

# SN74LVC4245A 3 ステート出力、オクタール・バス・トランシーバと 3.3V~5V の電圧レベル・シフタ

## 1 特長

- 双方向電圧変換
- 5.5V (A ポート)、2.7V~3.6V (B ポート)
- $V_{CCA}$  電圧基準の制御入力  $V_{IH}/V_{IL}$  レベル
- JESD 17 準拠で 250mA 超のラッチアップ性能
- JESD 22 を超える ESD 保護
  - 人体モデルで 2000V
  - 荷電デバイス・モデルで 1000V

## 2 アプリケーション

- ATCA ソリューション
- CPAP 機器
- [カメラ: 監視アナログ](#)
- 化学 / ガス・センサ
- CT スキャナ
- [DLP 3D マシン・ビジョンおよび光ネットワーク](#)
- [デジタル・サイネージ](#)
- [ECG: 心電図](#)
- フィールド・トランスミッタ: 圧力センサおよび温度センサ
- 高速データ・アクイジションおよび生成
- HMI (ヒューマン・マシン・インターフェイス)
- [RF4CE リモート・コントロール](#)
- サーバー・マザーボード
- [ソフトウェア無線 \(SDR\)](#)
- [ワイヤレス LAN カードおよびデータ・アクセス・カード](#)
- [X 線: 医療用、歯科用、手荷物スキャナ](#)

## 3 概要

この 8 ビット (オクタール) 非反転バス・トランシーバは、2 つの独立した電源レールを搭載しています。B ポートには 3.3V に設定された  $V_{CCB}$ 、A ポートには 5V に設定された  $V_{CCA}$  があります。これにより、3.3V 環境から 5V 環境への変換、およびその逆変換が可能になります。

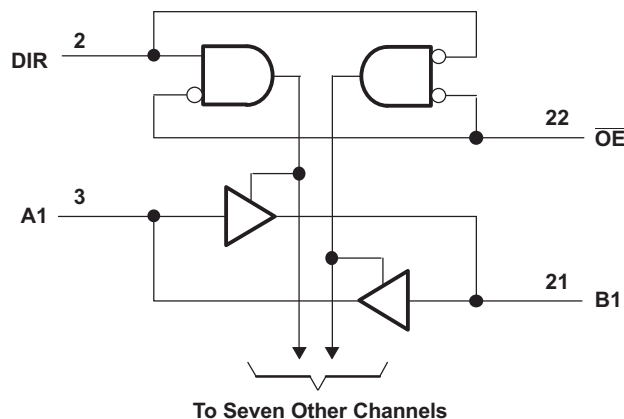
SN74LVC4245A デバイスは、データ・バス間の非同期通信用に設計されています。このデバイスは、方向制御 (DIR) 入力の論理レベルに応じて、A バスから B バス、または B バスから A バスへデータを転送します。出力イネーブル ( $\overline{OE}$ ) 入力を使うと、このデバイスを無効化してバスを実質的に絶縁できます。制御回路 (DIR、 $\overline{OE}$ ) には、 $V_{CCA}$  から電源が供給されます。

SN74LVC4245A デバイスの端子出力により、基板を再レイアウトすることなく、通常のすべて 3.3V またはすべて 5V の 20 端子 SN74LVC4245 デバイスに切り替えることができます。SN74LVC4245A デバイスのピン 2~11 および 14~23 のデータ・バスを使用して、従来の '245 端子出力と整合させます。

### パッケージ情報 (1)

部品番号	パッケージ	本体サイズ (公称)
SN74LVC4245A	DB (SSOP) (24)	8.20mm × 5.30mm
	DW (SOIC, 24)	15.40mm × 7.50mm
	PW (TSSOP, 24)	7.80mm × 4.40mm

(1) 利用可能なパッケージについては、このデータシートの末尾にある注文情報を参照してください。



概略回路図



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## 4 Revision History

### Changes from Revision I (January 2015) to Revision J (December 2022)

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- 文書全体にわたって表、図、相互参照の採番方法を更新..... 1
- Updated thermals for DB and PW package..... 5

### Changes from Revision H (March 2005) to Revision I (January 2015)

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- 「アプリケーション」セクション、「製品情報」表、「端子機能」表、「ESD 定格」表、「熱に関する情報」表、「代表的特性」セクション、「機能説明」セクション、「デバイスの機能モード」セクション、「アプリケーションと実装」セクション、「電源に関する推奨事項」セクション、「レイアウト」セクション、「デバイスおよびドキュメントのサポート」セクション、「メカニカル、パッケージ、および注文情報」セクションを追加..... 1
- 「注文情報」表を削除..... 1

## 5 Pin Configuration and Functions

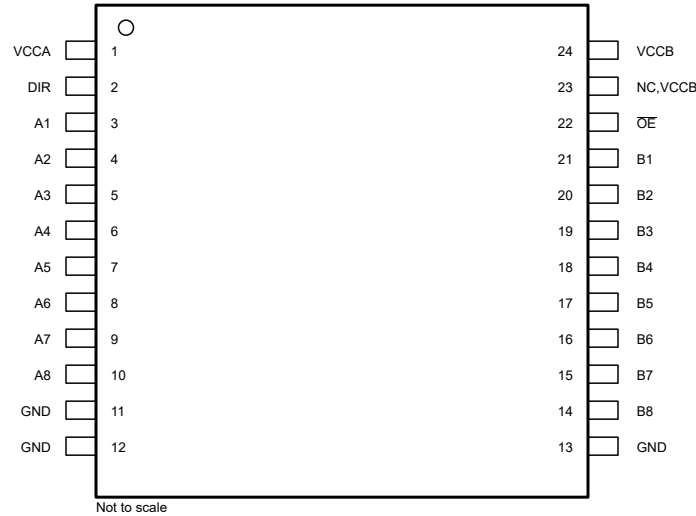


图 5-1. DB, DW, or PW Package, SOP, TSSOP, (Top View)

