# TL07xx 低噪声 FET 输入运算放大器

## 1 特性

- 高压摆率：20V/μs（TL07xH，典型值）
- 低失调电压：1mV（TL07xH，典型值）
- 低失调电压漂移：2μV/°C
- 低功耗：940μA/通道（TL07xH，典型值）
- 宽共模和差分电压范围
  - 共模输入电压范围包括 $V_{CC+}$
- 低输入偏置和失调电流
- 低噪声：
  - f = 1kHz 时，$V_n$ = 37nV/√Hz（典型值）
- 输出短路保护
- 低总计谐波失真：0.003%（典型值）
- 宽电源电压：
  - ±2.25V 至 ±20V，4.5V 至 40V

## 2 应用

- 太阳能：串式和中央逆变器
- 电机驱动器：交流和伺服驱动控制及功率级模块
- 单相在线式 UPS
- 三相 UPS
- 专业音频混合器
- 电池测试设备

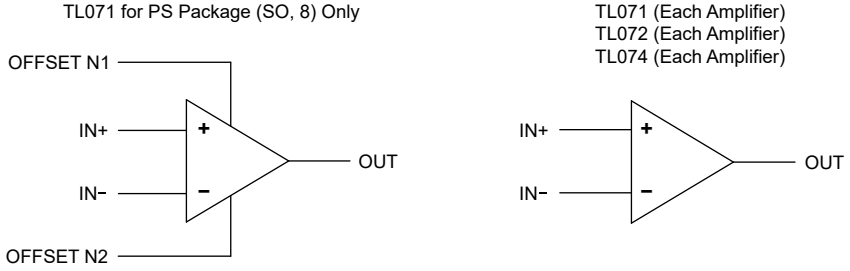
## 3 说明

TL071H、TL072H 和 TL074H (TL07xH) 系列器件是业界通用的 TL071、TL072 和 TL074 (TL07x) 器件的下一代版本。这些器件为成本敏感型应用提供了卓越的价值，其特性包括低失调电压（1mV，典型值）、高压摆率 (20V/μs) 和正电源的共模输入。得益于高 ESD（1.5kV，HBM）、集成 EMI 和射频滤波器以及 –40°C 至 +125°C 的完整工作温度范围，TL07xH 器件可用于要求苛刻的应用。

**器件信息**

| 器件型号(1) | 通道数 | 封装 |
|---|---|---|
| TL071x | 单通道 | D（SOIC，8） |
| | | DBV（SOT-23，5） |
| | | DCK（SC70，5） |
| | | P（PDIP，8） |
| | | PS（SO，8） |
| TL072x | 双通道 | D（SOIC，8） |
| | | DDF（SOT-23-THIN，8） |
| | | P（PDIP，8） |
| | | PS（SO，8） |
| | | PW（TSSOP，8） |
| TL072M(2) | 双通道 | FK（LCCC，20） |
| | | JG（CDIP，8） |
| | | U（CFP，10） |
| TL074x | 四通道 | D（SOIC，14） |
| | | DB（SSOP，14） |
| | | DYY（SOT-23-THIN，14） |
| | | N（PDIP，14） |
| | | NS（SOP，14） |
| | | PW（TSSOP，14） |
| TL074M(2) | 四通道 | FK（LCCC，20） |
| | | J（CDIP，14） |
| | | W（CFP，14） |

(1) 有关更多信息，请参阅 节 11。
(2) 带有后缀 M 的器件具有更宽的工作温度范围：–55°C 至 +125°C。




**逻辑符号**

# 内容

# 4 引脚配置和功能

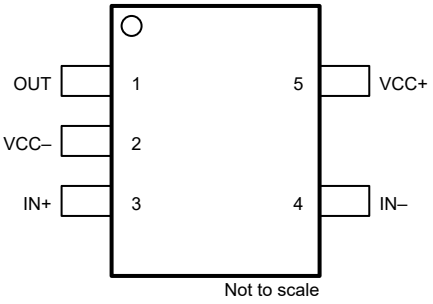



图 4-1. TL071H DBV 封装，5 引脚 SOT-23
（顶视图）

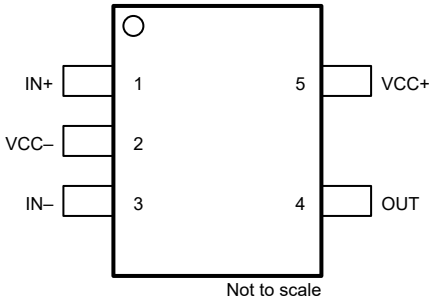



图 4-2. TL071H DCK 封装，5 引脚 SC70
（顶视图）

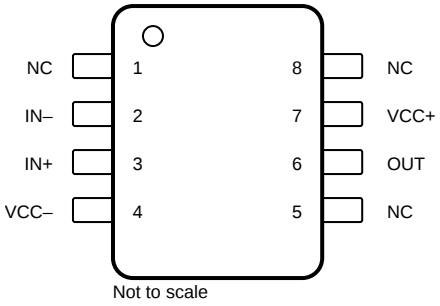



图 4-3. TL071x D 封装，8 引脚 SOIC
和 P 封装，8 引脚 PDIP
（顶视图）

表 4-1. 引脚功能：TL071x

| 引脚 | | | | | 类型 | 说明 |
|---|---|---|---|---|---|---|
| 名称 | 编号 | | | | | |
| | DBV (SOT-23) | DCK (SC70) | D (SOIC) | P (PDIP) | | |
| IN – | 4 | 3 | 2 | 2 | 输入 | 反相输入 |
| IN+ | 3 | 1 | 3 | 3 | 输入 | 同相输入 |
| NC | — | — | 8 | 8 | — | 不连接 |
| NC | — | — | 1 | 1 | — | 不连接 |
| NC | — | — | 5 | 5 | — | 不连接 |
| OUT | 1 | 4 | 6 | 6 | 输出 | 输出 |
| VCC – | 2 | 2 | 4 | 4 | — | 电源 |
| VCC+ | 5 | 5 | 7 | 7 | — | 电源 |

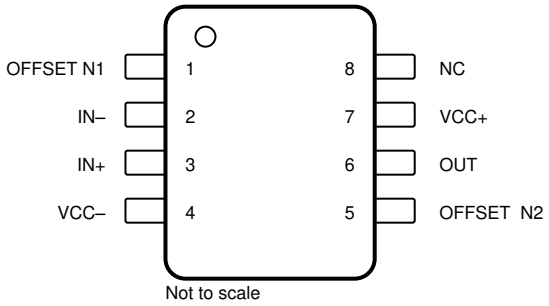



**图 4-4. TL071C PS 封装，8 引脚 SO**
**（顶视图）**

**表 4-2. 引脚功能：TL071C**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| IN – | 2 | 输入 | 反相输入 |
| IN+ | 3 | 输入 | 同相输入 |
| NC | 8 | — | 不连接 |
| OFFSET N1 | 1 | — | 输入偏移调整 |
| OFFSET N2 | 5 | — | 输入偏移调整 |
| OUT | 6 | 输出 | 输出 |
| VCC – | 4 | — | 电源 |
| VCC+ | 7 | — | 电源 |

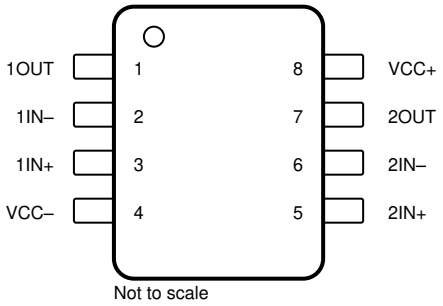



**图 4-5. TL072x D、DDF、JG、P、PS 和 PW 封装，8 引脚 SOIC、SOT-23-THIN、CDIP、PDIP、SO 和 TSSOP（顶视图）**

**表 4-3. 引脚功能：TL072x**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| 1IN – | 2 | 输入 | 反相输入 |
| 1IN+ | 3 | 输入 | 同相输入 |
| 1OUT | 1 | 输出 | 输出 |
| 2IN – | 6 | 输入 | 反相输入 |
| 2IN+ | 5 | 输入 | 同相输入 |
| 2OUT | 7 | 输出 | 输出 |
| VCC – | 4 | — | 电源 |
| VCC+ | 8 | — | 电源 |

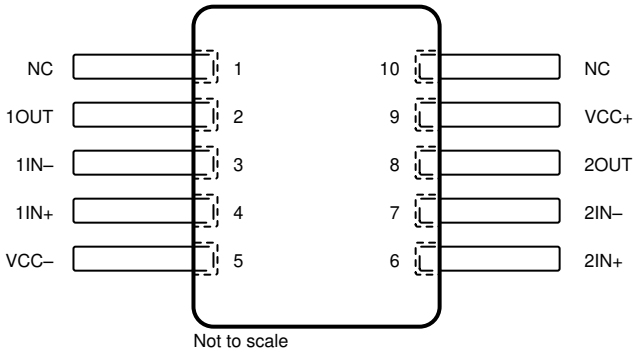



**图 4-6. TL072M U 封装，10 引脚 CFP**
**（顶视图）**

**表 4-4. 引脚功能：TL072M**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| 1IN – | 3 | 输入 | 反相输入 |
| 1IN+ | 4 | 输入 | 同相输入 |
| 1OUT | 2 | 输出 | 输出 |
| 2IN – | 7 | 输入 | 反相输入 |
| 2IN+ | 6 | 输入 | 同相输入 |
| 2OUT | 8 | 输出 | 输出 |
| NC | 1、10 | — | 不连接 |
| VCC – | 5 | — | 电源 |
| VCC+ | 9 | — | 电源 |

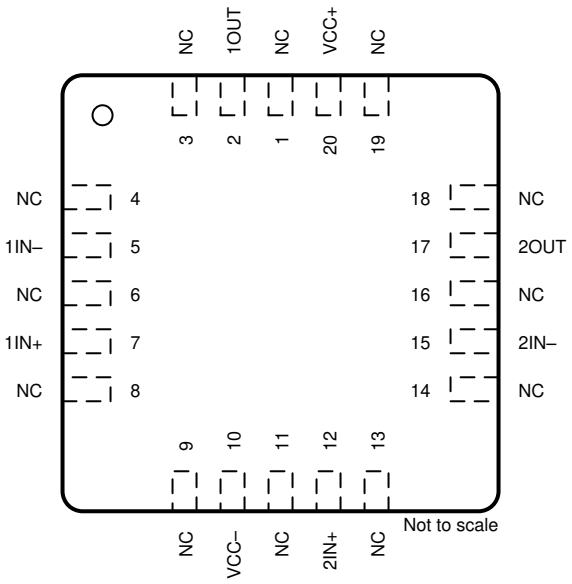



**图 4-7. TL072M FK 封装，20 引脚 LCCC**
**（顶视图）**

**表 4-5. 引脚功能：TL072M**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| 1IN – | 5 | 输入 | 反相输入 |
| 1IN+ | 7 | 输入 | 同相输入 |
| 1OUT | 2 | 输出 | 输出 |
| 2IN – | 15 | 输入 | 反相输入 |
| 2IN+ | 12 | 输入 | 同相输入 |
| 2OUT | 17 | 输出 | 输出 |
| NC | 1、3、4、6、8、9、11、13、14、16、18、19 | — | 不连接 |
| VCC – | 10 | — | 电源 |
| VCC+ | 20 | — | 电源 |

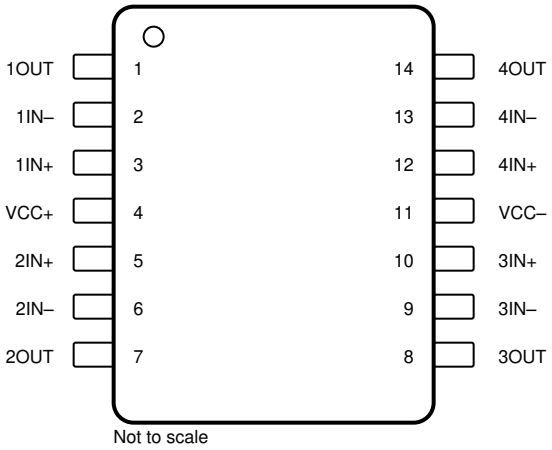



**图 4-8. TL074x D、DYY、J、N、NS、PW 和 W 封装，14 引脚 SOIC、SOT-23-THIN、CDIP、PDIP、SOP、TSSOP 和 CFP（顶视图）**

**表 4-6. 引脚功能：TL074x**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| 1IN – | 2 | 输入 | 反相输入 |
| 1IN+ | 3 | 输入 | 同相输入 |
| 1OUT | 1 | 输出 | 输出 |
| 2IN – | 6 | 输入 | 反相输入 |
| 2IN+ | 5 | 输入 | 同相输入 |
| 2OUT | 7 | 输出 | 输出 |
| 3IN – | 9 | 输入 | 反相输入 |
| 3IN+ | 10 | 输入 | 同相输入 |
| 3OUT | 8 | 输出 | 输出 |
| 4IN – | 13 | 输入 | 反相输入 |
| 4IN+ | 12 | 输入 | 同相输入 |
| 4OUT | 14 | 输出 | 输出 |
| VCC – | 11 | — | 电源 |
| VCC+ | 4 | — | 电源 |

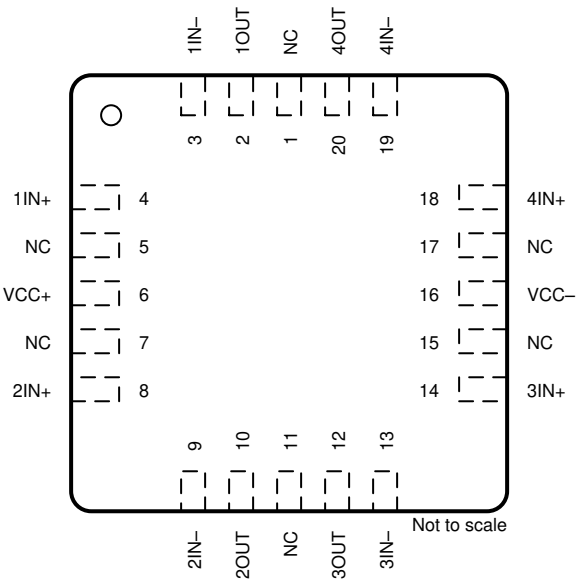



**图 4-9. TL074M FK 封装，20 引脚 LCCC**
**（顶视图）**

**表 4-7. 引脚功能：TL074M**

| 引脚 | | 类型 | 说明 |
|---|---|---|---|
| 名称 | 编号 | | |
| 1IN – | 3 | 输入 | 反相输入 |
| 1IN+ | 4 | 输入 | 同相输入 |
| 1OUT | 2 | 输出 | 输出 |
| 2IN – | 9 | 输入 | 反相输入 |
| 2IN+ | 8 | 输入 | 同相输入 |
| 2OUT | 10 | 输出 | 输出 |
| 3IN – | 13 | 输入 | 反相输入 |
| 3IN+ | 14 | 输入 | 同相输入 |
| 3OUT | 12 | 输出 | 输出 |
| 4IN – | 19 | 输入 | 反相输入 |
| 4IN+ | 18 | 输入 | 同相输入 |
| 4OUT | 20 | 输出 | 输出 |
| NC | 1、5、7、11、15、17 | — | 不连接 |
| VCC – | 16 | — | 电源 |
| VCC+ | 6 | — | 电源 |

# 5 规格

**备注**

TLV07xx 系列已将新裸片制造过渡到一种现代工艺。

此新裸片采用 H 后缀。

带有不同后缀的裸片要么较旧、要么较新；另请参阅 节 9.1.1。

节 5.7 和 节 5.10 描述了新裸片的性能。

节 5.8、节 5.9 和 节 5.11 描述了旧裸片的性能。

## 5.1 绝对最大额定值

在工作环境温度范围内测得（除非另有说明）(1)

| | | | 最小值 | 最大值 | 单位 |
|---|---|---|---|---|---|
| 电源电压，$V_S$ = (V+) – (V–) | | 所有 NS 和 PS 封装；所有 TL07xM 器件 | -0.3 | 36 | V |
| | | 所有其他器件 | 0 | 42 | |
| 信号输入引脚 | 共模电压(2) | 所有 NS 和 PS 封装；所有 TL07xM 器件 | ($V_{CC-}$) – 0.3 | ($V_{CC-}$) + 36 | V |
| | | 所有其他器件 | ($V_{CC-}$) – 0.5 | ($V_{CC+}$) + 0.5 | |
| | 差分电压(2) | 所有 NS 和 PS 封装；所有 TL07xM 器件(3) | ($V_{CC-}$) – 0.3 | ($V_{CC-}$) + 36 | V |
| | | 所有其他器件 | | $V_S$ + 0.2 | |
| | 电流(2) | 所有 NS 和 PS 封装；所有 TL07xM 器件 | | 50 | mA |
| | | 所有其他器件 | -10 | 10 | |
| 输出短路(4) | | | 持续 | | |
| 工作环境温度，$T_A$ | | | -55 | 150 | °C |
| 结温，$T_J$ | | | | 150 | °C |
| 60 秒内的管壳温度 - FK 封装 | | | | 260 | °C |
| 10 秒内距离外壳 1.8mm（1/16 英寸）的引线温度 | | | | 300 | °C |
| 贮存温度，$T_{stg}$ | | | -65 | 150 | °C |

(1) 应力超出*绝对最大额定值*下面列出的值时可能会对器件造成永久损坏。这些列出的值仅仅是应力等级，并不表示器件在这些条件下以及在*建议工作条件*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) 在所有新裸片上，输入引脚均被二极管钳制至两个电源轨。对于摆幅超过电源导轨 0.5V 的输入信号，应将其电流限制在 10mA 或者更低。
(3) 差动电压仅受输入电压限制。
(4) 接地短路，每个封装对应一个放大器。

## 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) | ±2000 | 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 可通过标准 ESD 控制流程实现安全生产。
(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

在工作环境温度范围内测得（除非另有说明）

| | | | 最小值 | 最大值 | 单位 |
|---|---|---|---|---|---|
| $V_S$ | 电源电压，($V_{CC+}$) – ($V_{CC-}$) | 所有 NS 和 PS 封装；所有 TL07xM 器件(1) | 10 | 30 | V |
| | | 所有其他器件 | 4.5 | 40 | |
| $V_I$ | 输入电压 | 所有 NS 和 PS 封装；所有 TL07xM 器件 | ($V_{CC-}$) + 2 | ($V_{CC+}$) + 0.1 | V |
| | | 所有其他器件 | ($V_{CC-}$) + 4 | ($V_{CC+}$) + 0.1 | |
| $T_A$ | 额定温度(2) | TL07xM | -55 | 125 | °C |
| | | TL07xH | -40 | 125 | |
| | | TL07xI | -40 | 85 | |
| | | TL07xC | 0 | 70 | |

(1) $V_{CC+}$ 和 $V_{CC-}$ 不要求具有相同的幅度，只要总 $V_S$ ($V_{CC+}$ – $V_{CC-}$) 介于 10V 与 30V 之间即可。
(2) 另请参阅节 9.1.1。

## 5.4 单通道器件的热性能信息

| 热指标(1) | | TL071xx | | | | | 单位 |
|---|---|---|---|---|---|---|---|
| | | D (SOIC) | DCK (SC70) | DBV (SOT-23) | P (PDIP) | PS (SO) | |
| | | 8 引脚 | 5 引脚 | 5 引脚 | 8 引脚 | 8 引脚 | |
| $R_{\theta JA}$ | 结至环境热阻 | 158.8 | 217.5 | 212.2 | 85 | 95 | °C/W |
| $R_{\theta JC(top)}$ | 结至外壳（顶部）热阻 | 98.6 | 113.1 | 111.1 | – | – | °C/W |
| $R_{\theta JB}$ | 结至电路板热阻 | 102.3 | 63.8 | 79.4 | – | – | °C/W |
| $\psi_{JT}$ | 结至顶部特征参数 | 45.8 | 34.8 | 51.8 | – | – | °C/W |
| $\psi_{JB}$ | 结至电路板特征参数 | 101.5 | 63.5 | 79.0 | – | – | °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 | °C/W |

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

## 5.5 双通道器件的热性能信息

| 热指标(1) | | TL072xx | | | | | | | | 单位 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | D (SOIC) | DDF (SOT-23) | FK (LCCC) | JG (CDIP) | P (PDIP) | PS (SO) | PW (TSSOP) | U (CFP) | |
| | | 8 引脚 | 8 引脚 | 20 引脚 | 8 引脚 | 8 引脚 | 8 引脚 | 8 引脚 | 10 引脚 | |
| $R_{\theta JA}$ | 结至环境热阻 | 147.8 | 181.5 | – | – | 85 | 95 | 200.3 | 169.8 | °C/W |
| $R_{\theta JC(top)}$ | 结至外壳（顶部）热阻 | 88.2 | 112.5 | 5.61 | 15.05 | – | – | 89.4 | 62.1 | °C/W |
| $R_{\theta JB}$ | 结至电路板热阻 | 91.4 | 98.2 | – | – | – | – | 131.0 | 176.2 | °C/W |
| $\psi_{JT}$ | 结至顶部特征参数 | 36.8 | 17.2 | – | – | – | – | 22.2 | 48.4 | °C/W |
| $\psi_{JB}$ | 结至电路板特征参数 | 90.6 | 97.6 | – | – | – | – | 129.3 | 144.1 | °C/W |
| $R_{\theta JC(bot)}$ | 结至外壳（底部）热阻 | 不适用 | 不适用 | – | – | – | – | 不适用 | 5.4 | °C/W |

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

## 5.6 四通道器件的热性能信息

| 热指标(1) | | TL074xx | | | | | | | | 单位 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | D (SOIC) | DYY (SOT-23) | FK (TSSOP) | J (TSSOP) | N (TSSOP) | NS (TSSOP) | PW (TSSOP) | W (TSSOP) | |
| | | 14 引脚 | 14 引脚 | 20 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 | 114.2 | 153.2 | – | – | 80 | 76 | – | 128.8 | °C/W |
| $R_{\theta JC(top)}$ | 结至外壳（顶部）热阻 | 70.3 | 88.7 | 5.61 | 14.5 | – | – | 14.5 | 56.1 | °C/W |
| $R_{\theta JB}$ | 结至电路板热阻 | 70.2 | 65.4 | – | – | – | – | – | 127.6 | °C/W |
| $\psi_{JT}$ | 结至顶部特征参数 | 28.8 | 9.5 | – | – | – | – | – | 29 | °C/W |
| $\psi_{JB}$ | 结至电路板特征参数 | 69.8 | 65.0 | – | – | – | – | – | 106.1 | °C/W |
| $R_{\theta JC(bot)}$ | 结至外壳（底部）热阻 | 不适用 | 不适用 | – | – | – | – | – | 0.5 | °C/W |

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

## 5.7 TL07xH 的电气特性

$V_S$ = ($V_{CC+}$) – ($V_{CC-}$) = 4.5V 至 40V（±2.25V 至 ±20V），$T_A$ = 25°C，$R_L$ = 10kΩ 连接至 $V_S$ / 2，$V_{CM}$ = $V_S$ / 2，且 $V_{OUT}$ = $V_S$ / 2（除非另有说明）

| 参数 | | 测试条件 | | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|---|
| **失调电压** | | | | | | | |
| $V_{OS}$ | 输入失调电压 | | | | ±1 | ±4 | mV |
| | | | $T_A$ = -40°C 至 +125°C | | | ±5 | |
| $dV_{OS}/dT$ | 输入失调电压漂移 | | $T_A$ = -40°C 至 +125°C | | ±2 | | μV/℃ |
| PSRR | 输入失调电压与电源间的关系 | $V_S$ = 5V 至 40V，$V_{CM}$ = $V_S$ / 2 | $T_A$ = -40°C 至 +125°C | | ±1 | ±10 | μV/V |
| | 通道隔离 | f = 0Hz | | | 10 | | μV/V |
| **输入偏置电流** | | | | | | | |
| $I_B$ | 输入偏置电流 | | | | ±1 | ±120 | pA |
| | | | DCK 和 DBV 封装 | | ±1 | ±300 | pA |
| | | | $T_A$ = -40°C 至 +125°C(1) | | | ±5 | nA |
| $I_{OS}$ | 输入失调电流 | | | | ±0.5 | ±120 | pA |
| | | | DCK 和 DBV 封装 | | ±0.5 | ±250 | pA |
| | | | $T_A$ = -40°C 至 +125°C(1) | | | ±5 | nA |
| **噪声** | | | | | | | |
| $E_N$ | 输入电压噪声 | f = 0.1Hz 至 10Hz | | | 9.2 | | μ$V_{PP}$ |
| | | | | | 1.4 | | μ$V_{RMS}$ |
| $e_N$ | 输入电压噪声密度 | f = 1kHz | | | 37 | | nV/√Hz |
| | | f = 10kHz | | | 21 | | |
| $i_N$ | 输入电流噪声 | f = 1kHz | | | 80 | | fA/√Hz |
| **输入电压范围** | | | | | | | |
| $V_{CM}$ | 共模电压 | | | ($V_{CC-}$) + 1.5 | | ($V_{CC+}$) | V |
| CMRR | 共模抑制比 | $V_S$ = 40V，($V_{CC-}$) + 2.5V < $V_{CM}$ < ($V_{CC+}$) – 1.5V | | 100 | 105 | | dB |
| | | | $T_A$ = -40°C 至 +125°C | 95 | | | dB |
| | | $V_S$ = 40V，($V_{CC-}$) + 2.5V < $V_{CM}$ < ($V_{CC+}$) | | 90 | 105 | | dB |
| | | | $T_A$ = -40°C 至 +125°C | 80 | | | dB |
| **输入电容** | | | | | | | |
| $Z_{ID}$ | 差分 | | | | 100 \|\| 2 | | MΩ \|\| pF |
| $Z_{ICM}$ | 共模 | | | | 6 \|\| 1 | | TΩ \|\| pF |
| **开环增益** | | | | | | | |
| $A_{OL}$ | 开环电压增益 | $V_S$ = 40V，$V_{CM}$ = $V_S$ / 2，($V_{CC-}$) + 0.3V < $V_O$ < ($V_{CC+}$) – 0.3V | $T_A$ = -40°C 至 +125°C | 118 | 125 | | dB |
| $A_{OL}$ | 开环电压增益 | $V_S$ = 40V，$V_{CM}$ = $V_S$ / 2，$R_L$ = 2kΩ，($V_{CC-}$) + 1.2V < $V_O$ < ($V_{CC+}$) – 1.2V | $T_A$ = -40°C 至 +125°C | 115 | 120 | | dB |
| **频率响应** | | | | | | | |
| GBW | 增益带宽积 | | | | 5.25 | | MHz |
| SR | 压摆率 | $V_S$ = 40V，G = +1，$C_L$ = 20pF | | | 20 | | V/μs |
| $t_S$ | 稳定时间 | 精度达到 0.1%，$V_S$ = 40V，$V_{STEP}$ = 10V，G = +1，$C_L$ = 20pF | | | 0.63 | | μs |
| | | 精度达到 0.1%，$V_S$ = 40V，$V_{STEP}$ = 2V，G = +1，$C_L$ = 20pF | | | 0.56 | | |
| | | 精度达到 0.01%，$V_S$ = 40V，$V_{STEP}$ = 10V，G = +1，$C_L$ = 20pF | | | 0.91 | | |
| | | 精度达到 0.01%，$V_S$ = 40V，$V_{STEP}$ = 2V，G = +1，$C_L$ = 20pF | | | 0.48 | | |

