

## Single Non-inverting Buffer with 3-state Output

### General Description

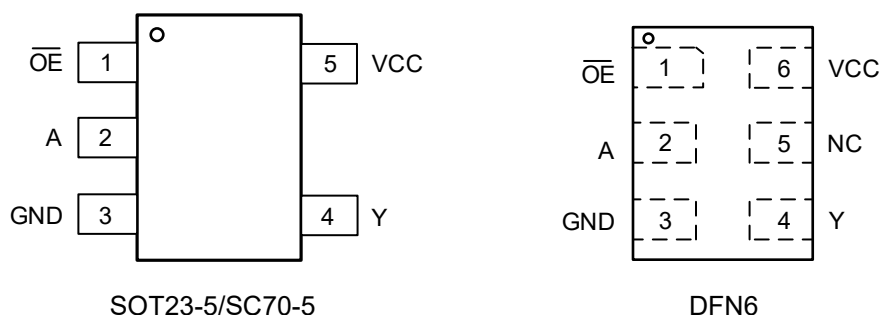
The ETQ74LVC1G125 is a high performance non-inverting buffer operating from a 1.65V to 5.5V supply. This device is fabricated with advanced CMOS technology to achieve ultra-high speed with high output drive.

### Features

- Designed for 1.65V to 5.5V  $V_{CC}$  Operation
- Over-voltage Tolerant Inputs
- $\pm 24\text{mA}$  Balanced Output Sink and Source Capability
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- These Devices are Pb-Free and are RoHS Compliant
- 3-State OE Input is Active-Low
- Multiple Package Options Automotive AEC-Q100 Grade 1 Qualified
  - Ambient Temperature Range of  $-40^{\circ}\text{C}$  to  $+125^{\circ}\text{C}$
  - ESD HBM  $\pm 4\text{KV}$  PASS
  - ESD CDM  $\pm 1\text{KV}$  PASS
  - Latch Up Current to  $\pm 100\text{mA}$  PASS
- Part No. and Package Information

| Part No.       | Package                | Packing Option         | MSL |
|----------------|------------------------|------------------------|-----|
| ETQ74LVC1G125  | SC70-5(1.3mm × 2.1mm)  | Tape and Reel, 3K/Reel | 1   |
| ETQ74LVC1G125T | SOT23-5(1.6mm × 2.9mm) | Tape and Reel, 3K/Reel | 3   |
| ETQ74LVC1G125Y | DFN6(1.0mm × 1.5mm)    | Tape and Reel, 3K/Reel | 1   |

### Pin Configuration



TOP VIEW

Figure1. Pin Configuration

# ETQ74LVC1G125

## Pin Function

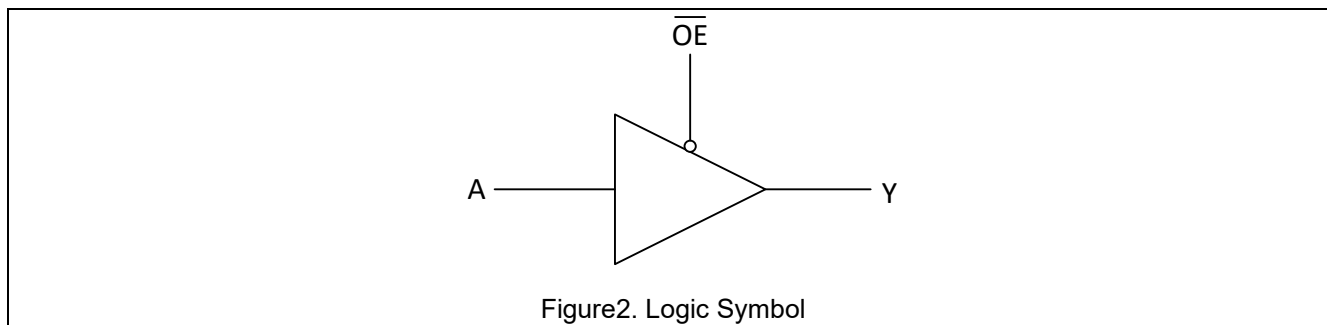
SC70-5/ SOT23-5

| Pin No. | Pin Name               | Function       |
|---------|------------------------|----------------|
| 1       | $\overline{\text{OE}}$ | Enable Input   |
| 2       | A                      | Input          |
| 3       | GND                    | Ground         |
| 4       | Y                      | Output         |
| 5       | VCC                    | Supply Voltage |

