54ACT11253, 74ACT11253
DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS

- **Inputs are TTL-Voltage Compatible**
- **Three-State Version of 'ACT11153**
- **Permits Multiplexing from N Lines to 1 Line**
- **Performs Parallel-to-Serial Conversion**
- **Package Options Include Plastic "Small Outline" Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**
- **Flow-Through Architecture to Optimize PCB Layout**
- **Center-Pin V_{CC} and GND Configurations to Minimize High-Speed Switching Noise**
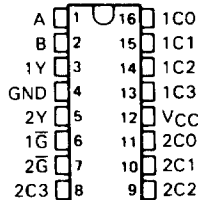- **EPIC™ (Enhanced-Performance Implanted CMOS) 1-μm Process**

description

Each of these data selectors/multiplexers contains inverters and drivers to supply full binary decoding data selection to the AND-OR gates. Separate output control inputs are provided for each of the two four-line sections.
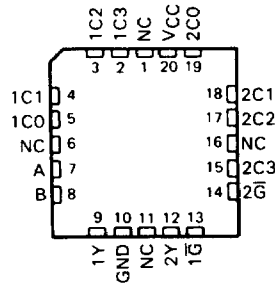
The three-state outputs can interface with and drive data lines of bus-organized systems. With all but one of the common outputs disabled (at a high-impedance state) the low-impedance of the single enabled output will drive the bus line to a high or low logic level. Each output has its own output enable ($\overline{G}$). The output is disabled when its strobe is high.

The 54ACT11253 is characterized for operation over the full military temperature range of −55°C to 125°C. The 74ACT11253 is characterized for operation from −40°C to 85°C.

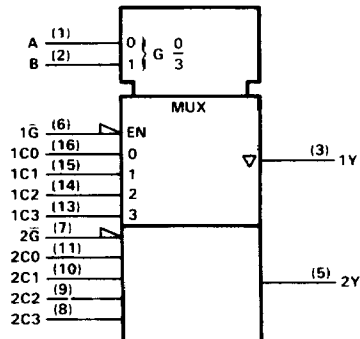**54ACT11253 ... J PACKAGE**
74ACT11253 ... D OR N PACKAGE
(TOP VIEW)

```
        A  [ 1   U  16 ]  1C0
        B  [ 2      15 ]  1C1
       1Y  [ 3      14 ]  1C2
      GND  [ 4      13 ]  1C3
       2Y  [ 5      12 ]  VCC
       1G  [ 6      11 ]  2C0
       2G  [ 7      10 ]  2C1
      2C3  [ 8       9 ]  2C2
```

54ACT11253 ... FK PACKAGE
(TOP VIEW)

```
           1C2 1C3 NC VCC 2C0
            3   2   1  20 19
      1C1 [ 4            18 ] 2C1
      1C0 [ 5            17 ] 2C2
       NC [ 6            16 ] NC
        A [ 7            15 ] 2C3
        B [ 8            14 ] 2G
            9  10 11 12 13
           1Y GND NC 2Y 1G
```

NC—No internal connection

logic symbol†

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

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TEXAS
INSTRUMENTS

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FUNCTION TABLE

SELECT INPUTS		DATA INPUTS				OUTPUT ENABLE	OUTPUT
B	**A**	**C0**	**C1**	**C2**	**C3**	$\overline{G}$	**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.

