- **B-Port Outputs Have Equivalent 25-Ω Series Resistors, So No External Resistors Are Required**

- **State-of-the-Art *EPIC*-II*B*™ BiCMOS Design Significantly Reduces Power Dissipation**

- **Latch-Up Performance Exceeds 500 mA Per JEDEC Standard JESD-17**

- **ESD Protection Exceeds 2000 V Per MIL-STD-833, Method 3015; Exceeds 200 V Using Machine Model (C = 200 pF, R = 0)**

- **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**

- **Package Options Include Plastic Small-Outline (DW), Shrink Small-Outline (DB), and Thin Shrink Small-Outline (PW) Packages, Ceramic Chip Carriers (FK), Plastic (N) and Ceramic (J) DIPs, and Ceramic Flat (W) Package**

SN54ABT2245 . . . J OR W PACKAGE
SN74ABT2245 . . . DB, DW, N, OR PW PACKAGE
(TOP VIEW)

DIR	1		20	V_{CC}
A1	2		19	$\overline{OE}$
A2	3		18	B1
A3	4		17	B2
A4	5		16	B3
A5	6		15	B4
A6	7		14	B5
A7	8		13	B6
A8	9		12	B7
GND	10		11	B8

SN54ABT2245 . . . FK PACKAGE
(TOP VIEW)

Top pins: A2 (3), A1 (2), DIR (1), V_{CC} (20), $\overline{OE}$ (19)

A3	4		18	B1
A4	5		17	B2
A5	6		16	B3
A6	7		15	B4
A7	8		14	B5

Bottom pins: A8 (9), GND (10), B8 (11), B7 (12), B6 (13)
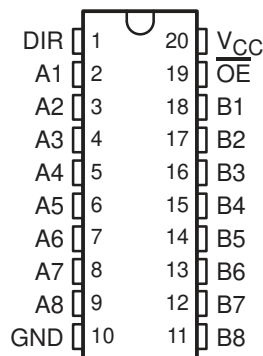
description

These octal transceivers and line drivers are designed for asynchronous communication between data buses. The devices transmit 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 B-port outputs, which are designed to sink up to 12 mA, include equivalent 25-Ω series resistors to reduce overshoot and undershoot.
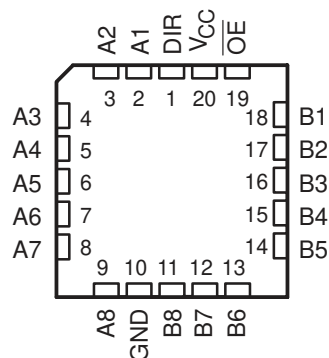
When V_{CC} is between 0 and 2.1 V, the device is in the high-impedance state during power up or power down. However, to ensure the high-impedance state above 2.1 V, $\overline{OE}$ should be tied to V_{CC} through a pullup resistor; the minimum value of the resistor is determined by the current-sinking/current-sourcing capability of the driver.

The SN54ABT2245 is characterized for operation over the full military temperature range of –55°C to 125°C. The SN74ABT2245 is characterized for operation from –40°C to 85°C.

FUNCTION TABLE

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

TEXAS INSTRUMENTS

logic symbol†

† This symbol is in accordance with ANSI/IEEE Std 91-1984 and IEC Publication 617-12.

logic diagram (positive logic)

To Seven Other Channels

schematic of A-port outputs
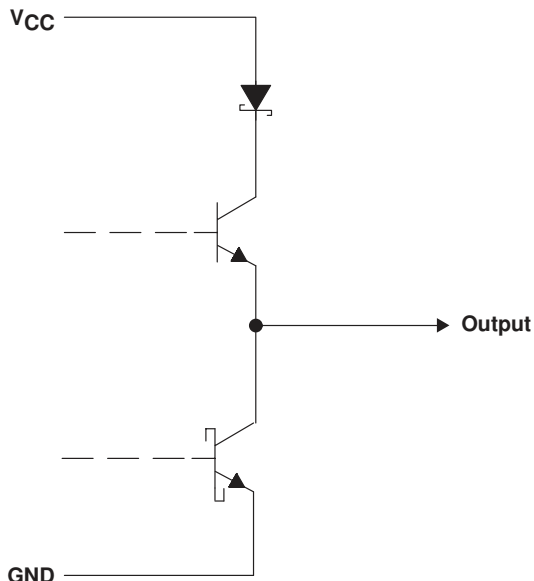
schematic of B-port outputs

All resistor values shown are nominal.

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

Supply voltage range, V_{CC} .... –0.5 V to 7 V
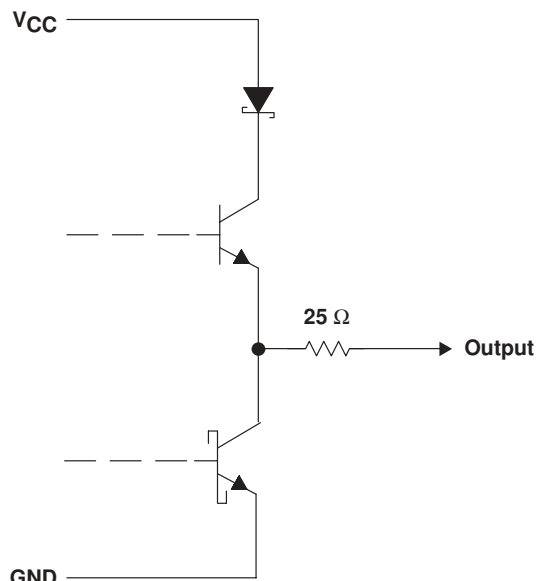Input voltage range, V_I (except I/O ports) (see Note 1) .... –0.5 V to 7 V
Voltage range applied to any output in the high or power-off state, V_O .... –0.5 V to 5.5 V
Current into any output in the low state, I_O: SN54ABT2245 (except B port) .... 96 mA
                                                     SN74ABT2245 (except B port) .... 128 mA
                                                     B port .... 30 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 .... 115°C/W
                                                        DW package .... 97°C/W
                                                        N package .... 67°C/W
                                                        PW package .... 128°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.

