

## SNx4HC540 3 ステート出力、オクタル・バッファ / ライン・ドライバ

## 1 特長

- 幅広い動作電圧範囲 : 2V ~ 6V
- バス・ラインを直接、または最大 15 の LSTTL 負荷を駆動する大電流 3 ステート出力
- 低消費電力、 $I_{CC}$  : 80 $\mu$ A 以下
- $t_{pd}$  = 8ns (標準値)
- 5V で  $\pm 6mA$  の出力駆動能力
- 低い入力電流 : 最大 1 $\mu$ A
- データ・フロースルーのピン配置 (すべての入力は出力の反対側)

## 2 概要

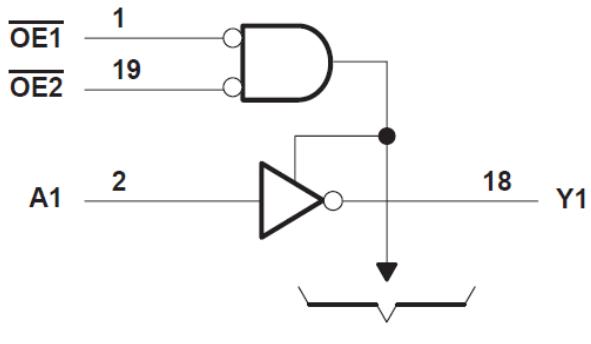
これらのオクタル・バッファおよびライン・ドライバは、一般的な HC240 シリーズの性能を備え、パッケージの反対側に各入力ピンと出力を配置してます。この配置により、プリント基板のレイアウトが大幅に簡素化されます。

3 ステート制御ゲートは、2 入力 NOR です。いずれかの出力イネーブル ( $\overline{OE1}$  または  $\overline{OE2}$ ) 入力が High の場合、8 つの出力はすべて高インピーダンス状態になります。HC540 デバイスの出力のデータは、反転されます。

## 製品情報

部品番号	パッケージ <sup>(1)</sup>	本体サイズ (公称)
SN54HC540J	CDIP (20)	26.92mm × 6.92mm
SN74HC540DW	SOIC (20)	12.80mm × 7.50mm
SN74HC540N	PDIP (20)	25.40mm × 6.35mm
SN74HC540NSR	SO (20)	15.00mm × 5.30mm
SN74HC540PW	TSSOP (20)	6.50mm × 4.40mm

(1) 利用可能なパッケージについては、このデータシートの末尾にある注文情報を参照してください。



To Seven Other Channels

機能ブロック図



英語版の TI 製品についての情報を翻訳したこの資料は、製品の概要を確認する目的で便宜的に提供しているものです。該当する正式な英語版の最新情報は、www.ti.com で閲覧でき、その内容が常に優先されます。TI では翻訳の正確性および妥当性につきましては一切保証いたしません。実際の設計などの前には、必ず最新版の英語版をご参照くださいますようお願いいたします。

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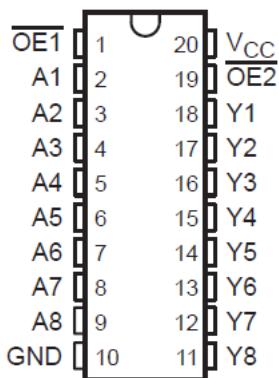
## 3 Revision History

資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

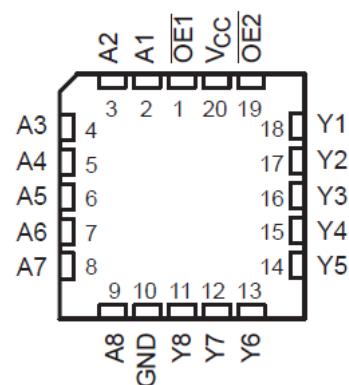
Changes from Revision E (January 2022) to Revision F (July 2022)	Page
• Junction-to-ambient thermal resistance values increased. DW was 58 is now 109.1, N was 69 is now 84.6, NS was 60 is now 113.4, PW was 83 is now 131.8.....	4

Changes from Revision D (August 2003) to Revision E (January 2022)	Page
• 最新のデータシート規格を反映するように、文書全体の採番、書式設定、表、図、相互参照を更新.....	1

## 4 Pin Configuration and Functions



J, DW, N, NS, PW package  
20-Pin CDIP, SOIC, PDIP, SO, TSSOP  
Top View



FK Package  
20-Pin CDIP  
Top View

## 5 Specifications

### 5.1 Absolute Maximum Ratings

overoperating free-air temperature range (unless otherwise noted)<sup>(1)</sup>

			MIN	MAX	UNIT
V <sub>CC</sub>	Supply voltage range		-0.5	7	V
I <sub>IK</sub>	Input clamp current <sup>(2)</sup>	V <sub>I</sub> < 0 or V <sub>I</sub> > V <sub>CC</sub>		±20	mA
I <sub>OK</sub>	Output clamp current <sup>(2)</sup>	V <sub>O</sub> < 0 or V <sub>O</sub> > V <sub>CC</sub>		±20	mA
I <sub>O</sub>	Continuous output current	V <sub>O</sub> = 0 to V <sub>CC</sub>		±35	mA
	Continuous current through V <sub>CC</sub> or GND			±70	mA
T <sub>J</sub>	Junction temperature			150	°C
T <sub>stg</sub>	Storage temperature range		-65	150	°C
	Lead temperature (Soldering 10s) (SOIC - Lead Tips Only)			300	°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 input and output voltage ratings may be exceeded if the input and output current ratings are observed.

### 5.2 Recommended Operating Conditions<sup>(1)</sup>

		SN54HC540			SN74HC540			UNIT
		MIN	NOM	MAX	MIN	NOM	MAX	
V <sub>CC</sub>	Supply voltage	2	5	6	2	5	6	V
V <sub>IH</sub>	High-level input voltage	V <sub>CC</sub> = 2 V	1.5		1.5			V
		V <sub>CC</sub> = 4.5 V	3.15		3.15			
		V <sub>CC</sub> = 6 V	4.2		4.2			
V <sub>IL</sub>	Low-level input voltage	V <sub>CC</sub> = 2 V		0.5		0.5		V
		V <sub>CC</sub> = 4.5 V		1.35		1.35		
		V <sub>CC</sub> = 6 V		1.8		1.8		
V <sub>I</sub>	Input voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
V <sub>O</sub>	Output voltage	0	V <sub>CC</sub>	0	V <sub>CC</sub>	0	V <sub>CC</sub>	V
Δt/Δv	Input transition rise/fall time	V <sub>CC</sub> = 2 V		1000		1000		ns
		V <sub>CC</sub> = 4.5 V		500		500		
		V <sub>CC</sub> = 6 V		400		400		
T <sub>A</sub>	Operating free-air temperature	-55	125	-40	85		°C	

(1) All unused inputs of the device must be held at V<sub>CC</sub> or GND to ensure proper device operation. Refer to the TI application report, *Implications of Slow or Floating CMOS Inputs*, literature number [SCBA004](#).

