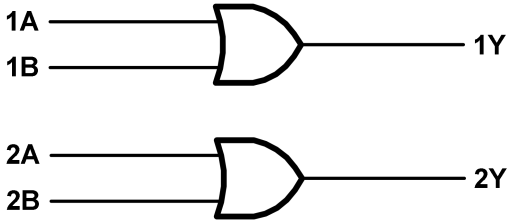


GT74LVC2G32

Dual 2-Input Positive-OR Gate

| 1 Features | 2 Application |
|---|--|
| <ul style="list-style-type: none"> - Operate from 1.65 V to 5.5 V - Supports 5-V VCC operation - Specified from -40°C to 125°C - Provides down translation to VCC - Max tpd of 3.8 ns at 3.3 V - ±24-mA output drive at 3.3 V | <ul style="list-style-type: none"> - Personal navigation device (GPS) - AV receiver - High-speed data acquisition and generation - SSD: internal and external - Digital picture frame (DPF) - TV: LCD/digital and high-definition (HDTV) |

| 3 Description | Circuit Diagram |
|--|--|
| <p>This dual 2-input positive-OR gate is designed for 1.65-V to 5.5-V V_{CC} operation.</p> <p>The GT74LVC2G32 performs the Boolean function $Y = A + B$ or $Y = \overline{A} \cdot \overline{B}$ in positive logic. The CMOS device has high output drive while maintaining low static power dissipation over a broad V_{CC} operating range.</p> <p>This device is fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down.</p> |  |

4 Revision History

| Revision | Date | Note |
|------------|--------------|--|
| Rev. A1. 0 | 2023. 09. 02 | Original Version |
| Rev. A1. 1 | 2023. 12. 15 | 1.Updated Package Qty 2.Added Tape and Reel Information 3.Added Application Note |
| Rev. A1. 2 | 2023. 12. 26 | 1.Added Marking 2.Added MSL |
| Rev. A1. 3 | 2024. 01. 26 | Updated Part Name |
| Rev. A1. 4 | 2024. 04. 11 | Updated Package Outline Dimension |

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⁽¹⁾

| Serial Name | Part Name | Package | Body Size (Nom) | Marking ⁽²⁾⁽⁴⁾ | MSL ⁽³⁾ | Package Qty |
|-------------|---------------|---------|----------------------|---------------------------|--------------------|--------------------|
| GT74LVC2G32 | GT74LVC2G32V8 | VSSOP8 | 2.00mm×2.30mm×0.75mm | 2G32 XXXX | 3 | Tape and Reel,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) "XXXXX" in Marking will be appeared as the batch code.

5 Device Summary, Pin and Packages(Continued)

Top View

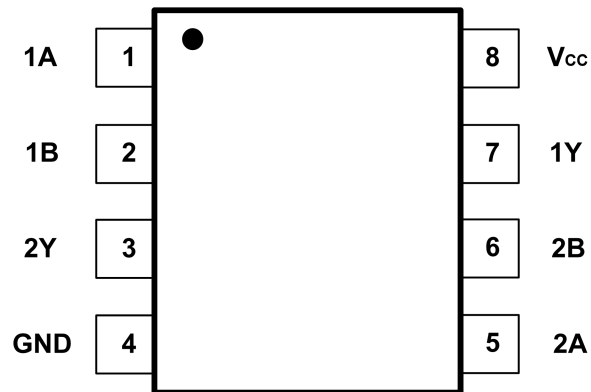


Fig. 5-1. GT74LVC2G32: V8 (VSSOP8) Package

Table 5-2 Pin definition

| Pin | | I/O | Description |
|------|----|-----|--------------------|
| Name | V8 | | |
| 1A | 1 | I | Gate 1 Data Input |
| 1B | 2 | I | Gate 1 Data Input |
| 2Y | 3 | O | Gate 2 Data Output |
| GND | 4 | - | Ground |
| 2A | 5 | I | Gate 2 Data Input |
| 2B | 6 | I | Gate 2 Data Input |
| 1Y | 7 | O | Gate 1 Data Output |
| VCC | 8 | - | Supply Voltage |

