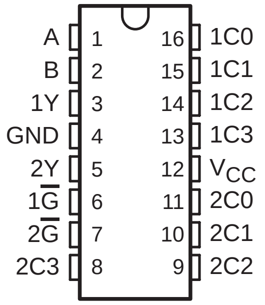
54ACT11353, 74ACT11353
DUAL 1-OF-4 DATA SELECTORS/MULTIPLEXERS WITH 3-STATE OUTPUTS

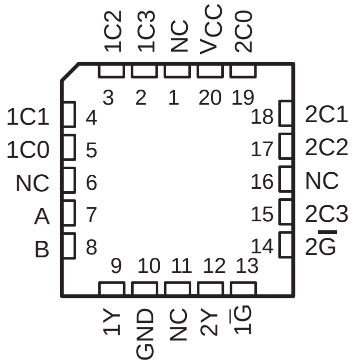
SCAS045A − D3109, JUNE 1988 − REVISED APRIL 1993

- **Inverting Versions of 54ACT11253 and 74ACT11253**
- **Permits Multiplexing From N Lines to 1 Line**
- **Performs Parallel-to-Serial Conversion**
- **Inputs Are TTL-Voltage Compatible**
- **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**
- **Package Options Include Plastic Small-Outline Packages, Ceramic Chip Carriers, and Standard Plastic and Ceramic 300-mil DIPs**

54ACT11353 . . . J PACKAGE
74ACT11535 . . . D OR N PACKAGE
(TOP VIEW)



54ACT11353 . . . FK 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 ($\overline{G}$) are provided for each of the two four-line sections.

The 3-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 strobe ($\overline{G}$). The output is disabled when its strobe is high.

The 54ACT11353 is characterized for operation over the full military temperature range of − 55°C to 125°C. The 74ACT11353 is characterized for operation from − 40°C to 85°C.

FUNCTION TABLE

SELECT INPUTS		DATA INPUTS				STROBE $\overline{G}$	OUTPUT Y
B	**A**	**C0**	**C1**	**C2**	**C3**		
X	X	X	X	X	X	H	Z
L	L	L	X	X	X	L	H
L	L	H	X	X	X	L	L
L	H	X	L	X	X	L	H
L	H	X	H	X	X	L	L
H	L	X	X	L	X	L	H
H	L	X	X	H	X	L	L
H	H	X	X	X	L	L	H
H	H	X	X	X	H	L	L

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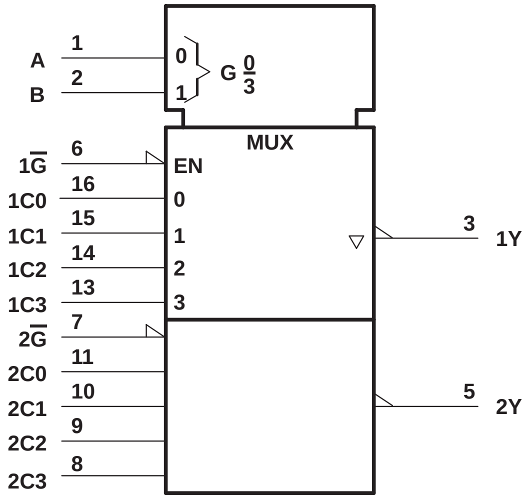
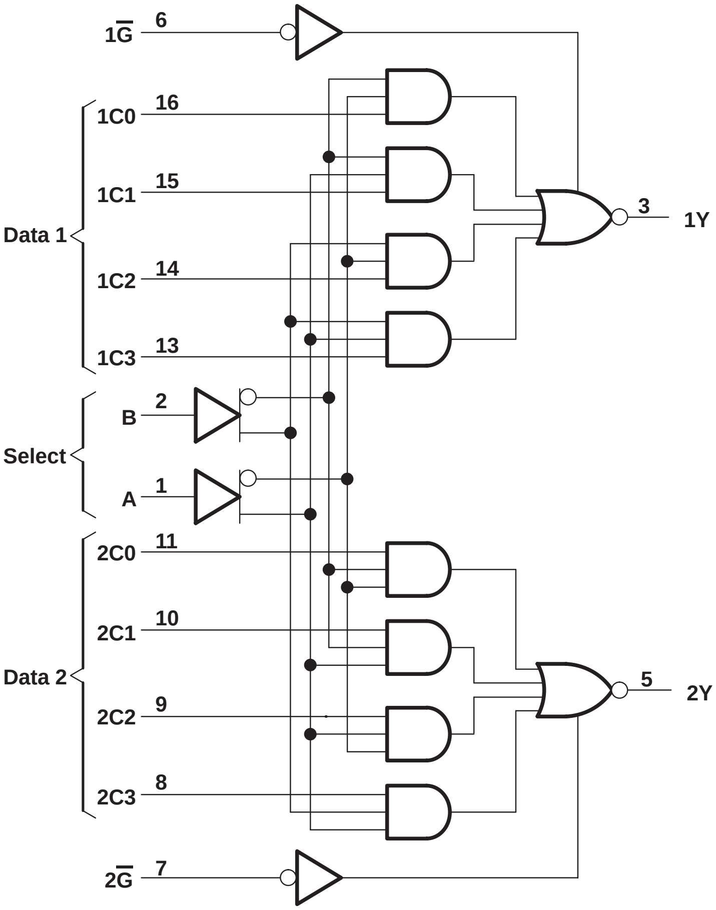
logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)



