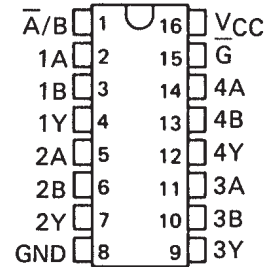


SN54LS257B, SN54LS258B, SN54S257, SN54S258 SN74LS257B, SN74LS258B, SN74S257, SN74S258 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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- Three-State Outputs Interface Directly with System Bus
- 'LS257B and 'LS258B Offer Three Times the Sink-Current Capability of the Original 'LS257 and 'LS258
- Same Pin Assignments as SN54LS157, SN74LS157, SN54S157, SN74S157, and SN54LS158, SN74LS158, SN54S158, SN74S158
- Provides Bus Interface from Multiple Sources in High-Performance Systems

SN54LS257B, SN54S257,
SN54LS258B, SN54S258 . . . J OR W PACKAGE
SN74LS257B, SN74S257,
SN74LS258B, SN74S258 . . . D OR N PACKAGE
(TOP VIEW)



	AVERAGE PROPAGATION DELAY FROM DATA INPUT	TYPICAL POWER DISSIPATION†
'LS257B	9 ns	55 mW
'LS258B	9 ns	55 mW
'S257	4.8 ns	320 mW
'S258	4 ns	280 mW

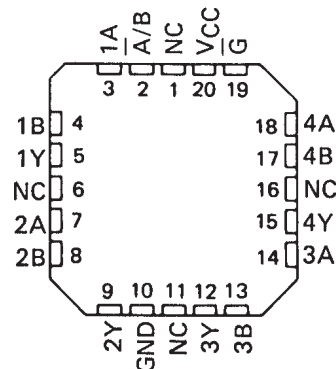
† Off state (worst case)

description

These devices are designed to multiplex signals from four-bit data sources to four-output data lines in bus-organized systems. The 3-state outputs will not load the data lines when the output control pin ($\bar{G}$) is at a high-logic level.

Series 54LS and 54S are characterized for operation over the full military temperature range of -55°C to 125°C ; Series 74LS and 74S are characterized for operation from 0°C to 70°C .

SN54LS257B, SN54S257,
SN54LS258B, SN54S258 . . . FK PACKAGE
(TOP VIEW)



NC-No internal connection.

FUNCTION TABLE

INPUTS				OUTPUT Y	
OUTPUT CONTROL	SELECT	A	B	'LS257B 'S257	'LS258B 'S258
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

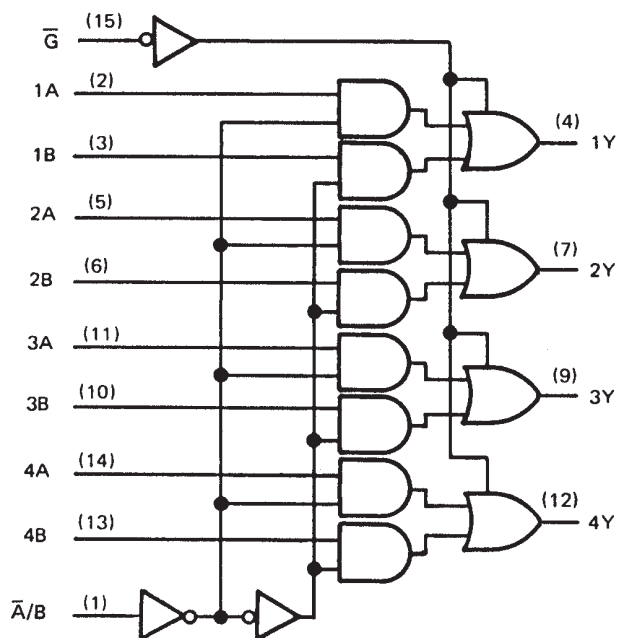
H = high level, L = low level, X = irrelevant,
Z = high impedance (off)

SN54LS257B, SN54LS258B, SN54S257, SN54S258
 SN74LS257B, SN74LS258B, SN74S257, SN74S258
 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