### 5.3 Thermal Information

THERMAL METRIC		DW (SOIC)	N (PDIP)	NS (SO)	PW (TSSOP)	UNIT
		20 PINS	20 PINS	20 PINS	20 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance <sup>(1)</sup>	109.1	84.6	113.4	131.8	°C/W
R <sub>θJC(top)</sub>	Junction-to-case (top) thermal resistance	76	72.5	78.6	72.2	°C/W
R <sub>θJB</sub>	Junction-to-board thermal resistance	77.6	65.3	78.4	82.8	°C/W
Ψ <sub>JT</sub>	Junction-to-top characterization parameter	51.5	55.3	47.1	21.5	°C/W
Ψ <sub>JB</sub>	Junction-to-board characterization parameter	77.1	65.2	78.1	82.4	°C/W

### 5.3 Thermal Information (continued)

THERMAL METRIC		DW (SOIC)	N (PDIP)	NS (SO)	PW (TSSOP)	UNIT
		20 PINS	20 PINS	20 PINS	20 PINS	
$R_{\theta JC(\text{bot})}$	Junction-to-case (bottom) thermal resistance	N/A	N/A	N/A	N/A	°C/W

- (1) For more information about traditional and new thermal metrics, see the [Semiconductor and IC package thermal metrics](#) application report.

### 5.4 Electrical Characteristics

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

PARAMETER	TEST CONDITIONS	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC540		SN74HC540		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OH</sub> = -20 µA	2 V	1.9	1.998	1.9		1.9		V
			4.5 V	4.4	4.499	4.4		4.4		
			6 V	5.9	5.999	5.9		5.9		
		I <sub>OH</sub> = -6 mA	4.5 V	3.98	4.3	3.7		3.84		
		I <sub>OH</sub> = -7.8 mA	6 V	5.48	5.8	5.2		5.34		
V <sub>OL</sub>	V <sub>I</sub> = V <sub>IH</sub> or V <sub>IL</sub>	I <sub>OL</sub> = 20 µA	2 V	0.002	0.1	0.1		0.1		V
			4.5 V	0.001	0.1	0.1		0.1		
			6 V	0.001	0.1	0.1		0.1		
		I <sub>OL</sub> = 6 mA	4.5 V	0.17	0.26	0.4		0.33		
		I <sub>OL</sub> = 7.8 mA	6 V	0.15	0.26	0.4		0.33		
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0		6 V	±0.1	±100	±1000		±1000		nA
I <sub>OZ</sub>	V <sub>O</sub> = V <sub>CC</sub> or 0		6 V	±0.01	±0.5	±10		±5		µA
I <sub>CC</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0, I <sub>O</sub> = 0		6 V		8	160		80		µA
C <sub>i</sub>			2 V to 6 V	3	10	10		10		pF

### 5.5 Switching Characteristics

over recommended operating free-air temperature range, C<sub>L</sub> = 50 pF (unless otherwise noted) (see [Figure 6-1](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC540		SN74HC540		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
t <sub>pd</sub>	A	Y	2 V		35	100		149		125	ns
			4.5 V		10	20		30		25	
			6 V		8	17		25		21	
t <sub>en</sub>	OE	Y	2 V		75	150		224		188	ns
			4.5 V		15	30		45		38	
			6 V		13	26		38		32	
t <sub>dis</sub>	OE	Y	2 V		40	150		224		188	ns
			4.5 V		18	30		45		38	
			6 V		17	26		38		32	
t <sub>l</sub>		Y	2 V		28	60		90		75	ns
			4.5 V		8	12		18		15	
			6 V		6	10		15		13	

## 5.6 Switching Characteristics

over recommended operating free-air temperature range,  $C_L = 150 \text{ pF}$  (unless otherwise noted) (see [图 6-1](#))

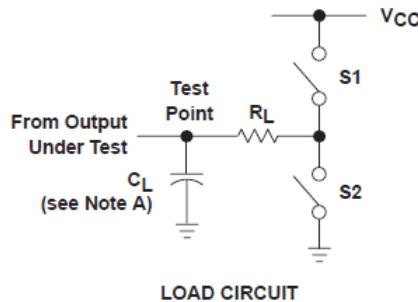
PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HC540		SN74HC540		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{pd}$	A	Y	2 V		60	150		224		188	ns
			4.5 V		15	30		45		38	
			6 V		13	26		38		32	
$t_{en}$	$\bar{OE}$	Y	2 V		100	200		298		250	ns
			4.5 V		20	40		60		50	
			6 V		17	34		51		43	
$t_t$		Y	2 V		45	210		315		265	ns
			4.5 V		17	42		63		53	
			6 V		13	36		53		45	

## 5.7 Operating Characteristics

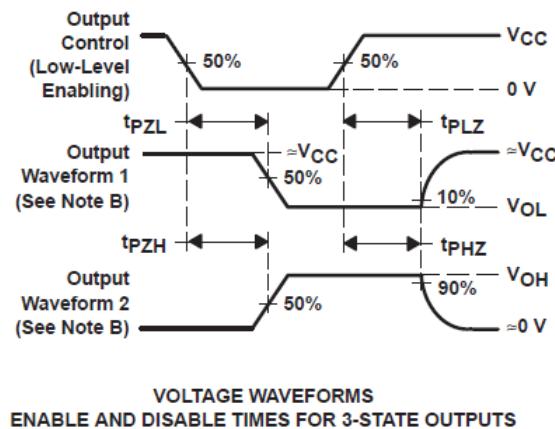
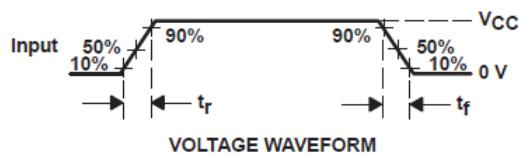
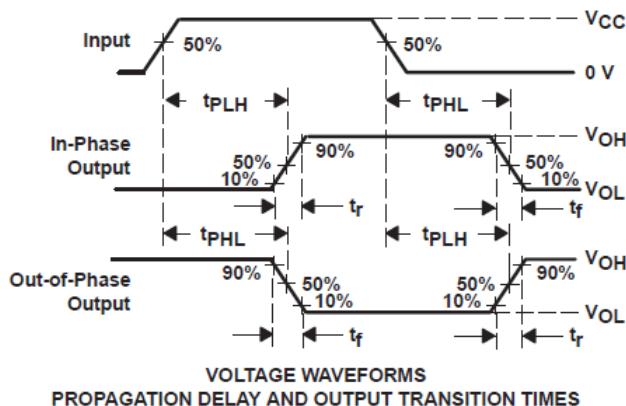
$T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance per buffer/driver	No load	35 pF

## 6 Parameter Measurement Information



PARAMETER	$R_L$	$C_L$	S1	S2
$t_{en}$	1 k $\Omega$	50 pF	Open	Closed
		or 150 pF	Closed	Open
$t_{dis}$	1 k $\Omega$	50 pF	Open	Closed
		or 150 pF	Closed	Open
$t_{pd}$ or $t_t$	—	50 pF or 150 pF	Open	Open



- A.  $C_L$  includes probe and test-fixture 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. Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics: PRR  $\leq$  1 MHz,  $Z_O = 50 \Omega$ ,  $t_r = 6$  ns,  $t_f = 6$  ns.
- D. The outputs are measured one at a time with one input transition per measurement.
- E.  $t_{PLZ}$  and  $t_{PHZ}$  are the same as  $t_{dis}$ .
- F.  $t_{PLZ}$  and  $t_{PZH}$  are the same as  $t_{en}$ .
- G.  $t_{PLH}$  and  $t_{PHL}$  are the same as  $t_{pd}$ .

