

1. DESCRIPTION

These Schottky-clamped TTL MSI circuits are designed to be used in high-performance memory-decoding or data-routing applications requiring very short propagation delay times. In high-performance memory systems, these decoders can be used to minimize the effects of system decoding. When employed with high-speed memories utilizing a fast-enable circuit, the delay times of these decoders and the enable time of the memory are usually less than the typical access time of the memory. This means that the effective system delay introduced by the Schottky-clamped system decoder is negligible.

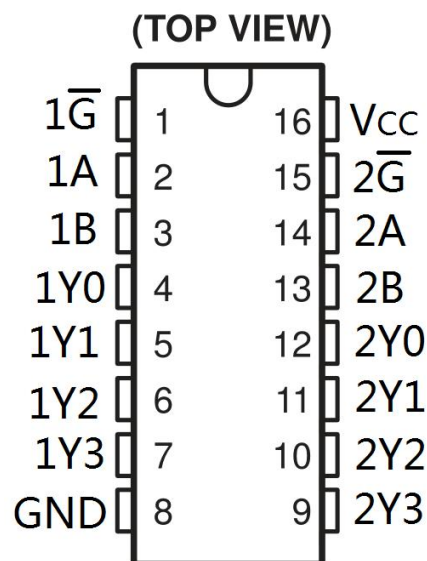
The circuit comprises two individual two-line to four-line decoders in a single package. The active-low enable input can be used as a data line in demultiplexing applications.

All of these decoders/demultiplexers feature fully buffered inputs, each of which represents only one normalized load to its driving circuit. All inputs are clamped with high-performance Schottky diodes to suppress line-ringing and to simplify system design.

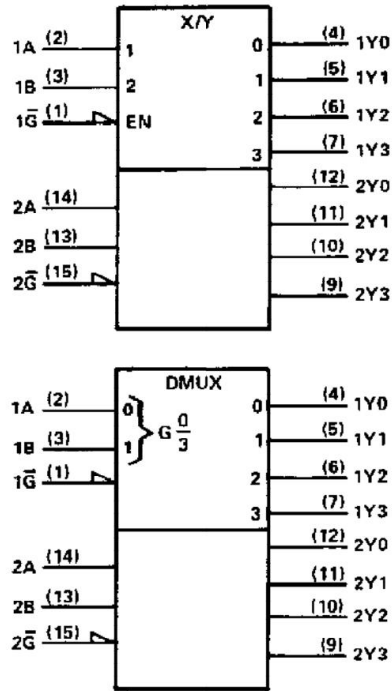
2. FEATURES

- Designed Specifically for High-Speed: Memory Decoders
- Two Fully Independent 2-to 4-Line Decoders/Demultiplexers
- Schottky Clamped for High Performance

