

TC74AC32P, TC74AC32F, TC74AC32FN, TC74AC32FT

QUAD 2-INPUT OR GATE

The TC74AC32 is an advanced high speed CMOS 2-INPUT OR GATE fabricated with silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

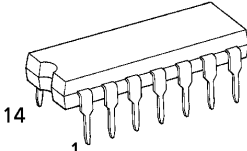
It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

The internal circuit is composed of 2 stages including buffer output, which provide high noise immunity and stable output. All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

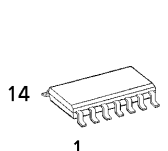
- High Speed..... $t_{pd} = 4.1\text{ns}$  (typ.) at  $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 4\mu\text{A}$ (Max.) at  $T_a = 25^{\circ}\text{C}$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (Min.)
- Symmetrical Output Impedance... $|I_{OH}| = |I_{OL}| = 24\text{mA}$  (Min.)  
Capability of driving  $50\Omega$  transmission lines.
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range.... $V_{CC}(\text{opr}) = 2\text{V} \sim 5.5\text{V}$
- Pin and Function Compatible with 74F32

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



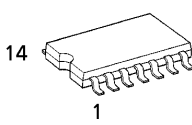
14  
1

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



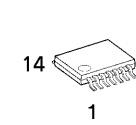
14  
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FN (SOL14-P-150-1.27)  
Weight : 0.12g (Typ.)



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1

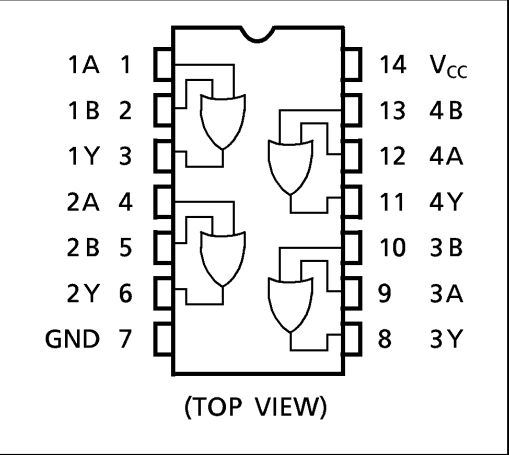
F (SOP14-P-300-1.27)  
Weight : 0.18g (Typ.)



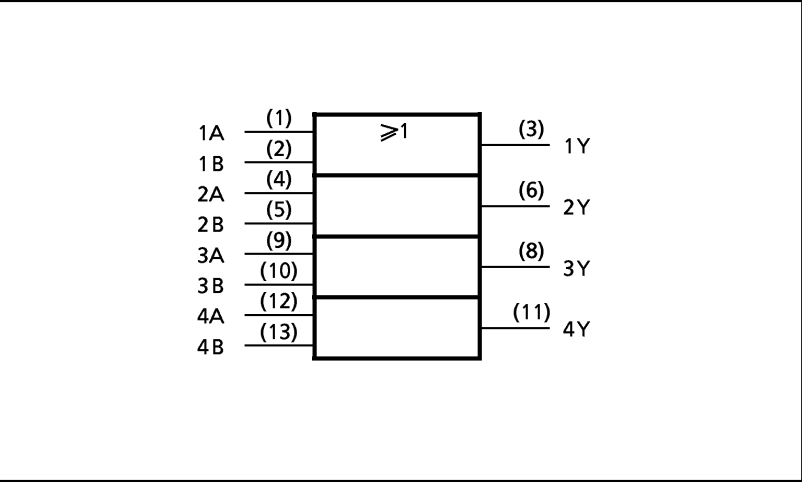
14  
1

FT (TSSOP14-P-0044-0.65)  
Weight : 0.06g (Typ.)

PIN ASSIGNMENT



IEC LOGIC SYMBOL



TRUTH TABLE

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

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	$V_{CC}$	$-0.5 \sim 7.0$	V
DC Input Voltage	$V_{IN}$	$-0.5 \sim V_{CC} + 0.5$	V
DC Output Voltage	$V_{OUT}$	$-0.5 \sim V_{CC} + 0.5$	V
Input Diode Current	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 50$	mA
DC Output Current	$I_{OUT}$	$\pm 50$	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	$\pm 100$	mA
Power Dissipation	$P_D$	500 (DIP)* / 180 (SOP/TSSOP)	mW
Storage Temperature	$T_{stg}$	$-65 \sim 150$	°C

\*500mW in the range of  $T_a = -40^\circ\text{C} \sim 65^\circ\text{C}$ . From  $T_a = 65^\circ\text{C}$  to  $85^\circ\text{C}$  a derating factor of  $-10\text{mW}/^\circ\text{C}$  should be applied up to 300mW.

## RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	$V_{CC}$	$2.0 \sim 5.5$	V
Input Voltage	$V_{IN}$	$0 \sim V_{CC}$	V
Output Voltage	$V_{OUT}$	$0 \sim V_{CC}$	V
Operating Temperature	$T_{opr}$	$-40 \sim 85$	°C
Input Rise and Fall Time	$dt/dV$	$0 \sim 100$ ( $V_{CC} = 3.3 \pm 0.3\text{V}$ ) $0 \sim 20$ ( $V_{CC} = 5 \pm 0.5\text{V}$ )	ns / V

## DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	$V_{CC}$ (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \sim 85^\circ\text{C}$		UNIT
				MIN.	TYP.	MAX.	MIN.	MAX.	
High - Level Input Voltage	$V_{IH}$		2.0 3.0 5.5	1.50 2.10 3.85	— — —	— — —	1.50 2.10 3.85	— — —	V
Low - Level Input Voltage	$V_{IL}$		2.0 3.0 5.5	— — —	— — —	0.50 0.90 1.65	— — —	0.50 0.90 1.65	V
High - Level Output Voltage	$V_{OH}$	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -50\mu\text{A}$	2.0 3.0 4.5	1.9 2.9 4.4	2.0 3.0 4.5	— — —	1.9 2.9 4.4	V
			$I_{OH} = -4\text{mA}$	3.0	2.58	—	—	2.48	
			$I_{OH} = -24\text{mA}$	4.5	3.94	—	—	3.80	
			$I_{OH} = -75\text{mA}^*$	5.5	—	—	—	3.85	
Low - Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IL}$	$I_{OL} = 50\mu\text{A}$	2.0 3.0 4.5	— — —	0.0 0.0 0.1	— — 0.1	0.1 0.1 0.1	V
			$I_{OL} = 12\text{mA}$	3.0	—	—	0.36	—	
			$I_{OL} = 24\text{mA}$	4.5	—	—	0.36	—	
			$I_{OL} = 75\text{mA}^*$	5.5	—	—	—	0.44 1.65	
Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC} \text{ or GND}$	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu\text{A}$
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC} \text{ or GND}$	5.5	—	—	4.0	—	40.0	

\* : This spec indicates the capability of driving  $50\Omega$  transmission lines.  
One output should be tested at a time for a 10ms maximum duration.

**AC ELECTRICAL CHARACTERISTICS (  $C_L = 50\text{pF}$  ,  $R_L = 500\ \Omega$  , Input  $t_r = t_f = 3\text{ns}$  )**

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = − 40~85°C		UNIT
			V <sub>CC</sub> (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time	t <sub>pLH</sub>		3.3 ± 0.3	—	6.1	10.3	1.0	11.9	ns
	t <sub>pHL</sub>		5.0 ± 0.5	—	5.2	7.4	1.0	8.5	
Input Capacitance	C <sub>IN</sub>			—	5	10	—	10	pF
Power Dissipation Capacitance	C <sub>PD</sub> (1)			—	64	—	—	—	

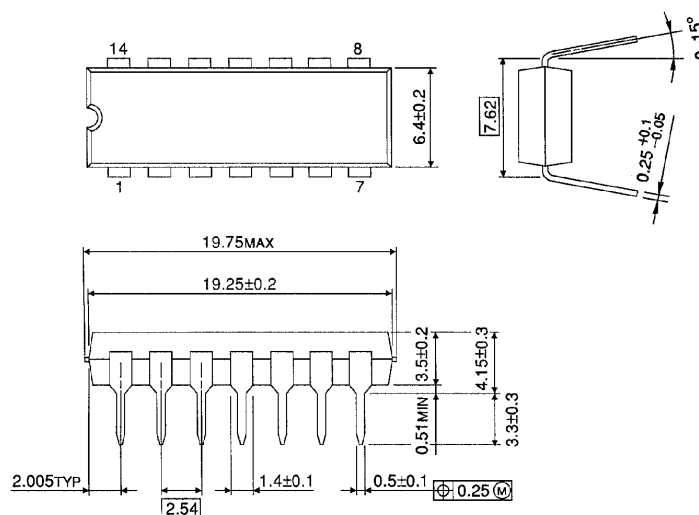
Note (1) C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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 PACKAGE DIMENSIONS (DIP14-P-300-2.54)

