TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

# TC74ACT240P, TC74ACT240F, TC74ACT240FW, TC74ACT240FT
# TC74ACT244P, TC74ACT244F, TC74ACT244FW, TC74ACT244FT

## OCTAL BUS BUFFER

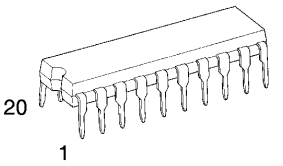
**TC74ACT240P/F/FW/FT INVERTED, 3 – STATE OUTPUTS**
**TC74ACT244P/F/FW/FT NON – INVERTED, 3 – STATE OUTPUTS**

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.

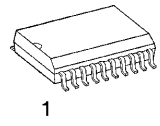
FEATURES :

- High Speed ····· $t_{pd}$ = 5.0ns(typ.) at $V_{CC}$ = 5V
- Low Power Dissipation ····· $I_{CC}$ = 8$\mu$A(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

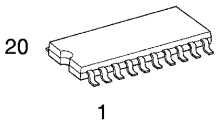
(Note) The JEDEC SOP (FW) is not available in Japan.



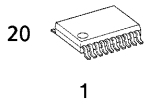

P (DIP20-P-300-2.54A)
Weight : 1.30g (Typ.)




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

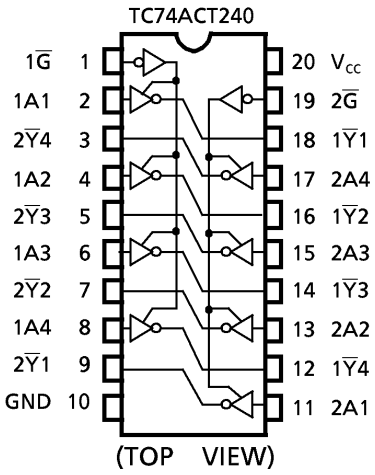


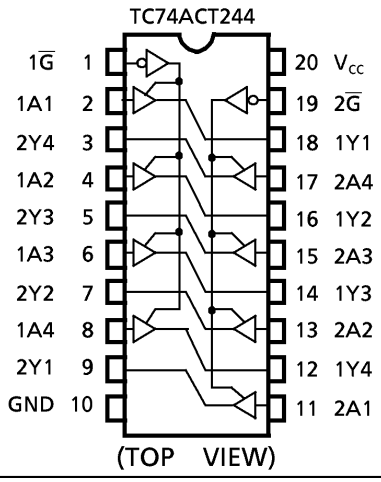

F (SOP20-P-300-1.27)
Weight : 0.22g (Typ.)




