

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 $\overline{\text{STROBE}}$ 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 ($\overline{Y}$) outputs.

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

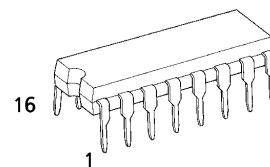
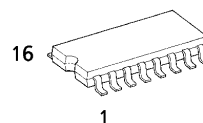
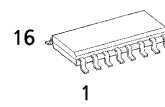
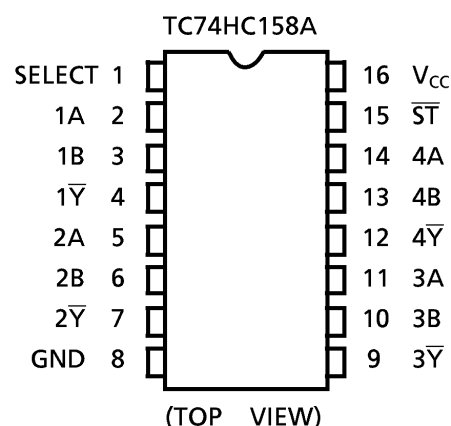
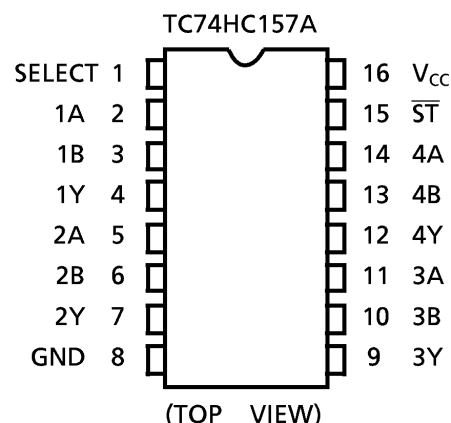
FEATURES :

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

TRUTH TABLE

INPUTS				OUTPUTS	
$\overline{\text{ST}}$	SELECT	A	B	Y (157A) $\overline{Y}$ (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

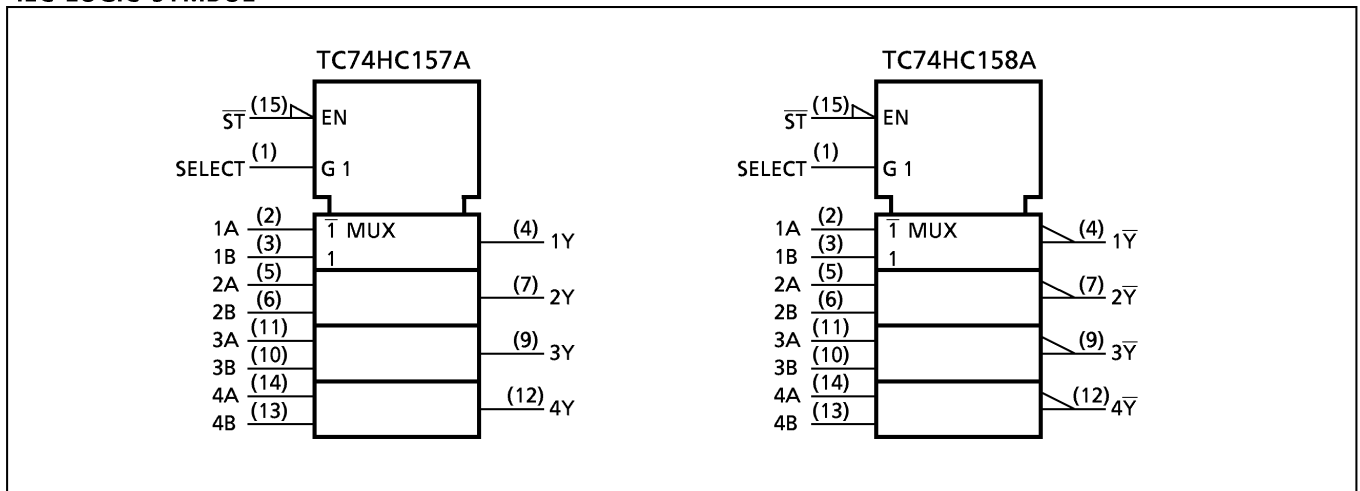
X : Don't Care


 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

980508EBA2

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IEC LOGIC SYMBOL



980508EBA2'

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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage Range	V_{CC}	$-0.5 \sim 7$	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}	± 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}	$-65 \sim 150$	°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 $-10\text{mW}/^\circ\text{C}$ shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	UNIT
Supply Voltage	V_{CC}	$2 \sim 6$	V
Input Voltage	V_{IN}	$0 \sim V_{CC}$	V
Output Voltage	V_{OUT}	$0 \sim V_{CC}$	V
Operating Temperature	T_{opr}	$-40 \sim 85$	°C
Input Rise and Fall Time	t_r, t_f	$0 \sim 1000 (V_{CC} = 2.0\text{V})$ $0 \sim 500 (V_{CC} = 4.5\text{V})$ $0 \sim 400 (V_{CC} = 6.0\text{V})$	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 4.5 6.0	1.50 3.15 4.20	— — —	— — —	1.50 3.15 4.20	— — —	V
Low - Level Input Voltage	V_{IL}		2.0 4.5 6.0	— — —	— — —	0.50 1.35 1.80	— — —	0.50 1.35 1.80	V
High - Level Output Voltage	V_{OH}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -20\mu\text{A}$	2.0 4.5 6.0	1.9 4.4 5.9	2.0 4.5 6.0	— — —	1.9 4.4 5.9	— — —	V
			4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 5.63	— —	
			4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 20\mu\text{A}$	2.0 4.5 6.0	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	0.1 0.1 0.1	V
		$I_{OL} = 4 \text{ mA}$ $I_{OL} = 5.2\text{mA}$	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
Input Leakage Current	I_{IN}	$V_{IN} = V_{CC} \text{ or GND}$	6.0	—	—	± 0.1	—	± 1.0	μA
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC} \text{ or GND}$	6.0	—	—	4.0	—	40.0	

