

SNx4HC00 四路 2 输入与非门

1 特性

- 缓冲输入
- 宽工作电压范围：2V 至 6V
- 宽工作温度范围：
 - 40°C to +85°C
- 支持多达 10 个 LSTTL 负载的扇出
- 与 LSTTL 逻辑 IC 相比，可显著降低功耗

2 应用

- [警报/篡改检测电路](#)
- S-R 锁存器

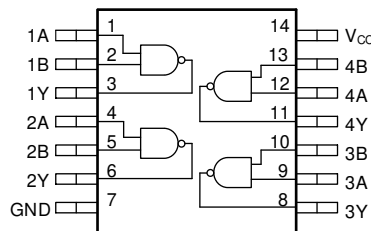
3 说明

此器件包含四个独立双输入或非门。每个逻辑门以正逻辑执行布尔函数 $Y = A \bullet B$ 。

器件信息

器件型号	封装 ⁽¹⁾	封装尺寸 (标称值)
SN74HC00D	SOIC (14)	8.70mm × 3.90mm
SN74HC00DB	SSOP (14)	6.50mm × 5.30mm
SN74HC00N	PDIP (14)	19.30mm × 6.40mm
SN74HC00NS	SO (14)	10.20mm × 5.30mm
SN74HC00PW	TSSOP (14)	5.00mm × 4.40mm
SN54HC00FK	LCCC (20)	8.90mm × 8.90mm
SN54HC00J	CDIP (14)	21.30mm × 7.60mm
SN54HC00W	CFP (14)	9.20mm × 6.29mm

(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。



Device Functional Pinout



Table of Contents

1 特性	1	8.4 Standard CMOS Inputs.....	9
2 应用	1	8.5 Clamp Diode Structure.....	9
3 说明	1	8.6 Device Functional Modes.....	10
4 Revision History	2	9 Application and Implementation	11
5 Pin Configuration and Functions	3	9.1 Application Information.....	11
6 Specifications	4	9.2 Typical Application.....	11
6.1 Absolute Maximum Ratings	4	10 Power Supply Recommendations	14
6.2 ESD Ratings	4	11 Layout	14
6.3 Recommended Operating Conditions	4	11.1 Layout Guidelines.....	14
6.4 Thermal Information	5	11.2 Layout Example.....	14
6.5 Electrical Characteristics - Commercial (74xx)	5	12 Device and Documentation Support	15
6.6 Electrical Characteristics - Military (54xx)	6	12.1 Documentation Support.....	15
6.7 Switching Characteristics - Commercial (74xx)	6	12.2 接收文档更新通知.....	15
6.8 Switching Characteristics - Military (54xx)	6	12.3 支持资源.....	15
6.9 Typical Characteristics.....	7	12.4 Trademarks.....	15
7 Parameter Measurement Information	8	12.5 Electrostatic Discharge Caution.....	15
8 Detailed Description	9	12.6 术语表.....	15
8.1 Overview.....	9	13 Mechanical, Packaging, and Orderable Information	15
8.2 Functional Block Diagram.....	9		
8.3 Balanced CMOS Push-Pull Outputs.....	9		

4 Revision History

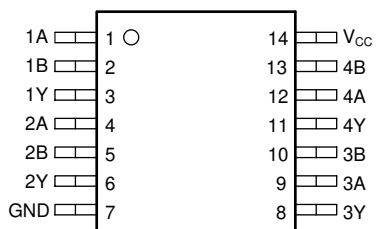
注：以前版本的页码可能与当前版本的页码不同

Changes from Revision G (January 2021) to Revision H (August 2021)	Page
• Increased D and PW package thermal values.....	5

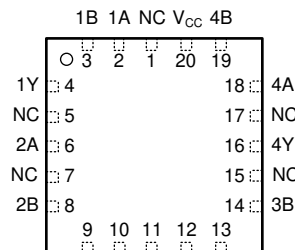
Changes from Revision F (July 2016) to Revision G (January 2021)	Page
• 更新至全新的数据表格式.....	1
• Updated D and PW package thermals to new standards.....	5

Changes from Revision E (August 2003) to Revision F (July 2016)	Page
• 添加了应用部分、器件信息表、ESD 等级表，典型特性部分、特性说明部分、器件功能模式、应用和实施部分、电源建议部分、布局部分、器件和文档支持部分以及机械、封装和可订购信息部分.....	1
• 向“特性”列表中添加了“军用免责声明”.....	1
• 删除了“订购信息”表；请参阅数据表末尾的 POA。.....	1
• Changed values in the Thermal Information table to align with JEDEC standards.....	5
• Deleted <i>Operating Characteristics</i> table; moved Cpd row to <i>Electrical Characteristics</i>	5

5 Pin Configuration and Functions



D, DB, N, NS, PW, J, or W Package
14-Pin SOIC, SSOP, PDIP, SO, TSSOP, CDIP, or CFP
Top View



FK Package
20-Pin LCCC
Top View

表 5-1. Pin Functions

NAME	PIN		I/O	DESCRIPTION
	D, DB, N, NS, PW, J, or W	FK		
1A	1	2	Input	Channel 1, Input A
1B	2	3	Input	Channel 1, Input B
1Y	3	4	Output	Channel 1, Output Y
2A	4	6	Input	Channel 2, Input A
2B	5	8	Input	Channel 2, Input B
2Y	6	9	Output	Channel 2, Output Y
3A	9	13	Input	Channel 3, Input A
3B	10	14	Input	Channel 3, Input B
3Y	8	12	Output	Channel 3, Output Y
4A	12	18	Input	Channel 4, Input A
4B	13	19	Input	Channel 4, Input B
4Y	11	16	Output	Channel 4, Output Y
GND	7	10	—	Ground
NC		1, 5, 7, 11, 15, 17	—	Not internally connected
V _{CC}	14	20	—	Positive Supply

6 Specifications

6.1 Absolute Maximum Ratings

over operating free-air temperature range (unless otherwise noted)⁽¹⁾

			MIN	MAX	UNIT
V_{CC}	Supply voltage		- 0.5	7	V
I_{IK}	Input clamp current ⁽²⁾	$V_I < -0.5\text{ V}$ or $V_I > V_{CC} + 0.5\text{ V}$		± 20	mA
I_{OK}	Output clamp current ⁽²⁾	$V_O < -0.5\text{ V}$ or $V_O > V_{CC} + 0.5\text{ V}$		± 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 ⁽³⁾			150	°C
T_{stg}	Storage temperature		- 65	150	°C

(1) Stresses beyond those listed under *Absolute Maximum Rating* may cause permanent damage to the device. These are stress ratings only, which do not imply functional operation of the device at these or any other conditions beyond those indicated under *Recommended Operating Condition*. 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.

(3) Guaranteed by design.

