

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

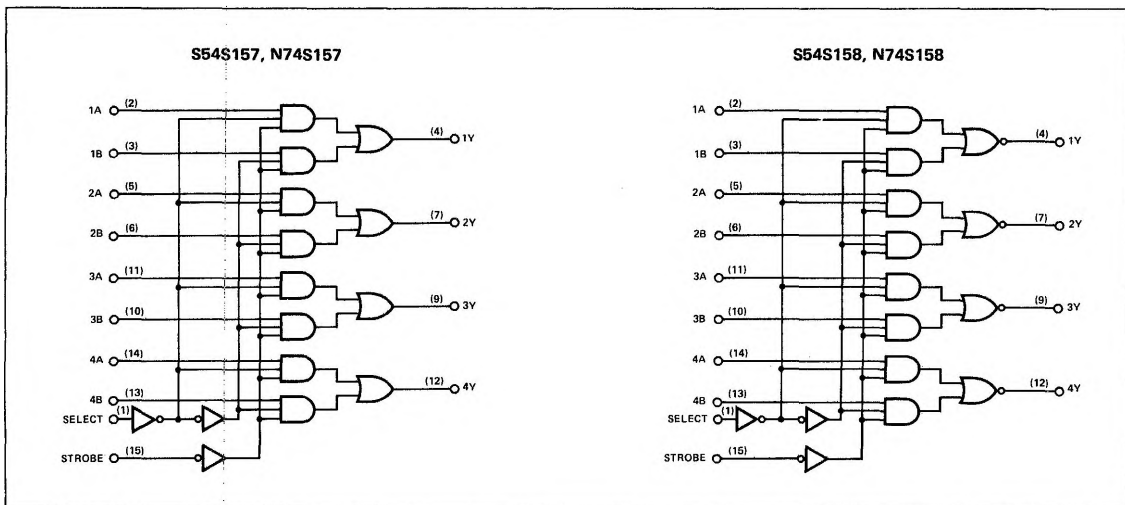
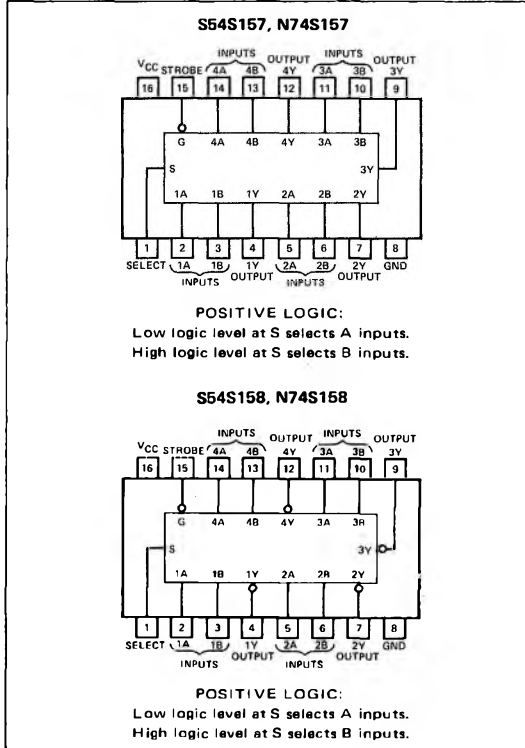
- SCHOTTKY-CLAMPING REDUCES DELAY TIME TO 4 ns TYPICAL (S54S158, N74S158 DATA-TO-OUTPUT)
- S54S157, N74S157 CAN UPGRADE EXISTING SYSTEM PERFORMANCE AS THEY ARE PIN-FOR-PIN REPLACEMENTS FOR S54157, N74157
- S54S157, S54S158 OPERATE THROUGHOUT -55°C TO 125°C FREE-AIR TEMPERATURE RANGE
- FULLY COMPATIBLE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



DIGITAL 54/74 TTL SERIES ■ S54157, S54158, N74157, N74S158

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		125	0		70	°C

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

PARAMETER	TEST CONDITIONS*	S54S157 N74S157		S54S158 N74S158		UNIT	
		MIN	TYP** MAX	MIN	TYP** MAX		
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	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$	-1.2		-1.2		V	
V_{OH} High-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$ $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -1 \text{ mA}$	Series 54S	2.5	3.4	2.5	3.4	V
		Series 74S	2.7	3.4	2.7	3.4	
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = 0.8 \text{ V}$, $I_{OL} = 20 \text{ mA}$	0.5		0.5		V	
I_I Input current at maximum input voltage	$V_{CC} = \text{MAX}$, $V_I = 5.5 \text{ V}$	1		1		mA	
I_{IH} High-level input current	S or G input	100		100		μA	
	A or B input	50		50			
I_{IL} Low-level input current	S or G input	-4		-4		mA	
	A or B input	-2		-2			
I_{OS} Short-circuit output current‡	$V_{CC} = \text{MAX}$	-40	-100	-40	-100	mA	
I_{CC} Supply current	$V_{CC} = \text{MAX}$, 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	$C_L = 15 \text{ pF}$, $R_L = 280 \Omega$, 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