

Dual 4-Line-To-1-Line Multiplexer With Three-State Outputs

LS253

FEATURES

- Three-state version of LS153
- Non-inverting
- Permits multiplexing from N lines to 1 line
- Performs parallel-to-serial conversion

DESCRIPTION

The LS253 is a high-speed dual 4-line-to-1-line multiplexer with common select inputs and separate output control inputs for each half. Each half can select one bit of four and present it at the output in non-inverted form.

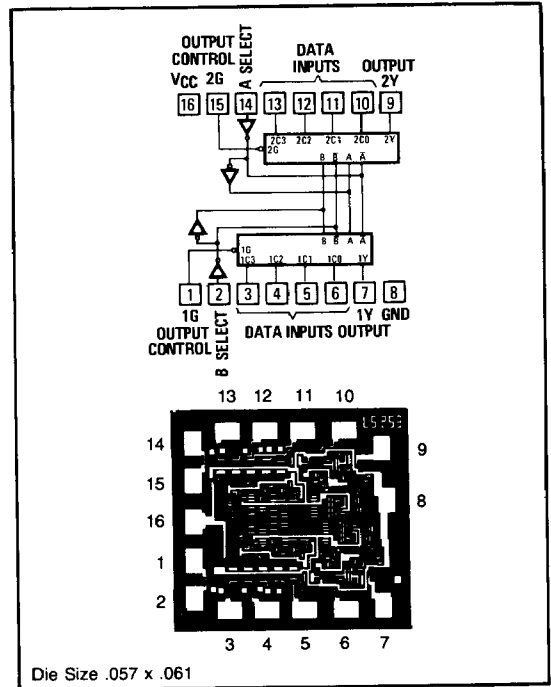
The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state) the low-impedance of the single enabled output will drive the bus line to a high or low logic level.

FUNCTION TABLE

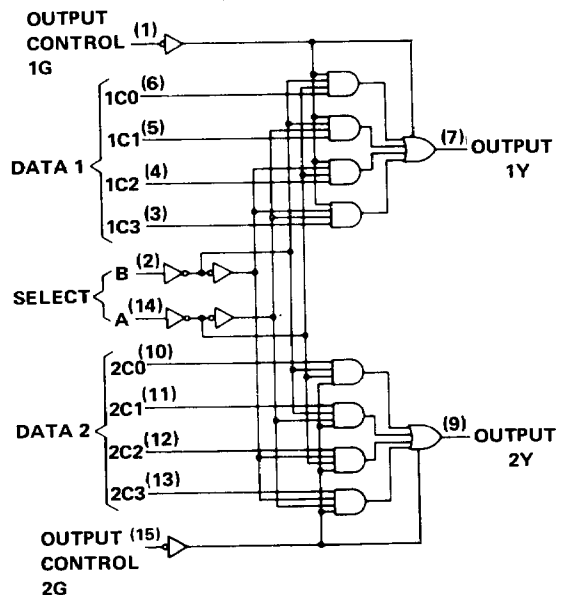
SELECT INPUTS		DATA INPUTS				OUTPUT CONTROL	OUTPUT
B	A	C0	C1	C2	C3	G	Y
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	L
L	L	H	X	X	X	L	H
L	H	X	L	X	X	L	L
L	H	X	H	X	X	L	H
H	L	X	X	L	X	L	L
H	L	X	X	H	X	L	H
H	H	X	X	X	L	L	L
H	H	X	X	X	H	L	H

Address inputs A and B are common to both sections.
H = high level, L = low level, X = irrelevant, Z = high impedance (off)

PIN-OUT DIAGRAM



LOGIC DIAGRAM



Dual 4-Line-To-1-Line Multiplexer With Three-State Outputs

LS253

Recommended Operating Conditions

	9LS/54LS			9LS/74LS			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			-2.6	mA
Low-level output current, I_{OL}			4			8	mA
Operating free-air temperature, T_A	-55		125	0		70	°C

Electrical Characteristics Over Recommended Free-Air Temperature Range (Unless Otherwise Noted)

Parameter	Test Conditions*	9LS/54LS			9LS/74LS			Unit	
		Min	Typ**	Max	Min	Typ**	Max		
V_{IH}		2			2			V	
V_{IL}				0.7			0.8	V	
V_I	$V_{CC}=\text{MIN}$, $I_I=-18\text{mA}$			-1.5			-1.5	V	
V_{OH}	$V_{CC}=\text{MIN}$, $V_{IH}=2\text{V}$, $V_{IL}=V_{IL\text{max}}$, $I_{OH}=\text{MAX}$	2.4	3.4		2.4	3.1		V	
V_{OL}	$V_{CC}=\text{MIN}$, $V_{IH}=2\text{V}$, $V_{IL}=V_{IL\text{max}}$	$I_{OL}=4\text{mA}$	0.25	0.40	0.25	0.40		V	
		$I_{OL}=8\text{mA}$			0.35	0.50			
$I_{O(\text{off})}$	$V_{CC}=\text{MAX}$, $V_{IH}=2\text{V}$	$V_O=2.7\text{V}$		20		20		μA	
		$V_O=0.4\text{V}$		-20		-20			
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}^\dagger	$V_{CC}=\text{MAX}$	-15		-100	-15		-100	mA	
I_{CC}^\ddagger	$V_{CC}=\text{MAX}$	Condition A		7	12	7	12		mA
		Condition B		8.5	14	8.5	14		

*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.

‡ I_{CC} is measured with the outputs open under the following conditions:

A. All inputs grounded.

B. Output control at 4.5V, all inputs grounded.

Switching Characteristics, $V_{CC}=5\text{V}$ Over Recommended Free-Air Temperature Range

Parameter	From (input)	To (output)	-55°C			+25°C			+125°C			Unit
			Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Test Conditions: $C_L = 15\text{pF}$, $R_L = 2\text{k}\Omega$ (See Fig. A, page 2-174)												
t_{PLH}	Data	Y		9	15		7	12		9	15	ns
t_{PHL}				14	22		12	17		14	22	
t_{PLH}	Select	Y		20	30		18	25		20	30	ns
t_{PHL}				20	31		18	27		20	31	
t_{ZH}	Output Control	Y		12	21		10	16		12	21	ns
t_{ZL}				15	23		13	18		15	23	
Test Conditions: $C_L = 5\text{pF}$, $R_L = 2\text{k}\Omega$ (See Fig. C on page 2-174)												
t_{HZ}	Output	Y		9	16		7	15		9	16	ns
t_{LZ}	Control			13	22		12	19		13	22	
Test Conditions: $C_L = 50\text{pF}$, $R_L = 2\text{k}\Omega$ (See Fig. A, page 2-174)												
t_{PLH}	Data	Y		13	20		10	16		13	20	ns
t_{PHL}				18	27		15	21		18	27	
t_{PLH}	Select	Y		24	35		21	29		24	35	ns
t_{PHL}				24	36		21	29		24	36	
t_{ZH}	Output Control	Y		16	26		13	20		16	26	ns
t_{ZL}				19	28		16	21		19	28	

Note: AC specification shown under -55°C and +125°C are for 9LS devices only. All 50pF specifications are for 9LS only.