INTEGRATED CIRCUIT

TOSHIBA

TECHNICAL DATA

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT

TC74ACT240P/F/FW/FS, TC74ACT244P/F/FW/FS

SILICON MONOLITHIC

OCTAL BUS BUFFER

TC74ACT240P/F/FS INVERTED, 3 – STATE OUTPUTS

TC74ACT244P/F/FS NON – INVERTED, 3 – STATE OUTPUTS

The TC74ACT240 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.

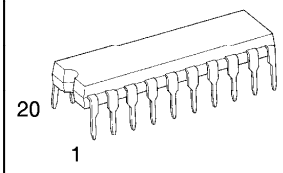
The 74ACT240 is an inverting 3-state buffer while the 74ACT244 is non-inverting. Both devices have two active-low output enables.

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

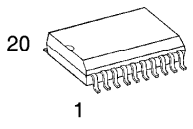
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

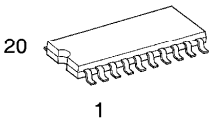
- High Speed ..... t_{pd} = 5.0ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ..... I_{CC} = 8μA(Max.) at Ta = 25°C
- Compatible with TTL outputs .... V_{IL} = 0.8V(Max.)
  V_{IH} = 2.0V(Min.)
- Symmetrical Output Impedance ... $|I_{OH}| = I_{OL}$ = 24mA(Min.)
  Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays ..... $t_{pLH} \simeq t_{pHL}$
- Pin and Function Compatible with 74F240/244



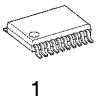
P (DIP20 – P – 300A)
Weight : 1.30g (TYP.)



FW (SOL20 – P – 300)
Weitht : 0.46g (TYP.)



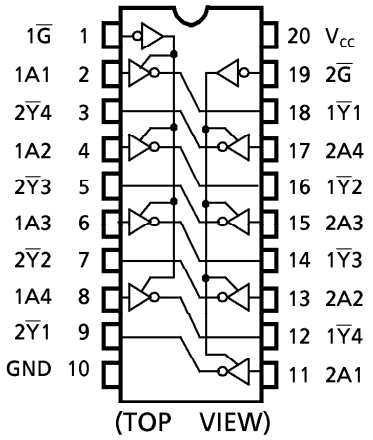
F (SOP20 – P – 300)
Weight : 0.22g (TYP.)



FS (SSOP20 – P – 225A)
Weight : 0.09g (TYP.)

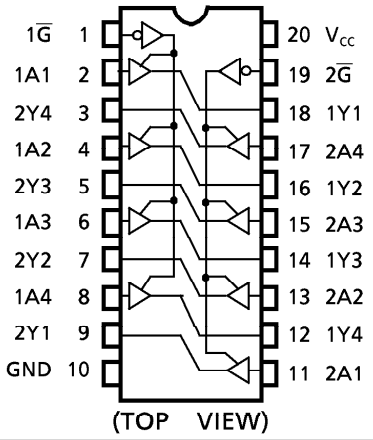
PIN ASSIGNMENT

TC74ACT240



(TOP VIEW)

TC74ACT244



(TOP VIEW)

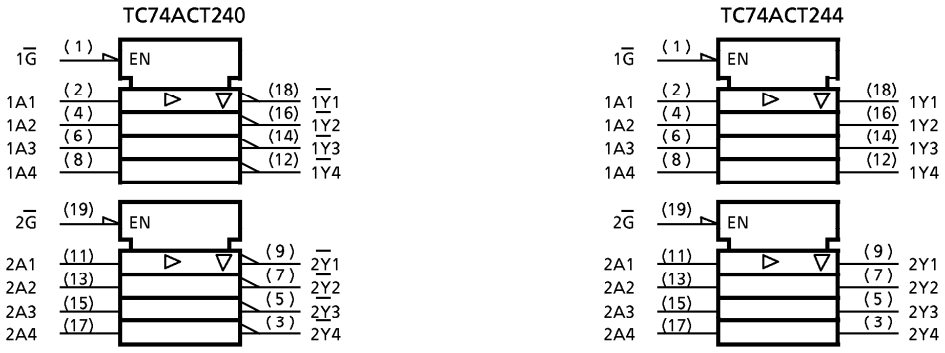
TRUTH TABLE

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 / SSOP)	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}	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	dt / dV	0~10	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}			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} = −50μA I_{OH} = −24mA I_{OH} = −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_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50μA I_{OL} = 24mA I_{OL} = 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_{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	μA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		5.5	—	—	8.0	—	80.0	μA
	I_C	PER INPUT : V_{IN} = 3.4V OTHER INPUT : V_{CC} 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.