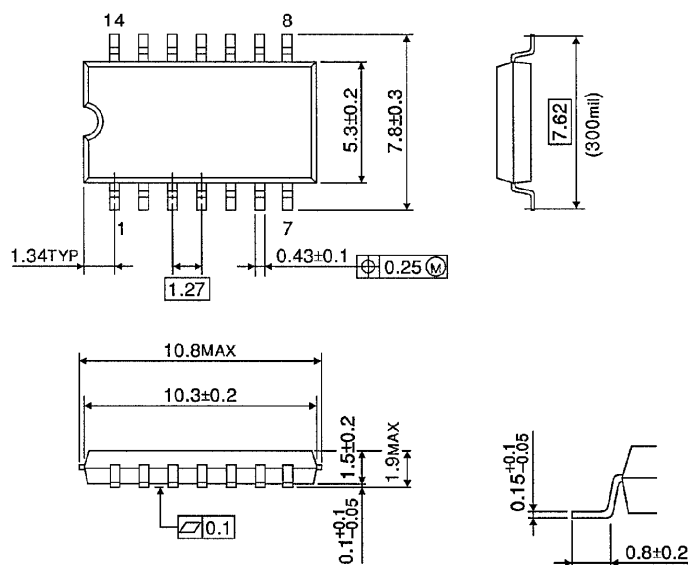
Unit in mm



Weight : 0.96g (Typ.)

## SOP 14PIN (200mil BODY) PACKAGE DIMENSIONS (SOP14-P-300-1.27)

Unit in mm

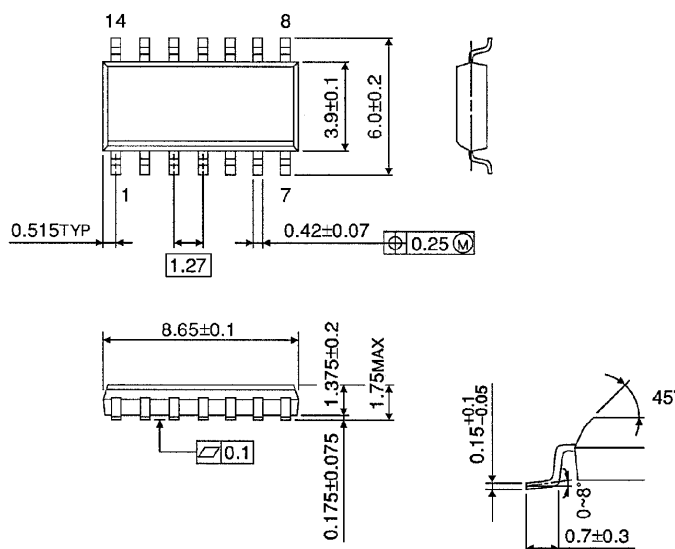


Weight : 0.18g (Typ.)

## SOP 14PIN (150mil BODY) PACKAGE DIMENSIONS (SOL14-P-150 -1.27)

Unit in mm

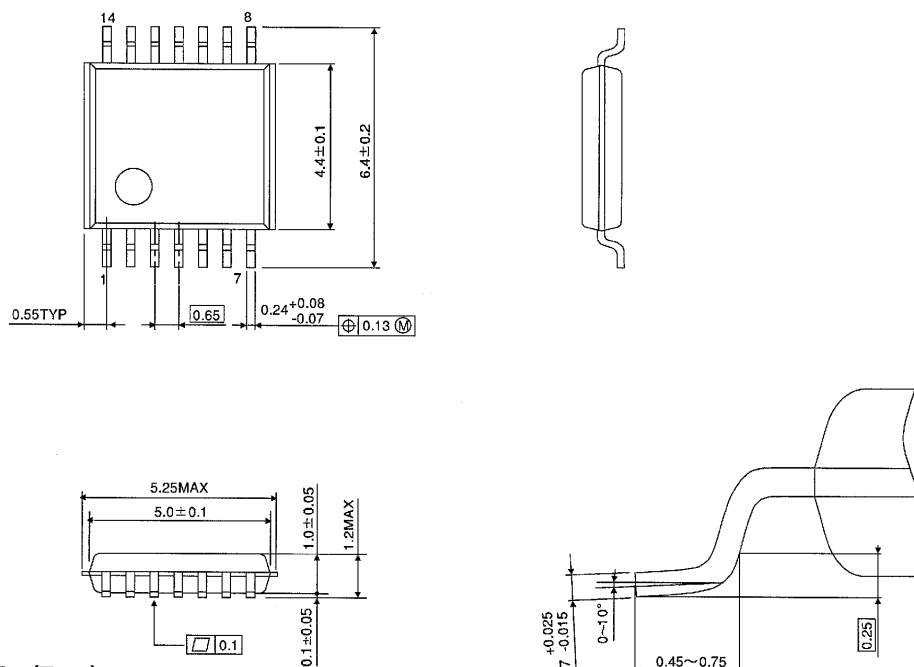
(Note) This package is not available in Japan.



Weight : 0.12g (Typ.)

## TSSOP 14PIN (170mil BODY) PACKAGE DIMENSIONS (TSSOP14-P-0044-0.65)

Unit in mm



Weight : 0.06g (Typ.)

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000707EBA

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