

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

**TC74HC157AP, TC74HC157AF, TC74HC157AFN
TC74HC158AP, TC74HC158AF, TC74HC158AFN**

**TC74HC157AP/AF/AFN QUAD 2 – CHANNEL MULTIPLEXER
TC74HC158AP/AF/AFN QUAD 2 – CHANNEL MULTIPLEXER (INVERTING)**

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

The TC74HC157A and TC74HC158A are high speed CMOS 2 - CHANNEL MULTIPLEXERS fabricated with silicon gate C²MOS technology.

They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation. The TC74HC158A is an inverting multiplexer while the TC74HC157A is a non-inverting.

When **STROBE** is held high, selection of data is inhibited and all the outputs become low in the case of HC157A or high in the case of HC158A.

The **SELECT** decoding determines whether the A or B inputs get transferred to their corresponding Y (\bar{Y}) outputs.

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

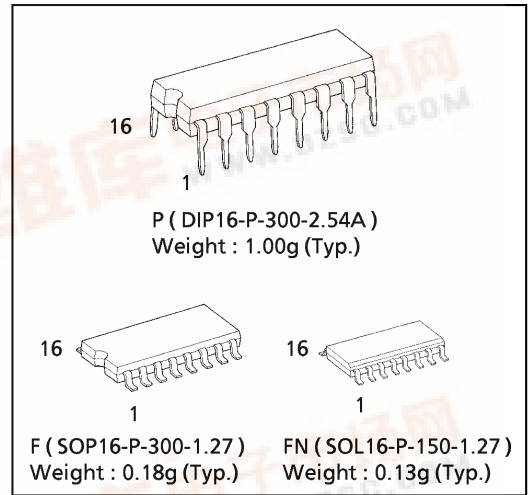
FEATURES :

- High Speed..... $t_{pd} = 10ns$ (typ.) at $V_{CC} = 5V$
- Low Power Dissipation..... $I_{CC} = 4\mu A$ (Max.) at $T_a = 25^\circ C$
- High Noise Immunity..... $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (Min.)
- Output Drive Capability..... 10 LSTTL Loads
- Symmetrical Output Impedance... $|I_{OH}| = I_{OL} = 4mA$ (Min.)
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range... V_{CC} (opr.) = 2V~6V
- Pin and Function Compatible with 74LS157/158

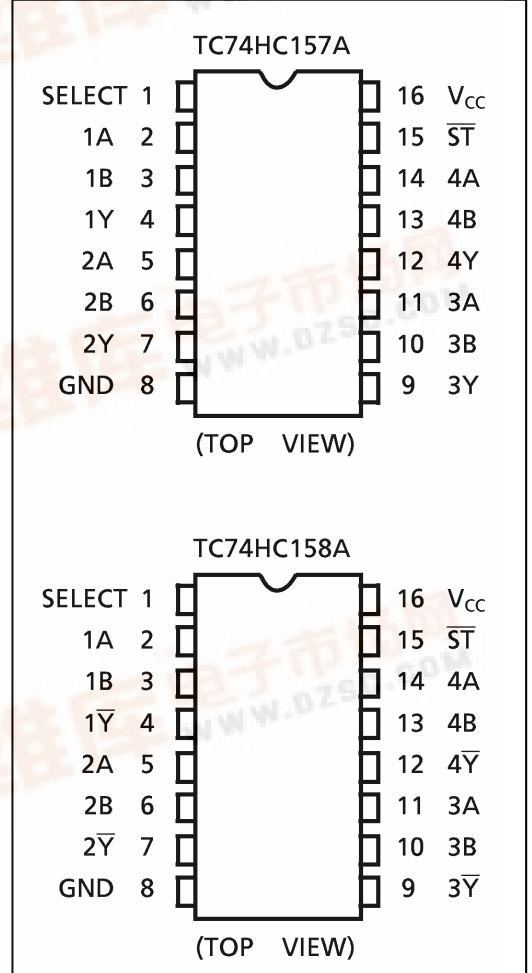
TRUTH TABLE

INPUTS				OUTPUTS	
\bar{ST}	SELECT	A	B	Y (157A)	\bar{Y} (158A)
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

