

## SNx4HC259 8 ビット・アドレス指定可能ラッチ

### 1 特長

- 幅広い動作電圧範囲: 2V~6V
- 大電流反転出力は最大 10 個の LSTTL 負荷を駆動可能
- 低消費電力、 $I_{CC}$ : 80 $\mu$ A 以下
- $t_{pd} = 14$ ns (標準値)
- 5V で  $\pm 4$ mA の出力駆動能力
- 低い入力電流: 最大 1 $\mu$ A
- 8 ビットの平行出力ストレージ・レジスタは、ストレージとのシリアル/平行変換を実行します。
- 非同期平行・クリア
- アクティブ・ハイ・デコーダ
- 拡張を簡単にするイネーブル入力
- n ビット・アプリケーション用に拡張可能
- 4 つの異なる機能モード

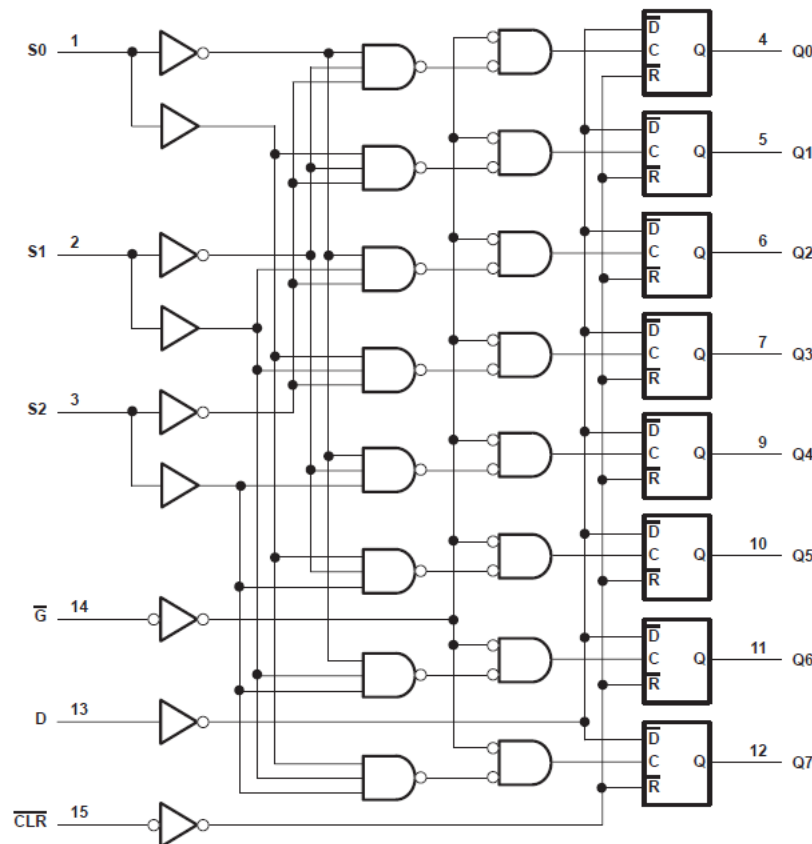
### 2 概要

これらの 8 ビット・アドレス指定可能ラッチは、デジタル・システムの汎用ストレージ・アプリケーション用に設計されています。具体的な用途としては、ワーキング・レジスタ、シリアル保持レジスタ、およびアクティブ・ハイのデコーダまたはデマルチプレクサがあります。これらは、シングル・ラインのデータを 8 つのアドレス指定可能ラッチに格納し、アクティブ・ハイ出力付きの 1:8 デコーダまたはデマルチプレクサになることができる、多機能デバイスです。

#### 製品情報

部品番号	パッケージ <sup>(1)</sup>	本体サイズ (公称)
SN74HC259D	SOIC (16)	9.90mm × 3.90mm
SN74HC259N	PDIP (16)	19.31mm × 6.35mm
SN74HC259NS	SO (16)	6.20mm × 5.30mm
SN74HC259PW	TSSOP (16)	5.00mm × 4.40mm
SN54HC259J	CDIP (16)	24.38mm × 6.92mm
SNJ54HC259FK	LCCC (20)	8.89mm × 8.45mm

