

单路 3 输入正或与门

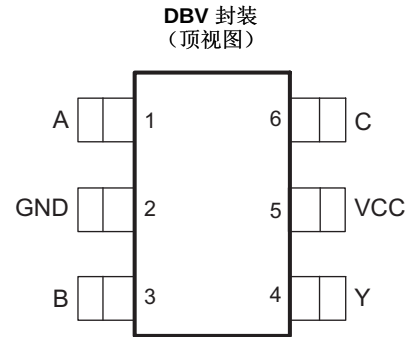
查询样品: [SN74LVC1G3208-EP](#)

特性

- 支持 **5V V_{CC}** 运行
- 输入接受的电压达到高达 **5.5V**
- 电压为 **3.3V** 时, 最大 **t_{pd}** 为 **5ns**
- 低功耗, 最大 **I_{CC}** 为 **12.5μA**
- 电压为 **3.3V** 时, 输出驱动为 **±24mA**
- 输入滞后可实现输入
(电压为 **3.3V** 时, **V_{滞后}** = **250mV** (典型值)) 上的
缓输入转换和更好的开关噪声抗扰度
- 可被用于三个组合:
 - 与或门
 - 或门
 - 与门
- **I_{关闭}** 支持部分断电模式运行

支持国防、航空航天、和医疗应用

- 受控基线
- 一个组装和测试场所
- 一个制造场所
- 军用 (**-55°C** 至 **125°C**) 温度范围内可用 ⁽¹⁾
- 延长的产品生命周期
- 延长的产品变更通知
- 产品可追溯性



(1) 可定制工作温度范围

说明/订购信息

该器件可设计用于 1.65V 至 5.5V V_{CC} 运行。

SN74LVC1G3208 是一款单路 3 输入正或与门。它在正逻辑中执行布尔函数 $Y = (A + B) \cdot C$ 。

通过将输入接地或接至 V_{CC}, SN74LVC1G3208 提供额外的两个功能。当 C 被接至 V_{CC} 时, 这个器件执行为一个 2 输入或门 ($Y = A + B$)。当 A 接地时, 此器件运行为一个 2 输入与门 ($Y = B \cdot C$)。当 B 接地时, 这个器件也运行为一个 2 输入与门 ($Y = A \cdot C$)。

该器件完全符合使用 I_{关闭} 的部分断电应用的规范要求。I_{关闭} 电路禁用输出, 从而可防止其断电时破坏性电流从该器件回流。

Table 1. ORDERING INFORMATION ⁽¹⁾

T _A	PACKAGE		ORDERABLE PART NUMBER	TOP-SIDE MARKING	VID NUMBER
-55°C to 125°C	SOT (SOT-23) – DBV	Reel of 250	74LVC1G3208MDBVTEP	CDD5M	V62/13605-01XE

(1) For the most current package and ordering information, see the Package Option Addendum at the end of this document, or see the TI website at [www.ti.com](#).

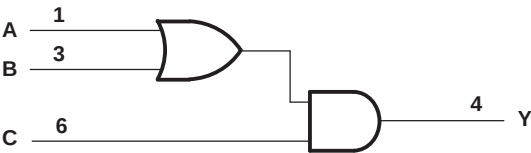

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

FUNCTION TABLE⁽¹⁾

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

(1) X = Valid H or L

LOGIC DIAGRAM (POSITIVE LOGIC)



FUNCTION SELECTION TABLE

LOGIC FUNCTION	FIGURE
2-Input AND Gate	1
2-Input OR Gate	2
$Y = (A + B) \cdot C$	3

