

单路 3 输入正或与门

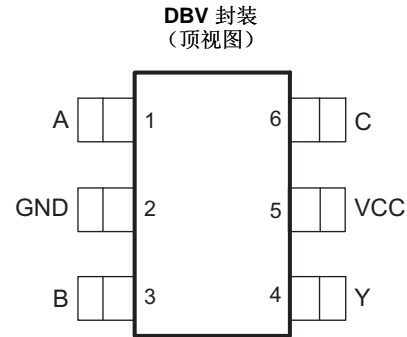
 查询样品: **SN74LVC1G3208-EP**

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 $Y = (A + B) \cdot C$ 。

 通过将一个输入接地或接至 **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.

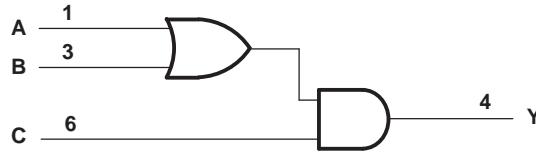

Please be aware that an important notice concerning availability, standard warranty, and use in critical applications of Texas Instruments semiconductor products and disclaimers thereto appears at the end of this data sheet.

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

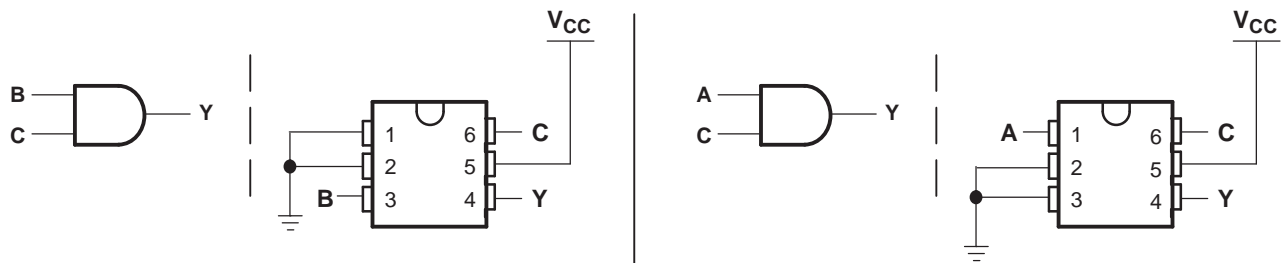


Figure 1. 2-Input AND Gate

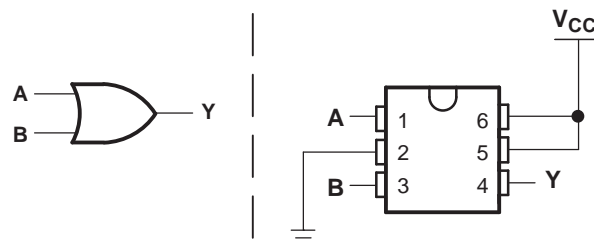


Figure 2. 2-Input OR Gate



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的更多信息，请参阅IC封装热量应用报告，[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

