

1、 General Description

The 74LVC1G08 provides one 2-input AND function. Inputs can be driven from either 3.3V or 5V devices. This feature allows the use of these devices as translators in mixed 3.3V and 5V applications.

Features:

- Wide supply voltage range from 1.65V to 5.5V
- $\pm 24\text{mA}$ output drive ($V_{DD}=3.0\text{V}$)
- CMOS low power consumption
- Input accepts voltages up to 5V
- Specified from -40°C to $+125^{\circ}\text{C}$
- Packaging information: SOT-23-5/SOT-353

2、 Block Diagram And Pin Description

2.1、 Block Diagram

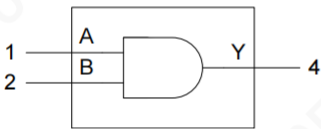


Figure 1. Logic symbol



Figure 2. IEC logic symbol

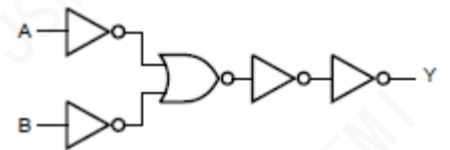
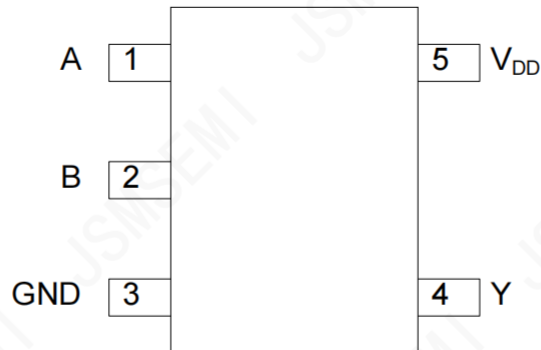


Figure 3. Logic diagram

Ordering Information

| Order number | Package | Operation Temperature Range | MSL Grade | Ship, Quantity | Green |
|----------------------|----------|-----------------------------|-----------|----------------|-------|
| 74LVC1G08GV-JSM | SOT-23-5 | -40 to 125°C | 3 | T&R,3000 | Rohs |
| 74LVC1G08GV,125-JSM | SOT-23-5 | -40 to 125°C | 3 | T&R,3000 | Rohs |
| 74LVC1G08GW-JSM | SOT-353 | -40 to 125°C | 3 | T&R,3000 | Rohs |
| 74LVC1G08GW,125-JSM | SOT-353 | -40 to 125°C | 3 | T&R,3000 | Rohs |
| 74LVC1G08GW-Q100-JSM | SOT-353 | -40 to 125°C | 3 | T&R,3000 | Rohs |

2.2、Pin Configurations



SOT-23-5/SOT-353

2.3、Pin Description

| Pin No. SOT-23-5/SOT-353 | Pin Name | Description |
|-----------------------------|-----------------|----------------|
| 1 | A | data input |
| 2 | B | data input |
| 3 | GND | ground (0V) |
| 4 | Y | data output |
| 5 | V _{DD} | supply voltage |

2.4、Function Table

| Input | | Output |
|-------|---|--------|
| A | B | Y |
| L | L | L |
| L | H | L |
| H | L | L |
| H | H | H |

Note: H=HIGH voltage level; L=LOW voltage level.

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_{DD} | - | -0.5 | +6.5 | V |
| input clamping current | I_{IK} | $V_I < 0V$ | -50 | - | mA |
| input voltage | V_I | - | -0.5 | +6.5 | V |
| output clamping current | I_{OK} | $V_O > V_{DD}$ or $V_O < 0V$ | - | ± 50 | mA |
| output voltage | V_O | Active mode | -0.5 | $V_{DD}+0.5$ | V |
| | | Power-down mode | -0.5 | +6.5 | V |
| output current | I_O | $V_O=0V$ to V_{DD} | - | ± 50 | mA |
| supply current | I_{DD} | - | - | 100 | mA |
| ground current | I_{GND} | - | -100 | - | mA |
| storage temperature | T_{stg} | - | -65 | +150 | °C |
| total power dissipation | P_{tot} | - | - | 250 | mW |
| soldering temperature | T_L | 10s | 260 | | °C |

