

TC74HC257AFN

Quad 2-Channel Multiplexer (3-state)

The TC74HC257A is high speed CMOS MULTIPLEXER fabricated with silicon gate C²MOS technology.

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

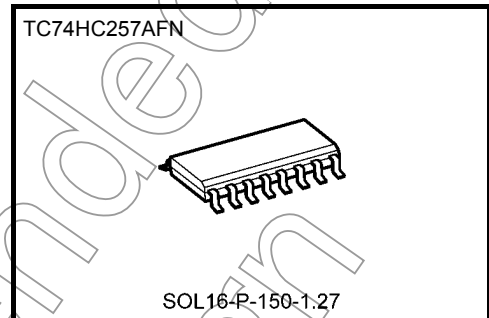
It is composed of four independent 2-channel multiplexers with common SELECT and OUTPUT ENABLE (OE).

If OE is set low, the outputs are held in a high-impedance state. When SELECT is set low, "A" data inputs are enabled.

Conversely, when SELECT is high, "B" data inputs are enabled.

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

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

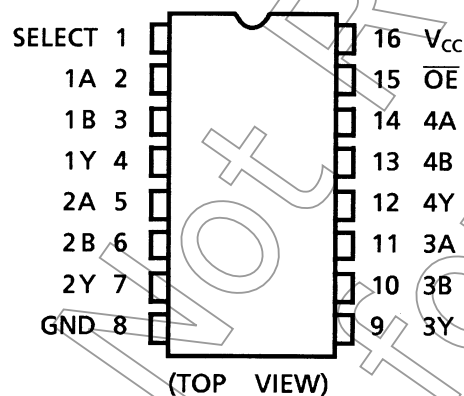


Weight
SOL16-P-150-1.27 : 0.13 g (typ.)

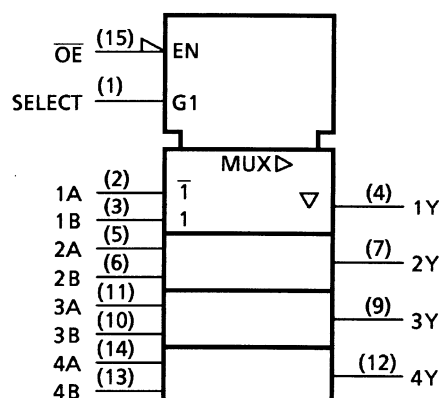
Features

- High speed: $t_{pd} = 10 \text{ ns}$ (typ.) at $V_{CC} = 5 \text{ V}$
- Low power dissipation: $I_{CC} = 4 \mu\text{A}$ (max) at $T_a = 25^\circ\text{C}$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Output drive capability: 15 LSTTL loads
- Symmetrical output impedance: $|I_{OH}| = I_{OL} = 6 \text{ mA}$ (min)
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: $V_{CC}(\text{opr}) = 2 \sim 6 \text{ V}$
- Pin and function compatible with 74LS257

Pin Assignment



IEC Logic Symbol



Truth Table

Inputs				Output
$\overline{OE}$	SELECT	A	B	Y
H	X	X	X	Z
L	L	L	X	L
L	L	H	X	H
L	H	X	L	L
L	H	X	H	H

X: Don't care

Z: High impedance

Absolute Maximum Ratings (Note)

Characteristics	Symbol	Rating	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}	± 35	mA
DC V_{CC} /ground current	I_{CC}	± 75	mA
Power dissipation	P_D	180	mW
Storage temperature	T_{stg}	-65~150	°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}	2~6	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 ($V_{CC} = 2.0$ V) 0~500 ($V_{CC} = 4.5$ V) 0~400 ($V_{CC} = 6.0$ V)	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		Ta = 25°C			Ta = -40~85°C		Unit	
				VCC (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	— — —	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} = -6 mA	4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 5.63	— —	
			I _{OH} = -7.8 mA	4.5 6.0	4.18 5.68	4.31 5.80	— —	4.13 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	V
			I _{OL} = 6 mA	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
			I _{OL} = 7.8 mA	4.5 6.0	— —	0.17 0.18	0.26 0.26	— —	0.33 0.33	
3-state off leak current	I _{OZ}	V _{IN} = V _{IH} or V _{IL} V _{OUT} = V _{CC} or GND		6.0	—	—	±0.5	—	±5.0	μA
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 (input: $t_r = t_f = 6 \text{ ns}$)

