

TC74HCT157AFN

Quad 2-Channel Multiplexer

The TC74HCT157A is a high speed CMOS 2-CHANNEL MULTIPLEXERS fabricated with silicon gate C²MOS technology.

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

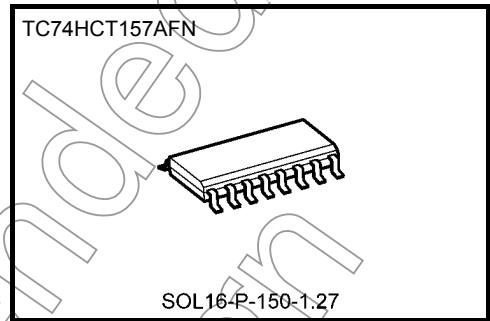
This device may be used as a level converter for interfacing TTL or NMOS to High Speed CMOS. The inputs are compatible with TTL, NMOS and CMOS output voltage levels.

When **STROBE** is held high, selection of data is inhibited and all the outputs become low.

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

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

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

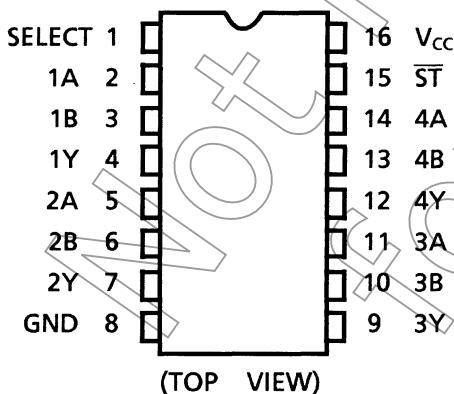


Weight SOL16-P-150-1.27 : 0.13 g (typ.)

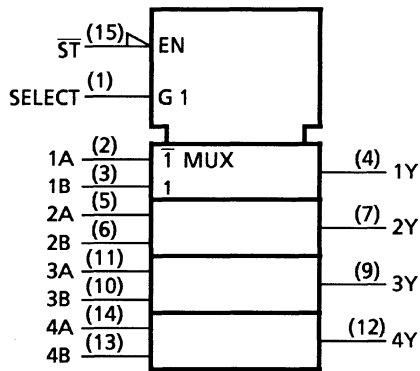
Features

- High speed: $t_{pd} = 21 \text{ ns (typ.)}$ at $V_{CC} = 5 \text{ V}$
- Low power dissipation: $I_{CC} = 4 \mu\text{A (max)}$ at $T_a = 25^\circ\text{C}$
- Compatible with TTL outputs: $V_{IH} = 2.0 \text{ V (min)}$
 $V_{IL} = 0.8 \text{ V (max)}$
- Wide interfacing ability: LSTTL, NMOS, CMOS
- Output drive capability: 10 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 4 \text{ mA (min)}$
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Pin and function compatible with 74LS157

Pin Assignment



IEC Logic Symbol



Truth Table

Inputs				Output
\overline{ST}	SELECT	A	B	
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

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	$^{\circ}C$

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}	4.5 to 5.5	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 500	ns

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

Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition	$T_a = 25^\circ\text{C}$			$T_a = -40 \text{ to } 85^\circ\text{C}$		Unit	
			V_{CC} (V)	Min	Typ.	Max	Min		Max
High-level input voltage	V_{IH}	—	4.5 to 5.5	2.0	—	—	2.0	—	V
Low-level input voltage	V_{IL}	—	4.5 to 5.5	—	—	0.8	—	0.8	V
High-level output voltage	V_{OH}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OH} = -20 \mu\text{A}$	4.5	4.4	4.5	—	4.4	—	V
			4.5	4.18	4.31	—	4.13	—	
Low-level output voltage	V_{OL}	$V_{IN} = V_{IH} \text{ or } V_{IL}$ $I_{OL} = 20 \mu\text{A}$	4.5	—	0.0	0.1	—	0.1	V
			4.5	—	0.17	0.26	—	0.33	
Input leakage current	I_{IN}	$V_{IN} = V_{CC} \text{ or } GND$	5.5	—	—	± 0.1	—	± 1.0	μA
Quiescent supply current	I_{CC}	$V_{IN} = V_{CC} \text{ or } GND$	5.5	—	—	4.0	—	40.0	μA
	I_C	Per input: $V_{IN} = 0.5 \text{ V or } 2.4 \text{ V}$ Other input: $V_{CC} \text{ or } GND$	5.5	—	—	2.0	—	2.9	mA