DFN6

| Pin No. | Pin Name               | Function       |
|---------|------------------------|----------------|
| 1       | $\overline{\text{OE}}$ | Enable Input   |
| 2       | A                      | Input          |
| 3       | GND                    | Ground         |
| 4       | Y                      | Output         |
| 5       | NC                     | No Connect     |
| 6       | VCC                    | Supply Voltage |

## Block Diagram



## Functional Description

Function Table

| Input                  |   | Output |
|------------------------|---|--------|
| $\overline{\text{OE}}$ | A | Y      |
| L                      | L | L      |
| L                      | H | H      |
| H                      | X | Z      |

# ETQ74LVC1G125

## Absolute Maximum Ratings

| Symbol           | Parameter                                                                      |                                     | Value                         | Unit |
|------------------|--------------------------------------------------------------------------------|-------------------------------------|-------------------------------|------|
| V <sub>CC</sub>  | DC Supply Voltage(VCC Pin)                                                     |                                     | -0.5 to 6.5                   | V    |
| V <sub>I</sub>   | DC Input Voltage <sup>(1)</sup>                                                |                                     | -0.5 ≤ V <sub>I</sub> ≤ 6.5   | V    |
| V <sub>O</sub>   | DC Output Voltage Output in Higher or Low State                                |                                     | -0.5 to V <sub>CC</sub> + 0.5 | V    |
| I <sub>IK</sub>  | DC Input Diode Current V <sub>I</sub> < GND                                    |                                     | -50                           | mA   |
| I <sub>OK</sub>  | DC Output Diode Current V <sub>O</sub> < GND, V <sub>O</sub> > V <sub>CC</sub> |                                     | ±50                           | mA   |
| I <sub>O</sub>   | DC Output Sink Current                                                         |                                     | ±50                           | mA   |
| I <sub>CC</sub>  | DC Supply Current per Supply Pin                                               |                                     | +100                          | mA   |
| I <sub>GND</sub> | DC Ground Current per Supply Pin                                               |                                     | -100                          | mA   |
| T <sub>STG</sub> | Storage Temperature Range                                                      |                                     | -65 to 150                    | °C   |
| T <sub>L</sub>   | Lead Temperature, Soldering 10 Seconds                                         |                                     | 260                           | °C   |
| T <sub>J</sub>   | Max Junction Temperature                                                       |                                     | 150                           | °C   |
| V <sub>ESD</sub> | ESD Classification                                                             | Human Body Model <sup>(2)</sup>     | ±4000                         | V    |
|                  |                                                                                | Charged Device Model <sup>(3)</sup> | ±1000                         |      |
| I <sub>LU</sub>  | Max Latch Up Current Above V <sub>CC</sub> and GND at 125°C <sup>(4)</sup>     |                                     | ±100                          | mA   |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

**Note1:** I<sub>O</sub> absolute maximum rating must be observed.

**Note2:** HBM tested per AEC-Q100-002(JEDEC JS-001);

**Note3:** CDM tested per AEC-Q100-011(JEDEC JS-002);

**Note4:** Latch up Current Maximum Rating tested per AEC-Q100-004(JEDEC JESD78F).

## Thermal Characteristics

| Symbol           | Package | Ratings                                                      | Value | Unit |
|------------------|---------|--------------------------------------------------------------|-------|------|
| R <sub>θJA</sub> | SC70-5  | Thermal Characteristics, Thermal Resistance, Junction-to-Air | 300   | °C/W |
|                  | SOT23-5 |                                                              | 250   |      |
|                  | DFN6    |                                                              | 440   |      |
| P <sub>D</sub>   | SC70-5  | Power Dissipation in Still Air at 85°C                       | 215   | mW   |
|                  | SOT23-5 |                                                              | 260   |      |
|                  | DFN6    |                                                              | 150   |      |

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## Recommended Operating Conditions

| Symbol                          | Parameter                             |                                 | Min  | Max | Unit |
|---------------------------------|---------------------------------------|---------------------------------|------|-----|------|
| V <sub>CC</sub>                 | DC Supply Voltage Operating           |                                 | 1.65 | 5.5 | V    |
|                                 | Date Retention                        |                                 | 1.5  | 5.5 |      |
| V <sub>IN</sub>                 | DC Input Voltage                      |                                 | 0    | 5.5 | V    |
| V <sub>OUT</sub>                | DC Output Voltage (High or Low State) |                                 | 0    | 5.5 | V    |
| T <sub>A</sub>                  | Operating Temperature Range           |                                 | -40  | 85  | °C   |
| t <sub>r</sub> , t <sub>f</sub> | Input Rise and Fall Time              | V <sub>CC</sub> = 2.5 V ± 0.2 V | 0    | 20  | ns/V |
|                                 |                                       | V <sub>CC</sub> = 3.0 V ± 0.3 V | 0    | 10  |      |
|                                 |                                       | V <sub>CC</sub> = 5.0 V ± 0.5 V | 0    | 5   |      |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied.

