

**TC74AC153P, TC74AC153F, TC74AC153FN**

**DUAL 4 - CHANNEL MULTIPLEXER**

The TC74AC153 is an advanced high speed CMOS DUAL 4 - CHANNEL MULTIPLEXER 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.

Each of these data (1C0 - 1C3, 2C0 - 2C3) is selected by the two address inputs A and B.

Separate strobe inputs ( $1\bar{G}$ ,  $2\bar{G}$ ) are provided for each of the two four - line sections.

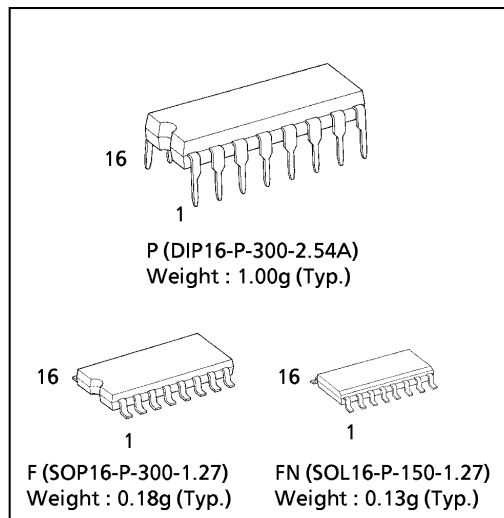
The strobe input can be used to inhibit the data output ; the output is fixed in low level unconditionally.

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

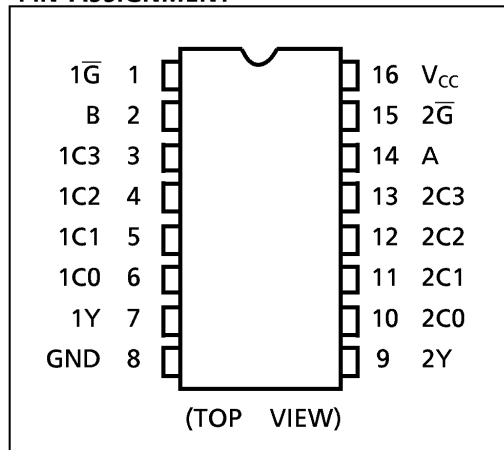
**FEATURES :**

- High Speed.....  $t_{pd} = 3.9ns$ (typ.) at  $V_{CC} = 5V$
- Low Power Dissipation.....  $I_{CC} = 8\mu A$ (Max.) at  $T_a = 25^\circ C$
- High Noise Immunity.....  $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (Min.)
- Symmetrical Output Impedance...  $|I_{OH}| = I_{OL} = 24mA$ (Min.)  
 Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays.....  $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range...  $V_{CC}$  (opr) = 2V~5.5V
- Pin and Function Compatible with 74F153

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



**PIN ASSIGNMENT**

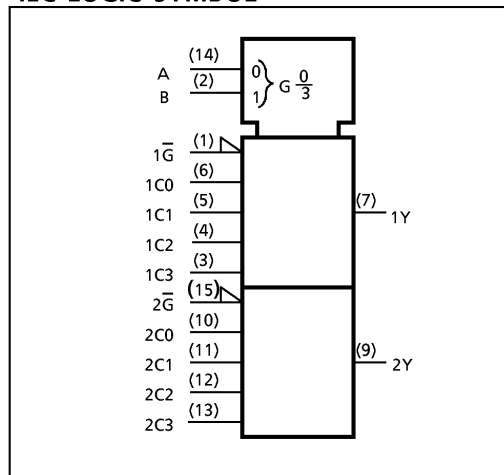


**TRUTH TABLE**

SELECT INPUTS		DATA INPUTS				STROBE	OUTPUT
B	A	C0	C1	C2	C3	$\bar{G}$	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

