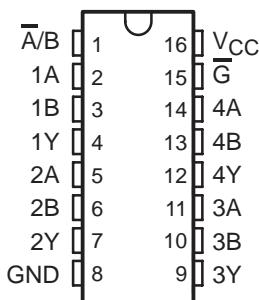


# SN54HC158, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

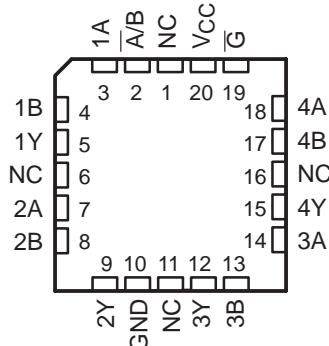
SCLS296D – JANUARY 1996 – REVISED OCTOBER 2003

- Wide Operating Voltage Range of 2 V to 6 V
- Outputs Can Drive Up To 15 LSTTL Loads
- Low Power Consumption, 80- $\mu$ A Max  $I_{CC}$
- Typical  $t_{pd} = 11$  ns
- $\pm 6$ -mA Output Drive at 5 V
- Low Input Current of 1  $\mu$ A Max

SN54HC158 . . . J OR W PACKAGE  
SN74HC158 . . . D, N, NS, OR PW PACKAGE  
(TOP VIEW)



SN54HC158 . . . FK PACKAGE  
(TOP VIEW)



NC – No internal connection

## description/ordering information

These data selectors/multiplexers contain inverters and drivers that supply full data selection to the four output gates. A separate strobe ( $G$ ) input is provided. A 4-bit word is selected from one of two sources and is routed to the four outputs. The 'HC158 devices' outputs provide inverted data.

## ORDERING INFORMATION

TA	PACKAGE <sup>†</sup>		ORDERABLE PART NUMBER	TOP-SIDE MARKING
–40°C to 85°C	PDIP – N	Tube of 25	SN74HC158N	SN74HC158N
	SOIC – D	Tube of 40	SN74HC158D	HC158
		Reel of 2500	SN74HC158DR	
		Reel of 250	SN74HC158DT	
	SOP – NS	Reel of 2000	SN74HC158NSR	HC158
	TSSOP – PW	Tube of 90	SN74HC158PW	HC158
		Reel of 2000	SN74HC158PWR	
		Reel of 250	SN74HC158PWT	
–55°C to 125°C	CDIP – J	Tube of 25	SNJ54HC158J	SNJ54HC158J
	CFP – W	Tube of 150	SNJ54HC158W	SNJ54HC158W
	LCCC – FK	Tube of 55	SNJ54HC158FK	SNJ54HC158FK

<sup>†</sup> Package drawings, standard packing quantities, thermal data, symbolization, and PCB design guidelines are available at [www.ti.com/sc/package](http://www.ti.com/sc/package).



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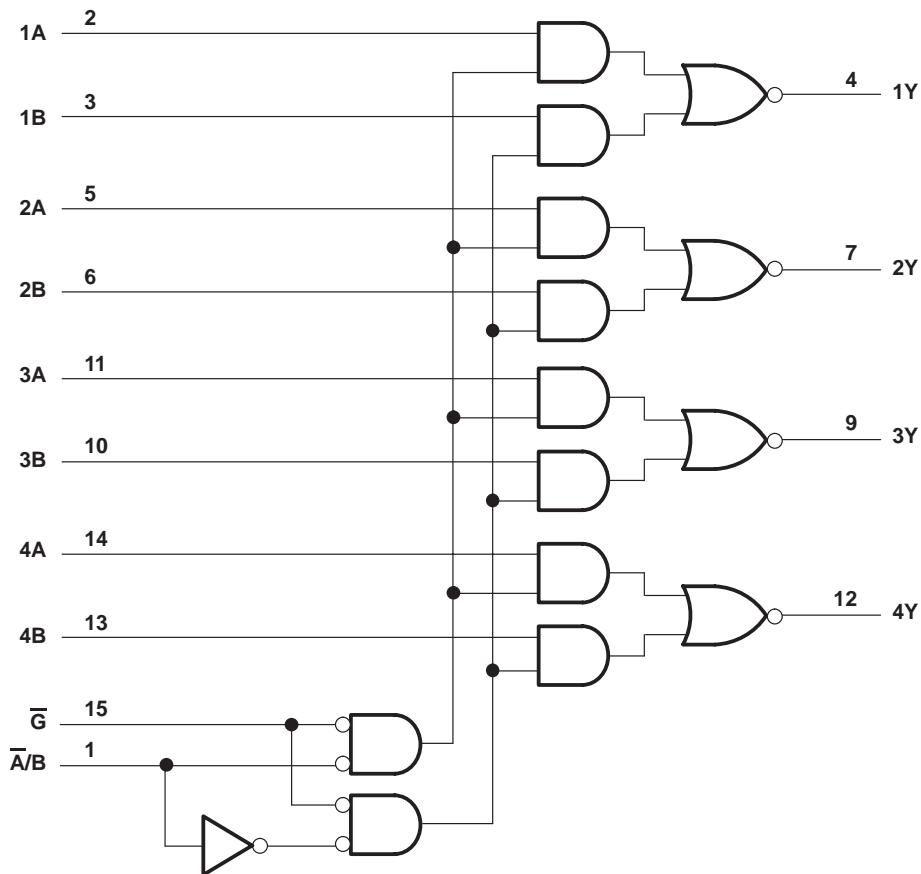
# SN54HC158, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MULTIPLEXERS

SCLS296D – JANUARY 1996 – REVISED OCTOBER 2003

FUNCTION TABLE

$\bar{G}$	SELECT $\bar{A}/B$	INPUTS		OUTPUT Y
		A	B	
H	X	X	X	H
L	L	L	X	H
L	L	H	X	L
L	H	X	L	H
L	H	X	H	L

logic diagram (positive logic)



Pin numbers shown are for the D, J, N, NS, PW, and W packages.

