



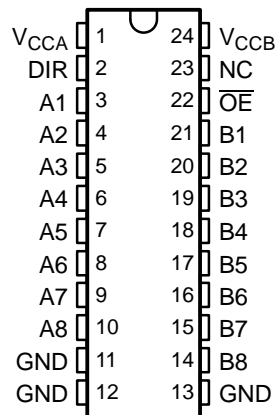
**THE DATASHEET OF
SN74LVCC4245ADWR**



FEATURES

- Bidirectional Voltage Translator
- 4.5 V to 5.5 V on A Port and 2.7 V to 5.5 V on B Port
- Control Inputs V_{IH}/V_{IL} Levels Are Referenced to V_{CCA} Voltage
- Latch-Up Performance Exceeds 250 mA Per JESD 17
- ESD Protection Exceeds JESD 22
 - 2000-V Human-Body Model (A114-A)
 - 200-V Machine Model (A115-A)
 - 1000-V Charged-Device Model (C101)

DB, DW, NS, OR PW PACKAGE
(TOP VIEW)



NC - No internal connection

DESCRIPTION/ORDERING INFORMATION

This 8-bit (octal) noninverting bus transceiver uses two separate power-supply rails. The A port, V_{CCA} , is dedicated to accepting a 5-V supply level, and the configurable B port, which is designed to track V_{CCB} , accepts voltages from 3 V to 5 V. This allows for translation from a 3.3-V to a 5-V environment and vice versa.

The SN74LVCC4245A is 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 effectively are isolated. The control circuitry (DIR, \overline{OE}) is powered by V_{CCA} .

ORDERING INFORMATION

T_A	PACKAGE ⁽¹⁾		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	SOIC – DW	Tube of 25	SN74LVCC4245ADW	LVCC4245A
		Reel of 2000	SN74LVCC4245ADWR	
	SOP – NS	Reel of 2000	SN74LVCC4245ANSR	LVCC4245A
	SSOP – DB	Reel of 2000	SN74LVCC4245ADBR	LG245A
	TSSOP – PW	Tube of 60	SN74LVCC4245APW	LG245A
		Reel of 2000	SN74LVCC4245APWR	
Reel of 250		SN74LVCC4245APWT		

(1) Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at www.ti.com/sc/package.

FUNCTION TABLE (EACH TRANSCEIVER)

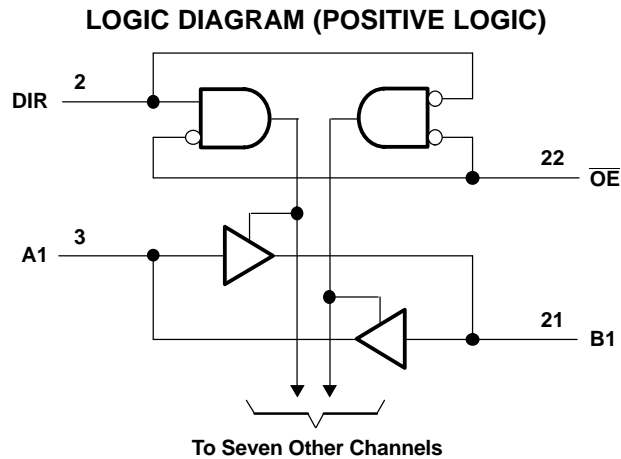
INPUTS		OPERATION
\overline{OE}	DIR	
L	L	B data to A bus
L	H	A data to B bus
H	X	Isolation



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.

SN74LVCC4245A
OCTAL DUAL-SUPPLY BUS TRANSCEIVER
WITH CONFIGURABLE OUTPUT VOLTAGE AND 3-STATE OUTPUTS

SCAS584M—NOVEMBER 1996—REVISED MARCH 2005



Absolute Maximum Ratings⁽¹⁾

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

		MIN	MAX	UNIT	
V_{CCA} V_{CCB}	Supply voltage range	-0.5	6	V	
V_I	Input voltage range ⁽²⁾	I/O ports (A port)	-0.5	$V_{CCA} + 0.5$	V
		I/O ports (B port)	-0.5	$V_{CCB} + 0.5$	
		Except I/O ports	-0.5	$V_{CCA} + 0.5$	
V_O	Output voltage range ⁽²⁾	A port	-0.5	$V_{CCA} + 0.5$	V
		B port	-0.5	$V_{CCB} + 0.5$	
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_{CCA} , V_{CCB} , or GND			±100	mA
θ_{JA}	Package thermal impedance ⁽³⁾	DB package		63	°C/W
		DW package		46	
		NS package		65	
		PW package		88	
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) This value is limited to 6 V maximum.
- (3) The package thermal impedance is calculated in accordance with JESD 51-7.