![Texas Instruments logo]

POST OFFICE BOX 655303 ● DALLAS, TEXAS 75265

3

recommended operating conditions (see Note 3)

			SN54ABT2245		SN74ABT2245		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	A port		−24		−32	mA
		B port		−12		−12	
I_{OL}	Low-level output current	A port		48		64	mA
		B port		12		12	
$\Delta t/\Delta v$	Input transition rise or fall rate	Outputs enabled		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 pins (input or I/O) 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		$T_A = 25°C$			SN54ABT2245		SN74ABT2245		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}	B port	V_{CC} = 4.5 V,	I_{OH} = −1 mA	3.35			3.3		3.35		V
		V_{CC} = 5 V,	I_{OH} = −1 mA	3.85			3.8		3.85		
		V_{CC} = 4.5 V	I_{OH} = −3 mA				3		3.1		
			I_{OH} = −12 mA	2.6					2.6		
	A port	V_{CC} = 4.5 V,	I_{OH} = −3 mA	2.5			2.5		2.5		
		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}	B port	V_{CC} = 4.5 V	I_{OL} = 8 mA			0.65		0.8		0.65	V
			I_{OL} = 12 mA			0.8				0.8	
	A port		I_{OL} = 48 mA			0.55		0.55			
			I_{OL} = 64 mA			0.55*				0.55	
V_{hys}					100						mV
I_I	Control inputs	V_{CC} = 0 to 5.5 V, V_I = V_{CC} or GND				±1		±1		±1	µA
	A or B ports	V_{CC} = 2.1 V to 5.5 V, V_I = V_{CC} or GND				±20		±20		±20	
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_{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_{off}		V_{CC} = 0,	V_I or V_O ≤ 4.5 V			±100				±100	µA
I_{CEX}	Outputs high	V_{CC} = 5.5 V,	V_O = 5.5 V			50		50		50	µA
I_O¶	B port	V_{CC} = 5.5 V,	V_O = 2.5 V	−25		−100	−25	−100	−25	−100	mA
	A port			−50	−100	−180	−50	−180	−50	−180	
I_{CC}	A or B ports	V_{CC} = 5.5 V, I_O = 0, V_I = V_{CC} or GND	Outputs high		1	250		250		250	µA
			Outputs low		24	32		32		32	mA
			Outputs disabled		0.5	250		250		250	µA
ΔI_{CC}#	Data inputs	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			0.05		0.05		0.05	
	Control inputs	V_{CC} = 5.5 V, One input at 3.4 V, Other inputs at V_{CC} or GND				1.5		1.5		1.5	
C_i		V_I = 2.5 V or 0.5 V			3						pF
C_{io}		V_O = 2.5 V or 0.5 V			6						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 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 is the increase in supply current for each input that is at the specified TTL voltage level rather than V_{CC} or GND.

![Texas Instruments logo]
TEXAS INSTRUMENTS

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)	V_{CC} = 5 V, T_A = 25°C			SN54ABT2245		SN74ABT2245		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t_{PLH}	A	B	1	2.5	3.4	1	4	1	3.8	ns
t_{PHL}			1	3.2	4.2	1	4.6	1	4.5	
t_{PLH}	B	A	1	2.2	3.2	1	3.8	1	3.6	ns
t_{PHL}			1	2.7	3.6	1	4.2	1	4	
t_{PZH}	$\overline{OE}$	A	1	3.3	4.6	1	5.6	1	5.5	ns
t_{PZL}			1	3.2	4.7	1	6	1	5.7	
t_{PHZ}	$\overline{OE}$	A	2	4	5.1	2	5.7	2	5.6	ns
t_{PLZ}			1	2.9	4	1	4.6	1	4.5	
t_{PZH}	$\overline{OE}$	B	1.5	3.6	4.9	1.5	6.3	1.5	6.1	ns
t_{PZL}			1.5	3.9	5.3	1.5	6.6	1.5	6.3	
t_{PHZ}	$\overline{OE}$	B	1.5	3.6	4.7	1.5	5.5	1.5	5.3	ns
t_{PLZ}			1.5	3.3	4.4	1.5	4.9	1.5	4.8	

TEXAS INSTRUMENTS

POST OFFICE BOX 655303 • DALLAS, TEXAS 75265

PARAMETER MEASUREMENT INFORMATION
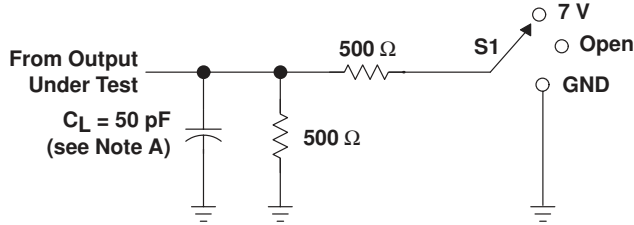
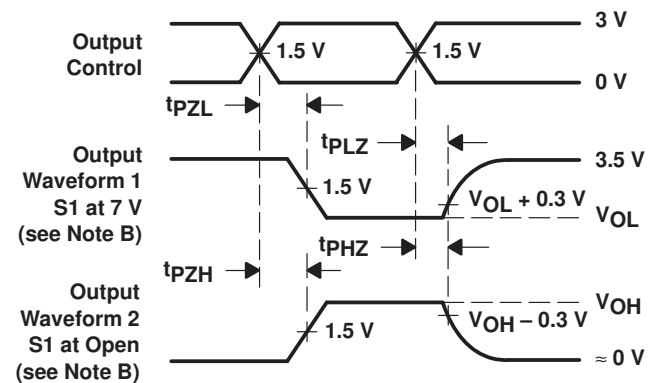| TEST	S1
t_{PLH}/t_{PHL}	Open
t_{PLZ}/t_{PZL}	7 V
t_{PHZ}/t_{PZH}	Open

LOAD CIRCUIT
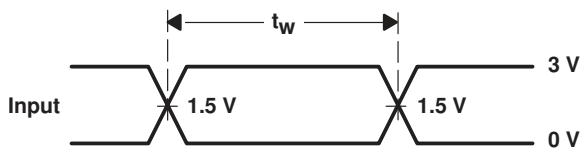
VOLTAGE WAVEFORMS
PULSE DURATION
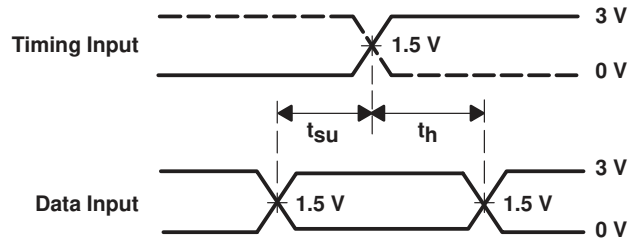
VOLTAGE WAVEFORMS
SETUP AND HOLD TIMES
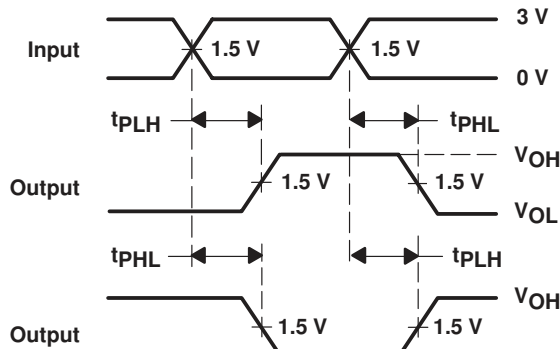
VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES
INVERTING AND NONINVERTING OUTPUTS

