



# SN74HC/HCT597 (LX)

## 8-bit Shift Register with Input Flip-flops

### Product Specification

#### Specification Revision History:

| Version    | Date    | Description |
|------------|---------|-------------|
| 2023-06-A1 | 2023-06 | New         |
|            |         |             |
|            |         |             |
|            |         |             |
|            |         |             |



灵星芯微 精密制程

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## 1、General Description

The 74HC597/74HCT597 is an 8-bit shift register with input flip-flops

### Features:

- Supply voltage range:  
SN74HC597: 2~6V  
SN74HCT597: 4.5~5.5V
- Input levels:  
SN74HC597: CMOS level  
SN74HCT597: TTL level
- Temperature range: -40°C to +125°C
- Packaging information: DIP16/SOP16/TSSOP16



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**Ordering Information:**

**Tube packing specifications:**

| Part number           | Packaging form | Marking code | Tube quantity  | Boxed tube quantity | Boxed quantity   | Notes                                                                      |
|-----------------------|----------------|--------------|----------------|---------------------|------------------|----------------------------------------------------------------------------|
| SN74HC597N(LX)        | DIP16          | SN74HC597N   | 25<br>PCS/tube | 40<br>tube/box      | 1000<br>PCS/box  | Dimensions of plastic enclosure:<br>19.0mm×6.4mm<br>Pin spacing:<br>2.54mm |
| SN74HCT597N(LX)       | DIP16          | SN74HCT597N  | 25<br>PCS/tube | 40<br>tube/box      | 1000<br>PCS/box  | Dimensions of plastic enclosure:<br>19.0mm×6.4mm<br>Pin spacing:<br>2.54mm |
| SN74HC597D(LX)        | SOP16          | SN74HC597    | 50<br>PCS/tube | 200<br>tube/box     | 10000<br>PCS/box | Dimensions of plastic enclosure:<br>10.0mm×3.9mm<br>Pin spacing:<br>1.27mm |
| SN74HCT597D(LX)       | SOP16          | SN74HCT597   | 50<br>PCS/tube | 200<br>tube/box     | 10000<br>PCS/box | Dimensions of plastic enclosure:<br>10.0mm×3.9mm<br>Pin spacing:<br>1.27mm |
| SN74HC597PWR<br>(LX)  | TSSOP16        | SN74HC597    | 96<br>PCS/tube | 200<br>tube/box     | 19200<br>PCS/box | Dimensions of plastic enclosure:<br>5.0mm×4.4mm<br>Pin spacing:<br>0.65mm  |
| SN74HCT597PWR<br>(LX) | TSSOP16        | SN74HCT597   | 96<br>PCS/tube | 200<br>tube/box     | 19200<br>PCS/box | Dimensions of plastic enclosure:<br>5.0mm×4.4mm<br>Pin spacing:<br>0.65mm  |



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**Reel packing specifications:**

| Part number       | Packaging form | Marking code | Reel quantity | Boxed reel quantity | Notes                                                                |
|-------------------|----------------|--------------|---------------|---------------------|----------------------------------------------------------------------|
| SN74HC597DR(LX)   | SOP16          | SN74HC597    | 4000 PCS/reel | 8000 PCS/box        | Dimensions of plastic enclosure: 10.0mm×3.9mm<br>Pin spacing: 1.27mm |
| SN74HCT597DR(LX)  | SOP16          | SN74HCT597   | 4000 PCS/reel | 8000 PCS/box        | Dimensions of plastic enclosure: 10.0mm×3.9mm<br>Pin spacing: 1.27mm |
| SN74HC597PWR(LX)  | TSSOP16        | SN74HC597    | 5000 PCS/reel | 10000 PCS/box       | Dimensions of plastic enclosure: 5.0mm×4.4mm<br>Pin spacing: 0.65mm  |
| SN74HCT597PWR(LX) | TSSOP16        | SN74HCT597   | 5000 PCS/reel | 10000 PCS/box       | Dimensions of plastic enclosure: 5.0mm×4.4mm<br>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

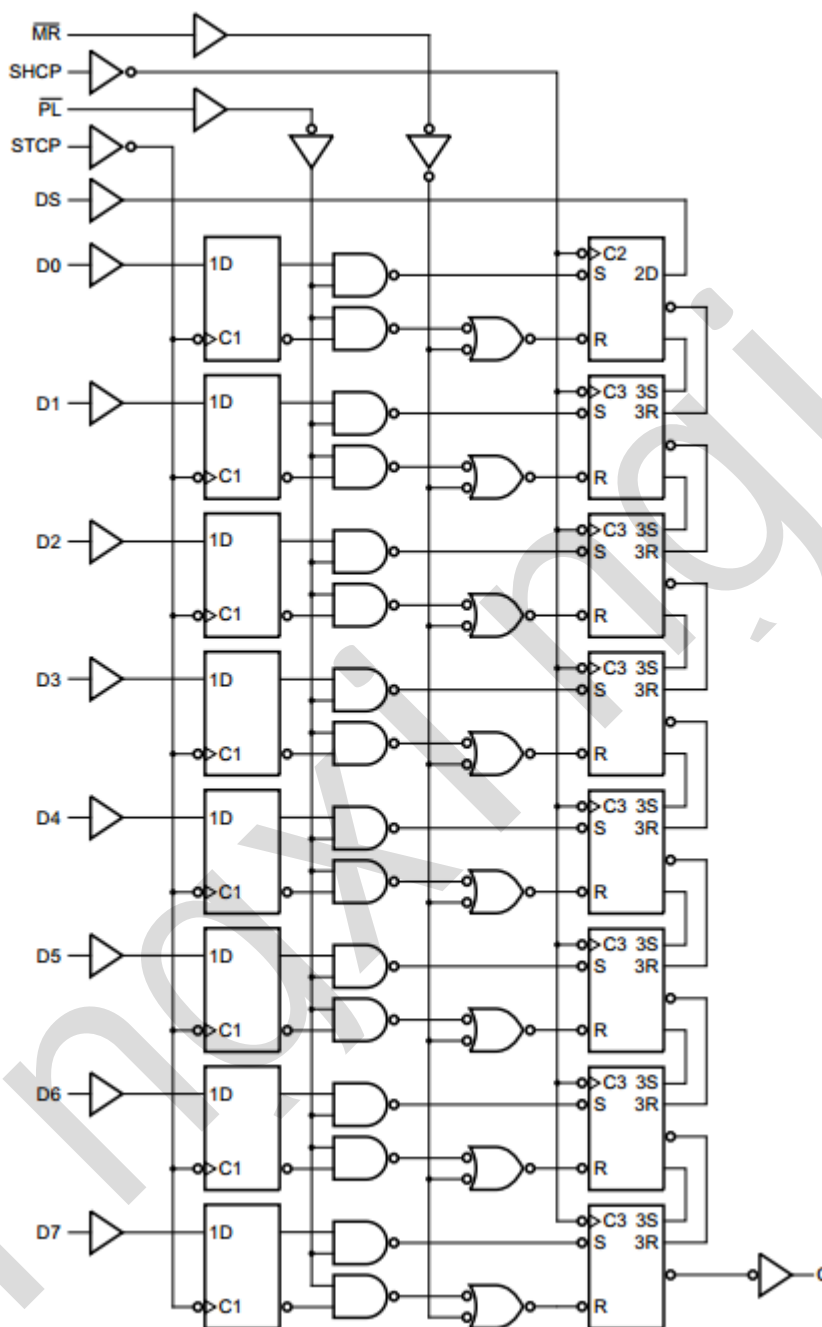
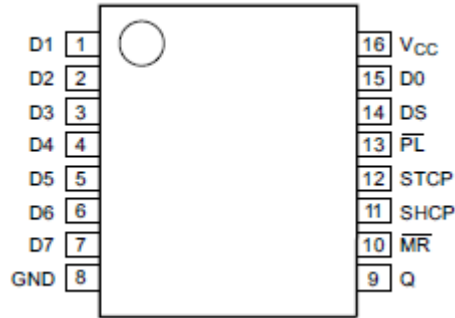