Recommended Operating Conditions⁽¹⁾

		V_{CCA}	V_{CCB}	MIN	NOM	MAX	UNIT
V_{CCA}	Supply voltage			4.5	5	5.5	V
V_{CCB}	Supply voltage			2.7	3.3	5.5	V
V_{IHA}	High-level input voltage	4.5 V	2.7 V	2			V
			3.6 V	2			
		5.5 V	5.5 V	2			
V_{IHB}	High-level input voltage	4.5 V	2.7 V	2			V
			3.6 V	2			
		5.5 V	5.5 V	3.85			
V_{ILA}	Low-level input voltage	4.5 V	2.7 V			0.8	V
			3.6 V			0.8	
		5.5 V	5.5 V			0.8	
V_{ILB}	Low-level input voltage	4.5 V	2.7 V			0.8	V
			3.6 V			0.8	
		5.5 V	5.5 V			1.65	
V_{IH}	High-level input voltage (control pins) (referenced to V_{CCA})	4.5 V	2.7 V	2			V
			3.6 V	2			
		5.5 V	5.5 V	2			
V_{IL}	Low-level input voltage (control pins) (referenced to V_{CCA})	4.5 V	2.7 V			0.8	V
			3.6 V			0.8	
		5.5 V	5.5 V			0.8	
V_{IA}	Input voltage			0		V_{CCA}	V
V_{IB}	Input voltage			0		V_{CCB}	V
V_{OA}	Output voltage			0		V_{CCA}	V
V_{OB}	Output voltage			0		V_{CCB}	V
I_{OHA}	High-level output current	4.5 V	3 V			–24	mA
I_{OHB}	High-level output current	4.5 V	2.7 V to 4.5 V			–24	mA
I_{OLA}	Low-level output current	4.5 V	3 V			24	mA
I_{OLB}	Low-level output current	4.5 V	2.7 V to 4.5 V			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.

SN74LVCC4245A
OCTAL DUAL-SUPPLY BUS TRANSCEIVER
WITH CONFIGURABLE OUTPUT VOLTAGE AND 3-STATE OUTPUTS



SCAS584M–NOVEMBER 1996–REVISED MARCH 2005

Electrical Characteristics

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

PARAMETER		TEST CONDITIONS	V _{CCA}	V _{CCB}	MIN	TYP	MAX	UNIT
V _{OHA}		I _{OH} = -100 μA	4.5 V	3 V	4.4	4.49		V
		I _{OH} = -24 mA	4.5 V	3 V	3.76	4.25		
V _{OHB}		I _{OH} = -100 μA	4.5 V	3 V	2.9	2.99		V
		I _{OH} = -12 mA	4.5 V	2.7 V	2.2	2.5		
				3 V	2.46	2.85		
		I _{OH} = -24 mA	4.5 V	2.7 V	2.1	2.3		
				3 V	2.25	2.65		
				4.5 V	3.76	4.25		
V _{OLA}		I _{OL} = 100 μA	4.5 V	3 V			0.1	V
		I _{OL} = 24 mA	4.5 V	3 V		0.21	0.44	
V _{OLB}		I _{OL} = 100 μA	4.5 V	3 V			0.1	V
		I _{OL} = 12 mA	4.5 V	2.7 V		0.11	0.44	
				2.7 V		0.22	0.5	
		I _{OL} = 24 mA	4.5 V	3 V		0.21	0.44	
				4.5 V		0.18	0.44	
I _I	Control inputs	V _I = V _{CCA} or GND	5.5 V	3.6 V		±0.1	±1	μA
				5.5 V		±0.1	±1	
I _{OZ} ⁽¹⁾	A or B ports	V _O = V _{CCA/B} or GND, V _I = V _{IL} or V _{IH}	5.5 V	3.6 V		±0.5	±5	μA
I _{CCA}	B to A	A _n = V _{CC} or GND	5.5 V	Open		8	80	μA
		I _O (A port) = 0, B _n = V _{CCB} or GND	5.5 V	3.6 V		8	80	
				5.5 V		8	80	
I _{CCB}	A to B	A _n = V _{CCA} or GND, I _O (B port) = 0	5.5 V	3.6 V		5	50	μA
				5.5 V		8	80	
ΔI _{CCA} ⁽²⁾	A port	V _I = V _{CCA} - 2.1 V, Other inputs at V _{CCA} or GND, \overline{OE} at GND and DIR at V _{CCA}	5.5 V	5.5 V		1.35	1.5	mA
	\overline{OE}	V _I = V _{CCA} - 2.1 V, Other inputs at V _{CCA} or GND, DIR at V _{CCA} or GND	5.5 V	5.5 V		1	1.5	
	DIR	V _I = V _{CCA} - 2.1 V, Other inputs at V _{CCA} or GND, \overline{OE} at V _{CCA} or GND	5.5 V	3.6 V		1	1.5	
ΔI _{CCB} ⁽²⁾	B port	V _I = V _{CCB} - 0.6 V, Other inputs at V _{CCB} or GND, \overline{OE} at GND and DIR at GND	5.5 V	3.6 V		0.35	0.5	mA
C _i	Control inputs	V _I = V _{CCA} or GND	Open	Open		5		pF
C _{io}	A or B ports	V _O = V _{CCA/B} or GND	5 V	3.3 V		11		pF

