SN74LVC1G32-Q1 Single 2-input positive-OR gate

1 Features

- Available in the small 1.45 mm^2 Package (DRY) with 0.5-mm Pitch
- Supports 5-V V_{CC} Operation
- Inputs Accept Voltages to 5.5-V
- Supports Down Translation to V_{CC}
- Max t_{pd} of 3.6 ns at 3.3-V
- Low Power Consumption, 10-µA Max I_{CC}
- ±24-mA Output Drive at 3.3-V
- I_{off} Supports Live Insertion, Partial-Power-Down Mode, and Back-Drive Protection
- Latch-Up Performance Exceeds 100 mA Per JESD 78, Class II
- ESD Protection Exceeds JESD 22
  - 2000-V Human-Body Model (A114-A)
  - 200-V Machine Model (A115-A)
  - 1000-V Charged-Device Model (C101)

2 Applications

- AV Receiver
- Blu-ray Player and Home Theater
- Digital Picture Frame (DPF)
- Embedded PC
- IP Phone: Wireless
- High-Speed Data Acquisition and Generation
- Motor Control: High-Voltage
- Optical Networking: Video Over Fiber and EPON
- Personal Navigation Device (GPS)
- Portable Media Player
- Private Branch Exchange (PBX)
- Server PSU
- SSD: Internal and External
- TV: LCD/Digital and High-Definition (HDTV)
- Telecom Shelter: Power Distribution Unit (PDU), Power Monitoring Unit (PMU), Wireless Battery Monitoring, Remote Electrical Tilt Unit (RET), Remote Radio Unit (RRU), Tower Mounted Amplifier (TMA)
- Video Conferencing: IP-Based HD
- Vector Signal Analyzer and Generator
- WiMAX and Wireless Infrastructure Equipment
- Wireless Headset, Keyboard, Mouse, and Repeater

3 Description

This single 2-input positive-OR gate is designed for 1.65-V to 5.5-V V_{CC} operation.

The SN74LVC1G32-Q1 device performs the Boolean function $Y = A + B$ or $Y = \overline{\overline{A} \bullet \overline{B}}$ in positive logic.

The CMOS device has high output drive while maintaining low static power dissipation over a broad V_{CC} operating range.

The SN74LVC1G32-Q1 device is available in a variety of packages, including the small DRY package with a body size of 1.45 × 1.00 mm.

Device Information

DEVICE NAME	PACKAGE (PINS)	BODY SIZE
SN74LVC1G32QDBV	SOT-23 (5)	2.90mm × 2.80mm
SN74LVC1G32QDCK	SC70 (5)	2.00mm × 1.25mm
SN74LVC1G32QDRY	SON (6)	1.45mm × 1.00mm

(1) For all available packages, see the orderable addendum at the end of the data sheet.

Table of Contents

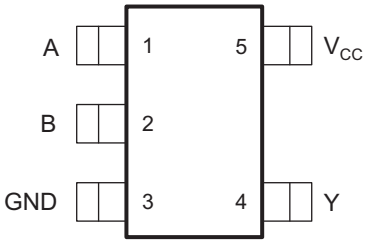
4 Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

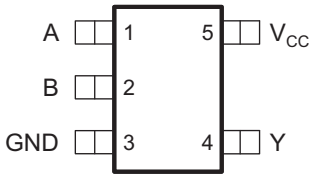
Changes from Original (February 2006) to Revision A	Page
• Changed data sheet format to new TI standard	1
• Added SON (6) DRY package to *Device Information* table	1
• Added DRY Package to *Pin Configuration and Functions* section.	3

5 Pin Configuration and Functions

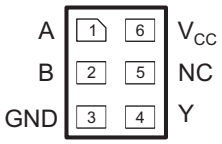
DBV package
5-Pin SOT-23
(Top View)



DCK package
5-Pin SC-70
(Top View)



DRY package
6-Pin SON
(Transparent Top View)



NC = No Connect

See Mechanical drawings at the end of the data sheet for dimensions

Pin Functions

PIN			DESCRIPTION
NAME	DBV, DCK	DRY	
A	1	1	Input
B	2	2	Input
GND	3	3	Ground
Y	4	4	Output
VCC	5	6	Power pin
NC	–	5	Not connected

6 Specifications

6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)(1)

			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			150	°C
T_{stg}	Storage temperature		–65	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 value of V_{CC} is provided in the *Recommended Operating Conditions* table.

6.2 ESD Ratings

PARAMETER		DEFINITION	VAUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human body model (HBM), per ANSI/ESDA/JEDEC JS-001, all pins(1)	±2000	V
		Charged device model (CDM), per JEDEC specification JESD22-C101, all pins(2)	±1000	

(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.

6.3 Recommended Operating Conditions

over operating free-air temperature range (unless otherwise noted)(1)

			MIN	MAX	UNIT
V_{CC}	Supply voltage	Operating	1.65	5.5	V
		Data retention only	1.5		
V_{IH}	High-level input voltage	V_{CC} = 1.65 V to 1.95 V	0.65 × V_{CC}		V
		V_{CC} = 2.3 V to 2.7 V	1.7		
		V_{CC} = 3 V to 3.6 V	2		
		V_{CC} = 4.5 V to 5.5 V	0.7 × V_{CC}		
V_{IL}	Low-level input voltage	V_{CC} = 1.65 V to 1.95 V		0.35 × V_{CC}	V
		V_{CC} = 2.3 V to 2.7 V		0.7	
		V_{CC} = 3 V to 3.6 V		0.8	
		V_{CC} = 4.5 V to 5.5 V		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} = 1.65 V		–4	mA
		V_{CC} = 2.3 V		–8	
		V_{CC} = 3 V		–16	
				–24	
		V_{CC} = 4.5 V		–32	
I_{OL}	Low-level output current	V_{CC} = 1.65 V		4	mA
		V_{CC} = 2.3 V		8	
		V_{CC} = 3 V		16	
				24	
		V_{CC} = 4.5 V		32	
$\Delta t/\Delta v$	Input transition rise or fall rate	V_{CC} = 1.8 V ± 0.15 V, 2.5 V ± 0.2 V		20	ns/V
		V_{CC} = 3.3 V ± 0.3 V		10	
		V_{CC} = 5 V ± 0.5 V		5	
T_A	Operating free-air temperature	DSBGA package	–40	85	°C
		All other packages	-40	125	°C