6.2 ESD Ratings

			VALUE	UNIT
$V_{(ESD)}$	Electrostatic discharge	Human-body model (HBM), per ANSI/ESDA/JEDEC JS-001 ⁽¹⁾	± 2000	V
		Charged-device model (CDM), per JEDEC specification JESD22-C101 ⁽²⁾	± 1000	

(1) JEDEC document JEP155 states that 500-V HBM allows safe manufacturing with a standard ESD control process.

(2) JEDEC document JEP157 states that 250-V CDM allows safe manufacturing with a standard ESD control process.

6.3 Recommended Operating Conditions

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

			MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage		2	5	6	V
V_{IH}	High-level input voltage	$V_{CC} = 2\text{ V}$	1.5			V
		$V_{CC} = 4.5\text{ V}$	3.15			
		$V_{CC} = 6\text{ V}$	4.2			
V_{IL}	Low-level input voltage	$V_{CC} = 2\text{ V}$			0.5	V
		$V_{CC} = 4.5\text{ V}$			1.35	
		$V_{CC} = 6\text{ V}$			1.8	
V_I	Input voltage		0		V_{CC}	V
V_O	Output voltage		0		V_{CC}	V
t_t	Input transition rise and fall time	$V_{CC} = 2\text{ V}$			1000	ns
		$V_{CC} = 4.5\text{ V}$			500	
		$V_{CC} = 6\text{ V}$			400	
T_A	Operating free-air temperature	SN54HC00	- 55		125	°C
		SN74HC00	- 40		85	

6.4 Thermal Information

THERMAL METRIC ⁽¹⁾		SN74HC00					UNIT
		D (SOIC)	DB (SSOP)	N (PDIP)	NS (SOP)	PW (TSSOP)	
		14 PINS	14 PINS	14 PINS	14 PINS	14 PINS	
$R_{\theta JA}$	Junction-to-ambient thermal resistance	133.6	108.3	57.5	91.0	151.7	°C/W
$R_{\theta JC(top)}$	Junction-to-case (top) thermal resistance	89.0	60.3	45.1	48.8	79.4	°C/W
$R_{\theta JB}$	Junction-to-board thermal resistance	89.5	55.7	37.3	49.8	94.7	°C/W
Ψ_{JT}	Junction-to-top characterization parameter	45.5	25	30.3	18.4	25.2	°C/W
Ψ_{JB}	Junction-to-board characterization parameter	89.1	55.2	37.2	49.5	94.1	°C/W
$R_{\theta JC(bot)}$	Junction-to-case (bottom) thermal resistance	N/A	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.

6.5 Electrical Characteristics - Commercial (74xx)

over operating free-air temperature range (unless otherwise noted) ⁽¹⁾ ⁽²⁾

PARAMETER		TEST CONDITIONS		V _{CC}	Operating free-air temperature (T _A)						UNIT
					25°C			-40°C to 85°C			
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{OH}	High-level output voltage	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	2 V	1.9	1.998		1.9			V
				4.5 V	4.4	4.499		4.4			
				6 V	5.9	5.999		5.9			
			I _{OH} = -4 mA	4.5 V	3.98	4.3		3.84			
			I _{OH} = -5.2 mA	6 V	5.48	5.8		5.34			
V _{OL}	Low-level output voltage	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	2 V		0.002	0.1			0.1	V
				4.5 V		0.001	0.1			0.1	
				6 V		0.001	0.1			0.1	
			I _{OL} = 4 mA	4.5 V		0.17	0.26		0.33		
			I _{OL} = 5.2 mA	6 V		0.15	0.26		0.33		
I _I	Input leakage current	V _I = V _{CC} or 0		6 V		±0.1	±100			±1000	μA
I _{CC}	Supply current	V _I = V _{CC} or 0	V _I = V _{CC} or 0	6 V			2			20	μA
C _i	Input capacitance			2 V to 6 V		3	10			10	pF
C _{pd}	Power dissipation capacitance per gate	No load		2 V to 6 V		20					pF

(1) V_{CCI} is the V_{CC} associated with the input port.

(2) V_{CCO} is the V_{CC} associated with the output port.

6.6 Electrical Characteristics - Military (54xx)

over operating free-air temperature range (unless otherwise noted) ⁽¹⁾ ⁽²⁾

PARAMETER		TEST CONDITIONS		V _{CC}	Operating free-air temperature (T _A)						UNIT
					25°C			-55°C to 125°C			
					MIN	TYP	MAX	MIN	TYP	MAX	
V _{OH}	High-level output voltage	V _I = V _{IH} or V _{IL}	I _{OH} = -20 μA	2 V	1.9	1.998		1.9			V
				4.5 V	4.4	4.499		4.4			
				6 V	5.9	5.999		5.9			
			I _{OH} = -4 mA	4.5 V	3.98	4.3		3.7			
				I _{OH} = -5.2 mA	6 V	5.48	5.8		5.2		
V _{OL}	Low-level output voltage	V _I = V _{IH} or V _{IL}	I _{OL} = 20 μA	2 V		0.002	0.1		0.1	V	
				4.5 V		0.001	0.1		0.1		
				6 V		0.001	0.1		0.1		
			I _{OL} = 4 mA	4.5 V		0.17	0.26		0.4		
				I _{OL} = 5.2 mA	6 V		0.15	0.26			0.4
I _I	Input leakage current	V _I = V _{CC} or 0		6 V		±0.1	±100		±1000	nA	
I _{CC}	Supply current	V _I = V _{CC} or 0	V _I = V _{CC} or 0	6 V			2		40	μA	
C _i	Input capacitance			2 V to 6 V		3	10		10	pF	
C _{pd}	Power dissipation capacitance per gate	No load		2 V to 6 V		20				pF	

(1) V_{CCI} is the V_{CC} associated with the input port.

(2) V_{CCO} is the V_{CC} associated with the output port.

