

### Features

- Operate from 1.65V to 5.5V
- Low Power Current:  $I_{CC}=10\mu A$  (Max.)
- $\pm 24mA$  Output Drive ( $V_{CC}=3.0V$ )
- Power Down Protection
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

### Applications

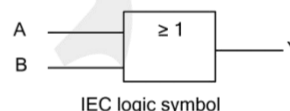
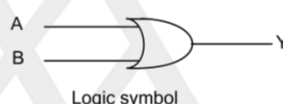
- AV Receiver
- Audio Dock: Portable
- Blu-ray Player and Home Theater
- Embedded PC
- Personal Digital Assistant(PDA)
- Power: Telecom/Server AC/DC Supply: Single Controller: Analog and Digital
- Solid State Drive(SSD): Client and Enterprise
- Wireless Headset, Keyboard, and Mouse

### General Description

The TP74LVC1G32 is a single 2-input OR gate which provides the Function  $Y=A+B$  in positive logic circuit.

This device has power-down protective circuit .

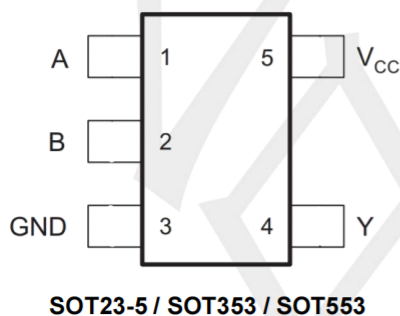
### Logic Diagram



### Ordering Information

| ORDER NUMBER  | PACKAGE DESCRIPTION | PACKAGE OPTION     | Marking |
|---------------|---------------------|--------------------|---------|
| TP74LVC1G32S5 | SOT23-5             | Tape and Reel,3000 | S103    |
| TP74LVC1G32C5 | SOT353              | Tape and Reel,3000 | C103    |
| TP74LVC1G32X5 | SOT553              | Tape and Reel,4000 | CG7     |
| TP74LVC1G32D6 | DFN1X1-6            | Tape and Reel,5000 | CG      |
| TP74LVC1G32N6 | DFN1510-6           | Tape and Reel,5000 | CG      |
| TP74LVC1G32P6 | DFN0808-4           | Tape and Reel,3000 | N4      |

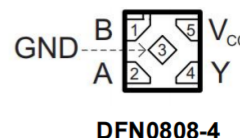
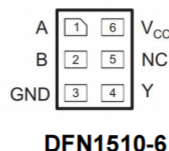
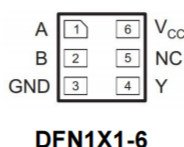
### Pin Configuratio



### Function Table

| INPUT(A) | INPUT(B) | OUTPUT(Y) |
|----------|----------|-----------|
| H        | X        | H         |
| X        | H        | H         |
| L        | L        | L         |

Note: H: HIGH voltage level; L: LOW voltage level; X: Don't care.



### Absolute Maximum Ratings

| PARAMETER                 | SYMBOL        | CONDITIONS                    | RATINGS     | UNIT |
|---------------------------|---------------|-------------------------------|-------------|------|
| Supply Voltage            | VCC           |                               | -0.5 ~ +6.5 | V    |
| Input Voltage             | VIN           |                               | -0.5 ~ +6.5 | V    |
| Output Voltage            | VOUT          |                               | -0.5 ~ +6.5 | V    |
| VCC or GND Current        | ICC           | Output in the Power-off state | ±100        | mA   |
| Continuous Output Current | IOUT          | VOUT=0~VCC                    | ±50         | mA   |
| Input Clamp Current       | IIK           | VIN<0                         | -50         | mA   |
| Output Clamp Current      | IOK           | VOUT<0                        | -50         | mA   |
| Storage Temperature Range | TSTG          |                               | -65 ~ +150  | °C   |
| Junction to Ambient       | $\theta_{JA}$ | SOT-23-5                      | 230         | °C/W |
|                           |               | SOT353                        | 280         | °C/W |
|                           |               | SOT553                        | 250         | °C/W |
|                           |               | DFN1X1-6                      | 460         | °C/W |
|                           |               | DFN1510-6                     | 440         | °C/W |
|                           |               | DFN0808-4                     | 340         | °C/W |

Note: Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

### Recommended Operating Conditions

| PARAMETER                            | SYMBOL              | TEST CONDITIONS           | MIN  | TYP | MAX | UNIT |
|--------------------------------------|---------------------|---------------------------|------|-----|-----|------|
| Supply Voltage                       | VCC                 | Operating                 | 1.65 | --  | 5.5 | V    |
|                                      |                     | Data retention only       | 1.5  | --  | --  | V    |
| Input Voltage                        | VIN                 |                           | 0    | --  | 5.5 | V    |
| Output Voltage                       | VOUT                | High or low state         | 0    | --  | VCC | V    |
| Low-Level Output Current             | I <sub>OL</sub>     | VCC=1.65V                 | --   | --  | 4   | mA   |
|                                      |                     | VCC=2.3V                  | --   | --  | 8   | mA   |
|                                      |                     | VCC=3V                    | --   | --  | 16  | mA   |
|                                      |                     | VCC=3V                    | --   | --  | 24  | mA   |
|                                      |                     | VCC=4.5V                  | --   | --  | 32  | mA   |
| Input Transition Rise or Fall<br>ate | $\Delta t/\Delta v$ | VCC=1.8V±0.15V, 2.5V±0.2V | --   | --  | 20  | ns/V |
|                                      |                     | VCC=3.3V±0.3V             | --   | --  | 10  | ns/V |
|                                      |                     | VCC=5V±0.5V               | --   | --  | 5   | ns/V |
| Operating Temperature                | TA                  |                           | -40  | --  | 125 | °C   |

