

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 C²MOS 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.

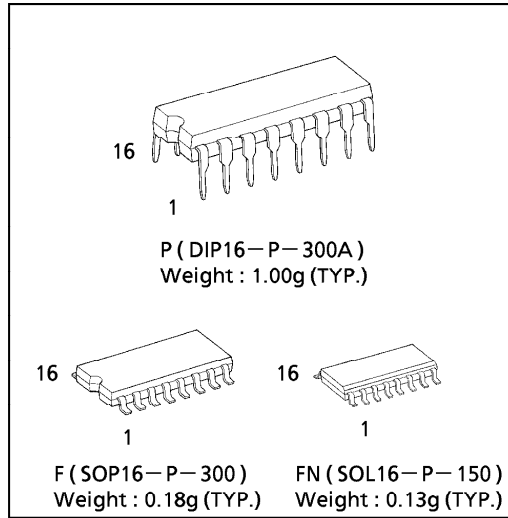
Separate strobe inputs ($1\bar{G}$, $2\bar{G}$) are provided for each of the two four - line sections.

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

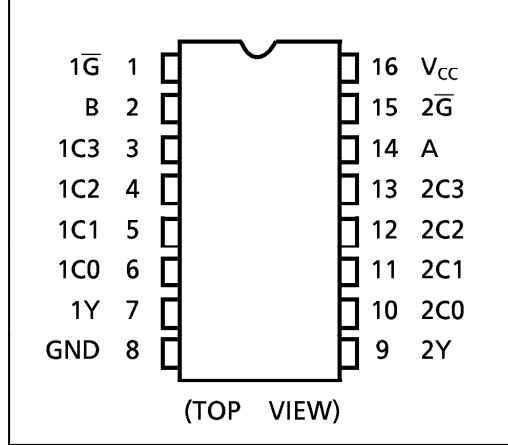
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

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 50 Ω transmission lines.
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range.... $V_{CC} (opr) = 2V \sim 5.5V$
- Pin and Function Compatible with 74F153