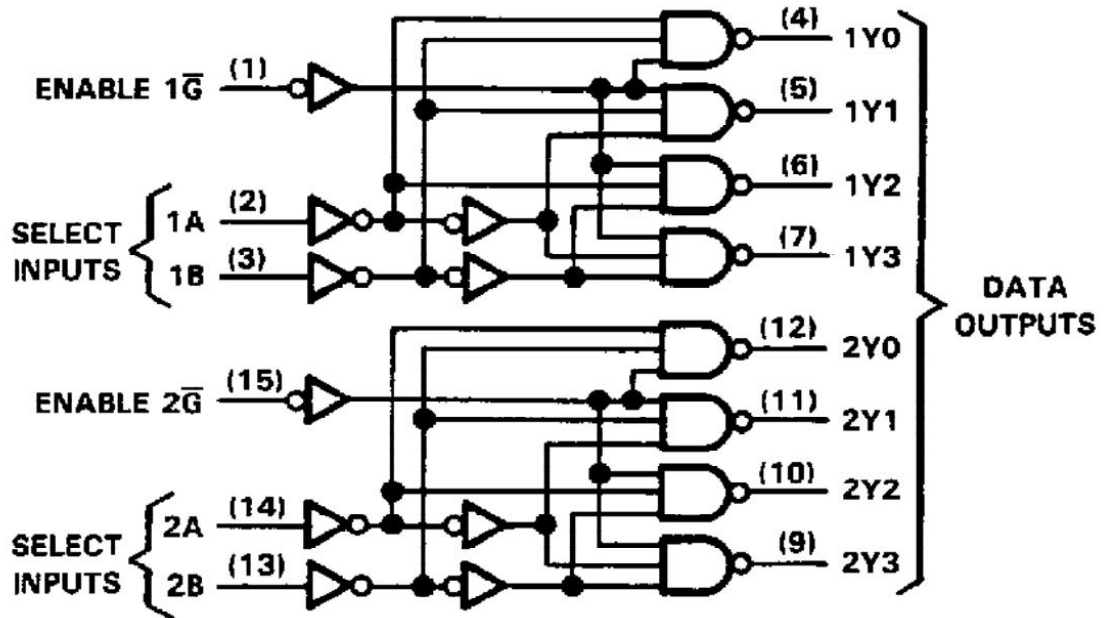
3. PIN CONFIGURATIONS



4. LOGIC SYMBOL

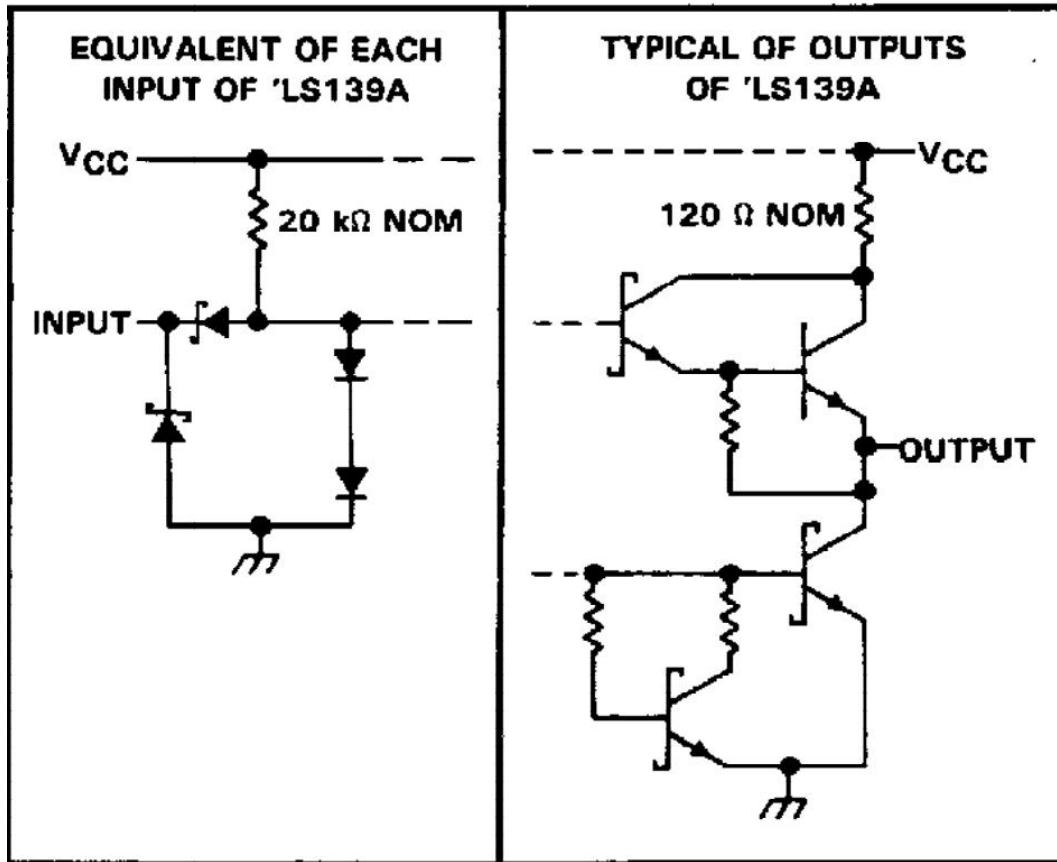


5. LOGIC DIAGRAMS



INPUT		OUTPUTS				
ENABLE	SELECT		Y0	Y1	Y2	Y3
\overline{G}	B	A				
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

6. SCHEMATICS OF INPUTS AND OUTPUTS



7. ABSOLUTE MAXIMUM RATINGS OVER OPERATING FREE-AIR TEMPERATURE RANGE (UNLESS OTHERWISE NOTES)

Supply voltage, V_{CC}	7V
Input voltage, V_I : 74LS139.....	7V
Operating free-air temperature range: SOP, DIP package.....	0°C to 70°C
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.

