TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HCT240AP, TC74HCT240AF, TC74HCT240AFW
TC74HCT244AP, TC74HCT244AF, TC74HCT244AFW

OCTAL BUS BUFFER WITH TTL INPUT LEVEL
TC74HCT240AP / AF / AFW INVERTED, 3 – STATE OUTPUTS
TC74HCT244AP / AF / AFW NON – INVERTED, 3 – STATE OUTPUTS

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

The TC74HCT240A, and HCT244A are high speed CMOS OCTAL BUS BUFFERs fabricated with silicon gate C^2MOS technology.

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

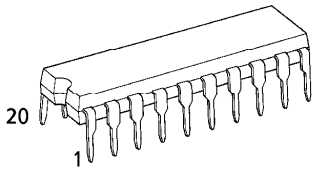
Their inputs are compatible with TTL, NMOS, and CMOS output voltage levels. The TC74HCT240A is an inverting 3 - state buffer having two active - low output enables. The TC74HCT244A is non - inverting 3 - state buffer the HCT244A has two active - low output enables.

These devices are designed to be used with 3 - state memory address drivers, etc.

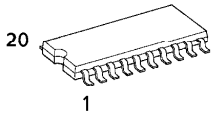
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

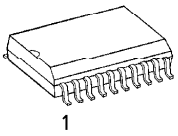
- High Speed ····· t_{pd} = 13ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 4μA(Max.) at Ta = 25°C
- Compatible with TTL outputs ···· V_{IL} = 0.8V(Max.)
  V_{IH} = 2.0V(Min.)
- Wide Interfacing ability ····· LSTTL, NMOS, CMOS
- Output Drive Capability ····· 15 LSTTL Loads
- Symmetrical Output Impedance ··· $|I_{OH}| = I_{OL}$ = 6mA(Min.)
- Balanced Propagation Delays ····· $t_{pLH} \simeq t_{pHL}$
- Wide Operating Voltage Range ···· V_{CC} (opr.) = 2V ~ 6V
- Pin and Function Compatible with 74LS 240 / 244



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



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



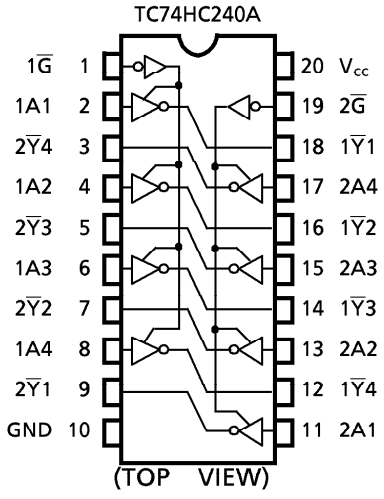
FW (SOL20-P-300-1.27)
Weight : 0.46g (Typ.)

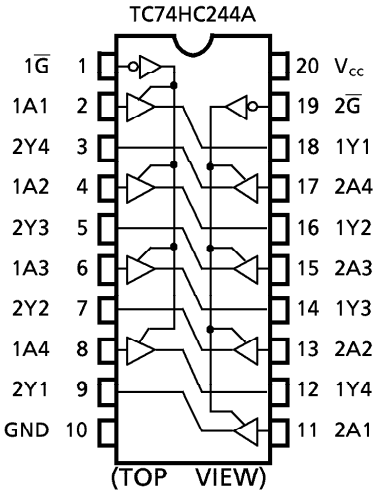
TRUTH TABLE

INPUTS		OUTPUTS	
$\overline{G}$	A_n	Y_n	$\overline{Y}_n$△△
L	L	L	H
L	H	H	L
H	X	Z	Z

