

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TC74ACT153P, TC74ACT153F, TC74ACT153FN**

**DUAL 4 - CHANNEL MULTIPLEXER**

The TC74ACT153 is an advanced high speed CMOS DUAL 4 - CHANNEL MULTIPLEXERS fabricated with silicon gate and double - layer metal wiring C<sup>2</sup>MOS technology. They achieve the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipations.

This device may be used as a level converter for interfacing TTL or NMOS to High Speed CMOS. The inputs are compatible with TTL, NMOS and CMOS output voltage levels.

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

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

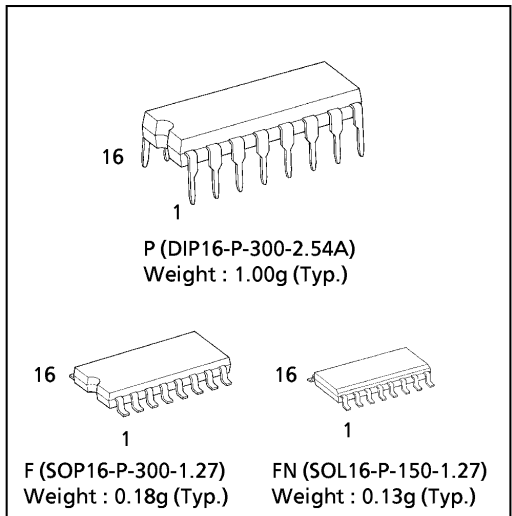
The strobe input can be used to inhibit the data output; the output is fixed in low level unconditionally.

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

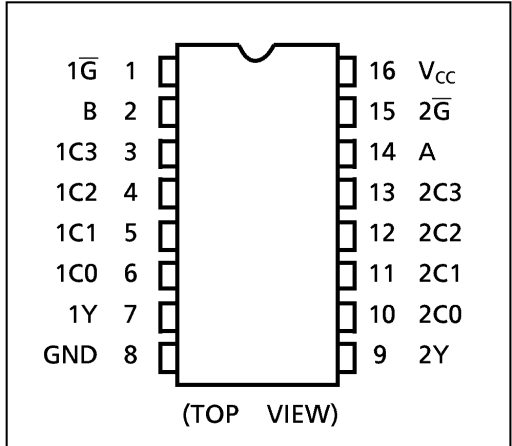
**FEATURES :**

- High Speed.....  $t_{pd} = 5.4ns(typ.)$  at  $V_{CC} = 5V$
- Low Power Dissipation.....  $I_{CC} = 8\mu A(Max.)$  at  $T_a = 25^\circ C$
- 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.....  $t_{pLH} \approx t_{pHL}$
- Pin and Function Compatible with 74F153

