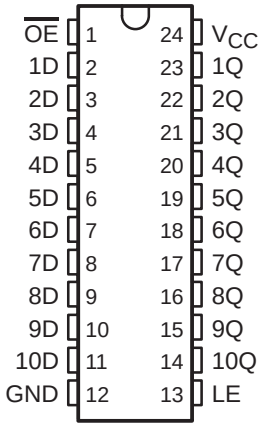
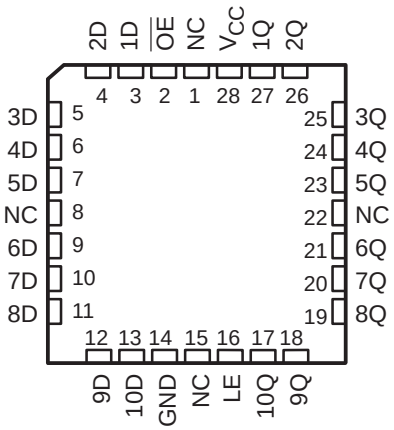
- **State-of-the-Art *EPIC*-II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **Typical V_{OLP} (Output Ground Bounce) < 1 V at V_{CC} = 5 V, T_A = 25°C**
- **High-Impedance State During Power Up and Power Down**
- **High-Drive Outputs (–32-mA I_{OH}, 64-mA I_{OL})**
- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK), Ceramic Flat (W) Package, and Plastic (NT) and Ceramic (JT) DIPs**

SN54ABT841 . . . JT OR W PACKAGE
SN74ABT841A . . . DB, DW, NT, OR PW PACKAGE
(TOP VIEW)



SN54ABT841 . . . FK PACKAGE
(TOP VIEW)



NC – No internal connection

description

The SN54ABT841 and SN74ABT841A 10-bit latches are designed specifically for driving highly capacitive or relatively low-impedance loads. They are particularly suitable for implementing buffer registers, I/O ports, bidirectional bus drivers, and working registers.

The ten transparent D-type latches provide true data at their outputs.

A buffered output-enable ($\overline{OE}$) input can be used to place the ten outputs in either a normal logic state (high or low logic levels) or a high-impedance state. In the high-impedance state, the outputs neither load nor drive the bus lines significantly. The high-impedance state and increased drive provide the capability to drive bus lines without need for interface or pullup components.

$\overline{OE}$ does not affect the internal operations of the latch. Previously stored data can be retained or new data can be entered while the outputs are in the high-impedance state.

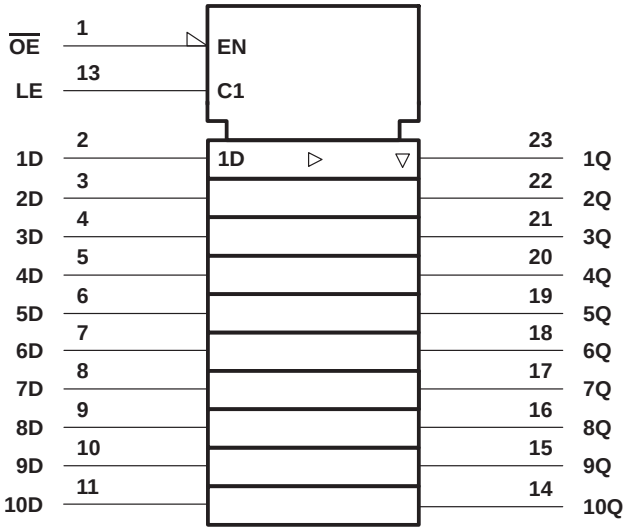
When V_{CC} is between 0 and 2.1 V, the device is in the high-impedance state during power up or power down. However, to ensure the high-impedance state above 2.1 V, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking capability of the driver.

The SN54ABT841 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT841A is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

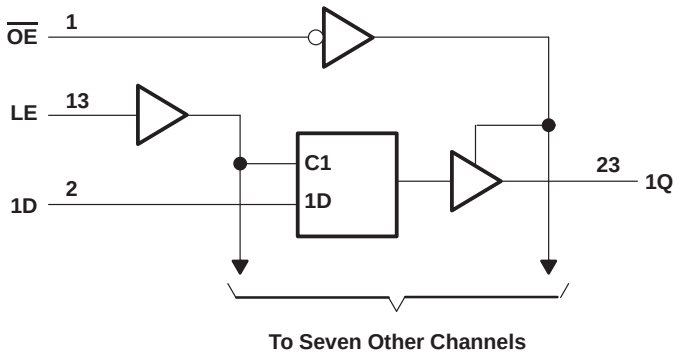
INPUTS			OUTPUT
$\overline{OE}$	LE	D	Q
L	H	H	H
L	H	L	L
L	L	X	Q_0
H	X	X	Z

logic symbol†



† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.
Pin numbers shown are for the DB, DW, JT, NT, PW, and W packages.

logic diagram (positive logic)



Pin numbers shown are for the DB, DW, JT, NT, PW, and W packages.

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

Supply voltage range, V_{CC} . . . . . –0.5 V to 7 V
Input voltage range, V_I (see Note 1) . . . . . –0.5 V to 7 V
Voltage range applied to any output in the high or power-off state, V_O . . . . . –0.5 V to 5.5 V
Current into any output in the low state, I_O: SN54ABT841 . . . . . 96 mA
SN74ABT841A . . . . . 128 mA
Input clamp current, I_{IK} (V_I < 0) . . . . . –18 mA
Output clamp current, I_{OK} (V_O < 0) . . . . . –50 mA
Package thermal impedance, θ_{JA} (see Note 2): DB package . . . . . 104°C/W
DW package . . . . . 81°C/W
NT package . . . . . 67°C/W
PW package . . . . . 120°C/W
Storage temperature range, T_{stg} . . . . . –65°C to 150°C

† 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.