△△ : for TC74HCT240A only
X : Don't Care
Z : High Impedance

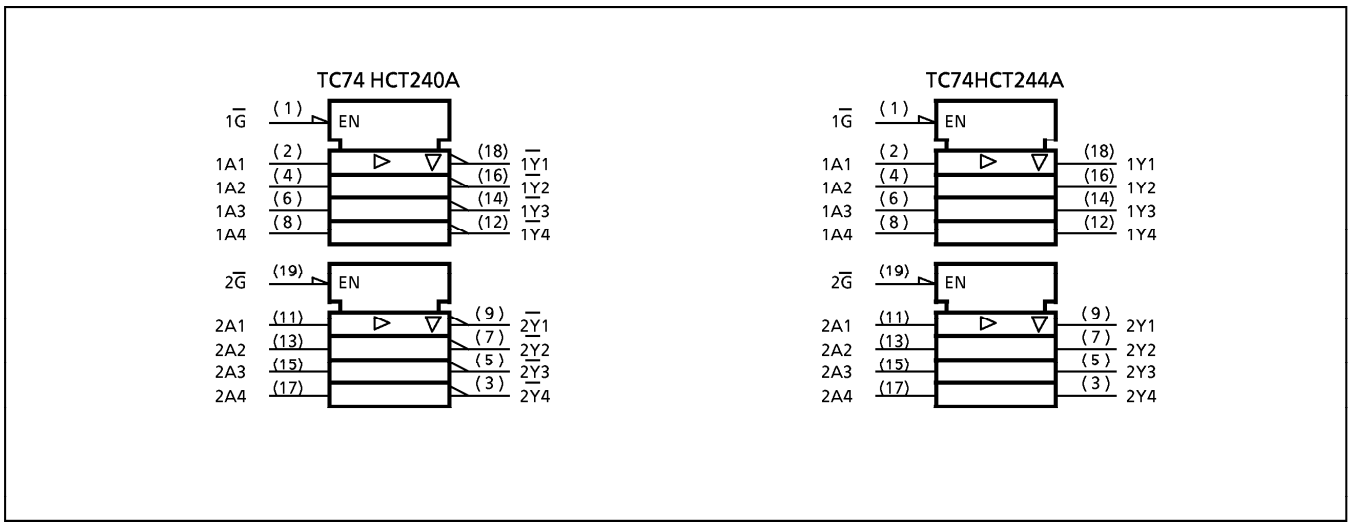
PIN ASSIGNMENT





961001EBA2

IEC LOGIC SYMBOL



961001EBA2'

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 Ta= −40°C~65°C. From Ta=65°C to 85 °C a derating factor of −10mW/ °C shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	4.5~5.5	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	t_r, t_f	0~500	ns

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}			4.5 ~ 5.5	2.0	—	—	2.0	—	V
Low - Level Input Voltage	V_{IL}			4.5 ~ 5.5	—	—	0.8	—	0.8	V
High - Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20 μA	4.5	4.4	4.5	—	4.4	—	V
			I_{OH} = −6 mA	4.5	4.18	4.31	—	4.13	—	
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20 μA	4.5	—	0.0	0.1	—	0.1	V
			I_{OL} = 6 mA	4.5	—	0.17	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		5.5	—	—	±0.5	—	±5.0	
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		5.5	—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	4.0	—	40.0	μA
	I_C	Per input: V_{IN} = 0.5V or 2.4V Other input: V_{CC} or GND		5.5	—	—	2.0	—	2.9	mA

AC ELECTRICAL CHARACTERISTICS (C_L = 50pF, Input $t_r = t_f$ = 6ns)

PARAMETER	SYMBOL	TEST CONDITION	CL (pF)	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
Output Transition Time	t_{TLH} t_{THL}		50	4.5	−	7	12	−	15	ns
				5.5	−	6	11	−	14	
Propagation Delay Time *	t_{pLH} t_{pHL}		50	4.5	−	15	22	−	28	
				5.5	−	13	20	−	25	
			150	4.5	−	21	30	−	38	
				5.5	−	16	27	−	34	
Propagation Delay Time **	t_{pLH} t_{pHL}		50	4.5	−	15	25	−	31	
				5.5	−	13	22	−	28	
			150	4.5	−	21	33	−	41	
				5.5	−	18	29	−	37	
3-State Output Enable time	t_{pZL} t_{pZH}	R_L = 1kΩ	50	4.5	−	17	30	−	38	
				5.5	−	14	27	−	34	
			150	4.5	−	23	38	−	48	
				5.5	−	20	34	−	43	
3-State Output Disable time	t_{pLZ} t_{pHZ}	R_L = 1kΩ	50	4.5	−	16	30	−	38	
				5.5	−	13	27	−	34	
Input Capacitance	C_{IN}				−	5	10	−	10	pF
Output Capacitance	C_{OUT}				−	10	−	−	−	
Power Dissipation Capacitance (Note 1)	C_{PD}	*			−	33	−	−	−	
		**			−	31	−	−	−	