LOGIC CONFIGURATIONS

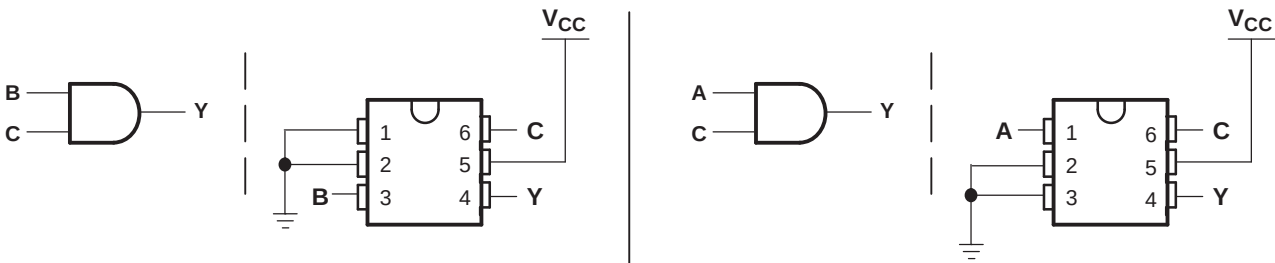


Figure 1. 2-Input AND Gate

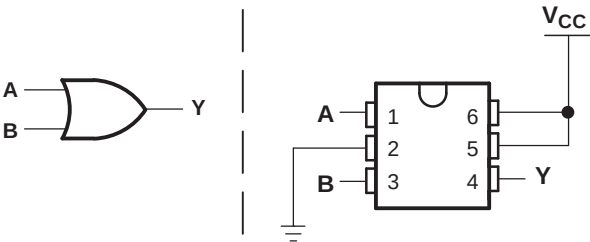


Figure 2. 2-Input OR Gate



Figure 3. $Y = (A + B) \cdot C$

Absolute Maximum Ratings⁽¹⁾

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

	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_{stg} Storage temperature range	-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 negative-voltage and output 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.

THERMAL INFORMATION

THERMAL METRIC ⁽¹⁾		SN74LVC1G3208	UNITS
		DBV	
		6 PINS	
θ_{JA}	Junction-to-ambient thermal resistance ⁽²⁾	207	°C/W
θ_{JCTop}	Junction-to-case (top) thermal resistance ⁽³⁾	148.1	
θ_{JB}	Junction-to-board thermal resistance ⁽⁴⁾	50.6	
ψ_{JT}	Junction-to-top characterization parameter ⁽⁵⁾	41.2	
ψ_{JB}	Junction-to-board characterization parameter ⁽⁶⁾	50.1	
θ_{JCbott}	Junction-to-case (bottom) thermal resistance ⁽⁷⁾	N/A	

- (1) 有关传统和新的热 度量的更多信息，请参阅IC 封装热度量应用报告，[SPRA953](#)。
- (2) 在 JESD51-2a 描述的环境中，按照 JESD51-7 的指定，在一个 JEDEC 标准高 K 电路板上进行仿真，从而获得自然 对流条件下的结至环境热阻。
- (3) 通过在封装顶部模拟一个冷板测试来获得结至芯片外壳（顶部）的热阻。不存在特定的 JEDEC 标准测试，但 可在 ANSI SEMI 标准 G30-88 中找到内容接近的说明。
- (4) 按照 JESD51-8 中的说明，通过 在配有用于控制 PCB 温度的环形冷板夹具的环境中进行仿真，以获得结板热阻。
- (5) 结至顶部特征参数， ψ_{JT} ，估算真实系统中器件的结温，并使用 JESD51-2a（第 6 章和第 7 章）中 描述的 程序从仿真数据中 提取出该参数以便获得 θ_{JA} 。
- (6) 结至电路板特征参数， ψ_{JB} ，估算真实系统中器件的结温，并使用 JESD51-2a（第 6 章和第 7 章）中 描述的 程序从仿真数据中 提取出该参数以便获得 θ_{JA} 。
- (7) 通过在外露（电源）焊盘上进行冷板测试仿真来获得 结至芯片外壳（底部）热阻。不存在特定的 JEDEC 标准 测试，但可在 ANSI SEMI 标准 G30-88 中找到内容接近的说明。

Recommended Operating Conditions⁽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		1.4	
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	
Δt/Δv	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		–55	125	°C