(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

6.4 Thermal Information

THERMAL METRIC(1)		SN74LVC1G32-Q1			UNIT
		DBV	DCK	DRY	
		5 PINS	5 PINS	6 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	229	278	439	°C/W
$R_{\theta JCtop}$	Junction-to-case (top) thermal resistance	164	93	277	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	62	65	271	°C/W
ψ_{JT}	Junction-to-top characterization parameter	44	2	84	°C/W
ψ_{JB}	Junction-to-board characterization parameter	62	64	271	°C/W
$R_{\theta JCbot}$	Junction-to-case (bottom) thermal resistance	–	–	–	°C/W

(1) For more information about traditional and new thermal metrics, see the *Semiconductor and IC package thermal metrics* application report.

6.5 Electrical Characteristics

over recommended operating free-air temperature range (unless otherwise noted)

PARAMETER		TEST CONDITIONS	V_{CC}	–40°C to 85°C			–40°C to 125°C RECOMMENDED			UNIT
				MIN	TYP(1)	MAX	MIN	TYP	MAX	
V_{OH}		I_{OH} = –100 µA	1.65 V to 5.5 V	V_{CC} – 0.1			V_{CC} – 0.1			V
		I_{OH} = –4 mA	1.65 V	1.2			1.2			
		I_{OH} = –8 mA	2.3 V	1.9			1.9			
		I_{OH} = –16 mA	3 V	2.4			2.4			
		I_{OH} = –24 mA		2.3			2.3			
		I_{OH} = –32 mA	4.5 V	3.8			3.8			
V_{OL}		I_{OL} = 100 µA	1.65 V to 5.5 V			0.1			0.1	V
		I_{OL} = 4 mA	1.65 V			0.45			0.45	
		I_{OL} = 8 mA	2.3 V			0.3			0.4	
		I_{OL} = 16 mA	3 V			0.4			0.5	
		I_{OL} = 24 mA				0.55			0.65	
		I_{OL} = 32 mA	4.5 V			0.55			0.65	
I_I	A or B inputs	V_I = 5.5 V or GND	0 to 5.5 V			±5			±5	µA
I_{off}		V_I or V_O = 5.5 V	0			±10			±25	µA
I_{CC}		V_I = 5.5 V or GND, I_O = 0	1.65 V to 5.5 V			10			10	µA
ΔI_{CC}		One input at V_{CC} – 0.6 V, Other inputs at V_{CC} or GND	3 V to 5.5 V			500			500	µA
C_i		V_I = V_{CC} or GND	3.3 V		4			4		pF

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25°C.

6.6 Switching Characteristics, C_L = 15 pF

over recommended operating free-air temperature range, C_L = 15 pF (unless otherwise noted) (see Figure 3)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–40°C to 85°C								UNIT
			V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V ± 0.2 V		V_{CC} = 3.3 V ± 0.3 V		V_{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	1.9	7.2	0.8	4.4	0.9	3.6	0.8	3.4	ns

6.7 Switching Characteristics, 1.8 V and 2.5V

over recommended operating free-air temperature range, C_L = 30 pF or 50 pF (unless otherwise noted)(1) (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–40°C to 85°C		–40°C to 125°C RECOMMENDED		–40°C to 85°C		–40°C to 125°C RECOMMENDED		UNIT
			V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 1.8 V ± 0.15 V		V_{CC} = 2.5 V ± 0.2 V		V_{CC} = 2.5 V ± 0.2 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	2.8	8	2.8	9	1.2	5.5	1.2	6	ns

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested.

6.8 Switching Characteristics, 3.3 V and 5 V

over recommended operating free-air temperature range, C_L = 30 pF or 50 pF (unless otherwise noted)(1) (see Figure 4)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	–40°C to 85°C		–40°C to 125°C RECOMMENDED		–40°C to 85°C		–40°C to 125°C RECOMMENDED		UNIT
			V_{CC} = 3.3 V ± 0.3 V		V_{CC} = 3.3 V ± 0.3 V		V_{CC} = 5 V ± 0.5 V		V_{CC} = 5 V ± 0.5 V		
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A or B	Y	1.1	4.5	1	4	1	4	1	4.5	ns

(1) On products compliant to MIL-PRF-38535, this parameter is not production tested

6.9 Operating Characteristics

T_A = 25°C

PARAMETER		TEST CONDITIONS	V_{CC} = 1.8 V	V_{CC} = 2.5 V	V_{CC} = 3.3 V	V_{CC} = 5 V	UNIT
			TYP	TYP	TYP	TYP	
C_{pd}	Power dissipation capacitance	f = 10 MHz	20	20	21	22	pF

