# SNx4HCT138 3 线路至 8 线路解码器/多路信号分离器

## 1 特性

- 4.5V 至 5.5V 的工作电压范围
- 输出可驱动多达 10 个 LSTTL 负载
- 低功耗，$I_{CC}$ 最大值为 80μA
- $t_{pd}$ 典型值 = 17ns
- ±4mA 输出驱动（在 5 V 时）
- 低输入电流，最大值 1μA
- 输入兼容 TTL 电压
- 专门为高速存储器解码器和数据传输系统设计
- 包含三个使能输入以简化级联和/或数据接收

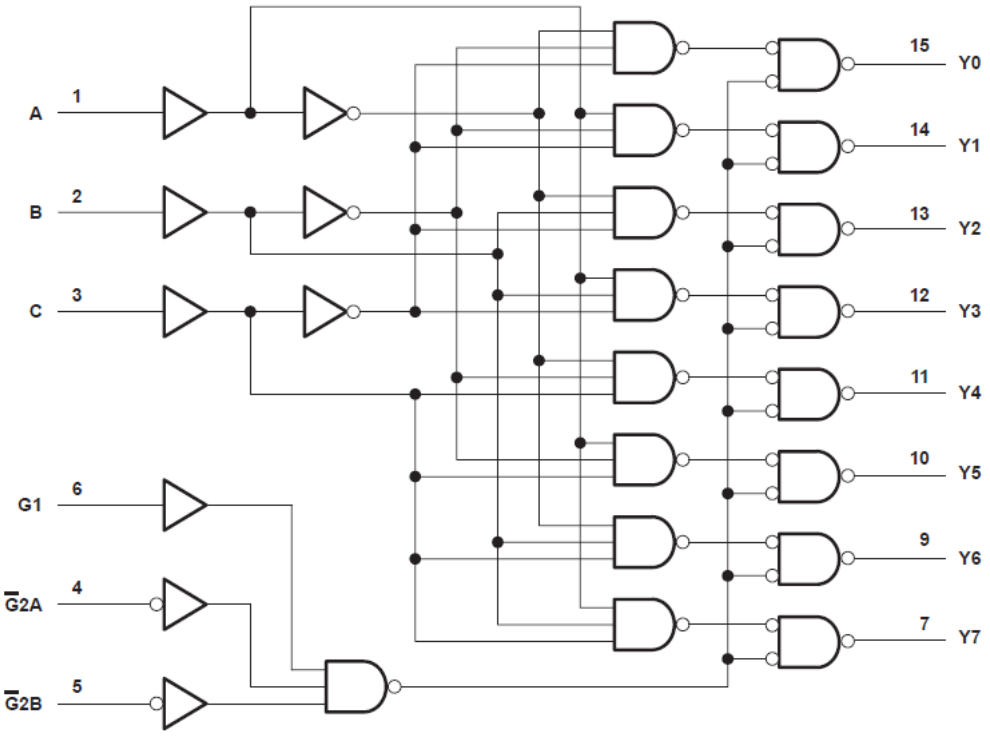
## 2 说明

HCT138 器件设计用于需要极短传播延迟时间的高性能存储器解码或数据路由应用。在高性能存储系统中，此类解码器有助于最大限度地消除系统解码的影响。与使用高速使能电路的高速存储器一同使用时，这些解码器的延迟时间和存储器的使能时间通常小于存储器的典型存取时间。这意味着解码器引起的有效系统延迟可以忽略不计。

**器件信息**

| 器件型号 | 封装(1) | 封装尺寸（标称值） |
|---|---|---|
| SN74HCT138D | SOIC (16) | 9.90mm × 3.90mm |
| SN74HCT138N | PDIP (16) | 19.31mm × 6.35mm |
| SN74HCT138NS | SO (16) | 6.20mm x 5.30mm |
| SN74HCT138PW | TSSOP (16) | 5.00mm × 4.40mm |
| SN54HCT138J | CDIP (16) | 24.38mm × 6.92mm |
| SNJ54HCT138FK | LCCC (20) | 8.89mm × 8.45mm |

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。




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

**功能方框图**

本文档旨在为方便起见，提供有关 TI 产品中文版本的信息，以确认产品的概要。有关适用的官方英文版本的最新信息，请访问 www.ti.com，其内容始终优先。TI 不保证翻译的准确性和有效性。在实际设计之前，请务必参考最新版本的英文版本。

# Table of Contents

**1 特性** ... 1
**2 说明** ... 1
**3 Revision History** ... 2
**4 Pin Configuration and Functions** ... 3
**5 Specifications** ... 4
5.1 Absolute Maximum Ratings ... 4
5.2 Recommended Operating Conditions(1) ... 4
5.3 Thermal Information ... 4
5.4 Electrical Characteristics ... 5
5.5 Switching Characteristics ... 5
5.6 Operating Characteristics ... 5
**6 Parameter Measurement Information** ... 6
**7 Detailed Description** ... 7
7.1 Overview ... 7
7.2 Functional Block Diagram ... 7
7.3 Device Functional Modes ... 8
**8 Power Supply Recommendations** ... 9
**9 Layout** ... 9
9.1 Layout Guidelines ... 9
**10 Device and Documentation Support** ... 10
10.1 Documentation Support ... 10
10.2 接收文档更新通知 ... 10
10.3 支持资源 ... 10
10.4 Trademarks ... 10
10.5 Electrostatic Discharge Caution ... 10
10.6 术语表 ... 10
**11 Mechanical, Packaging, and Orderable Information** ... 10

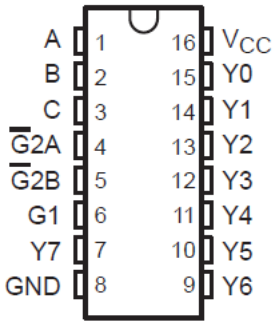
## 3 Revision History

注：以前版本的页码可能与当前版本的页码不同

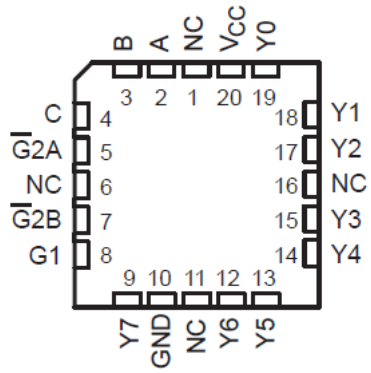
| Changes from Revision E (September 2003) to Revision F (March 2022) | Page |
|---|---|
| • 更新了整个文档中的编号、格式、表格、图和交叉参考，以反映现代数据表标准 | 1 |


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## 4 Pin Configuration and Functions




**J, W, D, N, NS, or PW Package**
**16-Pin CDIP, CFP, 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)(1)

| | | | MIN | MAX | UNIT |
|---|---|---|---|---|---|
| $V_{CC}$ | Supply voltage range | | -0.5 | 7 | V |
| $I_{IK}$ | Input clamp current(2) | ($V_I$ < 0 or $V_I$ > $V_{CC}$) | | ±20 | mA |
| $I_{OK}$ | Output clamp current(2) | ($V_O$ < 0 or $V_O$ > $V_{CC}$) | | ±20 | mA |
| $I_O$ | Continuous output current | ($V_O$ = 0 to $V_{CC}$) | | ±25 | mA |
| | Continuous current through $V_{CC}$ or GND | | | ±50 | mA |
| $T_J$ | Junction temperature | | | 150 | °C |
| $T_{stg}$ | 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 *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(1)

| | | | SN54HCT138 | | | SN74HCT138 | | | UNIT |
|---|---|---|---|---|---|---|---|---|---|
| | | | MIN | NOM | MAX | MIN | NOM | MAX | |
| $V_{CC}$ | Supply voltage | | 4.5 | 5 | 5.5 | 4.5 | 5 | 5.5 | V |
| $V_{IH}$ | High-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | 2 | | | 2 | | | V |
| $V_{IL}$ | Low-level input voltage | $V_{CC}$ = 4.5 V to 5.5 V | | | 0.8 | | | 0.8 | V |
| $V_I$ | Input voltage | | 0 | | $V_{CC}$ | 0 | | $V_{CC}$ | V |
| $V_O$ | Output voltage | | 0 | | $V_{CC}$ | 0 | | $V_{CC}$ | V |
| $t_t$ | Input transition rise/fall time | | | | 500 | | | 500 | ns |
| $T_A$ | Operating free-air temperature | | -55 | | 125 | -40 | | 85 | °C |

(1) All unused inputs of the device must be held at $V_{CC}$ or GND to ensure proper device operation. Refer to the TI application report Implications of Slow or Floating SMOS Inputs, literature number SCBA004.

