

ELECTRICAL CHARACTERISTICS

Characteristic	Symbol	V_{DD} (V)	Test Conditions	-40°C		25°C			85°C		Unit
				min	max	min	typ	max	min	max	
Output Voltage	V_{OL}	5.0	$V_{in} = V_{DD}$ or 0	-	0.05	-	0	0.05	-	0.05	V
		10		-	0.05	-	0	0.05	-	0.05	
		15		-	0.05	-	0	0.05	-	0.05	
	V_{OH}	5.0	$V_{in} = 0$ or V_{DD}	4.95	-	4.95	5.0	-	4.95	-	V
		10		9.95	-	9.95	10	-	9.95	-	
		15		14.95	-	14.95	15	-	14.95	-	
Input Voltage	V_{IL}	5.0	$V_{out} = 4.5$ or $0.5V$	-	1.5	-	2.25	1.5	-	1.5	V
		10	$V_{out} = 9.0$ or $1.0V$	-	3.0	-	4.50	3.0	-	3.0	
		15	$V_{out} = 13.5$ or $1.5V$	-	4.0	-	6.75	4.0	-	4.0	
	V_{IH}	5.0	$V_{out} = 0.5$ or $4.5V$	3.5	-	3.5	2.75	-	3.5	-	V
		10	$V_{out} = 1.0$ or $9.0V$	7.0	-	7.0	5.50	-	7.0	-	
		15	$V_{out} = 1.5$ or $13.5V$	11.0	-	11.0	8.25	-	11.0	-	
Output Drive Current	I_{OH}	5.0	$V_{OH} = 2.5V$	-2.5	-	-2.1	-4.2	-	-1.7	-	mA
		5.0	$V_{OH} = 4.6V$	-0.52	-	-0.44	-0.88	-	-0.36	-	
		10	$V_{OH} = 9.5V$	-1.3	-	-1.1	-2.25	-	-0.9	-	
		15	$V_{OH} = 13.5V$	-3.6	-	-3.0	-8.8	-	-2.4	-	
	I_{OL}	5.0	$V_{OL} = 0.4V$	0.52	-	0.44	0.88	-	0.36	-	mA
		10	$V_{OL} = 0.5V$	1.3	-	1.1	2.25	-	0.9	-	
15		$V_{OL} = 1.5V$	3.6	-	3.0	8.8	-	2.4	-		
Input Current	I_{in}	15		-	± 0.3	-	± 0.0001	± 0.3	-	± 1.0	μA
Input Capacitance	C_{in}	-	$V_{in} = 0$	-	-	-	5.0	7.5	-	-	pF
Quiescent Current	I_{DD}	5.0	Zero Signal, per Package	-	20	-	0.0005	20	-	150	μA
		10		-	40	-	0.0010	40	-	300	
		15		-	80	-	0.0015	80	-	600	
Total Supply Current*	I_T	5.0	Dynamic $+I_{DD}$, $C_L = 50pF$	-	-	-	1.7	-	-	-	μA
		10	$f = 1kHz$	-	-	-	3.4	-	-	-	
		15	per Gate	-	-	-	5.0	-	-	-	

* To calculate total supply current at frequency other than 1kHz.

⊗ $V_{DD} = 5.0V$ $I_T = (1.7\mu A/kHz) f + I_{DD}$ ⊗ $V_{DD} = 10V$ $I_T = (3.4\mu A/kHz) f + I_{DD}$ ⊗ $V_{DD} = 15V$ $I_T = (5.0\mu A/kHz) f + I_{DD}$

SWITCHING CHARACTERISTICS ($C_L=50\text{pF}$, $T_a=25^\circ\text{C}$)

Characteristic	Symbol	V_{DD} (V)	min	typ	max	Unit	
Output Rise and Fall Time	t_r, t_f	5.0	—	100	200	ns	
		10	—	50	100		
		15	—	40	80		
Propagation Delay Time	Clock	t_{PLH}	5.0	—	220	420	ns
		t_{PHL}	10	—	90	170	
			15	—	70	130	
	Reset	t_{PHL}	5.0	—	325	650	ns
			10	—	130	260	
			15	—	100	200	
Clock Pulse Width	PW_C	5.0	250	110	—	ns	
		10	100	45	—		
		15	75	35	—		
Reset Pulse Width	PW_R	5.0	200	100	—	ns	
		10	80	40	—		
		15	60	30	—		
Clock Frequency	PRF	5.0	—	4.5	2.0	MHz	
		10	—	11	5.0		
		15	—	14	6.5		
Clock Pulse Rise and Fall Time	t_r, t_f	5.0	—	—	15	μs	
		10	—	—	15		
		15	—	—	15		
Setup Time	t_{setup}	5.0	120	60	—	ns	
		10	50	25	—		
		15	40	20	—		
Hold Time	t_{hold}	5.0	80	40	—	ns	
		10	40	20	—		
		15	30	15	—		
Reset Removal Time	t_{rem}	5.0	250	125	—	ns	
		10	100	50	—		
		15	80	40	—		

* The reset signal must be high prior to a positive-going transition of the clock.



Hitachi Code	DP-16
JEDEC	Conforms
EIAJ	Conforms
Weight (reference value)	1.07 g

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