6 Voltage, Temperature, ESD and Thermal Ratings

6.1 Absolute Maximum Ratings⁽¹⁾

| Parameters | | Min. | Max. | Unit |
|------------------|---|--------------------|----------------------|------|
| V _{CC} | Supply voltage range | -0.5 | 6.5 | V |
| V _I | Input voltage range ⁽²⁾ | -0.5 | 6.5 | V |
| V _O | Voltage range applied to any output in the high-impedance or power-off state ⁽²⁾ | -0.5 | 6.5 | V |
| V _O | Voltage range applied to any output in the high or low state ⁽²⁾⁽³⁾ | -0.5 | V _{CC} +0.5 | V |
| I _{IK} | Input clamp current | V _I < 0 | -50 | mA |
| I _{OK} | Output clamp current | V _O < 0 | -50 | mA |
| I _O | Continuous output current | | ±50 | mA |
| | Continuous current through V _{CC} or GND | | ±100 | mA |
| T _J | Junction temperature | -55 | 150 | °C |
| T _{stg} | Storage temperature | -55 | 150 | °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 and output negative-voltage ratings may be exceeded if the input and output current ratings are observed.

(3) The output positive-voltage rating may be exceeded up to 6.5 V maximum if the output current rating is observed.

6.2 ESD Ratings

| ESD | | Value | Unit |
|--------|-------------------------|---|-------|
| V(ESD) | Electrostatic discharge | Human-body model (HBM) ⁽¹⁾ | 8 K |
| | | Charged device model (CDM) ⁽²⁾ | 1.5 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⁽¹⁾

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

| Symbol | Parameter | | Min | Max | Units |
|-----------------|------------------------------------|--|----------------------|----------------------|-------|
| V _{CC} | Supply Voltage | Operating | 1.65 | 5.5 | V |
| V _{IH} | High-Level Input Voltage | V _{CC} =1.65V to 1.95V | 0.65×V _{CC} | | V |
| | | V _{CC} =2.3V to 2.7V | 1.7 | | |
| | | V _{CC} =3V to 3.6V | 2 | | |
| | | V _{CC} =4.5V to 5.5V | 0.7×V _{CC} | | |
| V _{IL} | Low-Level Input Voltage | V _{CC} =1.65V to 1.95V | | 0.35×V _{CC} | V |
| | | V _{CC} =2.3V to 2.7V | | 0.7 | |
| | | V _{CC} =3V to 3.6V | | 0.8 | |
| | | V _{CC} =4.5V to 5.5V | | 0.3×V _{CC} | |
| 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 | |
| | | V _{CC} =4.5V | | -24 | |
| I _{OL} | Low-Level Output Current | V _{CC} =1.65V | | 4 | mA |
| | | V _{CC} =2.3V | | 8 | |
| | | V _{CC} =3V | | 16 | |
| | | V _{CC} =4.5V | | 24 | |
| Δt/Δv | Input Transition Rise or Fall Rate | V _{CC} =1.8V±0.15V, 2.5V±0.2V | | 20 | ns/V |
| | | V _{CC} =3.3V±0.3V | | 10 | |
| | | V _{CC} =5V±0.5V | | 5 | |
| TA | Operating Free-air Temperature | All Other Packages | -40 | 125 | °C |

(1) All unused digital inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

6.4 Thermal Information

| Package Type | θ _{JA} | θ _{JC} | Unit |
|--------------|-----------------|-----------------|------|
| VSSOP8 | 204 | 77 | °C/W |

7 Electrical Specifications

7.1 Electrical Characteristics

V_{CC}=1.65V to 5.5V, FULL=-40°C to +125°C, Typical values are at TA=+25°C. (unless otherwise noted)⁽¹⁾