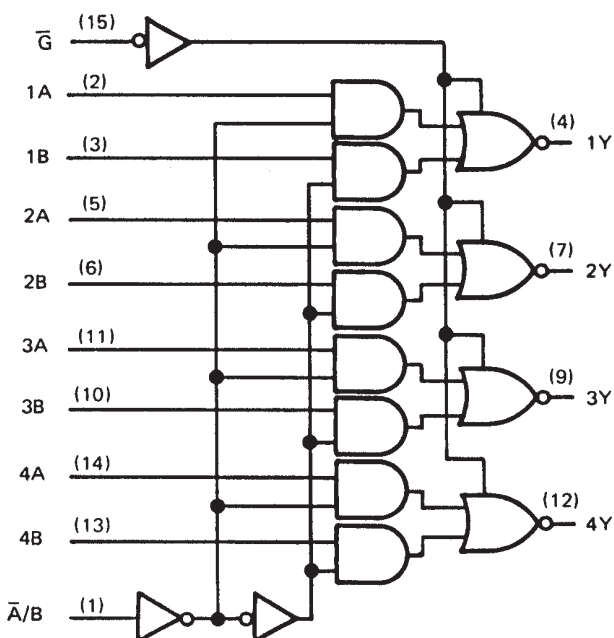
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logic diagrams (positive logic)

