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 introduces by the Schottky-clamped system decoder is negligible.
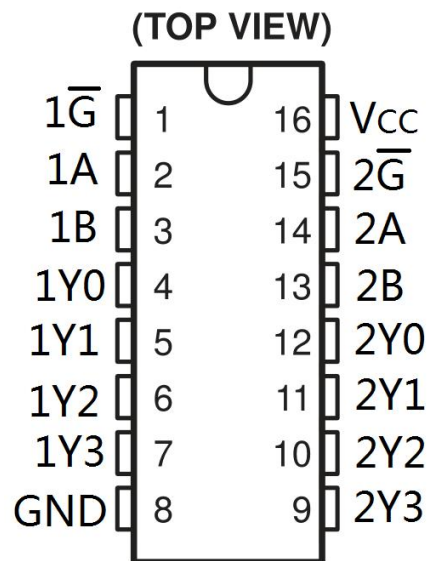
The circuit comprises two individual two-line to four-line decoders in a single package.The active-low enable input can be used as a data line in demultiplexing applications.

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.
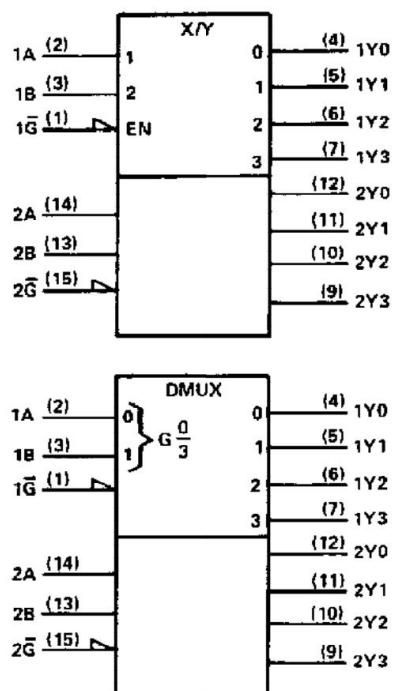
2. FEATURES

- Designed Specifically for High-Speed: Memory Decoders

- Two Fully Independent 2-to 4-Line Decoders/Demultiplexers

- Schottky Clamped for High Performance

3. PIN CONFIGURATIONS

(TOP VIEW)

1$\overline{\text{G}}$	1		16	V$_{\text{CC}}$
1A	2		15	2$\overline{\text{G}}$
1B	3		14	2A
1Y0	4		13	2B
1Y1	5		12	2Y0
1Y2	6		11	2Y1
1Y3	7		10	2Y2
GND	8		9	2Y3

4. LOGIC SYMBOL

	X/Y	
1A (2)	1	0 (4) 1Y0
1B (3)	2	1 (5) 1Y1
1G̅ (1)	EN	2 (6) 1Y2
		3 (7) 1Y3
2A (14)		(12) 2Y0
2B (13)		(11) 2Y1
2G̅ (15)		(10) 2Y2
		(9) 2Y3

	DMUX	
1A (2)	0 G 0/3	0 (4) 1Y0
1B (3)	1	1 (5) 1Y1
1G̅ (1)		2 (6) 1Y2
		3 (7) 1Y3
2A (14)		(12) 2Y0
2B (13)		(11) 2Y1
2G̅ (15)		(10) 2Y2
		(9) 2Y3

