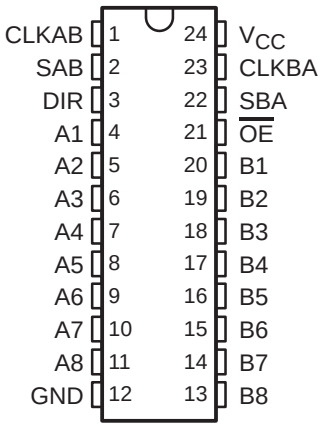
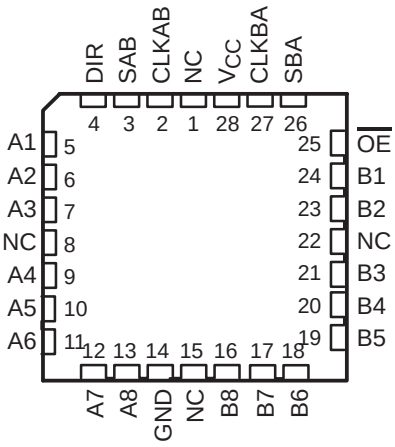
- **Typical V_{OLP} (Output Ground Bounce) <1 V at V_{CC} = 5 V, T_A = 25°C**
- **High-Drive Outputs (−32-mA I_{OH}, 64-mA I_{OL})**
- **I_{off} Supports Partial-Power-Down Mode Operation**
- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**
- **ESD Protection Exceeds JESD 22**
  - **2000-V Human-Body Model (A114-A)**
  - **200-V Machine Model (A115-A)**

SN54ABT646A . . . JT OR W PACKAGE
SN74ABT646A . . . DB, DGV, DW, NS, NT, OR PW PACKAGE
(TOP VIEW)



SN54ABT646A . . . FK PACKAGE
(TOP VIEW)



NC − No internal connection

description/ordering information

These devices consist of bus-transceiver circuits, D-type flip-flops, and control circuitry arranged for multiplexed transmission of data directly from the input bus or from the internal registers. Data on the A or B bus is clocked into the registers on the low-to-high transition of the appropriate clock (CLKAB or CLKBA) input. Figure 1 illustrates the four fundamental bus-management functions that can be performed with the ’ABT646A devices.

ORDERING INFORMATION

T_A	PACKAGE†		ORDERABLE PART NUMBER	TOP-SIDE MARKING
−40°C to 85°C	PDIP − NT	Tube	SN74ABT646ANT	SN74ABT646ANT
	SOIC − DW	Tube	SN74ABT646ADW	ABT646A
		Tape and reel	SN74ABT646ADWR	
	SOP − NS	Tape and reel	SN74ABT646ANSR	ABT646A
	SSOP − DB	Tape and reel	SN74ABT646ADBR	AB646A
	TSSOP − PW	Tube	SN74ABT646APW	AB646A
		Tape and reel	SN74ABT646APWR	
	TVSOP − DGV	Tape and reel	SN74ABT646ADGVR	AB646A
−55°C to 125°C	CDIP − JT	Tube	SNJ54ABT646AJT	SNJ54ABT646AJT
	CFP − W	Tube	SNJ54ABT646AW	SNJ54ABT646AW
	LCCC − FK	Tube	SNJ54ABT646AFK	SNJ54ABT646AFK

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

description/ordering information(continued)

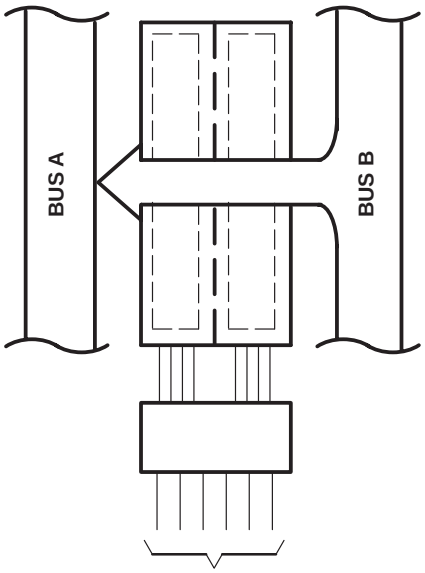
Output-enable ($\overline{OE}$) and direction-control (DIR) inputs are provided to control the transceiver functions. In the transceiver mode, data present at the high-impedance port can be stored in either register or in both.

The select-control (SAB and SBA) inputs can multiplex stored and real-time (transparent mode) data. The direction control (DIR) determines which bus receives data when $\overline{OE}$ is low. In the isolation mode ($\overline{OE}$ high), A data can be stored in one register and/or B data can be stored in the other register.

When an output function is disabled, the input function still is enabled and can be used to store and transmit data. Only one of the two buses, A or B, can be driven at a time.

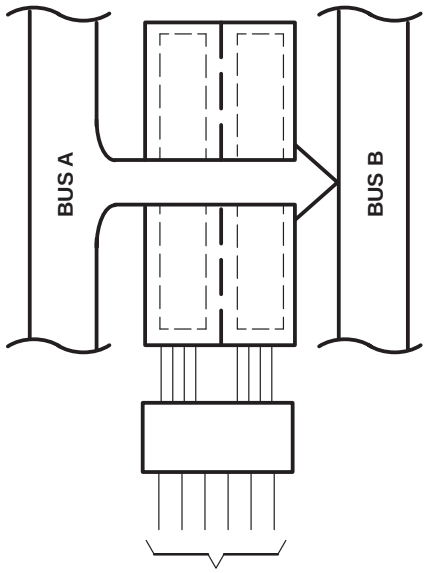
These devices are fully specified for partial-power-down applications using I_{off}. The I_{off} circuitry disables the outputs, preventing damaging current backflow through the devices when they are powered down.

To ensure the high-impedance state during power up or power down, $\overline{OE}$ 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.



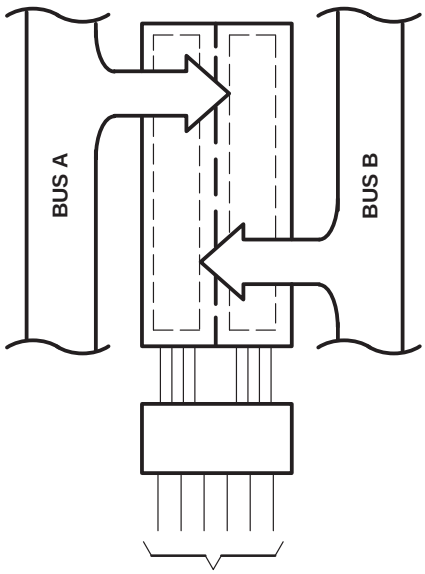
21	3	1	23	2	22
$\overline{OE}$	DIR	CLKAB	CLKBA	SAB	SBA
L	L	X	X	X	L

REAL-TIME TRANSFER
BUS B TO BUS A



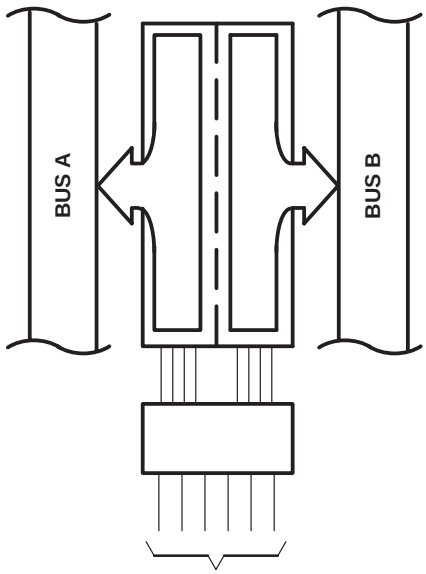
21	3	1	23	2	22
$\overline{OE}$	DIR	CLKAB	CLKBA	SAB	SBA
L	H	X	X	L	X