Figure 1. Logic symbol

### 2.2、Pin Configurations



### 2.3、Pin Description

| Pin No. | Pin Name               | Description                                                |
|---------|------------------------|------------------------------------------------------------|
| 1       | D1                     | parallel data output                                       |
| 2       | D2                     | parallel data output                                       |
| 3       | D3                     | parallel data output                                       |
| 4       | D4                     | parallel data output                                       |
| 5       | D5                     | parallel data output                                       |
| 6       | D6                     | parallel data output                                       |
| 7       | D7                     | parallel data output                                       |
| 8       | GND                    | ground (0V)                                                |
| 9       | Q                      | serial data output                                         |
| 10      | $\overline{\text{MR}}$ | asynchronous master reset input (active LOW)               |
| 11      | SHCP                   | shift register clock input (LOW-to-HIGH, edge-triggered)   |
| 12      | STCP                   | storage register clock input (LOW-to-HIGH, edge-triggered) |
| 13      | $\overline{\text{PL}}$ | parallel load input (active LOW)                           |
| 14      | DS                     | serial data input                                          |
| 15      | D0                     | parallel data inputs                                       |
| 16      | V <sub>cc</sub>        | supply voltage                                             |

### 2.4、Function Table

| Input         |      |                        |                        | Function                                                                       |
|---------------|------|------------------------|------------------------|--------------------------------------------------------------------------------|
| STCP          | SHCP | $\overline{\text{PL}}$ | $\overline{\text{MR}}$ |                                                                                |
| ↑             | X    | X                      | X                      | data loaded to input latches                                                   |
| ↑             | X    | L                      | H                      | data loaded from inputs to shift register                                      |
| No clock edge | X    | L                      | H                      | data transferred from input flip-flops to shift register                       |
| X             | X    | L                      | L                      | invalid logic, state of shift register is indeterminate when signals removed   |
| X             | X    | H                      | L                      | shift register cleared                                                         |
| X             | ↑    | H                      | H                      | shift register clocked Q <sub>n</sub> = Q <sub>n-1</sub> , Q <sub>0</sub> = DS |

Note: H=HIGH voltage level; L=LOW voltage level. ↑=LOW-to-HIGH transition .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       | V           |
| supply current          | $I_{CC}$  | -                                    | -         | 50       | mA          |
| ground current          | $I_{GND}$ | -                                    | -50       | -        | mA          |
| 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          | $I_O$     | $-0.5V < V_O < V_{CC}+0.5V$          | -         | $\pm 25$ | mA          |
| storage temperature     | $T_{stg}$ | -                                    | -65       | +150     | $^{\circ}C$ |
| 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>SN74HC597</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           |
| ambient temperature | $T_{amb}$ | -          | -40  | -    | +125     | $^{\circ}C$ |
| <b>SN74HCT597</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           |
| ambient temperature | $T_{amb}$ | -          | -40  | -    | +125     | $^{\circ}C$ |





### 3.3、Electrical Characteristics

#### 3.3.1、DC Characteristics 1

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

| Parameter                 | Symbol           | V <sub>CC</sub> | Conditions                                                                                                           | Min. | Typ. | Max. | Unit |
|---------------------------|------------------|-----------------|----------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| <b>SN74HC597</b>          |                  |                 |                                                                                                                      |      |      |      |      |
| HIGH-level input voltage  | V <sub>IH</sub>  | 2.0V            | -                                                                                                                    | 1.5  | 1.2  | -    | V    |
|                           |                  | 4.5V            | -                                                                                                                    | 3.15 | 2.4  | -    | V    |
|                           |                  | 6.0V            | -                                                                                                                    | 4.2  | 3.2  | -    | V    |
| LOW-level input voltage   | V <sub>IL</sub>  | 2.0V            | -                                                                                                                    | -    | 0.8  | 0.5  | V    |
|                           |                  | 4.5V            | -                                                                                                                    | -    | 2.1  | 1.35 | V    |
|                           |                  | 6.0V            | -                                                                                                                    | -    | 2.8  | 1.8  | V    |
| HIGH-level output voltage | V <sub>OH</sub>  | 2.0V            | I <sub>O</sub> =-20uA                                                                                                | 1.9  | 2.0  | -    | V    |
|                           |                  | 4.5V            | I <sub>O</sub> =-20uA                                                                                                | 4.4  | 4.5  | -    | V    |
|                           |                  | 6.0V            | I <sub>O</sub> =-20uA                                                                                                | 5.9  | 6.0  | -    | V    |
|                           |                  | 4.5V            | I <sub>O</sub> =-4.0mA                                                                                               | 3.84 | 4.32 | -    | V    |
|                           |                  | 6.0V            | I <sub>O</sub> =-5.2mA                                                                                               | 5.34 | 5.81 | -    | V    |
| LOW-level output voltage  | V <sub>OL</sub>  | 2.0V            | I <sub>O</sub> =20uA                                                                                                 | -    | 0    | 0.1  | V    |
|                           |                  | 4.5V            | I <sub>O</sub> =20uA                                                                                                 | -    | 0    | 0.1  | V    |
|                           |                  | 6.0V            | I <sub>O</sub> =20uA                                                                                                 | -    | 0    | 0.1  | V    |
|                           |                  | 4.5V            | I <sub>O</sub> =4.0mA                                                                                                | -    | 0.15 | 0.33 | V    |
|                           |                  | 6.0V            | I <sub>O</sub> =5.2mA                                                                                                | -    | 0.16 | 0.33 | V    |
| input leakage current     | I <sub>I</sub>   | 6.0V            | V <sub>I</sub> =V <sub>CC</sub> or GND                                                                               | -    | -    | ±2   | uA   |
| supply current            | I <sub>CC</sub>  | 6.0V            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A                                                           | -    | -    | 80   | uA   |
| <b>SN74HCT597</b>         |                  |                 |                                                                                                                      |      |      |      |      |
| HIGH-level input voltage  | V <sub>IH</sub>  | 4.5~5.5V        | -                                                                                                                    | 2.0  | 1.6  | -    | V    |
| LOW-level input voltage   | V <sub>IL</sub>  | 4.5~5.5V        | -                                                                                                                    | -    | 1.2  | 0.8  | V    |
| HIGH-level output voltage | V <sub>OH</sub>  | 4.5V            | I <sub>O</sub> =-20uA                                                                                                | 4.4  | 4.5  | -    | V    |
|                           |                  |                 | I <sub>O</sub> =-4.0mA                                                                                               | 3.84 | 4.32 | -    | V    |
| LOW-level output voltage  | V <sub>OL</sub>  | 4.5V            | I <sub>O</sub> =20uA                                                                                                 | -    | 0    | 0.1  | V    |
|                           |                  |                 | I <sub>O</sub> =4.0mA                                                                                                | -    | 0.15 | 0.33 | V    |
| input leakage current     | I <sub>I</sub>   | 5.5V            | V <sub>I</sub> =V <sub>CC</sub> or GND                                                                               | -    | -    | ±2   | uA   |
| supply current            | I <sub>CC</sub>  | 6.0V            | V <sub>I</sub> =V <sub>CC</sub> or GND; I <sub>O</sub> =0A                                                           | -    | -    | 80   | uA   |
| additional supply current | ΔI <sub>CC</sub> | 4.5~5.5V        | One input at V <sub>I</sub> =V <sub>CC</sub> -2.1V;<br>Other inputs at V <sub>CC</sub> or GND;<br>I <sub>O</sub> =0A | -    | -    | 135  | uA   |