| Parameter | Symbol | Test Conditions | V _{CC} | TA | Min | Typ | Max | Units |
|-----------------------|------------------|---|-----------------|------|----------------------|-----|------|-------|
| Output | | | | | | | | |
| Output High Voltage | V _{OH} | I _{OH} =-100μA | 1.65V to 5.5V | FULL | V _{CC} -0.1 | | | V |
| | | I _{OH} =-4mA | 1.65V | FULL | 1.2 | | | V |
| | | I _{OH} =-8mA | 2.3V | FULL | 1.9 | | | V |
| | | I _{OH} =-16mA | 3V | FULL | 2.4 | | | V |
| | | I _{OH} =-24mA | | FULL | 2.3 | | | V |
| | | I _{OH} =-32mA | 4.5V | FULL | 3.8 | | | V |
| Output Low Voltage | V _{OL} | I _{OL} =100μA | 1.65V to 5.5V | FULL | | | 0.1 | V |
| | | I _{OL} =4mA | 1.65V | FULL | | | 0.45 | V |
| | | I _{OL} =8mA | 2.3V | FULL | | | 0.3 | V |
| | | I _{OL} =16mA | 3V | FULL | | | 0.4 | V |
| | | I _{OL} =24mA | | FULL | | | 0.55 | V |
| | | I _{OL} =32mA | 4.5V | FULL | | | 0.55 | V |
| Off-State Current | I _{off} | V _I or V _O =5.5V | 0V | FULL | | | ±10 | μA |
| Input | | | | | | | | |
| Input Leakage Current | I _I | V _I =5.5V or GND | 0V to 5.5V | FULL | | | ±5 | μA |
| Input Capacitance | C _I | V _I =V _{CC} or GND | 3.3V | FULL | | 5 | | pF |
| Power Supply | | | | | | | | |
| Power Supply Range | V _{CC} | | 1.65V to 5.5V | FULL | 1.65 | | 5.5 | V |
| Power Supply Current | I _{CC} | V _I =V _{CC} or GND, I _O =0 | 5.5V | FULL | | | 10 | μA |
| Delta Power Current | ΔI _{CC} | One Input at V _{CC} - 0.6V, Other Inputs at V _{CC} or GND | 3V to 5.5V | FULL | | | 500 | μA |

(1) All unused digital inputs of the device must be held at V_{CC} or GND to ensure proper device operation.

7.2 Switching Characteristics

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

| Parameter | From(Input) | To(Output) | -40°C to +125°C | | | | | | | | Units |
|-----------------|-------------|------------|-----------------------------|-----|----------------------------|-----|----------------------------|-----|--------------------------|-----|-------|
| | | | V _{CC} =1.8V±0.15V | | V _{CC} =2.5V±0.2V | | V _{CC} =3.3V±0.3V | | V _{CC} =5V±0.5V | | |
| | | | Min | Max | Min | Max | Min | Max | Min | Max | |
| t _{pd} | A or B | Y | 1 | 9 | 1 | 3.8 | 1 | 3.8 | 1 | 3.3 | ns |

7.3 Operating Characteristics

TA=-40°C to +125°C

| Parameter | | Test Conditions | V _{CC} =1.8V | V _{CC} =2.5V | V _{CC} =3.3V | V _{CC} =5V | Units |
|-----------------|-------------------------------|-----------------|-----------------------|-----------------------|-----------------------|---------------------|-------|
| | | | Typ | Typ | Typ | Typ | |
| C _{pd} | Power Dissipation Capacitance | f=10Mhz | 23 | 23 | 23 | 29 | pF |

8 Typical Characteristics

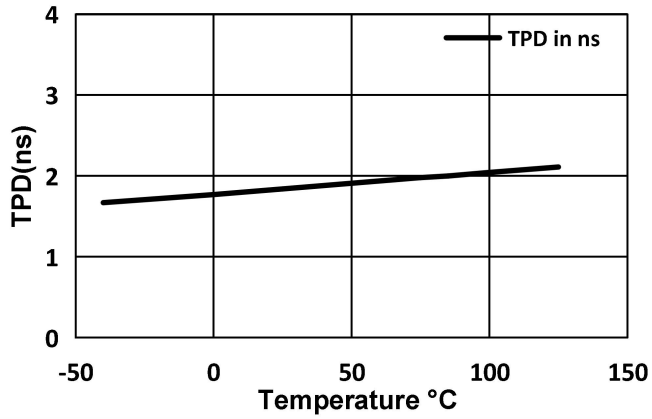


Fig.8-1. TPD Across Temperature AT 3.3V V_{CC}

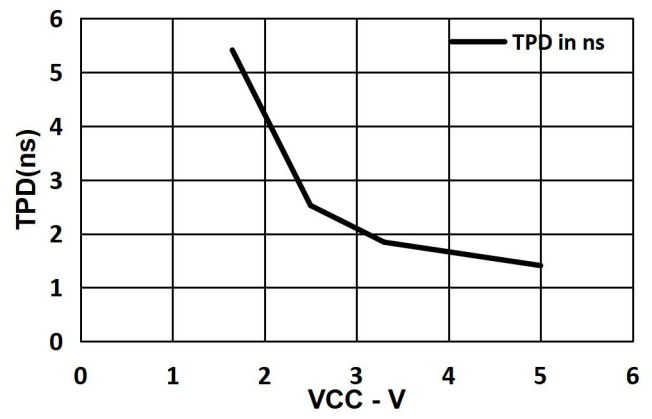
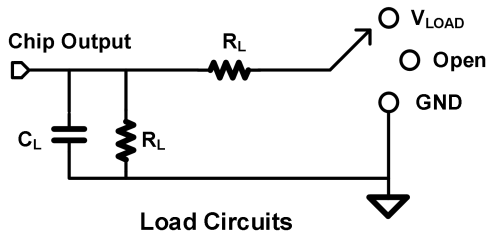