NOTES: 1. The input and output negative-voltage ratings may be exceeded if the input and output clamp-current ratings are observed.
2. The package thermal impedance is calculated in accordance with EIA/JEDEC Std JESD51, except for through-hole packages, which use a trace length of zero.

recommended operating conditions (see Note 3)

		SN54ABT841		SN74ABT841A		UNIT
		MIN	MAX	MIN	MAX	
V_{CC}	Supply voltage	4.5	5.5	4.5	5.5	V
V_{IH}	High-level input voltage	2		2		V
V_{IL}	Low-level input voltage		0.8		0.8	V
V_I	Input voltage	0	V_{CC}	0	V_{CC}	V
I_{OH}	High-level output current		–24		–32	mA
I_{OL}	Low-level output current		48		64	mA
$\Delta t/\Delta v$	Input transition rise or fall rate		5		5	ns/V
$\Delta t/\Delta V_{CC}$	Power-up ramp rate	200		200		μs/V
T_A	Operating free-air temperature	–55	125	–40	85	°C

NOTE 3: Unused inputs must be held high or low to prevent them from floating.

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

PARAMETER	TEST CONDITIONS		T_A = 25°C			SN54ABT841		SN74ABT841A		UNIT
			MIN	TYP†	MAX	MIN	MAX	MIN	MAX	
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA			–1.2		–1.2		–1.2	V
V_{OH}	V_{CC} = 4.5 V,	I_{OH} = –3 mA	2.5			2.5		2.5		V
	V_{CC} = 5 V,	I_{OH} = –3 mA	3			3		3		
	V_{CC} = 4.5 V	I_{OH} = –24 mA	2			2				
		I_{OH} = –32 mA	2*					2		
V_{OL}	V_{CC} = 4.5 V	I_{OL} = 48 mA			0.55		0.55			V
		I_{OL} = 64 mA			0.55*				0.55	
V_{hys}				100						mV
I_I	V_{CC} = 0 to 5.5 V,	V_I = V_{CC} or GND			±1		±1		±1	µA
I_{OZPU}‡	V_{CC} = 0 to 2.1 V, V_O = 0.5 V to 2.7 V, $\overline{OE}$ = X				±50		±50		±50	µA
I_{OZPD}‡	V_{CC} = 2.1 V to 0, V_O = 0.5 V to 2.7 V, $\overline{OE}$ = X				±50		±50		±50	µA
I_{OZH}	V_{CC} = 2.1 V to 5.5 V, V_O = 2.7 V, $\overline{OE}$ ≥ 2 V				10		10		10	µA
I_{OZL}	V_{CC} = 2.1 V to 5.5 V, V_O = 0.5 V, $\overline{OE}$ ≥ 2 V				–10		–10		–10	µA
I_{off}	V_{CC} = 0,	V_I or V_O ≤ 4.5 V			±100				±100	µA
I_{CEX}	V_{CC} = 5.5 V, V_O = 5.5 V	Outputs high			50		50		50	µA
I_O§	V_{CC} = 5.5 V,	V_O = 2.5 V	–50	–140	–180	–50	–180	–50	–180	mA
I_{CC}	V_{CC} = 5.5 V, I_O = 0, V_I = V_{CC} or GND	Outputs high		1**	250**		280		250	µA
		Outputs low		24**	38¶**		45¶		38¶	mA
		Outputs disabled		0.5**	250**		280		250	µA
ΔI_{CC}#	V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at V_{CC} or GND	Outputs enabled			1.5		1.5		1.5	mA
		Outputs disabled			250**		280		250	µA
		Control inputs			1.5		1.5		1.5	mA
C_i	V_I = 2.5 V or 0.5 V			4						pF
C_o	V_O = 2.5 V or 0.5 V			7						pF

* On products compliant to MIL-PRF-38535, this parameter does not apply.
** These limits apply only to the SN74ABT841A.
† All typical values are at V_{CC} = 5 V.
‡ This parameter is characterized, but not production tested.
§ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
¶ This limit may vary among suppliers.
# This is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 1)

			V_{CC} = 5 V, T_A = 25°C		SN54ABT841		SN74ABT841A		UNIT
			MIN	MAX	MIN	MAX	MIN	MAX	
t_w	Pulse duration, LE high or low		3.3		3.3		3.3		ns
t_{su}	Setup time, data before LE↓	High	2.5		2.5		2.5		ns
		Low	1.5		1.5		1.5		
t_h	Hold time, data after LE↓	High	1.5		1.5		1.5		ns
		Low	1.5		2		1.5		

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54ABT841					UNIT
			V_{CC} = 5 V, T_A = 25°C			MIN	MAX	
			MIN	TYP	MAX			
t_{PLH}	D	Q	1†	4.1	5.5	1†	6.8	ns
t_{PHL}			1.5†	4	5.5	1.5†	6.8	
t_{PLH}	LE	Q	1.6†	4.1	6.6†	1.6†	7.4	ns
t_{PHL}			2†	4.6	6.2	2†	6.8	
t_{PZH}	$\overline{OE}$	Q	1	3	4.9†	1	5.8	ns
t_{PZL}			2.2	4.1	5.7†	2.2	6.5	
t_{PHZ}	$\overline{OE}$	Q	2†	4.7	6.2	2†	7.2	ns
t_{PLZ}			1.5†	4.6	6.1	1.5†	6.6	

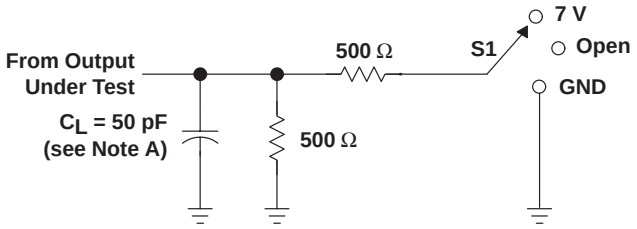
† This data sheet limit may vary among suppliers.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74ABT841A					UNIT
			V_{CC} = 5 V, T_A = 25°C			MIN	MAX	
			MIN	TYP	MAX			
t_{PLH}	D	Q	1.4†	4.1	5.5	1.4†	6.2†	ns
t_{PHL}			1.5†	4	5.5	1.5†	6.2	
t_{PLH}	LE	Q	2.1†	4.1	5.9†	2.1†	6.5†	ns
t_{PHL}			2.4†	4.6	6.2	2.4†	6.7	
t_{PZH}	$\overline{OE}$	Q	1	3	4.7†	1	5.3†	ns
t_{PZL}			2.2	4.1	5.7†	2.2	6.3†	
t_{PHZ}	$\overline{OE}$	Q	2.6†	4.7	6.2	2.6†	7.1	ns
t_{PLZ}			1.9†	4.6	6.1	1.9†	6.5	

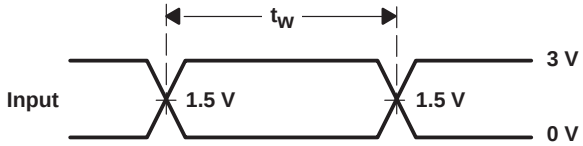
† This data sheet limit may vary among suppliers.