Pin numbers shown are for the D, J, and N packages.

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	±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

		54ACT11353		74ACT11353		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			54ACT11353		74ACT11353		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V_{OH}	I_{OH} = − 50 μA	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 μA	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 a 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 to V_{CC}.

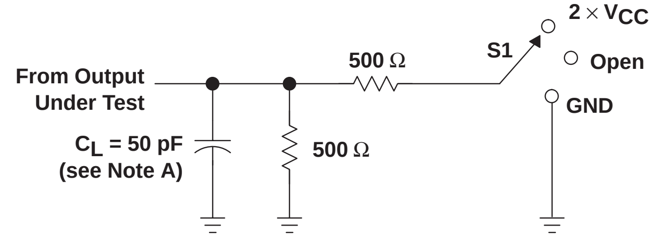
switching characteristics over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			54ACT11353		74ACT11353		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A or B	Any Y	1.5	6.6	11.1	1.5	13.8	1.5	12.7	ns
t_{PHL}			1.5	5.9	8.3	1.5	10.1	1.5	9.4	
t_{PLH}	Data (Any C)	Any Y	1.5	6.3	9.8	1.5	12.3	1.5	11	ns
t_{PHL}			1.5	5.3	7.2	1.5	10.5	1.5	8	
t_{PZH}	$\overline{G}$	Any Y	1.5	4.3	6.8	1.5	7.9	1.5	7.4	ns
t_{PZL}			1.5	4.2	6.7	1.5	7.8	1.5	7.4	
t_{PHZ}	$\overline{G}$	Any Y	1.5	6.1	7.8	1.5	8.6	1.5	8.2	ns
t_{PLZ}			1.5	5.4	6.9	1.5	7.6	1.5	7.3	

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

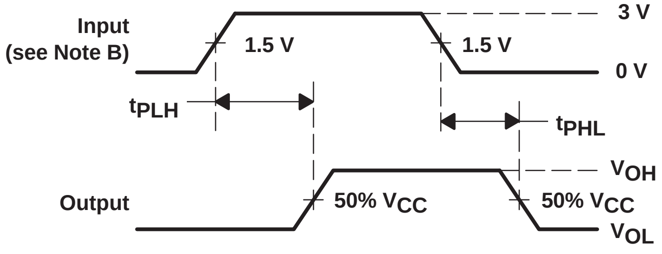
PARAMETER			TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per multiplexer	Outputs enabled	C_L = 50 pF, f = 1 MHz	39	pF
		Outputs disabled		19	

PARAMETER MEASUREMENT INFORMATION

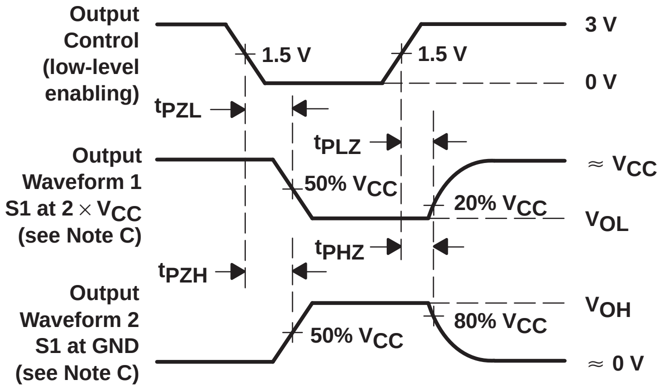


LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 × V_{CC}
t_{PHZ}/t_{PZH}	GND



VOLTAGE WAVEFORMS



VOLTAGE WAVEFORMS

NOTES: A. C_L includes probe and jig capacitance.
B. All input pulses are supplied by generators having the following characteristics: PRR ≤ 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

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