



# SN74HC/HCT139 (LX)

## Dual 2-to-4 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 SN74HC/HCT139 decodes two binary weighted address inputs ( $nA0$ ,  $nA1$ ) to four mutually exclusive outputs ( $n\bar{Y}0$  to  $n\bar{Y}3$ ). Each decoder features an enable input ( $n\bar{E}$ ). When  $n\bar{E}$  is HIGH all outputs are forced HIGH. The enable input can be used as the data input for a 1-to-4 demultiplexer application. 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 SN74HC139: CMOS level
  - For SN74HCT139: TTL level
- Demultiplexing capability
- 2 independent 2-to-4 decoders
- Multifunction capability
- Suitable for memory decoding, data routing or code conversion
- Active LOW mutually exclusive outputs
- Specified from  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
- Packaging information: DIP16/SOP16/TSSOP16



### Ordering Information:

### Tube packing specifications:

Part number	Packaging form	Marking code	Tube quantity	Boxed tube quantity	Boxed quantity	Notes
SN74HC139N (LX)	DIP16	SN74HC139N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74HCT139N (LX)	DIP16	SN74HCT139N	25 PCS/tube	40 tube/box	1000 PCS/box	Dimensions of plastic enclosure: 19.0mm×6.4mm Pin spacing: 2.54mm
SN74HC139D (LX)	SOP16	74HC139	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
SN74HCT139D (LX)	SOP16	74HCT139	50 PCS/tube	200 tube/box	10000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing: 1.27mm
SN74HC139P (LX)	TSSOP16	74HC139	96 PCS/tube	200 tube/box	19200 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing: 0.65mm
SN74HCT139P (LX)	TSSOP16	74HCT139	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
SN74HC139DR (LX)	SOP16	HC139	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SN74HCT139DR (LX)	SOP16	HCT139	2500 PCS/reel	5000 PCS/box	Dimensions of plastic enclosure: 10.0mm×3.9mm Pin spacing:1.27mm
SN74HC139PWR (LX)	TSSOP16	74HC139	5000 PCS/reel	10000 PCS/box	Dimensions of plastic enclosure: 5.0mm×4.4mm Pin spacing:0.65mm
SN74HCT139PWR (LX)	TSSOP16	74HCT139	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

