

TC74HC157AP/AF/AFN TC74HC158AP/AF/AFN

TC74HC157 Quad 2-Channel Multiplexer

TC74HC158 Quad 2-Channel Multiplexer (Inverting)

The TC74HC157A and TC74HC158A are high speed CMOS 2-CHANNEL MULTIPLEXERS fabricated with silicon gate C²MOS technology.

They achieve the high speed operation similar to equivalent LSTTL while maintaining the CMOS low power dissipation.

The TC74HC158A is an inverting multiplexer while the TC74HC157A is a non-inverting.

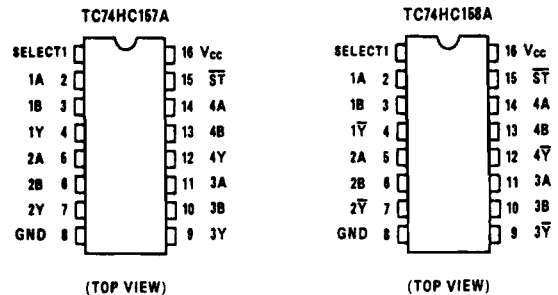
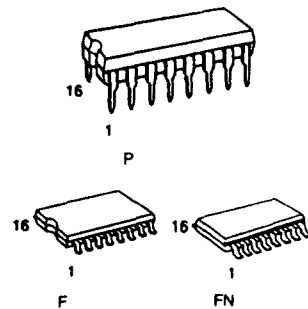
When STROBE is held high, selection of data is inhibited and all the outputs become low in the case of HC157A or high in the case of HC158A.

The SELECT decoding determines whether a A or B inputs get transferred to their corresponding Y (\bar{Y}) outputs.

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

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: 10 LSTTL Loads
- Symmetrical Output Impedance: $I_{OH} = I_{OL} = 4\text{mA}$ (Min.)
- Balanced Propagation Delays: $t_{pLH} = t_{pHL}$
- Wide Operating Voltage Range: $V_{CC}(\text{opr}) = 2\text{V} \sim 6\text{V}$
- Pin and Function Compatible with 74LS157/158

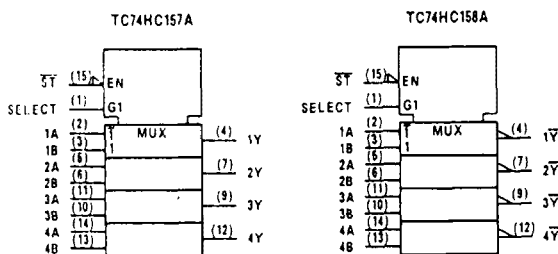


Pin Assignment

Truth Table

Inputs				Outputs	
ST	SELECT	A	B	Y(157A)	\bar{Y} (158A)
H	X	X	X	L	H
L	L	L	X	L	H
L	L	H	X	H	L
L	H	X	L	L	H
L	H	X	H	H	L

X: Don't Care



IEC Logic Symbol

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(MFP)	mW
Storage Temperature	T _{stg}	-65 ~ 150	°C
Lead Temperature 10sec	T _L	300	°C

*500mW in the range of Ta = -40°C ~ 65°C. From Ta = 65°C to 85°C a derating factor of -10mW/°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} = 2.0V) 0 ~ 500(V _{CC} = 4.5V) 0 ~ 400(V _{CC} = 6.0V)	ns

DC Electrical Characteristics

Parameter	Symbol	Test Condition	Ta = 25°C			Ta = -40 ~ 85°C		Unit		
			V _{CC}	Min.	Typ.	Max.	Min.		Max.	
High-Level Input Voltage	V _{IH}	-	2.0	1.5	-	-	1.5	-	V	
			4.5	3.15	-	-	3.15	-		
			6.0	4.2	-	-	4.2	-		
Low-Level Input Voltage	V _{IL}	-	2.0	-	-	0.5	-	0.5	V	
			4.5	-	-	1.35	-	1.35		
			6.0	-	-	1.8	-	1.8		
High-Level Output Voltage	V _{OH}	V _{IN} = V _{IH} or V _{IL}	I _{OH} = -20μA	2.0	1.9	2.0	-	1.9	-	V
				4.5	4.4	4.5	-	4.4	-	
			I _{OH} = -4 mA I _{OH} = -5.2mA	4.5	4.18	4.31	-	4.13	-	
				6.0	5.68	5.80	-	5.63	-	
Low-Level Output Voltage	V _{OL}	V _{IN} = V _{IH} or V _{IL}	I _{OL} = 20μA	2.0	-	0.0	0.1	-	0.1	V
				4.5	-	0.0	0.1	-	0.1	
			I _{OL} = 4 mA I _{OL} = 5.2mA	4.5	-	0.17	0.26	-	0.33	
				6.0	-	0.18	0.26	-	0.33	
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		

AC Electrical Characteristics ($C_L = 15\text{pF}$, $V_{CC} = 5\text{V}$, $T_a = 25^\circ\text{C}$)

Parameter	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Output Transition Time	t_{TLH} t_{THL}	–	–	4	8	ns
Propagation Delay Time (A, B-Y)	t_{PLH} t_{PHL}	–	–	10	16	
Propagation Delay Time (SELECT-Y)	t_{PLH} t_{PHL}	–	–	13	21	
Propagation Delay Time (STROBE-Y)	t_{PLH} t_{PHL}	–	–	10	19	

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}	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 (A, B-Y)	t_{PLH} t_{PHL}	–	2.0	–	36	100	–	125	
			4.5	–	12	20	–	25	
			6.0	–	10	17	–	21	
Propagation Delay Time (SELECT-Y)	t_{PLH} t_{PHL}	–	2.0	–	50	125	–	155	
			4.5	–	16	25	–	31	
			6.0	–	14	21	–	26	
Propagation Delay Time (STROBE-Y)	t_{PLH} t_{PHL}	–	2.0	–	36	115	–	145	
			4.5	–	12	23	–	29	
			6.0	–	10	20	–	25	
Input Capacitance	C_{IN}	–	–	5	10	–	10	pF	
Power Dissipation Capacitance	$C_{PD(1)}$	TC74HC157A	–	57	–	–	–		
		TC74HC158A	–	53	–	–	–		

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:

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

Notes