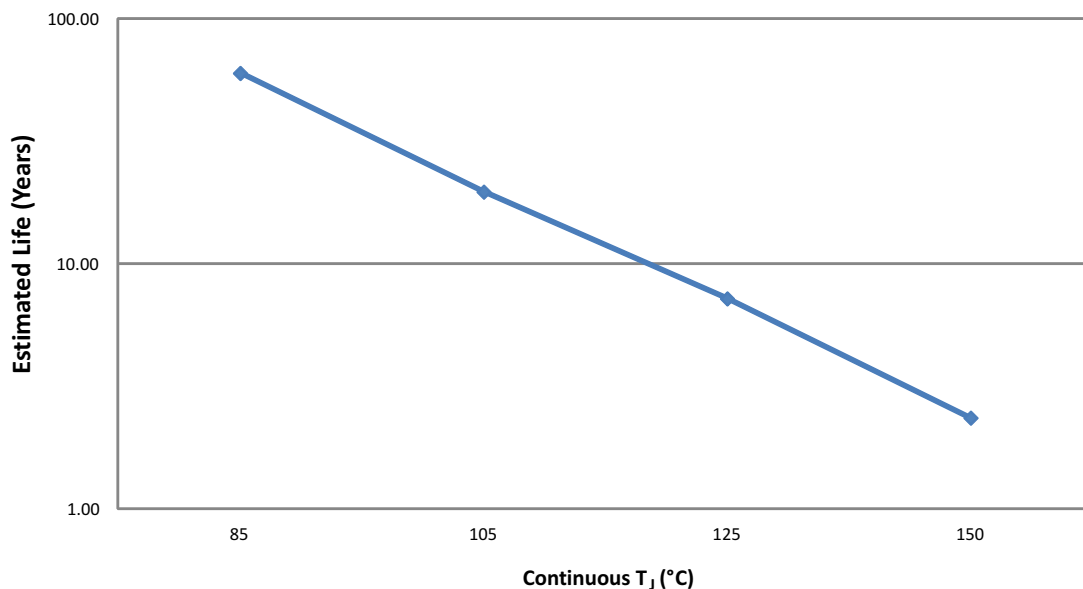
(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

Electrical Characteristics

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

PARAMETER		TEST CONDITIONS	V _{CC}	MIN	TYP ⁽¹⁾	MAX	UNIT
V _{OH}		I _{OH} = –100 µA	1.65 V to 5.5 V	V _{CC} – 0.1			V
		I _{OH} = –4 mA	1.65 V	1.2			
		I _{OH} = –8 mA	2.3 V	1.9			
		I _{OH} = –16 mA	3 V	2.4			
		I _{OH} = –24 mA		2.3			
		I _{OH} = –32 mA	4.5 V	3.8			
V _{OL}		I _{OL} = 100 µA	1.65 V to 5.5 V	0.11			V
		I _{OL} = 4 mA	1.65 V	0.52			
		I _{OL} = 8 mA	2.3 V	0.45			
		I _{OL} = 16 mA	3 V	0.68			
		I _{OL} = 24 mA		1.1			
		I _{OL} = 32 mA	4.5 V	1.1			
I _I	A, B, or C inputs	V _I = 5.5 V or GND	0 to 5.5 V	–12.05		8.6	µA
I _{off}		V _I or V _O = 5.5 V	0	–22		41.5	µA
I _{CC}		V _I = 5.5 V or GND I _O = 0	1.65 V to 5.5 V			12.5	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	µA
C _i		V _I = V _{CC} or GND	3.3 V	3.5			pF

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



- (1) See datasheet for absolute maximum and minimum recommended operating conditions.
- (2) Silicon operating life design goal is 10 years at 105°C junction temperature (does not include package interconnect life).
- (3) Enhanced plastic product disclaimer applies.

Figure 4. 74LVC1G3208-EP Operating Life Derating Chart

Switching Characteristics

only valid for -40°C to 85°C, $C_L = 15$ pF (unless otherwise noted) (see [Figure 5](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A, B, or C	Y	3.7	14	2.5	7	1.7	5	1.3	3.4	ns

Switching Characteristics

only valid for -40°C to 85°C, $C_L = 30$ pF or 50 pF (unless otherwise noted) (see [Figure 6](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A, B, or C	Y	2.5	17.5	1.8	7.6	1.8	5.9	1.3	4.0	ns

Switching Characteristics

over recommended operating free-air temperature range, $C_L = 50$ pF (unless otherwise noted) (see [Figure 6](#))

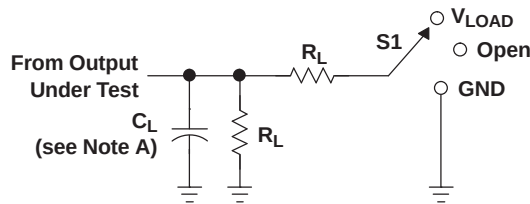
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A, B, or C	Y		17.5		7.6		5.9		4.5	ns

