TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC86AP, TC74HC86AF, TC74HC86AFN

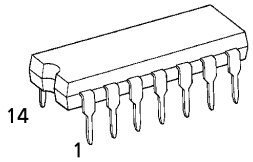
QUAD EXCLUSIVE OR GATE

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

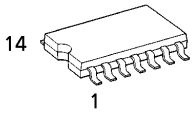
The TC74HC86A is a high speed CMOS EXCLUSIVE OR GATE fabricated with silicon gate C^2MOS technology.
It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.
Input and output buffers are provided which offer high noise immunity and stable output.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES:

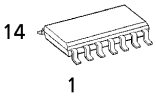
- High Speed ····· t_{pd} = 10ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 1μA(Max.) at Ta = 25°C
- High Noise Immunity ····· $V_{NIH} = V_{NIL}$ = 28% V_{CC} (Min.)
- Output Drive Capability ····· 10 LSTTL Loads
- Symmetrical Output Impedance ··· $|I_{OH}| = I_{OL}$ = 4mA(Min.)
- Balanced Propagation Delays ····· $t_{pLH} \simeq t_{pHL}$
- Wide Operating Voltage Range ···· V_{CC} (opr.) = 2V ~ 6V
- Pin and Function Compatible with 74LS86



P (DIP14-P-300-2.54)
Weight : 0.96g (Typ.)

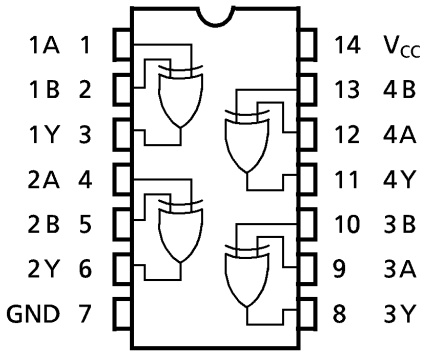


F (SOP14-P-300-1.27)
Weight : 0.18g (Typ.)



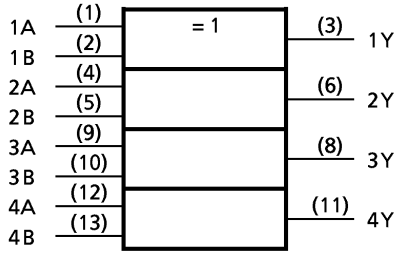
FN (SOL14-P-150-1.27)
Weight : 0.12g (Typ.)

PIN ASSIGNMENT



(TOP VIEW)

IEC LOGIC SYMBOL



TRUTH TABLE

A	B	Y
H	H	L
L	H	H
H	L	H
L	L	L

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}	±25	mA
DC V_{CC} / Ground Current	I_{CC}	±50	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
Input Rise and Fall Time	t_r, t_f	0~ 1000 (V_{CC} = 2.0V) 0~ 500 (V_{CC} = 4.5V) 0~ 400 (V_{CC} = 6.0V)	ns

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}			2.0 4.5 6.0	1.50 3.15 4.20	— — —	— — —	1.50 3.15 4.20	— — —	V
Low - Level Input Voltage	V_{IL}			2.0 4.5 6.0	— — —	— — —	0.50 1.35 1.80	— — —	0.50 1.35 1.80	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} = −4 mA I_{OH} = −5.2mA	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} = 4 mA I_{OL} = 5.2mA	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
Input Leakage Current	I_{IN}	V_{IN} = V_{CC} or GND		6.0	—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I_{CC}	V_{IN} = V_{CC} or GND		6.0	—	—	1.0	—	10.0	

961001EBA2'

AC ELECTRICAL CHARACTERISTICS (C_L = 15pF, V_{CC} = 5V, Ta = 25°C, Input $t_r = t_f$ = 6ns)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t_{TLH} t_{THL}		—	4	8	ns
Propagation Delay Time	t_{pLH} t_{pHL}		—	10	17	