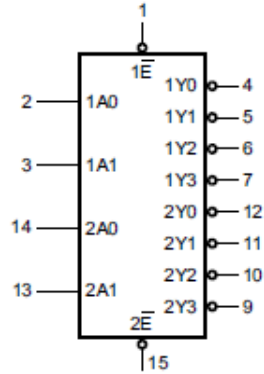


Figure 1. Logic symbol

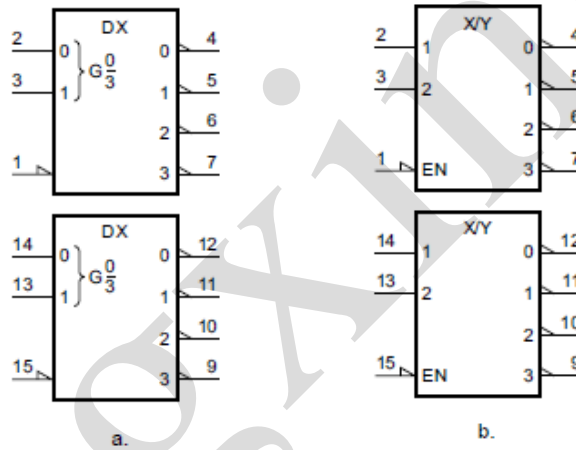


Figure 2. IEC logic symbol

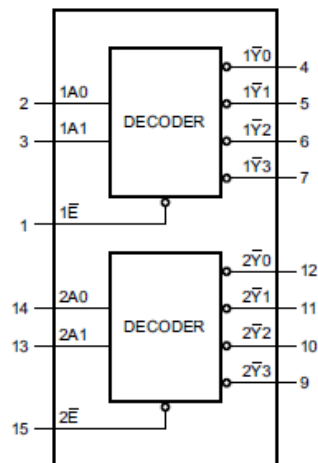


Figure 3. Functional diagram

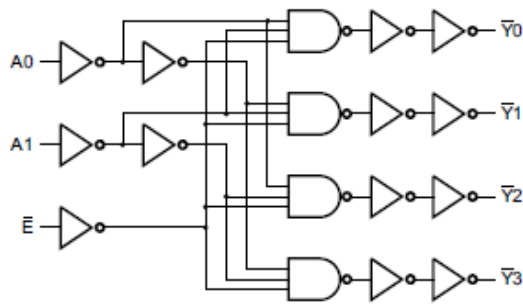
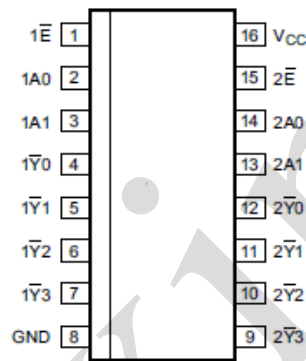


Figure 4. Logic diagram (one decoder/demultiplexer)

## 2.2、Pin Configurations



## 2.3、Pin Description

Pin No.	Pin Name	Description
1	$\overline{1E}$	enable input (active LOW)
2	1A0	address input
3	1A1	address input
4	$\overline{1Y0}$	output (active LOW)
5	$\overline{1Y1}$	output (active LOW)
6	$\overline{1Y2}$	output (active LOW)
7	$\overline{1Y3}$	output (active LOW)
8	GND	ground (0V)
9	$\overline{2Y3}$	output (active LOW)
10	$\overline{2Y2}$	output (active LOW)
11	$\overline{2Y1}$	output (active LOW)
12	$\overline{2Y0}$	output (active LOW)
13	2A1	address input
14	2A0	address input
15	$\overline{2E}$	enable input (active LOW)
16	V <sub>CC</sub>	supply voltage



## 2.4、Function Table

Control	Input		Output			
$\bar{nE}$	nA1	nA0	$\bar{nY3}$	$\bar{nY2}$	$\bar{nY1}$	$\bar{nY0}$
H	X	X	H	H	H	H
L	L	L	H	H	H	L
L	L	H	H	H	L	H
L	H	L	H	L	H	H
L	H	H	L	H	H	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 $V_I > V_{CC}+0.5V$	-	$\pm 20$	mA
output clamping current	$I_{OK}$	$V_O < -0.5V$ or $V_O > V_{CC}+0.5V$	-	$\pm 20$	mA
output current	$I_O$	$V_O = -0.5V$ to $V_{CC}+0.5V$	-	$\pm 25$	mA
supply current	$I_{CC}$	-	-	50	mA
ground current	$I_{GND}$	-	-50	-	mA
storage temperature	$T_{stg}$	-	-65	+150	$^{\circ}C$
total power dissipation	$P_{tot}$	-	-	500	mW
soldering temperature	$T_L$	10s	DIP	245	$^{\circ}C$
			SOP/TSSOP	260	

### 3.2、Recommended Operating Conditions

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit
<b>SN74HC139</b>						
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	$^{\circ}C$
<b>SN74HCT139</b>						
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	$^{\circ}C$





3.3、Electrical Characteristics

3.3.1、DC Characteristics 1

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

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>SN74HC139</b>							
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 $V_{IL}$	$I_O=-20\mu A$ ; $V_{CC}=2.0V$	1.9	2.0	-	V
			$I_O=-20\mu A$ ; $V_{CC}=4.5V$	4.4	4.5	-	V
			$I_O=-20\mu A$ ; $V_{CC}=6.0V$	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 $V_{IL}$	$I_O=20\mu A$ ; $V_{CC}=2.0V$	-	0	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=4.5V$	-	0	0.1	V
			$I_O=20\mu A$ ; $V_{CC}=6.0V$	-	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; $V_{CC}=6.0V$	-	-	$\pm 1.0$	$\mu A$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_O=V_{CC}$ or GND; $V_{CC}=6.0V$	-	-	$\pm 1.0$	$\mu A$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=6.0V$	-	-	8.0	$\mu A$	
input capacitance	$C_I$	-	-	3.5	-	pF	
<b>SN74HCT139</b>							
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 $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=-20\mu A$	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 $V_{IL}$ ; $V_{CC}=4.5V$	$I_O=20\mu A$	-	0	0.1	V
			$I_O=4.0mA$	-	0.15	0.26	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5V$	-	-	$\pm 1.0$	$\mu A$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}$ ; $V_O=V_{CC}$ or GND; $V_{CC}=5.5V$	-	-	$\pm 1.0$	$\mu A$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=5.5V$	-	-	8.0	$\mu A$	
additional supply current	$\Delta I_{CC}$	$V_I=V_{CC}-2.1V$ ; other inputs at $V_{CC}$ or GND; $I_O=0A$ ; $V_{CC}=4.5V$ to $5.5V$	per input pin; 1An inputs	-	-	252	$\mu A$
			per input pin; 2An inputs	-	-	252	$\mu A$
			per input pin; nE inputs	-	-	486	$\mu A$