**absolute maximum ratings over operating free-air temperature range (unless otherwise noted)<sup>†</sup>**

† 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 voltage ratings may be exceeded if the input and output current ratings are observed.  
2. The package thermal impedance is calculated in accordance with JESD 51-7.

### **recommended operating conditions (see Note 3)**

			SN54HC158			SN74HC158			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	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	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>	V		V			
V <sub>O</sub>	Output voltage		0	V <sub>CC</sub>	0	V <sub>CC</sub>	V		V			
Δt/Δv	Input transition rise/fall time	V <sub>CC</sub> = 2 V	1000		1000		ns	ns	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		°C			

NOTE 3: 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.

# SN54HC158, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

SCLS296D – JANUARY 1996 – REVISED OCTOBER 2003

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			SN54HC158	SN74HC158	UNIT
			MIN	TYP	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>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

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

PARAMETER	FROM (INPUT)	TO (OUTPUT)	V <sub>CC</sub>	T <sub>A</sub> = 25°C			SN54HC158	SN74HC158	UNIT
				MIN	TYP	MAX	MIN	MAX	
t <sub>pd</sub>	A or B	Y	2 V	63	125		190	160	ns
			4.5 V	13	25		38	32	
			6 V	11	21		32	27	
	A/B	Y	2 V	67	125		190	160	
			4.5 V	18	25		38	31	
			6 V	14	21		32	27	
	G	Y	2 V	59	115		170	145	
			4.5 V	16	23		34	29	
			6 V	13	20		29	25	
t <sub>t</sub>		Y	2 V	28	60		90	75	ns
			4.5 V	8	12		18	15	
			6 V	6	10		15	13	

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.



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# SN54HC158, SN74HC158 QUADRUPLE 2-LINE TO 1-LINE DATA SELECTORS/MUXES

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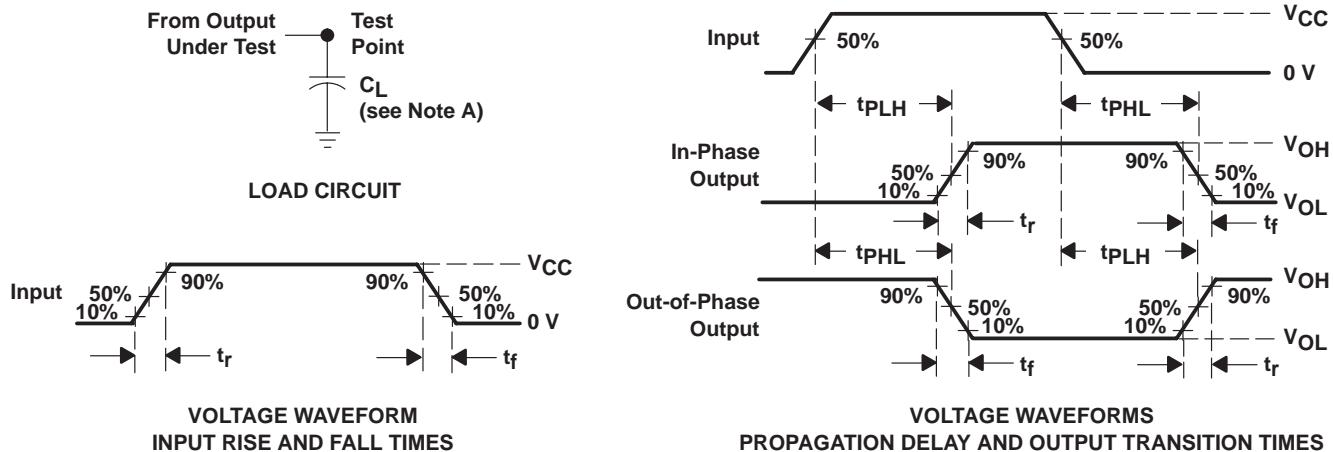
switching characteristics over recommended operating free-air temperature range,  $C_L = 150 \text{ pF}$  (unless otherwise noted) (see Figure 1)

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$	$T_A = 25^\circ\text{C}$			SN54HC158	SN74HC158	UNIT
				MIN	TYP	MAX	MIN	MAX	
$t_{pd}$	A or B	Y	2 V	81	190	290	235	235	ns
			4.5 V	23	38	58	47	47	
			6 V	18	33	49	41	41	
	$\overline{A}/B$	Y	2 V	81	210	320	260	260	
			4.5 V	23	42	64	52	52	
			6 V	18	36	54	45	45	
	$\overline{G}$	Y	2 V	91	190	290	235	235	
			4.5 V	24	38	58	47	47	
			6 V	18	33	49	41	41	
$t_t$		Y	2 V	45	210	315	265	265	ns
			4.5 V	17	42	63	53	53	
			6 V	13	36	53	45	45	

## operating characteristics, $T_A = 25^\circ\text{C}$

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$ Power dissipation capacitance	No load	40	pF

## PARAMETER MEASUREMENT INFORMATION



NOTES:

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

Figure 1. Load Circuit and Voltage Waveforms

PRODUCT PREVIEW information concerns products in the formative or design phase of development. Characteristic data and other specifications are design goals. Texas Instruments reserves the right to change or discontinue these products without notice.

 **TEXAS  
INSTRUMENTS**

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**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
SN74HC158D	ACTIVE	SOIC	D	16	40	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158DR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158DT	ACTIVE	SOIC	D	16	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158DTG4	ACTIVE	SOIC	D	16	250	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158N	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC158N	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158NE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC158N	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158NSR	ACTIVE	SO	NS	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158PW	ACTIVE	TSSOP	PW	16	90	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>
SN74HC158PWR	ACTIVE	TSSOP	PW	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC158	<span style="background-color: red; color: white; padding: 2px;">Samples</span>

(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.