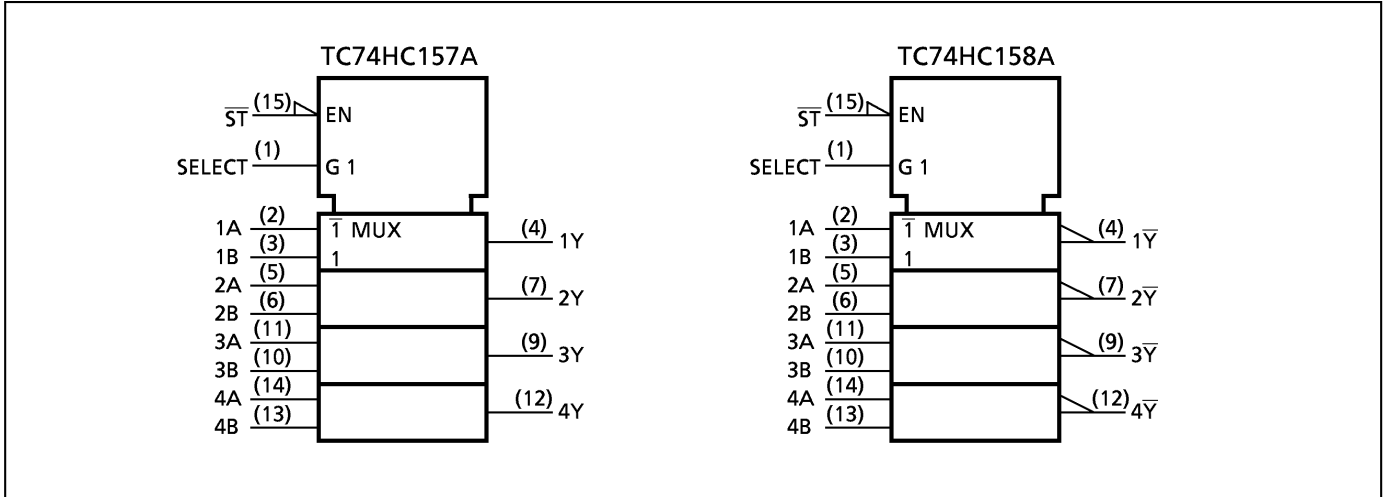
X : Don't Care



PIN ASSIGNMENT



IEC LOGIC SYMBOL



ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	-0.5~7	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}	±20	mA
DC Output Current	I_{OUT}	±25	mA
DC V_{CC} / Ground Current	I_{CC}	±50	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 $-10\text{mW}/^{\circ}\text{C}$ shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	2~6	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	t_r, t_f	0~1000 ($V_{CC} = 2.0\text{V}$) 0~500 ($V_{CC} = 4.5\text{V}$) 0~400 ($V_{CC} = 6.0\text{V}$)	ns

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		
			4.5	3.15	—	—	3.15	—			
			6.0	4.20	—	—	4.20	—			
Low - Level Input Voltage	V_{IL}		2.0	—	—	0.50	—	0.50	V		
			4.5	—	—	1.35	—	1.35			
			6.0	—	—	1.80	—	1.80			
High - Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V	
				4.5	4.4	4.5	—	4.4	—		
			6.0	$I_{OH} = -4\text{ mA}$	4.5	4.18	4.31	—	4.13		—
				$I_{OH} = -5.2\text{ mA}$	6.0	5.68	5.80	—	5.63		—
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\mu\text{A}$	2.0	—	0.0	0.1	—	0.1	V	
				4.5	—	0.0	0.1	—	0.1		
			6.0	$I_{OL} = 4\text{ mA}$	4.5	—	0.17	0.26	—		0.33
				$I_{OL} = 5.2\text{ mA}$	6.0	—	0.18	0.26	—		0.33
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC}$ or GND	6.0	—	—	±0.1	—	±1.0	μA		
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	6.0	—	—	4.0	—	40.0			

AC ELECTRICAL CHARACTERISTICS (C_L = 15pF, V_{CC} = 5V, Ta = 25°C, Input t_r = t_f = 6ns)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t _{TLH} t _{THL}		—	4	8	ns
Propagation Delay Time (A, B—Y, \bar{Y})	t _{pLH} t _{pHL}		—	10	16	
Propagation Delay Time (SELECT—Y, \bar{Y})	t _{pLH} t _{pHL}		—	13	21	
Propagation Delay Time ($\overline{\text{STOROB}}\bar{E}$ —Y, \bar{Y})	t _{pLH} t _{pHL}		—	10	19	

AC ELECTRICAL CHARACTERISTICS (C_L = 50pF, Input t_r = t_f = 6ns)