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 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
5962-9560601Q2A	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962-9560601Q2A SNJ54 ABT2245FK	Samples
5962-9560601QRA	ACTIVE	CDIP	J	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9560601QRA SNJ54ABT2245J	Samples
5962-9560601QSA	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9560601QSA SNJ54ABT2245W	Samples
SN74ABT2245DBR	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AA245	Samples
SN74ABT2245DBRG4	ACTIVE	SSOP	DB	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AA245	Samples
SN74ABT2245DW	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT2245	Samples
SN74ABT2245DWE4	ACTIVE	SOIC	DW	20	25	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT2245	Samples
SN74ABT2245DWR	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT2245	Samples
SN74ABT2245DWRE4	ACTIVE	SOIC	DW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	ABT2245	Samples
SN74ABT2245N	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-40 to 85	SN74ABT2245N	Samples
SN74ABT2245NE4	ACTIVE	PDIP	N	20	20	Pb-Free (RoHS)	NIPDAU	N / A for Pkg Type	-40 to 85	SN74ABT2245N	Samples
SN74ABT2245PW	ACTIVE	TSSOP	PW	20	70	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AA245	Samples
SN74ABT2245PWR	ACTIVE	TSSOP	PW	20	2000	Green (RoHS & no Sb/Br)	NIPDAU	Level-1-260C-UNLIM	-40 to 85	AA245	Samples
SNJ54ABT2245FK	ACTIVE	LCCC	FK	20	1	TBD	POST-PLATE	N / A for Pkg Type	-55 to 125	5962-9560601Q2A SNJ54 ABT2245FK	Samples

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
SNJ54ABT2245J	ACTIVE	CDIP	J	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9560601QRA SNJ54ABT2245J	Samples
SNJ54ABT2245W	ACTIVE	CFP	W	20	1	TBD	Call TI	N / A for Pkg Type	-55 to 125	5962-9560601QSA SNJ54ABT2245W	Samples

(1) The marketing status values are defined as follows:
ACTIVE: Product device recommended for new designs.
LIFEBUY: TI has announced that the device will be discontinued, and a lifetime-buy period is in effect.
NRND: Not recommended for new designs. Device is in production to support existing customers, but TI does not recommend using this part in a new design.
PREVIEW: Device has been announced but is not in production. Samples may or may not be available.
OBSOLETE: TI has discontinued the production of the device.

(2) **RoHS:** TI defines "RoHS" to mean semiconductor products that are compliant with the current EU RoHS requirements for all 10 RoHS substances, including the requirement that RoHS substance do not exceed 0.1% by weight in homogeneous materials. Where designed to be soldered at high temperatures, "RoHS" products are suitable for use in specified lead-free processes. TI may reference these types of products as "Pb-Free".
RoHS Exempt: TI defines "RoHS Exempt" to mean products that contain lead but are compliant with EU RoHS pursuant to a specific EU RoHS exemption.
Green: TI defines "Green" to mean the content of Chlorine (Cl) and Bromine (Br) based flame retardants meet JS709B low halogen requirements of <=1000ppm threshold. Antimony trioxide based flame retardants must also meet the <=1000ppm threshold requirement.

(3) MSL, Peak Temp. - The Moisture Sensitivity Level rating according to the JEDEC industry standard classifications, and peak solder temperature.

(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

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

(6) Lead/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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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 SN54ABT2245, SN74ABT2245 :

● Catalog: SN74ABT2245

● Military: SN54ABT2245

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
SN74ABT2245DBR	SSOP	DB	20	2000	330.0	16.4	8.2	7.5	2.5	12.0	16.0	Q1
SN74ABT2245DWR	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1
SN74ABT2245PWR	TSSOP	PW	20	2000	330.0	16.4	6.95	7.0	1.4	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)
SN74ABT2245DBR	SSOP	DB	20	2000	367.0	367.0	38.0
SN74ABT2245DWR	SOIC	DW	20	2000	367.0	367.0	45.0
SN74ABT2245PWR	TSSOP	PW	20	2000	367.0	367.0	38.0