3.2、Recommended Operating Conditions

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit |
|---------------------|-----------|------------------------------|------|------|----------|------|
| supply voltage | V_{DD} | - | 1.65 | - | 5.5 | V |
| input voltage | V_I | - | 0 | - | 5.5 | V |
| output voltage | V_O | Active mode | 0 | - | V_{DD} | V |
| | | Power-down mode; $V_{DD}=0V$ | 0 | - | 5.5 | V |
| ambient temperature | T_{amb} | - | -40 | - | +125 | °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 | Conditions | Min. | Typ. | Max. | Unit | |
|---------------------------|-----------------|--|---|--------------|----------------------|---------------|---|
| HIGH-level input voltage | V_{IH} | $V_{DD}=1.65\text{V}$ to 1.95V | $0.65 \times V_{DD}$ | - | - | V | |
| | | $V_{DD}=2.3\text{V}$ to 2.7V | 1.7 | - | - | V | |
| | | $V_{DD}=2.7\text{V}$ to 3.6V | 2.0 | - | - | V | |
| | | $V_{DD}=4.5\text{V}$ to 5.5V | $0.7 \times V_{DD}$ | - | - | V | |
| LOW-level input voltage | V_{IL} | $V_{DD}=1.65\text{V}$ to 1.95V | - | - | $0.35 \times V_{DD}$ | V | |
| | | $V_{DD}=2.3\text{V}$ to 2.7V | - | - | 0.7 | V | |
| | | $V_{DD}=2.7\text{V}$ to 3.6V | - | - | 0.8 | V | |
| | | $V_{DD}=4.5\text{V}$ to 5.5V | - | - | $0.3 \times V_{DD}$ | V | |
| HIGH-level output voltage | V_{OH} | $V_I = V_{IH}$ or V_{IL} | $I_O=-100\mu\text{A}$; $V_{DD}=1.65\text{V}$ to 5.5V | $V_{DD}-0.1$ | - | - | V |
| | | | $I_O=-4\text{mA}$; $V_{DD}=1.65\text{V}$ | 1.2 | - | - | V |
| | | | $I_O=-8\text{mA}$; $V_{DD}=2.3\text{V}$ | 1.9 | - | - | V |
| | | | $I_O=-12\text{mA}$; $V_{DD}=2.7\text{V}$ | 2.2 | - | - | V |
| | | | $I_O=-24\text{mA}$; $V_{DD}=3.0\text{V}$ | 2.3 | - | - | V |
| | | | $I_O=-32\text{mA}$; $V_{DD}=4.5\text{V}$ | 3.8 | - | - | V |
| LOW-level output voltage | V_{OL} | $V_I = V_{IH}$ or V_{IL} | $I_O=100\mu\text{A}$; $V_{DD}=1.65\text{V}$ to 5.5V | - | - | 0.1 | V |
| | | | $I_O=4\text{mA}$; $V_{DD}=1.65\text{V}$ | - | - | 0.45 | V |
| | | | $I_O=8\text{mA}$; $V_{DD}=2.3\text{V}$ | - | - | 0.3 | V |
| | | | $I_O=12\text{mA}$; $V_{DD}=2.7\text{V}$ | - | - | 0.4 | V |
| | | | $I_O=24\text{mA}$; $V_{DD}=3.0\text{V}$ | - | - | 0.55 | V |
| | | | $I_O=32\text{mA}$; $V_{DD}=4.5\text{V}$ | - | - | 0.55 | V |
| input leakage current | I_I | $V_I=5.5\text{V}$ or GND; $V_{DD}=0\text{V}$ to 5.5V | - | - | ± 1 | μA | |
| power-off leakage current | I_{OFF} | V_I or $V_O=5.5\text{V}$; $V_{DD}=0\text{V}$ | - | - | ± 2 | μA | |
| supply current | I_{DD} | $V_I=5.5\text{V}$ or GND; $I_O=0\text{A}$; $V_{DD}=1.65\text{V}$ to 5.5V | - | - | 4 | μA | |
| additional supply current | ΔI_{DD} | per pin; $V_I=V_{DD}-0.6\text{V}$; $I_O=0\text{A}$; $V_{DD}=2.3\text{V}$ to 5.5V | - | - | 500 | μA | |
| input capacitance | C_I | $V_{DD}=3.3\text{V}$; $V_I=\text{GND}$ to V_{DD} | - | 5 | - | pF | |