## 5.7 TL07xH 的电气特性（续）

$V_S$ = ($V_{CC+}$) – ($V_{CC-}$) = 4.5V 至 40V（±2.25V 至 ±20V），$T_A$ = 25°C，$R_L$ = 10kΩ 连接至 $V_S$ / 2，$V_{CM}$ = $V_S$ / 2，且 $V_{OUT}$ = $V_S$ / 2（除非另有说明）

| 参数 | | 测试条件 | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|
| | 相位裕度 | G = +1，$R_L$ = 10kΩ，$C_L$ = 20pF | | 56 | | ° |
| | 过载恢复时间 | $V_{IN}$ × 增益 > $V_S$ | | 300 | | ns |
| THD+N | 总谐波失真 + 噪声 | $V_S$ = 40V，$V_O$ = 6$V_{RMS}$，G = +1，f = 1kHz | | 0.00012 | | % |
| EMIRR | EMI 抑制比 | f = 1GHz | | 53 | | dB |

## 5.7 TL07xH 的电气特性（续）

$V_S$ = ($V_{CC+}$) – ($V_{CC-}$) = 4.5V 至 40V（±2.25V 至 ±20V），$T_A$ = 25°C，$R_L$ = 10kΩ 连接至 $V_S$ / 2，$V_{CM}$ = $V_S$ / 2，且 $V_{OUT}$ = $V_S$ / 2（除非另有说明）

| 参数 | | 测试条件 | | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|---|
| **输出** | | | | | | | |
| | 相对于电源轨的电压输出摆幅 | 正电源轨余量 | $V_S$ = 40V，$R_L$ = 10kΩ | | 115 | 210 | mV |
| | | | $V_S$ = 40V，$R_L$ = 2kΩ | | 520 | 965 | |
| | | 负电源轨余量 | $V_S$ = 40V，$R_L$ = 10kΩ | | 105 | 215 | |
| | | | $V_S$ = 40V，$R_L$ = 2kΩ | | 500 | 1030 | |
| $I_{SC}$ | 短路电流 | | | | ±26 | | mA |
| $C_{LOAD}$ | 容性负载驱动 | | | | 300 | | pF |
| $Z_O$ | 开环输出阻抗 | f = 1MHz，$I_O$ = 0A | | | 125 | | Ω |
| **电源** | | | | | | | |
| $I_Q$ | 每个放大器的静态电流 | $I_O$ = 0A | | | 937.5 | 1125 | μA |
| | | $I_O$ = 0A，(TL071H) | | | 960 | 1156 | |
| | | $I_O$ = 0A | $T_A$ = -40°C 至 +125°C | | | 1130 | |
| | | $I_O$ = 0A，(TL072H) | | | | 1143 | |
| | | $I_O$ = 0A，(TL071H) | | | | 1160 | |
| | 导通时间 | $T_A$ = 25°C，$V_S$ = 40V，$V_S$ 升降速率 > 0.3V/μs | | | 60 | | μs |

(1) 根据表征结果指定最大 $I_B$ 和 $I_{OS}$ 数据。

## 5.8 TL07xC、TL07xAC、TL07xBC、TL07xI、TL07xM 的电气特性（直流）

$V_S$ = ($V_{CC+}$) – ($V_{CC-}$) = ±15V，$T_A$ = 25°C 时（除非另有说明）

| 参数 | | 测试条件(1) (2) | | | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|---|---|
| **DC** | | | | | | | | |
| $V_{OS}$ | 输入失调电压 | $V_O$ = 0V<br>$R_S$ = 50Ω | TL07xC | | | 3 | 10 | mV |
| | | | | $T_A$ = 完整范围 | | | 13 | |
| | | | TL07xAC | | | 3 | 6 | |
| | | | | $T_A$ = 完整范围 | | | 7.5 | |
| | | | TL07xBC | | | 2 | 3 | |
| | | | | $T_A$ = 完整范围 | | | 5 | |
| | | | TL07xI | | | 3 | 6 | |
| | | | | $T_A$ = 完整范围 | | | 8 | |
| | | | TL071M、TL072M | | | 3 | 6 | |
| | | | | $T_A$ = 完整范围 | | | 9 | |
| | | | TL074M | | | 3 | 9 | |
| | | | | $T_A$ = 完整范围 | | | 15 | |
| $dV_{OS}/dT$ | 输入失调电压漂移 | $V_O$ = 0V，$R_S$ = 50Ω | $T_A$ = 完整范围 | | | ±18 | | μV/℃ |
| $I_{OS}$ | 输入失调电流 | $V_O$ = 0V | TL07xC | | | 5 | 100 | pA |
| | | | | $T_A$ = 完整范围 | | | 10 | nA |
| | | | TL07xAC、TL07xBC、TL07xI | | | 5 | 100 | pA |
| | | | | $T_A$ = 完整范围 | | | 2 | nA |
| | | | TL07xM | | | 5 | 100 | pA |
| | | | | $T_A$ = 完整范围 | | | 20 | nA |
| $I_B$ | 输入偏置电流 | $V_O$ = 0V | TL07xC、TL07xAC、TL07xBC、TL07xI | | | 65 | 200 | pA |
| | | | | $T_A$ = 完整范围 | | | 7 | nA |
| | | | TL071M、TL072M | | | 65 | 200 | pA |
| | | | | $T_A$ = 完整范围 | | | 50 | nA |
| | | | TL074M | | | 65 | 200 | pA |
| | | | | $T_A$ = 完整范围 | | | 20 | nA |
| $V_{CM}$ | 共模电压 | | | | ±11 | -12 至 15 | | V |
| VOM | 最大峰值输出电压摆幅 | $R_L$ = 10kΩ | | | ±12 | ±13.5 | | V |
| | | $R_L$ ≥ 10kΩ | $T_A$ = 完整范围 | | ±12 | | | |
| | | $R_L$ ≥ 2kΩ | | | ±10 | | | |
| $A_{OL}$ | 开环电压增益 | $V_O$ = 0V | TL07xC | | 25 | 200 | | V/mV |
| | | | | $T_A$ = 完整范围 | 15 | | | |
| | | | TL07xAC、TL07xBC、TL07xI | | 50 | 200 | | |
| | | | | $T_A$ = 完整范围 | 25 | | | |
| | | | TL07xM | | 35 | 200 | | |
| | | | | $T_A$ = 完整范围 | 15 | | | |
| GBW | 增益带宽积 | 所有 NS 和 PS 封装；所有 TL07xM 器件 | | | | 3 | | MHz |
| | | 所有其他器件 | | | | 5.25 | | |
| $R_{ID}$ | 共模输入电阻 | | | | | 1 | | TΩ |
| CMRR | 共模抑制比 | $V_{IC}$ = $V_{ICR(min)}$<br>$V_O$ = 0V<br>$R_S$ = 50Ω | TL07xC | | 70 | 100 | | dB |
| | | | TL07xAC、TL07xBC、TL07xI | | 75 | 100 | | |
| | | | TL07xM | | 80 | 86 | | |
| PSRR | 输入失调电压与电源间的关系 | $V_S$ = ±9V 至 ± 18V<br>$V_O$ = 0V<br>$R_S$ = 50Ω | TL07xC | | 70 | 100 | | dB |
| | | | TL07xAC、TL07xBC、TL07xI | | 80 | 100 | | |
| | | | TL07xM | | 80 | 86 | | |

## 5.8 TL07xC、TL07xAC、TL07xBC、TL07xI、TL07xM 的电气特性（直流）（续）

$V_S = (V_{CC+}) - (V_{CC-}) = \pm 15V$，$T_A = 25°C$ 时（除非另有说明）

| 参数 | | 测试条件(1) (2) | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|
| $I_Q$ | 每个放大器的静态电流 | $V_O = 0V$，空载 | | 1.4 | 2.5 | mA |
| | 通道隔离 | f = 0Hz | | 1 | | μV/V |

(1) 除非另有说明，否则所有特性均在开环条件下以零共模电压测定。
(2) 对于 TL07xC、TL07xAC 和 TL07xBC，完整范围为 $T_A$ = 0°C 至 70°C；对于 TL07xI，$T_A$ = –40°C 至 +85°C；对于 TL07xM，$T_A$ = –55°C 至 +125°C。

## 5.9 TL07xC、TL07xAC、TL07xBC、TL07xI、TL07xM 的电气特性（交流）

$V_S = (V_{CC+}) - (V_{CC-}) = \pm 15V$，$T_A = 25°C$ 时（除非另有说明）

| 参数 | | 测试条件 | | 最小值 | 典型值 | 最大值 | 单位 |
|---|---|---|---|---|---|---|---|
| **AC** | | | | | | | |
| SR | 压摆率 | $V_I$ = 10V，$C_L$ = 100pF，$R_L$ = 2kΩ | TL07xM | 5 | 20 | | V/μs |
| | | | TL07xC、TL07xAC、TL07xBC、TL07xI | 8 | 20 | | V/μs |
| $t_S$ | 稳定时间 | $V_I$ = 20V，$C_L$ = 100pF，$R_L$ = 2kΩ | | | 0.1 | | μs |
| | | | | | 20% | | |
| $e_N$ | 输入电压噪声密度 | 所有 PS 和 NS 封装，所有 TL07xM 器件 | $R_S$ = 20Ω，f = 1kHz | | 18 | | nV/√Hz |
| | | 所有其他器件 | f = 1kHz | | 37 | | nV/√Hz |
| | | | f = 10kHz | | 21 | | |
| $E_N$ | 输入电压噪声 | 所有 PS 和 NS 封装，所有 TL07xM 器件 | $R_S$ = 20Ω，f = 10Hz 至 10kHz | | 4 | | $\mu V_{RMS}$ |
| | | 所有其他器件 | f = 0.1Hz 至 10Hz | | 1.4 | | $\mu V_{RMS}$ |
| $i_N$ | 输入电流噪声 | $R_S$ = 20Ω，f = 1kHz | | | 10 | | fA/√Hz |
| | 相位裕度 | TL07xC、TL07xAC、TL07xBC、TL07xI | G = +1，$R_L$ = 10kΩ，$C_L$ = 20pF | | 56 | | ° |
| | 过载恢复时间 | $V_{IN}$ × 增益 > $V_S$ | | | 300 | | ns |
| THD+N | 总谐波失真 + 噪声 | 所有 PS 和 NS 封装，所有 TL07xM 器件 | $V_O = 6V_{RMS}$，$R_L \geq 2k\Omega$，f = 1kHz，G = +1，$R_S \leq 1k\Omega$ | | 0.003 | | % |
| | | 所有其他器件 | $V_S$ = 40V，$V_O = 6V_{RMS}$，G = +1，f = 1kHz | | 0.00012 | | % |
| EMIRR | EMI 抑制比 | TL07xC、TL07xAC、TL07xBC、TL07xI | f = 1GHz | | 53 | | dB |
| $Z_O$ | 开环输出阻抗 | TL07xC、TL07xAC、TL07xBC、TL07xI | f = 1MHz，$I_O$ = 0A | | 125 | | Ω |

## 5.10 典型特性：TL07xH

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

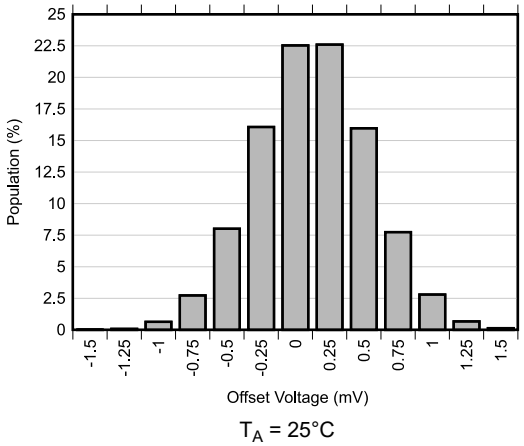



图 5-1. 失调电压产生分布

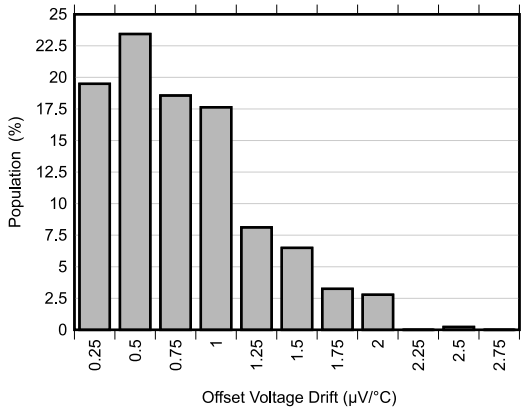



图 5-2. 失调电压漂移分布

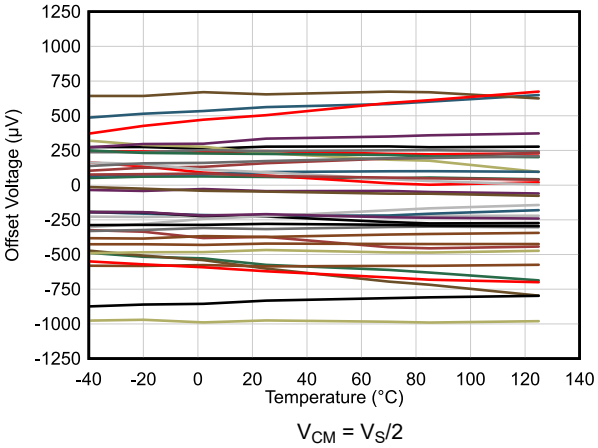



图 5-3. 失调电压与温度间的关系

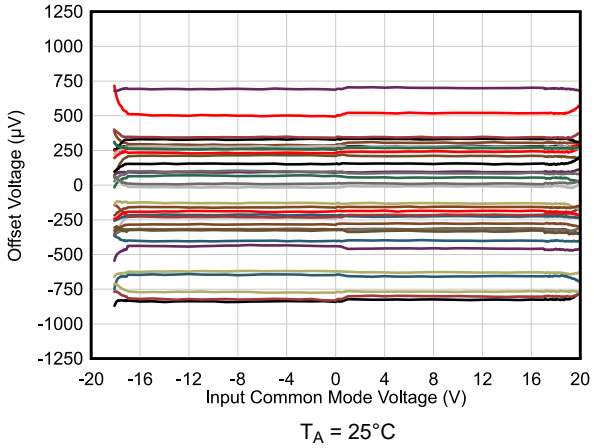



图 5-4. 失调电压与共模电压间的关系

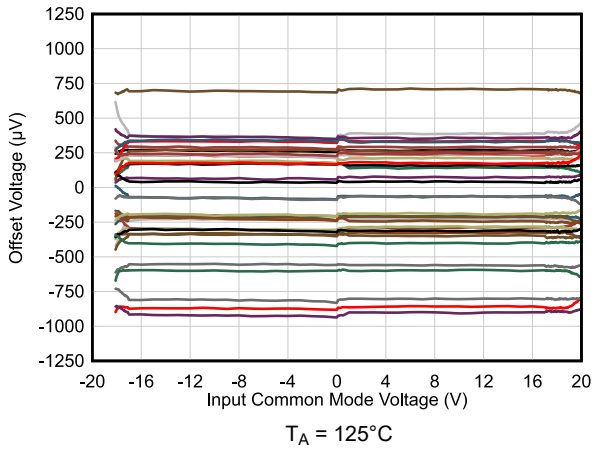



图 5-5. 失调电压与共模电压间的关系

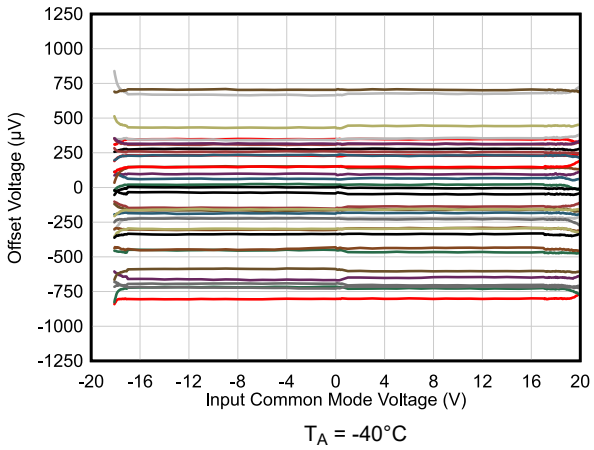



图 5-6. 失调电压与共模电压间的关系

## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

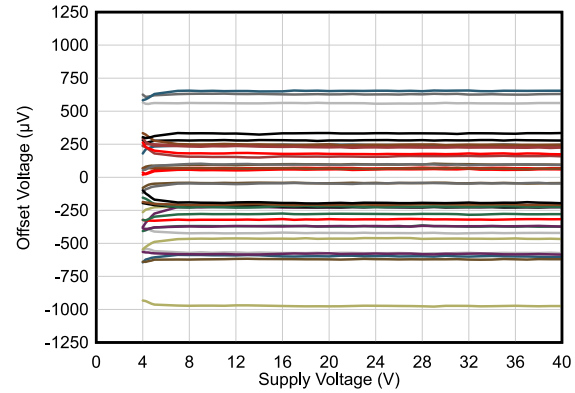



图 5-7. 失调电压与电源间的关系

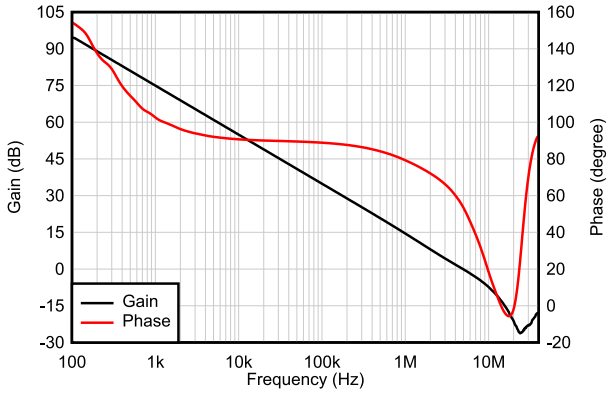



图 5-8. 开环增益和相位与频率间的关系

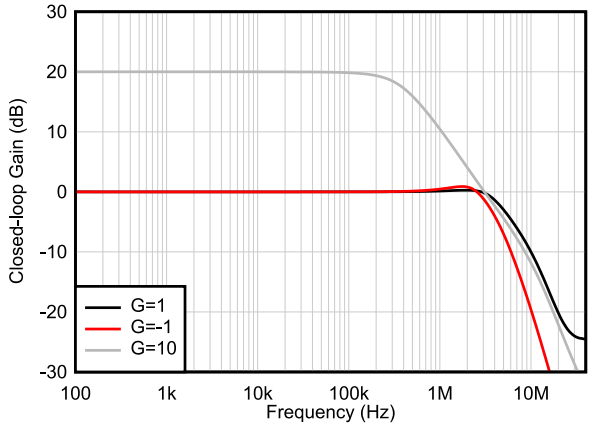



图 5-9. 闭环增益与频率间的关系

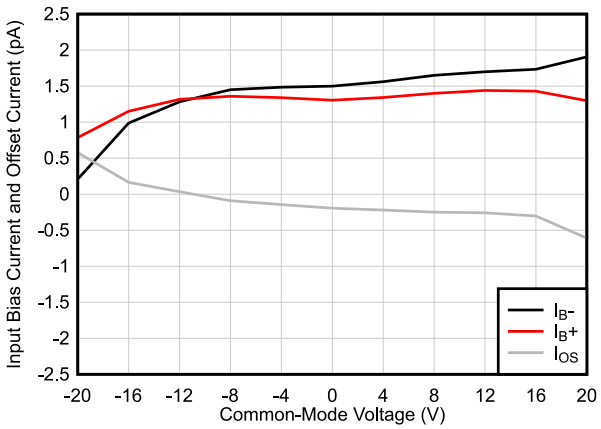



图 5-10. 输入偏置电流与共模电压间的关系

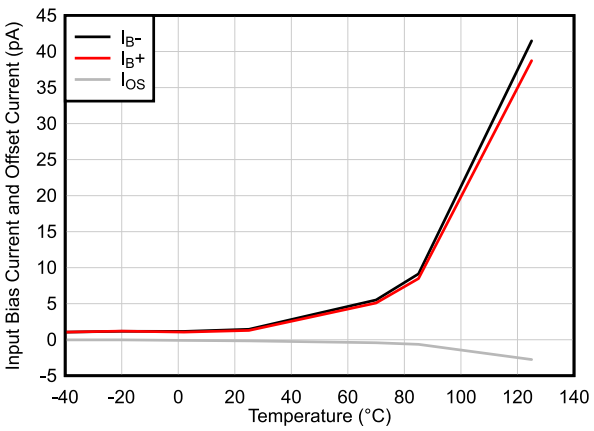



图 5-11. 输入偏置电流与温度间的关系

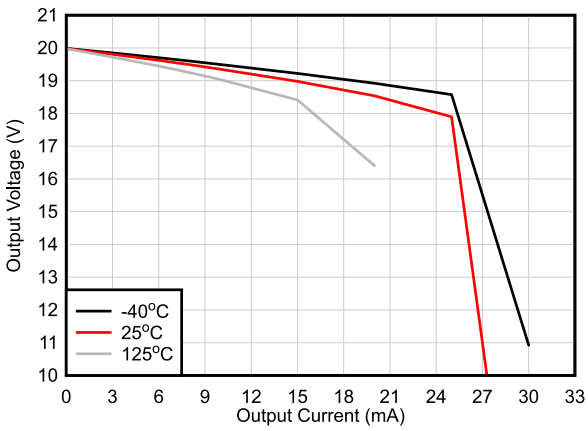



图 5-12. 输出电压摆幅与输出电流（拉电流）间的关系

## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

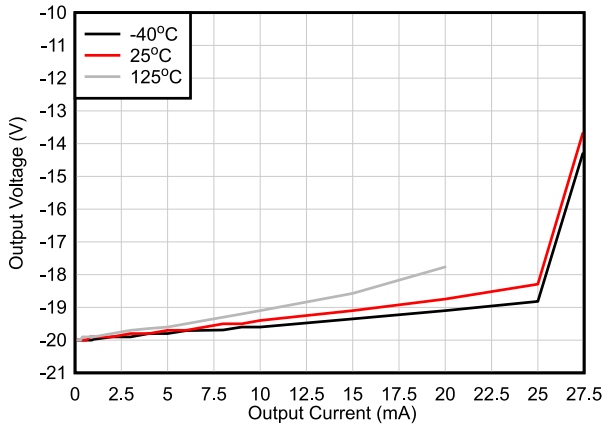



图 5-13. 输出电压摆幅与输出电流（灌电流）间的关系

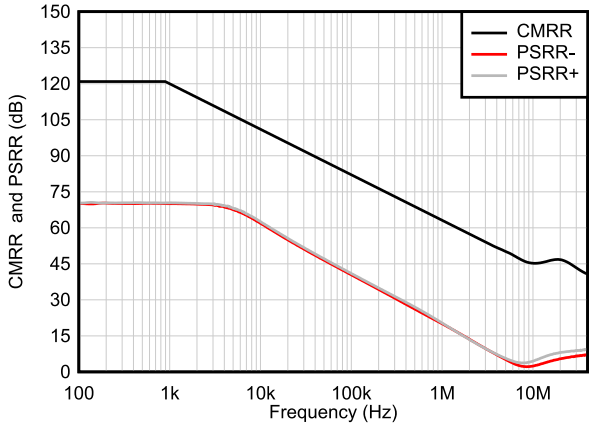



图 5-14. CMRR 和 PSRR 与频率间的关系

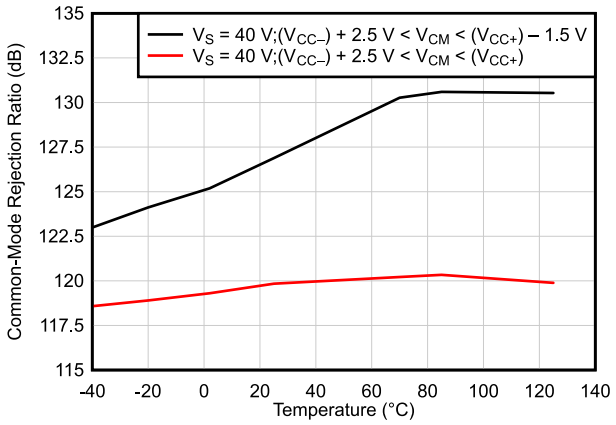



图 5-15. CMRR 与温度间的关系 (dB)

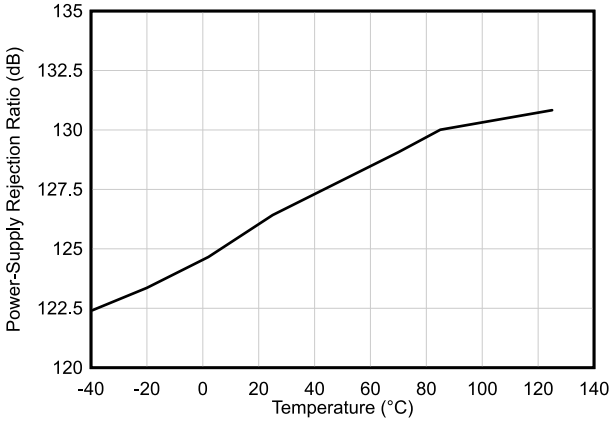



图 5-16. PSRR 与温度间的关系 (dB)

