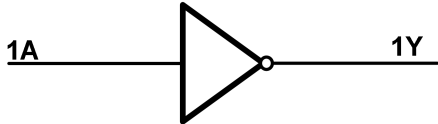


## GT74LVC1G04

### Single Inverter Gate

| 1 Features                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2 Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>- Low power consumption, 10-<math>\mu</math>A max <math>I_{CC}</math></li> <li>- Supports 5 V <math>V_{CC}</math> operation</li> <li>- Inputs accept voltages to 5.5 V</li> <li>- Max <math>t_{pd}</math> of 3.3 ns at 3.3 V</li> <li>- <math>\pm 24</math>-mA output drive at 3.3 V</li> <li>- <math>I_{off}</math> supports partial-power-down mode</li> <li>- Typical <math>V_{OHV} &gt; 2</math> V at <math>V_{CC} = 3.3</math> V, <math>T_A = 25^\circ\text{C}</math></li> <li>- Typical <math>V_{OLP} &lt; 0.8</math> V at <math>V_{CC} = 3.3</math> V, <math>T_A = 25^\circ\text{C}</math></li> </ul> | <ul style="list-style-type: none"> <li>- AV receivers</li> <li>- Audio docks: portable</li> <li>- Blu-ray players and home theater</li> <li>- Embedded PC</li> <li>- MP3 player/recorder (portable audio)</li> <li>- Personal digital assistant (PDA)</li> <li>- Power: telecom/server AC/DC supply</li> <li>- Solid state drive (SSD): client and enterprise</li> <li>- TV: LCD/digital and high-definition (HDTV)</li> <li>- Tablet: enterprise</li> <li>- Video analytics: server</li> <li>- Wireless headset, keyboard, and mouse</li> </ul> |

| 3 Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | Circuit Diagram                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| <p>The operating voltage range of the single inverter is 1.65 V to 5.5 V.</p> <p>The GT74LVC1G04 device contains single inverter and performs the Boolean function <math>Y = \overline{A}</math>. The CMOS device has high output drive while maintaining low static power dissipation over a broad <math>V_{CC}</math> operating range.</p> <p>This device is fully specified for partial-power-down applications using <math>I_{off}</math>. The <math>I_{off}</math> circuitry disables the outputs, preventing damaging current back flow through the device when it is powered down.</p> |  |

## 4 Revision History

| Revision  | Date         | Note                                                                                    |
|-----------|--------------|-----------------------------------------------------------------------------------------|
| Rev. A1.0 | 2023. 08. 31 | Original Version                                                                        |
| Rev. A1.1 | 2023. 10. 24 | 1.Updated Package Qty<br>2.Added Tape and Reel Information<br>3. Added Application Note |
| Rev. A1.2 | 2023. 12. 26 | 1.Added Marking<br>2.Added MSL                                                          |
| Rev. A1.3 | 2024. 01. 26 | Updated Part Name                                                                       |
| Rev. A1.4 | 2025. 06. 23 | Updated HBM Value                                                                       |

The latest datasheet version should be checked on the GTIC official website, as the company does not actively inform customers about updates to the datasheet.

## 5 Device Summary, Pin and Packages

**Table 5-1. Device Summary<sup>(1)</sup>**

| Serial Name | Part Name     | Package | Body Size (Nom)      | Marking <sup>(2)</sup> | MSL <sup>(3)</sup> | Package Qty           |
|-------------|---------------|---------|----------------------|------------------------|--------------------|-----------------------|
| GT74LVC1G04 | GT74LVC1G04S5 | SOT23-5 | 2.90mm×1.60mm×1.10mm | 1G04<br>XXXXX          | 3                  | Tape and Reel<br>3000 |
|             | GT74LVC1G04C5 | SC70-5  | 2.10mm×1.25mm×1.00mm | 1G04<br>XXXXX          | 3                  | Tape and Reel<br>3000 |

(1) For all available packages, please contact product sales.

(2) There may be additional marking, which relates to the lot trace code information (data code and vendor code), the logo or the environmental category on the device.