図 6-1. Load Circuit and Voltage Waveforms

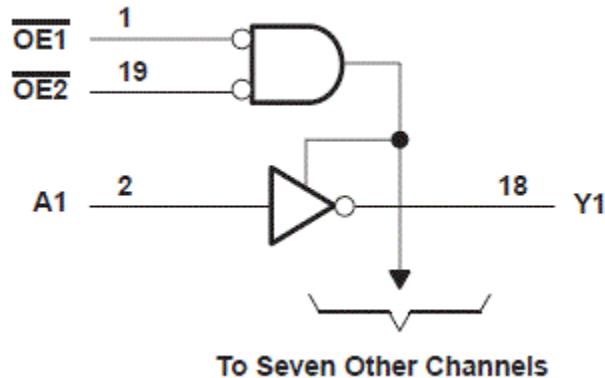
## 7 Detailed Description

### 7.1 Overview

These octal buffers and line drivers feature the performance of the popular 'HC240 series and offer a pinout with inputs and outputs on opposite sides of the package. This arrangement greatly facilitates printed circuit board layout.

The 3-state control gate is a 2-input NOR. If either output-enable ( $\overline{OE1}$  or  $\overline{OE2}$ ) input is high, all eight outputs are in the high-impedance state. The 'HC540 devices provide inverted data at the outputs.

### 7.2 Functional Block Diagram



### 7.3 Device Functional Modes

表 7-1. Function Table  
(Each Buffer/Driver)

INPUTS			OUTPUT Y
$\overline{OE1}$	$\overline{OE2}$	A	
L	L	L	H
L	L	H	L
H	X	X	Z
X	H	X	Z

## 8 Power Supply Recommendations

The power supply can be any voltage between the minimum and maximum supply voltage rating located in the *Recommended Operating Conditions*. Each  $V_{CC}$  terminal should have a good bypass capacitor to prevent power disturbance. A 0.1- $\mu$ F capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- $\mu$ F and 1- $\mu$ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results.

## 9 Layout

### 9.1 Layout Guidelines

When using multiple-input and multiple-channel logic devices inputs must not ever be left floating. In many cases, functions or parts of functions of digital logic devices are unused; for example, when only two inputs of a triple-input AND gate are used or only 3 of the 4 buffer gates are used. Such unused input pins must not be left unconnected because the undefined voltages at the outside connections result in undefined operational states. All unused inputs of digital logic devices must be connected to a logic high or logic low voltage, as defined by the input voltage specifications, to prevent them from floating. The logic level that must be applied to any particular unused input depends on the function of the device. Generally, the inputs are tied to GND or  $V_{CC}$ , whichever makes more sense for the logic function or is more convenient.

## 10 Device and Documentation Support

TI offers an extensive line of development tools. Tools and software to evaluate the performance of the device, generate code, and develop solutions are listed below.

### 10.1 Receiving Notification of Documentation Updates

To receive notification of documentation updates, navigate to the device product folder on [ti.com](http://ti.com). Click on *Subscribe to updates* to register and receive a weekly digest of any product information that has changed. For change details, review the revision history included in any revised document.

### 10.2 サポート・リソース

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### 10.3 Trademarks

TI E2E™ is a trademark of Texas Instruments.

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### 10.4 Electrostatic Discharge Caution

 This integrated circuit can be damaged by ESD. Texas Instruments recommends that all integrated circuits be handled with appropriate precautions. Failure to observe proper handling and installation procedures can cause damage.

ESD damage can range from subtle performance degradation to complete device failure. Precision integrated circuits may be more susceptible to damage because very small parametric changes could cause the device not to meet its published specifications.

### 10.5 Glossary

[TI Glossary](#) This glossary lists and explains terms, acronyms, and definitions.

## 11 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

**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)
JM38510/65710BRA	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65710BRA
JM38510/65710BRA.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65710BRA
M38510/65710BRA	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65710BRA
<a href="#">SN54HC540J</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC540J
SN54HC540J.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC540J
<a href="#">SN74HC540DWR</a>	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
SN74HC540DWR.A	Active	Production	SOIC (DW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
<a href="#">SN74HC540N</a>	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC540N
SN74HC540N.A	Active	Production	PDIP (N)   20	20   TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC540N
<a href="#">SN74HC540NSR</a>	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
SN74HC540NSR.A	Active	Production	SOP (NS)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
<a href="#">SN74HC540PW</a>	Obsolete	Production	TSSOP (PW)   20	-	-	Call TI	Call TI	-40 to 85	HC540
<a href="#">SN74HC540PWR</a>	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
SN74HC540PWR.A	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
SN74HC540PWRE4	Active	Production	TSSOP (PW)   20	2000   LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC540
<a href="#">SN74HC540PWT</a>	Obsolete	Production	TSSOP (PW)   20	-	-	Call TI	Call TI	-40 to 85	HC540
<a href="#">SNJ54HC540J</a>	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SNJ54HC540J
SNJ54HC540J.A	Active	Production	CDIP (J)   20	20   TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SNJ54HC540J

<sup>(1)</sup> **Status:** For more details on status, see our [product life cycle](#).

<sup>(2)</sup> **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.

<sup>(3)</sup> **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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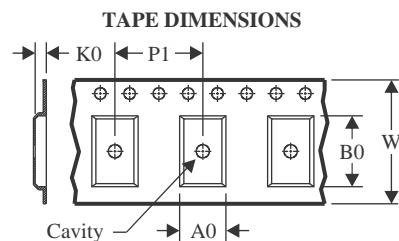
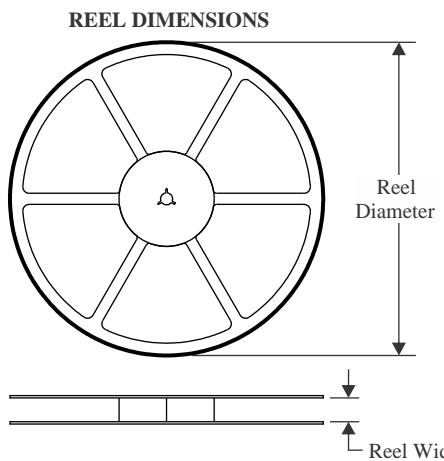
In no event shall TI's liability arising out of such information exceed the total purchase price of the TI part(s) at issue in this document sold by TI to Customer on an annual basis.