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

(2) 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}.

Switching Characteristics

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CCA} = 5\text{ V} \pm 0.5\text{ V}$, $V_{CCB} = 5\text{ V} \pm 0.5\text{ V}$		$V_{CCA} = 5\text{ V} \pm 0.5\text{ V}$, $V_{CCB} = 2.7\text{ V to } 3.6\text{ V}$		UNIT
			MIN	MAX	MIN	MAX	
t_{PHL}	A	B	1	7.1	1	7	ns
t_{PLH}			1	6	1	7	
t_{PHL}	B	A	1	6.8	1	6.2	ns
t_{PLH}			1	6.1	1	5.3	
t_{PZL}	\overline{OE}	A	1	9	1	9	ns
t_{PZH}			1	8.3	1	8	
t_{PZL}	\overline{OE}	B	1	8.2	1	10	ns
t_{PZH}			1	8.1	1	10.2	
t_{PLZ}	\overline{OE}	A	1	4.7	1	5.2	ns
t_{PHZ}			1	4.9	1	5.2	
t_{PLZ}	\overline{OE}	B	1	5.4	1	5.4	ns
t_{PHZ}			1	6.3	1	7.4	

Operating Characteristics

$V_{CCA} = 5\text{ V}$, $V_{CCB} = 3.3\text{ V}$, $T_A = 25^\circ\text{C}$

PARAMETER		TEST CONDITIONS	TYP	UNIT
C_{pd}	Power dissipation capacitance per transceiver	$C_L = 0$, $f = 10\text{ MHz}$	20	pF
			6.5	

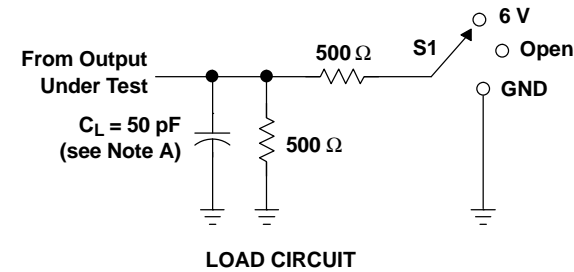
Power-Up Considerations⁽¹⁾

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 pins. Take these precautions to guard against such power-up problems:

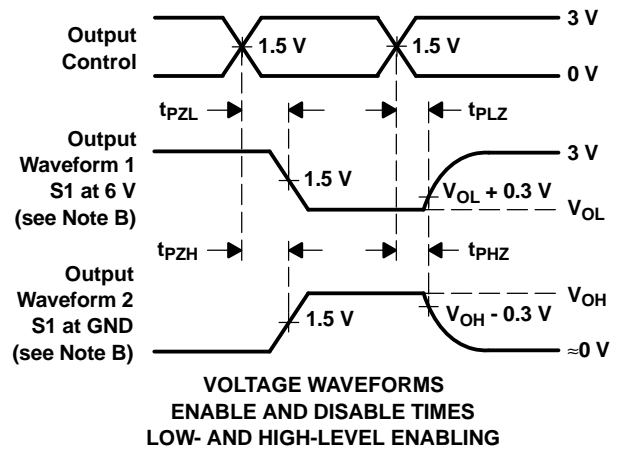
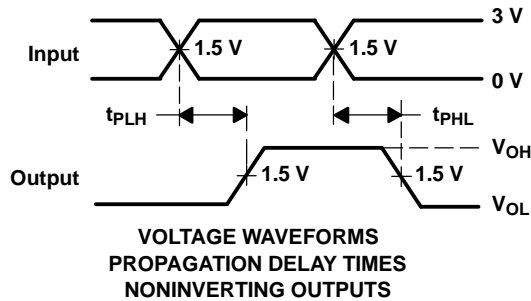
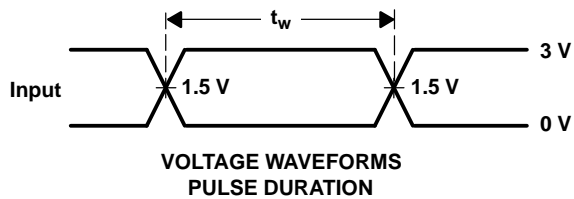
1. Connect ground before any supply voltage is applied.
2. Power up the control side of the device (V_{CCA} for all four of these devices).
3. Tie \overline{OE} to V_{CCA} with a pullup resistor so that it ramps with V_{CCA} .
4. Depending on the direction of the data path, DIR can be high or low. If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

