

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC373AP, TC74HC373AF, TC74HC373AFW

OCTAL D - TYPE LATCH WITH 3 - STATE OUTPUT

The TC74HC373A is a high speed CMOS OCTAL LATCH with 3 - STATE OUTPUT fabricated with silicon gate C²MOS technology.

It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. These 8 - bit D - type latches are controlled by a latch enable input (LE) and a output enable input (OE).

When the \overline{OE} input is high, the eight outputs are in a high impedance state.

All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

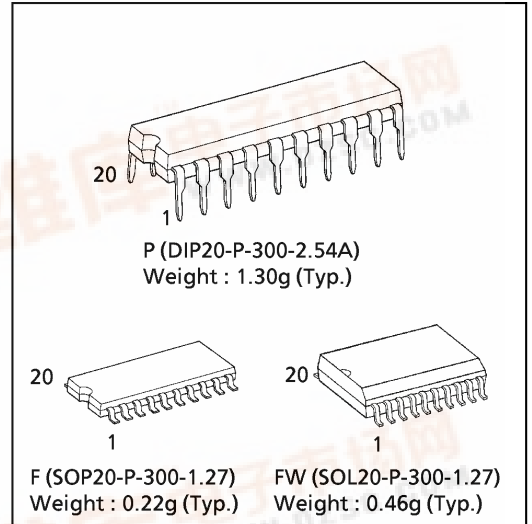
- High Speed..... $t_{pd} = 11\text{ns}(\text{typ.})$ at $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 4\mu\text{A}(\text{Max.})$ at $T_a = 25^\circ\text{C}$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC} (\text{Min.})$
- Output Drive Capability..... 15 LSTTL Loads
- Symmetrical Output Impedance... $|I_{OH}| = I_{OL} = 6\text{mA}(\text{Min.})$
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range... $V_{CC} (\text{opr.}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS373

TRUTH TABLE

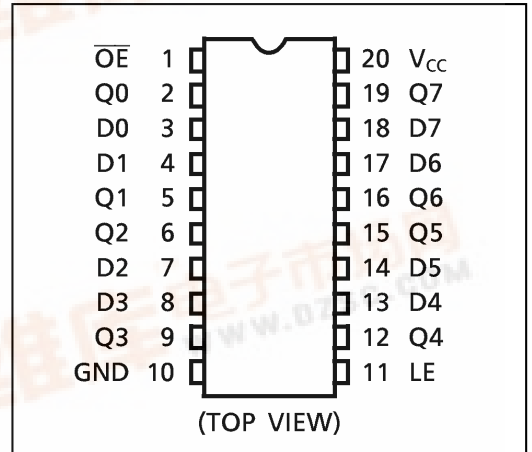
INPUTS			OUTPUTS
\overline{OE}	LE	D	Q
H	X	X	Z
L	L	X	Q_n
L	H	L	L
L	H	H	H

X : Don't Care
 Z : High Impedance
 Q_n : Q outputs are latched at the time when the LE input is taken to a low logic level.

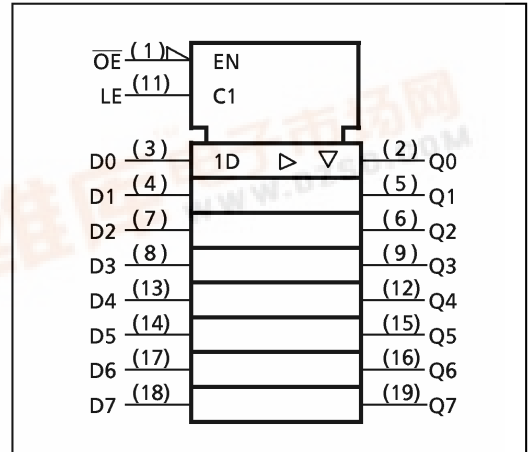
(Note) The JEDEC SOP (FW) is not available in Japan.



