TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

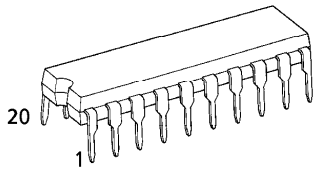
TC74HC7240AP, TC74HC7240AF
TC74HC7244AP, TC74HC7244AF

OCTAL BUS BUFFER (WITH SCHMITT TRIGGER INPUTS)
TC74HC7240AP / AF INVERTED, 3 – STATE OUTPUTS
TC74HC7244AP / AF NON – INVERTED, 3 – STATE OUTPUTS

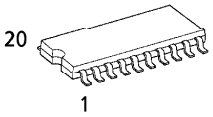
The TC74HC7240A/7244A are high speed CMOS OCTAL BUS BUFFERs with silicon gate C^2MOS technology.
They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.
The TC74HC7240A/7244A have same pin configuration and function as the TC74HC240A/244A. And they have a hystereis characterictics with each input, so TC74HC7240A /7244A can be used as a line receiver, etc.
They have two active low output enables.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

- High Speed ····· t_{pd} = 15ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 4μA(Max.) at Ta = 25°C
- High Noise Immunity ····· V_H = 1.1V(typ.) at V_{CC} = 5V
- 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 74LS240/244



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



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

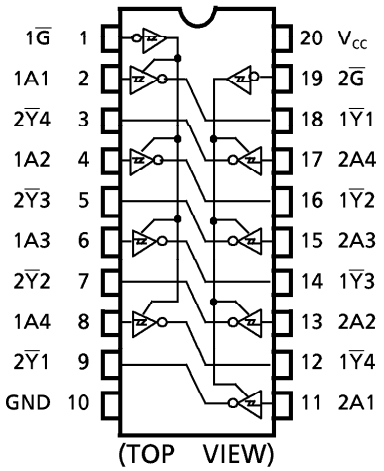
TRUTH TABLE

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

△ : for TC74HC7240A only
X : Don't Care
Z : High Impedance

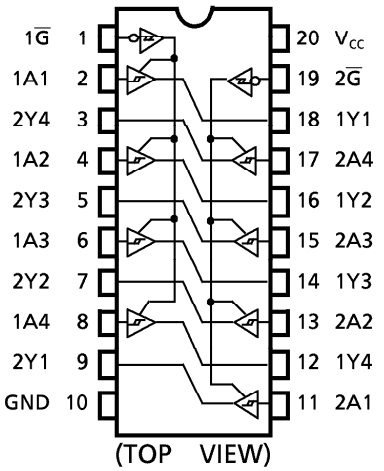
PIN ASSIGNMENT

TC74HC7240A



(TOP VIEW)

TC74HC7244A

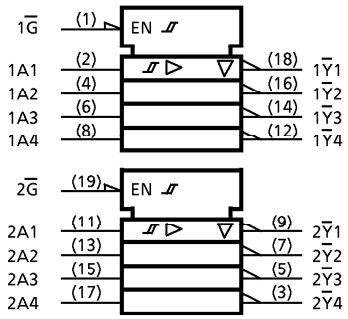


(TOP VIEW)

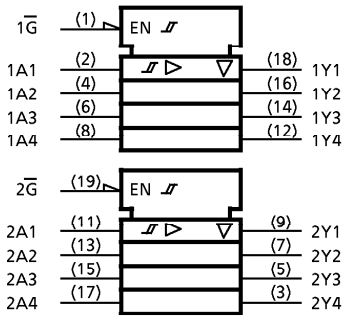
961001EBA2

IEC LOGIC SYMBOL

TC74 HC7240A



TC74HC7244A



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}	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

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
Positive Threshold Voltage	V_P			2.0 4.5 6.0	1.0 2.3 3.0	1.25 2.7 3.5	1.5 3.15 4.2	1.0 2.3 3.0	1.5 3.15 4.2	V
Negative Threshold Voltage	V_N			2.0 4.5 6.0	0.3 1.13 1.5	0.65 1.6 2.3	0.9 2.0 2.6	0.3 1.13 1.5	0.9 2.0 2.6	V
Hysteresis Voltage	V_H			2.0 4.5 6.0	0.3 0.6 0.8	0.6 1.1 1.2	1.0 1.4 1.7	0.3 0.6 0.8	1.0 1.4 1.7	V
High - Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = −20μA	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	− − −	1.9 4.4 5.9	− − −	V
			I_{OH} = −6 mA I_{OH} = −7.8mA	4.5 6.0	4.18 5.68	4.31 5.80	− −	4.13 5.63	− −	
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 20μA	2.0 4.5 6.0	− − −	0.0 0.0 0.0	0.1 0.1 0.1	− − −	0.1 0.1 0.1	V
			I_{OL} = 6 mA I_{OL} = 7.8mA	4.5 6.0	− −	0.17 0.18	0.26 0.26	− −	0.33 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	

