

**TC74AC157P, TC74AC157F, TC74AC157FN, TC74AC157FT**

**QUAD 2-CHANNEL MULTIPLEXER**

The TC74AC157 is an advanced high speed CMOS QUAD 2-CHANNEL MULTIPLEXER fabricated with silicon gate and double-layer metal wiring C<sup>2</sup>MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL while maintaining the CMOS low power dissipation.

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.

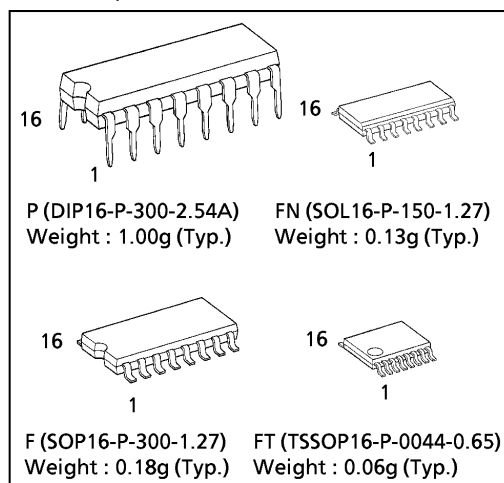
The SELECT decoding determines whether the A or B inputs get routed to their corresponding Y outputs.

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

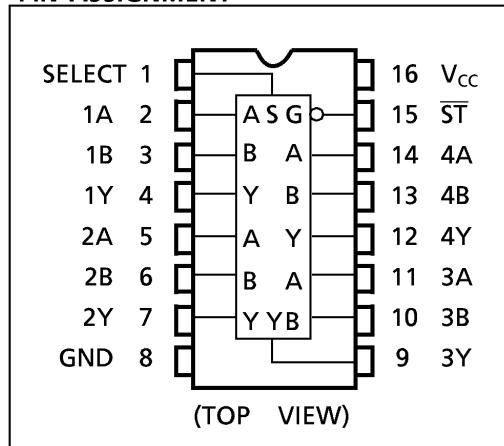
**FEATURES :**

- High Speed.....  $t_{pd} = 4.5\text{ns}(\text{typ.})$  at  $V_{CC} = 5\text{V}$
- Low Power Dissipation.....  $I_{CC} = 8\mu\text{A}(\text{Max.})$  at  $T_a = 25^\circ\text{C}$
- High Noise Immunity.....  $V_{NIH} = V_{NIL} = 28\% V_{CC}$  (Min.)
- Symmetrical Output Impedance...  $|I_{OH}| = I_{OL} = 24\text{mA}(\text{Min.})$   
Capability of driving 50Ω transmission lines.
- Balanced Propagation Delays.....  $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range...  $V_{CC}(\text{opr}) = 2\text{V} \sim 5.5\text{V}$
- Pin and Function Compatible with 74F157

