

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74AC240P, TC74AC240F, TC74AC240FW, TC74AC240FT

TC74AC244P, TC74AC244F, TC74AC244FW, TC74AC244FT

OCTAL BUS BUFFER**TC74AC240P/F/FW/FT INVERTED, 3 - STATE OUTPUTS****TC74AC244P/F/FW/FT NON - INVERTED, 3 - STATE OUTPUTS**

The TC74AC240 and 244 are advanced high speed CMOS OCTAL BUS BUFFERS fabricated with silicon gate and double-layer metal wiring C²MOS technology.

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

The 74AC240 is an inverting 3-state buffer while the 74AC244 is non-inverting. Both devices have two active-low output enables.

These devices are designed to be used in such applications as 3-state memory address drivers.

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

FEATURES :

- High Speed..... $t_{pd} = 4.0\text{ns}(\text{typ.})$ at $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 8\mu\text{A}(\text{Max.})$ at $T_a = 25^\circ\text{C}$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC}(\text{Min.})$
- Symmetrical Output Impedance... $|I_{OH}| = |I_{OL}| = 24\text{mA}(\text{Min.})$
Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays..... $t_{PLH} \approx t_{PHL}$
- Wide Operating Voltage Range.... $V_{CC}(\text{opr}) = 2\text{V} \sim 5.5\text{V}$
- Pin and Function Compatible with 74F240/244

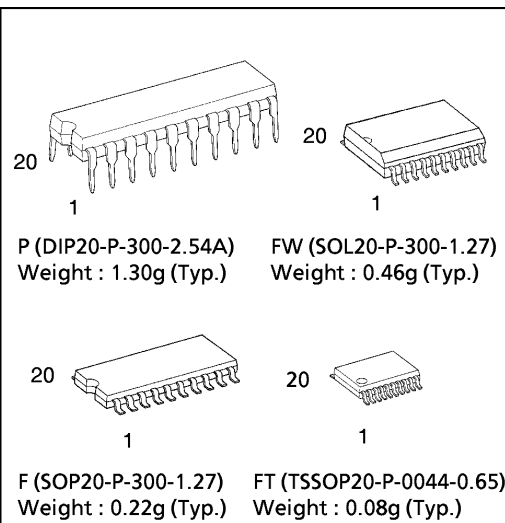
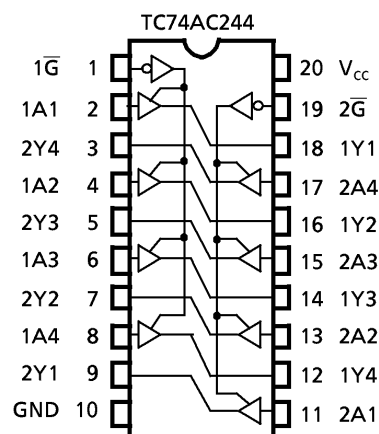
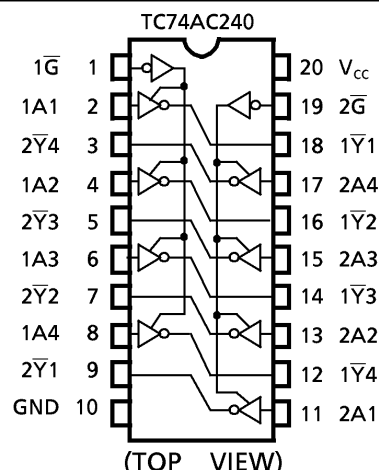
TRUTH TABLE

INPUTS		OUTPUTS	
$\overline{G}$	A_n	$Y_n(244)$	$\overline{Y}_n(240)$
L	L	L	H
L	H	H	L
H	X	Z	Z