5. LOGIC DIAGRAMS
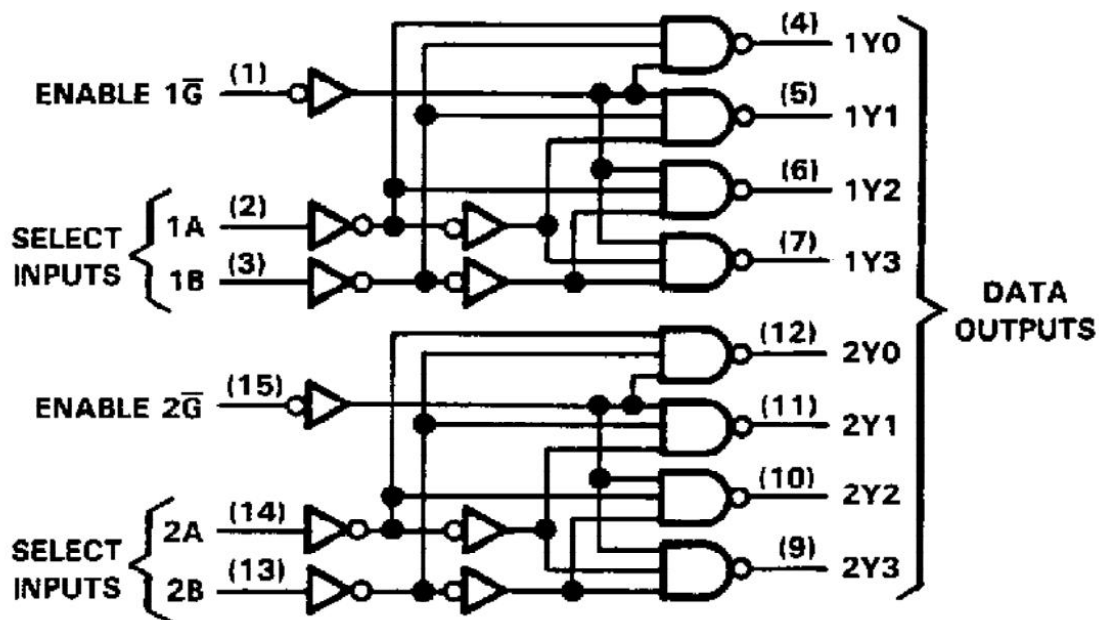
INPUT			OUTPUTS			
ENABLE	SELECT					
$\overline{G}$	B	A	Y0	Y1	Y2	Y3
H	X	X	H	H	H	H
L	L	L	L	H	H	H
L	L	H	H	L	H	H
L	H	L	H	H	L	H
L	H	H	H	H	H	L

6. SCHEMATICS OF INPUTS AND OUTPUTS
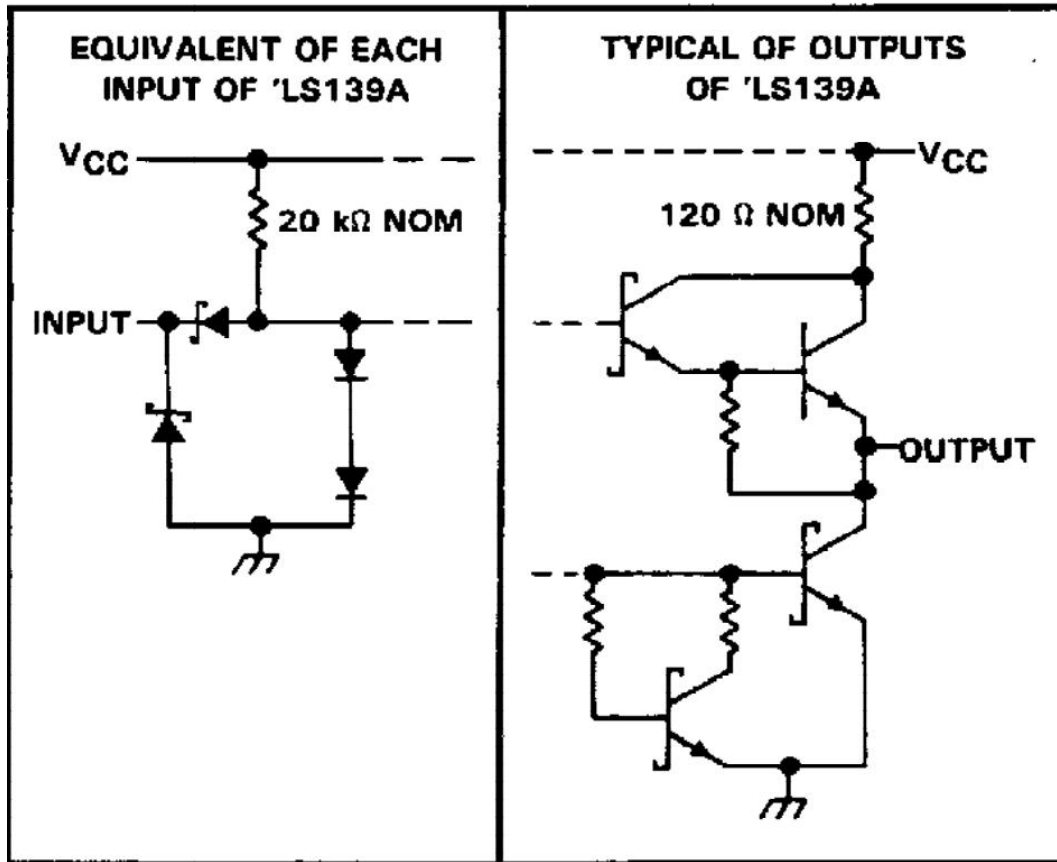
7. ABSOLUTE MAXIMUM RATINGS OVER OPERATING FREE-AIR TEMPERATURE RANGE (UNLESS OTHERWISE NOTES)

