TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC74ACT240P, TC74ACT240F, TC74ACT240FT TC74ACT244P, TC74ACT244F, TC74ACT244FT

Octal Bus Buffer

TC74ACT240P/F/FT Inverted, 3-State

Outputs

TC74ACT244P/F/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.

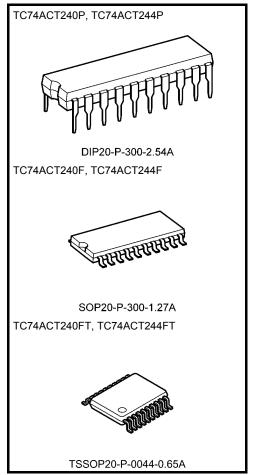
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

Features

- High speed: $t_{pd} = 5.0 \text{ ns (typ.)}$ at $V_{CC} = 5 \text{ V}$
- Low power dissipation: $I_{CC} = 8 \mu A \text{ (max)}$ at $T_a = 25^{\circ}C$
- Compatible with TTL outputs: V_{IL} = 0.8 V (max)
 - $V_{IH} = 2.0 \text{ V (min)}$
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 24 \text{ mA (min)}$

Capability of driving 50Ω transmission lines.

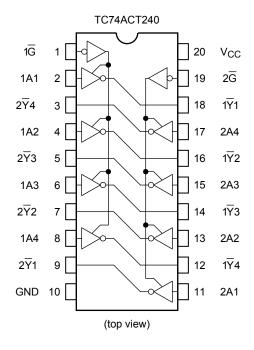
- Balanced propagation delays: $t_{pLH} \simeq t_{pHL}$
- Pin and function compatible with 74F240/244

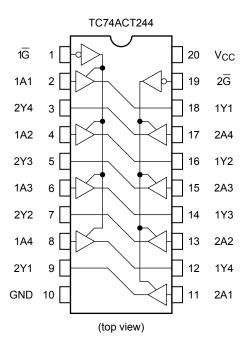


Weight

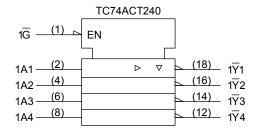
DIP20-P-300-2.54A : 1.30 g (typ.) SOP20-P-300-1.27A : 0.22 g (typ.) TSSOP20-P-0044-0.65A : 0.08 g (typ.)

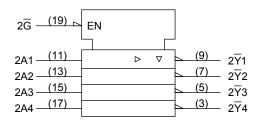
Pin Assignment

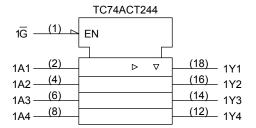


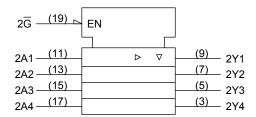


IEC Logic Symbol









Truth Table

Inputs		Outputs				
G	A _n	Y _n (244)	Ÿ _n (240)			
L	L	L	Н			
L	Н	Н	L			
Н	Х	Z	Z			

X: Don't care

Z: High impedance



Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	−0.5 to 7.0	V
DC input voltage	V _{IN}	-0.5 to V _{CC} + 0.5	V
DC output voltage	V _{OUT}	-0.5 to V _{CC} + 0.5	V
Input diode current	I _{IK}	±20	mA
Output diode current	lok	±50	mA
DC output current	lout	±50	mA
DC V _{CC} /ground current	I _{CC}	±200	mA
Power dissipation	PD	500 (DIP) (Note 2)/180 (SOP/TSSOP)	mW
Storage temperature	T _{stg}	−65 to 150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc).

Note 2: 500 mW in the range of Ta = -40 to 65°C. From Ta = 65 to 85°C a derating factor of -10 mW/°C should be applied up to 300 mW.

Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V _{CC}	4.5 to 5.5	V
Input voltage	V _{IN}	0 to V _{CC}	V
Output voltage	V _{OUT}	0 to V _{CC}	V
Operating temperature	T _{opr}	−40 to 85	°C
Input rise and fall time	dt/dV	0 to 10	ns/V

Note: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either V_{CC} or GND.

3



Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition			Ta = 25°C			Ta = -40 to 85°C		Unit	
					V _{CC} (V)	Min	Тур.	Max	Min	Max	
High-level input voltage	V _{IH}	_			4.5 to 5.5	2.0	_	_	2.0	_	V
Low-level input voltage	V _{IL}	_			4.5 to 5.5	_	_	0.8	_	0.8	٧
	VoH	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50 μA		4.5	4.4	4.5	_	4.4	_	
High-level output voltage			I _{OH} = −24 mA		4.5	3.94	_	_	3.80	_	V
3.			I _{OH} = −75 mA	(Note)	5.5	_	_	_	3.85	_	
	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50 μA		4.5	_	0.0	0.1	_	0.1	
Low-level output voltage			I _{OL} = 24 mA		4.5	_	_	0.36	_	0.44	V
			I _{OL} = 75 mA	(Note)	5.5	_	_	_	_	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	μΑ
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND			5.5	-	_	±0.1	_	±1.0	μΑ
Out a sent avants	Icc	V _{IN} = V _{CC} or GND			5.5	_	_	8.0	_	80.0	μΑ
Quiescent supply current	Ic	Per input: V _{IN} = 3.4 V Other input: V _{CC} or GND			5.5	-	_	1.35	_	1.5	mA

Note: This spec indicates the capability of driving 50 Ω transmission lines.

