SNx4AHC125 具有三态输出的四路总线缓冲门

1 特性

- 工作电压范围为 2V 至 5.5V
- 闩锁性能超过 250mA，符合 JESD 17 规范
- 四个独立输出使能引脚

2 应用

- 流量计
- 可编程逻辑控制器
- 以太网供电 (PoE)
- 电机驱动与控制
- 电子销售终端

3 说明

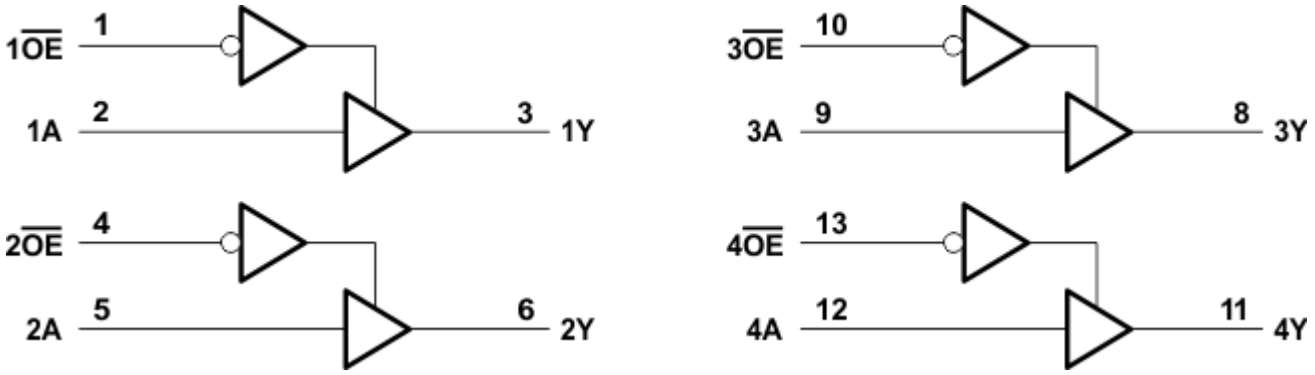
SNx4AHC125 器件是四路总线缓冲门，采用具有三态输出的独立线路驱动器。当每个输出的相关输出使能 ($\overline{OE}$) 输入为高电平时，输出被禁用。当 $\overline{OE}$ 为低电平时，相应的逻辑门会将来自 A 输入的数据传递到 Y 输出。

为了确保加电或断电期间的高阻抗状态，$\overline{OE}$ 必须通过一个上拉电阻器被连接至 V_{CC}；该电阻器的最小值由驱动器的电流灌入能力来决定。

器件信息

器件型号	封装(1)	封装尺寸(2)
SN54AHC125	J（CDIP，14）	8.89mm x 8.89mm
	W（CFP，14）	19.56mm × 6.67mm
	FK（LCCC，20）	9.21mm × 5.97mm
SN74AHC125	DB（SSOP，14）	6.20mm x 5.30mm
	D（SOIC，14）	8.65mm × 3.91mm
	NS（SO，14）	10.30mm × 5.30mm
	DGV（TVSOP，14）	3.60mm × 4.40mm
	PW（TSSOP，14）	5.00mm × 4.40mm
	N（PDIP，14）	19.30mm × 6.35mm
	RGY（VQFN，14）	3.50mm × 3.50mm
	BQA（WQFN，14）	3mm × 2.5mm

(1) 更多相关信息，请参阅第 11 节。
(2) 封装尺寸（长 × 宽）为标称值，不包括引脚。



所示引脚编号用于 D、DB、DGV、J、N、NS、PW、RGY 和 W 封装。

逻辑图（正逻辑）

本资源的原文使用英文撰写。 为方便起见，TI 提供了译文；由于翻译过程中可能使用了自动化工具，TI 不保证译文的准确性。 为确认准确性，请务必访问 ti.com 参考最新的英文版本（控制文档）。

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4 引脚配置和功能

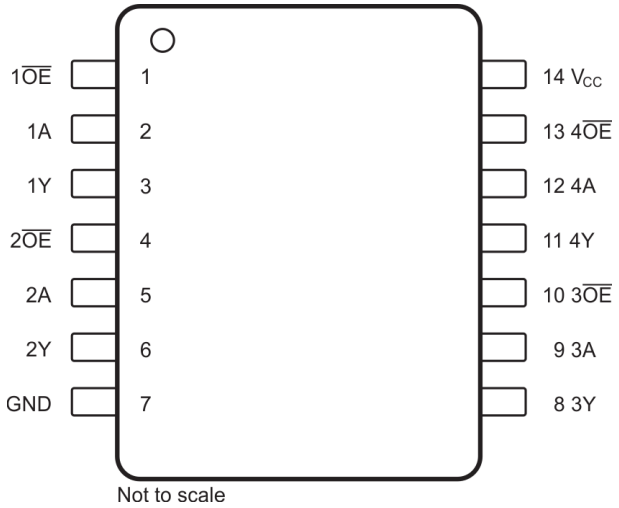

图 4-1. D、DB、DGV、N、NS、J、W 或 PW 封装 14 引脚 SOIC、SSOP、TVSOP、PDIP、SO、CDIP、CFP 或 TSSOP 顶视图

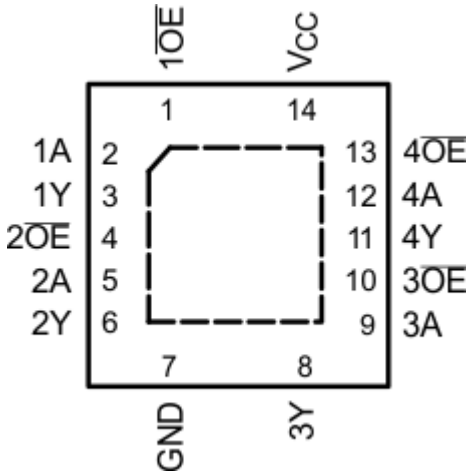

图 4-2. RGY 或 BQA 封装 14 引脚 VQFN 顶视图

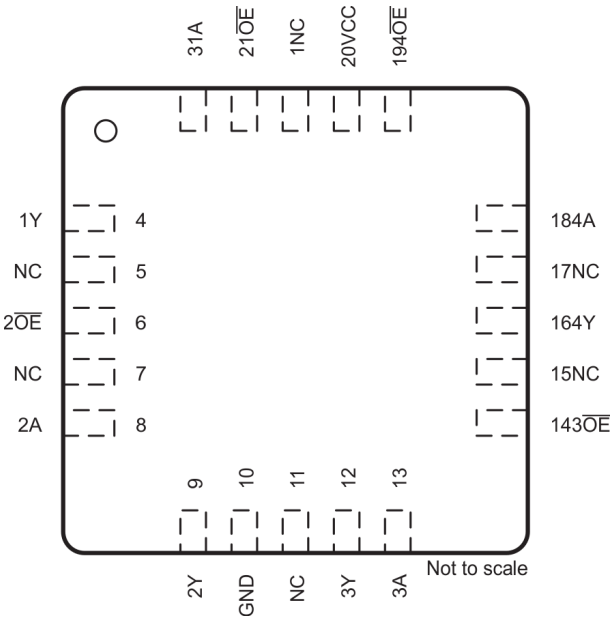

图 4-3. FK 封装 20 引脚 LCCC 顶视图

表 4-1. 引脚功能

引脚			I/O	说明
名称	SOIC、SSOP、TVSOP、PDIP、SO、CDIP、CFP、TSSOP、VQFN	LCCC		
1 $\overline{OE}$	1	2	I	栅极 1 的输出使能
1A	2	3	I	栅极 1 输入
1Y	3	4	O	栅极 1 输出
2 $\overline{OE}$	4	6	I	栅极 2 的输出使能
2A	5	8	I	栅极 2 输入
2Y	6	9	O	栅极 2 输出
3 $\overline{OE}$	10	14	I	栅极 3 的输出使能
3A	9	13	I	栅极 3 输入
3Y	8	12	O	栅极 3 输出
4 $\overline{OE}$	13	19	I	栅极 4 的输出使能
4A	12	18	I	栅极 4 输入
4Y	11	16	O	栅极 4 输出
GND	7	10	—	接地引脚
NC	—	1、5、7、11、15、17	—	无内部连接
V_{CC}	14	20	—	电源引脚

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5 规格

5.1 绝对最大额定值

在自然通风条件下的工作温度范围内测得（除非另有说明）[(1)]

		最小值	最大值	单位
电源电压		-0.5	7	V
输入电压[(2)]		-0.5	7	V
输出电压[(2)]		-0.5	V_{CC}+0.5	V
输入钳位电流	V_I < 0		-20	mA
输出钳位电流	V_O < 0 或 V_O > V_{CC}		±20	mA
持续输出电流	V_O = 0 至 V_{CC}		±25	mA
通过 V_{CC} 或 GND 的持续电流			±50	mA
工作等效结温，T_J			150	°C
贮存温度，T_{stg}		-65	150	°C

(1) 超出*绝对最大额定值*下列出的压力可能会对器件造成永久损坏。这些仅仅是压力额定值，并不表示器件在这些条件下以及在*建议运行条件*以外的任何其他条件下能够正常运行。长时间处于绝对最大额定条件下可能会影响器件的可靠性。
(2) 如果遵守输入和输出电流额定值，输入和输出电压可超过额定值。

5.2 ESD 等级

			值	单位
$V_{(ESD)}$	静电放电	人体放电模型 (HBM)，符合 ANSI/ESDA/JEDEC JS-001 标准[(1)]	±1500	V
		充电器件模型 (CDM)，符合 JEDEC 规范 JESD22-C101[(2)]	±1000	

(1) JEDEC 文档 JEP155 指出：500V HBM 能够在标准 ESD 控制流程下安全生产。
(2) JEDEC 文档 JEP157 指出：250V CDM 能够在标准 ESD 控制流程下安全生产。

5.3 建议运行条件

在自然通风条件下的工作温度范围内测得（除非另有说明）

			最小值	最大值	单位
V_{CC}	电源电压		2	5.5	V
V_{IH}	高电平输入电压	V_{CC} = 2V	1.5		V
		V_{CC} = 3V	2.1		
		V_{CC} = 5.5V	3.85		
V_{IL}	低电平输入电压	V_{CC} = 2V		0.5	V
		V_{CC} = 3V		0.9	
		V_{CC} = 5.5V		1.65	
V_I	输入电压		0	5.5	V
V_O	输出电压		0	V_{CC}	V
I_{OH}	高电平输出电流	V_{CC} = 2V		-50	μA
		V_{CC} = 3.3V ± 0.3V		-4	mA
		V_{CC} = 5V ± 0.5V		-8	
I_{OL}	低电平输出电流	V_{CC} = 2V		50	μA
		V_{CC} = 3.3V ± 0.3V		4	mA
		V_{CC} = 5V ± 0.5V		8	
Δt/Δv	输入转换上升或下降速率	V_{CC} = 3.3V ± 0.3V		100	ns/V
		V_{CC} = 5V ± 0.5V		20	
T_A	自然通风条件下的工作温度范围		-40	125	°C

5.4 热性能信息

热指标[1]		SNx4AHC125								单位
		D (SOIC)	DB (SSOP)	NS (SO)	DGV (TVSOP)	PW (TSSOP)	N (PDIP)	RGY (VQFN)	BQA (WQFN)	
		14 引脚	14 引脚	14 引脚	14 引脚	14 引脚	14 引脚	14 引脚	14 引脚	
$R_{\theta JA}$	结至环境热阻	124.5	107.3	89.9	134.6	147.7	56.3	87.1	88.3	°C/W
$R_{\theta JC(top)}$	结至外壳（顶部）热阻	78.8	59.3	47.7	53.9	77.4	43.9	92.6	90.9	°C/W
$R_{\theta JB}$	结至电路板热阻	81	54.7	48.6	63.8	90.9	36.1	62.5	56.8	°C/W
ψ_{JT}	结至顶部特征参数	37	24	17.5	6.3	27.2	29.2	22.8	9.9	°C/W
ψ_{JB}	结至电路板特征参数	80.6	54.1	48.3	63.2	90.2	36	61.7	56.7	°C/W
$R_{\theta JC(bot)}$	结至外壳（底部）热阻	不适用	不适用	不适用	不适用	不适用	不适用	45.1	33.4	°C/W

(1) 有关新旧热指标的更多信息，请参阅*半导体和 IC 封装热指标*应用报告。

5.5 电气特性

在自然通风条件下的建议运行温度范围内测得（除非另有说明）

参数	测试条件			最小值	典型值	最大值	单位
V_{OH}	I_{OH} = -50μA	V_{CC} = 2V	T_A = 25°C	1.9	2		V
			T_A = –55°C 至 125°C (SN54AHC125)	1.9			
			T_A = –40°C 至 85°C (SN74AHC125)	1.9			
			T_A = –40°C 至 125°C（建议 SN74AHC125）	1.9			
		V_{CC} = 3V	T_A = 25°C	2.9	3		
			T_A = –55°C 至 125°C (SN54AHC125)	2.9			
			T_A = –40°C 至 85°C (SN74AHC125)	2.9			
			T_A = –40°C 至 125°C（建议 SN74AHC125）	2.9			
		V_{CC} = 4.5V	T_A = 25°C	4.4	4.5		
			T_A = –55°C 至 125°C (SN54AHC125)	4.4			
			T_A = –40°C 至 85°C (SN74AHC125)	4.4			
			T_A = –40°C 至 125°C（建议 SN74AHC125）	4.4			
	I_{OH} = –4mA 且 V_{CC} = 3V		T_A = 25°C	2.58			
			T_A = –55°C 至 125°C (SN54AHC125)	2.48			
			T_A = –40°C 至 85°C (SN74AHC125)	2.48			
			T_A = –40°C 至 125°C（建议 SN74AHC125）	2.48			
	I_{OH} = –8mA 且 V_{CC} = 4.5V		T_A = 25°C	3.94			
			T_A = –55°C 至 125°C (SN54AHC125)	3.8			
			T_A = –40°C 至 85°C (SN74AHC125)	3.8			
			T_A = –40°C 至 125°C（建议 SN74AHC125）	3.8			