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



**PIN ASSIGNMENT**

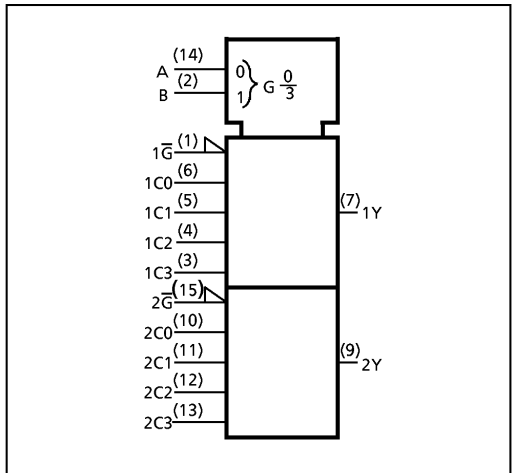


**TRUTH TABLE**

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

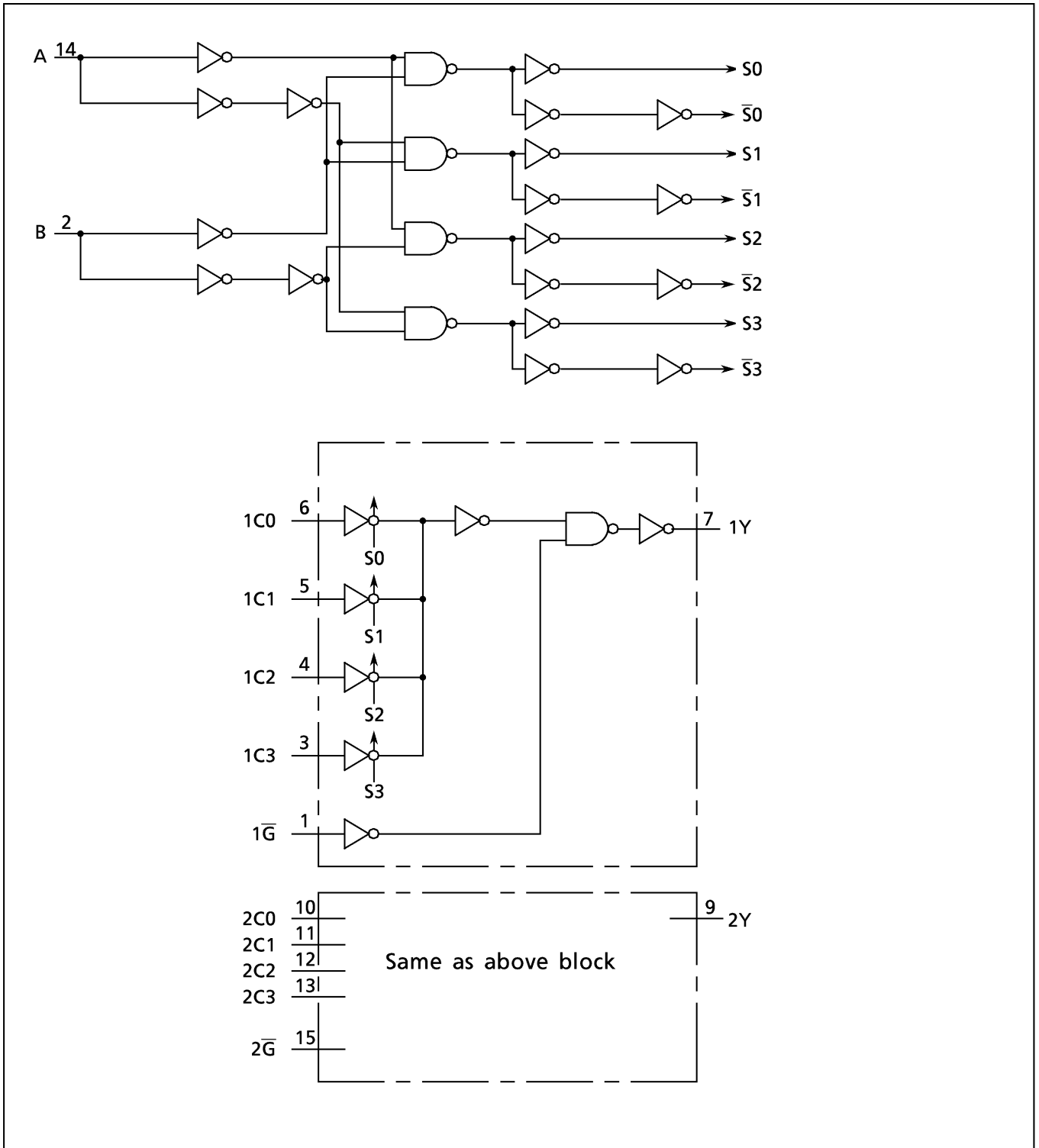
**IEC LOGIC SYMBOL**



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	$I_{IK}$	± 20	mA
Output Diode Current	$I_{OK}$	± 50	mA
DC Output Current	$I_{OUT}$	± 50	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	± 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	$V_{CC}$	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)	$T_a = 25^{\circ}\text{C}$			$T_a = -40 \sim 85^{\circ}\text{C}$		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High - Level Input Voltage	$V_{IH}$		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 $V_{IL}$	$I_{OH} = -50\mu\text{A}$	4.5	4.4	4.5	—	4.4	—	V
			$I_{OH} = -24\text{mA}$	4.5	3.94	—	3.80	—		
			$I_{OH} = -75\text{mA}^*$	5.5	—	—	3.85	—		
Low - Level Output Voltage	$V_{OL}$	$V_{IN} = V_{IH}$ or $V_{IL}$	$I_{OL} = 50\mu\text{A}$	4.5	—	0.0	0.1	—	0.1	V
			$I_{OL} = 24\text{mA}$	4.5	—	—	0.36	—	0.44	
			$I_{OL} = 75\text{mA}^*$	5.5	—	—	—	—	1.65	
Input Leakage Current	$I_{IN}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	± 0.1	—	± 1.0	$\mu\text{A}$	
Quiescent Supply Current	$I_{CC}$	$V_{IN} = V_{CC}$ or GND	5.5	—	—	8.0	—	80.0		
		$I_C$	PER INPUT : $V_{IN} = 3.4\text{V}$ OTHER INPUT : $V_{CC}$ or GND	5.5	—	—	1.35	—	1.5	mA