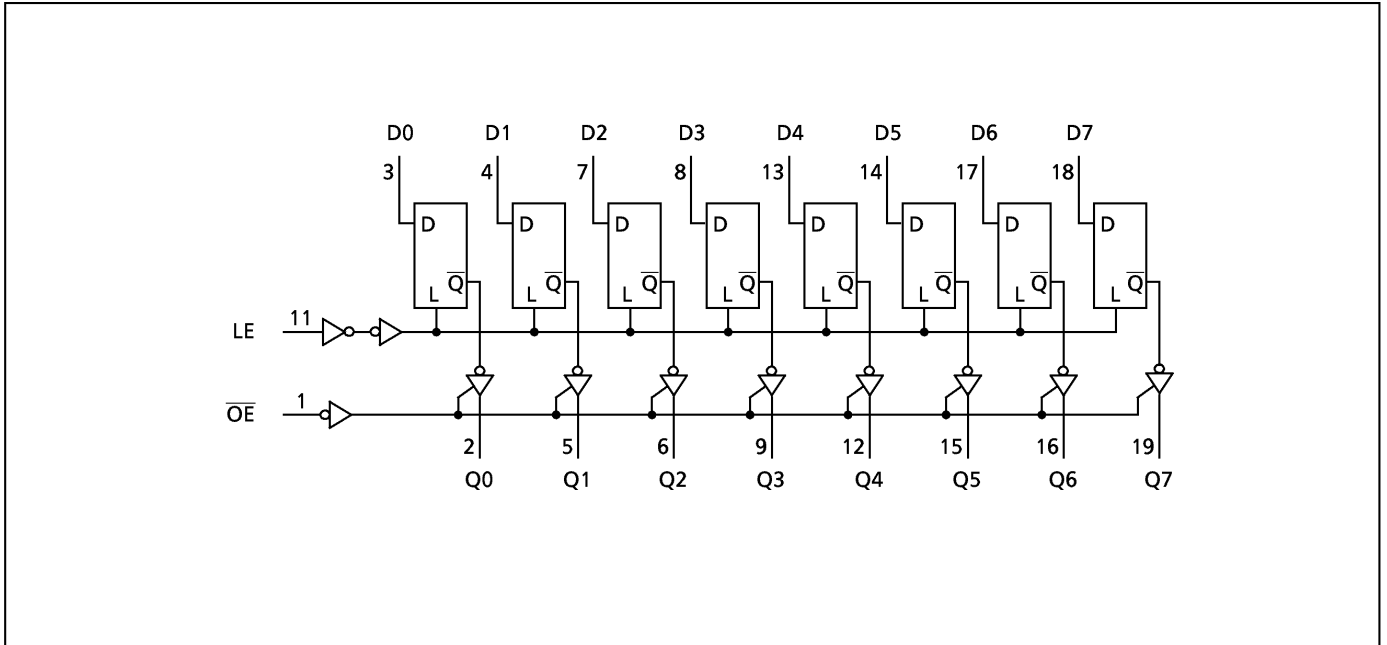
PIN ASSIGNMENT



IEC LOGIC SYMBOL



SYSTEM DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	-0.5~7	V
DC Input Voltage	V_{IN}	-0.5~ $V_{CC}+0.5$	V
DC Output Voltage	V_{OUT}	-0.5~ $V_{CC}+0.5$	V
Input Diode Current	I_{IK}	± 20	mA
Output Diode Current	I_{OK}	± 20	mA
DC Output Current	I_{OUT}	± 35	mA
DC V_{CC} /Ground Current	I_{CC}	± 75	mA
Power Dissipation	P_D	500 (DIP)* / 180 (SOP)	mW
Storage Temperature	T_{stg}	-65~150	°C

