TOSHIBA CMOS Digital Integrated Circuit Silicon Monolithic

TC74ACT157FN

Quad 2-Channel Multiplexer

The TC74ACT157 is an advanced high speed CMOS QUAD 2-CHANNEL MULTIPLEXER fabricated with silicon gate and double-layer metal wiring C²MOS technology.

It achieves the high speed operation similar to equivalent Bipolar Schottky TTL 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 levles.

This device consist of four 2-input digital multiplexer with common select and strobe inputs.

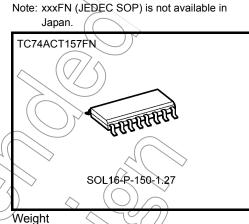
When the \overline{ST} input is held "H" level, selection of data is inhibited and all the outputs become "L" level.

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

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

Features

- High speed: $t_{pd} = 5.1$ ns (typ.) at $V_{CC} = 5/V$
- Low power dissipation: $I_{CC} = 8 \mu A \text{ (max) at Ta} = 25^{\circ}C$
- Compatible with TTL outputs: $V_{IL} = 0.8 \text{ V (max)}$ $V_{IH} = 2.0 \text{ V (min)}$
- Symmetrical output impedance: | IOH | = IOL = 24 mA (min) | Capability of driving 50 Ω | transmission lines.
- Balanced propagation delays: tpLH ≈ tpHL
- Pin and function compatible with 74F157



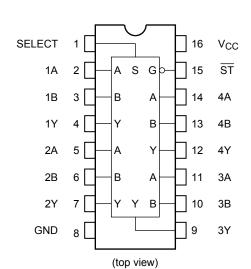
SOL16-P-150-1.27

: 0.13 g (typ.)

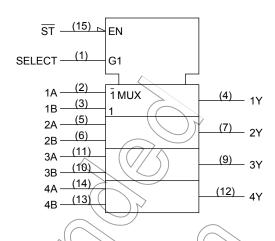


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Pin Assignment



IEC Logic Symbol



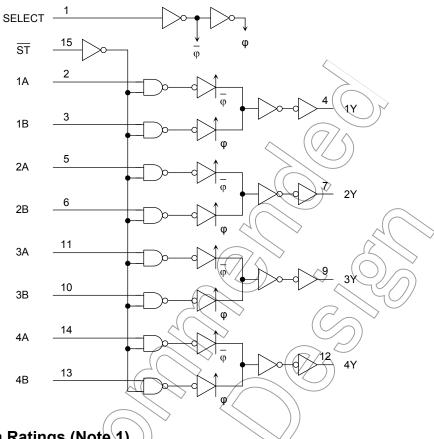
Truth Table

	Inputs	Output		
ST	SELECT	АВ		Υ
Н	Х	Х	Х	L
L	L	L	Х	L
L	L	Н	Х	н <
L	Н	Х	L	L
L	Н	Х	Н	н





System Diagram



Absolute Maximum	Ratings	(Note	1)
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Characteristics	Symbol	Rating	Unit
Supply voltage range	Vcc	-0.5 to 7.0	V
DC input voltage	() y _{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	lok	±50	mA
DC output current	lout	±50	mA
DC V _{CC} /ground current	lçe,	±100	mA
Power dissipation	(RD	180	mW
Storage temperature	T _{stg}	−65 to 150	°C

Note 1: Exceeding any of the absolute maximum ratings, even briefly, lead to deterioration in IC performance or even destruction.

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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	ာို င
Input rise and fall time	dt/dV	0 to 10	ns/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.

