TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74AC240P, TC74AC240F, TC74AC240FW, TC74AC240FT
TC74AC244P, TC74AC244F, TC74AC244FW, TC74AC244FT

OCTAL BUS BUFFER

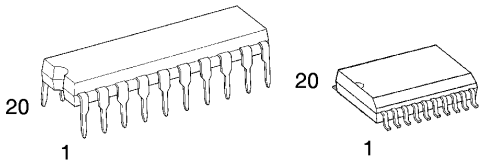
TC74AC240P/F/FW/FT INVERTED, 3 – STATE OUTPUTS
TC74AC244P/F/FW/FT NON – INVERTED, 3 – STATE OUTPUTS

The TC74AC240 and 244 are advanced high speed CMOS OCTAL BUS BUFFERs fabricated with silicon gate and double - layer metal wiring C^2MOS 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 :

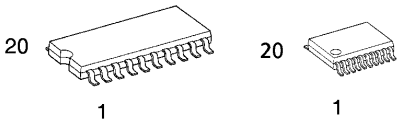
- High Speed ····· t_{pd} = 4.0ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 8μA(Max.) at Ta = 25°C
- High Noise Immunity ····· $V_{NIH} = V_{NIL}$ = 28% V_{CC} (Min.)
- Symmetrical Output Impedance ··· $|I_{OH}| = I_{OL}$ = 24mA(Min.)
  Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays ····· $t_{pLH} \simeq t_{pHL}$
- Wide Operating Voltage Range ···· V_{CC} (opr) = 2V ~ 5.5V
- Pin and Function Compatible with 74F240 / 244

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



P (DIP20-P-300-2.54A)
Weight : 1.30g (Typ.)

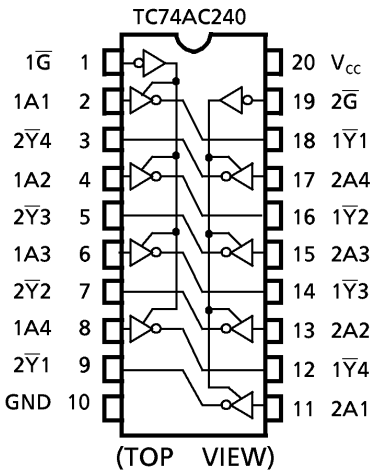
FW (SOL20-P-300-1.27)
Weight : 0.46g (Typ.)



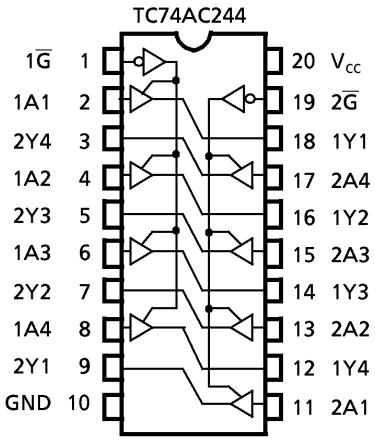
F (SOP20-P-300-1.27)
Weight : 0.22g (Typ.)

FT (TSSOP20-P-0044-0.65)
Weight : 0.08g (Typ.)

PIN ASSIGNMENT



(TOP VIEW)

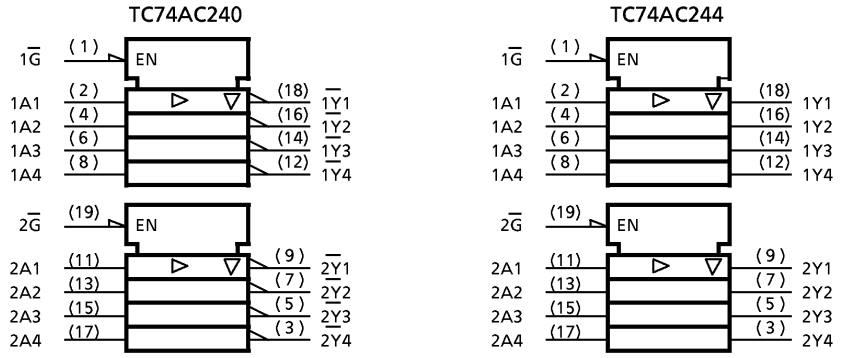


TRUTH TABLE

INPUTS		OUTPUTS	
$\overline{G}$	An	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

