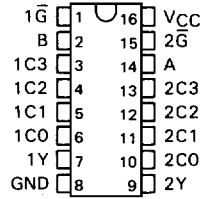


TYPES SN54ALS153, SN54AS153, SN74ALS153, SN74AS153 DUAL 1 OF 4 DATA SELECTORS/MULTIPLEXERS

D2661, APRIL 1982—REVISED DECEMBER 1983

- Permits Multiplexing from N Lines to 1 Line
- Performs Parallel-to-Serial Conversion
- Strobe (Enable) Line Provided for Cascading (N lines to n lines)
- Fully Compatible with Most TTL Circuits
- 'ALS253 and 'AS253 Are 3-State Versions of These Parts
- Package Options Include Both Plastic and Ceramic Chip Carriers in Addition to Plastic and Ceramic DIPs
- Dependable Texas Instruments Quality and Reliability

SN54ALS153, SN54AS153 . . . J PACKAGE
SN74ALS153, SN74AS153 . . . N PACKAGE
(TOP VIEW)

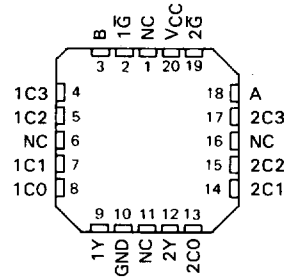


description

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate strobe inputs (G) are provided for each of the two four-line sections.

The SN54ALS153 and SN54AS153 are characterized for operation over the full military temperature range of -55°C to 125°C. The SN74ALS153 and SN74AS153 are characterized for operation from 0°C to 70°C.

SN54ALS153, SN54AS153 . . . FH PACKAGE
SN74ALS153, SN74AS153 . . . FN PACKAGE
(TOP VIEW)

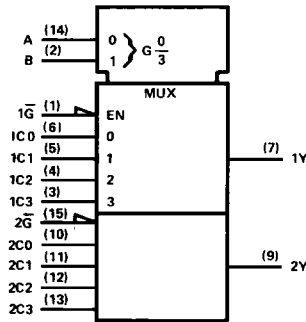


NC — No internal connection

FUNCTION TABLE							
SELECT INPUTS		DATA INPUTS				STROBE	OUTPUT
B	A	C0	C1	C2	C3	\bar{G}	Y
X	X	X	X	X	X	H	L
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Select inputs A and B are common to both sections.

logic symbol



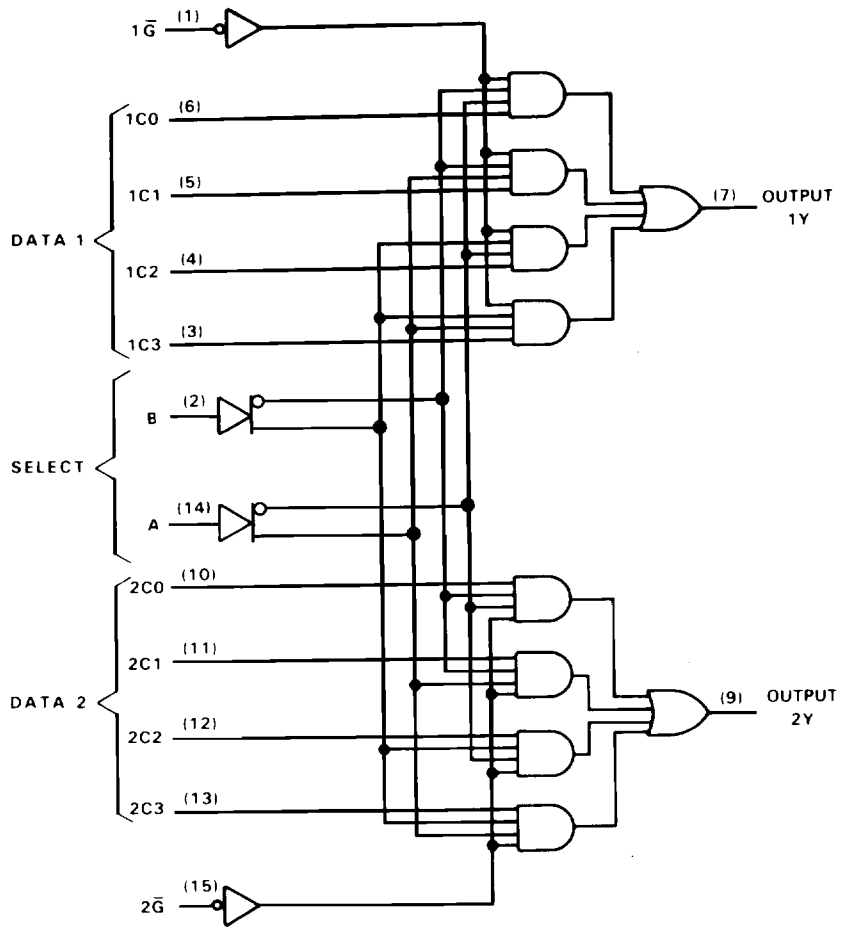
Pin numbers shown are for J and N packages.