## Electrical Characteristics

### DC Electrical Characteristics

| Symbol          | Parameter                 | Condition                     | V <sub>CC</sub> (V)  | T <sub>A</sub> = 25°C                     |                 |                                           | -40°C ≤ T <sub>A</sub> ≤ 125°C            |                                           | Unit |
|-----------------|---------------------------|-------------------------------|----------------------|-------------------------------------------|-----------------|-------------------------------------------|-------------------------------------------|-------------------------------------------|------|
|                 |                           |                               |                      | Min                                       | Typ             | Max                                       | Min                                       | Max                                       |      |
| V <sub>IH</sub> | High-Level Input Voltage  |                               | 1.65-1.95<br>2.3-5.5 | 0.75V <sub>CC</sub><br>0.7V <sub>CC</sub> |                 |                                           | 0.75V <sub>CC</sub><br>0.7V <sub>CC</sub> |                                           | V    |
| V <sub>IL</sub> | Low-Level Input Voltage   |                               | 1.65-1.95<br>2.3-5.5 |                                           |                 | 0.25V <sub>CC</sub><br>0.3V <sub>CC</sub> |                                           | 0.25V <sub>CC</sub><br>0.3V <sub>CC</sub> | V    |
| V <sub>OH</sub> | High-Level Output Voltage | I <sub>OH</sub> = -100uA      | 1.65-5.5             | V <sub>CC</sub> -0.1                      | V <sub>CC</sub> |                                           | V <sub>CC</sub> -0.1                      |                                           | V    |
|                 |                           | I <sub>OH</sub> = -3mA        | 1.65                 | 1.29                                      | 1.52            |                                           | 1.29                                      |                                           |      |
|                 |                           | I <sub>OH</sub> = -8mA        | 2.3                  | 1.9                                       | 2.1             |                                           | 1.9                                       |                                           |      |
|                 |                           | I <sub>OH</sub> = -12mA       | 2.7                  | 2.2                                       | 2.4             |                                           | 2.2                                       |                                           |      |
|                 |                           | I <sub>OH</sub> = -16mA       | 3.0                  | 2.4                                       | 2.7             |                                           | 2.4                                       |                                           |      |
|                 |                           | I <sub>OH</sub> = -24mA       | 3.0                  | 2.3                                       | 2.5             |                                           | 2.3                                       |                                           |      |
|                 |                           | I <sub>OH</sub> = -32mA       | 4.5                  | 3.8                                       | 4.0             |                                           | 3.8                                       |                                           |      |
| V <sub>OL</sub> | Low-Level Output Voltage  | I <sub>OH</sub> = 100uA       | 1.65-5.5             |                                           | 0.0             | 0.1                                       |                                           | 0.1                                       | V    |
|                 |                           | I <sub>OL</sub> = 3mA         | 1.65                 |                                           | 0.08            | 0.24                                      |                                           | 0.24                                      |      |
|                 |                           | I <sub>OL</sub> = 8mA         | 2.3                  |                                           | 0.20            | 0.3                                       |                                           | 0.3                                       |      |
|                 |                           | I <sub>OL</sub> = 12mA        | 2.7                  |                                           | 0.22            | 0.4                                       |                                           | 0.4                                       |      |
|                 |                           | I <sub>OL</sub> = 16mA        | 3.0                  |                                           | 0.28            | 0.4                                       |                                           | 0.4                                       |      |
|                 |                           | I <sub>OL</sub> = 24mA        | 3.0                  |                                           | 0.38            | 0.55                                      |                                           | 0.55                                      |      |
|                 |                           | I <sub>OL</sub> = 32mA        | 4.5                  |                                           | 0.42            | 0.55                                      |                                           | 0.55                                      |      |
| I <sub>IN</sub> | Input Leakage Current     | V <sub>IN</sub> = 5.5V or GND | 0-5.5                |                                           |                 | ±0.1                                      |                                           | ±1.0                                      | uA   |