# TP74LVC1G32 Series

## SINGLE 2-INPUT POSITIVE-OR GATE

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### Electrical Characteristics (unless otherwise specified)

| PARAMETER                                         | SYM<br>BOL           | TEST Conditions                                                                                       | TA=25°C              |     |                      | TA=-40°C~+125°C      |     |                      | UNIT |
|---------------------------------------------------|----------------------|-------------------------------------------------------------------------------------------------------|----------------------|-----|----------------------|----------------------|-----|----------------------|------|
|                                                   |                      |                                                                                                       | MIN                  | TYP | MAX                  | MIN                  | TYP | MAX                  |      |
| High-Level Input Voltage                          | V <sub>IH</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V                                                                        | 0.65×V <sub>CC</sub> | --  | --                   | 0.65×V <sub>CC</sub> | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V ~ 2.7V                                                                          | 1.7                  | --  | --                   | 1.7                  | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =3V ~ 3.6V                                                                            | 2                    | --  | --                   | 2                    | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V ~ 5.5V                                                                          | 0.7×V <sub>CC</sub>  | --  | --                   | 0.7×V <sub>CC</sub>  | --  | --                   | V    |
| Low-Level Input Voltage                           | V <sub>IL</sub>      | V <sub>CC</sub> =1.65V ~ 1.95V                                                                        | --                   | --  | 0.35×V <sub>CC</sub> | --                   | --  | 0.35×V <sub>CC</sub> | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V ~ 2.7V                                                                          | --                   | --  | 0.7                  | --                   | --  | 0.7                  | V    |
|                                                   |                      | V <sub>CC</sub> =3V ~ 3.6V                                                                            | --                   | --  | 0.8                  | --                   | --  | 0.8                  | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V ~ 5.5V                                                                          | --                   | --  | 0.3×V <sub>CC</sub>  | --                   | --  | 0.3×V <sub>CC</sub>  | V    |
| Low-Level Output Voltage                          | V <sub>OL</sub>      | V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OL</sub> =100μA                                                  | --                   | --  | 0.1                  | --                   | --  | 0.1                  | V    |
|                                                   |                      | V <sub>CC</sub> =1.65V, I <sub>OL</sub> =4mA                                                          | --                   | --  | 0.45                 | --                   | --  | 0.7                  | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V, I <sub>OL</sub> =8mA                                                           | --                   | --  | 0.3                  | --                   | --  | 0.45                 | V    |
|                                                   |                      | V <sub>CC</sub> =3.0V, I <sub>OH</sub> =16mA                                                          | --                   | --  | 0.4                  | --                   | --  | 0.6                  | V    |
|                                                   |                      | V <sub>CC</sub> =3.0V, I <sub>OH</sub> =24mA                                                          | --                   | --  | 0.55                 | --                   | --  | 0.8                  | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V, I <sub>OH</sub> =32mA                                                          | --                   | --  | 0.55                 | --                   | --  | 0.8                  | V    |
| High-Level Output Voltage                         | V <sub>OH</sub>      | V <sub>CC</sub> =1.65 ~ 5.5V, I <sub>OL</sub> =-100μA                                                 | V <sub>CC</sub> -0.1 | --  | --                   | V <sub>CC</sub> -0.1 | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =1.65V, I <sub>OL</sub> =-4mA                                                         | 1.2                  | --  | --                   | 0.95                 | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =2.3V, I <sub>OL</sub> =-8mA                                                          | 1.9                  | --  | --                   | 1.7                  | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =3.0V, I <sub>OH</sub> =-16mA                                                         | 2.4                  | --  | --                   | 2.1                  | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =3.0V, I <sub>OH</sub> =-24mA                                                         | 2.3                  | --  | --                   | 2                    | --  | --                   | V    |
|                                                   |                      | V <sub>CC</sub> =4.5V, I <sub>OH</sub> =-32mA                                                         | 3.8                  | --  | --                   | 3.4                  | --  | --                   | V    |
| Input Leakage Current                             | I <sub>I(LEAK)</sub> | V <sub>CC</sub> =0 ~ 5.5V, V <sub>IN</sub> =5.5V or GND                                               | --                   | --  | ±5                   | --                   | --  | ±5                   | μA   |
| Power OFF Leakage Current                         | I <sub>OFF</sub>     | V <sub>CC</sub> =0V, V <sub>IN</sub> or V <sub>OUT</sub> =5.5V                                        | --                   | --  | ±10                  | --                   | --  | ±25                  | μA   |
| Quiescent Supply Current                          | I <sub>Q</sub>       | V <sub>CC</sub> =1.65 ~ 5.5V, V <sub>IN</sub> =V <sub>CC</sub> or GND, I <sub>OUT</sub> =0A           | --                   | --  | 10                   | --                   | --  | ±10                  | μA   |
| Additional Quiescent Supply Current Per Input Pin | ΔI <sub>Q</sub>      | V <sub>CC</sub> =3 ~ 5.5V, One input at V <sub>CC</sub> -0.6V, Other inputs at V <sub>CC</sub> or GND | --                   | --  | 500                  | --                   | --  | 500                  | μA   |