6.10 Typical Characteristics

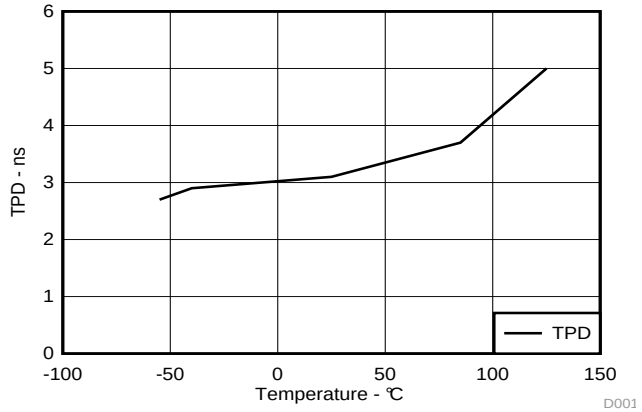


Figure 1. TPD Across Temperature at 3.3 V V_{CC}

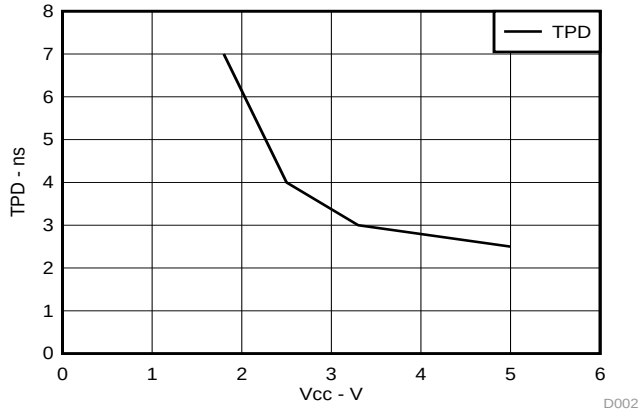
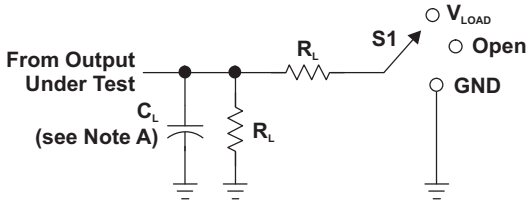


Figure 2. TPD Across V_{CC} at 25°C

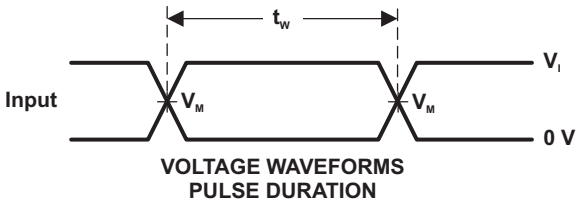
7 Parameter Measurement Information



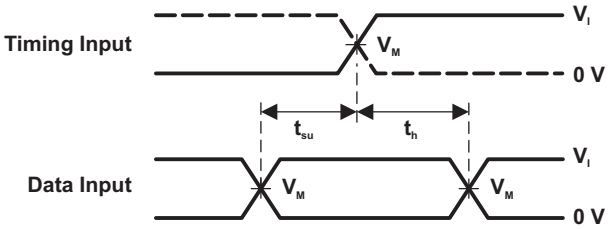
LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

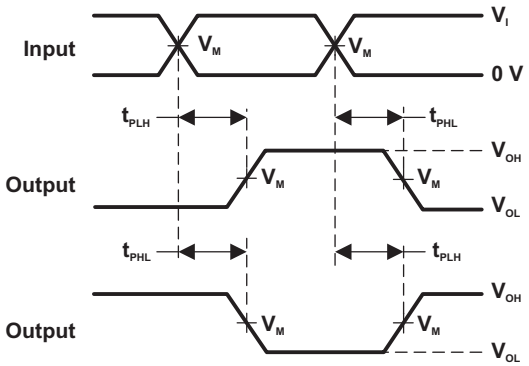
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
1.8 V ± 0.15 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	15 pF	1 MΩ	0.15 V
2.5 V ± 0.2 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	15 pF	1 MΩ	0.15 V
3.3 V ± 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	15 pF	1 MΩ	0.3 V
5 V ± 0.5 V	V_{CC}	≤2.5 ns	$V_{CC}/2$	2 × V_{CC}	15 pF	1 MΩ	0.3 V



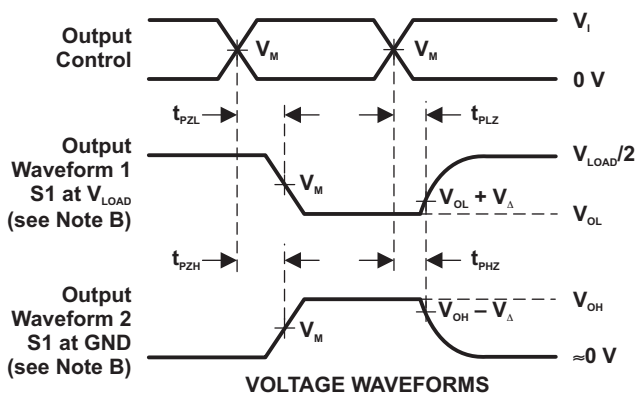
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS

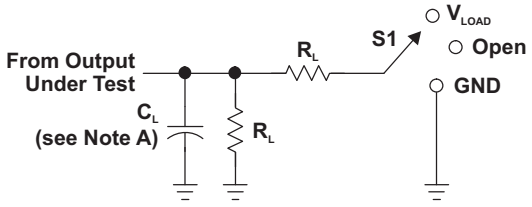


VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

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_O = 50 Ω.
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.

Figure 3. Load Circuit and Voltage Waveforms

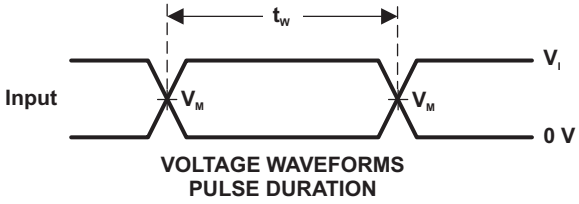
Parameter Measurement Information (continued)



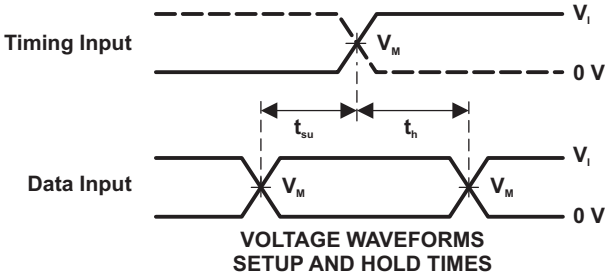
LOAD CIRCUIT

TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	V_{LOAD}
t_{PHZ}/t_{PZH}	GND

