



CD74HC/HCT238 (LX)

3-to-8 Line Decoder/Demultiplexer

Product Specification

Specification Revision History:

Version	Date	Description
2021-06-A1	2021-06	New
2023-04-B1	2023-04	Update the template



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1、General Description

The CD74HC/HCT238 decodes three binary weighted address inputs (A0, A1 and A2) to eight mutually exclusive outputs (Y0 to Y7). The device features three enable inputs ($\bar{E}1$ and $\bar{E}2$ and E3). Every output will be LOW unless $\bar{E}1$ and $\bar{E}2$ are LOW and E3 is HIGH. This multiple enable function allows easy parallel expansion to a 1-of-32 (5 to 32 lines) decoder with just four CD74HC/HCT238 ICs and one inverter. The CD74HC/HCT238 can be used as an eight output demultiplexer by using one of the active LOW enable inputs as the data input and the remaining enable inputs as strobes. Inputs include clamp diodes. This enables the use of current limiting resistors to interface inputs to voltages in excess of V_{CC} .

Features:

- Input levels:
For CD74HC238: CMOS level
For CD74HCT238: TTL level
- Demultiplexing capability
- Multiple input enable for easy expansion
- Ideal for memory chip select decoding
- Active HIGH mutually exclusive outputs
- Specified from -40°C to +125°C
- Packaging information: DIP16/SOP16/TSSOP16



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Tab: 835-12-B4

Number:CD74HC/HCT238-LX-LJ-A089EN

Ordering Information:

Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
CD74HC238E (LX)	DIP16	CD74HC238E	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
CD74HCT238E (LX)	DIP16	74HCT238	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
CD74HC238D (LX)	SOP16	74HC238	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
CD74HCT238D (LX)	SOP16	74HCT238	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
CD74HC238P (LX)	TSSOP16	74HC238	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
CD74HCT238P (LX)	TSSOP16	74HCT238	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm



Reel packing specifications:

Part number	Packaging form	Marking code	Reel quantity	Boxed reel quantity	Notes
CD74HC238DR (LX)	SOP16	HC238	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
CD74HCT238DR (LX)	SOP16	HCT238	4000 PCS/reel	8000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
CD74HC238PW (LX)	TSSOP16	74HC238	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm
CD74HCT238PW (LX)	TSSOP16	74HCT238	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm

Note: If the physical information is inconsistent with the ordering information, please refer to the actual product.



2、Block Diagram And Pin Description

2.1、Block Diagram

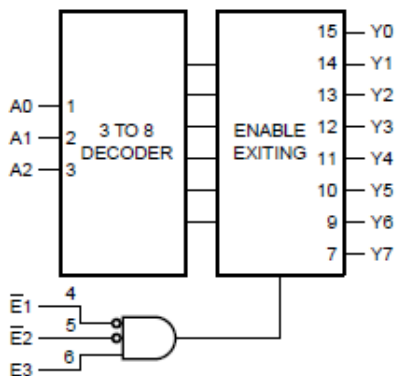


Figure 1. Logic symbol

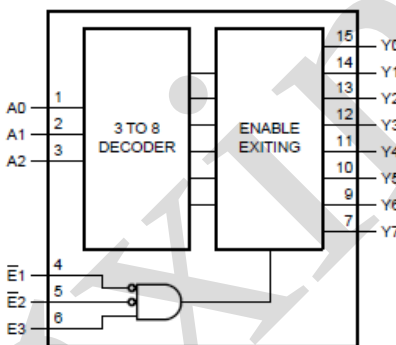


Figure 2. Functional diagram

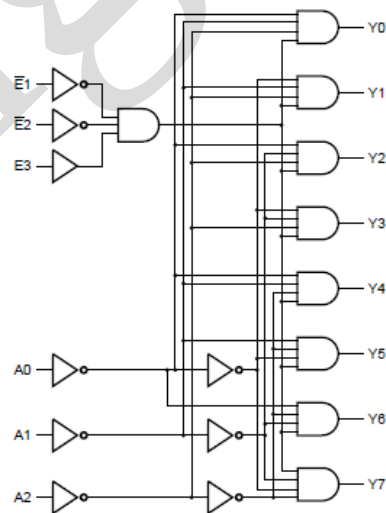
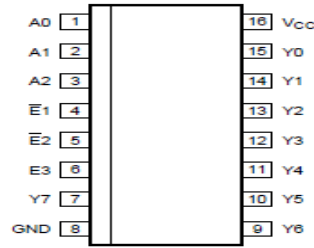