\* 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>		5.0 ± 0.5	—	6.1	9.7	1.0	11.0	ns
Propagation Delay Time (A, B-Y)	t <sub>pLH</sub> t <sub>pHL</sub>		5.0 ± 0.5	—	7.8	11.8	1.0	13.5	
Propagation Delay Time ( $\bar{G}$ -Y)	t <sub>pLH</sub> t <sub>pHL</sub>		5.0 ± 0.5	—	5.6	9.7	1.0	11.0	
Input Capacitance	C <sub>IN</sub>		—	—	5	10	—	10	pF
Power Dissipation Capacitance	C <sub>PD</sub> (1)		—	—	47	—	—	—	

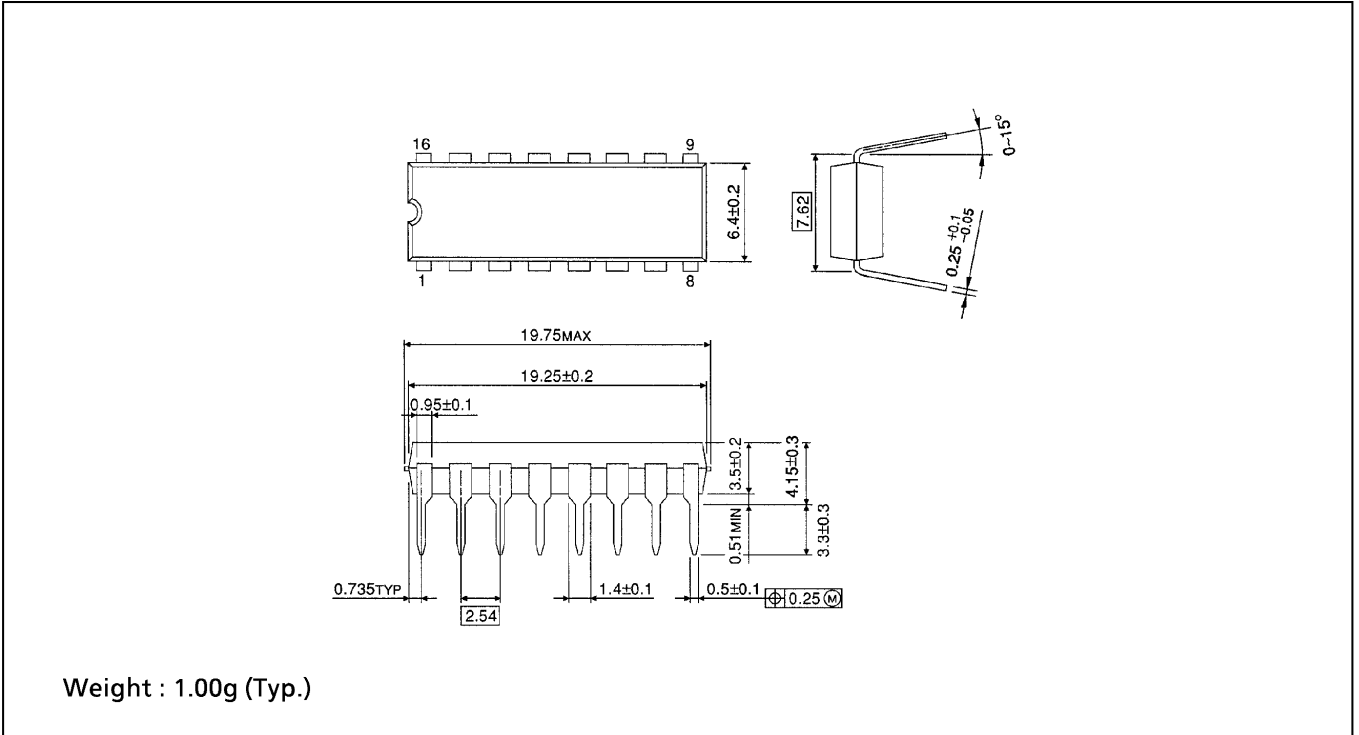
Note (1) C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