(1) Refer to the TI application report, *Texas Instruments Voltage-Level-Translation Devices*, literature number SCEA021.

PARAMETER MEASUREMENT INFORMATION FOR A TO B
 $V_{CCA} = 4.5 \text{ V TO } 5.5 \text{ V}$ AND $V_{CCB} = 2.7 \text{ V TO } 3.6 \text{ V}$



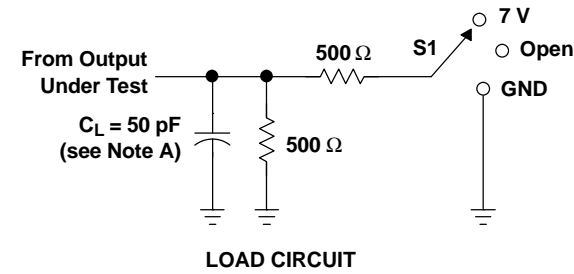
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	6 V
t_{PHZ}/t_{PZH}	GND



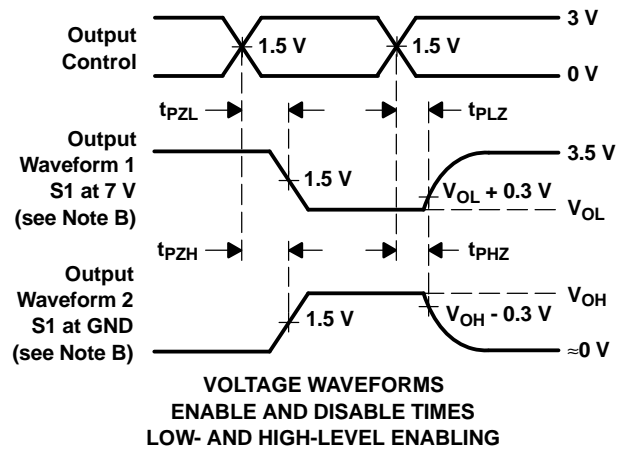
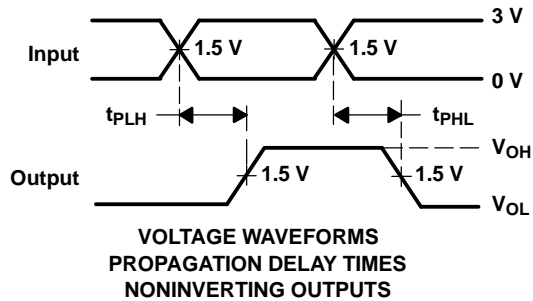
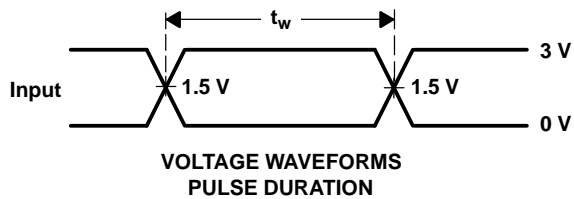
- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 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.

Figure 1. Load Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION FOR A TO B
 $V_{CCA} = 4.5\text{ V TO }5.5\text{ V}$ AND $V_{CCB} = 3.6\text{ V TO }5.5\text{ V}$



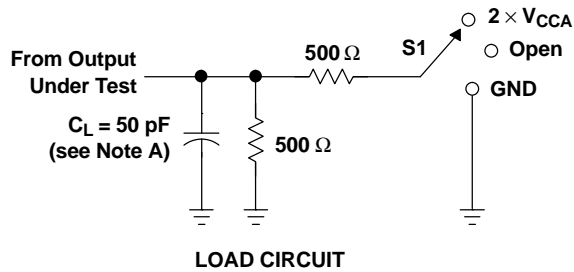
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	GND