表 5-1. Pin Functions

PIN		TYPE <sup>(1)</sup>	DESCRIPTION
NAME	NO.		
V <sub>CCA</sub>	1	—	Power supply for side A
DIR	2	I	Direction control
A1	3	I/O	Transceiver I/O pin
A2	4	I/O	Transceiver I/O pin
A3	5	I/O	Transceiver I/O pin
A4	6	I/O	Transceiver I/O pin
A5	7	I/O	Transceiver I/O pin
A6	8	I/O	Transceiver I/O pin
A7	9	I/O	Transceiver I/O pin
A8	10	I/O	Transceiver I/O pin
GND	11	—	Ground
GND	12	—	Ground
GND	13	—	Ground
B8	14	I/O	Transceiver I/O pin
B7	15	I/O	Transceiver I/O pin
B6	16	I/O	Transceiver I/O pin
B5	17	I/O	Transceiver I/O pin
B4	18	I/O	Transceiver I/O pin
B3	19	I/O	Transceiver I/O pin
B2	20	I/O	Transceiver I/O pin
B1	21	I/O	Transceiver I/O pin
OE	22	I	Output Enable
V <sub>CCB</sub>	23	—	Power supply for side B
V <sub>CCB</sub>	24	—	Power supply for side B

(1) I = input, O = output

## 6 Specifications

### 6.1 Absolute Maximum Ratings

over operating free-air temperature range for  $V_{CCA} = 4.5\text{ V to }5.5\text{ V}$  (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
$V_{CCA}$	Supply voltage range	-0.5	6.5	V
$V_I$	Input voltage range	A port <sup>(2)</sup>	$V_{CCA} + 0.5$	V
		Control inputs	6	
$V_O$	Output voltage range	-0.5	$V_{CCA} + 0.5$	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 each $V_{CCA}$ or GND		±100	
$T_{stg}$	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 [セクション 6.4](#) is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) This value is limited to 6 V maximum.

### 6.2 Absolute Maximum Ratings

over operating free-air temperature range for  $V_{CCB} = 2.7\text{ V to }3.6\text{ V}$  (unless otherwise noted)<sup>(1)</sup>

		MIN	MAX	UNIT
$V_{CCB}$	Supply voltage range	-0.5	4.6	V
$V_I$	Input voltage range	B port <sup>(2)</sup>	$V_{CCB} + 0.5$	V
$V_O$	Output voltage range	-0.5	$V_{CCB} + 0.5$	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 $V_{CCB}$ or GND		±100	
$T_{stg}$	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 [セクション 6.4](#) is not implied. Exposure to absolute-maximum-rated conditions for extended periods may affect device reliability.
- (2) This value is limited to 4.6 V maximum.

### 6.3 ESD Ratings

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

## 6.4 Recommended Operating Conditions

for  $V_{CCA} = 4.5\text{ V to }5.5\text{ V}^{(1)}$

		MIN	MAX	UNIT
$V_{CCA}$	Supply voltage	4.5	5.5	V
$V_{IH}$	High-level input voltage	2		V
$V_{IL}$	Low-level input voltage		0.8	V
$V_{IA}$	Input voltage	0	$V_{CCA}$	V
$V_{OA}$	Output voltage	0	$V_{CCA}$	V
$I_{OH}$	High-level output current		-24	mA
$I_{OL}$	Low-level output current		24	mA
$T_A$	Operating free-air temperature	-40	85	°C

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

## 6.5 Recommended Operating Conditions

for  $V_{CCB} = 2.7\text{ V to }3.6\text{ V}^{(1)}$

		MIN	MAX	UNIT
$V_{CCB}$	Supply voltage	2.7	3.6	V
$V_{IH}$	High-level input voltage	$V_{CCB} = 2.7\text{ V to }3.6\text{ V}$	2	V
$V_{IL}$	Low-level input voltage	$V_{CCB} = 2.7\text{ V to }3.6\text{ V}$	0.8	V
$V_{IB}$	Input voltage	0	$V_{CCB}$	V
$V_{OB}$	Output voltage	0	$V_{CCB}$	V
$I_{OH}$	High-level output current	$V_{CCB} = 2.7\text{ V}$	-12	mA
		$V_{CCB} = 3\text{ V}$	-24	
$I_{OL}$	Low-level output current	$V_{CCB} = 2.7\text{ V}$	12	mA
		$V_{CCB} = 3\text{ V}$	24	
$T_A$	Operating free-air temperature	-40	85	°C

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

## 6.6 Thermal Information

THERMAL METRIC <sup>(1)</sup>		SN74LVC4245A		UNIT
		DB	PW	
		24 PINS		
$R_{\theta JA}$	Junction-to-ambient thermal resistance	90.7	100.6	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	51.9	44.7	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	49.7	55.8	°C/W
$\Psi_{JT}$	Junction-to-top characterization parameter	18.8	6.8	°C/W
$\Psi_{JB}$	Junction-to-board characterization parameter	49.3	55.4	°C/W

(1) For more information about traditional and new thermal metrics, see the *IC Package Thermal Metrics* application report, [SPRA953](#).

## 6.7 Electrical Characteristics

over recommended operating free-air temperature range for  $V_{CCA} = 4.5\text{ V to }5.5\text{ V}$  (unless otherwise noted)<sup>(1)</sup>

PARAMETER		TEST CONDITIONS	$V_{CCA}$	MIN	TYP <sup>(2)</sup>	MAX	UNIT
$V_{OH}$		$I_{OH} = -100\ \mu\text{A}$	4.5 V	4.3		V	
			5.5 V	5.3			
		$I_{OH} = -24\ \text{mA}$	4.5 V	3.7			
			5.5 V	4.7			
$V_{OL}$		$I_{OL} = 100\ \mu\text{A}$	4.5 V	0.2		V	
			5.5 V	0.2			
		$I_{OL} = 24\ \text{mA}$	4.5 V	0.55			
			5.5 V	0.55			
$I_I$	Control inputs	$V_I = V_{CCA}$ or GND	5.5 V			$\pm 1$	$\mu\text{A}$
$I_{OZ}$ <sup>(3)</sup>	A port	$V_O = V_{CCA}$ or GND	5.5 V			$\pm 5$	$\mu\text{A}$
$I_{CCA}$		$V_I = V_{CCA}$ or GND, $I_O = 0$	5.5 V			80	$\mu\text{A}$
$\Delta I_{CCA}$ <sup>(4)</sup>		One input at 3.4 V, Other inputs at $V_{CCA}$ or GND	5.5 V			1.5	mA
$C_i$	Control inputs	$V_I = V_{CCA}$ or GND	Open	5			pF
$C_{io}$	A port	$V_O = V_{CCA}$ or GND	5 V	11			pF

(1)  $V_{CCB} = 2.7\text{ V to }3.6\text{ V}$ .

