

TOSHIBA CMOS DIGITAL INTEGRATED CIRCUIT SILICON MONOLITHIC

TC74HC251AP, TC74HC251AF

8 - CHANNEL MULTIPLEXER (3 - STATE)

The TC74HC251A is a high speed CMOS 8 - CHANNEL MULTIPLEXER fabricated with silicon gate C²MOS technology.

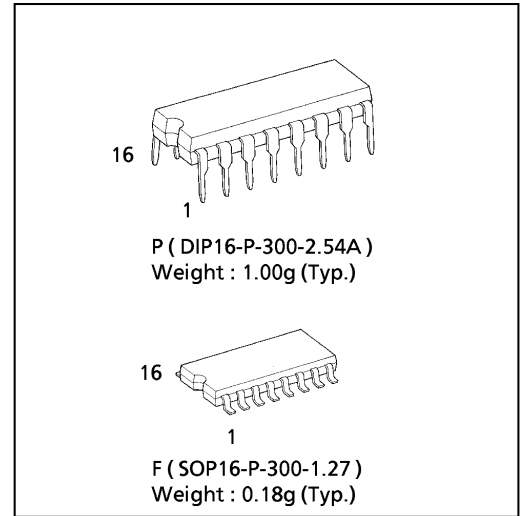
It achieves the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

One of eight data input signals (D0 - D7) is selected by decoding of the address input (A, B, C). The selected data appears on two outputs; non - inverting (Y) and inverting (W). When the strobe input is held high, both outputs are in the high-impedance state.

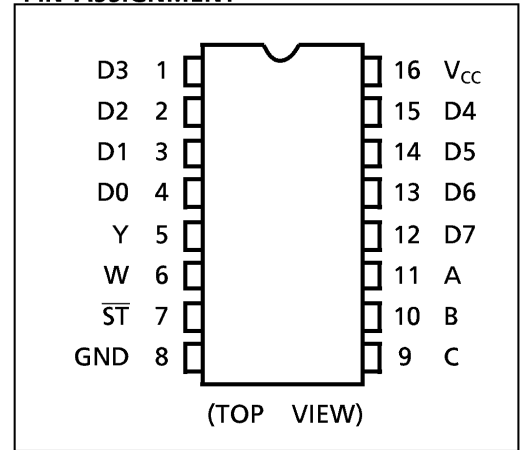
All inputs are equipped with protection circuits against static discharge or transient excess voltage.

FEATURES :

- High Speed..... $t_{pd} = 15\text{ns}(\text{typ.})$ at $V_{CC} = 5\text{V}$
- Low Power Dissipation..... $I_{CC} = 4\mu\text{A}(\text{Max.})$ 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... $|I_{OH}| = I_{OL} = 4\text{mA}(\text{Min.})$
- Balanced Propagation Delays..... $t_{pLH} \approx t_{pHL}$
- Wide Operating Voltage Range... $V_{CC}(\text{opr.}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS251



PIN ASSIGNMENT

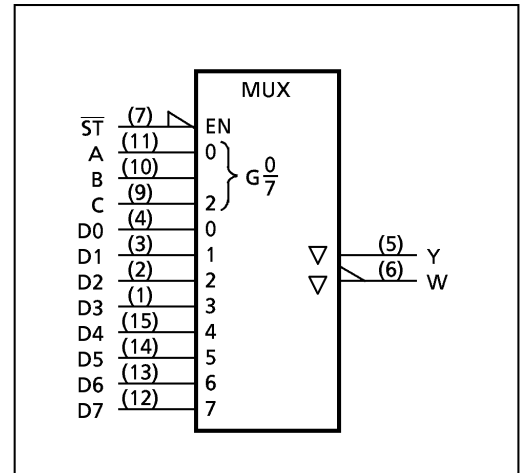


TRUTH TABLE

INPUTS				OUTPUTS	
SELECT			STROBE	Y	W
C	B	A	ST̄		
X	X	X	H	Z	Z
L	L	L	L	D0	D̄0
L	L	H	L	D1	D̄1
L	H	L	L	D2	D̄2
L	H	H	L	D3	D̄3
H	L	L	L	D4	D̄4
H	L	H	L	D5	D̄5
H	H	L	L	D6	D̄6
H	H	H	L	D7	D̄7

