SN74BCT760-EP
OCTAL BUFFER/DRIVER WITH OPEN-COLLECTOR OUTPUTS

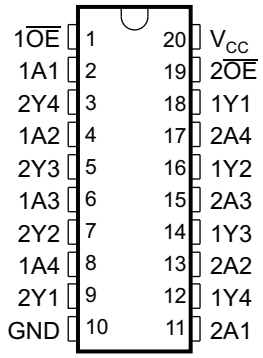
SCBS817B – JULY 2006 – REVISED SEPTEMBER 2006

FEATURES

- **Controlled Baseline**
  - **One Assembly/Test Site, One Fabrication Site**
- **Extended Temperature Performance of –55°C to 125°C**
- **Enhanced Diminishing Manufacturing Sources (DMS) Support**
- **Enhanced Product-Change Notification**
- **Qualification Pedigree** (1)
- **Open-Collector Version of 'BCT244**
- **Open-Collector Outputs Drive Bus Lines or Buffer Memory Address Registers**
- **ESD Protection Exceeds 2000 V Per MIL-STD-883C Method 3015**
- **Available In Plastic Small-Outline (DW) Package**

(1) Component qualification in accordance with JEDEC and industry standards to ensure reliable operation over an extended temperature range. This includes, but is not limited to, Highly Accelerated Stress Test (HAST) or biased 85/85, temperature cycle, autoclave or unbiased HAST, electromigration, bond intermetallic life, and mold compound life. Such qualification testing should not be viewed as justifying use of this component beyond specified performance and environmental limits.

DW PACKAGE
(TOP VIEW)



DESCRIPTION/ORDERING INFORMATION

The SN74BCT760 octal buffer and line driver is designed specifically to improve both the performance and density of 3-state memory address drivers, clock drivers, and bus-oriented receivers and transmitters.

The SN74BCT760 is organized as two 4-bit buffers/line drivers with separate output-enable ($\overline{OE}$) inputs. When $\overline{OE}$ is low, the device passes data from the A inputs to the Y outputs. When $\overline{OE}$ is high, the outputs are in the high-impedance state.

The device is characterized for operation over the full military temperature range of –55°C to 125°C.

ORDERING INFORMATION

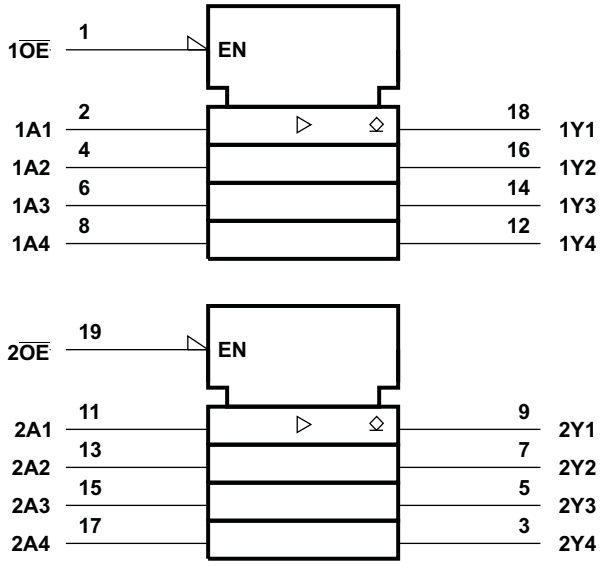
T_A	PACKAGE(1)		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–55°C to 125°C	SOIC – DW	Tape and reel	SN74BCT760MDWREP	BCT760MEP

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

FUNCTION TABLE
(each buffer)