**3.3.2、DC Characteristics 2**

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

| Parameter                 | Symbol           | V <sub>CC</sub> | Conditions                                                                                                              | Min. | Typ. | Max. | Unit |
|---------------------------|------------------|-----------------|-------------------------------------------------------------------------------------------------------------------------|------|------|------|------|
| <b>SN74HC597</b>          |                  |                 |                                                                                                                         |      |      |      |      |
| HIGH-level input voltage  | V <sub>IH</sub>  | 2.0V            | -                                                                                                                       | 1.5  | -    | -    | V    |
|                           |                  | 4.5V            | -                                                                                                                       | 3.15 | -    | -    | V    |
|                           |                  | 6.0V            | -                                                                                                                       | 4.2  | -    | -    | V    |
| LOW-level input voltage   | V <sub>IL</sub>  | 2.0V            | -                                                                                                                       | -    | -    | 0.5  | V    |
|                           |                  | 4.5V            | -                                                                                                                       | -    | -    | 1.35 | V    |
|                           |                  | 6.0V            | -                                                                                                                       | -    | -    | 1.8  | V    |
| HIGH-level output voltage | V <sub>OH</sub>  | 2.0V            | I <sub>O</sub> = -20uA                                                                                                  | 1.9  | -    | -    | V    |
|                           |                  | 4.5V            | I <sub>O</sub> = -20uA                                                                                                  | 4.4  | -    | -    | V    |
|                           |                  | 6.0V            | I <sub>O</sub> = -20uA                                                                                                  | 5.9  | -    | -    | V    |
|                           |                  | 4.5V            | I <sub>O</sub> = -4.0mA                                                                                                 | 3.7  | -    | -    | V    |
|                           |                  | 6.0V            | I <sub>O</sub> = -5.2mA                                                                                                 | 5.2  | -    | -    | V    |
| LOW-level output voltage  | V <sub>OL</sub>  | 2.0V            | I <sub>O</sub> = 20uA                                                                                                   | -    | -    | 0.1  | V    |
|                           |                  | 4.5V            | I <sub>O</sub> = 20uA                                                                                                   | -    | -    | 0.1  | V    |
|                           |                  | 6.0V            | I <sub>O</sub> = 20uA                                                                                                   | -    | -    | 0.1  | V    |
|                           |                  | 4.5V            | I <sub>O</sub> = 4.0mA                                                                                                  | -    | -    | 0.4  | V    |
|                           |                  | 6.0V            | I <sub>O</sub> = 5.2mA                                                                                                  | -    | -    | 0.4  | V    |
| input leakage current     | I <sub>I</sub>   | 6.0V            | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                                 | -    | -    | ±4   | uA   |
| supply current            | I <sub>CC</sub>  | 6.0V            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0A                                                            | -    | -    | 160  | uA   |
| <b>SN74HCT597</b>         |                  |                 |                                                                                                                         |      |      |      |      |
| HIGH-level input voltage  | V <sub>IH</sub>  | 4.5~5.5V        | -                                                                                                                       | 2.0  | -    | -    | V    |
| LOW-level input voltage   | V <sub>IL</sub>  | 4.5~5.5V        | -                                                                                                                       | -    | -    | 0.8  | V    |
| HIGH-level output voltage | V <sub>OH</sub>  | 4.5V            | I <sub>O</sub> = -20uA                                                                                                  | 4.4  | -    | -    | V    |
|                           |                  |                 | I <sub>O</sub> = -4.0mA                                                                                                 | 3.7  | -    | -    | V    |
| LOW-level output voltage  | V <sub>OL</sub>  | 4.5V            | I <sub>O</sub> = 20uA                                                                                                   | -    | -    | 0.1  | V    |
|                           |                  |                 | I <sub>O</sub> = 4.0mA                                                                                                  | -    | -    | 0.4  | V    |
| input leakage current     | I <sub>I</sub>   | 5.5V            | V <sub>I</sub> = V <sub>CC</sub> or GND                                                                                 | -    | -    | ±4   | uA   |
| supply current            | I <sub>CC</sub>  | 6.0V            | V <sub>I</sub> = V <sub>CC</sub> or GND; I <sub>O</sub> = 0A                                                            | -    | -    | 160  | uA   |
| additional supply current | ΔI <sub>CC</sub> | 4.5~5.5V        | One input at V <sub>I</sub> = V <sub>CC</sub> - 2.1V;<br>Other inputs at V <sub>CC</sub> or GND;<br>I <sub>O</sub> = 0A | -    | -    | 147  | uA   |