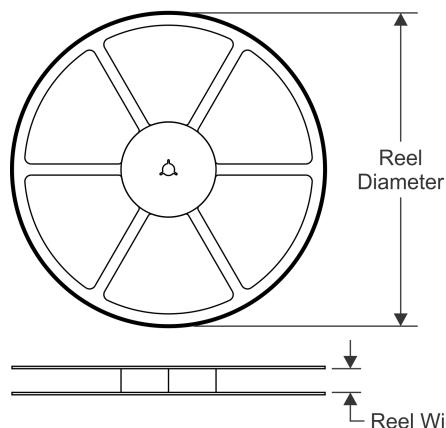
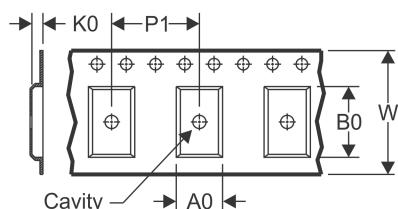
(4) There may be additional marking, which relates to the logo, the lot trace code information, or the environmental category on the device.

(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.

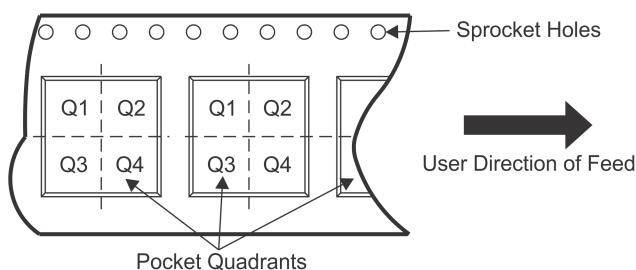
(6) Lead finish/Ball material - Orderable Devices may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

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**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**


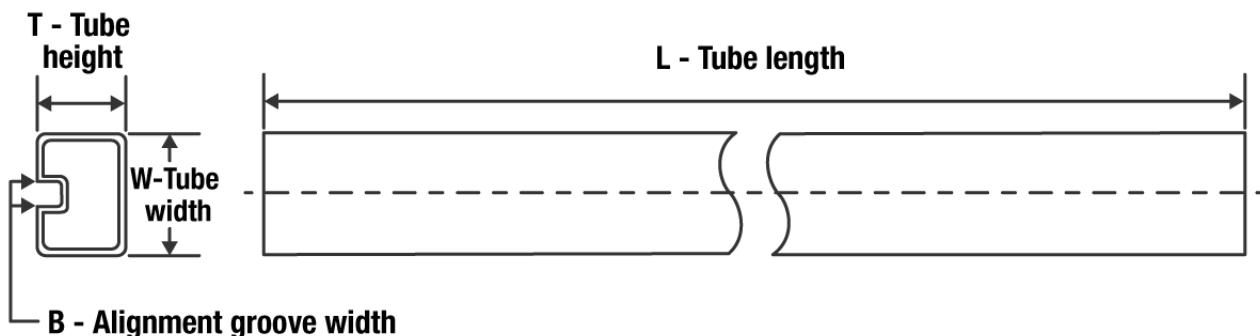
\*All dimensions are nominal

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
SN74HC158DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC158NSR	SO	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HC158PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1

**TAPE AND REEL BOX DIMENSIONS**


\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC158DR	SOIC	D	16	2500	340.5	336.1	32.0
SN74HC158NSR	SO	NS	16	2000	853.0	449.0	35.0
SN74HC158PWR	TSSOP	PW	16	2000	853.0	449.0	35.0

**TUBE**


\*All dimensions are nominal

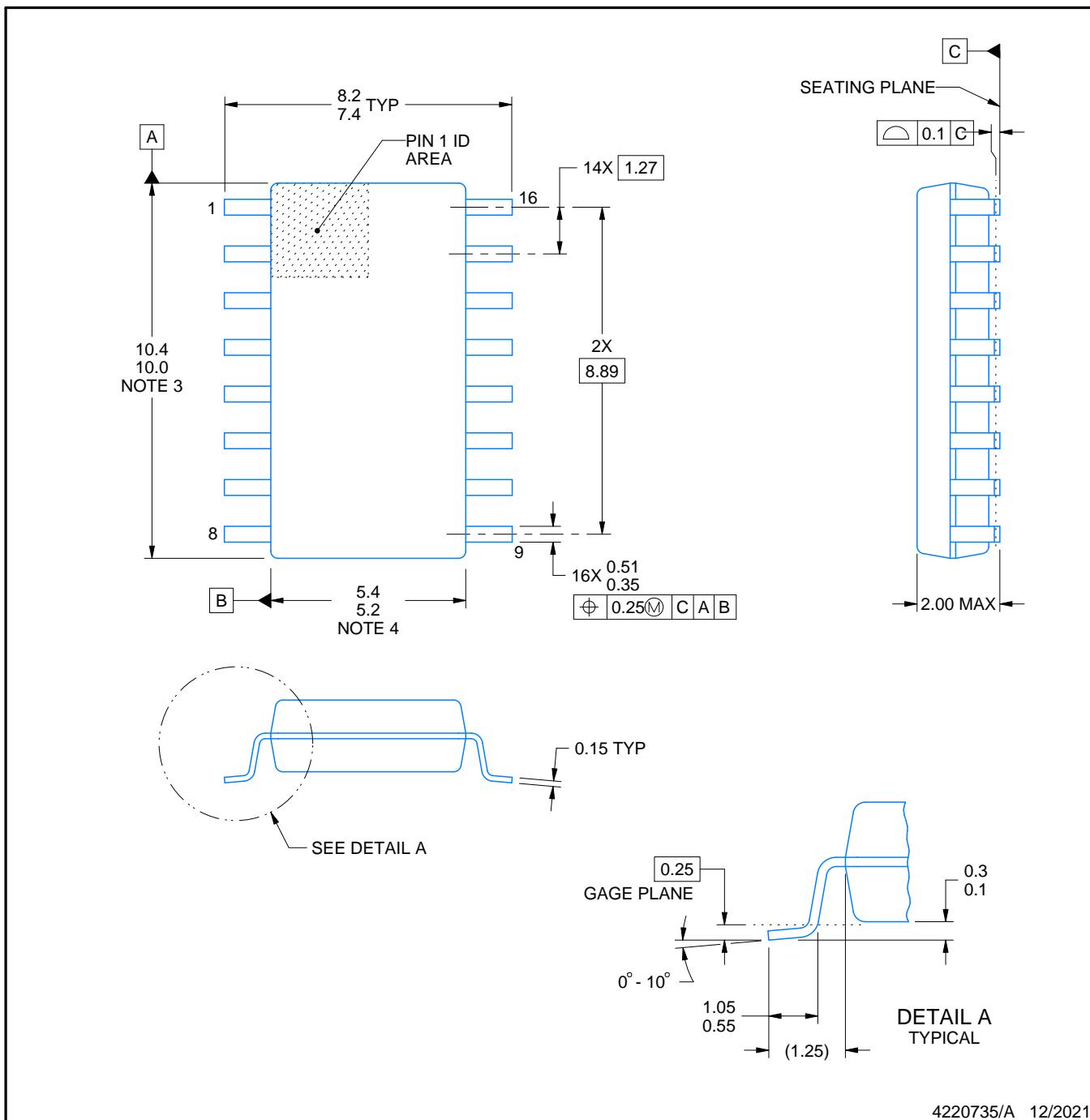
Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
SN74HC158D	D	SOIC	16	40	507	8	3940	4.32
SN74HC158N	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC158N	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC158NE4	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC158NE4	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC158PW	PW	TSSOP	16	90	530	10.2	3600	3.5