(3) MSL, The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications.

(4) "XXXXXX" in Marking will be appeared as the batch code.

## 5 Device Summary, Pin and Packages(Continued)

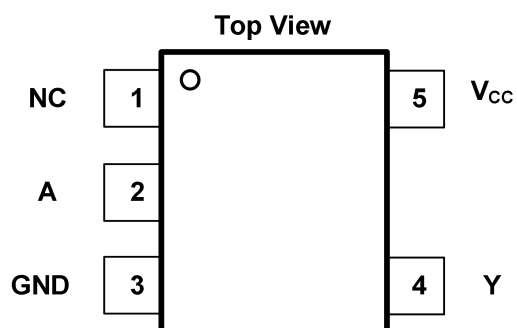


Fig.5-1. GT74LVC1G04: S5 (SOT23-5) Package  
GT74LVC1G04: C5 (SC70-5) Package

Table 5-2 Pin Definition

| Pin             |       | Type | Description            |
|-----------------|-------|------|------------------------|
| Name            | S5 C5 |      |                        |
| NC              | 1     | —    | No internal connection |
| A               | 2     | I    | Input                  |
| GND             | 3     | —    | Ground                 |
| Y               | 4     | O    | Output                 |
| V <sub>CC</sub> | 5     | —    | Positive supply        |

## 6 Voltage, Temperature, ESD and Thermal Ratings

### 6.1 Absolute Maximum Ratings

| Parameters |                                                                              | Min  | Max.         | Unit               |
|------------|------------------------------------------------------------------------------|------|--------------|--------------------|
| $V_{CC}$   | Supply voltage range                                                         | -0.5 | 6.5          | V                  |
| $V_I$      | Input voltage range                                                          | -0.5 | 6.5          | V                  |
| $V_O$      | Voltage range applied to any output in the high-impedance or power-off state | -0.5 | 6.5          | V                  |
| $V_O$      | Voltage range applied to any output in the high or low state                 | -0.5 | $V_{CC}+0.5$ | V                  |
| $I_{IK}$   | Input clamp current                                                          |      | -50          | mA                 |
| $I_{OK}$   | Output clamp current                                                         |      | -50          | mA                 |
| $I_O$      | Continuous output current                                                    |      | $\pm 50$     | mA                 |
|            | Continuous current through $V_{CC}$ or GND                                   |      | $\pm 100$    | mA                 |
| $T_J$      | Junction temperature under bias                                              |      | 150          | $^{\circ}\text{C}$ |
| $T_{stg}$  | Storage temperature range                                                    | -55  | 150          | $^{\circ}\text{C}$ |

(1) Stresses beyond those listed under Absolute Maximum Ratings may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under Recommended Operating Conditions is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.

(2) The input negative-voltage and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 6.2 ESD Ratings

| ESD    |                         | Value                     | Unit |
|--------|-------------------------|---------------------------|------|
| V(ESD) | Electrostatic discharge | Human-body model (HBM)    | 8 K  |
|        |                         | Charge device model (CDM) | 2 K  |

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

## 6 Voltage, Temperature, ESD and Thermal Ratings(Continued)

### 6.3 Recommended Operating Conditions

Over operating free-air temperature range (unless otherwise noted)

| Symbol   | Parameter                      |                | Min  | Max      | Unit |
|----------|--------------------------------|----------------|------|----------|------|
| $V_{CC}$ | Supply voltage                 |                | 1.65 | 5.5      | V    |
| $V_I$    | Input voltage                  |                | 0    | 5.5      | V    |
| $V_O$    | Output voltage                 |                | 0    | $V_{CC}$ | V    |
| $I_{OH}$ | High-level output current      | $V_{CC}=1.65V$ |      | -4       | mA   |
|          |                                | $V_{CC}=2.3V$  |      | -8       |      |
|          |                                | $V_{CC}=3V$    |      | -16      |      |
|          |                                |                |      | -24      |      |
|          |                                | $V_{CC}=4.5V$  |      | -32      |      |
| $I_{OL}$ | Low-level output current       | $V_{CC}=1.65V$ |      | 4        | mA   |
|          |                                | $V_{CC}=2.3V$  |      | 8        |      |
|          |                                | $V_{CC}=3V$    |      | 16       |      |
|          |                                |                |      | 24       |      |
|          |                                | $V_{CC}=4.5V$  |      | 32       |      |
| $T_A$    | Operating free-air temperature |                | -40  | 125      | °C   |