PIN ASSIGNMENT

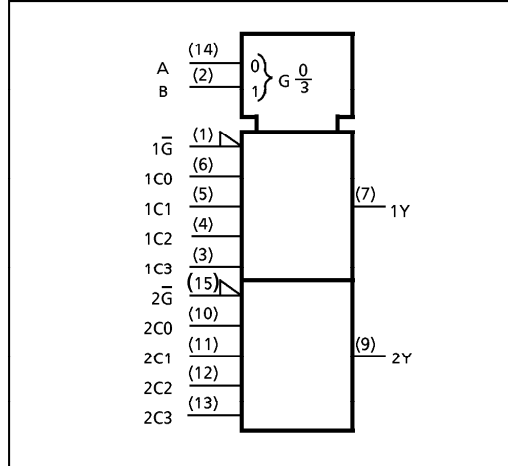


TRUTH TABLE

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

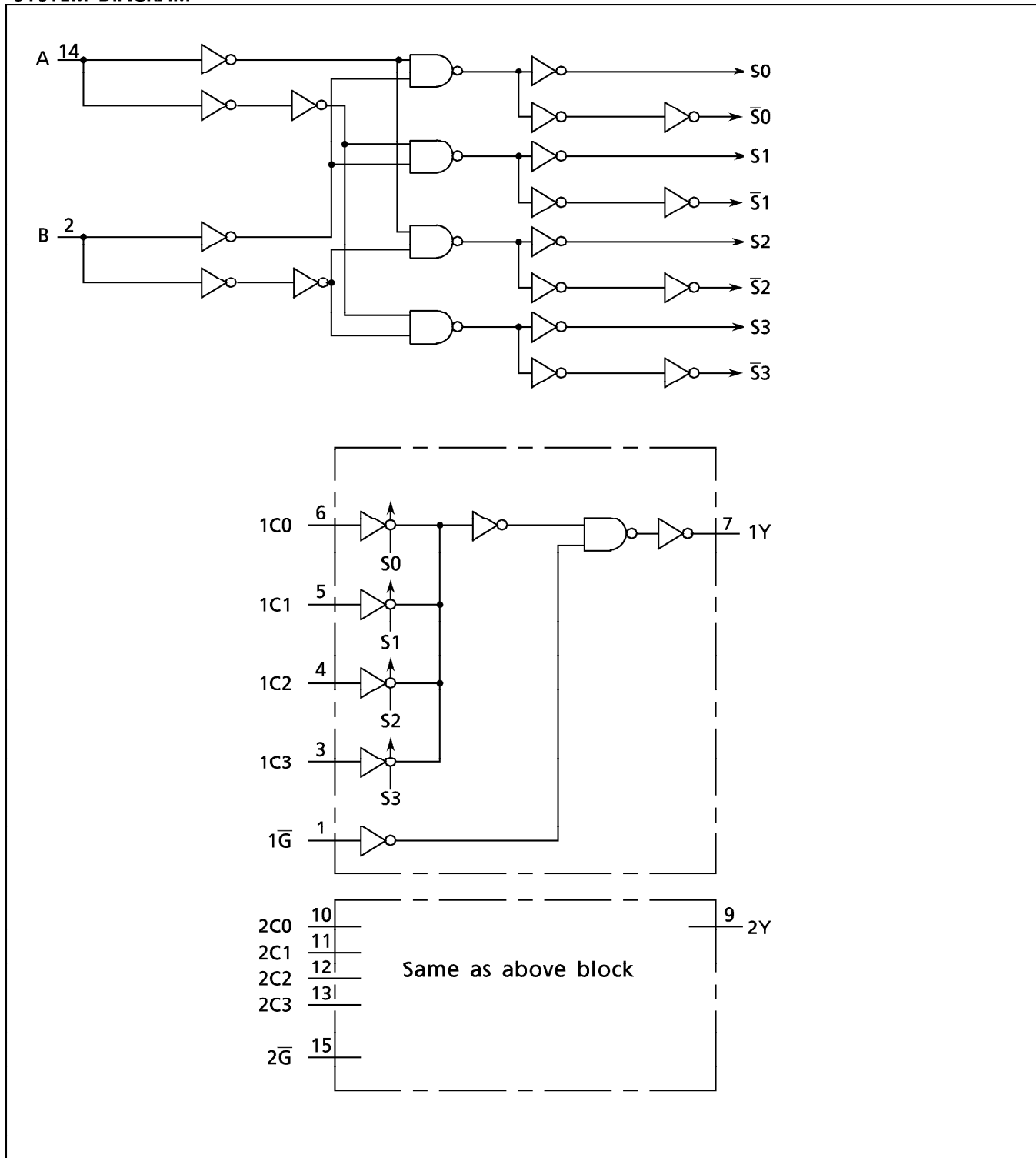
IEC LOGIC SYMBOL



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SYSTEM DIAGRAM



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°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}	$V_{IN} = V_{IH}$ 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	—	
				4.5	4.4	4.5	—	4.4	—	
				3.0	2.58	—	—	2.48	—	
4.5	3.94	—	—	3.80	—					
5.5	—	—	—	3.85	—					
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ 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	
				4.5	—	0.0	0.1	—	0.1	
				3.0	—	—	0.36	—	0.44	
4.5	—	—	0.36	—	0.44					
5.5	—	—	—	—	1.65	—				
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC}$ or GND	5.5	—	—	± 0.1	—	± 1.0	μA	
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	5.5	—	—	8.0	—	80.0		

* This spec indicates the capability of driving 50Ω 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 _{CC} (V)	MIN.	TYP.	MAX.	MIN.		MAX.
Propagation Delay Time (Cn-Y)	t _{pLH} t _{pHL}		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 _{pLH} t _{pHL}		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 _{pLH} t _{pHL}		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 _{IN}		—	5	10	—	10	pF	
Power Dissipation Capacitance	C _{PD} (1)		—	54	—	—	—		

