TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

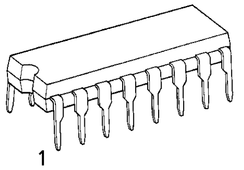
TC74ACT157P, TC74ACT157F, TC74ACT157FN, TC74ACT157FT

QUAD 2 – CHANNEL MULTIPLEXER

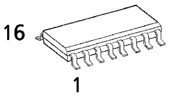
(Note) The JEDEC SOP (FN) is not available in Japan.

The TC74ACT157 is an advanced high speed CMOS QUAD 2 - CHANNEL MULTIPLEXER fabricated with silicon gate and double - layer metal wiring C^{2}MOS technology.
It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.
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 levles.
This device consist of four 2 - input digital multiplexer with common select and strobe inputs.
When the $\overline{\text{STROBE}}$ input is held “H” level, selection of data is inhibited and all the outputs become “L” level.
The SELECT decoding determines whether the A or B inputs get routed to their corresponding Y outputs.
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

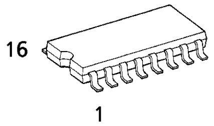
FEATURES :
- High Speed···································t_{pd} = 5.1ns(typ.) at V_{CC} = 5V
- Low Power Dissipation················I_{CC} = 8μA(Max.) at Ta = 25°C
- Compatible with TTL outputs····V_{IL} = 0.8V(Max.)
  V_{IH} = 2.0V(Min.)
- Symmetrical Output Impedance···$|I_{OH}| = I_{OL}$ = 24mA(Min.)
  Capability of driving 50Ω tansmission lines.
- Balanced Propagation Delays·····$t_{pLH} \simeq t_{pHL}$
- Pin and Function Compatible with 74F157



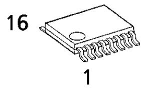
P (DIP16-P-300-2.54A)
Weight : 1.00g (Typ.)



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

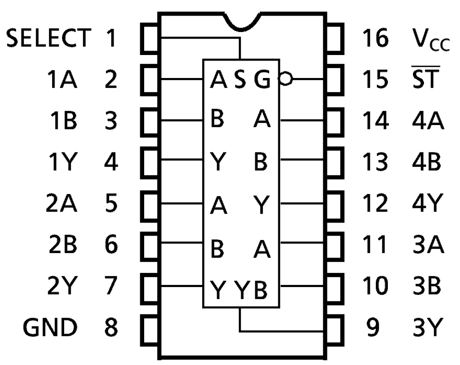


F (SOP16-P-300-1.27)
Weight : 0.18g (Typ.)



FT (TSSOP16-P-0044-0.65)
Weight : 0.06g (Typ.)

PIN ASSIGNMENT



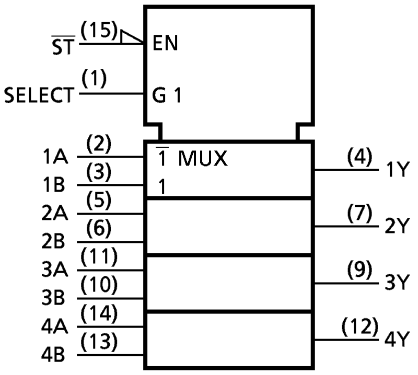
(TOP VIEW)