### 6.4 Thermal Information

| Package Type | $\theta_{JA}$ | $\theta_{JC}$ | Unit |
|--------------|---------------|---------------|------|
| SOT23-5      | 250           | 81            | °C/W |
| SC70-5       | 400           | 150           | °C/W |

## 7 Electrical Specifications

V<sub>CC</sub>=5.0V or 3.3V, FULL=−40°C to +125°C, Typical values are at T<sub>A</sub>=+25°C. (unless otherwise noted)

| Parameter        | Test Conditions           | V <sub>CC</sub>                                                                 | −40°C to 85°C        |     |      | −40°C to 125°C       |     |      | Unit |
|------------------|---------------------------|---------------------------------------------------------------------------------|----------------------|-----|------|----------------------|-----|------|------|
|                  |                           |                                                                                 | Min                  | Typ | Max  | Min                  | Typ | Max  |      |
| V <sub>OH</sub>  | I <sub>OH</sub> =− 100 μA | 1.65 V to 5.5 V                                                                 | V <sub>CC</sub> −0.1 |     |      | V <sub>CC</sub> −0.1 |     |      | V    |
|                  | I <sub>OH</sub> =−4 mA    | 1.65 V                                                                          | 1.2                  |     |      | 1.2                  |     |      |      |
|                  | I <sub>OH</sub> =−8 mA    | 2.3 V                                                                           | 1.9                  |     |      | 1.9                  |     |      |      |
|                  | I <sub>OH</sub> =− 16 mA  | 3 V                                                                             | 2.4                  |     |      | 2.4                  |     |      |      |
|                  | I <sub>OH</sub> =−24 mA   |                                                                                 | 2.3                  |     |      | 2.3                  |     |      |      |
|                  | I <sub>OH</sub> =−32 mA   | 4.5 V                                                                           | 3.8                  |     |      | 3.8                  |     |      |      |
| V <sub>OL</sub>  | I <sub>OL</sub> =100 μA   | 1.65 V to 5.5 V                                                                 |                      |     | 0.1  |                      |     | 0.1  | V    |
|                  | I <sub>OL</sub> =4 mA     | 1.65 V                                                                          |                      |     | 0.45 |                      |     | 0.45 |      |
|                  | I <sub>OL</sub> =8 mA     | 2.3 V                                                                           |                      |     | 0.3  |                      |     | 0.3  |      |
|                  | I <sub>OL</sub> =16 mA    | 3 V                                                                             |                      |     | 0.4  |                      |     | 0.4  |      |
|                  | I <sub>OL</sub> =24 mA    |                                                                                 |                      |     | 0.55 |                      |     | 0.55 |      |
|                  | I <sub>OL</sub> =32 mA    | 4.5 V                                                                           |                      |     | 0.55 |                      |     | 0.55 |      |
| I <sub>I</sub>   | A input                   | V <sub>I</sub> =5.5 V or GND                                                    |                      |     | ±5   |                      |     | ±5   | μA   |
| I <sub>off</sub> |                           | V <sub>I</sub> or V <sub>O</sub> =5.5 V                                         |                      |     | ±10  |                      |     | ±10  | μA   |
| I <sub>CC</sub>  |                           | V <sub>I</sub> =5.5 V or GND,<br>I <sub>O</sub> =0                              |                      |     | 10   |                      |     | 10   | μA   |
| ΔI <sub>CC</sub> |                           | One input at V <sub>CC</sub> − 0.6 V, Other inputs<br>at V <sub>CC</sub> or GND |                      |     | 500  |                      |     | 500  | μA   |
| C <sub>i</sub>   |                           | V <sub>I</sub> =V <sub>CC</sub> or GND                                          |                      | 5   |      |                      | 5   |      | pF   |

(1) All unused digital inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation.