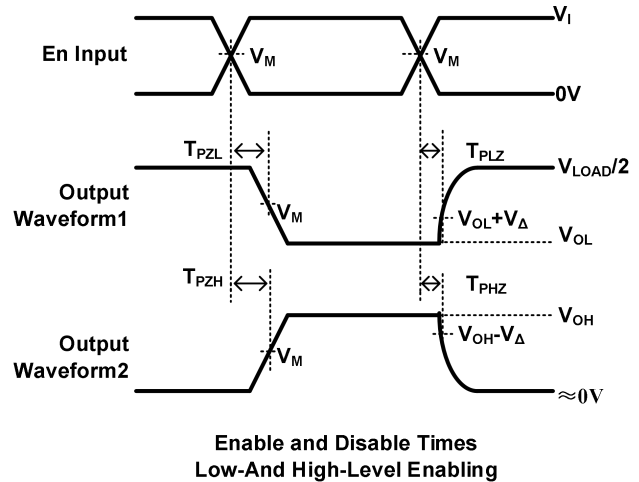
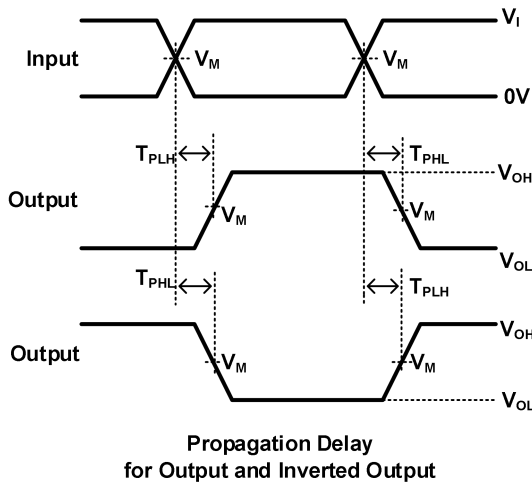
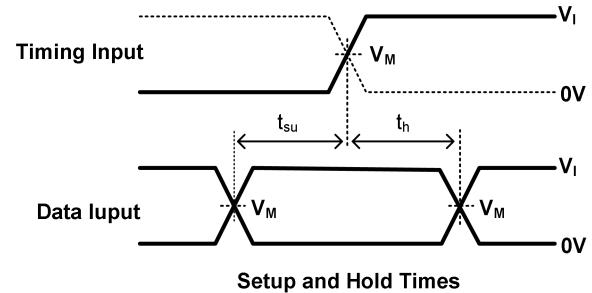
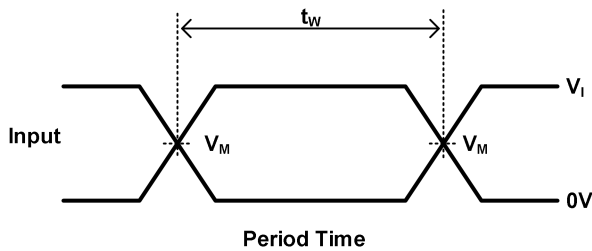
Fig.8-2. TPD Across V_{CC} at 25°C

9 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_{Δ} |
|------------------|----------|--------------|------------|-------------------|-------|--------------|--------------|
| | V_i | T_r/T_f | | | | | |
| $1.8V \pm 0.15V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF | 1k Ω | 0.15V |
| $2.5V \pm 0.15V$ | V_{CC} | $\leq 2ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 30pF | 500 Ω | 0.15V |
| $3.3V \pm 0.15V$ | 3V | $\leq 2.5ns$ | 1.5V | 6V | 50pF | 500 Ω | 0.3V |
| $5V \pm 0.15V$ | V_{CC} | $\leq 2.5ns$ | $V_{CC}/2$ | $2 \times V_{CC}$ | 50pF | 500 Ω | 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 devices.