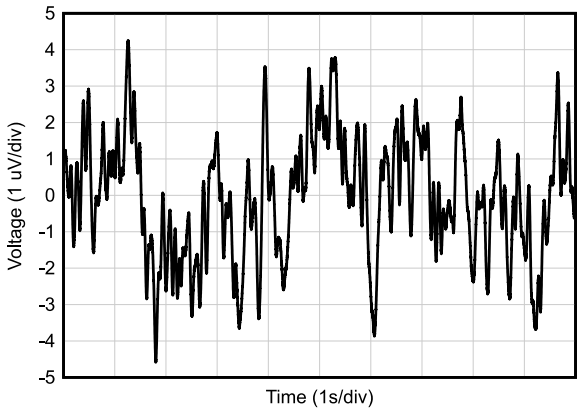



图 5-17. 0.1Hz 至 10Hz 噪声

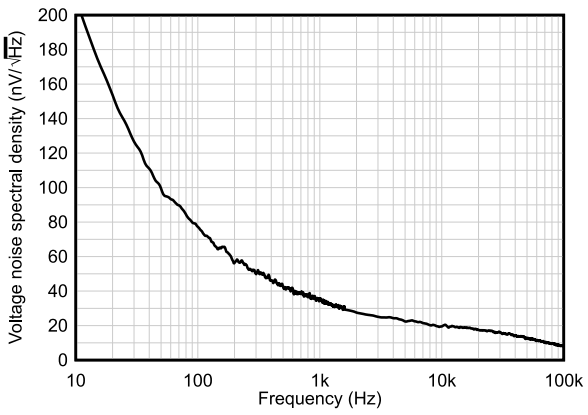



图 5-18. 输入电压噪声频谱密度与频率间的关系

## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

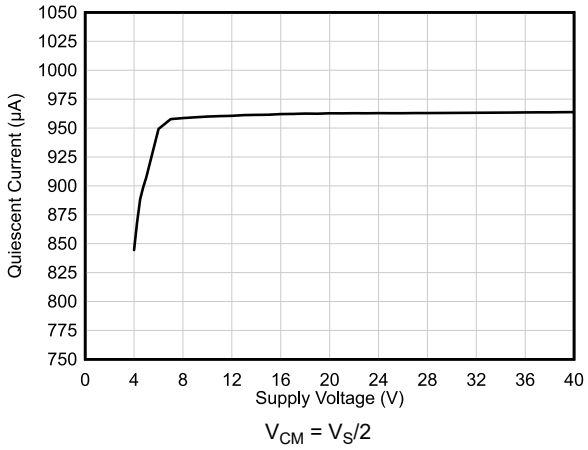



图 5-19. 静态电流与电源电压间的关系

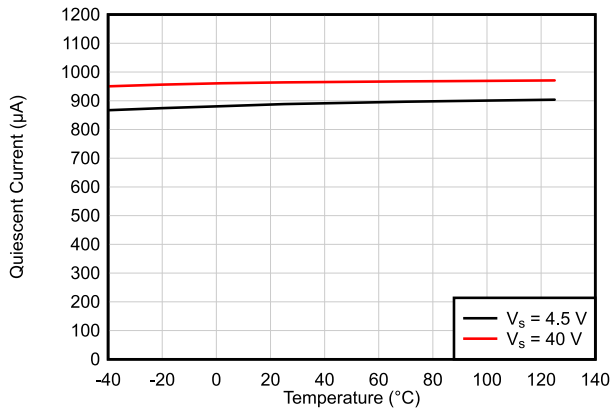



图 5-20. 静态电流与温度间的关系

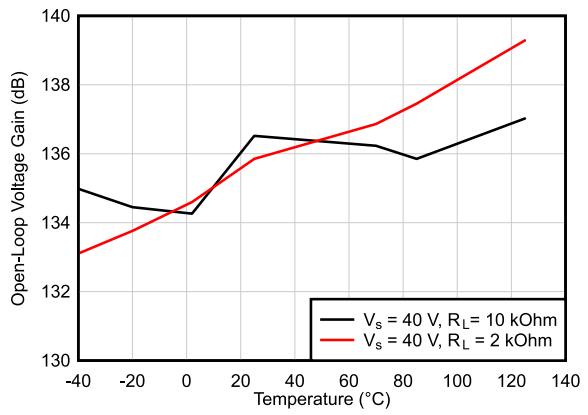



图 5-21. 开环电压增益与温度

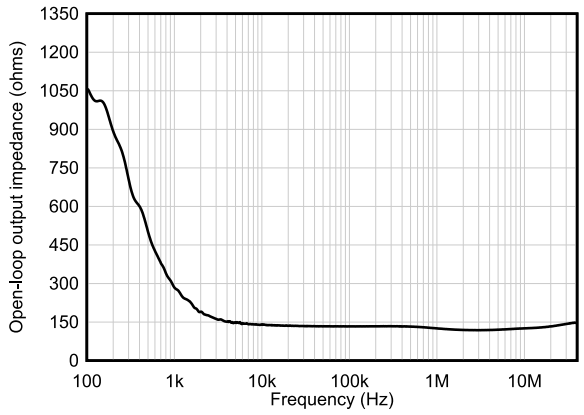



图 5-22. 开环输出阻抗与频率间的关系

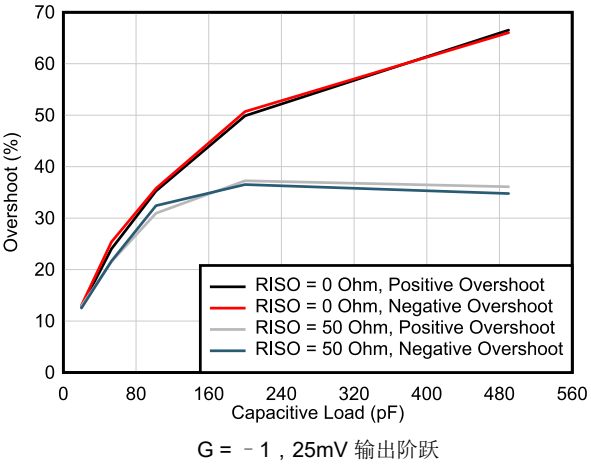



图 5-23. 小信号过冲与容性负载间的关系

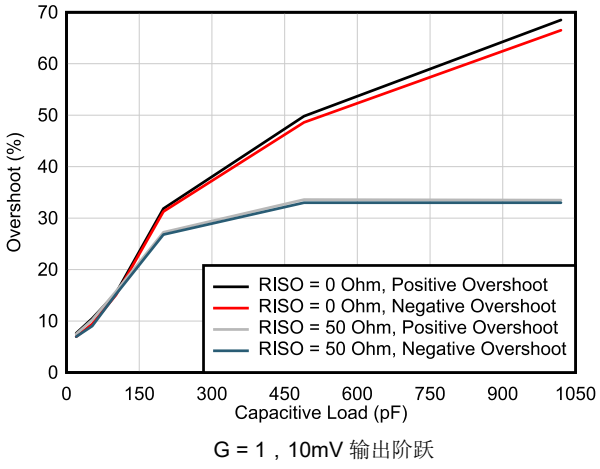



图 5-24. 小信号过冲与容性负载间的关系

## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

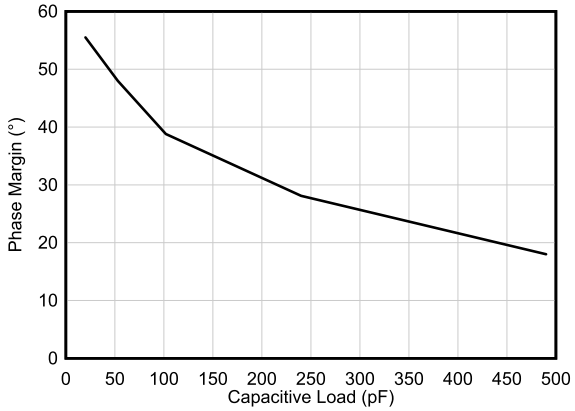
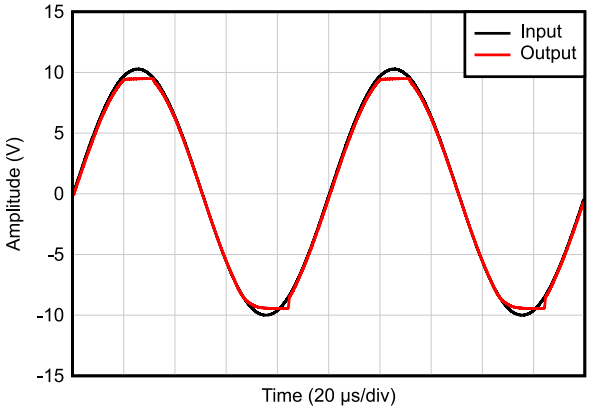
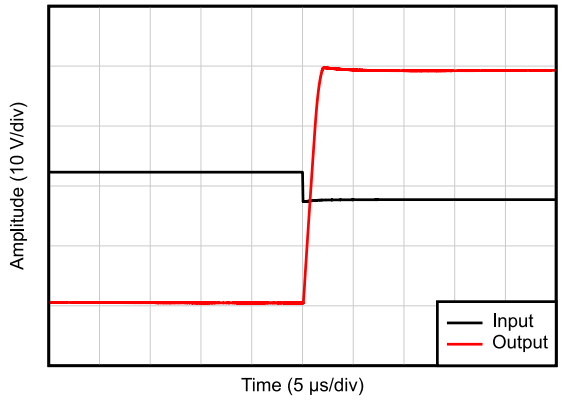



图 5-25. 相位裕度与容性负载间的关系



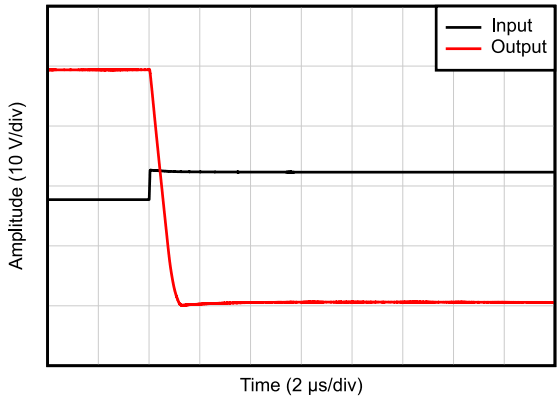

$V_S$ = ±10V，$V_{IN}$ = $V_{OUT}$

图 5-26. 无相位反转



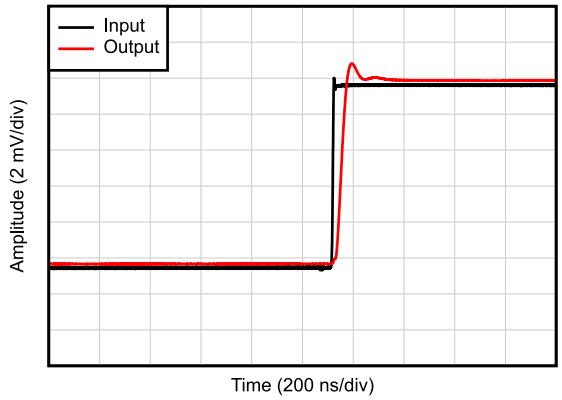

G = -10

图 5-27. 正过载恢复



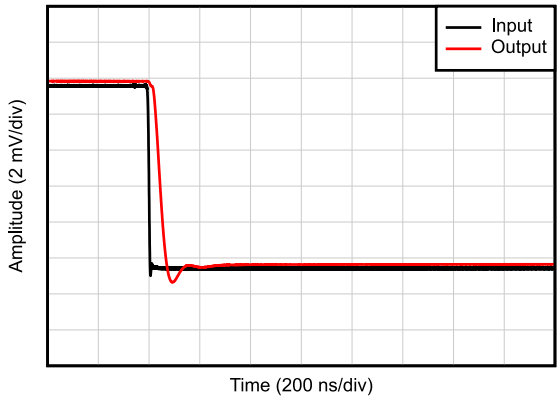

G = -10

图 5-28. 负过载恢复




$C_L$ = 20pF，G = 1，10mV 阶跃响应

图 5-29. 小信号阶跃响应，上升

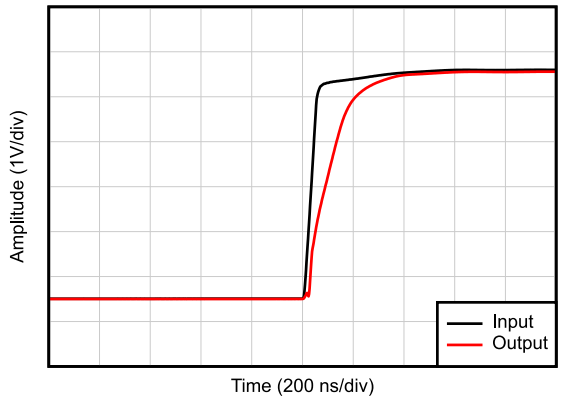



$C_L$ = 20pF，G = 1，10mV 阶跃响应

图 5-30. 小信号阶跃响应，下降

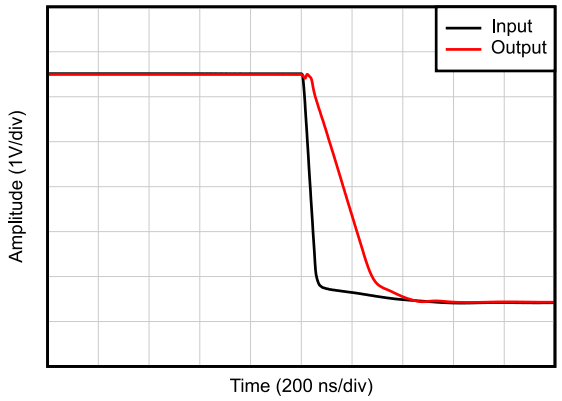
## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）



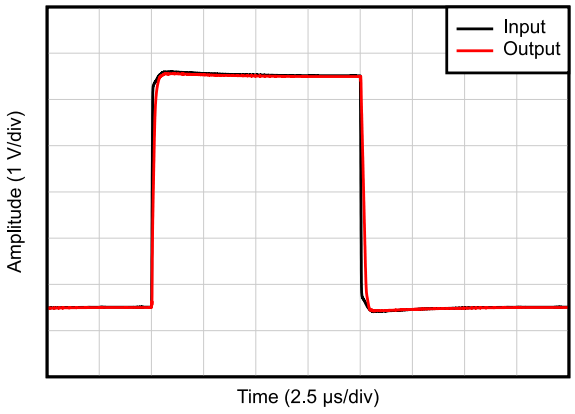

$C_L$ = 20pF，G = 1

**图 5-31. 大信号阶跃响应（上升）**




$C_L$ = 20pF，G = 1

**图 5-32. 大信号阶跃响应（下降）**




$C_L$ = 20pF，G = 1

**图 5-33. 大信号阶跃响应**

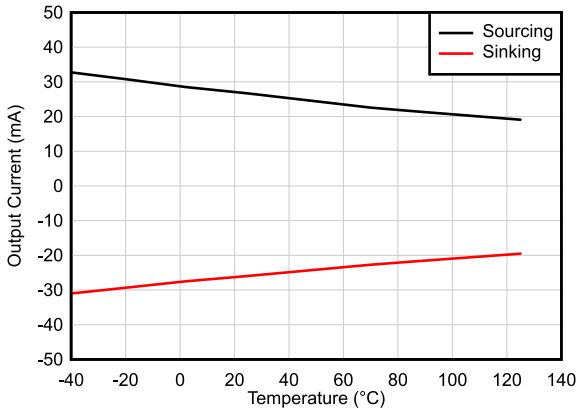



**图 5-34. 短路电流与温度间的关系**

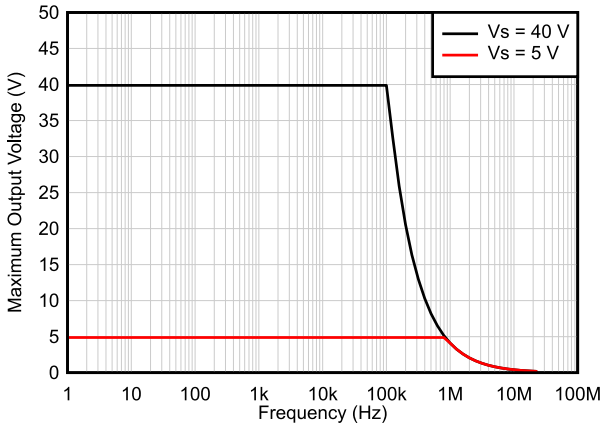



**图 5-35. 最大输出电压与频率间的关系**

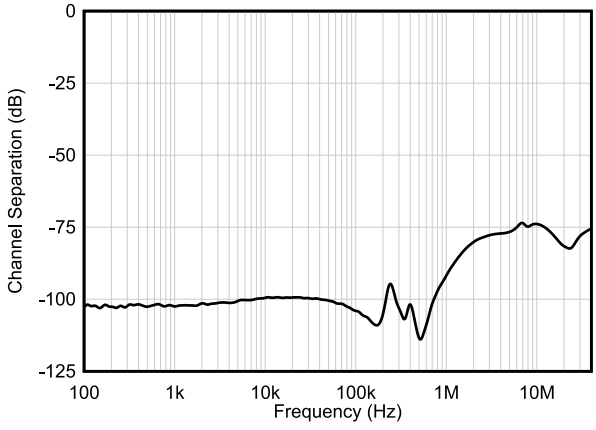



**图 5-36. 通道隔离与频率间的关系**

## 5.10 典型特性：TL07xH（续）

$T_A$ = 25°C，$V_S$ = 40V (±20V)，$V_{CM}$ = $V_S$/2，$R_{LOAD}$ = 10kΩ 连接至 $V_S$/2，且 $C_L$ = 20pF（除非另外说明）