Supply voltage, V_{CC} 7V

Input voltage, VI: 74LS139.. 7V

Operating free-air temperature range:SOP, DIP package...0°C to 70°C

Storage temperature range, Tstg... −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,VCC = 5 V, TA = 25℃

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

SOP16

SYM MARK	MIN (mm)	MAX (mm)	SYM MARK	MIN (mm)	MAX (mm)
A	9.80	10.00	C4	0.203	0.233
A1	0.356	0.456	D	1.05TYP	
A2	1.27TYP		D1	0.40	0.70
A3	0.302TYP		D2	0.15	0.25
B	3.85	3.95	R1	0.20TYP	
B1	5.84	6.24	R2	0.20TYP	
B2	5.00TYP		θ1	8° ~ 12° TYP4	
C	1.40	1.60	θ2	8° ~ 12° TYP4	
C1	0.61	0.71	θ3	0° ~ 8°	
C2	0.54	0.64	θ4	4° ~ 12°	
C3	0.05	0.25			
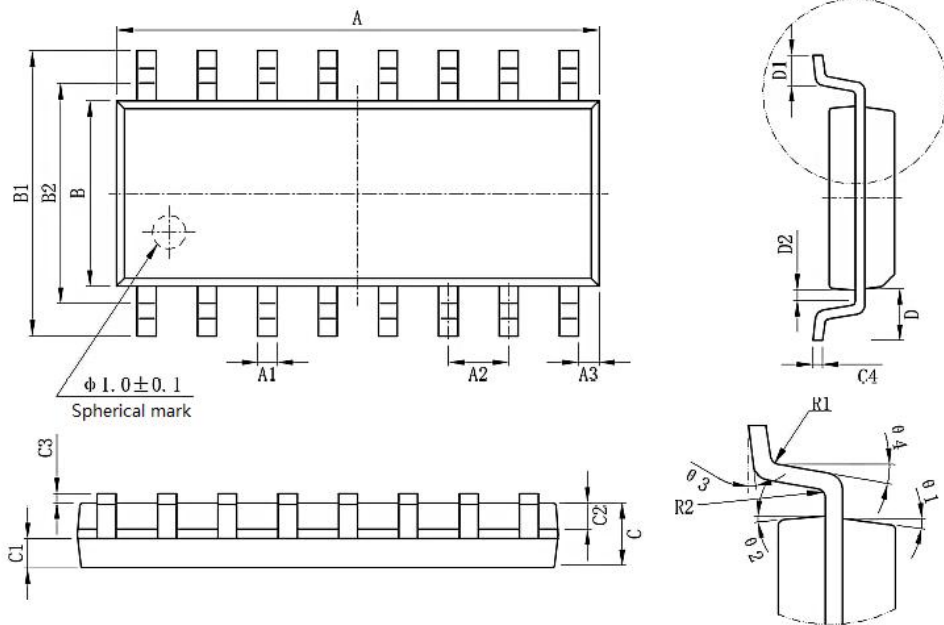
DIP16
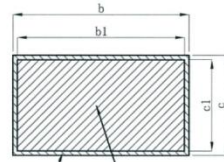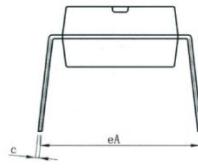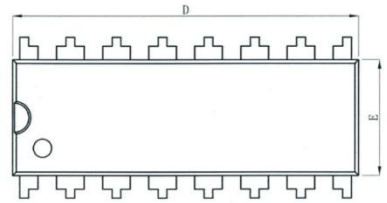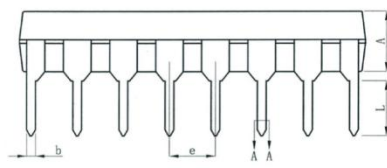
symbol	millimeter		
	Min	Nom	Max
A	3.20	3.30	3.40
b	0.44	---	0.53
b1	0.43	0.46	0.49
c	0.25	---	0.30
c1	0.24	0.25	0.26
D	18.95	19.05	19.15
E	6.25	6.35	6.45
e	2.54BSC		
eA	8.30	8.80	9.30
L	3.00	---	---

WITH PLATING — BASE METAL

[if you need help contact us. Xinluda reserves the right to change the above information without prior notice]