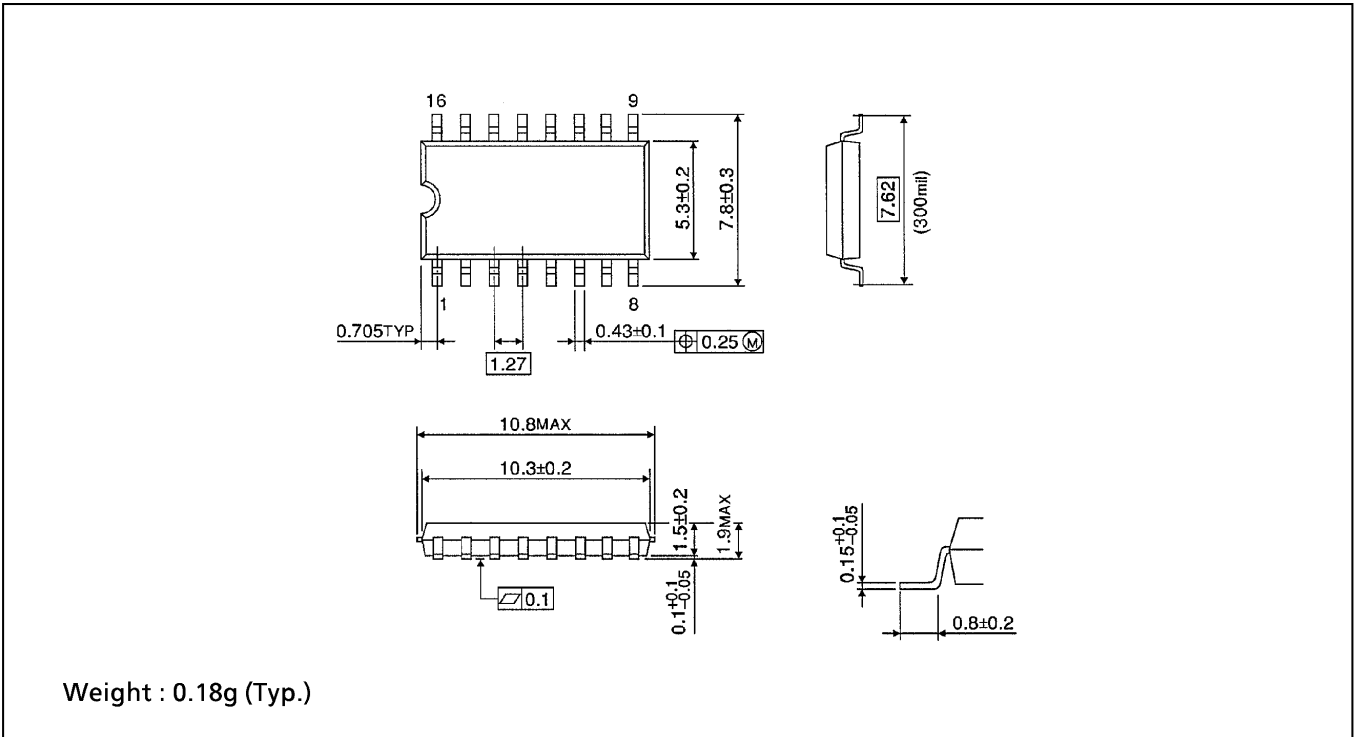
DIP 16PIN OUTLINE DRAWING (DIP16-P-300-2.54A)

Unit in mm



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

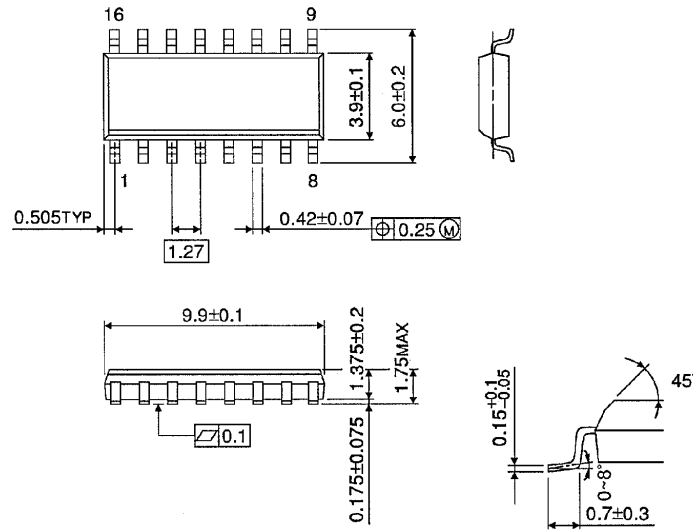
Unit in mm



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.)