W (R−GDFP−F20)   CERAMIC DUAL FLATPACK
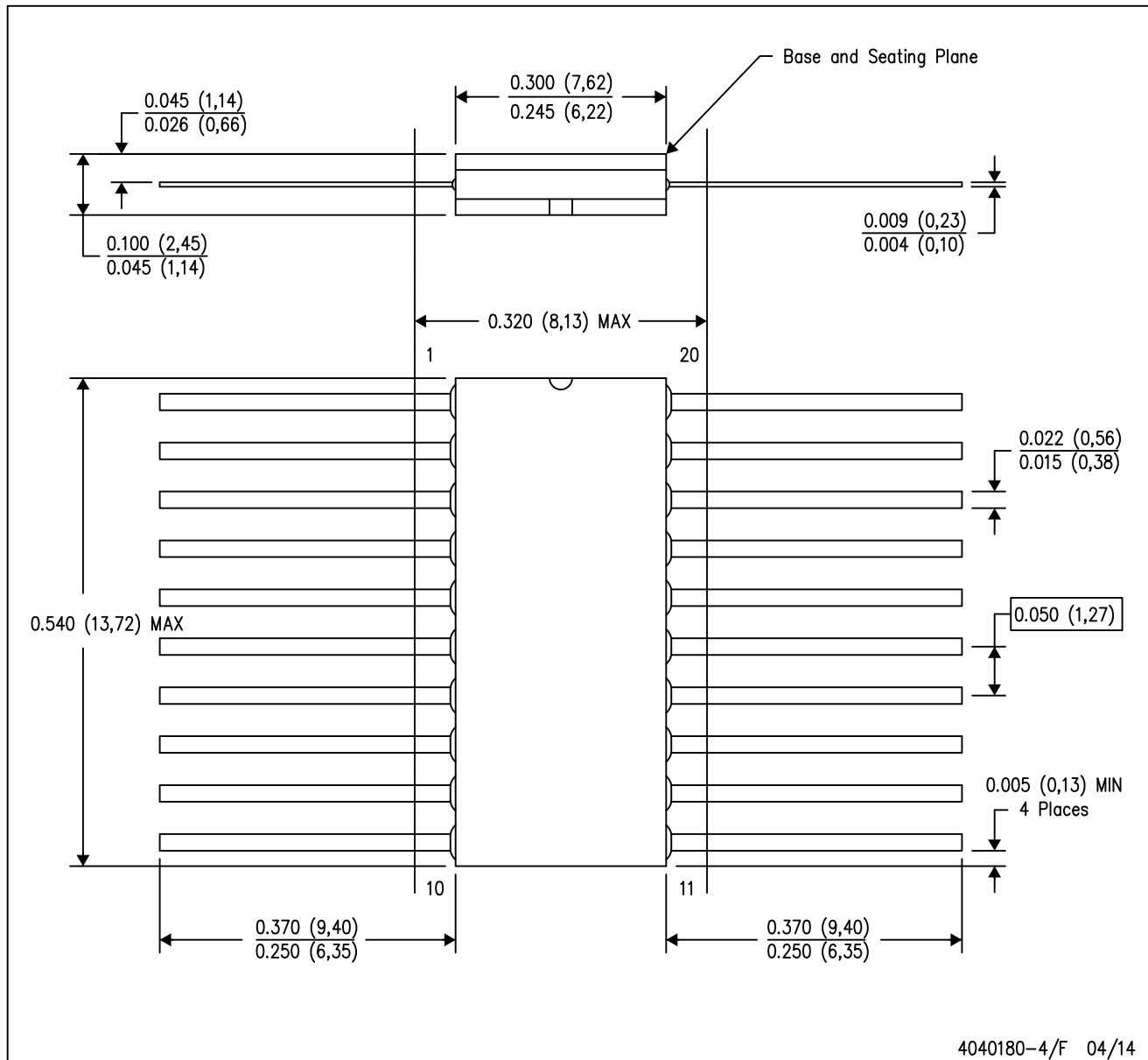
Base and Seating Plane

$\dfrac{0.045\ (1,14)}{0.026\ (0,66)}$

$\dfrac{0.300\ (7,62)}{0.245\ (6,22)}$

$\dfrac{0.009\ (0,23)}{0.004\ (0,10)}$

$\dfrac{0.100\ (2,45)}{0.045\ (1,14)}$

0.320 (8,13) MAX

1   20

$\dfrac{0.022\ (0,56)}{0.015\ (0,38)}$

0.050 (1,27)

0.540 (13,72) MAX

0.005 (0,13) MIN
4 Places

10   11

$\dfrac{0.370\ (9,40)}{0.250\ (6,35)}$

$\dfrac{0.370\ (9,40)}{0.250\ (6,35)}$

4040180−4/F   04/14

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 only.
         E.   Falls within Mil−Std 1835 GDFP2−F20

DIM \ PINS **	14	16	18	20
A	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC	0.300 (7,62) BSC
B MAX	0.785 (19,94)	.840 (21,34)	0.960 (24,38)	1.060 (26,92)
B MIN	——	——	——	——
C MAX	0.300 (7,62)	0.300 (7,62)	0.310 (7,87)	0.300 (7,62)
C MIN	0.245 (6,22)	0.245 (6,22)	0.220 (5,59)	0.245 (6,22)

B

14   8

C

1   7

0.065 (1,65)
0.045 (1,14)

0.005 (0,13) MIN

0.060 (1,52)
0.015 (0,38)

0.200 (5,08) MAX

Seating Plane

0.130 (3,30) MIN

0.026 (0,66)
0.014 (0,36)

0.100 (2,54)

A

0°−15°

0.014 (0,36)
0.008 (0,20)

4040083/F 03/03

NOTES: A. All linear dimensions are in inches (millimeters).
          B. This drawing is subject to change without notice.
          C. This package is hermetically sealed with a ceramic lid using glass frit.
          D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
          E. Falls within MIL STD 1835 GDIP1−T14, GDIP1−T16, GDIP1−T18 and GDIP1−T20.
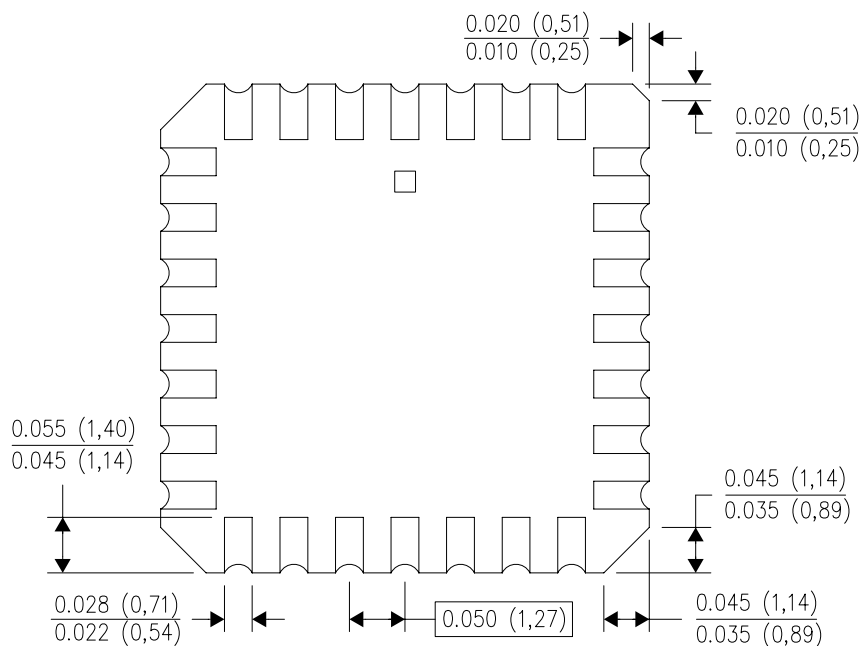
FK (S−CQCC−N**)   LEADLESS CERAMIC CHIP CARRIER
28 TERMINAL SHOWN
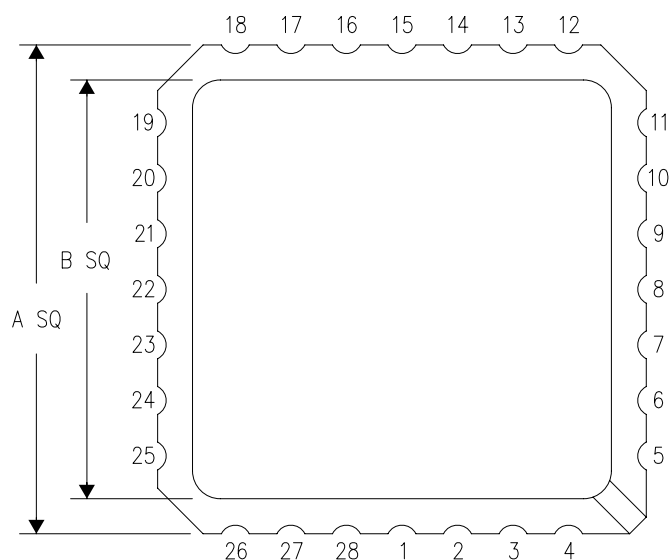
NO. OF TERMINALS **	A		B	
	MIN	MAX	MIN	MAX
20	0.342 (8,69)	0.358 (9,09)	0.307 (7,80)	0.358 (9,09)
28	0.442 (11,23)	0.458 (11,63)	0.406 (10,31)	0.458 (11,63)
44	0.640 (16,26)	0.660 (16,76)	0.495 (12,58)	0.560 (14,22)
52	0.740 (18,78)	0.761 (19,32)	0.495 (12,58)	0.560 (14,22)
68	0.938 (23,83)	0.962 (24,43)	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)