input capacitance	$C_I$	-	-	3.5	-	pF
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### 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	
<b>SN74HC139</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0\text{V}$	1.5	-	-	V	
		$V_{CC}=4.5\text{V}$	3.15	-	-	V	
		$V_{CC}=6.0\text{V}$	4.2	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0\text{V}$	-	-	0.5	V	
		$V_{CC}=4.5\text{V}$	-	-	1.35	V	
		$V_{CC}=6.0\text{V}$	-	-	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=-20\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=6.0\text{V}$	5.9	-	-	V
			$I_O=-4.0\text{mA}; V_{CC}=4.5\text{V}$	3.84	-	-	V
			$I_O=-5.2\text{mA}; V_{CC}=6.0\text{V}$	5.34	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=20\mu\text{A}; V_{CC}=2.0\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=4.5\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=6.0\text{V}$	-	-	0.1	V
			$I_O=4.0\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.33	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	-	0.33	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 1.0$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}; V_O=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 5.0$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=6.0\text{V}$	-	-	80	$\mu\text{A}$	
<b>SN74HCT139</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	2.0	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	0.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I=V_{IH}$ or $V_{IL}; V_{CC}=4.5\text{V}$	$I_O=-20\mu\text{A}$	4.4	-	-	V
			$I_O=-4.0\text{mA}$	3.84	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}; V_{CC}=4.5\text{V}$	$I_O=20\mu\text{A}$	-	-	0.1	V
			$I_O=4.0\text{mA}$	-	-	0.33	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	$\pm 1.0$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}; V_O=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	$\pm 5.0$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=5.5\text{V}$	-	-	80	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	$V_I=V_{CC}-2.1\text{V};$ other inputs at $V_{CC}$ or GND; $I_O=0\text{A};$ $V_{CC}=4.5\text{V}$ to $5.5\text{V}$	per input pin; 1An inputs	-	-	315	$\mu\text{A}$
			per input pin; 2An inputs	-	-	315	$\mu\text{A}$
			per input pin; nE inputs	-	-	607.5	$\mu\text{A}$