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5.5 电气特性（续）

在自然通风条件下的建议运行温度范围内测得（除非另有说明）

参数	测试条件			最小值	典型值	最大值	单位
V_{OL}	I_{OL} = 50μA	V_{CC} = 2V	T_A = 25°C			0.1	V
			T_A = –55°C 至 125°C (SN54AHC125)			0.1	
			T_A = –40°C 至 85°C (SN74AHC125)			0.1	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			0.1	
		V_{CC} = 3V	T_A = 25°C			0.1	
			T_A = –55°C 至 125°C (SN54AHC125)			0.1	
			T_A = –40°C 至 85°C (SN74AHC125)			0.1	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			0.1	
		V_{CC} = 4.5V	T_A = 25°C			0.1	
			T_A = –55°C 至 125°C (SN54AHC125)			0.1	
			T_A = –40°C 至 85°C (SN74AHC125)			0.1	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			0.1	
	I_{OH} = 4mA 且 V_{CC} = 3V		T_A = 25°C			0.36	
			T_A = –55°C 至 125°C (SN54AHC125)			0.5	
			T_A = –40°C 至 85°C (SN74AHC125)			0.44	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			0.5	
	I_{OH} = 8mA 且 V_{CC} = 4.5V		T_A = 25°C			0.36	
			T_A = –55°C 至 125°C (SN54AHC125)			0.5	
			T_A = –40°C 至 85°C (SN74AHC125)			0.44	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			0.5	
I_I	V_I = 5.5V 或 GND 并且 V_{CC} = 0V 至 5.5V		T_A = 25°C			±0.1	μA
			T_A = –55°C 至 125°C (SN54AHC125)			±1[(1)]	
			T_A = –40°C 至 85°C (SN74AHC125)			±1	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			±1	
I_{OZ}	V_O = V_{CC} 或 GND 且 V_{CC} = 5.5V		T_A = 25°C			±0.25	μA
			T_A = –55°C 至 125°C (SN54AHC125)			±2.5	
			T_A = –40°C 至 85°C (SN74AHC125)			±2.5	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			±2.5	
I_{CC}	V_I = V_{CC} 或 GND，I_O = 0，V_{CC} = 5.5V		T_A = 25°C			4	μA
			T_A = –55°C 至 125°C (SN54AHC125)			40	
			T_A = –40°C 至 85°C (SN74AHC125)			40	
			T_A = –40°C 至 125°C（建议 SN74AHC125）			40	
C_i	V_I = V_{CC} 或 GND 且 V_{CC} = 5V		T_A = 25°C		4	10	pF
			T_A = –40°C 至 85°C (SN74AHC125)			10	

(1) 对于符合 MIL-PRF-38535 标准的产品，此参数未经量产测试（在 V_{CC} = 0V 时）。

5.6 开关特性，V_{CC} = 3.3V ± 0.3V

在推荐的自然通风条件下的工作温度范围内，并且 V_{CC} = 3.3V ± 0.3V（除非另有说明；请参阅负载电路和电压波形）

参数	从（输入）	到（输出）	测试条件		最小值	典型值	最大值	单位
t_{PHL}，t_{PLH}	A	Y	C_L = 15pF	T_A = 25°C		5.6[(1)]	8[(1)]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[(1)]		9.5[(1)]	
				T_A = –40°C 至 85°C (SN74AHC125)	1		9.5	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		9.5	
t_{PZL}、t_{PZH}	$\overline{OE}$	Y	C_L = 15pF	T_A = 25°C		5.4[(1)]	8[(1)]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[(1)]		9.5[(1)]	
				T_A = –40°C 至 85°C (SN74AHC125)			9.5	
				T_A = –40°C 至 125°C（建议 SN74AHC125）			9.5	
t_{PLZ}、t_{PHZ}	$\overline{OE}$	Y	C_L = 15pF	T_A = 25°C		7.0[(1)]	9.7[(1)]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[(1)]		11.5[(1)]	
				T_A = –40°C 至 85°C (SN74AHC125)	1[(1)]		11.5[(1)]	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1[(1)]		11.5[(1)]	
t_{PHL}，t_{PLH}	A	Y	C_L = 50pF	T_A = 25°C		8.1	11.5	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		13	
				T_A = –40°C 至 85°C (SN74AHC125)	1		13	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		13	
t_{PZL}、t_{PZH}	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C		7.9	11.5	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		13	
				T_A = –40°C 至 85°C (SN74AHC125)	1		13	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		13	
t_{PLZ}、t_{PHZ}	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C		9.5	13.2	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		15	
				T_A = –40°C 至 85°C (SN74AHC125)	1		15	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		15	
tsk(o)	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C			1.5[(2)]	ns
				T_A = –40°C 至 85°C (SN74AHC125)			1.5	

(1) 对于符合 MIL-PRF-38535 标准的产品，此参数未经量产测试。
(2) 对于符合 MIL-PRF-38535 标准的产品，此参数不适用。

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5.7 开关特性，V_{CC} = 5V ± 0.5V

在推荐的自然通风条件下的工作温度范围内，并且 V_{CC} = 5V ± 0.5V（除非另有说明；请参阅负载电路和电压波形）

参数	从（输入）	到（输出）	测试条件		最小值	典型值	最大值	单位
t_{PLH}、t_{PHL}	A	Y	C_L = 15pF	T_A = 25°C		3.8[1]	5.5[1]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[1]		6.5[1]	
				T_A = –40°C 至 85°C (SN74AHC125)	1		6.5	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		6.5	
t_{PZH}，t_{PZL}	$\overline{OE}$	Y	C_L = 15pF	T_A = 25°C		3.6[1]	5.1[1]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[1]		6[1]	
				T_A = –40°C 至 85°C (SN74AHC125)	1		6	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		6	
t_{PHZ}，t_{PLZ}	$\overline{OE}$	Y	C_L = 15pF	T_A = 25°C		4.6[1]	6.8[1]	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1[1]		8[1]	
				T_A = –40°C 至 85°C (SN74AHC125)	1[1]		8[1]	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1[1]		8[1]	
t_{PLH}、t_{PHL}	A	Y	C_L = 50pF	T_A = 25°C		5.3	7.5	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		8.5	
				T_A = –40°C 至 85°C (SN74AHC125)	1		8.5	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		8.5	
t_{PZH}，t_{PZL}	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C		5.1	7.1	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		8	
				T_A = –40°C 至 85°C (SN74AHC125)	1		8	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		8	
t_{PHZ}，t_{PLZ}	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C		6.1	8.8	ns
				T_A = –55°C 至 125°C (SN54AHC125)	1		10	
				T_A = –40°C 至 85°C (SN74AHC125)	1		10	
				T_A = –40°C 至 125°C（建议 SN74AHC125）	1		10	
tsk(o)	$\overline{OE}$	Y	C_L = 50pF	T_A = 25°C			1[2]	ns
				T_A = –40°C 至 85°C (SN74AHC125)			1	

5.8 噪声特性

V_{CC} = 5V，C_L = 50pF 且 T_A = 25°C[(1)]

参数		最小值	最大值	单位
$V_{OL(P)}$	安静输出，最大动态 (V_{OL})		0.8	V
$V_{OL(V)}$	安静输出，最小动态 (V_{OL})		-0.8	V
$V_{OH(V)}$	安静输出，最小动态 (V_{OH})	4.4		V
$V_{IH(D)}$	高电平动态输入电压	3.5		V
$V_{IL(D)}$	低电平动态输入电压		1.5	V

(1) 特性仅适用于表面贴装封装。

5.9 工作特性

V_{CC} = 5V 且 T_A = 25°C

参数		测试条件	典型值	单位
C_{pd}	功率耗散电容	空载且 f = 1MHz	9.5	pF

5.10 典型特性

图 5-1 显示了 V_{CC} 为 5V ± 0.5V 且 T_A = 25°C 时，不断变化的 V_{IN} 值所对应的 I_{CC}。

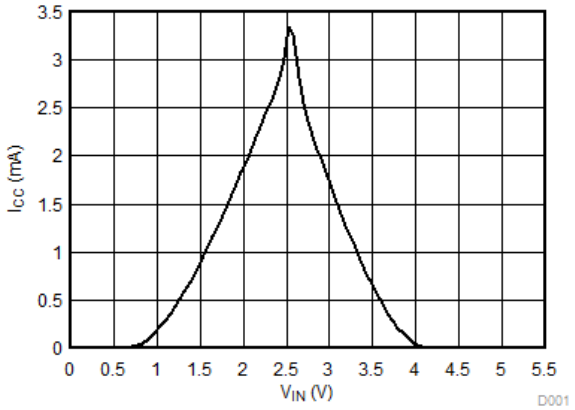

图 5-1. V_{IN} 与 I_{CC} 间的关系

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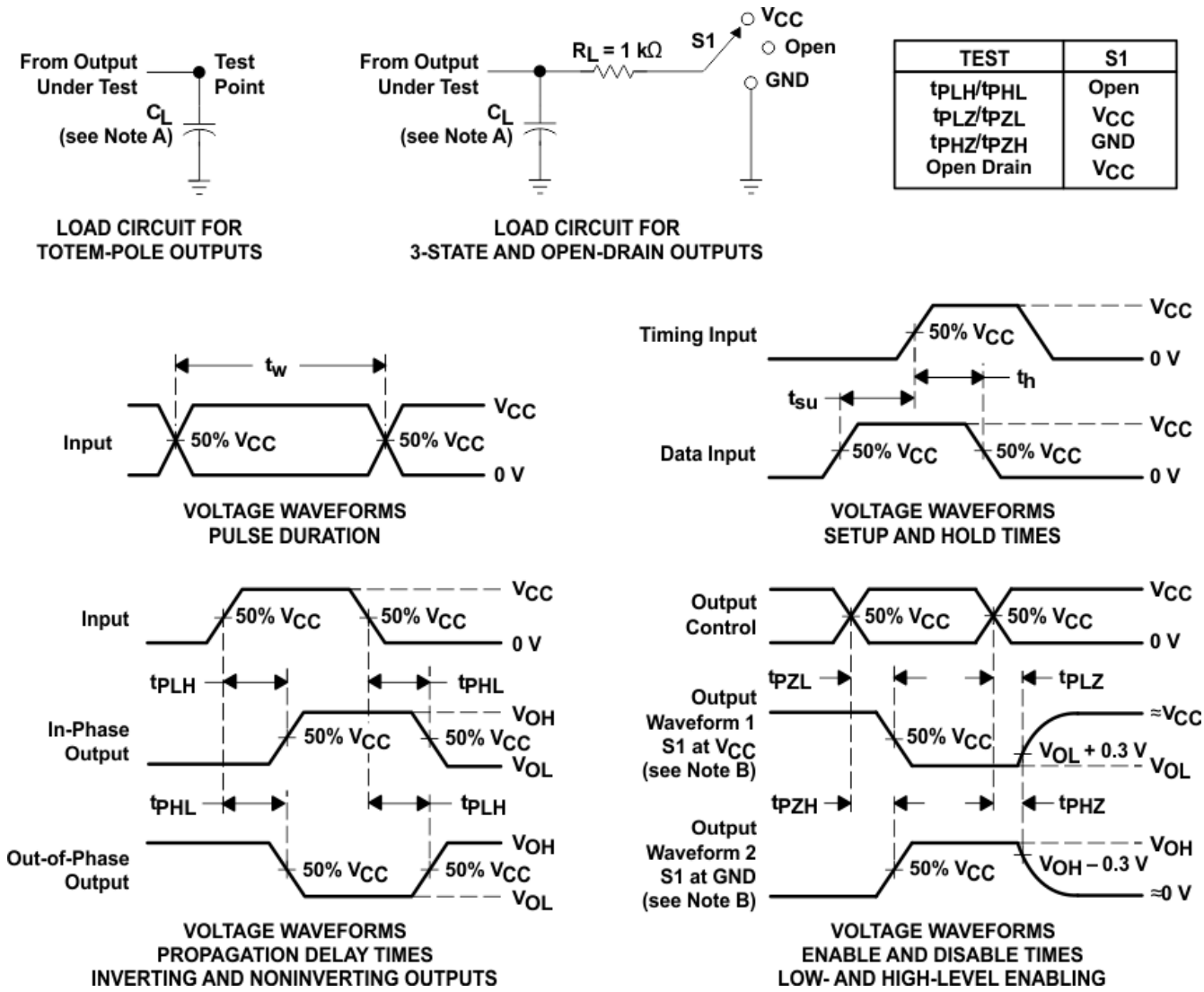
6 参数测量信息



A. C_L 包括探头和夹具电容。

B. 波形 1 用于具有内部条件的输出，使得输出为低电平，除非被输出控制禁用。波形 2 用于具有内部条件的输出，使得输出为高电平，除非被输出控制禁用。

C. 所有输入脉冲均由具有以下特性的发生器提供：PRR ≤ 1MHz，Z_O = 50 Ω，t_r ≤ 3 ns，t_f ≤ 3 ns。

D. 一次测量一个输出，每次测量一个输入转换。

E. 并非所有参数和波形都适用于所有器件。

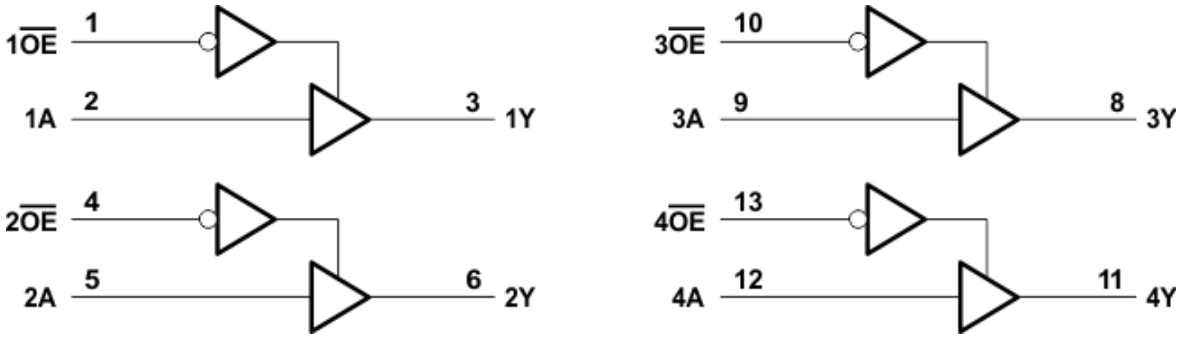
图 6-1. 负载电路和电压波形

7 详细说明

7.1 概述

SNx4AHC125 器件具有四个集成总线缓冲器门。每个门都可以通过各自的输出使能引脚单独控制，或者连接在一起同时控制。这允许从一个器件控制多达四条不同的线路。通常，微控制器对单个引脚提供多个功能选项。通过使用 GPIO 引脚启用特定缓冲器，SNx4AHC125 可以充当多路复用器，根据微控制器上选择的引脚功能来选择特定数据线。同时，未选择的线路将与引脚隔离。