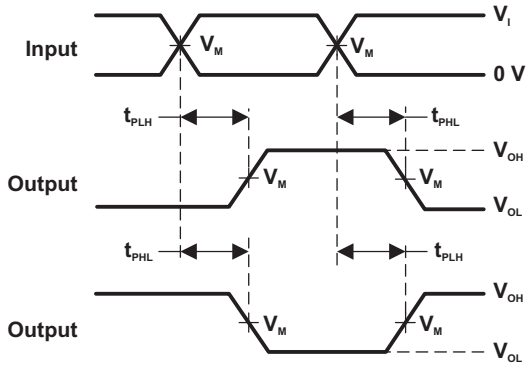
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_Δ
	V_I	t_r/t_f					
1.8 V ± 0.15 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	30 pF	1 kΩ	0.15 V
2.5 V ± 0.2 V	V_{CC}	≤2 ns	$V_{CC}/2$	2 × V_{CC}	30 pF	500 Ω	0.15 V
3.3 V ± 0.3 V	3 V	≤2.5 ns	1.5 V	6 V	50 pF	500 Ω	0.3 V
5 V ± 0.5 V	V_{CC}	≤2.5 ns	$V_{CC}/2$	2 × V_{CC}	50 pF	500 Ω	0.3 V



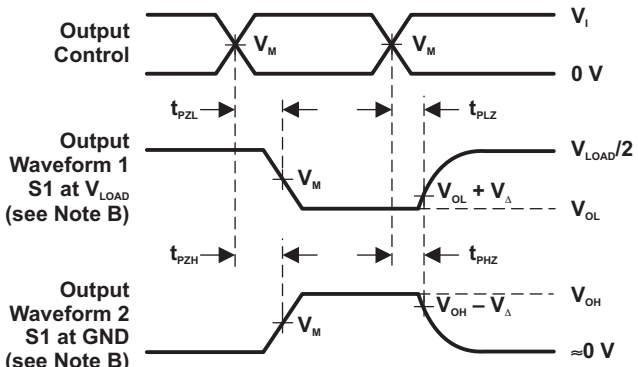
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

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_O = 50 Ω.
D. The outputs are measured one at a time, with one transition per measurement.
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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.

Figure 4. Load Circuit and Voltage Waveforms

8 Detailed Description

8.1 Overview

The SN74LVC1G32-Q1 device contains one 2-input positive OR gate device and performs the Boolean function $Y = A + B$ or $Y = \overline{\overline{A} \bullet \overline{B}}$ 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.

8.2 Functional Block Diagram

8.3 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.

8.4 Device Functional Modes

Table 1. Function Table

INPUTS		OUTPUT
A	B	Y
H	X	H
X	H	H
L	L	L

9 Application and Implementation

NOTE

Information in the following applications sections is not part of the TI component specification, and TI does not warrant its accuracy or completeness. TI's customers are responsible for determining suitability of components for their purposes. Customers should validate and test their design implementation to confirm system functionality.

9.1 Application Information

The SN74LVC1G32-Q1 device is a high drive CMOS device that can be used for implementing OR 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 translation down to V_{CC}.

9.2 Typical Application

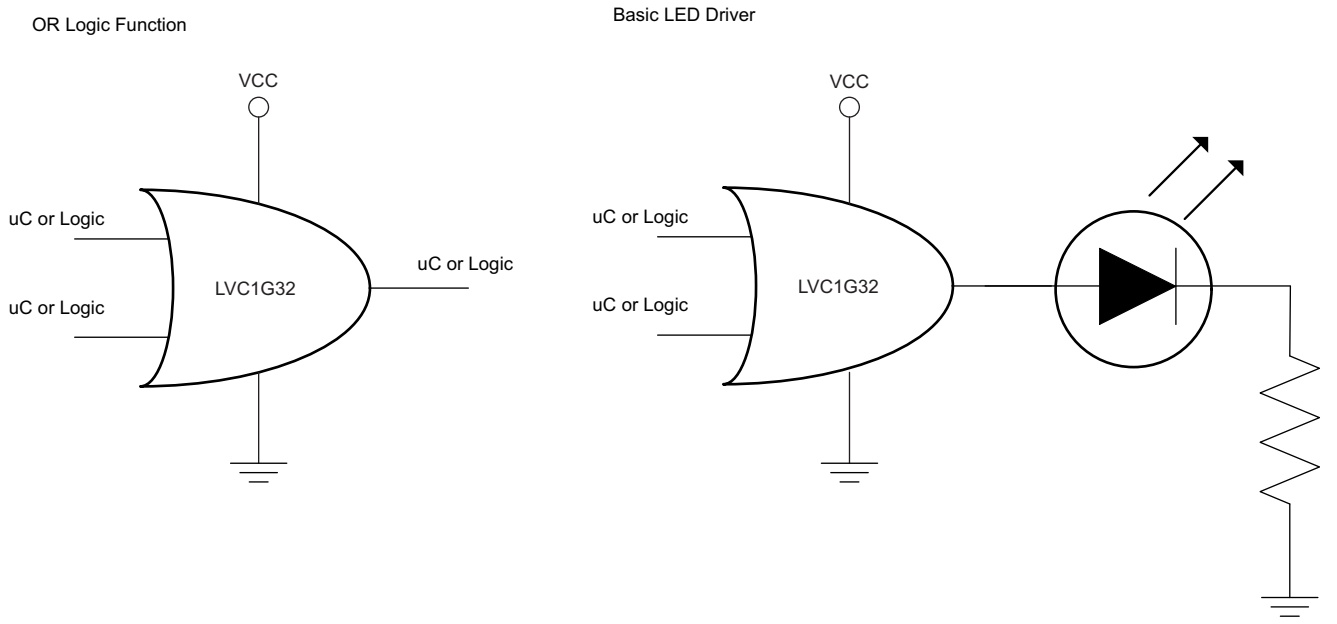


Figure 5. Typical Application Schematic

9.2.1 Design Requirements

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.

9.2.2 Detailed Design Procedure

1. Recommended Input Conditions:
   - Rise time and fall time specs. See ($\Delta t/\Delta V$) in the *Recommended Operating Conditions* table.
   - Specified high and low levels. See (V_{IH} and V_{IL}) in the *Recommended Operating Conditions* table.
   - Inputs are overvoltage tolerant allowing them to go as high as (V_I max) in the *Recommended Operating Conditions* table at any valid V_{CC}.
2. Recommend Output Conditions:
   - Load currents should not exceed (I_O max) per output and should not exceed total current (continuous current through V_{CC} or GND) for the part. These limits are located in the *Absolute Maximum Ratings* table.

