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Jameco Part Number 49605TI

SDLS058

**SN54157, SN54LS157, SN54LS158, SN54S157, SN54S158,
SN74157, SN74LS157, SN74LS158, SN74S157, SN74S158**
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

MARCH 1974 — REVISED MARCH 1988

- Buffered Inputs and Outputs
- Three Speed/Power Ranges Available

TYPES	TYPICAL	TYPICAL	DISSIPATION
	AVERAGE	POWER	
	PROPAGATION	TIME	
'157	9 ns	150 mW	
'LS157	9 ns	49 mW	
'S157	5 ns	250 mW	
'LS158	7 ns	24 mW	
'S158	4 ns	195 mW	

applications

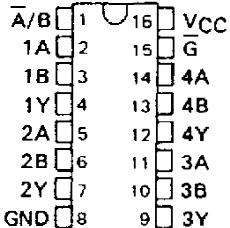
- Expand Any Data Input Point
- Multiplex Dual Data Buses
- Generate Four Functions of Two Variables (One Variable Is Common)
- Source Programmable Counters

description

These monolithic data selectors/multiplexers contain inverters and drivers to supply full on-chip data selection to the four output gates. A separate strobe input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The '157, 'LS157, and 'S157 present true data whereas the 'LS158 and 'S158 present inverted data to minimize propagation delay time.

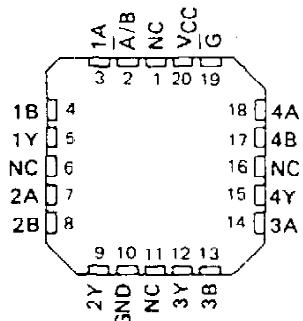
SN54157, SN54LS157, SN54S157,
SN54LS158, SN54S158 . . . J OR W PACKAGE
SN74157 . . . N PACKAGE
SN74LS157, SN74S157,
SN74LS158, SN74S158 . . . D OR N PACKAGE

(TOP VIEW)



SN54LS157, SN54S157, SN54LS158,
SN54S158 . . . FK PACKAGE

(TOP VIEW)



NC — No internal connection

FUNCTION TABLE

INPUTS			OUTPUT Y		
STROBE G	SELECT A/B	A	B	'157, 'LS157, 'S157	'LS158 'S158
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

absolute maximum ratings over operating free-air temperature range (unless otherwise noted)

Supply voltage, V _{CC} (See Note 1)	7 V
Input voltage: '157, 'S158	5.5 V
'LS157, 'LS158	7 V
Operating free-air temperature range: SN54'	-55°C to 125°C
SN74'	0°C to 70°C
Storage temperature range	-65°C to 150°C

NOTE 1: Voltage values are with respect to network ground terminal.

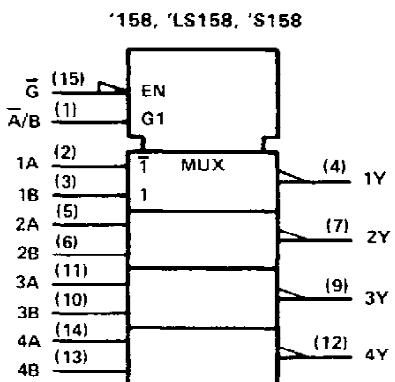
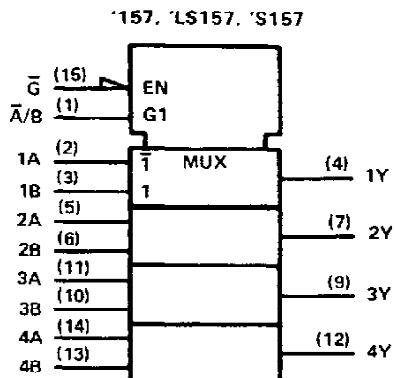
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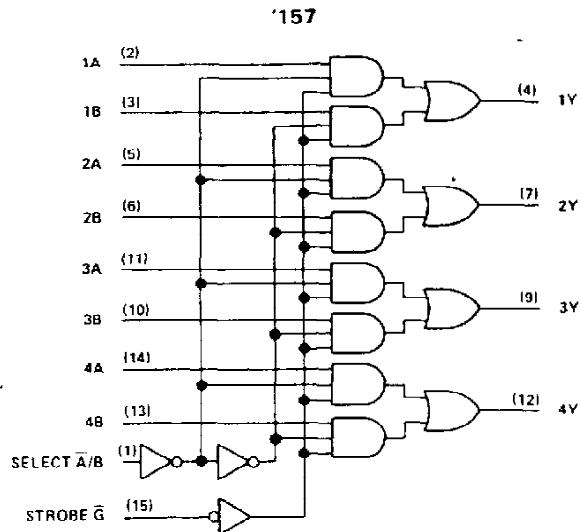
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**SN54157, SN54LS157, SN54LS158, SN54S157, SN54S158,
SN74157, SN74LS157, SN74LS158, SN74S157, SN74S158**
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