# PACKAGE OUTLINE

## SOP - 2.00 mm max height

SOP



### NOTES:

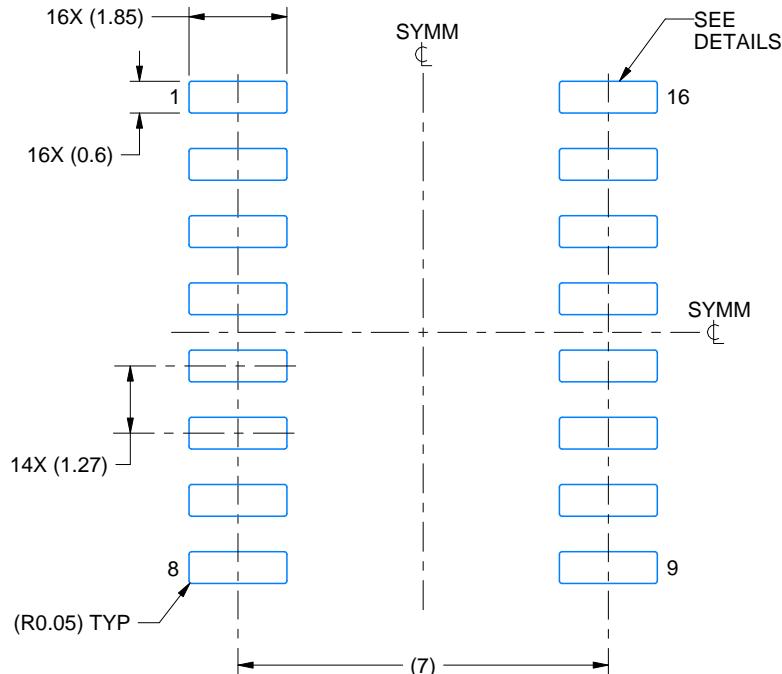
1. All linear dimensions are in millimeters. Dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm, per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.25 mm, per side.

# EXAMPLE BOARD LAYOUT

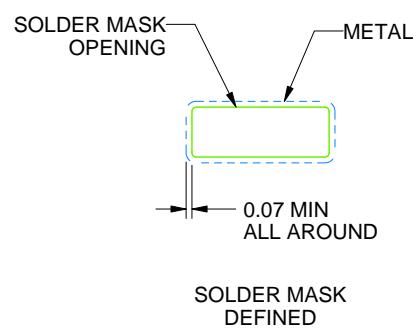
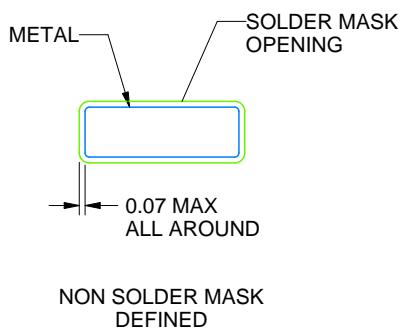
NS0016A

SOP - 2.00 mm max height

SOP



LAND PATTERN EXAMPLE  
SCALE:7X



SOLDER MASK DETAILS

4220735/A 12/2021

NOTES: (continued)

5. Publication IPC-7351 may have alternate designs.

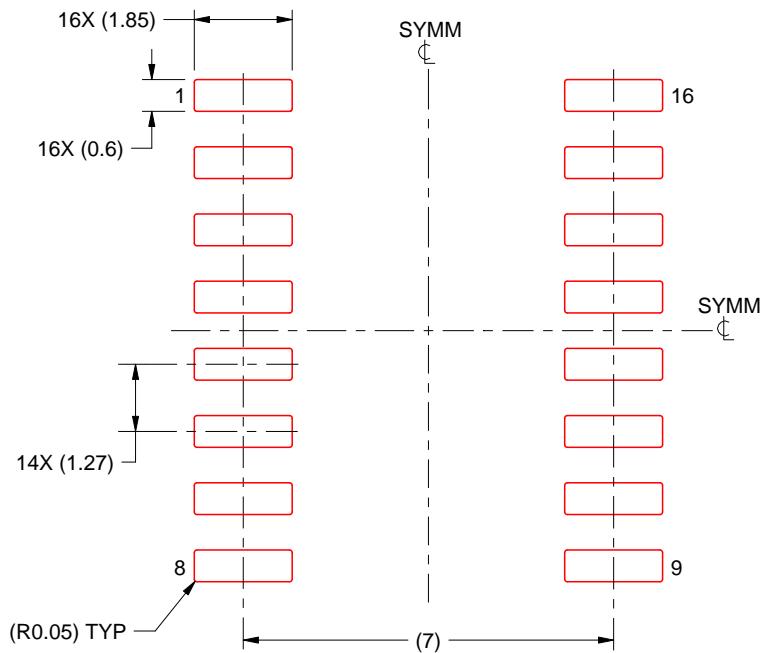
6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