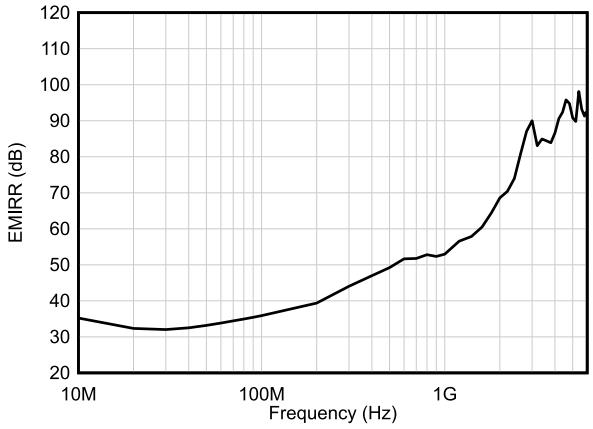



**图 5-37. EMIRR（电磁干扰抑制比）与频率间的关系**

## 5.11 典型特性：除 TL07xH 之外的所有器件

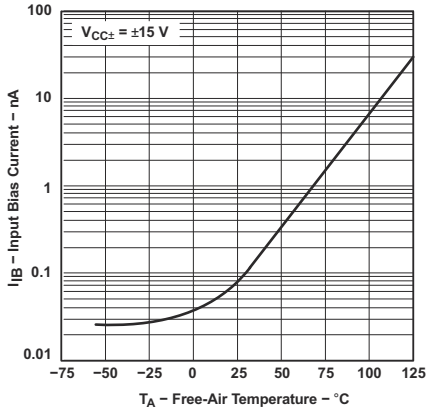



图 5-38. 输入偏置电流与自然通风温度间的关系

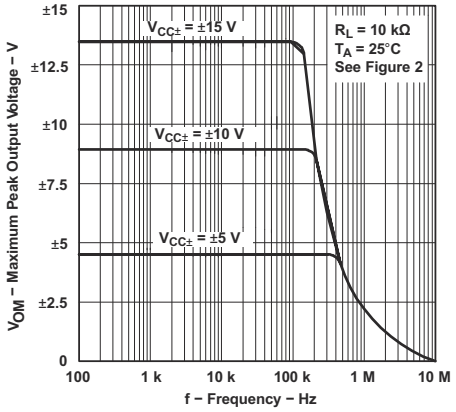



图 5-39. 最大峰值输出电压与频率间的关系

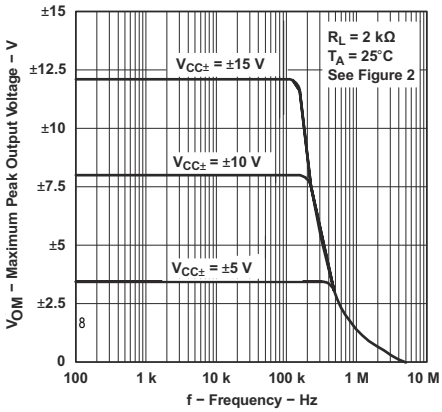



图 5-40. 最大峰值输出电压与频率间的关系

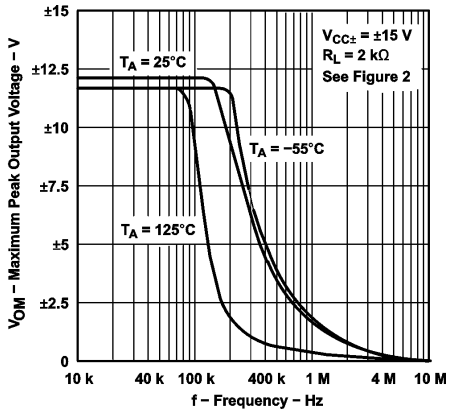



图 5-41. 最大峰值输出电压与频率间的关系

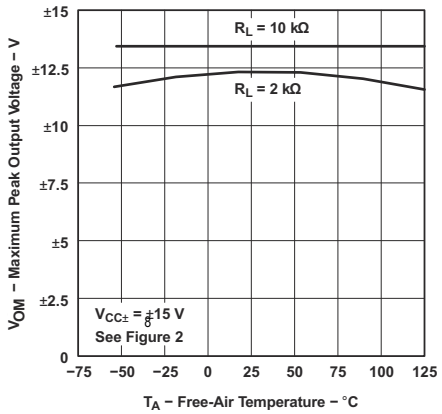



图 5-42. 最大峰值输出电压与自然通风温度间的关系

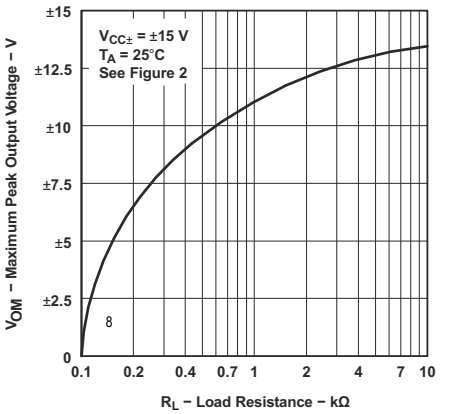



图 5-43. 最大峰值输出电压与负载电阻间的关系

## 5.11 典型特性：除 TL07xH 之外的所有器件（续）

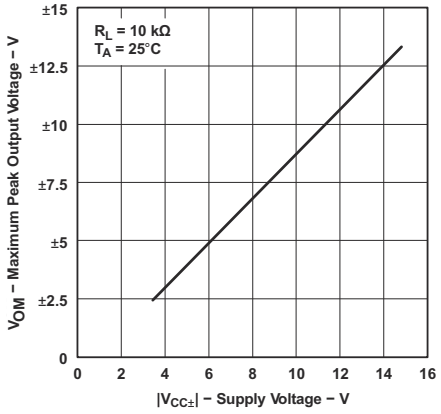



图 5-44. 最大峰值输出电压与电源电压间的关系

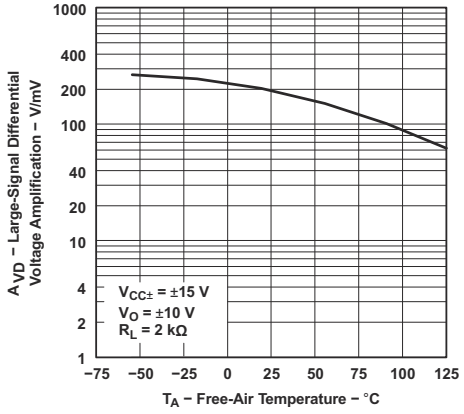



图 5-45. 大信号差分电压放大与自然通风温度间的关系

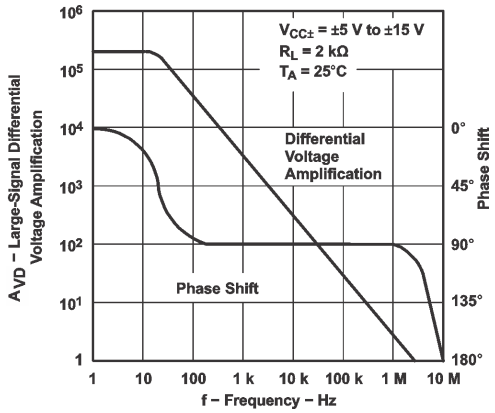



图 5-46. 大信号差分电压放大和相移与频率间的关系

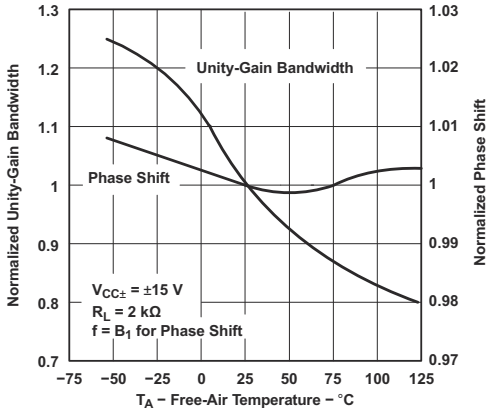



图 5-47. 归一化单位增益带宽和相移与自然通风温度间的关系

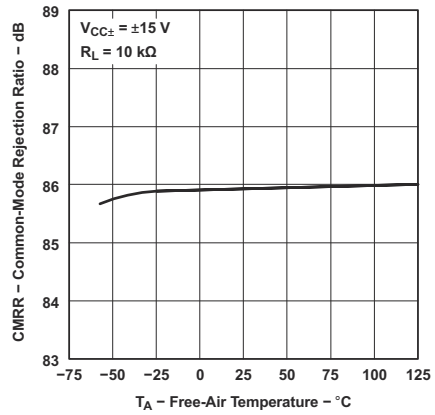



图 5-48. 共模抑制比与自然通风温度间的关系

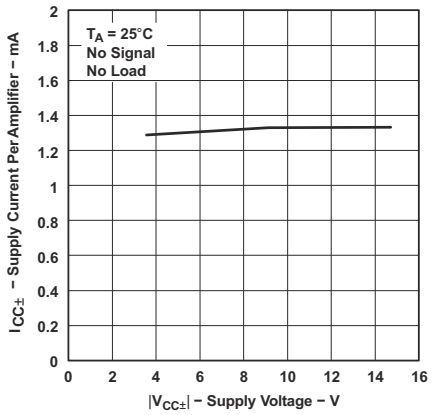



图 5-49. 每个放大器的电源电流与电源电压间的关系

## 5.11 典型特性：除 TL07xH 之外的所有器件 （续）

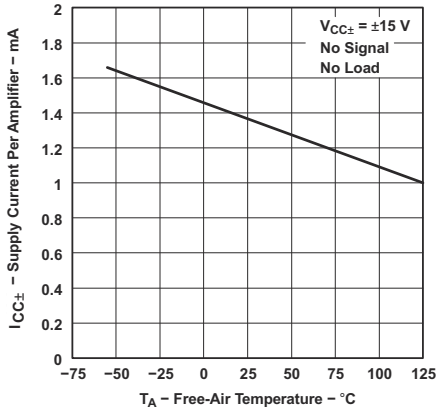



图 5-50. 每个放大器的电源电流与自然通风温度间的关系

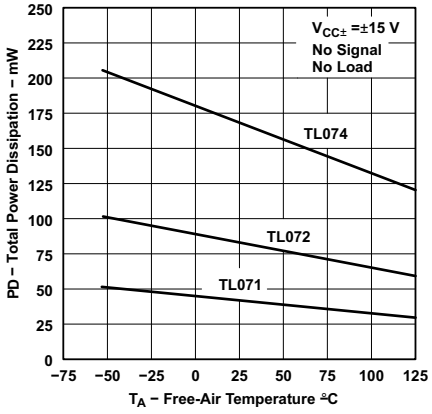



图 5-51. 总功率耗散与自然通风温度间的关系

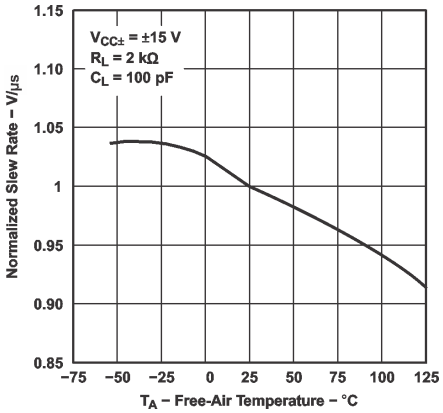



图 5-52. 归一化转换率与自然通风温度间的关系

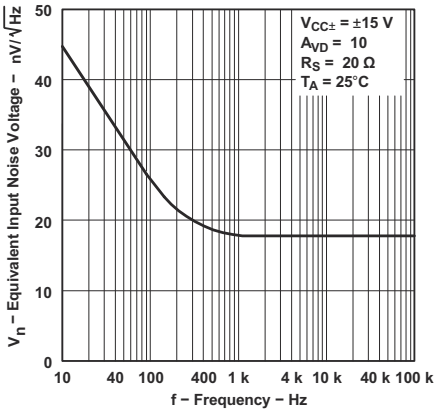



图 5-53. 等效输入噪声电压与频率间的关系

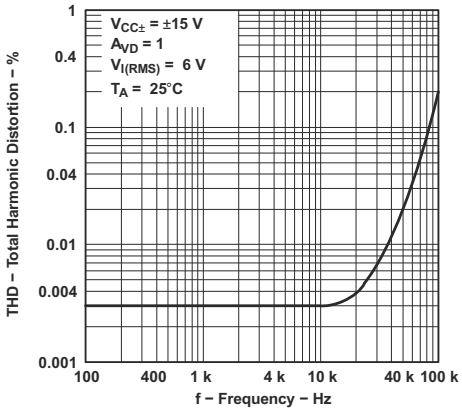



图 5-54. 总谐波失真与频率间的关系

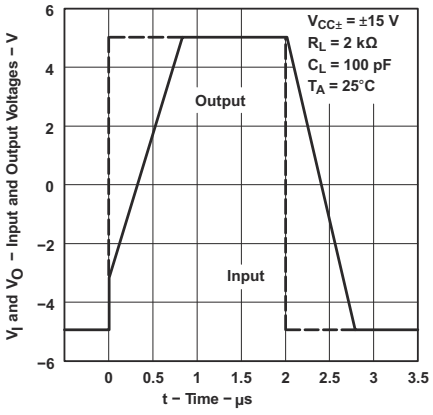



图 5-55. 电压输出器大信号脉冲响应

## 5.11 典型特性：除 TL07xH 之外的所有器件 （续）

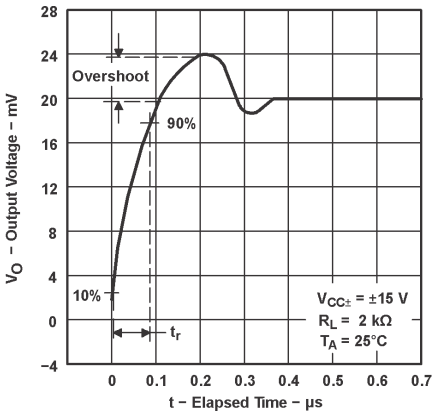



图 5-56. 输出电压与经历时间间的关系

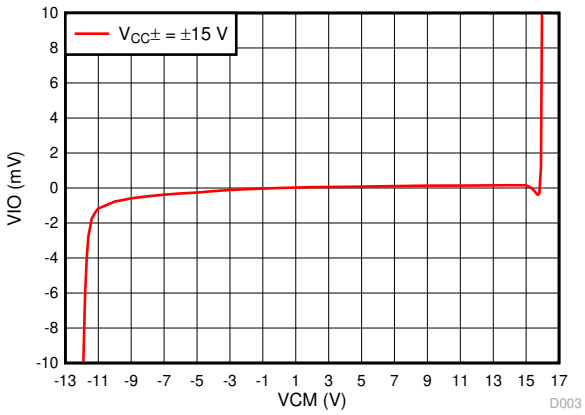



图 5-57. $V_{IO}$ 与 $V_{CM}$ 间的关系

# 6 参数测量信息

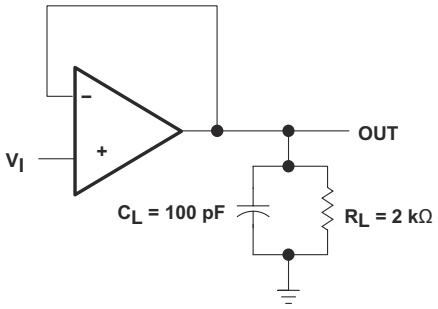



图 6-1. 单位增益放大器

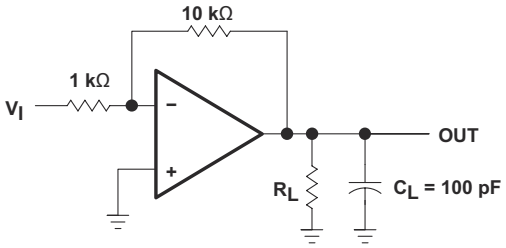



图 6-2. 10 倍增益反相放大器

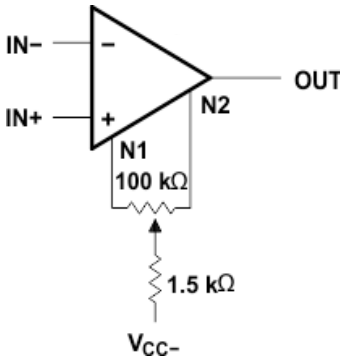



图 6-3. 仅适用于 PS 封装（SO，8）的输入偏移电压调零电路

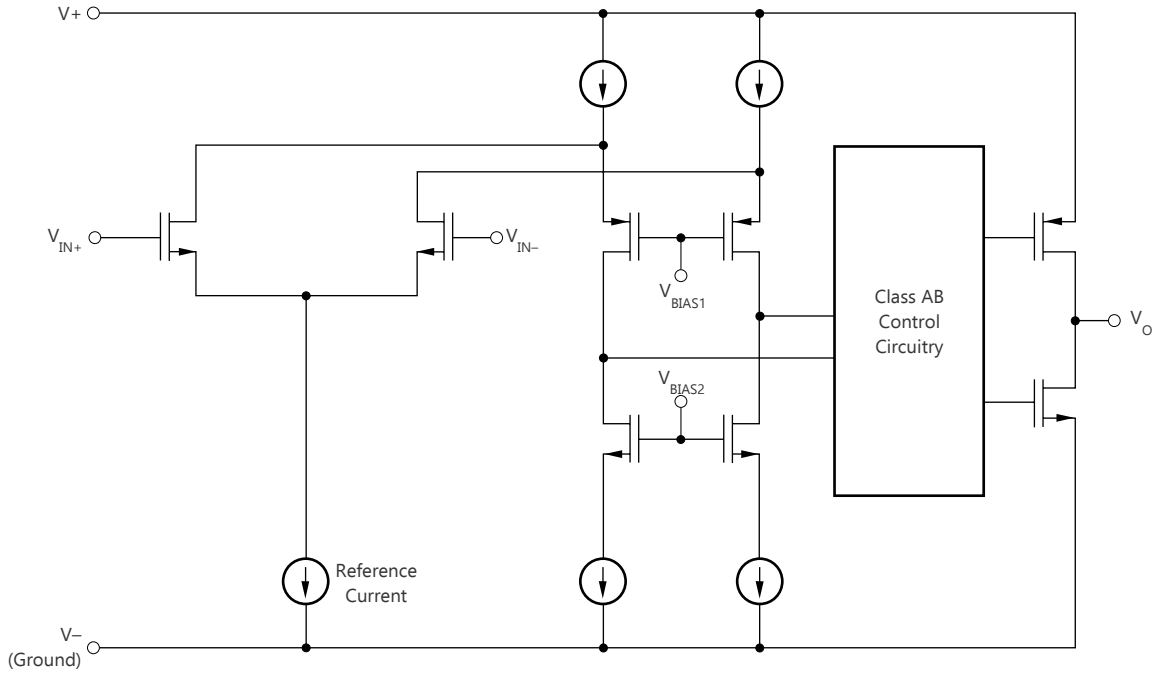
# 7 详细说明

## 7.1 概述

TL07xH（TL071H、TL072H 和 TL074H）系列器件是业界通用的 TL07x（TL071、TL072 和 TL074）器件的下一代版本。这些器件为成本敏感型应用提供了卓越的价值，其特性包括低失调电压（1mV，典型值）、高压摆率（20V/μs，典型值）和正电源的共模输入。得益于高 ESD（2kV，HBM）、集成 EMI 和射频滤波器以及 –40°C 至 125°C 的完整运行温度范围，TL07xH 器件可用于要求严苛的应用。

后缀为 C 的器件在 0°C 至 70°C 的温度范围内运行。后缀为 I 的器件在 −40°C 至 +85°C 的温度范围内运行。后缀为 M 的器件在 −55°C 至 +125°C 的完整军用温度范围内运行。

## 7.2 功能方框图




## 7.3 特性说明

与业界通用的 TL07x 系列相比，TL07xH 系列器件改进了许多规格。以下各节对这些系列之间的几个主要规格进行比较，展示了 TL07xH 系列的优势。

### *7.3.1 总谐波失真*

电路中的电子元件会导致音频信号发生谐波失真。总计谐波失真 (THD) 是衡量音频系统中信号所积累的谐波失真的指标。这些器件具有 0.003% 的极低 THD，这意味着 TL07x 器件用在音频信号应用中时几乎不增加谐波失真。

### *7.3.2 压摆率*

压摆率是运算放大器在输入发生变化时可以改变输出的速率。这些器件具有 20V/μs 的压摆率。

## 7.4 器件功能模式

这些器件会在连接电源时上电。这些器件可根据应用情况作为单电源运算放大器或双电源放大器使用。

# 8 应用和实现

**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

运算放大器的典型应用是反相放大器。该放大器在输入端接受正电压，然后使电压变为负电压。该放大器以相同的方式使负输入电压变为正电压。

## 8.2 典型应用

### *8.2.1 反相放大器*

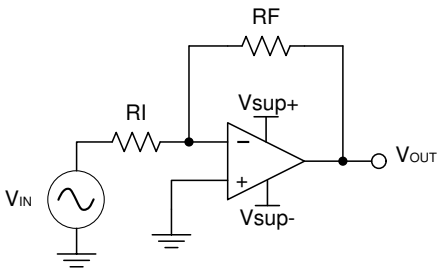



**图 8-1. 反相放大器**

#### 8.2.1.1 设计要求

所选用的电源电压必须大于输入电压范围和输出范围。例如，此应用将 ±0.5V 的信号扩展到了 ±1.8V。将电源设置在 ±12V 就足以满足此应用的要求。

#### 8.2.1.2 详细设计过程

确定反相放大器需要的增益：

$$A_V = \frac{VOUT}{VIN} \quad (1)$$

$$A_V = \frac{1.8}{-0.5} = -3.6 \quad (2)$$

确定所需增益后，选择 RI 或 RF 的阻值。由于放大器电路使用毫安级电流，因此需要选择千欧姆级阻值。此示例使用的 RI 为 10kΩ，这意味着对 RF 使用 36kΩ。增益通过 方程式 3 确定。

$$A_V = -\frac{RF}{RI} \quad (3)$$

#### 8.2.1.3 应用曲线

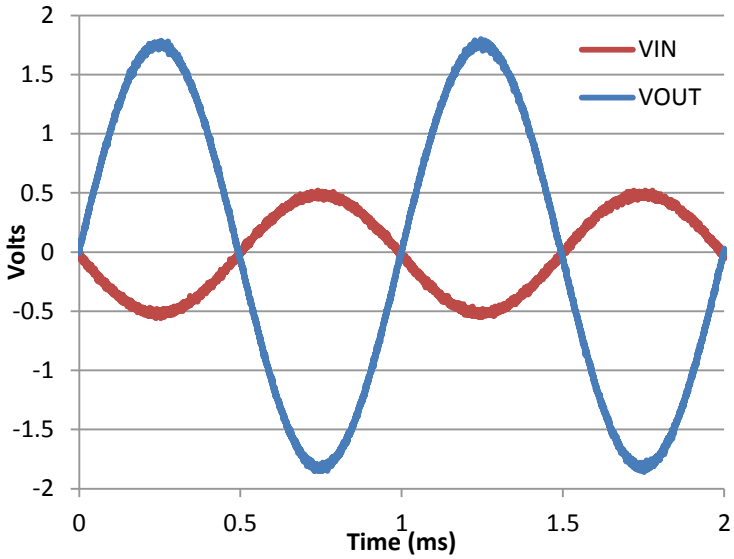



图 8-2. 反相放大器的输入和输出电压

## 8.3 电源相关建议

**小心**

单电源的电源电压超过 36V 或双电源的电源电压范围超出 ±18V 可能会对器件造成损坏（请参阅节 5.1）。

将 0.1 µ F 旁路电容器置于电源引脚附近，可减少从高噪声电源或高阻抗电源中耦合进来的误差。有关旁路电容器放置的更多详细信息，请参阅节 8.4。

## 8.4 布局

### *8.4.1 布局指南*

为了实现器件的出色工作性能，请采用良好的 PCB 布局实践，包括：

- 噪声可通过全部电路电源引脚以及运算放大器自身传入模拟电路。旁路电容器用于为局部模拟电路提供低阻抗电源，从而降低耦合噪声。
  - 在每个电源引脚和接地端之间连接低 ESR 0.1µF 陶瓷旁路电容器，放置位置尽量靠近器件。从 $V_{CC+}$ 到接地端的单个旁路电容器适用于单通道电源应用。
- 将电路中的模拟部分和数字部分单独接地是最简单、最有效的噪声抑制方法之一。多层 PCB 上的一层或多层通常专门用于作为接地平面。接地层有助于散热和减少 EMI 噪声拾取。请小心地对数字接地和模拟接地进行物理隔离，同时应注意接地电流。
- 为了减少寄生耦合，应让输入走线尽可能远离电源或输出走线。如果无法这么做，最好让敏感走线与有噪声的走线垂直相交，而不是平行。
- 外部元件应尽量靠近器件放置。使 RF 和 RG 接近反相输入可尽可能减小寄生电容；另请参阅 节 8.4.2。
- 尽可能缩短输入走线的长度。切记，输入布线是电路中最敏感的部分。
- 考虑在关键布线周围设定驱动型低阻抗保护环。这样可显著减少附近布线在不同电势下产生的漏电流。

### 8.4.2 布局示例

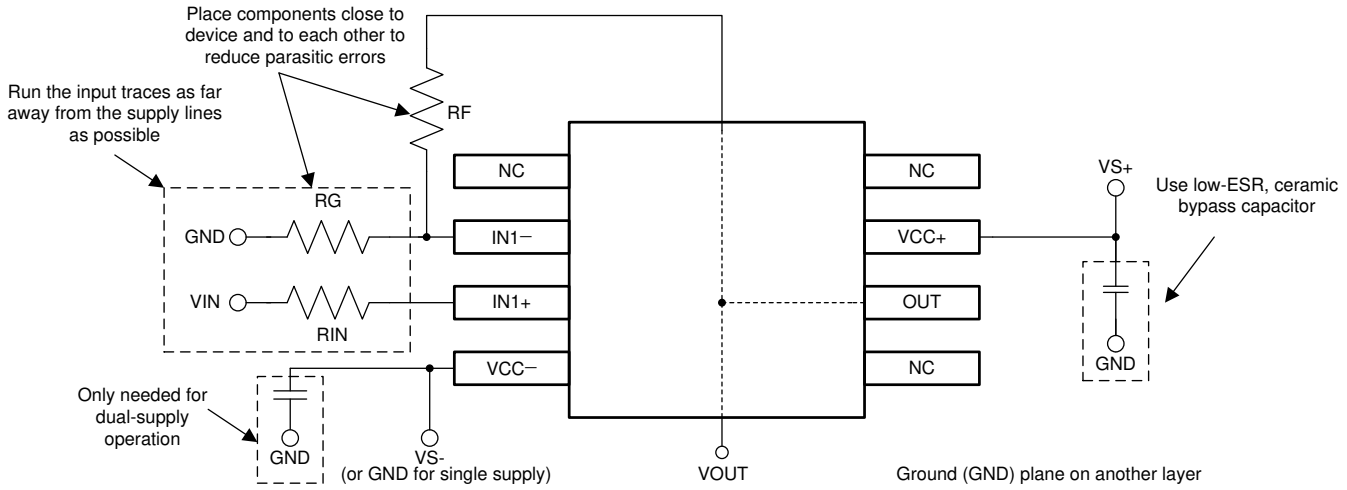



图 8-3. 同相配置的运算放大器电路板布局

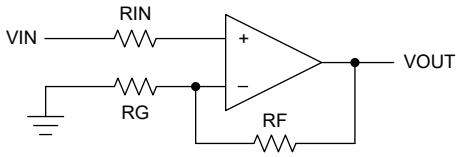



图 8-4. 同相配置的运算放大器原理图

# 9 器件和文档支持

## 9.1 器件支持

### *9.1.1 器件命名规则*

**表 9-1. 器件命名规则**

| 器件型号 | 定义 |
|---|---|
| TL07*xyzzzzzz* | *x* 是通道数 |
| | 如果 *y* = H，则裸片采用最新流程制造 (CSO：RFB )。<br>节 5.7 和 节 5.10 描述了新裸片的性能。 |
| | 如果 *y* ≠ H 且 *y* ≠ M，则裸片采用传统流程制造 (CSO: SFAB) 或采用最新流程 (CSO: RFB )。<br>节 5.8、节 5.9 和 节 5.11 描述了原始裸片的性能。<br>节 5.7 和 节 5.10 描述了新裸片的性能。 |
| | 如果 *y* = M，则该器件适用于 –55°C 到 +125°C 的工作温度范围。裸片采用传统工艺流程 (CSO:SFAB) 制造。<br>*z* 所代表的字母和数字表示分级和封装选项，其说明见 节 5.8 以及数据表末尾的 *封装选项附录*。 |

## 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 V (April 2023) to Revision W (July 2025) | Page |
|---|---|
| • 删除了除 PS ( SO，8 ) 封装之外所有封装中对修整功能的引用 | 1 |
| • 将 *特性* 中的 $V_n$ 从 18nV/ √Hz 更改为 37nV/ √Hz | 1 |
| • 更新了 *器件信息* 表，以便与 *封装选项附录* 一致 | 1 |
| • 更新了首页图像，以显示哪个器件仅使用 PS 封装 | 1 |
| • 更新了 *引脚配置和功能*，以表明只有 PS 封装 ( PDIP，8 ) 具有修整功能 | 3 |

- 添加了有关新旧裸片的注释 ..... 10
- 删除了图 5-19，*THD+N 比与频率间的关系* 和图 5-20，*THD+N 与输出振幅间的关系* ..... 18
- 向图 7-3 的标题添加了“仅适用于 PS 封装（SO，8）” ..... 29
- 删除了 *单位增益缓冲器* 和 *系统示例* 部分 ..... 31
- 从 *详细设计过程* 中删除了公式 1 ..... 31
- 从 *详细设计过程* 中删除了“这可确保器件不会消耗过多电流。” ..... 31
- 添加了 *器件命名规则* 表 ..... 35

| Changes from Revision U (December 2022) to Revision V (April 2023) | Page |
|---|---|
| • 更新了 *概述*、*功能方框图* 和 *特性说明* 部分 | 30 |

## 11 机械、封装和可订购信息

以下页面包含机械、封装和可订购信息。这些信息是指定器件的最新可用数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。如需获取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) |
|---|---|---|---|---|---|---|---|---|---|
| 81023052A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023052A TL072MFKB |
| 8102305HA | Active | Production | CFP (U) \| 10 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305HA TL072M |
| 8102305PA | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305PA TL072M |
| 81023062A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023062A TL074MFKB |
| 8102306CA | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306CA TL074MJB |
| 8102306DA | Active | Production | CFP (W) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306DA TL074MWB |
| JM38510/11905BPA | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510 /11905BPA |
| JM38510/11905BPA.A | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510 /11905BPA |
| M38510/11905BPA | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | JM38510 /11905BPA |
| TL071ACDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 071AC |
| TL071ACDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 071AC |
| TL071ACP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071ACP |
| TL071ACP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071ACP |
| TL071BCDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 071BC |
| TL071BCDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 071BC |
| TL071BCP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071BCP |
| TL071BCP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071BCP |
| TL071CDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL071C |
| TL071CDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL071C |
| TL071CDRE4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | - | Call TI | Call TI | 0 to 70 | |
| TL071CDRG4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | - | Call TI | Call TI | 0 to 70 | |
| TL071CP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071CP |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| TL071CP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL071CP |
| TL071CPE4 | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | - | Call TI | Call TI | 0 to 70 | |
| TL071CPSR | Active | Production | SO (PS) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T071 |
| TL071CPSR.A | Active | Production | SO (PS) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T071 |
| TL071HIDBVR | Active | Production | SOT-23 (DBV) \| 5 | 3000 \| LARGE T&R | Yes | NIPDAU \| SN | Level-1-260C-UNLIM | -40 to 125 | T71V |
| TL071HIDBVR.A | Active | Production | SOT-23 (DBV) \| 5 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | T71V |
| TL071HIDBVRG4 | Active | Production | SOT-23 (DBV) \| 5 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | T71V |
| TL071HIDBVRG4.A | Active | Production | SOT-23 (DBV) \| 5 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | T71V |
| TL071HIDCKR | Active | Production | SC70 (DCK) \| 5 | 3000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 1IO |
| TL071HIDCKR.A | Active | Production | SC70 (DCK) \| 5 | 3000 \| LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 1IO |
| TL071HIDR | Active | Production | SOIC (D) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL071D |
| TL071HIDR.A | Active | Production | SOIC (D) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL071D |
| TL071IDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL071I |
| TL071IDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL071I |
| TL071IDR1G4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL071I |
| TL071IDR1G4.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL071I |
| TL071IDRG4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | - | Call TI | Call TI | -40 to 85 | |
| TL071IP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL071IP |
| TL071IP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL071IP |
| TL072ACDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072AC |
| TL072ACDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072AC |
| TL072ACDRE4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072AC |
| TL072ACDRG4 | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072AC |
| TL072ACP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072ACP |
| TL072ACP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072ACP |
| TL072ACPE4 | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | - | Call TI | Call TI | 0 to 70 | |
| TL072ACPS | Active | Production | SO (PS) \| 8 | 80 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072A |
| TL072ACPS.A | Active | Production | SO (PS) \| 8 | 80 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072A |
| TL072BCD | Obsolete | Production | SOIC (D) \| 8 | - | - | Call TI | Call TI | 0 to 70 | 072BC |
| TL072BCDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072BC |
| TL072BCDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | 072BC |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| TL072BCP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072BCP |
| TL072BCP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072BCP |
| TL072CDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL072C |
| TL072CDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL072C |
| TL072CP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072CP |
| TL072CP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL072CP |
| TL072CPS | Active | Production | SO (PS) \| 8 | 80 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPS.A | Active | Production | SO (PS) \| 8 | 80 \| TUBE | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPSR | Active | Production | SO (PS) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPSR.A | Active | Production | SO (PS) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPSRG4 | Active | Production | SO (PS) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPWR | Active | Production | TSSOP (PW) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPWR.A | Active | Production | TSSOP (PW) \| 8 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T072 |
| TL072CPWRE4 | Active | Production | TSSOP (PW) \| 8 | 2000 \| LARGE T&R | - | Call TI | Call TI | 0 to 70 | |
| TL072CPWRG4 | Active | Production | TSSOP (PW) \| 8 | 2000 \| LARGE T&R | - | Call TI | Call TI | 0 to 70 | |
| TL072HIDDFR | Active | Production | SOT-23-THIN (DDF) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | O72F |
| TL072HIDDFR.A | Active | Production | SOT-23-THIN (DDF) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | O72F |
| TL072HIDR | Active | Production | SOIC (D) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL072D |
| TL072HIDR.A | Active | Production | SOIC (D) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL072D |
| TL072HIPWR | Active | Production | TSSOP (PW) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | 072HPW |
| TL072HIPWR.A | Active | Production | TSSOP (PW) \| 8 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | 072HPW |
| TL072IDR | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL072I |
| TL072IDR.A | Active | Production | SOIC (D) \| 8 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL072I |
| TL072IP | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL072IP |
| TL072IP.A | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL072IP |
| TL072IPE4 | Active | Production | PDIP (P) \| 8 | 50 \| TUBE | - | Call TI | Call TI | -40 to 85 | |
| TL072MFKB | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023052A TL072MFKB |
| TL072MFKB.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023052A TL072MFKB |
| TL072MJG | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL072MJG |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| TL072MJG.A | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL072MJG |
| TL072MJGB | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305PA TL072M |
| TL072MJGB.A | Active | Production | CDIP (JG) \| 8 | 50 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305PA TL072M |
| TL072MUB | Active | Production | CFP (U) \| 10 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305HA TL072M |
| TL072MUB.A | Active | Production | CFP (U) \| 10 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102305HA TL072M |
| TL074ACD | Obsolete | Production | SOIC (D) \| 14 | - | - | Call TI | Call TI | 0 to 70 | TL074AC |
| TL074ACDR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074AC |
| TL074ACDR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074AC |
| TL074ACN | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074ACN |
| TL074ACN.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074ACN |
| TL074ACNSR | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074A |
| TL074ACNSR.A | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074A |
| TL074BCD | Obsolete | Production | SOIC (D) \| 14 | - | - | Call TI | Call TI | 0 to 70 | TL074BC |
| TL074BCDR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074BC |
| TL074BCDR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074BC |
| TL074BCDRE4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074BC |
| TL074BCDRG4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074BC |
| TL074BCN | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074BCN |
| TL074BCN.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074BCN |
| TL074CD | Obsolete | Production | SOIC (D) \| 14 | - | - | Call TI | Call TI | 0 to 70 | TL074C |
| TL074CDBR | Active | Production | SSOP (DB) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074CDBR.A | Active | Production | SSOP (DB) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074CDR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074C |
| TL074CDR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074C |
| TL074CDRG4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074C |
| TL074CDRG4.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074C |
| TL074CN | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074CN |
| TL074CN.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | 0 to 70 | TL074CN |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| TL074CNSR | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074 |
| TL074CNSR.A | Active | Production | SOP (NS) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | TL074 |
| TL074CPW | Obsolete | Production | TSSOP (PW) \| 14 | - | - | Call TI | Call TI | 0 to 70 | T074 |
| TL074CPWR | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074CPWR.A | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074CPWRE4 | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074CPWRG4 | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | 0 to 70 | T074 |
| TL074HIDR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074HID |
| TL074HIDR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074HID |
| TL074HIDRG4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074HID |
| TL074HIDRG4.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074HID |
| TL074HIDYYR | Active | Production | SOT-23-THIN (DYY) \| 14 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | T074HDYY |
| TL074HIDYYR.A | Active | Production | SOT-23-THIN (DYY) \| 14 | 3000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | T074HDYY |
| TL074HIPWR | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074PW |
| TL074HIPWR.A | Active | Production | TSSOP (PW) \| 14 | 2000 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TL074PW |
| TL074ID | Obsolete | Production | SOIC (D) \| 14 | - | - | Call TI | Call TI | -40 to 85 | TL074I |
| TL074IDR | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL074I |
| TL074IDR.A | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL074I |
| TL074IDRE4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL074I |
| TL074IDRG4 | Active | Production | SOIC (D) \| 14 | 2500 \| LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TL074I |
| TL074IN | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL074IN |
| TL074IN.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL074IN |
| TL074ING4 | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL074IN |
| TL074ING4.A | Active | Production | PDIP (N) \| 14 | 25 \| TUBE | Yes | NIPDAU | N/A for Pkg Type | -40 to 85 | TL074IN |
| TL074MFK | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL074MFK |
| TL074MFK.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL074MFK |
| TL074MFKB | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023062A TL074MFKB |
| TL074MFKB.A | Active | Production | LCCC (FK) \| 20 | 55 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 81023062A TL074MFKB |

| 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) |
|---|---|---|---|---|---|---|---|---|---|
| TL074MJ | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL074MJ |
| TL074MJ.A | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | TL074MJ |
| TL074MJB | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306CA TL074MJB |
| TL074MJB.A | Active | Production | CDIP (J) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306CA TL074MJB |
| TL074MWB | Active | Production | CFP (W) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306DA TL074MWB |
| TL074MWB.A | Active | Production | CFP (W) \| 14 | 25 \| TUBE | No | SNPB | N/A for Pkg Type | -55 to 125 | 8102306DA TL074MWB |

(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.