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## DC Electrical Characteristics (Continued)

| Symbol           | Parameter                 | Condition                                         | V <sub>CC</sub> (V) | T <sub>A</sub> = 25°C |     |     | -40°C ≤ T <sub>A</sub> ≤ 125°C |     | Unit |
|------------------|---------------------------|---------------------------------------------------|---------------------|-----------------------|-----|-----|--------------------------------|-----|------|
|                  |                           |                                                   |                     | Min                   | Typ | Max | Min                            | Max |      |
| I <sub>OFF</sub> | Power Off Leakage Current | V <sub>IN</sub> = 5.5V or V <sub>OUT</sub> = 5.5V | 0                   |                       |     | 1   |                                | 10  | μA   |
| I <sub>CC</sub>  | Quiescent Supply Current  | V <sub>IN</sub> = 5.5V or GND                     | 5.5                 |                       |     | 1   |                                | 10  | μA   |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

## AC Electrical Characteristics

t<sub>r</sub> = t<sub>f</sub> = 5ns

| Symbol                                 | Parameter                              | Condition                                   | V <sub>CC</sub> (V) | T <sub>A</sub> = 25°C |      |      | -40°C ≤ T <sub>A</sub> ≤ 125°C |      | Unit |
|----------------------------------------|----------------------------------------|---------------------------------------------|---------------------|-----------------------|------|------|--------------------------------|------|------|
|                                        |                                        |                                             |                     | Min                   | Typ  | Max  | Min                            | Max  |      |
| t <sub>PD</sub>                        | Propagation Delay<br>(Figure3 and 4)   | R <sub>L</sub> = 1MΩ C <sub>L</sub> = 15pF  | 1.65                | 2.0                   | 12   | 16   | 2.0                            | 20   | ns   |
|                                        |                                        |                                             | 1.8                 | 2.0                   | 10.1 | 14   | 2.0                            | 17   |      |
|                                        |                                        |                                             | 2.5                 | 0.2                   | 6.2  | 9.1  | 0.8                            | 11.1 |      |
|                                        |                                        | R <sub>L</sub> = 1MΩ C <sub>L</sub> = 15pF  | 3.3                 | 0.8                   | 5.0  | 7.5  | 0.5                            | 8    |      |
|                                        |                                        | R <sub>L</sub> = 500Ω C <sub>L</sub> = 50pF |                     | 1.2                   | 5.6  | 8.1  | 1.5                            | 8.6  |      |
|                                        |                                        | R <sub>L</sub> = 1MΩ C <sub>L</sub> = 15pF  | 5.0                 | 0.5                   | 4.4  | 5.6  | 0.5                            | 6.1  |      |
|                                        |                                        | R <sub>L</sub> = 500Ω C <sub>L</sub> = 50pF |                     | 0.8                   | 4.8  | 6.1  | 0.8                            | 6.6  |      |
| t <sub>PZL</sub> ,<br>t <sub>PZH</sub> | Output Enable Time<br>(Figure5 and 6)  | R <sub>L</sub> = 500Ω C <sub>L</sub> = 50pF | 1.65                | 2.0                   | 15   | 20.0 | 2.0                            | 23.0 | ns   |
|                                        |                                        |                                             | 1.8                 | 2.0                   | 12.4 | 18.0 | 2.0                            | 22.0 |      |
|                                        |                                        |                                             | 2.5                 | 1.5                   | 7.2  | 8.8  | 1.5                            | 9.4  |      |
|                                        |                                        |                                             | 3.3                 | 1.5                   | 5.8  | 7.1  | 1.5                            | 7.6  |      |
|                                        |                                        |                                             | 5.0                 | 0.8                   | 4.5  | 5.5  | 0.8                            | 5.9  |      |
| t <sub>PLZ</sub> ,<br>t <sub>PHZ</sub> | Output Disable Time<br>(Figure5 and 6) | R <sub>L</sub> = 500Ω C <sub>L</sub> = 50pF | 1.65                | 2.0                   | 11.5 | 20.0 | 2.0                            | 23.0 | ns   |
|                                        |                                        |                                             | 1.8                 | 2.0                   | 9.8  | 18.0 | 2.0                            | 22.0 |      |
|                                        |                                        |                                             | 2.5                 | 1.5                   | 7.7  | 9.5  | 1.5                            | 10.1 |      |
|                                        |                                        |                                             | 3.3                 | 1.0                   | 7.2  | 8.8  | 1.0                            | 9.4  |      |
|                                        |                                        |                                             | 5.0                 | 0.5                   | 5.4  | 6.8  | 0.5                            | 7.3  |      |

