TC74HC257 2-Channel Multiplexer (3-State)
TC74HC258 2-Channel Multiplexer (3-State, Inverting)

The TC74HC257A and TC74HC258A are high speed CMOS MULTIPLEXERs fabricated with silicon gate C^2MOS technology.

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

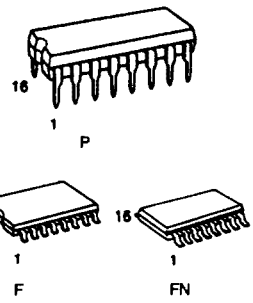
Each is composed of four independent 2-channel multiplexers with common SELECT and OUTPUT ENABLE ($\overline{OE}$).

The TC74HC257A is an inverting multiplexer, while the TC74HC258A is non-inverting.

If $\overline{OE}$ 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.



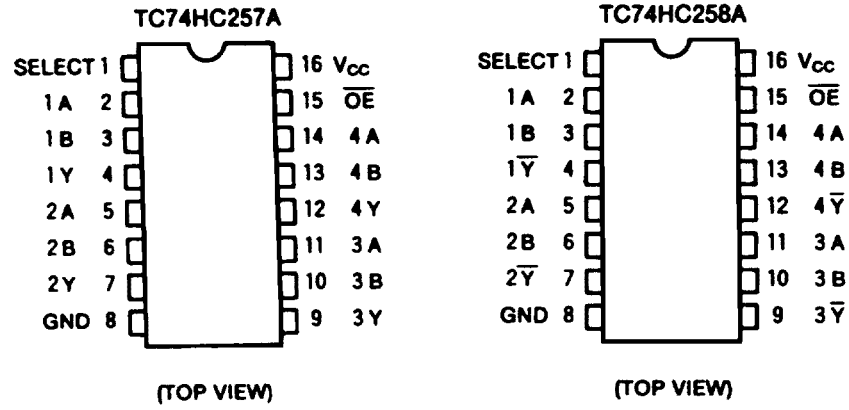
Features

- High Speed: t_{pd} = 10ns(Typ.) at V_{CC} = 5V
- Low Power Dissipation: I_{CC} = 4μA(Max.) at Ta = 25°C
- High Noise Immunity: $V_{NIH} = V_{NIL}$ = 28% V_{CC}(Min)
- Output Drive Capability: 15 LSTTL Loads
- Symmetrical Output Impedance: $|I_{OH}| = I_{OL}$ = 6mA(Min.)
- Balanced Propagation Delays: $t_{pLH} = t_{pHL}$
- Wide Operating Voltage Range: V_{CC}(opr) = 2V ~ 6V
- Pin and Function Compatible with 74LS257/258

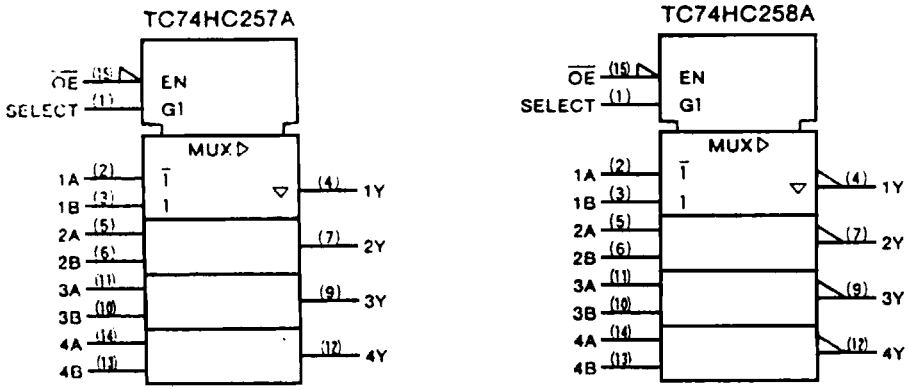
Truth Table

Inputs				Outputs	
$\overline{OE}$	SELECT	A	B	Y(257A)	Y(258A)
H	X	X	X	Z	Z
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
Z: High Impedance