7.2 功能方框图



所示引脚编号用于 D、DB、DGV、J、N、NS、PW、RGY 和 W 封装。

7.3 特性说明

每个缓冲器都有自己的输出使能。这允许单独控制每个缓冲器。当输出使能为低电平时，输入被传递到输出。当输出使能为高电平时，输出为高阻抗。此功能在可能需要隔离的应用中非常有用。

7.4 器件功能模式

表 7-1 列出了 SNx4AHC125 器件的功能模式。

表 7-1. 功能表
（每个缓冲器）

输入		输出
$\overline{OE}$	A	Y
L	H	H
L	L	L
H	X	Z

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8 应用和实施

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。

8.1 应用信息

SNx4AHC125 器件具有宽工作电压范围，可用于各种应用中。除宽工作电压范围外，这款器件与同类器件的不同之处在于它们具有可通过其独立输出使能 ($\overline{OE}$) 引脚单独控制的四个缓冲器。每个缓冲器可以处于启用状态并将数据从 A 传递到 Y，也可以禁用并设置为高阻抗状态。

8.2 典型应用

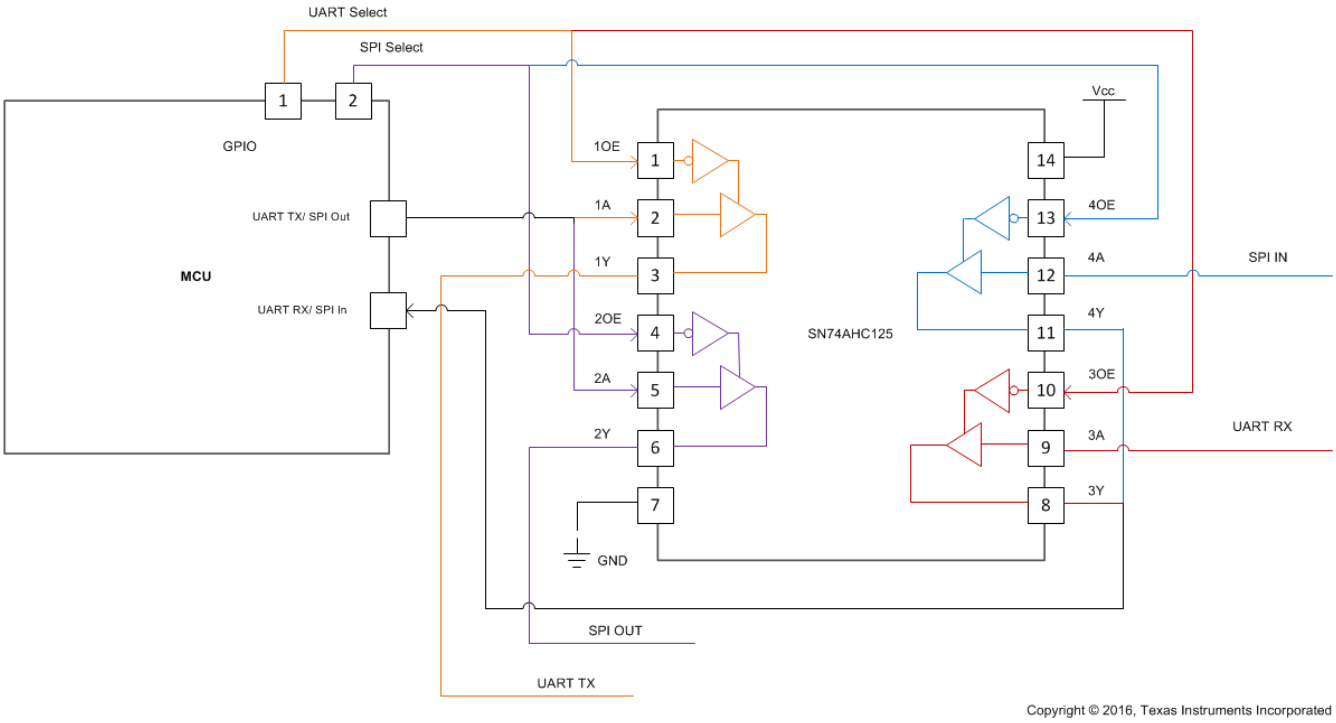

图 8-1. 数字多路复用器

8.2.1 设计要求

最好将 SN74AHC125 的 V_{CC} 设置为与微控制器逻辑电平相同的电平，以便实现出色的性能。SN74AHC125 可以安全地处理 –0.5V 至 7V 的输入电平。不过，如果接收到的逻辑电平与器件的 V_{CC} 电平不同，则可能会发生错误。例如，如果 V_{CC} 为 5.5V，则最低高电平输入电压 (V_{IH}) 电平为 3.85V。这意味着，如果微控制器正在发送高电平信号，但高电平 = 3.3V，则该电平对于 SNx4AHC125 来说太低而无法将其寄存为所需的值。在这种情况下，为降低 V_{IH} 的最小值，必须降低 V_{CC} 的值。对于低电平输入电压 (V_{IL})，可采取相反的操作。如果 VCC 设置为 2V，则 V_{IL} 最大值为 0.5V。根据微控制器逻辑电平，低电平信号可能不会低至 SNx4AHC125 无法对其进行寄存的水平。

8.2.2 详细设计过程

1. 建议的输入条件：
   - 有关不同 V_{CC} 下的 V_{IH} 和 V_{IL} 电平，请参阅*建议运行条件*。
   - 请注意输出使能引脚的上升时间和下降时间规格，确保及时启用正确的缓冲器并禁用其他缓冲器。这样可以更大限度地减少对微控制器引脚和外部电路的干扰。有关更多详细信息，请参阅*开关特性，V_{CC} = 3.3V ± 0.3V* 和 *开关特性，V_{CC} = 5V ± 0.5V* 表。
2. 建议的输出条件：
   - 每路输出的负载电流不能超过 I_O 最大值，且不能超过该器件的总电流（通过 V_{CC} 或 GND 的持续电流）。这些限值位于*绝对最大额定值*中。
   - 输出不应被拉至高于 V_{CC}。

8.2.3 应用曲线

典型器件 (25°C)

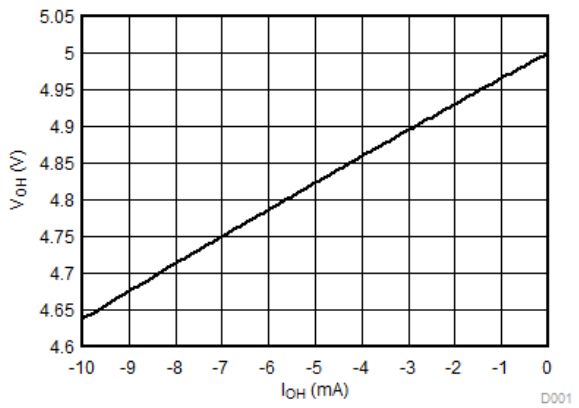

图 8-2. I_{OH} 与 V_{OH} 间的关系

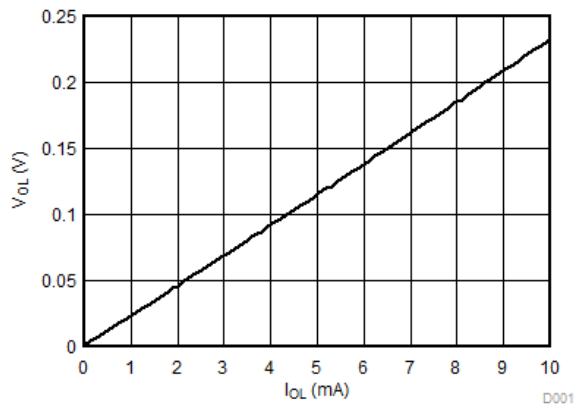

图 8-3. I_{OL} 与 V_{OL} 间的关系

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8.3 电源相关建议

电源可以是*建议运行条件*中最小和最大电源电压额定值之间的任何电压。

每个 V_{CC} 引脚必须具有一个良好的旁路电容器，以防止功率干扰。对于单电源器件，建议使用 0.1μF 电容器；如果有多个 V_{CC} 引脚，则建议为每个电源引脚使用 0.01μF 或 0.022μF 电容器。可以并联多个旁路电容器以抑制不同的噪声频率。0.1μF 和 1μF 电容器通常并联使用。为了获得更佳效果，旁路电容器必须尽可能靠近电源引脚安装。

8.4 布局

8.4.1 布局指南

当使用多位逻辑器件时，输入决不能悬空。在许多情况下，未使用数字逻辑器件的功能或部分功能；例如，当仅使用三输入与门的两个输入或仅使用 4 个缓冲门中的 3 个时。此类输入引脚不得悬空，因为外部连接处的未定义电压会导致未定义的运行状态。以下指定了在所有情况下都必须遵守的规则。数字逻辑器件的所有未使用输入必须连接至一个高或低偏置以防止悬空。必须应用于任何特定未使用输入的逻辑电平取决于器件的功能。通常，它们会连接到 GND 或 V_{CC}（具体取决于哪种更合理或更方便）。

8.4.1.1 布局示例

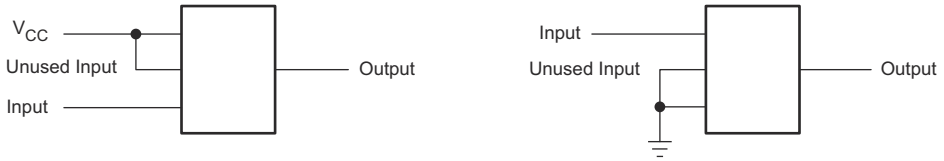

图 8-4. 布局图

9 器件和文档支持

9.1 文档支持（模拟）

9.1.1 相关文档

请参阅以下相关文档：

慢速或浮点 CMOS 输入的影响 (SCBA004)

9.1.2 相关链接

下表列出了快速访问链接。类别包括技术文档、支持和社区资源、工具和软件，以及申请样片或购买产品的快速链接。

表 9-1. 相关链接

器件	产品文件夹	样片 & 购买	技术文档	工具 & 软件	支持 & 社区
SN54AHC125	点击此处	点击此处	点击此处	点击此处	点击此处
SN74AHC125	点击此处	点击此处	点击此处	点击此处	点击此处

9.2 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*通知* 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。

9.3 支持资源

TI E2E™ 中文支持论坛是工程师的重要参考资料，可直接从专家处获得快速、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，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。

9.4 商标

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

9.5 静电放电警告

静电放电 (ESD) 会损坏这个集成电路。德州仪器 (TI) 建议通过适当的预防措施处理所有集成电路。如果不遵守正确的处理和安装程序，可能会损坏集成电路。

ESD 的损坏小至导致微小的性能降级，大至整个器件故障。精密的集成电路可能更容易受到损坏，这是因为非常细微的参数更改都可能会导致器件与其发布的规格不相符。

9.6 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。

10 修订历史记录

注：以前版本的页码可能与当前版本的页码不同

Changes from Revision N (October 2023) to Revision O (February 2024) **Page**

- 将 RGY 封装的热性能值 R θ JA 从 55.1 更新为 87.1，将 R θ JC(top) 从 52.3 更新为 92.6，将 R θ JB 从 49.4 更新为 30.9，将 ΨJT 从 14.6 更新为 2.4，将 ΨJB 从 31 更新为 61.7，将 R θ JC(bot) 从 12.7 更新为 45.1，所有值均以 °C/W 为单位 6

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Changes from Revision M (June 2023) to Revision N (October 2023) **Page**

- 更新了 D 和 PW 封装的 R θ JC(top)、R θ JB、ΨJT、ΨJB 和 R θ JC(bot)，所有值均以 °C/W 为单位.....6

11 机械、封装和可订购信息

下述页面包含机械、封装和订购信息。这些信息是指定器件可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。有关此数据表的浏览器版本，请查阅左侧的导航栏。

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)
5962-9686801Q2A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801Q2A SNJ54AHC 125FK
5962-9686801QCA	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QCA SNJ54AHC125J
5962-9686801QDA	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QDA SNJ54AHC125W
SN74AHC125BQAR	Active	Production	WQFN (BQA) | 14	3000 | LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125BQAR.A	Active	Production	WQFN (BQA) | 14	3000 | LARGE T&R	Yes	SN	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125D	Obsolete	Production	SOIC (D) | 14	-	-	Call TI	Call TI	-40 to 125	AHC125
SN74AHC125DBR	NRND	Production	SSOP (DB) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125DBR.A	NRND	Production	SSOP (DB) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125DGVR	NRND	Production	TVSOP (DGV) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125DGVR.A	NRND	Production	TVSOP (DGV) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125DR	Active	Production	SOIC (D) | 14	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125DR.A	Active	Production	SOIC (D) | 14	2500 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125N	Active	Production	PDIP (N) | 14	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC125N
SN74AHC125N.A	Active	Production	PDIP (N) | 14	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC125N
SN74AHC125NE4	Active	Production	PDIP (N) | 14	25 | TUBE	Yes	NIPDAU	N/A for Pkg Type	-40 to 125	SN74AHC125N
SN74AHC125NSR	Last Time Buy	Production	SOP (NS) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125NSR.A	Last Time Buy	Production	SOP (NS) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	AHC125
SN74AHC125PWR	Active	Production	TSSOP (PW) | 14	2000 | LARGE T&R	Yes	NIPDAU | SN	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125PWR.A	Active	Production	TSSOP (PW) | 14	2000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125RGYR	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125RGYR.A	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SN74AHC125RGYRG4	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125

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)
SN74AHC125RGYRG4.A	Active	Production	VQFN (RGY) | 14	3000 | LARGE T&R	Yes	NIPDAU	Level-1-260C-UNLIM	-40 to 125	HA125
SNJ54AHC125FK	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801Q2A SNJ54AHC 125FK
SNJ54AHC125FK.A	Active	Production	LCCC (FK) | 20	55 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801Q2A SNJ54AHC 125FK
SNJ54AHC125J	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QCA SNJ54AHC125J
SNJ54AHC125J.A	Active	Production	CDIP (J) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QCA SNJ54AHC125J
SNJ54AHC125W	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QDA SNJ54AHC125W
SNJ54AHC125W.A	Active	Production	CFP (W) | 14	25 | TUBE	No	SNPB	N/A for Pkg Type	-55 to 125	5962-9686801QDA SNJ54AHC125W