$\frac{0.020\ (0,51)}{0.010\ (0,25)}$

$\frac{0.020\ (0,51)}{0.010\ (0,25)}$

$\frac{0.080\ (2,03)}{0.064\ (1,63)}$

$\frac{0.055\ (1,40)}{0.045\ (1,14)}$

$\frac{0.045\ (1,14)}{0.035\ (0,89)}$

$\frac{0.028\ (0,71)}{0.022\ (0,54)}$

0.050 (1,27)

$\frac{0.045\ (1,14)}{0.035\ (0,89)}$

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

N (R–PDIP–T**)

PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

PINS ** DIM	14	16	18	20
A MAX	0.775 (19,69)	0.775 (19,69)	0.920 (23,37)	1.060 (26,92)
A MIN	0.745 (18,92)	0.745 (18,92)	0.850 (21,59)	0.940 (23,88)
MS–001 VARIATION	AA	BB	AC	AD

A

16   9

0.260 (6,60)
0.240 (6,10)

1   8

0.070 (1,78)
0.045 (1,14) △D

0.045 (1,14) △D
0.030 (0,76)

0.020 (0,51) MIN

0.200 (5,08) MAX

Seating Plane

0.125 (3,18) MIN

0.100 (2,54)

0.021 (0,53)
0.015 (0,38)

⊕ 0.010 (0,25) Ⓜ

14/18 Pin Only
20 Pin vendor option △D

0.325 (8,26)
0.300 (7,62)

0.015 (0,38)

Gauge Plane

0.010 (0,25) NOM

0.430 (10,92) MAX

4040049/E 12/2002

NOTES: A.   All linear dimensions are in inches (millimeters).
B.   This drawing is subject to change without notice.
△C   Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
△D   The 20 pin end lead shoulder width is a vendor option, either half or full width.

