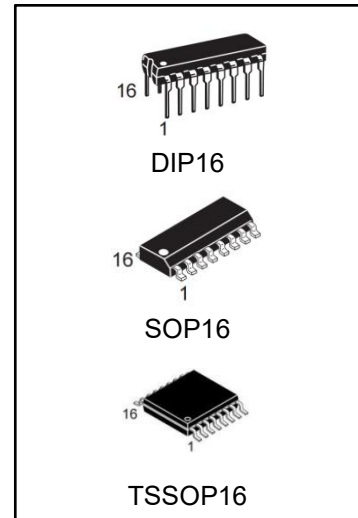


3-to-8 line decoder/demultiplexer**FEATURES**

- Demultiplexing capability
- Multiple input enable for easy expansion
- Ideal for memory chip select decoding
- Active HIGH mutually exclusive outputs
- Output capability: standard
- ICC category: MSI

**ORDERING INFORMATION**

DEVICE	Package Type	MARKING	Packing	Packing Qty
74HC238N	DIP16	74HC238	TUBE	1000/box
74HC238M/TR	SOP16	74HC238	REEL	2500/reel
74HC238MT/TR	TSSOP16	HC238	REEL	2500/reel

PIN DESCRIPTION

PIN NO.	SYMBOL	NAME AND FUNCTION
1, 2, 3	A ₀ to A ₂	address inputs
4, 5	\bar{E}_1, \bar{E}_2	enable inputs (active LOW)
6	E ₃	enable input (active HIGH)
8	GND	ground (0 V)
15, 14, 13, 12, 11, 10, 9, 7	Y ₀ to Y ₇	outputs (active HIGH)
16	VCC	positive supply voltage

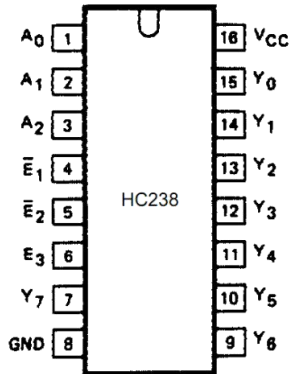


Fig.1 Pin configuration.

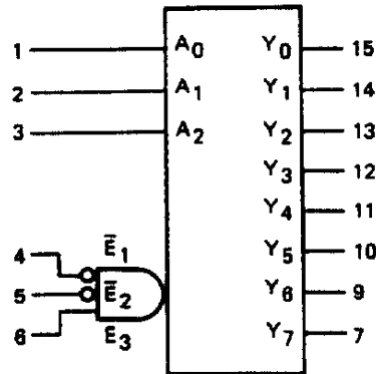


Fig.2 Logic symbol.

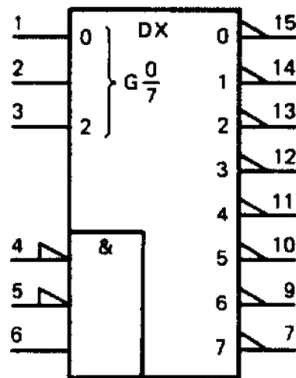


Fig.3 IEC logic symbol.

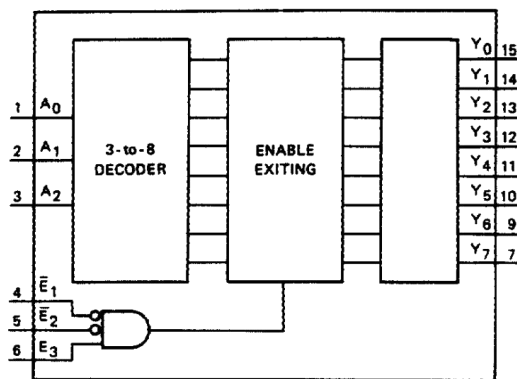


Fig.4 Functional diagram.

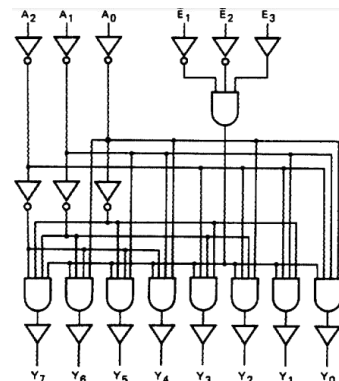


Fig.5 Logic diagram.

