

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 C²MOS 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.

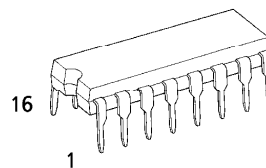
FEATURES:

- 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

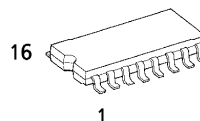
TRUTH TABLE

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

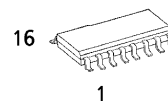
X : Don't Care



P (DIP16—P—300A)
Weight : 1.00g (TYP.)

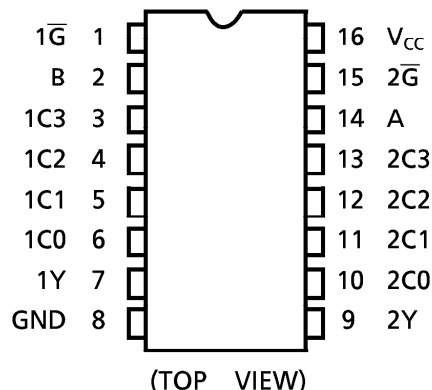


F (SOP16—P—300)
Weight : 0.18g (TYP.)

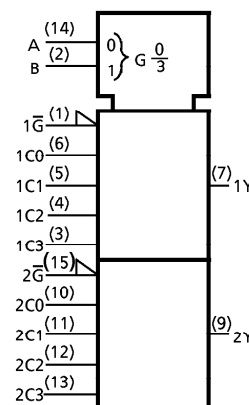


FN (SOL16—P—150)
Weight : 0.13g (TYP.)

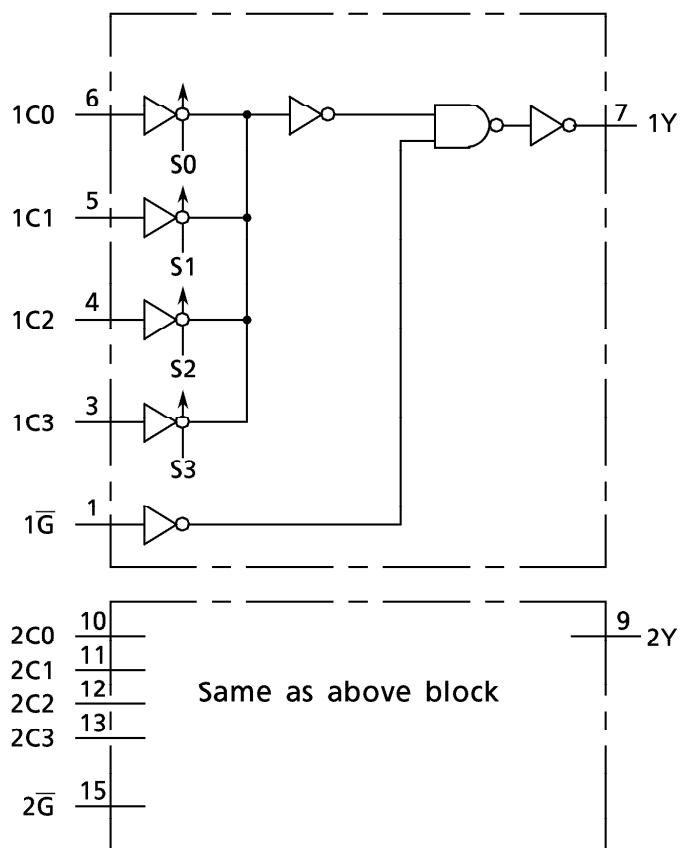
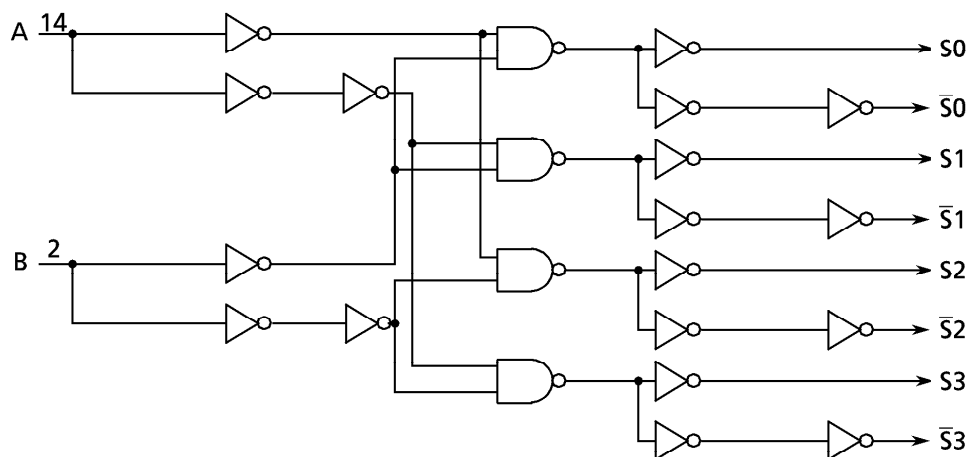
PIN ASSIGNMENT