One output should be tested at a time for a 10 ms maximum duration.

AC Characteristics ($C_L = 50 \text{ pF}$, $R_L = 500 \Omega$, input: $t_r = t_f = 3 \text{ ns}$)

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = −40 to 85°C		Unit
			V _{CC} (V)	Min	Тур.	Max	Min	Max	
Propagation delay	t _{pLH}		5.0 ± 0.5	_	5.7	8.0	1.0	9.0	ns
time	t _{pHL}	_							
Output enable time	t _{pZL}		5.0 ± 0.5		6.0	9.0	1.0	10.5	ns
Output enable time	t _{pZH}	_							
Output disable time	t _{pLZ}		5.0 ± 0.5	l	5.9	8.5	1.0	10.0	ns
Output disable time	t _{pHZ}	_							
Input capacitance	C _{IN}	_		_	5	10	_	10	pF
Output capacitance	C _{OUT}	_		_	10	_	_	_	pF
Power dissipation capacitance	C _{PD}	TC74ACT240		_	25	_	_	_	~F
	(Note)	TC74ACT244		_	29	_	_	_	pF

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

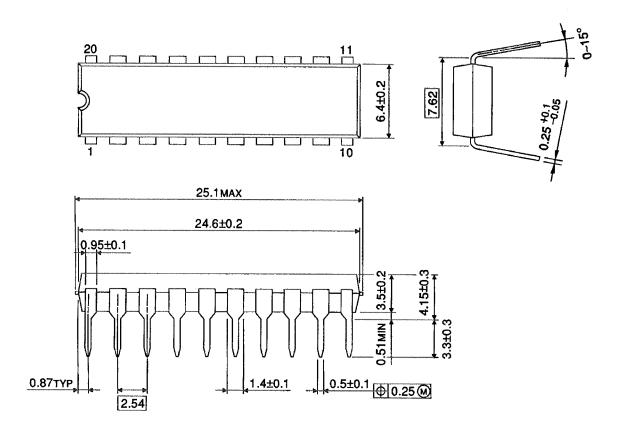
4

Average operating current can be obtained by the equation:

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

Package Dimensions

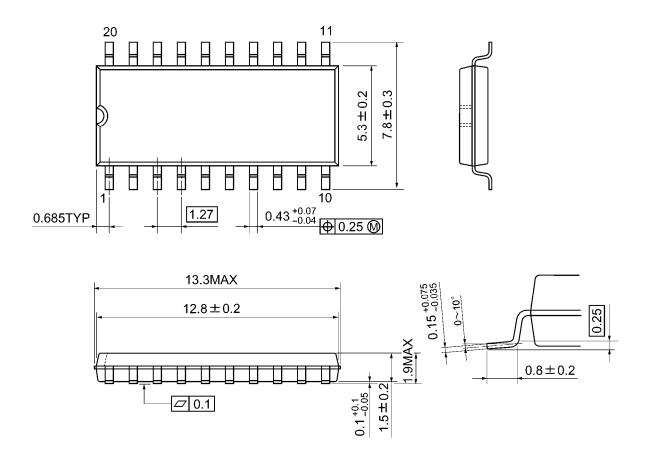
DIP20-P-300-2.54A Unit: mm



Weight: 1.30 g (typ.)

Package Dimensions

SOP20-P-300-1.27A Unit: mm

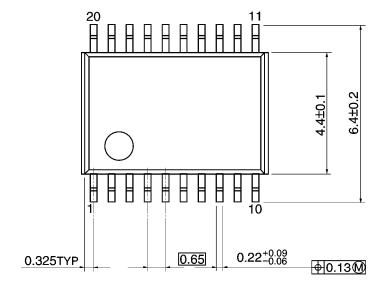


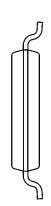
Weight: 0.22 g (typ.)

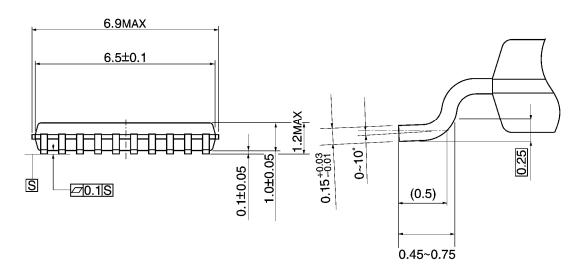
Package Dimensions

TSSOP20-P-0044-0.65A

Unit: mm







Weight: 0.08 g (typ.)

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8