## 7 Electrical Specifications (Continued)

V<sub>CC</sub>=5.0V or 3.3V, FULL=−40°C to +125°C, Typical values are at T<sub>A</sub>=+25°C. (unless otherwise noted)

| Parameter       | From<br>(Input) | To (Output) | −40°C to 125°C                     |     |                                   |     |                                   |     |                                 |     | Unit |
|-----------------|-----------------|-------------|------------------------------------|-----|-----------------------------------|-----|-----------------------------------|-----|---------------------------------|-----|------|
|                 |                 |             | V <sub>CC</sub> =1.8 V<br>± 0.15 V |     | V <sub>CC</sub> =2.5 V<br>± 0.2 V |     | V <sub>CC</sub> =3.3 V<br>± 0.3 V |     | V <sub>CC</sub> =5 V<br>± 0.5 V |     |      |
|                 |                 |             | Min                                | Max | Min                               | Max | Min                               | Max | Min                             | Max |      |
| t <sub>pd</sub> | A               | Y           | 3.9                                | 8.0 | 1.4                               | 3.5 | 1                                 | 3.3 | 1                               | 3.0 | ns   |

T<sub>A</sub>=25°C

| Parameter       |                               | Test Conditions | V <sub>CC</sub> =1.8 V | V <sub>CC</sub> =2.5 V | V <sub>CC</sub> =3.3 V | V <sub>CC</sub> =5 V | Unit |
|-----------------|-------------------------------|-----------------|------------------------|------------------------|------------------------|----------------------|------|
|                 |                               |                 | Typ                    | Typ                    | Typ                    | Typ                  |      |
| C <sub>pd</sub> | Power dissipation capacitance | f=10 MHz        | 17                     | 18                     | 25                     | 30                   | pF   |

## 8 Typical Characteristics

Over recommended operating free-air temperature range,  $C_L=30$  pF or 50 pF (unless otherwise noted)

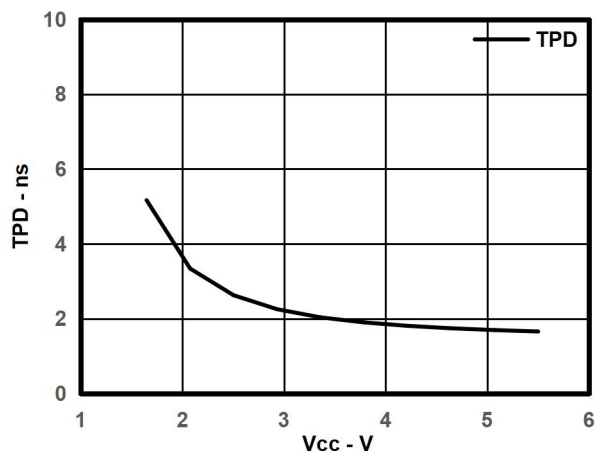


Fig.8-1. Typical Tpd vs Vcc

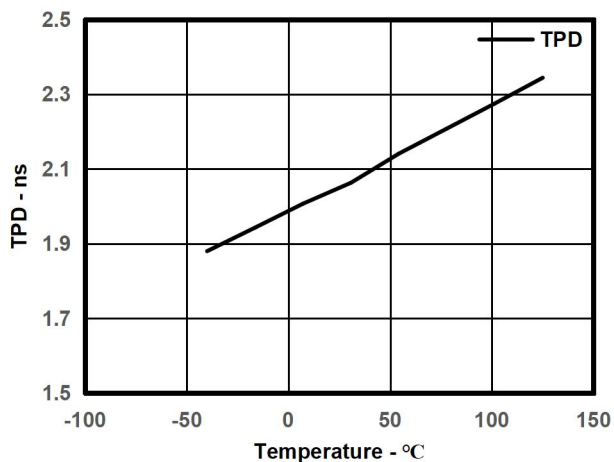
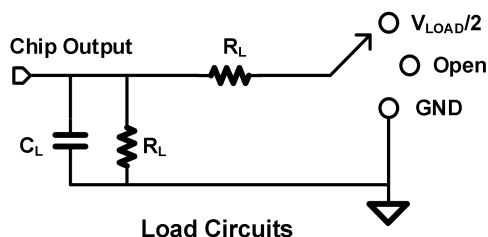


