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Renesas Technology Corp.
Customer Support Dept.
April 1, 2003

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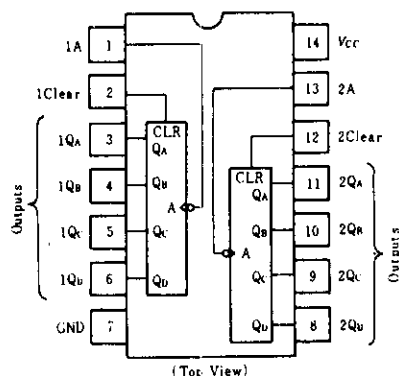
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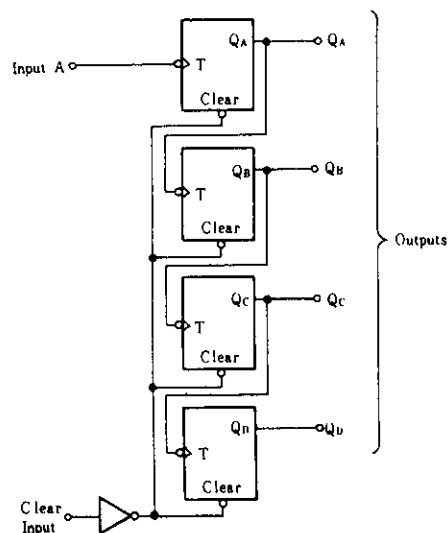
HD74LS393 ● Dual 4-bit Binary Counters

This circuit contains eight master-slave flip-flops and additional gating to implement two individual four-bit counters. The HD74LS393 comprises two independent four-bit binary counters each having a clear and a clock input. N-bit binary counter can be implemented with each package providing the capability of divide-by-256.

■ PIN ARRANGEMENT



■ BLOCK DIAGRAM (1/2)



■ RECOMMENDED OPERATING CONDITIONS

Item	Symbol	min	typ	max	Unit
Output current	I_{OH}	—	—	-400	μA
Output current	I_{OL}	—	—	8	mA
Count frequency	A input f_{count}	0	—	25	MHz
Pulse width	A input high or low	t_w	20	—	ns
	Clear high	t_w	20	—	ns
Setup time	t_{su}	25↓	—	—	ns

↓: The arrow indicates that the falling edge of the clock pulse is used for reference.

■ ABSOLUTE MAXIMUM RATINGS

Item	Symbol	Ratings	Unit
Supply voltage	V_{CC}	7	V
Input voltage	Clear	7	V
	A	5.5	V
Operating temperature range	T_{op}	-20~+75	°C
Storage temperature range	T_{stg}	-65~+150	°C

■ FUNCTION TABLE

Count	Output			
	Q_D	Q_C	Q_B	Q_A
0	L	L	L	L
1	L	L	L	H
2	L	L	H	L
3	L	L	H	H
4	L	H	L	L
5	L	H	L	H
6	L	H	H	L
7	L	H	H	H
8	H	L	L	L
9	H	L	L	H
10	H	L	H	L
11	H	L	H	H
12	H	H	L	L
13	H	H	L	H
14	H	H	H	L
15	H	H	H	H

H: high level, L: low level.

■ ELECTRICAL CHARACTERISTICS ($T_a = -20 \sim +75^\circ\text{C}$)