IEC LOGIC SYMBOL



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	−0.5~7.0	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}	±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 Ta = −40°C~65°C. From Ta = 65°C to 85°C a derating factor of −10mW/°C should be applied up to 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2.0~5.5	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	dt / dV	0~ 100 (Vcc = 3.3 ± 0.3V) 0~ 20 (Vcc = 5 ± 0.5V)	ns / V

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V_{CC} (V)	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
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 I_{OH} = −24mA I_{OH} = −75mA*	3.0 4.5 5.5	2.58 3.94 —	— — —	— — —	2.48 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	— — —	0.1 0.1 0.1	V
			I_{OL} = 12mA I_{OL} = 24mA I_{OL} = 75mA*	3.0 4.5 5.5	— — —	— — —	0.36 0.36 —	— — —	0.44 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)

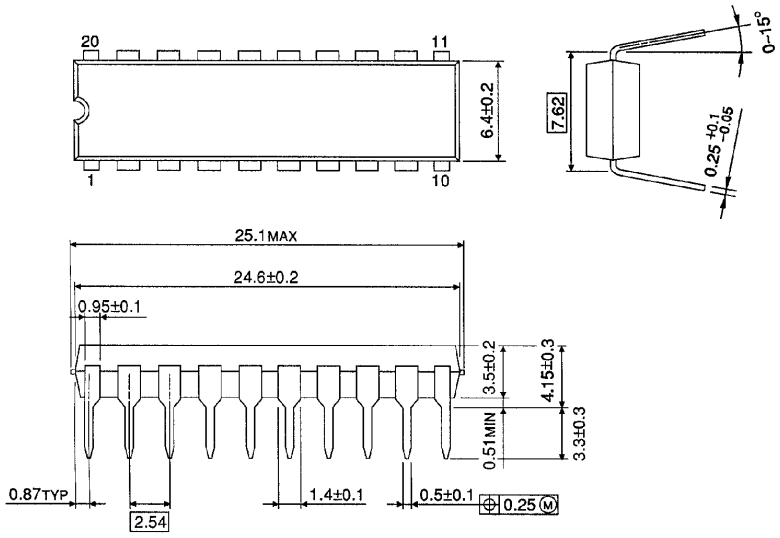
PARAMETER	SYMBOL	TEST CONDITION	V_{CC} (V)	Ta = 25°C MIN.	Ta = 25°C TYP.	Ta = 25°C MAX.	Ta = −40~85°C MIN.	Ta = −40~85°C MAX.	UNIT
Propagation Delay Time*	t_{pLH} t_{pHL}		3.3 ± 0.3 5.0 ± 0.5	— —	6.3 4.8	10.5 7.0	1.0 1.0	12.0 8.0	ns
Propagation Delay Time**	t_{pLH} t_{pHL}		3.3 ± 0.3 5.0 ± 0.5	— —	7.0 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	
Output Disable Time	t_{pLZ} t_{pHZ}		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 :

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

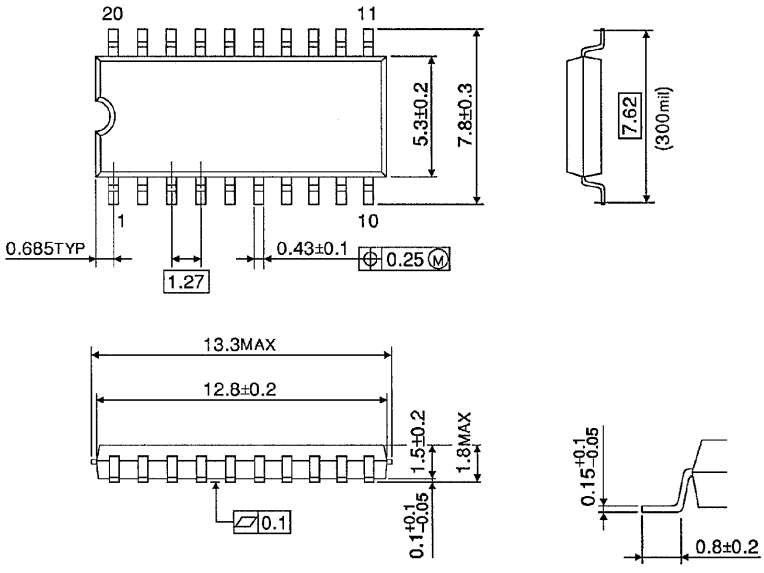
(2) * for TC74AC240 only
** for TC74AC244 only

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



Weight : 1.30g (Typ.)