(1) 利用可能なすべての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。



ピン番号は D、J、N、NS、PW、W の各パッケージのものであります。

#### 機能ブロック図



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### 3 Revision History

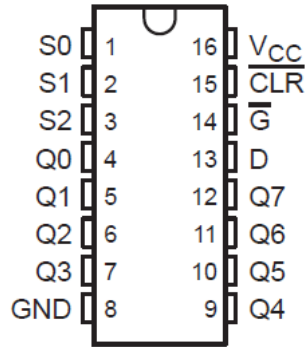
資料番号末尾の英字は改訂を表しています。その改訂履歴は英語版に準じています。

#### Changes from Revision E (September 2003) to Revision F (March 2022)

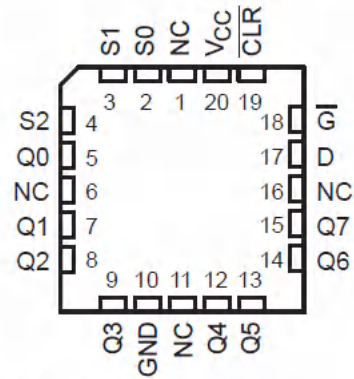
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|--|---|
| • 最新のデータシート規格を反映するように、文書全体にわたって表、図、相互参照の採番方法を更新..... | 1 |
|--|---|

## 4 Pin Configuration and Functions



**J, D, N, NS, or PW Package**  
**16-Pin CDIP, SOIC, PDIP, SO, TSSOP**  
**Top View**



NC – No internal connection

**FK Package**  
**20-Pin LCCC**  
**Top View**

## 5 Specifications

### 5.1 Absolute Maximum Ratings

over operating 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>	±25	mA
	Continuous current through V <sub>CC</sub> or GND		±50	mA
T <sub>J</sub>	Junction temperature		150	°C
T <sub>stg</sub>	Storage temperature	-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 [セクション 5.2](#) 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>

		SN54HC259			SN74HC259			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>	V
V <sub>O</sub>	Output voltage	0		V <sub>CC</sub>	0		V <sub>CC</sub>	V
t <sub>t</sub>	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		D (SOIC)	N (PDIP)	NS (SO)	PW (TSSOP)	UNIT
		16 PINS	16 PINS	16 PINS	16 PINS	
R <sub>θJA</sub>	Junction-to-ambient thermal resistance <sup>(1)</sup>	73	67	64	108	°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 <sup>(1)</sup>	V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C			SN54HC259		SN74HC259		UNIT
			MIN	TYP	MAX	MIN	MAX	MIN	MAX	
V <sub>OH</sub>	I <sub>OH</sub> = -20 μA	2	1.9	1.998		1.9		1.9	V	
		4.5	4.4	4.499		4.4		4.4		
		6	5.9	5.999		5.9		5.9		
	I <sub>OH</sub> = -4 mA	4.5	3.98	4.3		3.7		3.84		
	I <sub>OH</sub> = -5.2 mA	6	5.48	5.8		5.2		5.34		
V <sub>OL</sub>	I <sub>OL</sub> = 20 μA	2		0.002	0.1		0.1		0.1	
		4.5		0.001	0.1		0.1		0.1	
		6		0.001	0.1		0.1		0.1	
	I <sub>OL</sub> = 4 mA	4.5		0.17	0.26		0.4		0.33	
	I <sub>OL</sub> = 5.2 mA	6		0.15	0.26		0.4		0.33	
I <sub>I</sub>	V <sub>I</sub> = V <sub>CC</sub> or 0	6		±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			8		160		80	μA
C <sub>i</sub>		2 to 6		3	10		10		10	pF

(1) V<sub>I</sub> = V<sub>IH</sub> or V<sub>IL</sub>, unless otherwise noted.

## 5.5 Timing Requirements

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

			V <sub>CC</sub> (V)	T <sub>A</sub> = 25°C		SN54HC259		SN74HC259		UNIT
				MIN	MAX	MIN	MAX	MIN	MAX	
t <sub>w</sub>	Pulse duration	CLR low	2	80		120		100	ns	
			4.5	16		24		20		
			6	14		20		17		
		G low	2	80		120		100		
			4.5	16		24		20		
			6	14		20		17		
t <sub>su</sub>	Setup time, data or address before G ↑	2	75		115		95	ns		
		4.5	15		23		19			
		6	13		20		16			
t <sub>h</sub>	Hold time, data or address after GG ↑	2	5		5		5	ns		
		4.5	5		5		5			
		6	5		5		5			

## 5.6 Switching Characteristics

over recommended operating free-air temperature range,  $C_L = 50$  pF (unless otherwise noted) (see [Parameter Measurement Information](#))