X : Don't Care

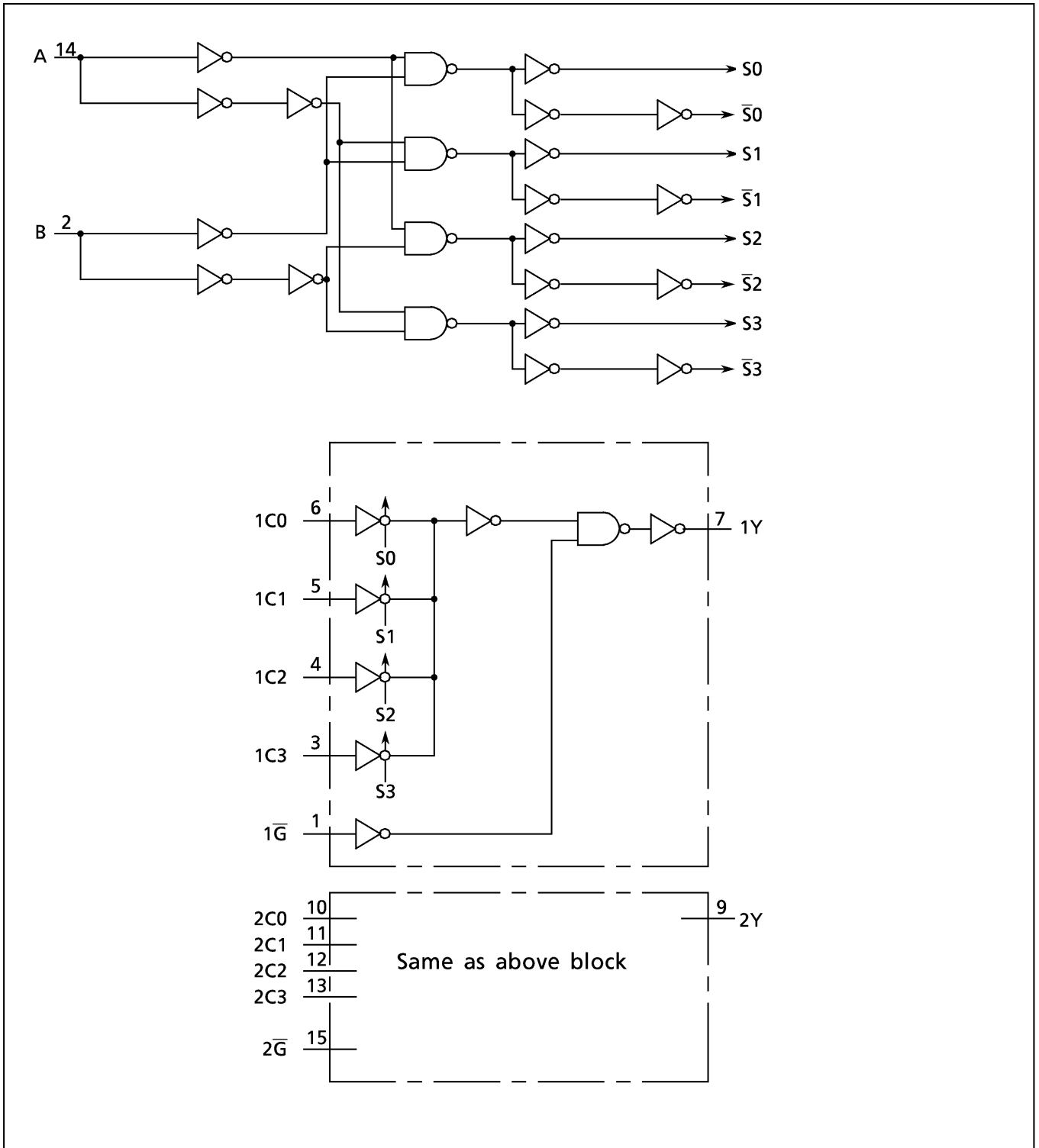
**IEC LOGIC SYMBOL**



961001EBA2

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SYSTEM DIAGRAM



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## 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	$I_{IK}$	$\pm 20$	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)	mW
Storage Temperature	$T_{stg}$	-65~150	°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	$V_{CC}$	2.0~5.5	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	$dt/dV$	0~100 ( $V_{CC} = 3.3 \pm 0.3\text{V}$ ) 0~20 ( $V_{CC} = 5 \pm 0.5\text{V}$ )	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	1.50	—	—	1.50	—	V	
			3.0	2.10	—	—	2.10	—		
			5.5	3.85	—	—	3.85	—		
Low - Level Input Voltage	$V_{IL}$		2.0	—	—	0.50	—	0.50	V	
			3.0	—	—	0.90	—	0.90		
			5.5	—	—	1.65	—	1.65		
High - Level Output Voltage	$V_{OH}$	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OH} = -50\mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V
				3.0	2.9	3.0	—	2.9	—	
		3.0	$I_{OH} = -4\text{mA}$	4.5	2.58	—	—	2.48	—	
				5.5	3.94	—	—	3.80	—	
Low - Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IH} \text{ or } V_{IL}$	$I_{OL} = 50\mu\text{A}$	2.0	—	0.0	0.1	—	0.1	V
				3.0	—	0.0	0.1	—	0.1	
		3.0	$I_{OL} = 12\text{mA}$	4.5	—	—	0.36	—	0.44	
				5.5	—	—	0.36	—	0.44	
Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC} \text{ or } \text{GND}$	5.5	—	—	$\pm 0.1$	—	$\pm 1.0$	$\mu\text{A}$	
			5.5	—	—	8.0	—	80.0		
										Quiescent Supply Current