Note: All typical values are measured at $V_{DD}=3.3\text{V}$ and $T_{amb}=25^{\circ}\text{C}$.

3.3.2、DC Characteristics 2

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

| Parameter | Symbol | Conditions | Min. | Typ. | Max. | Unit | |
|---------------------------|------------------|--|---|-----------------------|--------------------------|------|---|
| HIGH-level input voltage | V _{IH} | V _{DD} =1.65V to 1.95V | 0.65× V _{DD} | - | - | V | |
| | | V _{DD} =2.3V to 2.7V | 1.7 | - | - | V | |
| | | V _{DD} =2.7V to 3.6V | 2.0 | - | - | V | |
| | | V _{DD} =4.5V to 5.5V | 0.7× V _{DD} | - | - | V | |
| LOW-level input voltage | V _{IL} | V _{DD} =1.65V to 1.95V | - | - | 0.35× V _{DD} | V | |
| | | V _{DD} =2.3V to 2.7V | - | - | 0.7 | V | |
| | | V _{DD} =2.7V to 3.6V | - | - | 0.8 | V | |
| | | V _{DD} =4.5V to 5.5V | - | - | 0.3× V _{DD} | V | |
| HIGH-level output voltage | V _{OH} | V _I = V _{IH} or V _{IL} | I _O = -100μA; V _{DD} = 1.65V to 5.5V | V _{DD} - 0.1 | - | - | V |
| | | | I _O = -4mA; V _{DD} = 1.65V | 0.95 | - | - | V |
| | | | I _O = -8mA; V _{DD} = 2.3V | 1.7 | - | - | V |
| | | | I _O = -12mA; V _{DD} = 2.7V | 1.9 | - | - | V |
| | | | I _O = -24mA; V _{DD} = 3.0V | 2.0 | - | - | V |
| | | | I _O = -32mA; V _{DD} = 4.5V | 3.4 | - | - | V |
| LOW-level output voltage | V _{OL} | V _I = V _{IH} or V _{IL} | I _O = 100μA; V _{DD} = 1.65V to 5.5V | - | - | 0.1 | V |
| | | | I _O = 4mA; V _{DD} = 1.65V | - | - | 0.70 | V |
| | | | I _O = 8mA; V _{DD} = 2.3V | - | - | 0.45 | V |
| | | | I _O = 12mA; V _{DD} = 2.7V | - | - | 0.60 | V |
| | | | I _O = 24mA; V _{DD} = 3.0V | - | - | 0.80 | V |
| | | | I _O = 32mA; V _{DD} = 4.5V | - | - | 0.80 | V |
| input leakage current | I _I | V _I = 5.5V or GND; V _{DD} = 0V to 5.5V | - | - | ±1 | μA | |
| power-off leakage current | I _{OFF} | V _I or V _O = 5.5V; V _{DD} = 0V | - | - | ±2 | μA | |
| supply current | I _{DD} | V _I = 5.5V or GND; I _O = 0A; V _{DD} = 1.65V to 5.5V | - | - | 4 | μA | |
| additional supply current | ΔI _{DD} | per pin; V _I = V _{DD} - 0.6V; I _O = 0A; V _{DD} = 2.3V to 5.5V | - | - | 500 | μA | |