PARAMETER	FROM (INPUT)	TO (OUTPUT)	$V_{CC}$ (V)	$T_A = 25^\circ\text{C}$			SN54HC259		SN74HC259		UNIT
				MIN	TYP	MAX	MIN	MAX	MIN	MAX	
$t_{PHL}$	$\overline{CLR}$	Any Q	2	60	150	225	190	ns			
			4.5	18	30	45	38				
			6	14	26	38	32				
$t_{pd}$	Data	Any Q	2	56	130	195	165	ns			
			4.5	17	26	39	33				
			6	13	22	33	28				
	Address	Any Q	2	74	200	300	250				
			4.5	21	40	60	50				
			6	17	34	51	43				
	$\overline{G}$	Any Q	2	66	170	255	215				
			4.5	20	34	51	43				
			6	16	29	43	37				
$t_t$	Any	Any	2	28	75	110	95	ns			
			4.5	8	15	22	19				
			6	6	13	19	16				

## 5.7 Operating Characteristics

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

PARAMETER	TEST CONDITIONS	TYP	UNIT
$C_{pd}$	Power dissipation capacitance per latch	33	pF

## 6 Parameter Measurement Information

Phase relationships between waveforms were chosen arbitrarily. All input pulses are supplied by generators having the following characteristics:  $PRR \leq 1 \text{ MHz}$ ,  $Z_O = 50 \Omega$ ,  $t_t < 6 \text{ ns}$ .

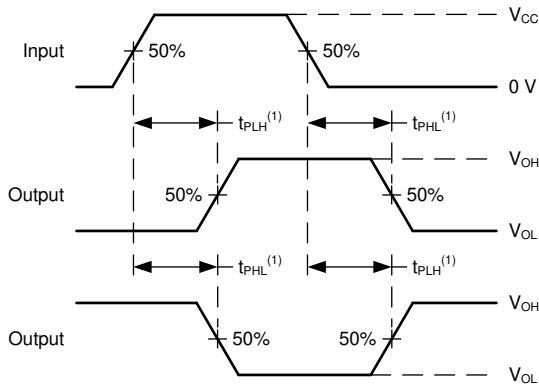
For clock inputs,  $f_{max}$  is measured when the input duty cycle is 50%.

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



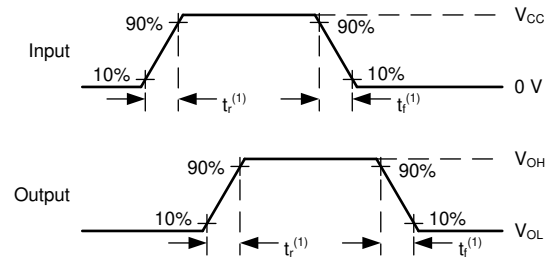
(1)  $C_L$  includes probe and test-fixture capacitance.

**6-1. Load Circuit for Push-Pull Outputs**



(1) The greater between  $t_{pLH}$  and  $t_{pHL}$  is the same as  $t_{pd}$ .

**6-2. Voltage Waveforms, Propagation Delays for Standard CMOS Inputs**



(1) The greater between  $t_r$  and  $t_f$  is the same as  $t_t$ .