6.7 Switching Characteristics - Commercial (74xx)

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

PARAMETER		FROM	TO	V _{CC}	Operating free-air temperature (T _A)						UNIT
					25°C			– 40°C to 85°C			
					MIN	TYP	MAX	MIN	TYP	MAX	
t _{pd}	Propagation delay	A or B	Y	2 V	45	90	115	ns			
				4.5 V	9	18	23				
				6 V	8	15	20				
t _t	Transition-time		Y	2 V	38	75	95	ns			
				4.5 V	8	15	19				
				6 V	6	13	16				

6.8 Switching Characteristics - Military (54xx)

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

PARAMETER		FROM	TO	V _{CC}	Operating free-air temperature (T _A)						UNIT
					25°C			– 55°C to 125°C			
					MIN	TYP	MAX	MIN	TYP	MAX	
t _{pd}	Propagation delay	A or B	Y	2 V	45	90	135			ns	
				4.5 V	9	18	27				
				6 V	8	15	23				

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

PARAMETER		FROM	TO	V _{CC}	Operating free-air temperature (T _A)						UNIT
					25°C			– 55°C to 125°C			
					MIN	TYP	MAX	MIN	TYP	MAX	
t _t	Transition-time		Y	2 V	38		75	110			ns
				4.5 V	8		15	22			
				6 V	6		13	19			

6.9 Typical Characteristics

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

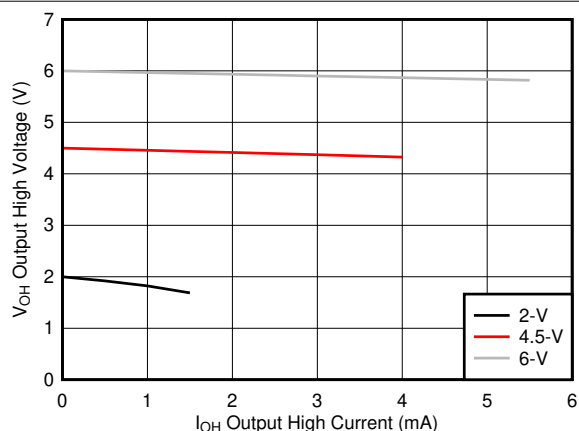


图 6-1. Typical Output Voltage in the High State (V_{OH})

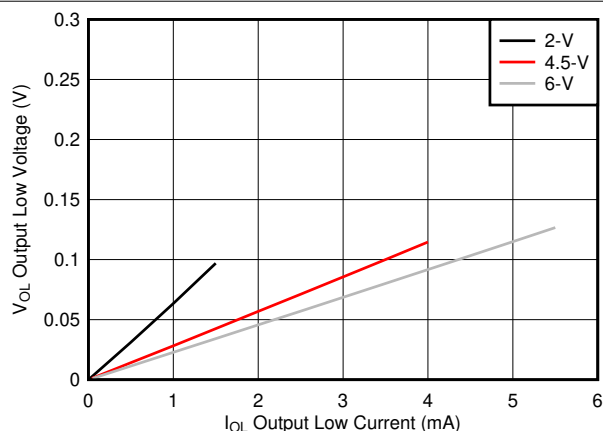


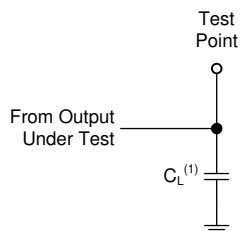
图 6-2. Typical Output Voltage in the Low State (V_{OL})

7 Parameter Measurement Information

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

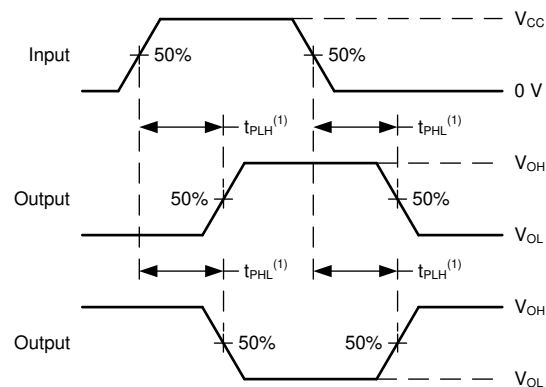
For clock inputs, $f_{\max}$ is measured when the input duty cycle is 50%.

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



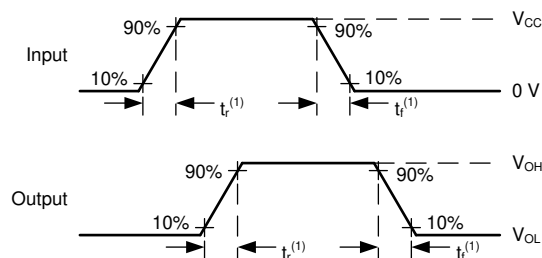
(1) C_L includes probe and test-fixture capacitance.

图 7-1. Load Circuit for Push-Pull Outputs



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

图 7-2. Voltage Waveforms Propagation Delays



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

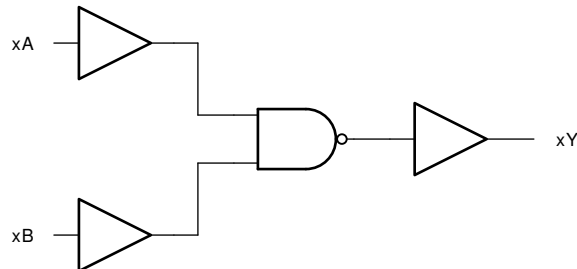
图 7-3. Voltage Waveforms, Input and Output Transition Times

8 Detailed Description

8.1 Overview

This device contains four independent 2-input NAND gates. Each gate performs the Boolean function $Y = A \odot B$ in positive logic.

8.2 Functional Block Diagram



8.3 Balanced CMOS Push-Pull Outputs

This device includes balanced CMOS push-pull outputs. The term *balanced* indicates that the device can sink and source similar currents. The drive capability of this device may create fast edges into light loads so routing and load conditions should be considered to prevent ringing. Additionally, the outputs of this device are capable of driving larger currents than the device can sustain without being damaged. It is important for the output power of the device to be limited to avoid damage due to overcurrent. The electrical and thermal limits defined in the *Absolute Maximum Ratings* must be followed at all times.

Unused push-pull CMOS outputs should be left disconnected.

8.4 Standard CMOS Inputs

This device includes standard CMOS inputs. Standard CMOS inputs are high impedance and are typically modeled as a resistor in parallel with the input capacitance given in the *Electrical Characteristics*. The worst case resistance is calculated with the maximum input voltage, given in the *Absolute Maximum Ratings*, and the maximum input leakage current, given in the *Electrical Characteristics*, using Ohm's law ($R = V \div I$).

Standard CMOS inputs require that input signals transition between valid logic states quickly, as defined by the input transition time or rate in the *Recommended Operating Conditions* table. Failing to meet this specification will result in excessive power consumption and could cause oscillations. More details can be found in [Implications of Slow or Floating CMOS Inputs](#).

Do not leave standard CMOS inputs floating at any time during operation. Unused inputs must be terminated at V_{CC} or GND. If a system will not be actively driving an input at all times, a pull-up or pull-down resistor can be added to provide a valid input voltage during these times. The resistor value will depend on multiple factors, however a 10-k Ω resistor is recommended and will typically meet all requirements.

8.5 Clamp Diode Structure

The inputs and outputs to this device have both positive and negative clamping diodes as depicted in [Electrical Placement of Clamping Diodes for Each Input and Output](#).

CAUTION

Voltages beyond the values specified in the *Absolute Maximum Ratings* table can cause damage to the device. The input and output voltage ratings may be exceeded if the input and output clamp-current ratings are observed.