Note1 : C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

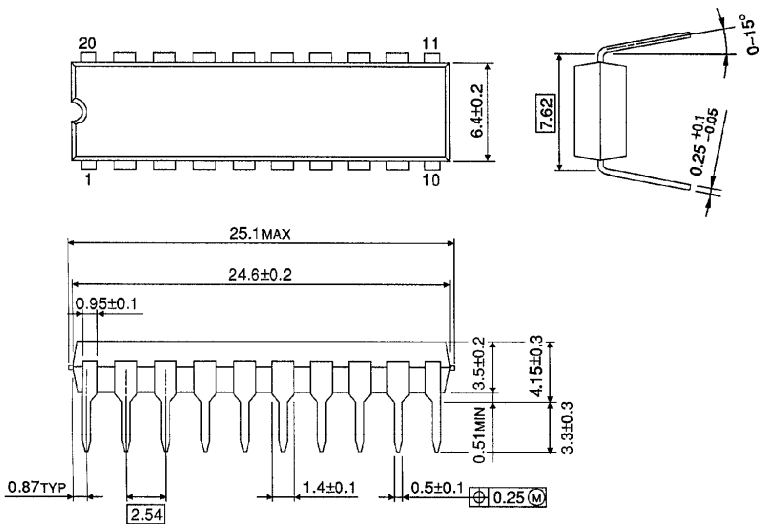
Average operating current can be obtained by the equation :

I_{CC} (opr) = C_{PD} · V_{CC} · f_{IN} + I_{CC} / 8 (per bit)

Note2 : * = TC74HCT240A

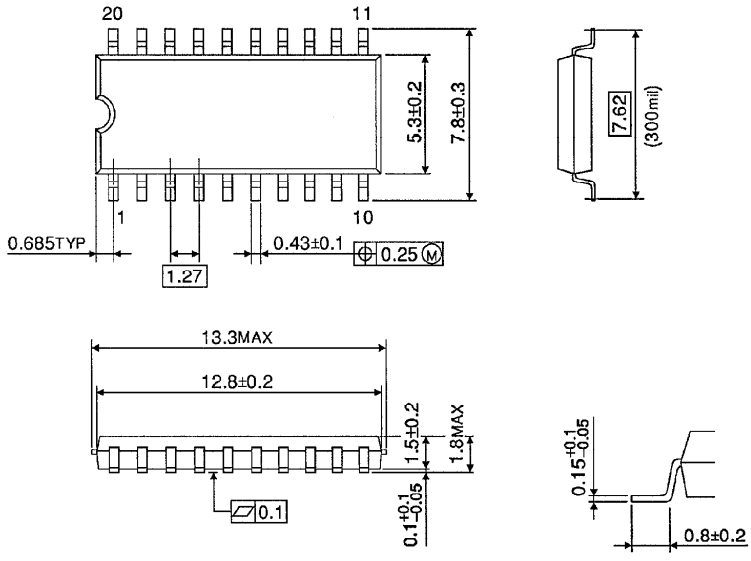
** = TC74HCT244A

DIP 20PIN OUTLINE DRAWING (DIP20-P-300-2.54A) Unit in mm



Weight : 1.30g (Typ.)

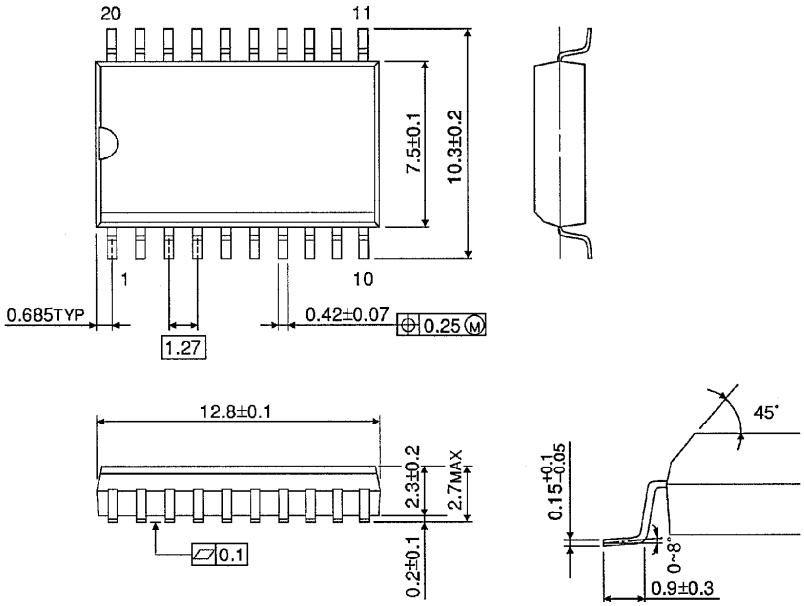
SOP 20PIN (200mil BODY) OUTLINE DRAWING (SOP20-P-300-1.27) Unit in mm



Weight : 0.22g (Typ.)

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.)