Figure 3. Logic diagram



2.2、Pin Configurations



2.3、Pin Description

Pin No.	Pin Name	Description
1	A0	address input
2	A1	address input
3	A2	address input
4	$\bar{E}1$	enable input (active LOW)
5	$\bar{E}2$	enable input (active LOW)
6	E3	enable input (active HIGH)
7	Y7	output (active HIGH)
8	GND	ground (0V)
9	Y6	output (active HIGH)
10	Y5	output (active HIGH)
11	Y4	output (active HIGH)
12	Y3	output (active HIGH)
13	Y2	output (active HIGH)
14	Y1	output (active HIGH)
15	Y0	output (active HIGH)
16	V _{CC}	supply voltage

2.4、Function Table

Input						Output							
$\bar{E}1$	$\bar{E}2$	E3	A0	A1	A2	Y0	Y1	Y2	Y3	Y4	Y5	Y6	Y7
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: H=HIGH voltage level; L=LOW voltage level; X=don't care.

**3、Electrical Parameter****3.1、Absolute Maximum Ratings**

(Voltages are referenced to GND(ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Max.	Unit
supply voltage	V_{CC}	-	-0.5	+7.0	V
input clamping current	I_{IK}	$V_I < -0.5V$ or $V_I > V_{CC}+0.5V$	-	± 20	mA
output clamping current	I_{OK}	$V_O < -0.5V$ or $V_O > V_{CC}+0.5V$	-	± 20	mA
output current	I_O	$-0.5V < V_O < V_{CC}+0.5V$	-	± 25	mA
supply current	I_{CC}	-	-	+50	mA
ground current	I_{GND}	-	-50	-	mA
storage temperature	T_{stg}	-	-65	+150	°C
total power dissipation	P_{tot}	-	-	500	mW
Soldering temperature	T_L	10s	DIP	245	°C
			SOP/TSSOP	260	°C

3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
CD74HC238						
supply voltage	V_{CC}	-	2.0	5.0	6.0	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=2.0V$	-	-	625	ns/V
		$V_{CC}=4.5V$	-	1.67	139	ns/V
		$V_{CC}=6.0V$	-	-	83	ns/V
ambient temperature	T_{amb}	-	-40	-	+125	°C
CD74HCT238						
supply voltage	V_{CC}	-	4.5	5.0	5.5	V
input voltage	V_I	-	0	-	V_{CC}	V
output voltage	V_O	-	0	-	V_{CC}	V
input transition rise and fall rate	$\Delta t/\Delta V$	$V_{CC}=4.5V$	-	1.67	139	ns/V
ambient temperature	T_{amb}	-	-40	-	+125	°C



3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
CD74HC238							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	1.2	-	V
		V _{CC} =4.5V		3.15	2.4	-	V
		V _{CC} =6.0V		4.2	3.2	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	0.8	0.5	V
		V _{CC} =4.5V		-	2.1	1.35	V
		V _{CC} =6.0V		-	2.8	1.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =2.0V	1.9	2.0	-	V
			I _O =-20uA; V _{CC} =4.5V	4.4	4.5	-	V
			I _O =-20uA; V _{CC} =6.0V	5.9	6.0	-	V
			I _O =-4.0mA; V _{CC} =4.5V	3.98	4.32	-	V
			I _O =-5.2mA; V _{CC} =6.0V	5.48	5.81	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	0	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	0	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	0	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	0.15	0.26	V
			I _O =5.2mA; V _{CC} =6.0V	-	0.16	0.26	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	8.0	uA
input capacitance	C _I	-		-	3.5	-	pF
CD74HCT238							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	1.6	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	1.2	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =-20uA	4.4	4.5	-	V
			I _O =-4.0mA	3.98	4.32	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	0	0.1	V
			I _O =4.0mA	-	0.16	0.26	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	8.0	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V	An inputs	-	-	252	uA
			$\overline{\text{E}}1, \overline{\text{E}}2$ inputs	-	-	144	uA
			E3 input	-	-	522	uA
input capacitance	C _I	-		-	3.5	-	pF