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## Capacitance Characteristics

| Symbol          | Parameter                                    | Condition                                                               | Typ | Unit |
|-----------------|----------------------------------------------|-------------------------------------------------------------------------|-----|------|
| C <sub>IN</sub> | Input Capacitance                            | V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub>        | 2.5 | pF   |
| C <sub>PD</sub> | Power Dissipation Capacitance <sup>(5)</sup> | 10MHz, V <sub>CC</sub> = 3.3 V, V <sub>I</sub> = 0 V or V <sub>CC</sub> | 15  | pF   |
|                 |                                              | 10MHz, V <sub>CC</sub> = 5.5 V, V <sub>I</sub> = 0 V or V <sub>CC</sub> | 15  |      |

**Note5:** C<sub>PD</sub> is used to determine the dynamic power dissipation (P<sub>D</sub> in μW).

$P_D = C_{PD} \times V_{CC}^2 \times f_i \times N + \Sigma(C_L \times V_{CC}^2 \times f_o)$  where:

f<sub>i</sub> = input frequency in MHz;

f<sub>o</sub> = output frequency in MHz;

C<sub>L</sub> = output load capacitance in pF;

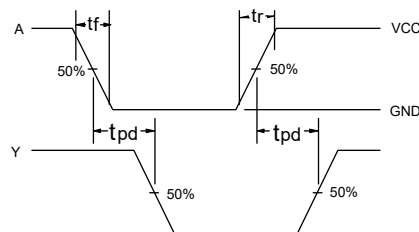
V<sub>CC</sub> = supply voltage in V;

N = number of inputs switching;

$\Sigma(C_L \times V_{CC}^2 \times f_o)$  = sum of outputs.

# ETQ74LVC1G125

## AC Test Circuit



PROPAGATION DELAYS:  
 $t_R=t_F=5\text{ns}$ , 10% to 90%;  $f=1\text{MHz}$ ;