10.63 / 9.97 TYP

PIN 1 ID AREA

A

1

18X 1.27

20

13.0 / 12.6 NOTE 3

2X 11.43

10

11

B

7.6 / 7.4 NOTE 4

20X 0.51 / 0.31

⌖ 0.25 Ⓜ C A B

C

SEATING PLANE

◯ 0.1 C

2.65 MAX

0.33 / 0.10 TYP

SEE DETAIL A

0.25 GAGE PLANE

0° - 8°

1.27 / 0.40

0.3 / 0.1

DETAIL A
TYPICAL
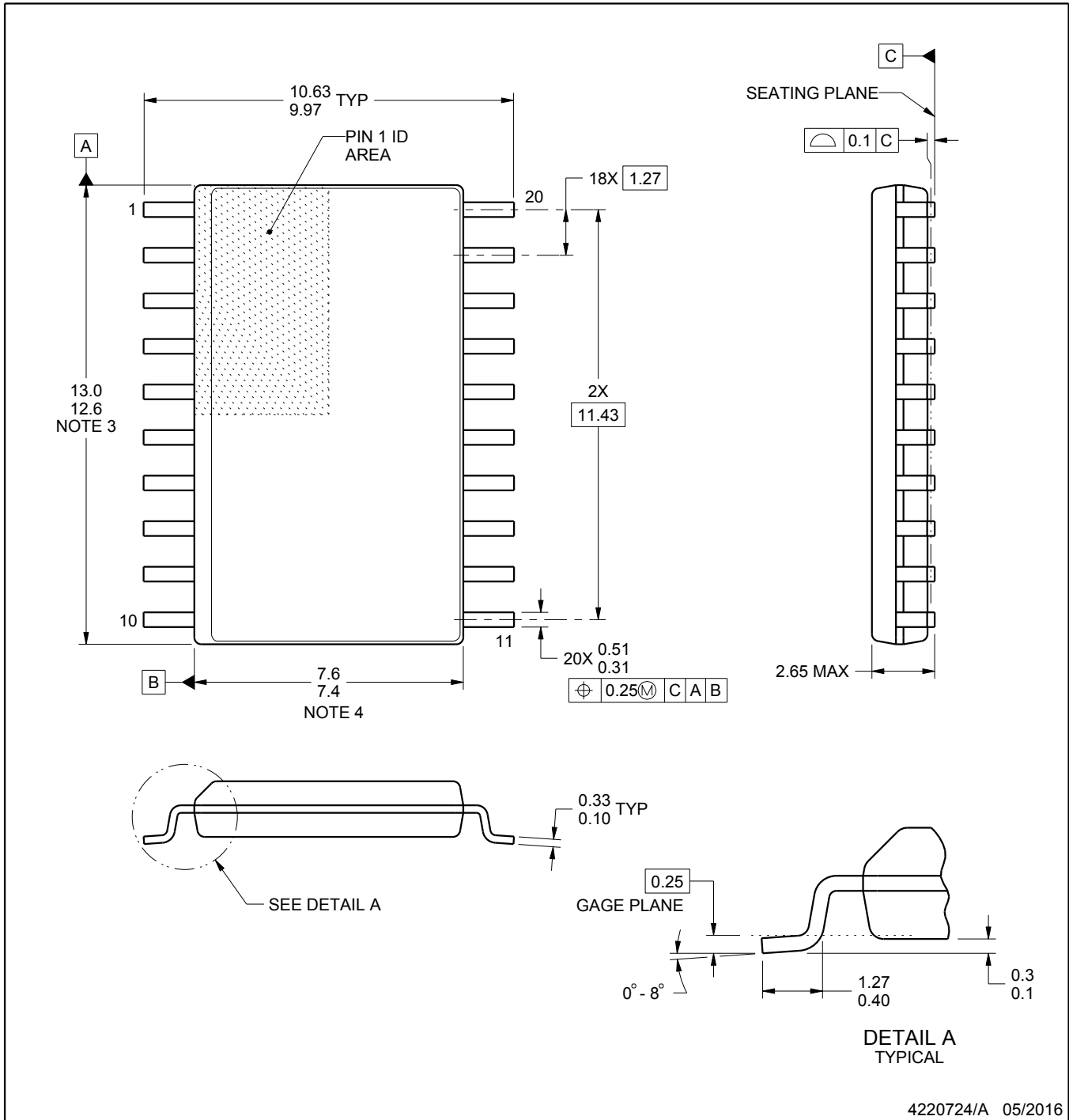
4220724/A   05/2016

NOTES:

1. All linear dimensions are in millimeters. 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 0.43 mm per side.
5. Reference JEDEC registration MS-013.

20X (2)

SYMM

1

20X (0.6)

18X (1.27)

SYMM

(R0.05)
TYP

10

11

(9.3)

LAND PATTERN EXAMPLE
SCALE:6X

SOLDER MASK
OPENING

METAL

METAL UNDER
SOLDER MASK

SOLDER MASK
OPENING

0.07 MAX
ALL AROUND

0.07 MIN
ALL AROUND

NON SOLDER MASK
DEFINED

SOLDER MASK
DEFINED
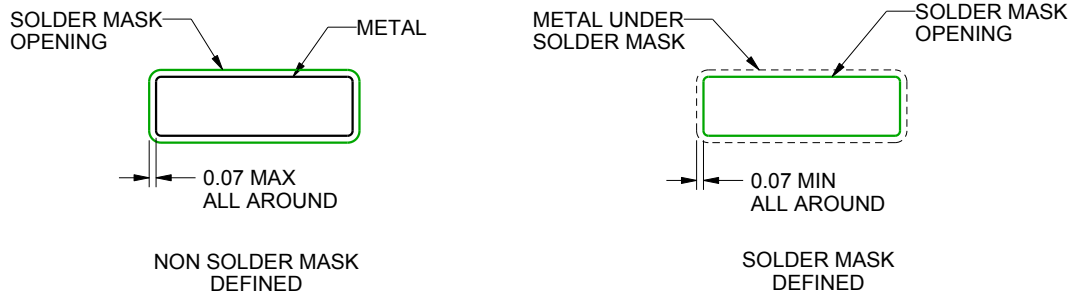
SOLDER MASK DETAILS

4220724/A   05/2016

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.

20X (2)

1

20X (0.6)

18X (1.27)

SYMM

20

SYMM

10

11

(9.3)

SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:6X

4220724/A   05/2016

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.