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

**PIN ASSIGNMENT**



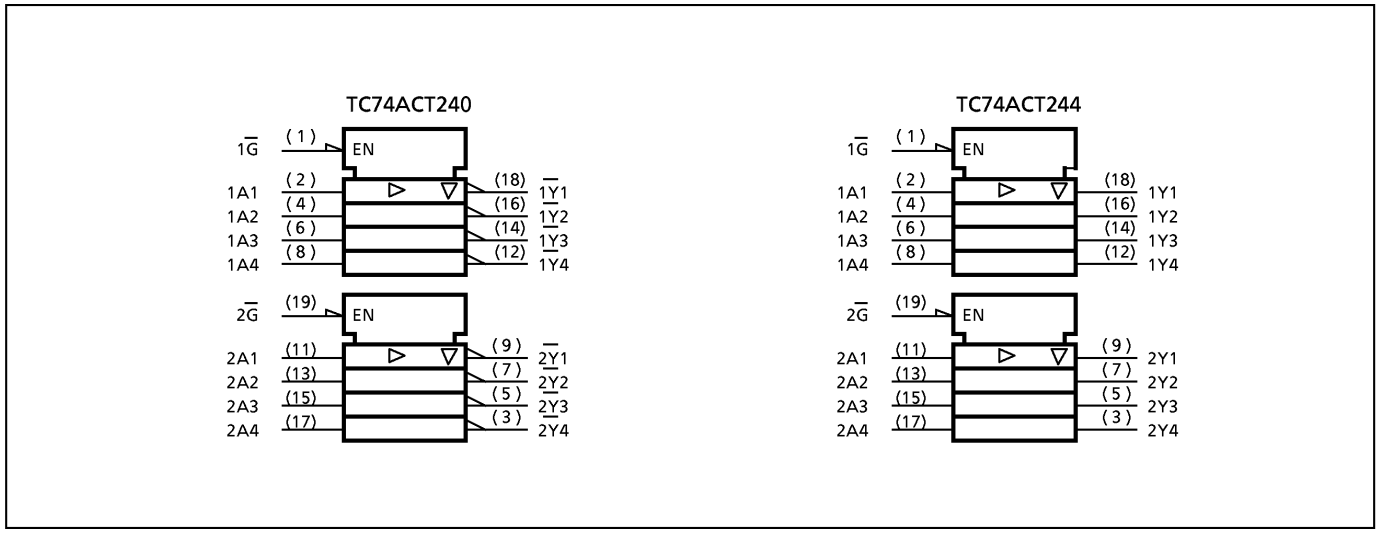




**TRUTH TABLE**

| 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 | $V_{CC}$ | 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 | 4.5 | 4.4 | 4.5 | — | 4.4 | — | V |
| | | | $I_{OH}$ = −24mA | 4.5 | 3.94 | — | — | 3.80 | — | |
| | | | $I_{OH}$ = −75mA* | 5.5 | — | — | — | 3.85 | — | |
| Low - Level Output Voltage | $V_{OL}$ | $V_{IN}$ = $V_{IH}$ or $V_{IL}$ | $I_{OL}$ = 50μA | 4.5 | — | 0.0 | 0.1 | — | 0.1 | V |
| | | | $I_{OL}$ = 24mA | 4.5 | — | — | 0.36 | — | 0.44 | |
| | | | $I_{OL}$ = 75mA* | 5.5 | — | — | — | — | 1.65 | |
| 3 - State Output Off - State Current | $I_{OZ}$ | $V_{IN}$ = $V_{IH}$ or $V_{IL}$<br>$V_{OUT}$ = $V_{CC}$ 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 | |
| | $I_C$ | PER INPUT : $V_{IN}$ = 3.4V<br>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.

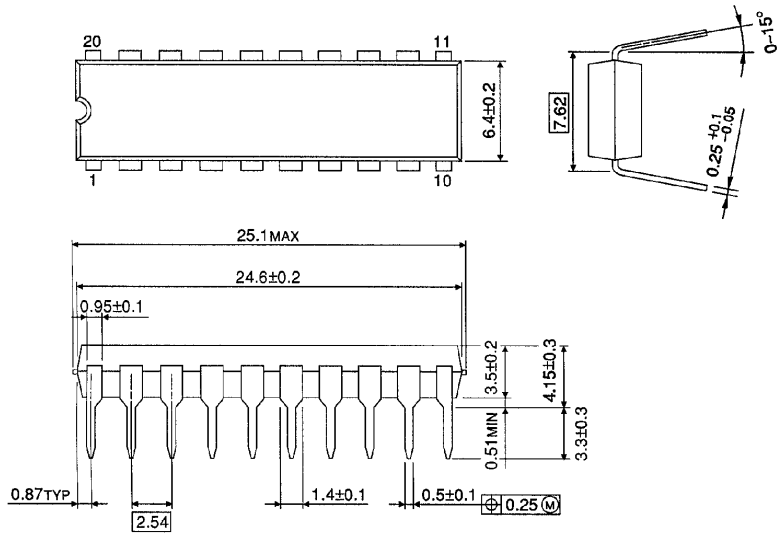
**AC ELECTRICAL CHARACTERISTICS ( $C_L$ = 50pF, $R_L$ = 500Ω, Input $t_r = t_f$ = 3ns )**

| 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 | |
| Output Disable Time | $t_{pLZ}$ $t_{pHZ}$ | | 5.0 ± 0.5 | — | 5.9 | 8.5 | 1.0 | 10.0 | |
| Input Capacitance | $C_{IN}$ | | | — | 5 | 10 | — | 10 | pF |
| Output Capacitance | $C_{OUT}$ | | | — | 10 | — | — | — | |
| Power Dissipation Capacitance | $C_{PD}$ (1) | TC74ACT240 | | — | 25 | — | — | — | |
| | | TC74ACT244 | | — | 29 | — | — | — | |

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 :

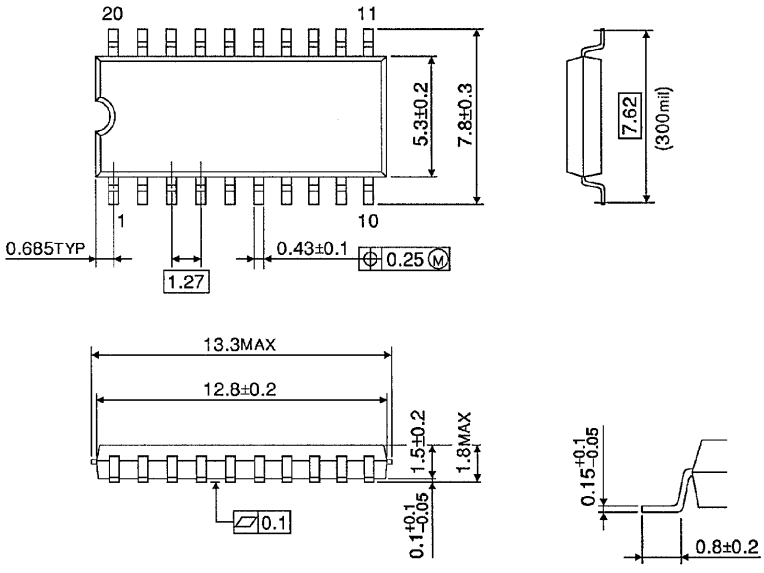
$$I_{CC}(opr.) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 8 \text{ ( per bit )}$$

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




Weight : 1.30g (Typ.)