X : Don't Care H : High Impedance

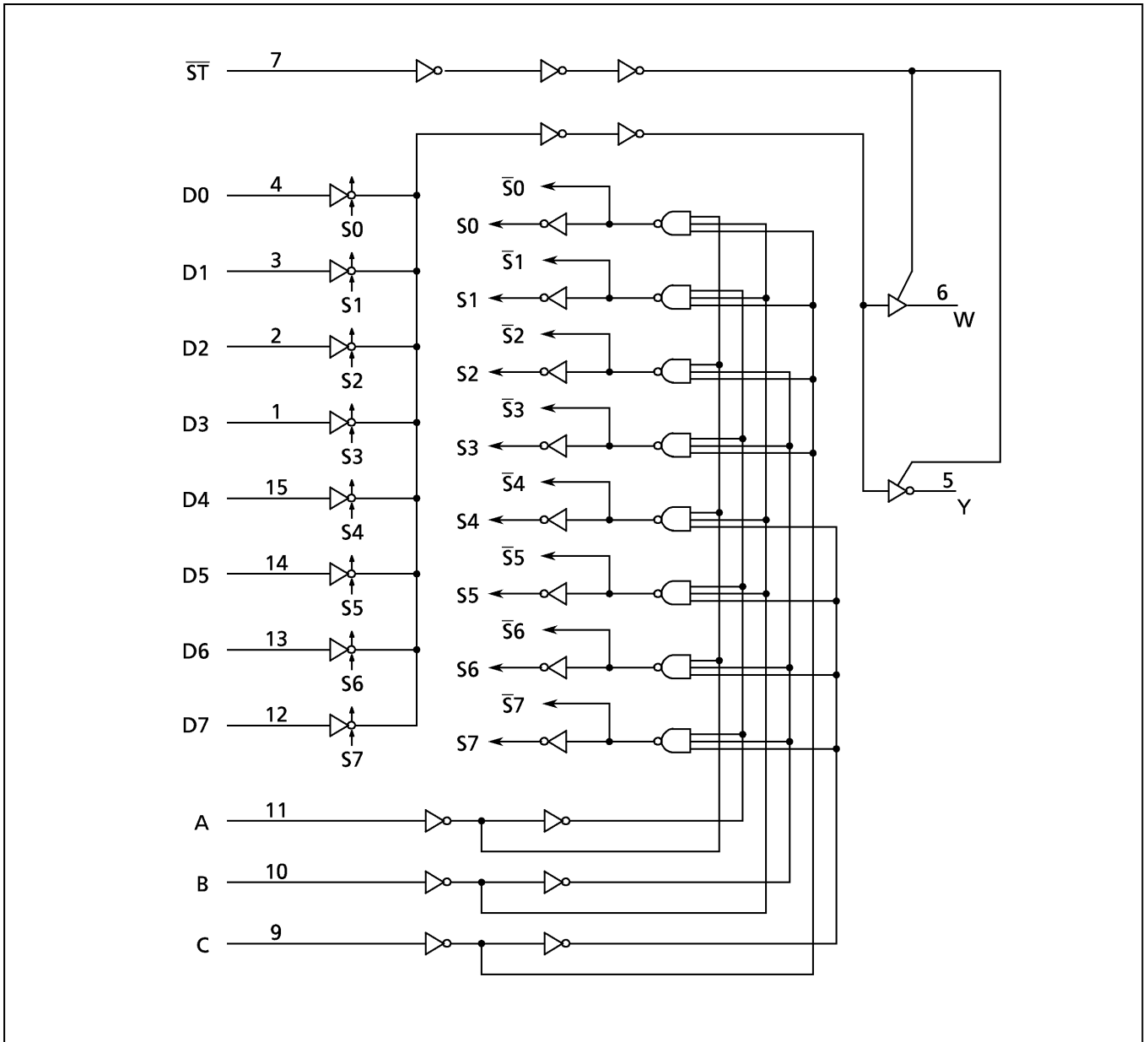
IEC LOGIC SYMBOL



980508EBA2

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SYSTEM DIAGRAM



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ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	VALUE	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}	± 25	mA
DC V_{CC} / Ground Current	I_{CC}	± 50	mA
Power Dissipation	P_D	500 (DIP)* / 180 (SOP)	mW
Storage Temperature	T_{stg}	-65~150	°C