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	
<b>SN74HC139</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=2.0\text{V}$	1.5	-	-	V	
		$V_{CC}=4.5\text{V}$	3.15	-	-	V	
		$V_{CC}=6.0\text{V}$	4.2	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=2.0\text{V}$	-	-	0.5	V	
		$V_{CC}=4.5\text{V}$	-	-	1.35	V	
		$V_{CC}=6.0\text{V}$	-	-	1.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=-20\mu\text{A}; V_{CC}=2.0\text{V}$	1.9	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=4.5\text{V}$	4.4	-	-	V
			$I_O=-20\mu\text{A}; V_{CC}=6.0\text{V}$	5.9	-	-	V
			$I_O=-4.0\text{mA}; V_{CC}=4.5\text{V}$	3.7	-	-	V
			$I_O=-5.2\text{mA}; V_{CC}=6.0\text{V}$	5.2	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}$	$I_O=20\mu\text{A}; V_{CC}=2.0\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=4.5\text{V}$	-	-	0.1	V
			$I_O=20\mu\text{A}; V_{CC}=6.0\text{V}$	-	-	0.1	V
			$I_O=4.0\text{mA}; V_{CC}=4.5\text{V}$	-	-	0.4	V
			$I_O=5.2\text{mA}; V_{CC}=6.0\text{V}$	-	-	0.4	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 1.0$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}; V_O=V_{CC}$ or GND; $V_{CC}=6.0\text{V}$	-	-	$\pm 10$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=6.0\text{V}$	-	-	160	$\mu\text{A}$	
<b>SN74HCT139</b>							
HIGH-level input voltage	$V_{IH}$	$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	2.0	-	-	V	
LOW-level input voltage	$V_{IL}$	$V_{CC}=4.5\text{V}$ to $5.5\text{V}$	-	-	0.8	V	
HIGH-level output voltage	$V_{OH}$	$V_I=V_{IH}$ or $V_{IL}; V_{CC}=4.5\text{V}$	$I_O=-20\mu\text{A}$	4.4	-	-	V
			$I_O=-4.0\text{mA}$	3.7	-	-	V
LOW-level output voltage	$V_{OL}$	$V_I=V_{IH}$ or $V_{IL}; V_{CC}=4.5\text{V}$	$I_O=20\mu\text{A}$	-	-	0.1	V
			$I_O=4.0\text{mA}$	-	-	0.4	V
input leakage current	$I_I$	$V_I=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	$\pm 1.0$	$\mu\text{A}$	
OFF-state output current	$I_{OZ}$	$V_I=V_{IH}$ or $V_{IL}; V_O=V_{CC}$ or GND; $V_{CC}=5.5\text{V}$	-	-	$\pm 10$	$\mu\text{A}$	
supply current	$I_{CC}$	$V_I=V_{CC}$ or GND; $I_O=0\text{A}; V_{CC}=5.5\text{V}$	-	-	160	$\mu\text{A}$	
additional supply current	$\Delta I_{CC}$	$V_I=V_{CC}-2.1\text{V};$ other inputs at $V_{CC}$ or GND; $I_O=0\text{A};$ $V_{CC}=4.5\text{V}$ to $5.5\text{V}$	per input pin; 1An inputs	-	-	343	$\mu\text{A}$
			per input pin; 2An inputs	-	-	343	$\mu\text{A}$
			per input pin; nE inputs	-	-	661.5	$\mu\text{A}$



3.3.4、AC Characteristics 1

( $T_{amb}=25^{\circ}C$ ,  $GND=0V$ ,  $C_L=50pF$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>SN74HC139</b>							
propagation delay	$t_{pd}$	nAn to n $\bar{Y}n$ ; see Figure 6 <sup>[1]</sup>	$V_{CC}=2.0V$	-	39	145	ns
			$V_{CC}=4.5V$	-	14	29	ns
			$V_{CC}=5.0V$ ; $C_L=15pF$	-	11	-	ns
			$V_{CC}=6.0V$	-	11	25	ns
		n $\bar{E}$ to n $\bar{Y}n$ ; see Figure 7 <sup>[2]</sup>	$V_{CC}=2.0V$	-	33	135	ns
			$V_{CC}=4.5V$	-	12	27	ns
			$V_{CC}=5.0V$ ; $C_L=15pF$	-	10	-	ns
			$V_{CC}=6.0V$	-	10	23	ns
transition time	$t_t$	n $\bar{Y}n$ ; see Figure 6 and Figure 7 <sup>[2]</sup>	$V_{CC}=2.0V$	-	19	75	ns
			$V_{CC}=4.5V$	-	7	15	ns
			$V_{CC}=6.0V$	-	6	13	ns
power dissipation capacitance	$C_{PD}$	$C_L=50pF$ ; $f=1MHz$ ; $V_I=GND$ to $V_{CC}$ <sup>[3]</sup>	-	42	-	pF	
<b>SN74HCT139</b>							
propagation delay	$t_{pd}$	nAn to n $\bar{Y}n$ ; see Figure 6 <sup>[1]</sup>	$V_{CC}=4.5V$	-	16	34	ns
			$V_{CC}=5.0V$ ; $C_L=15pF$	-	13	-	ns
		n $\bar{E}$ to n $\bar{Y}n$ ; see Figure 7 <sup>[1]</sup>	$V_{CC}=4.5V$	-	16	34	ns
			$V_{CC}=5.0V$ ; $C_L=15pF$	-	13	-	ns
transition time	$t_t$	n $\bar{Y}n$ ; $V_{CC}=4.5V$ ; see Figure 6 and Figure 7 <sup>[2]</sup>	-	7	15	ns	
power dissipation capacitance	$C_{PD}$	$C_L=50pF$ ; $f=1MHz$ ; $V_I=GND$ to $V_{CC}-1.5V$ <sup>[3]</sup>	-	44	-	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).