**OTHER QUALIFIED VERSIONS OF SN54HC540, SN74HC540 :**

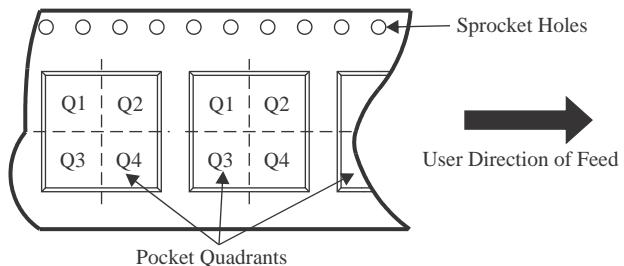
- Catalog : [SN74HC540](#)
- Military : [SN54HC540](#)

NOTE: Qualified Version Definitions:

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

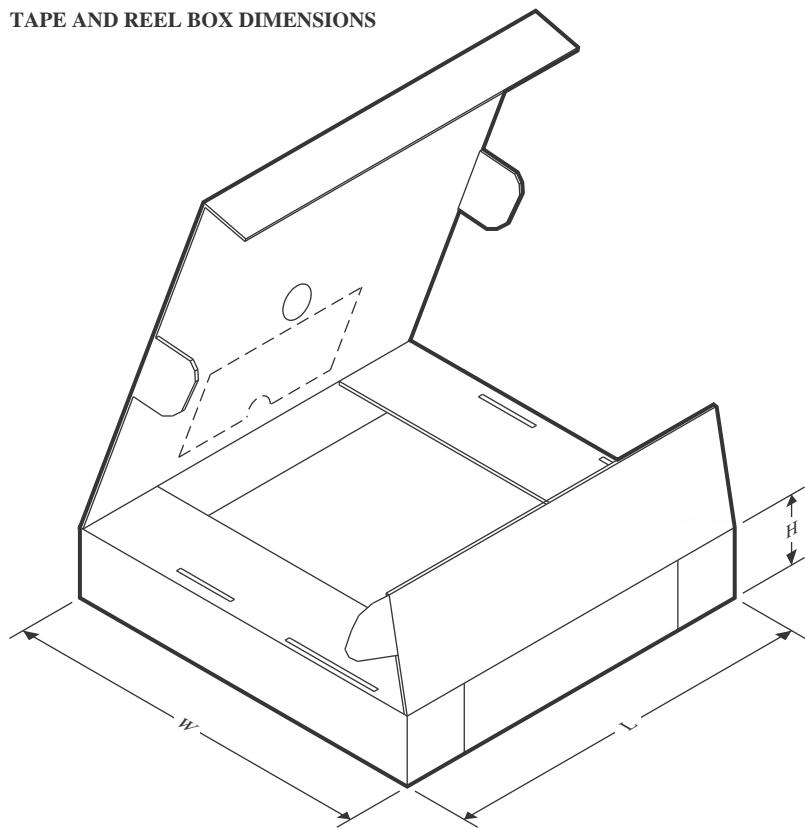
**TAPE AND REEL INFORMATION**


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**


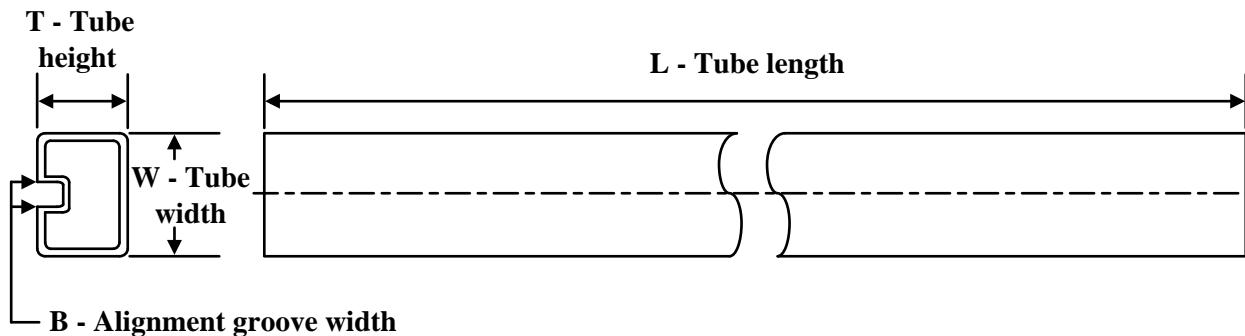
\*All dimensions are nominal

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
SN74HC540DWR	SOIC	DW	20	2000	330.0	24.4	10.9	13.3	2.7	12.0	24.0	Q1
SN74HC540NSR	SOP	NS	20	2000	330.0	24.4	8.4	13.0	2.5	12.0	24.0	Q1
SN74HC540PWR	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)
SN74HC540DWR	SOIC	DW	20	2000	356.0	356.0	45.0
SN74HC540NSR	SOP	NS	20	2000	356.0	356.0	45.0
SN74HC540PWR	TSSOP	PW	20	2000	353.0	353.0	32.0