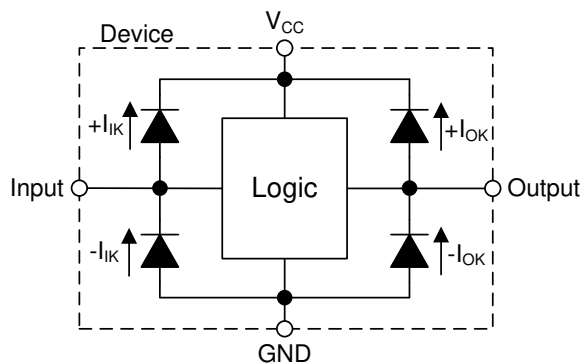


图 8-1. Electrical Placement of Clamping Diodes for Each Input and Output

8.6 Device Functional Modes

表 8-1. Function Table

INPUTS		OUTPUT
A	B	Y
H	H	L
L	X	H
X	L	H

9 Application and Implementation

备注

以下应用部分中的信息不属于 TI 器件规格的范围，TI 不担保其准确性和完整性。TI 的客户应负责确定器件是否适用于其应用。客户应验证并测试其设计，以确保系统功能。

9.1 Application Information

In this application, the SN74HC00 is used to create an active-low SR latch. The two additional gates can be used for a second active-low SR latch, individually used for their logic function, or the inputs can be grounded and both channels left unused. This device is used to drive the tamper indicator LED and provide one bit of data to the system controller. When the tamper switch outputs LOW, the output Q becomes HIGH. This output remains HIGH until the system controller addresses the event and sends a LOW signal to the R input which returns the Q output back to LOW.

9.2 Typical Application

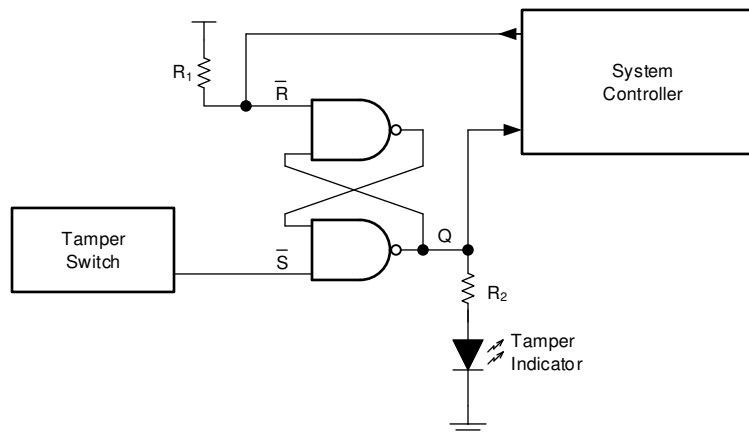


图 9-1. Typical Application Diagram

9.2.1 Design Requirements

9.2.1.1 Power Considerations

Ensure the desired supply voltage is within the range specified in the *Recommended Operating Conditions*. The supply voltage sets the device's electrical characteristics as described in the *Electrical Characteristics*.

The positive voltage supply must be capable of sourcing current equal to the total current to be sourced by all outputs of the SN74HC00 plus the maximum static supply current, I_{CC} , listed in *Electrical Characteristics* and any transient current required for switching. The logic device can only source as much current as is provided by the positive supply source. Be sure not to exceed the maximum total current through V_{CC} listed in the *Absolute Maximum Ratings*.

The ground must be capable of sinking current equal to the total current to be sunk by all outputs of the SN74HC00 plus the maximum supply current, I_{CC} , listed in *Electrical Characteristics*, and any transient current required for switching. The logic device can only sink as much current as can be sunk into its ground connection. Be sure not to exceed the maximum total current through GND listed in the *Absolute Maximum Ratings*.

The SN74HC00 can drive a load with a total capacitance less than or equal to 50 pF while still meeting all of the data sheet specifications. Larger capacitive loads can be applied; however, it is not recommended to exceed 50 pF.

The SN74HC00 can drive a load with total resistance described by $R_L \geq V_O / I_O$, with the output voltage and current defined in the *Electrical Characteristics* table with V_{OH} and V_{OL} . When outputting in the high state, the output voltage in the equation is defined as the difference between the measured output voltage and the supply voltage at the V_{CC} pin.

Total power consumption can be calculated using the information provided in [CMOS Power Consumption and Cpd Calculation](#).

Thermal increase can be calculated using the information provided in [Thermal Characteristics of Standard Linear and Logic \(SLL\) Packages and Devices](#).

CAUTION

The maximum junction temperature, $T_{J(max)}$ listed in the *Absolute Maximum Ratings*, is an additional limitation to prevent damage to the device. Do not violate any values listed in the *Absolute Maximum Ratings*. These limits are provided to prevent damage to the device.

9.2.1.2 Input Considerations

Input signals must cross $V_{IL(max)}$ to be considered a logic LOW, and $V_{IH(min)}$ to be considered a logic HIGH. Do not exceed the maximum input voltage range found in the *Absolute Maximum Ratings*.

Unused inputs must be terminated to either V_{CC} or ground. These can be directly terminated if the input is completely unused, or they can be connected with a pull-up or pull-down resistor if the input is to be used sometimes, but not always. A pull-up resistor is used for a default state of HIGH, and a pull-down resistor is used for a default state of LOW. The resistor size is limited by drive current of the controller, leakage current into the SN74HC00, as specified in the *Electrical Characteristics*, and the desired input transition rate. A 10-k Ω resistor value is often used due to these factors.

The SN74HC00 has CMOS inputs and thus requires fast input transitions to operate correctly, as defined in the *Recommended Operating Conditions* table. Slow input transitions can cause oscillations, additional power consumption, and reduction in device reliability.

Refer to the *Feature Description* section for additional information regarding the inputs for this device.

9.2.1.3 Output Considerations

The positive supply voltage is used to produce the output HIGH voltage. Drawing current from the output will decrease the output voltage as specified by the V_{OH} specification in the *Electrical Characteristics*. The ground voltage is used to produce the output LOW voltage. Sinking current into the output will increase the output voltage as specified by the V_{OL} specification in the *Electrical Characteristics*.

Push-pull outputs that could be in opposite states, even for a very short time period, should never be connected directly together. This can cause excessive current and damage to the device.

Two channels within the same device with the same input signals can be connected in parallel for additional output drive strength.

Unused outputs can be left floating. Do not connect outputs directly to V_{CC} or ground.

Refer to *Feature Description* section for additional information regarding the outputs for this device.