(2) All typical values are measured at  $V_{CC} = 5\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

(3) For I/O ports, the parameter  $I_{OZ}$  includes the input leakage current.

(4) This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or the associated  $V_{CC}$ .

## 6.8 Electrical Characteristics

over recommended operating free-air temperature range for  $V_{CCB} = 2.7\text{ V to }3.6\text{ V}$  (unless otherwise noted)<sup>(1)</sup>

PARAMETER		TEST CONDITIONS	$V_{CCB}$	MIN	TYP <sup>(4)</sup>	MAX	UNIT
$V_{OH}$		$I_{OH} = -100\ \mu\text{A}$	2.7 V to 3.6 V	$V_{CC} - 0.2$		V	
			2.7 V	2.2			
		$I_{OH} = -12\ \text{mA}$	3 V	2.4			
			3 V	2			
$V_{OL}$		$I_{OL} = 100\ \mu\text{A}$	2.7 V to 3.6 V	0.2		V	
		$I_{OL} = 12\ \text{mA}$	2.7 V	0.4			
		$I_{OL} = 24\ \text{mA}$	3 V	0.55			
$I_{OZ}$ <sup>(2)</sup>	B port	$V_O = V_{CCB}$ or GND	3.6 V			$\pm 5$	$\mu\text{A}$
$I_{CCB}$		$V_I = V_{CCB}$ or GND, $I_O = 0$	3.6 V			50	$\mu\text{A}$
$\Delta I_{CCB}$ <sup>(3)</sup>		One input at $V_{CCB} - 0.6\text{ V}$ , Other inputs at $V_{CCB}$ or GND	2.7 V to 3.6 V			0.5	mA
$C_{io}$	B port	$V_O = V_{CCB}$ or GND	3.3 V	11			pF

(1)  $V_{CCA} = 5\text{ V} \pm 0.5\text{ V}$ .

(2) For I/O ports, the parameter  $I_{OZ}$  includes the input leakage current.

(3) This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or the associated  $V_{CC}$ .

(4) All typical values are measured at  $V_{CC} = 3.3\text{ V}$ ,  $T_A = 25^\circ\text{C}$ .

### 6.9 Switching Characteristics

over recommended operating free-air temperature range,  $C_L = 50$  pF (unless otherwise noted) (see [7-1](#) and [7-2](#))

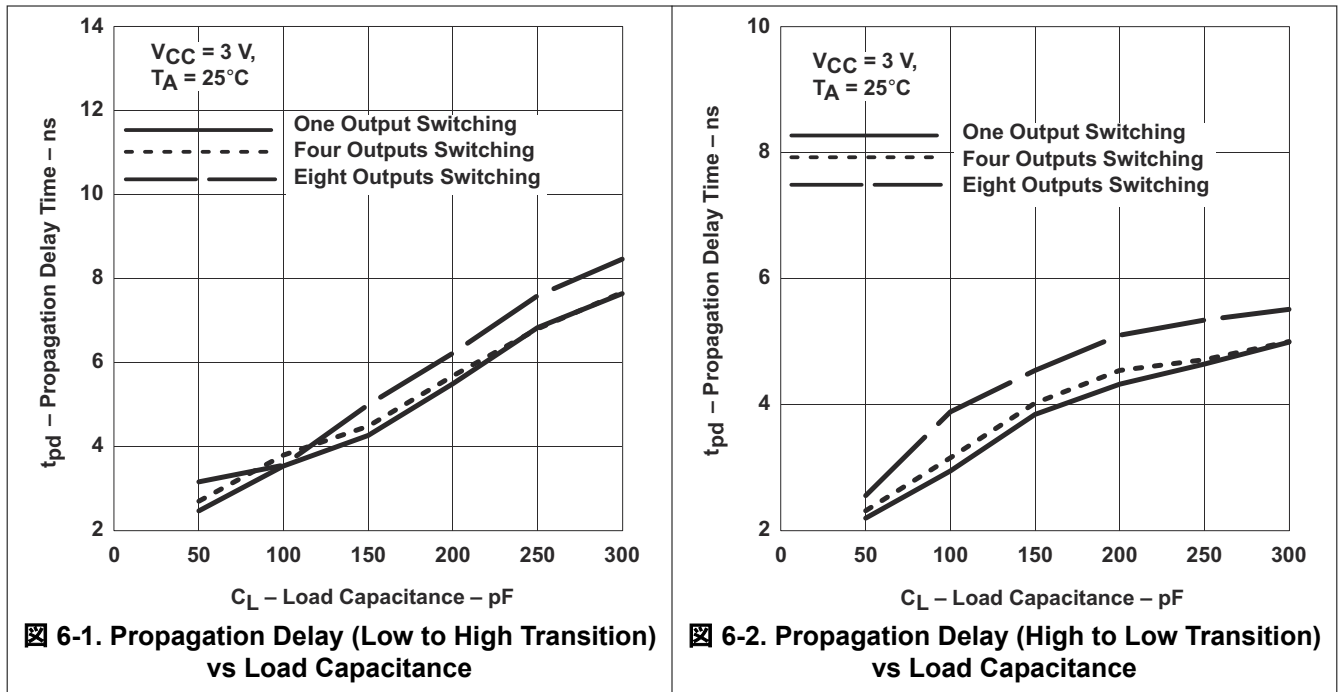
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCA} = 5 V \pm 0.5 V$ , $V_{CCB} = 2.7 V$ to $3.6 V$		UNIT
			MIN	MAX	
$t_{PHL}$	A	B	1	6.3	ns
$t_{PLH}$			1	6.7	
$t_{PHL}$	B	A	1	6.1	ns
$t_{PLH}$			1	5	
$t_{PZL}$	$\overline{OE}$	A	1	9	ns
$t_{PZH}$			1	10	
$t_{PZL}$	$\overline{OE}$	B	1	10.3	ns
$t_{PZH}$			1	9.8	
$t_{PLZ}$	$\overline{OE}$	A	1	7	ns
$t_{PHZ}$			1	5.8	
$t_{PLZ}$	$\overline{OE}$	B	1	7.7	ns
$t_{PHZ}$			1	7.8	