10 Detailed Description

10.1 Overview

The GT74LVC2G32 device contains two 2-input positive OR gate and each gate performs the Boolean function $Y=A + B$ or $Y=\overline{\overline{A} \cdot \overline{B}}$. This device is fully specified for partial-power-down applications using I_{off} . The I_{off} circuitry disables the outputs, preventing damaging current backflow through the device when it is powered down. The I_{off} feature allows voltages on the inputs and outputs, when V_{CC} is 0V.

10.2 Functional Block Diagram

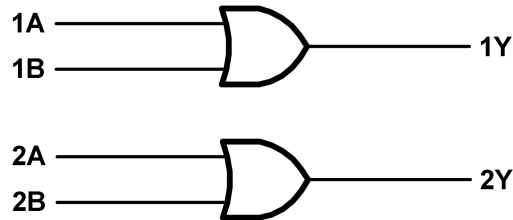


Fig.10-1.Functional Block Diagram

10.3 Feature Description

- Wide operating voltage range.
- Operates from 1.65 V to 5.5 V.
- Allows down voltage translation.
- Inputs accept voltages to 5.5 V.
- I_{off} feature allows voltages on the inputs and outputs, when V_{CC} is 0 V.

10.4 Device Functional Modes

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

11 Application Note

The GT74LVC2G32 device is dual 2-input OR gate. High-output current capability is ideal for driving multiple outputs.

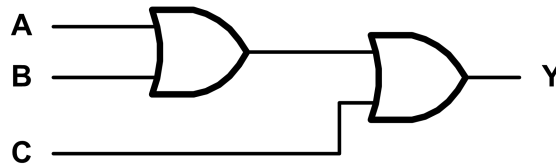


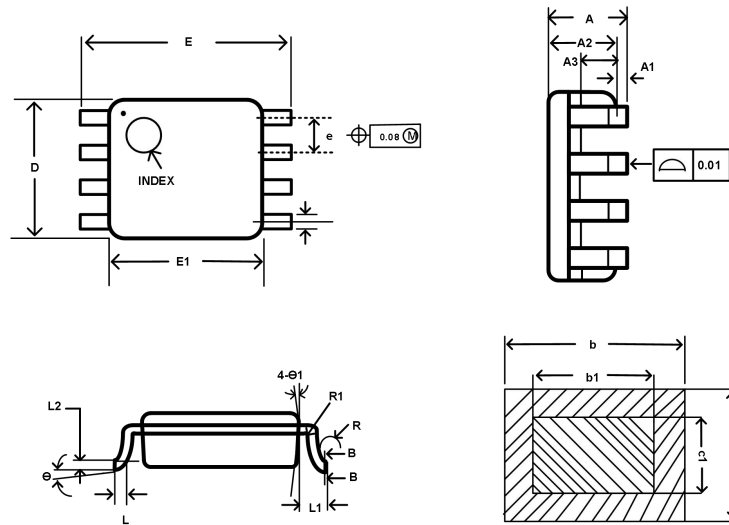
Fig.11-1. 3-input OR gate

This device uses CMOS technology and has balanced output drive. Care should be taken to avoid bus contention because it can drive currents that would exceed maximum limits. The high drive will also create fast edges into light loads, so routing and load conditions should be considered to prevent ringing.

Each VCC pin should have a good bypass capacitor to prevent power disturbance. For devices with a single supply, a 0.1- μ F capacitor is recommended. If there are multiple VCC pins, then a 0.01- μ F or 0.022- μ F capacitor is recommended for each power pin. It is ok to parallel multiple bypass capacitors to reject different frequencies of noise. A 0.1- μ F and 1- μ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power pin as possible for best results.