PARAMETER MEASUREMENT INFORMATION

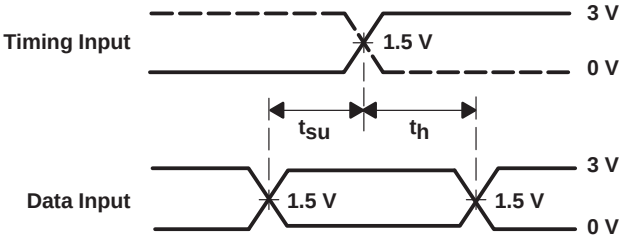


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

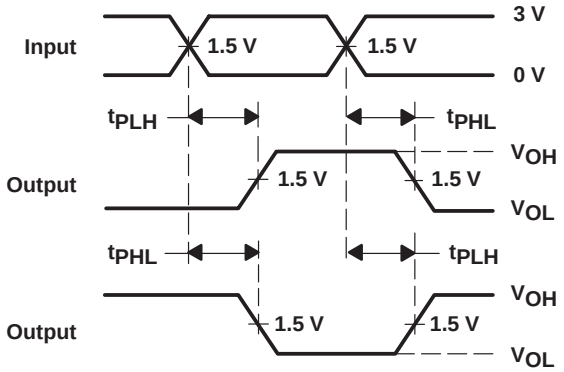
LOAD CIRCUIT



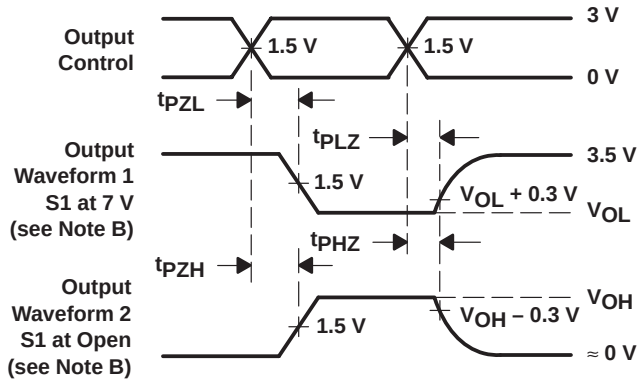
VOLTAGE WAVEFORMS
PULSE DURATION



VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS



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

NOTES: A. C_L includes probe and jig capacitance.
B. Waveform 1 is for an output with internal conditions such that the output is low except when disabled by the output control. Waveform 2 is for an output with internal conditions such that the output is high except when disabled by the output control.
C. All input pulses are supplied by generators having the following characteristics: PRR ≤ 10 MHz, Z_O = 50 Ω, t_r ≤ 2.5 ns, t_f ≤ 2.5 ns.
D. The outputs are measured one at a time with one transition per measurement.

Figure 1. 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)
5962-9676901QLA	Active	Production	CDIP (JT) | 24	15 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9676901QL A SNJ54ABT841JT
SN74ABT841ADBR	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841ADBR.B	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841ADBRE4	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841ADW	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT841A
SN74ABT841ADW.B	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT841A
SN74ABT841ADWG4	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT841A
SN74ABT841ADWR	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT841A
SN74ABT841ADWR.B	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT841A
SN74ABT841APW	Active	Production	TSSOP (PW) | 24	60 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841APW.B	Active	Production	TSSOP (PW) | 24	60 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841APWR	Active	Production	TSSOP (PW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SN74ABT841APWR.B	Active	Production	TSSOP (PW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB841A
SNJ54ABT841JT	Active	Production	CDIP (JT) | 24	15 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9676901QL A SNJ54ABT841JT

(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.

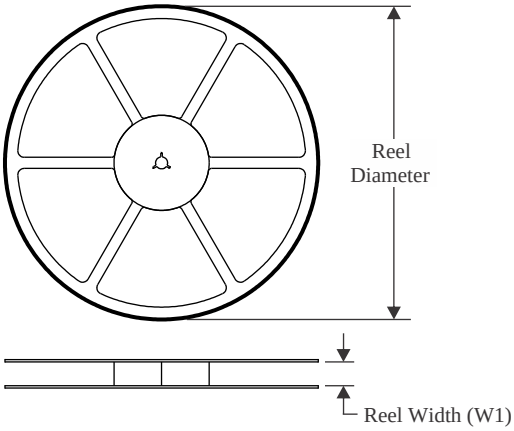
(5) **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will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

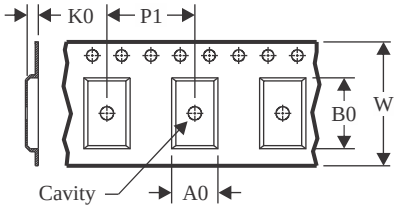
Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "~" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