8. RECOMMENDED OPERATING CONDITIONS

		74LS153			UNIT
		MIN	NOM	MAX	
V _{CC}	Supply voltage	4.75	5	5.25	V
V _{IH}	High-level input voltage	2			V
V _{IL}	Low-level input voltage			0.8	V
I _{OH}	High-level output current			-0.4	mA
I _{OL}	Low-level output current			8	mA
T _A	Operating free-air temperature	0		70	°C

9. ELECTRICAL CHARACTERISTICS OVER RECOMMENDED OPERATING FREE-AIR RANGE (UNLESS OTHERWISE NOTED)

PARAMETER		TEST CONDITIONS [†]		74LS153			UNIT
				MIN	TYP [‡]	MAX	
V _{IK}	Input clamp voltage	V _{CC} = MIN, I _I = -18 mA				-1.5	V
V _{OH}	High-level output voltage	V _{CC} = MIN, V _{IL} = 0.8 V, V _{IH} = 2 V, I _{OH} = -400 μA		2.7	3.4		V
V _{OL}	Low-level output voltage	V _{CC} = MIN, V _{IH} = 2 V, V _{IL} = V _{IL} MAX	I _{OL} = 4 mA	0.25	0.4		V
			I _{OL} = 8 mA	0.35	0.5		
I _I	Input current at maximum input voltage	V _{CC} = MAX, V _I = 7 V				0.1	mA
I _{IH}	High-level input current	V _{CC} = MAX, V _I = 2.7 V				20	μA
I _{IL}	Low-level input current	V _{CC} = MAX, V _I = 0.4 V				-0.4	mA
I _{OS}	Short-circuit output current [§]	V _{CC} = MAX		-20		-100	mA
I _{CC}	Supply current	V _{CC} = MAX, Outputs enabled and open		6.8		11	mA

[†] For conditions shown as MIN or MAX, use the appropriate value specified under recommended operating conditions.

[‡] All typical values are at V_{CC} = 5 V, T_A = 25°C.

[§] Not more than one output should be shorted at a time.

10. SWITCHING CHARACTERISTICS, V_{CC} = 5 V, T_A = 25°C

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

PARAMETER†	FROM (INPUT)	TO (OUTPUT)	LEVELS OF DELAY	TEST CONDITIONS	MIN	TYP	MAX	UNIT
t _{PLH}	Binary Select	Any	2	C _L = 15 pF, R _L = 2 kΩ	13	20		ns
t _{PHL}					22	33		ns
t _{PLH}			3		18	29		ns
t _{PHL}					25	38		ns
t _{PLH}	Enable	Any	2		16	24		ns
t _{PHL}					21	32		ns

