TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74ACT153P, TC74ACT153F, TC74ACT153FN

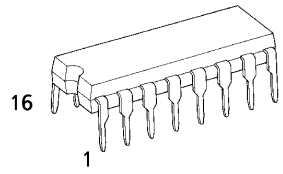
DUAL 4 – CHANNEL MULTIPLEXER

The TC74ACT153 is an advanced high speed CMOS DUAL 4 - CHANNEL MULTIPLEXERs fabricated with silicon gate and double - layer metal wiring 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 ($1\overline{G}$, $2\overline{G}$) 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.

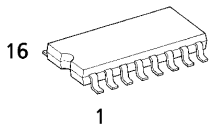
FEATURES :

- High Speed ····· t_{pd} = 5.4ns(typ.) at V_{CC} = 5V
- Low Power Dissipation ····· I_{CC} = 8μA(Max.) at Ta = 25°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 ····· $t_{pLH} \simeq t_{pHL}$
- Pin and Function Compatible with 74F153

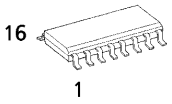
(Note) The JEDEC SOP (FN) is not available in Japan.



P (DIP16-P-300-2.54A)
Weight : 1.00g (Typ.)

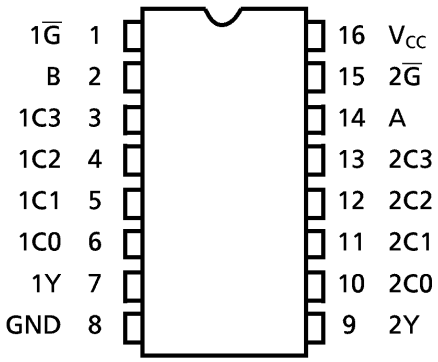


F (SOP16-P-300-1.27)
Weight : 0.18g (Typ.)



FN (SOL16-P-150-1.27)
Weight : 0.13g (Typ.)

PIN ASSIGNMENT



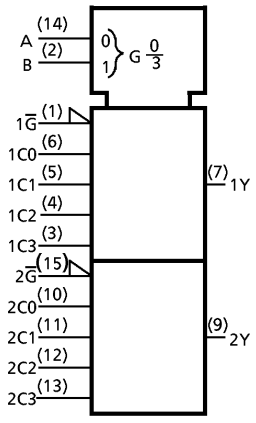
(TOP VIEW)