(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 SN54AHC125, SN74AHC125 :

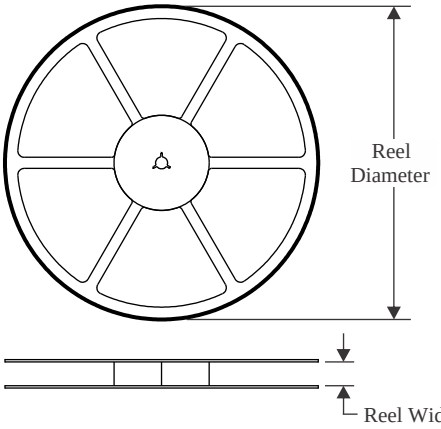
- Catalog : SN74AHC125
- Automotive : SN74AHC125-Q1, SN74AHC125-Q1
- Enhanced Product : SN74AHC125-EP, SN74AHC125-EP
- Military : SN54AHC125

NOTE: Qualified Version Definitions:

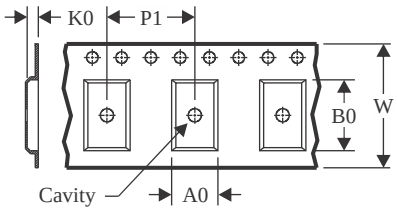
- Catalog - TI's standard catalog product
- Automotive - Q100 devices qualified for high-reliability automotive applications targeting zero defects
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

TAPE AND REEL INFORMATION

REEL DIMENSIONS

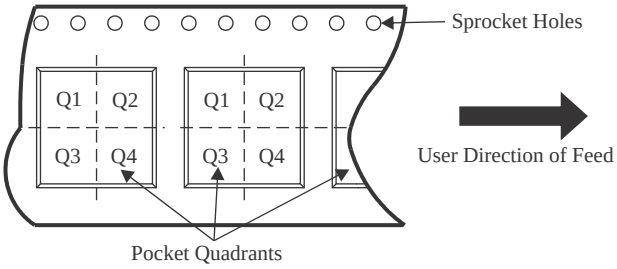


TAPE DIMENSIONS



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

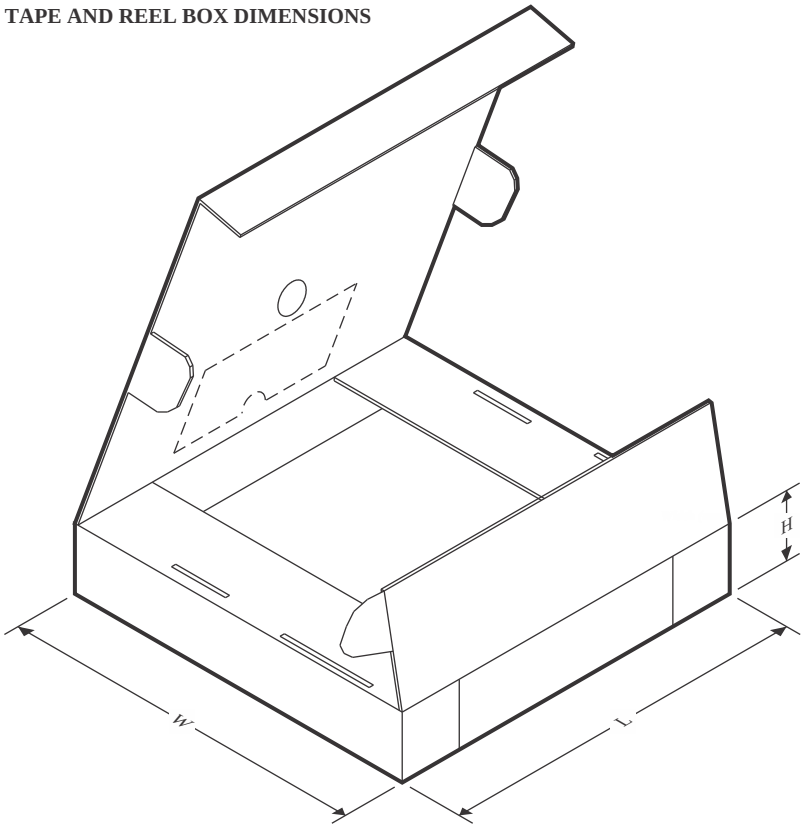
QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*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
SN74AHC125BQAR	WQFN	BQA	14	3000	180.0	12.4	2.8	3.3	1.1	4.0	12.0	Q1
SN74AHC125DBR	SSOP	DB	14	2000	330.0	16.4	8.35	6.6	2.4	12.0	16.0	Q1
SN74AHC125DGVR	TVSOP	DGV	14	2000	330.0	12.4	6.8	4.0	1.6	8.0	12.0	Q1
SN74AHC125DR	SOIC	D	14	2500	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1
SN74AHC125DR	SOIC	D	14	2500	330.0	16.4	6.5	9.0	2.1	8.0	16.0	Q1
SN74AHC125NSR	SOP	NS	14	2000	330.0	16.4	8.1	10.4	2.5	12.0	16.0	Q1
SN74AHC125PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHC125PWR	TSSOP	PW	14	2000	330.0	12.4	6.9	5.6	1.6	8.0	12.0	Q1
SN74AHC125RGYR	VQFN	RGY	14	3000	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1
SN74AHC125RGYRG4	VQFN	RGY	14	3000	330.0	12.4	3.75	3.75	1.15	8.0	12.0	Q1

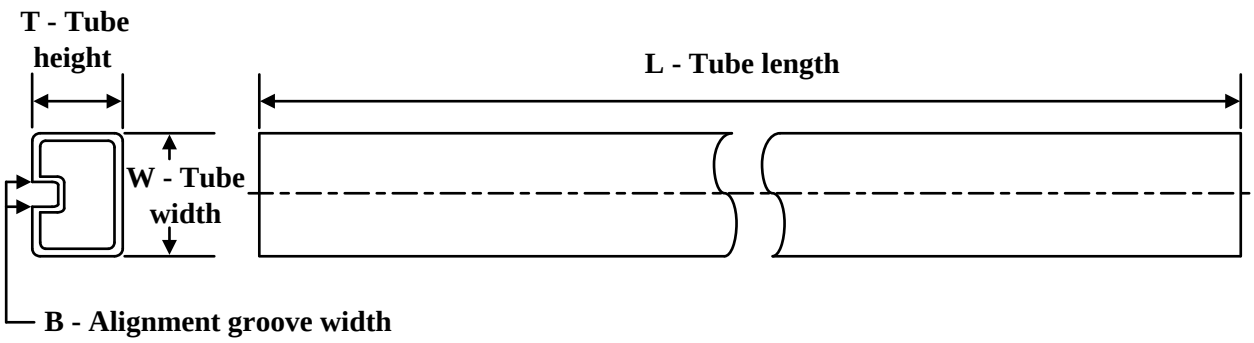
TAPE AND REEL BOX DIMENSIONS



*All dimensions are nominal

Device	Package Type	Package Drawing	Pins	SPQ	Length (mm)	Width (mm)	Height (mm)
SN74AHC125BQAR	WQFN	BQA	14	3000	210.0	185.0	35.0
SN74AHC125DBR	SSOP	DB	14	2000	353.0	353.0	32.0
SN74AHC125DGVR	TVSOP	DGV	14	2000	353.0	353.0	32.0
SN74AHC125DR	SOIC	D	14	2500	340.5	336.1	32.0
SN74AHC125DR	SOIC	D	14	2500	353.0	353.0	32.0
SN74AHC125NSR	SOP	NS	14	2000	353.0	353.0	32.0
SN74AHC125PWR	TSSOP	PW	14	2000	353.0	353.0	32.0
SN74AHC125PWR	TSSOP	PW	14	2000	356.0	356.0	35.0
SN74AHC125RGYR	VQFN	RGY	14	3000	360.0	360.0	36.0
SN74AHC125RGYRG4	VQFN	RGY	14	3000	360.0	360.0	36.0

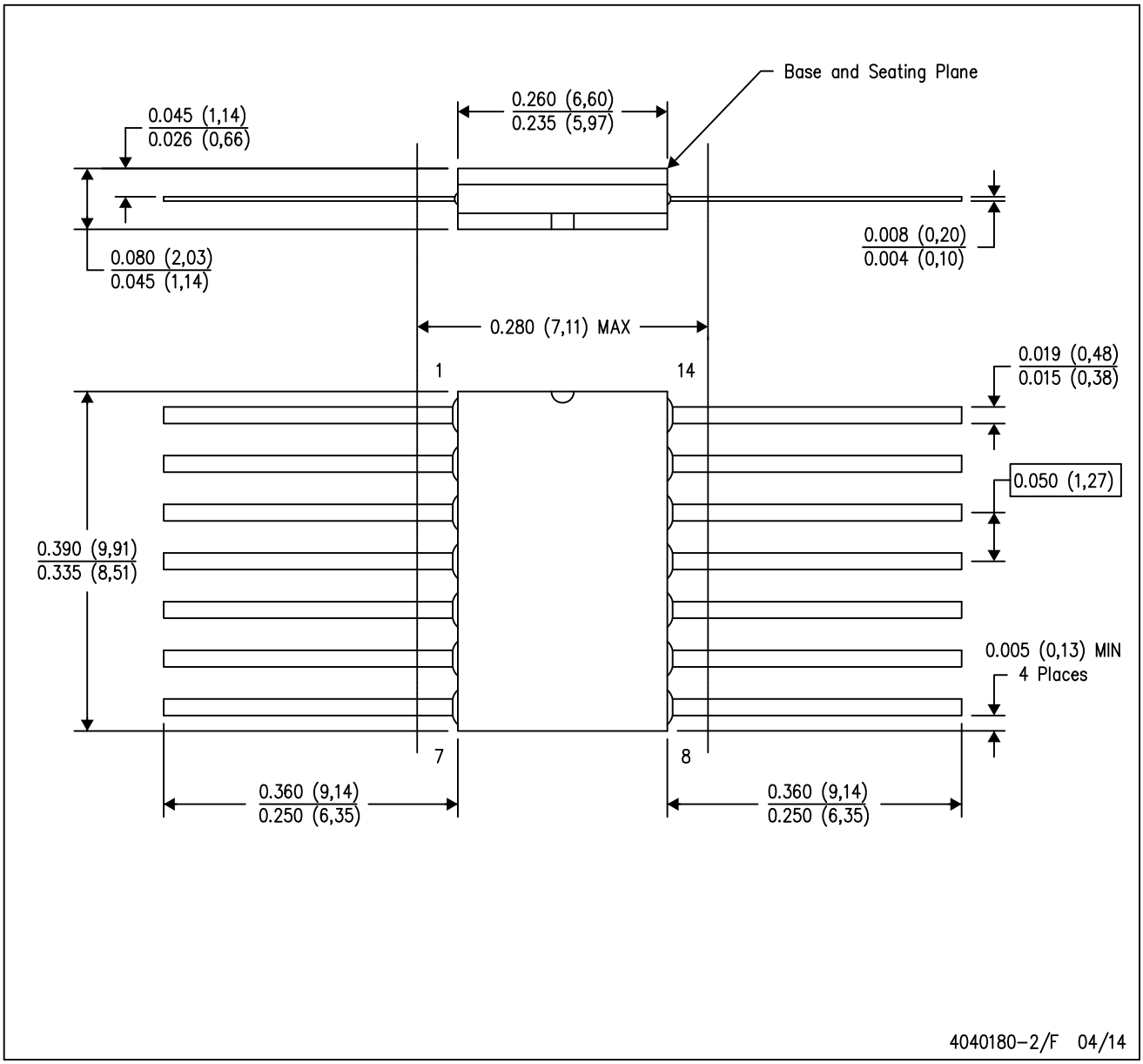
TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
5962-9686801Q2A	FK	LCCC	20	55	506.98	12.06	2030	NA
5962-9686801QDA	W	CFP	14	25	506.98	26.16	6220	NA
SN74AHC125N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC125N	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC125N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC125N.A	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC125NE4	N	PDIP	14	25	506	13.97	11230	4.32
SN74AHC125NE4	N	PDIP	14	25	506	13.97	11230	4.32
SNJ54AHC125FK	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC125FK.A	FK	LCCC	20	55	506.98	12.06	2030	NA
SNJ54AHC125W	W	CFP	14	25	506.98	26.16	6220	NA
SNJ54AHC125W.A	W	CFP	14	25	506.98	26.16	6220	NA