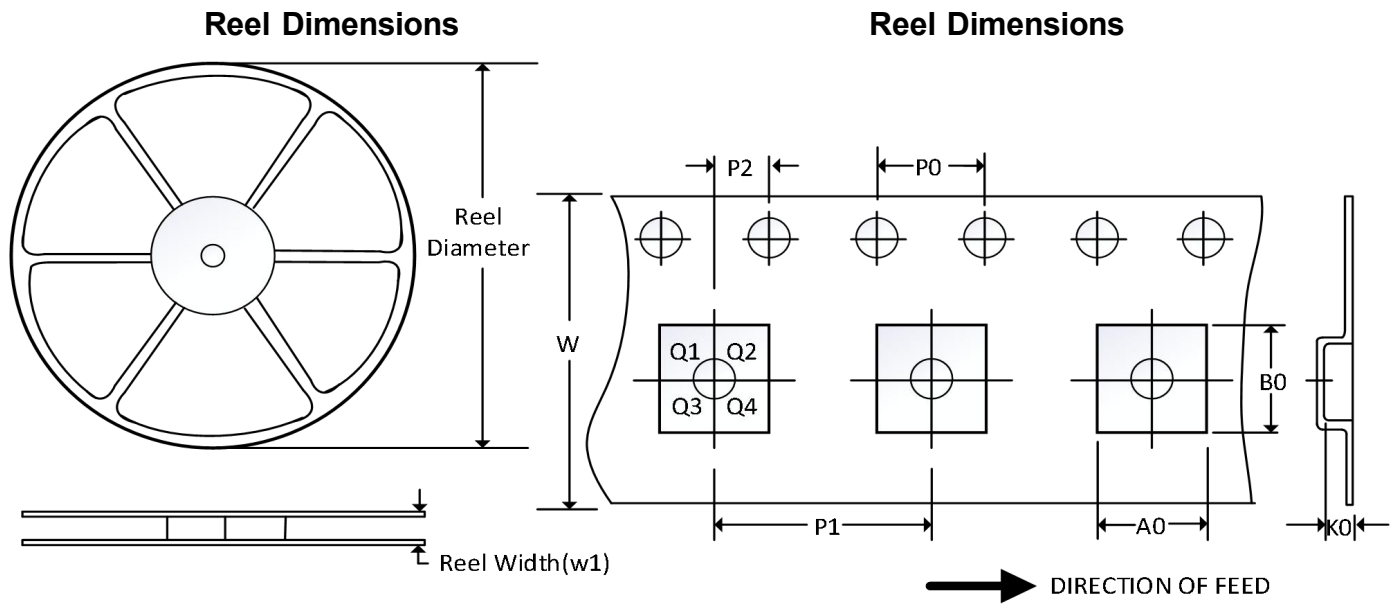
12 Package Outline Dimension

VSSOP8



| Symbol | Dimensions in Millimeters | | | Dimensions in Inches | | |
|--------|---------------------------|------|------|----------------------|-------|-------|
| | Min | Nom | Max | Min | Nom | Max |
| A | - | - | 0.90 | - | - | 0.035 |
| A1 | 0 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| A2 | 0.65 | 0.75 | 0.80 | 0.026 | 0.030 | 0.031 |
| A3 | 0.32 | 0.37 | 0.42 | 0.013 | 0.015 | 0.017 |
| b | 0.17 | - | 0.27 | 0.007 | - | 0.011 |
| b1 | 0.17 | 0.20 | 0.23 | 0.007 | 0.008 | 0.009 |
| c | 0.10 | - | 0.18 | 0.004 | - | 0.007 |
| c1 | 0.10 | 0.13 | 0.14 | 0.004 | 0.005 | 0.006 |
| E | 3.00 | 3.10 | 3.20 | 0.118 | 0.122 | 0.126 |
| D | 1.90 | 2.00 | 2.10 | 0.075 | 0.079 | 0.083 |
| E1 | 3.00 | 3.10 | 3.20 | 0.118 | 0.122 | 0.126 |
| E1 | 2.20 | 2.30 | 2.40 | 0.087 | 0.091 | 0.094 |
| e | 0.40 | 0.50 | 0.60 | 0.016 | 0.020 | 0.024 |
| L | 0.20 | 0.26 | 0.35 | 0.008 | 0.010 | 0.014 |
| L1 | 0.40REF | | | 0.016REF | | |
| L2 | 0.12BSC | | | 0.005BSC | | |
| R | 0.07 | - | - | 0.003 | - | - |
| R1 | 0.07 | - | - | 0.003 | - | - |
| θ | 0° | - | 6° | 0° | - | 6° |
| θ1 | 9° | 12° | 15° | 9° | 12° | 15° |

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 |
|--------------|---------------|-----------------|---------|---------|---------|---------|---------|---------|--------|---------------|
| VSSOP-8 | 7" | 9.5 | 2.25 | 3.35 | 1.40 | 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.