## 5.3 Thermal Information

| THERMAL METRIC | | D (SOIC) 16 PINS | N (PDIP) 16 PINS | NS (SO) 16 PINS | PW (TSSOP) 16 PINS | UNIT |
|---|---|---|---|---|---|---|
| $R_{\theta JA}$ | Junction-to-ambient thermal resistance(1) | 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.


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## 5.4 Electrical Characteristics

| PARAMETER | | TEST CONDITIONS[1] | $V_{CC}$ (V) | $T_A$ = 25°C | | | SN54HCT138 | | SN74HCT138 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $V_{OH}$ | High-level output voltage | $I_{OH}$ = –20 μA | 4.5 | 4.4 | 4.499 | | 4.4 | | 4.4 | | V |
| | | $I_{OH}$ = –4 mA | | 3.98 | 4.3 | | 3.7 | | 3.84 | | |
| $V_{OL}$ | Low-level output voltage | $I_{OL}$ = 20 μA | 4.5 | | 0.001 | 0.1 | | 0.1 | | 0.1 | V |
| | | $I_{OL}$ = 4 mA | | | 0.17 | 0.26 | | 0.4 | | 0.33 | |
| $I_I$ | Input hold current | $V_I$ = $V_{CC}$ or 0 | 5.5 | | ±0.1 | ±100 | | ±1000 | | ±1000 | nA |
| $I_{CC}$ | Supply current | $V_I$ = $V_{CC}$ or 0. $I_O$ = 0 | 5.5 | | | 8 | | 160 | | 80 | μA |
| $\Delta I_{CC}$ [2] | Supply-current change | One input at 0.5 V or 2.4 V, Other inputs at 0 or $V_{CC}$ | 5.5 | | 1.4 | 2.4 | | 3 | | 2.9 | mA |
| $C_i$ | Input capacitance | | 4.5 to 5.5 | | 3 | 10 | | 10 | | 10 | pF |

(1) $V_I$ = $V_{IH}$ or $V_{IL}$, unless otherwise noted.
(2) This is the increase in supply current for each input that is at one of the specified TTL voltage levels, rather than 0 V or $V_{CC}$.

## 5.5 Switching Characteristics

$C_L$ = 50 pF. See Parameter Measurement Information

| PARAMETER | FROM (INPUT) | TO (OUTPUT) | $V_{CC}$ (V) | $T_A$ = 25°C | | | SN54HCT138 | | SN74HCT138 | | UNIT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | MIN | TYP | MAX | MIN | MAX | MIN | MAX | |
| $t_{pd}$ | A, B or C | Any Y | 4.5 | | 23 | 36 | | 54 | | 45 | ns |
| | | | 5.5 | | 17 | 32 | | 49 | | 34 | |
| | Enable | Any Y | 4.5 | | 22 | 33 | | 50 | | 42 | |
| | | | 5.5 | | 18 | 30 | | 45 | | 38 | |
| $t_t$ | | Y | 4.5 | | 12 | 15 | | 22 | | 19 | ns |
| | | | 5.5 | | 11 | 14 | | 20 | | 17 | |

## 5.6 Operating Characteristics

$T_A$ = 25°C

| PARAMETER | | TEST CONDITIONS | TYP | UNIT |
|---|---|---|---|---|
| $C_{pd}$ | Power dissipation capacitance | No load | 85 | pF |

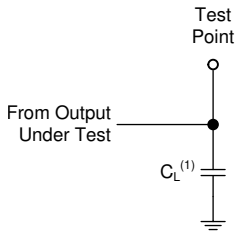
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## 6 Parameter Measurement Information

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

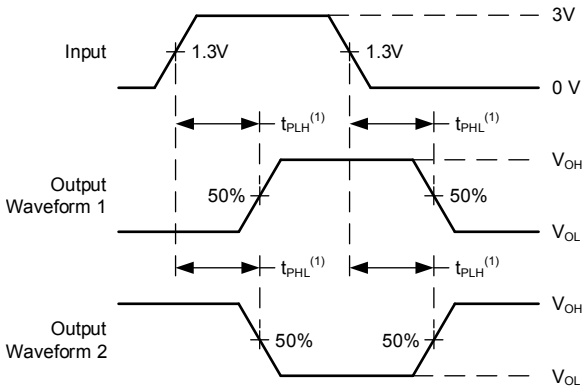
For clock inputs, $f_{max}$ is measured when the input duty cycle is 50%.

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




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

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




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

**图 6-2. Voltage Waveforms, Propagation Delays for TTL-Compatible Inputs**


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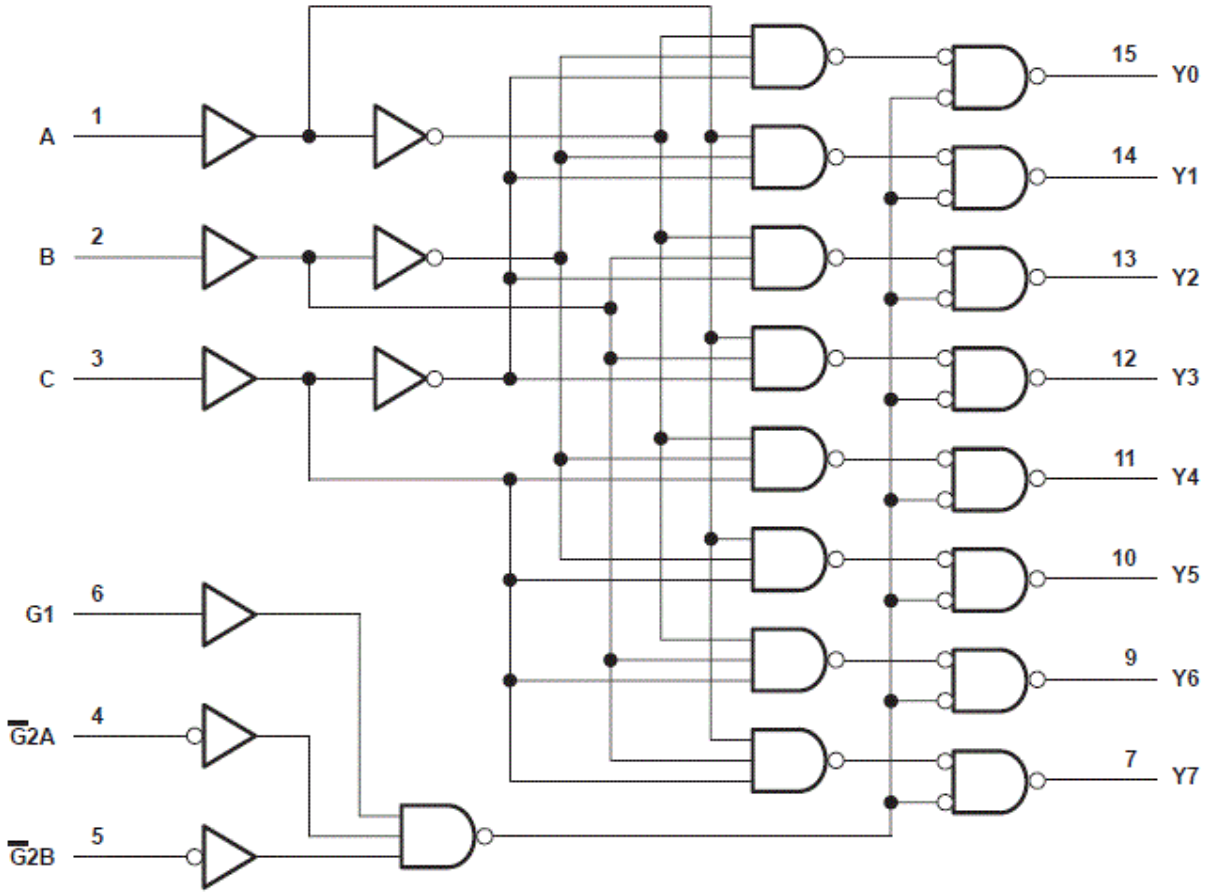
# 7 Detailed Description