Characteristics	Symbol	Test Condition	Ta = 25°C			Ta = -40~85°C		Unit
			CL (pF)	VCC (V)	Min	Typ.	Max	
Output transition time	t_{TLH} t_{THL}	—	50	2.0	—	20	60	ns
				4.5	—	6	12	
				6.0	—	5	10	
Propagation delay time (A, B-Y, $\bar{Y}$)	t_{pLH} t_{pHL}	—	50	2.0	—	45	100	ns
				4.5	—	13	20	
				6.0	—	11	17	
			150	2.0	—	62	140	
				4.5	—	18	28	
				6.0	—	15	24	
Propagation delay time (SELECT-Y, $\bar{Y}$)	t_{pLH} t_{pHL}	—	50	2.0	—	45	100	ns
				4.5	—	13	20	
				6.0	—	11	17	
			150	2.0	—	62	140	
				4.5	—	18	28	
				6.0	—	15	24	
3-state output enable time	t_{pZL} t_{pZH}	$R_L = 1 \text{ k}\Omega$	50	2.0	—	40	110	ns
				4.5	—	12	22	
				6.0	—	10	19	
			150	2.0	—	57	150	
				4.5	—	17	30	
				6.0	—	14	26	
3-state output disable time	t_{pLZ} t_{pHZ}	$R_L = 1 \text{ k}\Omega$	50	2.0	—	28	140	ns
				4.5	—	14	28	
				6.0	—	13	24	
Input capacitance	C_{IN}	—	—	—	—	5	10	pF
Output capacitance	C_{OUT}	—	—	—	—	10	—	pF
Power dissipation capacitance	C_{PD} (Note)	—	—	—	—	47	—	pF

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

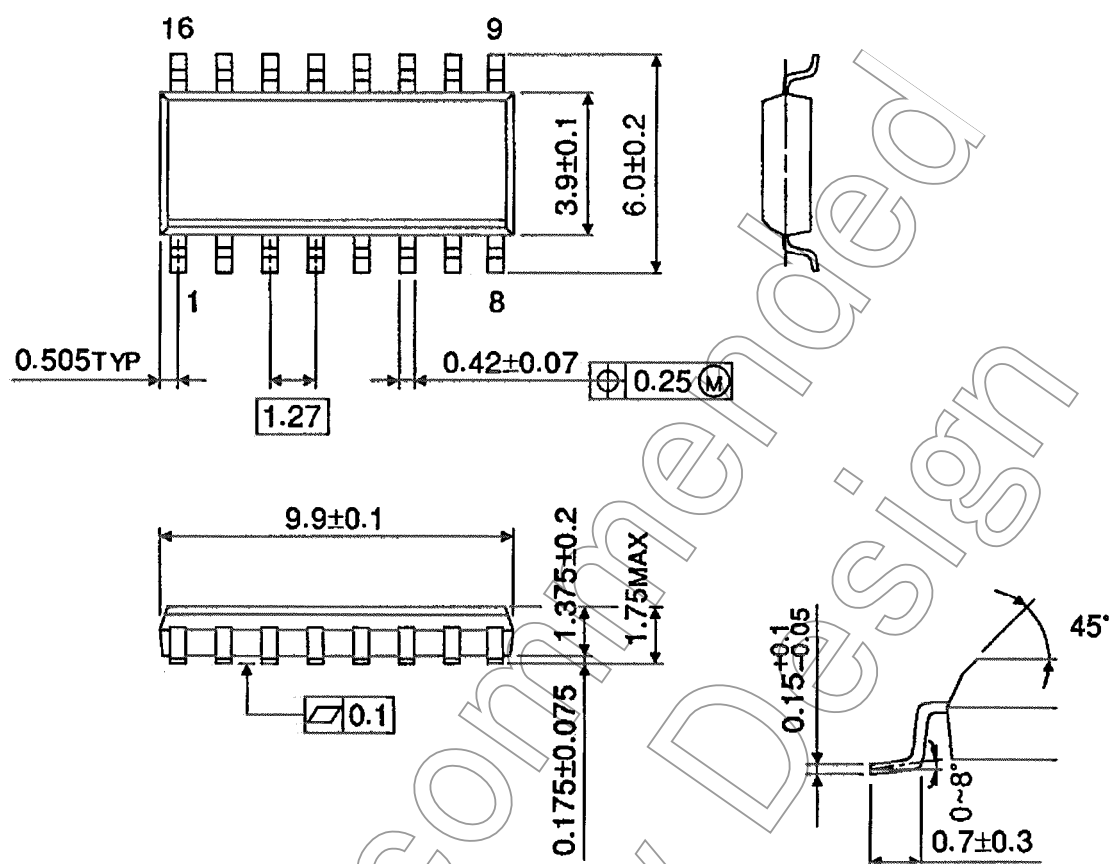
Average operating current can be obtained by the equation:

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

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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