TRUTH TABLE

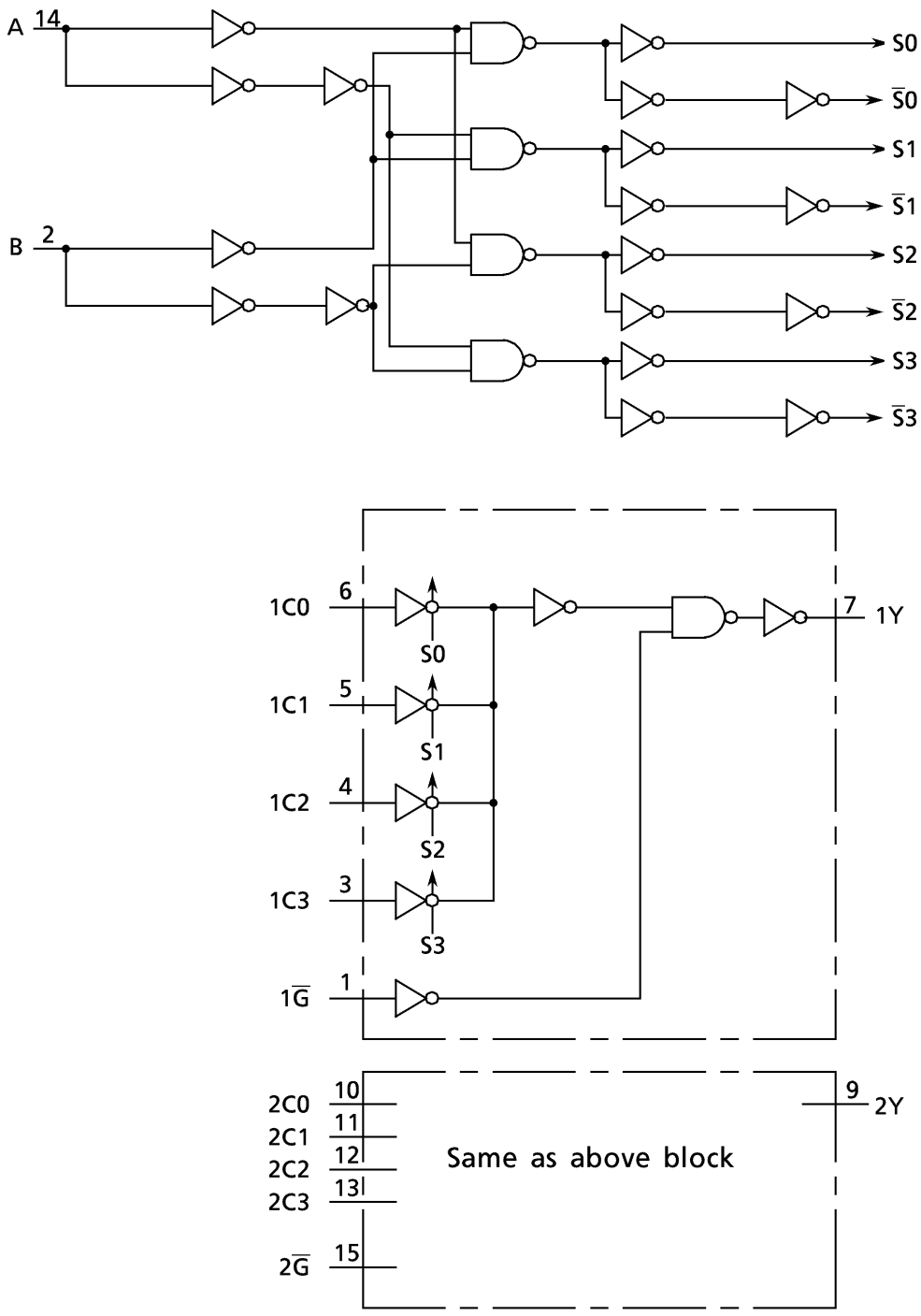
SELECT INPUTS		DATA INPUTS				STROBE	OUTPUT
B	A	C0	C1	C2	C3	$\overline{G}$	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

X : Don't Care

IEC LOGIC SYMBOL



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 Ta = −40°C~65°C. From Ta = 65°C to 85°C a derating factor of −10mW/°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)	Ta = 25°C			Ta = −40~85°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} = −50μA	4.5	4.4	4.5	—	4.4	—	V
			I_{OH} = −24mA	4.5	3.94	—	—	3.80	—	
			I_{OH} = −75mA*	5.5	—	—	—	3.85	—	
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50μA	4.5	—	0.0	0.1	—	0.1	V
			I_{OL} = 24mA	4.5	—	—	0.36	—	0.44	
			I_{OL} = 75mA*	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	μA
	I_C	PER INPUT : V_{IN} = 3.4V OTHER INPUT : V_{CC} or GND		5.5	—	—	1.35	—	1.5	mA

