

**TC74ACT574P, TC74ACT574F, TC74ACT574FW, TC74ACT574FT**

**OCTAL D-TYPE FLIP-FLOP WITH 3-STATE OUTPUT**

The TC74ACT574 is an advanced high speed CMOS OCTAL FLIP-FLOP fabricated with silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

This device may be used as a level converter for interfacing TTL or NMOS to High Speed CMOS. The inputs are compatible with TTL, NMOS and CMOS output voltage levels.

These 8-bit D-type flip-flops are controlled by a clock input (CK) and a output enable input ( $\overline{OE}$ ).

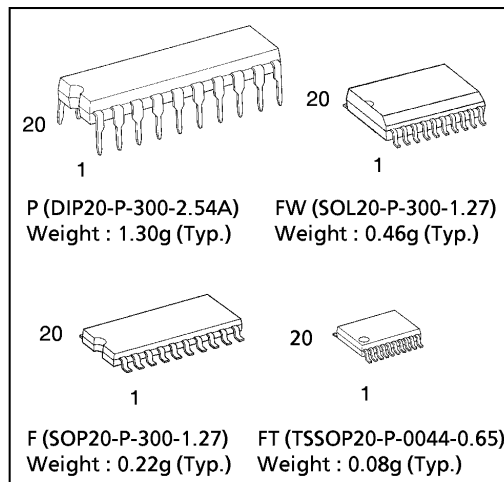
When the  $\overline{OE}$  input is high, the eight outputs are in a high impedance state.

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

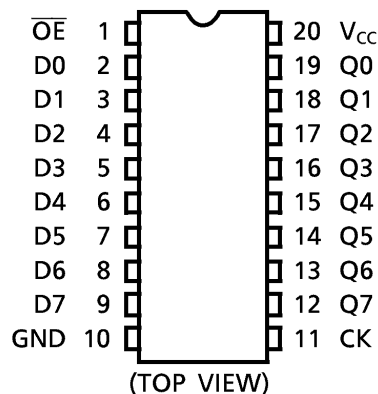
**FEATURES :**

- High Speed..... $f_{MAX} = 180\text{MHz}$  (typ.)  
at  $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 8\mu\text{A}$ (Max.) at  $T_a = 25^\circ\text{C}$
- Compatible with TTL outputs... $V_{IL} = 0.8\text{V}$  (Max.)  
 $V_{IH} = 2.0\text{V}$  (Min.)
- Symmetrical Output Impedance... $|I_{OH}| = I_{OL} = 24\text{mA}$  (Min.)  
Capability of driving 50 $\Omega$  transmission lines.
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Pin and Function Compatible with 74F574