3.3.2、DC Characteristics 2

($T_{amb}=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
CD74HC238							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =2.0V	1.9	-	-	V
			I _O =-20uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-20uA; V _{CC} =6.0V	5.9	-	-	V
			I _O =-4.0mA; V _{CC} =4.5V	3.84	-	-	V
			I _O =-5.2mA; V _{CC} =6.0V	5.34	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.33	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.33	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	80	uA
CD74HCT238							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =-20uA	4.4	-	-	V
			I _O =-4.0mA	3.84	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	-	0.1	V
			I _O =4.0mA	-	-	0.33	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	80	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V	An inputs	-	-	315	uA
			$\overline{\text{E}}1, \overline{\text{E}}2$ inputs	-	-	180	uA
			E3 input	-	-	653	uA



3.3.3、DC Characteristics 3

($T_{amb}=-40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
CD74HC238							
HIGH-level input voltage	V _{IH}	V _{CC} =2.0V		1.5	-	-	V
		V _{CC} =4.5V		3.15	-	-	V
		V _{CC} =6.0V		4.2	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =2.0V		-	-	0.5	V
		V _{CC} =4.5V		-	-	1.35	V
		V _{CC} =6.0V		-	-	1.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL}	I _O =-20uA; V _{CC} =2.0V	1.9	-	-	V
			I _O =-20uA; V _{CC} =4.5V	4.4	-	-	V
			I _O =-20uA; V _{CC} =6.0V	5.9	-	-	V
			I _O =-4.0mA; V _{CC} =4.5V	3.7	-	-	V
			I _O =-5.2mA; V _{CC} =6.0V	5.2	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL}	I _O =20uA; V _{CC} =2.0V	-	-	0.1	V
			I _O =20uA; V _{CC} =4.5V	-	-	0.1	V
			I _O =20uA; V _{CC} =6.0V	-	-	0.1	V
			I _O =4.0mA; V _{CC} =4.5V	-	-	0.4	V
			I _O =5.2mA; V _{CC} =6.0V	-	-	0.4	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =6.0V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =6.0V		-	-	160	uA
CD74HCT238							
HIGH-level input voltage	V _{IH}	V _{CC} =4.5V to 5.5V		2.0	-	-	V
LOW-level input voltage	V _{IL}	V _{CC} =4.5V to 5.5V		-	-	0.8	V
HIGH-level output voltage	V _{OH}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =-20uA	4.4	-	-	V
			I _O =-4.0mA	3.7	-	-	V
LOW-level output voltage	V _{OL}	V _I = V _{IH} or V _{IL} ; V _{CC} =4.5V	I _O =20uA	-	-	0.1	V
			I _O =4.0mA	-	-	0.4	V
input leakage current	I _I	V _I =V _{CC} or GND; V _{CC} =5.5V		-	-	±1.0	uA
supply current	I _{CC}	V _I =V _{CC} or GND; I _O =0A; V _{CC} =5.5V		-	-	160	uA
additional supply current	ΔI _{CC}	V _I =V _{CC} -2.1V; other inputs at V _{CC} or GND; I _O =0A; V _{CC} =4.5V to 5.5V	An inputs	-	-	343	uA
			$\overline{\text{E}}1, \overline{\text{E}}2$ inputs	-	-	196	uA
			E3 input	-	-	711	uA



