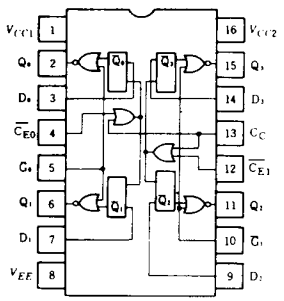
Quadruple Latches

The HD10133 is a high speed, low power quad latch consisting of four bistable latch circuits with D type inputs and gated Q outputs, allowing direct wiring to a bus. When the clock is high, outputs will follow D inputs. Information is latched on the negative going transition of the clock. The outputs are gated when the output enable($\overline{G}$) is low. All four latches may be clocked at one time with the common clock(C_C), or each half may be clocked separately with its clock enable ($\overline{CE}$).

■PIN ARRANGEMENT



(Top View)

■FUNCTION TABLE

$\overline{G}$	C	D	Q_{n+1}
H	×	×	L
L	L	×	Q_n
L	H	L	L
L	H	H	H

Notes) × : Don't care.
$C = C_C + \overline{C}_E$

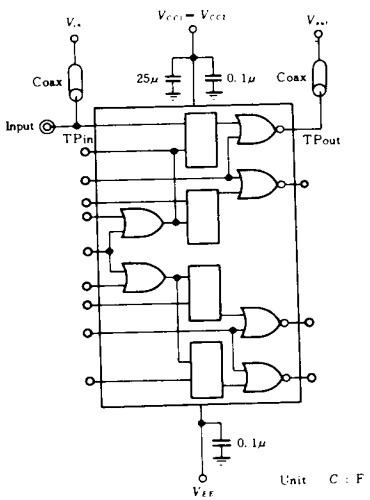
■DC CHARACTERISTICS ($V_{EE} = -5.2V$, $Ta = -30 \sim +85°C$)

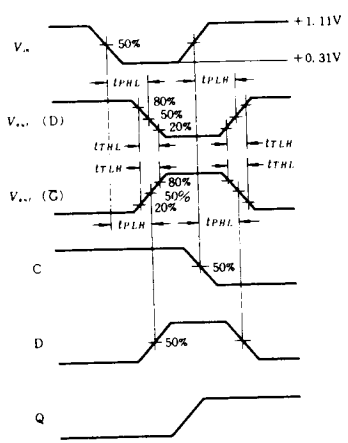
Item	Symbol	Test Condition			min	typ	max	Unit
Supply Current	I_{EE}			25℃	—	60	75	mA
Input Current	I_{IH}	$V_{IH} = -0.810V$	D	25℃	—	—	245	μA
			$\overline{C}_E$		—	—	265	
			$\overline{G}$, C_C		—	—	350	
	I_{IL}	$V_{IL} = -1.850V$		25℃	0.5	—	—	μA
Output Voltage	V_{OH}	$V_{IH} = -0.890V$ or $V_{IL} = -1.890V$		−30℃	−1.060	—	−0.890	V
		$V_{IH} = -0.810V$ or $V_{IL} = -1.850V$		25℃	−0.960	—	−0.810	
		$V_{IH} = -0.700V$ or $V_{IL} = -1.825V$		85℃	−0.890	—	−0.700	
	V_{OL}	$V_{IL} = -1.890V$ or $V_{IH} = -0.890V$		−30℃	−1.890	—	−1.675	V
		$V_{IL} = -1.850V$ or $V_{IH} = -0.810V$		25℃	−1.850	—	−1.650	
		$V_{IL} = -1.825V$ or $V_{IH} = -0.700V$		85℃	−1.825	—	−1.615	
Output Threshold Voltage	V_{OHA}	$V_{IHA} = -1.205V$ or $V_{ILA} = -1.500V$		−30℃	−1.080	—	—	V
		$V_{IHA} = -1.105V$ or $V_{ILA} = -1.475V$		25℃	−0.980	—	—	
		$V_{IHA} = -1.035V$ or $V_{ILA} = -1.440V$		85℃	−0.910	—	—	
	V_{OLA}	$V_{ILA} = -1.500V$ or $V_{IHA} = -1.205V$		−30℃	—	—	−1.655	V
		$V_{ILA} = -1.475V$ or $V_{IHA} = -1.105V$		25℃	—	—	−1.630	
		$V_{ILA} = -1.440V$ or $V_{IHA} = -1.035V$		85℃	—	—	−1.595	

■AC CHARACTERISTICS ($V_{EE}=-3.2V$, $V_{CC}=+2.0V$, $Ta=-30\sim+85℃$)

Item	Symbol	Input	Output	Test Condition		min	typ	max	Unit
Propagation Delay Time	t_{PLH}	D	Q	$R_L=50\Omega$	−30℃	1.0	—	5.6	ns
					25℃	1.0	—	5.4	
					85℃	1.1	—	5.9	
	t_{PHL}				−30℃	1.0	—	5.6	ns
					25℃	1.0	—	5.4	
					85℃	1.1	—	5.9	
	t_{PLH}	$\overline{C_E}$	Q		−30℃	1.0	—	5.4	ns
					25℃	1.0	—	5.4	
					85℃	1.2	—	6.0	
	t_{PHL}				−30℃	1.0	—	5.4	ns
					25℃	1.0	—	5.4	
					85℃	1.2	—	6.0	
	t_{PLH}	$\overline{G}$	Q		−30℃	1.0	—	3.2	ns
					25℃	1.0	—	3.1	
					85℃	1.0	—	3.4	
	t_{PHL}				−30℃	1.0	—	3.2	ns
					25℃	1.0	—	3.1	
					85℃	1.0	—	3.4	
Rise/Fall Time	t_{TLH}		Q		−30℃	1.0	—	3.6	ns
					25℃	1.1	—	3.5	
					85℃	1.1	—	3.8	
	t_{THL}				−30℃	1.0	—	3.6	ns
					25℃	1.1	—	3.5	
					85℃	1.1	—	3.8	
Setup Time	t_{su}	D	Q		25℃	—	—	2.5	ns
Hold Time	t_h				25℃	—	—	1.5	ns

■SWITCHING TIME TEST CIRCUIT





Notes)
1. 50Ω termination to ground located in each scope channel input. All input and output cables to the scope are equal lengths of 50Ω coaxial cable.
2. Wire length should be <6.35mm (1/4 inch) from TPin to input pin and TPout to output pin.
3. Unused outputs connected to a 50Ω resistor to ground.
4. t_{su} is the minimum time before the positive transition of the clock pulse that information must be preset at the data.
5. t_h is the minimum time after the positive transition of the clock pulse that information must remain unchanged at the data.