- **Buffered Inputs and Outputs**
- **Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs**
- **Dependable Texas Instruments Quality and Reliability**

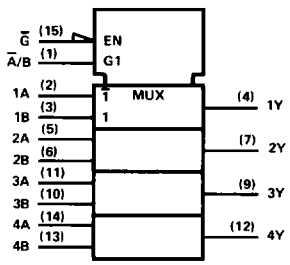
description

These monolithic data selectors/multiplexers contain inverters and drivers to supply full data selection to the four output gates. A separate strobe input ($\overline{G}$) is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'ALS157 and 'AS157 present true data whereas the 'ALS158 and 'AS158 present inverted data to minimize propagation delay time.

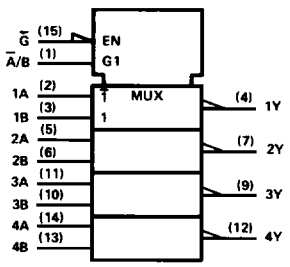
The SN54' family is characterized for operation over the full military temperature range −55°C to 125°C. The SN74' family is characterized for operation from 0°C to 70°C.

logic symbols

'ALS157, 'AS157

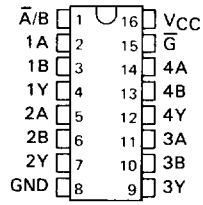


'ALS158, 'AS158

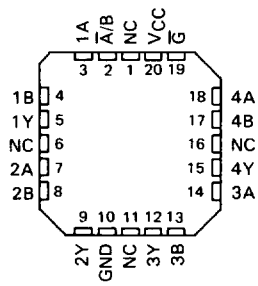


Pin numbers shown are for J and N packages.

SN54ALS', SN54AS' . . . J PACKAGE
SN74ALS', SN74AS' . . . N PACKAGE
(TOP VIEW)



SN54ALS', SN54AS' . . . FH PACKAGE
SN74ALS', SN74AS' . . . FN PACKAGE
(TOP VIEW)



NC — No internal connection

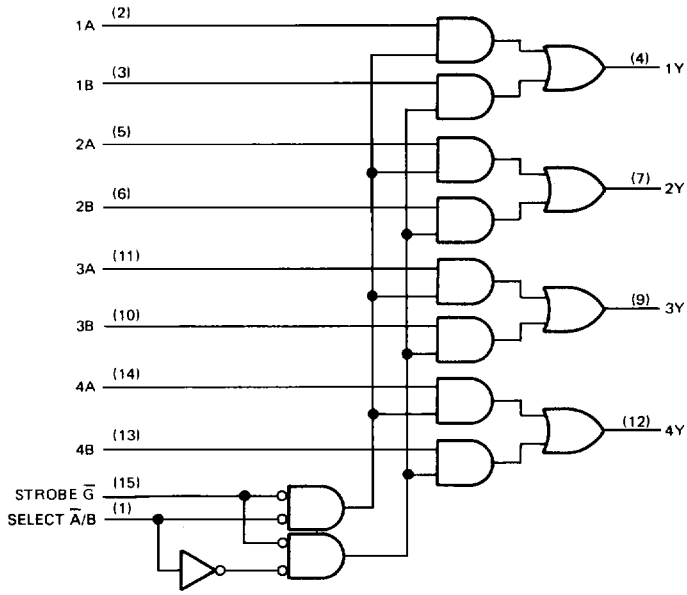
FUNCTION TABLE

INPUTS				OUTPUT Y	
STROBE	SELECT	DATA			
$\overline{G}$	$\overline{A}$/B	A	B	'ALS157 'AS157	'ALS158 'AS158
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

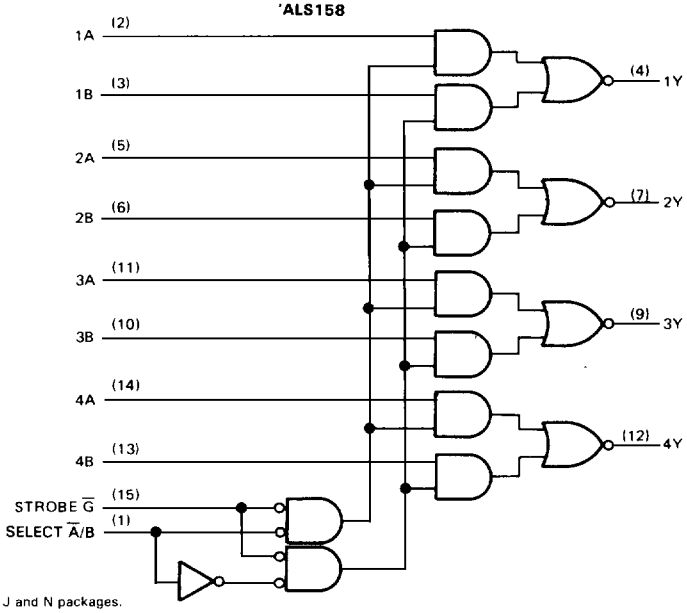
2 ALS AND AS CIRCUITS

logic diagrams (positive logic)

'ALS157



'ALS158



Pin numbers shown are for J and N packages.

