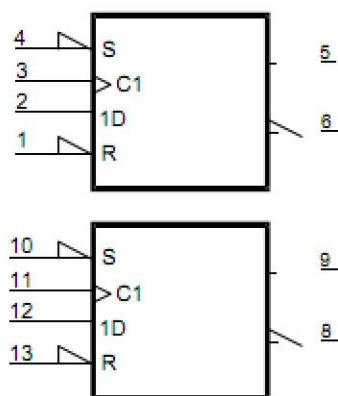


图 2 IEC 逻辑符号

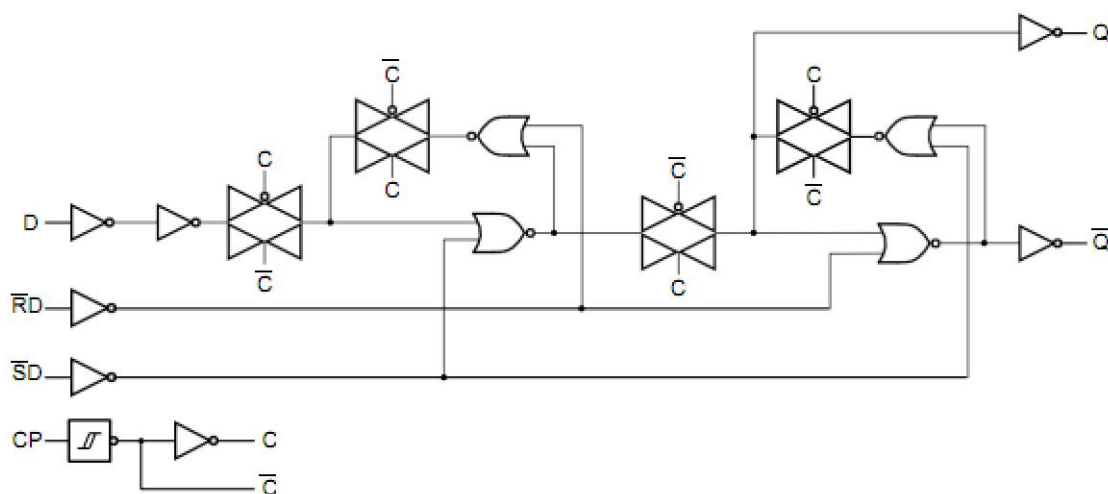
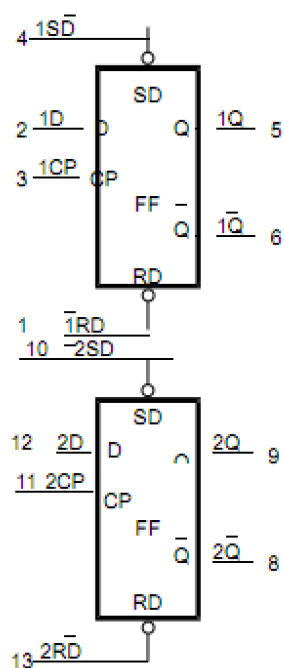


图 3 逻辑框图



功能表

输入				输出	
$\overline{nSD}$	$\overline{nRD}$	nCP	nD	nQ	$\overline{nQ}$
L	H	X	X	H	L
H	L	X	X	L	H
L	L	X	X	H	H

输入				输出	
$\overline{nSD}$	$\overline{nRD}$	nCP	nD	nQ_{n+1}	$\overline{nQ}_{n+1}$
H	H	↑	L	L	H
H	H	↑	H	H	L