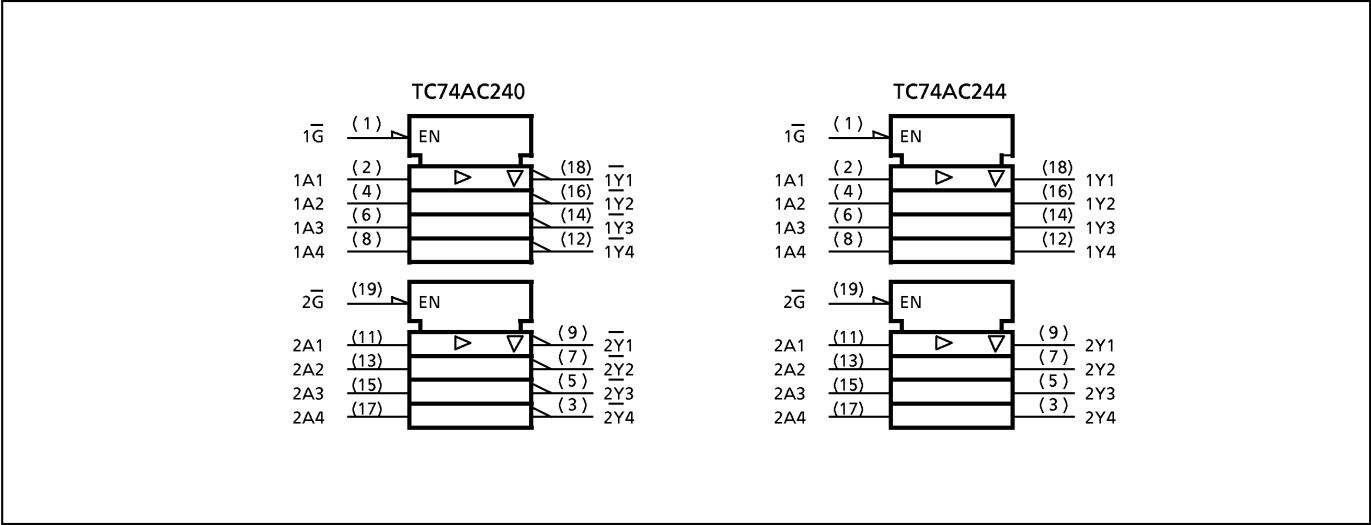
X : Don't Care

Z : High Impedance

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

**PIN ASSIGNMENT**

IEC LOGIC SYMBOL



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 7.0$	V
DC Input Voltage	V_{IN}	$-0.5 \sim V_{CC} + 0.5$	V
DC Output Voltage	V_{OUT}	$-0.5 \sim V_{CC} + 0.5$	V
Input Diode Current	I_{IK}	± 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}	$-65 \sim 150$	$^{\circ}C$

*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}	$2.0 \sim 5.5$	V
Input Voltage	V_{IN}	$0 \sim V_{CC}$	V
Output Voltage	V_{OUT}	$0 \sim V_{CC}$	V
Operating Temperature	T_{opr}	$-40 \sim 85$	$^{\circ}C$
Input Rise and Fall Time	dt/dV	$0 \sim 100$ ($V_{CC} = 3.3 \pm 0.3V$) $0 \sim 20$ ($V_{CC} = 5 \pm 0.5V$)	ns / V

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	V _{CC} (V)	Ta = 25°C			Ta = -40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
High - Level Input Voltage	V _{IH}		2.0 3.0 5.5	1.50 2.10 3.85	— — —	— — —	1.50 2.10 3.85	— — —	V
Low - Level Input Voltage	V _{IL}		2.0 3.0 5.5	— — —	— — —	0.50 0.90 1.65	— — —	0.50 0.90 1.65	V
High - Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50μA	2.0 3.0 4.5	1.9 2.9 4.4	2.0 3.0 4.5	— — —	1.9 2.9 4.4	V
			I _{OH} = -4mA	3.0	2.58	—	—	2.48	
			I _{OH} = -24mA I _{OH} = -75mA*	4.5 5.5	3.94 —	— —	— —	3.80 3.85	
Low - Level Output Voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50μA	2.0 3.0 4.5	— — —	0.0 0.0 0.0	— — —	0.1 0.1 0.1	V
			I _{OL} = 12mA	3.0	—	—	—	0.44	
			I _{OL} = 24mA I _{OL} = 75mA*	4.5 5.5	— —	0.36 —	— —	0.44 1.65	
3 - State Output Off - State Current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND	5.5	—	—	±0.5	—	±5.0	μA
Input Leakage Current	I _{IN}	V _{IN} = V _{CC} or GND	5.5	—	—	±0.1	—	±1.0	
Quiescent Supply Current	I _{CC}	V _{IN} = V _{CC} or GND	5.5	—	—	8.0	—	80.0	

* : This spec indicates the capability of driving 50Ω transmission lines.