### 6.10 Operating Characteristics

$V_{CCA} = 4.5 V$  to  $5.5 V$ ,  $V_{CCB} = 2.7 V$  to  $3.6 V$ ,  $T_A = 25^\circ C$

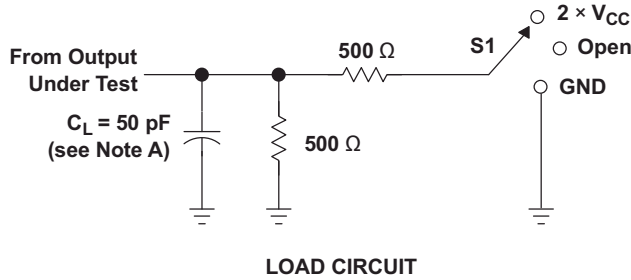
PARAMETER		TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance per transceiver	Outputs enabled	39.5	pF
		Outputs disabled	5	

### 6.11 Typical Characteristics

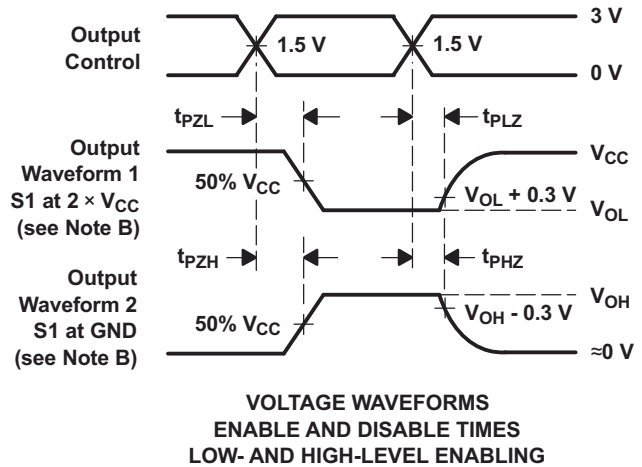
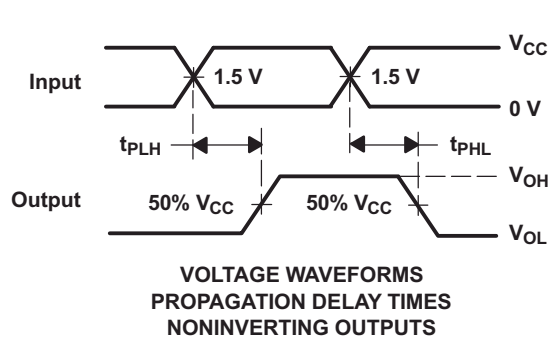
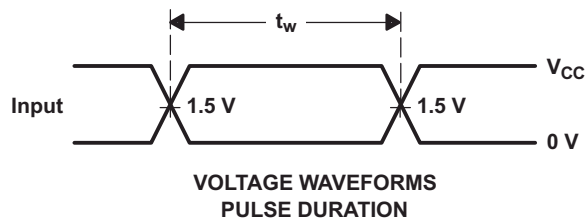


## 7 Parameter Measurement Information

### 7.1 A Port



TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	$2 \times V_{CC}$
$t_{PHZ}/t_{PZH}$	GND

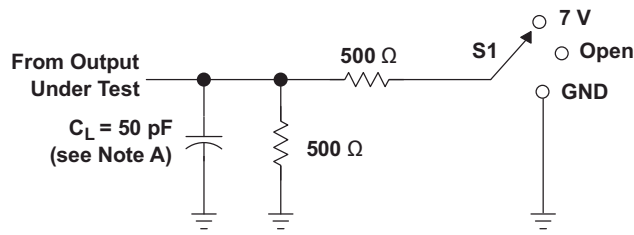


- NOTES: A.  $C_L$  includes probe and jig capacitance.  
 B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.  
 C. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 10$  MHz,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5$  ns,  $t_f \leq 2.5$  ns.  
 D. The outputs are measured one at a time, with one transition per measurement.  
 E. All parameters and waveforms are not applicable to all devices.

**7-1. Load Circuit and Voltage Waveforms**

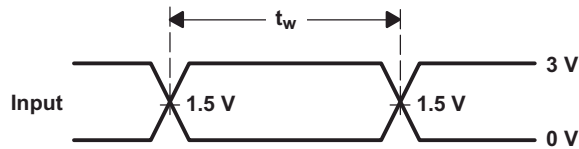


## 7.2 B Port

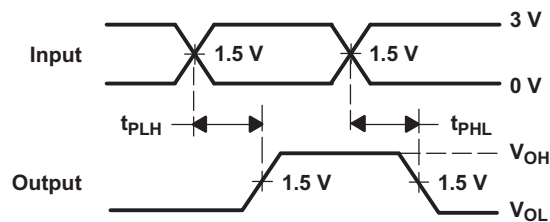


LOAD CIRCUIT

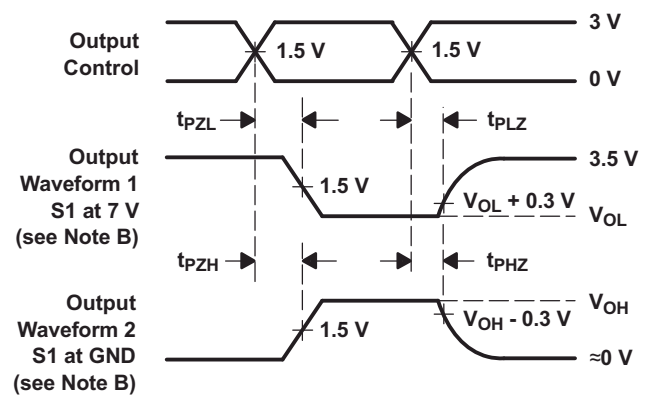
TEST	S1
$t_{PLH}/t_{PHL}$	Open
$t_{PLZ}/t_{PZL}$	7 V
$t_{PHZ}/t_{PZH}$	GND



VOLTAGE WAVEFORMS  
PULSE DURATION



VOLTAGE WAVEFORMS  
PROPAGATION DELAY TIMES  
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:  $PRR \leq 10 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_r \leq 2.5 \text{ ns}$ ,  $t_f \leq 2.5 \text{ ns}$ .  
 D. The outputs are measured one at a time, with one transition per measurement.  
 E. All parameters and waveforms are not applicable to all devices.