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



**PIN ASSIGNMENT**

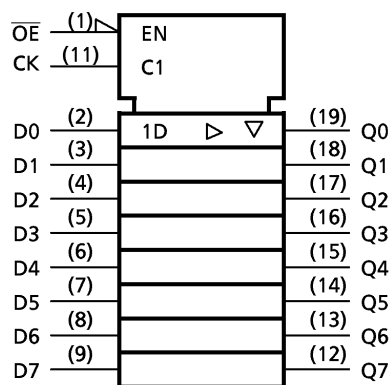


**TRUTH TABLE**

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

X : Don't Care  
Z : High Impedance  
 $Q_n$  : No Change

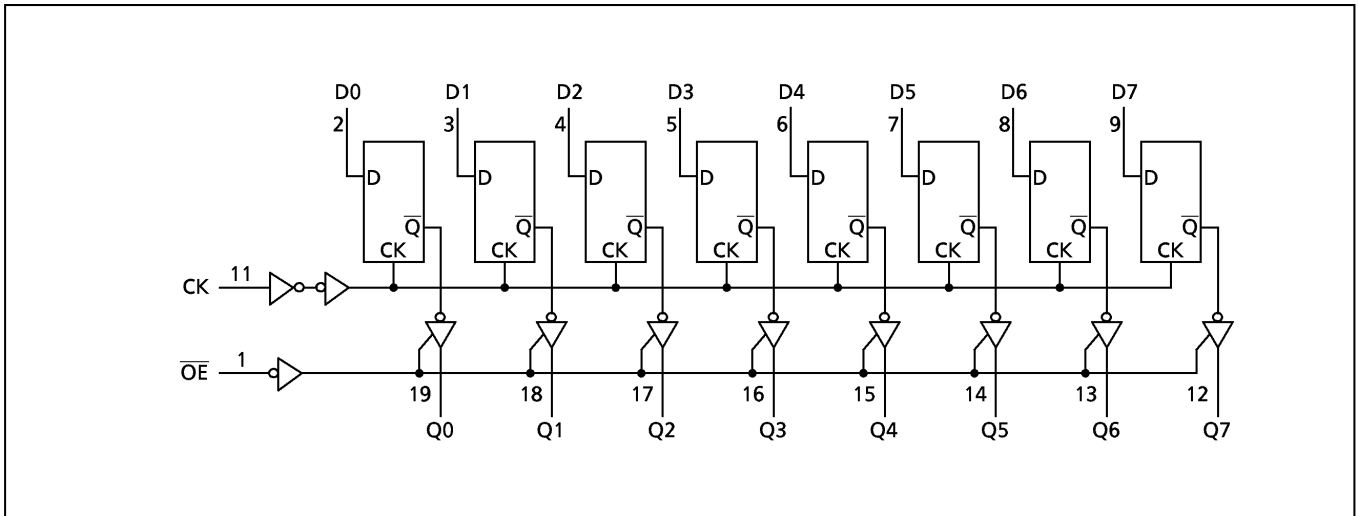
**IEC LOGIC SYMBOL**



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SYSTEM DIAGRAM



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	$V_{CC}$	-0.5~7.0	V
DC Input Voltage	$V_{I N}$	-0.5~ $V_{CC} + 0.5$	V
DC Output Voltage	$V_{OUT}$	-0.5~ $V_{CC} + 0.5$	V
Input Diode Current	$I_{I K}$	± 20	mA
Output Diode Current	$I_{OK}$	± 50	mA
DC Output Current	$I_{OUT}$	± 50	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	± 200	mA
Power Dissipation	$P_D$	500 (DIP)* / 180 (SOP/TSSOP)	mW
Storage Temperature	$T_{stg}$	-65~150	°C

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

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	4.5~5.5	V
Input Voltage	$V_{I N}$	0~ $V_{CC}$	V
Output Voltage	$V_{OUT}$	0~ $V_{CC}$	V
Operating Temperature	$T_{opr}$	-40~85	°C
Input Rise and Fall Time	$dt / dV$	0~10	ns / V

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## DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High - Level Input Voltage	V <sub>IH</sub>			4.5 } 5.5	2.0	—	—	2.0	—	V
Low - Level Input Voltage	V <sub>IL</sub>			4.5 } 5.5	—	—	0.8	—	0.8	V
High - Level Output Voltage	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -50μA I <sub>OH</sub> = -24mA I <sub>OH</sub> = -75mA*	4.5 4.5 5.5	4.4 3.94 —	4.5 — —	— — —	4.4 3.80 3.85	— — —	V
Low - Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 50μA I <sub>OL</sub> = 24mA I <sub>OL</sub> = 75mA*	4.5 4.5 5.5	— — —	0.0 — —	0.1 0.36 —	— — —	0.1 0.44 1.65	V
3 - State Output Off - State Current	I <sub>OZ</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub> V <sub>OUT</sub> = V <sub>CC</sub> or GND		5.5	—	—	±0.5	—	±5.0	μA
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND		5.5	—	—	±0.1	—	±1.0	
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND		5.5	—	—	8.0	—	80.0	
	I <sub>C</sub>	PER INPUT : V <sub>IN</sub> = 3.4V OTHER INPUT : V <sub>CC</sub> or GND		5.5	—	—	1.35	—	1.5	mA

\* : This spec indicates the capability of driving 50Ω transmission lines.  
One output should be tested at a time for a 10ms maximum duration.