$$P_D=C_{PD} \times V_{CC}^2 \times f_i \times N + \sum(C_L \times V_{CC}^2 \times f_o)$$
 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  $+85^{\circ}\text{C}$ ,  $GND = 0\text{V}$ ,  $C_L = 50\text{pF}$ , unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>SN74HC139</b>							
propagation delay	$t_{pd}$	nAn to n $\bar{Y}$ n; see Figure 6 <sup>[1]</sup>	$V_{CC} = 2.0\text{V}$	-	-	180	ns
			$V_{CC} = 4.5\text{V}$	-	-	36	ns
			$V_{CC} = 6.0\text{V}$	-	-	31	ns
		n $\bar{E}$ to n $\bar{Y}$ n; see Figure 7 <sup>[1]</sup>	$V_{CC} = 2.0\text{V}$	-	-	170	ns
			$V_{CC} = 4.5\text{V}$	-	-	34	ns
			$V_{CC} = 6.0\text{V}$	-	-	29	ns
transition time	$t_t$	n $\bar{Y}$ n; see Figure 6 and Figure 7 <sup>[2]</sup>	$V_{CC} = 2.0\text{V}$	-	-	95	ns
			$V_{CC} = 4.5\text{V}$	-	-	19	ns
			$V_{CC} = 6.0\text{V}$	-	-	16	ns
<b>SN74HCT139</b>							
propagation delay	$t_{pd}$	nAn to n $\bar{Y}$ n; see Figure 6 <sup>[1]</sup>	$V_{CC} = 4.5\text{V}$	-	-	43	ns
		n $\bar{E}$ to n $\bar{Y}$ n; see Figure 7 <sup>[1]</sup>	$V_{CC} = 4.5\text{V}$	-	-	43	ns
transition time	$t_t$	n $\bar{Y}$ n; $V_{CC} = 4.5\text{V}$ ; see Figure 6 and Figure 7 <sup>[2]</sup>		-	-	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<sub>amb</sub>=-40°C to +125°C, GND =0V, C<sub>L</sub>=50pF, unless otherwise specified.)

Parameter	Symbol	Conditions	Min.	Typ.	Max.	Unit	
<b>SN74HC139</b>							
propagation delay	t <sub>pd</sub>	nAn to nȲn; see Figure 6 <sup>[1]</sup>	V <sub>CC</sub> =2.0V	-	-	220	ns
			V <sub>CC</sub> =4.5V	-	-	44	ns
			V <sub>CC</sub> =6.0V	-	-	38	ns
		nĒ to nȲn; see Figure 7 <sup>[1]</sup>	V <sub>CC</sub> =2.0V	-	-	205	ns
			V <sub>CC</sub> =4.5V	-	-	41	ns
			V <sub>CC</sub> =6.0V	-	-	35	ns
transition time	t <sub>t</sub>	nȲn; see Figure 6 and Figure 7 <sup>[2]</sup>	V <sub>CC</sub> =2.0V	-	-	110	ns
			V <sub>CC</sub> =4.5V	-	-	22	ns
			V <sub>CC</sub> =6.0V	-	-	19	ns
<b>SN74HCT139</b>							
propagation delay	t <sub>pd</sub>	nAn to nȲn; see Figure 6 <sup>[1]</sup>	V <sub>CC</sub> =4.5V	-	-	51	ns
		nĒ to nȲn; see Figure 7 <sup>[1]</sup>	V <sub>CC</sub> =4.5V	-	-	51	ns
transition time	t <sub>t</sub>	nȲn; V <sub>CC</sub> =4.5V; see Figure 6 and Figure 7 <sup>[2]</sup>	-	-	22	ns	

Note:

[1] t<sub>pd</sub> is the same as t<sub>PLH</sub> and t<sub>PHL</sub>.

[2] t<sub>t</sub> is the same as t<sub>THL</sub> and t<sub>TLH</sub>.