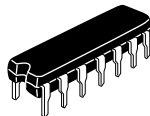
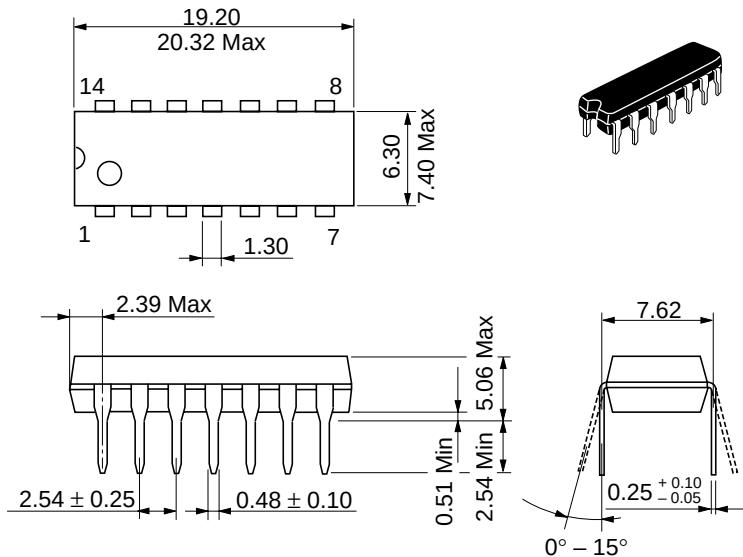
Item		Symbol	Test Conditions	min	typ*	max	Unit
Input voltage		V_{IH}		2.0	—	—	V
		V_{IL}		—	—	0.8	
Output voltage		V_{OH}	$V_{CC}=4.75\text{V}$, $V_{IH}=2\text{V}$, $V_{IL}=0.8\text{V}$, $I_{OH}=-400\mu\text{A}$	2.7	—	—	V
		V_{OL}	$V_{CC}=4.75\text{V}$, $V_{IH}=2\text{V}$, $V_{IL}=0.8\text{V}$	$I_{OL}=4\text{mA}$	—	0.4	V
				$I_{OL}=8\text{mA}$	—	0.5	
Input current	Clear	I_i	$V_{CC}=5.25\text{V}$	$V_i=7\text{V}$	—	0.1	mA
	Input A			$V_i=5.5\text{V}$	—	0.2	
	Clear	I_{IH}	$V_{CC}=5.25\text{V}$, $V_i=2.7\text{V}$	—	—	20	μA
	Input A			—	—	100	
	Clear	I_{iL}	$V_{CC}=5.25\text{V}$, $V_i=0.4\text{V}$	—	—	-0.4	mA
	Input A			—	—	-1.6	
Short-circuit output current		I_{OS}	$V_{CC}=5.25\text{V}$	-20	—	-100	mA
Supply current		I_{CC}^{**}	$V_{CC}=5.25\text{V}$	—	15	26	mA
Input clamp voltage		V_{IK}	$V_{CC}=4.75\text{V}$, $I_{IK}=-18\text{mA}$	—	—	-1.5	V

* $V_{CC}=5\text{V}$, $T_a=25^\circ\text{C}$

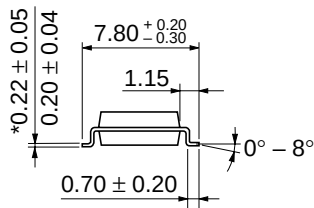
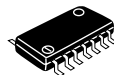
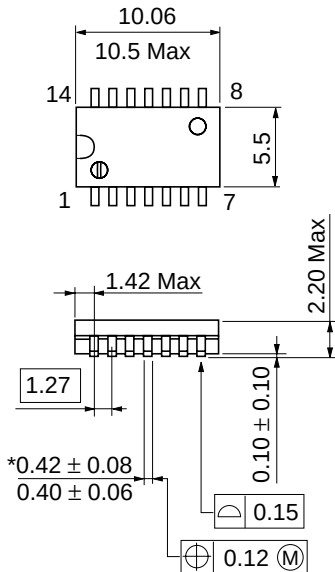
** I_{CC} is measured with all outputs open, both clear inputs grounded following momentary connection to 4.5V, and all other inputs grounded.

■ SWITCHING CHARACTERISTICS ($V_{CC}=5\text{V}$, $T_a=25^\circ\text{C}$)

Item	Symbol	Inputs	Outputs	Test Conditions	min	typ	max	Unit
Maximum count frequency	f_{max}	A	Q_A	$C_L=15\text{pF}$, $R_L=2\text{k}\Omega$	25	35	—	MHz
Propagation delay time	t_{PLH}	A	Q_A		—	12	20	ns
	t_{PHL}				—	13	20	
	t_{PLH}	A	Q_D		—	40	60	
	t_{PHL}				—	40	60	
	t_{PHL}	Clear	Any		—	24	39	

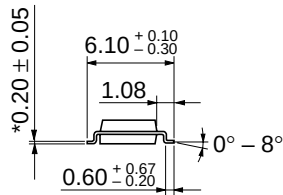
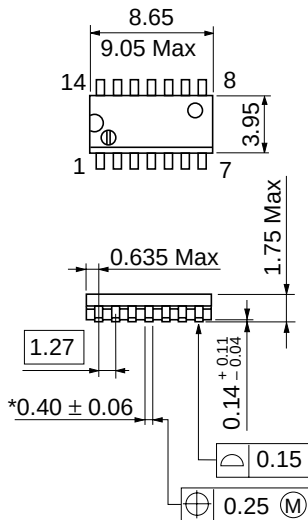


Hitachi Code	DP-14
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.97 g



Hitachi Code	FP-14DA
JEDEC	—
EIAJ	Conforms
Weight (reference value)	0.23 g

*Dimension including the plating thickness
Base material dimension



Hitachi Code	FP-14DN
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	0.13 g

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