REAL-TIME TRANSFER
BUS A TO BUS B



21	3	1	23	2	22
$\overline{OE}$	DIR	CLKAB	CLKBA	SAB	SBA
X	X	↑	X	X	X
X	X	X	↑	X	X
H	X	↑	↑	X	X

STORAGE FROM
A, B, OR A AND B



21	3	1	23	2	22
$\overline{OE}$	DIR	CLKAB	CLKBA	SAB	SBA
L	L	X	H or L	X	H
L	H	H or L	X	H	X

TRANSFER STORED DATA
TO A AND/OR B

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

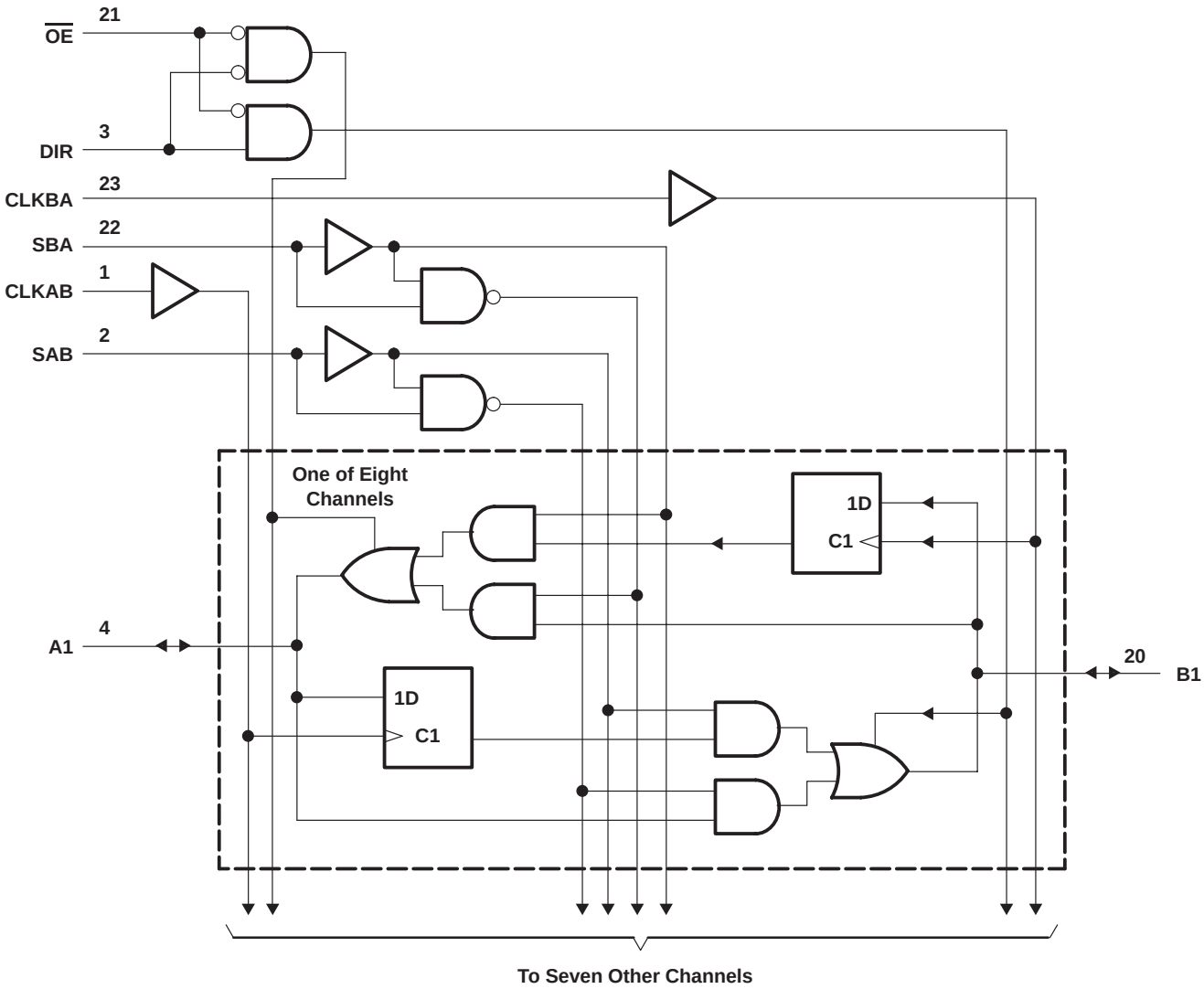
Figure 1. Bus-Management Functions

FUNCTION TABLE

INPUTS						DATA I/Os		OPERATION OR FUNCTION
$\overline{OE}$	DIR	CLKAB	CLKBA	SAB	SBA	A1−A8	B1−B8	
X	X	↑	X	X	X	Input	Unspecified†	Store A, B unspecified†
X	X	X	↑	X	X	Unspecified†	Input	Store B, A unspecified†
H	X	↑	↑	X	X	Input	Input	Store A and B data
H	X	H or L	H or L	X	X	Input disabled	Input disabled	Isolation, hold storage
L	L	X	X	X	L	Output	Input	Real-time B data to A bus
L	L	X	H or L	X	H	Output	Input	Stored B data to A bus
L	H	X	X	L	X	Input	Output	Real-time A data to B bus
L	H	H or L	X	H	X	Input	Output	Stored A data to B bus

† The data-output functions can be enabled or disabled by various signals at $\overline{OE}$ and DIR. Data-input functions always are enabled, i.e., data at the bus terminals is stored on every low-to-high transition of the clock inputs.

logic diagram (positive logic)



Pin numbers shown are for the DB, DGV, DW, JT, NS, 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 (except I/O ports) (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: SN54ABT646A . . . . . 96 mA
SN74ABT646A . . . . . 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 . . . . . 63°C/W
(see Note 2): DGV package . . . . . 86°C/W
(see Note 2): DW package . . . . . 46°C/W
(see Note 2): NS package . . . . . 65°C/W
(see Note 3): NT package . . . . . 67°C/W
(see Note 2): PW package . . . . . 88°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 JESD 51-7.
3. The package thermal impedance is calculated in accordance with JESD 51-3.

recommended operating conditions (see Note 4)

		SN54ABT646A		SN74ABT646A		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
T_A	Operating free-air temperature	−55	125	−40	85	°C

NOTE 4: 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		T_A = 25°C			SN54ABT646A		SN74ABT646A		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	Control inputs	V_{CC} = 5.5 V, V_I = V_{CC} or GND				±1		±1		±1	µA
	A or B ports					±100		±100		±100	
I_{OZH}‡		V_{CC} = 5.5 V,	V_O = 2.7 V			10§		10§		10§	µA
I_{OZL}‡		V_{CC} = 5.5 V,	V_O = 0.5 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	−100	−180	−50	−180	−50	−180	mA
I_{CC}		V_{CC} = 5.5 V, I_O = 0, V_I = V_{CC} or GND	Outputs high			250		250		250	µA
			Outputs low			30		30		30	mA
			Outputs disabled			250		250		250	µA
ΔI_{CC}#		V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at V_{CC} or GND				1.5		1.5		1.5	mA
C_i	Control inputs	V_I = 2.5 V or 0.5 V			7						pF
C_{io}	A or B ports	V_O = 2.5 V or 0.5 V			12						pF