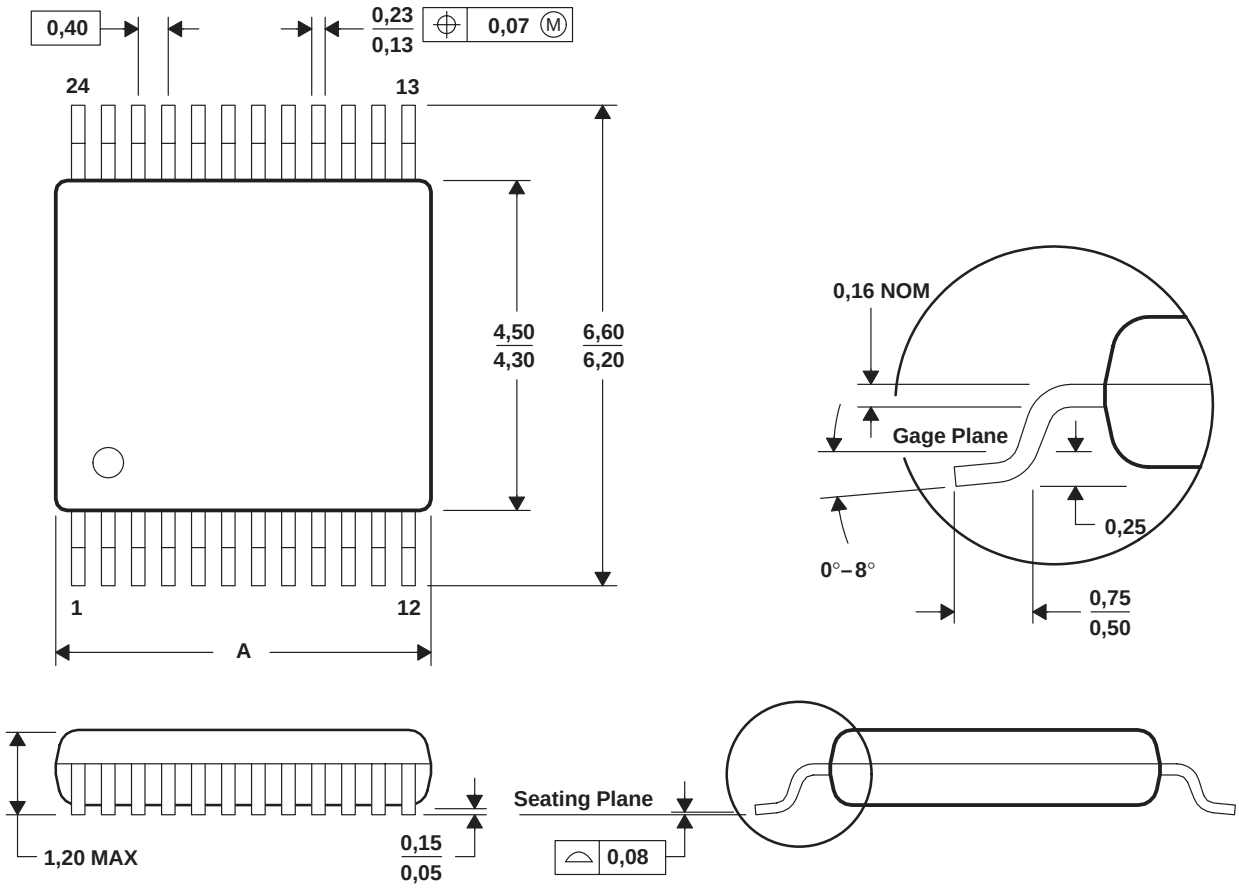
W (R–GDFP–F14) CERAMIC DUAL FLATPACK



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 GDFP1–F14

DGV (R-PDSO-G)** **PLASTIC SMALL-OUTLINE**

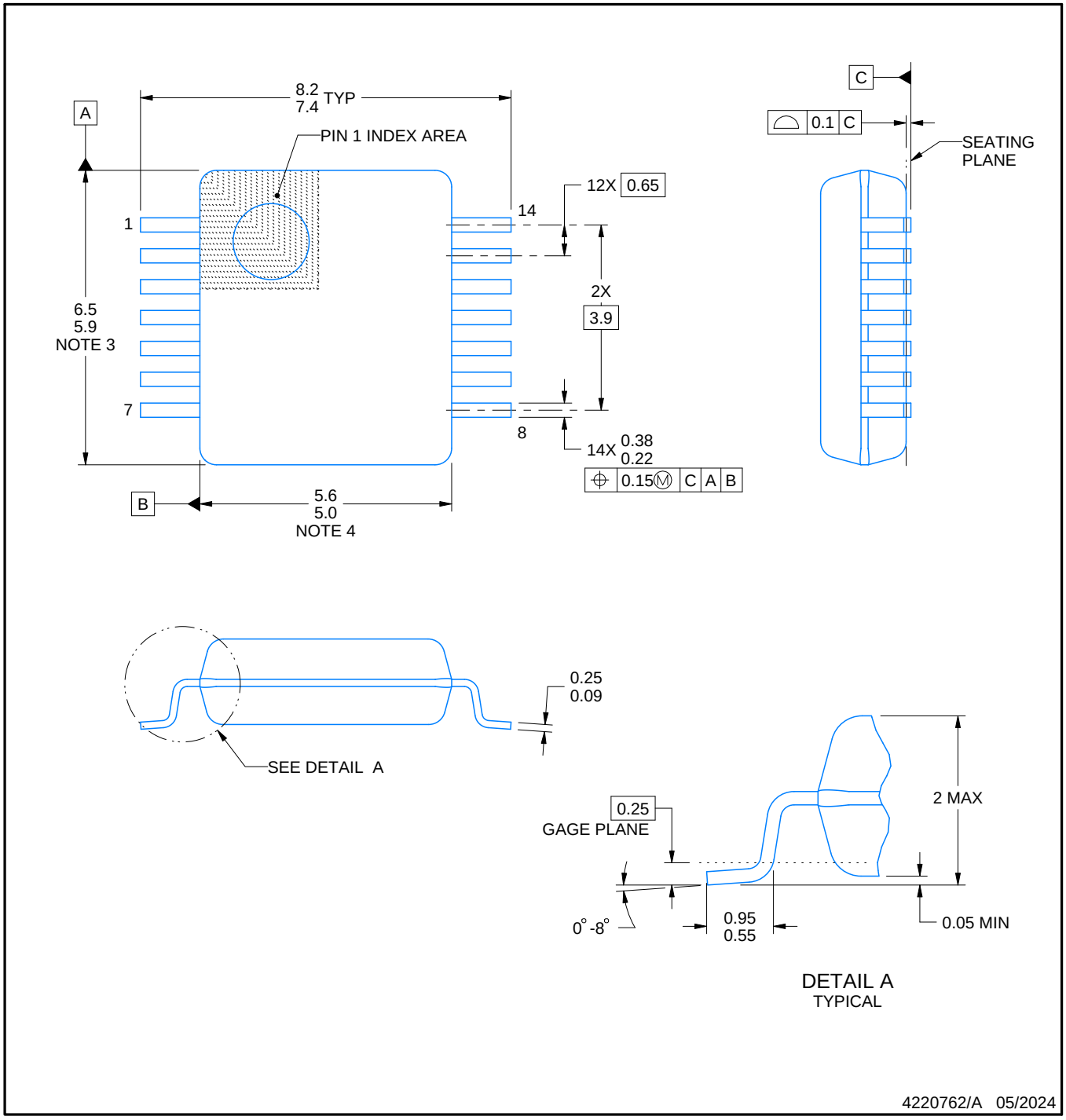
24 PINS SHOWN



DIM \ PINS **	14	16	20	24	38	48	56
A MAX	3,70	3,70	5,10	5,10	7,90	9,80	11,40
A MIN	3,50	3,50	4,90	4,90	7,70	9,60	11,20

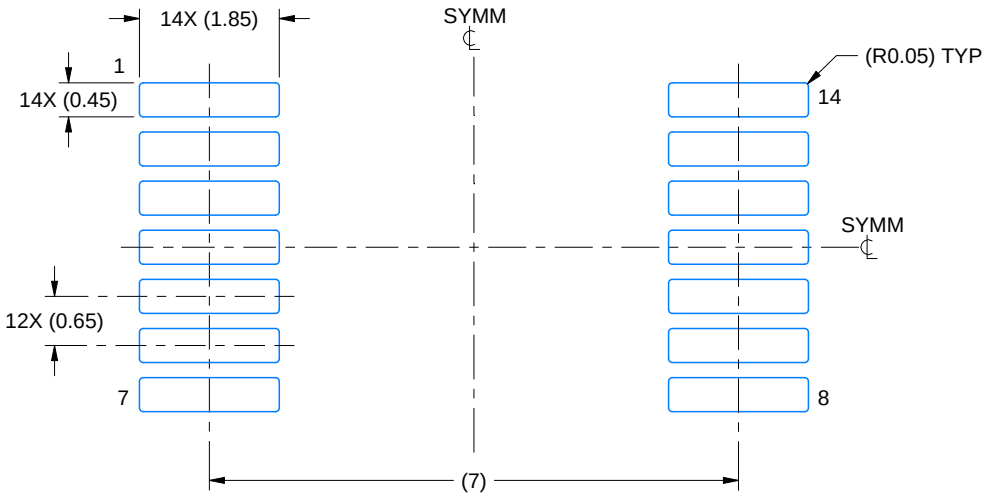
4073251/E 08/00

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 per side.
D. Falls within JEDEC: 24/48 Pins – MO-153
14/16/20/56 Pins – MO-194

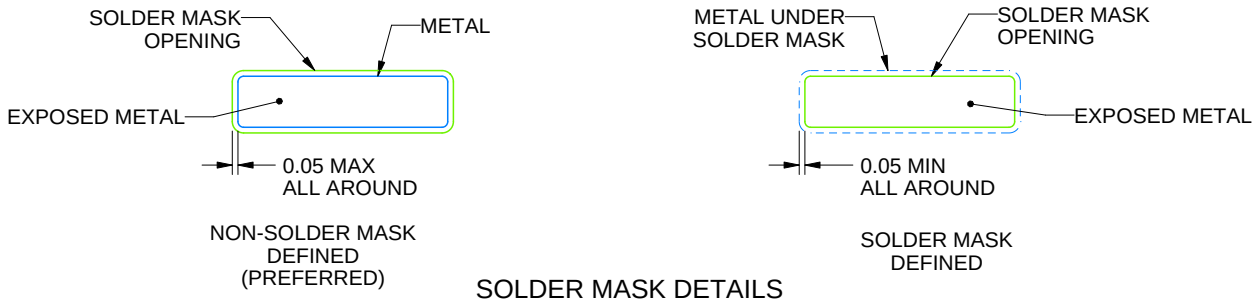


NOTES:

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.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

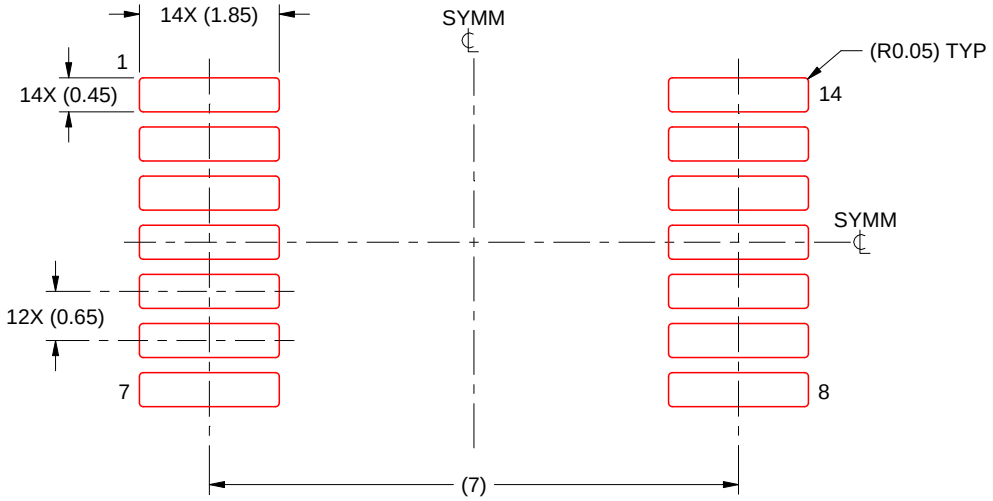


SOLDER MASK DETAILS

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.



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

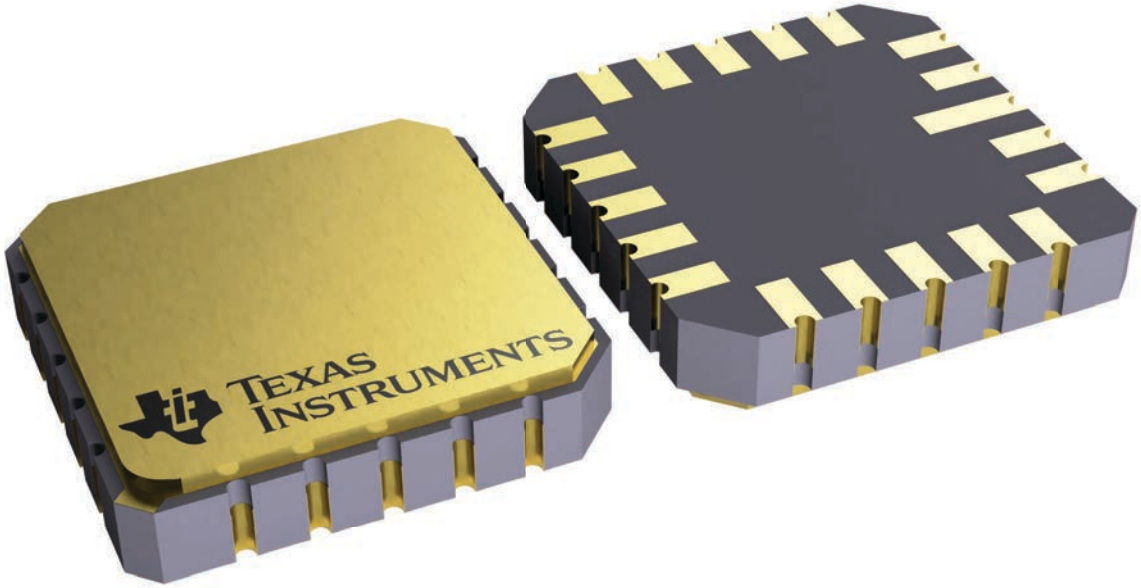
FK 20

LCCC - 2.03 mm max height

8.89 x 8.89, 1.27 mm pitch

LEADLESS CERAMIC CHIP CARRIER

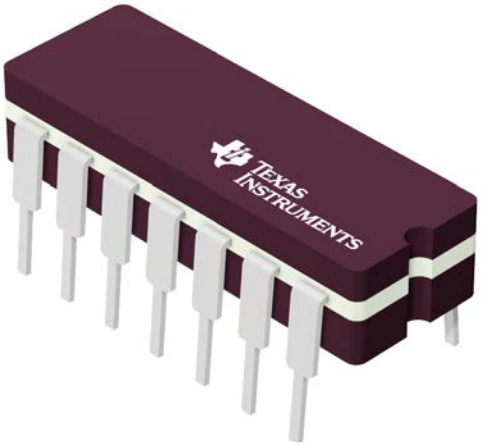
This image is a representation of the package family, actual package may vary.
Refer to the product data sheet for package details.



4229370VA\

J 14 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.