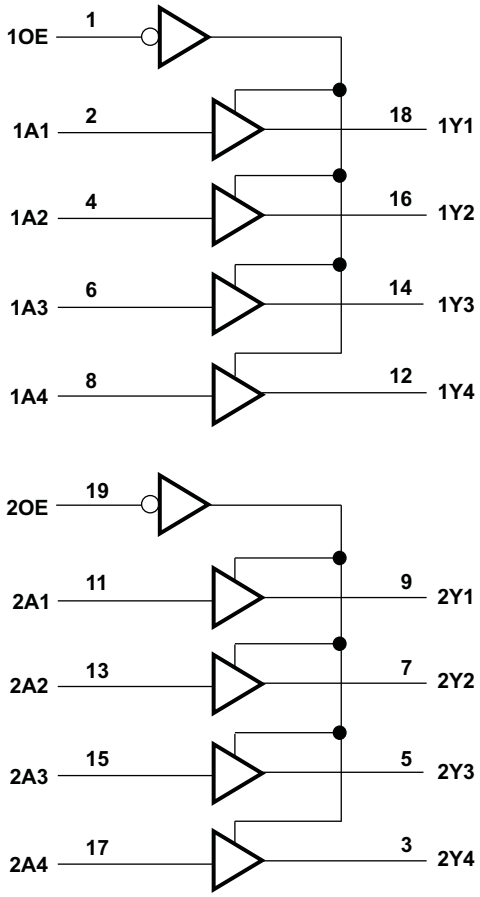
INPUTS		OUTPUT
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	H

LOGIC SYMBOL(1)



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

LOGIC DIAGRAM (POSITIVE LOGIC)



Absolute Maximum Ratings(1)

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

		MIN	MAX	UNIT
V_{CC}	Supply voltage range	–0.5	7	V
V_I	Input voltage range(2)	–0.5	7	V
I_I	Input current range	–30	5	mA
V_O	Voltage range applied to any output in the disabled or power-off state	–0.5	5.5	V
V_O	Voltage range applied to any output in the high state	–0.5	V_{CC}	V
	Current into any output in the low state		96	mA
	Operating free-air temperature range(3)	–55	125	°C
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) The negative input voltage rating may be exceeded if the input clamp current rating is observed.
(3) Long-term high-temperature storage and/or extended use at maximum recommended operating conditions may result in a reduction of overall device life. See http://www.ti.com/ep_quality for additional information on enhanced plastic packaging.

Recommended Operating Conditions

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	4.5	5	5.5	V
V_{IH}	High-level input voltage	2			V
V_{IL}	Low-level input voltage			0.8	V
V_{OH}	High-level output voltage			5.5	V
I_{IK}	Input clamp current			–18	mA
I_{OL}	Low-level output current			48	mA
T_A	Operating free-air temperature	–55		125	°C

Electrical Characteristics

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

PARAMETER	TEST CONDITIONS			MIN	TYP(1)	MAX	UNIT
V_{IK}	V_{CC} = 4.5 V,	I_I = –18 mA				–1.2	V
V_{OL}	V_{CC} = 4.5 V,	I_{OL} = 48 mA			0.38	0.55	V
I_I	V_{CC} = 5.5 V,	V_I = 7 V				0.1	mA
I_{IH}	V_{CC} = 5.5 V,	V_I = 2.7 V				20	µA
I_{IL}	V_{CC} = 5.5 V,	V_I = 0.5 V				–1	mA
I_{OH}	V_{CC} = 4.5 V,	V_{OH} = 5.5 V				0.1	mA
I_{CC}	V_{CC} = 5.5 V,	Outputs open	Outputs high		21	33	mA
			Outputs low		48	76	
			$\overline{OE}$ disabled		6	10	
C_i	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V			6		pF
C_o	V_{CC} = 5 V,	V_I = 2.5 V or 0.5 V			10		pF

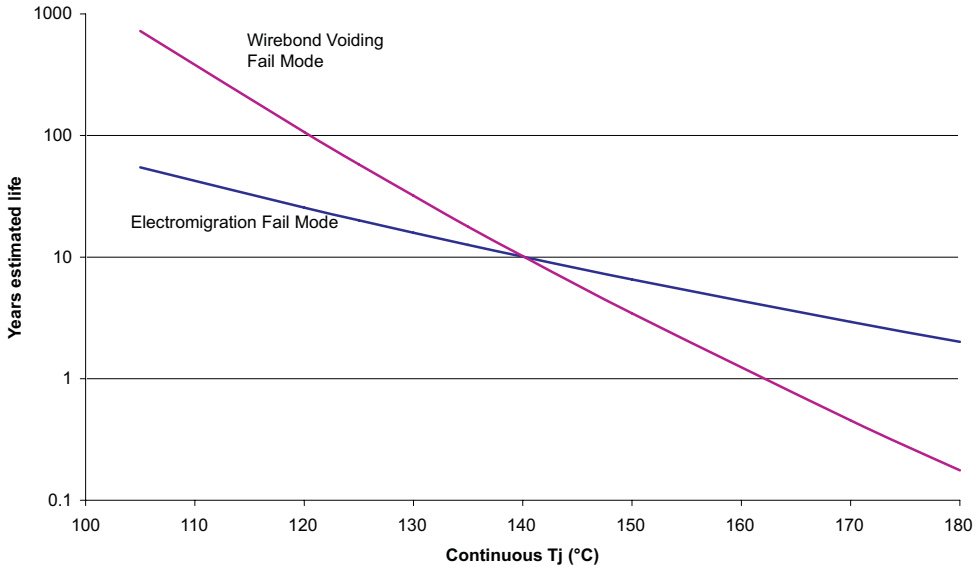
(1) All typical values are at V_{CC} = 5 V, T_A = 25°C.