logic diagram (positive logic)
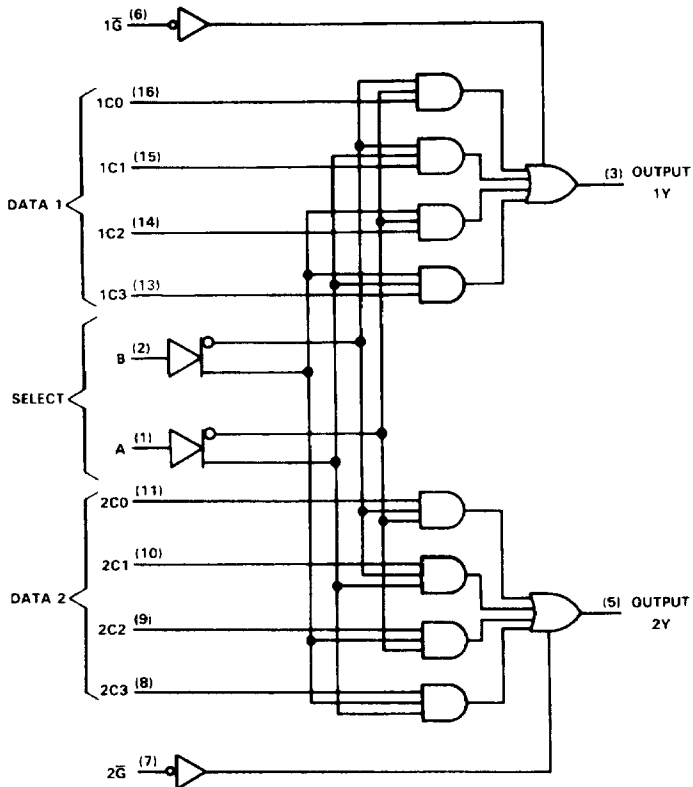
Pin numbers shown are for D, J, and N packages.

54ACT11253, 74ACT11253
DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS
WITH 3-STATE OUTPUTS
D3110, MARCH 1988—REVISED MARCH 1990—TI0113

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

Supply voltage range, V_{CC}	-0.5 V to 7 V
Input voltage range, V_I (see Note 1)	-0.5 V to $V_{CC} + 0.5$ V
Output voltage range, V_O (see Note 1)	-0.5 V to $V_{CC} + 0.5$ V
Input clamp current, I_{IK} ($V_I < 0$ or $V_I > V_{CC}$)	± 20 mA
Output clamp current, I_{OK} ($V_O < 0$ or $V_O > V_{CC}$)	± 50 mA
Continuous output current, I_O ($V_O = 0$ to V_{CC})	± 50 mA
Continuous current through V_{CC} or GND pins	± 100 mA
Storage temperature range	$-65°$C to $150°$C

† Stresses beyond those listed under "absolute maximum ratings" may cause permanent damage to the device. These are stress ratings only and functional operation of the device at these or any other conditions beyond those indicated under "recommended operating conditions" is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

NOTE 1: The input and output voltage ratings may be exceeded if the input and output current ratings are observed.

recommended operating conditions

		54ACT11253		74ACT11253		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
V_O	Output voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		-24		-24	mA
I_{OL}	Low-level output current		24		24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0	10	0	10	ns/V
T_A	Operating free-air temperature	-55	125	-40	85	°C

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

PARAMETER	TEST CONDITIONS	V_{CC}	$T_A = 25°C$			54ACT11253		74ACT11253		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	$I_{OH} = -50\ \mu A$	4.5 V	4.4			4.4		4.4		V
		5.5 V	5.4			5.4		5.4		
	$I_{OH} = -24$ mA	4.5 V	3.94			3.7		3.8		
		5.5 V	4.94			4.7		4.8		
	$I_{OH} = -50$ mA†	5.5 V				3.85				
	$I_{OH} = -75$ mA†	5.5 V						3.85		
V_{OL}	$I_{OL} = 50\ \mu A$	4.5 V			0.1		0.1		0.1	V
		5.5 V			0.1		0.1		0.1	
	$I_{OL} = 24$ mA	4.5 V			0.36		0.5		0.44	
		5.5 V			0.36		0.5		0.44	
	$I_{OL} = 50$ mA†	5.5 V					1.65			
	$I_{OL} = 75$ mA†	5.5 V							1.65	
I_{OZ}	$V_O = V_{CC}$ or GND	5.5 V			± 0.5		± 10		± 5	μA
I_I	$V_I = V_{CC}$ or GND	5.5 V			± 0.1		± 1		± 1	μA
I_{CC}	$V_I = V_{CC}$ or GND, $I_O = 0$	5.5 V			8		160		80	μA
ΔI_{CC}§	One input at 3.4 V, Other inputs at GND or V_{CC}	5.5 V			0.9		1		1	mA
C_i	$V_I = V_{CC}$ or GND	5 V		3.5						pF
C_o	$V_O = V_{CC}$ or GND	5 V		8						pF