TAPE AND REEL INFORMATION

REEL DIMENSIONS

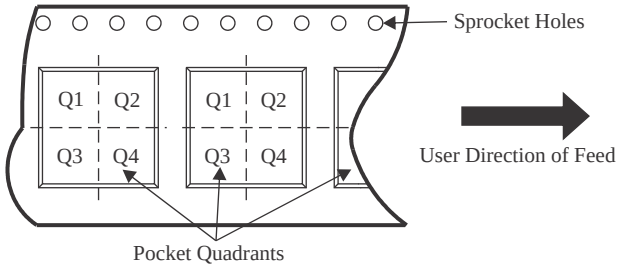


TAPE DIMENSIONS



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

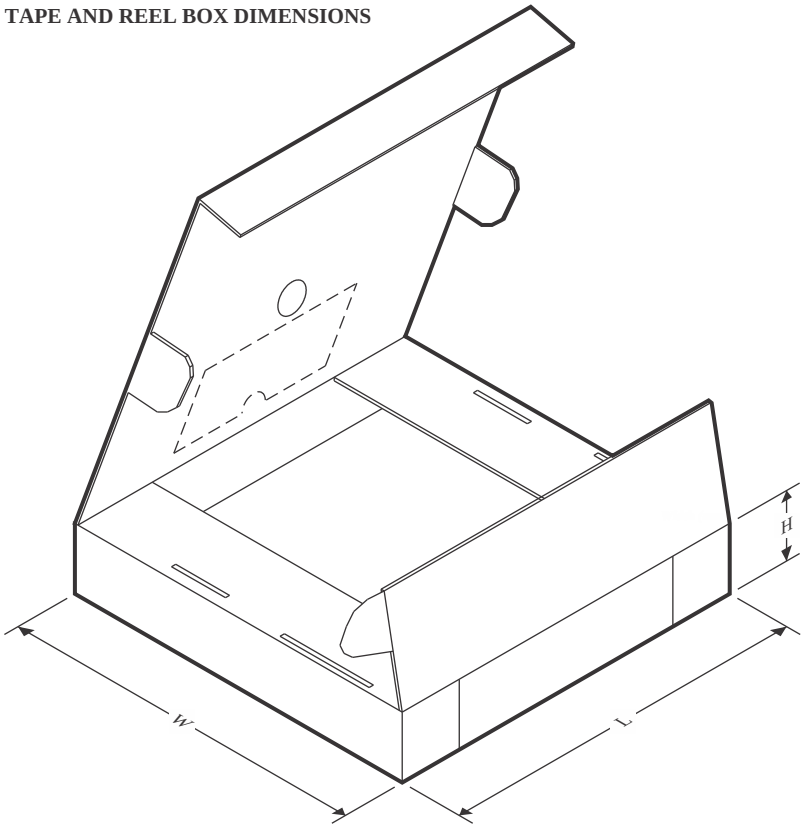
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74ABT841ADBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74ABT841ADWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1

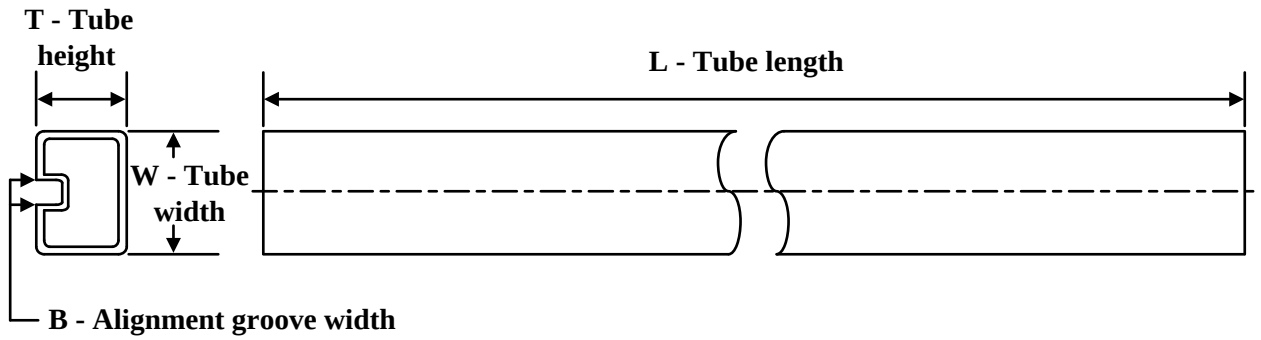
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ABT841ADBR	SSOP	DB	24	2000	353.0	353.0	32.0
SN74ABT841ADWR	SOIC	DW	24	2000	350.0	350.0	43.0