AC ELECTRICAL CHARACTERISTICS ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$, Input $t_r = t_f = 6\text{ns}$)

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 ($\overline{\text{STOROE}}$ —Y, $\bar{Y}$)	t_{pLH} t_{pHL}		—	10	19	

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITION	Ta = 25°C				Ta = -40~85°C		UNIT
			VCC(V)	MIN.	TYP.	MAX.	MIN.	MAX.	
Output Transition Time	tTLH tTHL		2.0	—	30	75	—	95	ns
			4.5	—	8	15	—	19	
			6.0	—	7	13	—	16	
Propagation Delay Time (A, B—Y, Y)	tPLH tPHL		2.0	—	36	100	—	125	
			4.5	—	12	20	—	25	
			6.0	—	10	17	—	21	
Propagation Delay Time (SELECT—Y, Y)	tPLH tPHL		2.0	—	50	125	—	155	
			4.5	—	16	25	—	31	
			6.0	—	14	21	—	26	
Propagation Delay Time (STOROE—Y, Y)	tPLH tPHL		2.0	—	36	115	—	145	
			4.5	—	12	23	—	29	
			6.0	—	10	20	—	25	
Input Capacitance	CIN			—	5	10	—	10	pF
Power Dissipation Capacitance	CPD (1)	TC74HC157A		—	57	—	—	—	
		TC74HC158A		—	53	—	—	—	

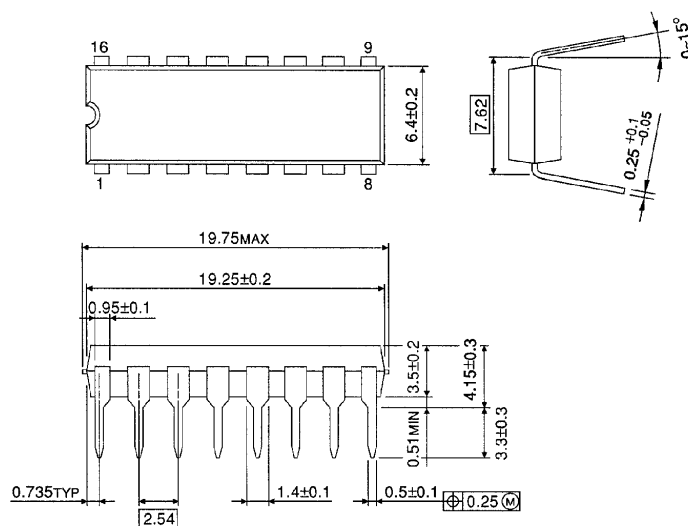
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

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 OUTLINE DRAWING (DIP16-P-300-2.54A)

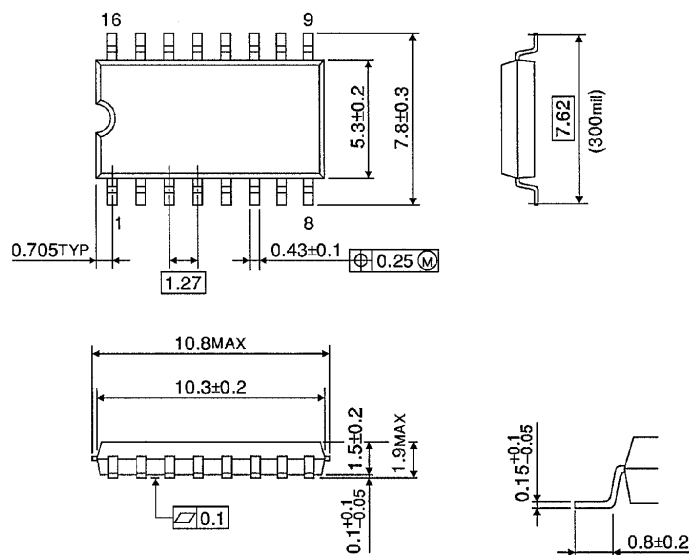
Unit in mm



Weight : 1.00g (Typ.)

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

Unit in mm

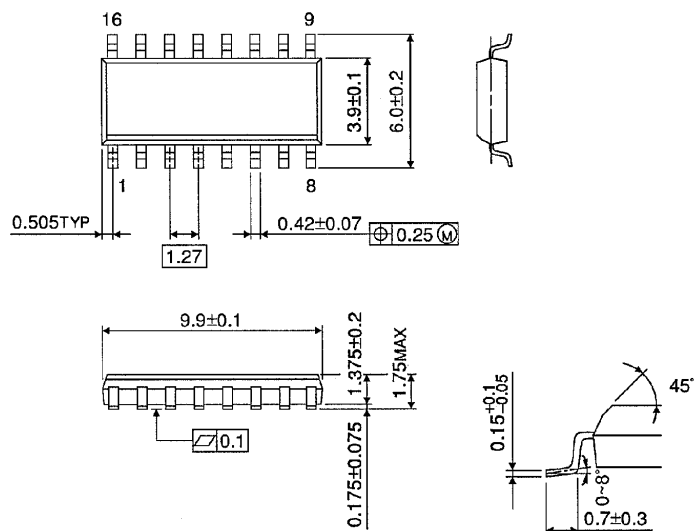


Weight : 0.18g (Typ.)

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.)