logic symbols[†]



logic diagram (positive logic)

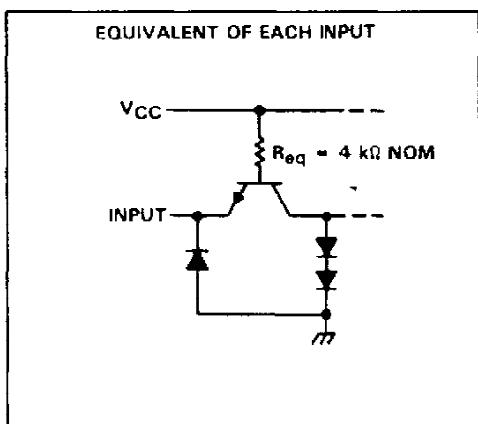


[†] These symbols are in accordance with ANSI/IEEE Std. 91-1984 and IEC Publication 617-12.

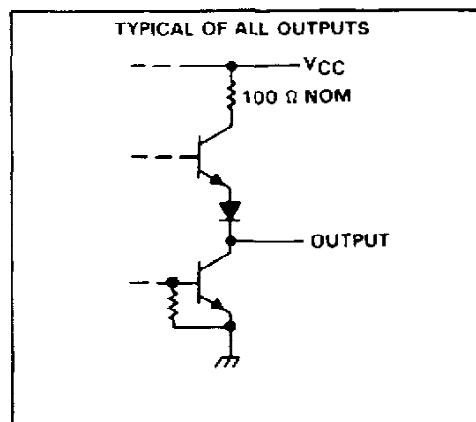
Pin numbers shown are for D, J, N, and W packages.