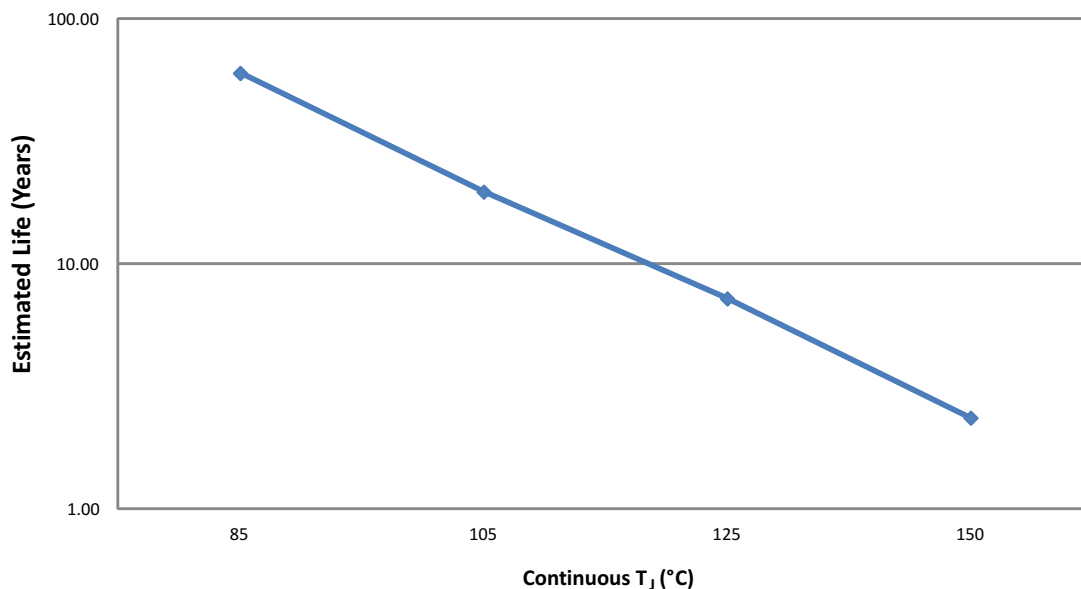
(1) All unused inputs of the device must be held at V_{CC} or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number SCBA004.

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](#))

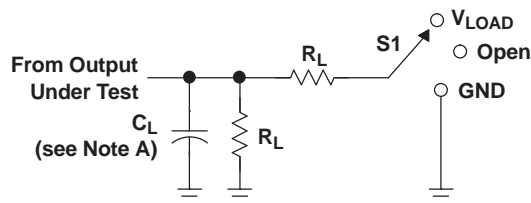
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC} = 1.8\text{ V}$ $\pm 0.15\text{ V}$		$V_{CC} = 2.5\text{ V}$ $\pm 0.2\text{ V}$		$V_{CC} = 3.3\text{ V}$ $\pm 0.3\text{ V}$		$V_{CC} = 5\text{ V}$ $\pm 0.5\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	MIN	MAX	
t_{pd}	A, B, or C	Y		17.5		7.6		5.9		4.5	ns

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

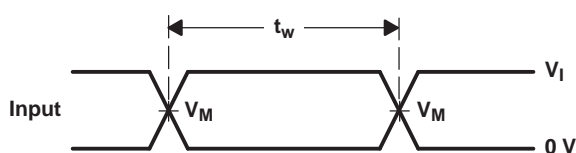
PARAMETER MEASUREMENT INFORMATION



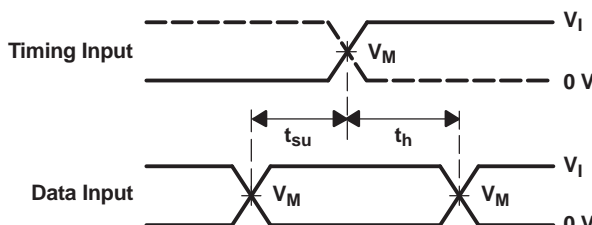
LOAD CIRCUIT

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

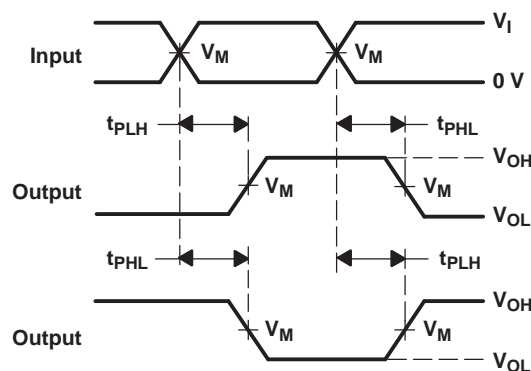
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	15 pF	1 M Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{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