* On products compliant to MIL-PRF-38535, this parameter does not apply.
† All typical values are at V_{CC} = 5 V.
‡ The parameters I_{OZH} and I_{OZL} include the input leakage current.
§ This data-sheet limit may vary among suppliers.
¶ Not more than one output should be tested at a time, and the duration of the test should not exceed one second.
# 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 2)

		SN54ABT646A				UNIT
		V_{CC} = 5 V, T_A = 25°C		MIN	MAX	
		MIN	MAX			
f_{clock}	Clock frequency		125		125	MHz
t_w	Pulse duration, CLK high or low	4		4		ns
t_{su}	Setup time, A or B before CLKAB↑ or CLKBA↑	3		3.5		ns
t_h	Hold time, A or B after CLKAB↑ or CLKBA↑	1.5		1.5		ns

timing requirements over recommended ranges of supply voltage and operating free-air temperature (unless otherwise noted) (see Figure 2)

		SN74ABT646A				UNIT
		V_{CC} = 5 V, T_A = 25°C		MIN	MAX	
		MIN	MAX			
f_{clock}	Clock frequency		125		125	MHz
t_w	Pulse duration, CLK high or low	4		4		ns
t_{su}	Setup time, A or B before CLKAB↑ or CLKBA↑	3		3		ns
t_h	Hold time, A or B after CLKAB↑ or CLKBA↑	0		0		ns

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN54ABT646A					UNIT
			V_{CC} = 5 V, T_A = 25°C			MIN	MAX	
			MIN	TYP	MAX			
f_{max}			125			125		MHz
t_{PLH}	CLKBA or CLKAB	A or B	2.2	4	5.1	2.2	6.7	ns
t_{PHL}			1.7	4	5.1	1.2	6.7	
t_{PLH}	A or B	B or A	1.5	3	4.3	1.5	5	ns
t_{PHL}			1.5	3.3	4.6	1.5	5.6	
t_{PLH}	SAB or SBA†	B or A	1.5	4	5.7	1.5	7.8	ns
t_{PHL}			1.5	3.6	4.9	1.5	6.2	
t_{PZH}	$\overline{OE}$	A or B	1.5	4.3	5.3	1.5	7	ns
t_{PZL}			3	5.8	8	3	10.5	
t_{PHZ}	$\overline{OE}$	A or B	1.5	3.5	5.8	1	7.3	ns
t_{PLZ}			1.5	3	4	1.5	5.7	
t_{PZH}	DIR	A or B	1.5	4.5	5.7	1.5	7.3	ns
t_{PZL}			2.5	6.5	9	2.5	11	
t_{PHZ}	DIR	A or B	1.5	3.8	6.5	1	9	ns
t_{PLZ}			1.5	3.8	4.7	1.2	6.7	

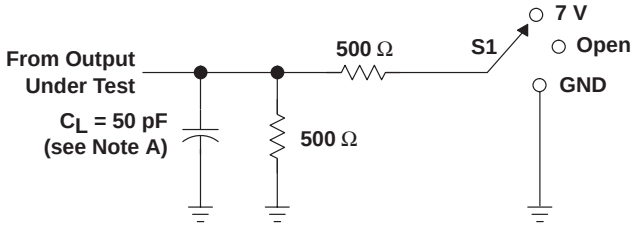
† These parameters are measured with the internal output state of the storage register opposite that of the bus input.

switching characteristics over recommended ranges of supply voltage and operating free-air temperature, C_L = 50 pF (unless otherwise noted) (see Figure 2)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	SN74ABT646A					UNIT
			V_{CC} = 5 V, T_A = 25°C			MIN	MAX	
			MIN	TYP	MAX			
f_{max}			125			125		MHz
t_{PLH}	CLKBA or CLKAB	A or B	2.2	4	5.1	2.2	5.6	ns
t_{PHL}			1.7	4	5.1	1.7	5.6	
t_{PLH}	A or B	B or A	1.5	3	4.3	1.5	4.8	ns
t_{PHL}			1.5	3.3	4.6	1.5	5.4	
t_{PLH}	SAB or SBA†	B or A	1.5	4	5.1	1.5	6.5	ns
t_{PHL}			1.5	3.6	4.9	1.5	5.9	
t_{PZH}	$\overline{OE}$	A or B	1.5	4.3	5.3	1.5	6.3	ns
t_{PZL}			3	5.8	7.4	3	8.8	
t_{PHZ}	$\overline{OE}$	A or B	1.5	3.5	4.5	1.5	5	ns
t_{PLZ}			1.5	3	4	1.5	4.5	
t_{PZH}	DIR	A or B	1.5	4.5	5.7	1.5	6.7	ns
t_{PZL}			2.5	6.5	9	2.5	9.5	
t_{PHZ}	DIR	A or B	1.5	3.8	5	1.5	5.7	ns
t_{PLZ}			1.5	3.8	4.7	1.5	6	

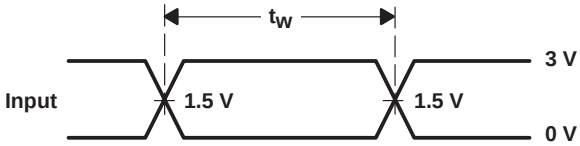
† These parameters are measured with the internal output state of the storage register opposite that of the bus input.

PARAMETER MEASUREMENT INFORMATION

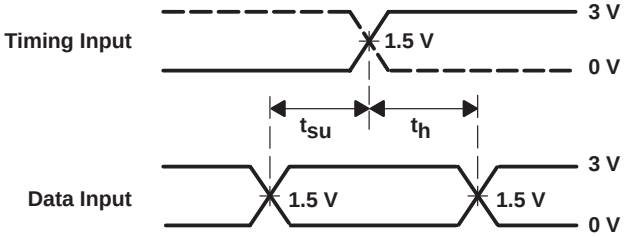


TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

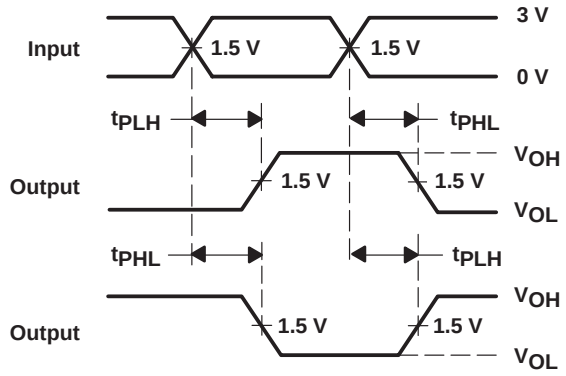
LOAD CIRCUIT



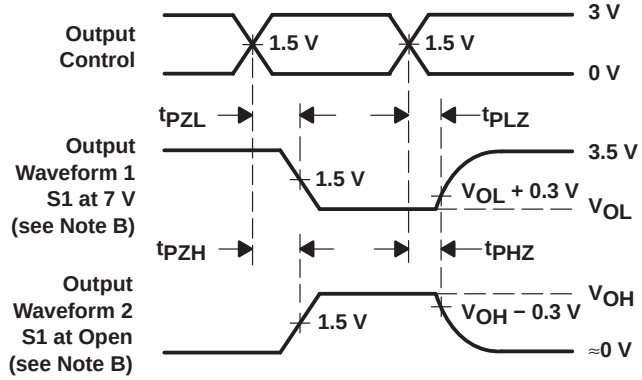
VOLTAGE WAVEFORMS
PULSE DURATION



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.
E. All parameters and waveforms are not applicable to all devices.