schematics of inputs and outputs

'157



'157

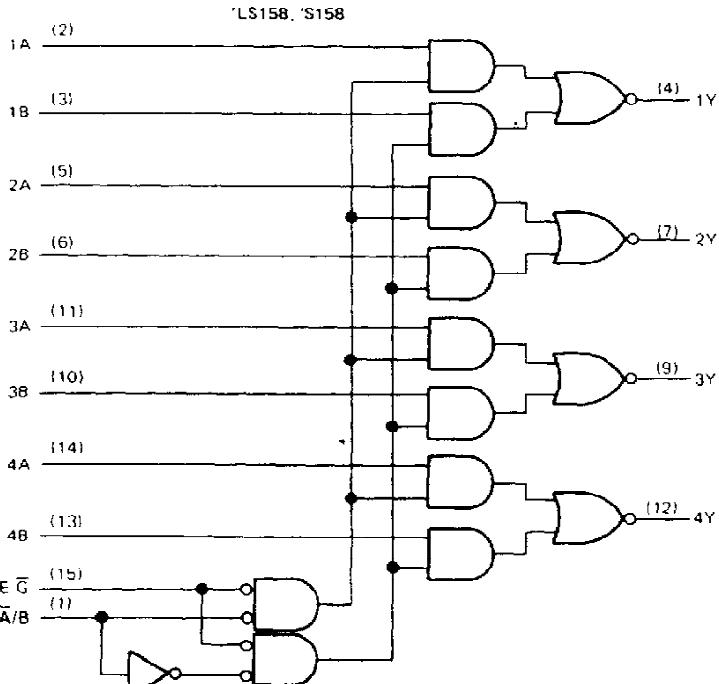
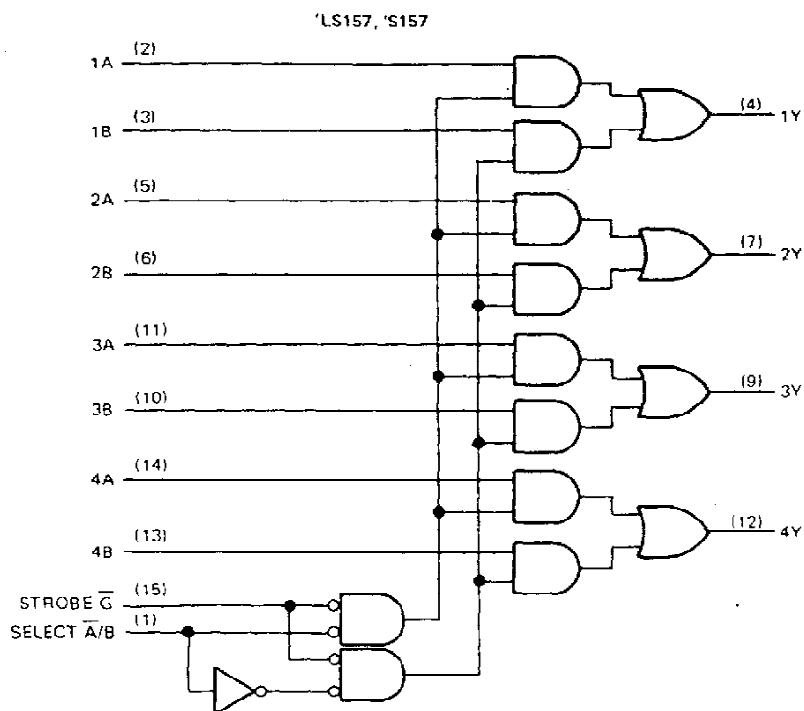


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**SN54LS157, SN54LS158, SN54S157, SN54S158,
SN74LS157, SN74LS158, SN74S157, SN74S158**
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

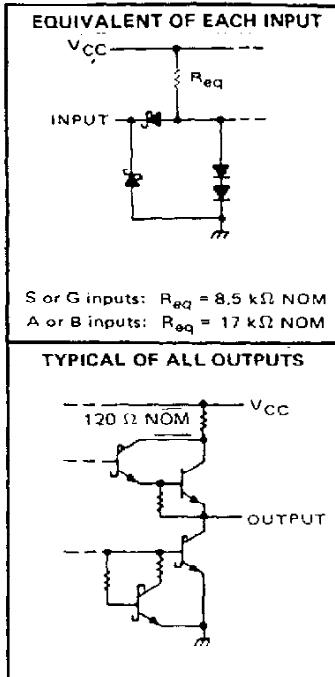
logic diagrams (positive logic)



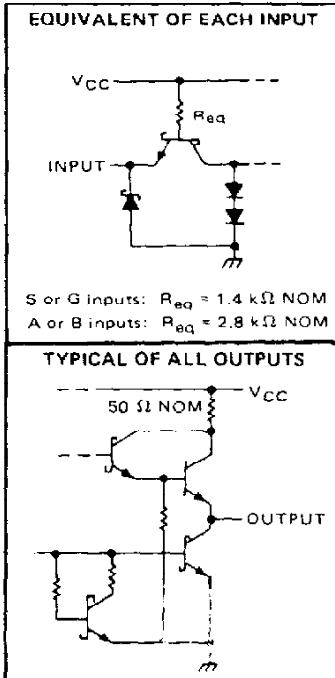
Pin numbers shown are for D, J, N, and W packages.