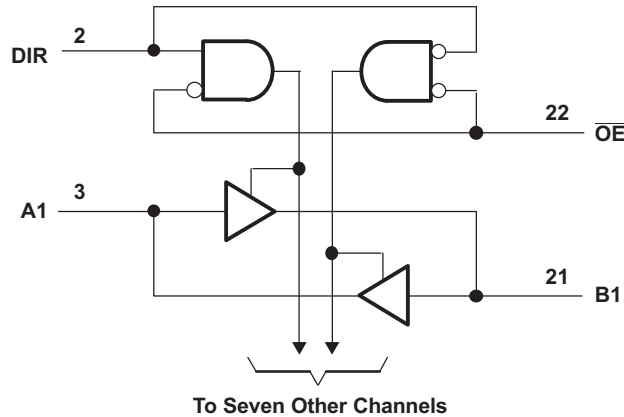
7-2. Load Circuit and Voltage Waveforms

## 8 Detailed Description

### 8.1 Overview

SN74LVC4245A is an 8-bit (octal) noninverting bus transceiver contains two separate supply rails; B port has  $V_{CCB}$ , which is set at 3.3 V, and A port has  $V_{CCA}$ , which is set at 5 V. This allows for translation from a 3.3-V to a 5-V environment, and vice versa, designed for asynchronous communication between data buses. The device transmits data from the A bus to the B bus or from the B bus to the A bus, depending on the logic level at the direction-control (DIR) input. The output-enable ( $\overline{OE}$ ) input can be used to disable the device so the buses are effectively isolated. The control circuitry (DIR,  $\overline{OE}$ ) is powered by  $V_{CCA}$ .

### 8.2 Functional Block Diagram



### 8.3 Feature Description

- 24 mA drive at 3-V supply
  - Good for heavier loads and longer traces
- Low  $V_{IH}$ 
  - Allows 3.3-V to 5-V translation

### 8.4 Device Functional Modes

表 8-1. Function Table

INPUTS		OPERATION
$\overline{OE}$	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation

## 9 Application and Implementation

### 注

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### 9.1 Application Information

The SN74LVC4245A device pinout allows the designer to switch to a normal all-3.3-V or all-5-V 20-pin '245 device without board re-layout. The designer uses the data paths for pins 2–11 and 14–23 of the SN74LVC4245A to align with the conventional SN74LVC4245 device's pinout. SN74LVC4245A is a high drive CMOS device that can be used for a multitude of bus interface type applications where output drive or PCB trace length is a concern.