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 | Conditions | Min. | Typ. ^[1] | Max. | Unit | |
|-----------------------------|-----------|--------------|---|---------------------|------|------|----|
| A, B to Y propagation delay | t_{PHL} | see Figure 5 | $V_{CC}=1.65\text{V}$ to 1.95V | - | 12.5 | 18.8 | ns |
| | | | $V_{CC}=2.3\text{V}$ to 2.7V | - | 10.5 | 15.8 | ns |
| | | | $V_{CC}=2.7\text{V}$ | - | 10 | 15 | ns |
| | | | $V_{CC}=3.0\text{V}$ to 3.6V | - | 9.5 | 14.3 | ns |
| | | | $V_{CC}=4.5\text{V}$ to 5.5V | - | 9 | 13.5 | ns |
| A, B to Y propagation delay | t_{PLH} | see Figure 5 | $V_{CC}=1.65\text{V}$ to 1.95V | - | 14 | 21 | ns |
| | | | $V_{CC}=2.3\text{V}$ to 2.7V | - | 10 | 15 | ns |
| | | | $V_{CC}=2.7\text{V}$ | - | 9.5 | 14.3 | ns |
| | | | $V_{CC}=3.0\text{V}$ to 3.6V | - | 8.5 | 12.8 | ns |
| | | | $V_{CC}=4.5\text{V}$ to 5.5V | - | 7.5 | 11.3 | ns |

Note:

 [1] Typical values are measured at $T_{amb}=25^{\circ}\text{C}$ and $V_{DD}=1.8\text{V}$, 2.5V , 2.7V , 3.3V and 5.0V respectively.

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 | Conditions | Min. | Typ. | Max. | Unit | |
|-----------------------------|-----------|--------------|---|------|------|------|----|
| A, B to Y propagation delay | t_{PHL} | see Figure 5 | $V_{CC}=1.65\text{V}$ to 1.95V | - | - | 20.8 | ns |
| | | | $V_{CC}=2.3\text{V}$ to 2.7V | - | - | 17.8 | ns |
| | | | $V_{CC}=2.7\text{V}$ | - | - | 17 | ns |
| | | | $V_{CC}=3.0\text{V}$ to 3.6V | - | - | 16.3 | ns |
| | | | $V_{CC}=4.5\text{V}$ to 5.5V | - | - | 15.5 | ns |
| A, B to Y propagation delay | t_{PLH} | see Figure 5 | $V_{CC}=1.65\text{V}$ to 1.95V | - | - | 23 | ns |
| | | | $V_{CC}=2.3\text{V}$ to 2.7V | - | - | 17 | ns |
| | | | $V_{CC}=2.7\text{V}$ | - | - | 16.3 | ns |
| | | | $V_{CC}=3.0\text{V}$ to 3.6V | - | - | 14.8 | ns |
| | | | $V_{CC}=4.5\text{V}$ to 5.5V | - | - | 13.3 | ns |

4、Testing Circuit

4.1、AC Testing Circuit

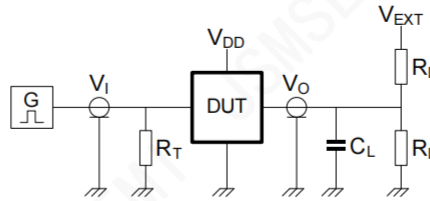


Figure 4. Test circuit for measuring switching times

Definitions for test circuit:

R_L =Load resistance.

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.

V_{EXT} =External voltage for measuring switching times.