### 3.3.3、AC Characteristics 1

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

| Parameter                     | Symbol                              | V <sub>CC</sub> | Conditions           | Min.          | Typ. | Max. | Unit |    |
|-------------------------------|-------------------------------------|-----------------|----------------------|---------------|------|------|------|----|
| <b>SN74HC597</b>              |                                     |                 |                      |               |      |      |      |    |
| SHCP to Q propagation delay   |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 5  | -    | 55   | 220  | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | -    | 20   | 44   | ns |
|                               |                                     | 5.0V            | C <sub>L</sub> =15pF |               | -    | 17   | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | -    | 16   | 37   | ns |
| MR to Q propagation delay     |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 6  | -    | 58   | 220  | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | -    | 21   | 44   | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | -    | 17   | 37   | ns |
| STCP to Q propagation delay   | t <sub>PLH</sub> , t <sub>PHL</sub> | 2.0V            | C <sub>L</sub> =50pF | see Figure 5  | -    | 80   | 315  | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | -    | 29   | 63   | ns |
|                               |                                     | 5.0V            | C <sub>L</sub> =15pF |               | -    | 25   | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | -    | 23   | 54   | ns |
| PL to Q propagation delay     |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 7  | -    | 69   | 270  | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | -    | 25   | 54   | ns |
|                               |                                     | 5.0V            | C <sub>L</sub> =15pF |               | -    | 21   | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | -    | 20   | 46   | ns |
| transition time               | tt                                  | 2.0V            | C <sub>L</sub> =50pF | see Figure 5  | -    | 19   | 95   | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | -    | 7    | 19   | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | -    | 6    | 16   | ns |
| STCP(HIGH or LOW) pulse width |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 5  | 100  | 11   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 20   | 4    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 17   | 3    | -    | ns |
| SHCP(HIGH or LOW) pulse width |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 5  | 100  | 14   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 20   | 5    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 17   | 4    | -    | ns |
| MR LOW                        |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 6  | 100  | 22   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 20   | 8    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 17   | 6    | -    | ns |
| PL LOW                        |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 7  | 100  | 22   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 20   | 8    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 17   | 6    | -    | ns |
| Dn to STCP Set_up time        |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 9  | 75   | 8    | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 15   | 3    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 13   | 2    | -    | ns |
| DS to SHCP Set_up time        | tsu                                 | 2.0V            | C <sub>L</sub> =50pF | see Figure 9  | 75   | 11   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 15   | 4    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 13   | 3    | -    | ns |
| PL to SHCP Set_up time        |                                     | 2.0V            | C <sub>L</sub> =50pF | see Figure 10 | 75   | 11   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 15   | 4    | -    | ns |
|                               |                                     | 6.0V            | C <sub>L</sub> =50pF |               | 13   | 3    | -    | ns |
| Dn to STCP hold time          | th                                  | 2.0V            | C <sub>L</sub> =50pF | see Figure 9  | 5    | -3   | -    | ns |
|                               |                                     | 4.5V            | C <sub>L</sub> =50pF |               | 5    | -1   | -    | ns |



|                                                     |                                  |                   |                   |               |     |     |    |     |
|-----------------------------------------------------|----------------------------------|-------------------|-------------------|---------------|-----|-----|----|-----|
| DS TO SHCP<br>hold time                             |                                  | 6.0V              | $C_L=50\text{pF}$ | see Figure 9  | 5   | -1  | -  | ns  |
|                                                     |                                  | 2.0V              | $C_L=50\text{pF}$ |               | 5   | -3  | -  | ns  |
|                                                     |                                  | 4.5V              | $C_L=50\text{pF}$ |               | 5   | -1  | -  | ns  |
|                                                     |                                  | 6.0V              | $C_L=50\text{pF}$ |               | 5   | -1  | -  | ns  |
| $\overline{\text{PL}}$ TO SHCP<br>hold time         |                                  | 2.0V              | $C_L=50\text{pF}$ | see Figure 10 | 5   | -6  | -  | ns  |
|                                                     |                                  | 4.5V              | $C_L=50\text{pF}$ |               | 5   | -2  | -  | ns  |
|                                                     |                                  | 6.0V              | $C_L=15\text{pF}$ |               | 5   | -2  | -  | ns  |
| $\overline{\text{MR}}$ to SHCP<br>recovery time     | trec                             | 2.0V              | $C_L=50\text{pF}$ | see Figure 8  | 75  | -3  | -  | ns  |
|                                                     |                                  | 4.5V              | $C_L=50\text{pF}$ |               | 15  | -1  | -  | ns  |
|                                                     |                                  | 6.0V              | $C_L=50\text{pF}$ |               | 13  | -1  | -  | ns  |
| SHCP<br>maximum<br>frequency                        | fmax                             | 2.0V              | $C_L=50\text{pF}$ | see Figure 5  | 4.8 | 29  | -  | MHZ |
|                                                     |                                  | 4.5V              | $C_L=50\text{pF}$ |               | 24  | 87  | -  | MHZ |
|                                                     |                                  | 5.0V              | $C_L=15\text{pF}$ |               | -   | 96  | -  | MHZ |
|                                                     |                                  | 6.0V              | $C_L=50\text{pF}$ |               | 28  | 104 | -  | MHZ |
| <b>SN74HCT597</b>                                   |                                  |                   |                   |               |     |     |    |     |
| SHCP to Q<br>propagation<br>delay                   |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 5  | -   | 23  | 50 | ns  |
|                                                     |                                  | 5.0V              | $C_L=15\text{pF}$ |               | -   | 20  | -  | ns  |
| $\overline{\text{MR}}$ to Q<br>propagation<br>delay | $t_{\text{PLH}}, t_{\text{PHL}}$ | 4.5V              | $C_L=50\text{pF}$ | see Figure 6  | -   | 28  | 61 | ns  |
| STCP to Q<br>propagation<br>delay                   |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 5  | -   | 33  | 71 | ns  |
|                                                     |                                  | 5.0V              | $C_L=15\text{pF}$ |               | -   | 29  | -  | ns  |
| $\overline{\text{PL}}$ to Q<br>propagation<br>delay |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 7  | -   | 30  | 65 | ns  |
|                                                     | 5.0V                             | $C_L=15\text{pF}$ | -                 |               | 26  | -   | ns |     |
| transition time                                     | tt                               | 4.5V              | $C_L=50\text{pF}$ | see Figure 5  | -   | 7   | 19 | ns  |
| STCP(HIGH or<br>LOW)<br>pulse width                 | tw                               | 4.5V              | $C_L=50\text{pF}$ | see Figure 5  | 20  | 6   | -  | ns  |
| SHCP(HIGH<br>or LOW)<br>pulse width                 |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 5  | 20  | 7   | -  | ns  |
| $\overline{\text{MR}}$ LOW                          |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 6  | 31  | 14  | -  | ns  |
| $\overline{\text{PL}}$ LOW                          |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 7  | 25  | 10  | -  | ns  |
| Dn to STCP<br>Set up time                           | tsu                              | 4.5V              | $C_L=50\text{pF}$ | see Figure 9  | 15  | 5   | -  | ns  |
| DS to SHCP<br>Set up time                           |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 9  | 15  | 2   | -  | ns  |
| $\overline{\text{PL}}$ to SHCP<br>Set up time       |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 10 | 15  | 4   | -  | ns  |
| Dn to SHCP<br>hold time                             | th                               | 4.5V              | $C_L=50\text{pF}$ | see Figure 9  | 5   | -1  | -  | ns  |
| DS to SHCP<br>hold time                             |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 9  | 5   | -2  | -  | ns  |
| $\overline{\text{PL}}$ to SHCP<br>hold time         |                                  | 4.5V              | $C_L=50\text{pF}$ | see Figure 10 | 5   | -2  | -  | ns  |



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Shenzhen Lingxing Microelectronics Technology Co., Ltd.