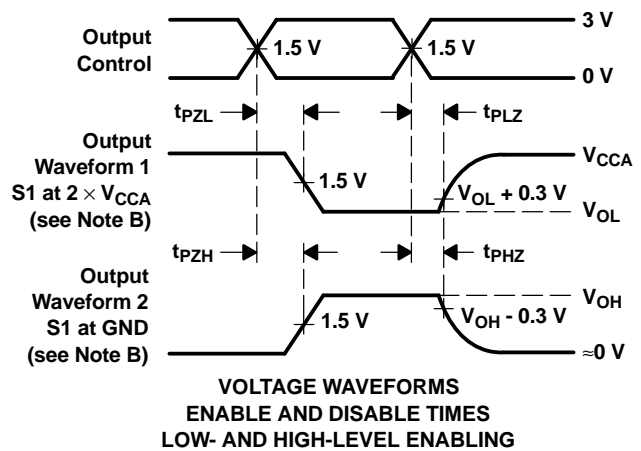
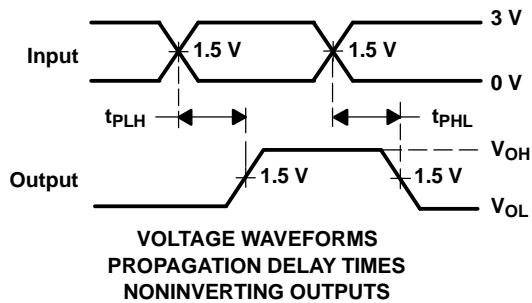
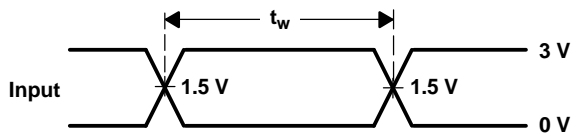
- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 2.5\text{ ns}$, $t_f \leq 2.5\text{ ns}$.
 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.

Figure 2. Load Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION FOR B TO A
 $V_{CCA} = 4.5 \text{ V to } 5.5 \text{ V}$ AND $V_{CCB} = 2.7 \text{ V TO } 3.6 \text{ V}$



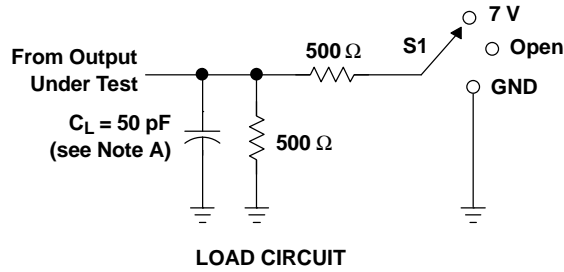
TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	2 $\times V_{CCA}$
t_{PHZ}/t_{PZH}	GND



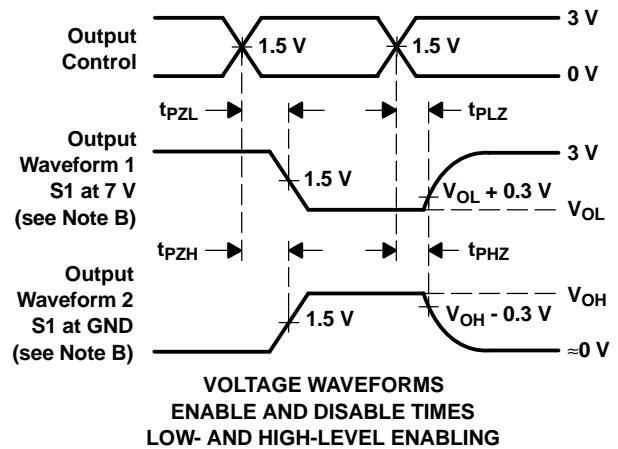
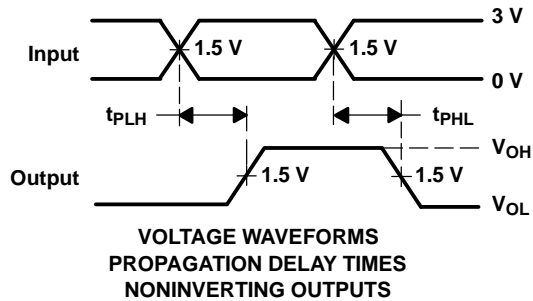
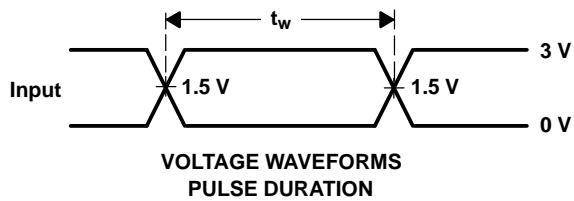
- NOTES: A. C_L includes probe and jig capacitance.
 B. Waveform 1 is for an output with internal conditions such that the output is low, except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high, except when disabled by the output control.
 C. All input pulses are supplied by generators having the following characteristics: $PRR \leq 10 \text{ MHz}$, $Z_O = 50 \Omega$, $t_r \leq 2.5 \text{ ns}$, $t_f \leq 2.5 \text{ ns}$.
 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.