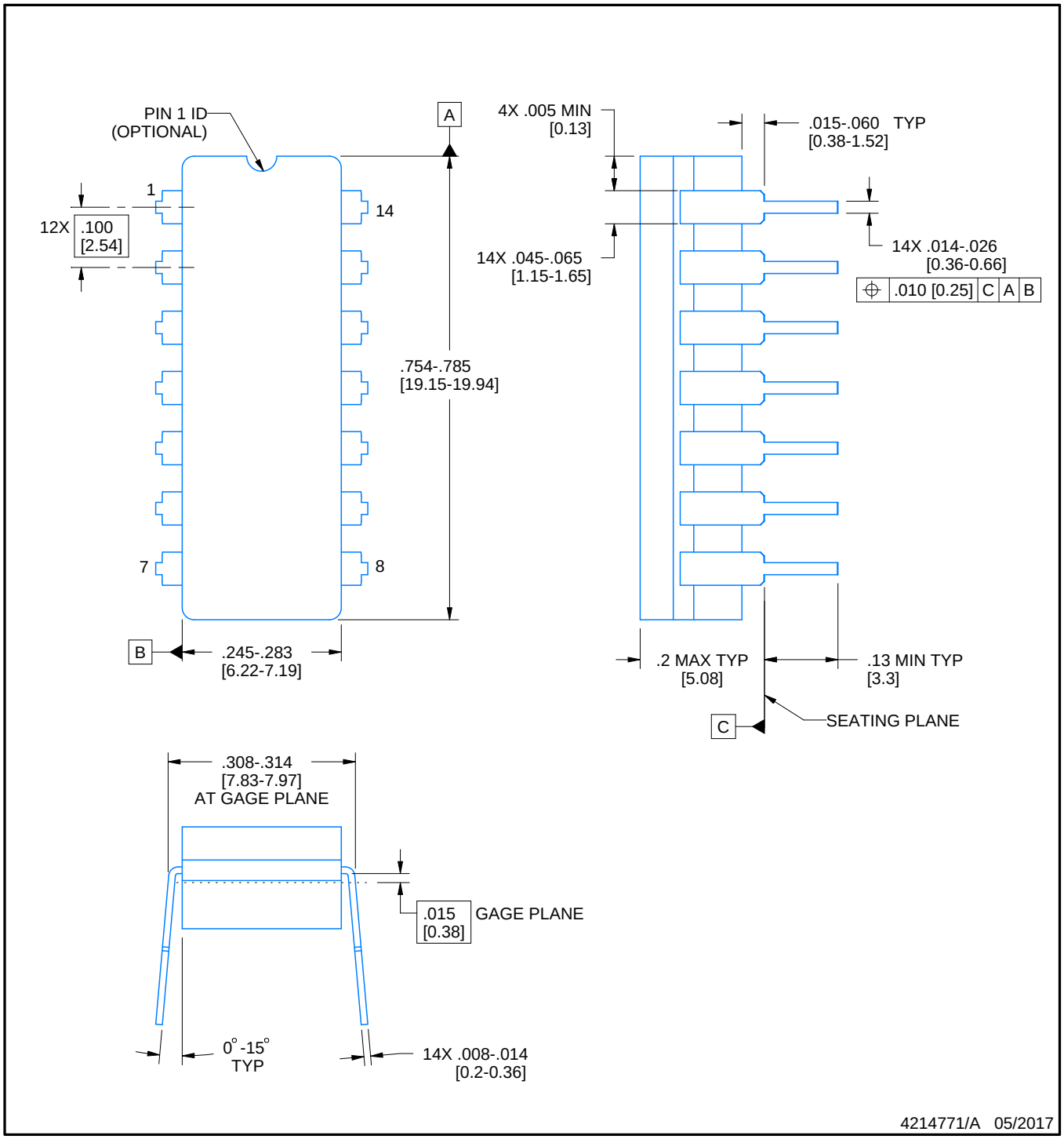
4040083-5/G

PACKAGE OUTLINE

J0014A

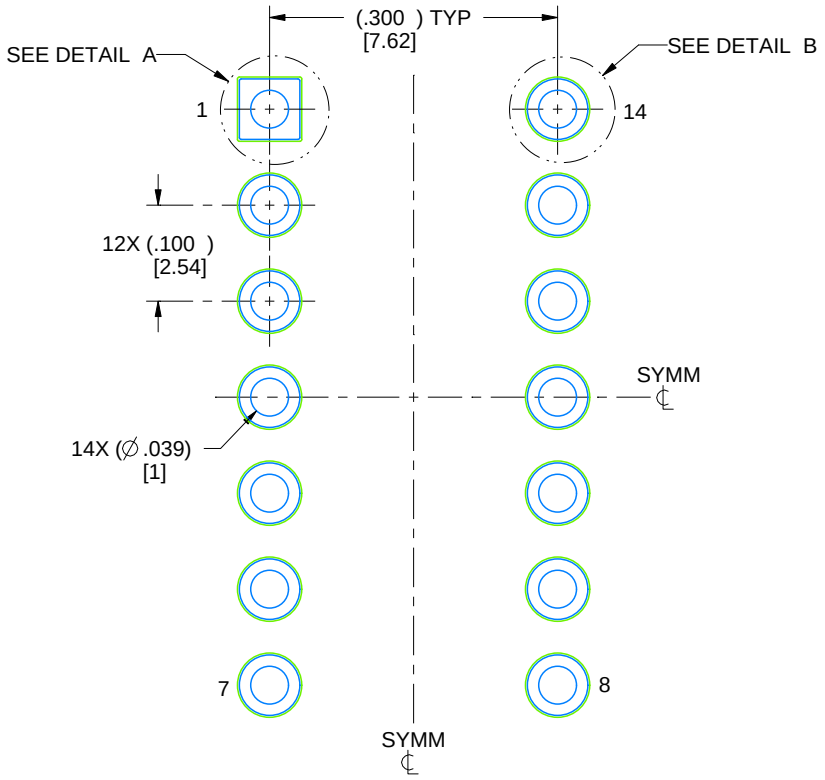
CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE

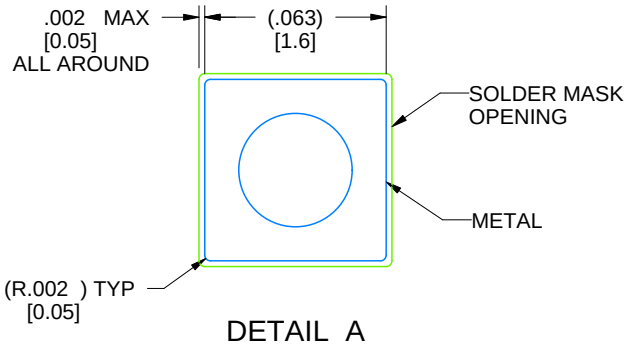


NOTES:

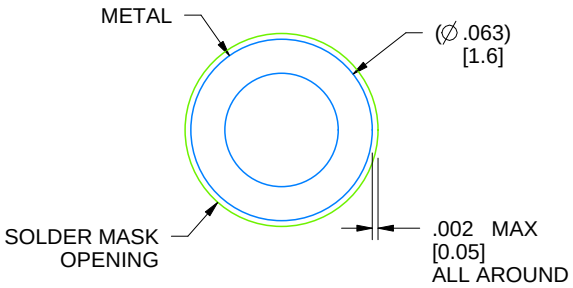
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermitically sealed with 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.



LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE: 5X



DETAIL A
SCALE: 15X

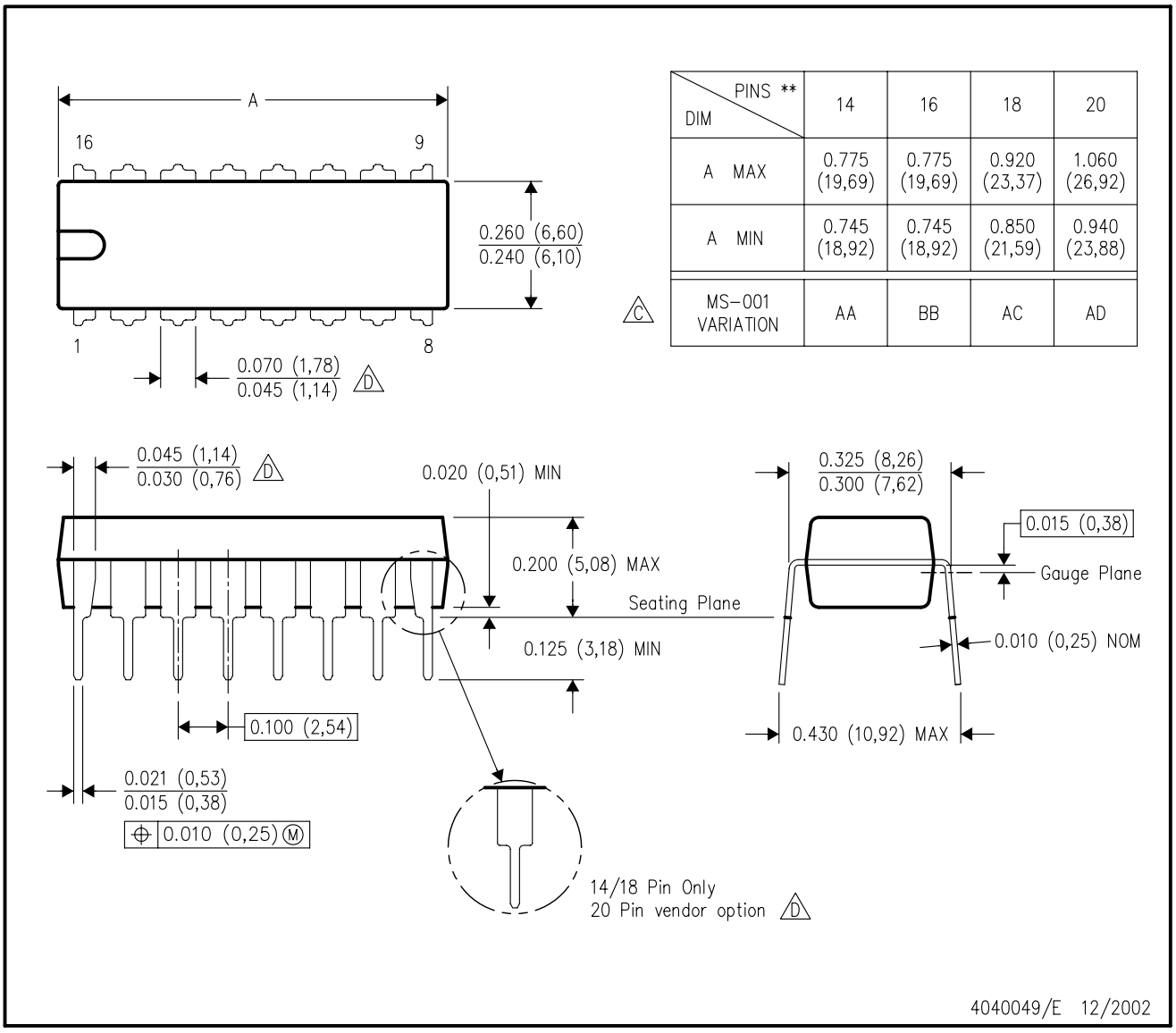


DETAIL B
13X, SCALE: 15X

4214771/A 05/2017

N (R–PDIP–T**) PLASTIC DUAL–IN–LINE PACKAGE

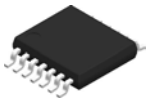
16 PINS SHOWN



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

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.

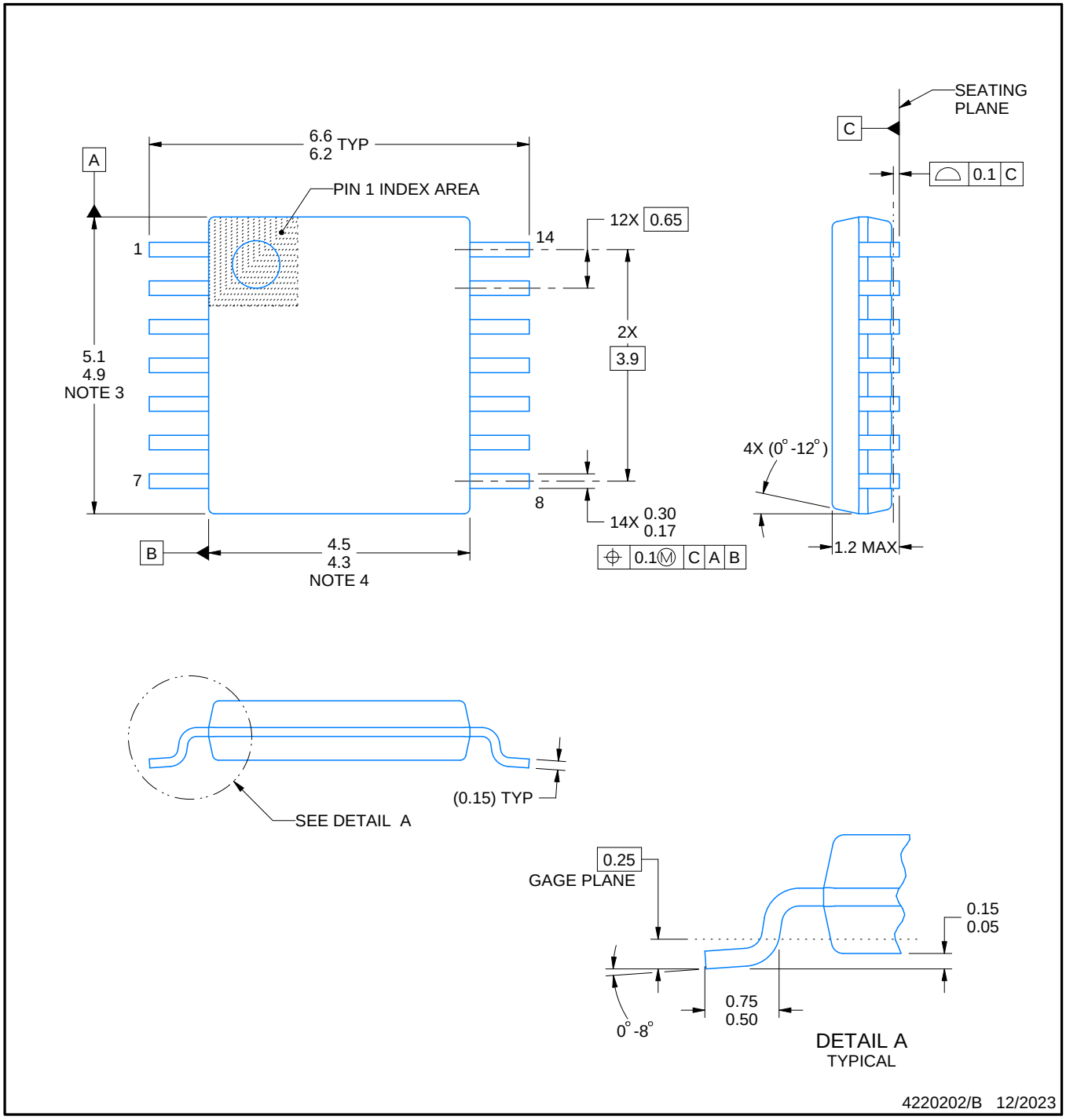
PW0014A



PACKAGE OUTLINE

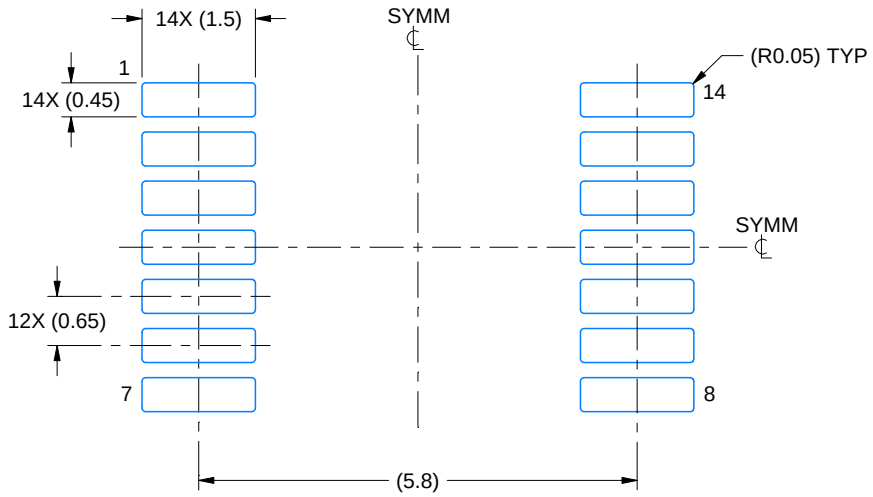
TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

