

General Description

The SN74LVC2G17 is a high performance dual buffer operating from a 1.65 to 5.5V supply. At $V_{CC} = 3.0V$, high impedance TTL compatible inputs significantly reduce current loading to input drivers while the TTL compatible outputs offer improved switching noise performance.

Features

- Extremely High Speed: t_{PD} 2.0ns (typical) at $V_{CC} = 5.0V$
- Designed for 1.65V to 5.5V V_{CC} Operation
- Overvoltage Tolerant Inputs
- LVTTTL Compatible – Interface Capability with 5.0V TTL Logic with $V_{CC} = 3.0V$ (2.7–3.3)
- LVC MOS Compatible
- 24mA Balanced Output Sink and Source Capability at $V_{CC} = 3.0V$
- Near Zero Static Supply Current Substantially Reduces System Power Requirements
- Chip Complexity: FET = 72; Equivalent Gate = 18
- These Devices are Pb-Free and are RoHS Compliant
- NLV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q100 Qualified and PPAP Capable

Pin Configuration

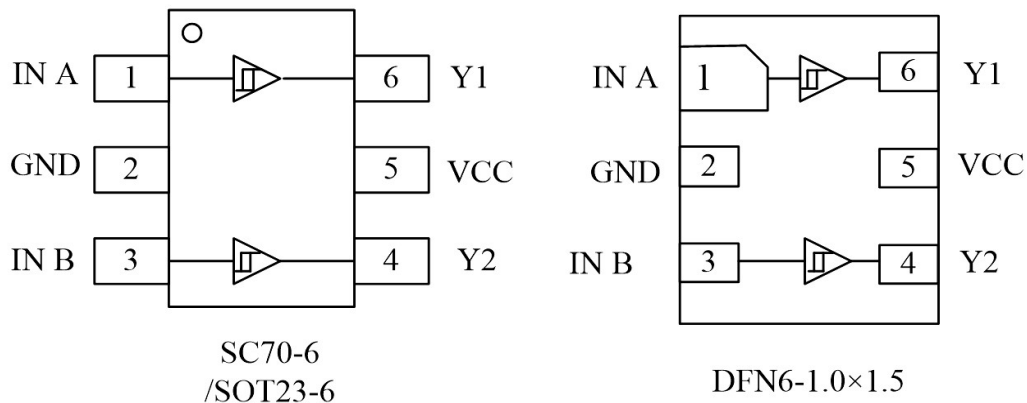


Figure1. Pinouts (Top View)

Pin Function

| PIN | ASSIGNMENT |
|-----|------------|
| 1 | IN A |
| 2 | GND |
| 3 | IN B |
| 4 | Y2 |
| 5 | VCC |
| 6 | Y1 |

Block Diagram

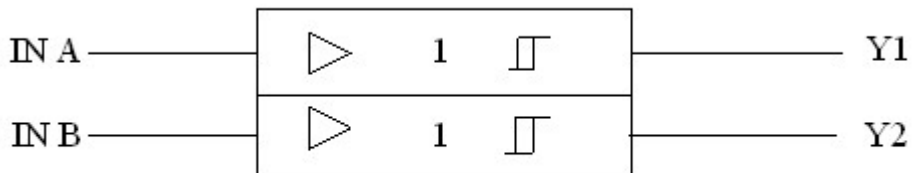


Figure2.Logic symbol

Functional Description

Function Table

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

Absolute Maximum Ratings

| Symbol | Parameter | Value | Unit |
|---------------|--|---------------------------|------|
| V_{CC} | DC Supply Voltage | -0.5 to 7.0 | V |
| V_I | DC Input Voltage | $-0.5 \leq V_I \leq +7.0$ | V |
| V_O | DC Output Voltage Output in Higher or Low State (Note 1) | -0.5 to $V_{CC} + 0.5$ | V |
| I_{IK} | DC Input Diode Current $V_I < GND$ | -50 | mA |
| I_{OK} | DC Output Diode Current $V_O < GND, V_O > V_{CC}$ | ± 50 | mA |
| I_O | DC Output Sink Current | ± 50 | mA |
| I_{CC} | DC Supply Current per Supply Pin | ± 100 | mA |
| I_{GND} | DC Ground Current per Supply Pin | ± 100 | mA |
| T_{STG} | Storage Temperature Range | -65 to 150 | °C |
| T_L | Lead Temperature, 1 mm from Case for 10 Seconds | 260 | °C |
| T_J | Junction Temperature Under Bias | 150 | °C |
| θ_{JA} | Thermal Resistance | 333 | °C/W |
| P_D | Power Dissipation in Still Air at 85°C | 200 | mW |
| MSL | Moisture Sensitivity | Level 1 | |
| F_R | Flammability Rating Oxygen Index:28 to 34 | UL94V-0@0.12in | |
| ESD | ESD Classification Human Body Model (Note 2) | 2000 | V |
| | Machine Model (Note3) | 200 | |
| | Charged Device Model (Note 4) | N/A | |
| $I_{Latchup}$ | Latchup Performance Above V_{CC} and Below GND at 125°C (Note 5) | ± 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.