Tab: 835-12-B4

Number: SN74HC/HCT597-AX-LJ-A097EN

|                             |      |      |                   |              |    |    |   |     |
|-----------------------------|------|------|-------------------|--------------|----|----|---|-----|
| MR to SHCP<br>recovery time | trec | 4.5V | $C_L=50\text{pF}$ | see Figure 8 | 15 | -2 | - | ns  |
| maximum<br>frequency        | fmax | 4.5V | $C_L=15\text{pF}$ | see Figure 5 | 24 | 75 | - | MHZ |
|                             |      | 5.0V | $C_L=15\text{pF}$ |              | -  | 83 | - | MHZ |

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### 3.3.4、AC Characteristics 2

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

| Parameter                                     | Symbol             | V <sub>CC</sub>   | Conditions        | Min.              | Typ.         | Max. | Unit |    |    |
|-----------------------------------------------|--------------------|-------------------|-------------------|-------------------|--------------|------|------|----|----|
| <b>SN74HC597</b>                              |                    |                   |                   |                   |              |      |      |    |    |
| SHCP to Q propagation delay                   | $t_{PLH}, t_{PHL}$ | 2.0V              | $C_L=50\text{pF}$ | see Figure 5      | -            | -    | 265  | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | -            | -    | 53   | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | -            | -    | 45   | ns |    |
| $\overline{\text{MR}}$ to Q propagation delay |                    | 2.0V              | $C_L=50\text{pF}$ | see Figure 6      | -            | -    | 265  | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | -            | -    | 53   | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | -            | -    | 45   | ns |    |
| STCP to Q propagation delay                   |                    | 2.0V              | $C_L=50\text{pF}$ | see Figure 5      | -            | -    | 375  | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | -            | -    | 75   | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | -            | -    | 64   | ns |    |
| $\overline{\text{PL}}$ to Q propagation delay | 2.0V               | $C_L=50\text{pF}$ | see Figure 7      | -                 | -            | 325  | ns   |    |    |
|                                               | 4.5V               | $C_L=50\text{pF}$ |                   | -                 | -            | 65   | ns   |    |    |
|                                               | 6.0V               | $C_L=50\text{pF}$ |                   | -                 | -            | 55   | ns   |    |    |
| transition time                               | tt                 | 2.0V              | $C_L=50\text{pF}$ | see Figure 5      | -            | -    | 110  | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | -            | -    | 22   | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | -            | -    | 19   | ns |    |
| STCP(HIGH or LOW) pulse width                 | tw                 | 2.0V              | $C_L=50\text{pF}$ | see Figure 5      | 120          | -    | -    | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | 24           | -    | -    | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | 20           | -    | -    | ns |    |
| SHCP(HIGH or LOW) pulse width                 |                    | 2.0V              | $C_L=50\text{pF}$ | see Figure 5      | 120          | -    | -    | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | 24           | -    | -    | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | 20           | -    | -    | ns |    |
| $\overline{\text{MR}}$ LOW                    |                    | 2.0V              | $C_L=50\text{pF}$ | see Figure 6      | 120          | -    | -    | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | 24           | -    | -    | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | 20           | -    | -    | ns |    |
| $\overline{\text{PL}}$ LOW                    |                    | 2.0V              | $C_L=50\text{pF}$ | see Figure 7      | 120          | -    | -    | ns |    |
|                                               |                    | 4.5V              | $C_L=50\text{pF}$ |                   | 24           | -    | -    | ns |    |
|                                               |                    | 6.0V              | $C_L=50\text{pF}$ |                   | 20           | -    | -    | ns |    |
| Dn to STCP Set_up time                        |                    | tsu               | 2.0V              | $C_L=50\text{pF}$ | see Figure 9 | 90   | -    | -  | ns |
|                                               |                    |                   | 4.5V              | $C_L=50\text{pF}$ |              | 18   | -    | -  | ns |
|                                               |                    |                   | 6.0V              | $C_L=50\text{pF}$ |              | 15   | -    | -  | ns |
| DS to SHCP Set_up time                        |                    |                   | 2.0V              | $C_L=50\text{pF}$ | see Figure 9 | 90   | -    | -  | ns |
|                                               |                    |                   | 4.5V              | $C_L=50\text{pF}$ |              | 18   | -    | -  | ns |
|                                               |                    |                   | 6.0V              | $C_L=50\text{pF}$ |              | 15   | -    | -  | ns |
| $\overline{\text{PL}}$ to SHCP Set_up time    | 2.0V               |                   | $C_L=50\text{pF}$ | see Figure 10     | 90           | -    | -    | ns |    |
|                                               | 4.5V               |                   | $C_L=50\text{pF}$ |                   | 18           | -    | -    | ns |    |
|                                               | 6.0V               |                   | $C_L=50\text{pF}$ |                   | 15           | -    | -    | ns |    |
| Dn to STCP hold time                          | th                 |                   | 2.0V              | $C_L=50\text{pF}$ | see Figure 9 | 5    | -    | -  | ns |
|                                               |                    |                   | 4.5V              | $C_L=50\text{pF}$ |              | 5    | -    | -  | ns |
|                                               |                    |                   | 6.0V              | $C_L=50\text{pF}$ |              | 5    | -    | -  | ns |
| DS to SHCP hold time                          |                    |                   | 2.0V              | $C_L=50\text{pF}$ | see Figure 9 | 5    | -    | -  | ns |
|                                               |                    |                   | 4.5V              | $C_L=50\text{pF}$ |              | 5    | -    | -  | ns |