9.2.2 Detailed Design Procedure

1. Add a decoupling capacitor from V_{CC} to GND. The capacitor needs to be placed physically close to the device and electrically close to both the V_{CC} and GND pins. An example layout is shown in the *Layout* section.
2. Ensure the capacitive load at the output is ≤ 50 pF. This is not a hard limit, however it will ensure optimal performance. This can be accomplished by providing short, appropriately sized traces from the SN74HC00 to one or more of the receiving devices.
3. Ensure the resistive load at the output is larger than $(V_{CC} / I_{O(max)}) \Omega$. This will ensure that the maximum output current from the *Absolute Maximum Ratings* is not violated. Most CMOS inputs have a resistive load measured in $M\Omega$; much larger than the minimum calculated above.
4. Thermal issues are rarely a concern for logic gates; the power consumption and thermal increase, however, can be calculated using the steps provided in the application report, [CMOS Power Consumption and Cpd Calculation](#).

9.2.3 Application Curve

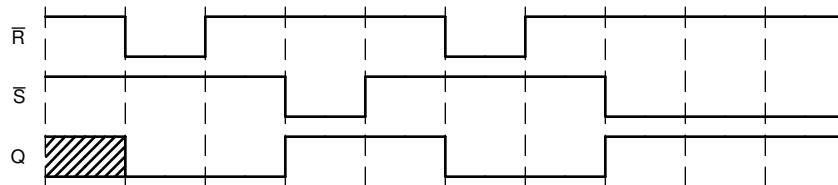


图 9-2. Application Timing Diagram

10 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- μ F capacitor is recommended for this device. It is acceptable to parallel multiple bypass caps to reject different frequencies of noise. The 0.1- μ F and 1- μ F capacitors are commonly used in parallel. The bypass capacitor should be installed as close to the power terminal as possible for best results, as shown in given example layout image.

11 Layout

11.1 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.

11.2 Layout Example

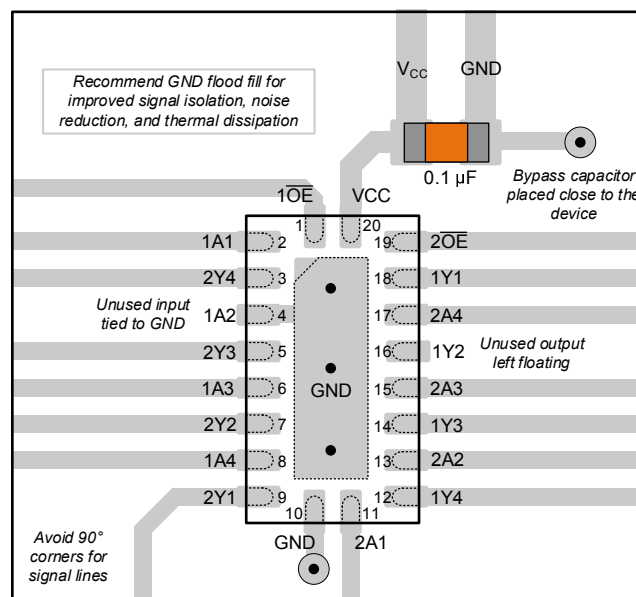


图 11-1. Example layout for the SN74HC00 in the RKS Package

12 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.

12.1 Documentation Support

12.2 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。

12.3 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》。

12.4 Trademarks

TI E2E™ is a trademark of Texas Instruments.

所有商标均为其各自所有者的财产。

12.5 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.

12.6 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。

13 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.

重要声明和免责声明

TI 提供技术和可靠性数据 (包括数据表)、设计资源 (包括参考设计)、应用或其他设计建议、网络工具、安全信息和其他资源, 不保证没有瑕疵且不做任何明示或暗示的担保, 包括但不限于对适销性、某特定用途方面的适用性或不侵犯任何第三方知识产权的暗示担保。

这些资源可供使用 TI 产品进行设计的熟练开发人员使用。您将自行承担以下全部责任: (1) 针对您的应用选择合适的 TI 产品, (2) 设计、验证并测试您的应用, (3) 确保您的应用满足相应标准以及任何其他安全、安保或其他要求。这些资源如有变更, 恕不另行通知。TI 授权您仅可将这些资源用于研发本资源所述的 TI 产品的应用。严禁对这些资源进行其他复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。您应全额赔偿因在这些资源的使用中对 TI 及其代表造成的任何索赔、损害、成本、损失和债务, TI 对此概不负责。

TI 提供的产品受 TI 的销售条款 (<https://www.ti.com/legal/termsofsale.html>) 或 [ti.com](https://www.ti.com) 上其他适用条款/TI 产品随附的其他适用条款的约束。TI 提供这些资源并不会扩展或以其他方式更改 TI 针对 TI 产品发布的适用的担保或担保免责声明。

邮寄地址: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265

Copyright © 2021, 德州仪器 (TI) 公司

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)
5962-8403701VCA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8403701VC A SNV54HC00J
5962-8403701VCA.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8403701VC A SNV54HC00J
5962-8403701VDA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8403701VD A SNV54HC00W
5962-8403701VDA.A	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-8403701VD A SNV54HC00W
84037012A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84037012A SNJ54HC 00FK
8403701CA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701CA SNJ54HC00J
8403701DA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701DA SNJ54HC00W
JM38510/65001B2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001B2A
JM38510/65001B2A.A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001B2A
JM38510/65001BCA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BCA
JM38510/65001BCA.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BCA
JM38510/65001BDA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BDA
JM38510/65001BDA.A	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BDA
M38510/65001B2A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001B2A

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)
M38510/65001BCA	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BCA
M38510/65001BDA	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	JM38510/ 65001BDA
SN54HC00J	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC00J
SN54HC00J.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	SN54HC00J
SN74HC00D	Obsolete	Production	SOIC (D) 14	-	-	Call TI	Call TI	-40 to 85	HC00
SN74HC00DBR	Active	Production	SSOP (DB) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DBR.A	Active	Production	SSOP (DB) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DR	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DR.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DRG4	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DRG4.A	Active	Production	SOIC (D) 14	2500 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00DT	Obsolete	Production	SOIC (D) 14	-	-	Call TI	Call TI	-40 to 85	HC00
SN74HC00N	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC00N
SN74HC00N.A	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC00N
SN74HC00NE4	Active	Production	PDIP (N) 14	25 TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 85	SN74HC00N
SN74HC00NSR	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00NSR.A	Active	Production	SOP (NS) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00PW	Obsolete	Production	TSSOP (PW) 14	-	-	Call TI	Call TI	-40 to 85	HC00
SN74HC00PWR	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU SN	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00PWR.A	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00PWRG4	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SN74HC00PWRG4.A	Active	Production	TSSOP (PW) 14	2000 LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 85	HC00
SNJ54HC00FK	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84037012A SNJ54HC 00FK
SNJ54HC00FK.A	Active	Production	LCCC (FK) 20	55 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	84037012A SNJ54HC 00FK
SNJ54HC00J	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701CA SNJ54HC00J

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)
SNJ54HC00J.A	Active	Production	CDIP (J) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701CA SNJ54HC00J
SNJ54HC00W	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701DA SNJ54HC00W
SNJ54HC00W.A	Active	Production	CFP (W) 14	25 TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	8403701DA SNJ54HC00W

⁽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.