Figure3. Switch Waveform

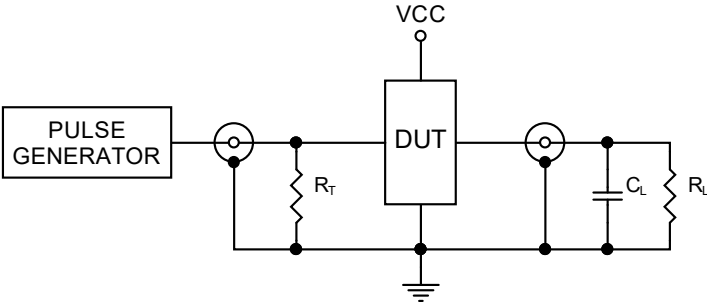


Figure4. Test Circuit  $R_T=50\Omega(\text{Typ})$

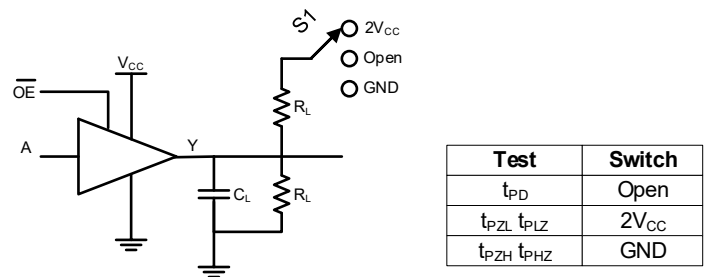


Figure5. Output Enable/Disable Time Test Circuit

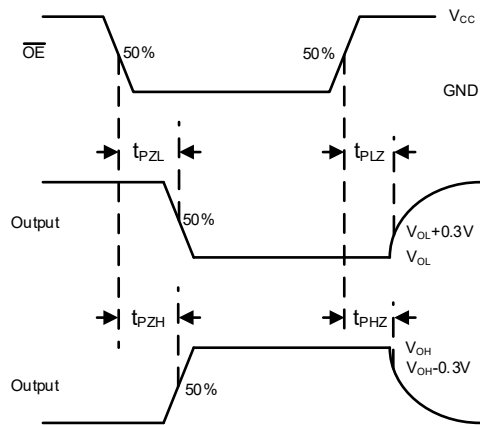
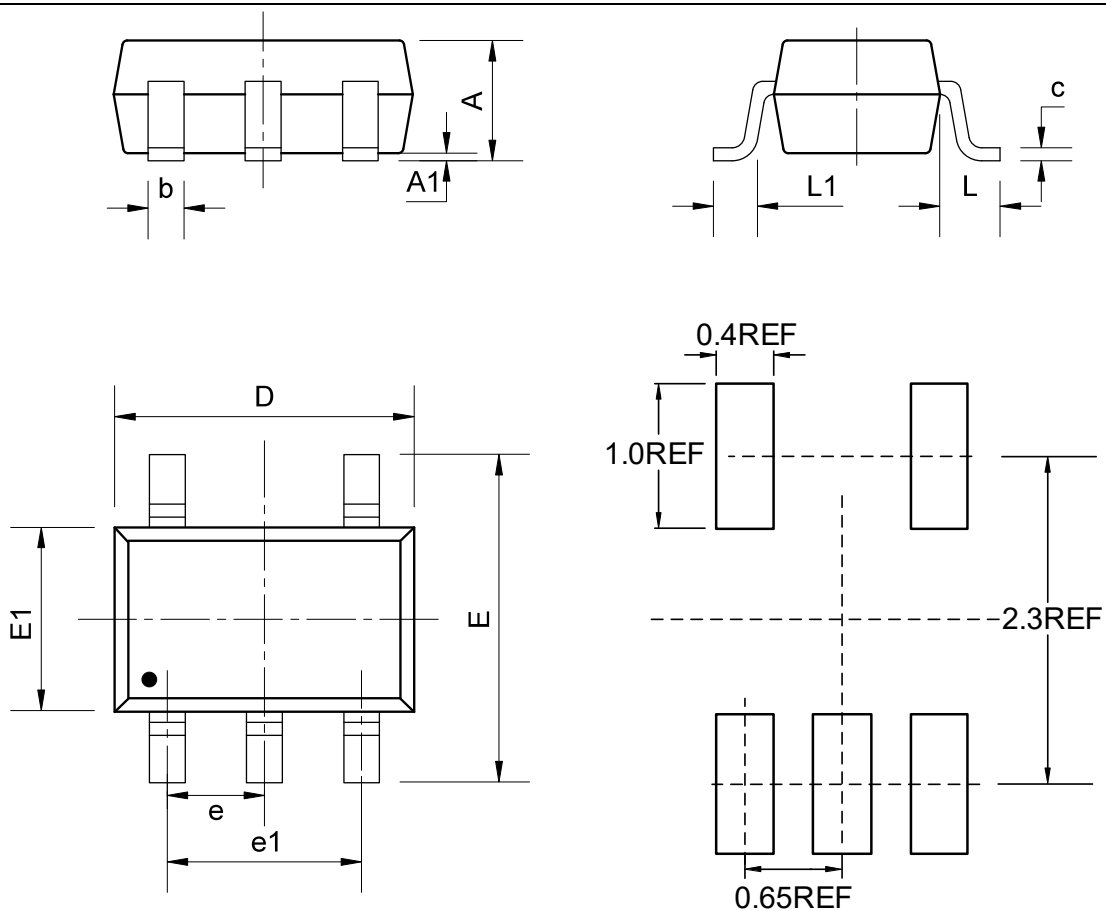


Figure6. Output Enable/Disable Waveform

# ETQ74LVC1G125

## Package Dimension

SC70-5(1.3mm × 2.1mm)