## 7.1 Overview

The ’HCT138 devices are designed for high-performance memory-decoding or data-routing applications requiring very short propagation delay times. In high-performance memory systems, these decoders can minimize the effects of system decoding. When employed with high-speed memories utilizing a fast enable circuit, the delay times of these decoders and the enable time of the memory usually are less than the typical access time of the memory. This means that the effective system delay introduced by the decoders is negligible.

The conditions at the binary-select inputs and the three enable inputs select one of eight output lines. Two active-low ($\overline{G}$) and one active-high (G) enable inputs reduce the need for external gates or inverters when expanding. A 24-line decoder can be implemented without external inverters, and a 32-line decoder requires only one inverter. An enable input can be used as a data input for demultiplexing applications.

## 7.2 Functional Block Diagram




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

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## 7.3 Device Functional Modes

表 7-1. Function Table

| INPUTS | | | | | | OUTPUTS | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ENABLE | | | SELECT | | | | | | | | | | |
| G1 | $\overline{G2A}$ | $\overline{G2B}$ | C | B | A | Y0 | Y1 | Y2 | Y3 | Y4 | Y5 | Y6 | Y7 |
| X | H | X | X | X | X | H | H | H | H | H | H | H | H |
| X | X | H | X | X | X | H | H | H | H | H | H | H | H |
| L | X | X | X | X | X | H | H | H | H | H | H | H | H |
| H | L | L | L | L | L | L | H | H | H | H | H | H | H |
| H | L | L | L | L | H | H | L | H | H | H | H | H | H |
| H | L | L | L | H | L | H | H | L | H | H | H | H | H |
| H | L | L | L | H | H | H | H | H | L | H | H | H | H |
| H | L | L | H | L | L | H | H | H | H | L | H | H | H |
| H | L | L | H | L | H | H | H | H | H | H | L | H | H |
| H | L | L | H | H | L | H | H | H | H | H | H | L | H |
| H | L | L | H | H | H | H | H | H | H | H | H | H | L |


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# 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-μF capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1-μF and 1-μF 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.

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# 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 Documentation Support

### 10.1.1 Related Documentation

## 10.2 接收文档更新通知

要接收文档更新通知，请导航至 ti.com 上的器件产品文件夹。点击 *订阅更新* 进行注册，即可每周接收产品信息更改摘要。有关更改的详细信息，请查看任何已修订文档中包含的修订历史记录。

## 10.3 支持资源

TI E2E™ 支持论坛是工程师的重要参考资料，可直接从专家获得快速、经过验证的解答和设计帮助。搜索现有解答或提出自己的问题可获得所需的快速设计帮助。

链接的内容由各个贡献者“按原样”提供。这些内容并不构成 TI 技术规范，并且不一定反映 TI 的观点；请参阅 TI 的《使用条款》。

## 10.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.
所有商标均为其各自所有者的财产。

## 10.5 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.

## 10.6 术语表

| | |
|---|---|
| TI 术语表 | 本术语表列出并解释了术语、首字母缩略词和定义。 |

# 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.


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## 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) |
|---|---|---|---|---|---|---|---|---|---|
| 85504012A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85504012A SNJ54HCT 138FK |
| 8550401EA | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8550401EA SNJ54HCT138J |
| 8550401FA | Active | Production | CFP (W) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8550401FA SNJ54HCT138W |
| 8550401FA.A | Active | Production | CFP (W) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8550401FA SNJ54HCT138W |
| JM38510/65852BEA | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 65852BEA |
| JM38510/65852BEA.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 65852BEA |
| M38510/65852BEA | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510/ 65852BEA |
| SN54HCT138J | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | SN54HCT138J |
| SN54HCT138J.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | SN54HCT138J |
| SN74HCT138D | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -40 to 85 | HCT138 |
| SN74HCT138DR | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138DR.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138DRE4 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138DRG4 | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138DRG4.A | Active | Production | SOIC (D) \| 16 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138DT | Obsolete | Production | SOIC (D) \| 16 | - | - | Call TI | Call TI | -40 to 85 | HCT138 |
| SN74HCT138N | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74HCT138N |
| SN74HCT138N.A | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74HCT138N |
| SN74HCT138NE4 | Active | Production | PDIP (N) \| 16 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | SN74HCT138N |
| SN74HCT138NSR | Active | Production | SOP (NS) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138NSR.A | Active | Production | SOP (NS) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HCT138 |
| SN74HCT138PW | Obsolete | Production | TSSOP (PW) \| 16 | - | - | Call TI | Call TI | -40 to 85 | HT138 |
| SN74HCT138PWR | Active | Production | TSSOP (PW) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -40 to 85 | HT138 |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| SN74HCT138PWR.A | Active | Production | TSSOP (PW) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HT138 |
| SN74HCT138PWRG4 | Active | Production | TSSOP (PW) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HT138 |
| SN74HCT138PWRG4.A | Active | Production | TSSOP (PW) \| 16 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | HT138 |
| SNJ54HCT138FK | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85504012A SNJ54HCT 138FK |
| SNJ54HCT138FK.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 85504012A SNJ54HCT 138FK |
| SNJ54HCT138J | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8550401EA SNJ54HCT138J |
| SNJ54HCT138J.A | Active | Production | CDIP (J) \| 16 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8550401EA SNJ54HCT138J |

(1) **Status:** For more details on status, see our product life cycle.

(2) **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.

(3) **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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and accurate information but may not have conducted destructive testing or chemical analysis on incoming materials and chemicals. TI and TI suppliers consider certain information to be proprietary, and thus CAS numbers and other limited information may not be available for release.