Important Information and Disclaimer: The information provided on this page represents TI's knowledge and belief as of the date that it is provided. TI bases its knowledge and belief on information provided by third parties, and makes no representation or warranty as to the accuracy of such information. Efforts are underway to better integrate information from third parties. TI has taken and continues to take reasonable steps to provide representative 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.

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 SN54HC00, SN54HC00-SP, SN74HC00 :

- Catalog : [SN74HC00](#), [SN54HC00](#)
- Automotive : [SN74HC00-Q1](#), [SN74HC00-Q1](#)
- Military : [SN54HC00](#)
- Space : [SN54HC00-SP](#)

NOTE: Qualified Version Definitions:

- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Military - QML certified for Military and Defense Applications
- Space - Radiation tolerant, ceramic packaging and qualified for use in Space-based application

TAPE AND REEL INFORMATION



*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
SN74HC00DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74HC00DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC00DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC00DRG4	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74HC00NSR	SOP	NS	14	2000	330.0	16.4	8.45	10.55	2.5	12.0	16.2	Q1
SN74HC00PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74HC00PWRG4	TSSOP	PW	14	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)
SN74HC00DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74HC00DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74HC00DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74HC00DRG4	SOIC	D	14	2500	340.5	336.1	32.0
SN74HC00NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74HC00PWR	TSSOP	PW	14	2000	356.0	356.0	35.0
SN74HC00PWRG4	TSSOP	PW	14	2000	353.0	353.0	32.0

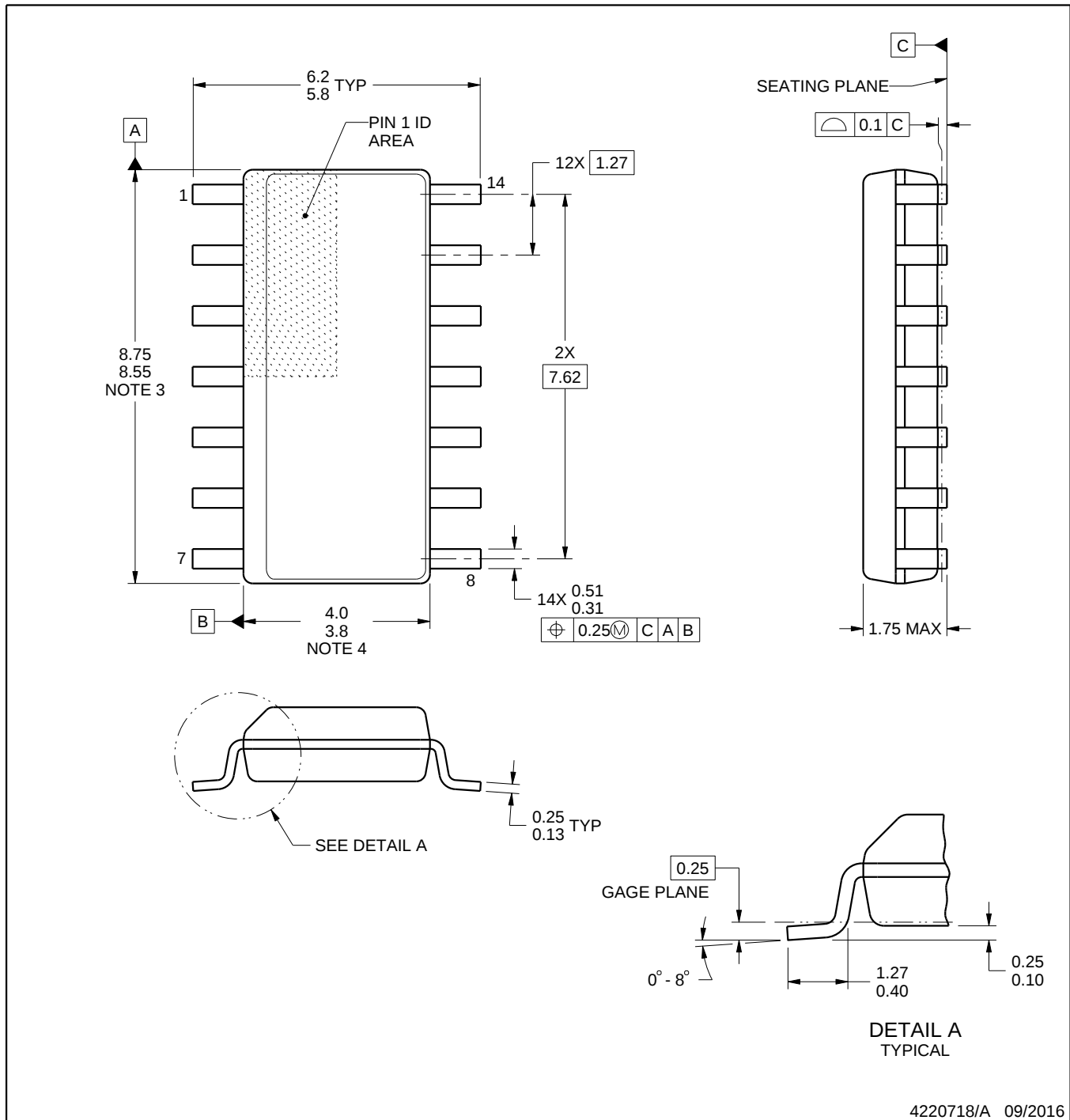
TUBE


*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (μm)	B (mm)
5962-8403701VDA	W	CFP	14	25	506.98	26.16	6220	NA
5962-8403701VDA.A	W	CFP	14	25	506.98	26.16	6220	NA
84037012A	FK	LCCC	20	55	506.98	12.06	2030	NA
8403701DA	W	CFP	14	25	506.98	26.16	6220	NA
JM38510/65001B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/65001B2A.A	FK	LCCC	20	55	506.98	12.06	2030	NA
JM38510/65001BDA	W	CFP	14	25	506.98	26.16	6220	NA
JM38510/65001BDA.A	W	CFP	14	25	506.98	26.16	6220	NA
M38510/65001B2A	FK	LCCC	20	55	506.98	12.06	2030	NA
M38510/65001BDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74HC00N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC00N	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC00N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC00N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC00NE4	N	PDIP	14	25	506	13.97	11230	4.32
SN74HC00NE4	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54HC00FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54HC00FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54HC00W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54HC00W.A	W	CFP	14	25	506.98	26.16	6220	NA

D0014A**PACKAGE OUTLINE****SOIC - 1.75 mm max height**

SMALL OUTLINE INTEGRATED CIRCUIT



4220718/A 09/2016

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-012, variation AB.