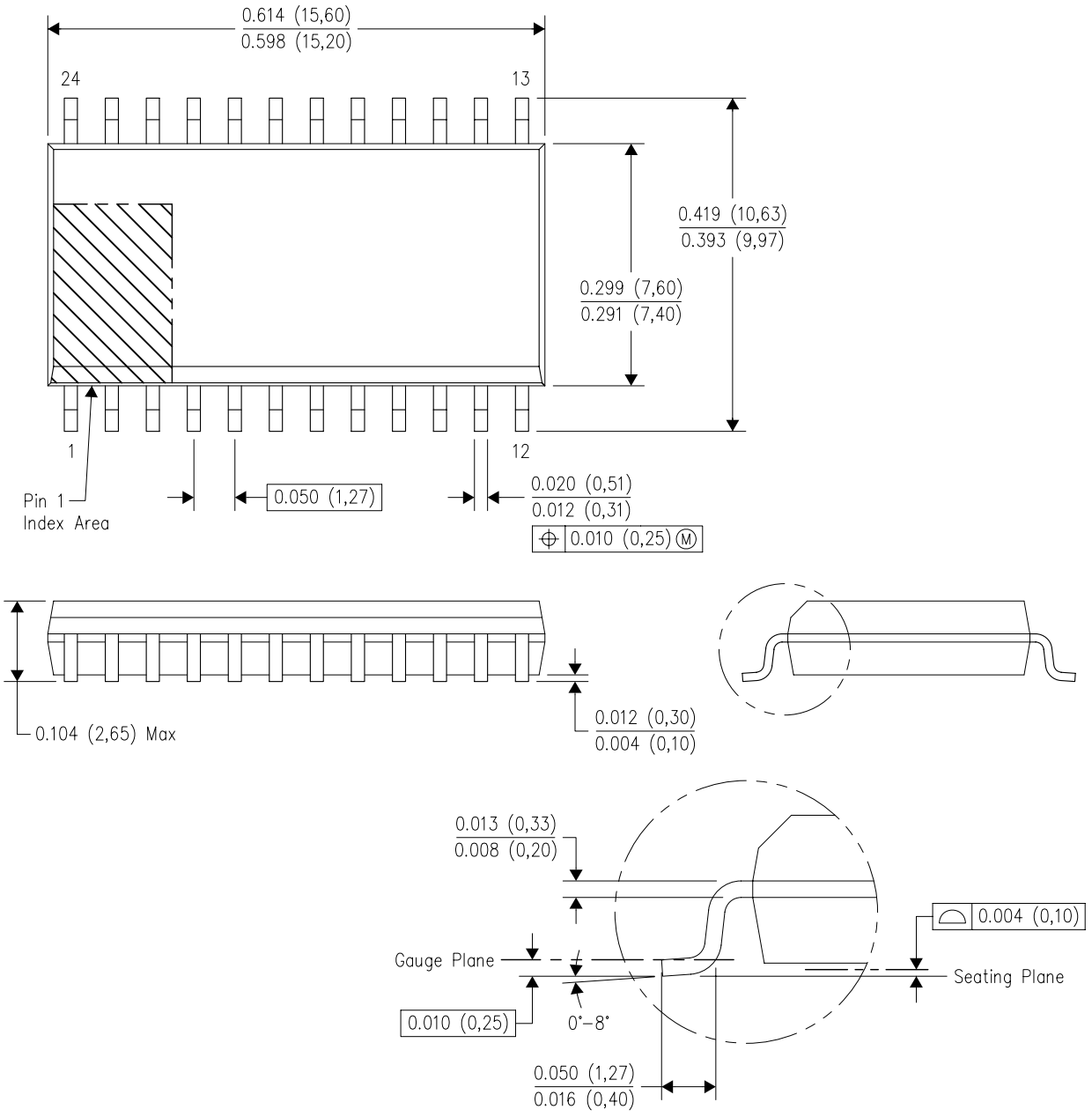
TUBE



*All dimensions are nominal

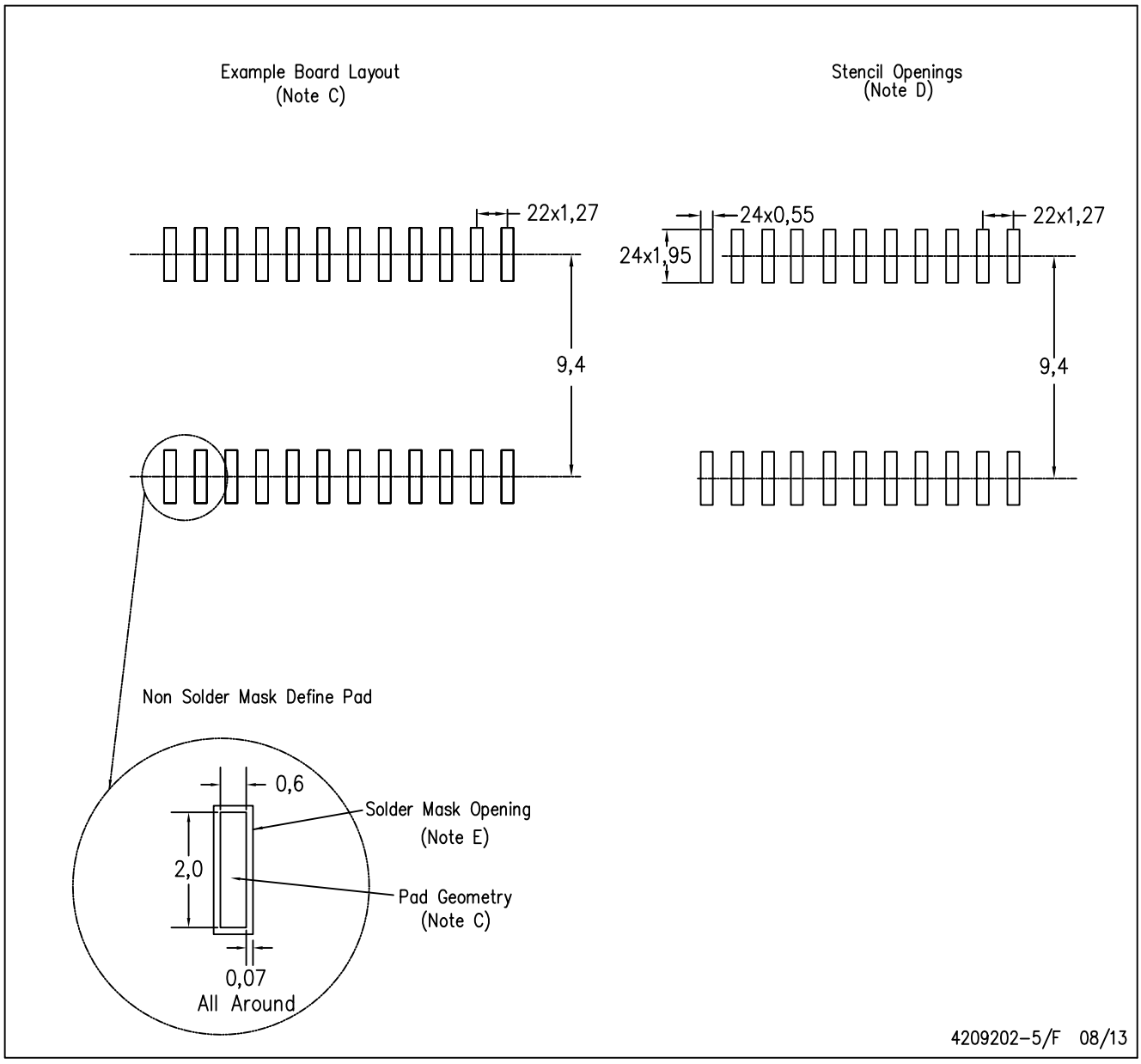
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74ABT841ADW	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT841ADW.B	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT841ADWG4	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT841APW	PW	TSSOP	24	60	530	10.2	3600	3.5
SN74ABT841APW.B	PW	TSSOP	24	60	530	10.2	3600	3.5