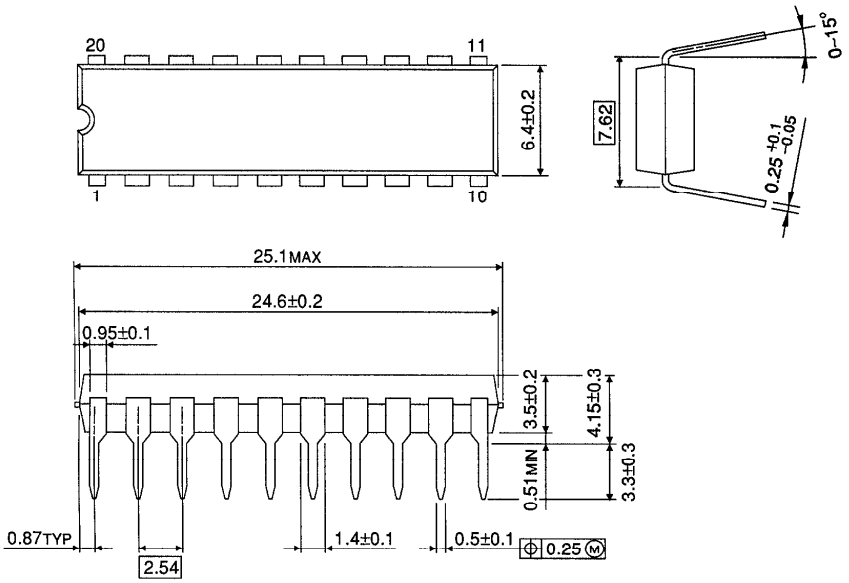
AC ELECTRICAL CHARACTERISTICS (C_L = 50pF, R_L = 500Ω, Input $t_r = t_f$ = 3ns)

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}		5.0 ± 0.5	—	5.7	8.0	1.0	9.0	ns
Output Enable Time	t_{pZL} t_{pZH}		5.0 ± 0.5	—	6.0	9.0	1.0	10.5	ns
Output Disable Time	t_{pLZ} t_{pHZ}		5.0 ± 0.5	—	5.9	8.5	1.0	10.0	ns
Input Capacitance	C_{IN}			—	5	10	—	10	pF
Output Capacitance	C_{OUT}			—	10	—	—	—	pF
Power Dissipation Capacitance	C_{PD} (1)	TC74ACT240		—	25	—	—	—	pF
		TC74ACT244		—	29	—	—	—	pF

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 :

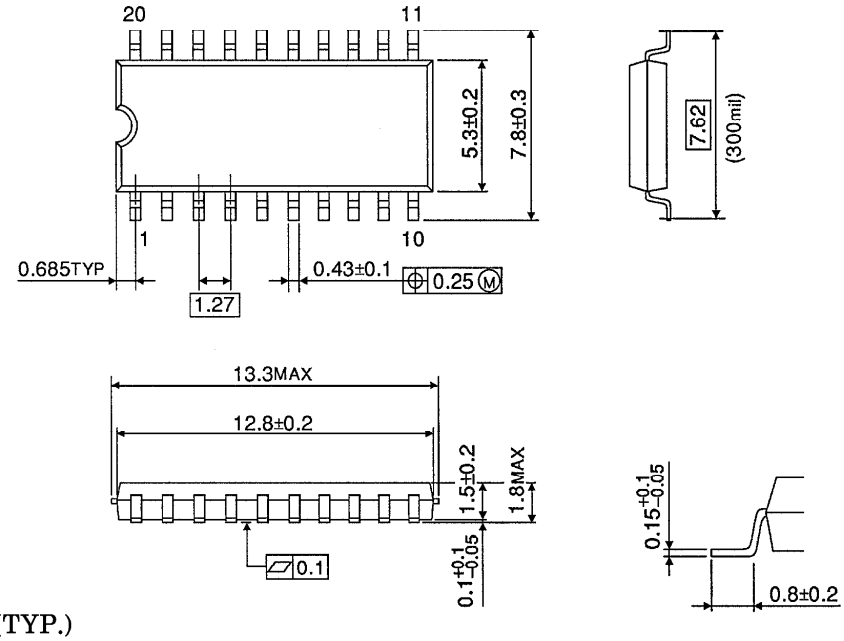
$$I_{CC}(opr.) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 8 \text{ (per bit)}$$