'LS257B, 'S257

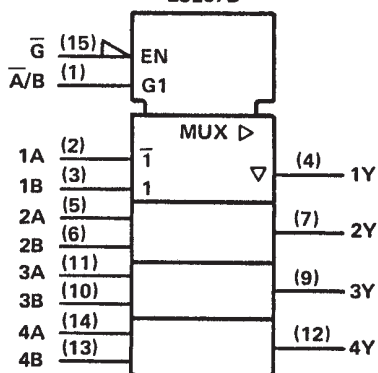


'LS258B, 'S258

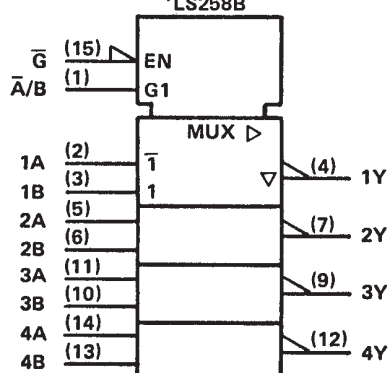


logic symbols†

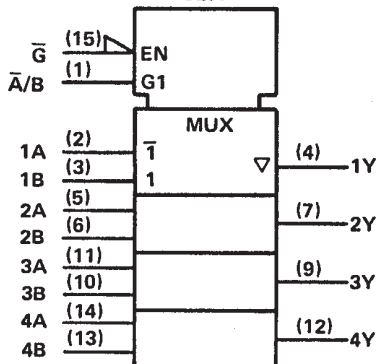
'LS257B



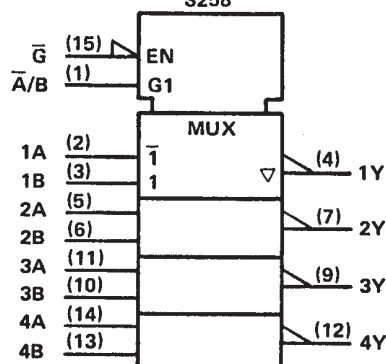
'LS258B



'S257



'S258

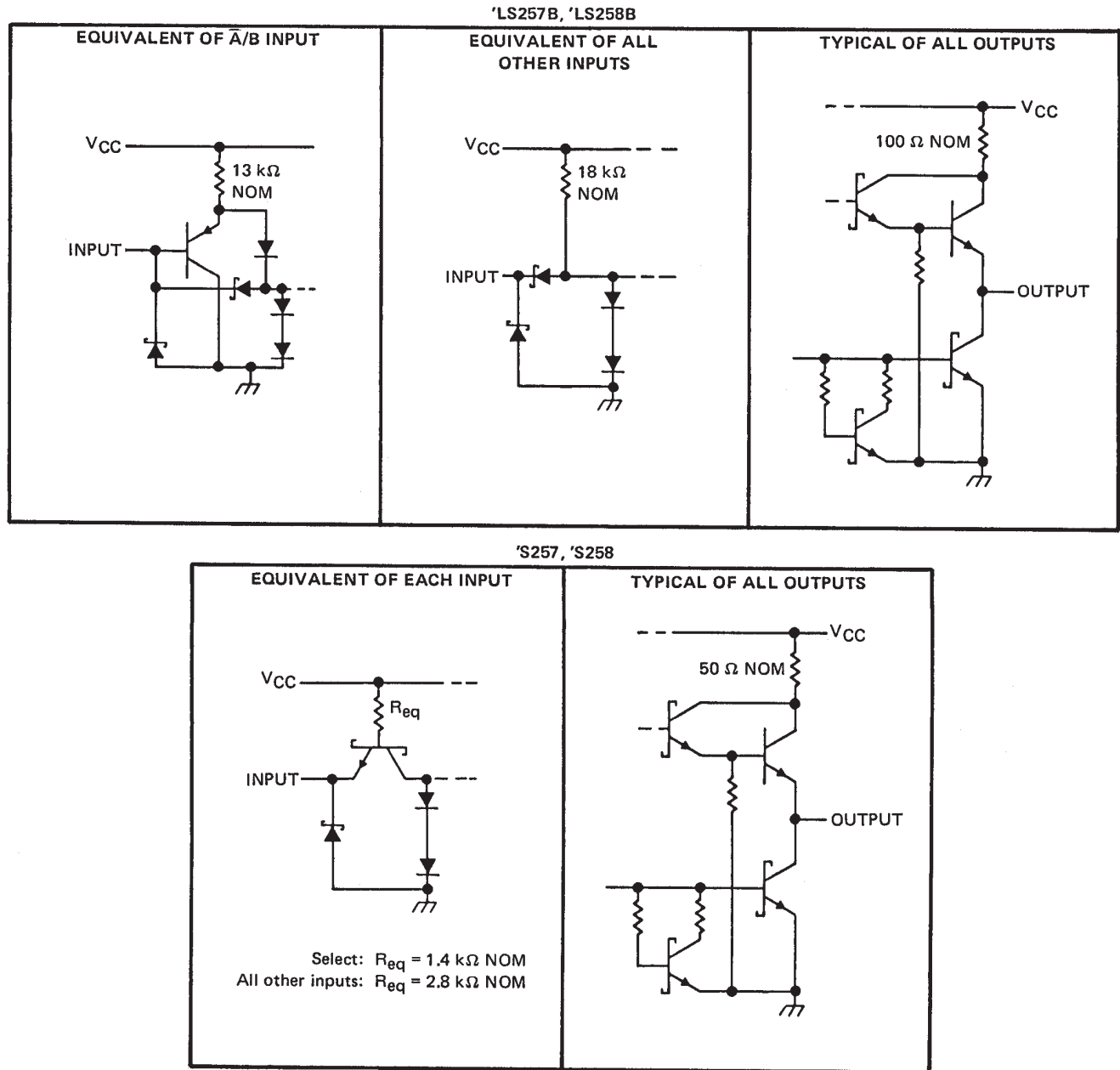


†These symbols are in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
 Pin numbers shown are for D, J, N, and W packages.

SN54LS257B, SN54LS258B, SN54S257, SN54S258
SN74LS257B, SN74LS258B, SN74S257, SN74S258
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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schematics of inputs and outputs



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

Supply voltage, V_{CC} (see Note 1)	7 V
Input voltage: 'LS257B, 'LS258B Circuits	7 V
'S257, 'S258 Circuits	5.5 V
Off-state output voltage	5.5 V
Operating free-air temperature range: SN54LS', SN54S' Circuits	–55°C to 125°C
SN74LS', SN74S' Circuits	0°C to 70°C
Storage temperature range	–65°C to 150°C

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

SN54LS257B, SN54LS258B, SN54S257, SN54S258
SN74LS257B, SN74LS258B, SN74S257, SN74S258
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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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
V_{IH} High-level input voltage	2			2			V
V_{IL} Low-level input voltage			0.7			0.8	V
I_{OH} High-level output current			– 1			– 2.6	mA
I_{OL} Low-level output current			12			24	mA
T_A Operating free-air temperature	– 55		125	0		70	°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_{IK}		$V_{CC} = \text{MIN}, I_I = -18 \text{ mA}$			– 1.5			– 1.5	V
V_{OH}		$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = \text{MAX}, I_{OH} = \text{MAX}$	2.4	3.4		2.4	3.1		V
V_{OL}		$V_{CC} = \text{MIN}, V_{IH} = 2 \text{ V}, V_{IL} = \text{MAX}, I_{OL} = 12 \text{ mA}$	0.25	0.4		0.25	0.4		V
		$I_{OL} = 24 \text{ mA}$				0.35	0.5		
I_{OZH}		$V_{CC} = \text{MAX}, V_{IH} = 2 \text{ V}, V_O = 2.7 \text{ V}$		20			20		µA
I_{OZL}		$V_{CC} = \text{MAX}, V_{IH} = 2 \text{ V}, V_O = 0.4 \text{ V}$		– 20			– 20		µA
I_I		$V_{CC} = \text{MAX}, V_I = 7 \text{ V}$		0.1			0.1		mA
I_{IH}		$V_{CC} = \text{MAX}, V_I = 2.7 \text{ V}$		20			20		µA
I_{IL}		$V_{CC} = \text{MAX}, V_I = 0.4 \text{ V}$		– 0.4			– 0.4		mA
$I_{OS}§$		$V_{CC} = \text{MAX},$	– 30		– 130	– 30		– 130	mA
I_{CC}	All outputs high	$V_{CC} = \text{MAX},$ See Note 2	'LS257B	8	12	'LS258B	8	12	mA
	All outputs low			12	18		12	18	
	All outputs off			13	19		13	19	
	All outputs high		'LS258B	6	9		6	9	
	All outputs low			10	15		10	15	
	All outputs off			11	16		11	16	