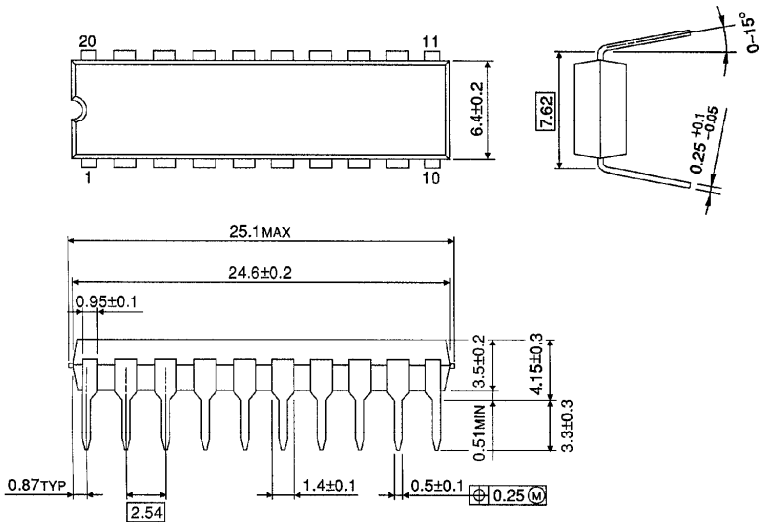
AC ELECTRICAL CHARACTERISTICS (Input $t_r = t_f = 6ns$)

PARAMETER	SYMBOL	TEST CONDITION			Ta = 25°C			Ta = −40~85°C		UNIT
			CL (PF)	V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t_{TLH} t_{THL}		50	2.0	—	25	60	—	75	ns
				4.5	—	7	12	—	15	
				6.0	—	6	10	—	13	
Propagation Delay Time	t_{pLH} t_{pHL}		50	2.0	—	50	125	—	155	
				4.5	—	15	25	—	31	
				6.0	—	13	21	—	26	
			150	2.0	—	67	165	—	205	
				4.5	—	20	33	—	41	
				6.0	—	17	28	—	35	
Output Enable Time	t_{pZL} t_{pZH}	$R_L = 1k\Omega$	50	2.0	—	68	150	—	190	
				4.5	—	21	30	—	38	
				6.0	—	16	26	—	32	
			150	2.0	—	84	165	—	230	
				4.5	—	26	37	—	46	
				6.0	—	20	31	—	39	
Output Disable Time	t_{pLZ} t_{pHZ}	$R_L = 1k\Omega$	50	2.0	—	48	150	—	190	
				4.5	—	21	30	—	38	
				6.0	—	19	26	—	32	
Input Capacitance	C_{IN}				—	5	10	—	10	pF
Output Capacitance	C_{OUT}				—	10	—	—	—	
Power Dissipation Capacitance	C_{PD} (1)	TC74HC7240A			—	33	—	—	—	
		TC74HC 7244A				34	—	—	—	

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:

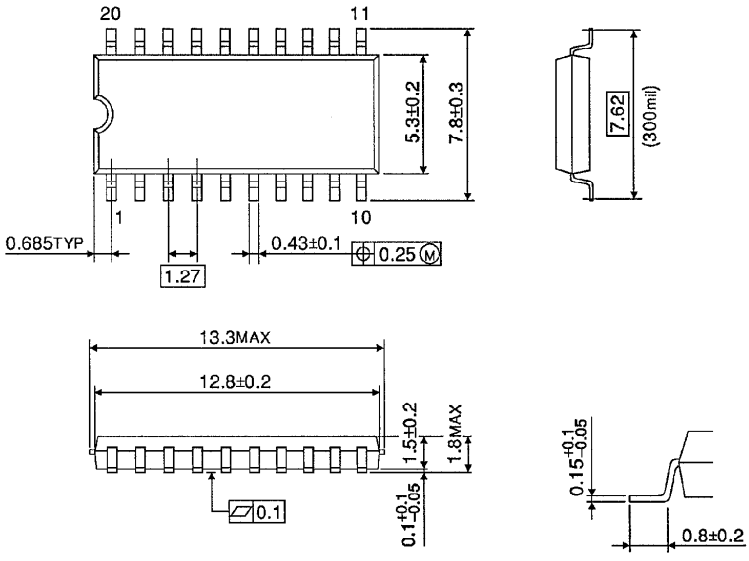
$$I_{CC}(opr) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 8 \text{ (per bit)}$$

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.)