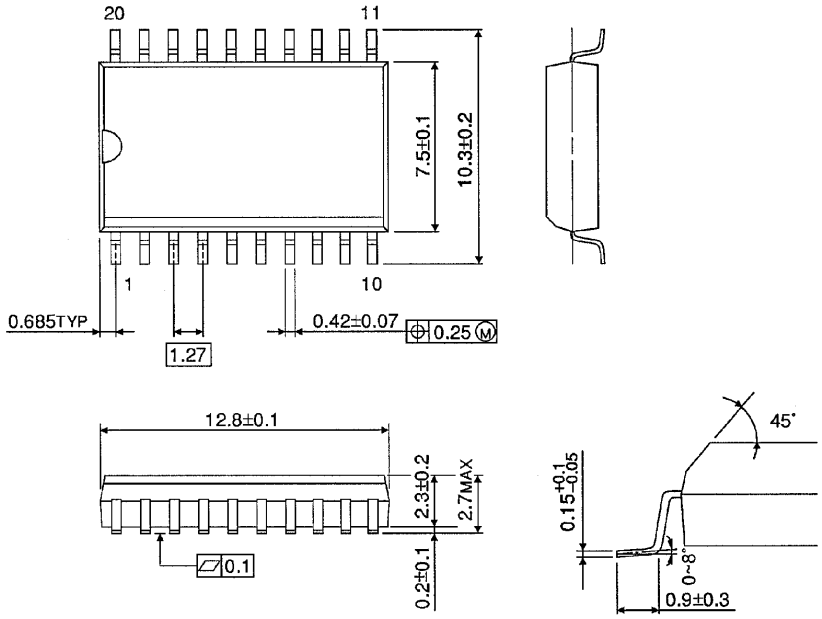
SOP 20PIN (200mil BODY) PACKAGE DIMENSIONS (SOP20-P-300-1.27) Unit in mm



Weight : 0.22g (Typ.)

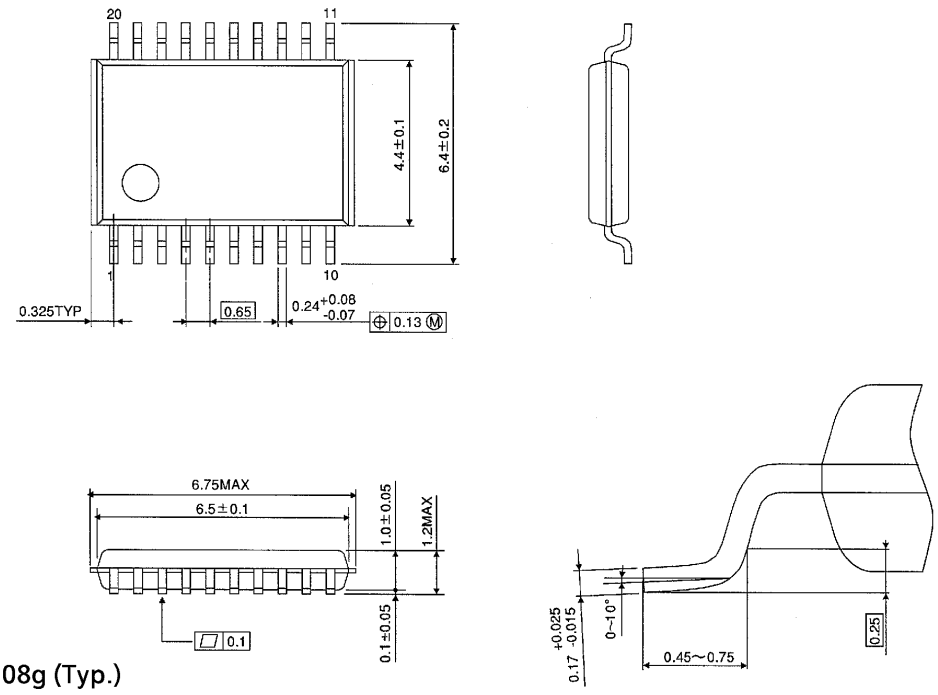
SOP 20PIN (300mil BODY) PACKAGE DIMENSIONS (SOL20-P-300-1.27) Unit in mm

(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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