**TUBE**


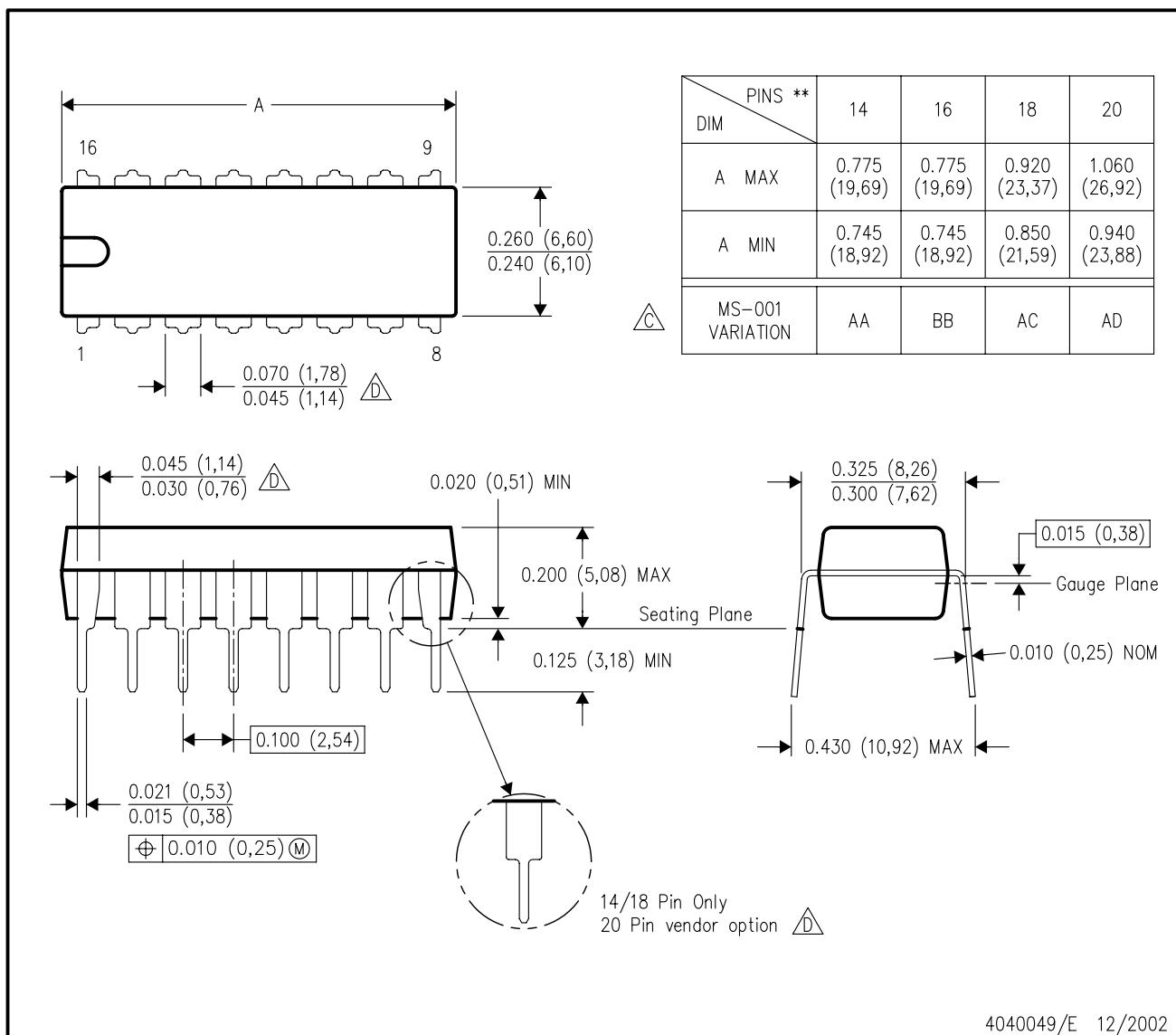
\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T ( $\mu$ m)	B (mm)
SN74HC540N	N	PDIP	20	20	506	13.97	11230	4.32
SN74HC540N.A	N	PDIP	20	20	506	13.97	11230	4.32

## N (R-PDIP-T\*\*)

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



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.