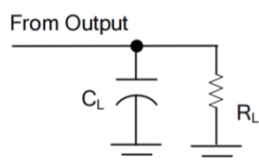
### OPERATING CHARACTERISTICS (f=10MHz, TA =25°C , unless otherwise specified)

| PARAMETER                     | SYMBOL          | TEST Conditions                                                | MIN | TYP | MAX | UNIT |
|-------------------------------|-----------------|----------------------------------------------------------------|-----|-----|-----|------|
| Power Dissipation Capacitance | C <sub>PD</sub> | V <sub>CC</sub> =1.8V                                          | --  | 20  | --  | pF   |
|                               |                 | V <sub>CC</sub> =2.5V                                          | --  | 20  | --  | pF   |
|                               |                 | V <sub>CC</sub> =3.3V                                          | --  | 21  | --  | pF   |
|                               |                 | V <sub>CC</sub> =5.0V                                          | --  | 22  | --  | pF   |
| Input Capacitance             | C <sub>IN</sub> | V <sub>CC</sub> =3.3V, V <sub>IN</sub> =V <sub>CC</sub> or GND | --  | 4   | --  | pF   |

## SWITCHING CHARACTERISTICS ( unless otherwise specified)

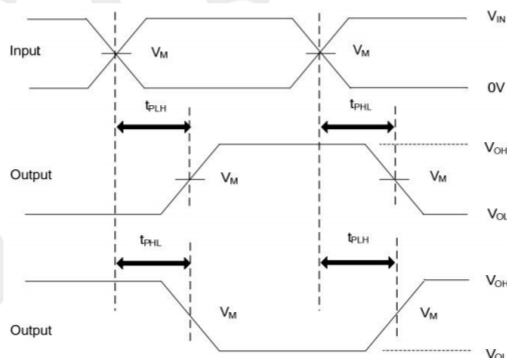
| PARAMETER                                          | SYM<br>BOL                             | TEST Conditions                                         | TA=25°C |     |     | TA=-40°C~+125°C |     |      | UNIT |
|----------------------------------------------------|----------------------------------------|---------------------------------------------------------|---------|-----|-----|-----------------|-----|------|------|
|                                                    |                                        |                                                         | MIN     | TYP | MAX | MIN             | TYP | MAX  |      |
| Propagation delay from input (A or B) to output(Y) | t <sub>PLH</sub> /<br>t <sub>PHL</sub> | V <sub>CC</sub> =1.8±0.15V,CL=15pF,R <sub>L</sub> =1MΩ  | 1.9     | --  | 9   | --              | --  | 12   | nS   |
|                                                    |                                        | V <sub>CC</sub> =2.5±0.2V, CL=15pF,R <sub>L</sub> =1MΩ  | 0.8     | --  | 6.5 | --              | --  | 9    | nS   |
|                                                    |                                        | V <sub>CC</sub> =3.3±0.3V,CL=15pF,R <sub>L</sub> =1MΩ   | 0.9     | --  | 5.5 | --              | --  | 8    | nS   |
|                                                    |                                        | V <sub>CC</sub> =5±0.5V,CL=15pF,R <sub>L</sub> =1MΩ     | 0.8     | --  | 5   | --              | --  | 7    | nS   |
|                                                    |                                        | V <sub>CC</sub> =1.8±0.15V,CL=30pF,R <sub>L</sub> =1KΩ  | 2.8     | --  | 9.5 | --              | --  | 12.5 | nS   |
|                                                    |                                        | V <sub>CC</sub> =2.5±0.2V, CL=30pF,R <sub>L</sub> =500Ω | 1.2     | --  | 7.5 | --              | --  | 10   | nS   |
|                                                    |                                        | V <sub>CC</sub> =3.3±0.3V,CL=50pF,R <sub>L</sub> =500Ω  | 1.1     | --  | 6.5 | --              | --  | 9    | nS   |
|                                                    |                                        | V <sub>CC</sub> =5±0.5V,CL=50pF,R <sub>L</sub> =500Ω    | 1       | --  | 6   | --              | --  | 8    | nS   |

## TEST CIRCUIT AND WAVEFORMS



### TEST CIRCUIT

| V <sub>CC</sub> | INPUTS          |                                 | V <sub>M</sub>     | C <sub>L</sub> | R <sub>L</sub> |
|-----------------|-----------------|---------------------------------|--------------------|----------------|----------------|
|                 | V <sub>IN</sub> | t <sub>R</sub> , t <sub>F</sub> |                    |                |                |
| 1.8V±0.15V      | V <sub>CC</sub> | ≤2ns                            | V <sub>CC</sub> /2 | 15pF           | 1MΩ            |
| 2.5V±0.2V       | V <sub>CC</sub> | ≤2ns                            | V <sub>CC</sub> /2 | 15pF           | 1MΩ            |
| 3.3V±0.3V       | 3V              | ≤2.5ns                          | 1.5V               | 15pF           | 1MΩ            |
| 5V±0.5V         | V <sub>CC</sub> | ≤2.5ns                          | V <sub>CC</sub> /2 | 15pF           | 1MΩ            |
| 1.8V±0.15V      | V <sub>CC</sub> | ≤2ns                            | V <sub>CC</sub> /2 | 30pF           | 1KΩ            |
| 2.5V±0.2V       | V <sub>CC</sub> | ≤2ns                            | V <sub>CC</sub> /2 | 30pF           | 500Ω           |
| 3.3V±0.3V       | 3V              | ≤2.5ns                          | 1.5V               | 50pF           | 500Ω           |
| 5V±0.5V         | V <sub>CC</sub> | ≤2.5ns                          | V <sub>CC</sub> /2 | 50pF           | 500Ω           |