‡ Not more than one output should be tested at one time, and the duration of the test should not exceed 10 ms.

§ This is the increase in supply current for each input that is at one of the specified TTL voltage levels rather than 0 V or V_{CC}.

switching characteristics, V_{CC} = 5 V ± 0.5 V (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			54ACT11253		74ACT11253		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Any Y	1.5	6.8	9.8	1.5	11.8	1.5	11	ns
t_{PHL}			1.5	9.1	12.6	1.5	15.5	1.5	14.3	
t_{PLH}	Data (Any C)	Y	1.5	5.7	7.4	1.5	8.9	1.5	8.3	ns
t_{PHL}			1.5	7.2	10.5	1.5	12.5	1.5	11.7	
t_{PZH}	$\overline{G}$	Y	1.5	5	7.6	1.5	9	1.5	8.5	ns
t_{PZL}			1.5	4.8	7.3	1.5	8.6	1.5	8.1	
t_{PHZ}	$\overline{G}$	Y	1.5	6.4	8.6	1.5	9.5	1.5	9.2	ns
t_{PLZ}			1.5	5.9	7.4	1.5	8.1	1.5	7.8	

operating characteristics, V_{CC} = 5 V, T_A = 25°C

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd} Power dissipation capacitance per multiplexer	Outputs enabled	C_L = 50 pF, f = 1 MHz	42	pF
	Outputs disabled		18	

PARAMETER MEASUREMENT INFORMATION
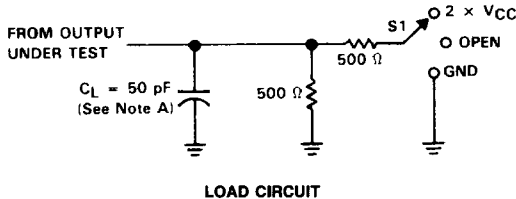
TEST	S1
t_{PLH}/t_{PHL}	OPEN
t_{PLZ}/t_{PZL}	$2 \times V_{CC}$
t_{PHZ}/t_{PZH}	GND

LOAD CIRCUIT
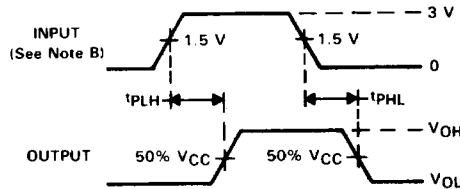
PROPAGATION DELAY TIMES
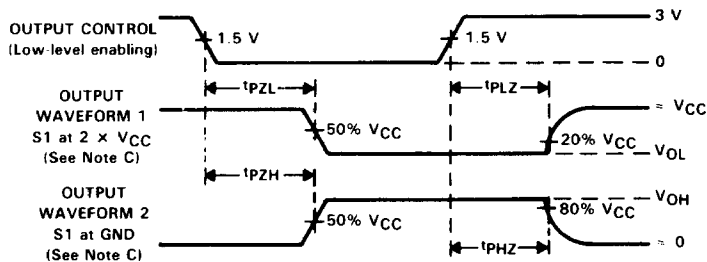
ENABLE AND DISABLE TIMES

NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR $\leq$ 10 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control.
Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
D. The outputs are measured one at a time with one input transition per measurement.

FIGURE 1. LOAD CIRCUIT AND VOLTAGE WAVEFORMS