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**OTHER QUALIFIED VERSIONS OF SN54HCT138, SN74HCT138 :**

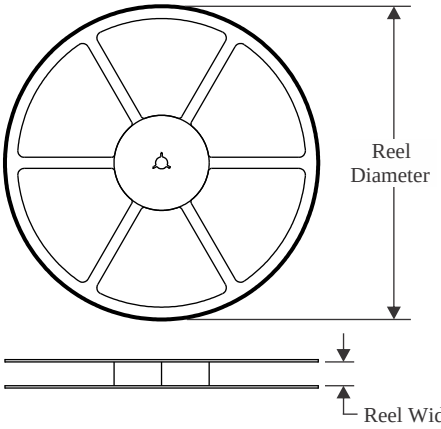
- Catalog : SN74HCT138
- Military : SN54HCT138

NOTE: Qualified Version Definitions:

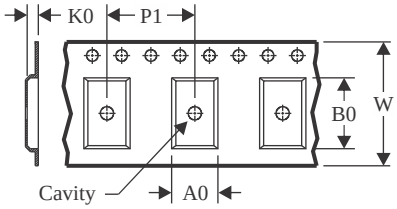
- Catalog - TI's standard catalog product
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

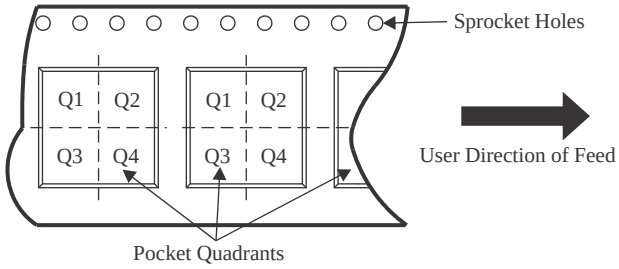



**TAPE DIMENSIONS**




| | |
|---|---|
| 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 |

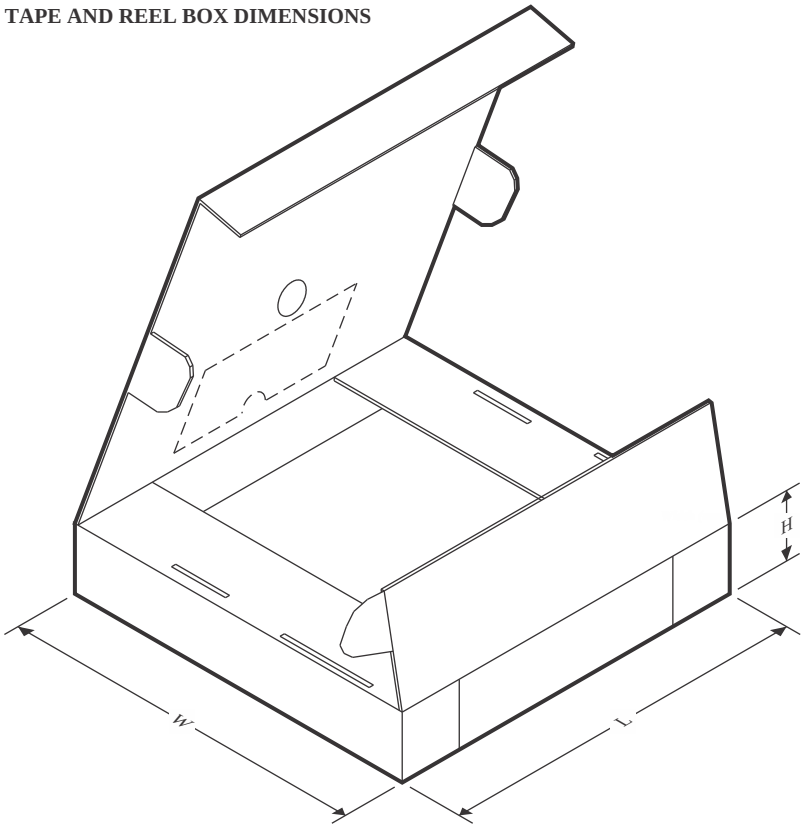
**QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE**




*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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SN74HCT138DRG4 | SOIC | D | 16 | 2500 | 330.0 | 16.4 | 6.5 | 10.3 | 2.1 | 8.0 | 16.0 | Q1 |
| SN74HCT138NSR | SOP | NS | 16 | 2000 | 330.0 | 16.4 | 8.1 | 10.4 | 2.5 | 12.0 | 16.0 | Q1 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.3 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| SN74HCT138PWRG4 | TSSOP | PW | 16 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |

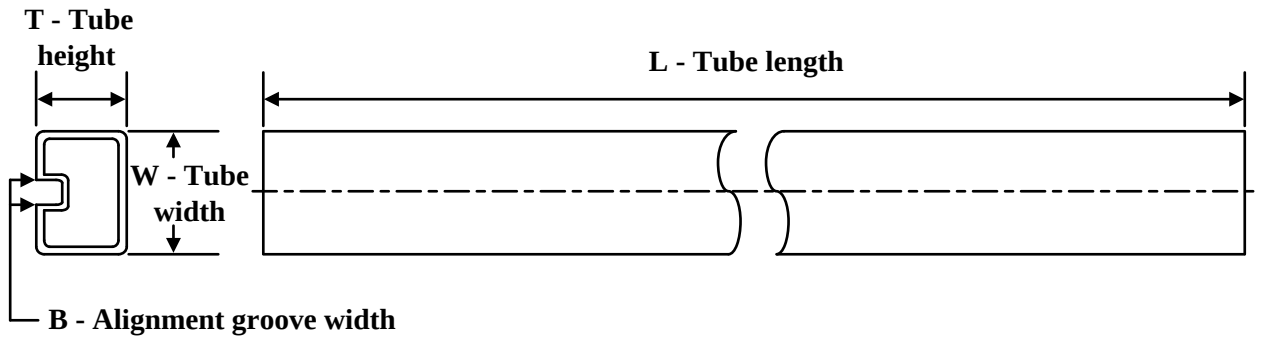
TAPE AND REEL BOX DIMENSIONS




*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| SN74HCT138DRG4 | SOIC | D | 16 | 2500 | 340.5 | 336.1 | 32.0 |
| SN74HCT138NSR | SOP | NS | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 367.0 | 367.0 | 35.0 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 353.0 | 353.0 | 32.0 |
| SN74HCT138PWR | TSSOP | PW | 16 | 2000 | 356.0 | 356.0 | 35.0 |
| SN74HCT138PWRG4 | TSSOP | PW | 16 | 2000 | 353.0 | 353.0 | 32.0 |