ALS AND AS CIRCUITS 2

**TYPES SN54ALS153, SN54AS153, SN74ALS153, SN74AS153
DUAL 1 OF 4 DATA SELECTORS/MULTIPLEXERS**

logic diagram (positive logic)

2
ALS AND AS CIRCUITS



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: SN54ALS153, SN54AS153	-55 °C to 125 °C
SN74ALS153, SN74AS153	0 °C to 70 °C
Storage temperature range	-65 °C to 150 °C

**TYPES SN54ALS153, SN74ALS153
DUAL 1 OF 4 DATA SELECTORS/MULTIPLEXERS**

recommended operating conditions

		SN54ALS153			SN74ALS153			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			0			70	°C

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

PARAMETER	TEST CONDITIONS	SN54ALS153		SN74ALS153		UNIT	
		MIN	TYP†	MAX	MIN		TYP†
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}	V _{CC} = 5.5 V, All inputs at 4.5 V	7.5		14	7.5	14	mA

† 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 output current, I_{OS}.

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
			SN54ALS153		SN74ALS153		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	5	25	5	21	ns
t _{PHL}			5	25	5	21	
t _{PLH}	Data (Any C)	Y	3	12	3	10	ns
t _{PHL}			4	18	4	15	
t _{PLH}	G	Y	5	22	5	18	ns
t _{PHL}			5	22	5	18	

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

**2
ALS AND AS CIRCUITS**

TYPES SN54AS153, SN74AS153
DUAL 1 OF 4 DATA SELECTORS/MULTIPLEXERS

recommended operating conditions

	SN54AS153			SN74AS153			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	-12			-15			mA
I _{OL} Low-level output current	32			48			mA
T _A Operating free-air temperature	-55			0			70 °C

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

PARAMETER	TEST CONDITIONS	SN54AS153		SN74AS153		UNIT	
		MIN	TYP [†]	MAX	MIN		TYP [†]
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 _{CC} = 4.5 V, I _{OH} = -12 mA	2.4	3.2				
	V _{CC} = 4.5 V, I _{OH} = -15 mA			2.4	3.3		
V _{OL}	V _{CC} = 4.5 V, I _{OL} = 32 mA	0.25 0.5				V	
	V _{CC} = 4.5 V, I _{OL} = 48 mA			0.35	0.5		
I _I	A, B	0.2		0.2		mA	
	All others	0.1		0.1			
I _{IH}	A, B	40		40		μA	
	All others	20		20			
I _{IL}	A, B	-1		-1		mA	
	All others	-0.5		-0.5			
I _O [‡]	V _{CC} = 5.5 V, V _O = 2.25 V	-30	-112	-30	-112	mA	
I _{CC}	V _{CC} = 5.5 V,	Outputs high	16	26	16	26	mA
		Outputs low	21	33	21	33	

[†]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 output current, I_{OS}.

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
			SN54AS153		SN74AS153		
			MIN	MAX	MIN	MAX	
t _{PLH}	A or B	Y	3	14	3	12.5	ns
t _{PHL}			3	12.5	3	11	
t _{PLH}	Data (Any C)	Y	2	8	2	7	ns
t _{PHL}			2	8.5	2	8	
t _{PLH}	\bar{G}	Y	3	13	3	11.5	ns
t _{PHL}			2	10	2	9	

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

2

ALS AND AS CIRCUITS