Figure 2. 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)
5962-9457702Q3A	Active	Production	LCCC (FK) | 28	42 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9457702Q3A SNJ54ABT646AFK
5962-9457702QLA	Active	Production	CDIP (JT) | 24	15 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9457702QLA SNJ54ABT646AJT
SN74ABT646ADBR	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SN74ABT646ADBR.B	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SN74ABT646ADBRG4	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SN74ABT646ADBRG4.B	Active	Production	SSOP (DB) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SN74ABT646ADW	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADW.B	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADWG4	Active	Production	SOIC (DW) | 24	25 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADWR	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADWR.B	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADWRG4	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ADWRG4.B	Active	Production	SOIC (DW) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ANSR	Active	Production	SOP (NS) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646ANSR.B	Active	Production	SOP (NS) | 24	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT646A
SN74ABT646APW	Active	Production	TSSOP (PW) | 24	60 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SN74ABT646APW.B	Active	Production	TSSOP (PW) | 24	60 | TUBE	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AB646A
SNJ54ABT646AFK	Active	Production	LCCC (FK) | 28	42 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9457702Q3A SNJ54ABT646AFK
SNJ54ABT646AJT	Active	Production	CDIP (JT) | 24	15 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9457702QLA SNJ54ABT646AJT

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

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

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

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

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

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

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

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In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

OTHER QUALIFIED VERSIONS OF SN54ABT646A, SN74ABT646A :

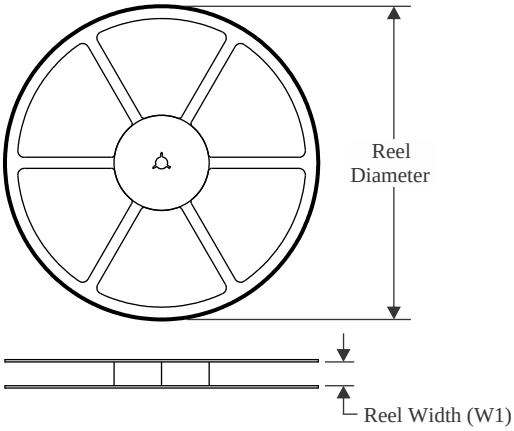
- Catalog : SN74ABT646A
- Military : SN54ABT646A

NOTE: Qualified Version Definitions:

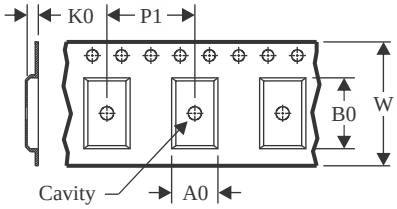
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

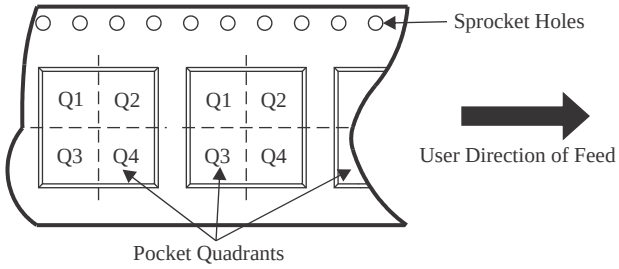


TAPE DIMENSIONS



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

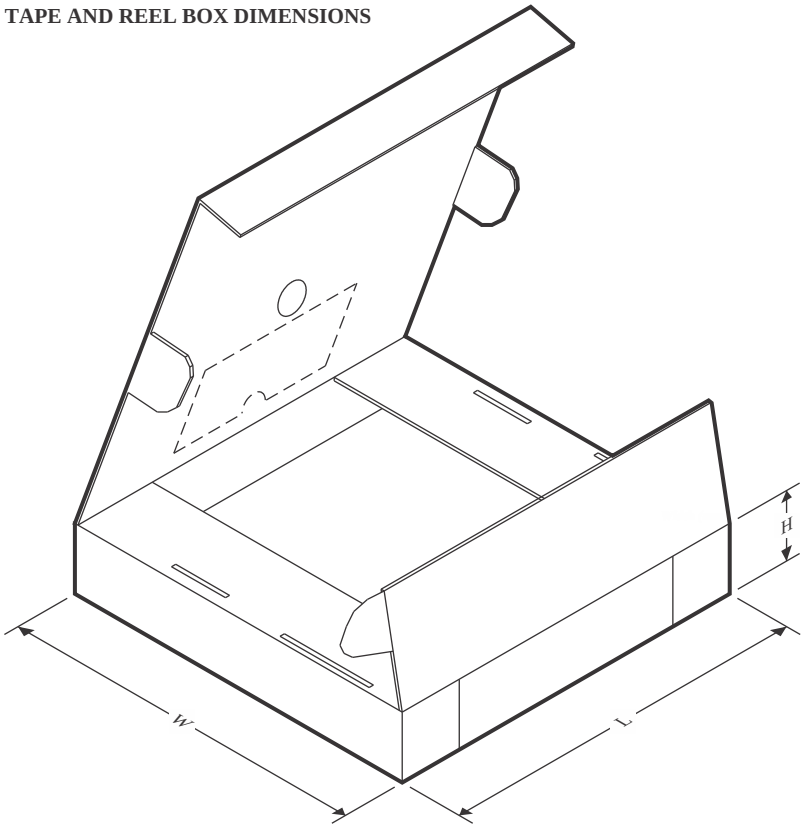
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
SN74ABT646ADBR	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74ABT646ADBRG4	SSOP	DB	24	2000	330.0	16.4	8.2	8.8	2.5	12.0	16.0	Q1
SN74ABT646ADWR	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74ABT646ADWRG4	SOIC	DW	24	2000	330.0	24.4	10.75	15.7	2.7	12.0	24.0	Q1
SN74ABT646ANSR	SOP	NS	24	2000	330.0	24.4	8.3	15.4	2.6	12.0	24.0	Q1

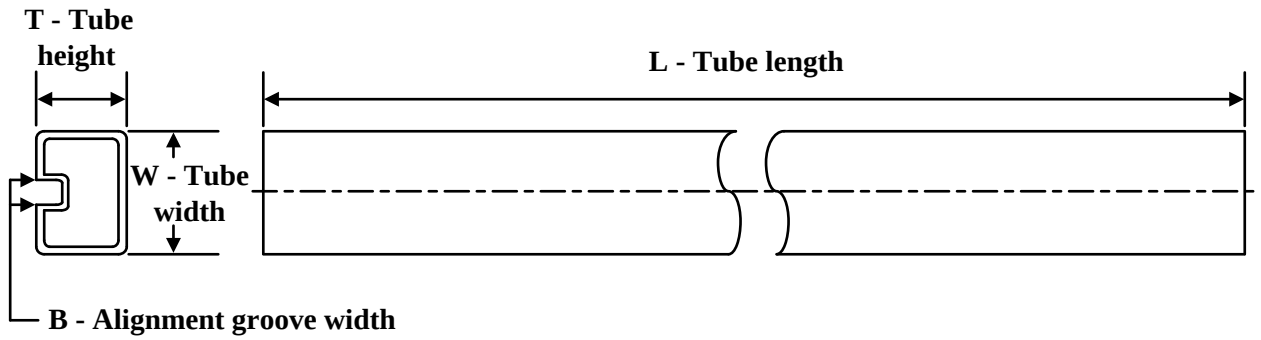
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74ABT646ADBR	SSOP	DB	24	2000	353.0	353.0	32.0
SN74ABT646ADBRG4	SSOP	DB	24	2000	353.0	353.0	32.0
SN74ABT646ADWR	SOIC	DW	24	2000	350.0	350.0	43.0
SN74ABT646ADWRG4	SOIC	DW	24	2000	350.0	350.0	43.0
SN74ABT646ANSR	SOP	NS	24	2000	356.0	356.0	45.0