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



**PIN ASSIGNMENT**

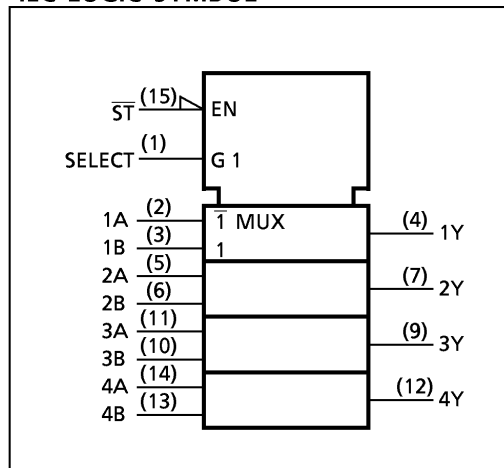


**TRUTH TABLE**

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

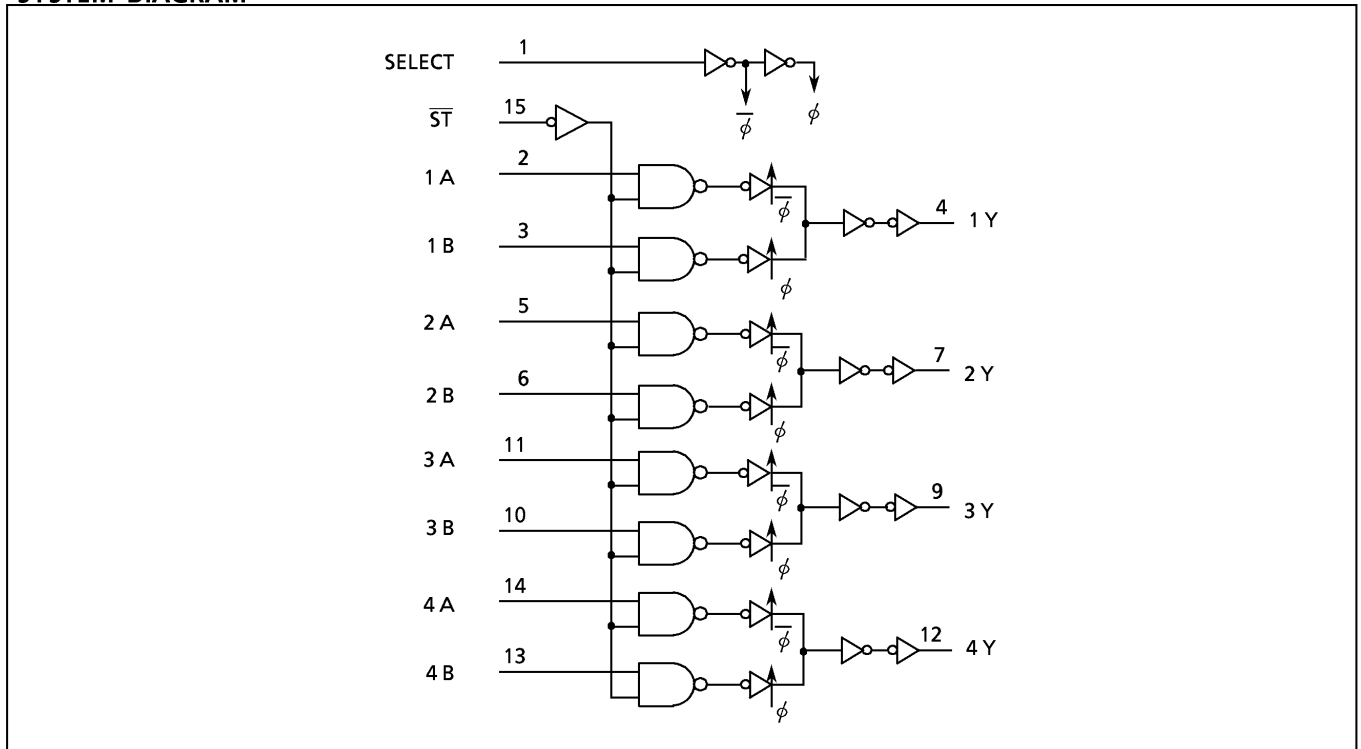
**IEC LOGIC SYMBOL**



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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	$I_{IK}$	$\pm 20$	mA
Output Diode Current	$I_{OK}$	$\pm 50$	mA
DC Output Current	$I_{OUT}$	$\pm 50$	mA
DC $V_{CC}$ /Ground Current	$I_{CC}$	$\pm 100$	mA
Power Dissipation	$P_D$	500 (DIP)* / 180 (SOP/TSSOP)	mW
Storage Temperature	$T_{stg}$	-65~150	$^{\circ}C$

\*500mW in the range of  $T_a = -40^{\circ}C \sim 65^{\circ}C$ . From  $T_a = 65^{\circ}C$  to  $85^{\circ}C$  a derating factor of  $-10mW/^{\circ}C$  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	$^{\circ}C$
Input Rise and Fall Time	$dt / dV$	0~100 ( $V_{CC} = 3.3 \pm 0.3V$ ) 0~20 ( $V_{CC} = 5 \pm 0.5V$ )	ns / V