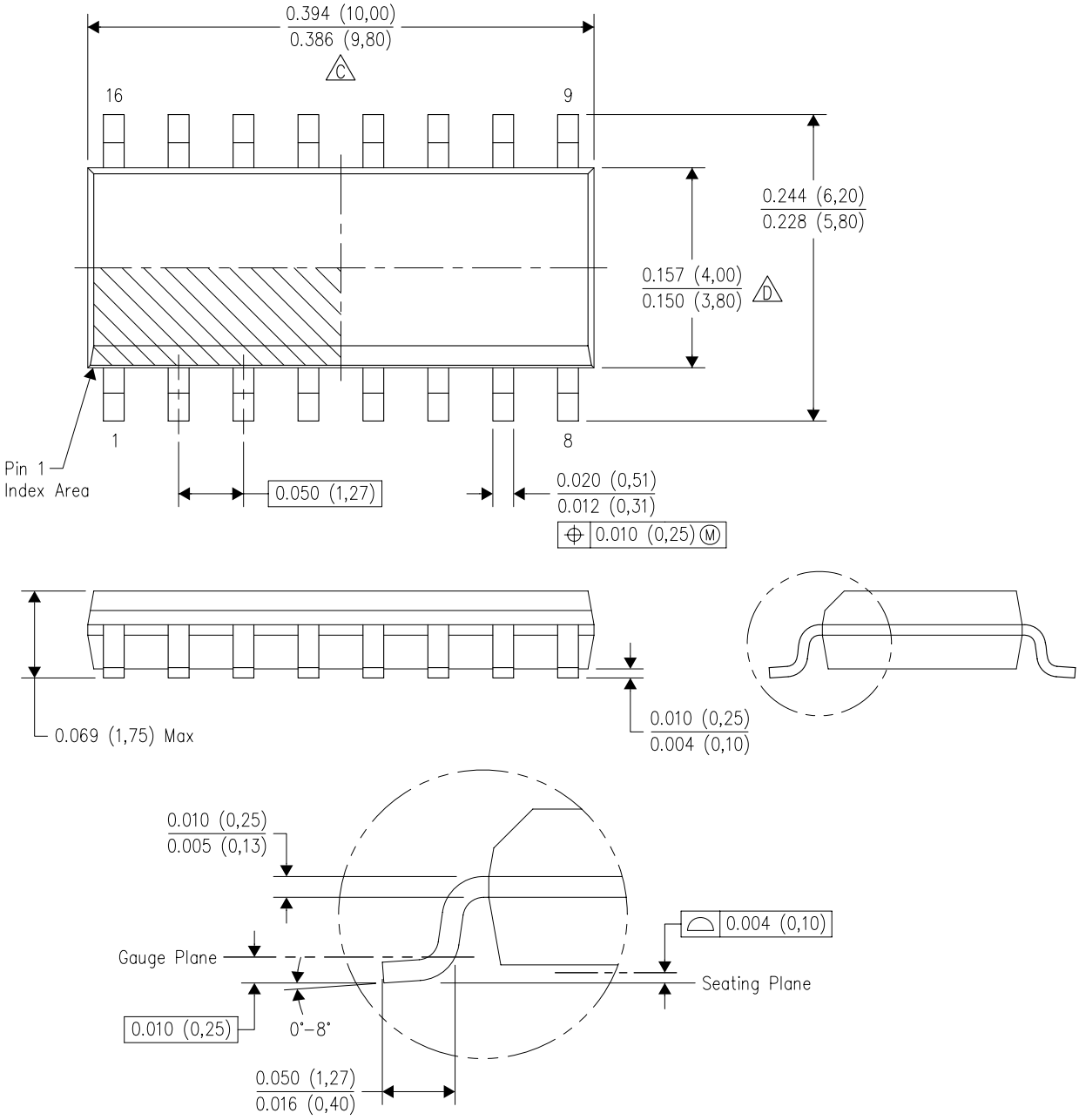
## TUBE




*All dimensions are nominal

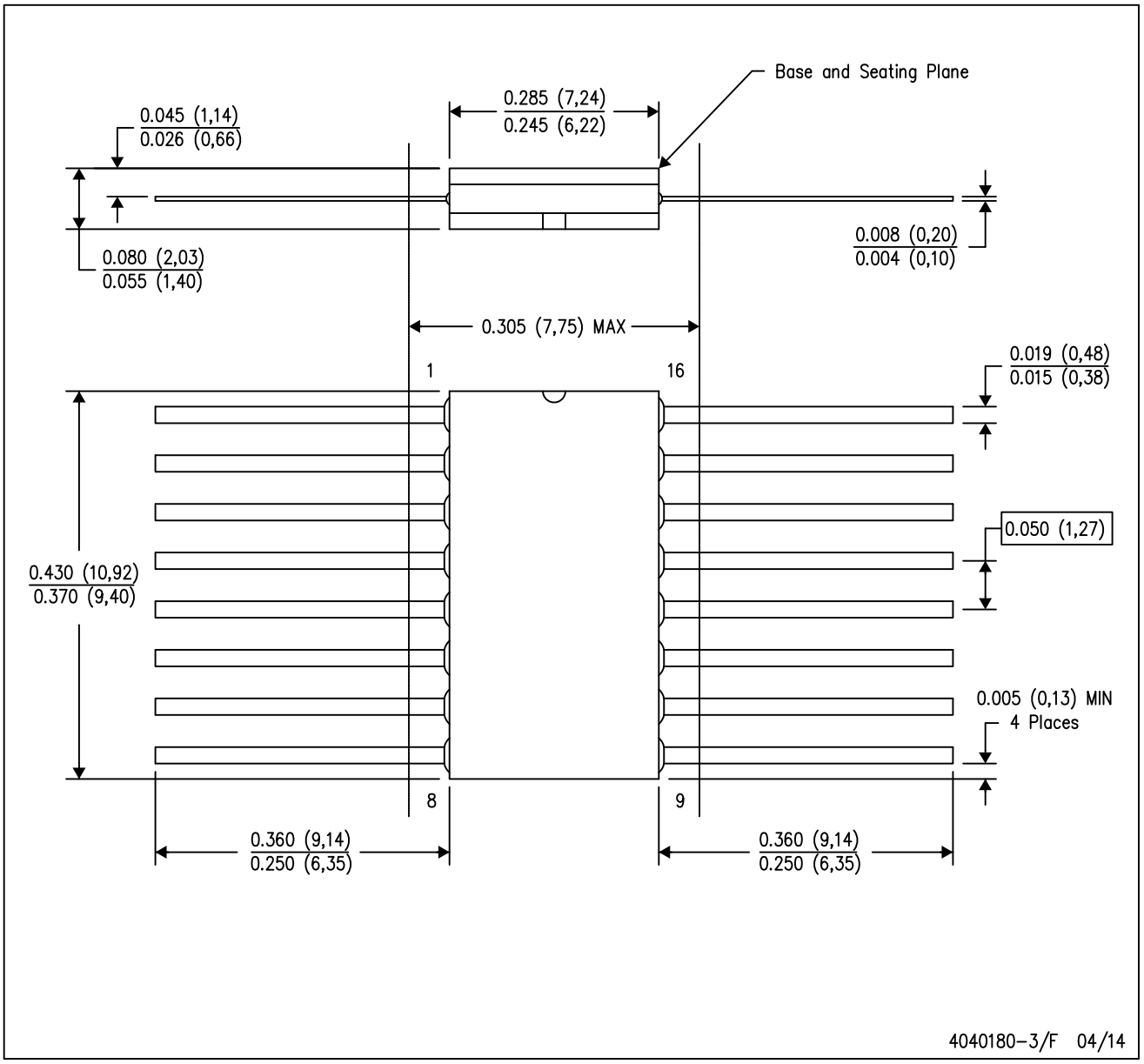
| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| 85504012A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 8550401FA | W | CFP | 16 | 25 | 506.98 | 26.16 | 6220 | NA |
| 8550401FA.A | W | CFP | 16 | 25 | 506.98 | 26.16 | 6220 | NA |
| SN74HCT138N | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74HCT138N | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74HCT138N.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74HCT138N.A | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74HCT138NE4 | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SN74HCT138NE4 | N | PDIP | 16 | 25 | 506 | 13.97 | 11230 | 4.32 |
| SNJ54HCT138FK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| SNJ54HCT138FK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |

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.