TUBE



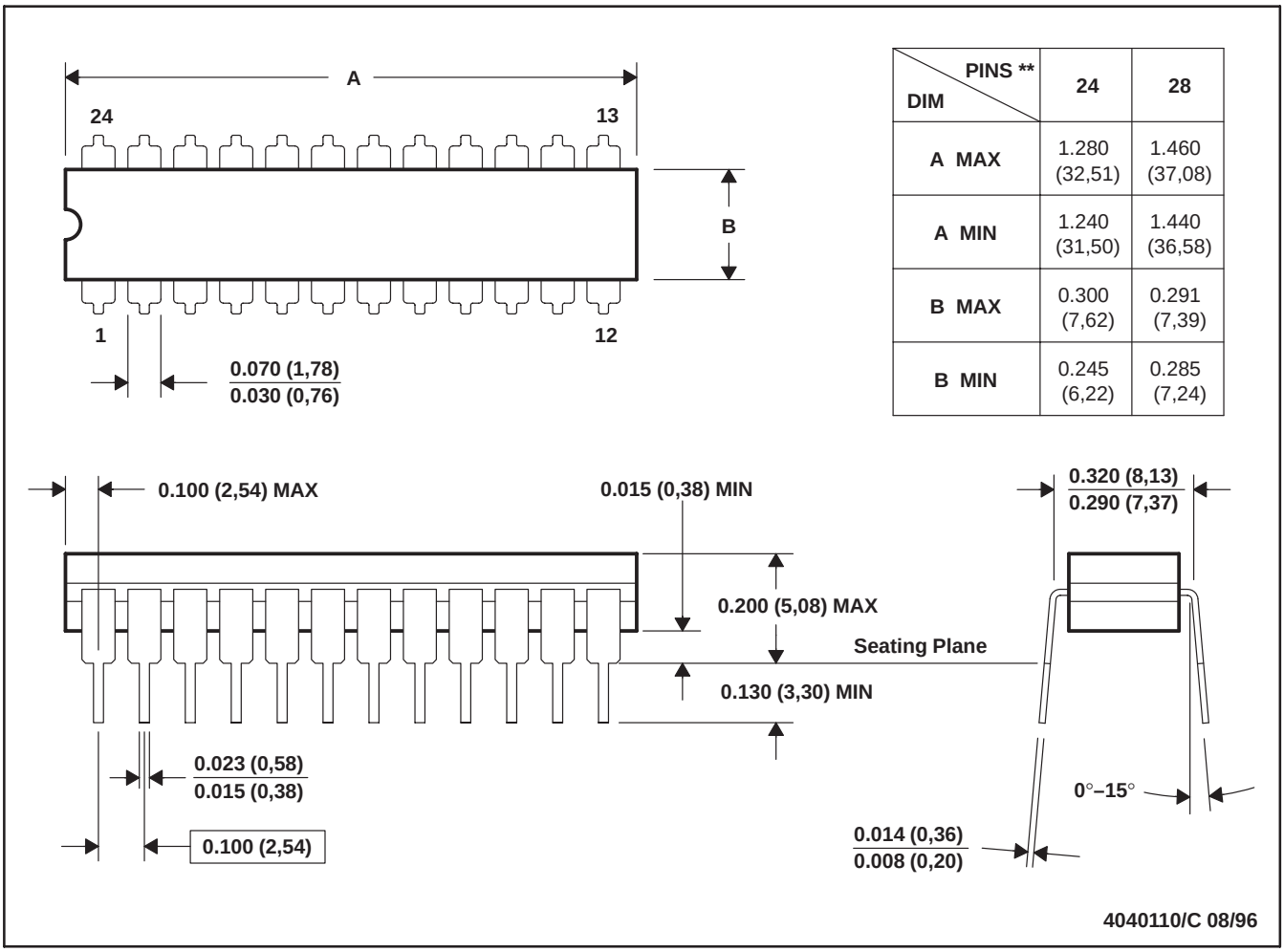
*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
SN74ABT646ADW	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT646ADW.B	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT646ADWG4	DW	SOIC	24	25	506.98	12.7	4826	6.6
SN74ABT646APW	PW	TSSOP	24	60	530	10.2	3600	3.5
SN74ABT646APW.B	PW	TSSOP	24	60	530	10.2	3600	3.5

MCER004A – JANUARY 1995 – REVISED JANUARY 1997

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

24 LEADS SHOWN

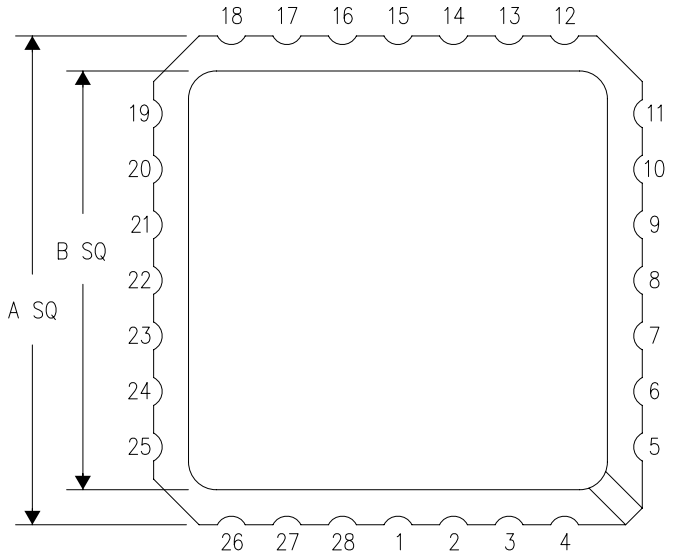


DIM \ PINS **	24	28
A MAX	1.280 (32,51)	1.460 (37,08)
A MIN	1.240 (31,50)	1.440 (36,58)
B MAX	0.300 (7,62)	0.291 (7,39)
B MIN	0.245 (6,22)	0.285 (7,24)