Figure 3. Load Circuit and Voltage Waveforms

PARAMETER MEASUREMENT INFORMATION FOR B TO A
 $V_{CCA} = 4.5\text{ V TO }5.5\text{ V}$ AND $V_{CCB} = 3.6\text{ V TO }5.5\text{ V}$



TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
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: $PRR \leq 10\text{ MHz}$, $Z_O = 50\ \Omega$, $t_r \leq 2.5\text{ ns}$, $t_f \leq 2.5\text{ ns}$.
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.

Figure 4. Load Circuit and Voltage Waveforms

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
SN74LVCC4245ADBR	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245ADBRE4	ACTIVE	SSOP	DB	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245ADW	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVCC4245A	Samples
SN74LVCC4245ADWE4	ACTIVE	SOIC	DW	24	25	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVCC4245A	Samples
SN74LVCC4245ADWR	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU CU SN	Level-1-260C-UNLIM	-40 to 85	LVCC4245A	Samples
SN74LVCC4245ADWRG4	ACTIVE	SOIC	DW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVCC4245A	Samples
SN74LVCC4245ANSR	ACTIVE	SO	NS	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LVCC4245A	Samples
SN74LVCC4245APW	ACTIVE	TSSOP	PW	24	60	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245APWR	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245APWRE4	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245APWRG4	ACTIVE	TSSOP	PW	24	2000	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245APWT	ACTIVE	TSSOP	PW	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	Samples
SN74LVCC4245APWTE4	ACTIVE	TSSOP	PW	24	250	Green (RoHS & no Sb/Br)	CU NIPDAU	Level-1-260C-UNLIM	-40 to 85	LG245A	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 ≤ 1000 ppm threshold. Antimony trioxide based flame retardants must also meet the ≤ 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/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.

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OTHER QUALIFIED VERSIONS OF SN74LVCC4245A :

- Enhanced Product: [SN74LVCC4245A-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
SN74LVCC4245ADBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74LVCC4245ADWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVCC4245ADWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVCC4245ADWRG4	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74LVCC4245ANSR	SO	NS	24	2000	330.0	24.4	8.3	15.4	2.6	12.0	24.0	Q1
SN74LVCC4245APWR	TSSOP	PW	24	2000	330.0	16.4	6.95	8.3	1.6	8.0	16.0	Q1
SN74LVCC4245APWT	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)
SN74LVCC4245ADBR	SSOP	DB	24	2000	367.0	367.0	38.0
SN74LVCC4245ADWR	SOIC	DW	24	2000	350.0	350.0	43.0
SN74LVCC4245ADWR	SOIC	DW	24	2000	364.0	361.0	36.0
SN74LVCC4245ADWRG4	SOIC	DW	24	2000	350.0	350.0	43.0
SN74LVCC4245ANSR	SO	NS	24	2000	367.0	367.0	45.0
SN74LVCC4245APWR	TSSOP	PW	24	2000	367.0	367.0	38.0
SN74LVCC4245APWT	TSSOP	PW	24	250	367.0	367.0	38.0