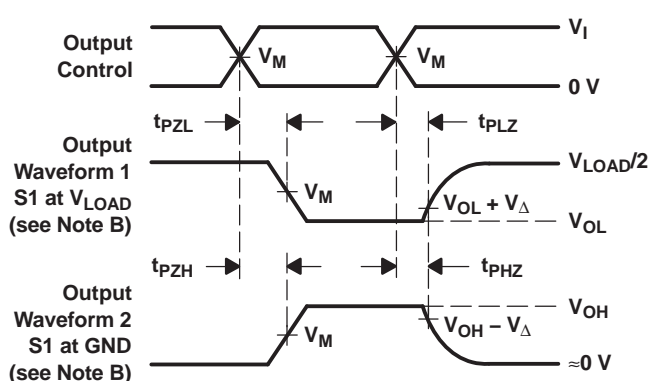
VOLTAGE WAVEFORMS PULSE DURATION



VOLTAGE WAVEFORMS SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS PROPAGATION DELAY TIMES INVERTING AND NONINVERTING OUTPUTS

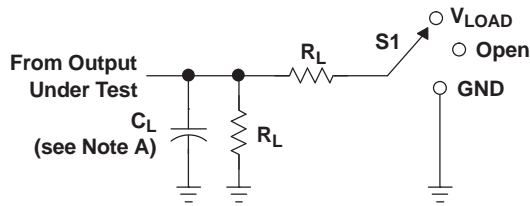


VOLTAGE WAVEFORMS ENABLE AND DISABLE TIMES LOW- AND HIGH-LEVEL ENABLING

- NOTES:
- 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 $\leq 10\text{ MHz}$, $Z_O = 50\ \Omega$.
 - 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 5. Load Circuit and Voltage Waveforms

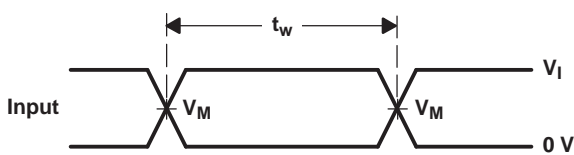
PARAMETER MEASUREMENT INFORMATION



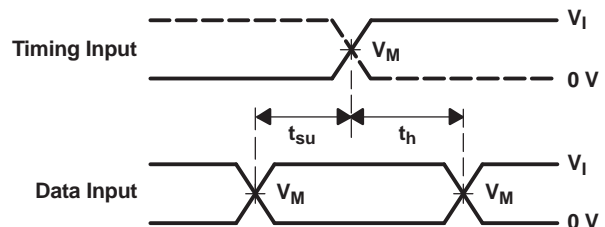
LOAD CIRCUIT

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

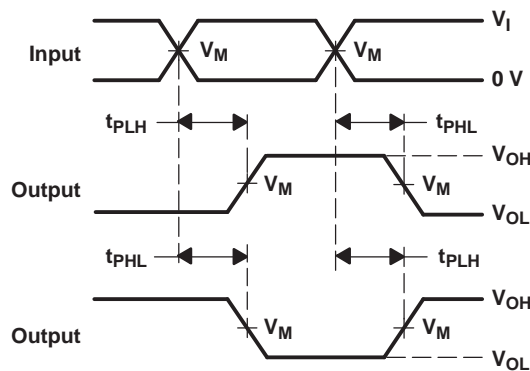
V_{CC}	INPUTS		V_M	V_{LOAD}	C_L	R_L	V_{Δ}
	V_I	t_r/t_f					
$1.8\text{ V} \pm 0.15\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	1 k Ω	0.15 V
$2.5\text{ V} \pm 0.2\text{ V}$	V_{CC}	$\leq 2\text{ ns}$	$V_{CC}/2$	$2 \times V_{CC}$	30 pF	500 Ω	0.15 V
$3.3\text{ V} \pm 0.3\text{ V}$	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