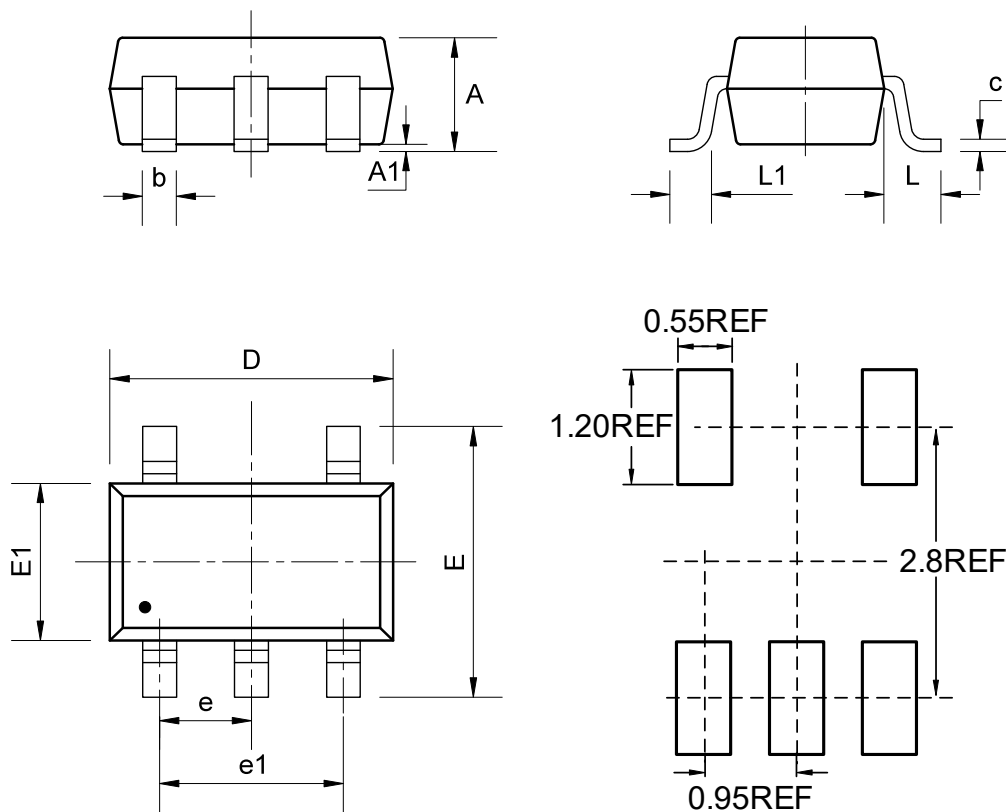
### COMMON DIMENSIONS

(Unit: mm)

| SYMBOL | MIN     | NOM  | MAX  |
|--------|---------|------|------|
| A      | -       | -    | 1.05 |
| A1     | 0       | -    | 0.15 |
| b      | 0.17    | -    | 0.33 |
| c      | 0.12    | -    | 0.20 |
| D      | 2.00    | 2.10 | 2.20 |
| e      | 0.65BSC |      |      |
| e1     | 1.30BSC |      |      |
| E      | 2.20    | 2.30 | 2.40 |
| E1     | 1.21    | 1.30 | 1.35 |
| L      | 0.50REF |      |      |
| L1     | 0.33REF |      |      |

# ETQ74LVC1G125

SOT23-5(1.6mm × 2.9mm)



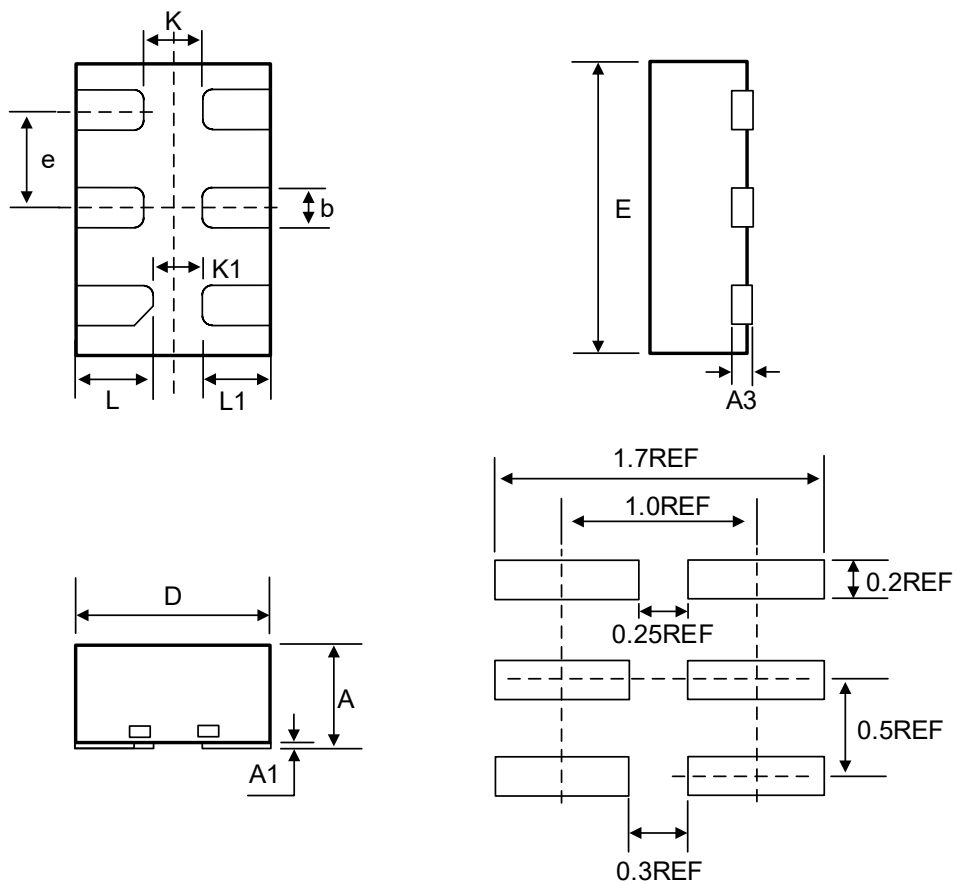
## COMMON DIMENSIONS

(Unit: mm)