Operating Characteristics

$T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	$V_{CC} = 1.8\text{ V}$	$V_{CC} = 2.5\text{ V}$	$V_{CC} = 3.3\text{ V}$	$V_{CC} = 5\text{ V}$	UNIT
		TYP	TYP	TYP	TYP	
C_{pd} Power dissipation capacitance	$f = 10\text{ MHz}$	15	15	16	17	pF

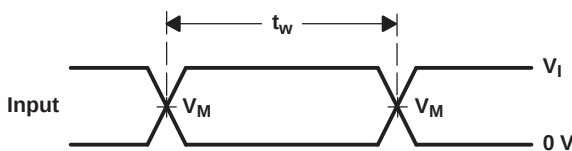
PARAMETER MEASUREMENT INFORMATION



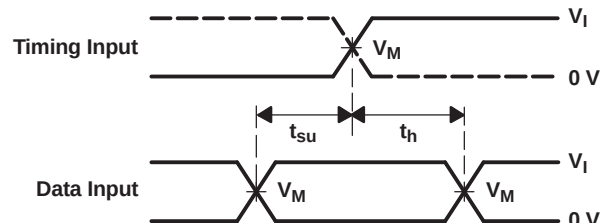
LOAD CIRCUIT

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

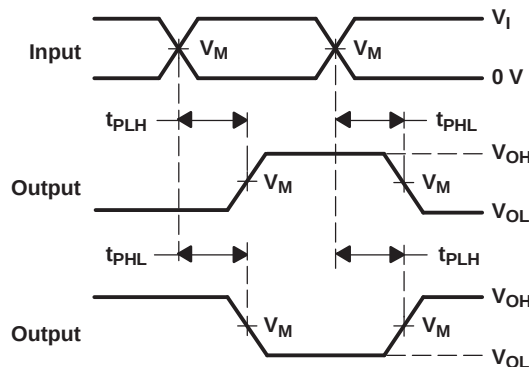
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	15 pF	1 M Ω	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	V_{CC}	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.3 V



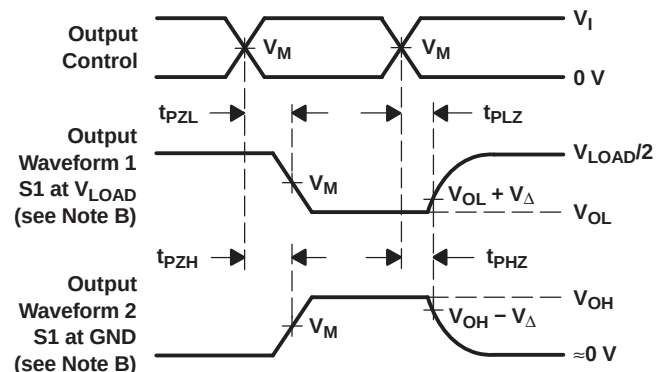
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS

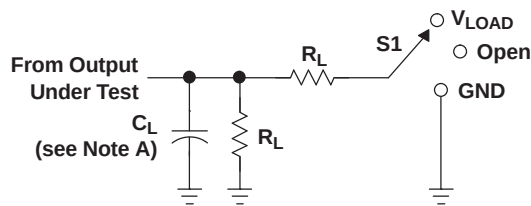


VOLTAGE WAVEFORMS
ENABLE AND DISABLE TIMES
LOW- AND HIGH-LEVEL ENABLING

- NOTES:
- C_L includes probe and jig capacitance.
 - 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.
 - All input pulses are supplied by generators having the following characteristics: PRR $\leq 10\text{ MHz}$, $Z_O = 50\text{ }\Omega$.
 - The outputs are measured one at a time, with one transition per measurement.
 - t_{PLZ} and t_{PHZ} are the same as t_{dis} .
 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .
 - All parameters and waveforms are not applicable to all devices.