IEC LOGIC SYMBOL



SYSTEM DIAGRAM



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}	± 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}	$-65 \sim 150$	°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°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}	$-40 \sim 85$	°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}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -50\mu\text{A}$ $I_{OH} = -24\text{mA}$ $I_{OH} = -75\text{mA}^*$	4.5	4.4	4.5	—	4.4	—	V
			4.5	3.94	—	—	3.80	—	
			5.5	—	—	—	3.85	—	
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 50\mu\text{A}$ $I_{OL} = 24\text{mA}$ $I_{OL} = 75\text{mA}^*$	4.5	—	0.0	0.1	—	0.1	V
			4.5	—	—	0.36	—	0.44	
			5.5	—	—	—	—	1.65	
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC} \text{ or } \text{GND}$	5.5	—	—	± 0.1	—	± 1.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC} \text{ or } \text{GND}$	5.5	—	—	8.0	—	80.0	mA
	I_C	PER INPUT : $V_{IN} = 3.4\text{V}$ OTHER INPUT : $V_{CC} \text{ or } \text{GND}$	5.5	—	—	1.35	—	1.5	

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

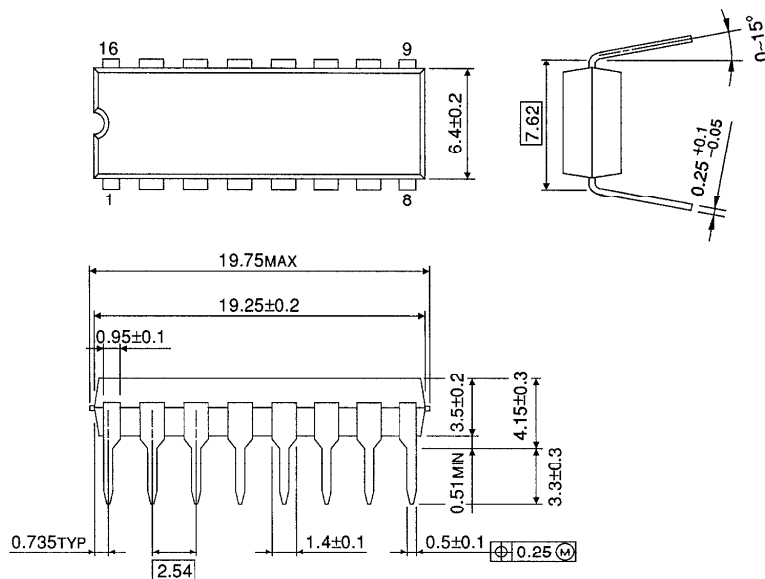
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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)

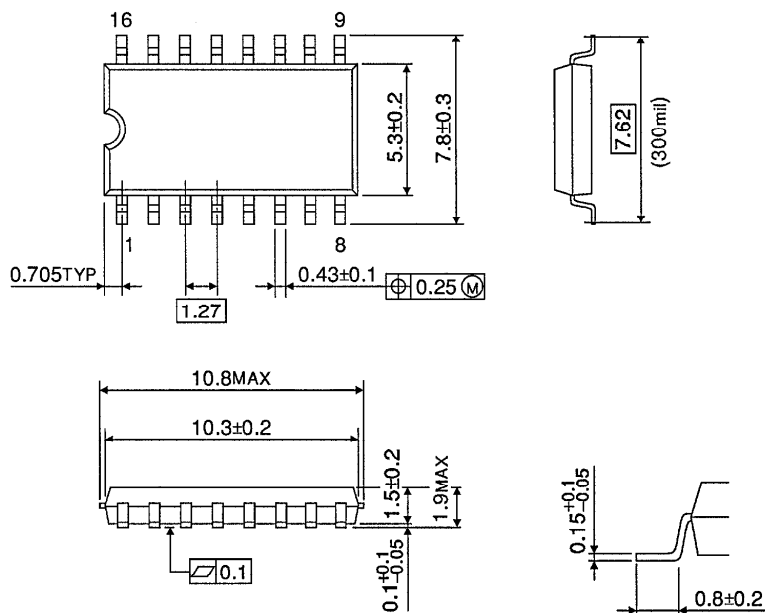
Unit in mm



Weight : 1.00g (TYP.)

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

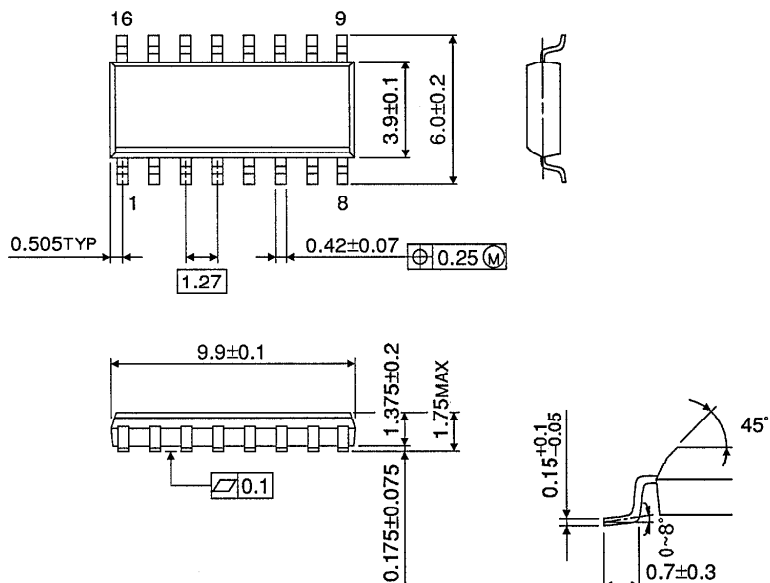
Unit in mm



Weight : 0.18g (TYP.)

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

Unit in mm



Weight : 0.13g (TYP.)