3.3.4、AC Characteristics 1

($T_{amb}=25^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
CD74HC238						
propagation delay	t_{pd}	An to Yn; see Figure 5	$V_{CC}=2.0\text{V}$	-	47	150 ns
			$V_{CC}=4.5\text{V}$	-	17	30 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	14	- ns
			$V_{CC}=6.0\text{V}$	-	14	26 ns
		E3 to Yn; see Figure 5	$V_{CC}=2.0\text{V}$	-	52	160 ns
			$V_{CC}=4.5\text{V}$	-	19	32 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	16	- ns
			$V_{CC}=6.0\text{V}$	-	15	27 ns
		$\bar{E}n$ to Yn; see Figure 6	$V_{CC}=2.0\text{V}$	-	50	155 ns
			$V_{CC}=4.5\text{V}$	-	18	31 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	17	- ns
			$V_{CC}=6.0\text{V}$	-	14	26 ns
transition time	t_t	see Figure 5, 6	$V_{CC}=2.0\text{V}$	-	19	75 ns
			$V_{CC}=4.5\text{V}$	-	7	15 ns
			$V_{CC}=6.0\text{V}$	-	6	13 ns
power dissipation capacitance	C_{PD}	per package; $V_I=\text{GND}$ to V_{CC}	-	72	-	pF
CD74HCT238						
propagation delay	t_{pd}	An to Yn; see Figure 5	$V_{CC}=4.5\text{V}$	-	19	35 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	18	- ns
		E3 to Yn; see Figure 5	$V_{CC}=4.5\text{V}$	-	20	37 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	20	- ns
		$\bar{E}n$ to Yn; see Figure 6	$V_{CC}=4.5\text{V}$	-	20	35 ns
			$V_{CC}=5.0\text{V}; C_L=15\text{pF}$	-	21	- ns
transition time	t_t	$V_{CC}=4.5\text{V}$; see Figure 5, 6		-	7	15 ns
power dissipation capacitance	C_{PD}	per package; $V_I=\text{GND}$ to $V_{CC}-1.5\text{V}$	-	76	-	pF

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

[2] t_t is the same as t_{THL} and t_{TLH} .

[3] C_{PD} is used to determine the dynamic power dissipation (P_D in uW).

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

f_i =input frequency in MHz;

f_o =output frequency in MHz;

C_L =output load capacitance in pF;

V_{CC} =supply voltage in V;

N =number of inputs switching;

$\sum (C_L \times V_{CC}^2 \times f_o)$ =sum of outputs.



3.3.5、AC Characteristics 2

($T_{amb}=-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
CD74HC238							
propagation delay	t _{pd}	An to Yn; see Figure 5	V _{CC} =2.0V	-	-	190	ns
			V _{CC} =4.5V	-	-	38	ns
			V _{CC} =6.0V	-	-	33	ns
		E3 to Yn; see Figure 5	V _{CC} =2.0V	-	-	200	ns
			V _{CC} =4.5V	-	-	40	ns
			V _{CC} =6.0V	-	-	34	ns
		$\bar{\text{E}}$ n to Yn; see Figure 6	V _{CC} =2.0V	-	-	195	ns
			V _{CC} =4.5V	-	-	39	ns
			V _{CC} =6.0V	-	-	33	ns
transition time	t _t	see Figure 5, 6	V _{CC} =2.0V	-	-	95	ns
			V _{CC} =4.5V	-	-	19	ns
			V _{CC} =6.0V	-	-	16	ns
CD74HCT238							
propagation delay	t _{pd}	An to Yn; see Figure 5	V _{CC} =4.5V	-	-	44	ns
		E3 to Yn; see Figure 5	V _{CC} =4.5V	-	-	46	ns
		$\bar{\text{E}}$ n to Yn; see Figure 6	V _{CC} =4.5V	-	-	44	ns
transition time	t _t	V _{CC} =4.5V; see Figure 5, 6		-	-	19	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

[2] t_t is the same as t_{THL} and t_{TLH} .