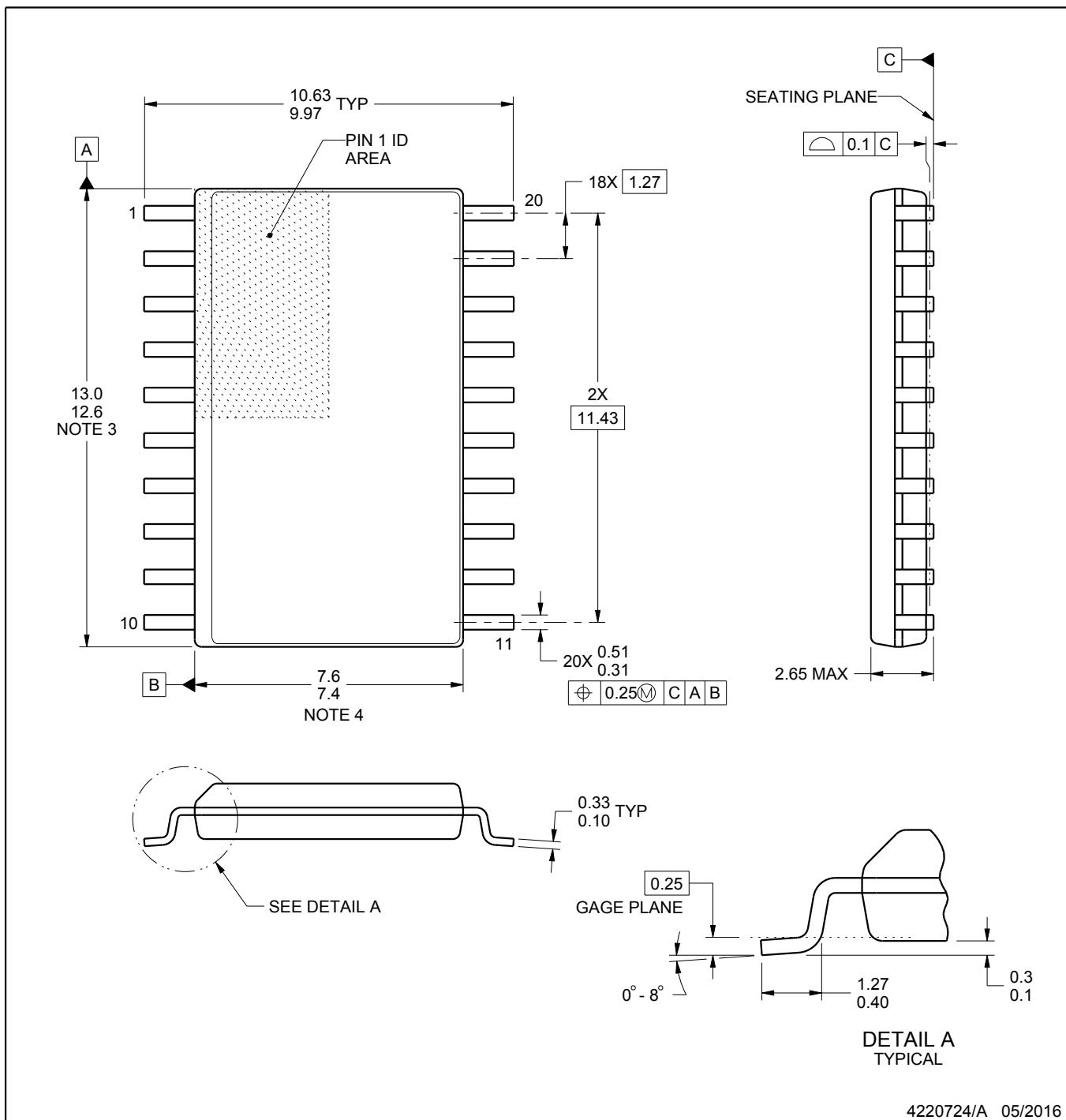
# PACKAGE OUTLINE

DW0020A



SOIC - 2.65 mm max height

SOIC



## NOTES:

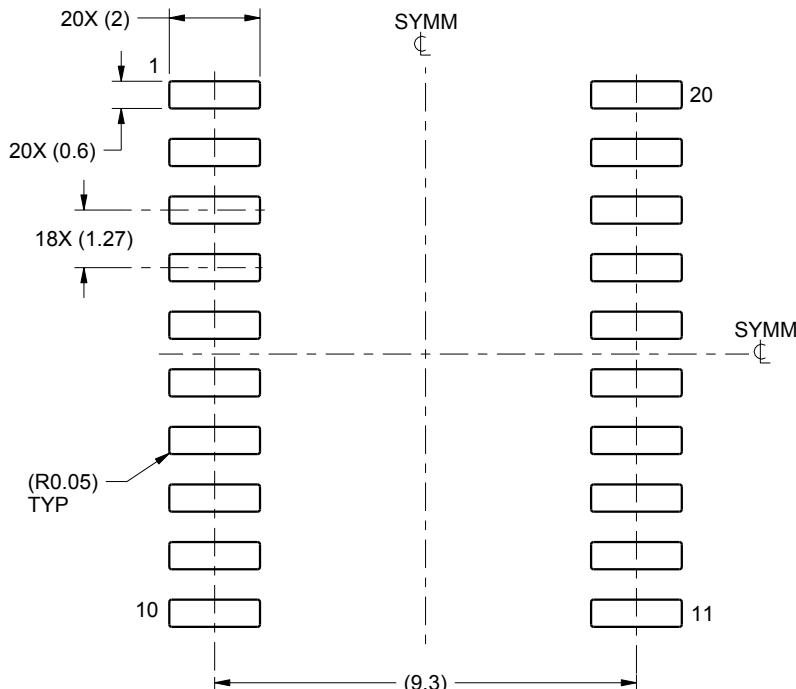
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate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

# EXAMPLE BOARD LAYOUT

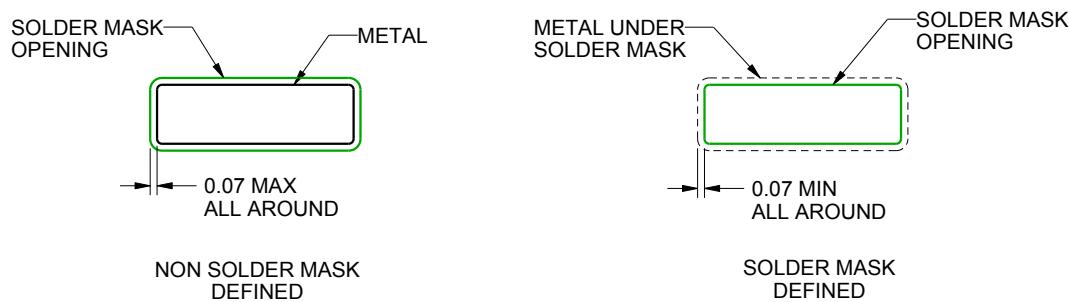
DW0020A

SOIC - 2.65 mm max height

SOIC



LAND PATTERN EXAMPLE  
SCALE:6X



SOLDER MASK DETAILS

4220724/A 05/2016

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

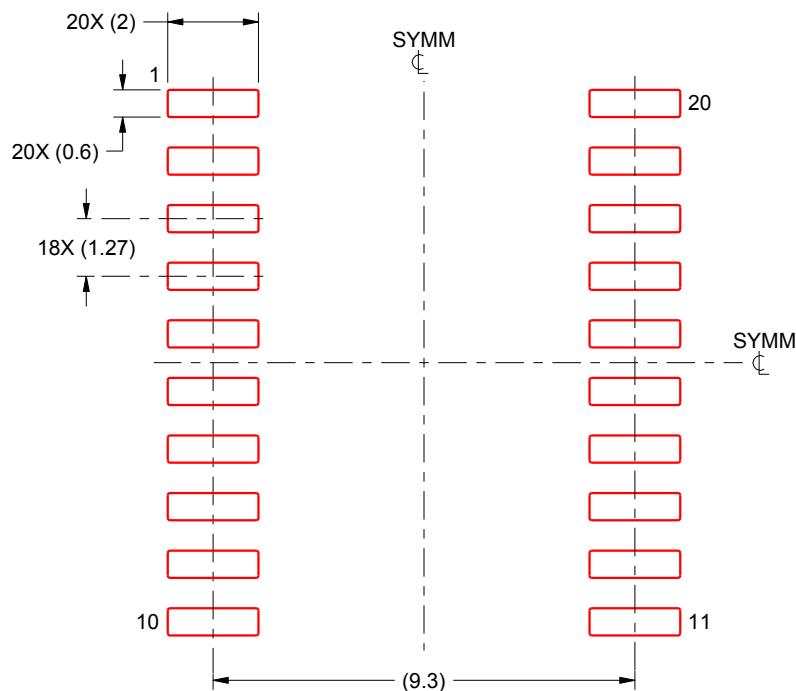
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

DW0020A

SOIC - 2.65 mm max height

SOIC



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

4220724/A 05/2016

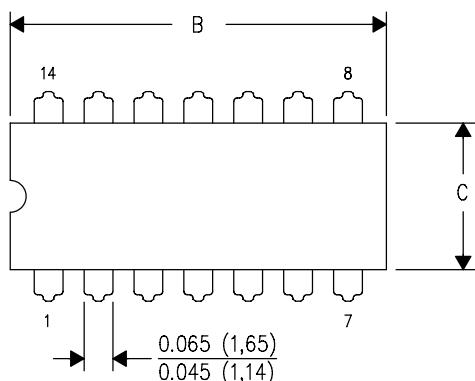
NOTES: (continued)

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.

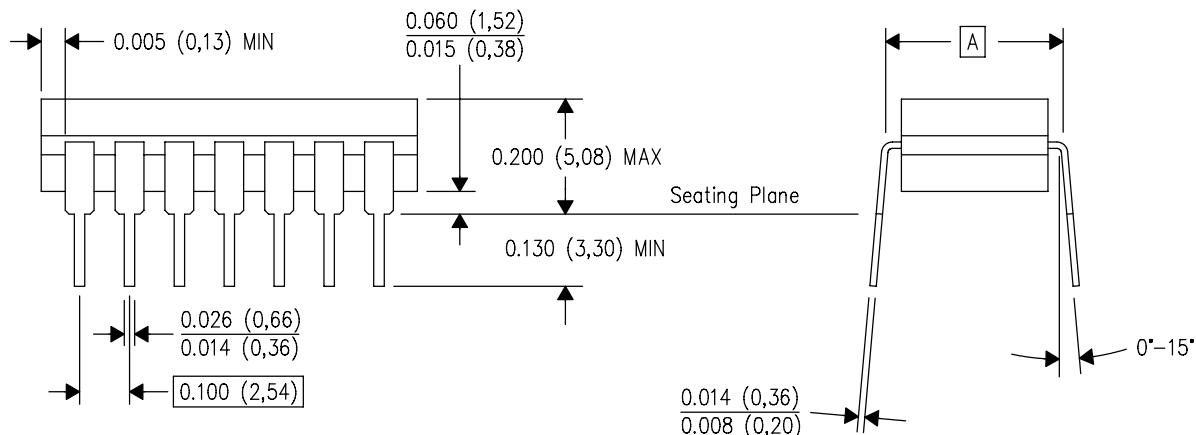
J (R-GDIP-T\*\*)

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



PINS ** DIM	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)

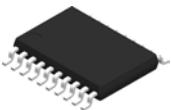


4040083/F 03/03

- 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.