1. IO absolute maximum rating must be observed.
2. Tested to EIA/JESD22-A114-A, rated to EIA/JESD22-A114-B.
3. Tested to EIA/JESD22-A115-A, rated to EIA/JESD22-A115-A.
4. Tested to JESD22-C101-A.
5. Tested to EIA/JESD78.

Recommended Operating Conditions

| Symbol | Parameter | Min | Max | Unit |
|------------|---|------|-----|------|
| V_{CC} | DC Supply Voltage Operating | 1.65 | 5.5 | V |
| | Date Retention | 1.5 | 5.5 | |
| V_{IN} | DC Input Voltage | 0 | 5.5 | V |
| V_{OUT} | DC Output Voltage (High or Low State) | 0 | 5.5 | V |
| T_A | Operating Temperature Range | -55 | 125 | °C |
| t_r, t_f | Input Rise and Fall Time $V_{CC} = 2.5 V \pm 0.2 V$ | 0 | 20 | ns/V |
| | $V_{CC} = 3.0 V \pm 0.3 V$ | 0 | 10 | |
| | $V_{CC} = 5.0 V \pm 0.5 V$ | 0 | 5 | |

Functional operation above the stresses listed in the Recommended Operating Ranges is not implied. Extended exposure to stresses beyond the Recommended.

Electrical Characteristics
DC ELECTRICAL CHARACTERISTICS

| Symbol | Parameter | Condition | VCC(V) | TA = 25 °C | | | -55°C ≤ TA ≤ 125°C | | Unit |
|------------------|---|---|----------------------------|---|-----------------|---|---|---|------|
| | | | | Min | Typ | Max | Min | Max | |
| V _{IH} | High-Level Input Voltage | | 1.65 to 1.95 2.3 to 5.5 | 0.75V _{CC} 0.7V _{CC} | | | 0.75V _{CC} 0.7V _{CC} | | V |
| V _{IL} | Low-Level Input Voltage | | 1.65 to 1.95 2.3 to 5.5 | | | 0.25V _{CC} 0.3V _{CC} | | 0.25V _{CC} 0.3V _{CC} | V |
| V _{OH} | High-Level Output Voltage V _{IN} = V _{IL} | I _{OH} = -100µA | 1.65 to 5.5 | V _{CC} - 0.1 | V _{CC} | | V _{CC} - 0.1 | | V |
| | | I _{OH} = -3mA | 1.65 | 1.29 | 1.52 | | 1.29 | | |
| | | I _{OH} = -8mA | 2.3 | 1.9 | 2.1 | | 1.9 | | |
| | | I _{OH} = -12mA | 2.7 | 2.2 | 2.4 | | 2.2 | | |
| | | I _{OH} = -16mA | 3.0 | 2.4 | 2.7 | | 2.4 | | |
| | | I _{OH} = -24mA | 3.0 | 2.3 | 2.5 | | 2.3 | | |
| | | I _{OH} = -32mA | 4.5 | 3.8 | 4.0 | | 3.8 | | |
| V _{OL} | Low-Level Output Voltage V _{IN} = V _{IH} | I _{OH} = 100µA | 1.65 to 5.5 | | 0.0 | 0.1 | | 0.1 | V |
| | | I _{OL} = 3mA | 1.65 | | 0.08 | 0.24 | | 0.24 | |
| | | I _{OL} = 8mA | 2.3 | | 0.20 | 0.3 | | 0.3 | |
| | | I _{OL} = 12mA | 2.7 | | 0.22 | 0.4 | | 0.4 | |
| | | I _{OL} = 16mA | 3.0 | | 0.28 | 0.4 | | 0.4 | |
| | | I _{OL} = 24mA | 3.0 | | 0.38 | 0.55 | | 0.55 | |
| | | I _{OL} = 32mA | 4.5 | | 0.42 | 0.55 | | 0.55 | |
| I _{IN} | Input Leakage Current | V _{IN} = 5.5V or GND | 0 to 5.5 | | ±0.1 | | | ±1.0 | µA |
| I _{OFF} | Power Off Leakage Current | V _{IN} = 5.5V or V _{OUT} = 5.5V | 0 | | | 1 | | 10 | µA |
| I _{CC} | Quiescent Supply Current | V _{IN} = 5.5V or GND | 5.5 | | | | | 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 $t_r=t_f= 2.5\text{ns}$; $C_L = 50\text{pF}$;
 $R_L = 500 \Omega$**