Pin Assignment



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}	±35	mA
DC V_{CC}/Ground Current	I_{CC}	±75	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		V_{CC}	Ta = 25°C Min.	Ta = 25°C Typ.	Ta = 25°C Max.	Ta = -40 ~ 85°C Min.	Ta = -40 ~ 85°C Max.	Unit
High-Level Input Voltage	V_{IH}	–		2.0 4.5 6.0	1.5 3.15 4.2	– – –	– – –	1.5 3.15 4.2	– – –	V
Low-Level Input Voltage	V_{IL}	–		2.0 4.5 6.0	– – –	– – –	0.5 1.35 1.8	– – –	0.5 1.35 1.8	V
High-Level Output Voltage	V_{OH}	V_{IN} = V_{IH} or V_{IL}	I_{OH} = -20μA	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 I_{OH} = -7.7mA	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} = 20μA	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 I_{OL} = 7.8mA	4.5 6.0	– –	0.17 0.18	0.26 0.26	– –	0.33 0.33	
3-State Output Off-State 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 (Input $t_r = t_f = 6ns$)

Parameter	Symbol	Test Condition			Ta = 25°C			Ta = -40 ~ 85°C		Unit
			CL	V_{CC}	Min.	Typ.	Max.	Min.	Max.	
Output Transition Time	t_{TLH} t_{THL}	–	50	2.0	–	20	60	–	75	ns
				4.5	–	6	12	–	15	
				6.0	–	7	10	–	13	
Propagation Delay Time (A, B,-Y, $\overline{Y}$)	t_{pLH} t_{pHL}	–	50	2.0	–	45	100	–	125	
				4.5	–	13	20	–	25	
				6.0	–	11	17	–	21	
			150	2.0	–	62	140	–	175	
				4.5	–	18	28	–	35	
				6.0	–	15	24	–	30	
Propagation Delay Time (SELECT-Y, $\overline{Y}$)	t_{pLH} t_{pHL}	–	50	2.0	–	45	100	–	125	
				4.5	–	13	20	–	25	
				6.0	–	11	17	–	21	
			150	2.0	–	62	140	–	175	
				4.5	–	18	28	–	35	
				6.0	–	15	24	–	30	
3-State Output Enable Time	t_{pLZ} t_{pZH}	R_L = 1k Ω	50	2.0	–	40	110	–	140	
				4.5	–	12	22	–	28	
				6.0	–	10	19	–	24	
			150	2.0	–	57	150	–	190	
				4.5	–	17	30	–	38	
				6.0	–	14	26	–	33	
3-State Output Disable Time	t_{pLZ} t_{pHZ}	R_L = 1k Ω	50	2.0	–	28	140	–	175	
				4.5	–	14	28	–	35	
				6.0	–	13	24	–	30	
Input Capacitance	C_{IN}	–			–	5	10	–	10	pF
Output Capacitance	C_{OUT}	–			–	10	–	–	–	
Power Dissipation Capacitance Note (1)	C_{PD}	TC74HC257A			–	47	–	–	–	
		TC74HC258A			–	47	–	–	–	

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:

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

AC Electrical Characteristics (C_L = 50pF, Input $t_r = t_f$ = 6ns)

Parameter	Symbol	Test Condition		Ta = 25°C			Ta = -40 ~ 85°C		Unit
			V_{CC}	Min	Typ.	Max.	Min.	Max.	
Output Transition Time	t_{TLH} t_{THL}	–	2.0 4.5 6.0	– – –	20 7 6	60 12 10	– – –	75 15 13	ns
Propagation Delay Time	t_{pLH}	–	2.0 4.5 6.0	– – –	38 12 10	90 18 15	– – –	115 23 20	
	t_{pHL}		2.0 4.5 6.0	– – –	48 16 14	120 24 20	– – –	150 30 26	
3-State Output Enable Time	t_{pZL}	R_L = 1k Ω	2.0 4.5 6.0	– – –	48 16 14	150 30 26	– – –	190 38 32	
	t_{pZH}		2.0 4.5 6.0	– – –	63 21 18	180 36 31	– – –	225 45 38	
3-State Output Disable Time	t_{pLZ} t_{pHZ}	R_L = 1k Ω	2.0 4.5 6.0	– – –	37 17 15	150 30 26	– – –	190 38 32	
Input Capacitance	C_{IN}	DIR, G		–	5	10	–	10	pF
Bus Input Capacitance	C_{OUT}	An, Bn		–	13	–	–	–	
Power Dissipation Capacitance	C_{PD}(1)	TC74HC245A		–	39	–	–	–	
		TC74HC640A643A		–	37	–	–	–	

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:

$I_{CC(opr)} = C_{PD} \cdot V_{CC} \cdot f_{IN} + I_{CC}/8$(per bit)

Notes