\* 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 (Cn-Y)	t <sub>pLH</sub> t <sub>pHL</sub>		3.3 ± 0.3	—	7.6	14.5	1.0	16.5	ns
			5.0 ± 0.5	—	5.0	9.0	1.0	10.3	
Propagation Delay Time (A, B-Y)	t <sub>pLH</sub> t <sub>pHL</sub>		3.3 ± 0.3	—	10.5	20.5	1.0	23.4	
			5.0 ± 0.5	—	6.6	10.5	1.0	12.0	
Propagation Delay Time ( $\bar{G}$ -Y)	t <sub>pLH</sub> t <sub>pHL</sub>		3.3 ± 0.3	—	6.8	13.3	1.0	15.2	
			5.0 ± 0.5	—	4.4	8.0	1.0	9.1	
Input Capacitance	C <sub>IN</sub>		—	5	10	—	10	pF	
Power Dissipation Capacitance	C <sub>PD</sub> (1)		—	54	—	—	—		

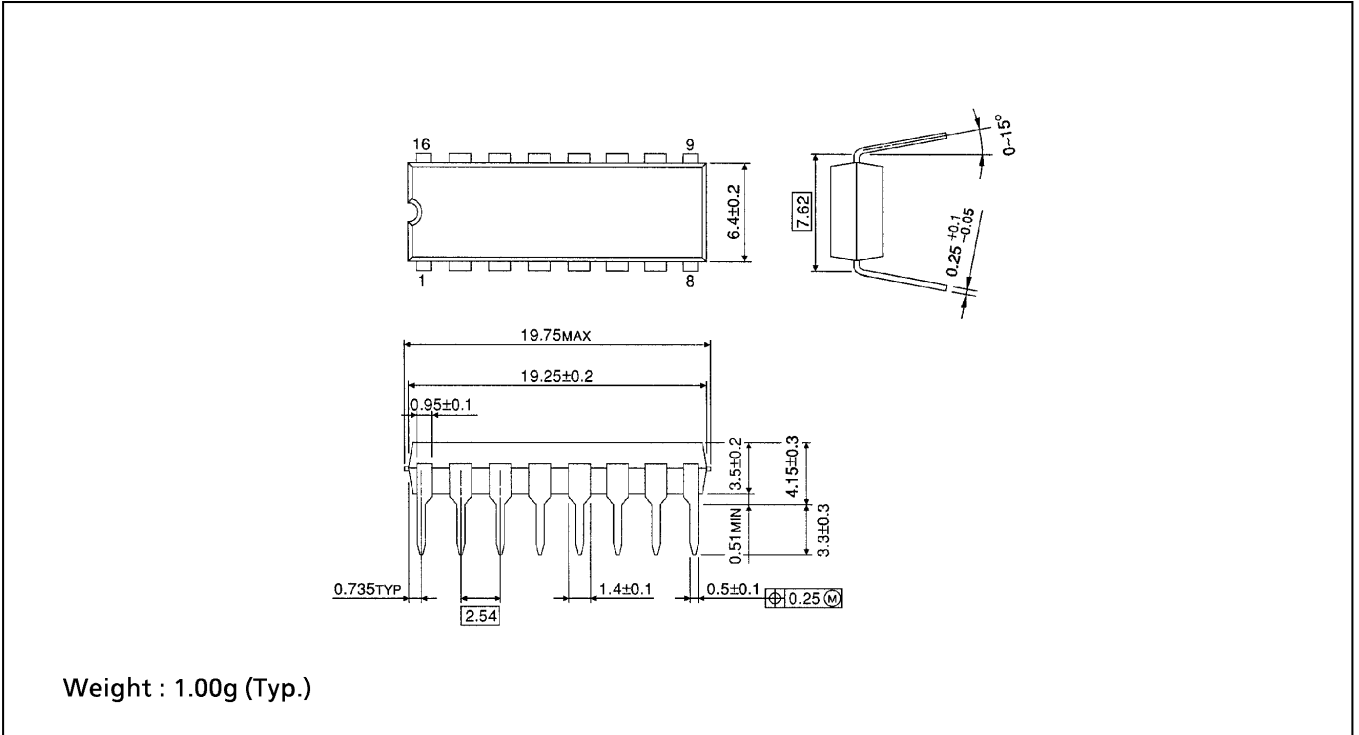
Note (1) C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