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

Characteristics	Symbol	Test Condition	Min	Typ.	Max	Unit
Output transition time	t_{TCH} t_{THL}	—	—	4	8	ns
Propagation delay time (A, B-Y)	t_{pLH} t_{pHL}	—	—	19	30	ns
Propagation delay time (STROBE -Y)	t_{pLH} t_{pHL}	—	—	19	30	ns
Propagation delay time (SELECT-Y)	t_{pLH} t_{pHL}	—	—	21	32	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}	—	4.5	—	8	15	—	19	ns
	t _{THL}		5.5	—	7	14	—	18	
Propagation delay time (A, B-Y)	t _{pLH}	—	4.5	—	23	35	—	44	ns
	t _{pHL}		5.5	—	20	32	—	40	
Propagation delay time ($\overline{\text{STROBE}}$ -Y)	t _{pLH}	—	4.5	—	23	35	—	44	ns
	t _{pHL}		5.5	—	20	32	—	40	
Propagation delay time (SELECT-Y)	t _{pLH}	—	4.5	—	25	37	—	46	ns
	t _{pHL}		5.5	—	21	34	—	42	
Input capacitance	C _{IN}	—			5	10		10	pF
Power dissipation capacitance	C _{PD} (Note)	—			59				pF

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:

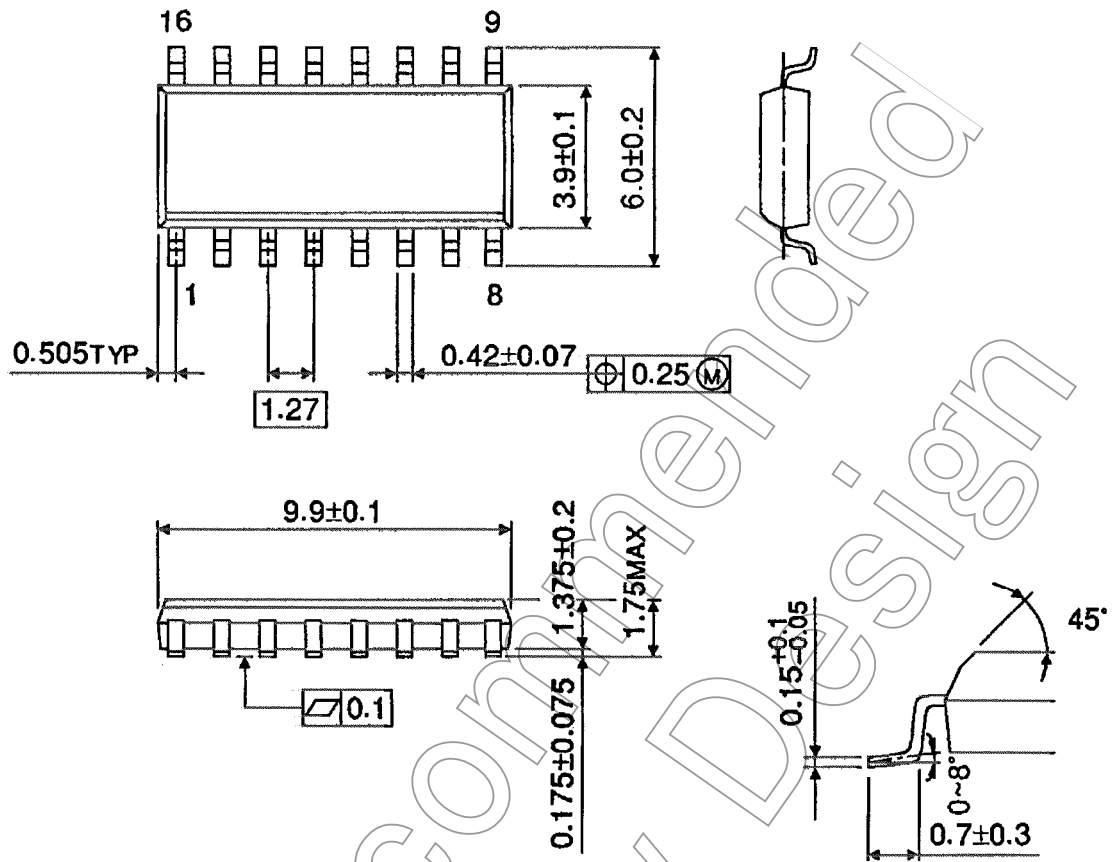
$$I_{CC}(\text{opr}) = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/4 \text{ (per bit)}$$

Not Recommended for New Designs

Package Dimensions (Note)

SOL16-P-150-1.27

Unit : mm



Note: This package is not available in Japan.

Weight: 0.13 g (typ.)

Not Recommended for New Design

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