W (R–GDFP–F16) CERAMIC DUAL FLATPACK




NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP2–F16

# GENERIC PACKAGE VIEW

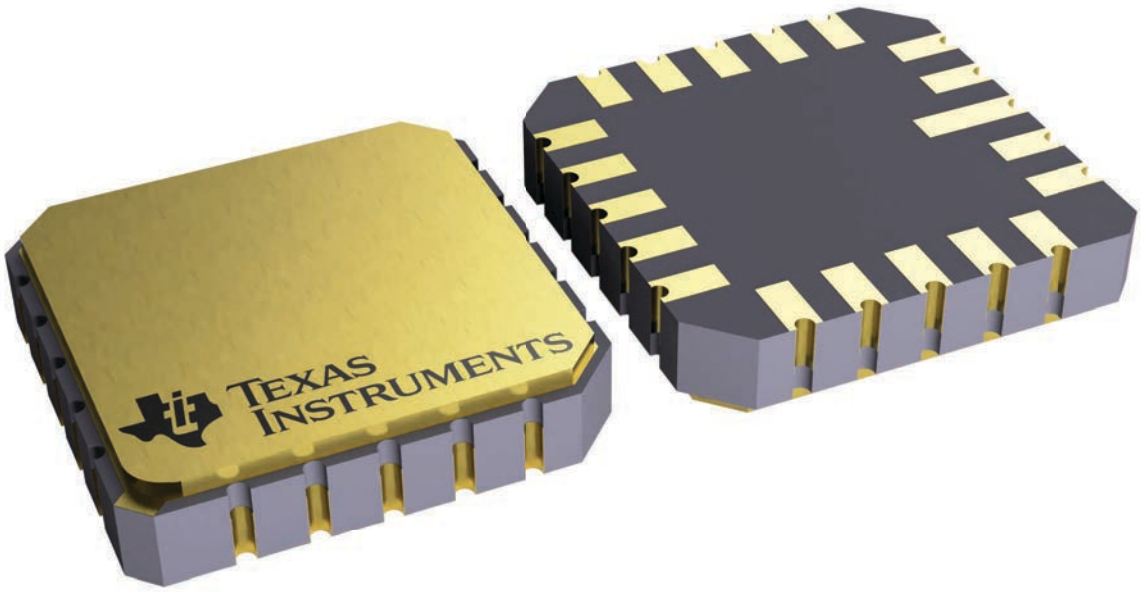
## FK 20

## 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.

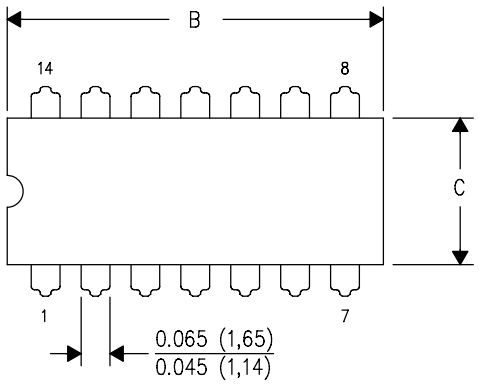



4229370VA\

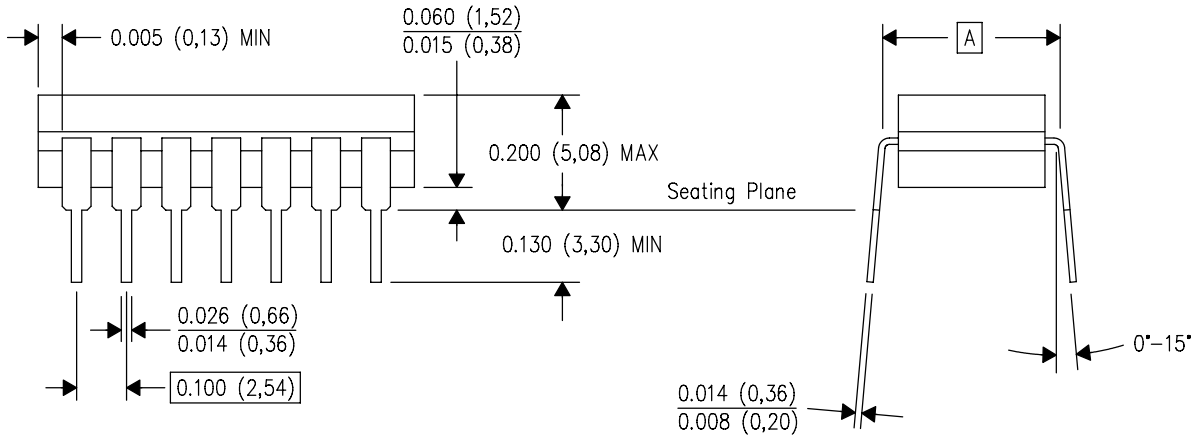
J (R–GDIP–T**)

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

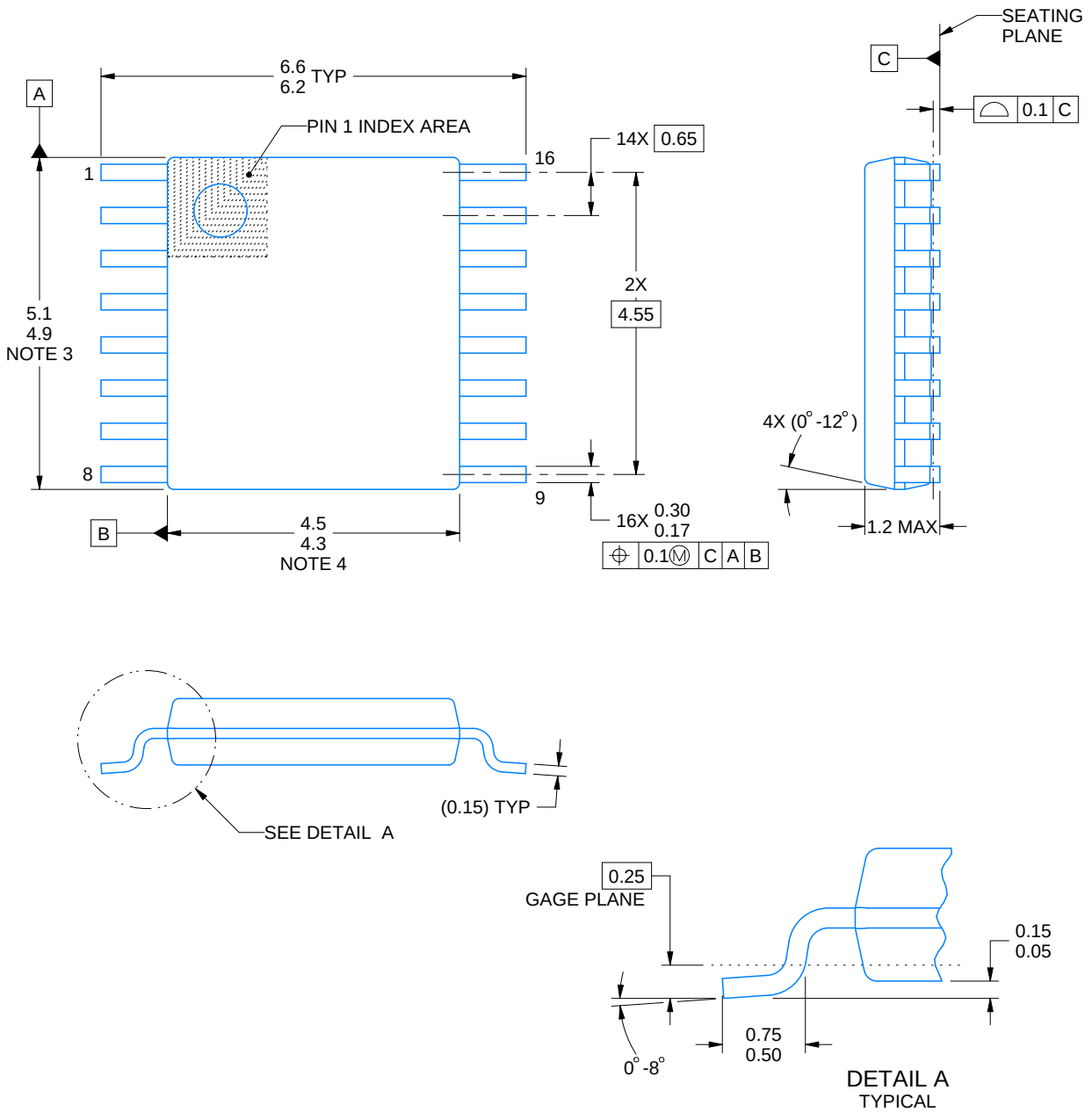
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package is hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only on press ceramic glass frit seal only.
E. Falls within MIL STD 1835 GDIP1–T14, GDIP1–T16, GDIP1–T18 and GDIP1–T20.