4.2、AC Testing Waveforms

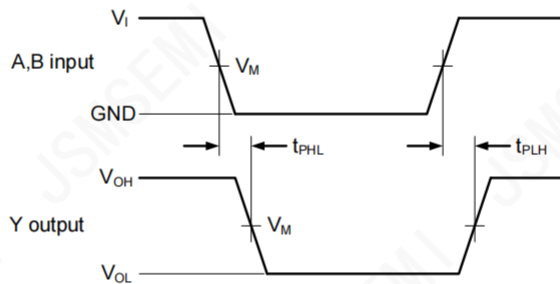


Figure 5. The input A, B to output Y propagation delays

4.3、Measurement Points

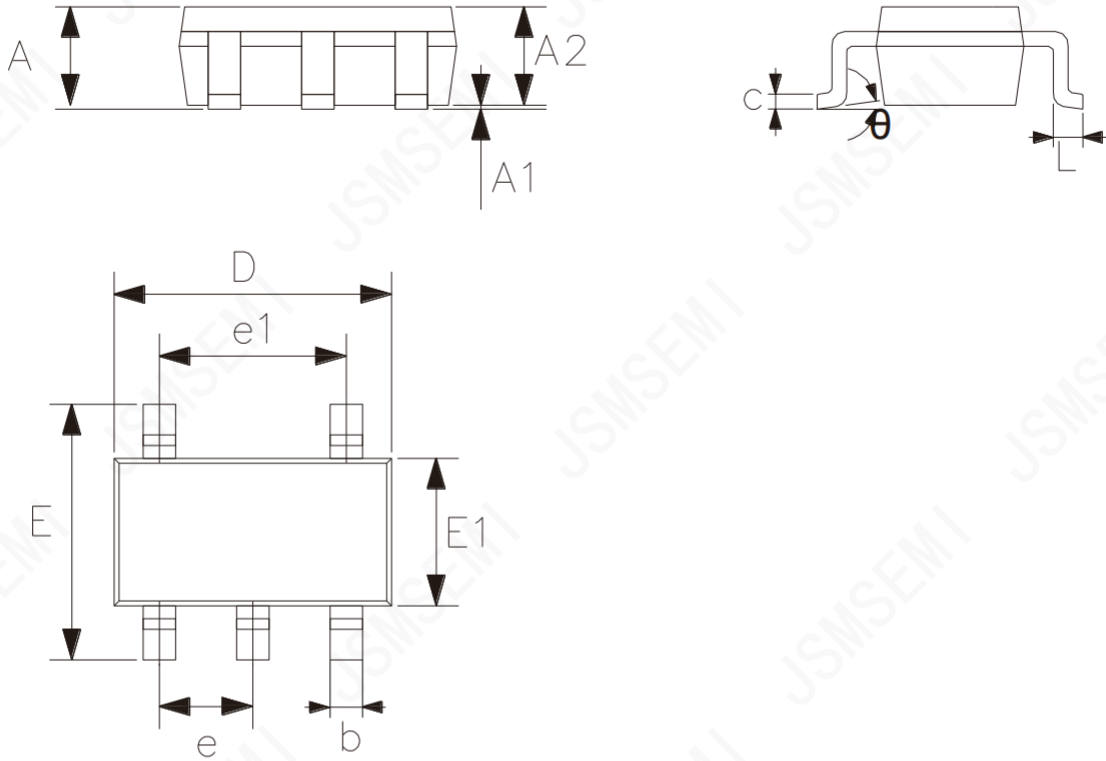
| Supply voltage | Input | Output |
|----------------|---------------------|---------------------|
| V_{DD} | V_M | V_M |
| 1.65V to 1.95V | $0.5 \times V_{DD}$ | $0.5 \times V_{DD}$ |
| 2.3V to 2.7V | $0.5 \times V_{DD}$ | $0.5 \times V_{DD}$ |
| 2.7V | 1.5V | 1.5V |
| 3.0V to 3.6V | 1.5V | 1.5V |
| 4.5V to 5.5V | $0.5 \times V_{DD}$ | $0.5 \times V_{DD}$ |

4.4、Test Data

| Supply voltage | Input | | Load | | V_{EXT} |
|----------------|----------|-------------|-------|--------------|--------------------|
| V_{DD} | V_I | $t_r = t_f$ | C_L | R_L | t_{PLH}, t_{PHL} |
| 1.65V to 1.95V | V_{DD} | $\leq 3ns$ | 30pF | 1k Ω | open |
| 2.3V to 2.7V | V_{DD} | $\leq 3ns$ | 30pF | 500 Ω | open |
| 2.7V | 2.7V | $\leq 3ns$ | 50pF | 500 Ω | open |
| 3.0V to 3.6V | 2.7V | $\leq 3ns$ | 50pF | 500 Ω | open |
| 4.5V to 5.5V | V_{DD} | $\leq 3ns$ | 50pF | 500 Ω | open |