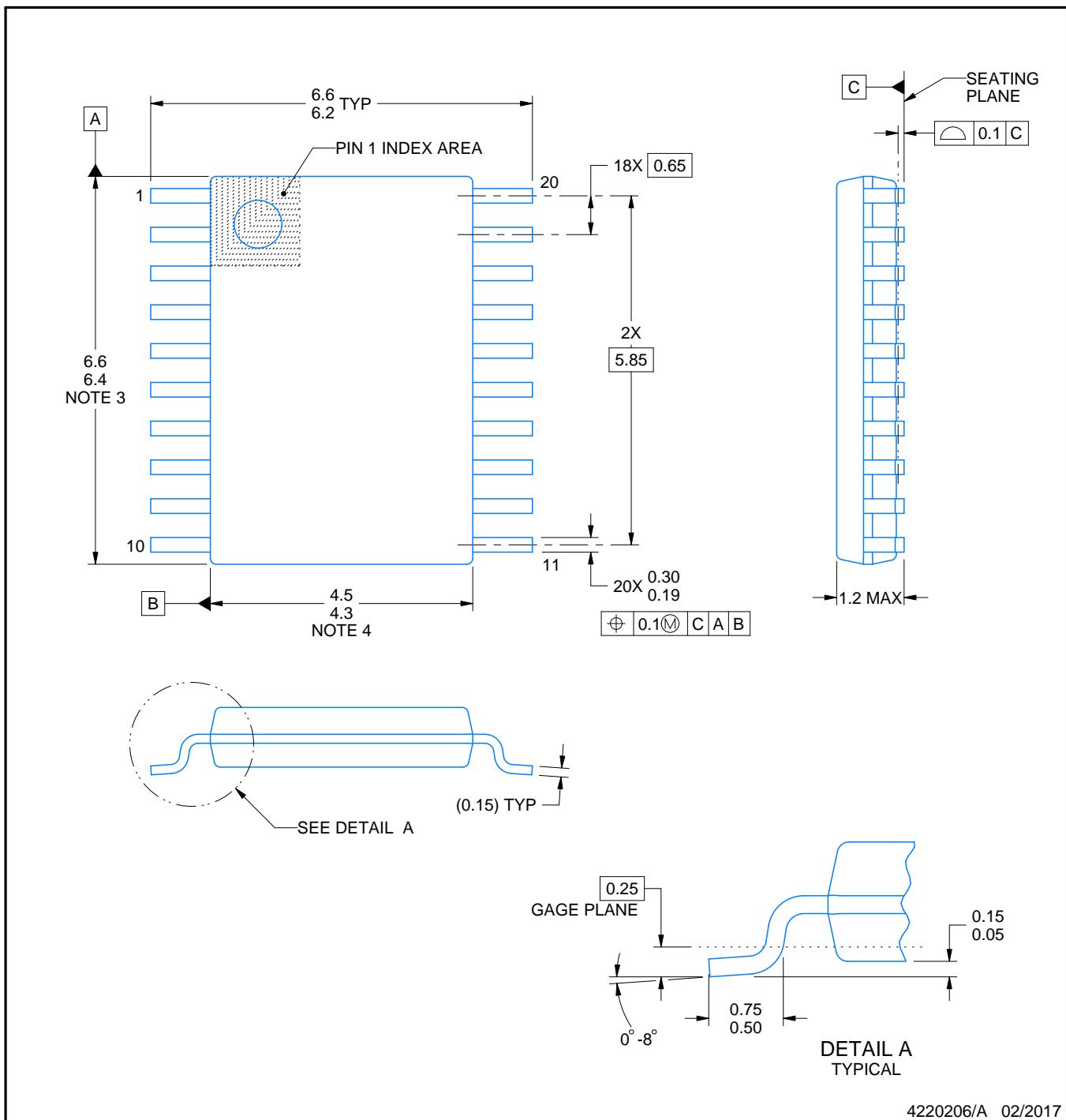
## PACKAGE OUTLINE

**PW0020A**



## **TSSOP - 1.2 mm max height**

## SMALL OUTLINE PACKAGE



## NOTES:

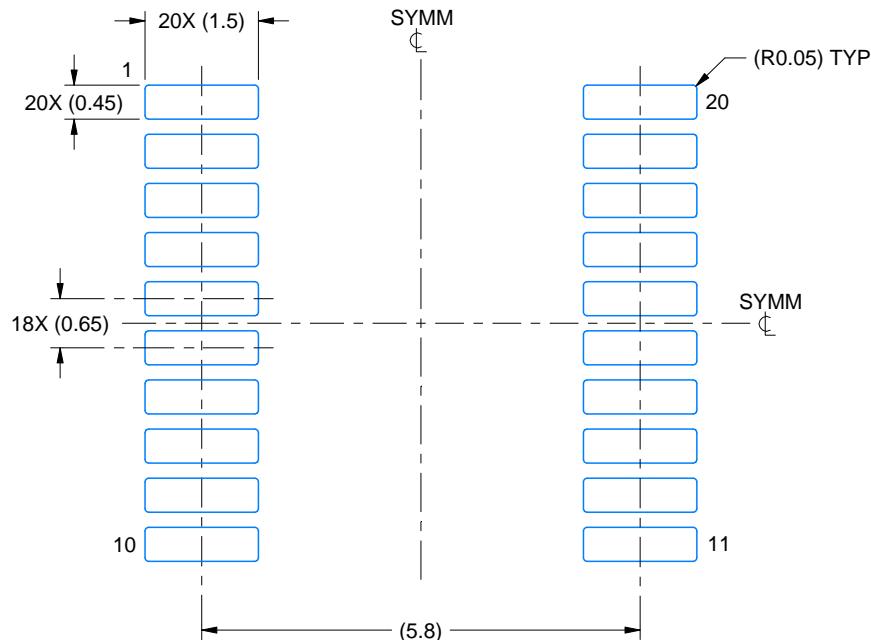
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
  2. This drawing is subject to change without notice.
  3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions,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