*500mW in the range of $T_a = -40^\circ\text{C} \sim 65^\circ\text{C}$. From $T_a = 65^\circ\text{C}$ to 85°C a derating factor of $-10\text{mW}/^\circ\text{C}$ shall be applied until 300mW.

RECOMMENDED OPERATING CONDITIONS

PARAMETER	SYMBOL	VALUE	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 ($V_{CC} = 2.0\text{V}$) 0~500 ($V_{CC} = 4.5\text{V}$) 0~400 ($V_{CC} = 6.0\text{V}$)	ns

DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	TEST CONDITION	V_{CC} (V)	$T_a = 25^\circ\text{C}$			$T_a = -40 \sim 85^\circ\text{C}$		UNIT	
				MIN.	TYP.	MAX.	MIN.	MAX.		
High - Level Input Voltage	V_{IH}		2.0	1.50	—	—	1.50	—	V	
			4.5	3.15	—	—	3.15	—		
			6.0	4.20	—	—	4.20	—		
Low - Level Input Voltage	V_{IL}		2.0	—	—	0.50	—	0.50	V	
			4.5	—	—	1.35	—	1.35		
			6.0	—	—	1.80	—	1.80		
High - Level Output Voltage	V_{OH}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OH} = -20\mu\text{A}$	2.0	1.9	2.0	—	1.9	—	V
				4.5	4.4	4.5	—	4.4	—	
				6.0	5.9	6.0	—	5.9	—	
Low - Level Output Voltage	V_{OL}	$V_{IN} = V_{IH}$ or V_{IL}	$I_{OL} = 20\mu\text{A}$	2.0	—	0.0	0.1	—	0.1	V
				4.5	—	0.0	0.1	—	0.1	
				6.0	—	0.0	0.1	—	0.1	
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		
Quiescent Supply Current	I_{CC}	$V_{IN} = V_{CC}$ or GND	6.0	—	—	4.0	—	40.0		

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

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Transition Time	t_{TLH} t_{THL}		—	4	8	ns
Propagation Delay Time (D–Y)	t_{PLH} t_{PHL}		—	14	24	
Propagation Delay Time (D–W)	t_{PLH} t_{PHL}		—	15	24	
Propagation Delay Time (A, B, C–Y)	t_{PLH} t_{PHL}		—	19	31	
Propagation Delay Time (A, B, C–W)	t_{PLH} t_{PHL}		—	19	31	
3-State Output Enable Time	t_{pZL} t_{pZH}		—	10	18	

AC ELECTRICAL CHARACTERISTICS ($C_L = 50\text{pF}$, Input $t_r = t_f = 6\text{ns}$)

PARAMETER	SYMBOL	TEST CONDITION	$T_a = 25^\circ\text{C}$			$T_a = -40\sim 85^\circ\text{C}$		UNIT	
			V_{CC} (V)	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 (D–Y)	t_{pLH} t_{pHL}		2.0	—	65	140	—	175	
			4.5	—	17	28	—	35	
			6.0	—	14	24	—	30	
Propagation Delay Time (D–W)	t_{pLH} t_{pHL}		2.0	—	70	140	—	175	
			4.5	—	18	28	—	35	
			6.0	—	15	24	—	30	
Propagation Delay Time (A, B, C–Y)	t_{pLH} t_{pHL}		2.0	—	80	180	—	225	
			4.5	—	23	36	—	45	
			6.0	—	19	31	—	38	
Propagation Delay Time (A, B, C–W)	t_{pLH} t_{pHL}		2.0	—	80	180	—	225	
			4.5	—	23	36	—	45	
			6.0	—	19	31	—	38	
3-State Output Enable Time	t_{pZL} t_{pZH}		2.0	—	40	105	—	130	
			4.5	—	13	21	—	26	
			6.0	—	10	19	—	22	
3-State Output Disable Time	t_{pLZ} t_{pHZ}		2.0	—	25	105	—	130	
			4.5	—	13	21	—	26	
			6.0	—	11	19	—	22	
Input Capacitance	C_{IN}		—	5	10	—	10	pF	
Power Dissipation Capacitance	C_{PD} (1)		—	69	—	—	—		