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

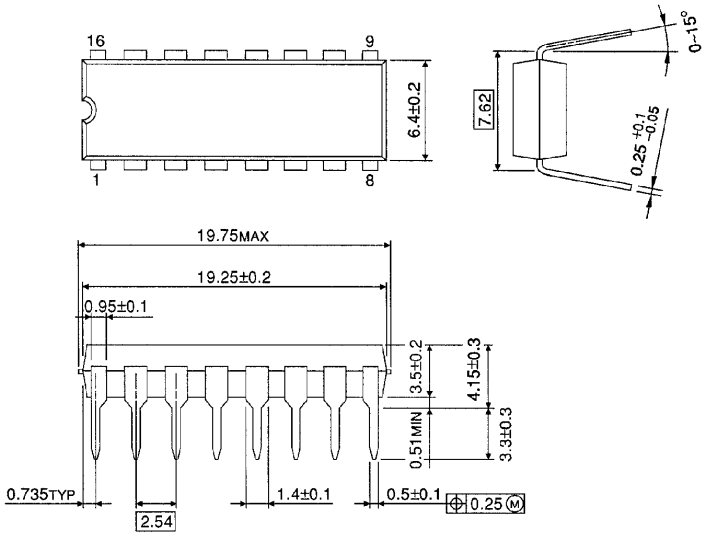
AC ELECTRICAL CHARACTERISTICS (C_L = 50pF , R_L = 500Ω , Input $t_r = t_f$ = 3ns)

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:

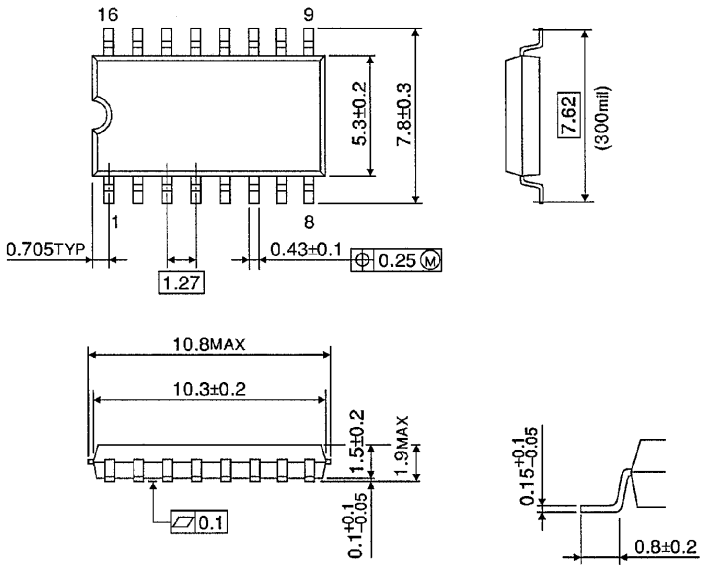
$$I_{CC}(opr.) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}$$

DIP 16PIN PACKAGE DIMENSIONS (DIP16-P-300-2.54A) Unit in mm



Weight : 1.00g (Typ.)

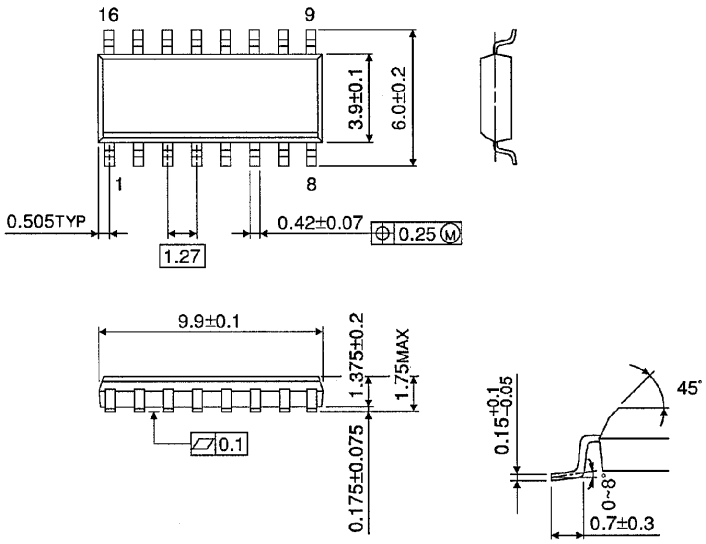
SOP 16PIN (200mil BODY) PACKAGE DIMENSIONS (SOP16-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

SOP 16PIN (150mil BODY) PACKAGE DIMENSIONS (SOL16-P-150 -1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)

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