# EXAMPLE BOARD LAYOUT

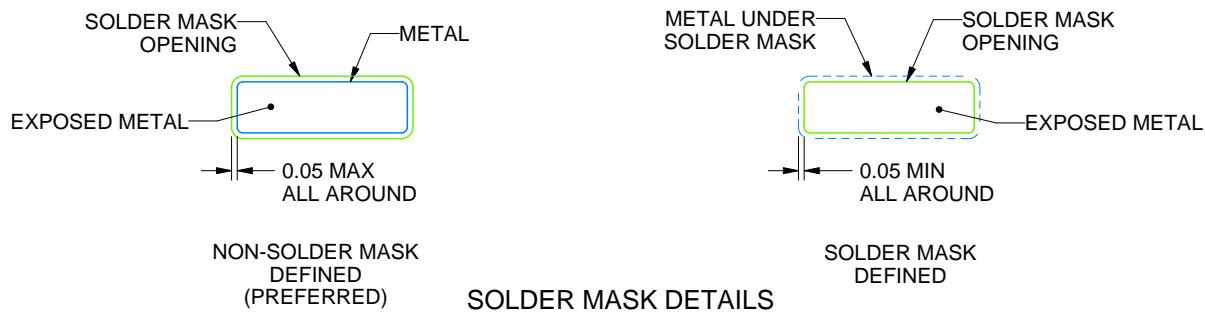
PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4220206/A 02/2017

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

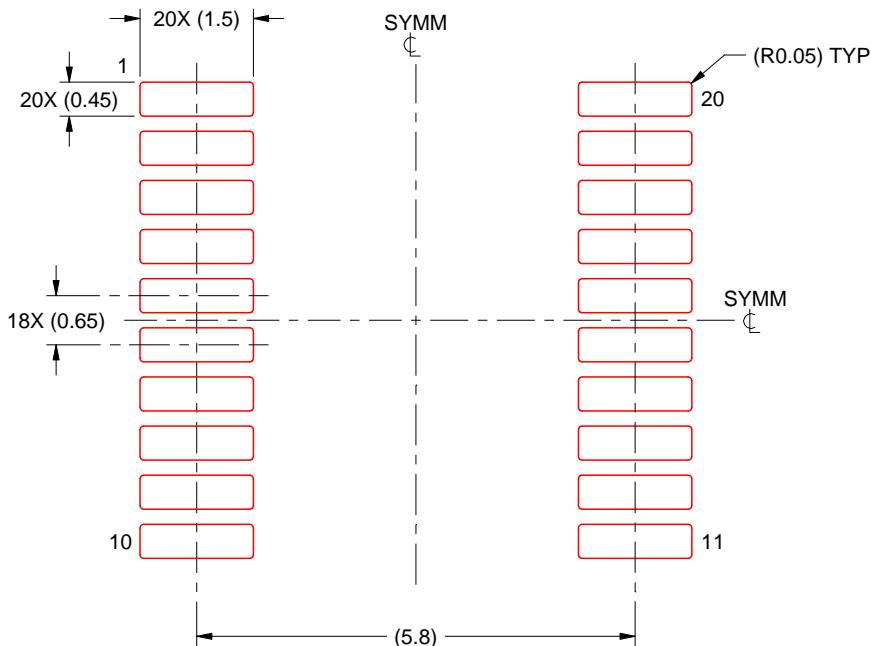
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

PW0020A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220206/A 02/2017

NOTES: (continued)

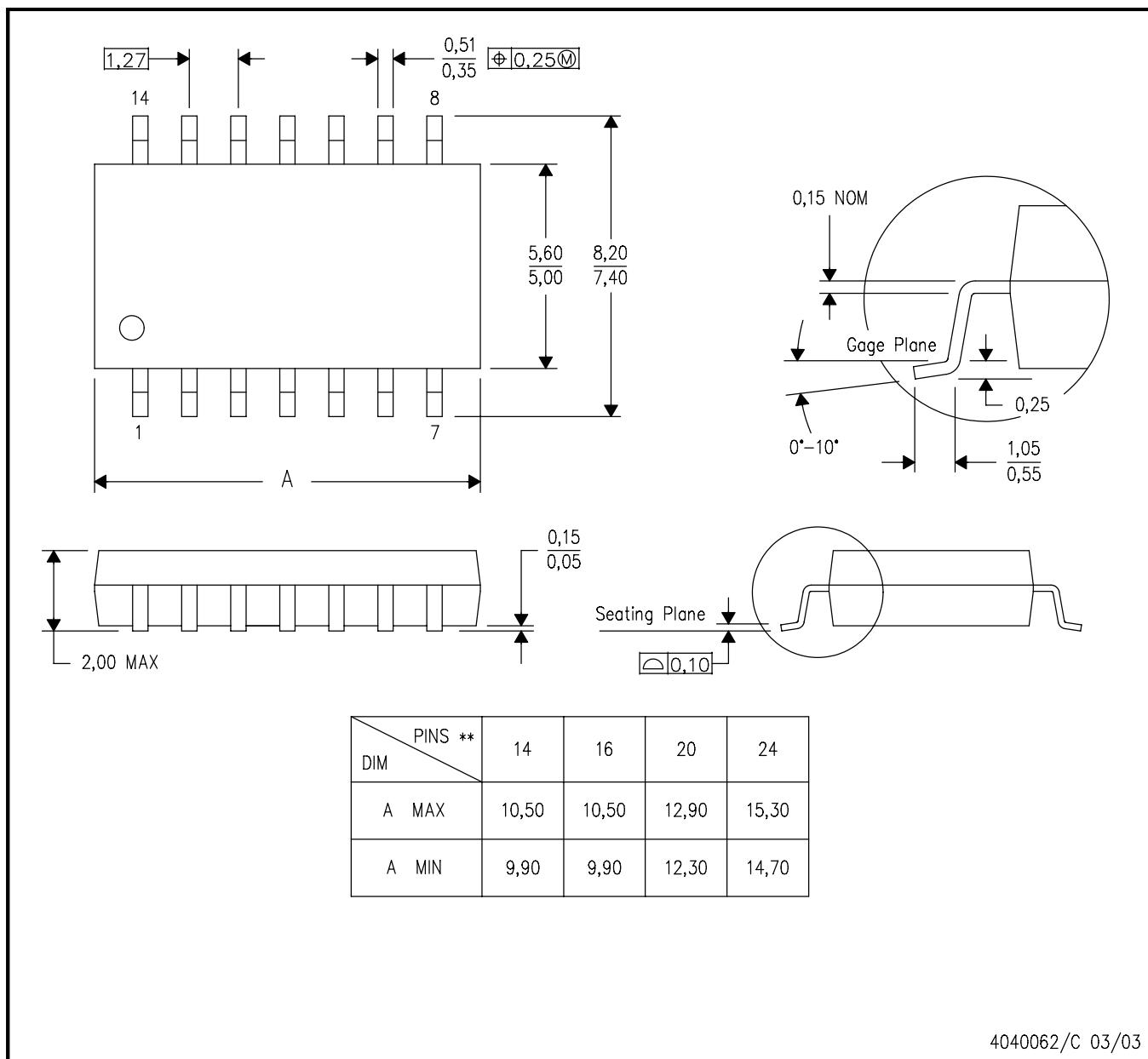
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

## MECHANICAL DATA

NS (R-PDSO-G\*\*)

14-PINS SHOWN

PLASTIC SMALL-OUTLINE PACKAGE



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.

4040062/C 03/03

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