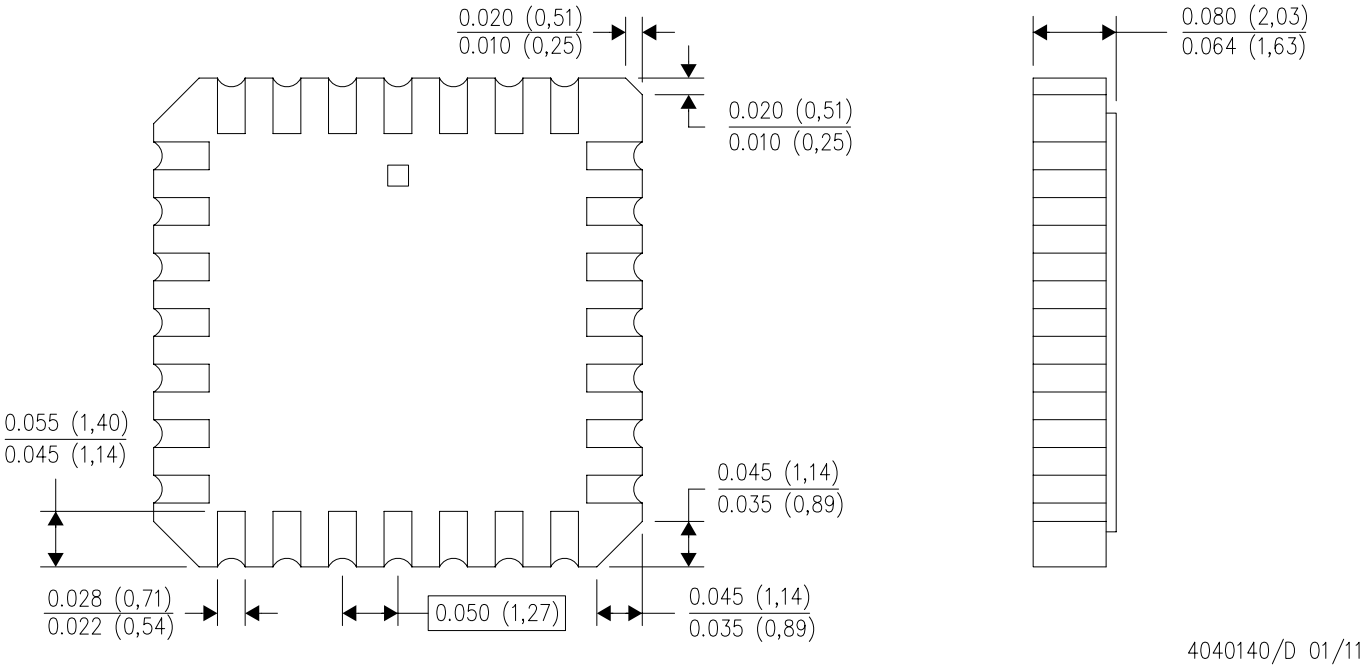
NOTES: A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification.
E. Falls within MIL STD 1835 GDIP3-T24, GDIP4-T28,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

FK (S–CQCC–N**) LEADLESS CERAMIC CHIP CARRIER

28 TERMINAL SHOWN



NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	0.850 (21,6)	0.858 (21,8)
84	1.141 (28,99)	1.165 (29,59)	1.047 (26,6)	1.063 (27,0)



4040140/D 01/11

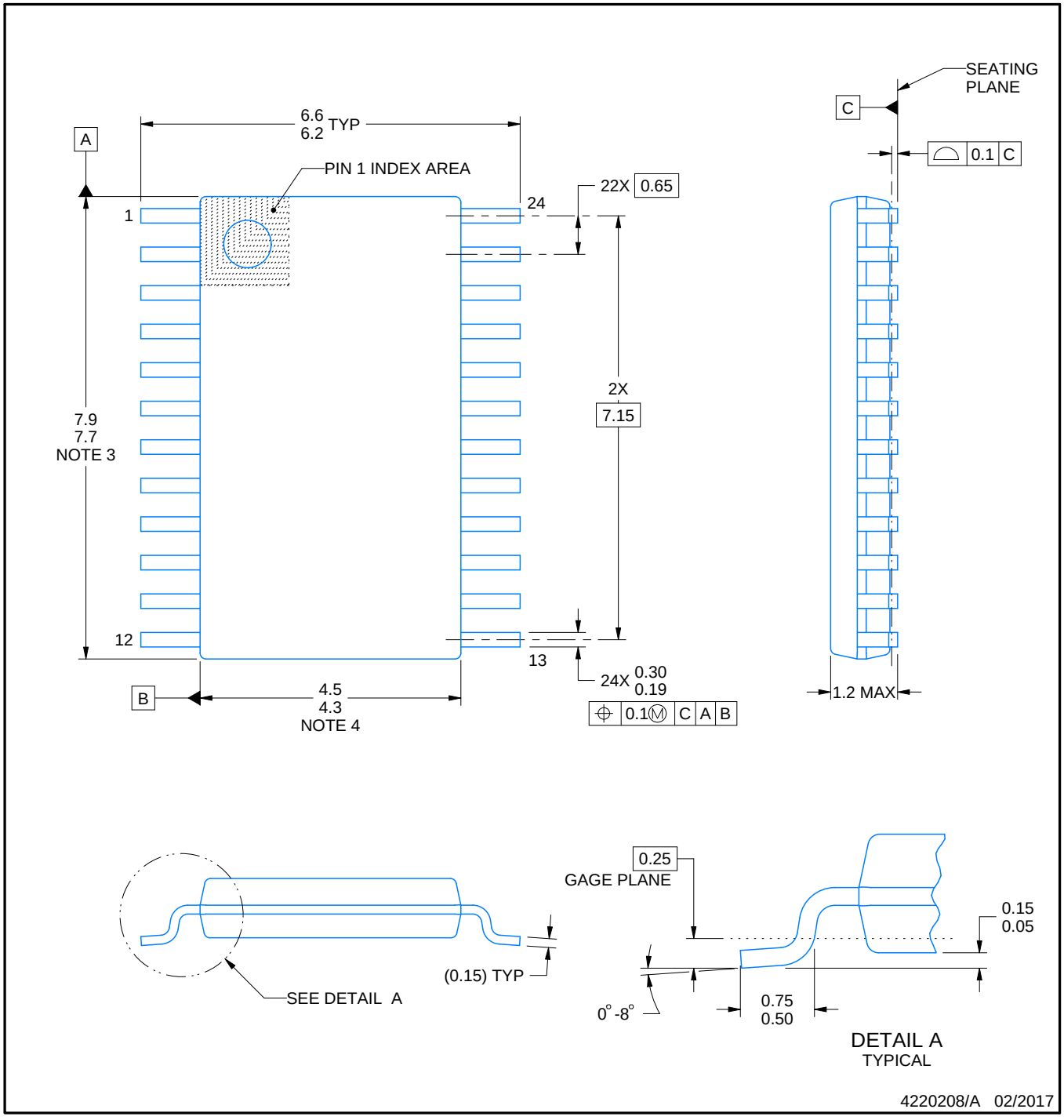
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a metal lid.
D. Falls within JEDEC MS–004

PACKAGE OUTLINE

PW0024A

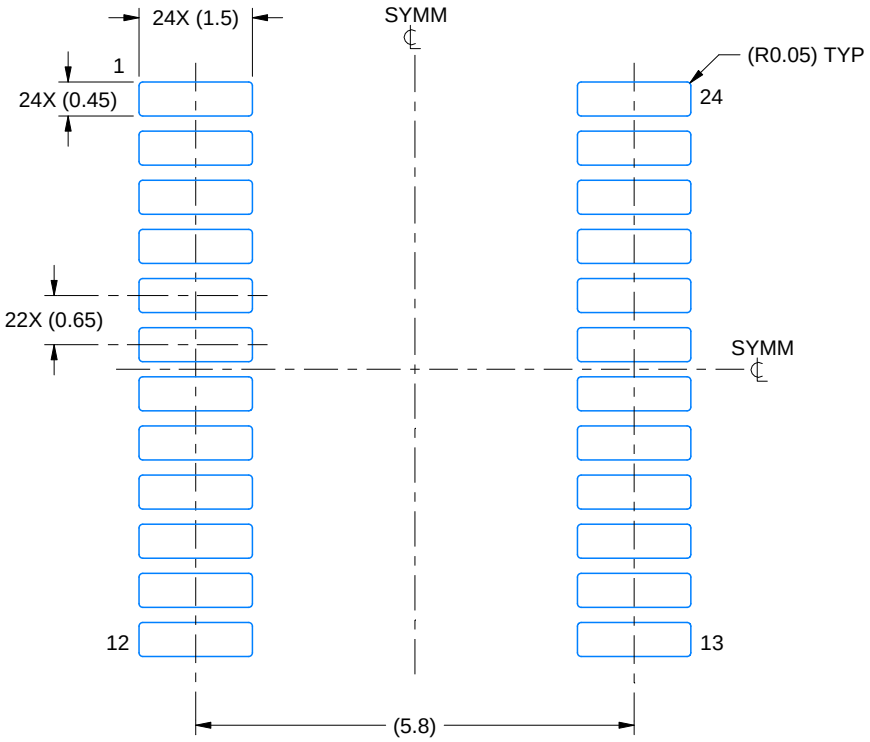
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