NS0016A

SOP - 2.00 mm max height

SOP



SOLDER PASTE EXAMPLE  
BASED ON 0.125 mm THICK STENCIL  
SCALE:7X

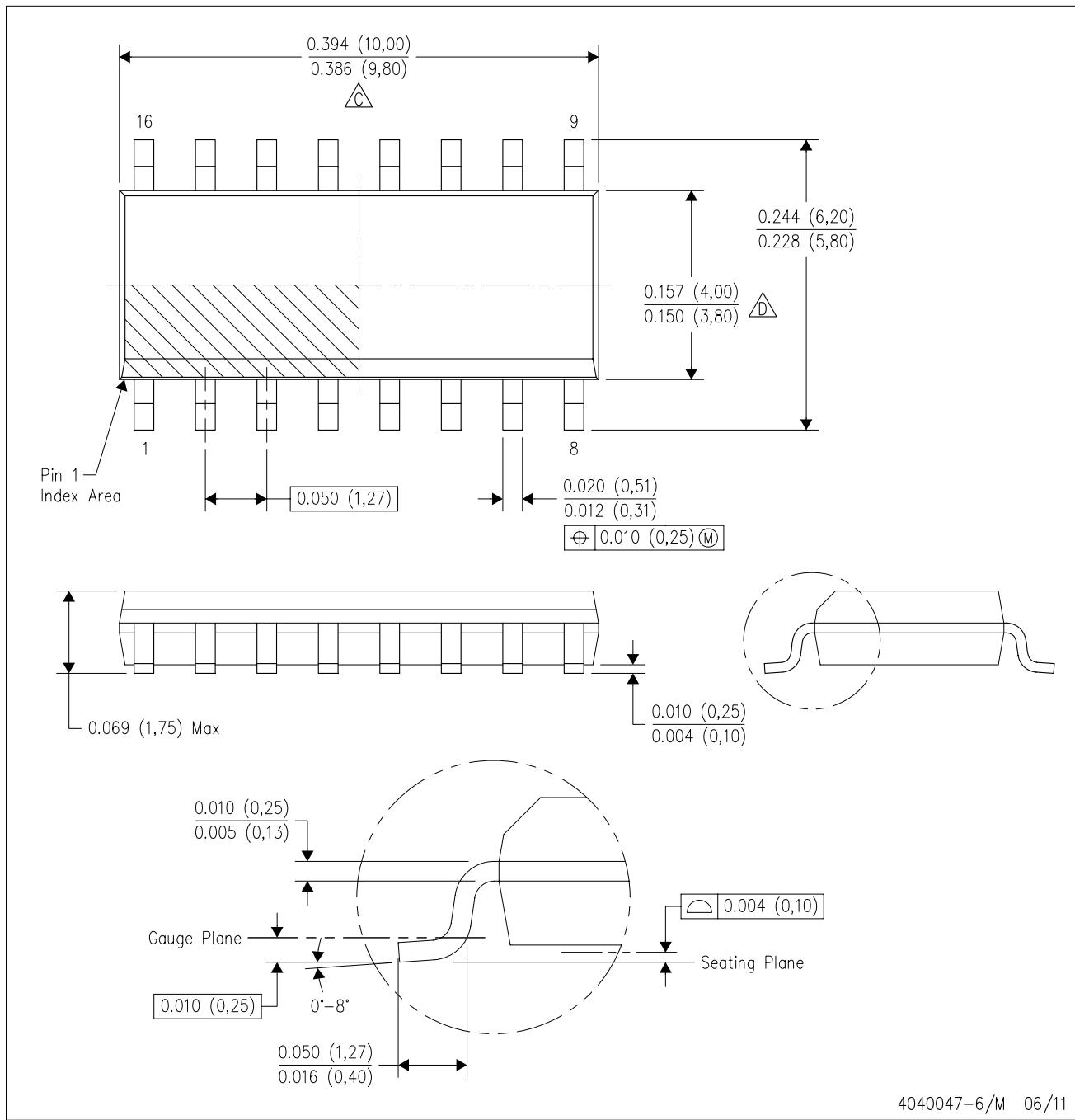
4220735/A 12/2021

NOTES: (continued)

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

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE



NOTES: A. All linear dimensions are in inches (millimeters).

B. This drawing is subject to change without notice.

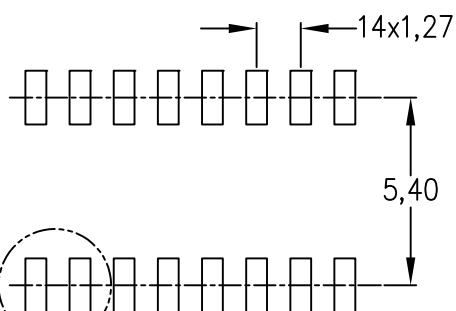
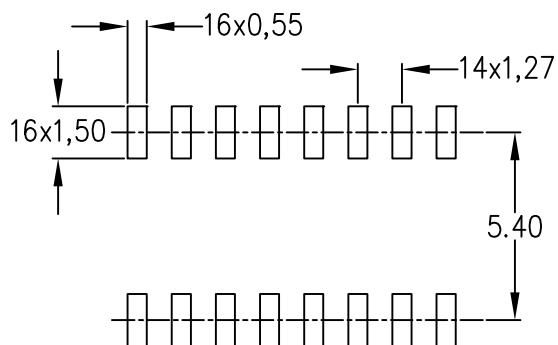
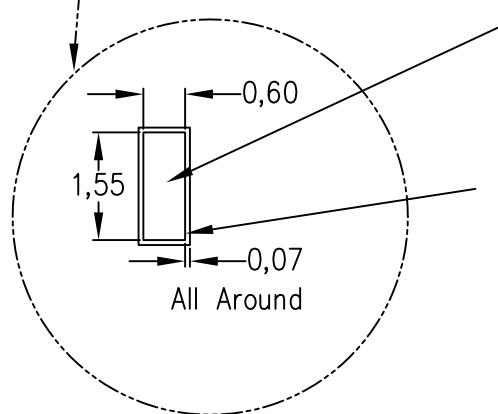
C. Body length does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.006 (0,15) each side.