### 9.2 Typical Application

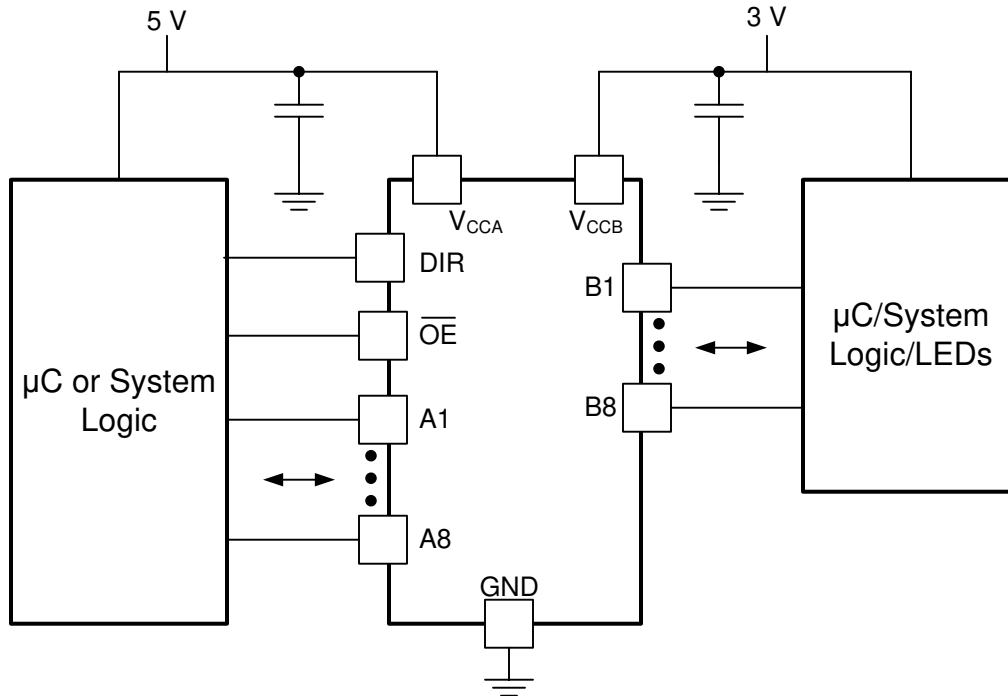


図 9-1. Typical Application Schematic

#### 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

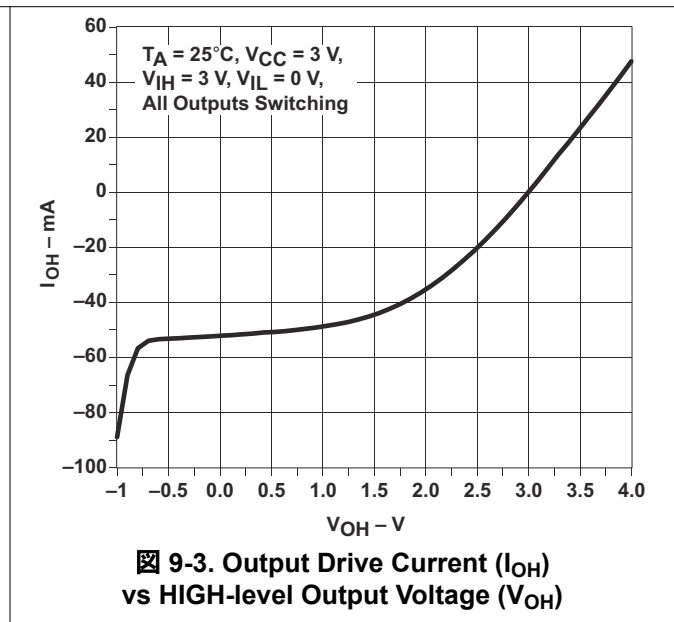
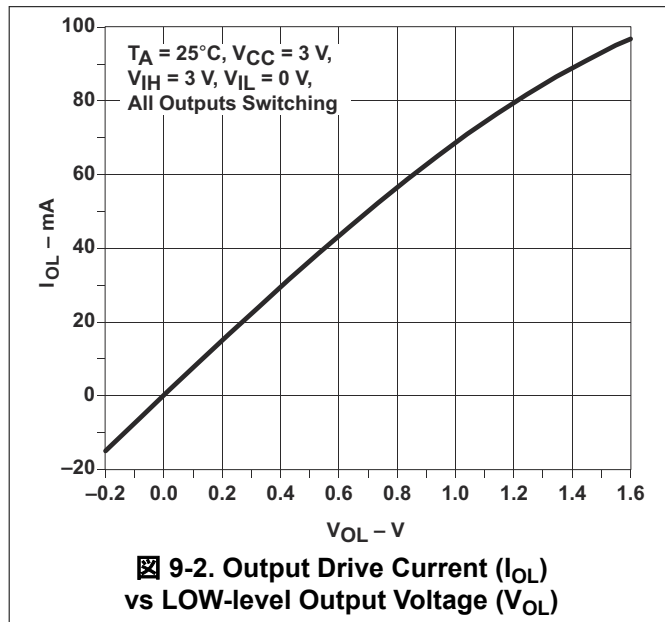
#### 1. Recommended Input Conditions:

- For rise time and fall time specifications, see ( $\Delta t/\Delta V$ ) in the [セクション 6.4](#) table.
- For specified high and low levels, see ( $V_{IH}$  and  $V_{IL}$ ) in the [セクション 6.4](#) table.

#### 2. Recommend Output Conditions:

- Load currents should not exceed ( $I_O$  max) per output and should not exceed (Continuous current through  $V_{CC}$  or GND) total current for the part. These limits are located in the [セクション 6.1](#) table.
- Outputs should not be pulled above  $V_{CC}$ .
- Series resistors on the output may be used if the user desires to slow the output edge signal or limit the output current.

### 9.2.3 Application Curves



## 10 Power Supply Recommendations

### 10.1 Power-Up Consideration

TI level-translation devices offer an opportunity for successful mixed-voltage signal design. A proper power-up sequence always should be followed to avoid excessive supply current, bus contention, oscillations, or other anomalies caused by improperly biased device terminals. Take these precautions to guard against such power-up problems:

1. Connect ground before any supply voltage is applied.
2. Power up the control side of the device ( $V_{CCA}$  for all four of these devices).
3. Tie  $\overline{OE}$  to  $V_{CCA}$  with a pullup resistor so that it ramps with  $V_{CCA}$ .
4. Depending on the direction of the data path, DIR can be high or low. If DIR high is needed (A data to B bus), ramp it with  $V_{CCA}$ . Otherwise, keep DIR low.

For more information, refer to the [Voltage-Level-Translation Devices](#) application note.

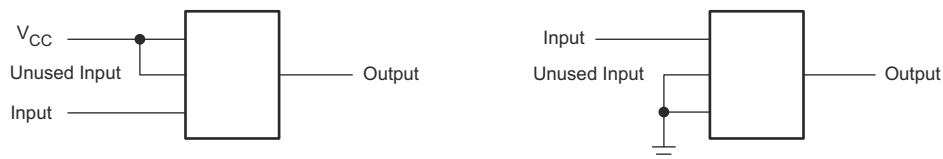
## 11 Layout

### 11.1 Layout Guidelines

When using multiple bit logic devices, inputs should not float. In many cases, functions or parts of functions of digital logic devices are unused. Some examples are when only two inputs of a triple-input AND gate are used, or when 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 [Figure 11-1](#) are 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  $V_{CC}$ , whichever makes more sense or is more convenient.

### 11.2 Layout Example



**Figure 11-1. Layout Diagram**

## 12 Device and Documentation Support

### 12.1 Documentation Support

#### 12.1.1 Related Documentation

For related documentation, see the following:

- Texas Instruments, [Voltage-Level-Translation Devices application note](#)

### 12.2 ドキュメントの更新通知を受け取る方法

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### 12.6 用語集

[テキサス・インスツルメンツ用語集](#) この用語集には、用語や略語の一覧および定義が記載されています。

## 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 finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74LVC4245ADBR	ACTIVE	SSOP	DB	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245ADBRE4	ACTIVE	SSOP	DB	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245ADW	ACTIVE	SOIC	DW	24	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245ADWE4	ACTIVE	SOIC	DW	24	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245ADWG4	ACTIVE	SOIC	DW	24	25	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245ADWR	ACTIVE	SOIC	DW	24	2000	RoHS & Green	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245ADWRE4	ACTIVE	SOIC	DW	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245ADWRG4	ACTIVE	SOIC	DW	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVC4245A	<a href="#">Samples</a>
SN74LVC4245APW	ACTIVE	TSSOP	PW	24	60	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWG4	ACTIVE	TSSOP	PW	24	60	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWR	ACTIVE	TSSOP	PW	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWRE4	ACTIVE	TSSOP	PW	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWRG4	ACTIVE	TSSOP	PW	24	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWT	ACTIVE	TSSOP	PW	24	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>
SN74LVC4245APWTG4	ACTIVE	TSSOP	PW	24	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	LJ245A	<a href="#">Samples</a>

(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.