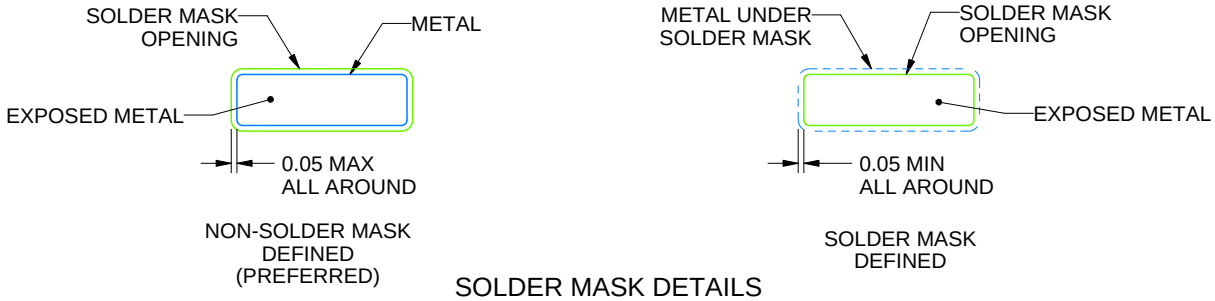


NOTES:

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

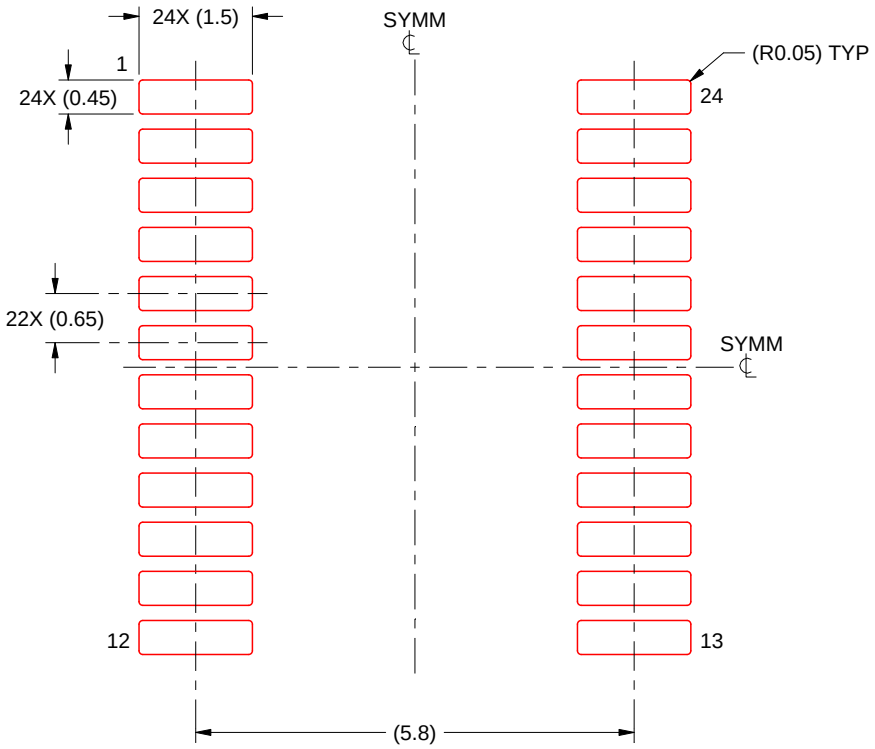


SOLDER MASK DETAILS

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

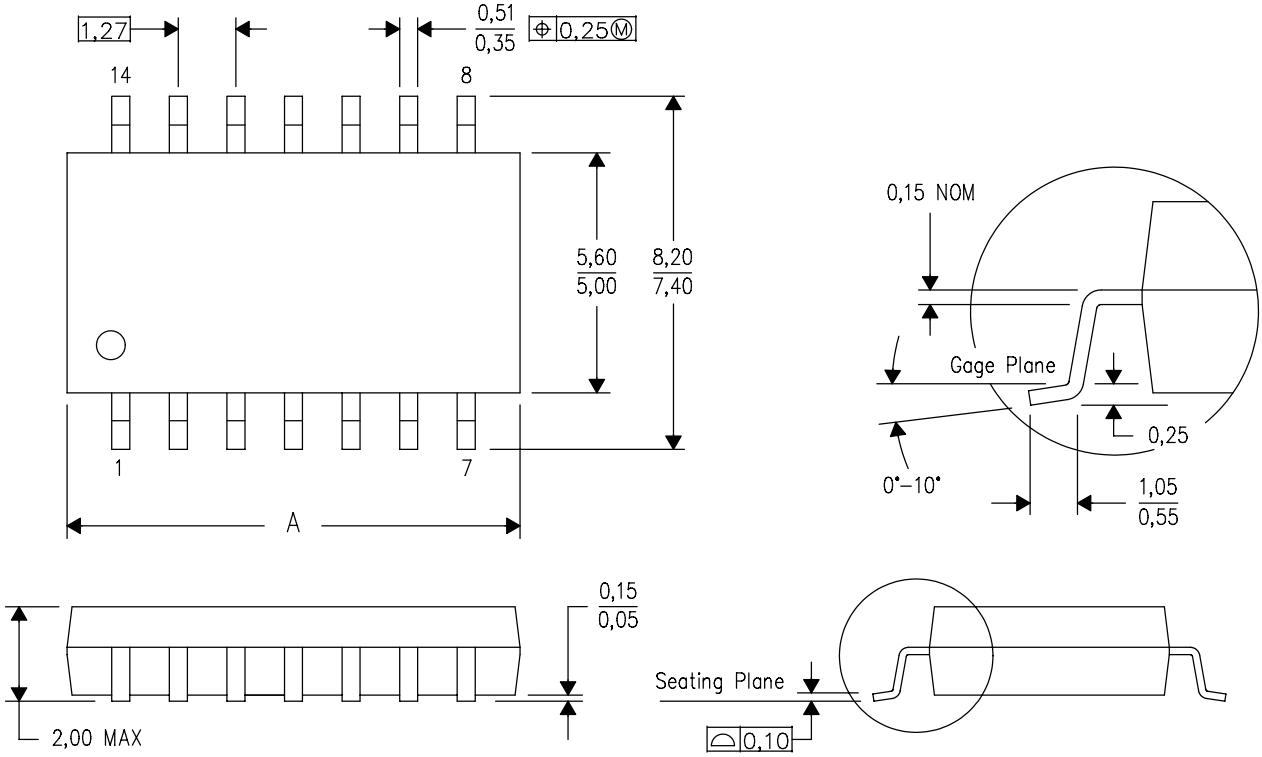
NOTES: (continued)

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.