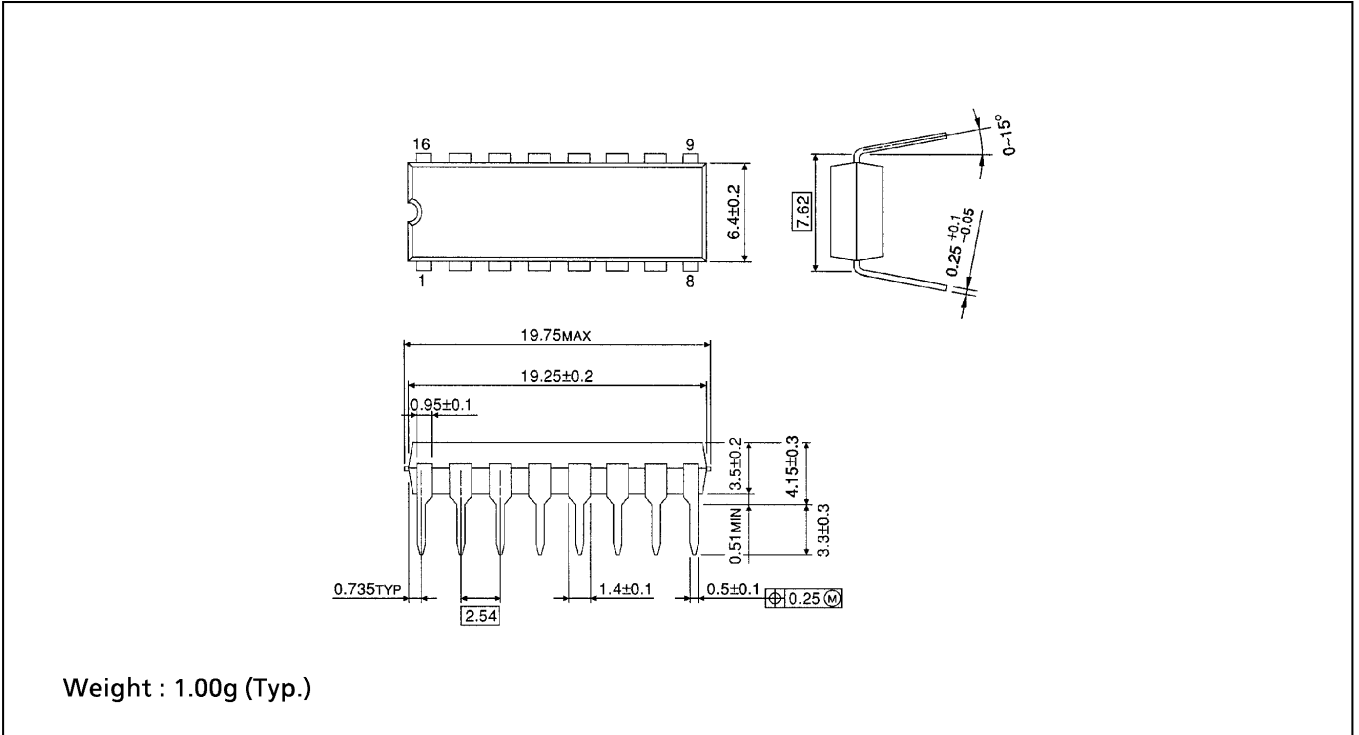
Note (1) C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load.

Average operating current can be obtained by the equation :

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

DIP 16PIN OUTLINE DRAWING (DIP16-P-300-2.54A)

Unit in mm



SOP 16PIN (200mil BODY) OUTLINE DRAWING (SOP16-P-300-1.27)

Unit in mm