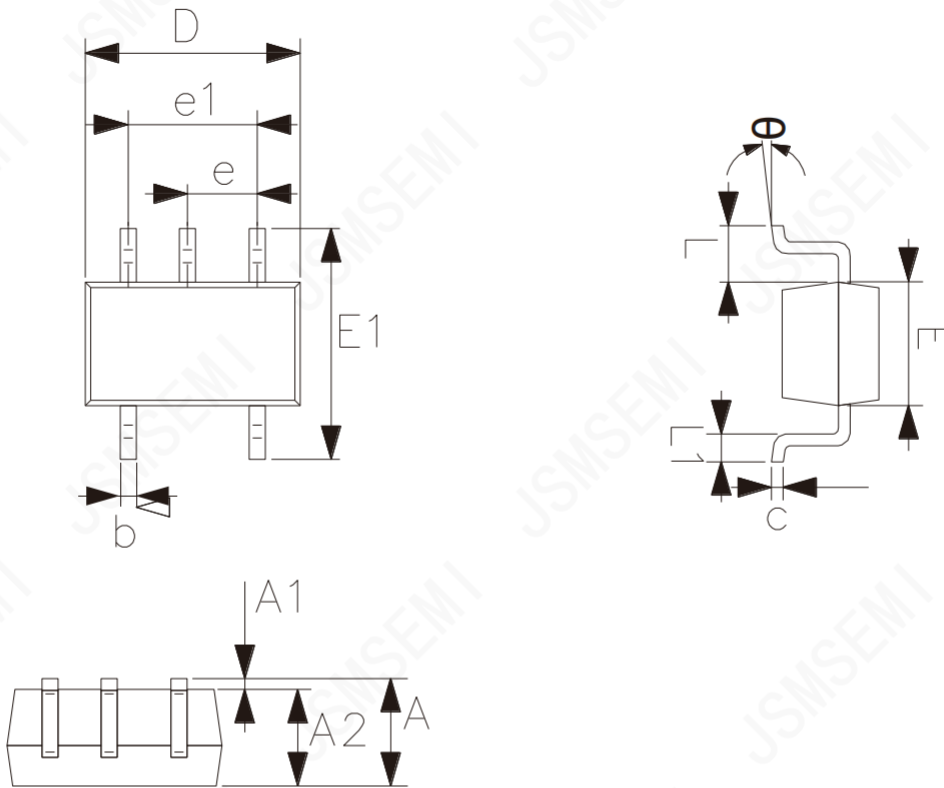
5、Package Information

5.1、SOT23-5



| 2023/12/A | Dimensions In Millimeters | |
|-----------|---------------------------|------|
| Symbol | Min. | Max. |
| A | — | 1.26 |
| A1 | 0.00 | 0.12 |
| A2 | 1.00 | 1.20 |
| b | 0.30 | 0.50 |
| c | 0.10 | 0.20 |
| D | 2.82 | 3.02 |
| E | 2.60 | 3.00 |
| E1 | 1.50 | 1.70 |
| e | 0.95 | |
| e1 | 1.80 | 2.00 |
| L | 0.30 | 0.60 |
| θ | 0° | 8° |

5.2 SOT353



| Symbol | Dimensions (mm) | |
|----------|-----------------|-------|
| | Min. | Max. |
| A | 0.90 | 1.10 |
| A1 | 0.00 | 0.10 |
| A2 | 0.90 | 1.00 |
| b | 0.15 | 0.35 |
| c | 0.11 | 0.175 |
| D | 2.00 | 2.20 |
| E | 1.15 | 1.35 |
| E1 | 2.15 | 2.45 |
| e | 0.65 | |
| e1 | 1.20 | 1.40 |
| L | 0.525 | |
| L1 | 0.26 | 0.46 |
| θ | 0° | 8° |

6、 Statements And Notes

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

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

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