PARAMETER	SYMBOL	TEST CONDITION	Ta = 25°C			Ta = -40~85°C		UNIT
			V _{CC} (V)	MIN.	TYP.	MAX.	MIN.	
Output Transition Time	t _{TLH} t _{THL}		2.0	—	30	75	—	95
			4.5	—	8	15	—	19
			6.0	—	7	13	—	16
Propagation Delay Time (A, B—Y, \bar{Y})	t _{pLH} t _{pHL}		2.0	—	36	100	—	125
			4.5	—	12	20	—	25
			6.0	—	10	17	—	21
Propagation Delay Time (SELECT—Y, \bar{Y})	t _{pLH} t _{pHL}		2.0	—	50	125	—	155
			4.5	—	16	25	—	31
			6.0	—	14	21	—	26
Propagation Delay Time ($\overline{\text{STOROB}}\bar{E}$ —Y, \bar{Y})	t _{pLH} t _{pHL}		2.0	—	36	115	—	145
			4.5	—	12	23	—	29
			6.0	—	10	20	—	25
Input Capacitance	C _{IN}		—	5	10	—	10	
Power Dissipation Capacitance	C _{PD} (1)	TC74HC157A	—	57	—	—	—	pF
		TC74HC158A	—	53	—	—	—	

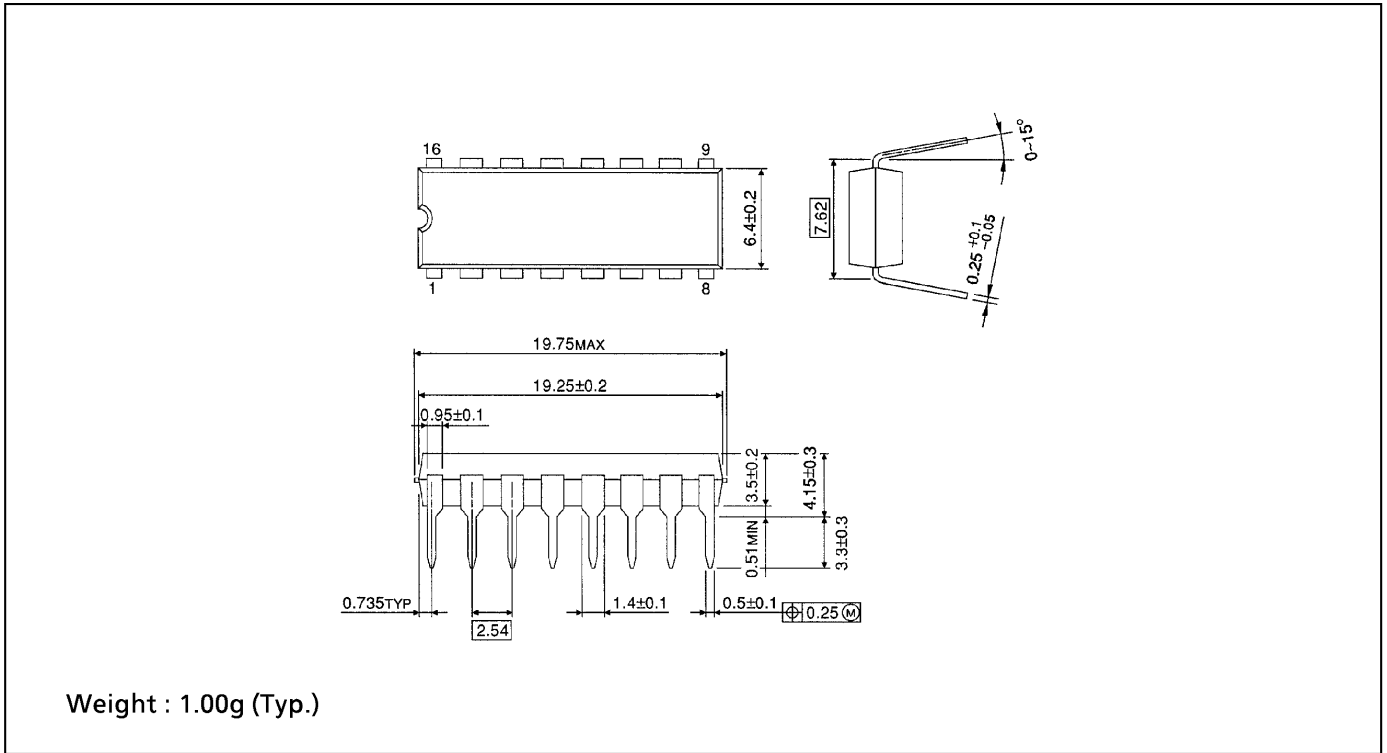
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