| SYMBOL | MIN     | NOM  | MAX  |
|--------|---------|------|------|
| A      | -       | -    | 1.25 |
| A1     | 0       | -    | 0.15 |
| b      | 0.36    | -    | 0.50 |
| c      | 0.12    | -    | 0.20 |
| D      | 2.75    | 2.9  | 3.05 |
| e      | 0.90    | 0.95 | 1.00 |
| e1     | 1.80    | 1.90 | 2.00 |
| E      | 2.60    | 2.80 | 3.00 |
| E1     | 1.45    | 1.6  | 1.75 |
| L      | 0.60REF |      |      |
| L1     | 0.30    | 0.45 | 0.60 |

# ETQ74LVC1G125

DFN6 (1.0mm × 1.5mm)



## COMMON DIMENSIONS

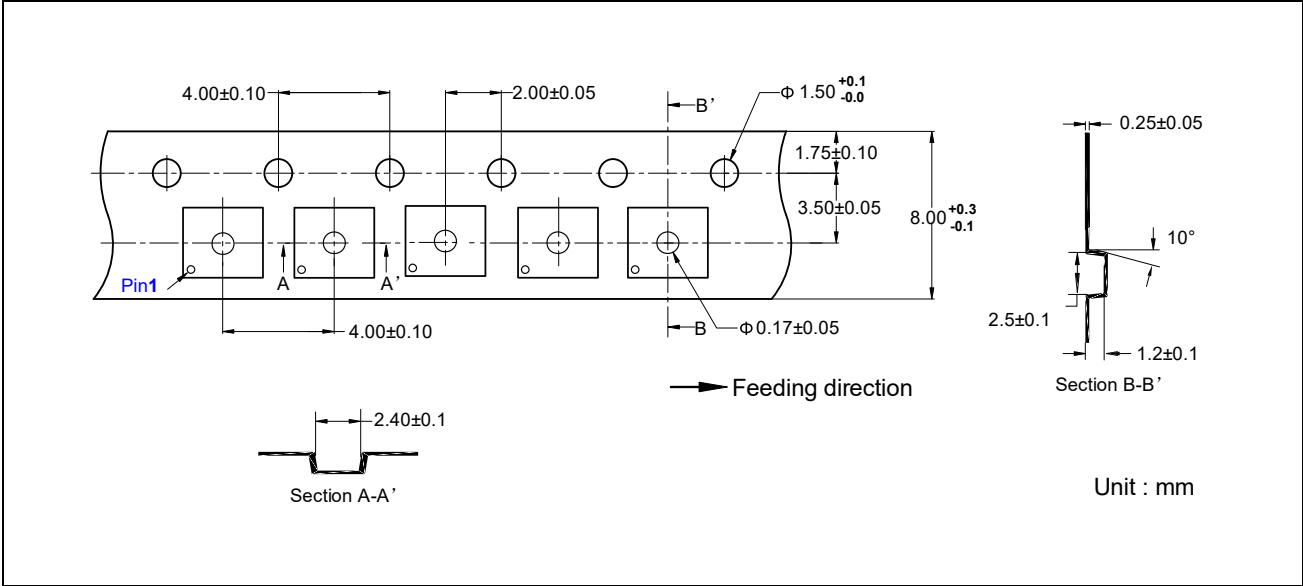
(Unit: mm)

| SYMBOL | MIN      | NOM  | MAX  |
|--------|----------|------|------|
| A      | 0.34     | 0.37 | 0.40 |
| A1     | 0        | 0.02 | 0.05 |
| A3     | 0.10REF  |      |      |
| b      | 0.10     | 0.15 | 0.20 |
| D      | 0.95     | 1.00 | 1.05 |
| E      | 0.95     | 1.00 | 1.05 |
| e      | 0.30     | 0.35 | 0.40 |
| H      | 0.10REF  |      |      |
| K      | 0.15     | --   | --   |
| L      | 0.35     | 0.40 | 0.45 |
| L1     | 0.075REF |      |      |

# ETQ74LVC1G125

## Tape

SC70-5



## Revision History and Checking Table

| Version | Date       | Revision Item    | Modifier   | Function & Spec Checking | Package & Tape Checking |
|---------|------------|------------------|------------|--------------------------|-------------------------|
| 1.0     | 2025-07-30 | Official Version | Wang anran | Yang xiaoxu              | Liu jiaying             |
| 1.1     | 2025-10-15 | Update Format    | Wang anran | Yang xiaoxu              | Liu jiaying             |