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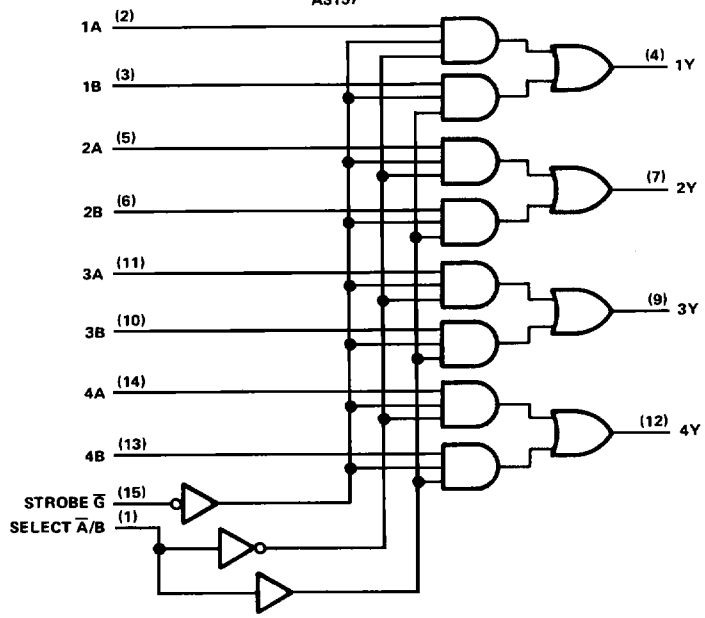
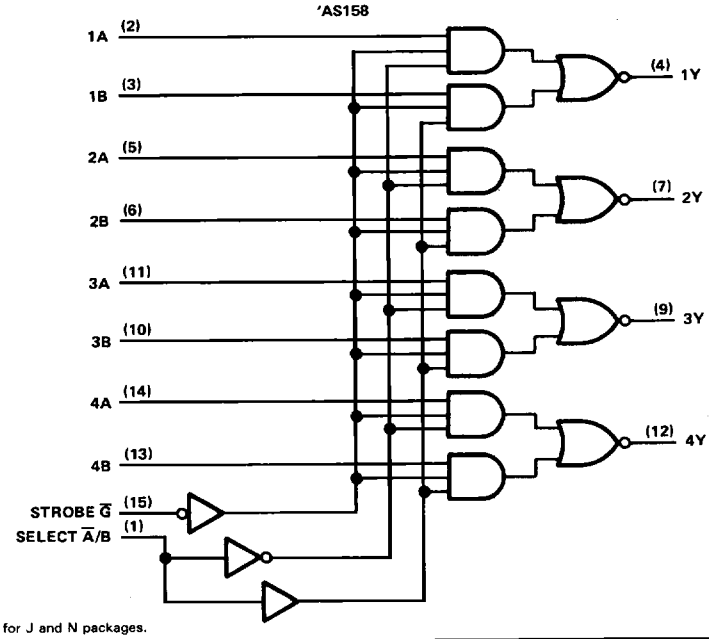
logic diagrams (positive logic)

'AS157



'AS158



Pin numbers shown are for J and N packages.

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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range: SN54ALS157, SN54ALS158 . . . . . −55°C to 125°C
SN74ALS157, SN74ALS158 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54ALS157 SN54ALS158			SN74ALS157 SN74ALS158			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			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		SN54ALS157 SN54ALS158			SN74ALS157 SN74ALS158			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = −18 mA			−1.5			−1.5	V
V_{OH}		V_{CC} = 4.5 V to 5.5 V,	I_{OH} = −0.4 mA	V_{CC} − 2			V_{CC} − 2			V
		V_{CC} = 4.5 V,	I_{OH} = −1 mA	2.4	3.3					
		V_{CC} = 4.5 V,	I_{OH} = −2.6 mA				2.4	3.2		
V_{OL}		V_{CC} = 4.5 V,	I_{OL} = 12 mA		0.25	0.4		0.25	0.4	V
		V_{CC} = 4.5 V	I_{OL} = 24 mA					0.35	0.5	
I_I		V_{CC} = 5.5 V,	V_I = 7 V			0.1			0.1	mA
I_{IH}		V_{CC} = 5.5 V,	V_I = 2.7 V			20			20	μA
I_{IL}		V_{CC} = 5.5 V,	V_I = 0.4 V			−0.1			−0.1	mA
I_O‡		V_{CC} = 5.5 V,	V_O = 2.25 V	−30		−112	−30		−112	mA
I_{CC}	'ALS157	V_{CC} = 5.5 V,			7.8			7.8		mA
	'ALS158				2.3			2.3		

†All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit current, I_{OS}.