PW (R–PDSO–G20)   PLASTIC SMALL OUTLINE

0,65

0,30
0,19

⊕ | 0,10 Ⓜ

20   11

4,50
4,30

6,60
6,20

Ⓓ

1   10

6,60
6,40

Ⓒ

0,15 NOM

Gage Plane

0,25

0°–8°

0,75
0,50

1,20 MAX

0,15
0,05

Seating Plane

▱ | 0,10
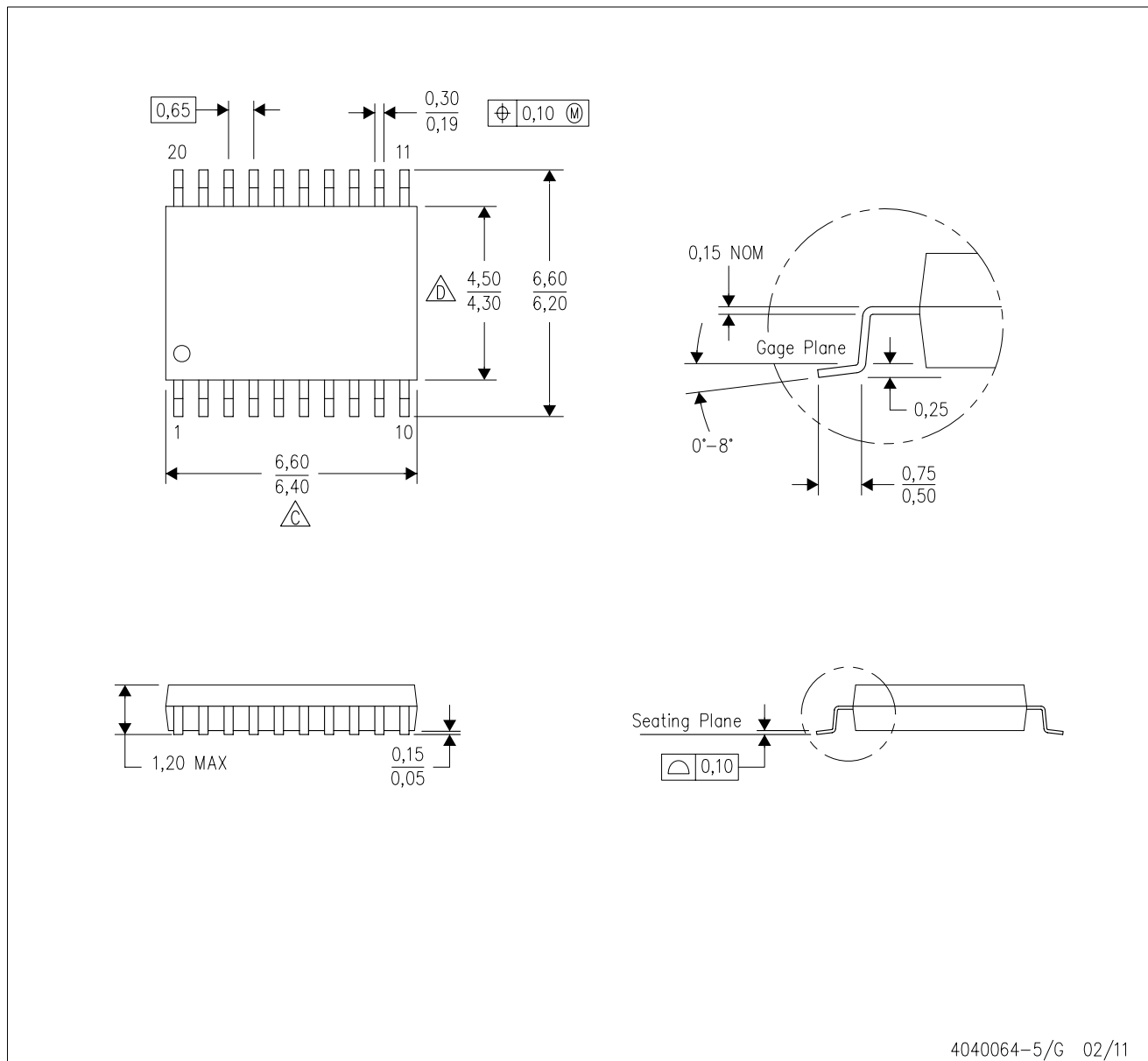
4040064–5/G 02/11

NOTES: A.   All linear dimensions are in millimeters. Dimensioning and tolerancing per ASME Y14.5M–1994.
          B.   This drawing is subject to change without notice.
          Ⓒ   Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall
               not exceed 0,15 each side.
          Ⓓ   Body width does not include interlead flash. Interlead flash shall not exceed 0,25 each side.
          E.   Falls within JEDEC MO–153

TEXAS
INSTRUMENTS
www.ti.com

PW (R−PDSO−G20)　　　　　　　　　PLASTIC SMALL OUTLINE

Example Board Layout

Based on a stencil thickness
of .127mm (.005inch).

18x0,65

20x0,25

5,6

1,55

5,6

18x0,65

Example
Non Soldermask Defined Pad

Example
Solder Mask Opening
(See Note E)

0,3

1,6

Pad Geometry

0,07
All Around

4211284−5/G　08/15
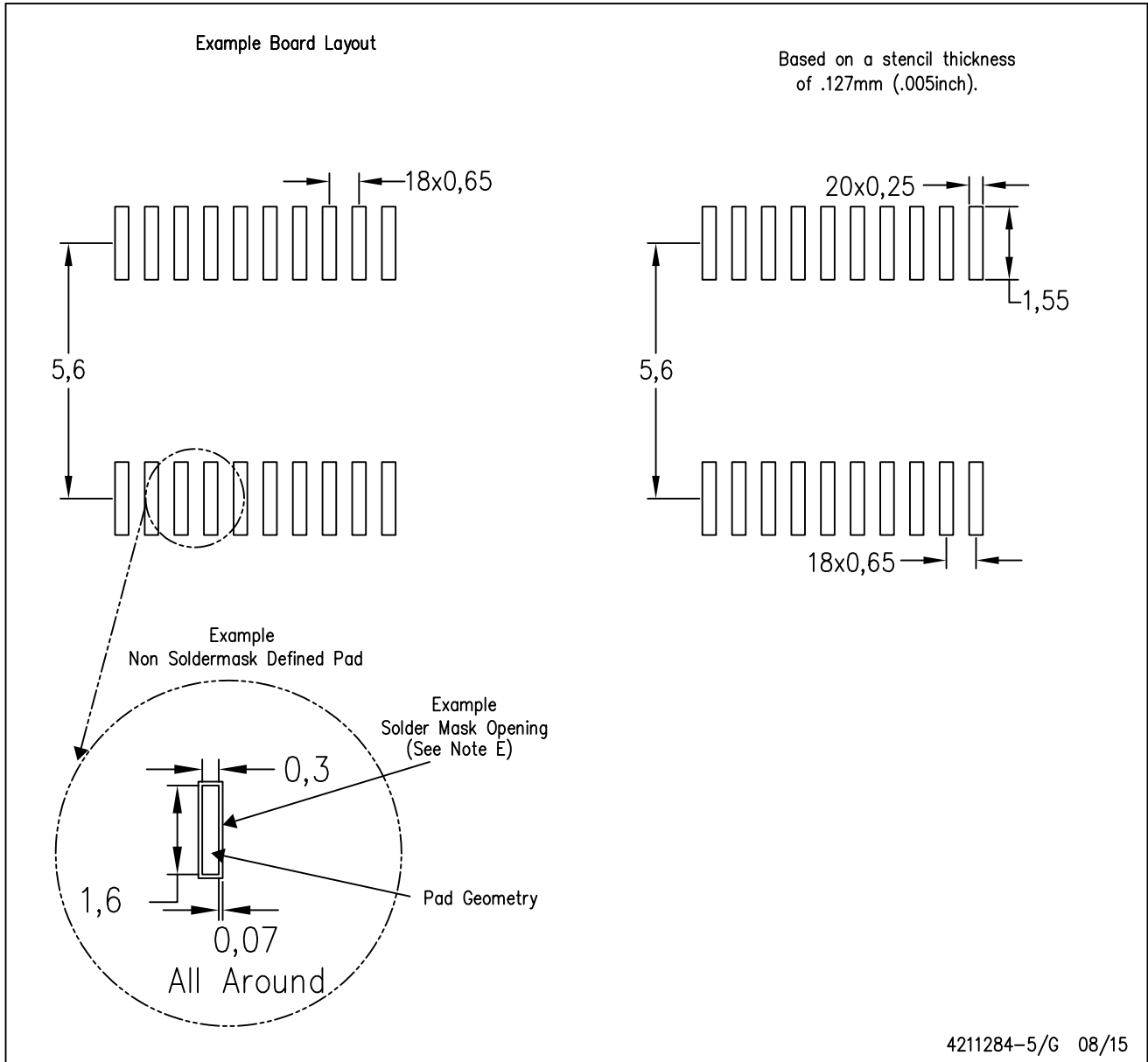
NOTES:　A.　All linear dimensions are in millimeters.
　　　　B.　This drawing is subject to change without notice.
　　　　C.　Publication IPC−7351 is recommended for alternate design.
　　　　D.　Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should
　　　　　　contact their board assembly site for stencil design recommendations. Refer to IPC−7525 for other stencil recommendations.
　　　　E.　Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.
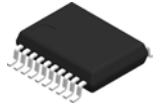
TEXAS
INSTRUMENTS
www.ti.com