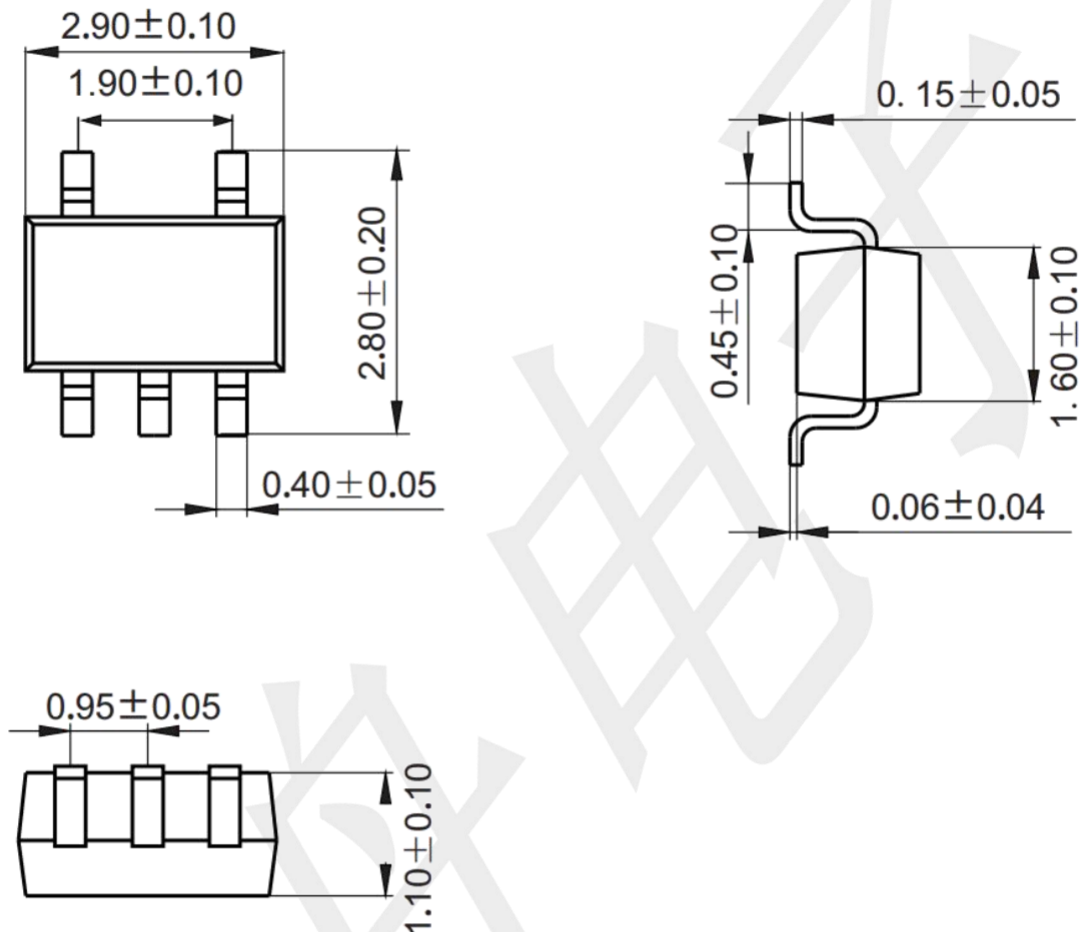
### PROPAGATION DELAY TIMES

Notes: 1.  $C_L$  includes probe and jig capacitance.

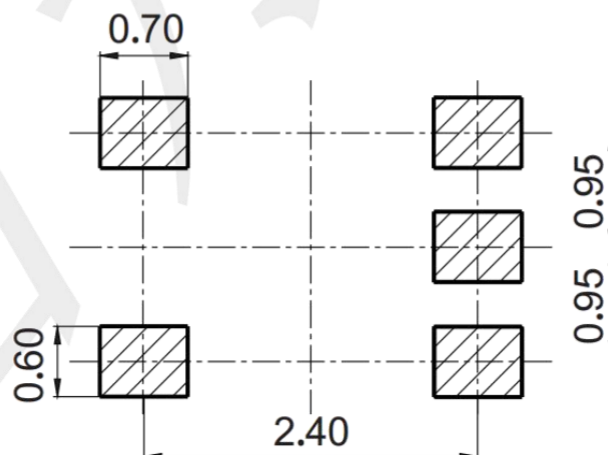
2. All input pulses are supplied by generators having the following characteristics:  $P_{RR} \leq 10\text{MHz}$ ,  $Z_O = 50\Omega$ .