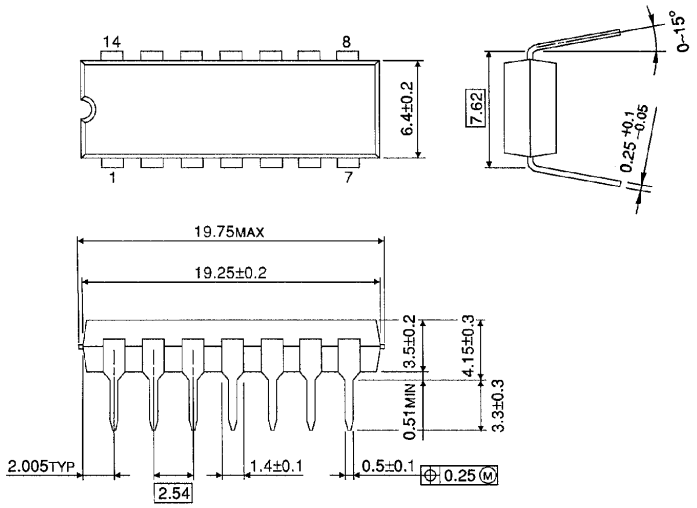
AC ELECTRICAL CHARACTERISTICS (C_L = 50pF, Input $t_r = t_f$ = 6ns)

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	t_{TLH} t_{THL}		2.0 4.5 6.0	— — —	30 8 7	75 15 13	— — —	95 19 16	ns
Propagation Delay Time	t_{pLH} t_{pHL}		2.0 4.5 6.0	— — —	45 13 11	100 20 17	— — —	125 25 21	
Input Capacitance	C_{IN}			—	5	10	—	10	pF
Power Dissipation Capacitance	C_{PD} (1)			—	26	—	—	—	

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:

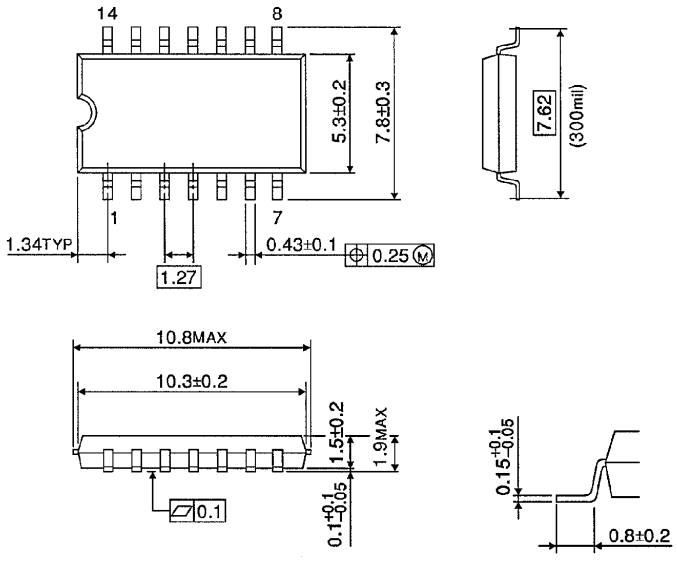
$$I_{CC}(opr) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 4 \text{ (per Gate)}$$

DIP 14PIN OUTLINE DRAWING (DIP14-P-300-2.54) Unit in mm



Weight : 0.96g (Typ.)

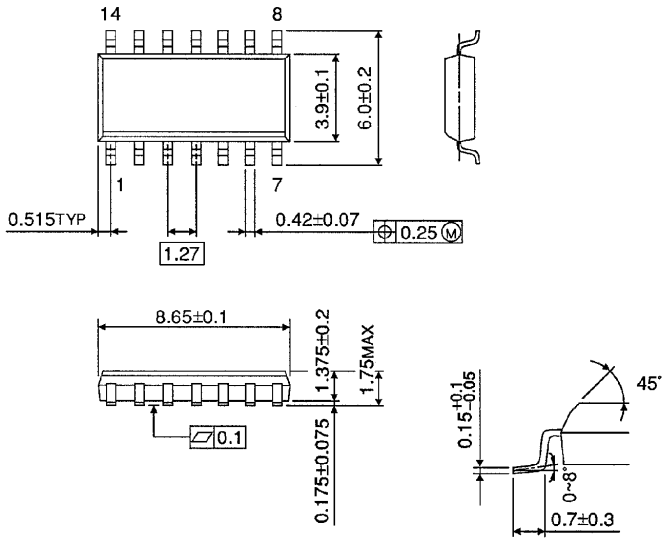
SOP 14PIN (200mil BODY) OUTLINE DRAWING (SOP14-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

SOP 14PIN (150mil BODY) OUTLINE DRAWING (SOL14-P-150 -1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)