Figure 5. Load Circuit and Voltage Waveforms

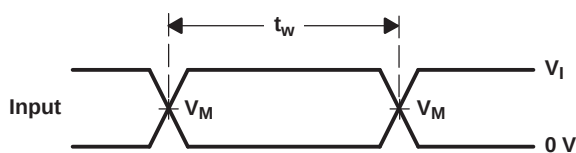
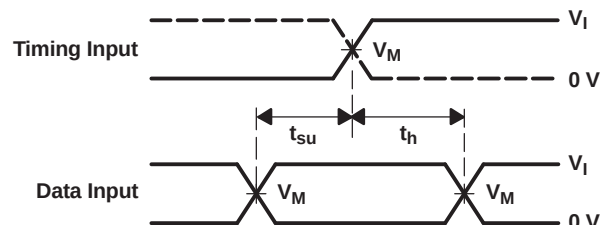
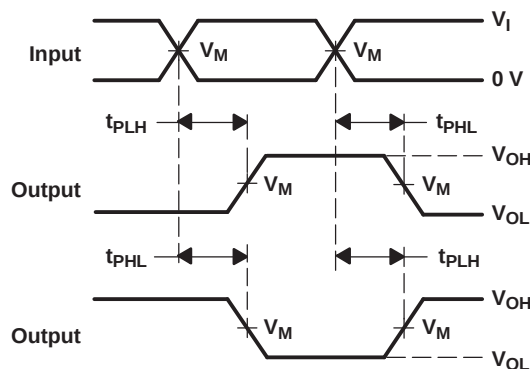
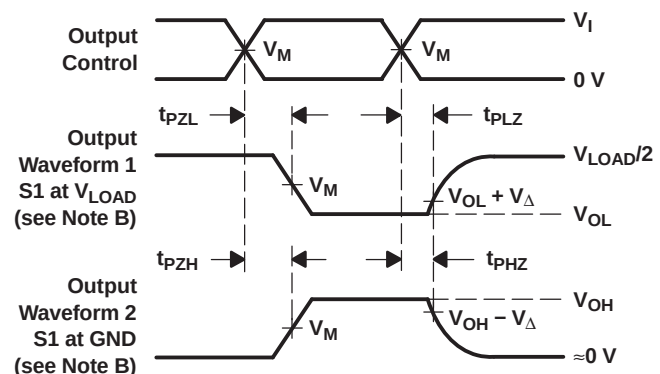
PARAMETER MEASUREMENT INFORMATION



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					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	3 V	$\leq 2.5\text{ ns}$	1.5 V	6 V	50 pF	500 Ω	0.3 V
$5\text{ V} \pm 0.5\text{ V}$	V_{CC}	$\leq 2.5\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	50 pF	500 Ω	0.3 V

VOLTAGE WAVEFORMS
PULSE DURATIONVOLTAGE WAVEFORMS
SETUP AND HOLD TIMESVOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
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 - t_{PZL} and t_{PZH} are the same as t_{en} .
 - t_{PLH} and t_{PHL} are the same as t_{pd} .
 - All parameters and waveforms are not applicable to all devices.

Figure 6. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable part number	Status (1)	Material type (2)	Package Pins	Package qty Carrier	RoHS (3)	Lead finish/ Ball material (4)	MSL rating/ Peak reflow (5)	Op temp (°C)	Part marking (6)
74LVC1G3208MDBVTEP	Active	Production	SOT-23 (DBV) 6	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CDD5M
V62/13605-01XE	Active	Production	SOT-23 (DBV) 6	250 SMALL T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CDD5M

⁽¹⁾ **Status:** For more details on status, see our [product life cycle](#).