**6-3. Voltage Waveforms, Input and Output Transition Times for Standard CMOS Inputs**

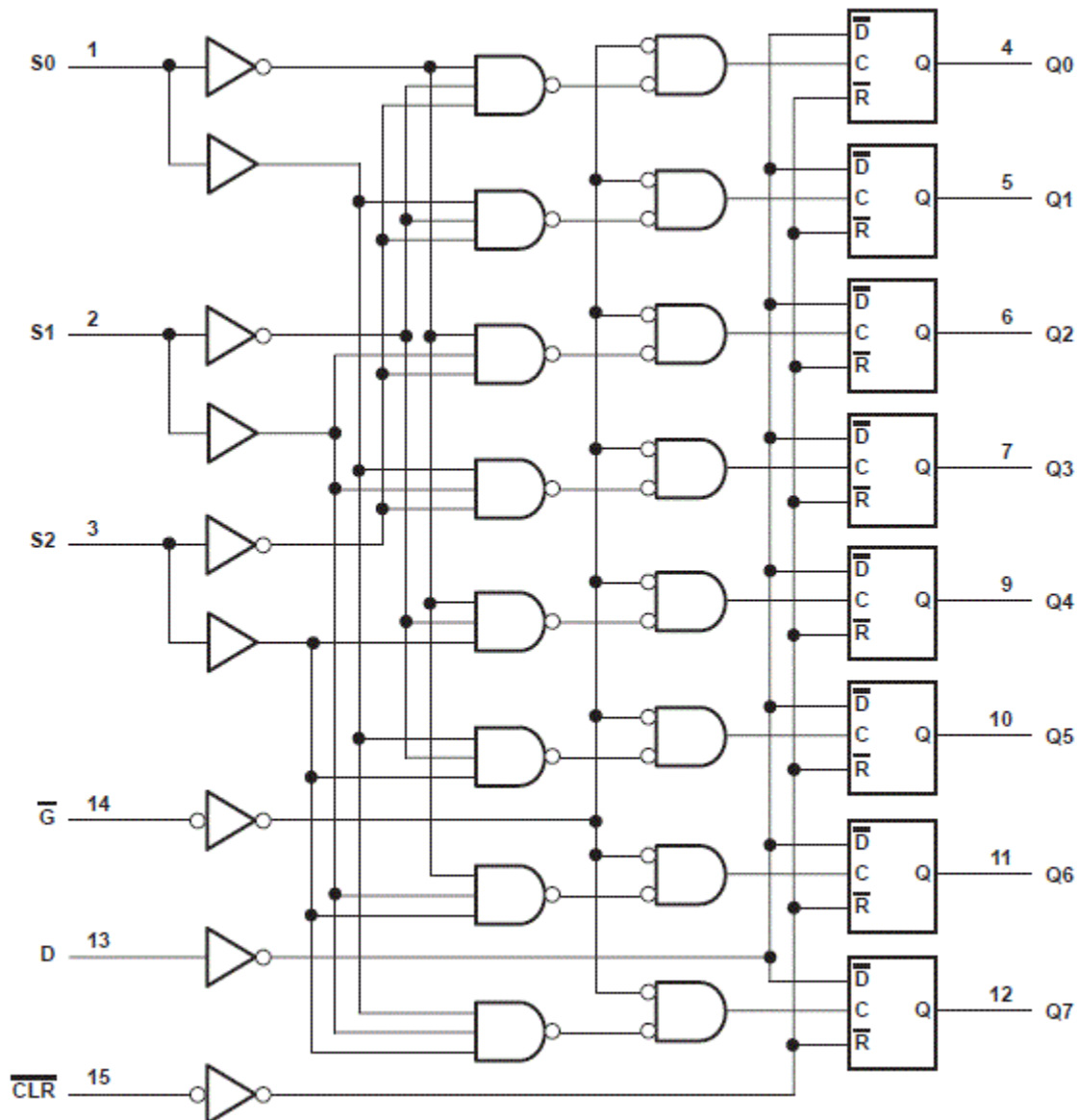
## 7 Detailed Description

### 7.1 Overview

These 8-bit addressable latches are designed for general-purpose storage applications in digital systems. Specific uses include working registers, serial-holding registers, and active-high decoders or demultiplexers. They are multifunctional devices capable of storing single-line data in eight addressable latches and being a 1-of-8 decoder or demultiplexer with active-high outputs.

Four distinct modes of operation are selectable by controlling the clear ( $\overline{\text{CLR}}$ ) and enable ( $\overline{\text{G}}$ ) inputs. In the addressable-latch mode, data at the data-in terminal is written into the addressed latch. The addressed latch follows the data input, with all unaddressed latches remaining in their previous states. In the memory mode, all latches remain in their previous states and are unaffected by the data or address inputs. To eliminate the possibility of entering erroneous data in the latches,  $\overline{\text{G}}$  should be held high (inactive) while the address lines are changing. In the 1-of-8 decoding or demultiplexing mode, the addressed output follows the level of the D input with all other outputs low. In the clear mode, all outputs are low and unaffected by the address and data inputs.

### 7.2 Functional Block Diagram





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

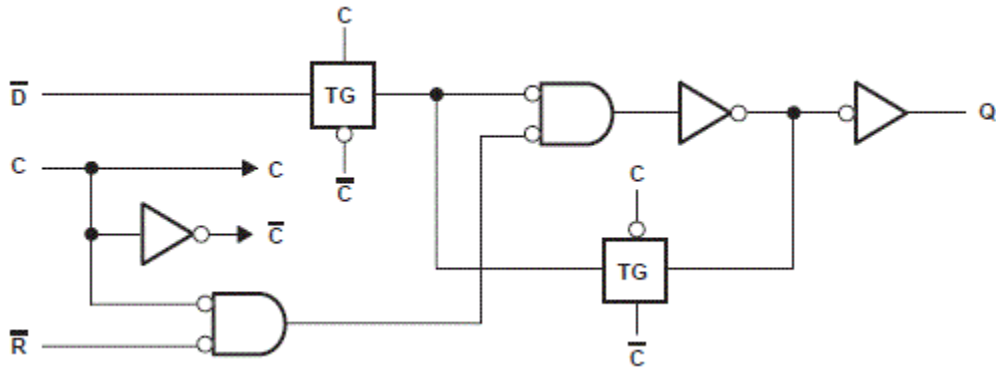


图 7-1. Logic Diagram, Each Internal Latch (positive logic)