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## DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION		V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
High - Level Input Voltage	V <sub>IH</sub>			2.0 3.0 5.5	1.50 2.10 3.85	— — —	— — —	1.50 2.10 3.85	— — —	V
Low - Level Input Voltage	V <sub>IL</sub>			2.0 3.0 5.5	— — —	— — —	0.50 0.90 1.65	— — —	0.50 0.90 1.65	V
High - Level Output Voltage	V <sub>OH</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -50μA	2.0 3.0 4.5	1.9 2.9 4.4	2.0 3.0 4.5	— — —	1.9 2.9 4.4	— — —	V
			I <sub>OH</sub> = -4mA	3.0	2.58	—	—	2.48	—	
			I <sub>OH</sub> = -24mA	4.5	3.94	—	—	3.80	—	
			I <sub>OH</sub> = -75mA*	5.5	—	—	—	3.85	—	
Low - Level Output Voltage	V <sub>OL</sub>	V <sub>IN</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 50μA	2.0 3.0 4.5	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	0.1 0.1 0.1	V
			I <sub>OL</sub> = 12mA	3.0	—	—	0.36	—	0.44	
			I <sub>OL</sub> = 24mA	4.5	—	—	0.36	—	0.44	
			I <sub>OL</sub> = 75mA*	5.5	—	—	—	—	1.65	
Input Leakage Current	I <sub>IN</sub>	V <sub>IN</sub> = V <sub>CC</sub> or GND		5.5	—	—	±0.1	—	±1.0	μA
Quiescent Supply Current	I <sub>CC</sub>	V <sub>IN</sub> = V <sub>CC</sub> 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<sub>L</sub> = 50pF, R<sub>L</sub> = 500Ω, Input t<sub>r</sub> = t<sub>f</sub> = 3ns)

PARAMETER	SYMBOL	TEST CONDITION		V <sub>CC</sub> (V)	Ta = 25°C			Ta = -40~85°C		UNIT
					MIN.	TYP.	MAX.	MIN.	MAX.	
Propagation Delay Time (A, B-Y)	t <sub>pLH</sub> t <sub>pHL</sub>			3.3 ± 0.3	—	7.2	12.2	1.0	14.0	ns
				5.0 ± 0.5	—	5.5	7.9	1.0	9.1	
Propagation Delay Time (SELECT-Y)	t <sub>pLH</sub> t <sub>pHL</sub>			3.3 ± 0.3	—	8.5	14.5	1.0	16.7	
				5.0 ± 0.5	—	6.3	9.1	1.0	10.5	
Propagation Delay Time ( $\overline{ST}$ -Y)	t <sub>pLH</sub> t <sub>pHL</sub>			3.3 ± 0.3	—	8.6	14.6	1.0	16.8	
				5.0 ± 0.5	—	6.4	9.2	1.0	10.6	
Input Capacitance	C <sub>IN</sub>			—	5	10	—	10	pF	
Power Dissipation Capacitance	C <sub>PD</sub> (1)			—	93	—	—	—		

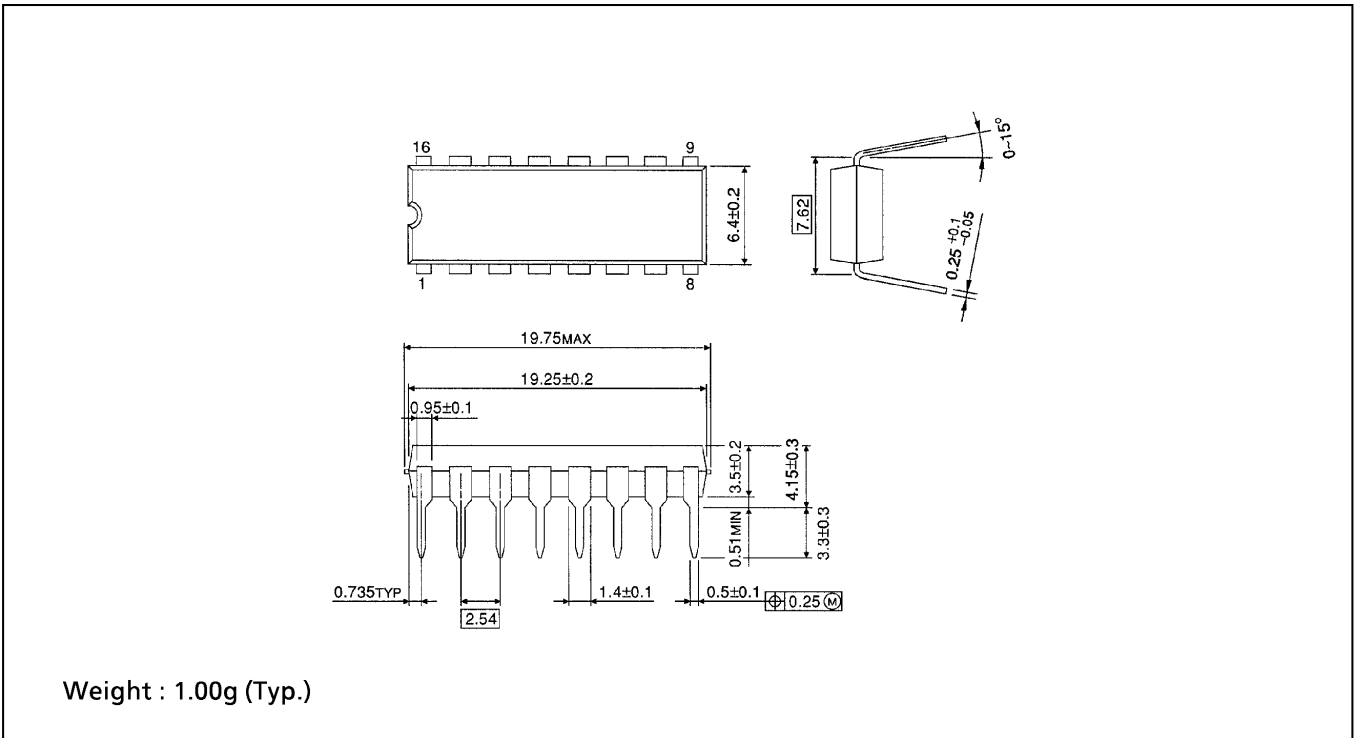
Note (1) C<sub>PD</sub> is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