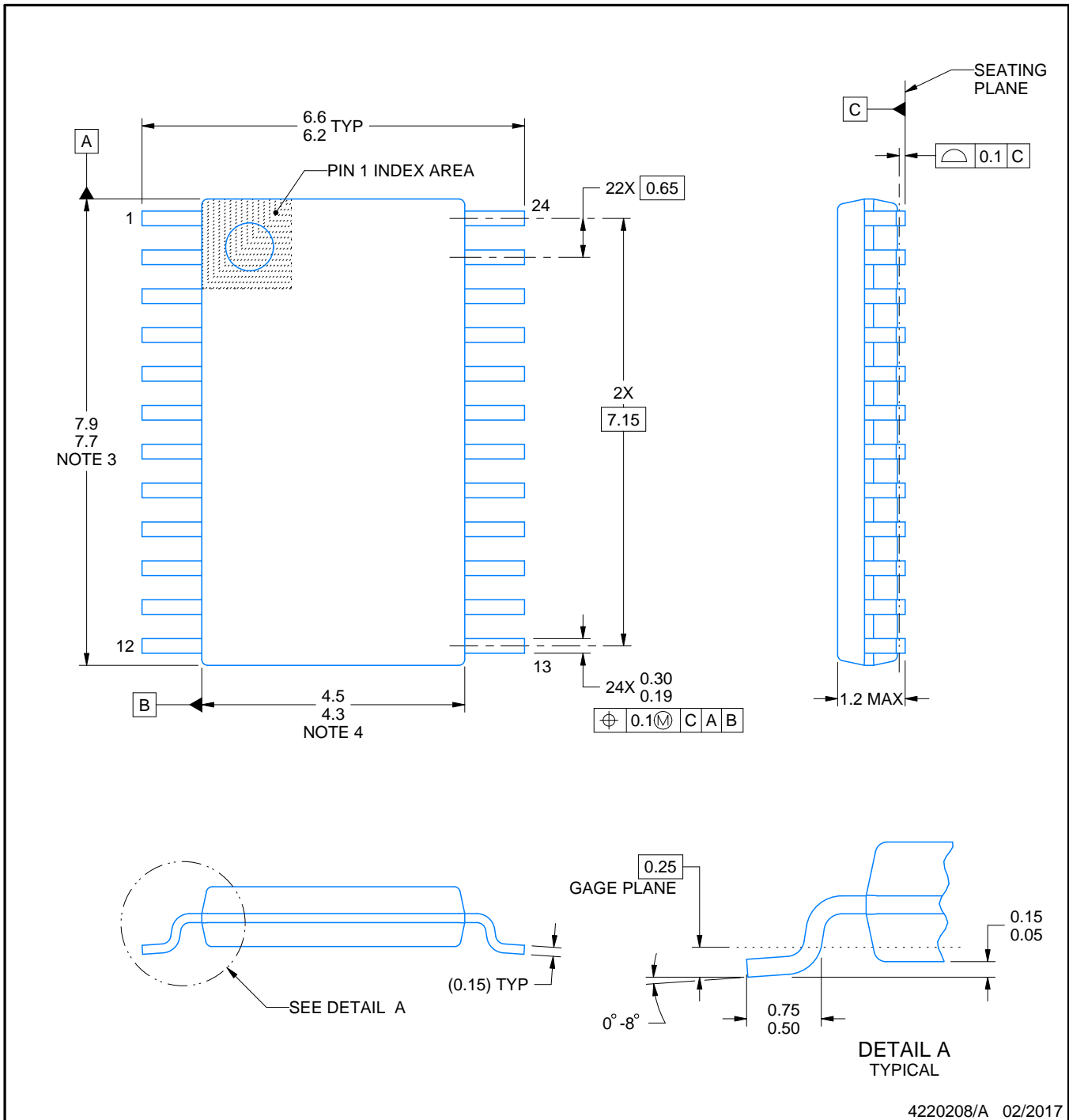
PW0024A



PACKAGE OUTLINE

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220208/A 02/2017

NOTES:

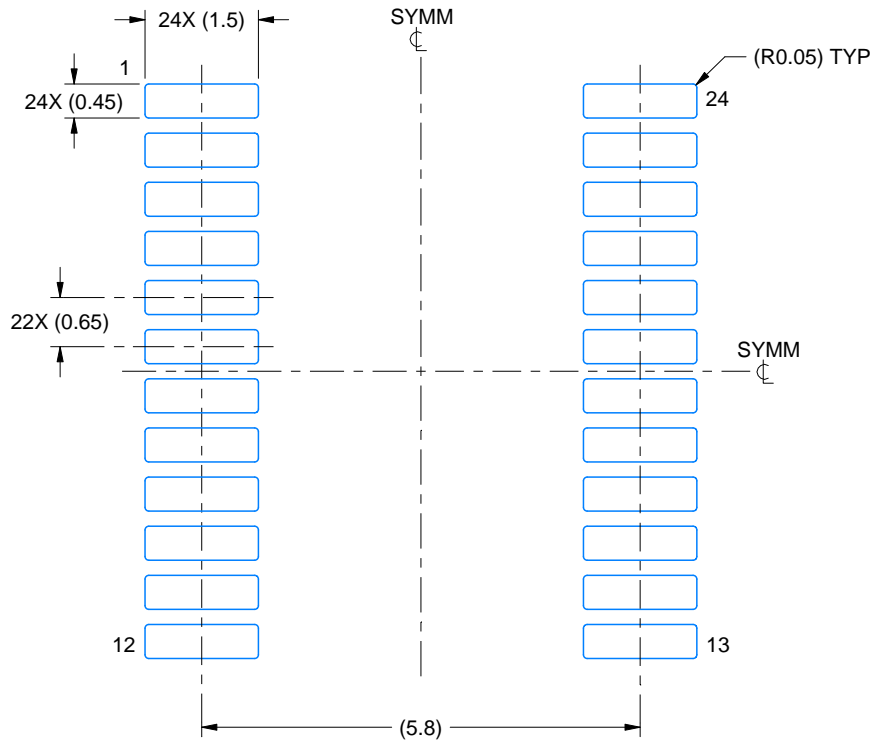
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or 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.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-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.

