

TC74AC153FN

Dual 4-Channel Multiplexer

The TC74AC153 is an advanced high speed CMOS DUAL 4-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.

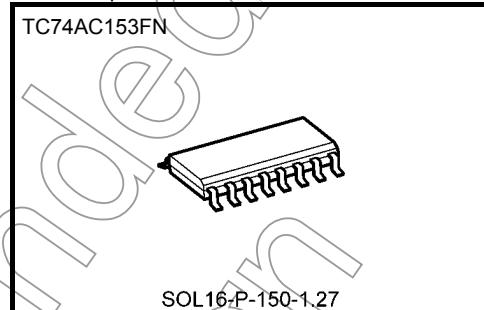
Each of these data (1C0-1C3, 2C0-2C3) is selected by the two address inputs A and B.

Separate strobe inputs (1 \bar{G} , 2 \bar{G}) are provided for each of the two four-line sections.

The strobe input can be used to inhibit the data output; the output is fixed in low level unconditionally.

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

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

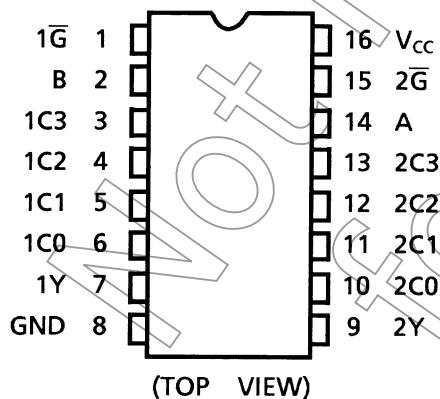


Weight
SOL16-P-150-1.27 : 0.13 g (typ.)

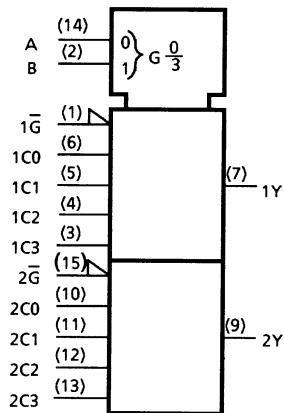
Features

- High speed: $t_{pd} = 3.9$ ns (typ.) at $V_{CC} = 5$ V
- Low power dissipation: $I_{CC} = 8 \mu A$ (max) at $T_a = 25^\circ C$
- High noise immunity: $V_{NIH} = V_{NIL} = 28\% V_{CC}$ (min)
- Symmetrical output impedance: $|I_{OH}| = |I_{OL}| = 24$ mA (min)
- Capability of driving 50 Ω transmission lines.
- Balanced propagation delays: $t_{pLH} \approx t_{pHL}$
- Wide operating voltage range: V_{CC} (opr) = 2 to 5.5 V
- Pin and function compatible with 74F153