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

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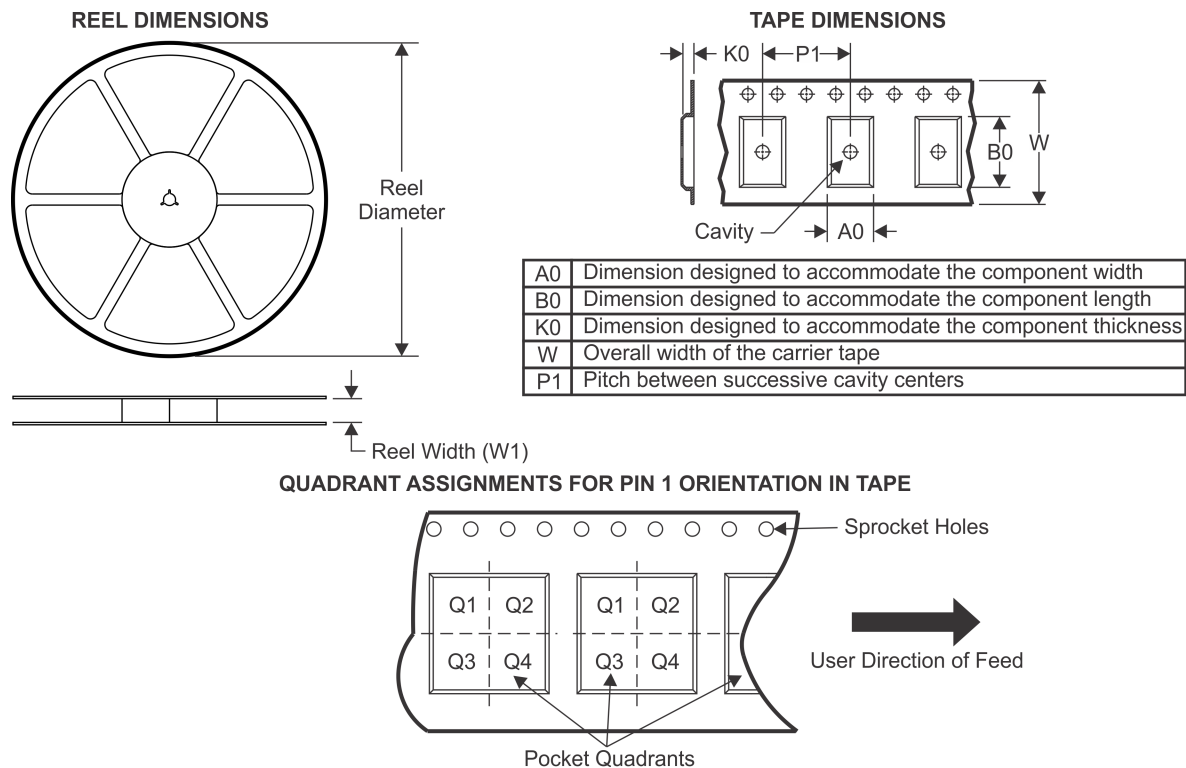
OTHER QUALIFIED VERSIONS OF SN74LVC1G3208-EP :

- Catalog : [SN74LVC1G3208](#)

- Automotive : [SN74LVC1G3208-Q1](#)

NOTE: Qualified Version Definitions:

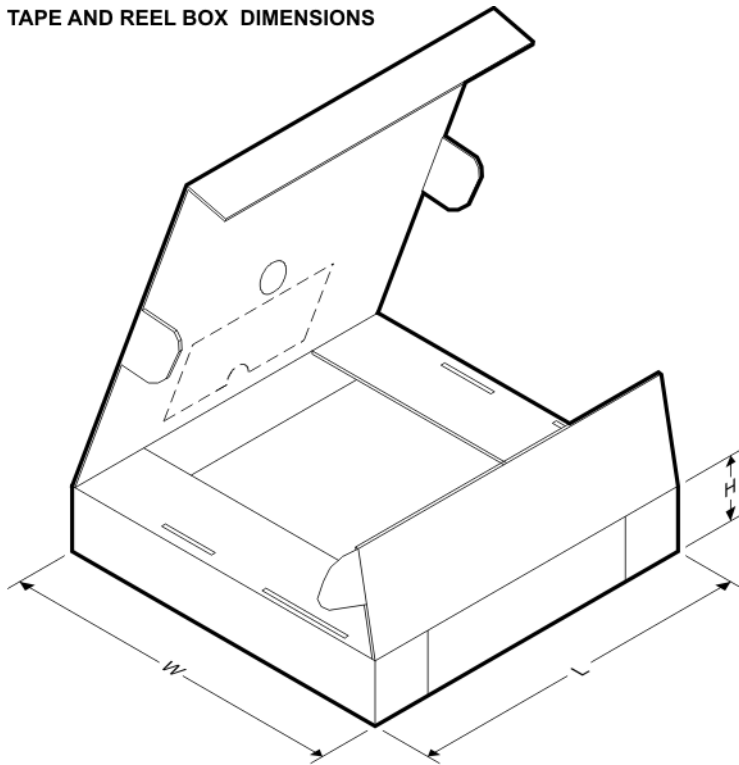
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects

TAPE AND REEL INFORMATION


*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
74LVC1G3208MDBVTEP	SOT-23	DBV	6	250	178.0	9.2	3.3	3.2	1.55	4.0	8.0	Q3

TAPE AND REEL BOX DIMENSIONS

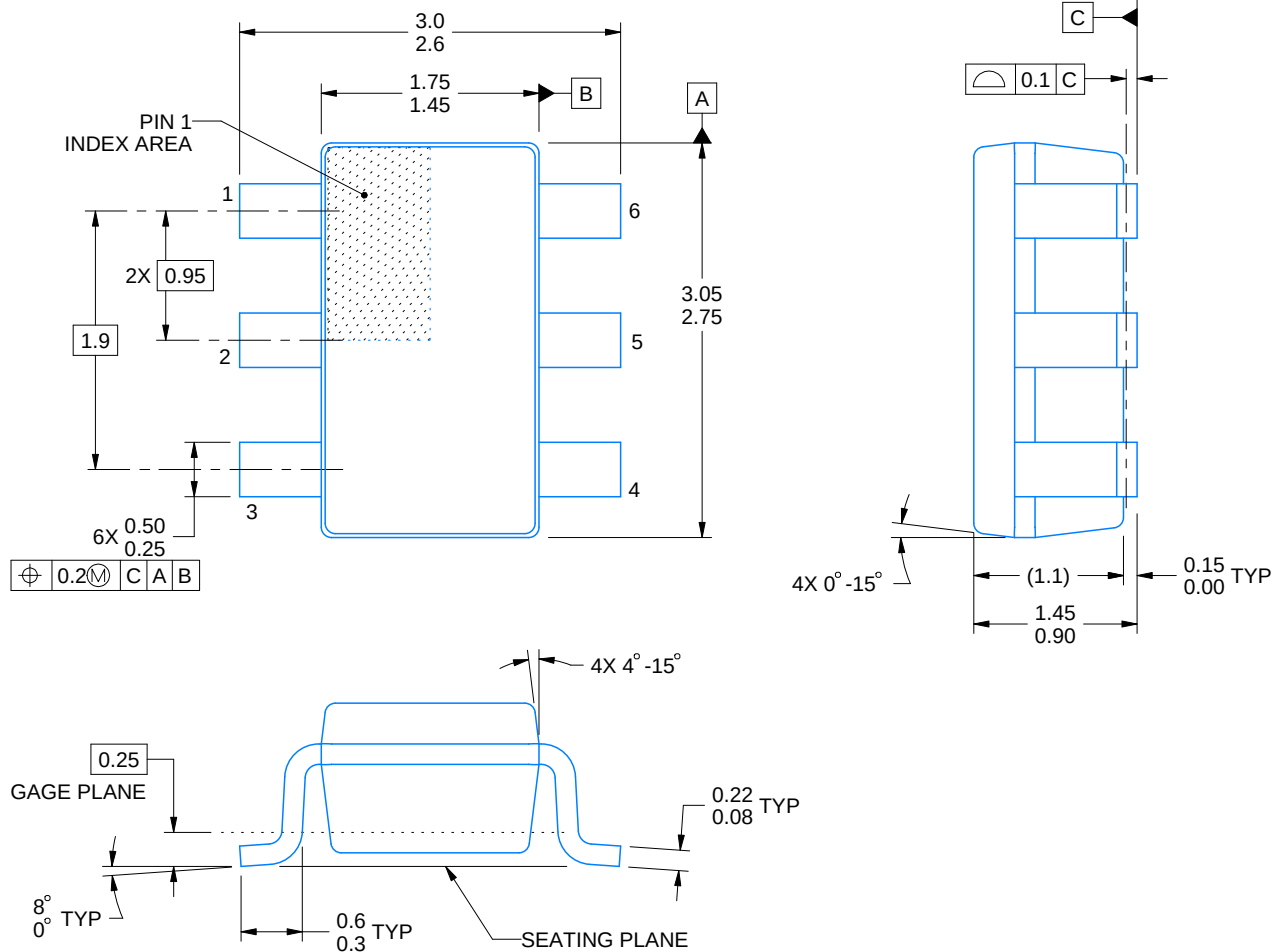


*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
74LVC1G3208MDBVTEP	SOT-23	DBV	6	250	180.0	180.0	18.0