| Symbol | Parameter | Condition | V_{CC} (V) | TA = 25 °C | | | -55°C ≤TA≤125°C | | Unit |
|---------------------------------------|------------------------------------|---|--------------|------------|-----|------|--------------------|------|------|
| | | | | Min | Typ | Max | Min | Max | |
| t_{PLH} t_{PHL} | Propagation Delay (Figure3and4) | $R_L= 1\text{M}\Omega$ $C_L= 15 \text{ pF}$ | 1.65 | 2.0 | 5.3 | 11.4 | 2.0 | 12.0 | ns |
| | | | 1.8 | 2.0 | 4.4 | 9.5 | 2.0 | 10.0 | |
| | | $R_L= 1\text{M}\Omega$ $C_L= 15 \text{ pF}$ | 2.5±0.2 | 0.2 | 3.5 | 6.5 | 0.8 | 4.1 | |
| | | $R_L= 1\text{M}\Omega$ $C_L= 15 \text{ pF}$ | 3.3±0.3 | 0.8 | 2.1 | 4.5 | 0.5 | 3.7 | |
| | | $R_L= 500\Omega$ $C_L= 50 \text{ pF}$ | | 1.2 | 2.9 | 5.5 | 1.5 | 5.2 | |
| | | $R_L= 1\text{M}\Omega$ $C_L= 15 \text{ pF}$ | 5.0±0.5 | 0.5 | 1.8 | 3.9 | 0.5 | 4.1 | |
| $R_L= 500\Omega$ $C_L= 50 \text{ pF}$ | 0.8 | 2.4 | | 4.3 | 0.8 | 4.5 | | | |

CAPACITIVE CHARACTERISTICS

| Symbol | Parameter | Condition | Typical | Unit |
|----------|---|---|---------|------|
| C_{IN} | Input Capacitance | $V_{CC}= 5.5 \text{ V}, V_I = 0 \text{ V or } V_{CC}$ | >2.5 | pF |
| C_{PD} | Power Dissipation Capacitance (Note 6) | 10MHz, $V_{CC} = 3.3 \text{ V}, V_I = 0 \text{ V or } V_{CC}$ | 4 | pF |
| | | 10MHz, $V_{CC} = 5.5 \text{ V}, V_I = 0 \text{ V or } V_{CC}$ | 4 | |

6. C_{PD} is defined as the value of the internal equivalent capacitance which is calculated from the operating current consumption without load. Average operating current can be obtained by the equation:

$I_{CC(OPR)}=C_{PD} * V_{CC} * f_{in} + I_{CC} * C_{PD}$ is used to determine the no-load dynamic power consumption;

$P_D=C_{PD} * V_{CC}^2 * f_{in} + I_{CC} * V_{CC} * Fig.$

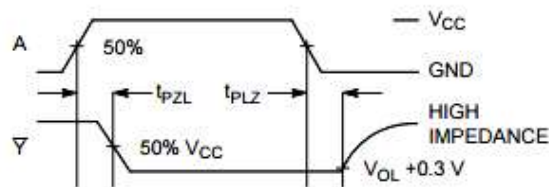
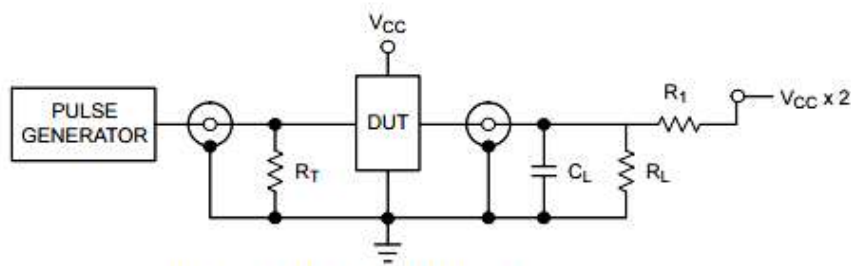