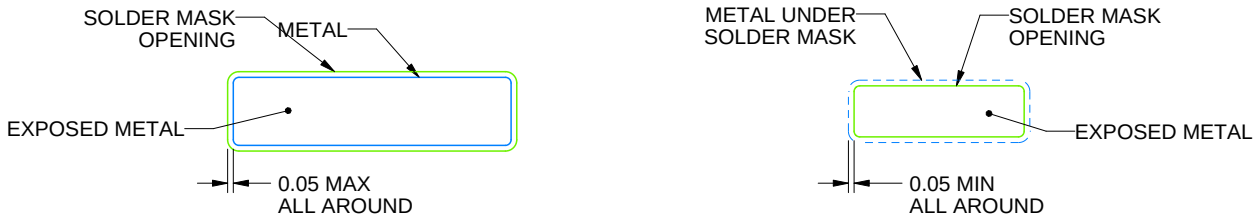


NOTES:

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



NON-SOLDER MASK DEFINED (PREFERRED)

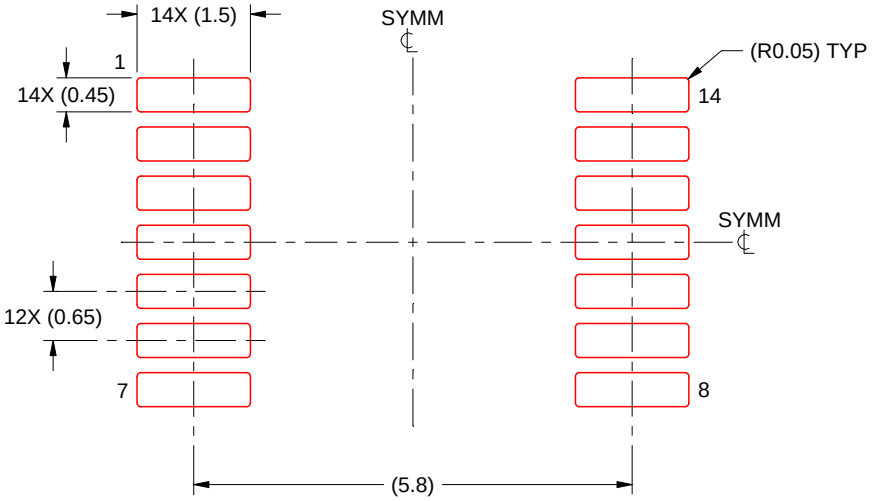
SOLDER MASK DEFINED

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.



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.

GENERIC PACKAGE VIEW

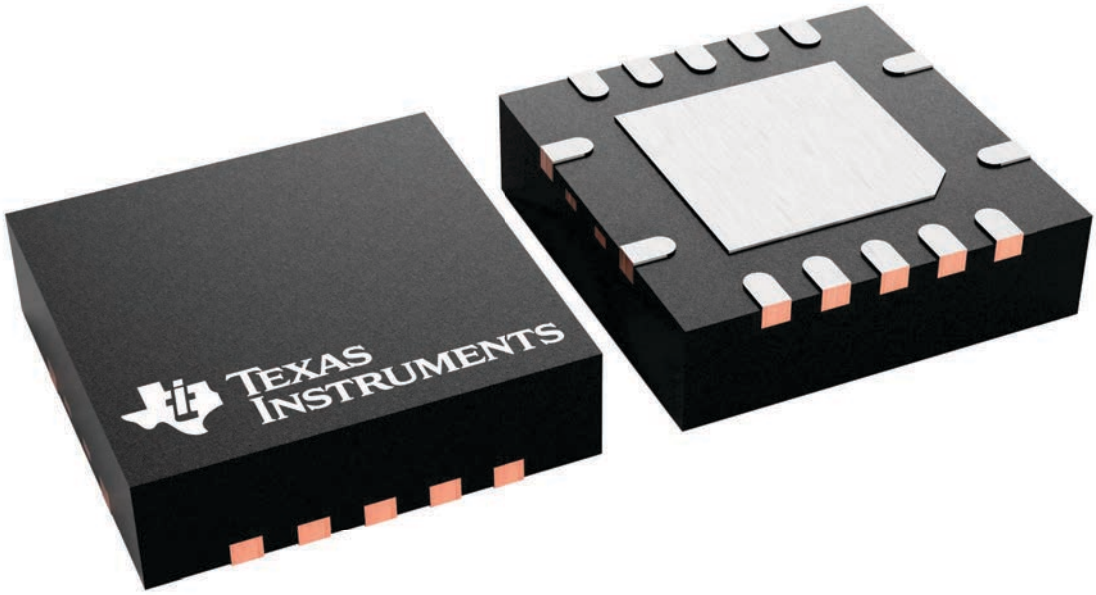
RGY 14

VQFN - 1 mm max height

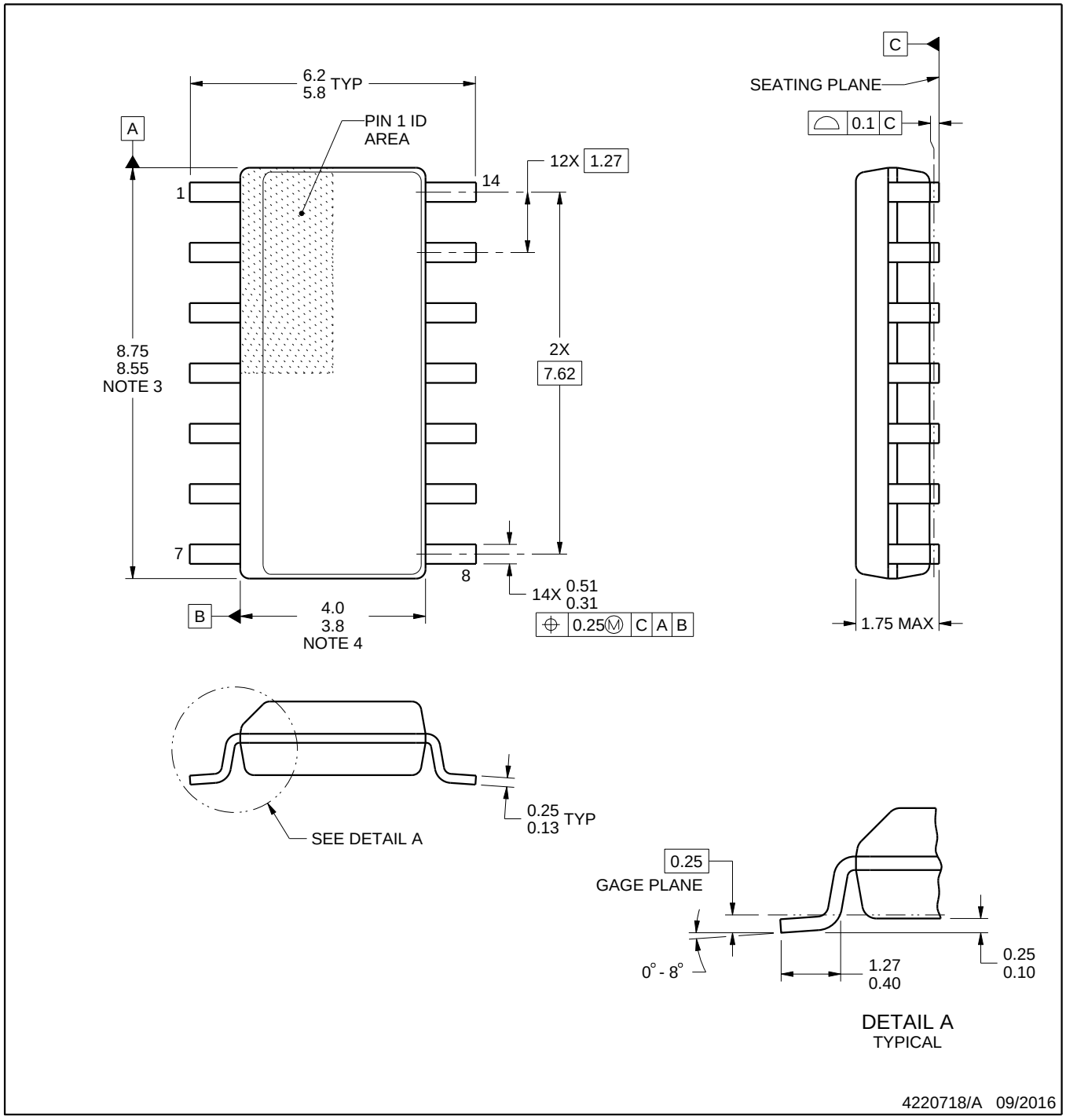
3.5 x 3.5, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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

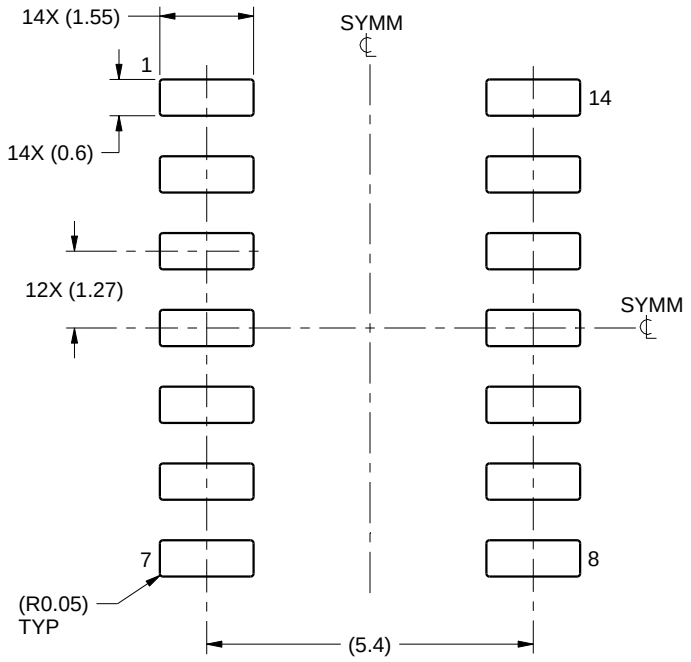


4231541/A

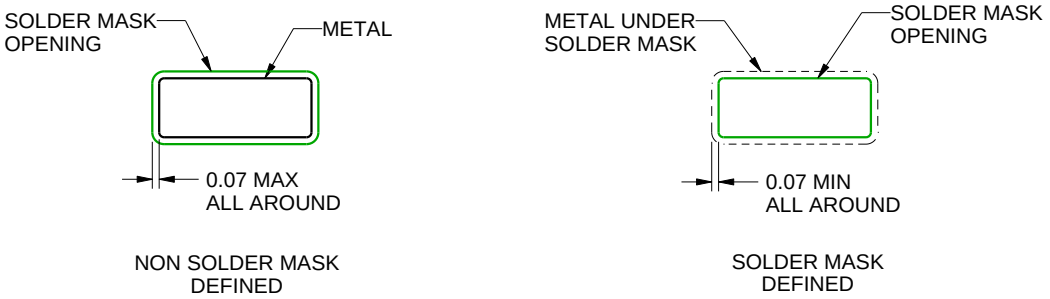


NOTES:

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.



LAND PATTERN EXAMPLE
SCALE:8X

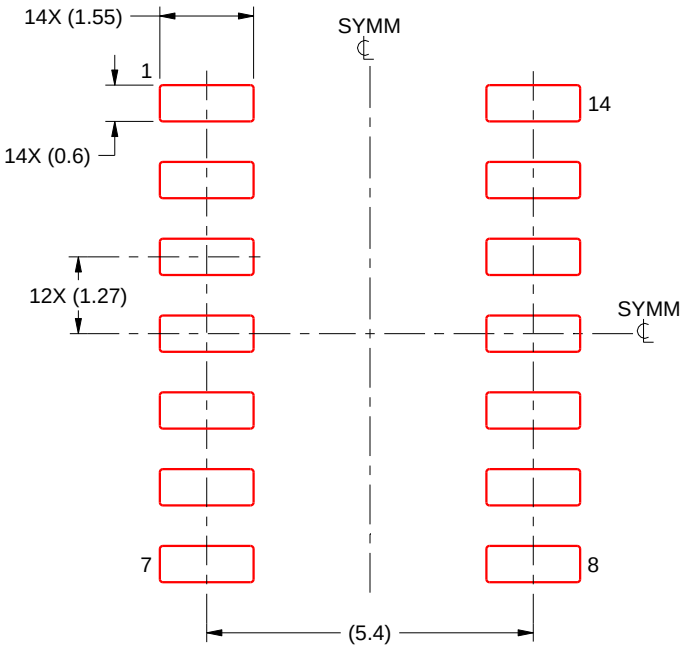


SOLDER MASK DETAILS

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.



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.