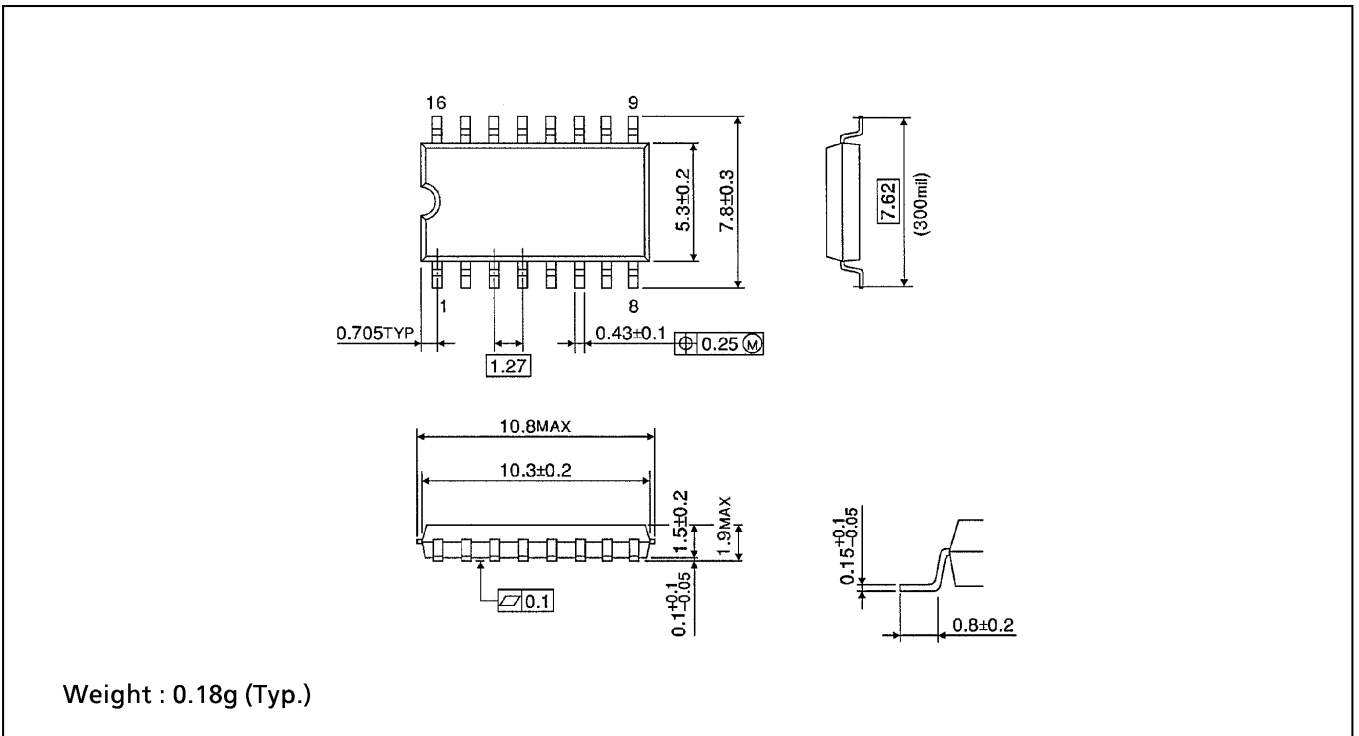
**DIP 16PIN OUTLINE DRAWING (DIP16-P-300-2.54A)**