# PACKAGE OUTLINE

## PW0016A

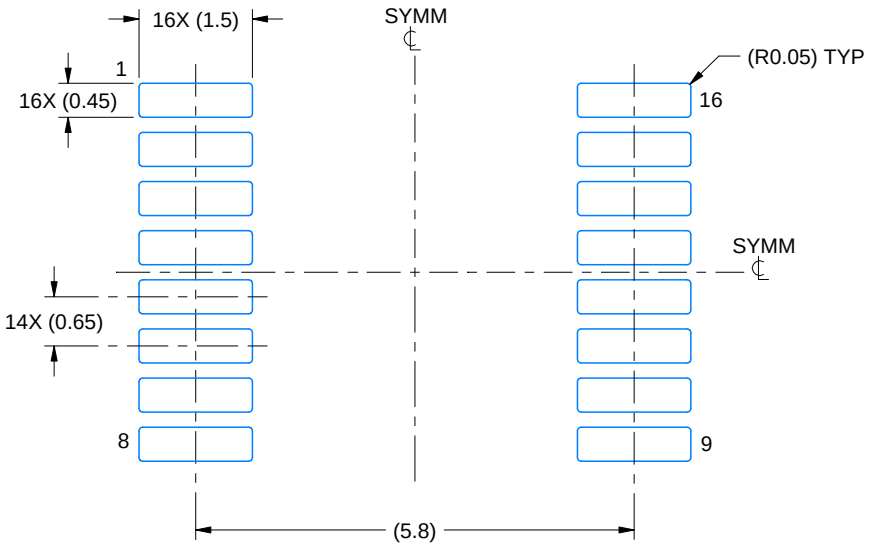
## TSSOP - 1.2 mm max height

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.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

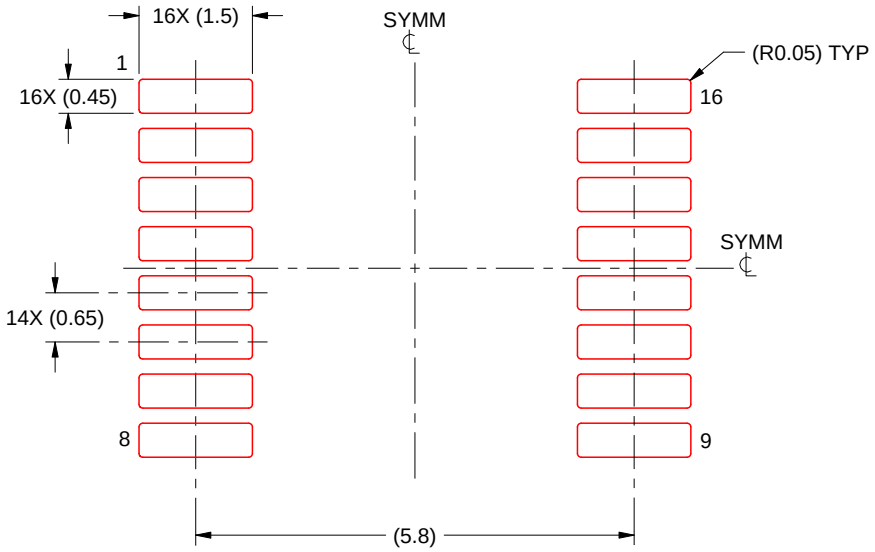



SOLDER MASK DETAILS

4220204/B 12/2023

NOTES: (continued)

6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.




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

4220204/B 12/2023

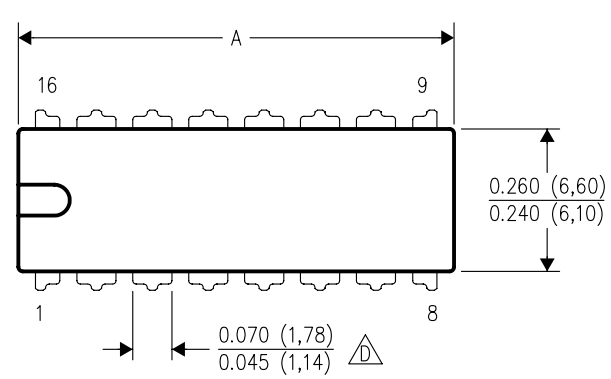
NOTES: (continued)

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.

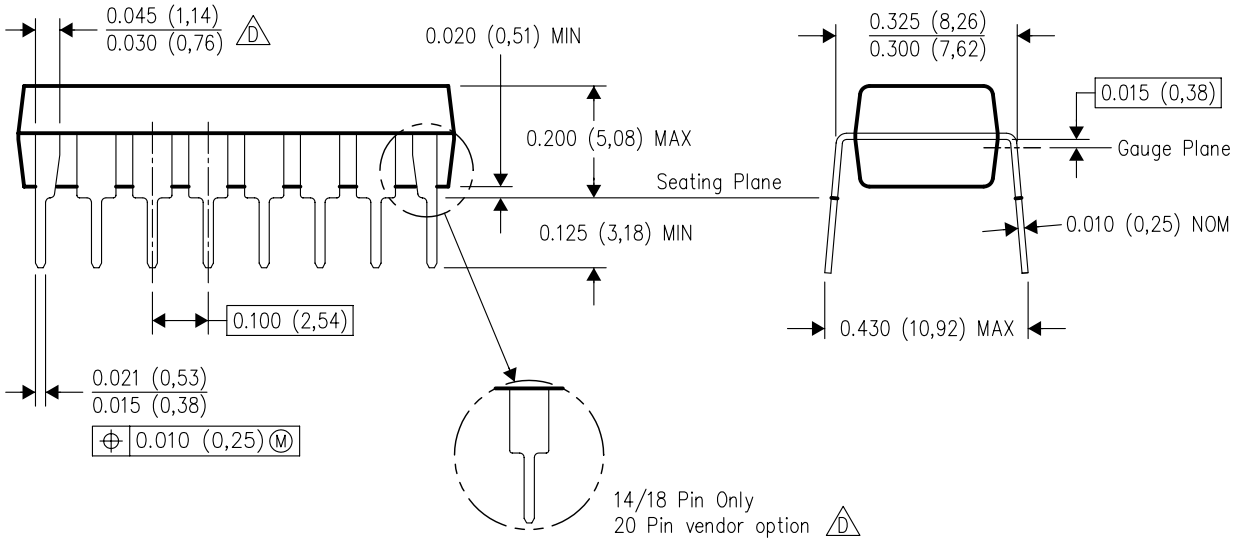
## N (R–PDIP–T**)

## PLASTIC DUAL–IN–LINE PACKAGE

16 PINS SHOWN

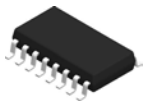



| DIM \ PINS ** | 14 | 16 | 18 | 20 |
|---|---|---|---|---|
| A MAX | 0.775 (19,69) | 0.775 (19,69) | 0.920 (23,37) | 1.060 (26,92) |
| A MIN | 0.745 (18,92) | 0.745 (18,92) | 0.850 (21,59) | 0.940 (23,88) |
| MS–001 VARIATION (C) | AA | BB | AC | AD |