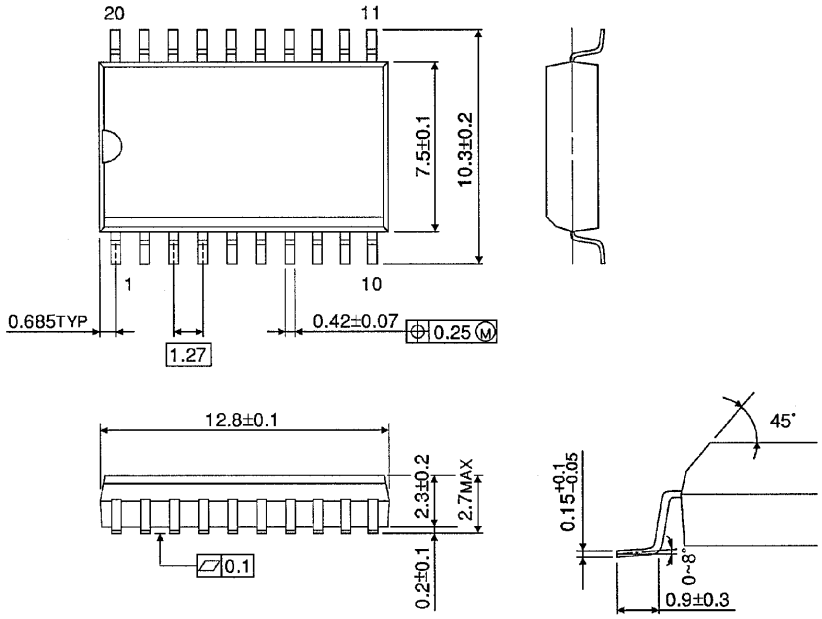
**SOP 20PIN (200mil BODY) PACKAGE DIMENSIONS (SOP20-P-300-1.27)** Unit in mm




Weight : 0.22g (Typ.)

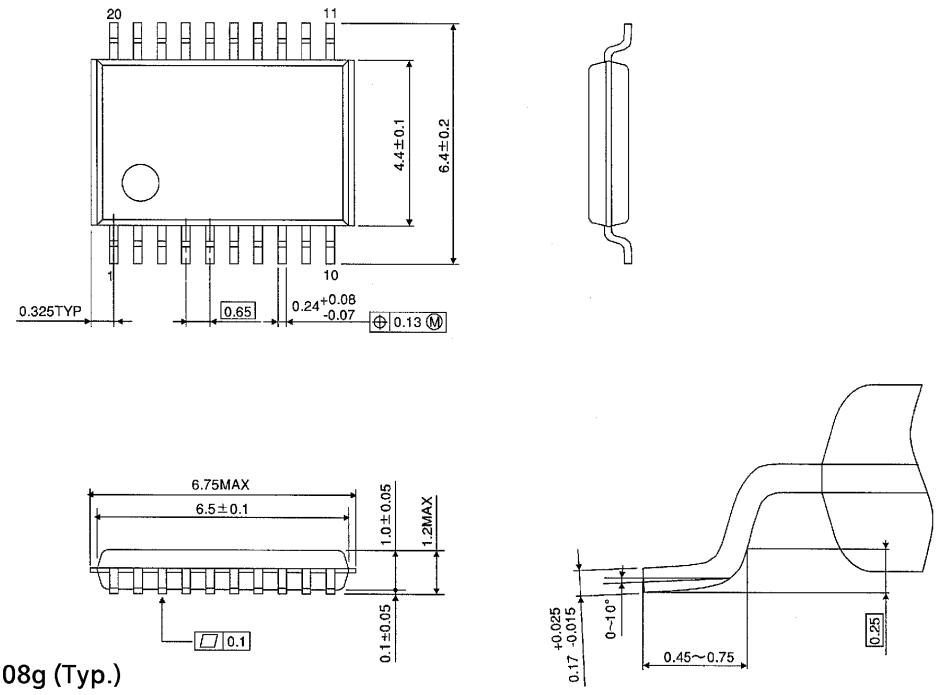
**SOP 20PIN (300mil BODY) PACKAGE DIMENSIONS (SOL20-P-300-1.27)** Unit in mm

(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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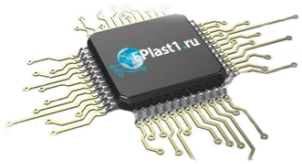
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