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 TL072, TL072M, TL074, TL074M :**

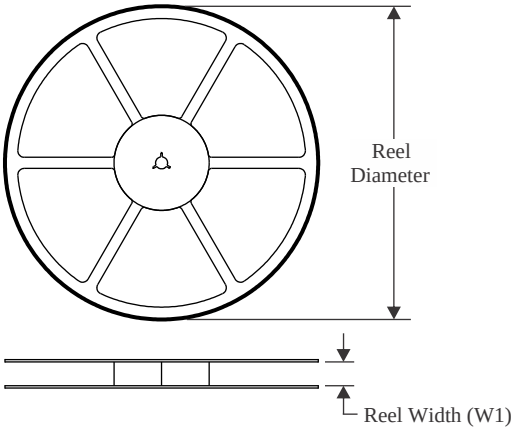
- Catalog : TL072, TL074
- Enhanced Product : TL072-EP, TL072-EP, TL074-EP, TL074-EP
- Military : TL072M, TL074M

NOTE: Qualified Version Definitions:

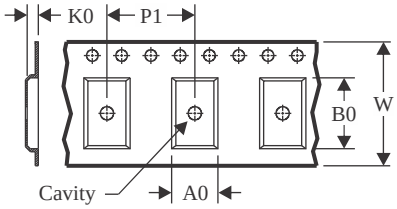
- Catalog - TI's standard catalog product
- Enhanced Product - Supports Defense, Aerospace and Medical Applications
- Military - QML certified for Military and Defense Applications

## TAPE AND REEL INFORMATION

**REEL DIMENSIONS**

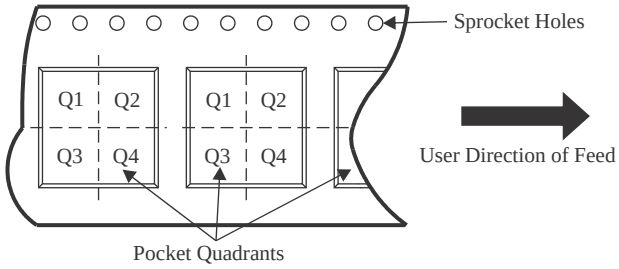



**TAPE DIMENSIONS**




| | |
|---|---|
| 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**

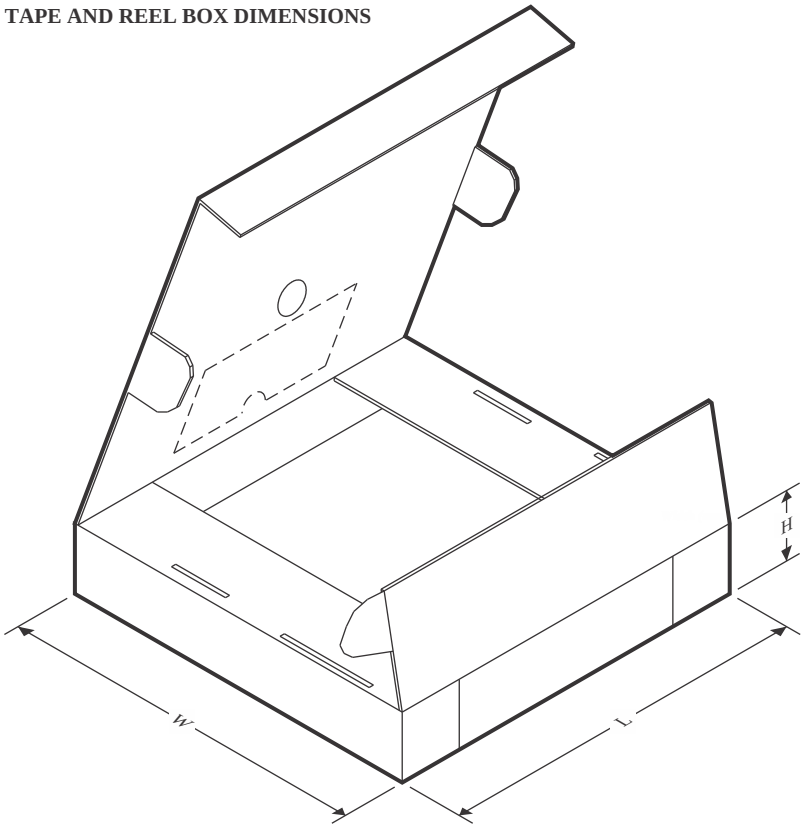



*All dimensions are nominal

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TL071ACDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL071BCDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL071CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL071CPSR | SO | PS | 8 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| TL071HIDBVR | SOT-23 | DBV | 5 | 3000 | 180.0 | 8.4 | 3.2 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TL071HIDBVRG4 | SOT-23 | DBV | 5 | 3000 | 180.0 | 8.4 | 3.2 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TL071HIDCKR | SC70 | DCK | 5 | 3000 | 178.0 | 9.0 | 2.4 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL071HIDR | SOIC | D | 8 | 3000 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL071IDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL071IDR1G4 | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL072ACDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL072BCDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL072CDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL072CPSR | SO | PS | 8 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| TL072CPWR | TSSOP | PW | 8 | 2000 | 330.0 | 12.4 | 7.0 | 3.6 | 1.6 | 8.0 | 12.0 | Q1 |

| 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 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| TL072HIDDFR | SOT-23-THIN | DDF | 8 | 3000 | 180.0 | 8.4 | 3.2 | 3.2 | 1.4 | 4.0 | 8.0 | Q3 |
| TL072HIDR | SOIC | D | 8 | 3000 | 330.0 | 12.4 | 6.5 | 5.4 | 2.0 | 8.0 | 12.0 | Q1 |
| TL072HIDR | SOIC | D | 8 | 3000 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL072HIPWR | TSSOP | PW | 8 | 3000 | 330.0 | 12.4 | 7.0 | 3.6 | 1.6 | 8.0 | 12.0 | Q1 |
| TL072IDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.5 | 5.4 | 2.0 | 8.0 | 12.0 | Q1 |
| TL072IDR | SOIC | D | 8 | 2500 | 330.0 | 12.4 | 6.4 | 5.2 | 2.1 | 8.0 | 12.0 | Q1 |
| TL074ACDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074ACNSR | SOP | NS | 14 | 2000 | 330.0 | 16.4 | 8.1 | 10.4 | 2.5 | 12.0 | 16.0 | Q1 |
| TL074BCDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074CDBR | SSOP | DB | 14 | 2000 | 330.0 | 16.4 | 8.35 | 6.6 | 2.4 | 12.0 | 16.0 | Q1 |
| TL074CDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074CDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.35 | 2.3 | 8.0 | 16.0 | Q1 |
| TL074CDRG4 | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074CNSR | SOP | NS | 14 | 2000 | 330.0 | 16.4 | 8.45 | 10.55 | 2.5 | 12.0 | 16.2 | Q1 |
| TL074CPWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| TL074CPWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| TL074HIDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.35 | 2.3 | 8.0 | 16.0 | Q1 |
| TL074HIDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074HIDRG4 | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |
| TL074HIDYYR | SOT-23-THIN | DYY | 14 | 3000 | 330.0 | 12.4 | 4.8 | 3.6 | 1.6 | 8.0 | 12.0 | Q3 |
| TL074HIPWR | TSSOP | PW | 14 | 2000 | 330.0 | 12.4 | 6.9 | 5.6 | 1.6 | 8.0 | 12.0 | Q1 |
| TL074IDR | SOIC | D | 14 | 2500 | 330.0 | 16.4 | 6.5 | 9.0 | 2.1 | 8.0 | 16.0 | Q1 |

TAPE AND REEL BOX DIMENSIONS

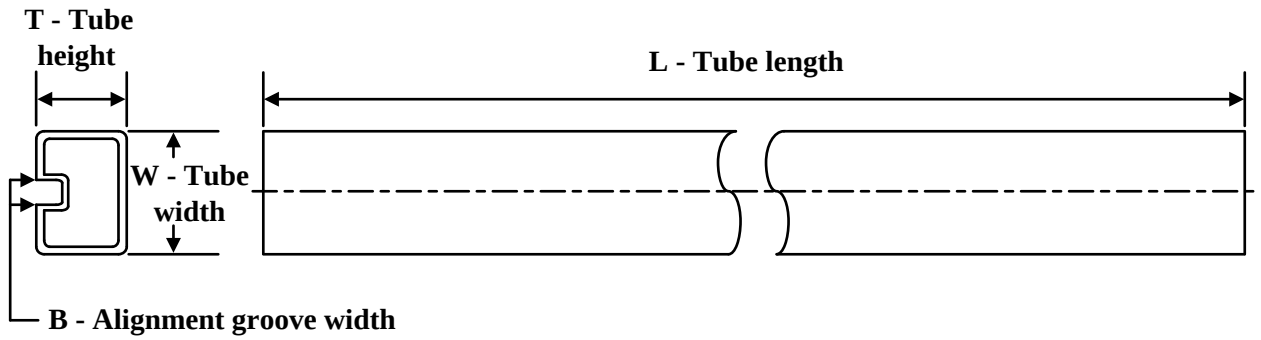



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| TL071ACDR | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |
| TL071BCDR | SOIC | D | 8 | 2500 | 340.5 | 338.1 | 20.6 |
| TL071CDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL071CPSR | SO | PS | 8 | 2000 | 353.0 | 353.0 | 32.0 |
| TL071HIDBVR | SOT-23 | DBV | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL071HIDBVRG4 | SOT-23 | DBV | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL071HIDCKR | SC70 | DCK | 5 | 3000 | 190.0 | 190.0 | 30.0 |
| TL071HIDR | SOIC | D | 8 | 3000 | 353.0 | 353.0 | 32.0 |
| TL071IDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL071IDR1G4 | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL072ACDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL072BCDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL072CDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL072CPSR | SO | PS | 8 | 2000 | 353.0 | 353.0 | 32.0 |
| TL072CPWR | TSSOP | PW | 8 | 2000 | 353.0 | 353.0 | 32.0 |
| TL072HIDDFR | SOT-23-THIN | DDF | 8 | 3000 | 210.0 | 185.0 | 35.0 |
| TL072HIDR | SOIC | D | 8 | 3000 | 367.0 | 367.0 | 35.0 |
| TL072HIDR | SOIC | D | 8 | 3000 | 353.0 | 353.0 | 32.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|---|---|---|---|---|---|---|---|
| TL072HIPWR | TSSOP | PW | 8 | 3000 | 353.0 | 353.0 | 32.0 |
| TL072IDR | SOIC | D | 8 | 2500 | 367.0 | 367.0 | 35.0 |
| TL072IDR | SOIC | D | 8 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074ACDR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074ACNSR | SOP | NS | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074BCDR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074CDBR | SSOP | DB | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074CDR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074CDR | SOIC | D | 14 | 2500 | 367.0 | 367.0 | 35.0 |
| TL074CDRG4 | SOIC | D | 14 | 2500 | 340.5 | 336.1 | 32.0 |
| TL074CNSR | SOP | NS | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074CPWR | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074CPWR | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074HIDR | SOIC | D | 14 | 2500 | 367.0 | 367.0 | 35.0 |
| TL074HIDR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074HIDRG4 | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |
| TL074HIDYYR | SOT-23-THIN | DYY | 14 | 3000 | 336.6 | 336.6 | 31.8 |
| TL074HIPWR | TSSOP | PW | 14 | 2000 | 353.0 | 353.0 | 32.0 |
| TL074IDR | SOIC | D | 14 | 2500 | 353.0 | 353.0 | 32.0 |

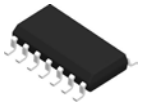
## TUBE




*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| 81023052A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 8102305HA | U | CFP | 10 | 25 | 506.98 | 26.16 | 6220 | NA |
| 81023062A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| 8102306DA | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |
| TL071ACP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071ACP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071BCP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071BCP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071CP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071CP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071IP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL071IP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072ACP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072ACP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072ACPS | PS | SOP | 8 | 80 | 530 | 10.5 | 4000 | 4.1 |
| TL072ACPS.A | PS | SOP | 8 | 80 | 530 | 10.5 | 4000 | 4.1 |
| TL072BCP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072BCP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072CP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072CP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072CPS | PS | SOP | 8 | 80 | 530 | 10.5 | 4000 | 4.1 |
| TL072CPS.A | PS | SOP | 8 | 80 | 530 | 10.5 | 4000 | 4.1 |
| TL072IP | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072IP.A | P | PDIP | 8 | 50 | 506 | 13.97 | 11230 | 4.32 |
| TL072MFKB | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL072MFKB.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL072MUB | U | CFP | 10 | 25 | 506.98 | 26.16 | 6220 | NA |
| TL072MUB.A | U | CFP | 10 | 25 | 506.98 | 26.16 | 6220 | NA |
| TL074ACN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| TL074ACN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074ACN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074ACN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074BCN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074BCN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074BCN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074BCN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074CN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074CN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074IN | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074IN.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074ING4 | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074ING4.A | N | PDIP | 14 | 25 | 506 | 13.97 | 11230 | 4.32 |
| TL074MFK | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL074MFK.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL074MFKB | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL074MFKB.A | FK | LCCC | 20 | 55 | 506.98 | 12.06 | 2030 | NA |
| TL074MWB | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |
| TL074MWB.A | W | CFP | 14 | 25 | 506.98 | 26.16 | 6220 | NA |

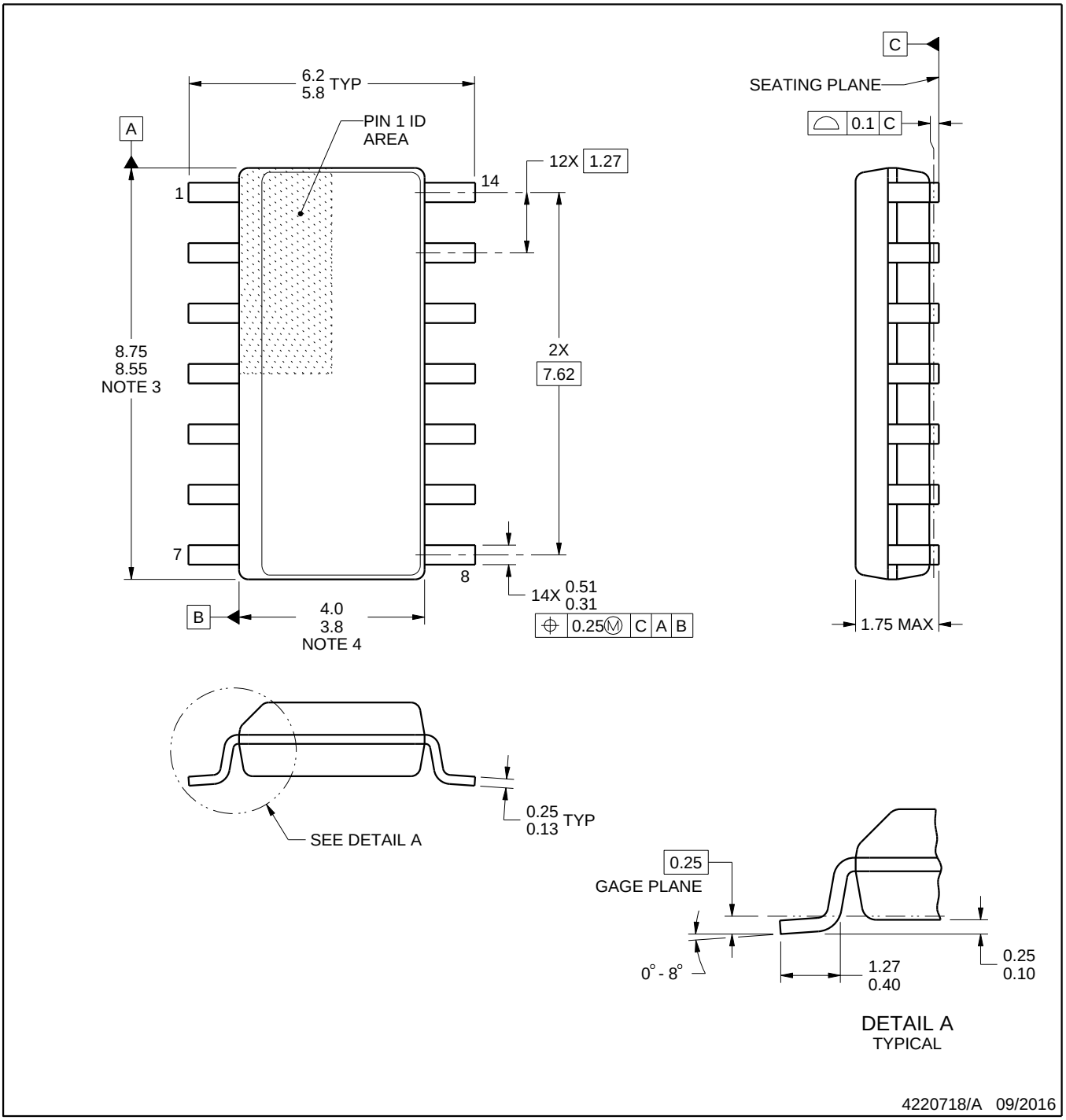


# PACKAGE OUTLINE

## D0014A

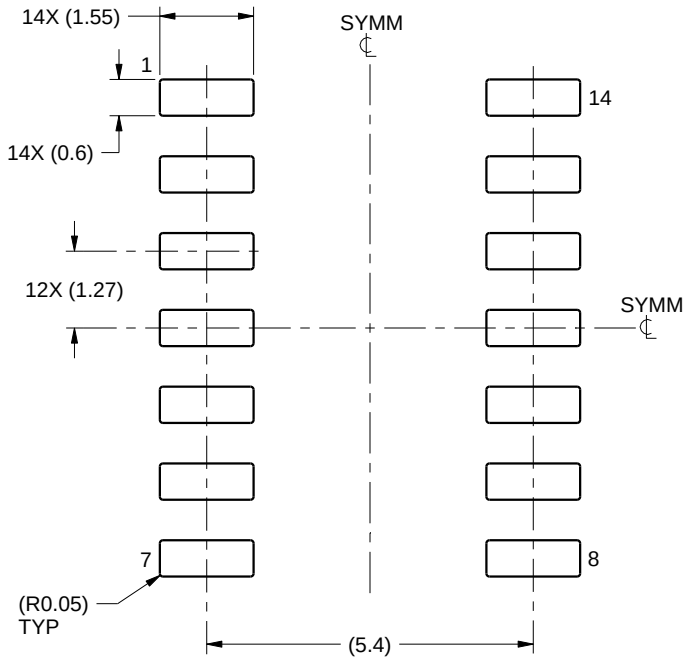
## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

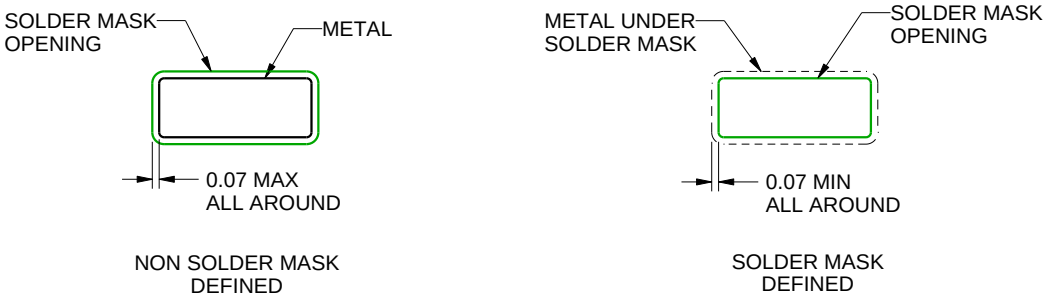



NOTES:

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)

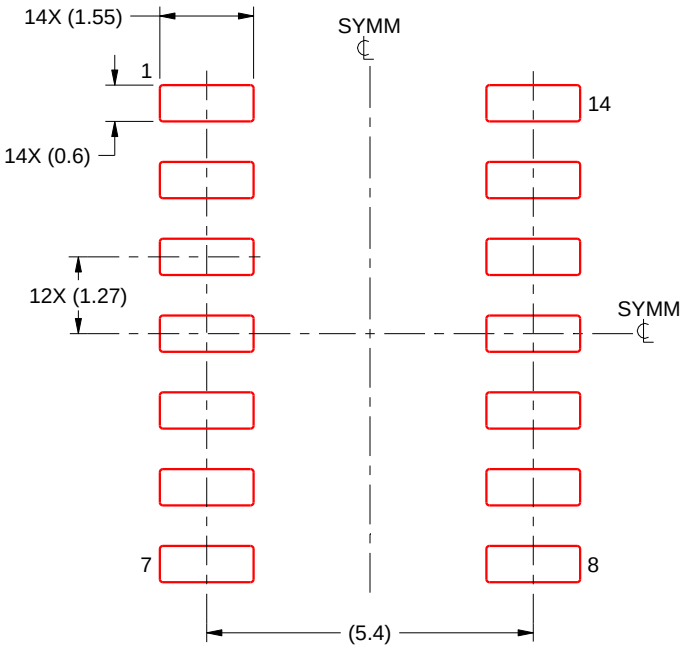
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# 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

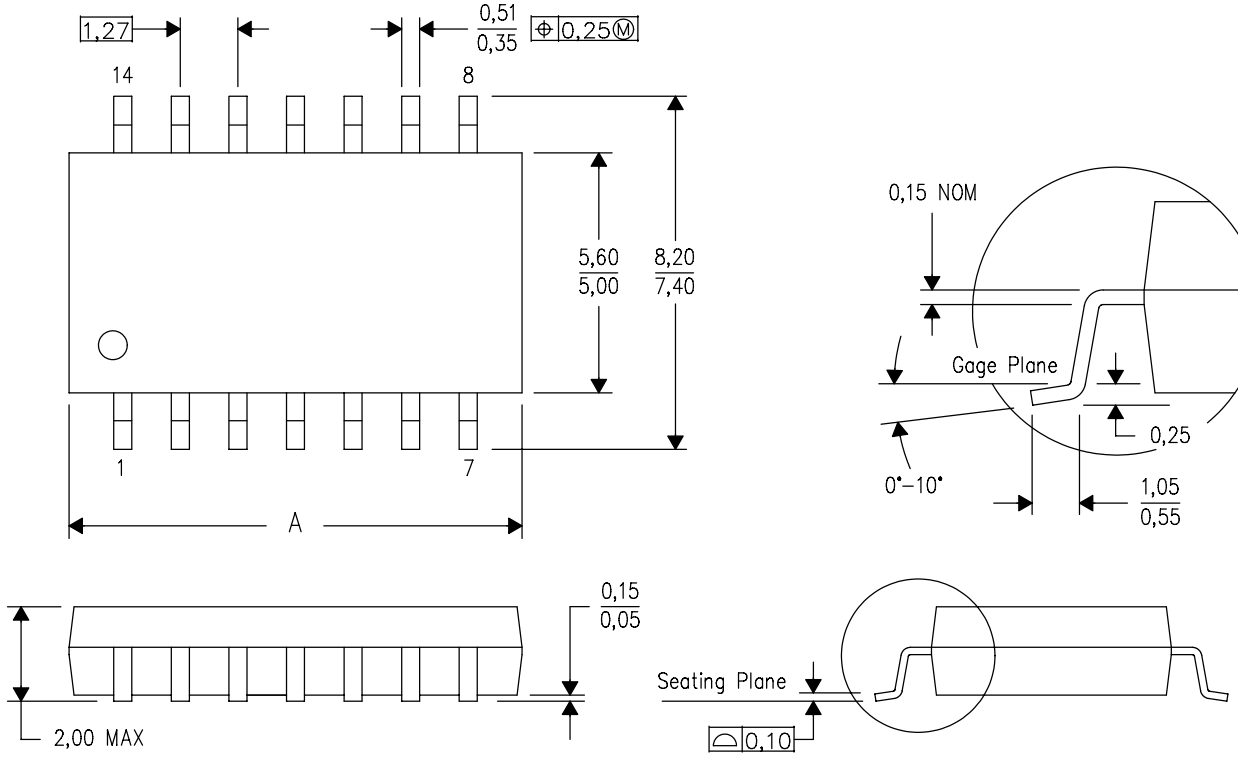
NOTES: (continued)

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**

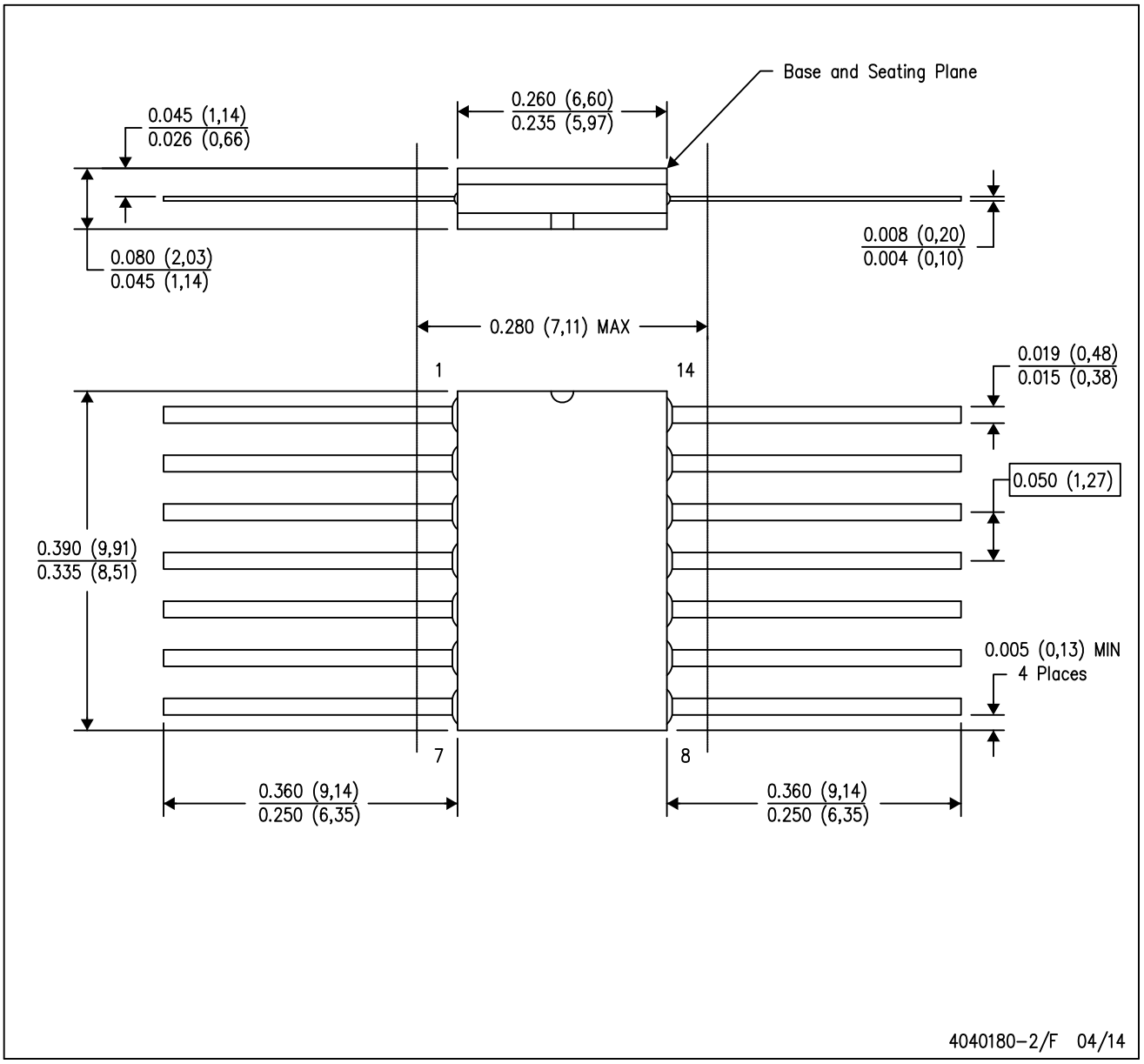



| DIM \ PINS ** | 14 | 16 | 20 | 24 |
|---|---|---|---|---|
| A MAX | 10,50 | 10,50 | 12,90 | 15,30 |
| A MIN | 9,90 | 9,90 | 12,30 | 14,70 |

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.