Pin Assignment



IEC Logic Symbol

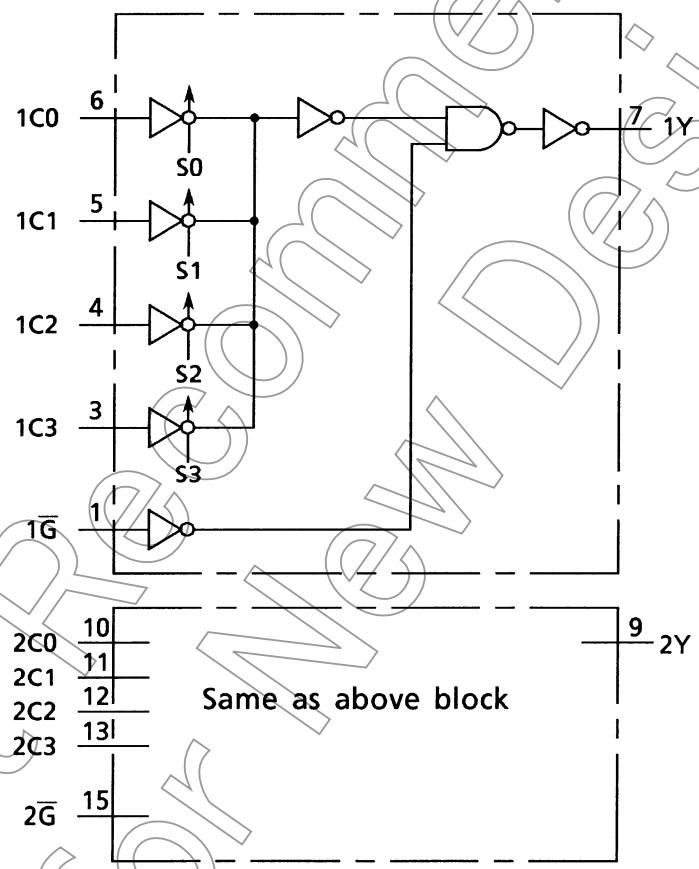
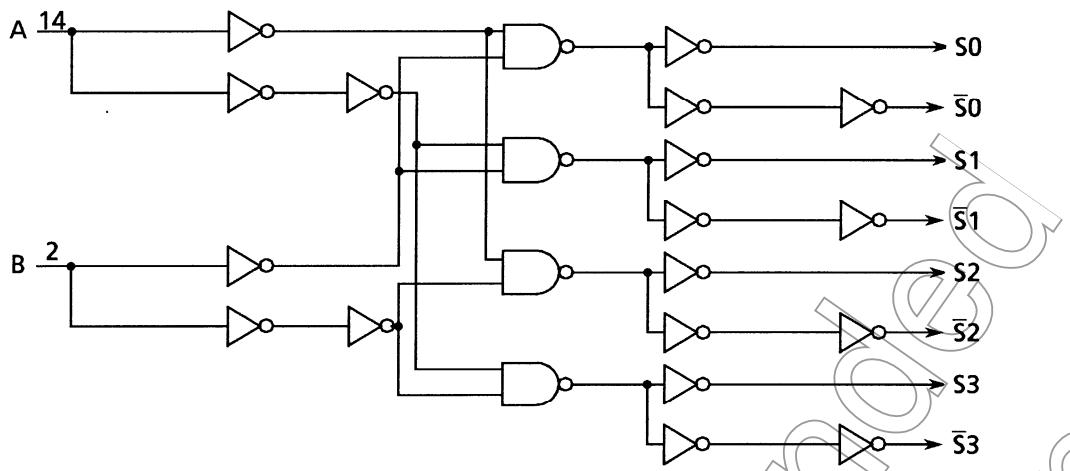


Truth Table

Select Inputs		Data Inputs				Strobe	Output
B	A	C0	C1	C2	C3	\bar{G}	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

X: Don't care

System Diagram



Absolute Maximum Ratings (Note 1)

Characteristics	Symbol	Rating	Unit
Supply voltage range	V_{CC}	-0.5 to 7.0	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}	± 50	mA
DC output current	I_{OUT}	± 50	mA
DC V_{CC} /ground current	I_{CC}	± 100	mA
Power dissipation	P_D	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.

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}	2.0 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	dt/dV	0 to 100 ($V_{CC} = 3.3 \pm 0.3$ V) 0 to 20 ($V_{CC} = 5 \pm 0.5$ V)	ns/V

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 to 85°C		Unit
				V _{CC} (V)	Min	Typ.	Max	Min	Max	
High-level input voltage	V _{IH}	—		2.0	1.50	—	—	1.50	—	V
				3.0	2.10	—	—	2.10	—	
				5.5	3.85	—	—	3.85	—	
Low-level input voltage	V _{IL}	—		2.0	—	—	0.50	—	0.50	V
				3.0	—	—	0.90	—	0.90	
				5.5	—	—	1.65	—	1.65	
High-level output voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -50 µA		2.0	1.9	2.0	—	1.9	V
			I _{OH} = -4 mA		3.0	2.9	3.0	—	2.9	
			I _{OH} = -24 mA		4.5	4.4	4.5	—	4.4	
		V _{IN} = V _{IH} or V _{IL}	I _{OH} = -75 mA (Note)		3.0	2.58	—	—	2.48	V
			I _{OH} = -4 mA		4.5	3.94	—	—	3.80	
			I _{OH} = -24 mA		5.5	—	—	—	3.85	
			I _{OH} = -75 mA (Note)		2.0	—	0.0	0.1	—	
Low-level output voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 50 µA		3.0	—	0.0	0.1	—	V
			I _{OL} = 12 mA		4.5	—	0.0	0.1	—	
			I _{OL} = 24 mA		5.5	—	0.0	0.1	—	
Input leakage current	I _{IN}	V _{IN} = V _{CC} or GND		5.5	—	—	—	±0.1	—	µA
		V _{IN} = V _{CC} or GND		5.5	—	—	—	8.0	—	
Quiescent supply current	I _{CC}			5.5	—	—	—	—	80.0	µA