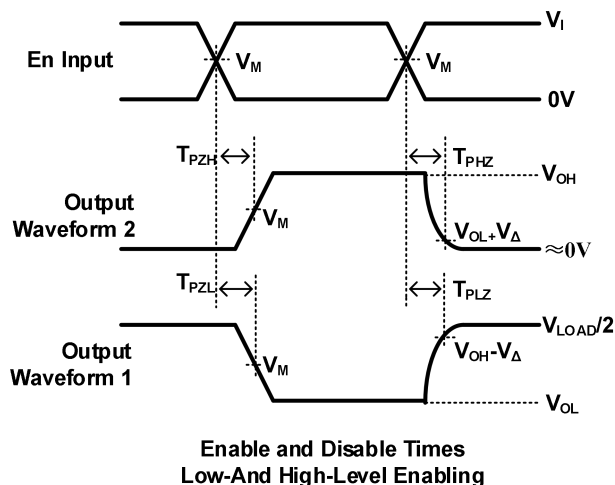
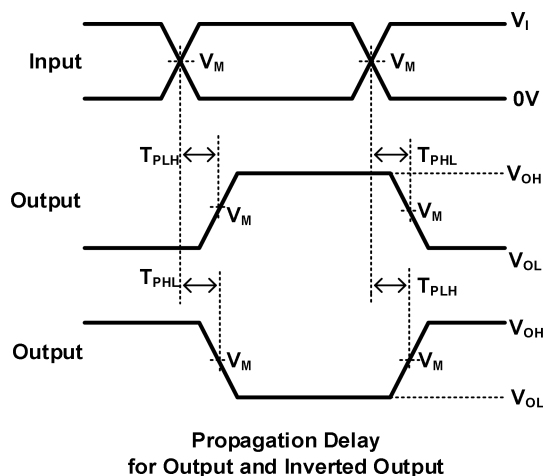
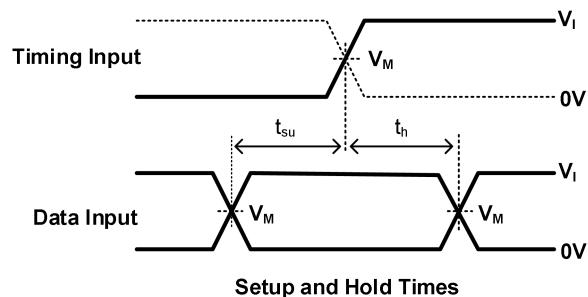
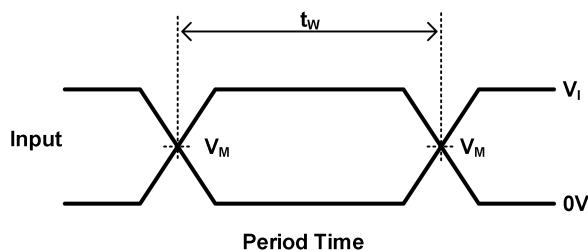
Fig.8-2. Typical Tpd vs Temp

## 9 Parameter Measurement Information



| TEST              | S1         |
|-------------------|------------|
| $T_{PHL}/T_{PLH}$ | OPEN       |
| $T_{PLZ}/T_{PZL}$ | $V_{LOAD}$ |
| $T_{PHZ}/T_{PZH}$ | GND        |

| $V_{CC}$         | INPUTS   |              | $V_M$      | $V_{LOAD}$        | $C_L$ | $R_L$        | $V_{\Delta}$ |
|------------------|----------|--------------|------------|-------------------|-------|--------------|--------------|
|                  | $V_i$    | $T_r/T_f$    |            |                   |       |              |              |
| $1.8V \pm 0.15V$ | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF  | 1k $\Omega$  | 0.15V        |
| $2.5V \pm 0.15V$ | $V_{CC}$ | $\leq 2ns$   | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF  | 500 $\Omega$ | 0.15V        |
| $3.3V \pm 0.15V$ | 3V       | $\leq 2.5ns$ | 1.5V       | 6V                | 50pF  | 500 $\Omega$ | 0.3V         |
| $5V \pm 0.15V$   | $V_{CC}$ | $\leq 2.5ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 50pF  | 500 $\Omega$ | 0.3V         |



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

B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.