Figure 3. Switching Waveforms

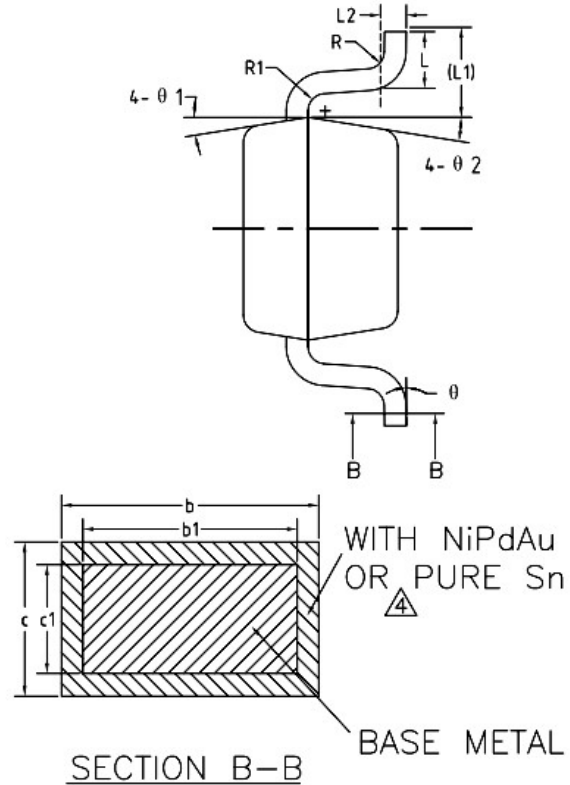
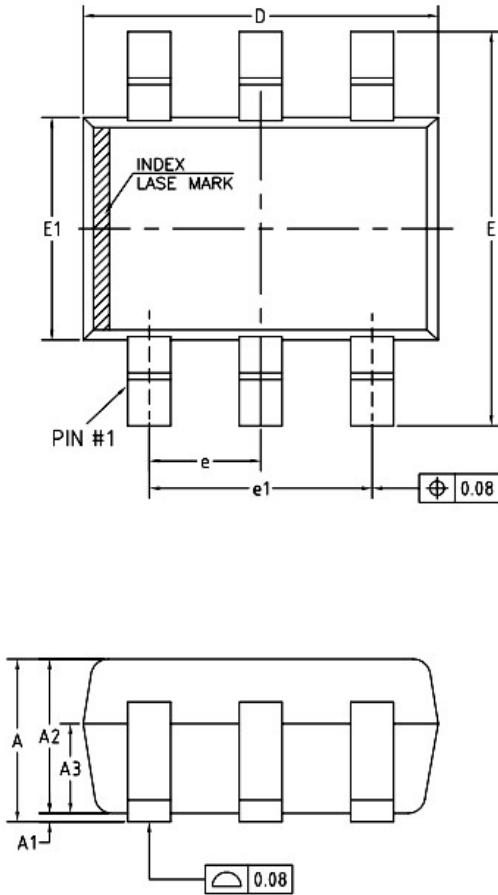


$R_T = Z_{OUT}$ of pulse generator (typically 50 Ω)