3.3.6、AC Characteristics 3

($T_{amb}=-40^{\circ}\text{C}$ to $+125^{\circ}\text{C}$, voltages are referenced to GND (ground=0V), unless otherwise specified.)

Parameter	Symbol	Conditions		Min.	Typ.	Max.	Unit
CD74HC238							
propagation delay	t _{pd}	An to Yn; see Figure 5	V _{CC} =2.0V	-	-	225	ns
			V _{CC} =4.5V	-	-	45	ns
			V _{CC} =6.0V	-	-	38	ns
		E3 to Yn; see Figure 5	V _{CC} =2.0V	-	-	240	ns
			V _{CC} =4.5V	-	-	48	ns
			V _{CC} =6.0V	-	-	41	ns
		$\bar{\text{E}}$ n to Yn; see Figure 6	V _{CC} =2.0V	-	-	235	ns
			V _{CC} =4.5V	-	-	47	ns
			V _{CC} =6.0V	-	-	40	ns
transition time	t _t	see Figure 5, 6	V _{CC} =2.0V	-	-	110	ns
			V _{CC} =4.5V	-	-	22	ns
			V _{CC} =6.0V	-	-	19	ns
CD74HCT238							
propagation delay	t _{pd}	An to Yn; see Figure 5	V _{CC} =4.5V	-	-	53	ns
		E3 to Yn; see Figure 5	V _{CC} =4.5V	-	-	56	ns
		$\bar{\text{E}}$ n to Yn; see Figure 6	V _{CC} =4.5V	-	-	53	ns
transition time	t _t	V _{CC} =4.5V; see Figure 5, 6		-	-	22	ns

Note:

[1] t_{pd} is the same as t_{PLH} and t_{PHL} .

[2] t_t is the same as t_{THL} and t_{TLH} .



4、Testing Circuit

4.1、AC Testing Circuit

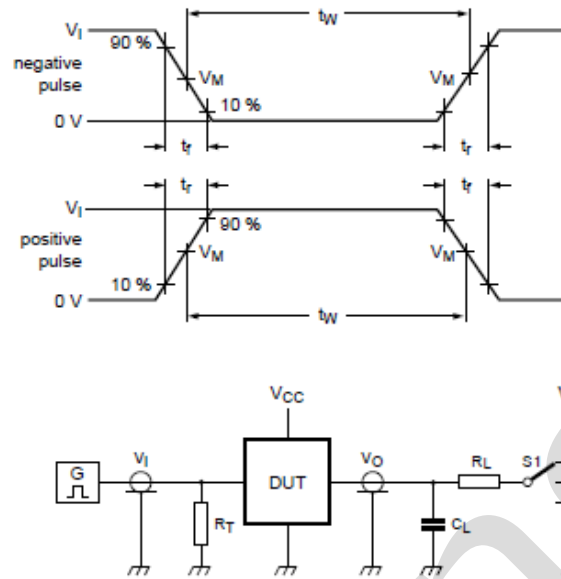


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:

C_L =Load capacitance including jig and probe capacitance.

R_T =Termination resistance should be equal to the output impedance Z_o of the pulse generator.

R_L =Load resistance.

S1=Test selection switch.

4.2、AC Testing Waveforms

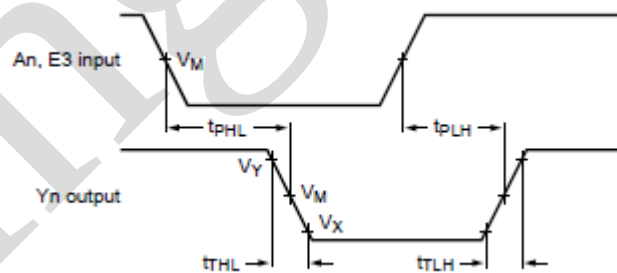


Figure 5. Input (An, E3) to output (Yn) propagation delays and output transition times