FUNCTION TABLE

INPUTS						OUTPUTS							
\bar{E}_1	\bar{E}_2	E_3	A_0	A_1	A_2	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
H	X	X	X	X	X	L	L	L	L	L	L	L	L
X	H	X	X	X	X	L	L	L	L	L	L	L	L
X	X	L	X	X	X	L	L	L	L	L	L	L	L
L	L	H	L	L	L	H	L	L	L	L	L	L	L
L	L	H	H	L	L	L	H	L	L	L	L	L	L
L	L	H	L	H	L	L	L	H	L	L	L	L	L
L	L	H	H	H	L	L	L	L	H	L	L	L	L
L	L	H	L	L	H	L	L	L	L	H	L	L	L
L	L	H	H	L	H	L	L	L	L	L	H	L	L
L	L	H	L	H	H	L	L	L	L	L	L	H	L
L	L	H	H	H	H	L	L	L	L	L	L	L	H

Note

1. H = HIGH voltage level
2. L = LOW voltage level
3. X = don't care

QUICK REFERENCE DATA

GND = 0 V; $T_{amb} = 25^{\circ}\text{C}$; $t_r = t_f = 6 \text{ ns}$

SYMBOL	PARAMETER	CONDITIONS	TYPICAL	UNIT
t_{PHL}/t_{PLH}	propagation delay A_n to Y_n E_3 to Y_n \bar{E}_n to Y_n	$C_L = 15 \text{ pF}$; $V_{CC} = 5 \text{ V}$	14 16 17	ns ns ns
C_i	input capacitance		3.5	pF
CPD	power dissipation capacitance per package	notes 1 and 2	72	pF

Notes

CPD is used to determine the dynamic power dissipation (PD in μW):

$PD = CPD \times V_{CC}^2 \times f_i + \sum (C_L \times V_{CC}^2 \times f_o)$ where:

f_i = input frequency in MHz

f_o = output frequency in MHz

$\sum (C_L \times V_{CC} \times f_o)$ = sum of outputs

C_L = output load capacitance in pF

V_{CC} = supply voltage in V

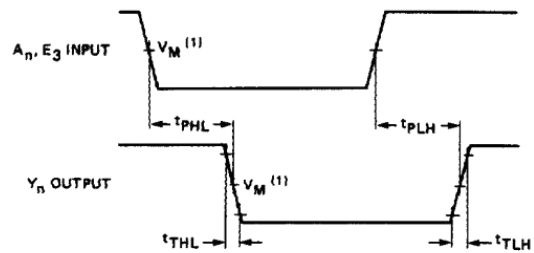
For HC238 the condition is $V_I = \text{GND to } V_{CC}$

AC CHARACTERISTICS FOR

GND = 0 V; $t_r = t_f = 6$ ns; CL = 50 pF

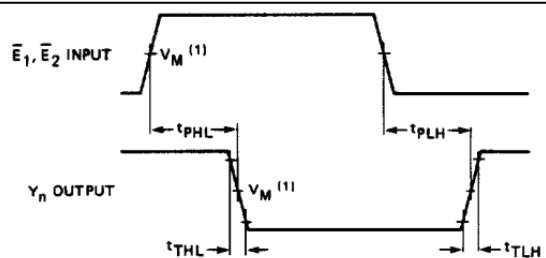
SYMBOL	PARAMETER	T _{amb} (°C)							UNIT	TEST CONDITIONS	
		HC238								V _{CC} (V)	WAVEFORMS
		+25			-40 to +85		-40 to +125				
		min.	typ.	max.	min.	max.	min.	max.			
t _{PHL} / t _{PLH}	propagation delay A _n to Y _n		47	150		190		225	ns	2.0 4.5 6.0	Fig.6
			17	30		38		45			
			14	26		33		38			
t _{PHL} / t _{PLH}	propagation delay E ₃ to Y _n		52	160		200		240	ns	2.0 4.5 6.0	Fig.6
			19	32		40		48			
			15	27		34		41			
t _{PHL} / t _{PLH}	propagation delay E _n to Y _n		50	155		195		235	ns	2.0 4.5 6.0	Fig.7
			18	31		39		47			
			14	26		33		40			
t _{THL} / t _{TLH}	output transition time		19	75		95		110	ns	2.0 4.5 6.0	Figs 6 and 7
			7	15		19		22			
			6	13		16		19			

AC WAVEFORMS



(1)HC238: V_M = 50%; V_I = GND to V_{CC}.

Fig.6 Waveforms showing the address input (A_n) and enable input (E₃) to output (Y_n) propagation delays and the output transition times.