EXAMPLE BOARD LAYOUT

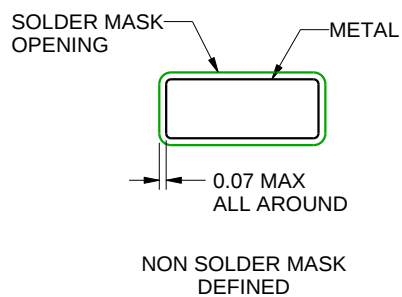
D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



LAND PATTERN EXAMPLE
SCALE:8X



SOLDER MASK DETAILS

4220718/A 09/2016

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

D0014A

SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:8X

4220718/A 09/2016

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.

MECHANICAL DATA

NS (R-PDSO-G**)

PLASTIC SMALL-OUTLINE PACKAGE

14-PINS SHOWN



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

W (R-GDFP-F14)

CERAMIC DUAL FLATPACK



- NOTES:
- All linear dimensions are in inches (millimeters).
 - This drawing is subject to change without notice.
 - This package can be hermetically sealed with a ceramic lid using glass frit.
 - Index point is provided on cap for terminal identification only.
 - Falls within MIL STD 1835 GDFP1-F14



4220762/A 05/2024

NOTES:

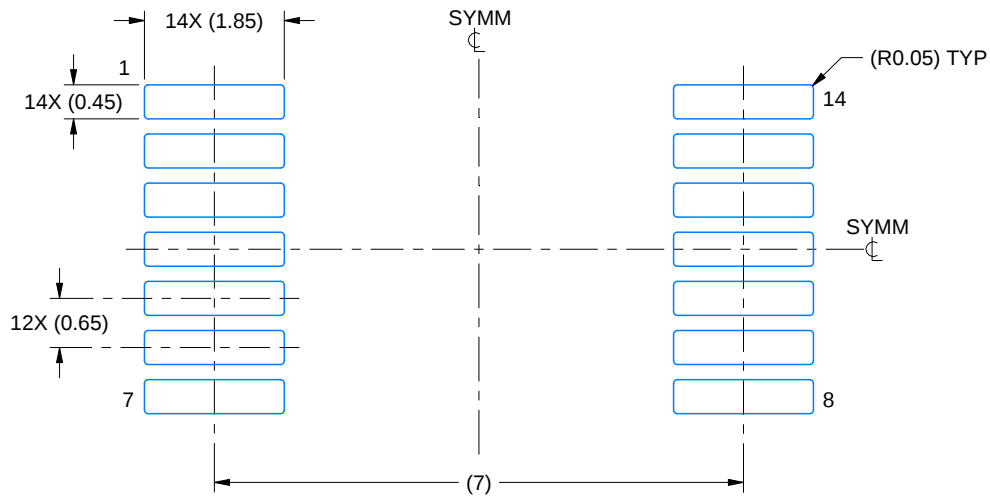
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 mm per side.
4. Reference JEDEC registration MO-150.

EXAMPLE BOARD LAYOUT

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4220762/A 05/2024

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

DB0014A

SSOP - 2 mm max height

SMALL OUTLINE PACKAGE



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

4220762/A 05/2024

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.

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 14

GENERIC PACKAGE VIEW

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



Images above are just a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.

4040083-5/G

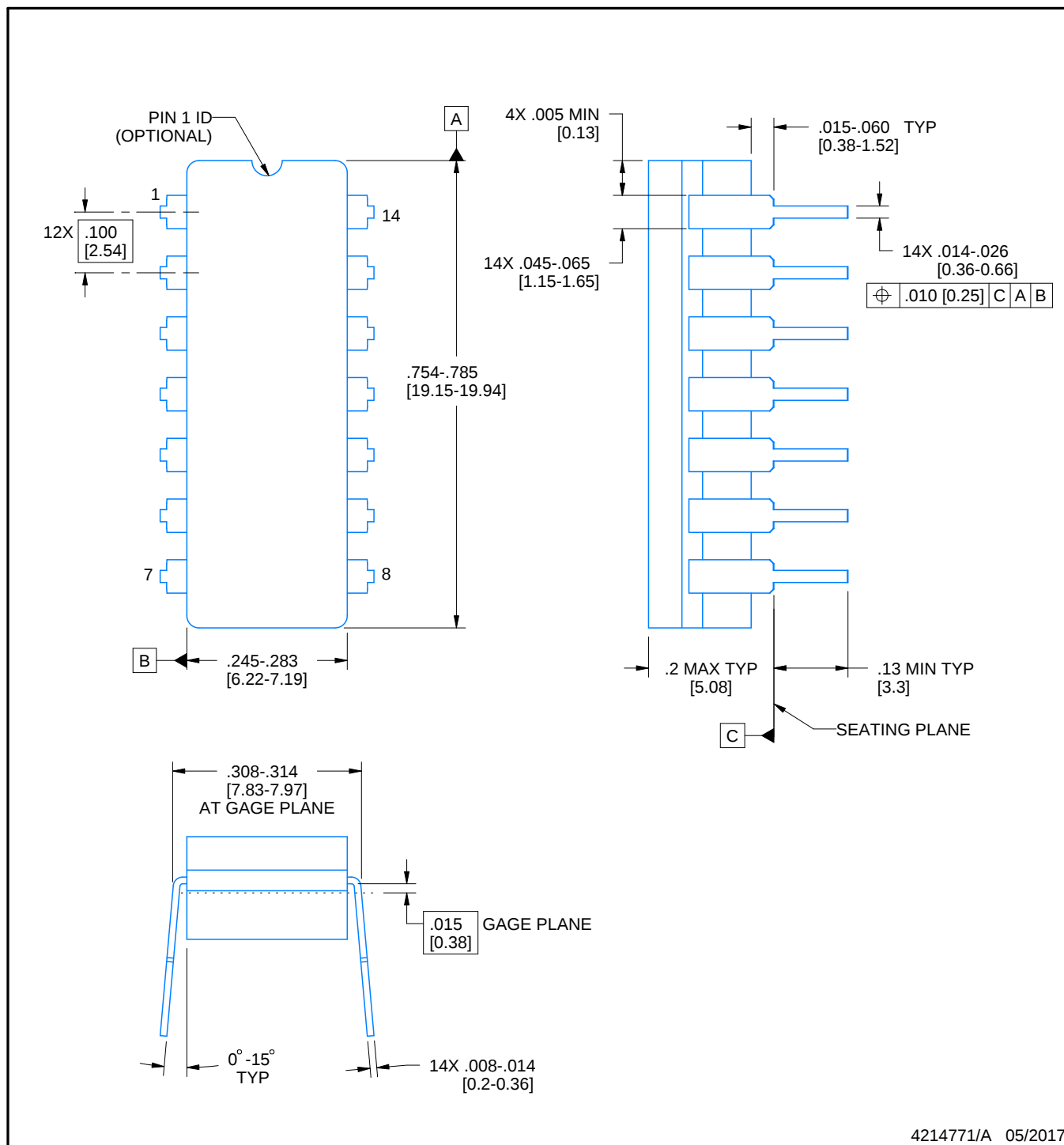


J0014A

PACKAGE OUTLINE

CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE



NOTES:

1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification only and on press ceramic glass frit seal only.
5. Falls within MIL-STD-1835 and GDIP1-T14.