|                               |            |      |                   |                   |              |    |    |     |
|-------------------------------|------------|------|-------------------|-------------------|--------------|----|----|-----|
| PL to SHCP hold time          |            | 6.0V | $C_L=50\text{pF}$ | see Figure 10     | 5            | -  | -  | ns  |
|                               |            | 2.0V | $C_L=50\text{pF}$ |                   | 5            | -  | -  | ns  |
|                               |            | 4.5V | $C_L=50\text{pF}$ |                   | 5            | -  | -  | ns  |
|                               |            | 6.0V | $C_L=15\text{pF}$ |                   | 5            | -  | -  | ns  |
| MR to SHCP recovery time      | trec       | 2.0V | $C_L=50\text{pF}$ | see Figure 8      | 90           | -  | -  | ns  |
|                               |            | 4.5V | $C_L=50\text{pF}$ |                   | 18           | -  | -  | ns  |
|                               |            | 6.0V | $C_L=50\text{pF}$ |                   | 15           | -  | -  | ns  |
| SHCP maximum frequency        | fmax       | 2.0V | $C_L=50\text{pF}$ | see Figure 5      | 4.8          | -  | -  | MHZ |
|                               |            | 4.5V | $C_L=50\text{pF}$ |                   | 24           | -  | -  | MHZ |
|                               |            | 6.0V | $C_L=50\text{pF}$ |                   | 28           | -  | -  | MHZ |
| <b>SN74HCT597</b>             |            |      |                   |                   |              |    |    |     |
| SHCP to Q propagation delay   | tPLH, tPHL | 4.5V | $C_L=50\text{pF}$ | see Figure 5      | -            | -  | 60 | ns  |
| MR to Q propagation delay     |            | 4.5V | $C_L=50\text{pF}$ | see Figure 6      | -            | -  | 74 | ns  |
| STCP to Q propagation delay   |            | 4.5V | $C_L=50\text{pF}$ | see Figure 5      | -            | -  | 86 | ns  |
| PL to Q propagation delay     |            | 4.5V | $C_L=50\text{pF}$ | see Figure 7      | -            | -  | 78 | ns  |
| transition time               | tt         | 4.5V | $C_L=50\text{pF}$ | see Figure 5      | -            | -  | 22 | ns  |
| STCP(HIGH or LOW) pulse width | tw         | 4.5V | $C_L=50\text{pF}$ | see Figure 5      | 24           | -  | -  | ns  |
| SHCP(HIGH or LOW) pulse width |            | 4.5V | $C_L=50\text{pF}$ | see Figure 5      | 24           | -  | -  | ns  |
| MR LOW                        |            | 4.5V | $C_L=50\text{pF}$ | see Figure 6      | 38           | -  | -  | ns  |
| PL LOW                        |            | 4.5V | $C_L=50\text{pF}$ | see Figure 7      | 30           | -  | -  | ns  |
| Dn to STCP Set up time        |            | tsu  | 4.5V              | $C_L=50\text{pF}$ | see Figure 9 | 18 | -  | -   |
| DS to SHCP Set up time        | 4.5V       |      | $C_L=50\text{pF}$ | see Figure 9      | 18           | -  | -  | ns  |
| PL to SHCP Set up time        | 4.5V       |      | $C_L=50\text{pF}$ | see Figure 10     | 18           | -  | -  | ns  |
| Dn to SHCP hold time          | th         | 4.5V | $C_L=50\text{pF}$ | see Figure 9      | 5            | -  | -  | ns  |
| DS to SHCP hold time          |            | 4.5V | $C_L=50\text{pF}$ | see Figure 9      | 5            | -  | -  | ns  |
| PL to SHCP hold time          |            | 4.5V | $C_L=50\text{pF}$ | see Figure 10     | 5            | -  | -  | ns  |
| MR to SHCP recovery time      | trec       | 4.5V | $C_L=50\text{pF}$ | see Figure 8      | 18           | -  | -  | ns  |
| maximum frequency             | fmax       | 4.5V | $C_L=15\text{pF}$ | see Figure 5      | 20           | -  | -  | MHZ |



## 4、Testing Circuit

### 4.1、AC Testing Circuit

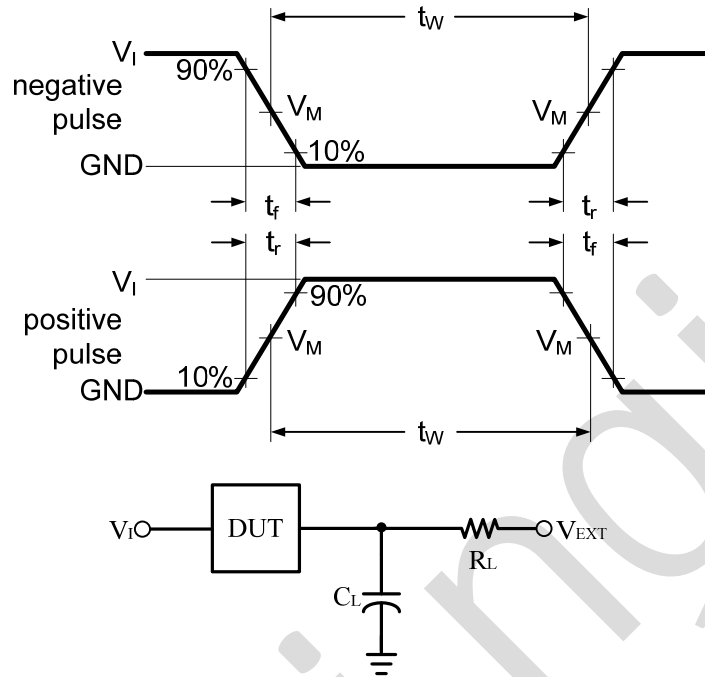


Figure 4. Test circuit for measuring switching times

$C_L$  includes probe and jig capacitance.

### 4.2、Test Data

| Type       | Input    |             | Load       |             | $V_{EXT}$         |                   |                   |
|------------|----------|-------------|------------|-------------|-------------------|-------------------|-------------------|
|            | $V_I$    | $t_r = t_f$ | $C_L$      | $R_L$       | $t_{PLH}/t_{PHL}$ | $t_{PLZ}/t_{PZL}$ | $t_{PHZ}/t_{PZH}$ |
| SN74HC597  | $V_{CC}$ | 3.0ns       | 15pF, 50pF | 1K $\Omega$ | Open              | $V_{CC}$          | GND               |
| SN74HCT597 | 3.0V     | 3.0ns       | 15pF, 50pF | 1K $\Omega$ | Open              | $V_{CC}$          | GND               |