D. Body width does not include interlead flash. Interlead flash shall not exceed 0.017 (0,43) each side.

E. Reference JEDEC MS-012 variation AC.

D (R-PDSO-G16)

PLASTIC SMALL OUTLINE

Example Board Layout  
(Note C)Stencil Openings  
(Note D)Example  
Non Soldermask Defined PadExample  
Pad Geometry  
(See Note C)Example  
Solder Mask Opening  
(See Note E)

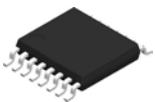
4211283-4/E 08/12

NOTES:

- All linear dimensions are in millimeters.
- This drawing is subject to change without notice.
- Publication IPC-7351 is recommended for alternate designs.
- 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.
- Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

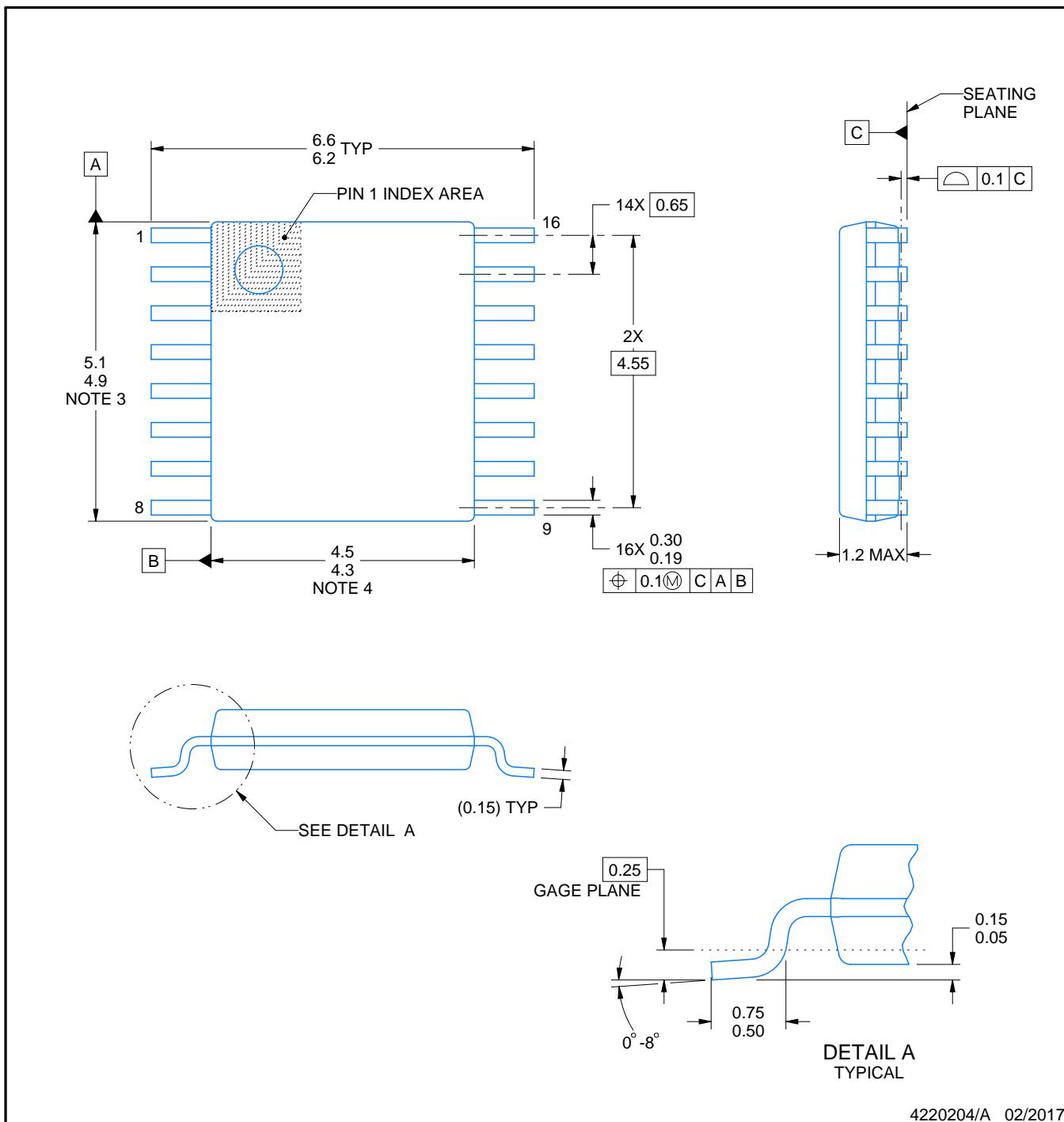
# PACKAGE OUTLINE

PW0016A



TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



## NOTES:

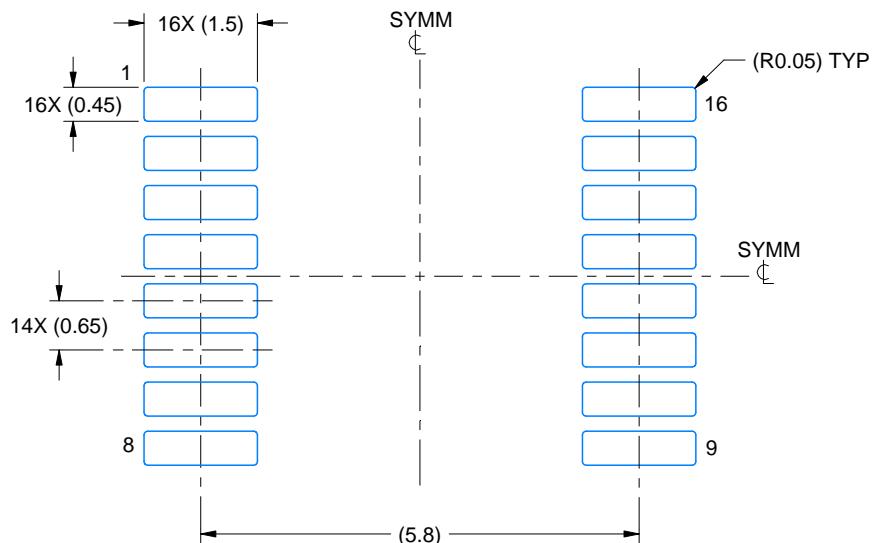
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or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