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN

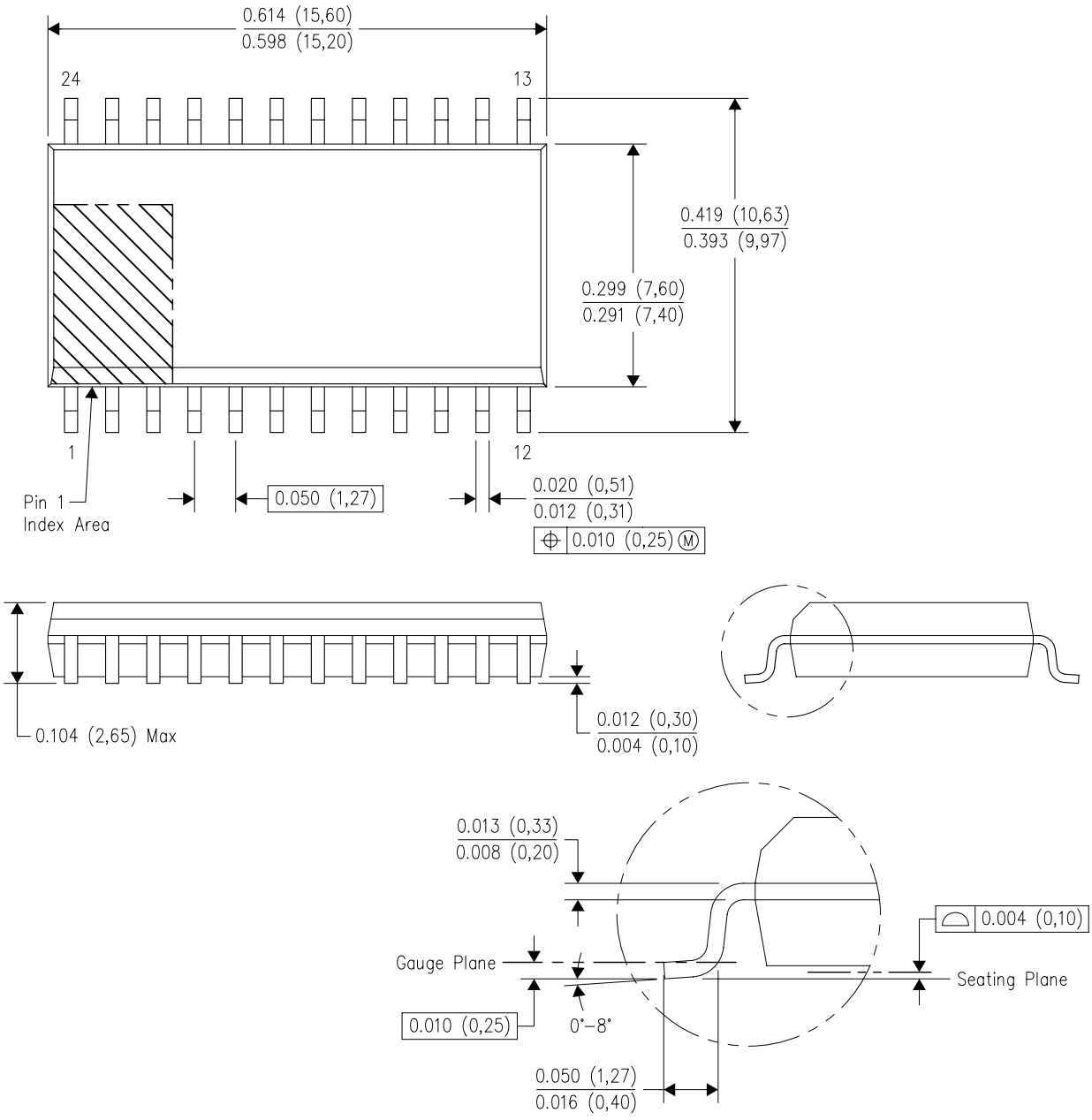


DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

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

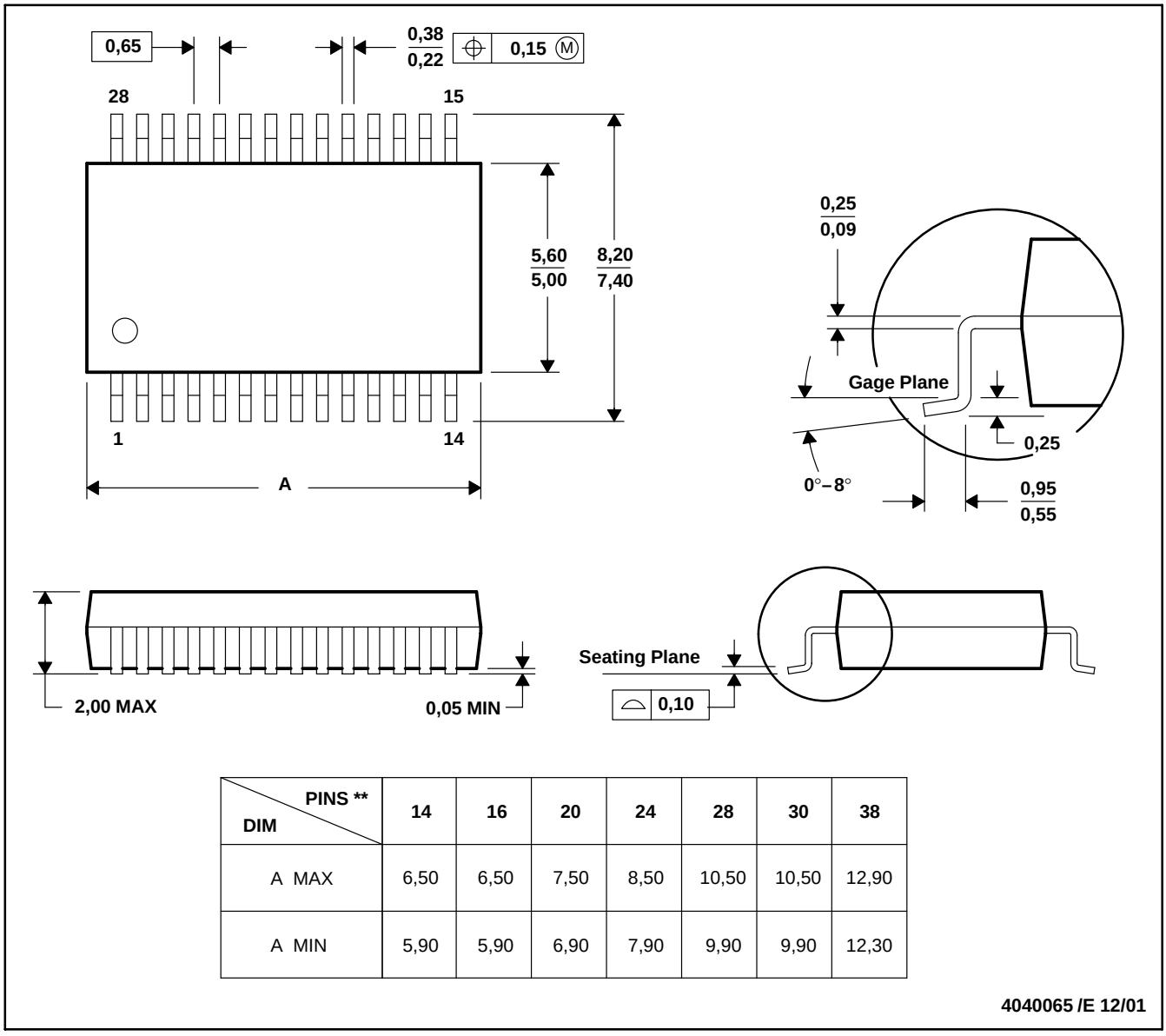


NOTES:
A. All linear dimensions are in inches (millimeters). Dimensioning and tolerancing per ASME Y14.5M–1994.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion not to exceed 0.006 (0,15).
D. Falls within JEDEC MS–013 variation AD.

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

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Last updated 10/2025