### 4.3. AC Testing Waveforms

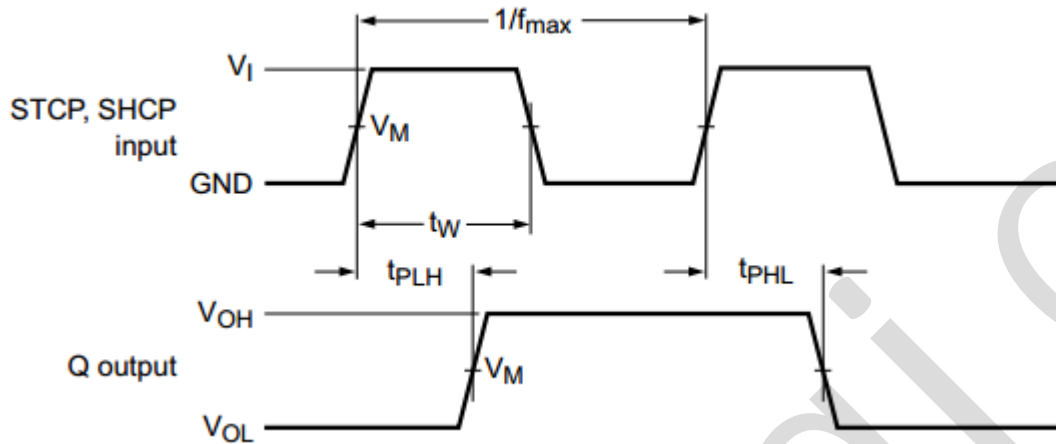


Figure 5. Shift clock and storage clock inputs to output, propagation delays, pulse widths and maximum clock frequency

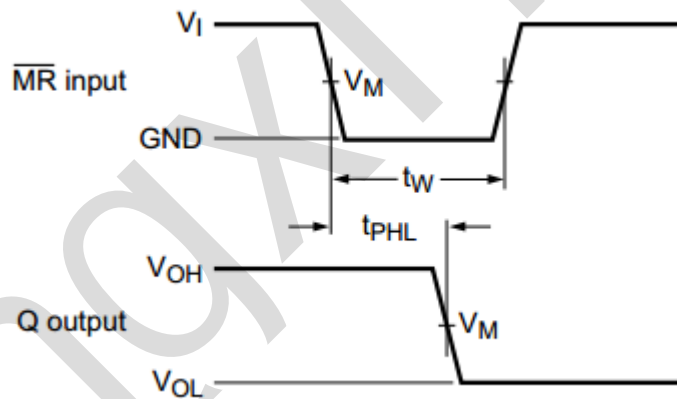


Figure 6. input ( $\overline{MR}$ ) to (Q), output propagation delays and ( $\overline{MR}$ ) pulse width

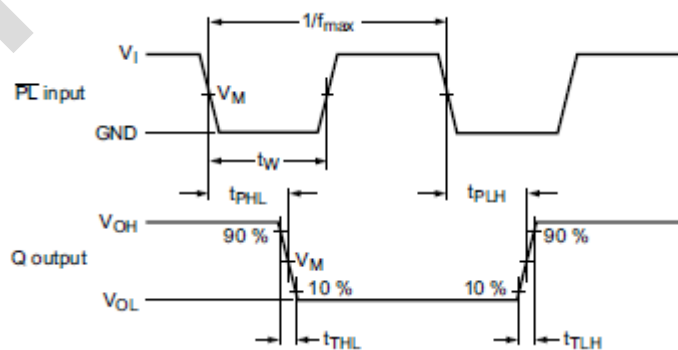


Figure 7 Input ( $\overline{PL}$ ) to (Q), output propagation delays,  $\overline{PL}$  pulse width and output transition times

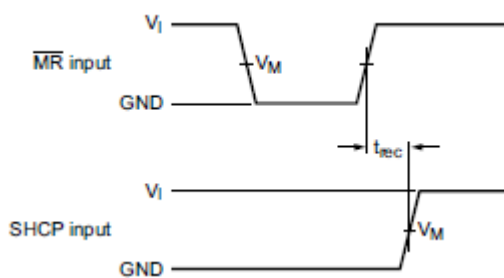


Figure 8 Input ( $\overline{\text{MR}}$ ) to shift clock (SHCP) and storage clock (STCP) recovery times