TIMING REQUIREMENTS ( Input t<sub>r</sub> = t<sub>f</sub> = 3ns )

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C	Ta = -40~85°C	UNIT
			V <sub>CC</sub> (V)	LIMIT	LIMIT	
Minimum Pulse Width (CK)	t <sub>W(H)</sub> t <sub>W(L)</sub>		5.0 ± 0.5	5.0	5.0	ns
Minimum Set - up Time	t <sub>s</sub>		5.0 ± 0.5	3.0	3.0	
Minimum Hold Time	t <sub>h</sub>		5.0 ± 0.5	2.0	2.0	

AC ELECTRICAL CHARACTERISTICS ( $C_L = 50\text{pF}$ ,  $R_L = 500\Omega$ , Input  $t_r = t_f = 3\text{ns}$ )

PARAMETER	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT	
			V <sub>CC</sub> (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Propagation Delay Time (CK-Q)	t <sub>pLH</sub> t <sub>pHL</sub>		5.0 ± 0.5	—	6.2	10.1	1.0	11.5	ns
Output Enable Time	t <sub>pZL</sub> t <sub>pZH</sub>		5.0 ± 0.5	—	6.3	10.5	1.0	12.0	
Output Disable Time	t <sub>pLZ</sub> t <sub>pHZ</sub>		5.0 ± 0.5	—	6.6	9.6	1.0	11.0	
Maximum Clock Frequency	f <sub>MAX</sub>		5.0 ± 0.5	85	160	—	85	—	MHz
Input Capacitance	C <sub>IN</sub>			—	5	10	—	10	pF
Output Capacitance	C <sub>OUT</sub>			—	10	—	—	—	
Power Dissipation Capacitance	C <sub>PD</sub> (1)			—	33	—	—	—	

Note (1) C<sub>PD</sub> 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 :

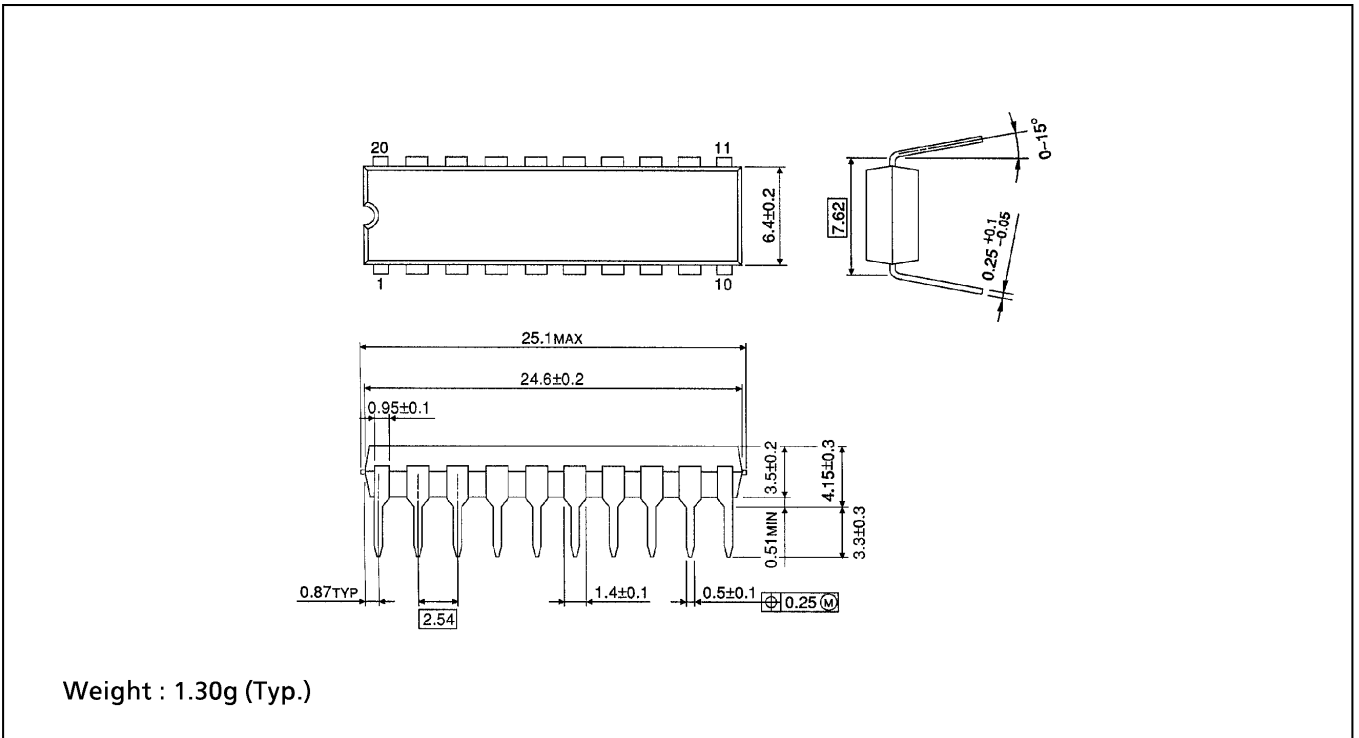
$$I_{CC}(\text{opr.}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 8 \text{ (per F/F)}$$