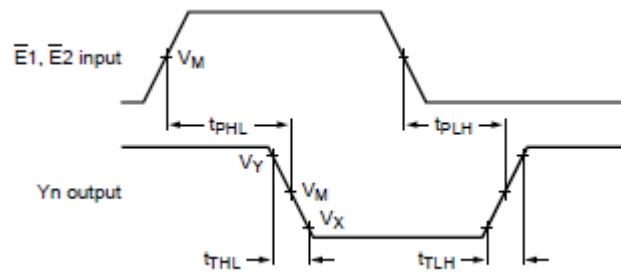


Figure 6. Input ($\bar{E}1$, $\bar{E}2$) to output (Y_n) propagation delays and output transition times

4.3、Measurement Points

Type	Input	Output		
	V_M	V_M	V_X	V_Y
CD74HC238	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$
CD74HCT238	1.3V	1.3V	$0.1 \times V_{CC}$	$0.9 \times V_{CC}$

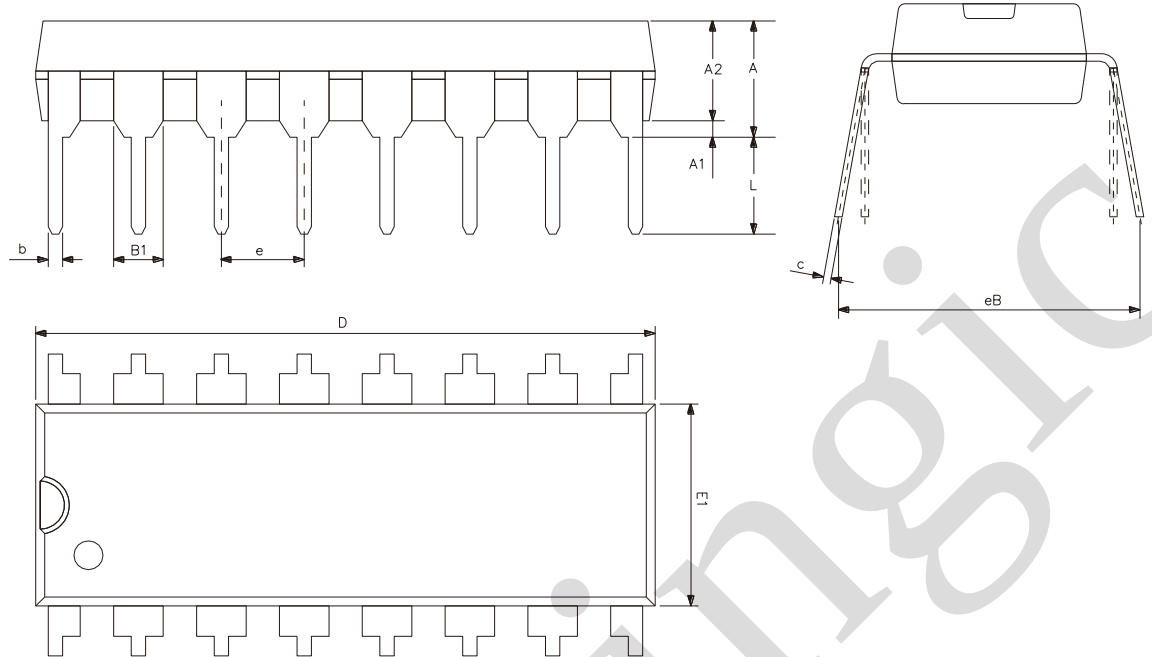
4.4、Test Data

Type	Input		Load		S1 position
	V_I	t_r, t_f	C_L	R_L	t_{PHL}, t_{PLH}
CD74HC238	V_{CC}	6ns	15pF, 50pF	1k Ω	open
CD74HCT238	3V	6ns	15pF, 50pF	1k Ω	open