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

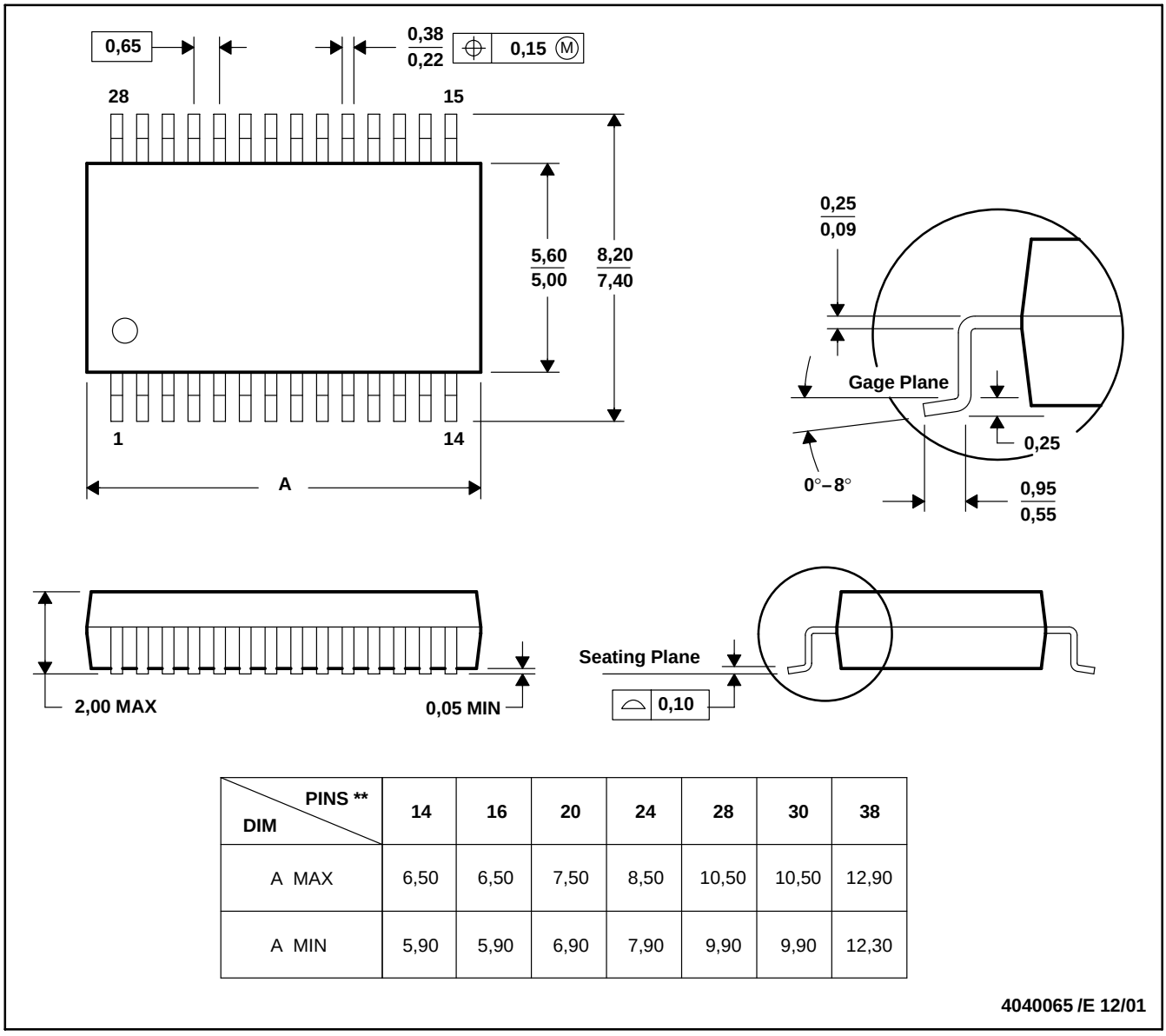


NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Refer to IPC7351 for alternate board design.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly 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.