Typical Application (continued)

– Outputs should not be pulled above V_{CC}.

9.2.3 Application Curves

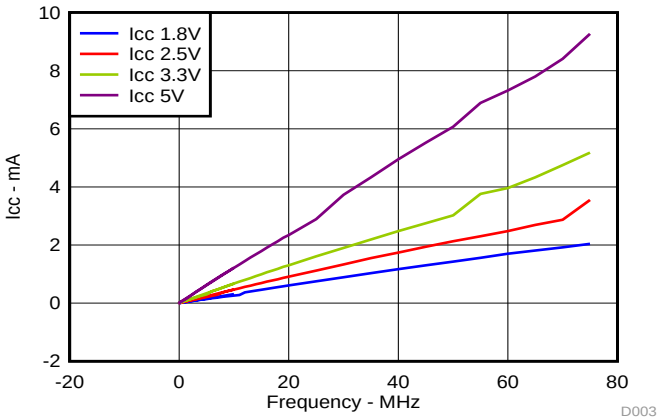


Figure 6. I_{CC} vs Frequency

10 Power Supply Recommendations

The power supply can be any voltage between the min and max supply voltage rating located in the *Recommended Operating Conditions* table.

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

11 Layout

11.1 Layout Guidelines

When using multiple bit logic devices inputs should not ever float.

In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used, or only 3 of the 4 buffer gates are used. Such input pins should not be left unconnected because the undefined voltages at the outside connections result in undefined operational states.

Specified in Layout Example are the rules that must be observed under all circumstances. All unused inputs of digital logic devices must be connected to a high or low bias to prevent them from floating. The logic level that should be applied to any particular unused input depends on the function of the device. Generally they will be tied to GND or VCC, whichever make more sense or is more convenient.

11.2 Layout Example

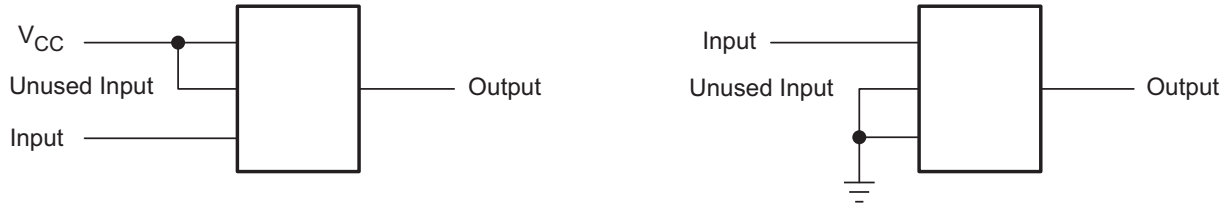


Figure 7. Layout Example

12 Device and Documentation Support

12.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on ti.com. In the upper right corner, click on *Alert me* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

12.2 Community Resources

The following links connect to TI community resources. Linked contents are provided "AS IS" by the respective contributors. They do not constitute TI specifications and do not necessarily reflect TI's views; see TI's Terms of Use.

TI E2E™ Online Community ***TI's Engineer-to-Engineer (E2E) Community.*** Created to foster collaboration among engineers. At e2e.ti.com, you can ask questions, share knowledge, explore ideas and help solve problems with fellow engineers.

Design Support ***TI's Design Support*** Quickly find helpful E2E forums along with design support tools and contact information for technical support.

12.3 Trademarks

E2E is a trademark of Texas Instruments.
All other trademarks are the property of their respective owners.

12.4 Electrostatic Discharge Caution

These devices have limited built-in ESD protection. The leads should be shorted together or the device placed in conductive foam during storage or handling to prevent electrostatic damage to the MOS gates.

12.5 Glossary

SLYZ022 — *TI Glossary*.

This glossary lists and explains terms, acronyms, and definitions.

13 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead/Ball Finish (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74LVC1G32QDBVRQ1	ACTIVE	SOT-23	DBV	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	C32O	Samples
SN74LVC1G32QDCKRQ1	ACTIVE	SC70	DCK	5	3000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 125	CGO	Samples
SN74LVC1G32QDRYRQ1	PREVIEW	SON	DRY	6	5000	TBD	Call TI	Call TI	-40 to 125		

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

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

(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead/Ball Finish - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead/Ball Finish values may wrap to two lines if the finish value exceeds the maximum column width.

OTHER QUALIFIED VERSIONS OF SN74LVC1G32-Q1 :

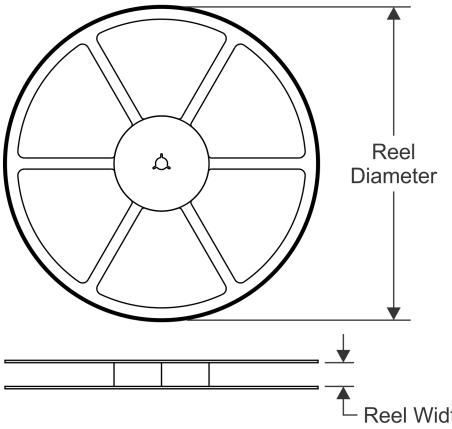
- Catalog: SN74LVC1G32
- Enhanced Product: SN74LVC1G32-EP

NOTE: Qualified Version Definitions:

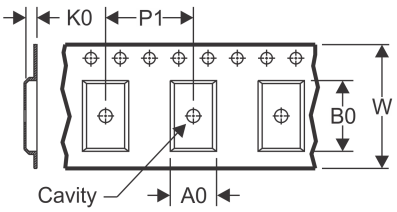
- Catalog - TI's standard catalog product
- Enhanced Product - Supports Defense, Aerospace and Medical Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

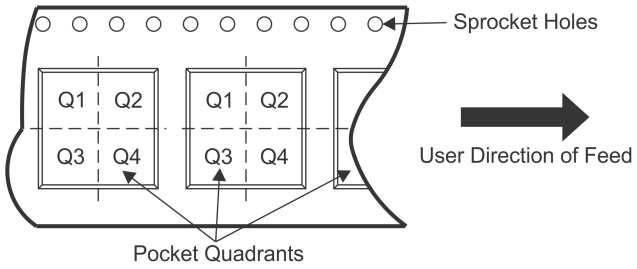


TAPE DIMENSIONS



A0	Dimension designed to accommodate the component width
B0	Dimension designed to accommodate the component length
K0	Dimension designed to accommodate the component thickness
W	Overall width of the carrier tape
P1	Pitch between successive cavity centers