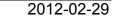
Electrical Characteristics

DC Characteristics

Characteristics	Symbol	Test Condition Ta = 25°C					-40 to	- Unit			
Characteristics	Symbol				\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\	Min	Тур.	Max	Min	Max	Offic
High-level input voltage	V _{IH}		- <		4.5 to 5.5	2.0	-((/\[(\)\[(\)\]	2.0	ı	٧
Low-level input voltage	V _{IL}		-		4.5 to 5.5			0.8	ı	0.8	V
High-level output voltage	Voн	V _{IN} = V _{IH} or V _{IL}	$I_{OH} = -50 \mu A$ $I_{OH} = -24 mA$ $I_{OH} = -75 mA$	(Note)	4.5 4.5 5.5	4.4 3.94	4:5	_ _ _	4.4 3.80 3.85		V
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	IOH = 50 µA IOH = 24 mA IOH = 75 mA	(Note)	4.5 4.5 5.5	\ \ \ \ \	0.0 — —	0.1 0.36 —	1 1 1	0.1 0.44 1.65	٧
Input leakage current	TIN (V _{IN} = V _C	C or GND		5.5	ı	ı	±0.1	ı	±1.0	μΑ
	// lcc/	V _{IN} = V _C	C or GND	$\langle \langle \rangle \rangle$	5.5	_	_	8.0	_	80.0	μΑ
Quiescent supply current	IC		: V _{IN} = 3.4 V ut: V _{CC} or GND	<u></u>	5.5	_	_	1.35		1.5	mA

Note: This spec indicates the capability of driving 50 Ω transmission lines.

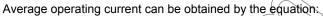
One output should be tested at a time for a 10 ms maximum duration.

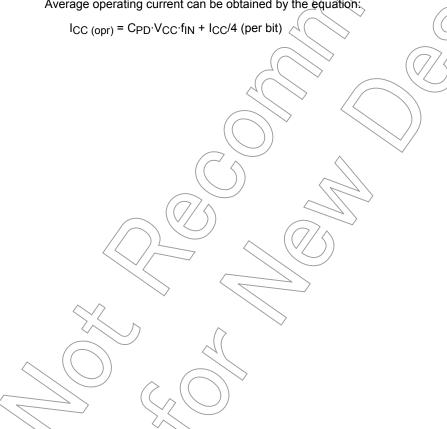


AC Characteristics (C_L = 50 pF, R_L = 500 Ω , input: t_r = t_f = 3 ns)

Characteristics	Symbol	Test Condition		Ta = 25°C			Ta = -40 to 85°C		Unit
	, , , ,		V _{CC} (V)	Min	Тур.	Max	Min	Max	
Propagation delay time (A, B-Y)	t _{pLH}	-	5.0 ± 0.5	_	5.5 <	8.0	1.0	9.1	ns
Propagation delay time (SELECT-Y)	t _{pLH}	_	5.0 ± 0.5	_	6.9	11.4)71.0	13.0	ns
Propagation delay time (ST -Y)	t _{pLH}	_	5.0 ± 0.5	_	6.8	10.8	1.0	12.3	ns
Input capacitance	C _{IN}	_		-(5)	10	_	10	pF
Power dissipation capacitance	C _{PD} (Note)	_	<		51	_		\ <u>\</u>	pF

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

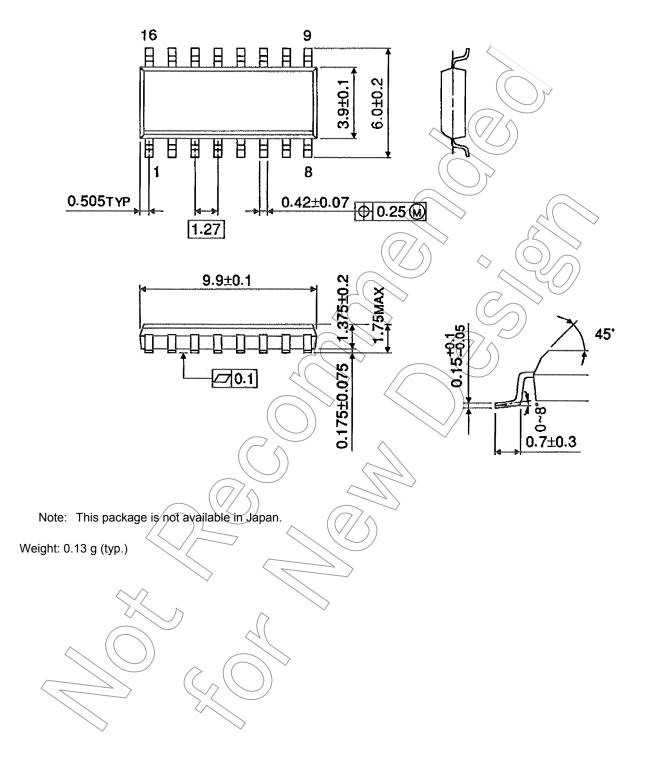




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Package Dimensions (Note)

SOL16-P-150-1.27 Unit: mm



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