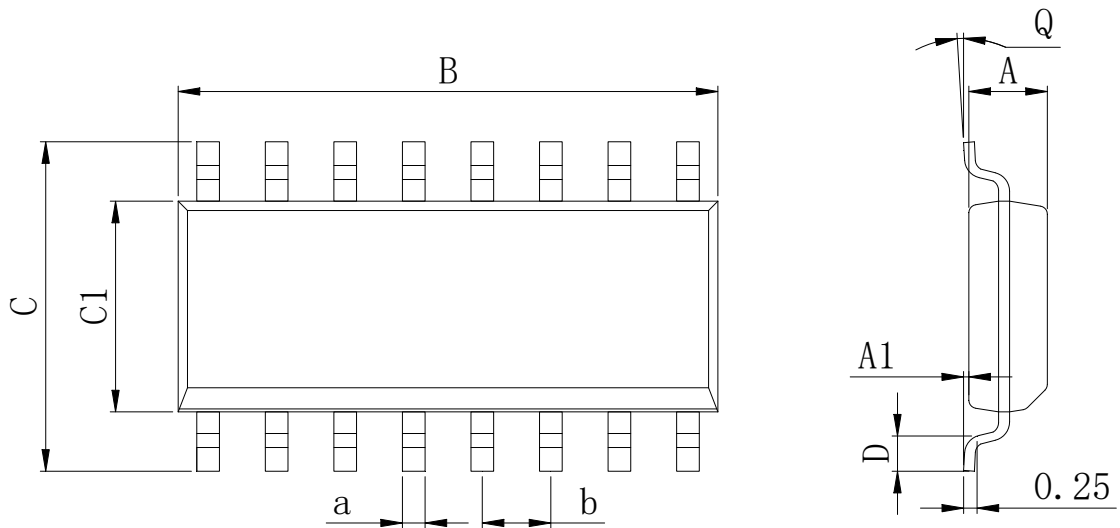


(1)HC238: V_M = 50%; V_I = GND to V_{CC}.

Fig.7 Waveforms showing the enable input (E_n) to output (Y_n) propagation delays and the output transition times.

Physical Dimensions

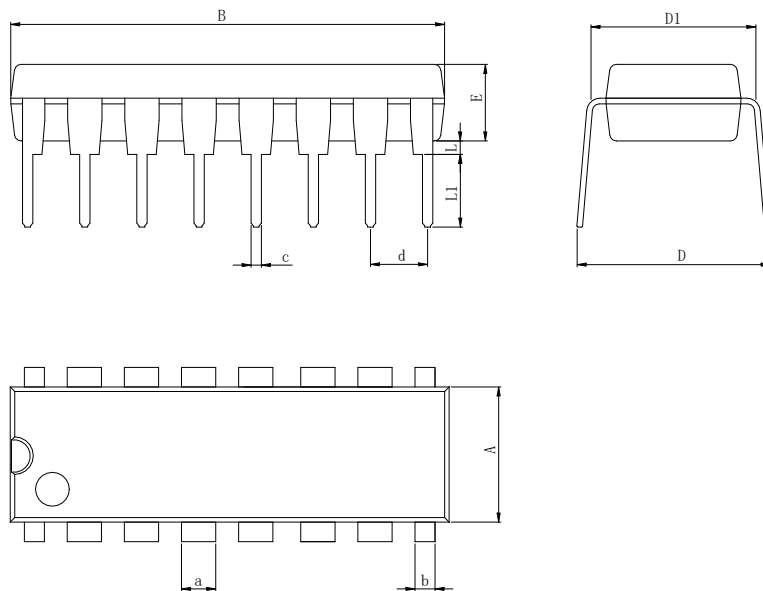
SOP16



Dimensions In Millimeters(SOP16)

Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	1.35	0.05	9.80	5.80	3.80	0.40	0°	0.35	1.27 BSC
Max:	1.55	0.20	10.0	6.20	4.00	0.80	8°	0.45	

DIP16

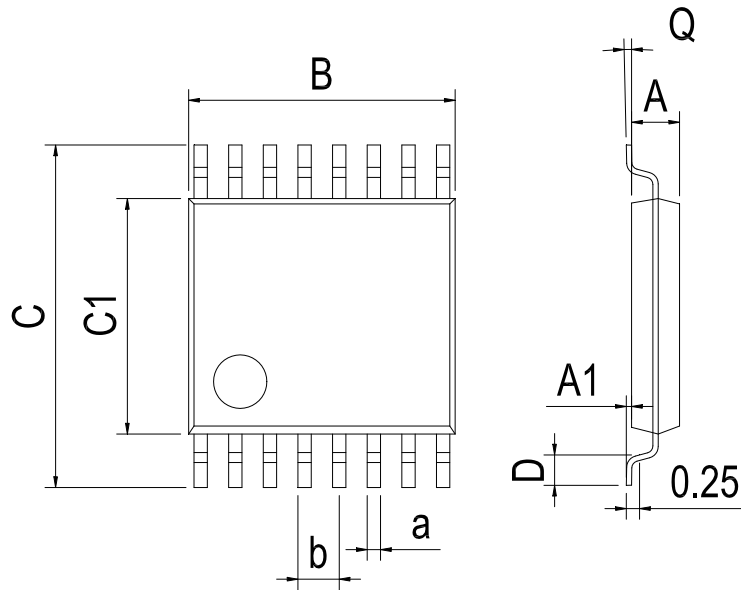


Dimensions In Millimeters(DIP16)

Symbol:	A	B	D	D1	E	L	L1	a	b	c	d
Min:	6.10	18.94	8.40	7.42	3.10	0.50	3.00	1.50	0.85	0.40	2.54 BSC
Max:	6.68	19.56	9.00	7.82	3.55	0.70	3.60	1.55	0.90	0.50	

Physical Dimensions

TSSOP16



Dimensions In Millimeters(TSSOP16)									
Symbol:	A	A1	B	C	C1	D	Q	a	b
Min:	0.85	0.05	4.90	6.20	4.30	0.40	0°	0.20	0.65 BSC
Max:	0.95	0.20	5.10	6.60	4.50	0.80	8°	0.25	