## Package informantion

SOT23-5 (Unit: mm)

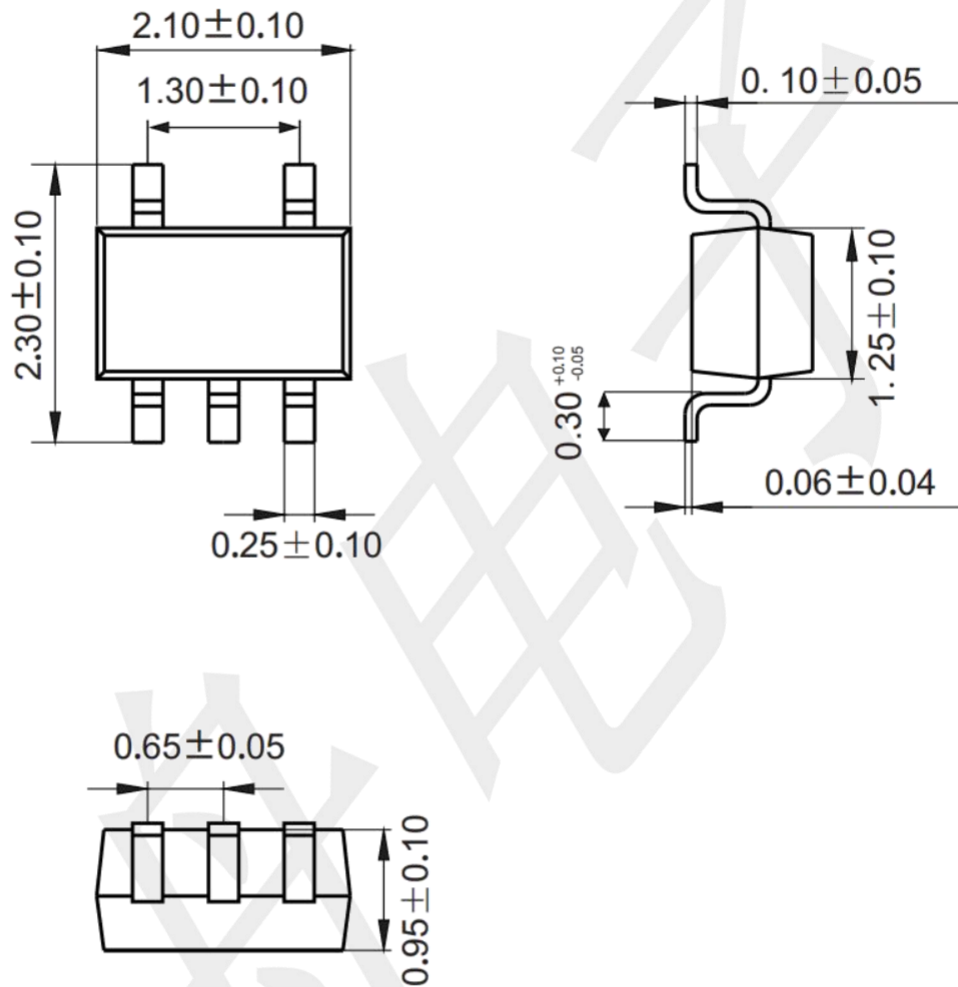


## Mounting Pad Layout (unit: mm)

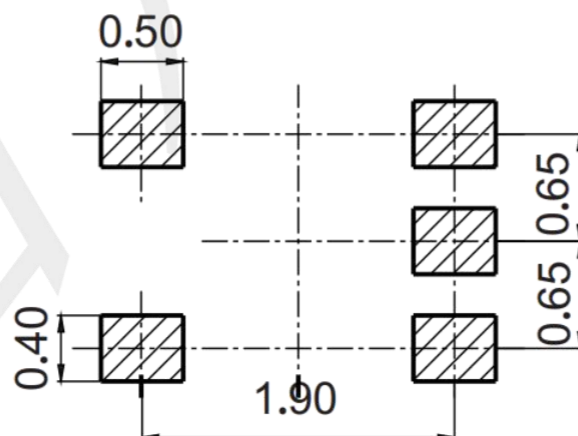


## Package information

SOT353 (Unit: mm)

