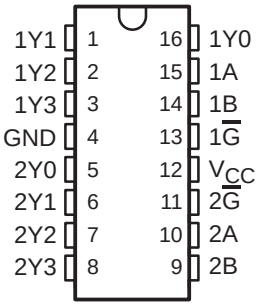
- **Inputs Are TTL-Voltage Compatible**
- **Designed Specifically for High-Speed Memory Decoders and Data Transmission Systems**
- **Incorporates Two Enable Inputs to Simplify Cascading and/or Data Reception**
- **Fully Synchronous Operation for Counting**
- **Center-Pin V_{CC} and GND Configurations Minimize High-Speed Switching Noise**
- ***EPIC*™ (Enhanced-Performance Implanted CMOS) 1-μm Process**
- **500-mA Typical Latch-Up Immunity at 125°C**
- **Package Options Include Plastic Small-Outline (D) and Thin Shrink Small-Outline (PW) Packages, and Standard Plastic 300-mil DIPs (N)**

D, N, OR PW PACKAGE
(TOP VIEW)



description

The 74ACT11139 is designed for use in high-performance memory-decoding or data-routing applications that require very short propagation delay times. In high-performance memory systems, this decoder is used to minimize the effects of system decoding.

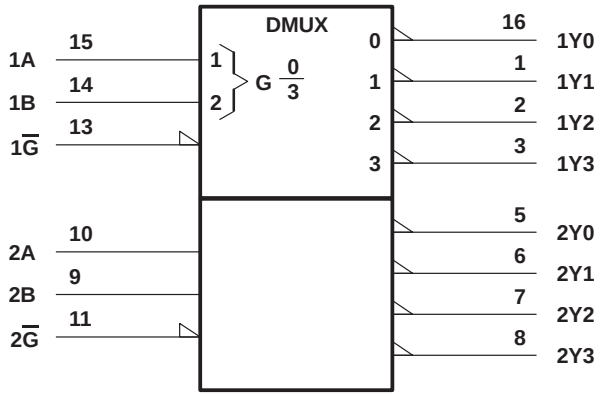
The 74ACT11139 is composed of two individual 2-line to 4-line decoders in a single package. The active-low enables ($1\overline{G}$ or $2\overline{G}$) can be used as data lines in demultiplexing applications. This decoder/demultiplexer features fully buffered inputs, each of which represents only one normalized load to its driving circuit.

The 74ACT11139 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

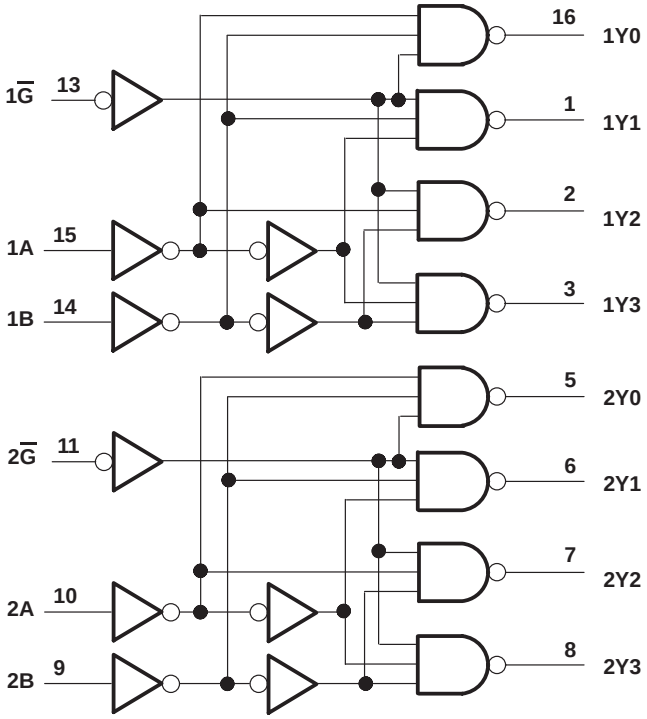
INPUTS			OUTPUTS			
$\overline{G}$	B	A	Y0	Y1	Y2	Y3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

logic symbol†



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

logic diagram (positive logic)



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 . . . . . ±200 mA
Maximum power dissipation at T_A = 55°C (in still air) (see Note 2): D package . . . . . 1.3 W
N package . . . . . 1.1 W
PW package . . . . . 0.5 W
Storage temperature range, T_{stg} . . . . . –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.