C. All input pulses are supplied by generators having the following characteristics: PRR 10 MHz,  $Z = 50$ .

D. The outputs are measured one at a time, with one transition per measurement.

E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .

F.  $t_{PZL}$  and  $t_{PZH}$  are the same as  $t_{en}$ .

G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

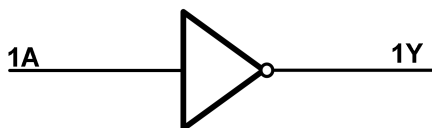
H. All parameters and waveforms are not applicable to all device.

## 10 Detailed Description

### 10.1 Overview

This device is fully specified for partial-power-down applications using  $I_{off}$ . The  $I_{off}$  circuitry disables the outputs, preventing damaging current back flow through the device when it is powered down.

### 10.2 Functional Block Diagram



### 10.3 Feature Description

The device is designed for 1.65V to 5.5V  $V_{CC}$  operation and it allows down voltage translation from 5V to 3.3V, or 3.3V to 1.8V. Input signals to this device can be driven above the supply voltage so long as they remain below the maximum input voltage value.  $I_{off}$  feature allows voltages on the inputs and outputs, when  $V_{CC}$  is 0 V.

### 10.4 Device Functional Modes

Table 10-1 Function Table

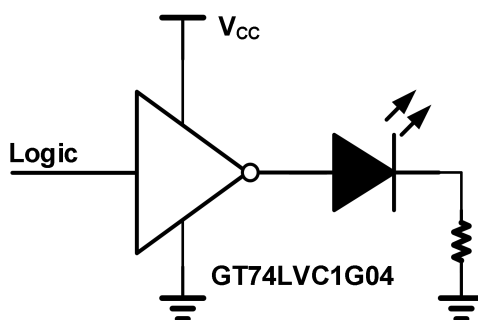
| Input A | Output Y |
|---------|----------|
| H       | L        |
| L       | H        |

## 11 Application Note

### 11.1 Application Information

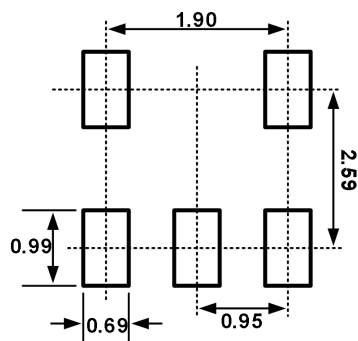
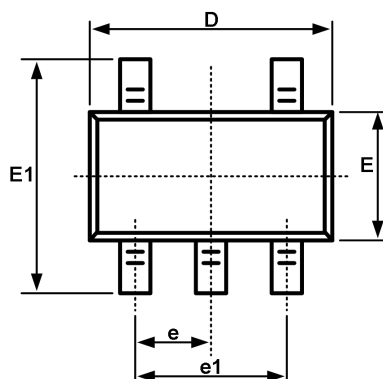
The GT74LVC1G04 is a high drive CMOS device that can be used for implementing inversion logic with a high output drive, such as an LED application. It can produce 24 mA of drive current at 3.3 V making it Ideal for driving multiple outputs and good for high-speed applications up to 100 Mhz. The inputs are 5.5 V tolerant allowing it to translate down to  $V_{CC}$ .