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



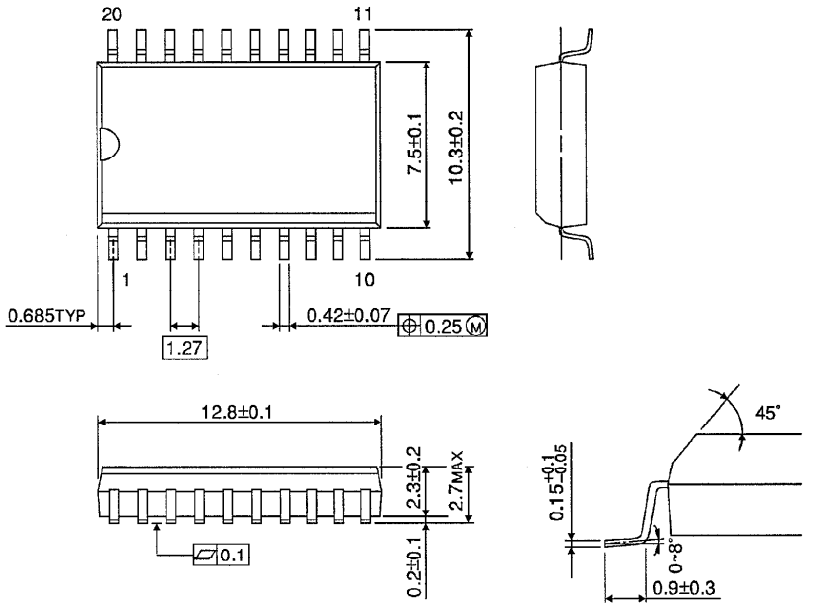
Weight : 1.30g (TYP.)

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



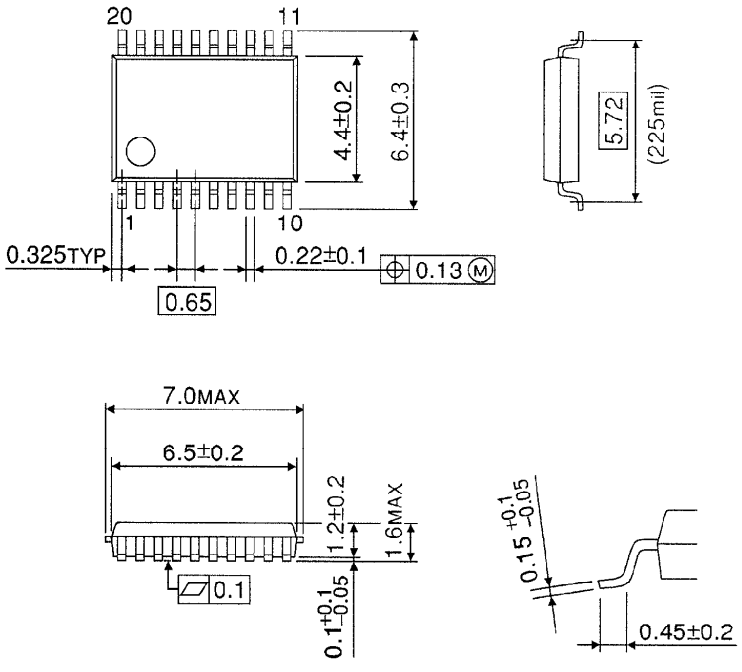
Weight : 0.22g (TYP.)

SOP 20PIN (300mil BODY) OUTLINE DRAWING (SOL20−P−300) Unit in mm



Weight : 0.46g (TYP.)

SSOP 20PIN OUTLINE DRAWING (SSOP20−P−225A) Unit in mm



Weight : 0.09g (TYP.)