### 7.3 Device Functional Modes

表 7-1. Function Table

INPUTS		OUTPUT OF ADDRESSED LATCH	EACH OTHER OUTPUT	FUNCTION
CLR	G			
H	L	D	$Q_{iO}$	Addressable latch
H	H	$Q_{iO}$	$Q_{iO}$	Memory
L	L	D	L	8-line demultiplexer
L	H	L	L	Clear

表 7-2. Latch Selection Table

SELECT INPUTS			LATCH ADDRESSED
S2	S1	S0	
L	L	L	0
L	L	H	1
L	H	L	2
L	H	H	3
H	L	L	4
H	L	H	5
H	H	L	6
H	H	H	7

## 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- $\mu\text{F}$  capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- $\mu\text{F}$  and 1- $\mu\text{F}$  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

[TI E2E™ サポート・フォーラム](#)は、エンジニアが検証済みの回答と設計に関するヒントをエキスパートから迅速かつ直接得ることができる場所です。既存の回答を検索したり、独自の質問をしたりすることで、設計に必要な支援を迅速に得ることができます。

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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 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
85519012A	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	85519012A SNJ54HC 259FK	<a href="#">Samples</a>
8551901EA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8551901EA SNJ54HC259J	<a href="#">Samples</a>
JM38510/65402BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65402BEA	<a href="#">Samples</a>
M38510/65402BEA	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	JM38510/ 65402BEA	<a href="#">Samples</a>
SN54HC259J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	SN54HC259J	<a href="#">Samples</a>
SN74HC259D	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85	HC259	
SN74HC259DR	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	HC259	<a href="#">Samples</a>
SN74HC259DRE4	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC259	<a href="#">Samples</a>
SN74HC259DRG4	ACTIVE	SOIC	D	16	2500	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC259	<a href="#">Samples</a>
SN74HC259DT	OBSOLETE	SOIC	D	16		TBD	Call TI	Call TI	-40 to 85	HC259	
SN74HC259N	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC259N	<a href="#">Samples</a>
SN74HC259NE4	ACTIVE	PDIP	N	16	25	RoHS & Green	NIPDAU	N / A for Pkg Type	-40 to 85	SN74HC259N	<a href="#">Samples</a>
SN74HC259NSR	ACTIVE	SOP	NS	16	2000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC259	<a href="#">Samples</a>
SN74HC259PWR	ACTIVE	TSSOP	PW	16	2000	RoHS & Green	NIPDAU   SN	Level-1-260C-UNLIM	-40 to 85	HC259	<a href="#">Samples</a>
SN74HC259PWT	OBSOLETE	TSSOP	PW	16		TBD	Call TI	Call TI	-40 to 85	HC259	
SN74HCS259DYR	ACTIVE	SOT-23-THIN	DYY	16	3000	RoHS & Green	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HCS259	<a href="#">Samples</a>
SNJ54HC259FK	ACTIVE	LCCC	FK	20	55	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	85519012A SNJ54HC 259FK	<a href="#">Samples</a>
SNJ54HC259J	ACTIVE	CDIP	J	16	25	Non-RoHS & Green	SNPB	N / A for Pkg Type	-55 to 125	8551901EA SNJ54HC259J	<a href="#">Samples</a>

(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  $\leq 1000$ ppm threshold. Antimony trioxide based flame retardants must also meet the  $\leq 1000$ ppm 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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**OTHER QUALIFIED VERSIONS OF SN54HC259, SN74HC259 :**

● Catalog : [SN74HC259](#)

● Military : [SN54HC259](#)

NOTE: Qualified Version Definitions:

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

**TAPE AND REEL INFORMATION**

**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
SN74HC259DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC259DR	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC259DRG4	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC259DRG4	SOIC	D	16	2500	330.0	16.4	6.5	10.3	2.1	8.0	16.0	Q1
SN74HC259NSR	SOP	NS	16	2000	330.0	16.4	8.2	10.5	2.5	12.0	16.0	Q1
SN74HC259PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC259PWR	TSSOP	PW	16	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HCS259DYYR	SOT-23-THIN	DYY	16	3000	330.0	12.4	4.8	3.6	1.6	8.0	12.0	Q3

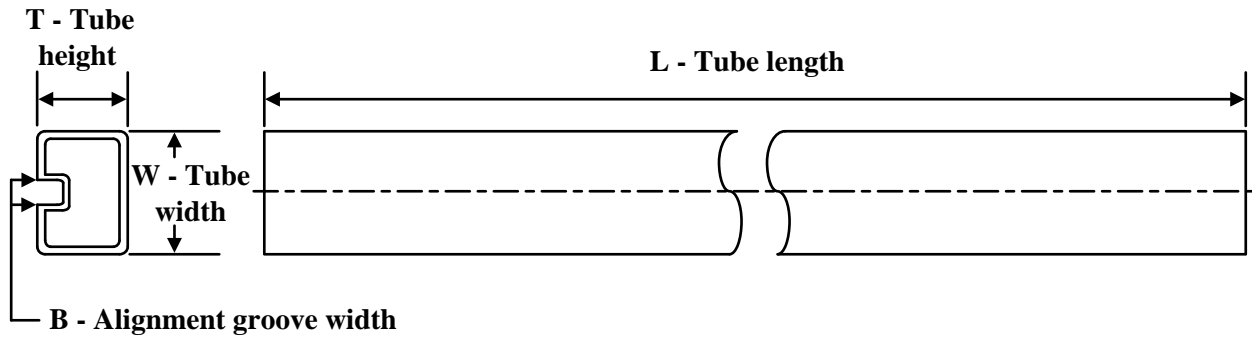
## TAPE AND REEL BOX DIMENSIONS



\*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74HC259DR	SOIC	D	16	2500	356.0	356.0	35.0
SN74HC259DR	SOIC	D	16	2500	356.0	356.0	35.0
SN74HC259DRG4	SOIC	D	16	2500	353.0	353.0	32.0
SN74HC259DRG4	SOIC	D	16	2500	367.0	367.0	38.0
SN74HC259NSR	SOP	NS	16	2000	356.0	356.0	35.0
SN74HC259PWR	TSSOP	PW	16	2000	356.0	356.0	35.0
SN74HC259PWR	TSSOP	PW	16	2000	356.0	356.0	35.0
SN74HCS259DYYR	SOT-23-THIN	DYY	16	3000	336.6	336.6	31.8



**TUBE**


\*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
85519012A	FK	LCCC	20	55	506.98	12.06	2030	NA
SN74HC259N	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC259N	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC259NE4	N	PDIP	16	25	506	13.97	11230	4.32
SN74HC259NE4	N	PDIP	16	25	506	13.97	11230	4.32
SNJ54HC259FK	FK	LCCC	20	55	506.98	12.06	2030	NA



# PACKAGE OUTLINE

## NS0016A

### 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



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



4040047-6/M 06/11

- 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.