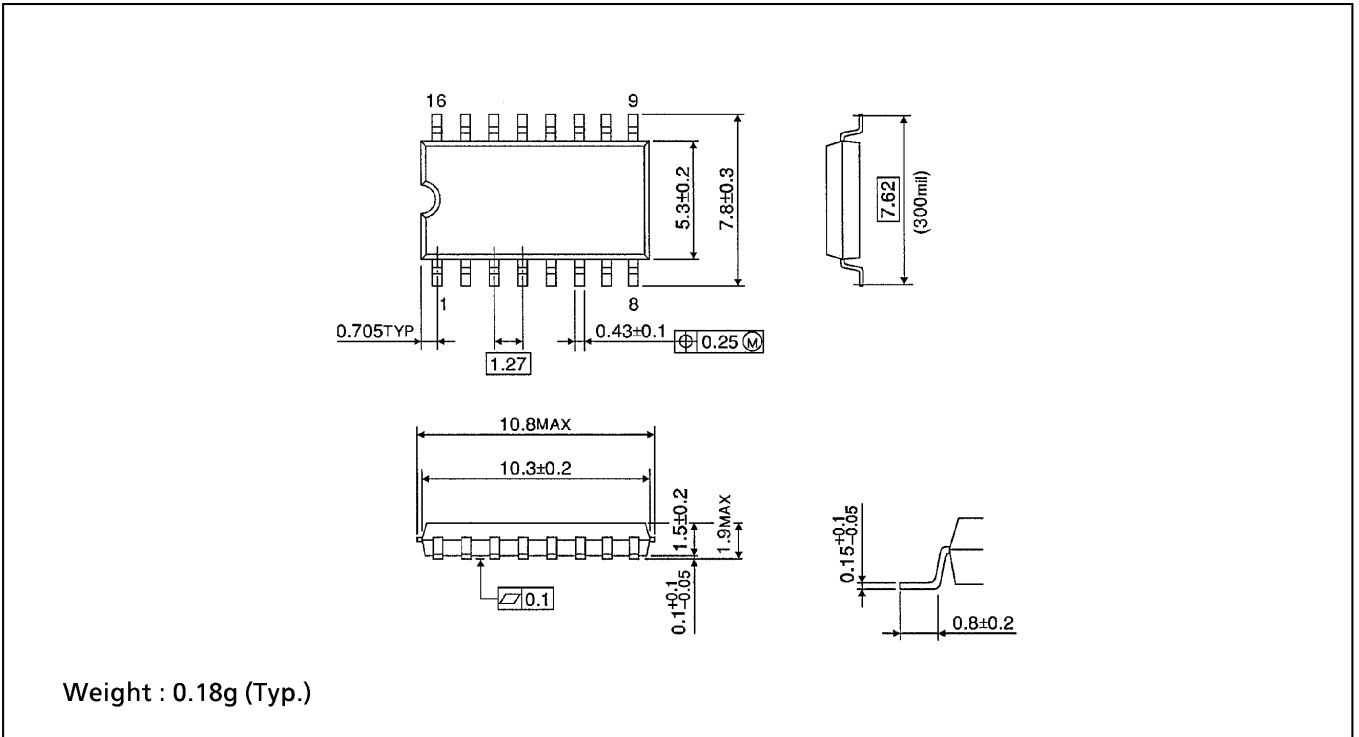
DIP 16PIN OUTLINE DRAWING (DIP16-P-300-2.54A)

Unit in mm



SOP 16PIN (200mil BODY) OUTLINE DRAWING (SOP16-P-300-1.27)

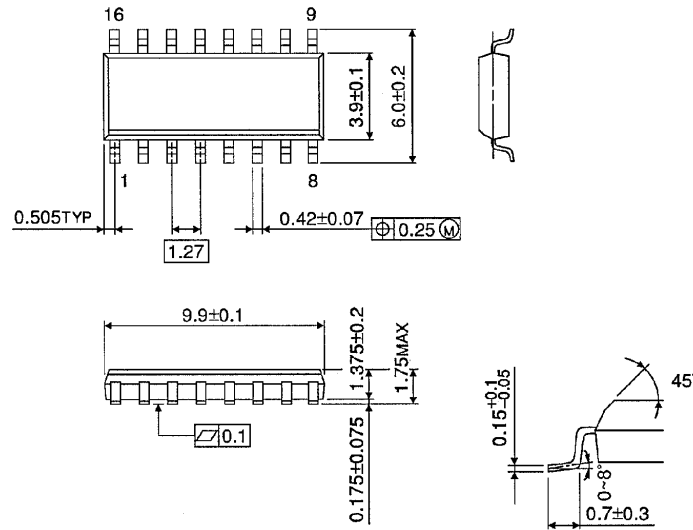
Unit in mm



SOP 16PIN (150mil BODY) OUTLINE DRAWING (SOL16-P-150 -1.27)

Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)