GENERIC PACKAGE VIEW

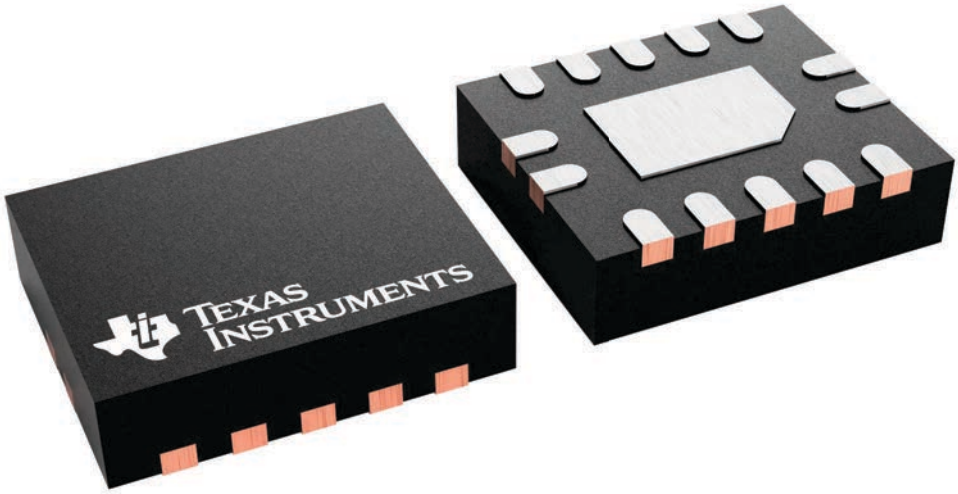
BQA 14

WQFN - 0.8 mm max height

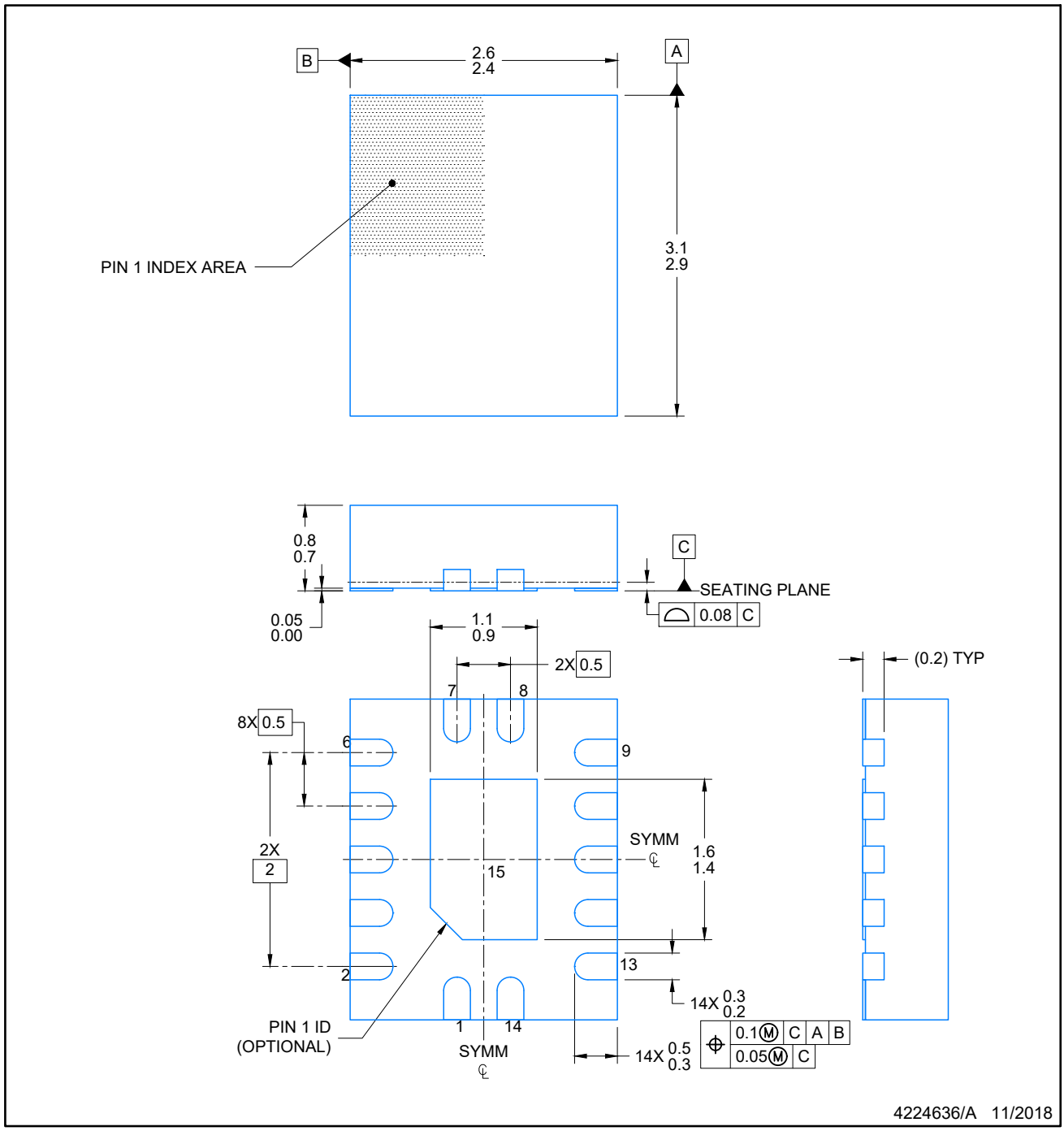
2.5 x 3, 0.5 mm pitch

PLASTIC QUAD FLATPACK - NO LEAD

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

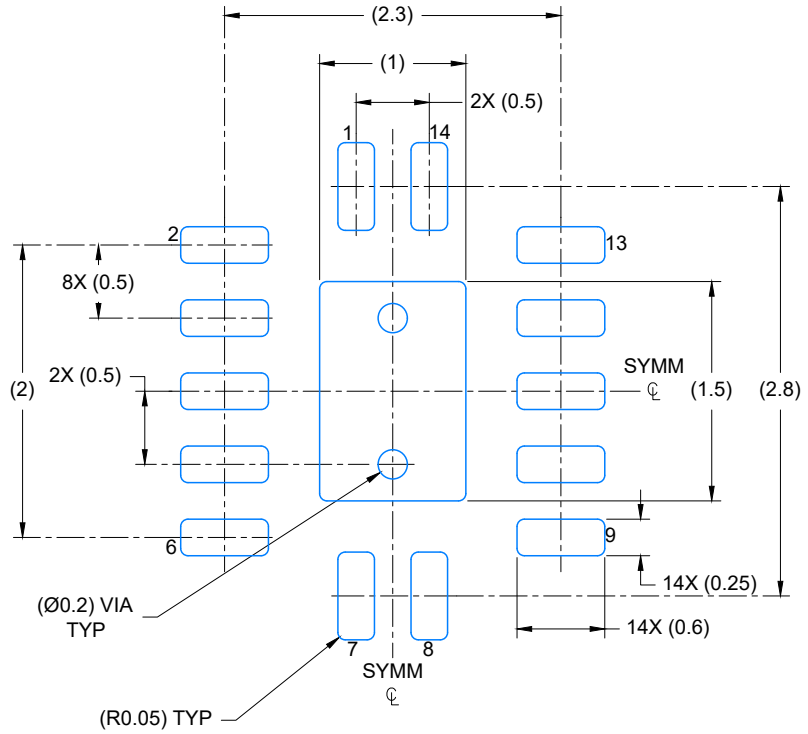


4227145/A

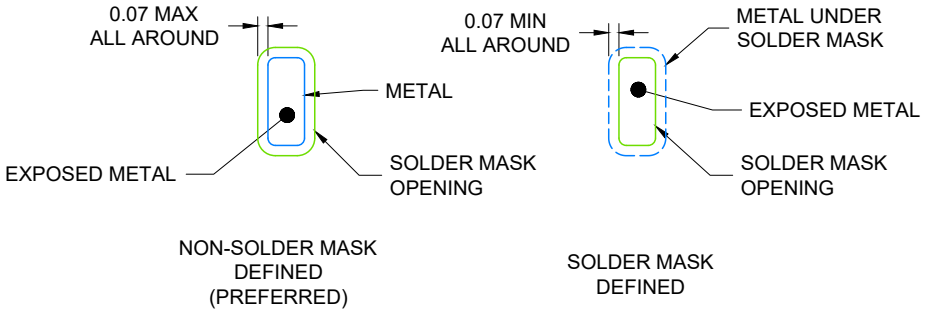


NOTES:

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. The package thermal pad must be soldered to the printed circuit board for optimal thermal and mechanical performance.



LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X



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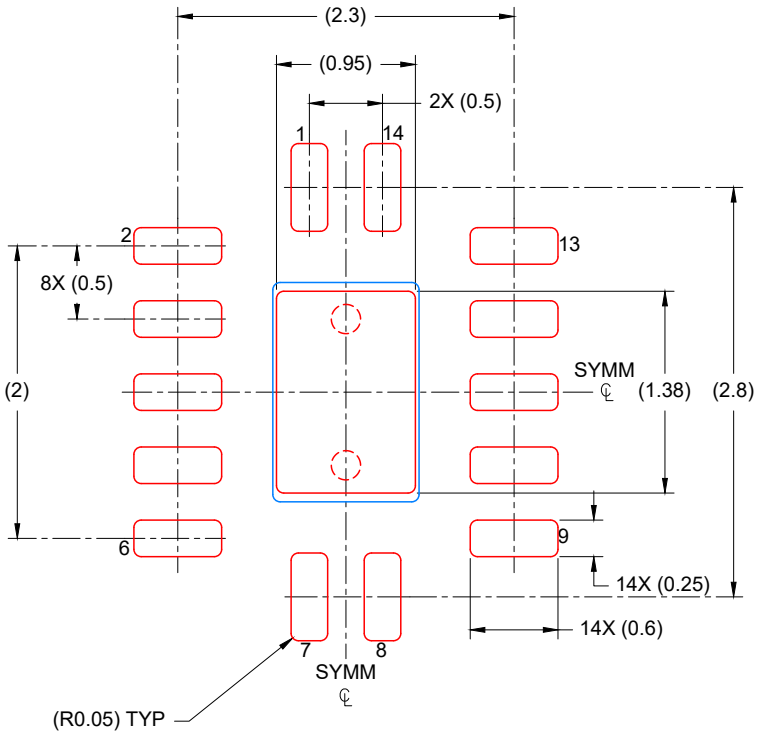
NOTES: (continued)

4. This package is designed to be soldered to a thermal pad on the board. For more information, see Texas Instruments literature number SLUA271 (www.ti.com/lit/slua271).
5. Vias are optional depending on application, refer to device data sheet. If any vias are implemented, refer to their locations shown on this view. It is recommended that vias under paste be filled, plugged or tented.



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL

EXPOSED PAD
88% PRINTED COVERAGE BY AREA
SCALE: 20X

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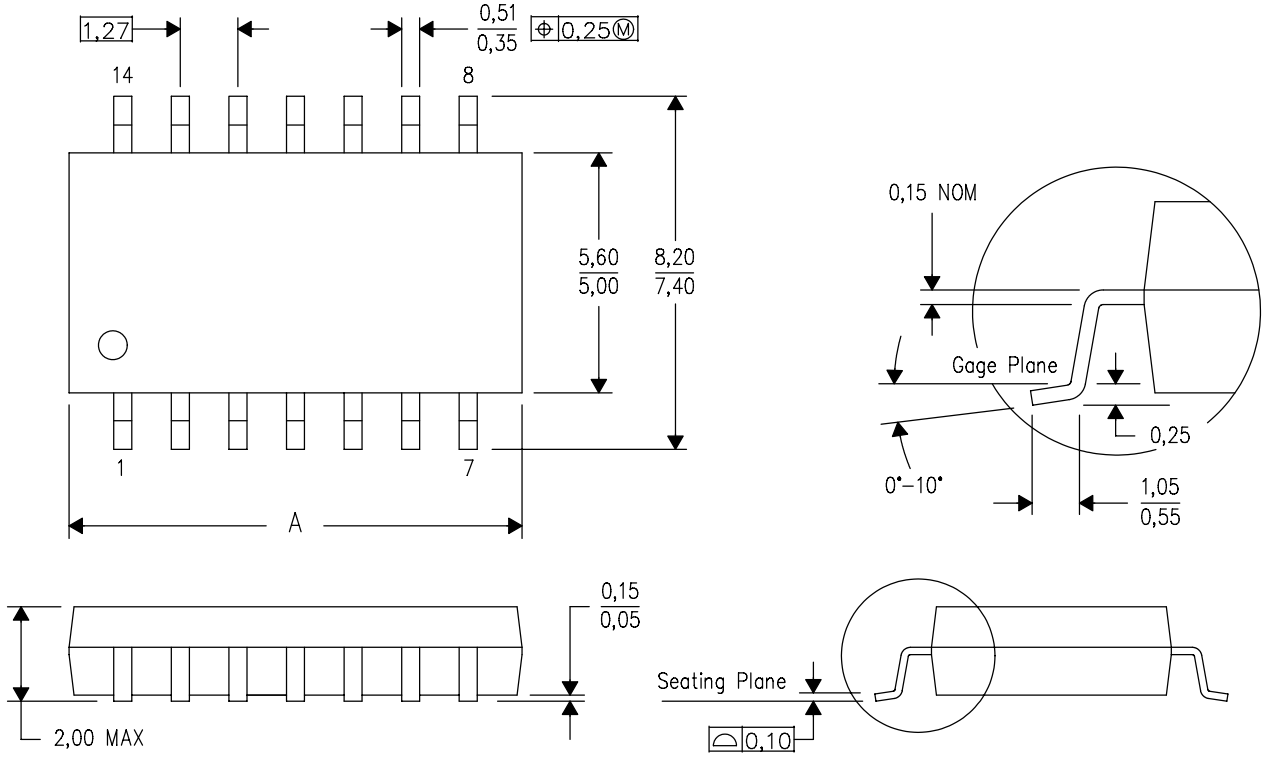
NOTES: (continued)

6. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.

MECHANICAL DATA

NS (R-PDSO-G)** **PLASTIC SMALL-OUTLINE PACKAGE**

14-PINS SHOWN



DIM \ PINS **	14	16	20	24
A MAX	10,50	10,50	12,90	15,30
A MIN	9,90	9,90	12,30	14,70

4040062/C 03/03

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.

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