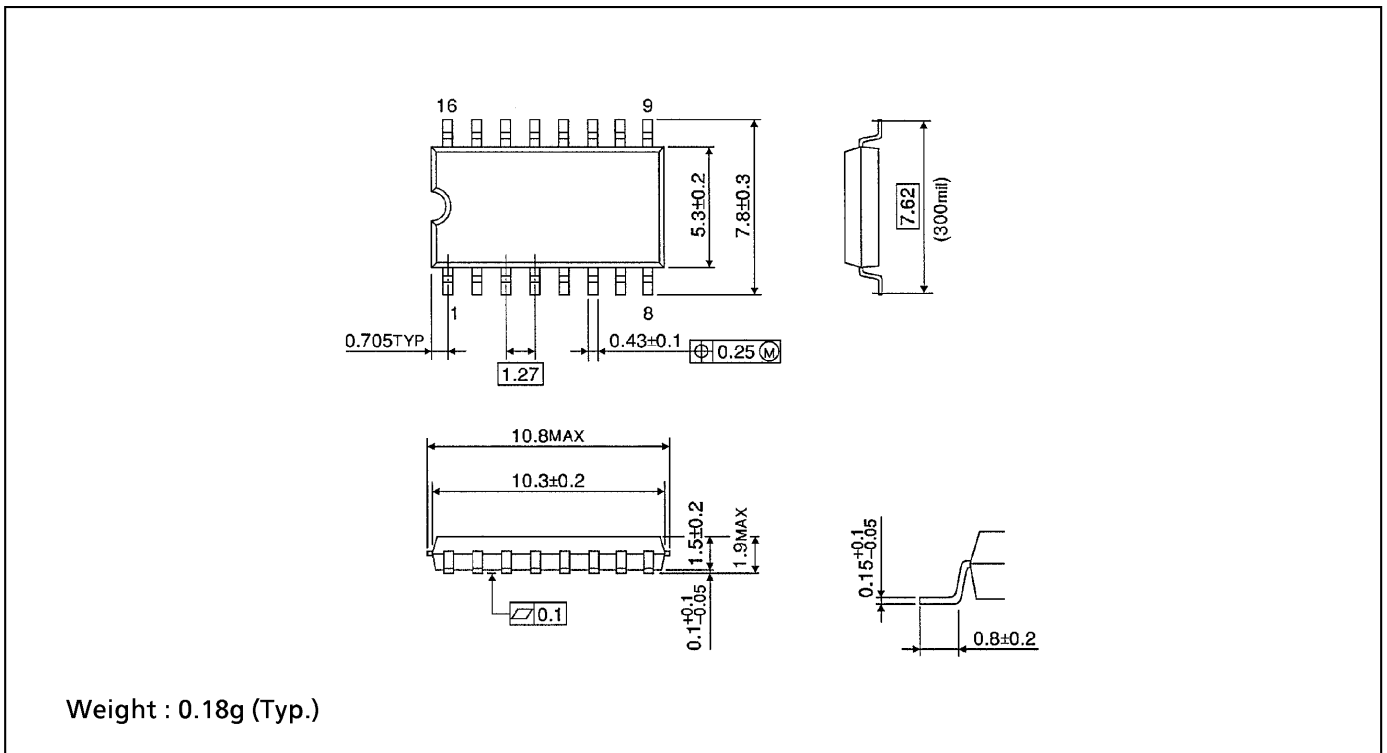
DIP 16PIN PACKAGE DIMENSIONS (DIP16-P-300-2.54A)

Unit in mm



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

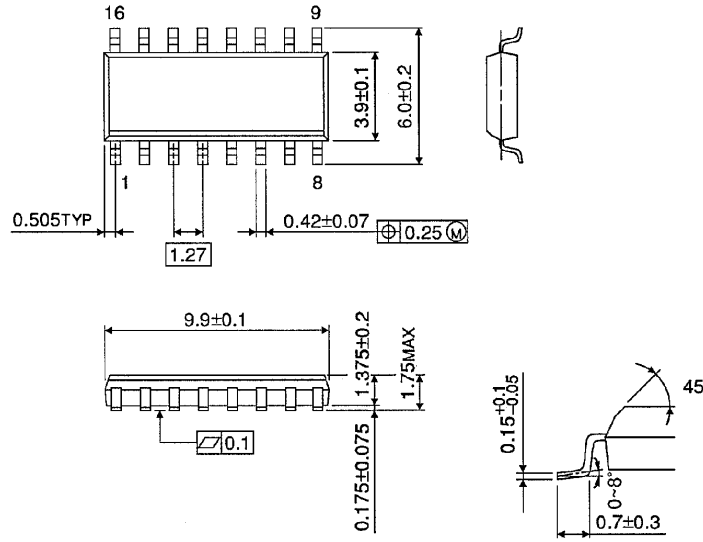
Unit in mm



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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