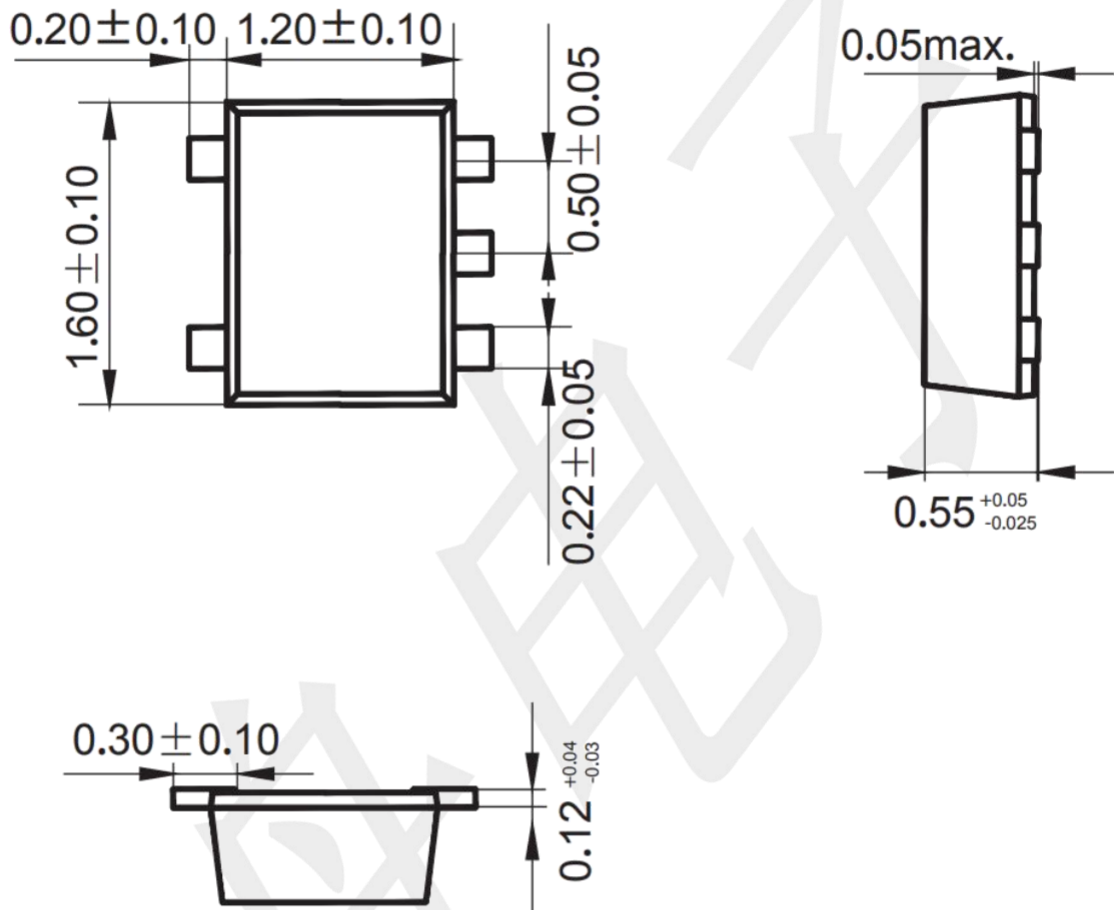


## Mounting Pad Layout (unit: mm)

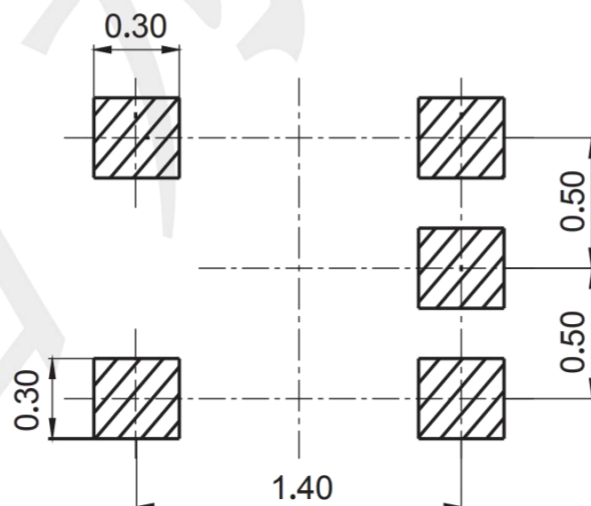


**Package informantion**

SOT553 (unit: mm)