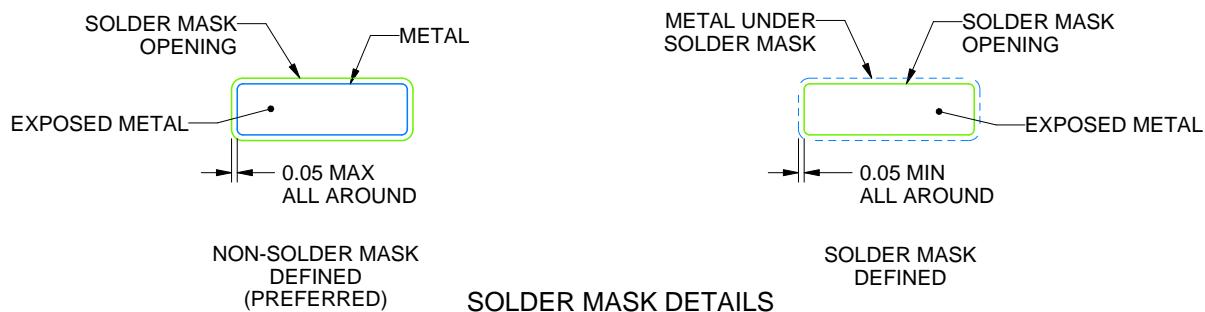
PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 10X



4220204/A 02/2017

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.

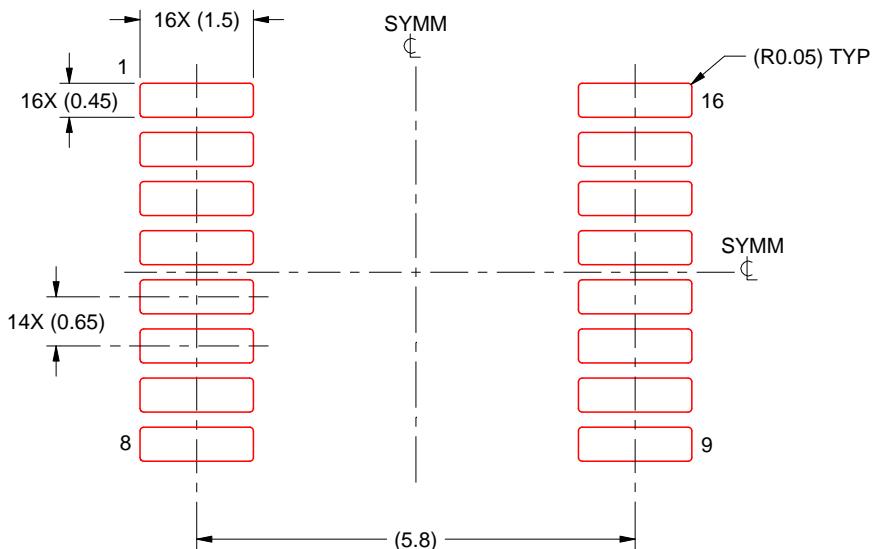
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

PW0016A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220204/A 02/2017

NOTES: (continued)

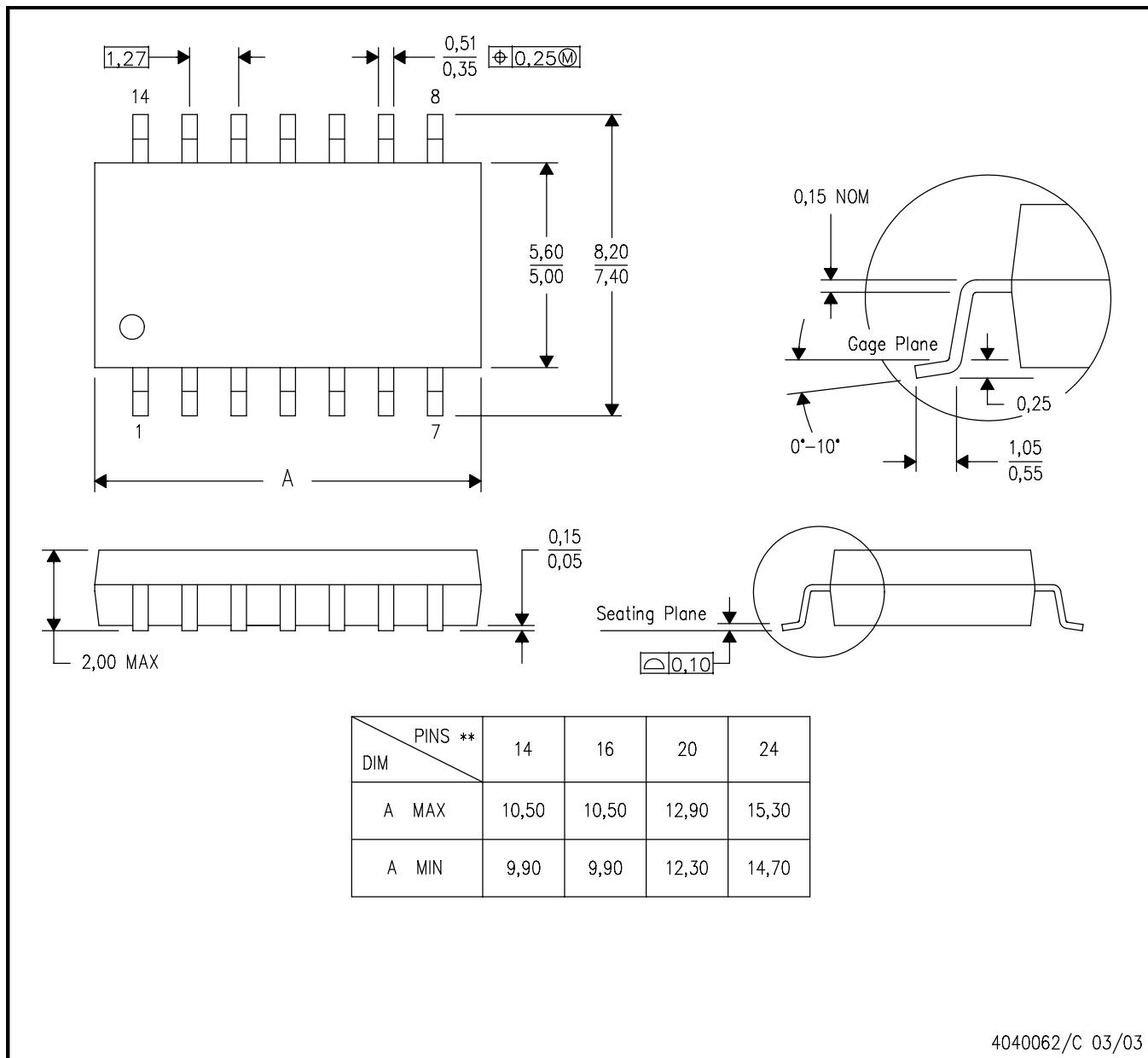
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