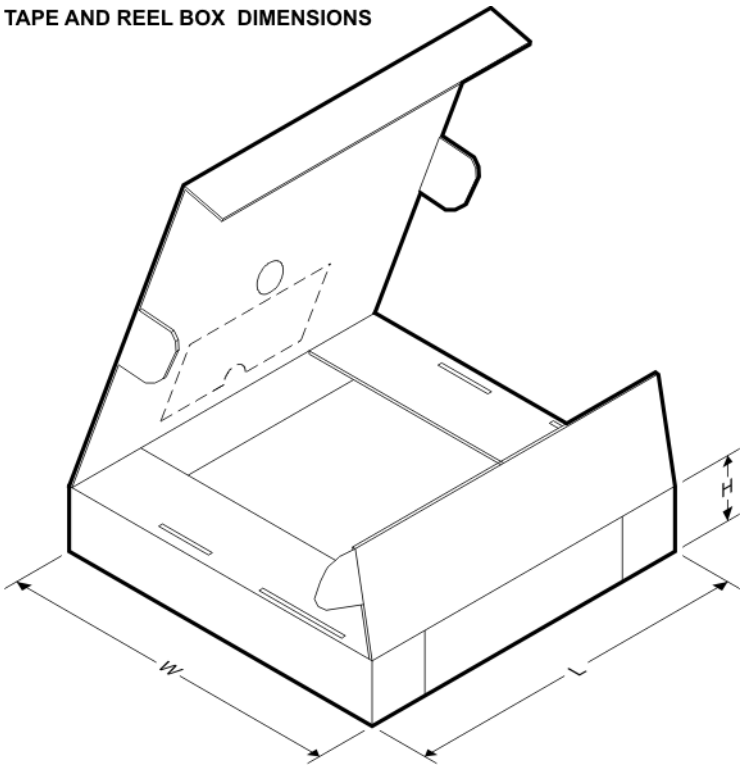
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74LVC1G32QDBVRQ1	SOT-23	DBV	5	3000	179.0	8.4	3.2	3.2	1.4	4.0	8.0	Q3
SN74LVC1G32QDCKRQ1	SC70	DCK	5	3000	179.0	8.4	2.2	2.5	1.2	4.0	8.0	Q3

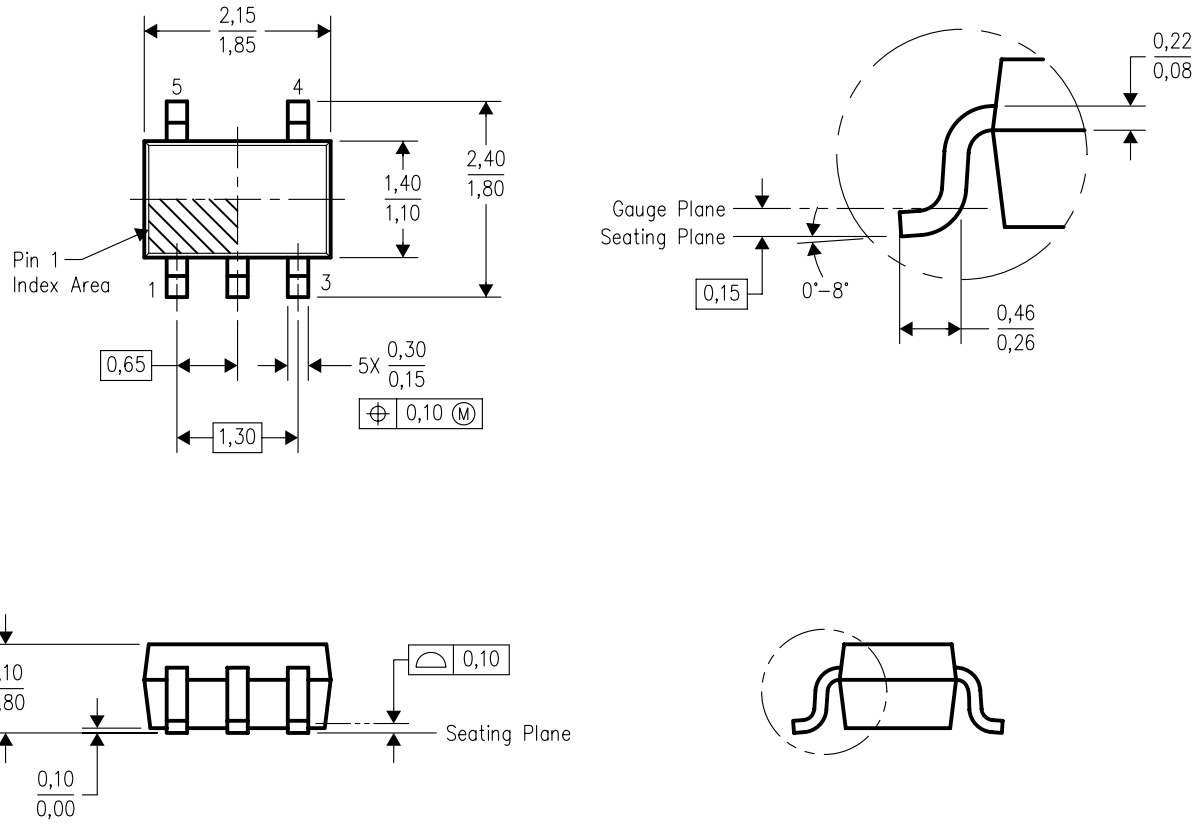
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC1G32QDBVRQ1	SOT-23	DBV	5	3000	203.0	203.0	35.0
SN74LVC1G32QDCKRQ1	SC70	DCK	5	3000	203.0	203.0	35.0