And the total C<sub>PD</sub> when n pcs. of F/F operate can be gained by the following equation:

$$C_{PD}(\text{total}) = 21 + 12 \cdot n$$

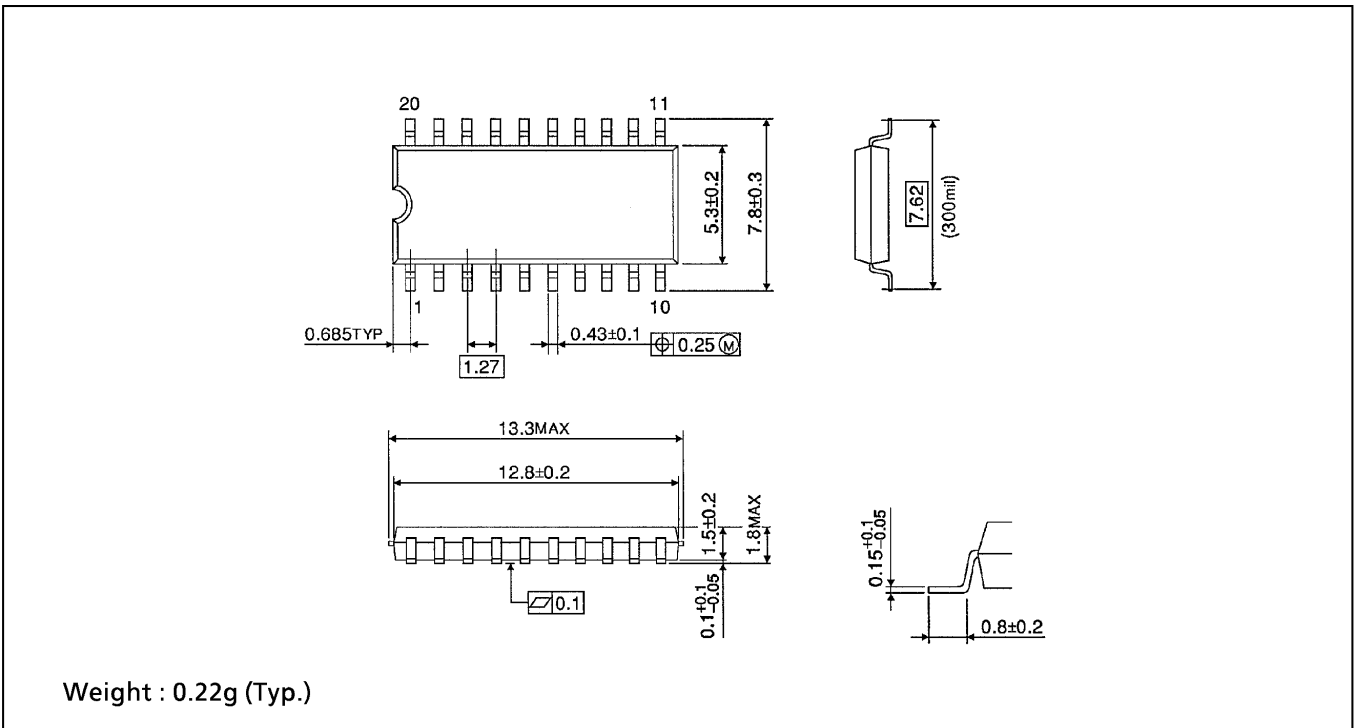
**DIP 20PIN OUTLINE DRAWING (DIP20-P-300-2.54A)**