TRUTH TABLE

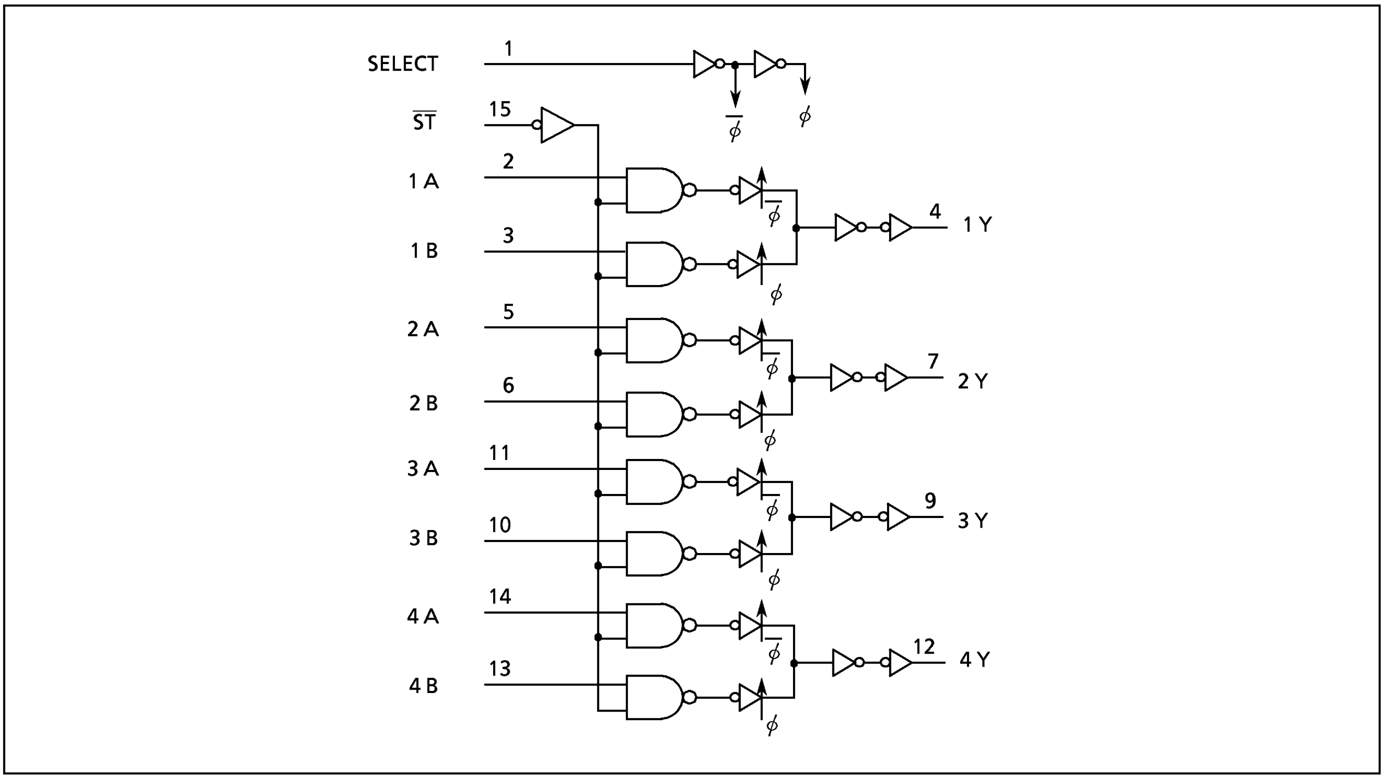
INPUTS				OUTPUTS
$\overline{\text{ST}}$	SELECT	A	B	Y
H	X	X	X	L
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

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/TSSOP)	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 I_{OH} = −24mA I_{OH} = −75mA*	4.5 4.5 5.5	4.4 3.94 —	4.5 — —	— — —	4.4 3.80 3.85	— — —	V
Low - Level Output Voltage	V_{OL}	V_{IN} = V_{IH} or V_{IL}	I_{OL} = 50µA I_{OL} = 24mA I_{OL} = 75mA*	4.5 4.5 5.5	— — —	0.0 — —	0.1 0.36 —	— — —	0.1 0.44 1.65	V
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	
	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.

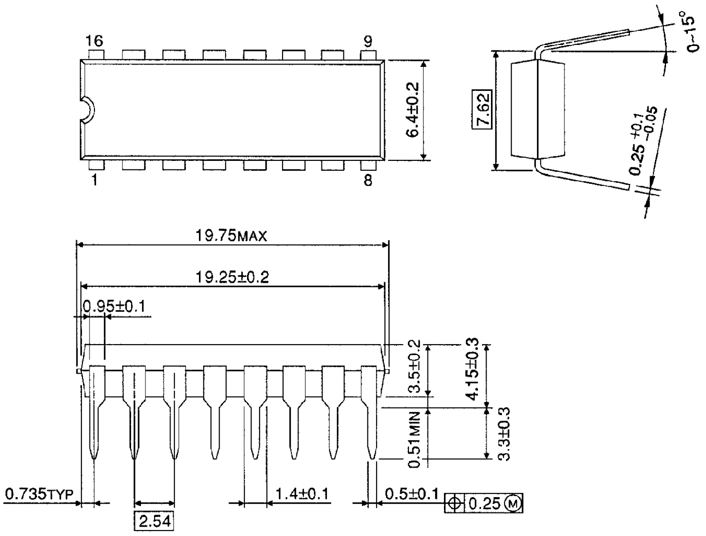
AC ELECTRICAL CHARACTERISTICS (C_L = 50pF , R_L = 500Ω , Input t_r = t_f = 3ns)

PARAMETER	SYMBOL	TEST CONDITION		Ta = 25°C			Ta = −40~85°C		UNIT
			V_{CC} (V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time (A , B − Y)	t_{pLH} t_{pHL}		5.0 ± 0.5	—	5.5	8.0	1.0	9.1	ns
Propagation Delay Time (SELECT − Y)	t_{pLH} t_{pHL}		5.0 ± 0.5	—	6.9	11.4	1.0	13.0	
Propagation Delay Time ($\overline{ST}$ − Y)	t_{pLH} t_{pHL}		5.0 ± 0.5	—	6.8	10.8	1.0	12.3	
Input Capacitance	C_{IN}			—	5	10	—	10	pF
Power Dissipation Capacitance	C_{PD}			—	51	—	—	—	

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 :