### 11.2 Typical Application

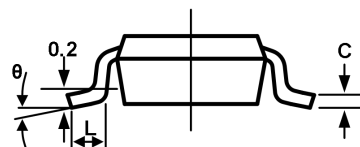
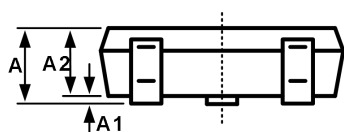


# 12 Package Outline Dimension

SOT23-5



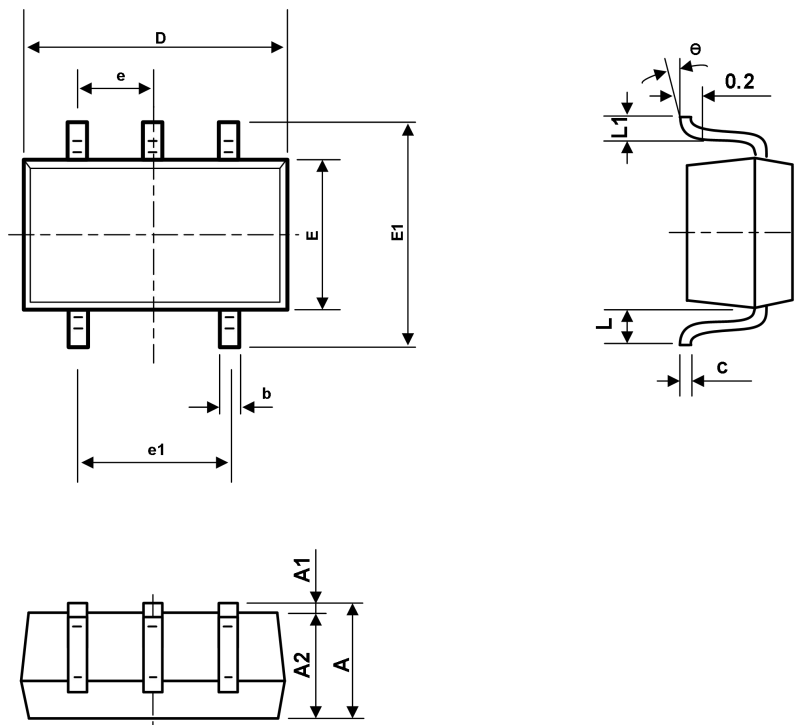
Recommended Land Pattern (Unit: mm)



| Symbol   | Dimensions In Millimeters |       | Dimensions In Inches |       |
|----------|---------------------------|-------|----------------------|-------|
|          | Min                       | Max   | Min                  | Max   |
| A        | 1.050                     | 1.250 | 0.041                | 0.049 |
| A1       | 0.000                     | 0.100 | 0.000                | 0.004 |
| A2       | 1.050                     | 1.150 | 0.041                | 0.045 |
| b        | 0.300                     | 0.500 | 0.012                | 0.020 |
| c        | 0.100                     | 0.200 | 0.004                | 0.008 |
| D        | 2.820                     | 3.020 | 0.111                | 0.119 |
| E        | 1.500                     | 1.700 | 0.059                | 0.067 |
| E1       | 2.650                     | 2.950 | 0.104                | 0.116 |
| e        | 0.950BSC                  |       | 0.037BSC             |       |
| e1       | 1.800                     | 2.000 | 0.071                | 0.079 |
| L        | 0.300                     | 0.600 | 0.012                | 0.024 |
| $\theta$ | 0°                        | 8°    | 0°                   | 8°    |