Switching Characteristics

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V_{CC} = 5 V, C_L = 50 pF, R_L = 500 Ω, T_A = 25°C			V_{CC} = 4.5 V to 5.5 V, C_L = 50 pF, R_L = 500 Ω, T_A = MIN to MAX(1)		UNIT
			MIN	TYP	MAX	MIN	MAX	
t_{PLH}	Any A	Y	6.3	8	9.5	6.3	11.1	ns
t_{PHL}			2.1	4.3	6.5	2.1	7.7	
t_{PLH}	$\overline{OE}$	Y	8.6	13	15.2	8.6	18.7	ns
t_{PHL}			3.2	6.2	8.9	3.2	10.4	

(1) For conditions shown as MIN or MAX, use the appropriate values specified under recommended operating conditions.

SN74BCT760MDWREP Operating Life Derating Chart

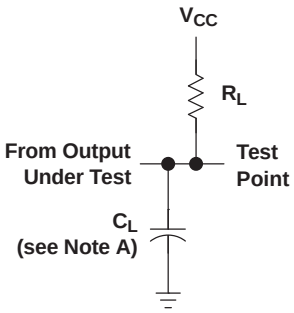


A. See datasheet for absolute maximum ratings and minimum recommended operating conditions.

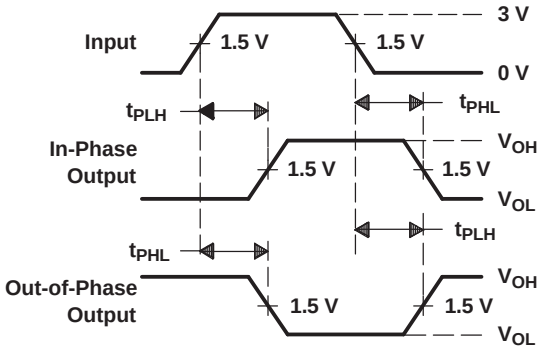
B. Silicon operating life design goal is 10 years at 10°C junction temperature (does not include package interconnect life).

C. Enhanced plastic product disclaimer applies.

PARAMETER MEASUREMENT INFORMATION



LOAD CIRCUIT
FOR OPEN-COLLECTOR OUTPUTS



VOLTAGE WAVEFORMS
PROPAGATION DELAY TIMES

A. C_L includes probe and jig capacitance.

B. All input pulses have the following characteristics: PRR ≤ 1 MHz, $t_r = t_f = 2$ ns, duty cycle = 50%.

C. The outputs are measured one at a time with one transition per measurement.

Figure 1. Load Circuits and Voltage Waveforms

PACKAGING INFORMATION

Orderable Device	Status (1)	Package Type	Package Drawing	Pins	Package Qty	Eco Plan (2)	Lead finish/ Ball material (6)	MSL Peak Temp (3)	Op Temp (°C)	Device Marking (4/5)	Samples
SN74BCT760MDWREP	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	BCT760MEP	Samples
V62/06672-01XE	ACTIVE	SOIC	DW	20	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-55 to 125	BCT760MEP	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 finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

OTHER QUALIFIED VERSIONS OF SN74BCT760-EP :