MSSO002E – JANUARY 1995 – REVISED DECEMBER 2001

DB (R-PDSO-G)** **PLASTIC SMALL-OUTLINE**

28 PINS SHOWN



DIM \ PINS **	14	16	20	24	28	30	38
A MAX	6,50	6,50	7,50	8,50	10,50	10,50	12,90
A MIN	5,90	5,90	6,90	7,90	9,90	9,90	12,30

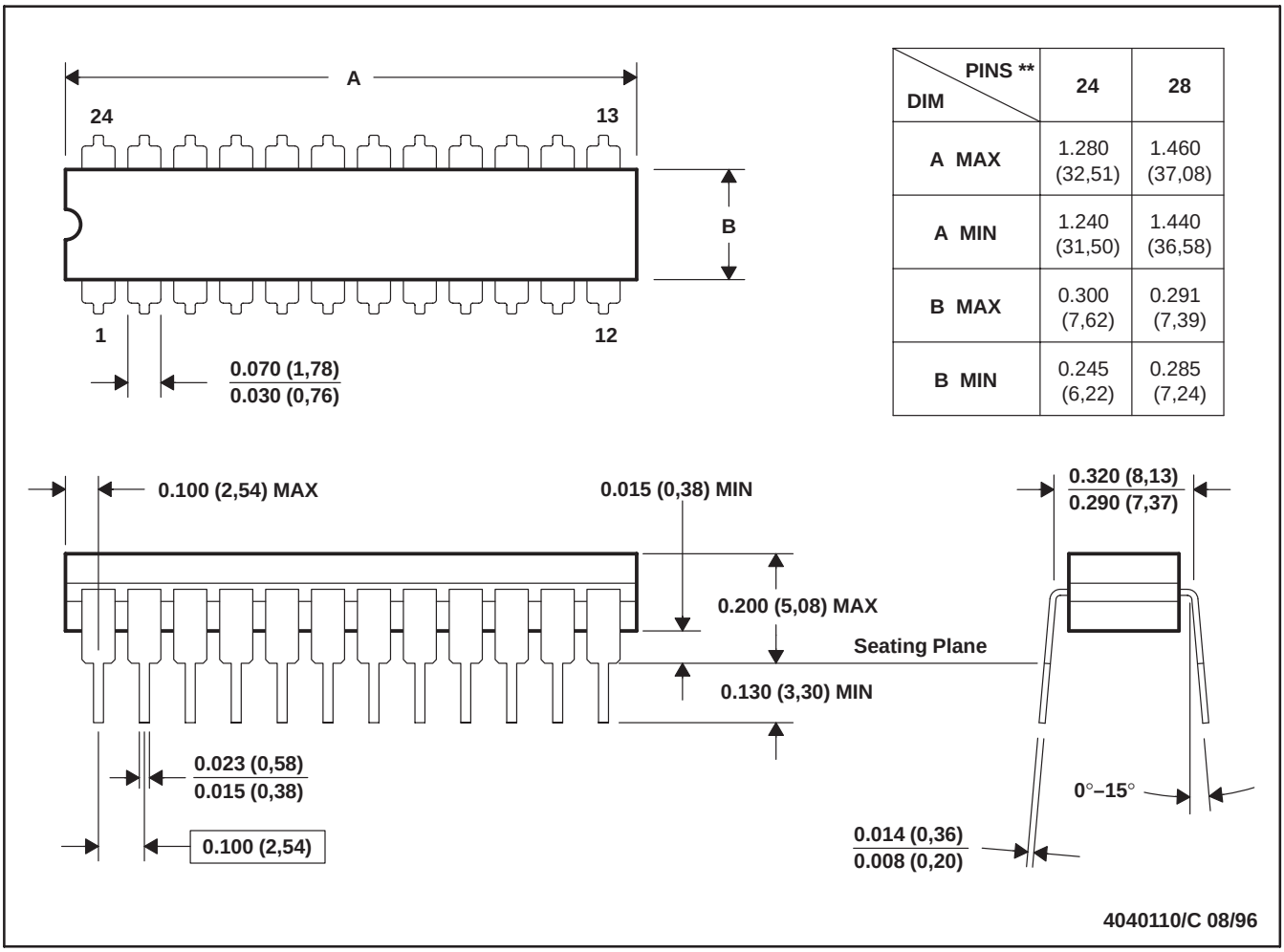
4040065 /E 12/01

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

MCER004A – JANUARY 1995 – REVISED JANUARY 1997

JT (R-GDIP-T)** **CERAMIC DUAL-IN-LINE**

24 LEADS SHOWN



DIM \ PINS **	24	28
A MAX	1.280 (32,51)	1.460 (37,08)
A MIN	1.240 (31,50)	1.440 (36,58)
B MAX	0.300 (7,62)	0.291 (7,39)
B MIN	0.245 (6,22)	0.285 (7,24)

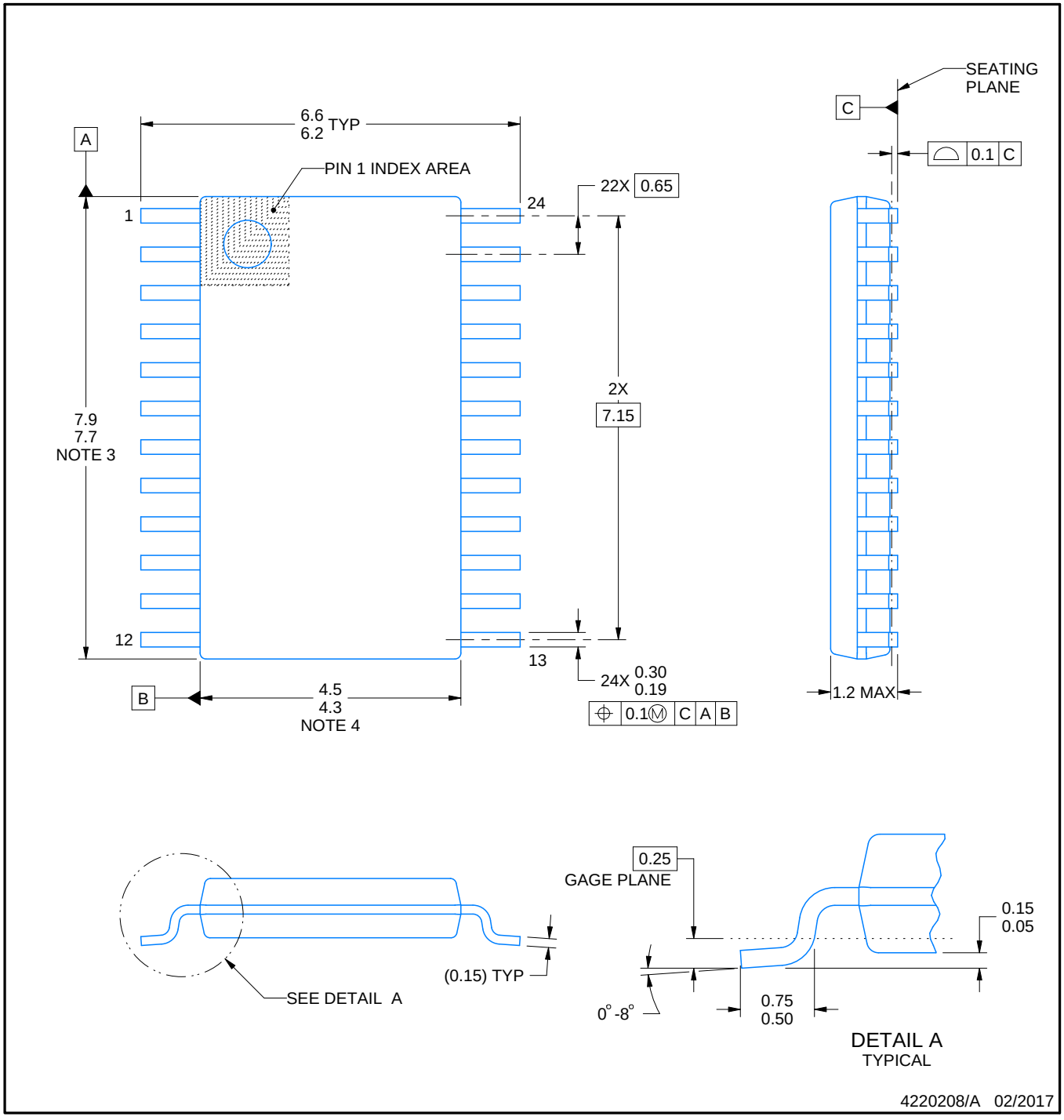
NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification.
E. Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28, and JEDEC MO-058 AA, MO-058 AB