One output should be tested at a time for a 10ms maximum duration.

AC ELECTRICAL CHARACTERISTICS (C_L = 50pF , R_L = 500Ω , Input t_r = t_f = 3ns)

PARAMETER	SYMBOL	TEST CONDITION	V _{CC} (V)	Ta = 25°C			Ta = -40~85°C		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time*	t _{pLH} t _{pHL}		3.3 ± 0.3 5.0 ± 0.5	— —	6.3 4.8	10.5 7.0	1.0 1.0	12.0 8.0	ns
			3.3 ± 0.3 5.0 ± 0.5	— —	7.0 5.2	11.4 7.5	1.0 1.0	13.0 8.5	
Output Enable Time	t _{pZL} t _{pZH}		3.3 ± 0.3 5.0 ± 0.5	— —	8.4 5.9	14.0 8.7	1.0 1.0	16.0 10.0	
			3.3 ± 0.3 5.0 ± 0.5	— —	6.4 5.5	10.5 7.9	1.0 1.0	12.0 9.0	
Input Capacitance	C _{IN}			—	5	10	—	10	pF
Output Capacitance	C _{OUT}			—	10	—	—	—	
Power Dissipation Capacitance	C _{PD} (1)			—	30	—	—	—	

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 :

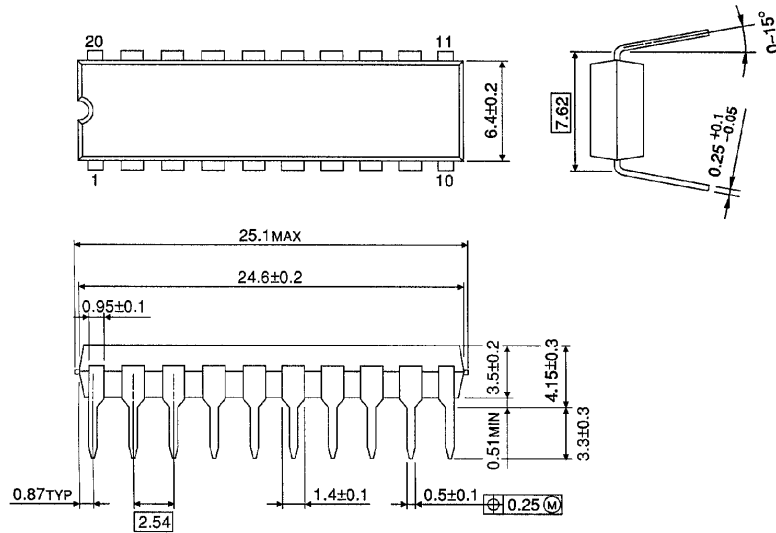
$$I_{CC}(\text{opr.}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 8 \text{ (per bit)}$$

(2) * for TC74AC240 only

** for TC74AC244 only

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

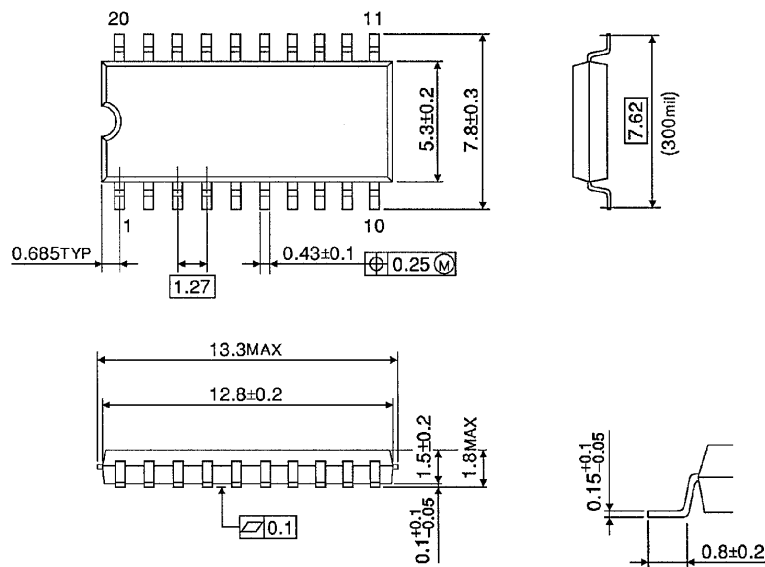
Unit in mm



Weight : 1.30g (Typ.)