*500mW in the range of $T_a = -40^{\circ}\text{C} \sim 65^{\circ}\text{C}$. From $T_a = 65^{\circ}\text{C}$ to 85°C a derating factor of $-10\text{mW}/^{\circ}\text{C}$ shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2~6	V
Input Voltage	V_{IN}	0~ V_{CC}	V
Output Voltage	V_{OUT}	0~ V_{CC}	V
Operating Temperature	T_{opr}	-40~85	°C
Input Rise and Fall Time	t_r, t_f	0~1000 ($V_{CC} = 2.0\text{V}$) 0~500 ($V_{CC} = 4.5\text{V}$) 0~400 ($V_{CC} = 6.0\text{V}$)	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	V_{CC} (V)	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \sim 85^{\circ}\text{C}$		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High - Level Input Voltage	V_{IH}		2.0	1.50	—	—	1.50	—	V	
			4.5	3.15	—	—	3.15	—		
			6.0	4.20	—	—	4.20	—		
Low - Level Input Voltage	V_{IL}		2.0	—	—	0.50	—	0.50	V	
			4.5	—	—	1.35	—	1.35		
			6.0	—	—	1.80	—	1.80		
High - Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
			6.0	5.9	6.0	—	5.9	—		
			$I_{OH} = -6\text{ mA}$ $I_{OH} = -7.8\text{ mA}$	4.5	4.18	4.31	—	4.13	—	
6.0	5.68	5.80		—	5.63	—				
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\mu\text{A}$	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
			6.0	—	0.0	0.1	—	0.1		
			$I_{OL} = 6\text{ mA}$ $I_{OL} = 7.8\text{ mA}$	4.5	—	0.17	0.26	—	0.33	
6.0	—	0.18		0.26	—	0.33				
3 - State Output Off - State Current	I_{OZ}	$V_{IN} = V_{IH}$ or V_{IL} $V_{OUT} = V_{CC}$ or GND	6.0	—	—	± 0.5	—	± 5.0	μA	
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC}$ or GND	6.0	—	—	± 0.1	—	± 1.0		
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	6.0	—	—	4.0	—	40.0		

TIMING REQUIREMENTS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CONDITION	$V_{CC}(V)$	Ta = 25°C		Ta = -40~85°C	UNIT
				TYP.	LIMIT	LIMIT	
Minimum Pulse Width (LE)	$t_{w(H)}$		2.0	—	75	95	ns
			4.5	—	15	19	
			6.0	—	13	16	
Minimum Set-up Time (Dn)	t_s		2.0	—	50	65	
			4.5	—	10	13	
			6.0	—	9	11	
Minimum Hold Time (Dn)	t_h		2.0	—	5	5	
			4.5	—	5	5	
			6.0	—	5	5	

AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CONDITION	CL (pF)	$V_{CC}(V)$	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t_{TLH} t_{THL}		50	2.0	—	20	60	—	75	ns
				4.5	—	6	12	—	15	
				6.0	—	5	10	—	13	
Propagation Delay Time (LE-Q)	t_{pLH} t_{pHL}		50	2.0	—	42	125	—	155	
				4.5	—	14	25	—	31	
				6.0	—	12	21	—	26	
			150	2.0	—	57	175	—	220	
				4.5	—	19	35	—	44	
				6.0	—	16	30	—	37	
Propagation Delay Time (D-Q)	t_{pLH} t_{pHL}		50	2.0	—	42	125	—	155	
				4.5	—	14	25	—	31	
				6.0	—	12	21	—	26	
			150	2.0	—	57	175	—	220	
				4.5	—	19	35	—	44	
				6.0	—	16	30	—	37	
Output Enable Time	t_{pZL} t_{pZH}	$R_L = 1k\Omega$	50	2.0	—	39	125	—	155	
				4.5	—	13	25	—	31	
				6.0	—	11	21	—	26	
			150	2.0	—	54	175	—	220	
				4.5	—	18	35	—	44	
				6.0	—	15	30	—	37	
Output Disable Time	t_{pLZ} t_{pHZ}	$R_L = 1k\Omega$	50	2.0	—	30	125	—	155	
				4.5	—	14	25	—	31	
				6.0	—	13	21	—	26	
Input Capacitance	C_{IN}				—	5	10	—	10	pF
Output Capacitance	C_{OUT}				—	10	—	—	—	
Power Dissipation Capacitance	$C_{PD}(1)$				—	38	—	—	—	

Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

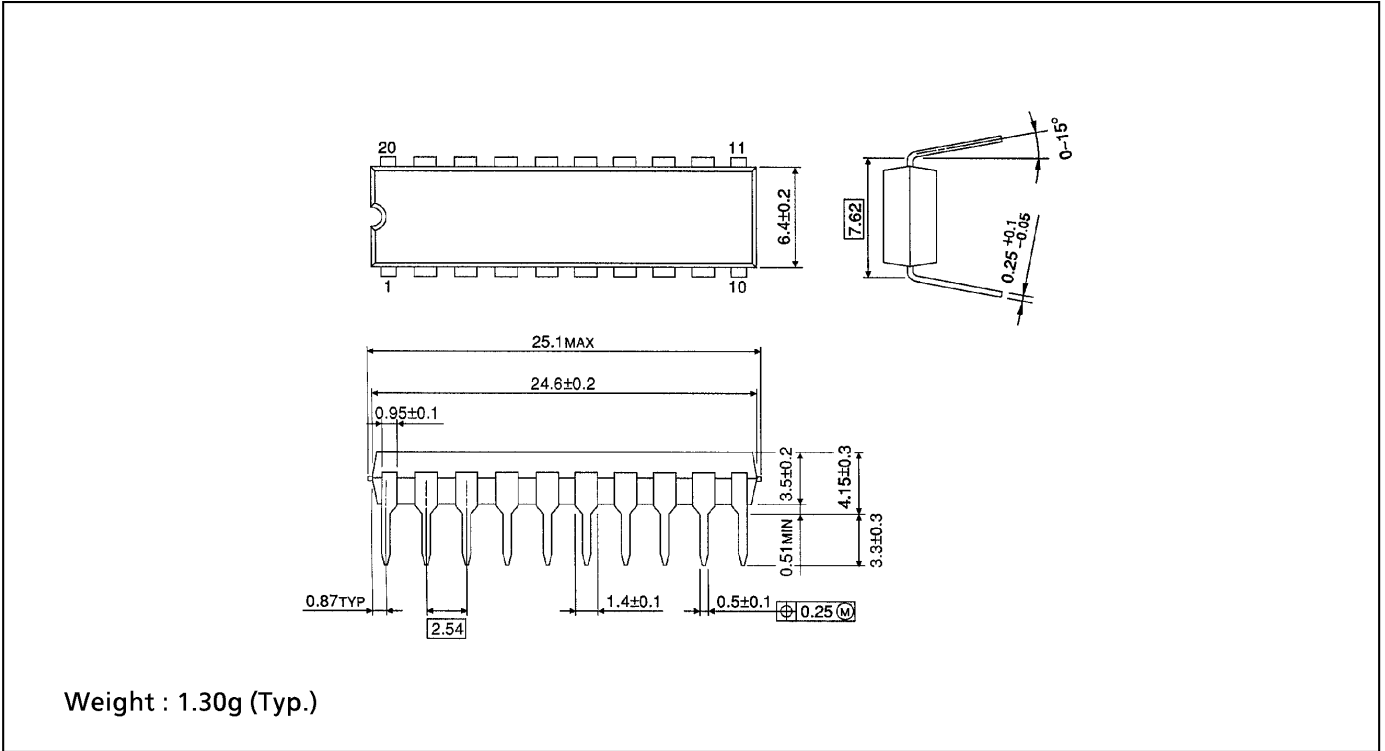
$$I_{CC}(opr) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8 \text{ (per Latch)}$$

And the total C_{PD} when n pcs. of Latch operate can be gained by the following equation :