Figure 4. Test Circuit

Package Dimension

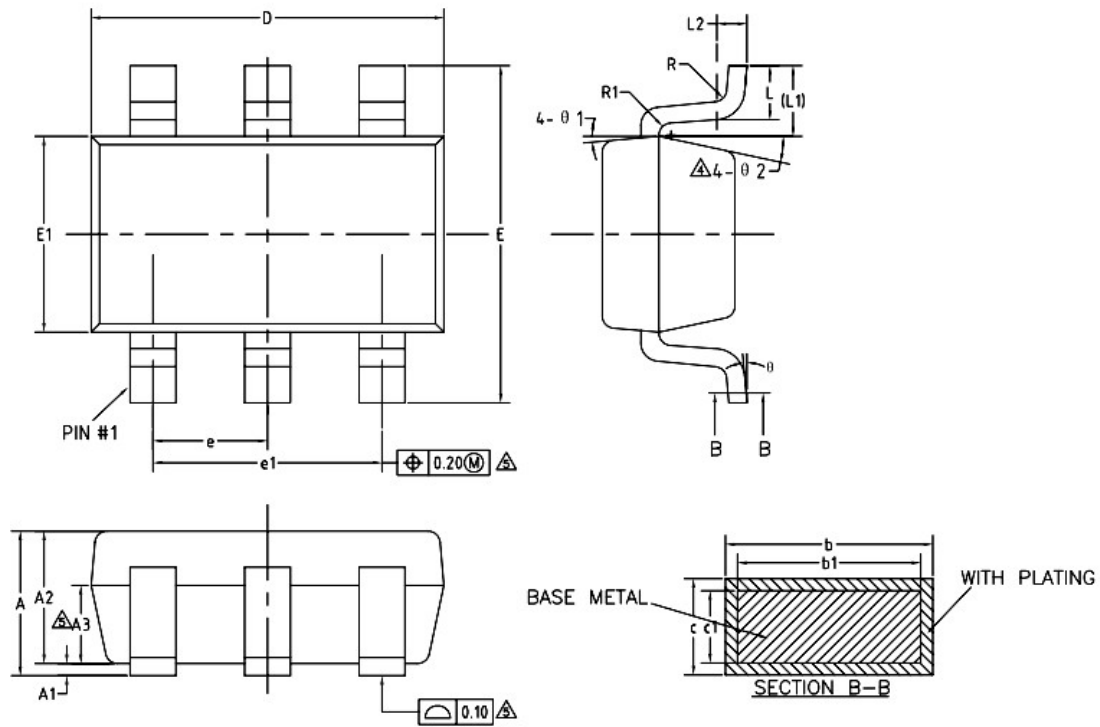
SC70-6



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|---------|------------------------------|------|--------------|
| A | 0.85 | — | 1.05 |
| A1 | 0 | — | 0.10 |
| A2 | 0.80 | 0.90 | 1.00 |
| A3 | 0.47 | 0.52 | 0.57 |
| b | NiPdAu 0.22 PURE Sn 0.23 | — | 0.29 0.33 |
| b1 | 0.22 | 0.25 | 0.28 |
| c | NiPdAu 0.115 PURE Sn 0.12 | — | 0.15 0.18 |
| c1 | 0.115 | 0.13 | 0.14 |
| D | 2.02 | 2.07 | 2.12 |
| E | 2.20 | 2.30 | 2.40 |
| E1 | 1.25 | 1.30 | 1.35 |
| e | 0.60 | 0.65 | 0.70 |
| e1 | 1.20 | 1.30 | 1.40 |
| L | 0.28 | 0.33 | 0.38 |
| L1 | 0.50REF | | |
| L2 | 0.15BSC | | |
| R | 0.10 | — | — |
| R1 | 0.10 | — | 0.25 |
| theta | 0° | — | 8° |
| theta 1 | 6° | 9° | 12° |
| theta 2 | 6° | 9° | 12° |