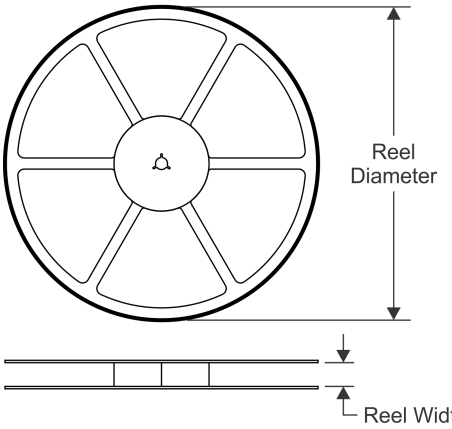
- Catalog: SN74BCT760
- Military: SN54BCT760

NOTE: Qualified Version Definitions:

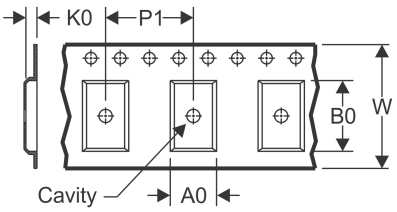
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

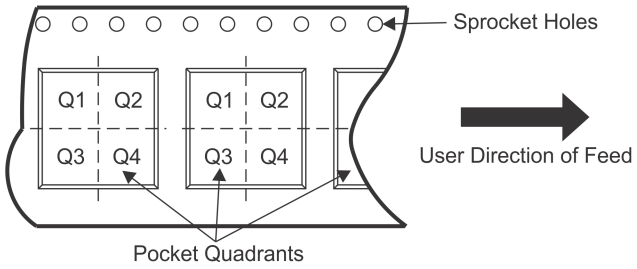


TAPE DIMENSIONS



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

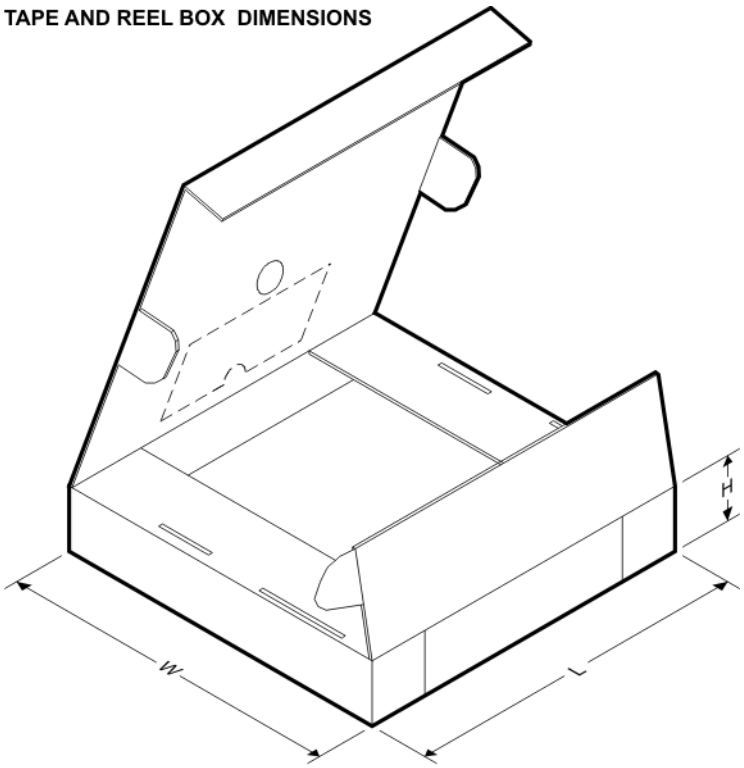
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

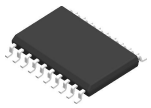
Device	Package Type	Package Drawing	Pins	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
SN74BCT760MDWREP	SOIC	DW	20	2000	330.0	24.4	10.8	13.3	2.7	12.0	24.0	Q1

TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74BCT760MDWREP	SOIC	DW	20	2000	367.0	367.0	45.0