# PW0016A



# PACKAGE OUTLINE

## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220204/A 02/2017

### 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



SOLDER MASK DETAILS

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

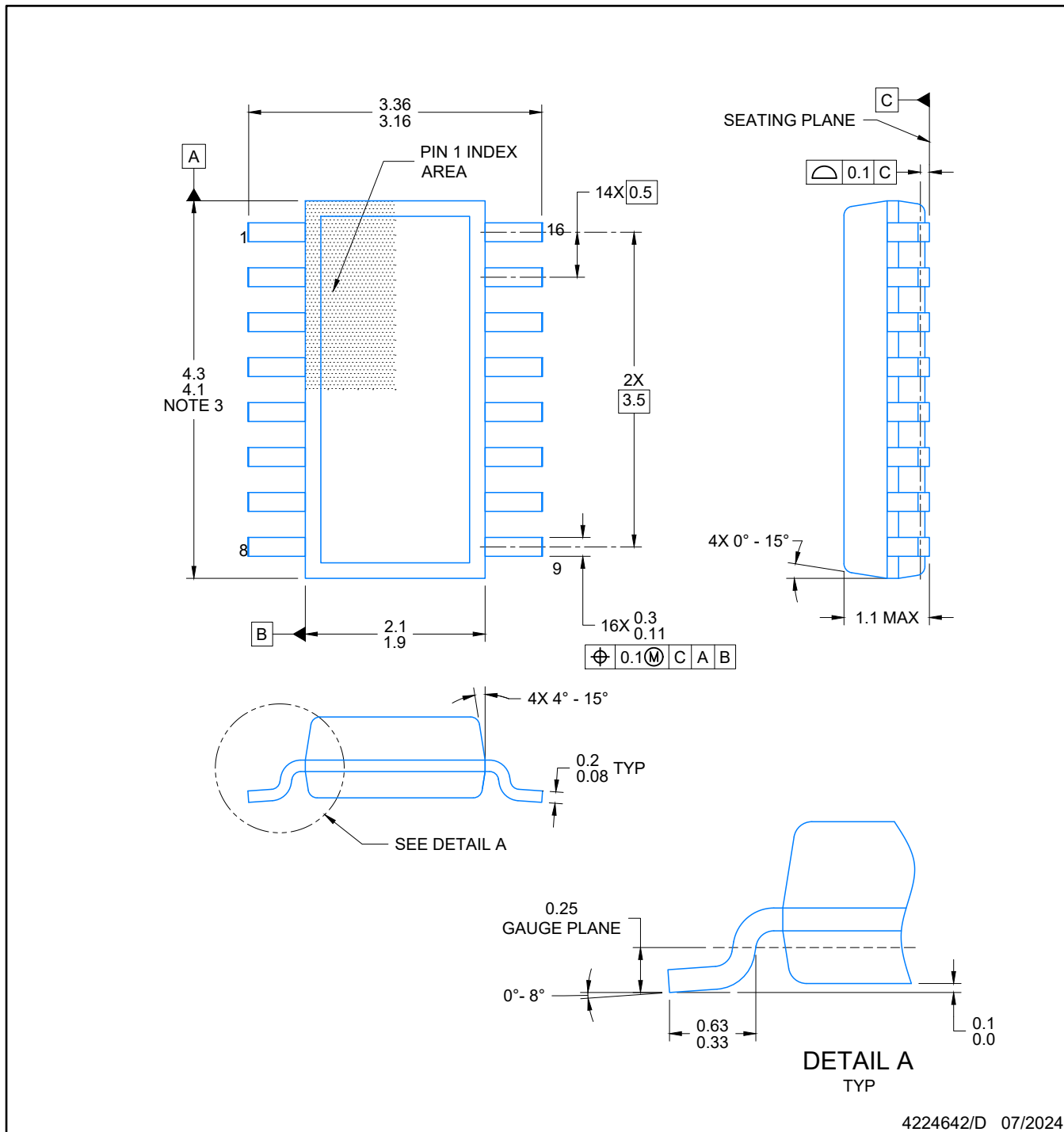
NS (R-PDSO-G\*\*)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



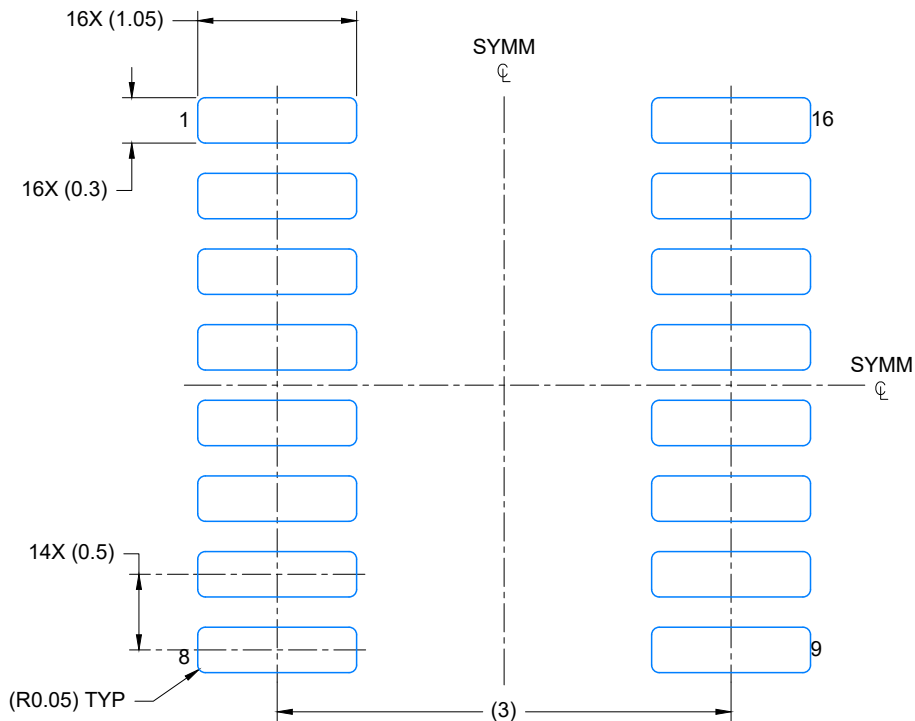
- NOTES:
- A. All linear dimensions are in millimeters.
  - B. This drawing is subject to change without notice.
  - C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.