NOTES: 1. The input and output voltage ratings may be exceeded if the input and output current ratings are observed.
2. The maximum package power dissipation is calculated using a junction temperature of 150°C and a board trace length of 750 mils, except for the N package, which has a trace length of zero.

recommended operating conditions (see Note 3)

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
V_I	Input voltage	0		V_{CC}	V
V_O	Output voltage	0		V_{CC}	V
I_{OH}	High-level output current			–24	mA
I_{OL}	Low-level output current			24	mA
$\Delta t/\Delta v$	Input transition rise or fall rate	0		10	ns/V
T_A	Operating free-air temperature	–40		85	°C

NOTE 3: Unused or floating inputs must be held high or low.

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

PARAMETER	TEST CONDITIONS		V_{CC}	T_A = 25°C			MIN	MAX	UNIT
				MIN	TYP	MAX			
V_{OH}	I_{OH} = –50 μA		4.5 V	4.4			4.4		V
			5.5 V	5.4			5.4		
	I_{OH} = –24 mA		4.5 V	3.94			3.8		
			5.5 V	4.94			4.8		
	I_{OH} = –75 mA†		5.5 V				3.85		
V_{OL}	I_{OL} = 50 μA		4.5 V			0.1		0.1	V
			5.5 V			0.1		0.1	
	I_{OL} = 24 mA		4.5 V			0.36		0.44	
			5.5 V			0.36		0.44	
	I_{OL} = 75 mA†		5.5 V					1.65	
I_I	$V_I = V_{CC}$ or GND		5.5 V			±0.1		±1	μA
I_{CC}	$V_I = V_{CC}$ or GND,	I_O = 0	5.5 V			8		80	μA
ΔI_{CC}‡	One input at 3.4 V,	Other inputs at V_{CC} or GND	5.5 V			0.9		1	mA
C_i	$V_I = V_{CC}$ or GND		5 V		3.5				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 or V_{CC}.

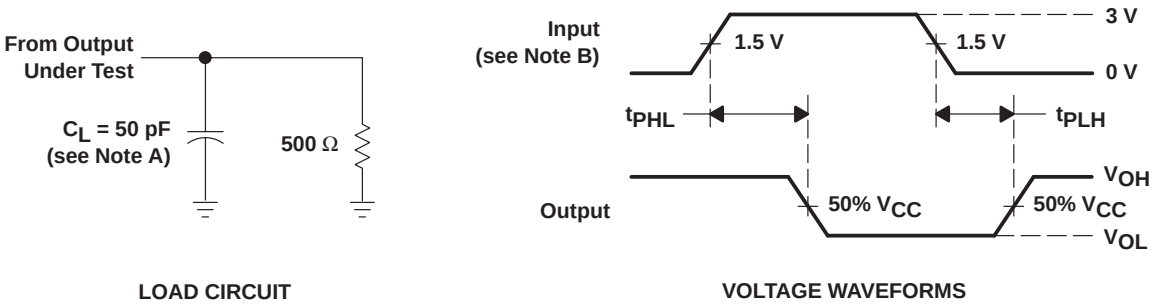
switching characteristics over recommended operating free-air temperature range, V_{CC} = 5 V ± 0.5 V (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	T_A = 25°C			MIN	MAX	UNIT
			MIN	TYP	MAX			
t_{PLH}	A or B	Y	1.7	5.7	7.8	1.7	8.5	ns
t_{PHL}			2.1	5.5	7.4	2.1	8.5	
t_{PLH}	$\overline{G}$	Y	2.7	5.3	7.2	2.7	7.9	ns
t_{PHL}			1.8	4.3	6.7	1.8	7.5	

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

PARAMETER		TEST CONDITIONS		TYP	UNIT
C_{pd}	Power dissipation capacitance	C_L = 50 pF,	f = 1 MHz	47	pF

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT **VOLTAGE WAVEFORMS**

NOTES: A. C_L includes probe and jig capacitance.
B. Input pulses are supplied by generators having the following characteristics: PRR ≤ 1 MHz, Z_O = 50 Ω, t_r = 3 ns, t_f = 3 ns.
C. 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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