DBV0006A**PACKAGE OUTLINE****SOT-23 - 1.45 mm max height**

SMALL OUTLINE TRANSISTOR



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NOTES:

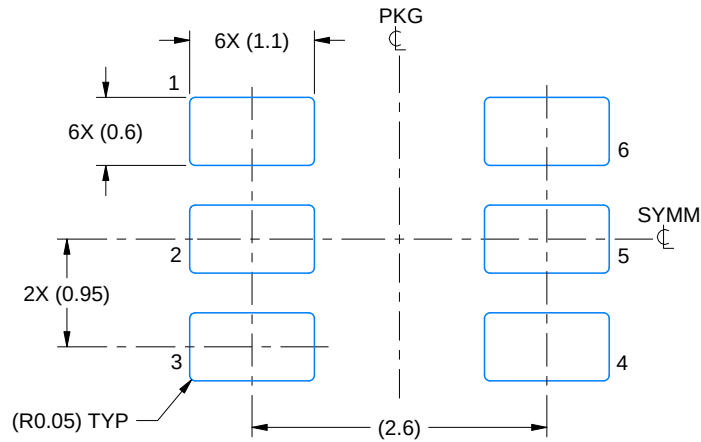
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 0.25 per side.
4. Leads 1,2,3 may be wider than leads 4,5,6 for package orientation.
5. Reference JEDEC MO-178.

EXAMPLE BOARD LAYOUT

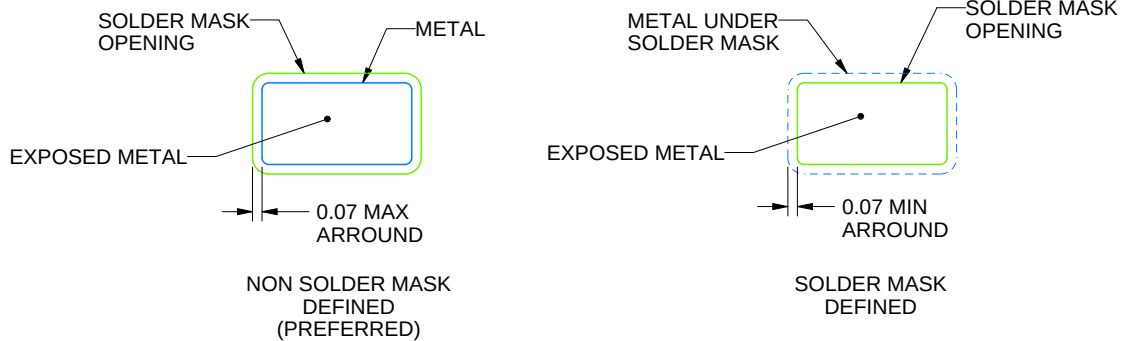
DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X



SOLDER MASK DETAILS

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NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

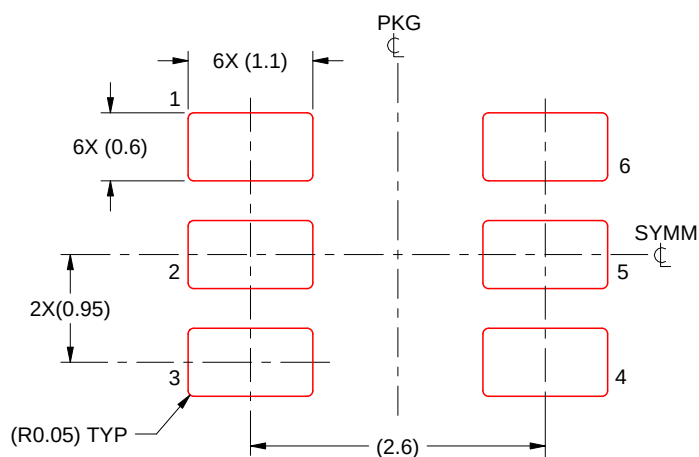
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBV0006A

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



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

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NOTES: (continued)

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

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最后更新日期：2025 年 10 月