

TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC74HC157AFN TC74HC158AFN

TC74HC157AFN Quad 2-Channel Multiplexer

TC74HC158AFN Quad 2-Channel Multiplexer (inverting)

Note: xxxFN (JEDEC SOP) is not available in Japan.

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

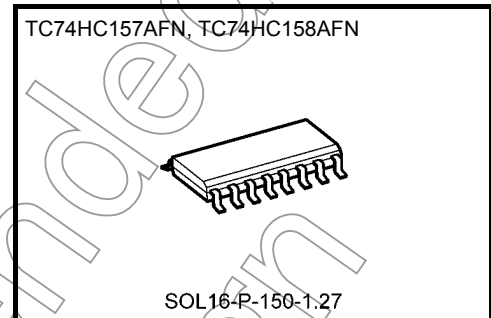
They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

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.



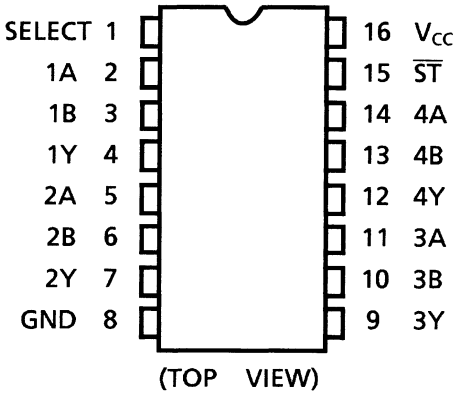
Weight
SOL16-P-150-1.27 : 0.13 g (typ.)

Features

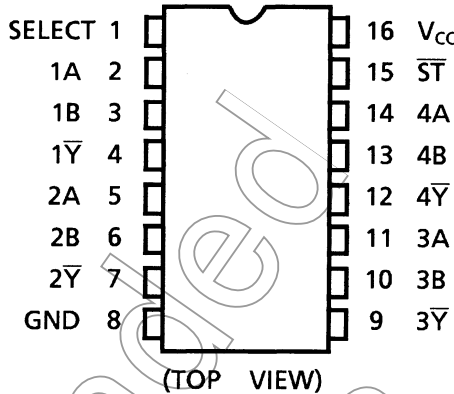
- High speed: $t_{pd} = 10$ ns (typ.) at $V_{CC} = 5$ V
- Low power dissipation: $I_{CC} = 4$ μ A (max) at $T_a = 25^\circ\text{C}$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Output drive capability: 10 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 4$ mA (min)
- Balanced propagation delays: $t_{PLH} \approx t_{PHL}$
- Wide operating voltage range: $V_{CC}(\text{opr}) = 2$ to 6 V
- Pin and function compatible with 74LS157/158

Pin Assignment

TC74HC157A

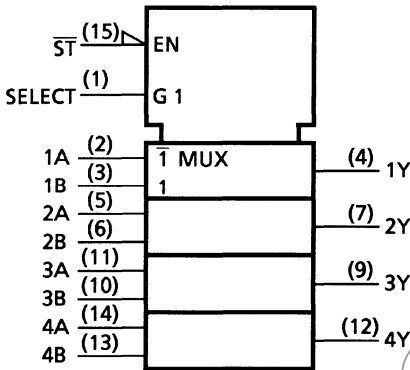


TC74HC158A

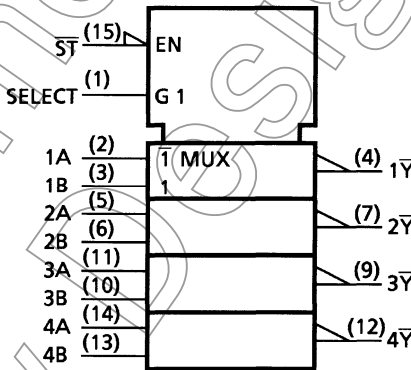


IEC Logic Symbol

TC74HC157A



TC74HC158A



Truth Table

Inputs				Outputs	
ST	SELECT	A	B	Y (157A)	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

Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to 7	V
DC input voltage	V_{IN}	-0.5 to $V_{CC} + 0.5$	V
DC output voltage	V_{OUT}	-0.5 to $V_{CC} + 0.5$	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	180	mW
Storage temperature	T_{stg}	-65 to 150	°C

Note: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings and the operating ranges.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

Operating Ranges (Note)

Characteristics	Symbol	Rating	Unit
Supply voltage	V_{CC}	2 to 6	V
Input voltage	V_{IN}	0 to V_{CC}	V
Output voltage	V_{OUT}	0 to V_{CC}	V
Operating temperature	T_{opr}	-40 to 85	°C
Input rise and fall time	t_r, t_f	0 to 1000 ($V_{CC} = 2.0$ V)	ns
		0 to 500 ($V_{CC} = 4.5$ V)	
		0 to 400 ($V_{CC} = 6.0$ V)	

Note: The operating ranges must be maintained to ensure the normal operation of the device. Unused inputs must be tied to either VCC or GND.