† 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 and all possible inputs grounded while achieving the stated output conditions.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}, R_L = 667 \Omega$

PARAMETER ¹	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'LS257B			'LS258B			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
t _{PLH}	Data	Any	C _L = 45 pF, See Note 3	8	13		7	12	ns	
t _{PHL}				10	15		11	17		
t _{PLH}	Select	Any		16	21		14	21	ns	
t _{PHL}				17	24		19	24		
t _{PZH}	Output Control	Any		15	30		15	30	ns	
t _{PZL}				19	30		20	30		
t _{PHZ}	Output Control	Any	C _L = 5 pF, See Note 3	18	30		18	30	ns	
t _{PLZ}			16	25		16	25			

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

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

t_{PZH} = output enable time to high level

t_{PZL} = output enable time to low level

t_{PHZ} = output disable time from high level

t_{PLZ} = output disable time from low level

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



SN54LS257B, SN54LS258B, SN54S257, SN54S258
SN74LS257B, SN74LS258B, SN74S257, SN74S258
QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

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recommended operating conditions

	SN54S'			SN74S'			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}			-2			-6.5	mA
Low-level output current, I_{OL}			20			20	mA
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†		'S257			'S258			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} = MIN, I _I = −18 mA		−1.2			−1.2			V
V _{OH}	High-level output voltage		V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OH} = −1 mA	SN74S'	2.7			2.7			V
			V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = 0.8 V, I _{OH} = MAX	SN54S'	2.4	3.4	2.4	3.4			
				SN74S'	2.4	3.2	2.4	3.2			
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 _{OZH}	Off-state output current, high-level voltage applied		V _{CC} = MAX, V _{IH} = 2 V, V _O = 2.4 V		50			50			μA
I _{OZL}	Off-state output current, low-level voltage applied		V _{CC} = MAX, V _{IH} = 2 V, V _O = 0.5 V		−50			−50			μA
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 input	V _{CC} = MAX, V _I = 2.7 V		100			100			μA
		Any other			50			50			
I _{IL}	Low-level input current	S input	V _{CC} = MAX V _I = 0.5 V		−4			−4			mA
		Any other			−2			−2			
I _{OS}	Short-circuit output current §		V _{CC} = MAX		−40	−100		−40	−100		mA
I _{CC}	Supply current	All outputs high	V _{CC} = MAX, See Note 2		44	68		36	56		mA
		All outputs low			60	93		52	81		
		All outputs off			64	99		56	87		

† 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 and all possible inputs grounded while achieving the stated output conditions.

switching characteristics, $V_{CC} = 5 \text{ V}, T_A = 25^\circ\text{C}, R_L = 280 \Omega$

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	TEST CONDITIONS	'S257			'S258			UNIT
				MIN	TYP	MAX	MIN	TYP	MAX	
tPLH	Data	Any	CL = 15 pF, See Note 3	5	7.5		4	6	ns	
tPHL				4.5	6.5		4	6		
tPLH	Select	Any		8.5	15		8	12	ns	
tPHL				8.5	15		7.5	12		
tPZH	Output	Any		13	19.5		13	19.5	ns	
tPZL	Control			14	21		14	21		
tPHZ	Output	Any		5.5	8.5		5.5	8.5	ns	
tPLZ	Control			9	14		9	14		

¶ f_{max} = Maximum clock frequency

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

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

t_{PZH} = output enable time to high level

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

t_{PZL} = output enable time to low level

t_{PHZ} = output disable time from high level

t_{PLZ} = output disable time from low level



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