

DESCRIPTION

The Schottky-clamped S54S157, S54S158, N74S157, and N74S158 are ultra-high-speed data selectors/multiplexers which can be employed in high-performance designs. These circuits select a 4-bit word from one of two sources and route it to the four outputs. The S54S157/N74S157 present true data whereas the S54S158/N74S158 present inverted data to minimize propagation delay time.

The S54S157/N74S157 can be used to replace the S54157/N74157 in existing designs to upgrade performance substantially.

The S54S157 and S54S158 are characterized for operation over the full military temperature range of -55°C to 125°C . The N74S157 and N74S158 are characterized for operation from 0°C to 70°C .

FEATURES

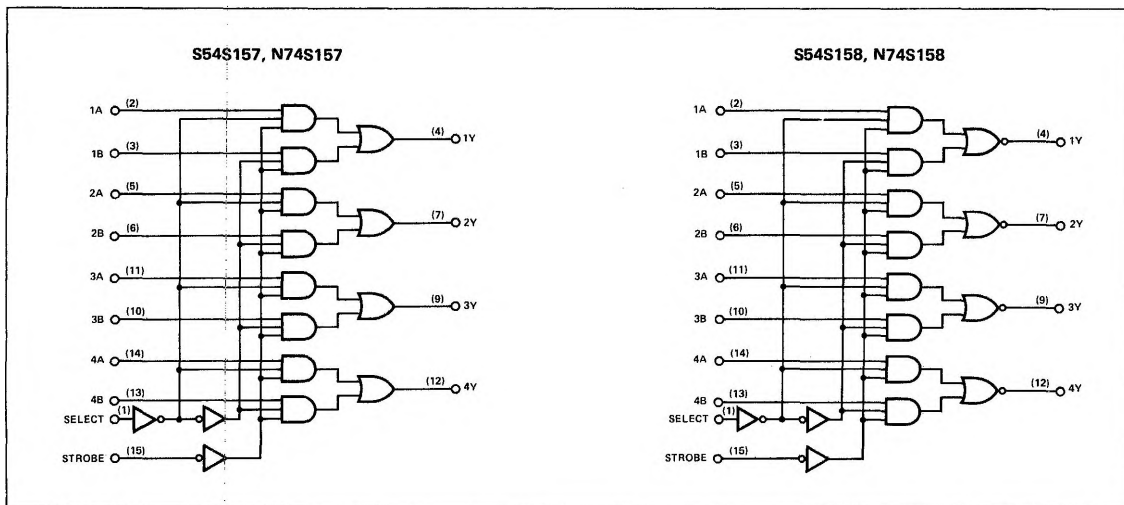
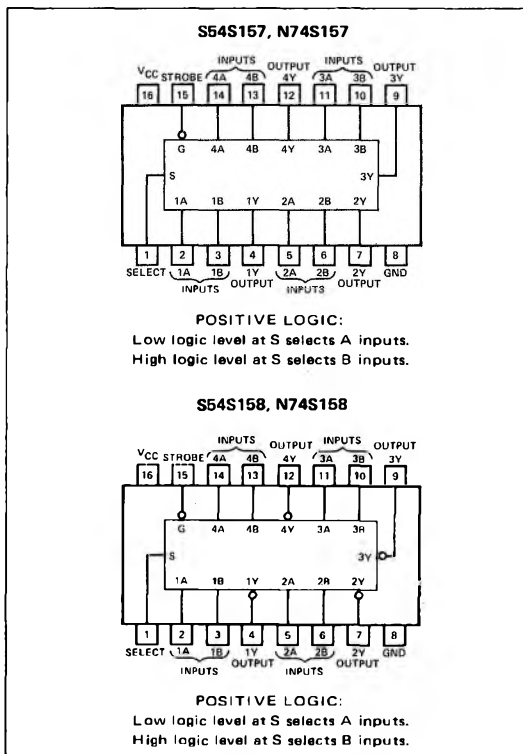
- SCHOTTKY-CLAMPING REDUCES DELAY TIME TO 4 ns TYPICAL (S54S158, N74S158 DATA-TO-OUTPUT)
- S54S157, N74S157 CAN UPGRADE EXISTING SYSTEM PERFORMANCE AS THEY ARE PIN-FOR-PIN REPLACEMENTS FOR S54157, N74157
- S54S157, S54S158 OPERATE THROUGHOUT -55°C TO 125°C FREE-AIR TEMPERATURE RANGE
- FULLY COMPATIBLE WITH MOST TTL AND TTL MSI CIRCUITS

FUNCTION TABLE

INPUTS			OUTPUT Y	
STROBE	SELECT	A B	S54S157 N74S157	S54S158 N74S158
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

H = high level, L = low level, X = irrelevant

PIN CONFIGURATION



RECOMMENDED OPERATING CONDITIONS

			S54S157, S54S158			N74S157, N74S158			UNIT
			MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V _{CC}			4.5	5	5.5	4.75	5	5.25	V
Normalized fan-out from each output, N	High logic level		20			20			
	Low logic level		10			10			
Operating free-air temperature, T _A			−55			0			70 °C

ELECTRICAL CHARACTERISTICS (over recommended operating free-air temperature range unless otherwise noted)

PARAMETER		TEST CONDITIONS*			S54S157 N74S157 MIN TYP** MAX		S54S158 N74S158 MIN TYP** MAX		UNIT
V _{IH} High-level input voltage					2		2		V
V _{IL} Low-level input voltage					0.8		0.8		V
V _I Input clamp voltage		V _{CC} = MIN I _I = −18 mA			−1.2		−1.2		V
V _{OH} High-level output voltage		V _{CC} = MIN, V _{IH} = 2 V		Series 54S	2.5 3.4		2.5 3.4		V
		V _{IL} = 0.8 V, I _{OH} = −1 mA		Series 74S	2.7 3.4		2.7 3.4		
V _{OL} Low-level output voltage		V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OL} = 20 mA			0.5		0.5		V
I _I Input current at maximum input voltage		V _{CC} = MAX, V _I = 5.5 V			1		1		mA
I _{IH} High-level input current	S or G input	V _{CC} = MAX, V _I = 2.7 V			100		100		μA
	A or B input				50		50		
I _{IL} Low-level input current	S or G input	V _{CC} = MAX, V _I = 0.5 V			−4		−4		mA
	A or B input				−2		−2		
I _{OS} Short-circuit output current†		V _{CC} = MAX			−40 −100		−40 −100		mA
I _{CC} Supply current		V _{CC} = MAX, See Note 1			50 78		39 61		mA

*For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions for the applicable device type.

**All typical values are at $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$.

†Not more than one output should be shorted at a time and duration of the short-circuit test should not exceed one second.

NOTE 1: I_{CC} is measured with 4.5 V applied to all inputs and all outputs open.

SWITCHING CHARACTERISTICS, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$, N = 10

PARAMETER	FROM (INPUT)	TEST CONDITIONS	S54S157, N74S157			S54S158, N74S158			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t _{PLH}	Data	C _L = 15 pF, R _L = 280 Ω, See Note 2	5	7.5		4	6	ns	
t _{PHL}			4.5	6.5		4	6		
t _{PLH}	Strobe		8.5	12.5		6.5	ns		
t _{PHL}			7.5	12		7			
t _{PLH}	Select		9.5	15		8	12	ns	
t _{PHL}			9.5	15		8	12		

t_{PLH} = Propagation delay time, low-to-high-level output

t_{PHL} = Propagation delay time, high-to-low-level output

NOTE 2: Load circuits and waveforms are shown on page 2-293