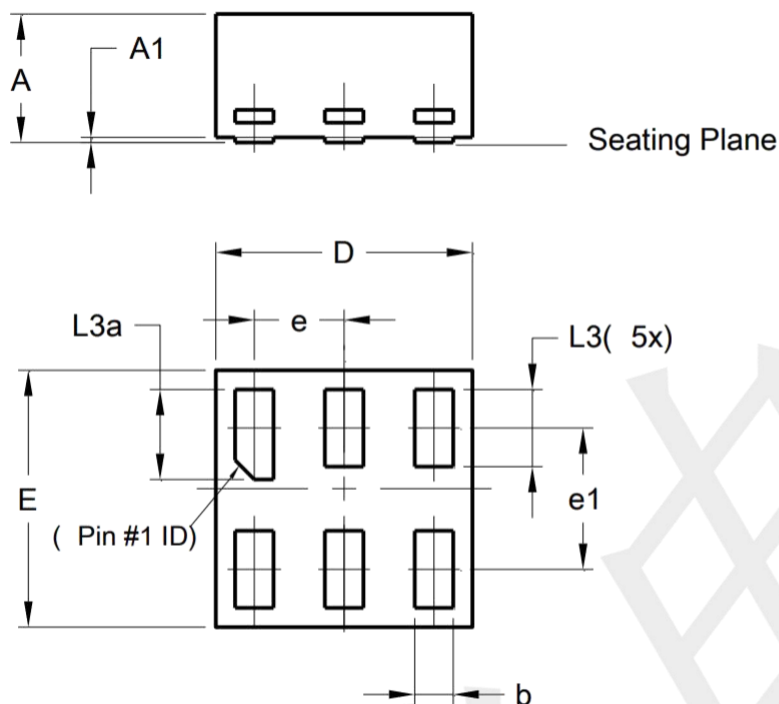


**Mounting Pad Layout (unit: mm)**



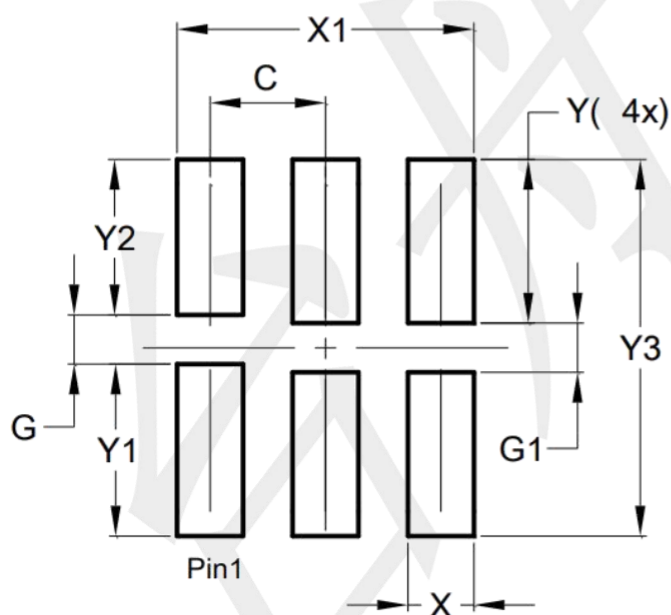
## Package information

DFN1X1-6 (unit: mm)



| DFN1010-6<br>(Type B) |          |       |      |
|-----------------------|----------|-------|------|
| Dim                   | Min      | Max   | Typ  |
| A                     | -        | 0.50  | 0.39 |
| A1                    | -        | 0.04  | -    |
| b                     | 0.12     | 0.20  | 0.15 |
| D                     | 0.95     | 1.050 | 1.00 |
| E                     | 0.95     | 1.050 | 1.00 |
| e                     | 0.35 BSC |       |      |
| e1                    | 0.55 BSC |       |      |
| L3                    | 0.27     | 0.30  | 0.30 |
| L3a                   | 0.32     | 0.40  | 0.35 |
| All Dimensions in mm  |          |       |      |

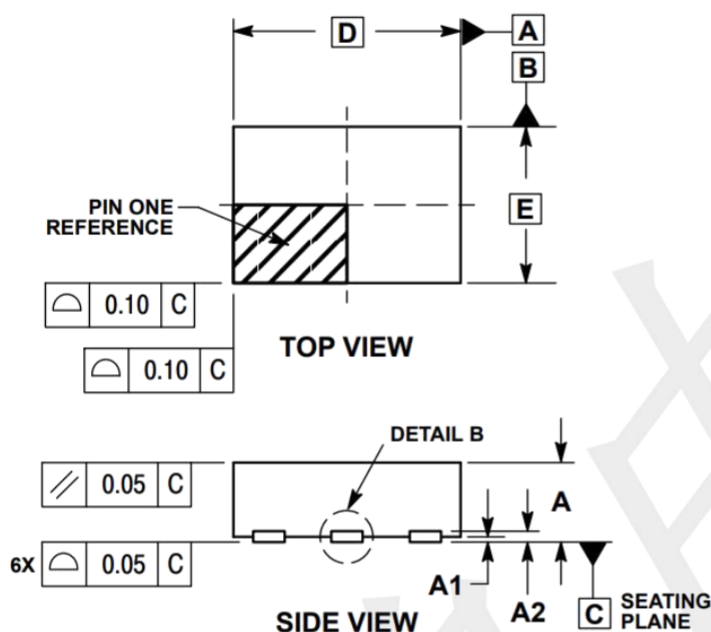
## Mounting Pad Layout (unit: mm)



| Dimensions | Value<br>(in mm) |
|------------|------------------|
| C          | 0.350            |
| G          | 0.150            |
| G1         | 0.150            |
| X          | 0.200            |
| X1         | 0.900            |
| Y          | 0.500            |
| Y1         | 0.525            |
| Y2         | 0.475            |
| Y3         | 1.150            |

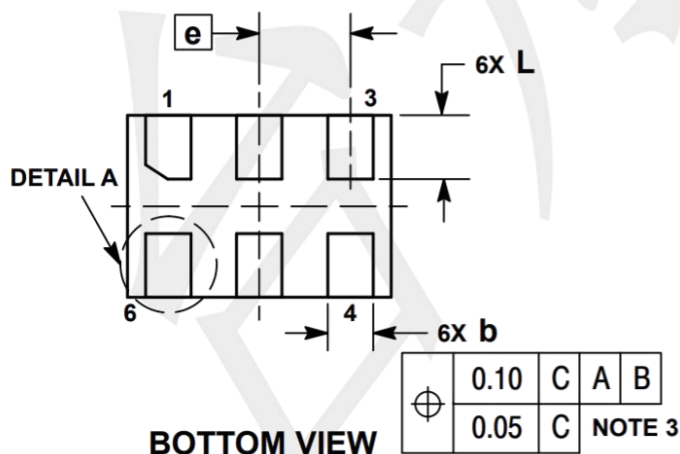
## Package information

DFN1510-6 (unit: mm)