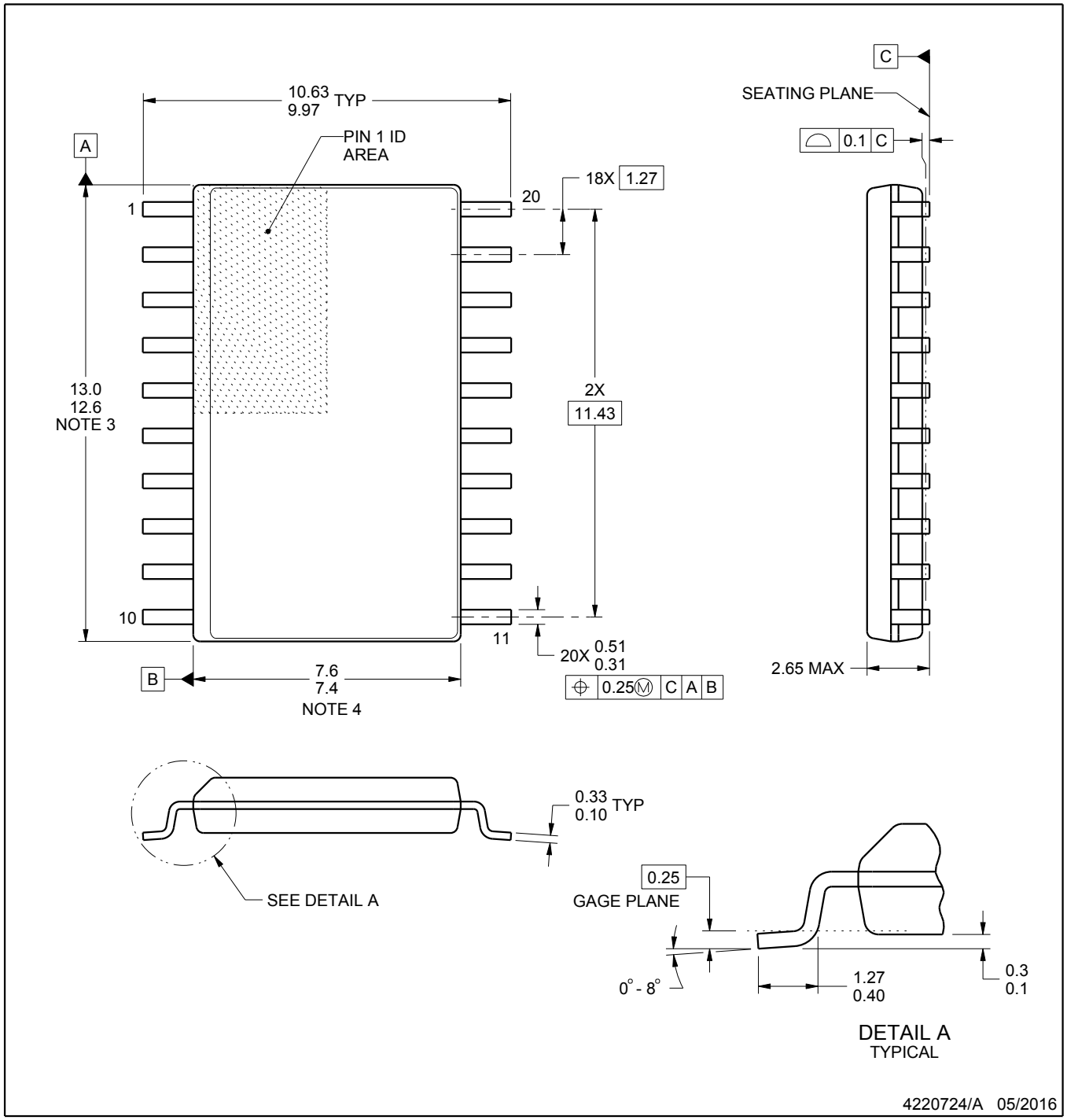


PACKAGE OUTLINE

DW0020A

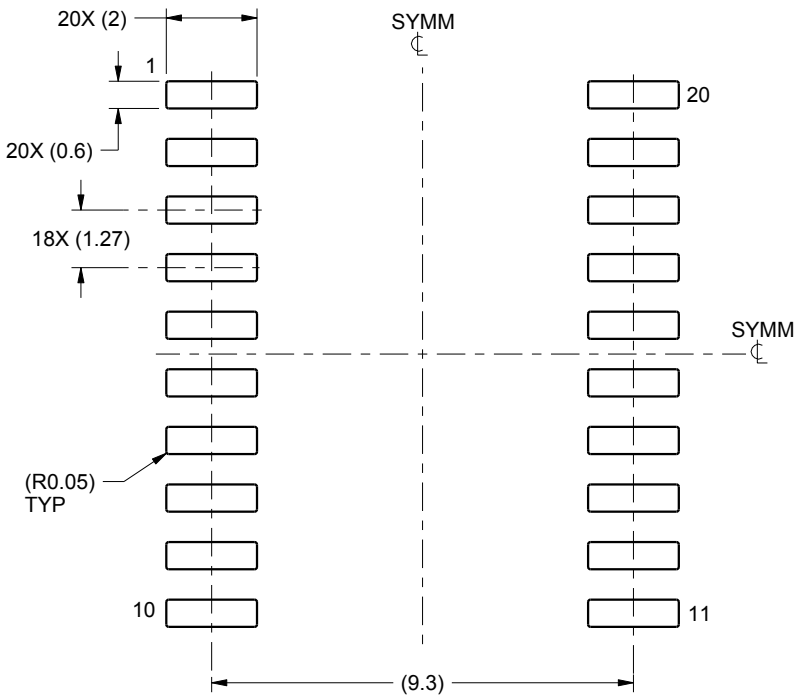
SOIC - 2.65 mm max height

SOIC

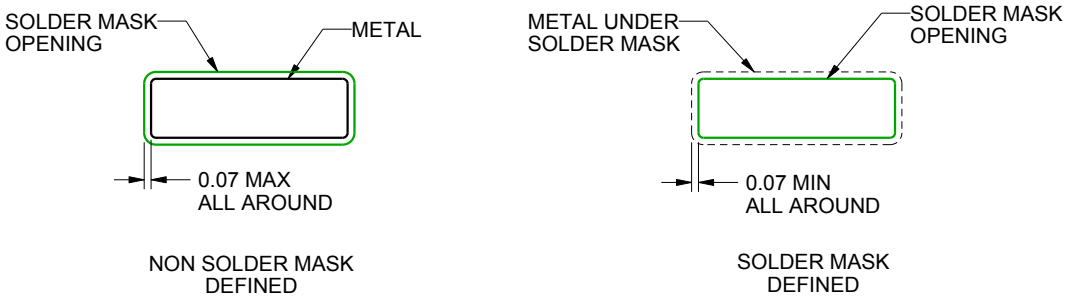


NOTES:

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.



LAND PATTERN EXAMPLE
SCALE:6X



SOLDER MASK DETAILS