Unit in mm



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

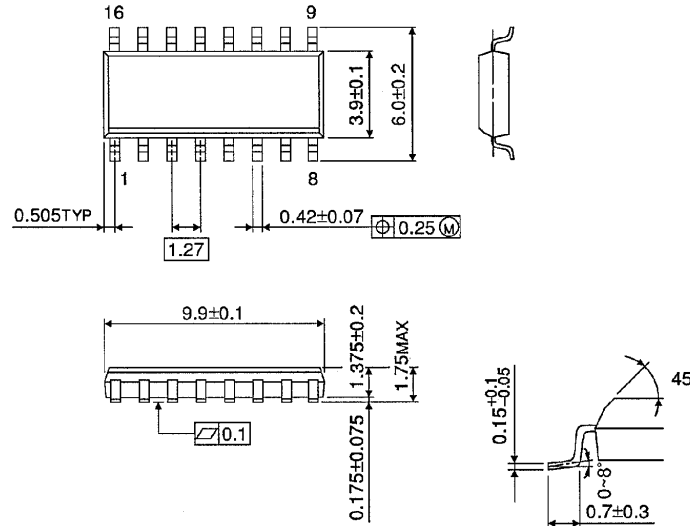
Unit in mm



**SOP 16PIN (150mil BODY) OUTLINE DRAWING (SOL16-P-150 -1.27)**

Unit in mm

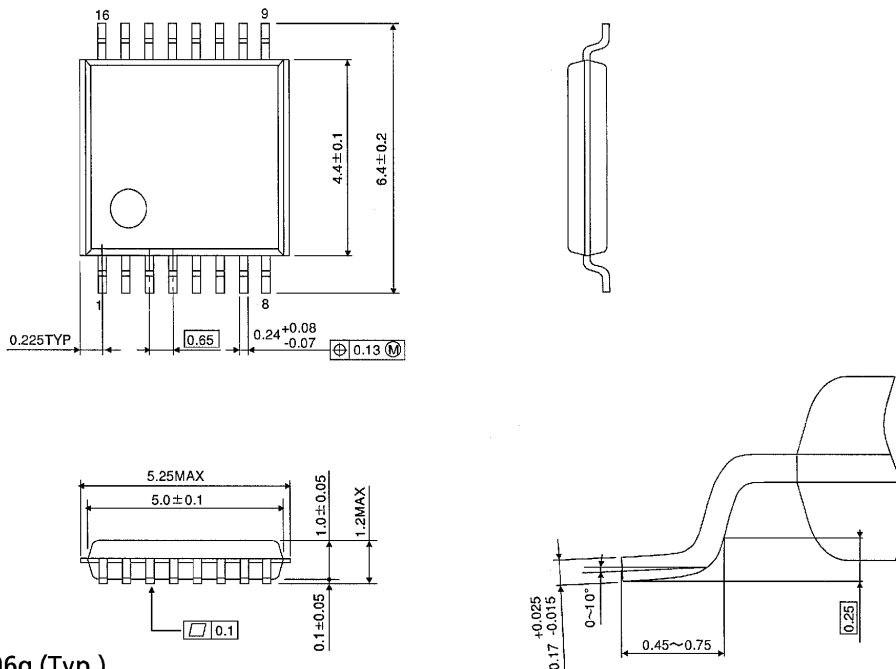
(Note) This package is not available in Japan.



Weight : 0.13g (Typ.)

**TSSOP 16PIN OUTLINE DRAWING (TSSOP16-P-0044-0.65)**

Unit in mm



Weight : 0.06g (Typ.)