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit
				V _{CC} (V)	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	— — —	V
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20 µA	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
			I _{OH} = -4 mA	4.5	4.18	4.31	—	4.13	—
			I _{OH} = -5.2 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 µA	2.0 4.5 6.0	— — —	0.0 0.0 0.0	0.1 0.1 0.1	— — —	0.1 0.1 0.1
			I _{OL} = 4 mA	4.5	—	0.17	0.26	—	0.33
			I _{OL} = 5.2 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 µA

AC Characteristics (C_L = 15 pF, V_{CC} = 5 V, Ta = 25°C, input: t_r = t_f = 6 ns)

Characteristics	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	ns
Propagation delay time (SELECT-Y, $\bar{Y}$)	t _{pLH} t _{pHL}	—	—	13	21	ns
Propagation delay time (STOROE -Y, $\bar{Y}$)	t _{pLH} t _{pHL}	—	—	10	19	ns

AC Characteristics (C_L = 50 pF, input: t_r = t_f = 6 ns)

Characteristics	Symbol	Test Condition	V _{CC} (V)	Ta = 25°C			Ta = -40 to 85°C		Unit
				Min	Typ.	Max	Min	Max	
Output transition time	t _{TLH} t _{THL}	—	2.0	—	30	75	—	95	ns
			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	ns
			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	ns
			4.5	—	16	25	—	31	
			6.0	—	14	21	—	26	
Propagation delay time ($\overline{\text{STOROB}}\text{-Y}$, $\bar{Y}$)	t _{pLH} t _{pHL}	—	2.0	—	36	115	—	145	ns
			4.5	—	12	23	—	29	
			6.0	—	10	20	—	25	
Input capacitance	C _{IN}	—	—	5	10	—	10	—	pF
Power dissipation capacitance	C _{PD} (Note)	TC74HC157A	—	57	—	—	—	—	pF
		TC74HC158A	—	53	—	—	—	—	

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

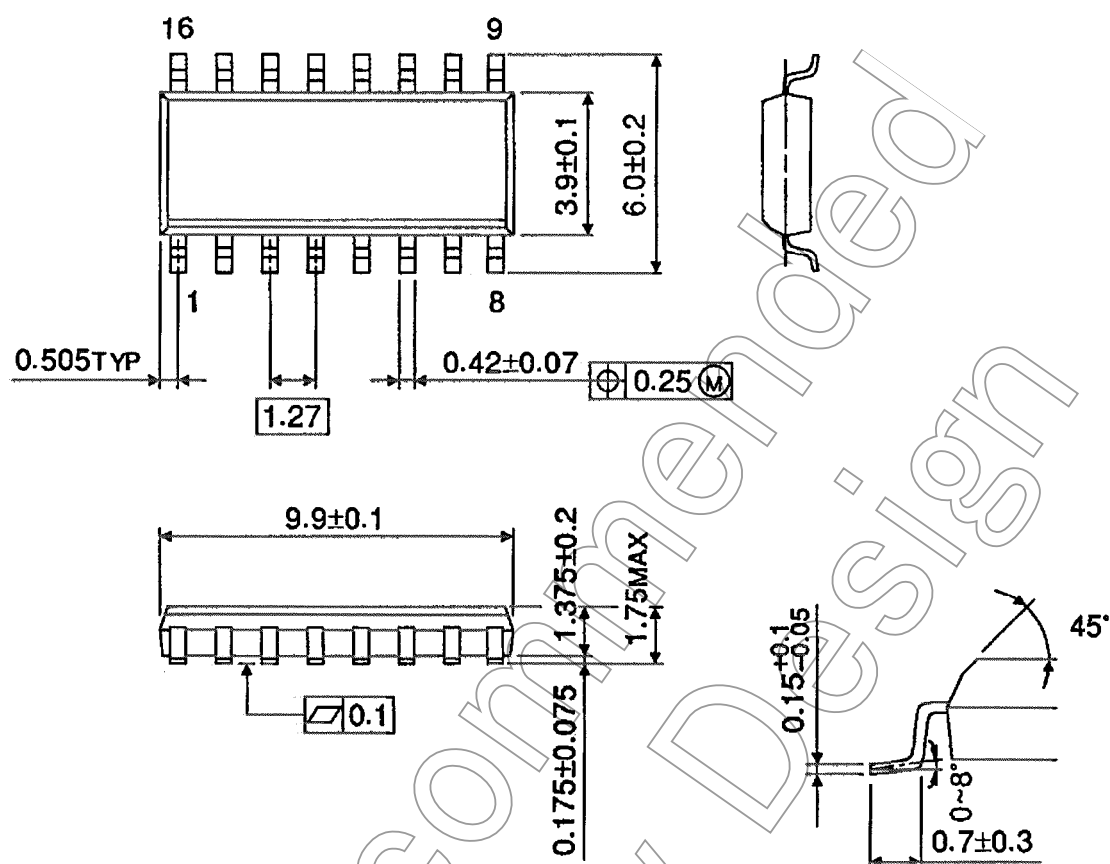
Average operating current can be obtained by the equation:

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

Package Dimensions (Note)

SOL16-P-150-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.13 g (typ.)

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