$$C_{PD}(\text{total}) = 22 + 16 \cdot n$$

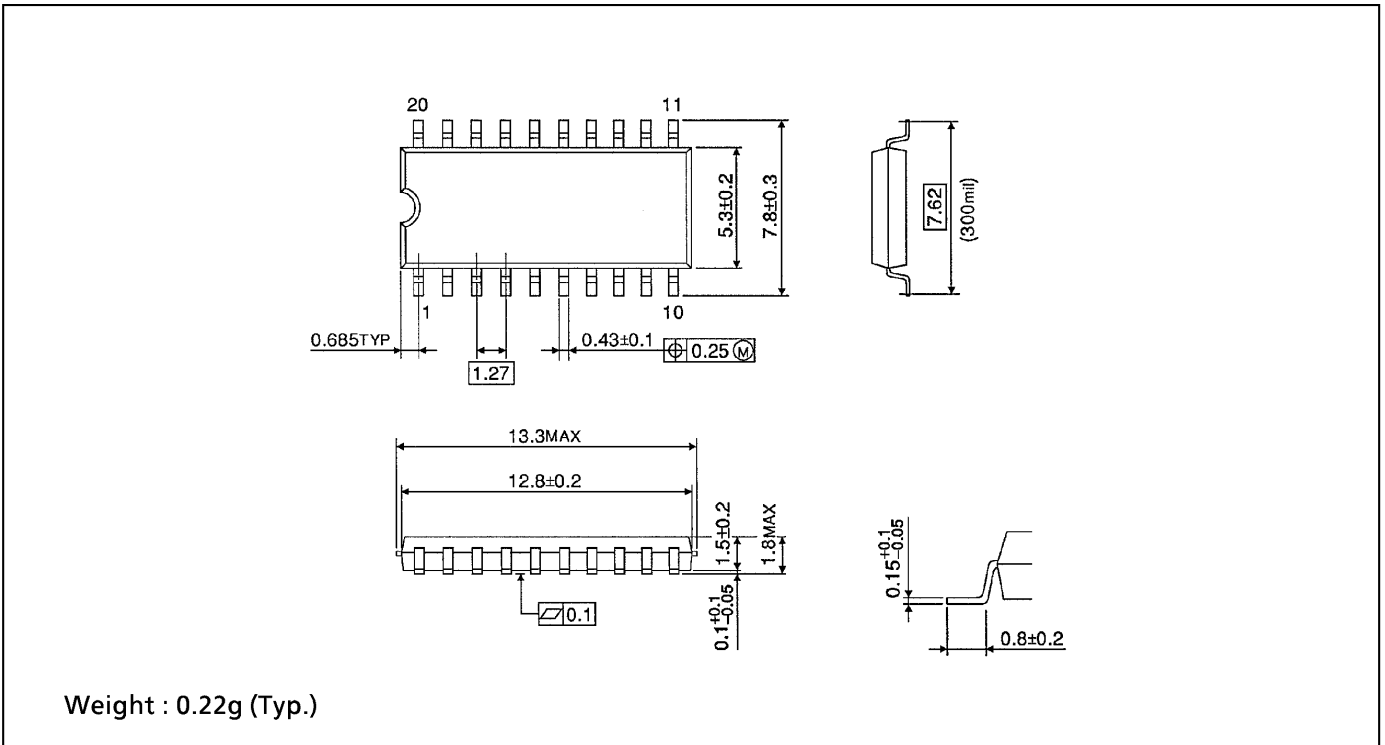
DIP 20PIN PACKAGE DIMENSIONS (DIP20-P-300-2.54A)

Unit in mm



SOP 20PIN (200mil BODY) PACKAGE DIMENSIONS (SOP20-P-300-1.27)

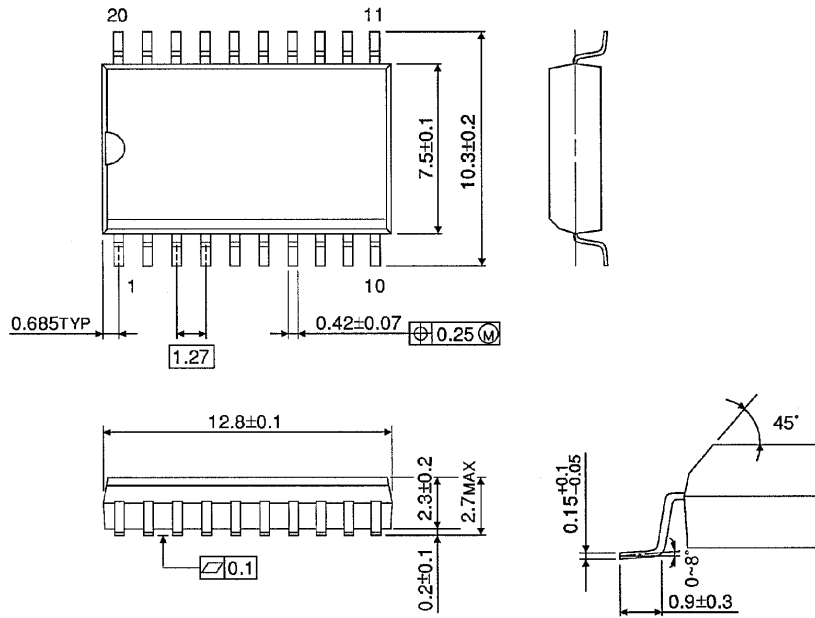
Unit in mm



SOP 20PIN (300mil BODY) PACKAGE DIMENSIONS (SOL20-P-300-1.27)

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.46g (Typ.)

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