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

Unit in mm

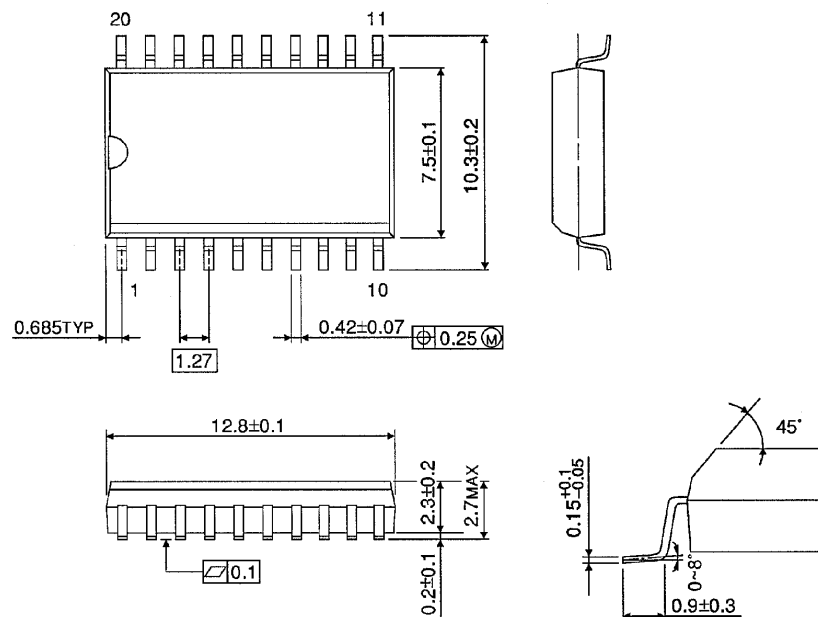


Weight : 0.22g (Typ.)

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

Unit in mm

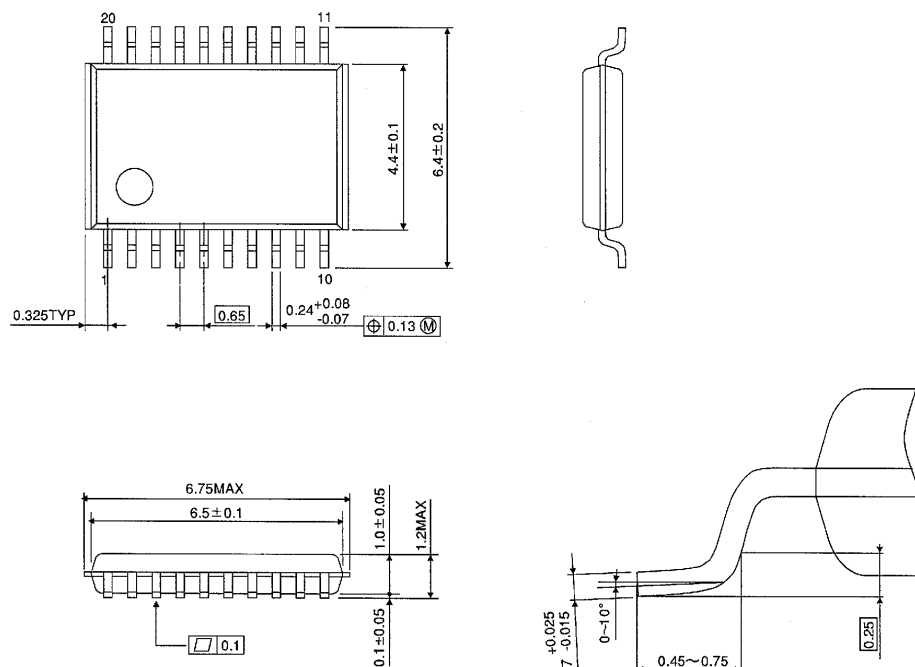
(Note) This package is not available in Japan.



Weight : 0.46g (Typ.)

TSSOP 20PIN PACKAGE DIMENSIONS (TSSOP20-P-0044-0.65)

Unit in mm



Weight : 0.08g (Typ.)

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000707EBA

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