W (R–GDFP–F14) CERAMIC DUAL FLATPACK



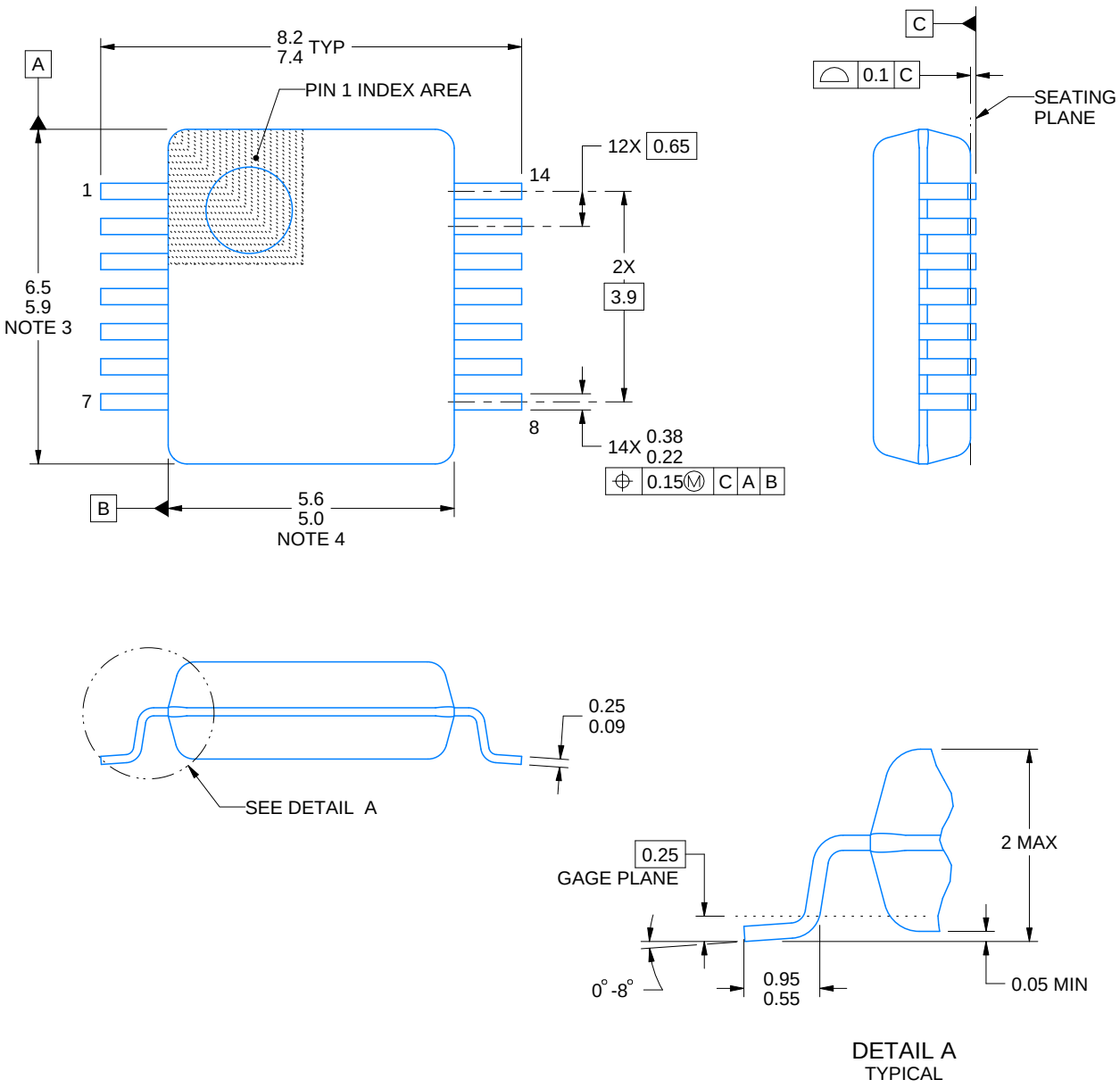

NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. This package can be hermetically sealed with a ceramic lid using glass frit.
D. Index point is provided on cap for terminal identification only.
E. Falls within MIL STD 1835 GDFP1–F14

# PACKAGE OUTLINE

## DB0014A

## SSOP - 2 mm max height

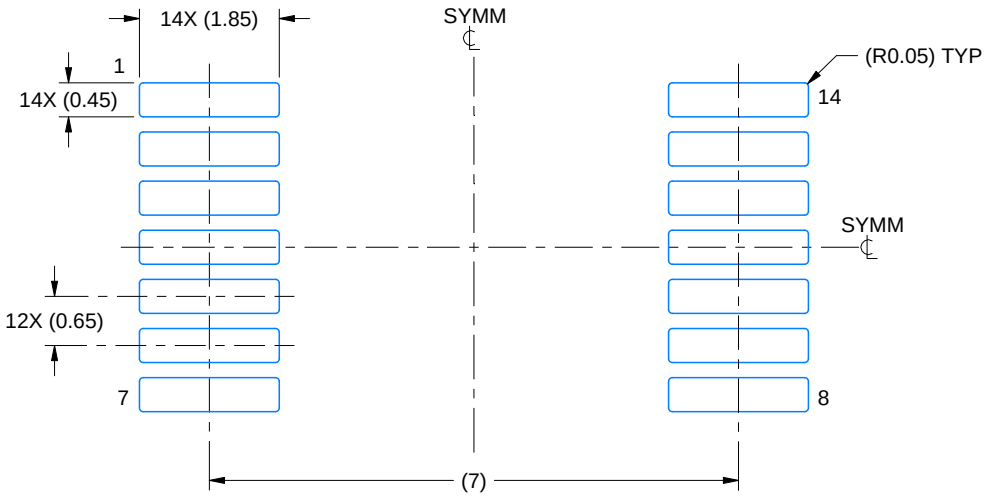
SMALL OUTLINE PACKAGE



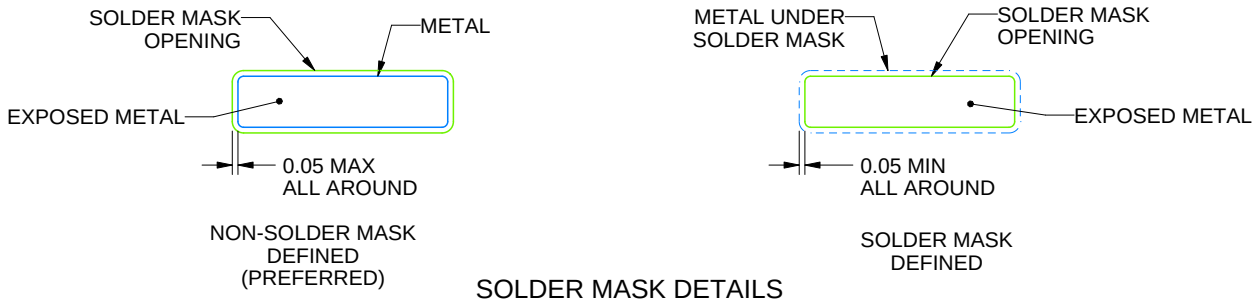

4220762/A 05/2024

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.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 10X

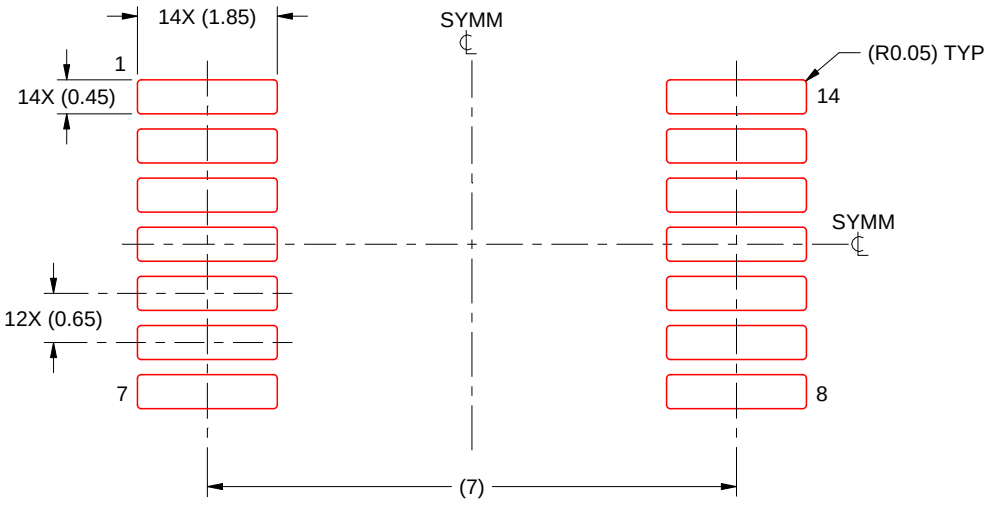



SOLDER MASK DETAILS

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

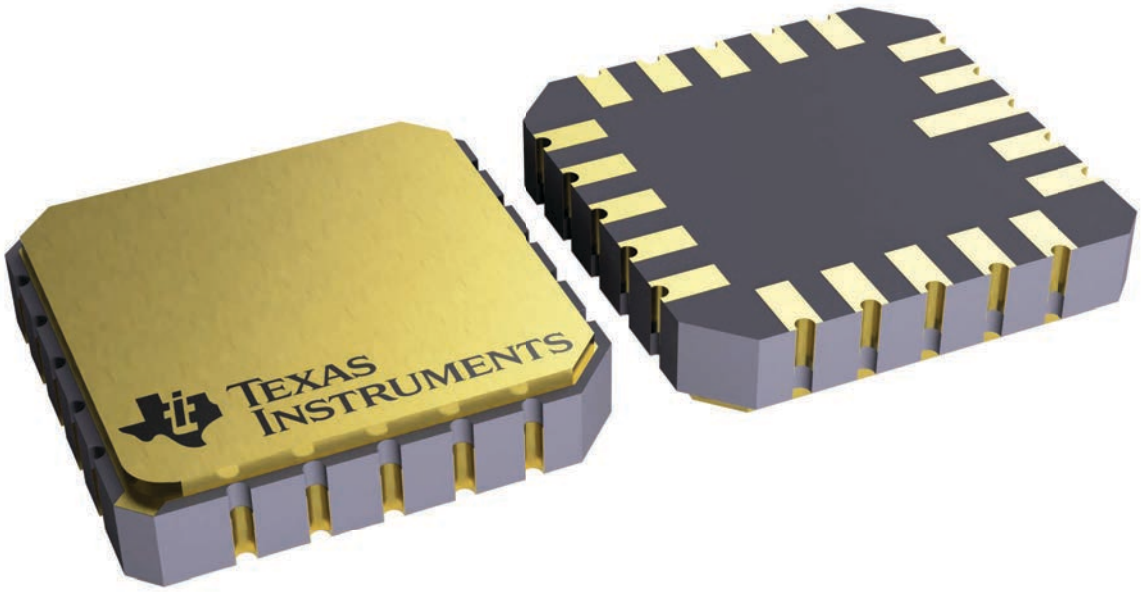
## FK 20

## 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.

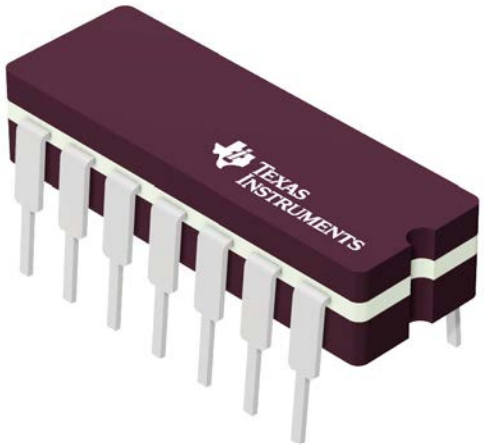



4229370VA\

# GENERIC PACKAGE VIEW

## 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.

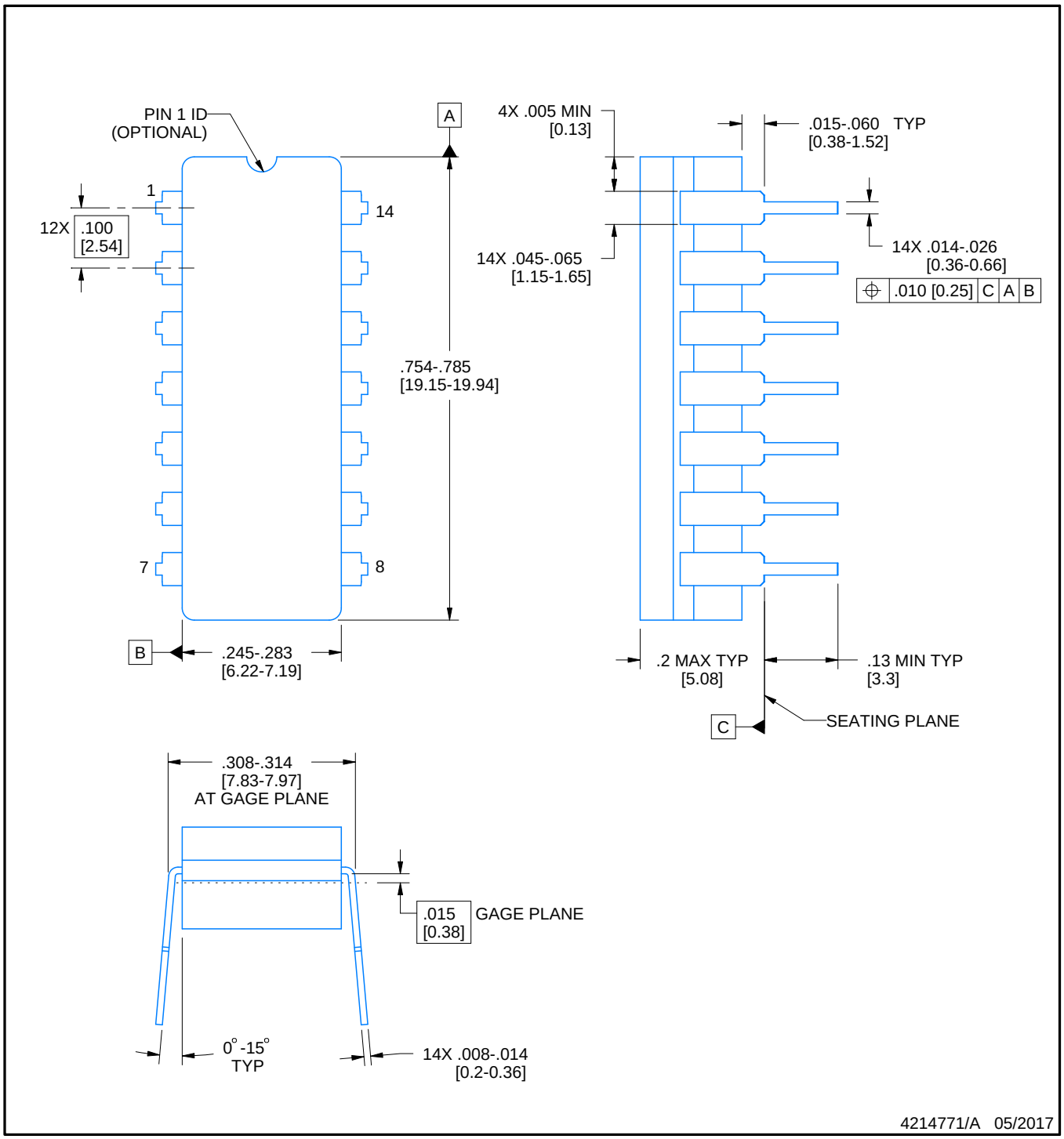
4040083-5/G

# PACKAGE OUTLINE

## J0014A

## CDIP - 5.08 mm max height

CERAMIC DUAL IN LINE PACKAGE




NOTES:

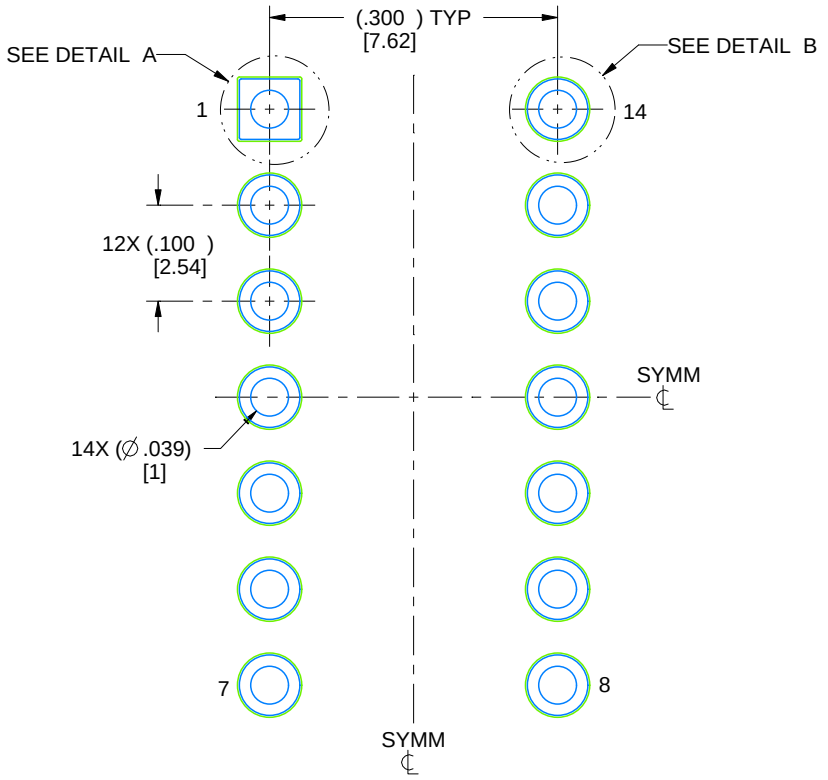
1. All controlling linear dimensions are in inches. Dimensions in brackets are in millimeters. Any dimension in brackets or parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package is hermitically sealed with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

# EXAMPLE BOARD LAYOUT

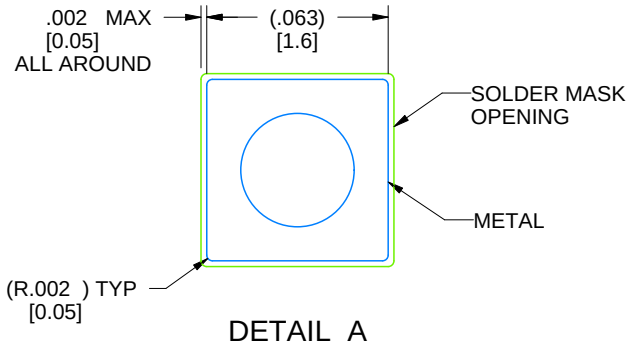
## J0014A

## CDIP - 5.08 mm max height

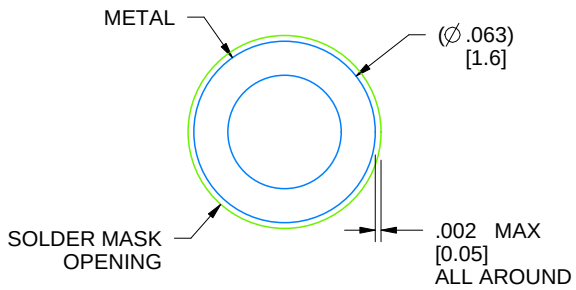
CERAMIC DUAL IN LINE PACKAGE




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




DETAIL A
SCALE: 15X




DETAIL B
13X, SCALE: 15X

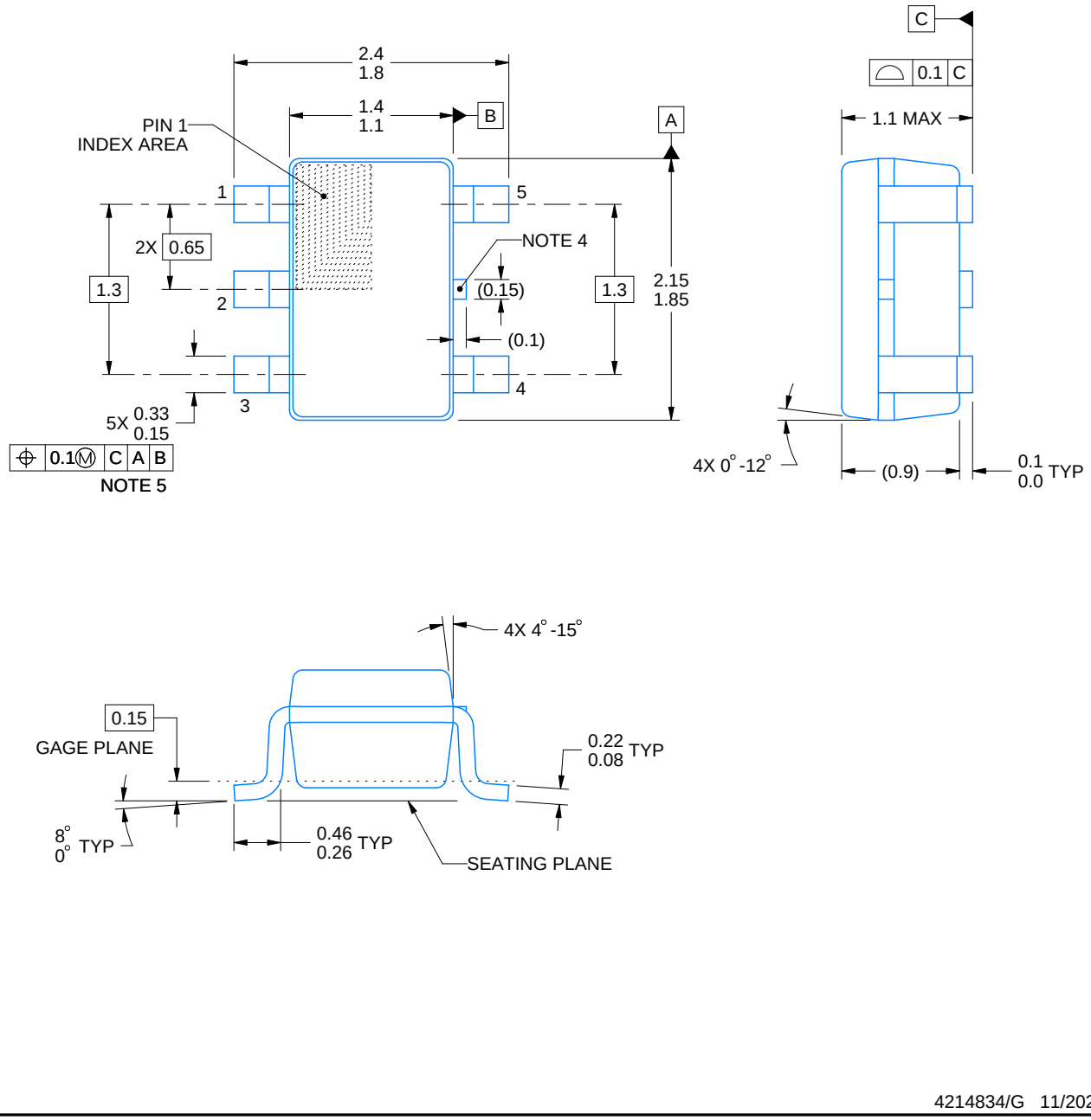
4214771/A 05/2017

# PACKAGE OUTLINE

## DCK0005A

## SOT - 1.1 max height

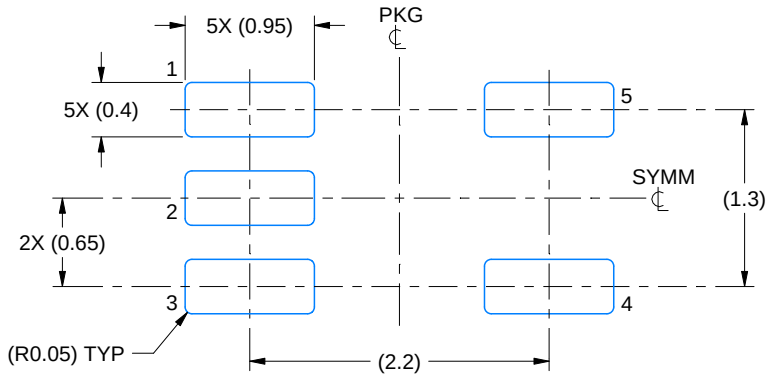
SMALL OUTLINE TRANSISTOR



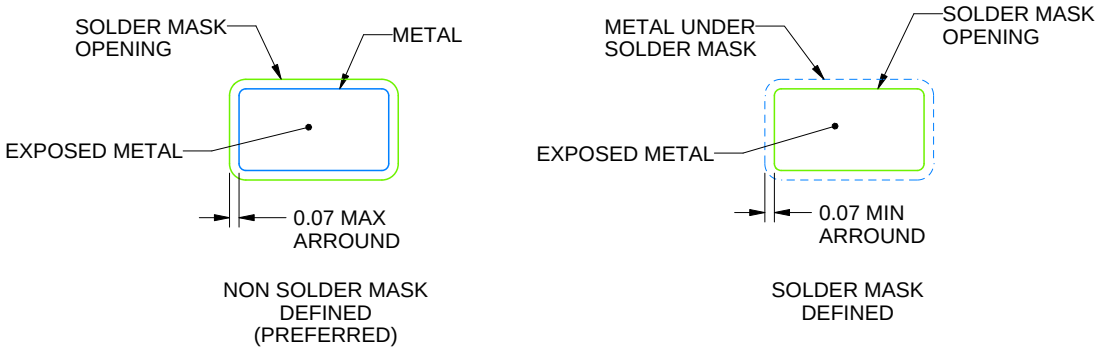

4214834/G 11/2024

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. Refernce JEDEC MO-203.
4. Support pin may differ or may not be present.
5. Lead width does not comply with JEDEC.
6. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25mm per side