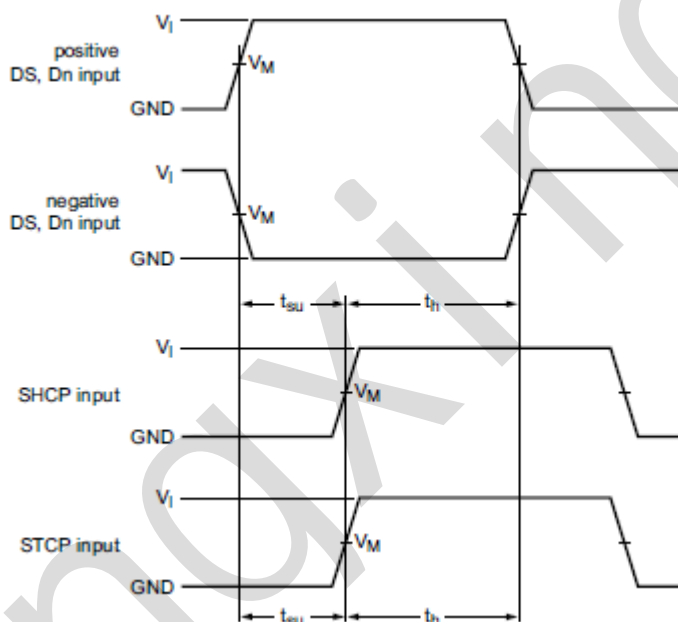


Figure 9 Hold and set-up times for (DS), (Dn) inputs to (SHCP), (STCP) inputs

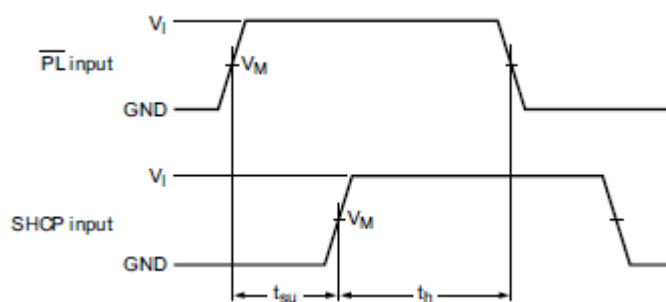




Figure 10 Set-up times for (PL) input to (SHCP) input

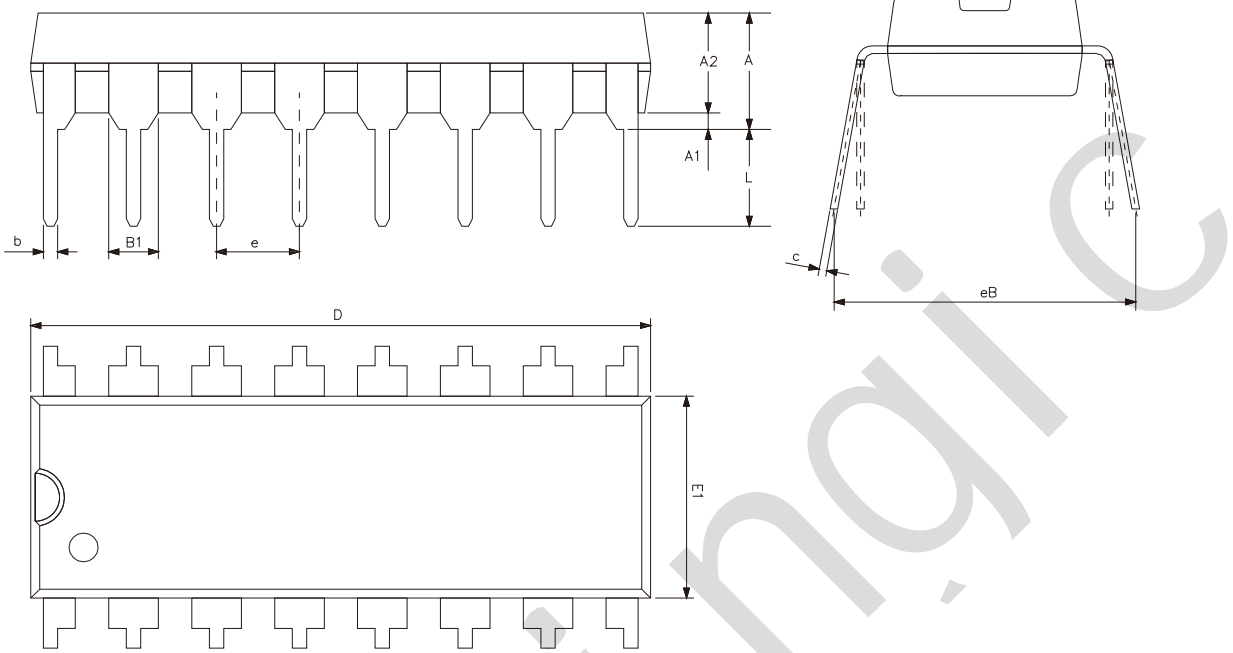
#### 4.4、Measurement Points

| Type       | Input               | Output              |                     |                     |
|------------|---------------------|---------------------|---------------------|---------------------|
|            | $V_M$               | $V_M$               | $V_X$               | $V_Y$               |
| SN74HC597  | $0.5 \times V_{CC}$ | $0.5 \times V_{CC}$ | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |
| SN74HCT597 | 1.3V                | 1.3V                | $0.1 \times V_{CC}$ | $0.9 \times V_{CC}$ |



## 5、Package Information

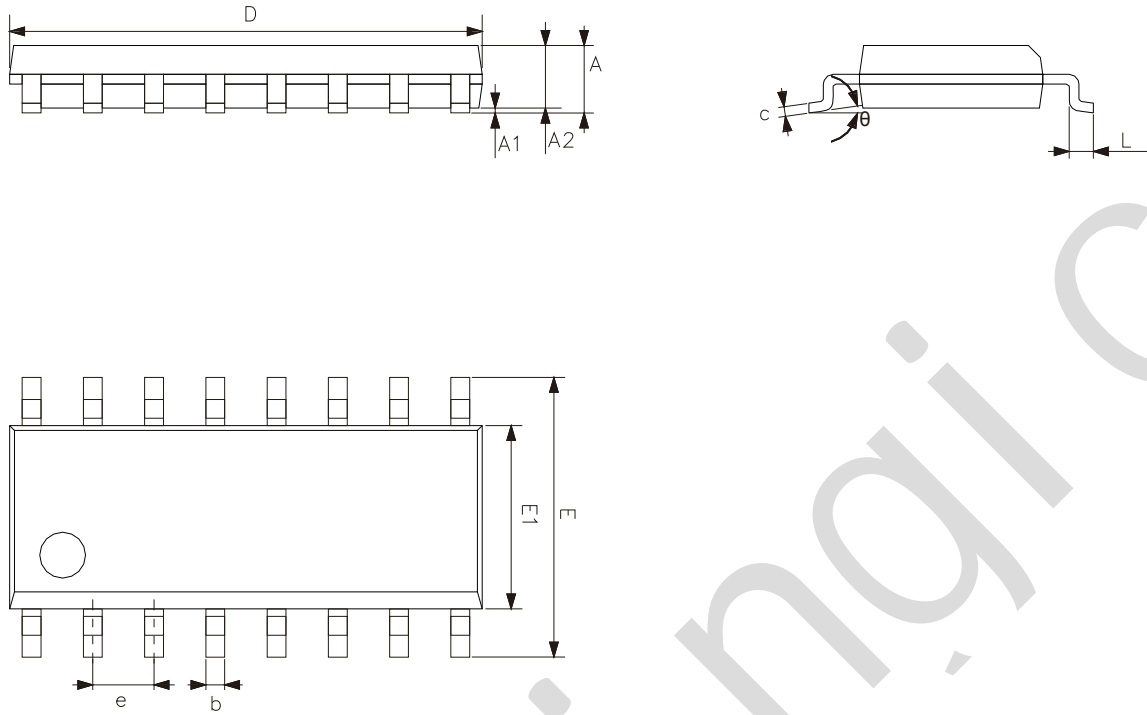
### 5.1、DIP16



| 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

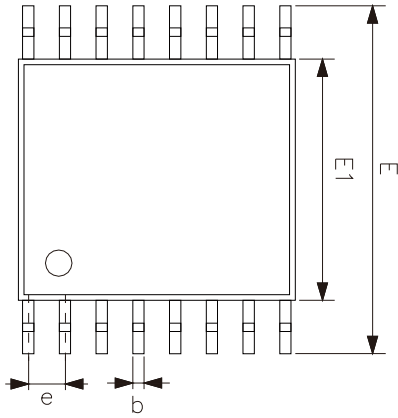
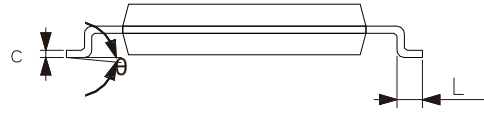
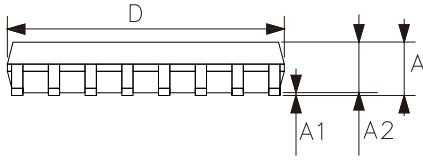


| Symbol   | Dimensions (mm) |       |
|----------|-----------------|-------|
|          | Min.            | Max.  |
| A        | 1.35            | 1.80  |
| A1       | 0.10            | 0.25  |
| A2       | 1.25            | 1.55  |
| b        | 0.33            | 0.51  |
| c        | 0.19            | 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°    |



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### 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°   |



灵星芯微 勇芯经营

## 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 SJ/T11363-2006 standard.<br>×: Indicates that the content of hazardous substances or elements exceeding the SJ/T11363-2006 Standard limit requirements. |                               |                               |                               |                          |                                |                   |                       |                           |                      |

### 6.2、 Notes

Recommended carefully reading this information before the use of this product;

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