**OBSELETE:** 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  $\leq 1000$ ppm threshold. Antimony trioxide based flame retardants must also meet the  $\leq 1000$ ppm 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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#### OTHER QUALIFIED VERSIONS OF SN74LVC4245A :

- Enhanced Product : [SN74LVC4245A-EP](#)

NOTE: Qualified Version Definitions:

- Enhanced Product - Supports Defense, Aerospace and Medical Applications



**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
SN74LVC4245ADBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74LVC4245ADBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74LVC4245ADWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVC4245ADWRG4	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVC4245APWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74LVC4245APWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74LVC4245APWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74LVC4245APWT	TSSOP	PW	24	250	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1

## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74LVC4245ADBR	SSOP	DB	24	2000	356.0	356.0	35.0
SN74LVC4245ADBR	SSOP	DB	24	2000	356.0	356.0	35.0
SN74LVC4245ADWR	SOIC	DW	24	2000	350.0	350.0	43.0
SN74LVC4245ADWRG4	SOIC	DW	24	2000	350.0	350.0	43.0
SN74LVC4245APWR	TSSOP	PW	24	2000	353.0	353.0	32.0
SN74LVC4245APWR	TSSOP	PW	24	2000	356.0	356.0	35.0
SN74LVC4245APWR	TSSOP	PW	24	2000	356.0	356.0	35.0
SN74LVC4245APWT	TSSOP	PW	24	250	356.0	356.0	35.0

**TUBE**


\*All dimensions are nominal

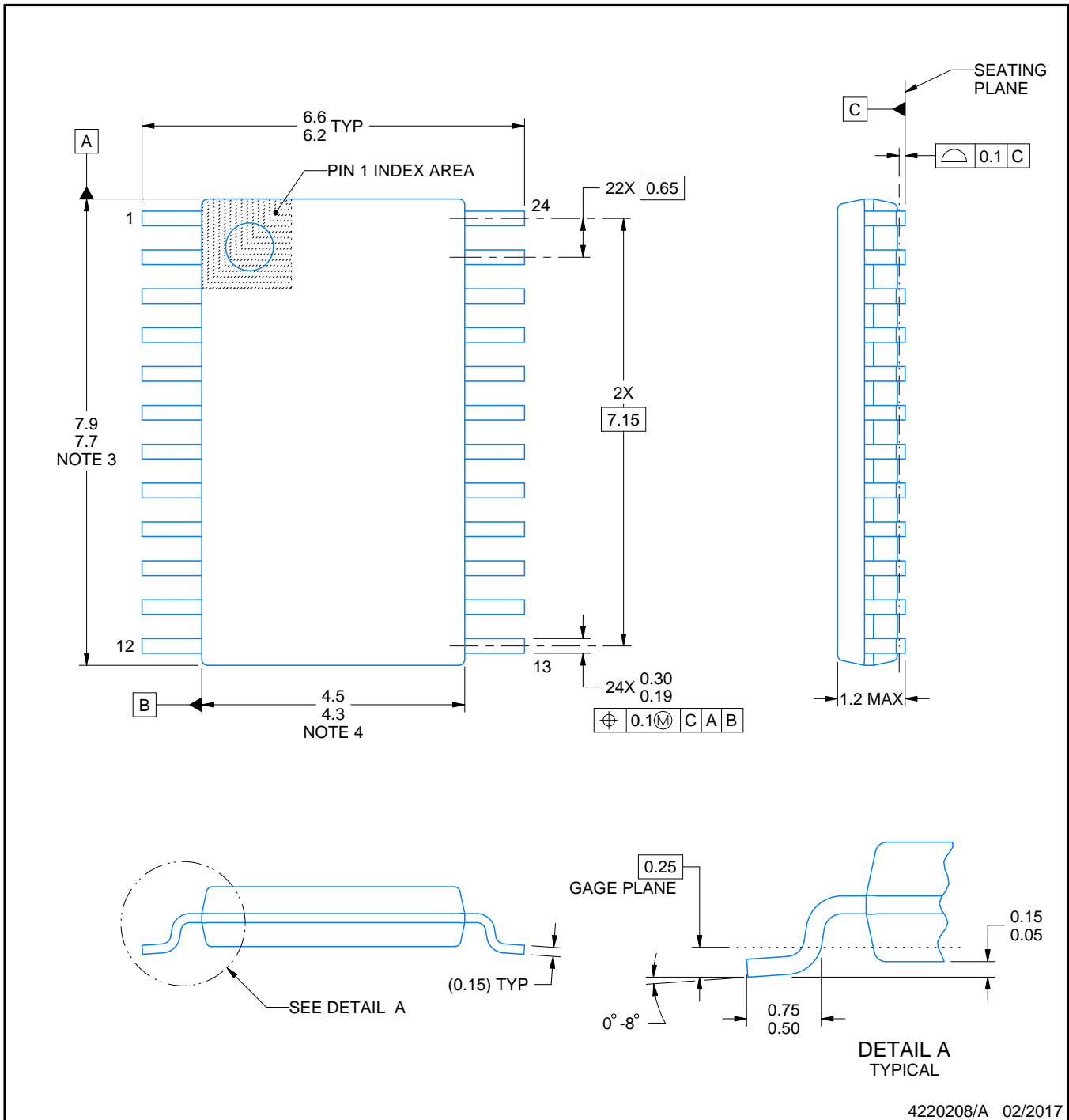
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74LVC4245ADW	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74LVC4245ADWE4	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74LVC4245ADWG4	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74LVC4245APW	PW	TSSOP	24	60	530	10.2	3600	3.5
SN74LVC4245APW	PW	TSSOP	24	60	530	10.2	3600	3.5
SN74LVC4245APWG4	PW	TSSOP	24	60	530	10.2	3600	3.5
SN74LVC4245APWG4	PW	TSSOP	24	60	530	10.2	3600	3.5

PW0024A



**PACKAGE OUTLINE**  
**TSSOP - 1.2 mm max height**

SMALL OUTLINE PACKAGE



4220208/A 02/2017

**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. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm per side.
5. Reference JEDEC registration MO-153.