## MECHANICAL DATA

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

## PLASTIC SMALL-OUTLINE PACKAGE

**14-PINS SHOWN**



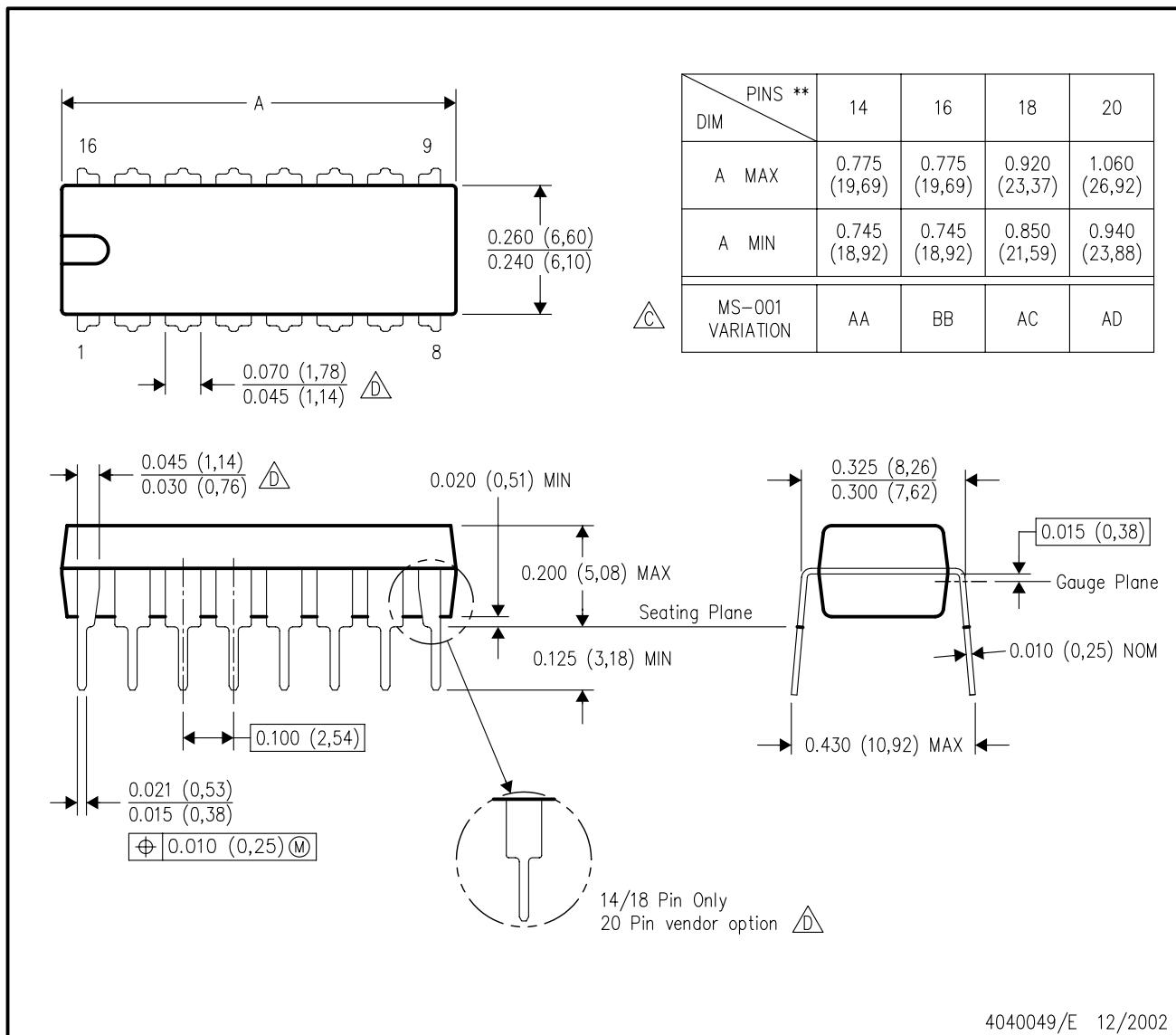
NOTES:

- 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.

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

16 PINS SHOWN

## PLASTIC DUAL-IN-LINE PACKAGE



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