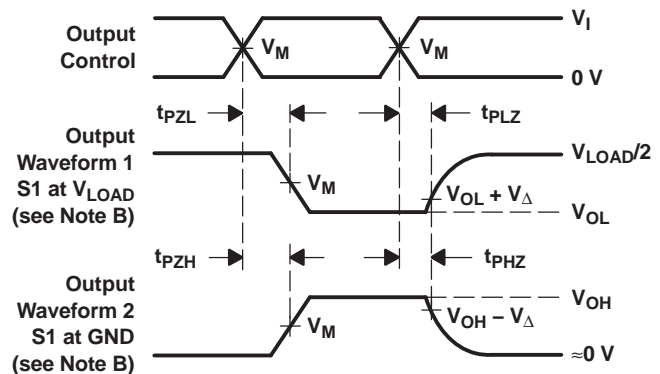
VOLTAGE WAVEFORMS PULSE DURATION



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:
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 - 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 6. Load Circuit and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
74LVC1G3208MDBVTEP	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CDD5M	Samples
V62/13605-01XE	ACTIVE	SOT-23	DBV	6	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	CDD5M	Samples

(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.

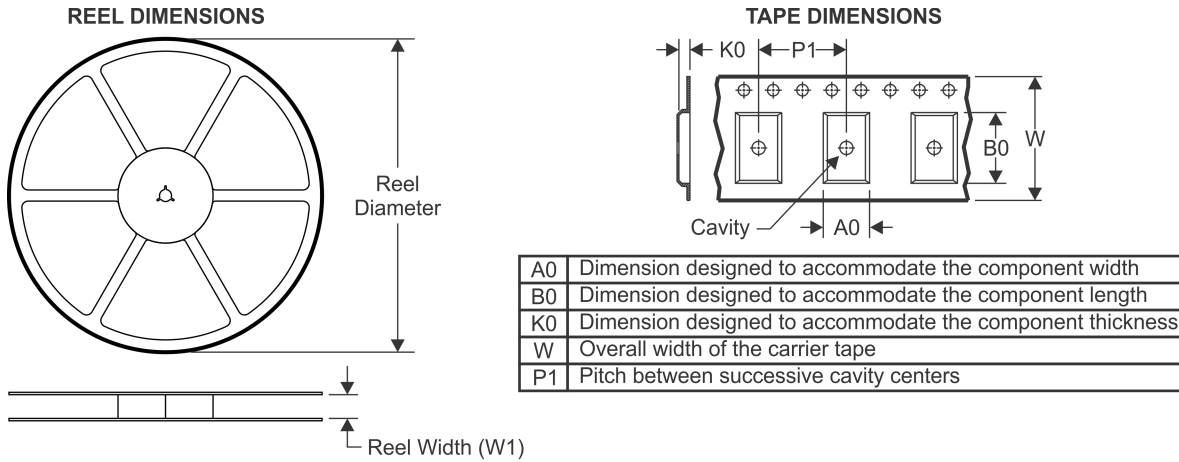
(5) Multiple Device Markings will be inside parentheses. Only one Device Marking contained in parentheses and separated by a "~" will appear on a device. If a line is indented then it is a continuation of the previous line and the two combined represent the entire Device Marking for that device.

(6) Lead finish/Ball material - Orderable Devices 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.

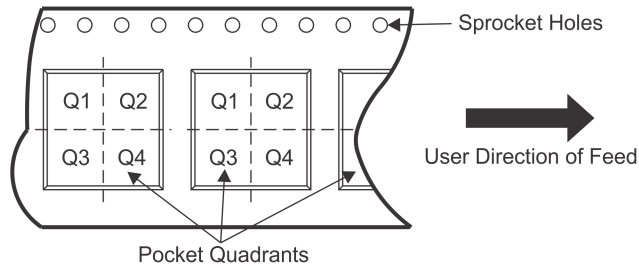
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TAPE AND REEL INFORMATION



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
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