# EXAMPLE BOARD LAYOUT

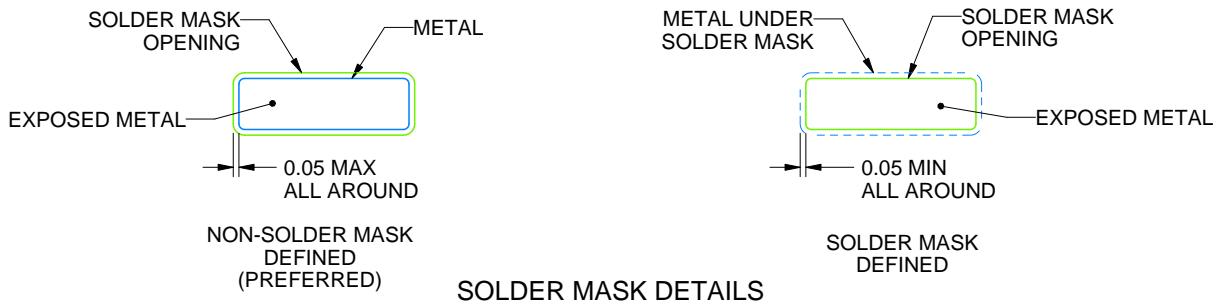
PW0024A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



SOLDER MASK DETAILS

4220208/A 02/2017

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

PW0024A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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.

DW (R-PDSO-G24)

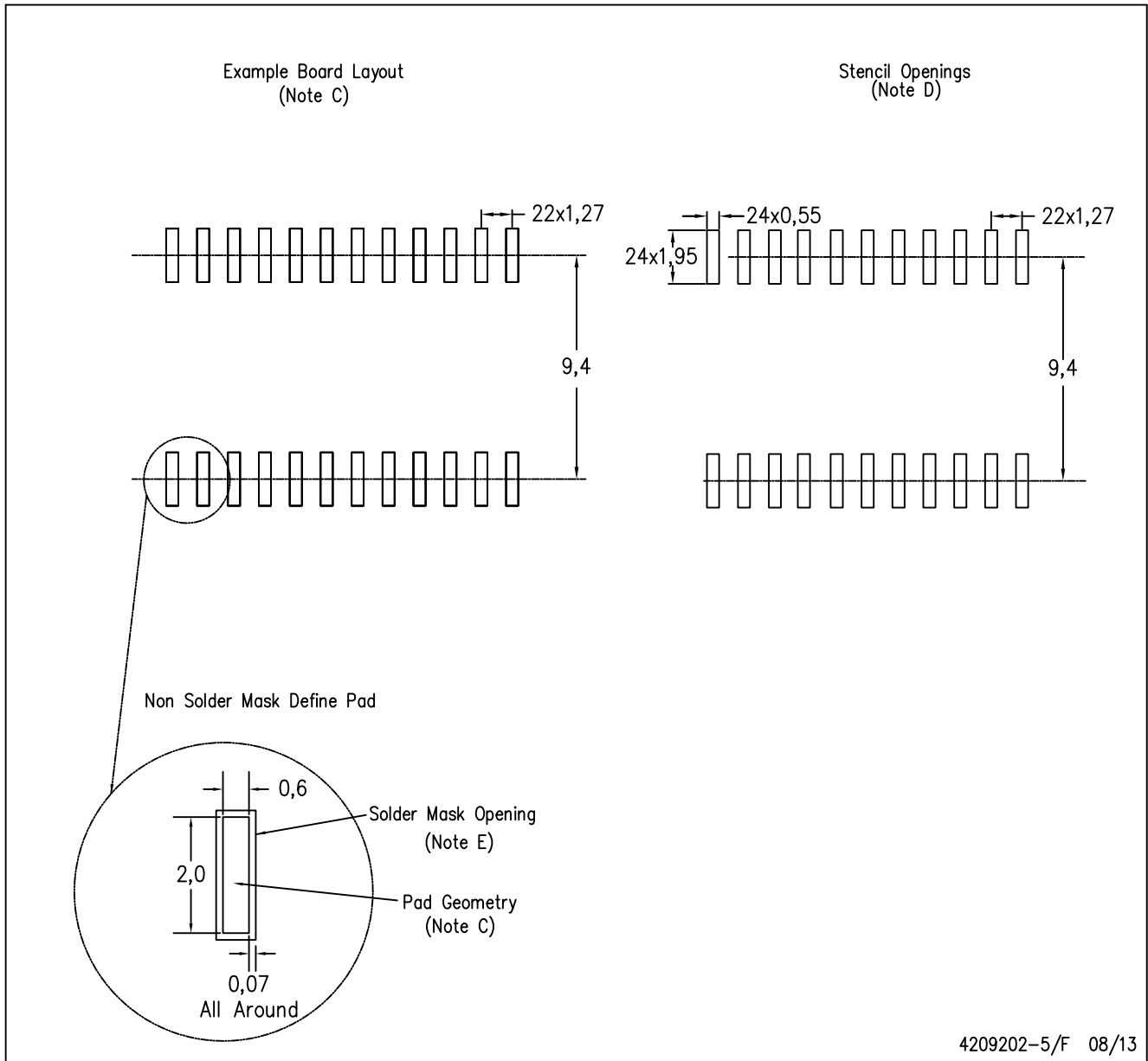
PLASTIC SMALL OUTLINE



- NOTES:
- A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M-1994.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
  - D. Falls within JEDEC MS-013 variation AD.

DW (R-PDSO-G24)

PLASTIC SMALL OUTLINE



4209202-5/F 08/13

- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Refer to IPC7351 for alternate board design.
  - D. 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. Refer to IPC-7525
  - E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.



DB (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE

28 PINS SHOWN



- 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 not to exceed 0,15.  
 D. Falls within JEDEC MO-150

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