Unit in mm



**SOP 20PIN (200mil BODY) OUTLINE DRAWING (SOP20-P-300-1.27)**

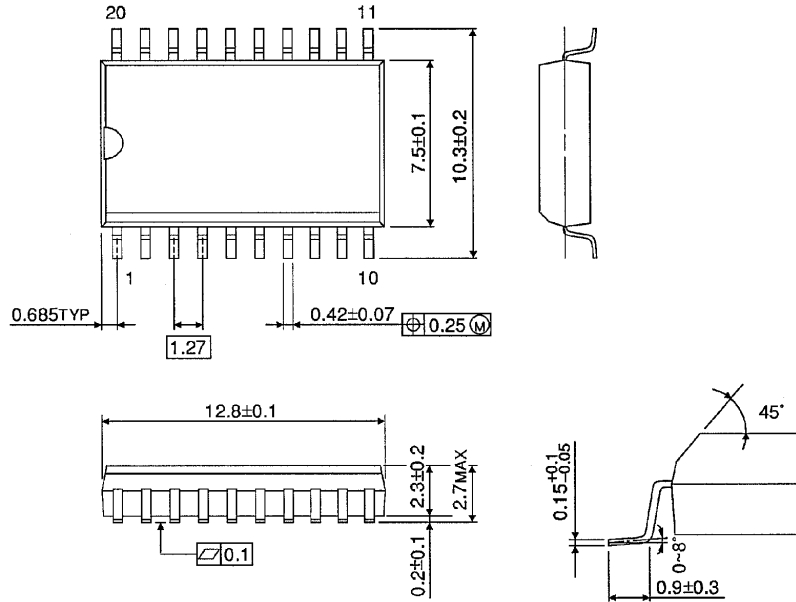
Unit in mm



**SOP 20PIN (300mil BODY) OUTLINE DRAWING (SOL20-P-300-1.27)**

Unit in mm

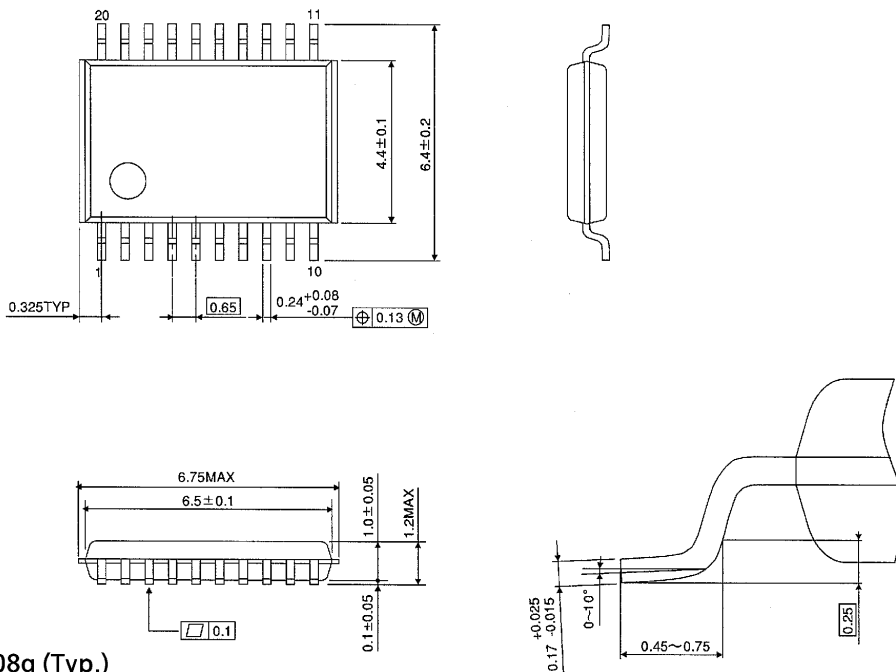
(Note) This package is not available in Japan.



Weight : 0.46g (Typ.)

**TSSOP 20PIN OUTLINE DRAWING (TSSOP20-P-0044-0.65)**

Unit in mm



Weight : 0.08g (Typ.)