'ALS157 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX						UNIT
			SN54ALS157			SN74ALS157			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	A or B	Y		3.5			3.5		ns
t_{PHL}				5			5		
t_{PLH}	$\overline{A}$/B	Y		6			6		ns
t_{PHL}				6.5			6.5		
t_{PLH}	$\overline{G}$	Y		6			6		ns
t_{PHL}				6.5			6.5		

'ALS158 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX						UNIT
			SN54ALS158			SN74ALS158			
			MIN	TYP†	MAX	MIN	TYP†	MAX	
t_{PLH}	A or B	Y		3.5			3.5		ns
t_{PHL}				5			5		
t_{PLH}	$\overline{A}$/B	Y		6			6		ns
t_{PHL}				6.5			6.5		
t_{PLH}	$\overline{G}$	Y		6			6		ns
t_{PHL}				6.5			6.5		

†All typical values are at V_{CC} = 5 V, T_A = 25°C.
NOTE 1: For load circuit and voltage waveforms, see page 1-12.

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

Supply voltage, V_{CC} . . . . . 7 V
Input voltage . . . . . 7 V
Operating free-air temperature range: SN54AS157, SN54AS158 . . . . . −55°C to 125°C
SN74AS157, SN74AS158 . . . . . 0°C to 70°C
Storage temperature range . . . . . −65°C to 150°C

recommended operating conditions

		SN54AS157 SN54AS158			SN74AS157 SN74AS158			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V_{CC}	Supply voltage	4.5	5	5.5	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			2			V
V_{IL}	Low-level input voltage			0.8			0.8	V
I_{OH}	High-level output current			−2			−2	mA
I_{OL}	Low-level output current			20			20	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		SN54AS157 SN54AS158			SN74AS157 SN74AS158			UNIT
				MIN	TYP†	MAX	MIN	TYP†	MAX	
V_{IK}		V_{CC} = 4.5 V,	I_I = −18 mA			−1.2			−1.2	V
V_{OH}		V_{CC} = 4.5 V to 5.5 V,	I_{OH} = −2 mA	V_{CC}−2			V_{CC}−2			V
V_{OL}		V_{CC} = 4.5 V,	I_{OL} = 20 mA		0.35	0.5		0.35	0.5	V
I_I	$\overline{A}$/B	V_{CC} = 5.5 V,	V_I = 7 V			0.2			0.2	mA
	A, B, or $\overline{G}$					0.1			0.1	
I_{IH}	$\overline{A}$/B	V_{CC} = 5.5 V,	V_I = 2.7 V			40			40	μA
	A, B, or $\overline{G}$					20			20	
I_{IL}	$\overline{A}$/B	V_{CC} = 5.5 V,	V_I = 0.4 V			−1			−1	mA
	A, B or $\overline{G}$					−0.5			−0.5	
I_O§		V_{CC} = 5.5 V,	V_O = 2.25 V	−30		−112	−30		−112	mA
I_{CC}	'AS157	V_{CC} = 5.5 V,			17.5	28		17.5	28	mA
	'AS158				15.6	22.5		15.6	22.5	

†All typical values are at V_{CC} = 5 V, T_A = 25°C.
‡The output conditions have been chosen to produce a current that closely approximates one half of the true short-circuit current, I_{OS}.

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'AS157 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX				UNIT
			SN54AS157		SN74AS157		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1	7.5	1	6	ns
t_{PHL}			1	6.5	1	5.5	
t_{PLH}	$\overline{A}$/B,	Y	2	12	2	11	ns
t_{PHL}			2	12	2	10	
t_{PLH}	$\overline{G}$	Y	2	12.5	2	10.5	ns
t_{PHL}			2	8.5	2	7.5	

'AS158 switching characteristics (see Note 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX				UNIT
			SN54AS158		SN74AS158		
			MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Y	1	6	1	5	ns
t_{PHL}			1	5.5	1	4.5	
t_{PLH}	$\overline{A}$/B	Y	2	11	2	9.5	ns
t_{PHL}			2	11.5	2	10.5	
t_{PLH}	$\overline{G}$	Y	2	8	2	6.5	ns
t_{PHL}			2	11.5	2	10	

NOTE 1: For load circuit and voltage waveforms, see page 1-12.