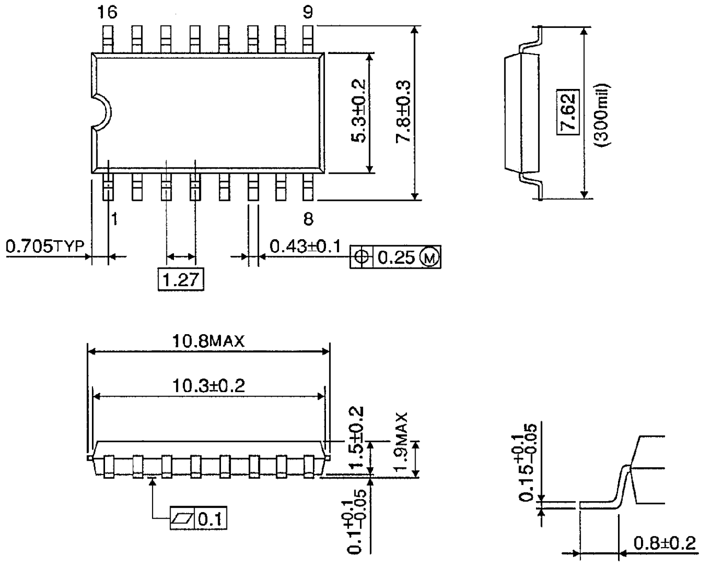
$$I_{CC\,(opr.)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC} / 4 \text{ (per bit)}$$

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



Weight : 1.00g (Typ.)

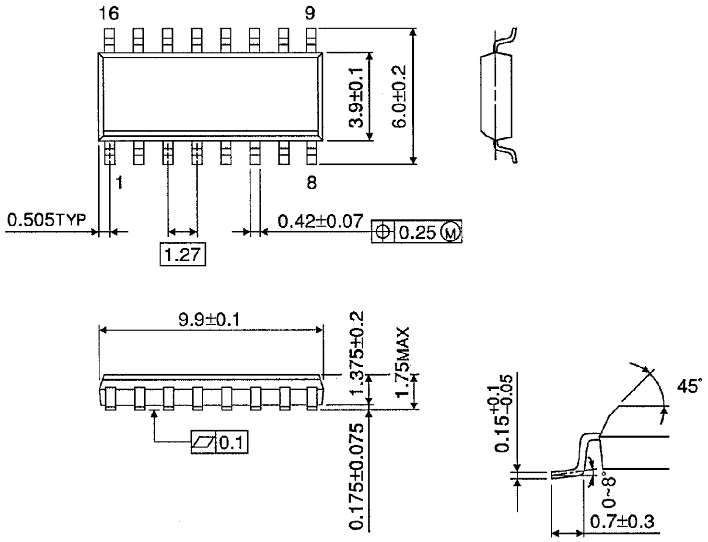
SOP 16PIN (200mil BODY) PACKAGE DIMENSIONS (SOP16-P-300-1.27) Unit in mm



Weight : 0.18g (Typ.)

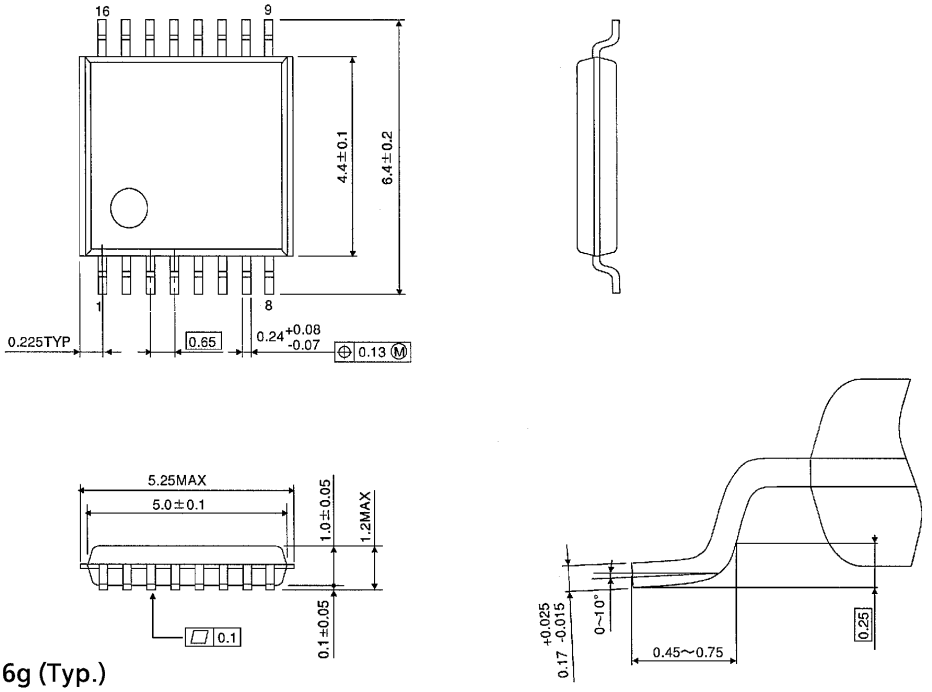
SOP 16PIN (150mil BODY) PACKAGE DIMENSIONS (SOL16-P-150 -1.27) Unit in mm

(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)

TSSOP 16PIN PACKAGE DIMENSIONS (TSSOP16-P-0044-0.65) Unit in mm



Weight : 0.06g (Typ.)

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