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	Typ.	Max	Min		
Propagation delay time (C _n -Y)	t _{pLH} t _{pHL}	—		3.3 ± 0.3	—	7.6	14.5	1.0	16.5	ns
				5.0 ± 0.5	—	5.0	9.0	1.0	10.3	
Propagation delay time (A, B-Y)	t _{pLH} t _{pHL}	—		3.3 ± 0.3	—	10.5	20.5	1.0	23.4	ns
				5.0 ± 0.5	—	6.6	10.5	1.0	12.0	
Propagation delay time (G-Y)	t _{pLH} t _{pHL}	—		3.3 ± 0.3	—	6.8	13.3	1.0	15.2	ns
				5.0 ± 0.5	—	4.4	8.0	1.0	9.1	
Input capacitance	C _{IN}	—		—	5	10	—	10	pF	
Power dissipation capacitance	C _{PD} (Note)	—		—	54	—	—	—	pF	

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

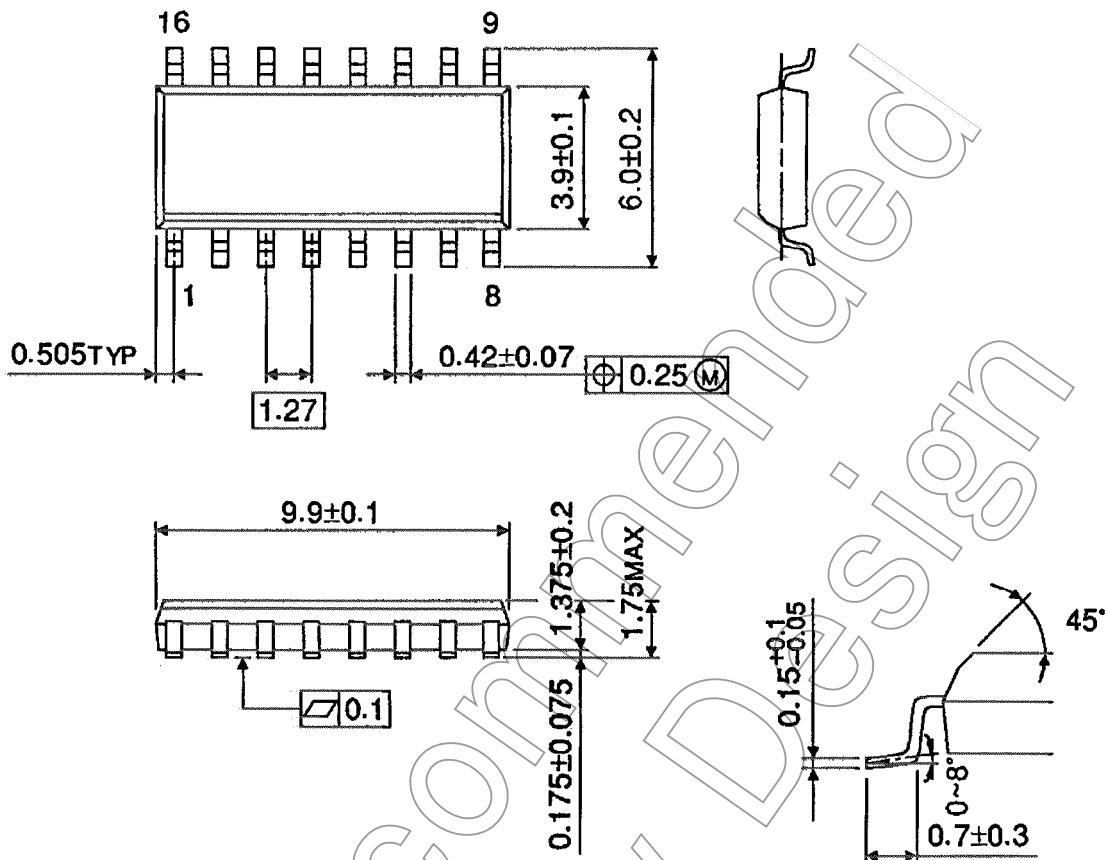
Average operating current can be obtained by the equation:

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

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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