schematics of inputs and outputs

'LS157, 'LS158



'S157, 'S158



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SN54157, SN74157
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

recommended operating conditions

	SN54157			SN74157			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}			-800			-800	μA
Low-level output current, I_{OL}			16			16	mA
Operating free-air temperature, T_A	-55	125	0	0	70	70	$^{\circ}C$

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS [†]	SN54157			SN74157			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_{IK} Input clamp voltage	$V_{CC} = \text{MIN}$, $I_I = -12 \text{ mA}$			-1.5			-1.5	V
V_{OH} High-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = 0.8 \text{ V}$, $I_{OH} = -800 \mu A$	2.4	3.4		2.4	3.4		V
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = 0.8 \text{ V}$, $I_{OL} = 16 \text{ mA}$		0.2	0.4		0.2	0.4	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	$V_{CC} = \text{MAX}$, $V_I = 2.4 \text{ V}$			40			40	μA
I_{IL} Low level input current	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$			-1.6			-1.6	mA
I_{OS} Short-circuit output current [§]	$V_{CC} = \text{MAX}$	-20	-55	-18	-55	-18	-55	mA
I_{CC} Supply current	$V_{CC} = \text{MAX}$, See Note 2	30	48	30	48	30	48	mA

[†]For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡]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 short-circuit should not exceed one second.

NOTE 2: I_{CC} is measured with 4.5 V applied to all inputs and all outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}\text{C}$

PARAMETER [¶]	FROM (INPUT)	TEST CONDITIONS	MIN			UNIT
			TYP	MAX	ns	
t_{PLH}	Data		9	14		
t_{PHL}			9	14		
t_{PLH}	Strobe \bar{G}	$C_L = 15 \text{ pF}$, $R_L = 400 \Omega$, See Note 3	13	20		
t_{PHL}			14	21		
t_{PLH}	Select \bar{A}/B		15	23		
t_{PHL}			18	27		

[¶] t_{PLH} = propagation delay time, low-to-high-level output

[¶] t_{PHL} = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage waveforms are shown in Section 1.

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SN54LS157, SN54LS158, SN74LS157, SN74LS158
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

recommended operating conditions

		SN54LS'			SN74LS'			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.75	5	5.25	V
I_{OH}	High-level output current			-400			-400	μA
I_{OL}	Low-level output current			4			8	mA
T_A	Operating free-air temperature	-55		125	0		70	$^{\circ}C$

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS [†]	SN54LS'			SN74LS'			UNIT
			MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IH}	High-level input voltage		2		2				V
V_{IL}	Low-level input voltage			0.7			0.8		V
V_{IK}	Input clamp voltage	$V_{CC} = \text{MIN}$, $I_I = -18 \text{ mA}$			-1.5			-1.5	V
V_{OH}	High-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = \text{MAX}$, $I_{OH} = -400 \mu A$	2.5	3.4		2.7	3.4		V
V_{OL}	Low-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $I_{OL} = 4 \text{ mA}$ $V_{IL} = \text{MAX}$, $I_{OL} = 8 \text{ mA}$	0.25	0.4		0.25	0.4		V
I_I	Input current at maximum input voltage	\bar{A}/B or \bar{G} A or B	$V_{CC} = \text{MAX}$, $V_I = 7 \text{ V}$		0.2		0.2		μA
I_{IH}	High-level input current	\bar{A}/B or \bar{G} A or B	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$		0.1		0.1		
I_{IL}	Low-level input current	\bar{A}/B or \bar{G} A or B	$V_{CC} = \text{MAX}$, $V_I = 0.4 \text{ V}$		40		40		mA
I_{OS}	Short-circuit output current [§]		$V_{CC} = \text{MAX}$		20	-100	-20	-100	
I_{CC}	Supply current		$V_{CC} = \text{MAX}$, See Note 2	'LS157	9.7	16	9.7	16	mA
			$V_{CC} = \text{MAX}$, All A inputs at 4.5 V, All other inputs at 0 V	'LS158	4.8	8	4.8	8	

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

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

[§] Not more than one output should be shorted at a time and duration of short circuit should not exceed one second.