PACKAGE OUTLINE

PW0024A

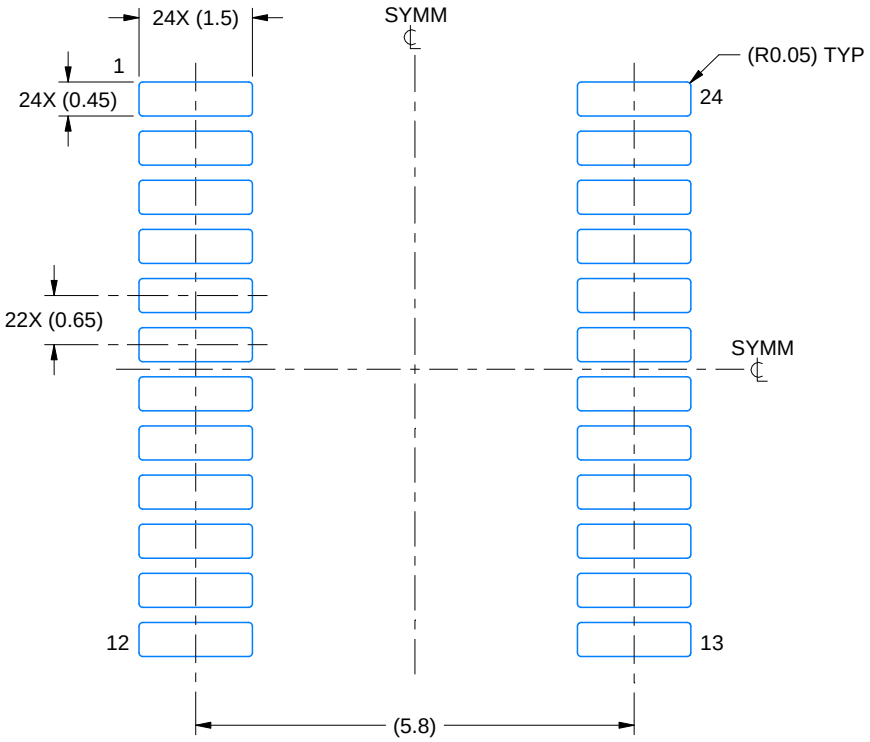
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

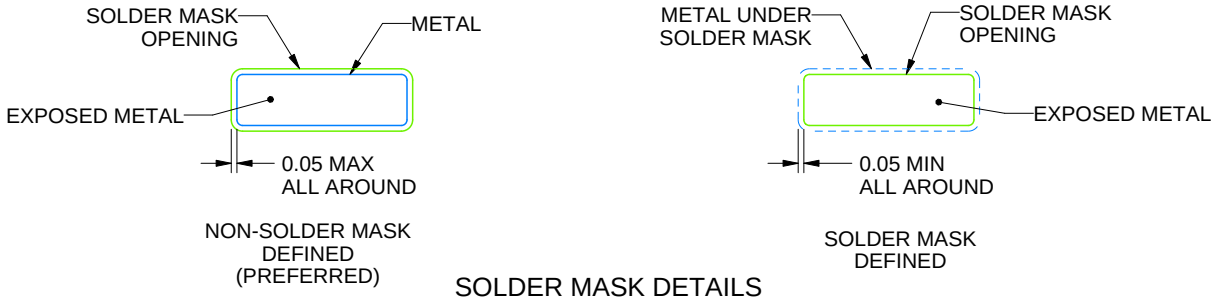


NOTES:

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.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

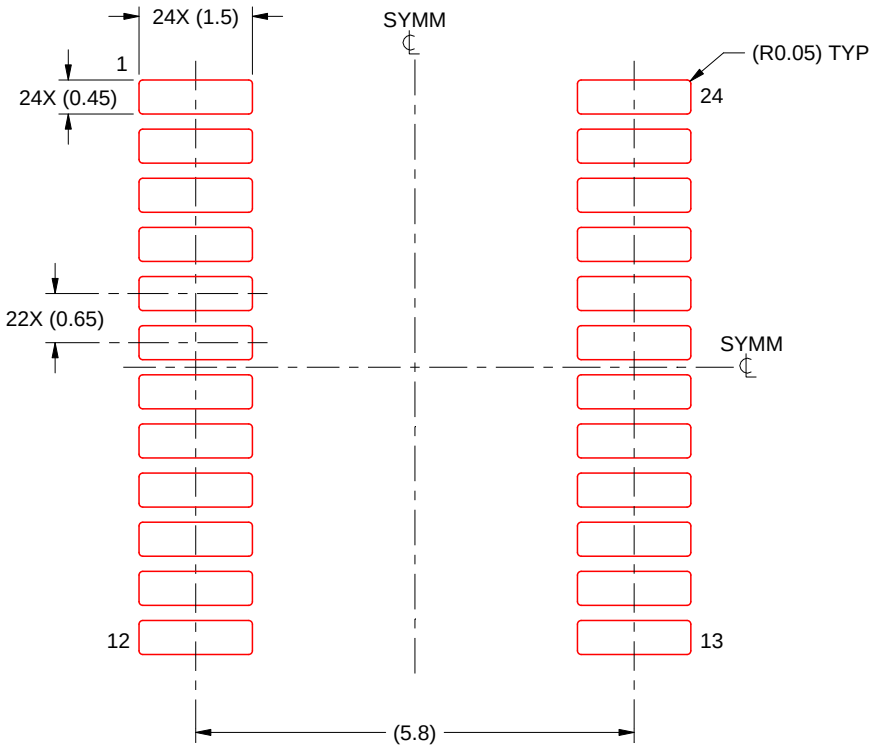


SOLDER MASK DETAILS

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.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 10X

4220208/A 02/2017

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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