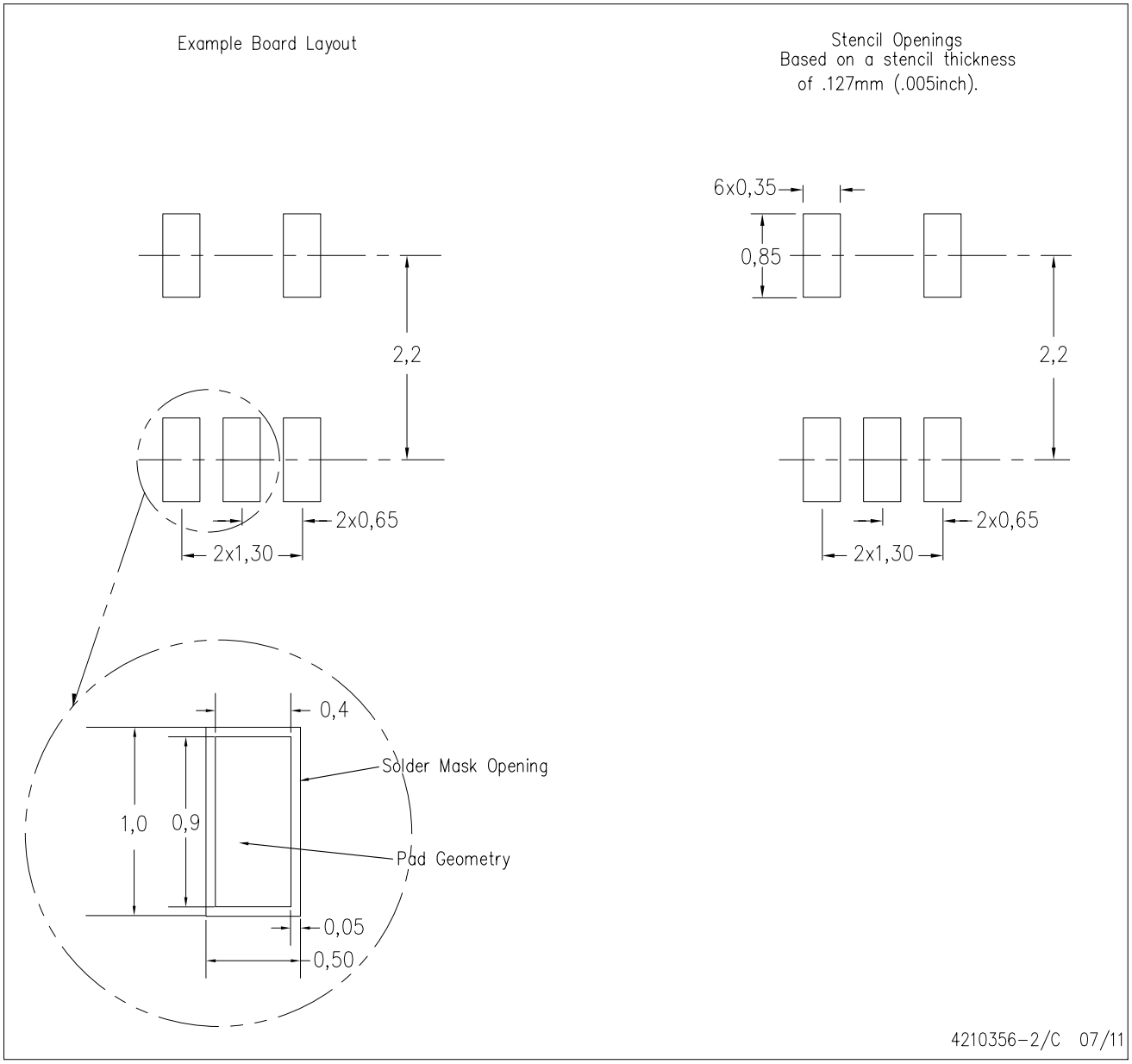
DCK (R–PDSO–G5) PLASTIC SMALL–OUTLINE PACKAGE



4093553–3/G 01/2007

NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.15 per side.
D. Falls within JEDEC MO–203 variation AA.