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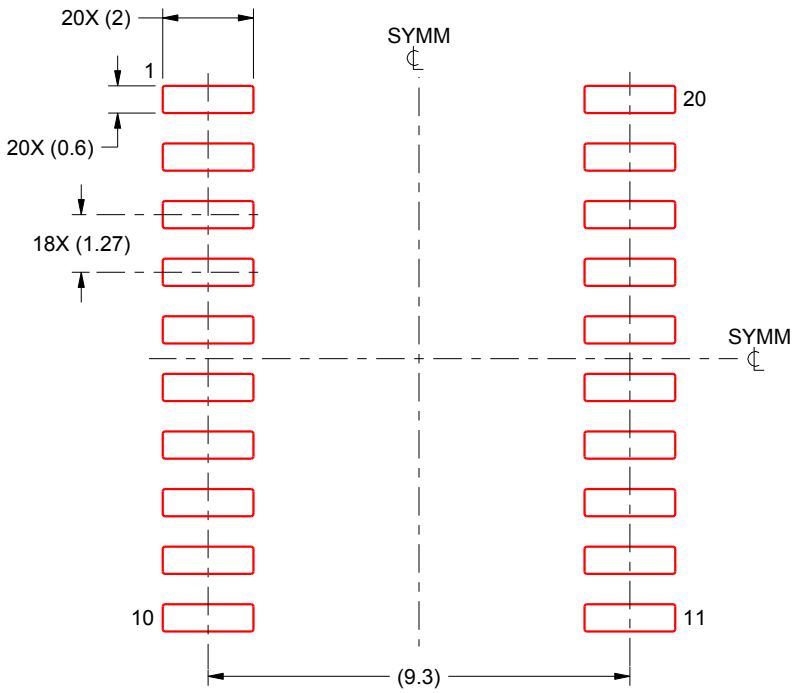
NOTES: (continued)

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: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.

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Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265