DW (R-PDSO-G24)

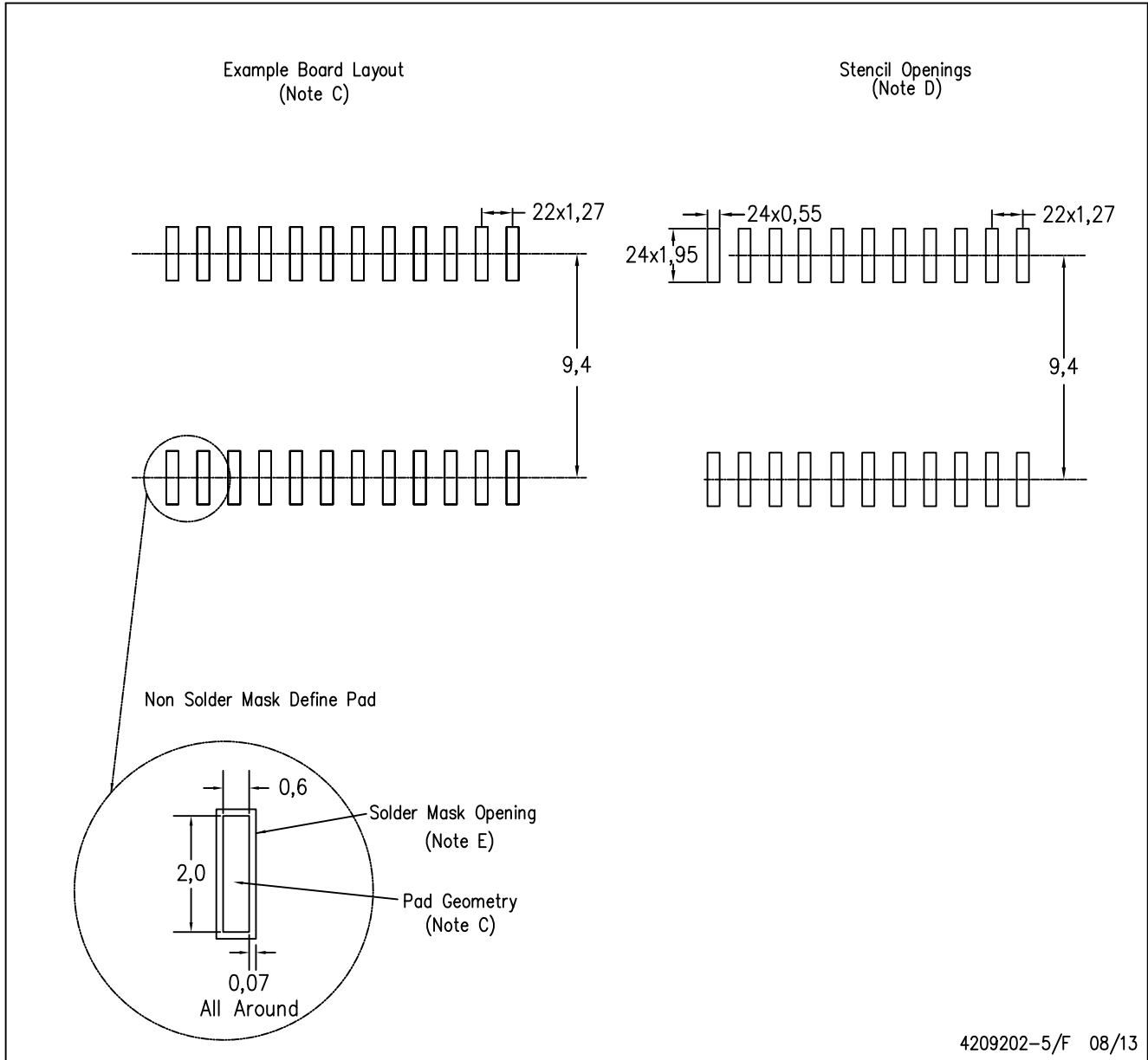
PLASTIC SMALL OUTLINE



- 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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