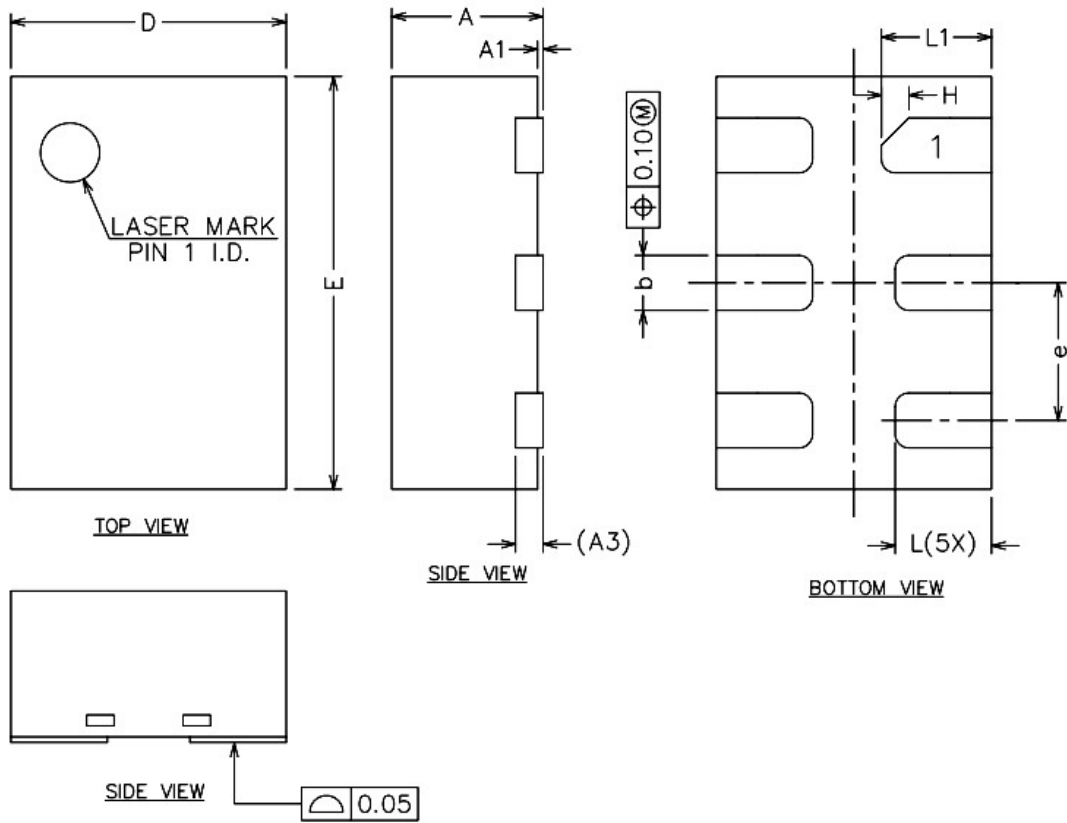
SOT23-6



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|---------|---------|-------|-------|
| A | — | — | 1.25 |
| A1 | 0 | — | 0.15 |
| A2 | 1.00 | 1.10 | 1.20 |
| A3 | 0.60 | 0.65 | 0.70 |
| b | 0.36 | — | 0.50 |
| b1 | 0.36 | 0.38 | 0.45 |
| c | 0.14 | — | 0.20 |
| c1 | 0.14 | 0.15 | 0.16 |
| D | 2.826 | 2.926 | 3.026 |
| E | 2.60 | 2.80 | 3.00 |
| E1 | 1.526 | 1.626 | 1.726 |
| e | 0.90 | 0.95 | 1.00 |
| e1 | 1.80 | 1.90 | 2.00 |
| L | 0.35 | 0.45 | 0.60 |
| L1 | 0.59REF | | |
| L2 | 0.25BSC | | |
| R | 0.10 | — | — |
| R1 | 0.10 | — | 0.20 |
| theta | 0° | — | 8° |
| theta 1 | 3° | 5° | 7° |
| theta 2 | 6° | — | 14° |

DFN6



COMMON DIMENSIONS
(UNITS OF MEASURE=MILLIMETER)

| SYMBOL | MIN | NOM | MAX |
|--------|---------|------|------|
| A | 0.50 | - | 0.60 |
| A1 | 0.00 | 0.02 | 0.05 |
| A3 | 0.10REF | | |
| b | 0.15 | 0.20 | 0.25 |
| D | 0.90 | 1.00 | 1.10 |
| E | 1.40 | 1.50 | 1.60 |
| e | 0.40 | 0.50 | 0.60 |
| H | 0.10REF | | |
| L | 0.30 | 0.35 | 0.40 |
| L1 | 0.35 | 0.40 | 0.45 |

Ordering information

| Order code | Marking code | Package | Baseqty | Deliverymode |
|---------------------|--------------|---------|---------|---------------|
| UMW SN74LVC2G17DBVR | C175 | SOT23-6 | 3000 | Tape and reel |
| UMW SN74LVC2G17DCKR | C75 | SC70-6 | 3000 | Tape and reel |
| UMW SN74LVC2G17DRYR | C7 | DFN6 | 3000 | Tape and reel |