5、Package Information

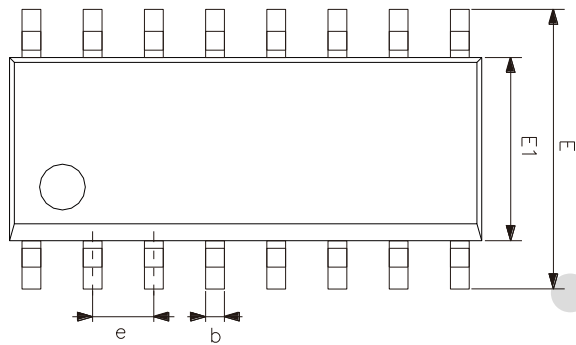
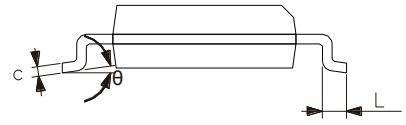
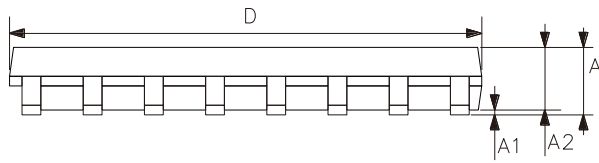
5.1、DIP16



Symbol	Dimensions (mm)	
	Min.	Max.
A2	3.20	3.60
A1	0.51	-
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
c	0.20	0.36
eB	7.62	9.30



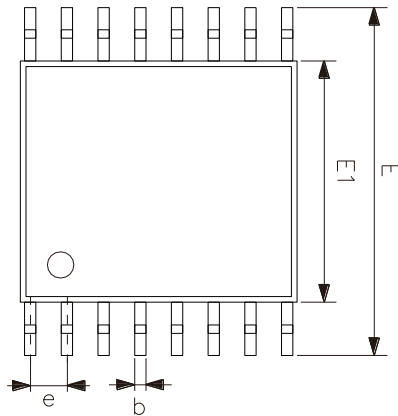
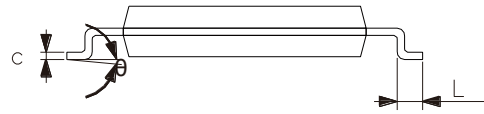
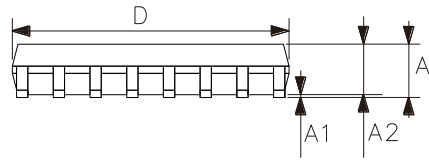
5.2、SOP16



Symbol	Dimensions (mm)	
	Min.	Max.
A	1.35	1.80
A1	0.10	0.25
A2	1.25	1.55
b	0.33	0.51
c	0.19	0.25
D	9.50	10.10
E	5.80	6.30
E1	3.70	4.10
e	1.27	
L	0.35	0.89
θ	0°	8°



5.3、TSSOP16



Symbol	Dimensions (mm)	
	Min.	Max.
A	-	1.20
A1	0.05	0.15
A2	0.80	1.05
b	0.19	0.30
c	0.09	0.20
D	4.90	5.10
E1	4.30	4.50
E	6.20	6.60
e	0.65	
L	0.45	0.75
θ	0°	8°



6、Statements And Notes

6.1、The name and content of Hazardous substances or Elements in the product

Part name	Hazardous substances or Elements									
	Lead and lead compounds	Mercury and mercury compounds	Cadmium and cadmium compounds	Hexavalent chromium compounds	Polybrominated biphenyls	Polybrominated biphenyl ethers	Dibutyl phthalate	Butylbenzyl phthalate	Di-2-ethylhexyl phthalate	Diisobutyl phthalate
Lead frame	○	○	○	○	○	○	○	○	○	○
Plastic resin	○	○	○	○	○	○	○	○	○	○
Chip	○	○	○	○	○	○	○	○	○	○
The lead	○	○	○	○	○	○	○	○	○	○
Plastic sheet installed	○	○	○	○	○	○	○	○	○	○
explanation	○: Indicates that the content of hazardous substances or elements in the detection limit of the following the SJ/T11363-2006 standard. ×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements.									

6.2、Notes

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