注：H=高电平；L=低电平；X=无关；
↑=低电平到高电平转换； Q_{n+1} =下一个低电平到高电平CP转换后状态。

电学特性

直流电学特性:TA=25℃

参数名称	符号	测试条件		最小	典型	最大	单位
74HC74							
高电平输入电压	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
低电平输入电压	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
高电平输出电压	V _{OH}	V _I =V _{IH} 或V _{IL}	I _O =-4.0mA; V _{CC} =4.5V	3.84	4.32	—	V
			I _O =-5.2mA; V _{CC} =6.0V	5.34	5.81	—	V
低电平输出电压	V _{OL}	V _I =V _{IH} 或V _{IL}	I _O =4.0mA; V _{CC} =4.5V	—	0.15	0.33	V
			I _O =5.2mA; V _{CC} =6.0V	—	0.16	0.33	V
输入漏电流	I _I	V _I =V _{CC} 或GND; V _{CC} =6.0V		—	—	±1.0	uA
静态电流	I _{CC}	V _I =V _{CC} 或GND; I _O =0A; V _{CC} =6.0V		—	—	40	uA
输入电容	C _I	—		—	3.5	—	pF

交流电学特性: TA=25°C

参数名称	符号	测试条件	最小	典型	最大	单位
74HC74						
nCP到nQ, nQ ⁻ 的传输延时	t_{pd}	见图6 ^[1]	V _{CC} =2.0V	—	47	ns
			V _{CC} =4.5V	—	17	ns
			V _{CC} =5.0V; C _L =15pF	—	14	ns
			V _{CC} =6.0V	—	14	ns
nSD到nQ, nQ ⁻ 的传输延时	t_{pd}	见图7 ^[1]	V _{CC} =2.0V	—	50	ns
			V _{CC} =4.5V	—	18	ns
			V _{CC} =5.0V; C _L =15pF	—	15	ns
			V _{CC} =6.0V	—	14	ns
nRD到nQ, nQ ⁻ 的传输延时	t_{pd}	见图7 ^[1]	V _{CC} =2.0V	—	52	ns
			V _{CC} =4.5V	—	19	ns
			V _{CC} =5.0V; C _L =15pF	—	16	ns
			V _{CC} =6.0V	—	15	ns
nQ, nQ ⁻ 转换时间	t_t	见图6 ^[2]	V _{CC} =2.0V	—	19	ns
			V _{CC} =4.5V	—	7	ns
			V _{CC} =6.0V	—	6	ns
CP脉宽	t_w	见图6	V _{CC} =2.0V	100	19	ns
			V _{CC} =4.5V	20	7	ns
			V _{CC} =6.0V	17	6	ns
nSD, nRD脉宽	t_w	见图7	V _{CC} =2.0V	100	19	ns
			V _{CC} =4.5V	20	7	ns
			V _{CC} =6.0V	17	6	ns
nSD, nRD恢复时间	t_{rec}	见图7	V _{CC} =2.0V	40	3	ns
			V _{CC} =4.5V	8	1	ns
			V _{CC} =6.0V	7	1	ns
nD到nCP设置时间	t_{su}	见图6	V _{CC} =2.0V	75	6	ns
			V _{CC} =4.5V	15	2	ns
			V _{CC} =6.0V	13	2	ns
nD到nCP保持时间	t_h	见图6	V _{CC} =2.0V	3	-6	ns
			V _{CC} =4.5V	3	-2	ns
			V _{CC} =6.0V	3	-2	ns
nCP最大频率	f_{max}	见图6	V _{CC} =2.0V	4.8	23	MHz
			V _{CC} =4.5V	24	69	MHz
			V _{CC} =5.0V; C _L =15pF	—	76	MHz
			V _{CC} =6.0V	28	82	MHz
功耗电容	C _{PD}	C _L =50pF; f=1MHz; V _I =GND~V _{CC} ^[3]		—	24	pF

注:

[1] t_{pd} 与 t_{PLH} 和 t_{PHL} 相同。[2] t_t 与 t_{THL} 和 t_{TLH} 相同。

交流测试线路图

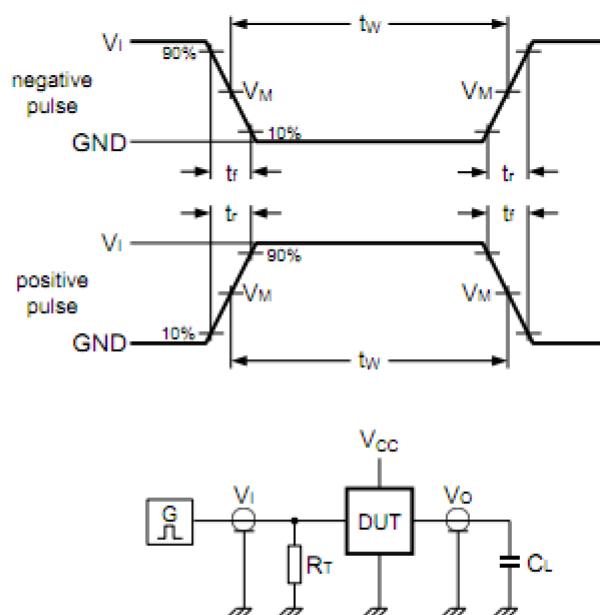


图5 测量开关时间的测试电路

测试电路的定义：

C_L = 负载电容，包括探针、夹子上的电容

R_T = 终端电阻须与信号发生器的输出阻抗 Z_o 匹配

交流测试波形

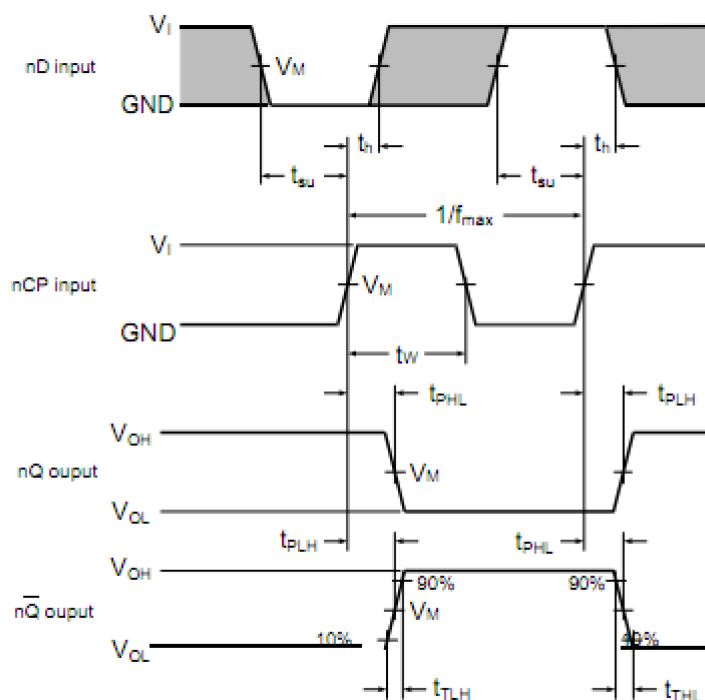


图6 输入到输出传输延迟及输出转换时间

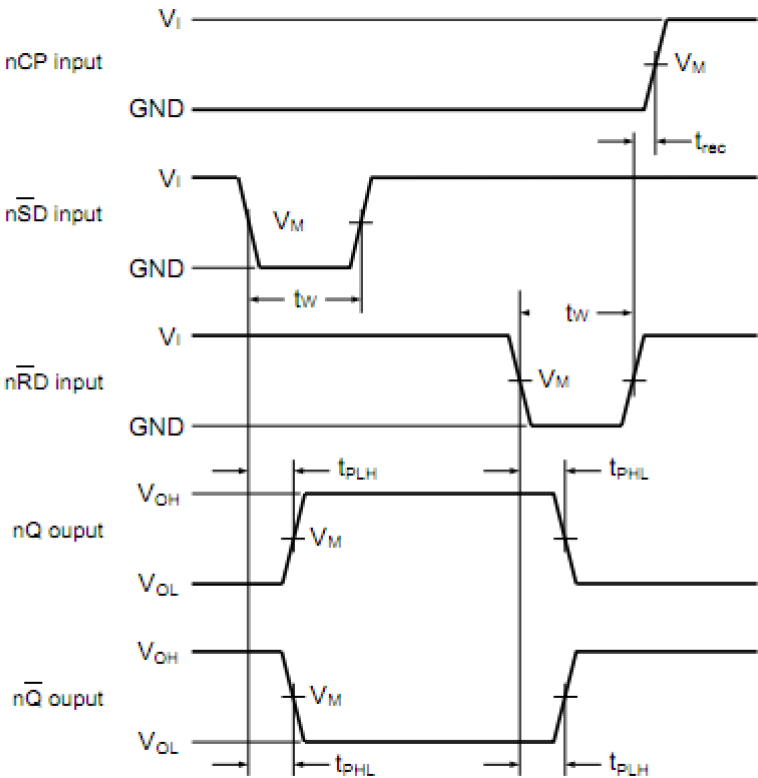


图7 设置和复位传输延时，脉冲宽度和恢复时间

测试点

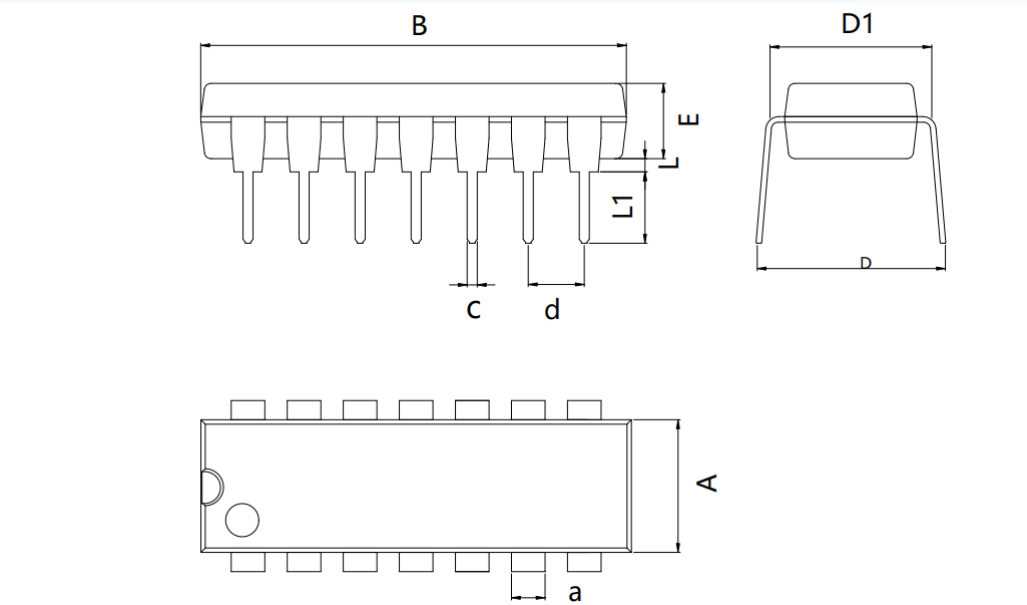
类型	输入	输出
	V _M	V _M
74HC74	0.5×V _{CC}	0.5×V _{CC}

测试数据

类型	输入		负载		测试
	V _I	t _r , t _r	C _L	R _L	
74HC74	V _{CC}	6.0ns	15pF, 50pF	1kΩ	t _{PLH} , t _{PHL}

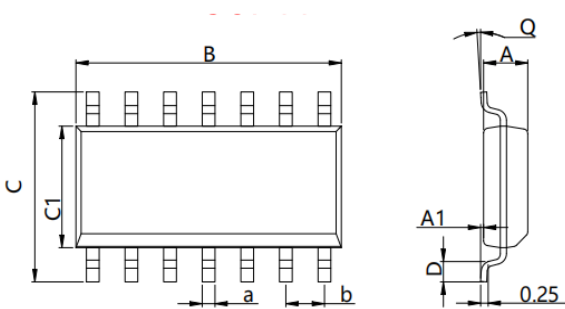
封装信息

DIP14



Dimensions In Millimeters(DIP14)										
Symbol:	A	B	D	D1	E	L	L1	a	c	d
Min:	6.10	18.94	8.40	7.42	3.10	0.50	3.00	1.50	0.40	2.54 BSC
Max:	6.68	19.56	9.00	7.82	3.55	0.70	3.60	1.55	0.50	

SOP14



Dimensions In Millimeters(SOP14)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	8.55	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	8.75	6.20	4.00	0.80	8°	0.45	

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