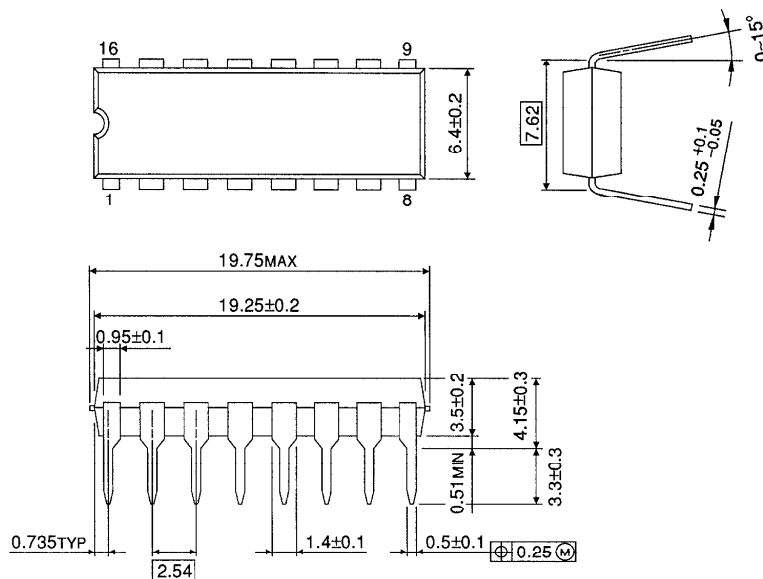
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

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

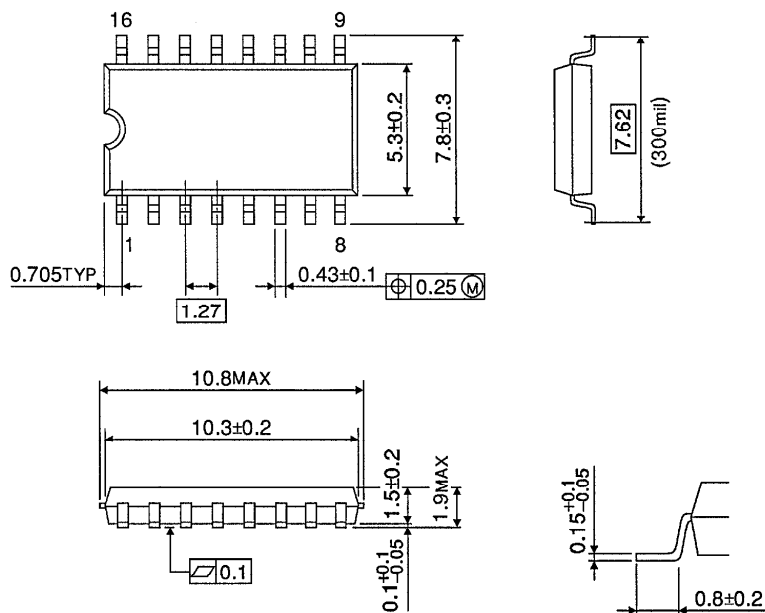
Unit in mm



Weight : 1.00g (TYP.)

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

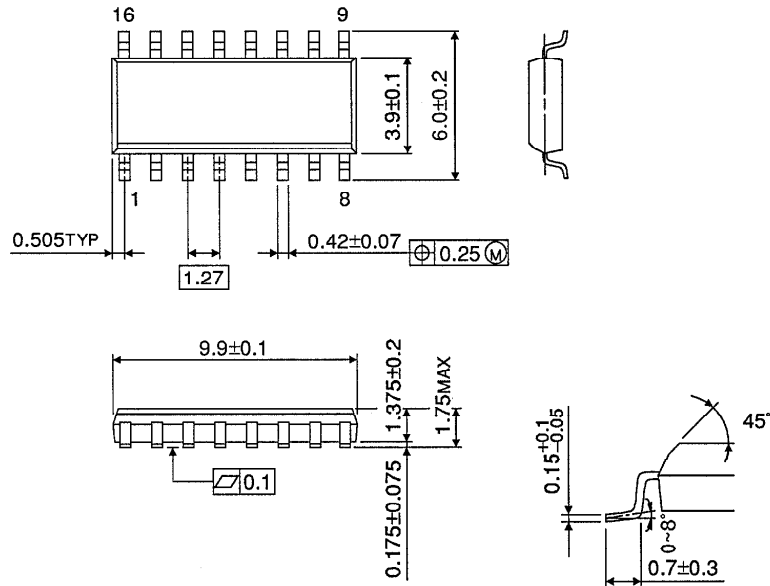
Unit in mm



Weight : 0.18g (TYP.)

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

Unit in mm



Weight : 0.13g (TYP.)