NOTE 2: I_{CC} is measured with 4.5 V applied to all inputs and all outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^{\circ}C$

PARAMETER [¶]	FROM (INPUT)	TEST CONDITIONS	'LS157			'LS158			UNIT
			MIN	TYP	MAX	MIN	TYP	MAX	
t_{PLH}	Data		9	14		7	12		ns
t_{PHL}			9	14		10	15		
t_{PLH}	Strobe \bar{G}	$C_L = 15 \text{ pF}$, $R_L = 2 \text{ k}\Omega$, See Note 3	13	20		11	17		ns
t_{PHL}			14	21		18	24		
t_{PLH}	Select \bar{A}/B		15	23		13	20		ns
t_{PHL}			18	27		16	24		

[¶] t_{PLH} = propagation delay time, low-to-high-level output

[¶] t_{PHL} = propagation delay time, high-to-low-level output

NOTE 3: Load circuits and voltage diagrams are shown in Section 1.

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SN54S157, SN54S158, SN74S157, SN74S158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

recommended operating conditions

	SN54S157 SN54S158			SN74S157 SN74S158			UNIT
	MIN	NOM	MAX	MIN	NOM	MAX	
Supply voltage, V_{CC}	4.5	5	5.5	4.75	5	5.25	V
High-level output current, I_{OH}				-1		-1	mA
Low-level output current, I_{OL}				20		20	mA
Operating free-air temperature, T_A	55	125	0	70		70	°C

electrical characteristics over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER	TEST CONDITIONS [†]	SN54S157 SN74S157			SN54S158 SN74S158			UNIT
		MIN	TYP [‡]	MAX	MIN	TYP [‡]	MAX	
V_{IH} High-level input voltage		2		2			2	V
V_{IL} Low-level input voltage				0.8			0.8	V
V_{IK} 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
V_{OL} Low-level output voltage	$V_{CC} = \text{MIN}$, $V_{IH} = 2 \text{ V}$, $V_{IL} = 0.8 \text{ V}$, $I_{OL} = 20 \text{ mA}$	Series 74S	2.7	3.4	2.7	3.4		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	\bar{A}/B or \bar{G} A or B	$V_{CC} = \text{MAX}$, $V_I = 2.7 \text{ V}$		100			100	μA
I_{IL} Low-level input current	\bar{A}/B or \bar{G} A or B	$V_{CC} = \text{MAX}$, $V_I = 0.5 \text{ V}$		50			50	μA
I_{OS} Short-circuit output current [§]	$V_{CC} = \text{MAX}$		-40	-100	-40	-100		mA
I_{CC} Supply current		$V_{CC} = \text{MAX}$, All inputs at 4.5 V, See Note 2		50	78	39	61	mA
		$V_{CC} = \text{MAX}$, A inputs at 4.5 V, B,G,S, inputs at 0 V, See Note 2					81	

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] 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 should not exceed one second.

Note 2: I_{CC} is measured with all outputs open.

switching characteristics, $V_{CC} = 5 \text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER [¶]	FROM (INPUT)	TEST CONDITIONS	SN54S157 SN74S157			SN54S158 SN74S158		
			MIN	TYP	MAX	MIN	TYP	MAX
t_{PLH}			5	7.5	4	6		
t_{PHL}	Data		4.5	6.5	4	6		
t_{PLH}			8.5	12.5	6.5	11.5		
t_{PHL}	Strobe \bar{G}		7.5	12	7	12		
t_{PLH}			9.5	15	8	12		
t_{PHL}	Select \bar{A}/B		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 3: Load circuits and voltage waveforms are shown in Section 1.

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