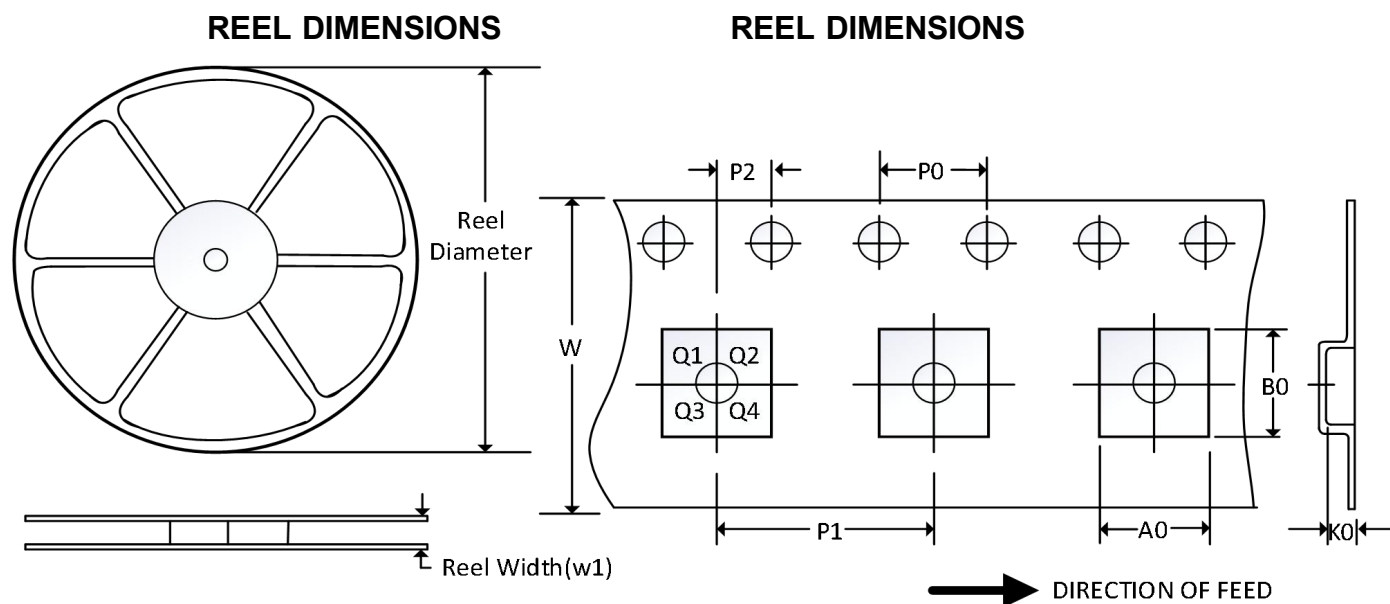
# 12 Package Outline Dimension(Continued)

SC70-5



| Symbol | Dimension In Millimeters |       | Dimensions In Inches |       |
|--------|--------------------------|-------|----------------------|-------|
|        | Min                      | Max   | Min                  | Max   |
| A      | 0.900                    | 1.100 | 0.035                | 0.043 |
| A1     | 0.000                    | 0.100 | 0.000                | 0.004 |
| A2     | 0.900                    | 1.000 | 0.035                | 0.039 |
| b      | 0.150                    | 0.350 | 0.006                | 0.014 |
| c      | 0.110                    | 0.175 | 0.004                | 0.007 |
| D      | 2.000                    | 2.200 | 0.079                | 0.087 |
| E      | 1.150                    | 1.350 | 0.045                | 0.053 |
| E1     | 2.150                    | 2.450 | 0.085                | 0.096 |
| e      | 0.650TYP                 |       | 0.026TYP             |       |
| e1     | 1.200                    | 1.400 | 0.047                | 0.055 |
| L      | 0.525REF                 |       | 0.021REF             |       |
| L1     | 0.260                    | 0.460 | 0.010                | 0.018 |
| θ      | 0°                       | 8°    | 0°                   | 8°    |

## 13 TAPE AND REEL INFORMATION



NOTE: The picture is only for reference. Please make the object as the standard.

### Key Parameter List of Tape and Reel

| Package Type | Reel Diameter | Reel Width (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P0 (mm) | P1 (mm) | P2 (mm) | W (mm) | Pin1 Quadrant |
|--------------|---------------|-----------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| SOT23-5      | 7"            | 9.5             | 3.20    | 3.20    | 1.40    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |
| SC70-5       | 7"            | 9.5             | 2.25    | 2.55    | 1.20    | 4.0     | 4.0     | 2.0     | 8.0    | Q3            |

NOTE:

1. All dimensions are nominal.
2. Plastic or metal protrusions of 0.15mm maximum per side are not included.