4、Testing Circuit

4.1、AC Testing Circuit

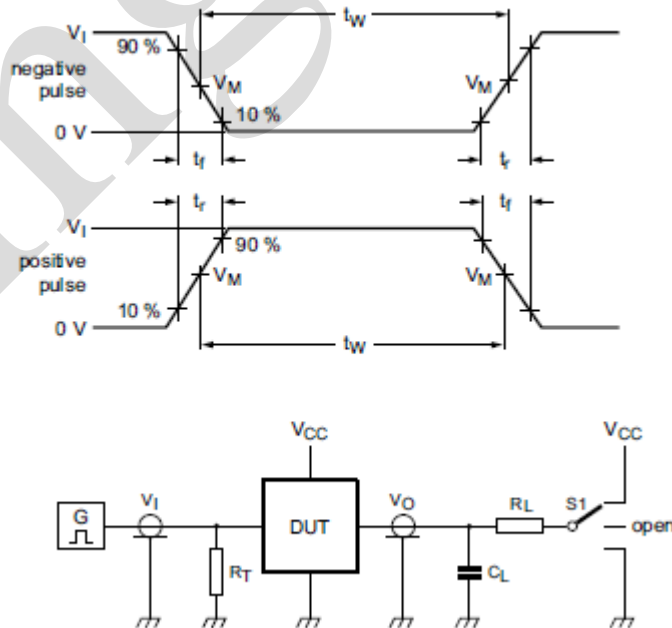


Figure 5. Test circuit for measuring switching times



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

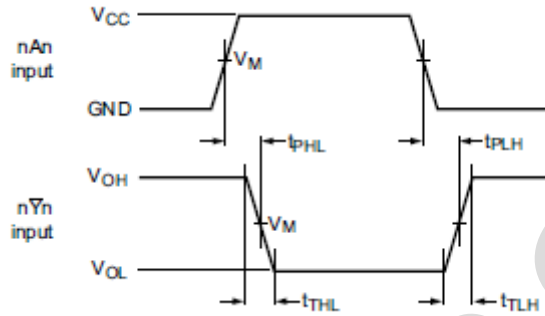


Figure 6. Propagation delay input ( $nA_n$ ) to output ( $n\bar{Y}_n$ ) and transition time output ( $n\bar{Y}_n$ )

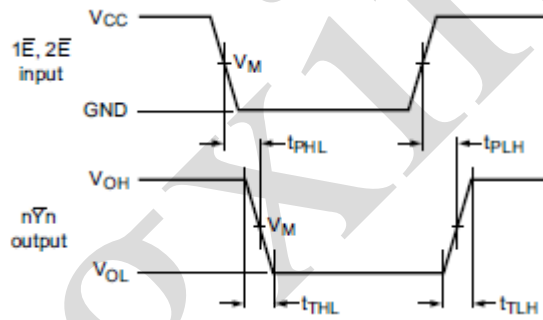


Figure 7. Propagation delay enable input ( $n\bar{E}$ ) to output ( $n\bar{Y}_n$ ) and transition time output ( $n\bar{Y}_n$ )

#### 4.3、 Measurement Points

Type	Input	Output
	$V_M$	$V_M$
SN74HC139	$0.5 \times V_{CC}$	$0.5 \times V_{CC}$
SN74HCT139	1.3V	1.3V