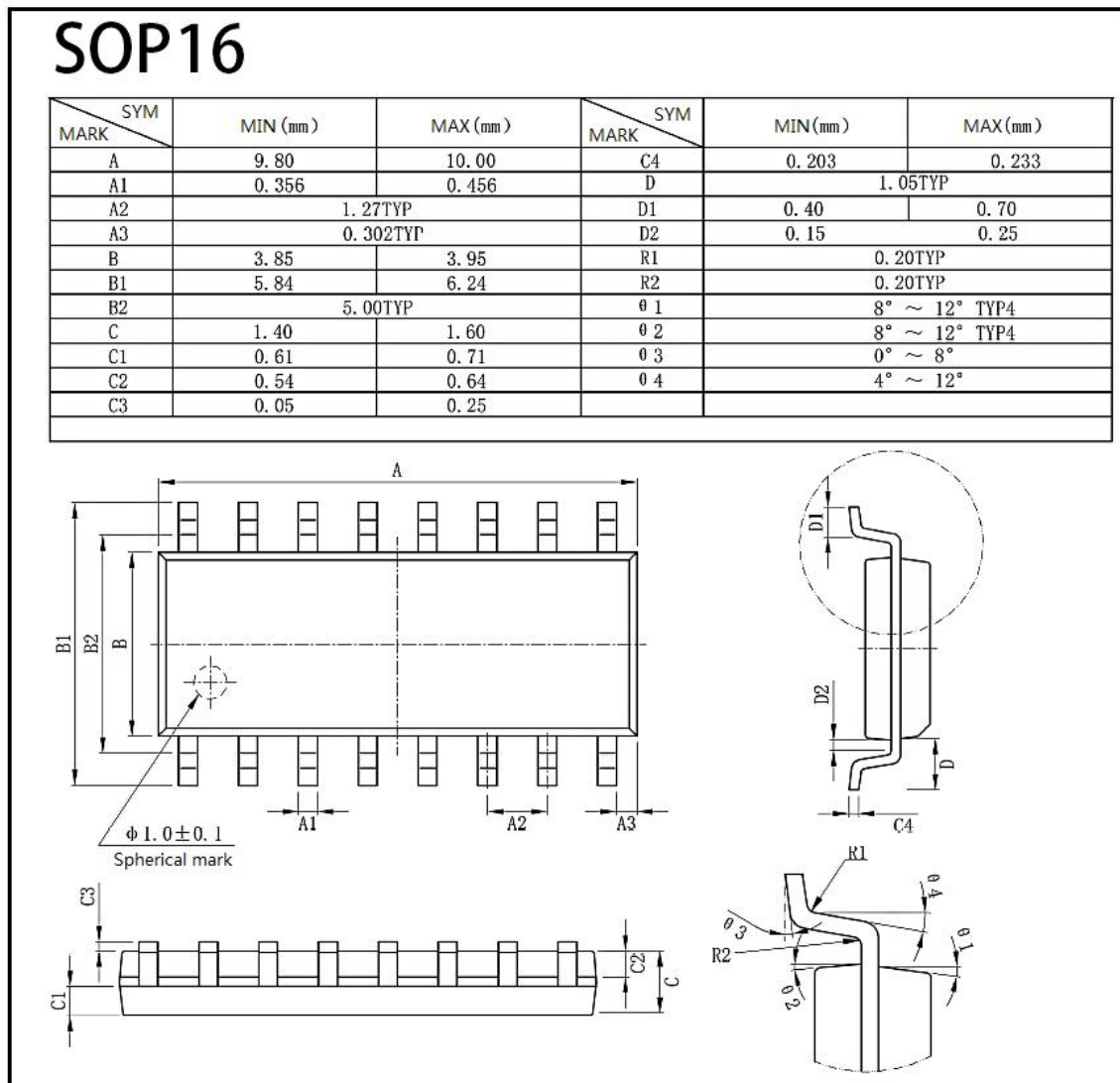
† t_{PLH} = propagation delay time, low-to-high-level output
t_{PHL} = propagation delay time, high-to-low-level output

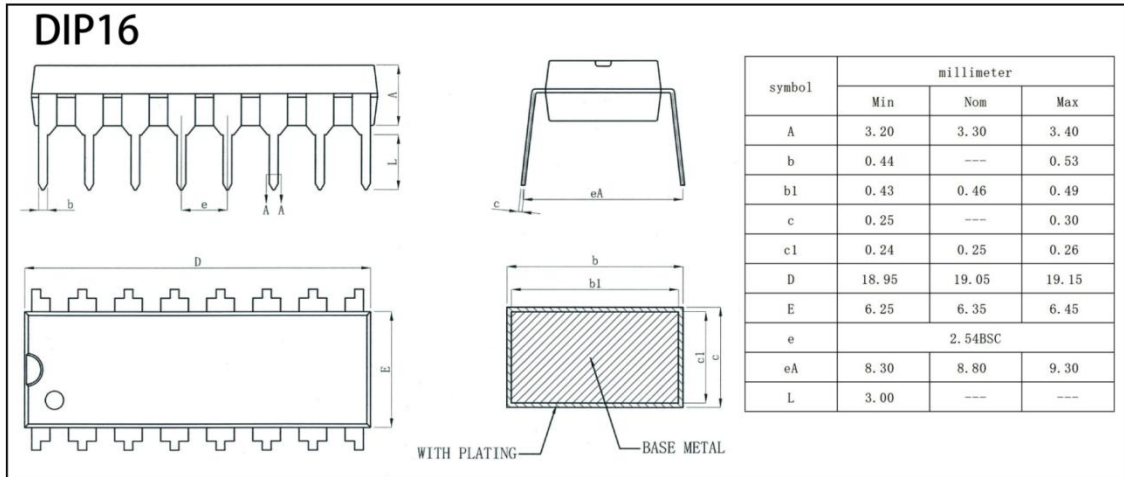
11. ORDERING INFORMATION

Ordering Information

Part Number	Device Marking	Package Type	Body size (mm)	Temperature (°C)	MSL	Transport Media	Package Quantity
XL74LS139	XL74LS139	SOP16	10.00 * 3.95	-0 to 70	MSL3	T&R	2500
XD74LS139	XD74LS139	DIP16	19.05 * 6.35	-0 to 70	MSL3	Tube 25	1000

12. DIMENSIONAL DRAWINGS





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