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:18X

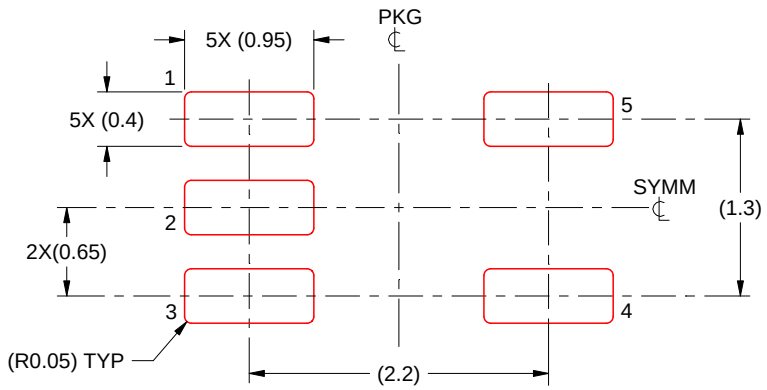



SOLDER MASK DETAILS

4214834/G 11/2024

NOTES: (continued)

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




SOLDER PASTE EXAMPLE
BASED ON 0.125 THICK STENCIL
SCALE:18X

4214834/G 11/2024

NOTES: (continued)

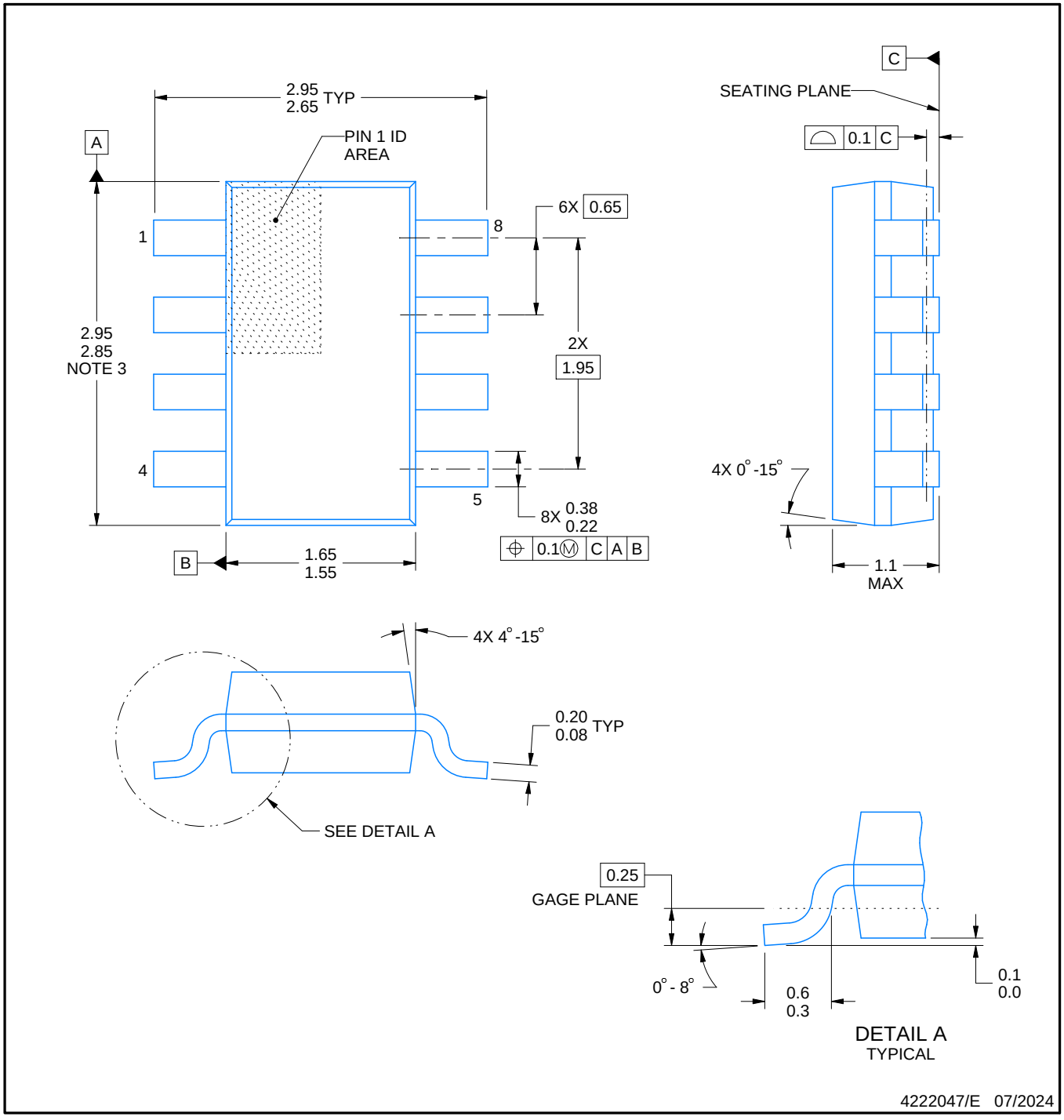
9. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
10. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## DDF0008A

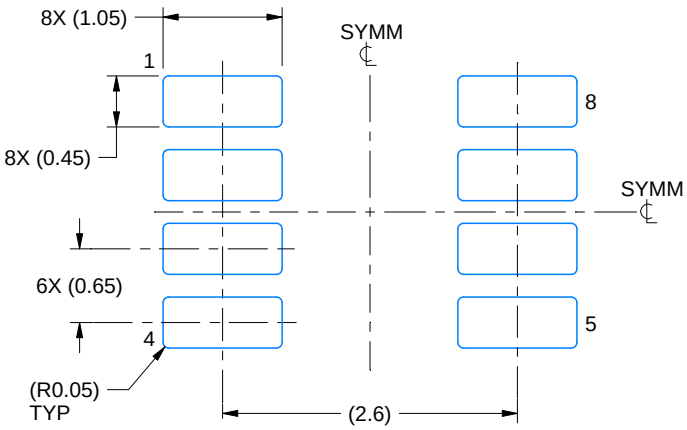
## SOT-23-THIN - 1.1 mm max height

PLASTIC SMALL OUTLINE

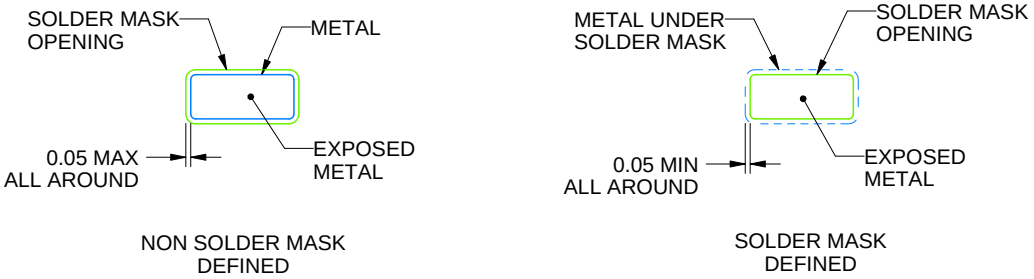



NOTES:

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.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X




SOLDER MASK DETAILS

4222047/E 07/2024

NOTES: (continued)

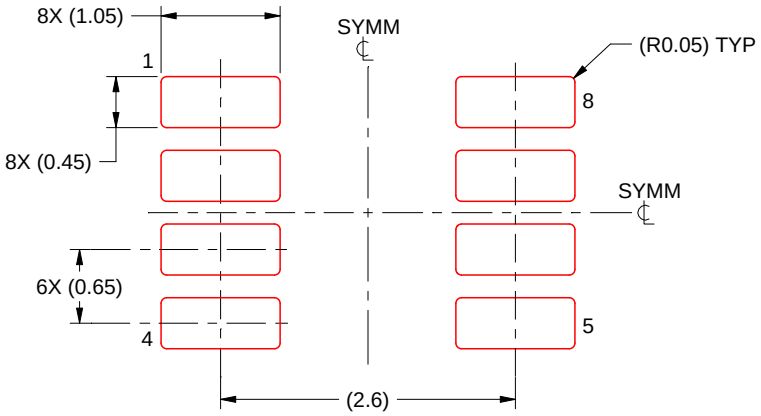
4. Publication IPC-7351 may have alternate designs.
5. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

## DDF0008A

## SOT-23-THIN - 1.1 mm max height

PLASTIC SMALL OUTLINE

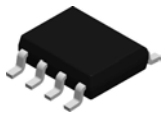



SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4222047/E 07/2024

NOTES: (continued)

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

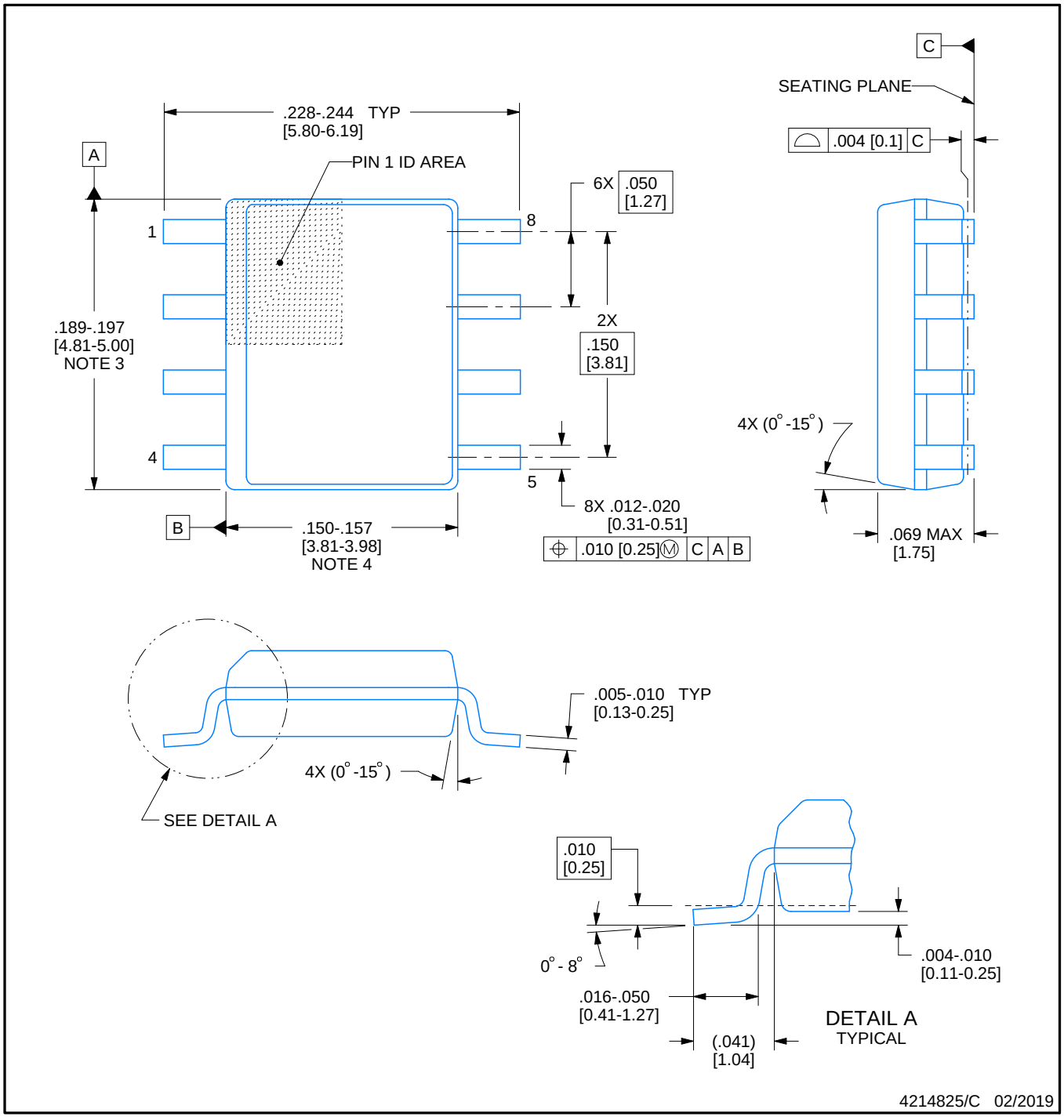


# PACKAGE OUTLINE

## D0008A

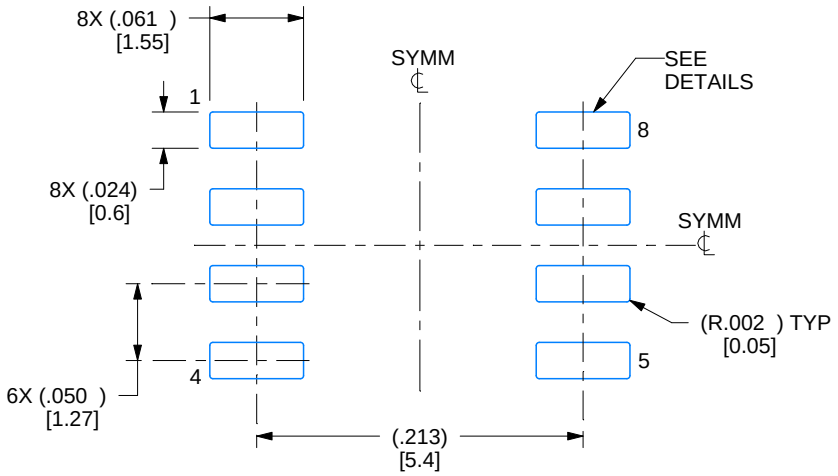
## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT

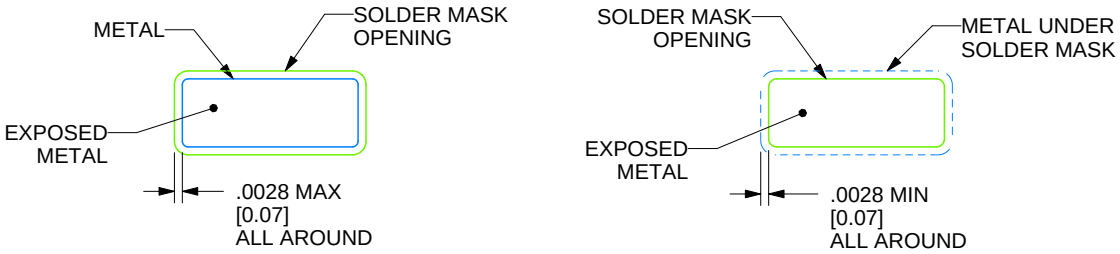



NOTES:

1. Linear dimensions are in inches [millimeters]. Dimensions in parenthesis are for reference only. Controlling dimensions are in inches. 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 .006 [0.15] per side.
4. This dimension does not include interlead flash.
5. Reference JEDEC registration MS-012, variation AA.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:8X




SOLDER MASK DETAILS

4214825/C 02/2019

NOTES: (continued)

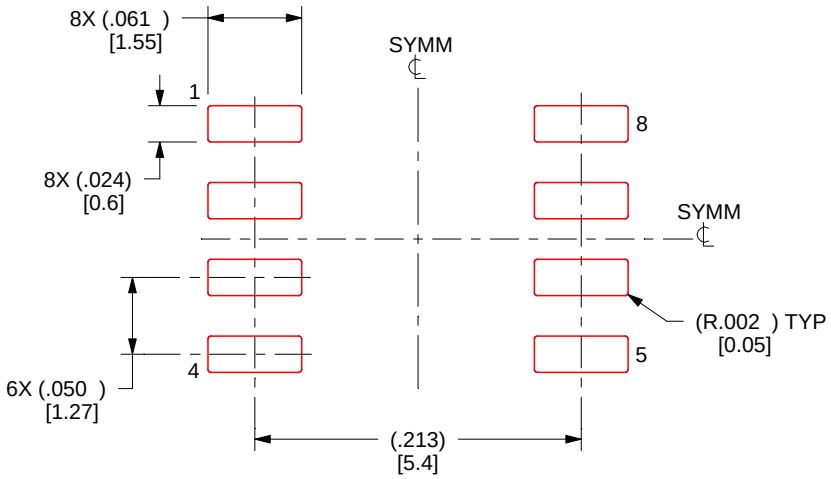
6. Publication IPC-7351 may have alternate designs.
7. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

# EXAMPLE STENCIL DESIGN

## D0008A

## SOIC - 1.75 mm max height

SMALL OUTLINE INTEGRATED CIRCUIT




SOLDER PASTE EXAMPLE
BASED ON .005 INCH [0.125 MM] THICK STENCIL
SCALE:8X

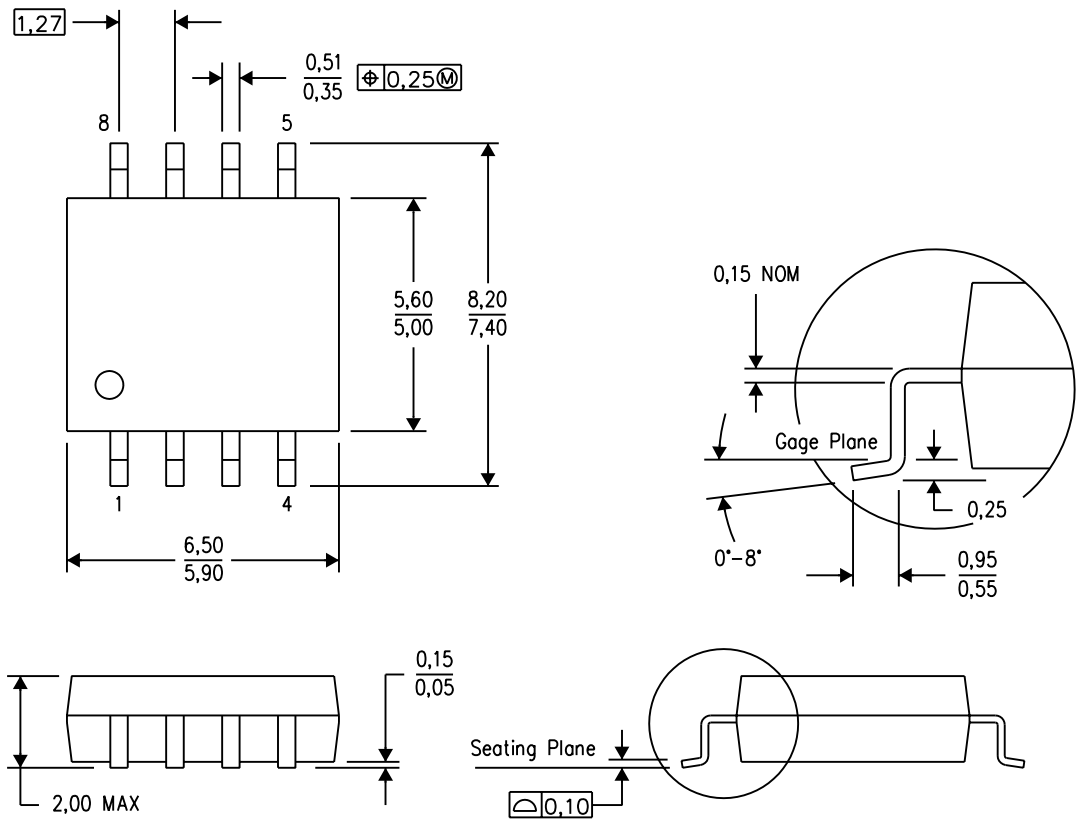
4214825/C 02/2019

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

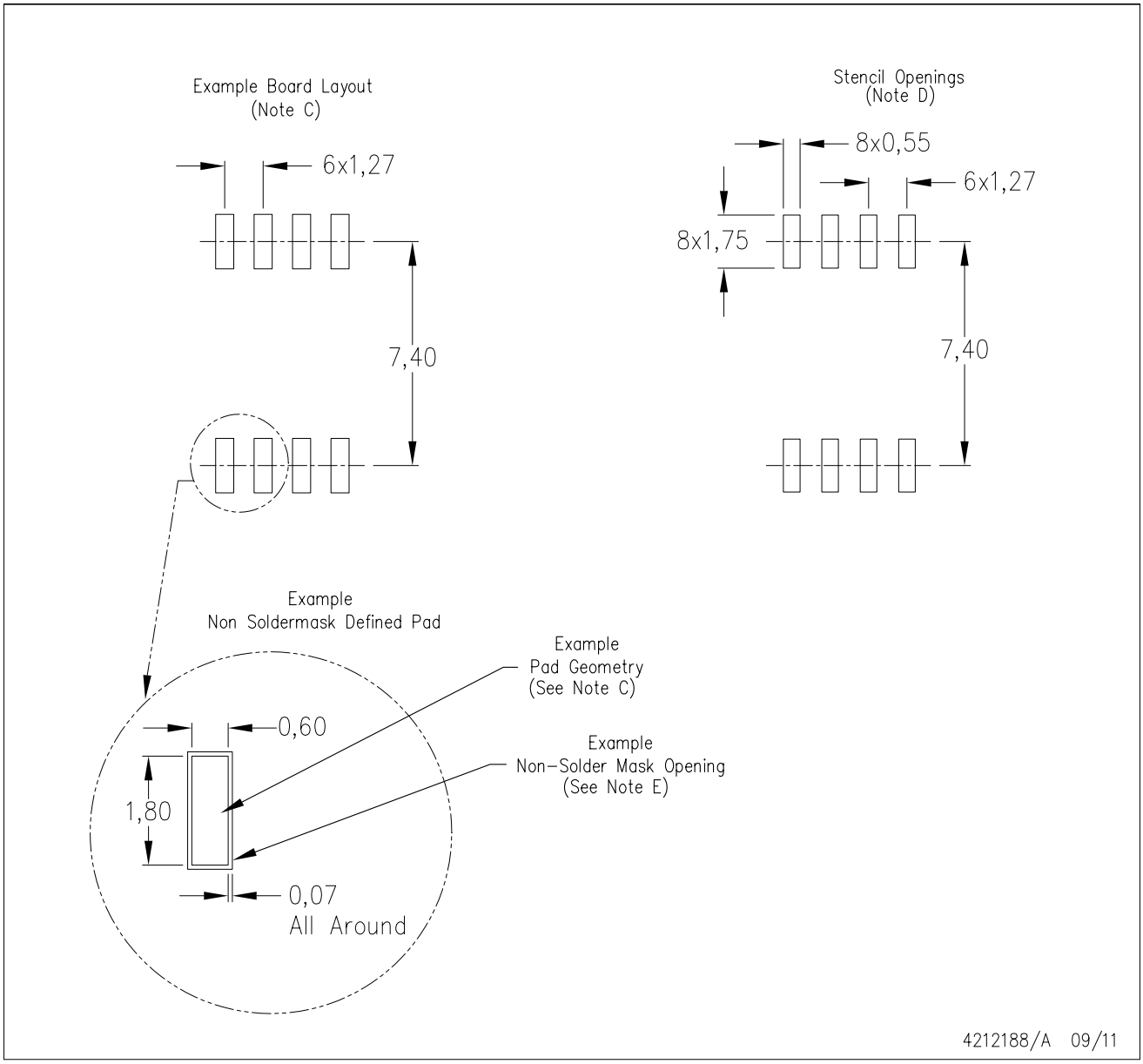
**PS (R-PDSO-G8)** **PLASTIC SMALL-OUTLINE PACKAGE**




4040063/C 03/03

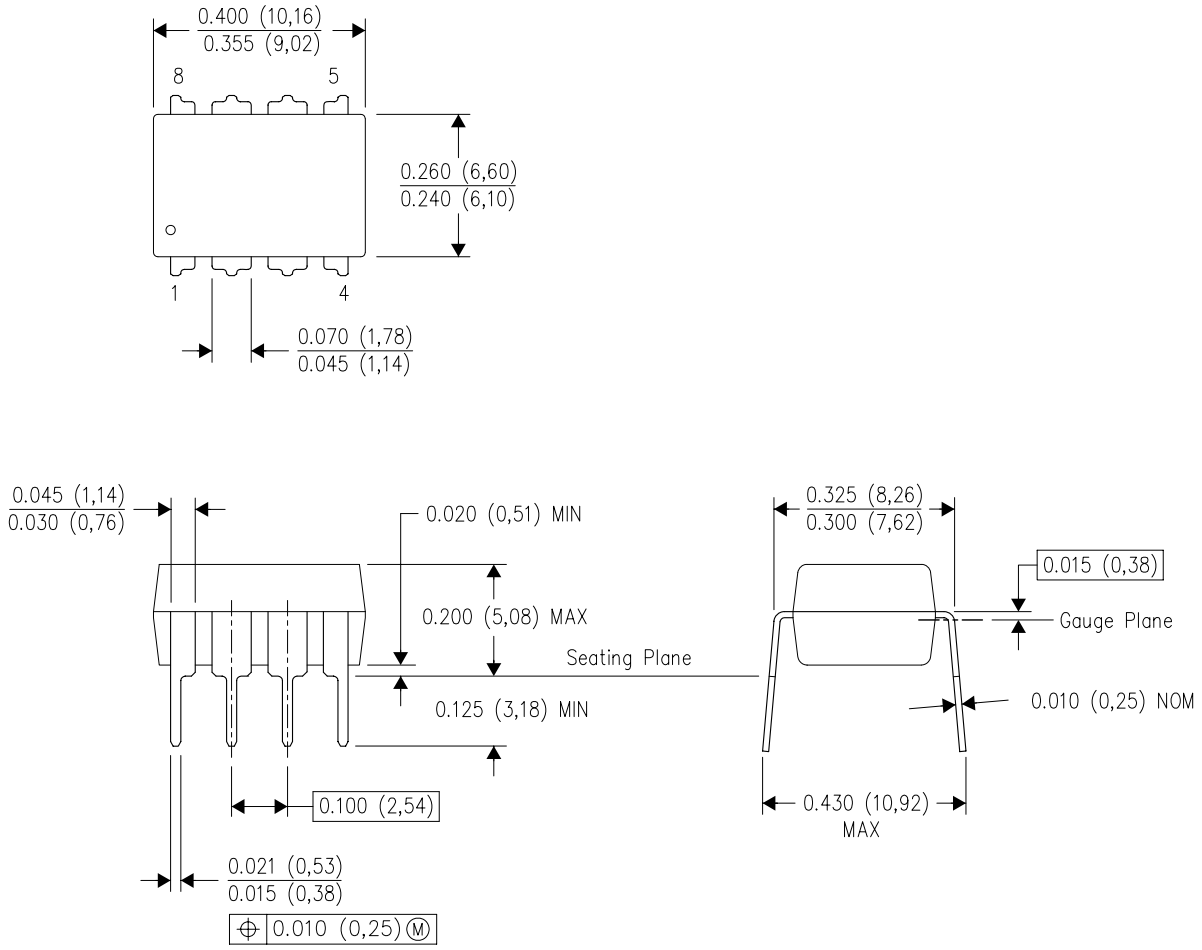
NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Body dimensions do not include mold flash or protrusion, not to exceed 0,15.

PS (R–PDSO–G8) PLASTIC SMALL OUTLINE




NOTES:
A. All linear dimensions are in millimeters.
B. This drawing is subject to change without notice.
C. Publication IPC–7351 is recommended for alternate designs.
D. Laser cutting apertures with trapezoidal walls and also rounding corners will offer better paste release. Customers should contact their board assembly site for stencil design recommendations. Refer to IPC–7525 for other stencil recommendations.
E. Customers should contact their board fabrication site for solder mask tolerances between and around signal pads.