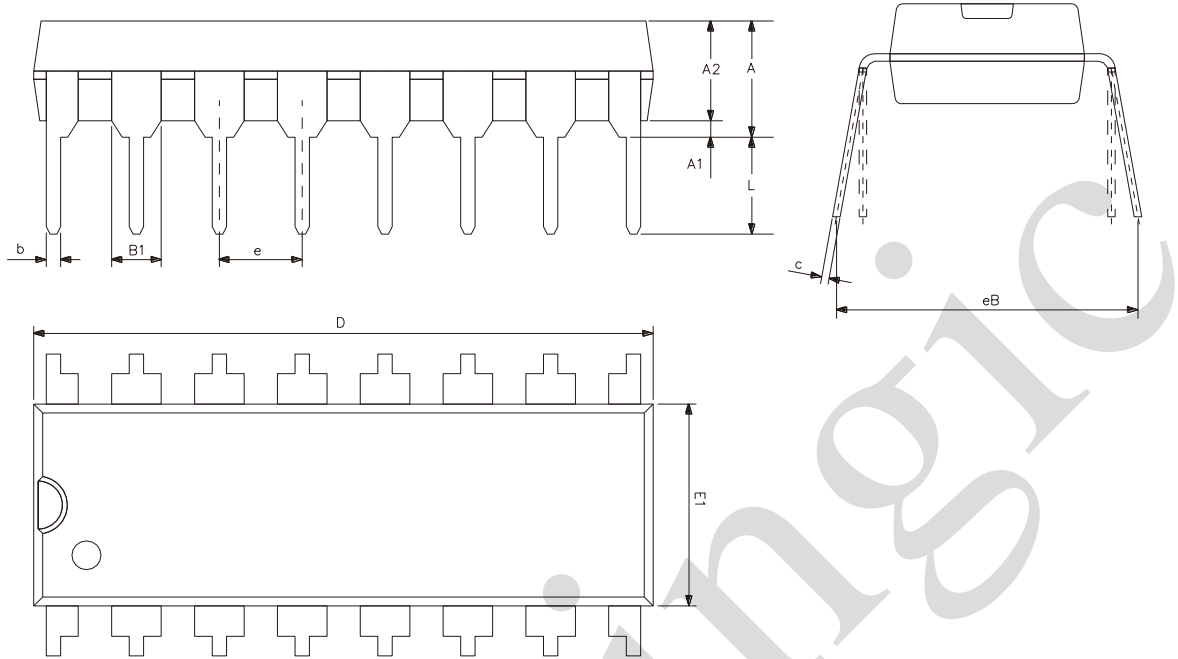
#### 4.4、 Test Data

Type	Input		Load		S1 position		
	$V_I$	$t_r, t_f$	$C_L$	$R_L$	$t_{PHL}, t_{PLH}$	$t_{PZH}, t_{PHZ}$	$t_{PZL}, t_{PLZ}$
SN74HC139	$V_{CC}$	6ns	15pF, 50pF	1k $\Omega$	open	GND	$V_{CC}$
SN74HCT139	3V	6ns	15pF, 50pF	1k $\Omega$	open	GND	$V_{CC}$



### 5、Package Information

#### 5.1、DIP16

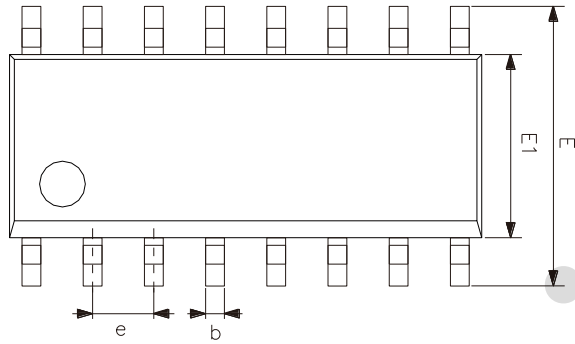
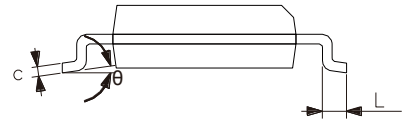
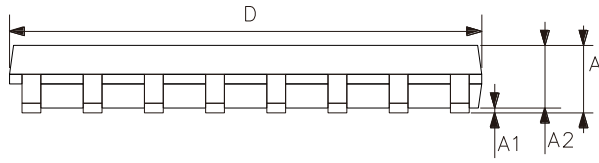


Symbol	Dimensions (mm)	
	Min.	Max.
A2	3.20	3.60
A1	0.51	-
A	3.60	5.33
L	3.00	3.60
b	0.36	0.56
B1	1.52	
D	18.80	19.94
E1	6.20	6.60
e	2.54	
c	0.20	0.36
eB	7.62	9.30





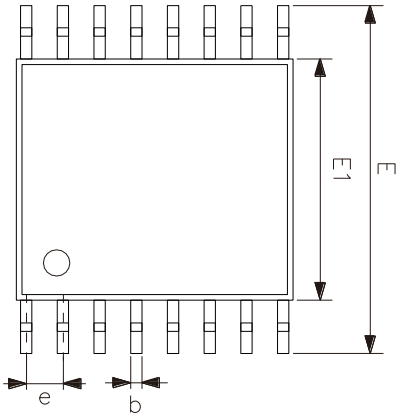
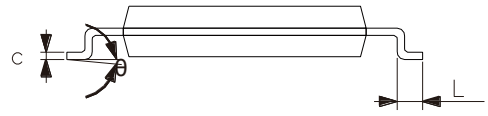
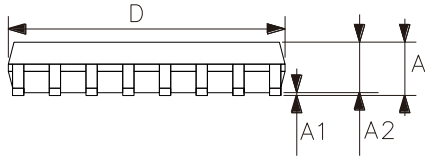
5.2、SOP16



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
$\theta$	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
$\theta$	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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