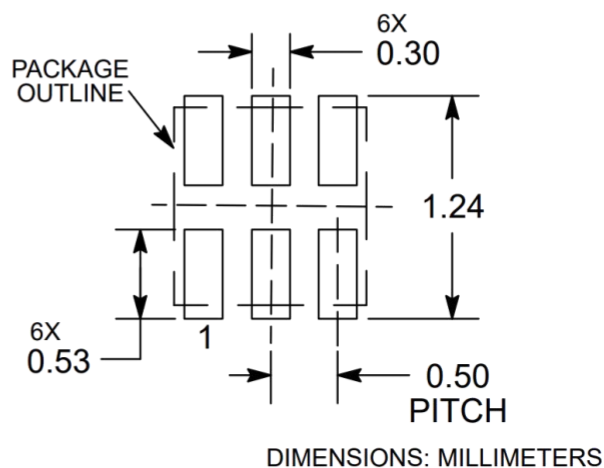


| DIM | MILLIMETERS |      |
|-----|-------------|------|
|     | MIN         | MAX  |
| A   | 0.45        | 0.55 |
| A1  | 0.00        | 0.05 |
| A2  | 0.07 REF    |      |
| b   | 0.20        | 0.30 |
| D   | 1.45 BSC    |      |
| E   | 1.00 BSC    |      |
| e   | 0.50 BSC    |      |
| L   | 0.30        | 0.40 |
| L1  | ---         | 0.15 |

## Mounting Pad Layout (unit: mm)

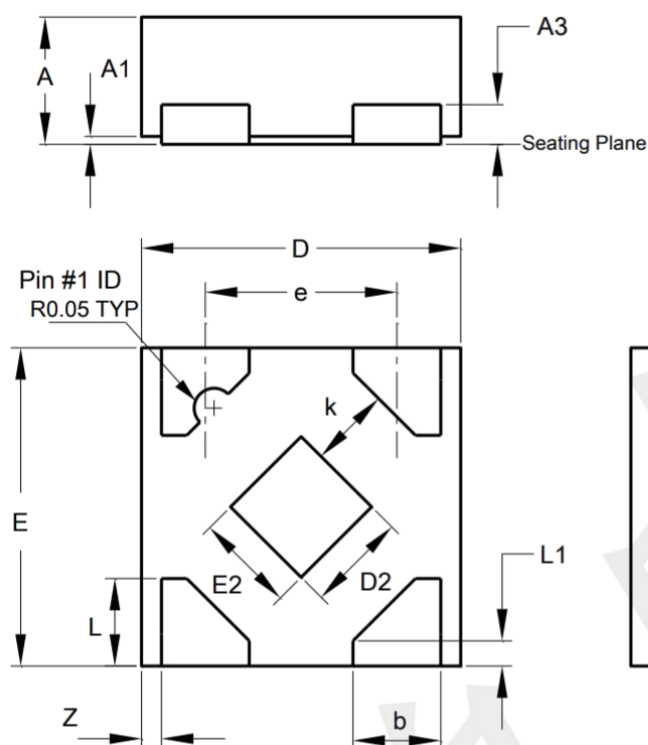


## MOUNTING FOOTPRINT



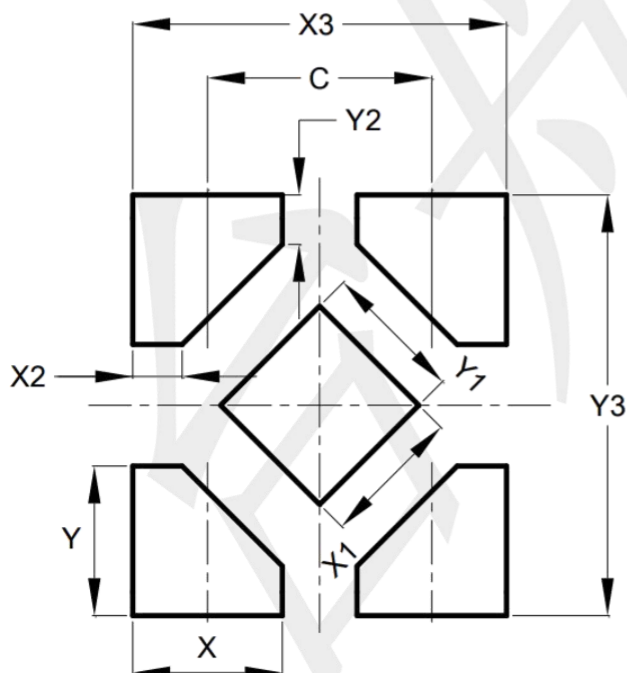
## Package information

DFN0808-4 (unit: mm)



| DFN0808-4            |      |      |      |
|----------------------|------|------|------|
| Dim                  | Min  | Max  | Typ  |
| A                    | 0.25 | 0.35 | 0.30 |
| A1                   | 0    | 0.04 | 0.02 |
| A3                   | -    | -    | 0.13 |
| b                    | 0.17 | 0.27 | 0.22 |
| D                    | 0.75 | 0.85 | 0.80 |
| D2                   | 0.15 | 0.35 | 0.25 |
| E                    | 0.75 | 0.85 | 0.80 |
| E2                   | 0.15 | 0.35 | 0.25 |
| e                    | -    | -    | 0.48 |
| k                    | 0.20 | -    | -    |
| L                    | 0.17 | 0.27 | 0.22 |
| L1                   | 0.02 | 0.12 | 0.07 |
| z                    | -    | -    | 0.05 |
| All Dimensions in mm |      |      |      |

## Mounting Pad Layout (unit: mm)



| Dimensions | Value |
|------------|-------|
| C          | 0.480 |
| X          | 0.320 |
| X1         | 0.300 |
| X2         | 0.106 |
| X3         | 0.800 |
| Y          | 0.320 |
| Y1         | 0.300 |
| Y2         | 0.106 |
| Y3         | 0.900 |