DCK (R–PDSO–G5) PLASTIC SMALL OUTLINE



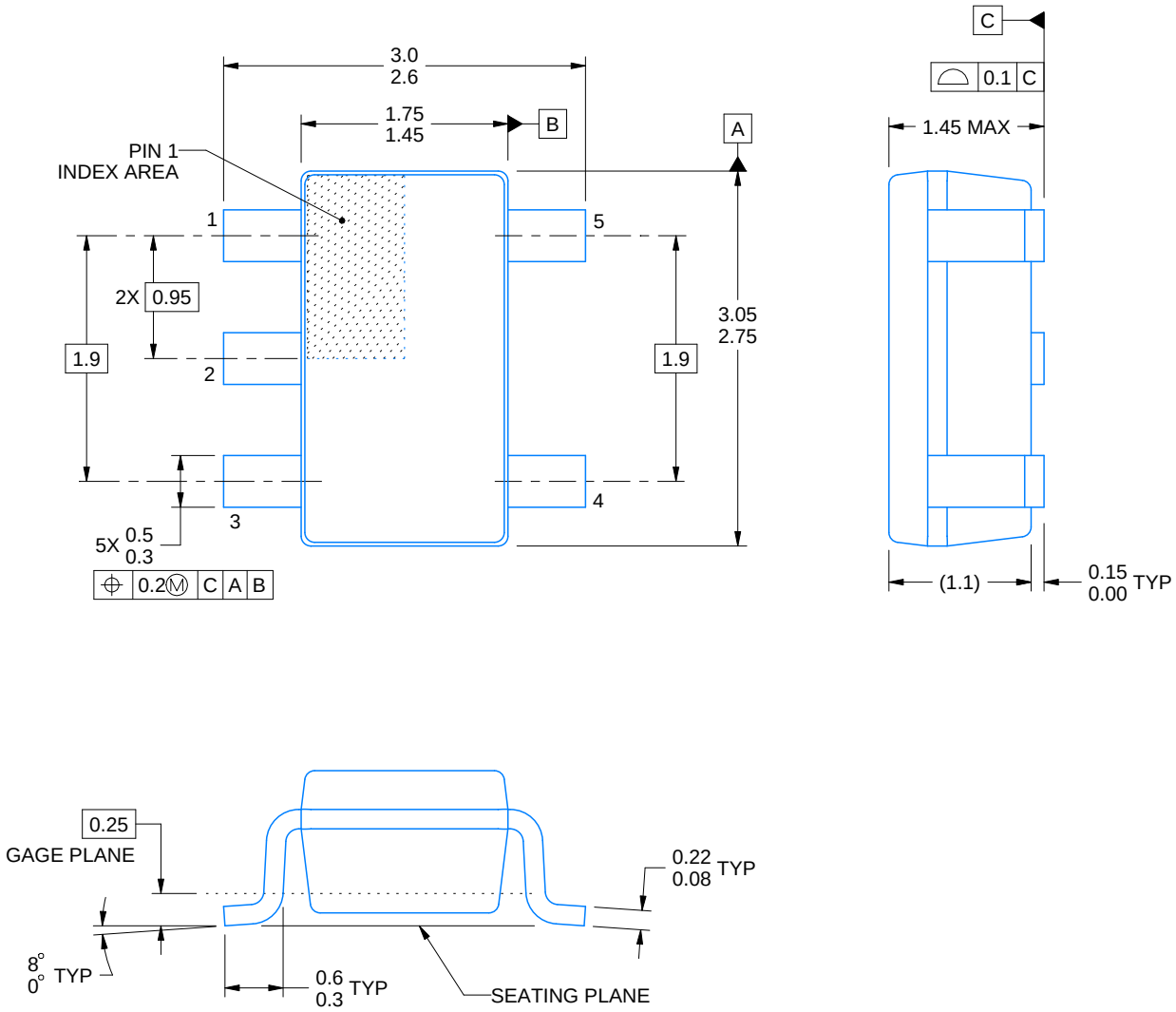
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Customers should place a note on the circuit board fabrication drawing not to alter the center solder mask defined pad.
D. Publication IPC–7351 is recommended for alternate designs.
E. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Example stencil design based on a 50% volumetric metal load solder paste. Refer to IPC–7525 for other stencil recommendations.

PACKAGE OUTLINE

DBV0005A

SOT-23 - 1.45 mm max height

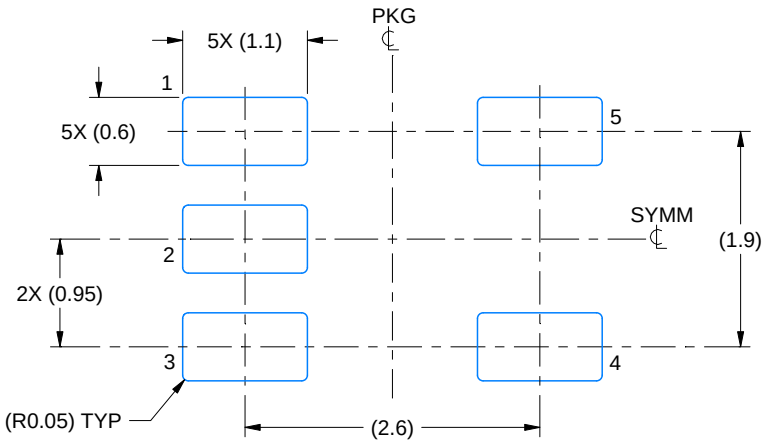
SMALL OUTLINE TRANSISTOR



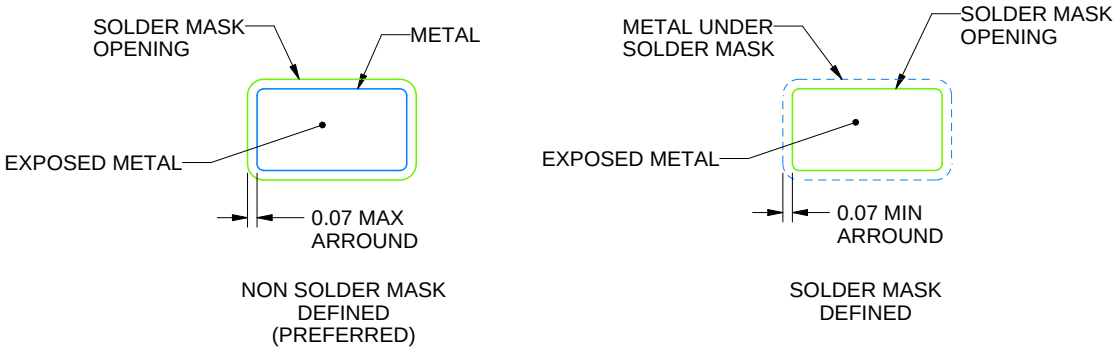
4214839/D 11/2018

NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Refernce JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

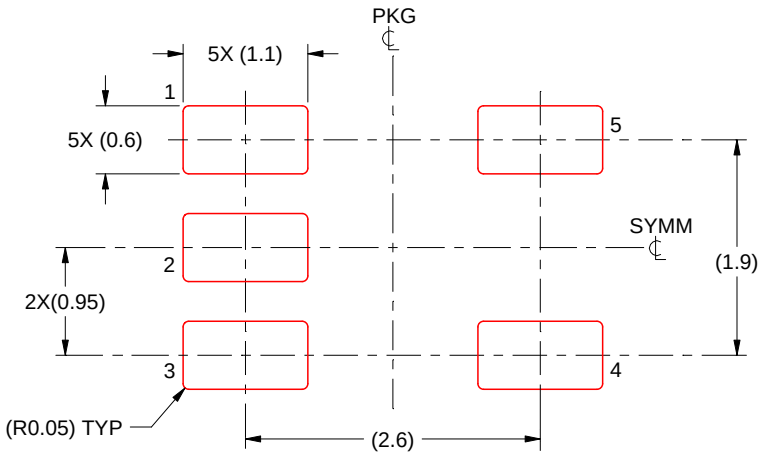


SOLDER MASK DETAILS

4214839/D 11/2018

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4214839/D 11/2018

NOTES: (continued)

7. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
8. Board assembly site may have different recommendations for stencil design.

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