N (R-PDIP-T**)

16 PINS SHOWN

PLASTIC DUAL-IN-LINE PACKAGE



PINS ** DIM	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	AA	BB	AC	AD



4040049/E 12/2002

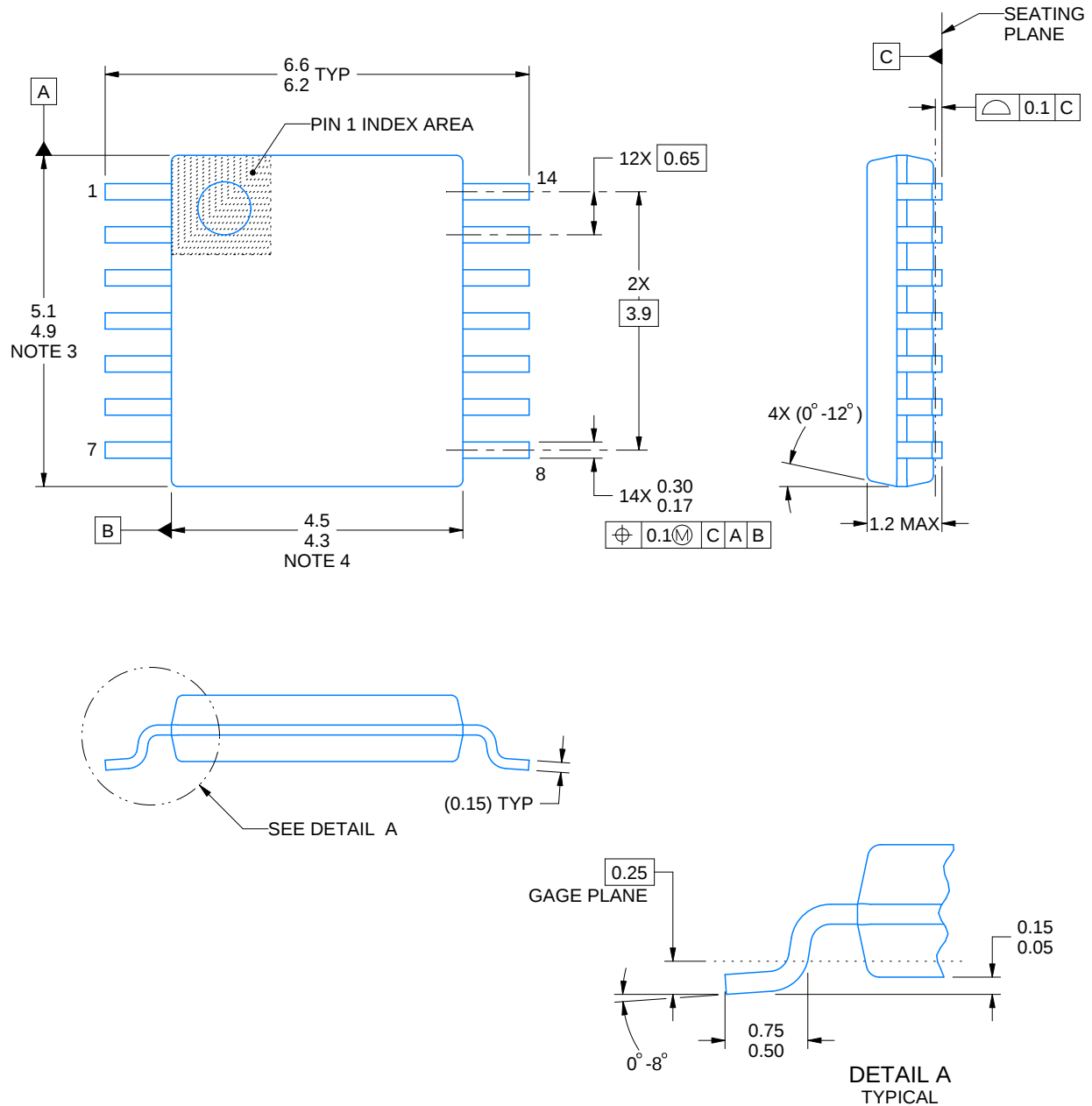
- NOTES:
- A. All linear dimensions are in inches (millimeters).
 - B. This drawing is subject to change without notice.
 -  Falls within JEDEC MS-001, except 18 and 20 pin minimum body length (Dim A).
 -  The 20 pin end lead shoulder width is a vendor option, either half or full width.

PW0014A

PACKAGE OUTLINE

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



4220202/B 12/2023

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

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X



SOLDER MASK DETAILS

4220202/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.

EXAMPLE STENCIL DESIGN

PW0014A

TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE



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

4220202/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.

重要通知和免责声明

TI“按原样”提供技术和可靠性数据（包括数据表）、设计资源（包括参考设计）、应用或其他设计建议、网络工具、安全信息和其他资源，不保证没有瑕疵且不做任何明示或暗示的担保，包括但不限于对适销性、与某特定用途的适用性或不侵犯任何第三方知识产权的暗示担保。

这些资源可供使用 TI 产品进行设计的熟练开发人员使用。您将自行承担以下全部责任：(1) 针对您的应用选择合适的 TI 产品，(2) 设计、验证并测试您的应用，(3) 确保您的应用满足相应标准以及任何其他安全、安保法规或其他要求。

这些资源如有变更，恕不另行通知。TI 授权您仅可将这些资源用于研发本资源所述的 TI 产品的相关应用。严禁以其他方式对这些资源进行复制或展示。您无权使用任何其他 TI 知识产权或任何第三方知识产权。对于因您对这些资源的使用而对 TI 及其代表造成的任何索赔、损害、成本、损失和债务，您将全额赔偿，TI 对此概不负责。

TI 提供的产品受 [TI 销售条款](#)、[TI 通用质量指南](#) 或 [ti.com](https://www.ti.com) 上其他适用条款或 TI 产品随附的其他适用条款的约束。TI 提供这些资源并不会扩展或以其他方式更改 TI 针对 TI 产品发布的适用的担保或担保免责声明。除非德州仪器 (TI) 明确将某产品指定为定制产品或客户特定产品，否则其产品均为按确定价格收入目录的标准通用器件。

TI 反对并拒绝您可能提出的任何其他或不同的条款。

版权所有 © 2025，德州仪器 (TI) 公司

最后更新日期：2025 年 10 月