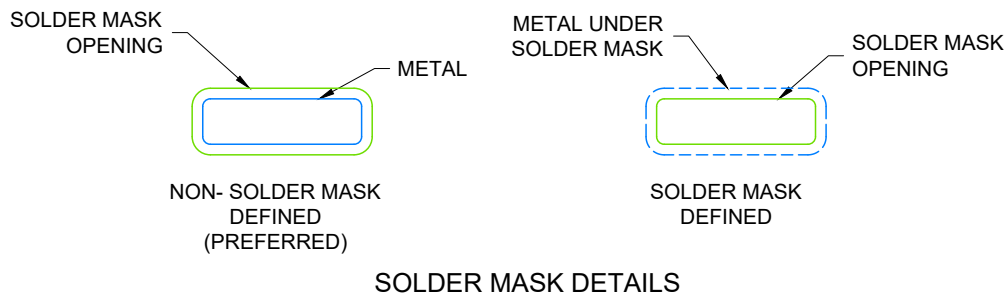
4224642/D 07/2024

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 per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.50 per side.
5. Reference JEDEC Registration MO-345, Variation AA



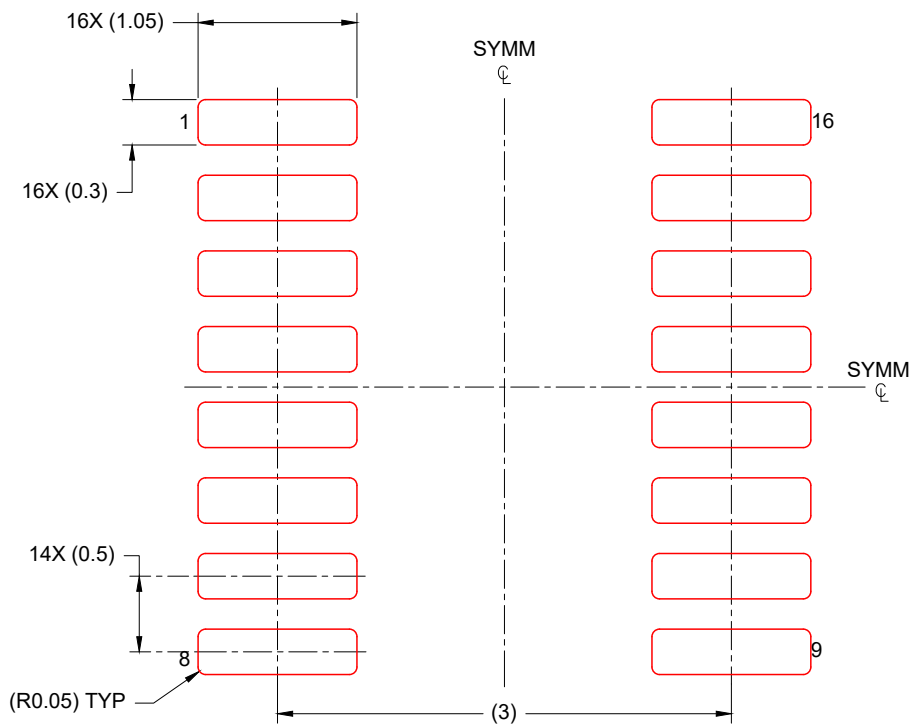
LAND PATTERN EXAMPLE  
EXPOSED METAL SHOWN  
SCALE: 20X



4224642/D 07/2024

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: 20X

4224642/D 07/2024

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.

## GENERIC PACKAGE VIEW

**FK 20**

**LCCC - 2.03 mm max height**

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

This image is a representation of the package family, actual package may vary.  
Refer to the product data sheet for package details.



4229370VA\

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

14 LEADS SHOWN

CERAMIC DUAL IN-LINE PACKAGE



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)



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.

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

PLASTIC DUAL-IN-LINE PACKAGE

16 PINS SHOWN



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

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