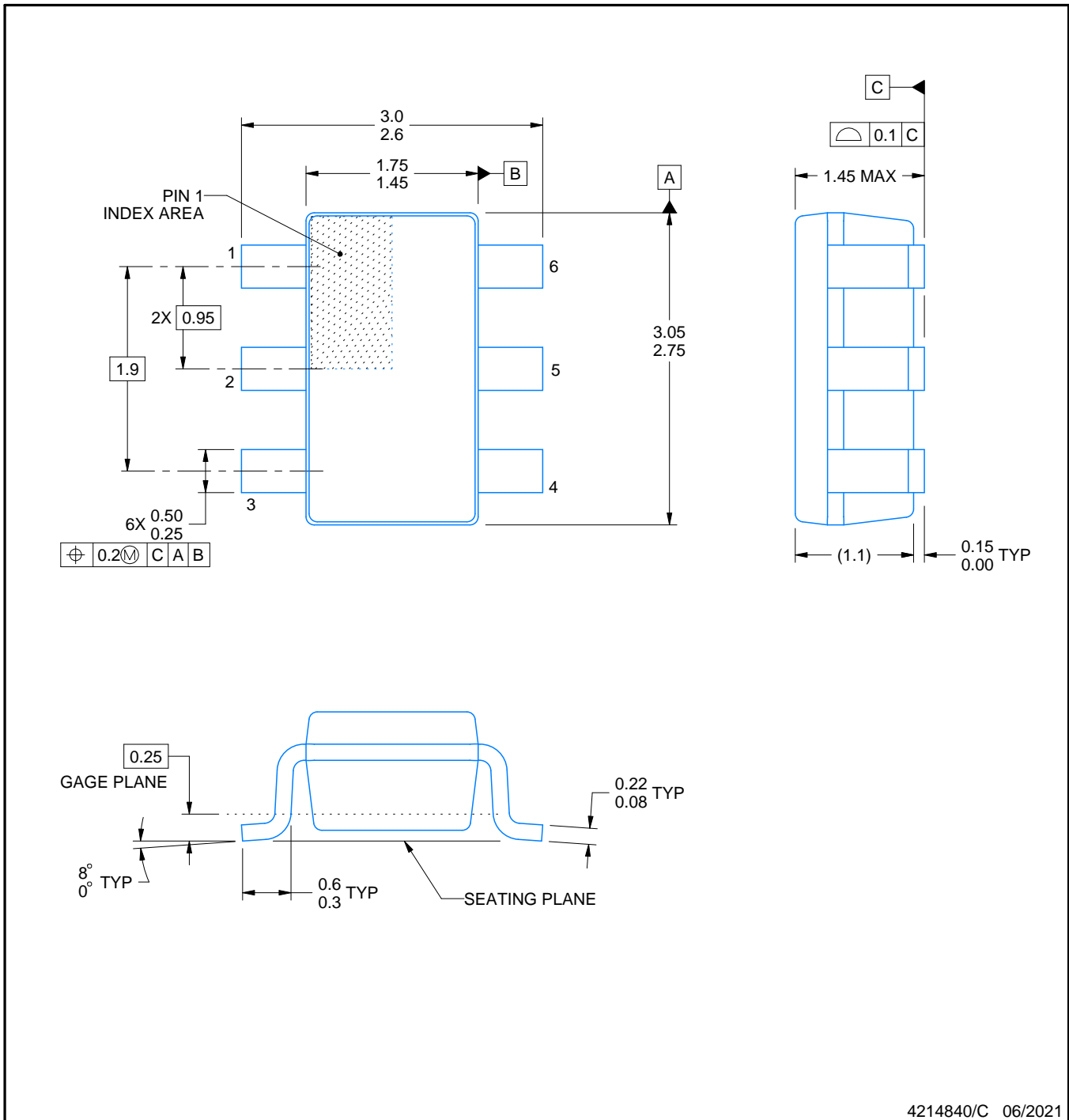
DBV0006A



PACKAGE OUTLINE

SOT-23 - 1.45 mm max height

SMALL OUTLINE TRANSISTOR



4214840/C 06/2021

NOTES:

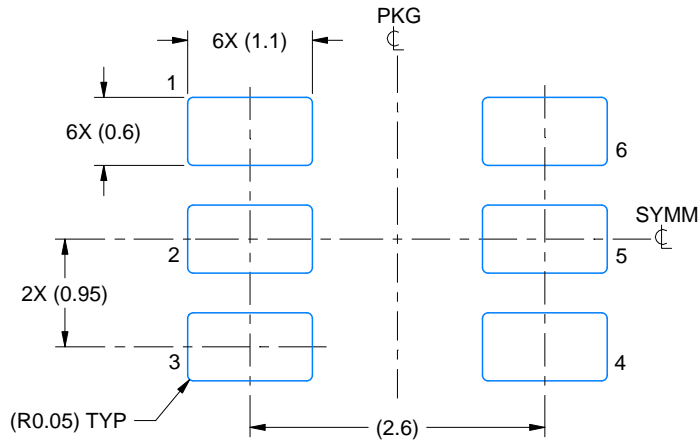
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. Body dimensions do not include mold flash or protrusion. Mold flash and protrusion shall not exceed 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

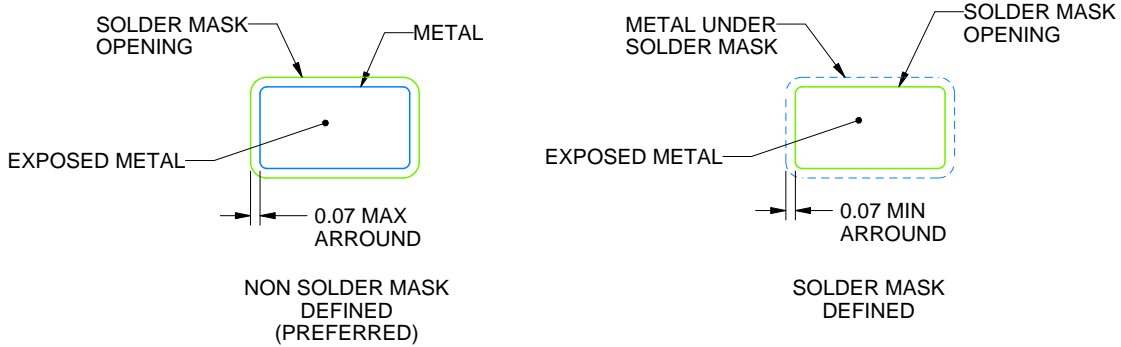
DBV0006A

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)

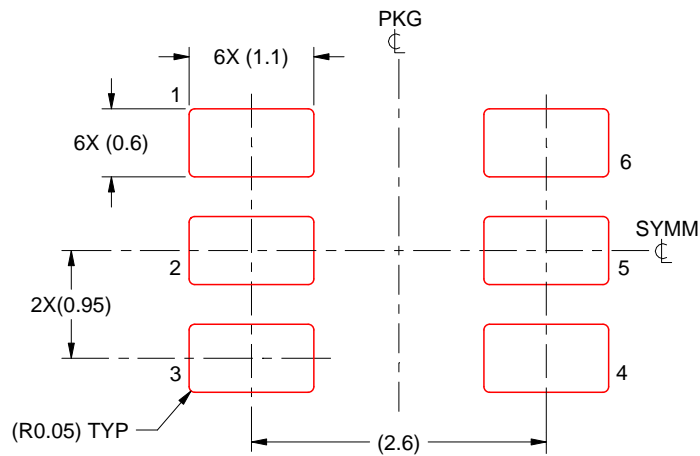
- 6. Publication IPC-7351 may have alternate designs.
- 7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

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

4214840/C 06/2021

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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