8.2
7.4 TYP

A

PIN 1 INDEX AREA

18X ⌴0.65⌴

20

1

2X

⌴5.85⌴

7.5
6.9
NOTE 3

10

11

20X 0.38
     0.22

B

5.6
5.0
NOTE 4

⊕ ⌴0.1Ⓜ⌴ C A B

C

⌴0.1 C

SEATING
PLANE

SEE DETAIL A

(0.15) TYP

GAGE PLANE

⌴0.25⌴

0°-8°

0.95
0.55

2 MAX

0.05 MIN

DETAIL A
TYPICAL

4214851/B 08/2019
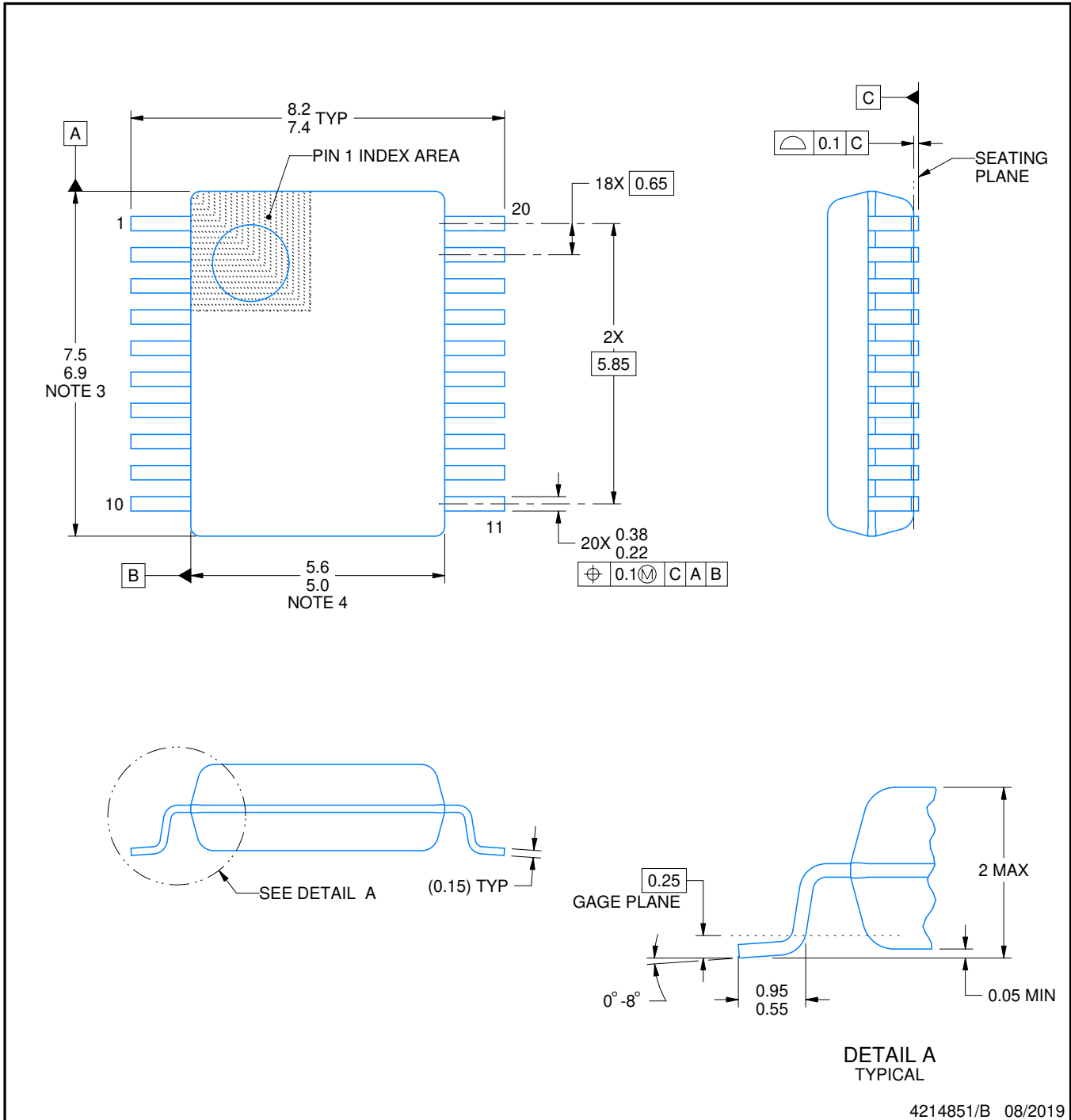
NOTES:

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-150.

20X (1.85)

SYMM

(R0.05) TYP

1

20X (0.45)

20

SYMM

18X (0.65)

10

11

(7)

LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X
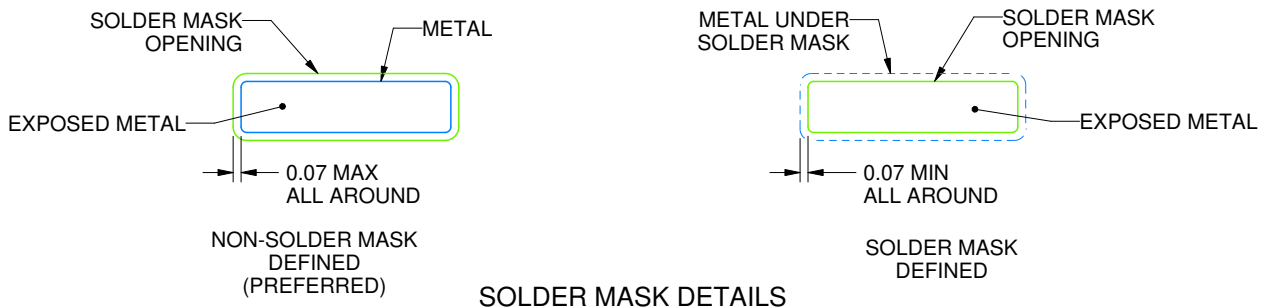
SOLDER MASK
OPENING

METAL

EXPOSED METAL

0.07 MAX
ALL AROUND

NON-SOLDER MASK
DEFINED
(PREFERRED)

METAL UNDER
SOLDER MASK

SOLDER MASK
OPENING

EXPOSED METAL

0.07 MIN
ALL AROUND

SOLDER MASK
DEFINED

SOLDER MASK DETAILS

4214851/B   08/2019

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

4214851/B   08/2019

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.