4040049/E 12/2002

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

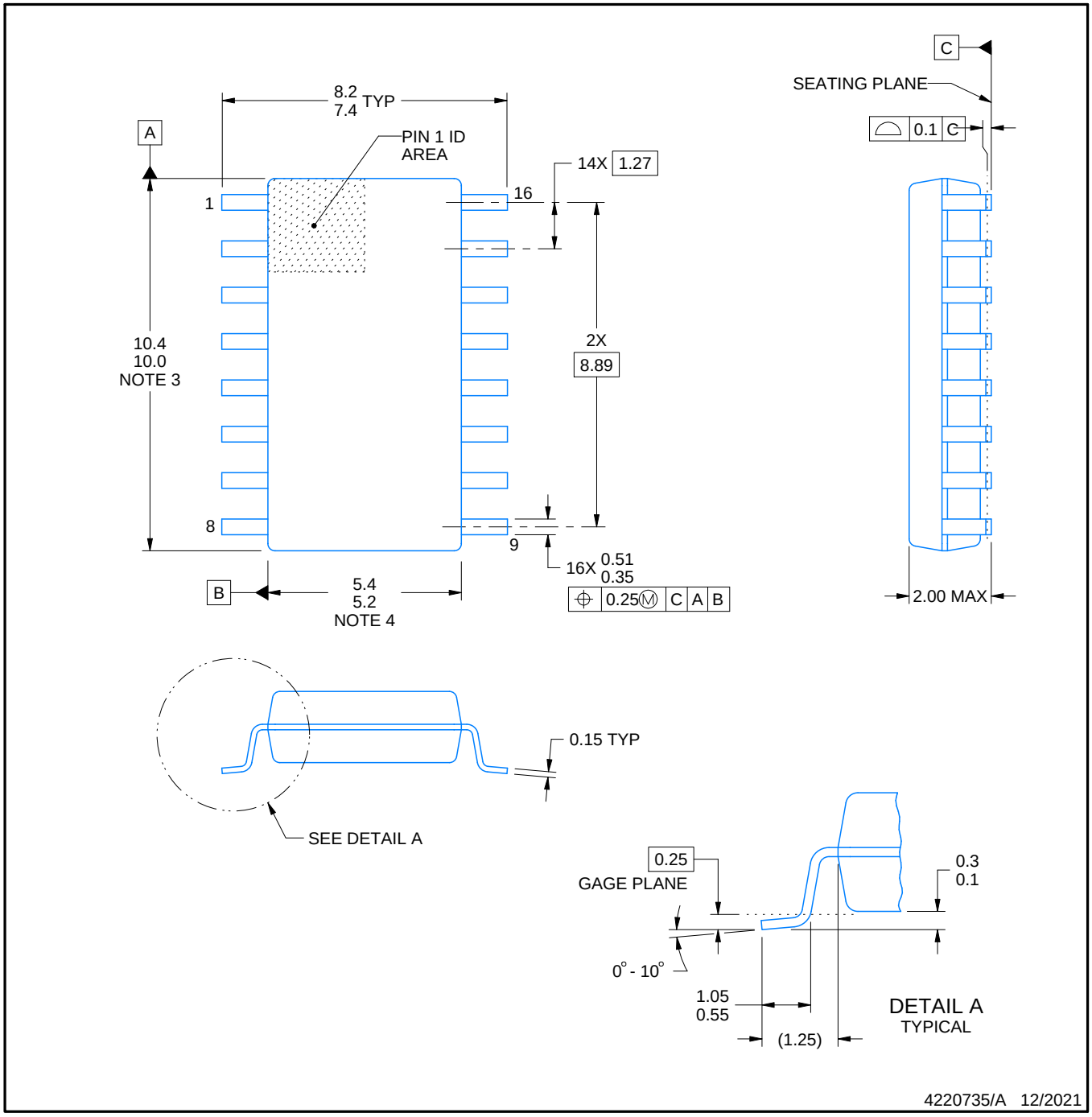


# PACKAGE OUTLINE

## NS0016A

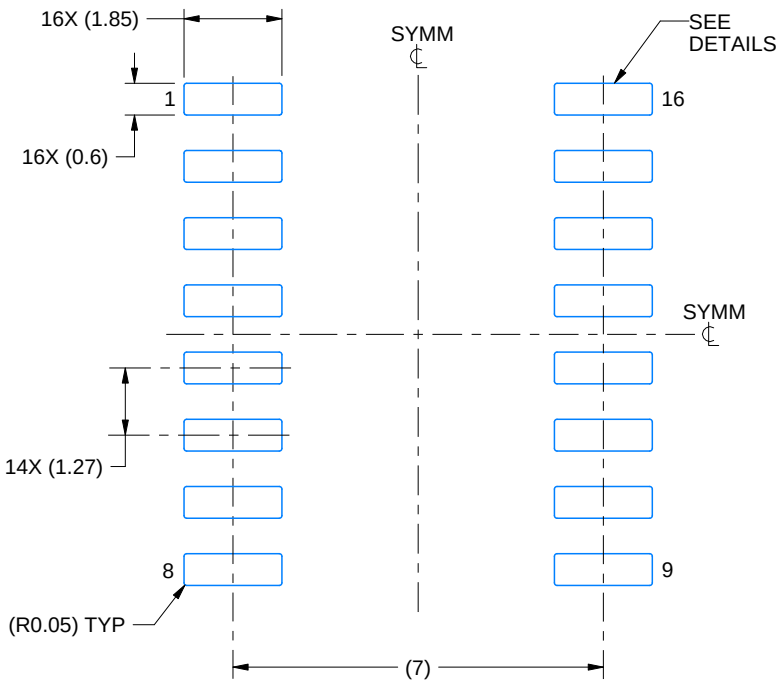
## SOP - 2.00 mm max height

SOP

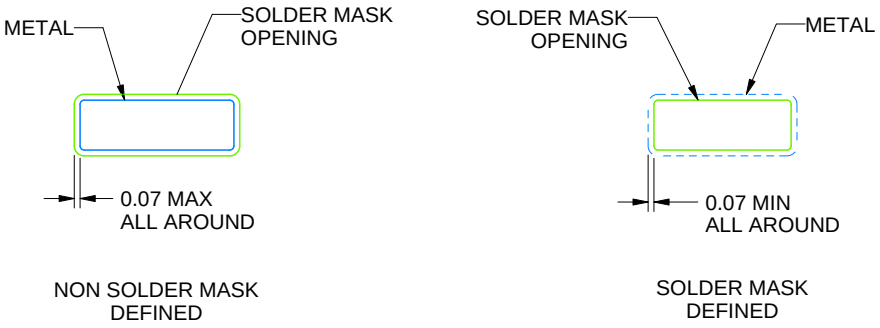



NOTES:

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.




LAND PATTERN EXAMPLE
SCALE:7X




NON SOLDER MASK
DEFINED

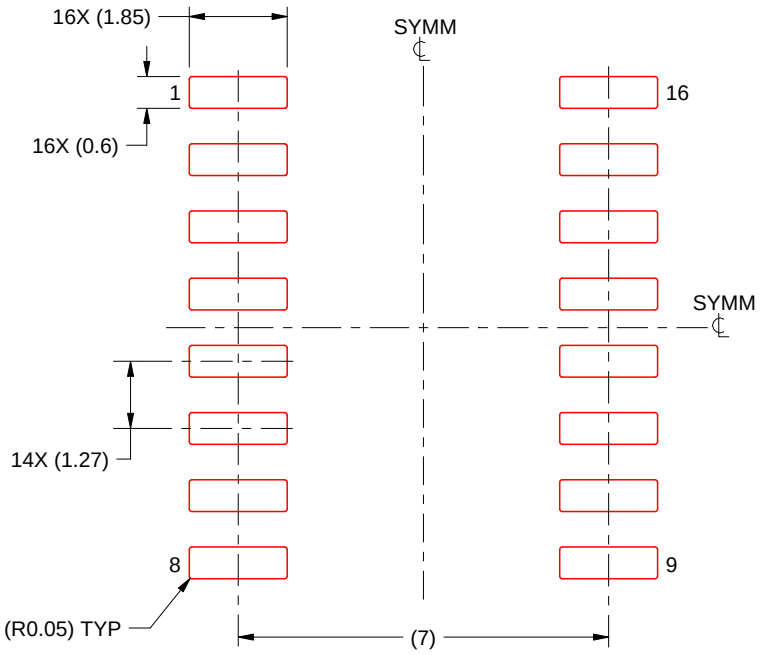
SOLDER MASK
DEFINED

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.




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.

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