P (R–PDIP–T8) PLASTIC DUAL–IN–LINE PACKAGE

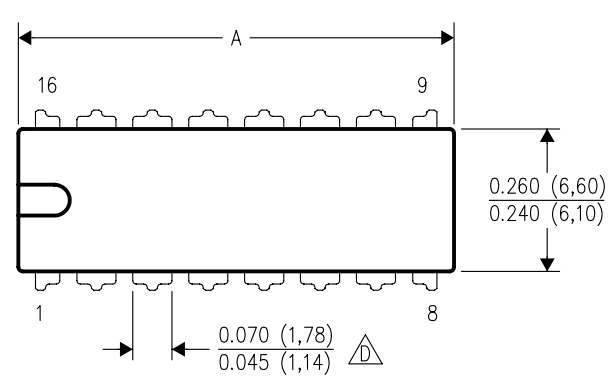



NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001 variation BA.

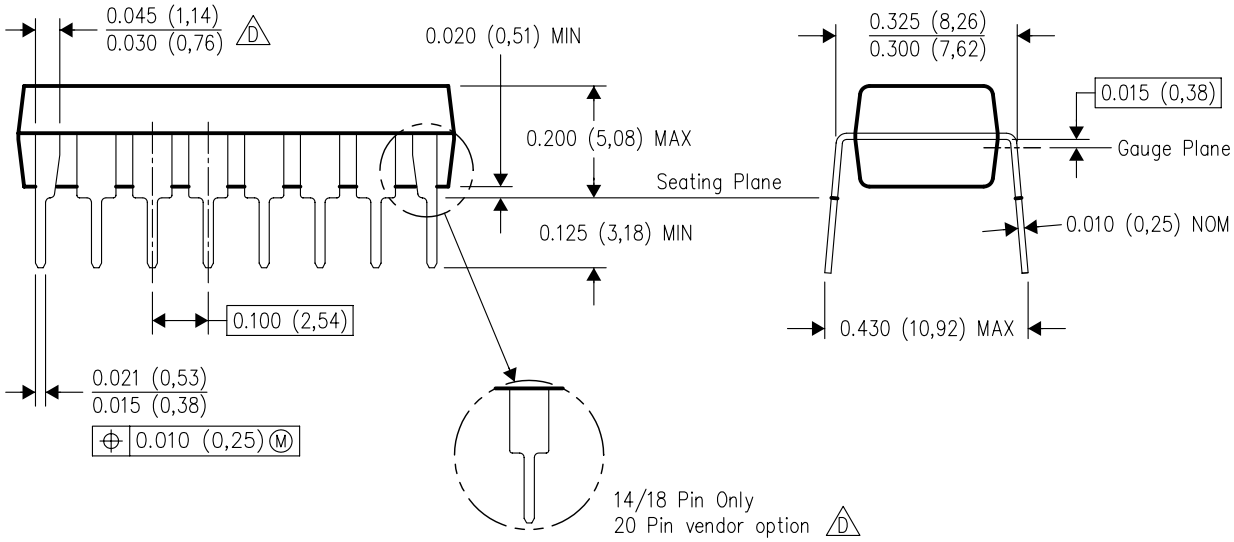
## N (R–PDIP–T**)

## 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

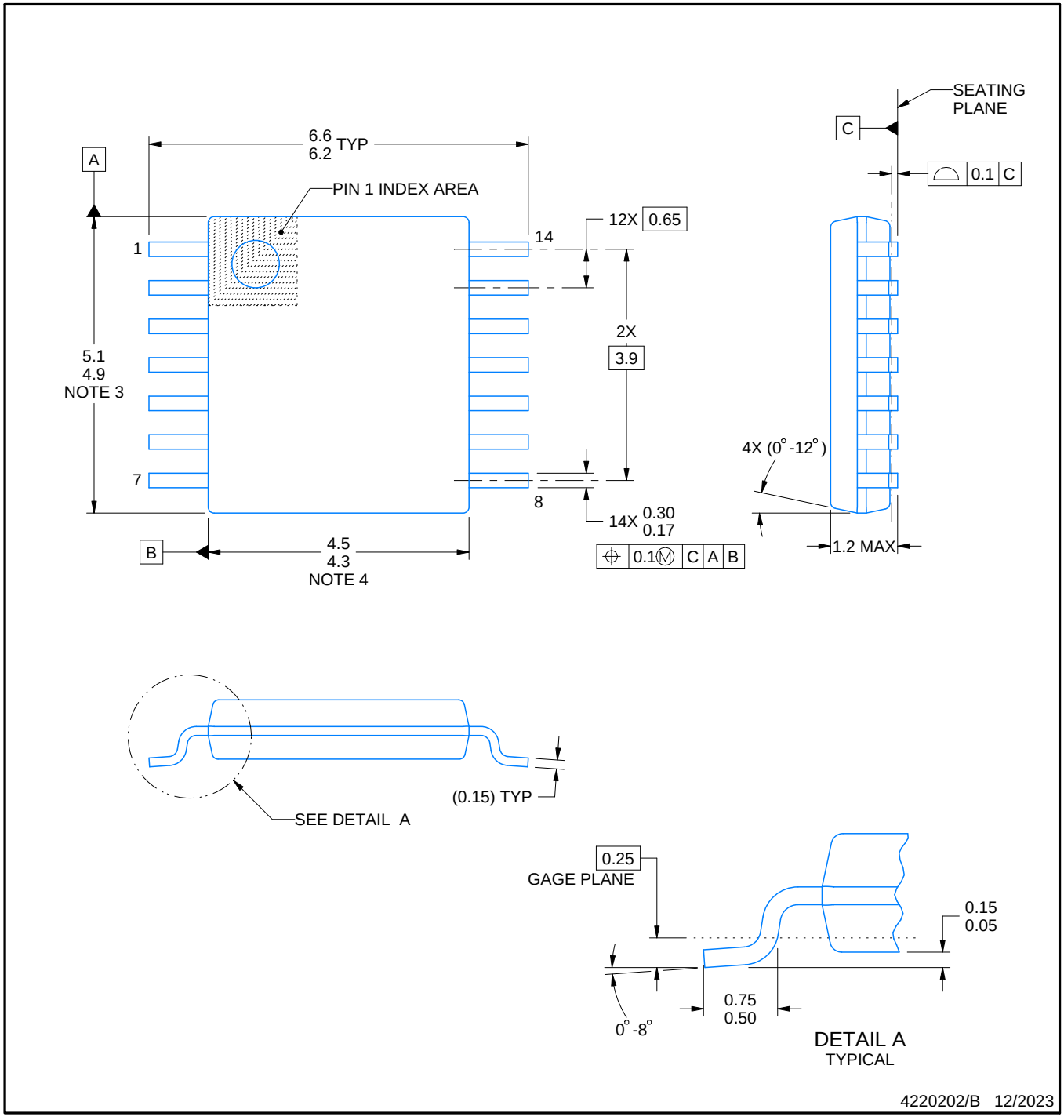
NOTES:
A. All linear dimensions are in inches (millimeters).
B. This drawing is subject to change without notice.
C. Falls within JEDEC MS–001, except 18 and 20 pin minimum body length (Dim A).
D. The 20 pin end lead shoulder width is a vendor option, either half or full width.

# PACKAGE OUTLINE

## PW0014A

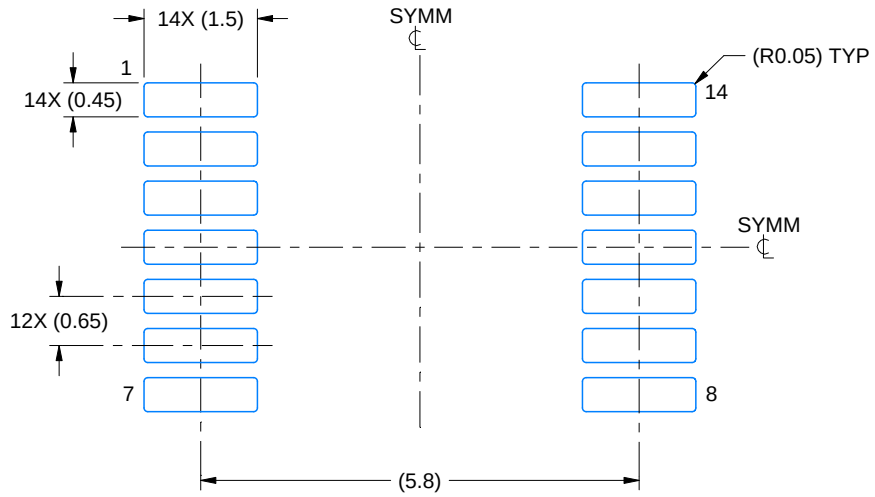
## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

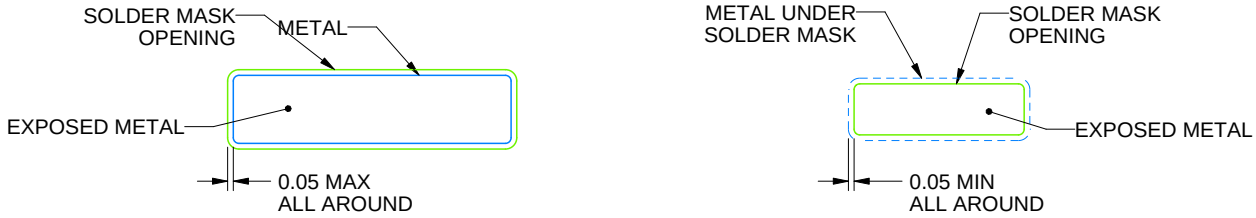



NOTES:

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

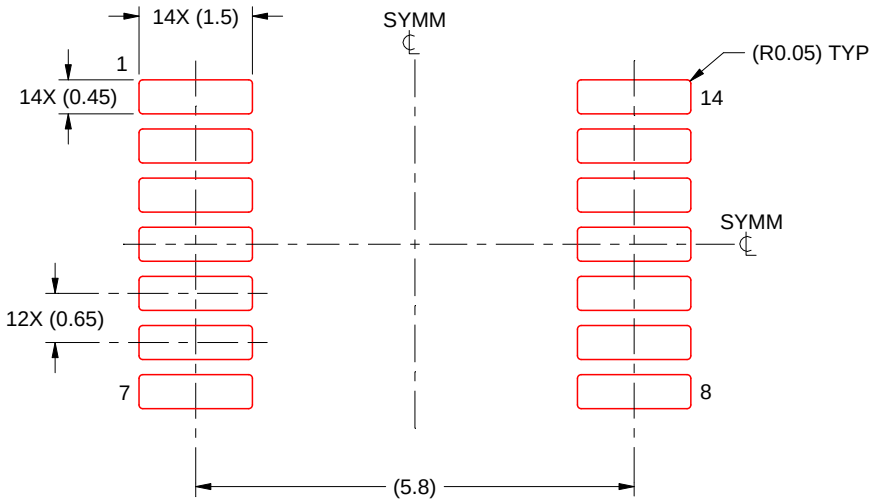



SOLDER MASK DETAILS

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)

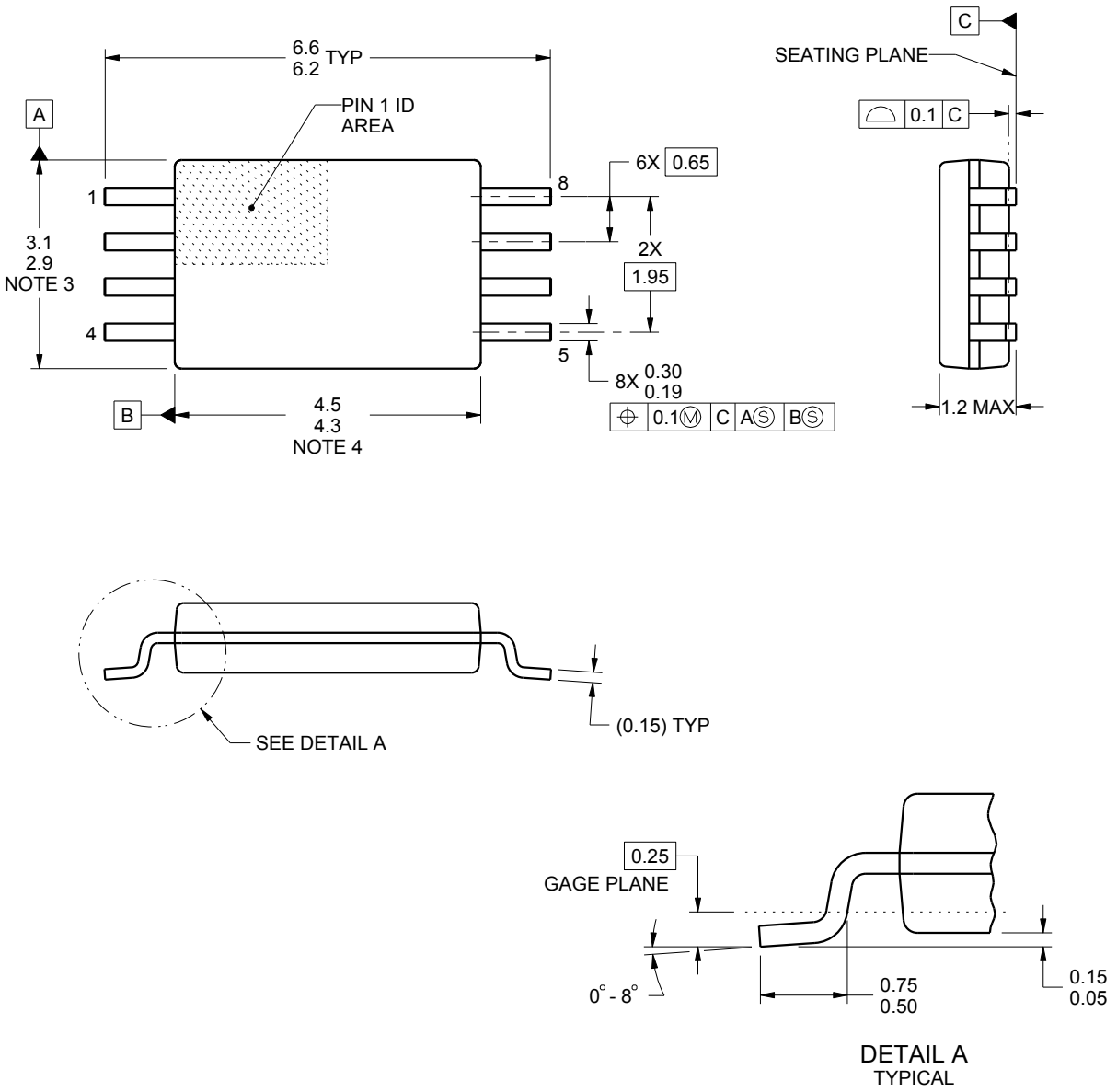
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## PW0008A

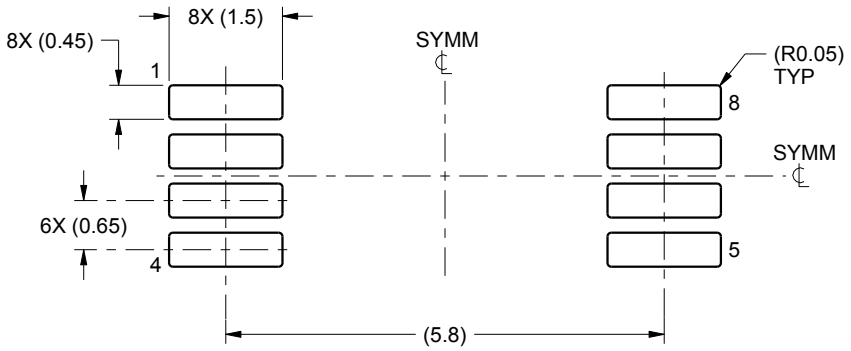
## TSSOP - 1.2 mm max height

SMALL OUTLINE PACKAGE

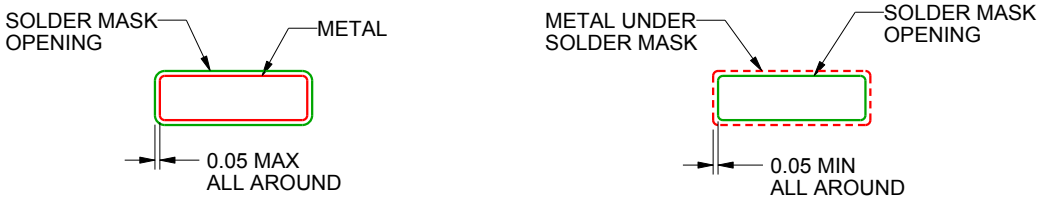



NOTES:

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, variation AA.




LAND PATTERN EXAMPLE
SCALE:10X

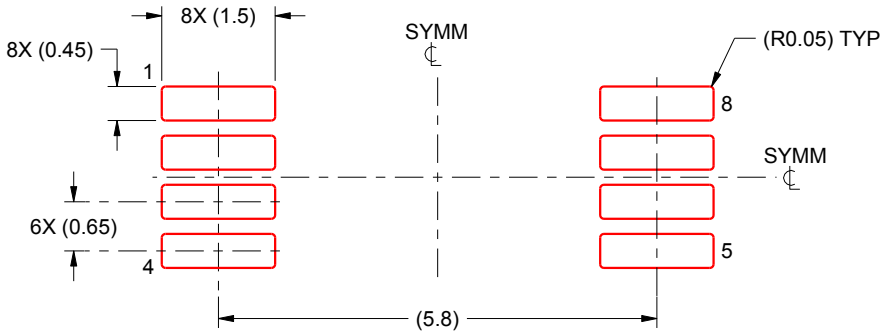



SOLDER MASK DETAILS
NOT TO SCALE

4221848/A 02/2015

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

4221848/A 02/2015

NOTES: (continued)

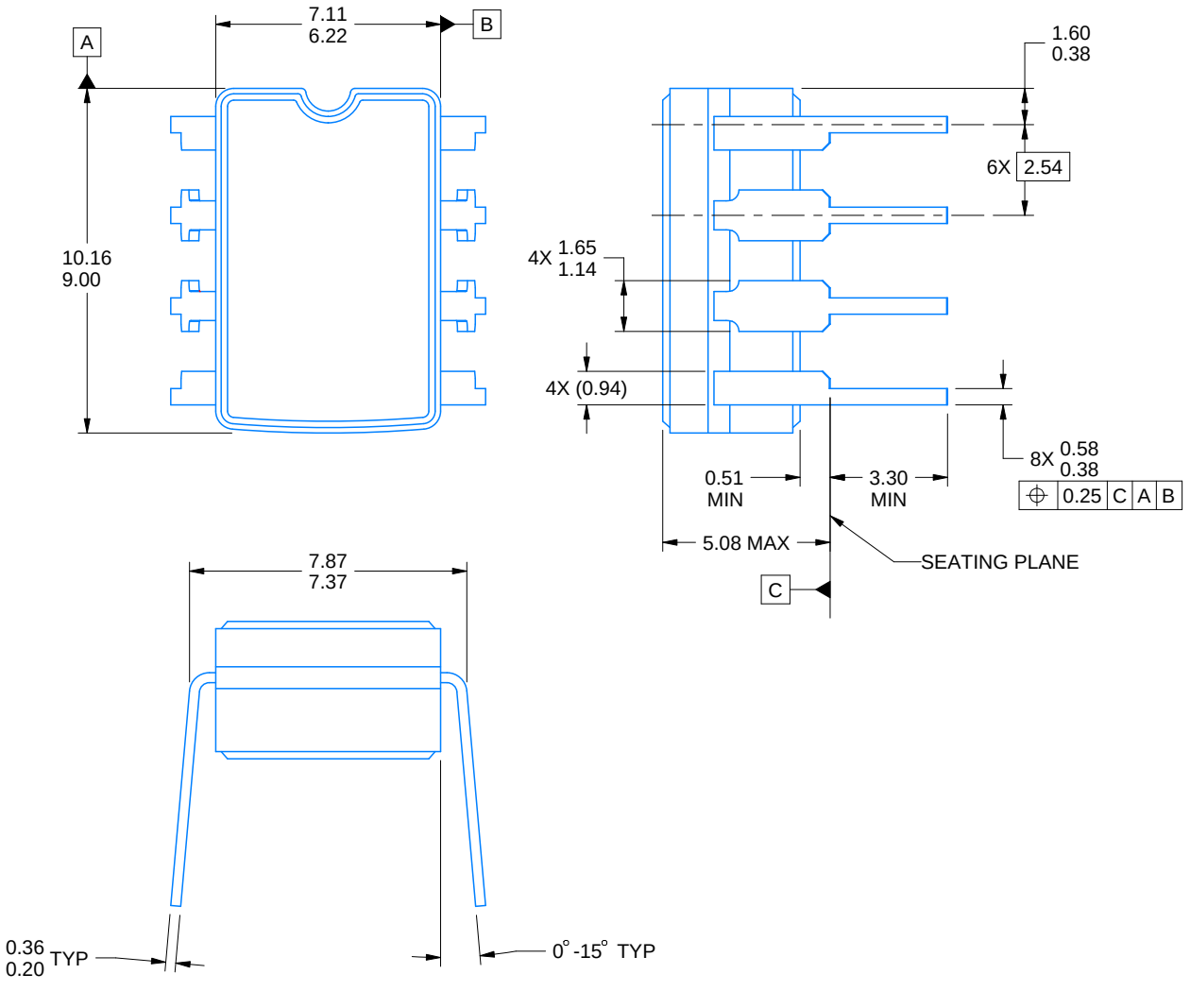
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## JG0008A

## CDIP - 5.08 mm max height

CERAMIC DUAL IN-LINE PACKAGE




4230036/A 09/2023

NOTES:

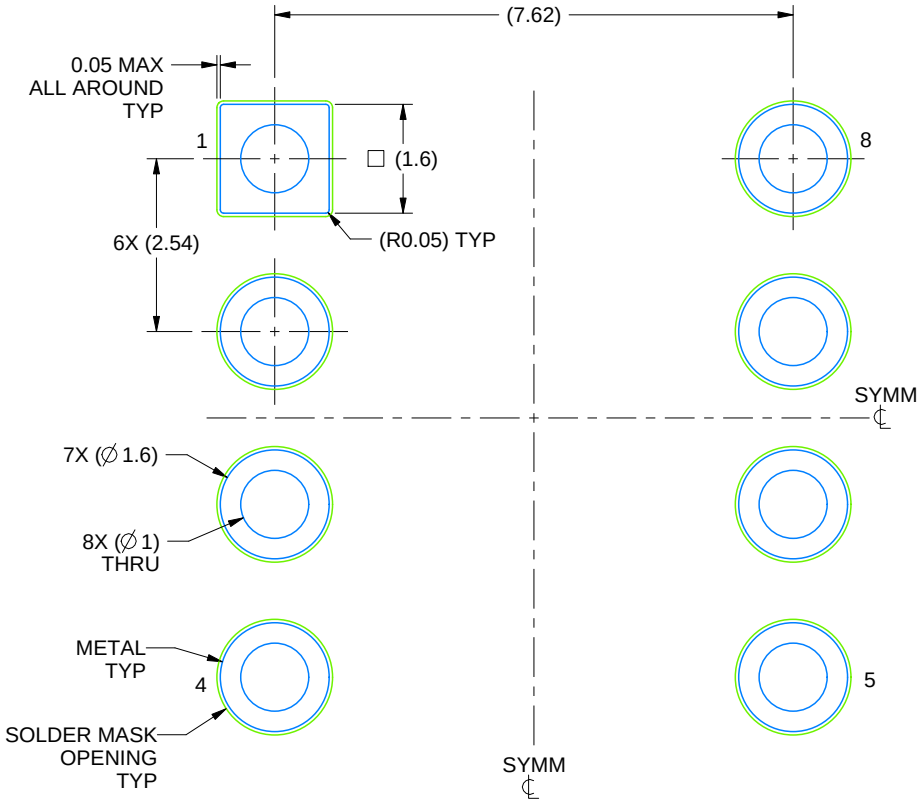
1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This package can be hermetically sealed with a ceramic lid using glass frit.
4. Index point is provided on cap for terminal identification.
5. Falls within MIL STD 1835 GDIP1-T8

# EXAMPLE BOARD LAYOUT

## JG0008A

## CDIP - 5.08 mm max height

CERAMIC DUAL IN-LINE PACKAGE




LAND PATTERN EXAMPLE
NON SOLDER MASK DEFINED
SCALE: 9X

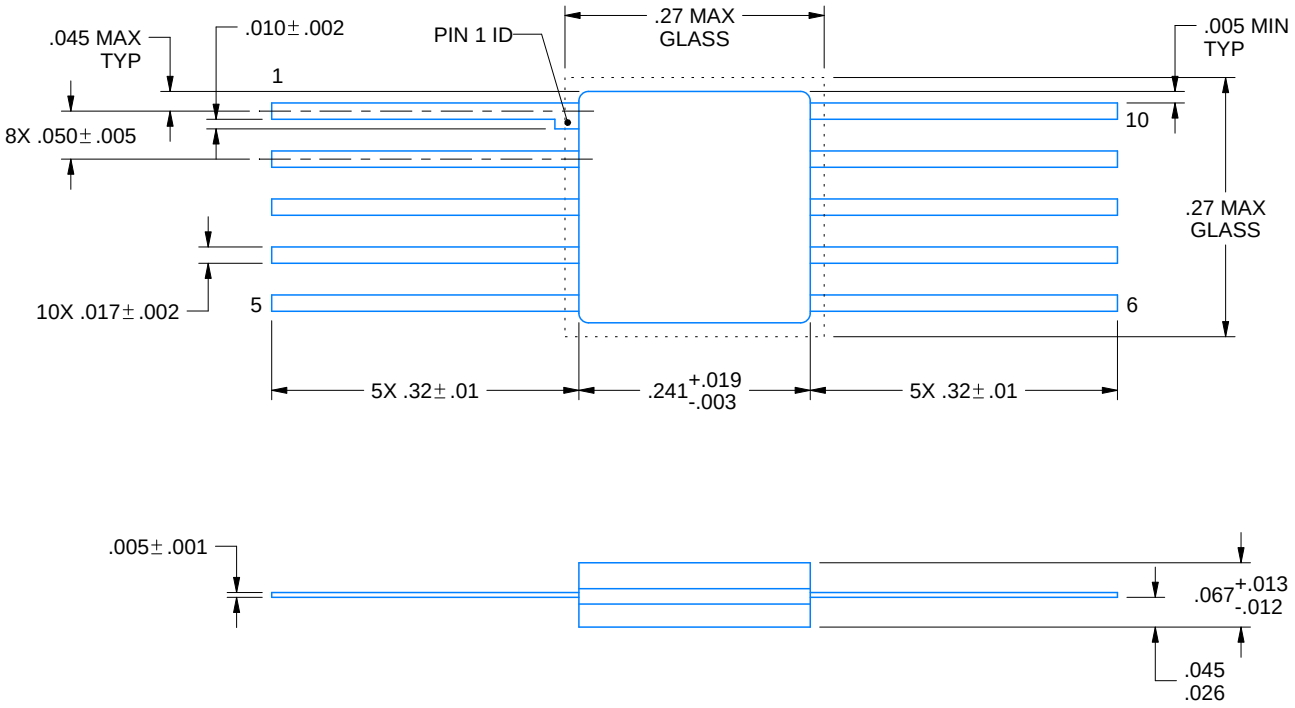
4230036/A 09/2023

# U0010A

# PACKAGE OUTLINE

## CFP - 2.03 mm max height

CERAMIC FLATPACK







4225582/A 01/2020

NOTES:

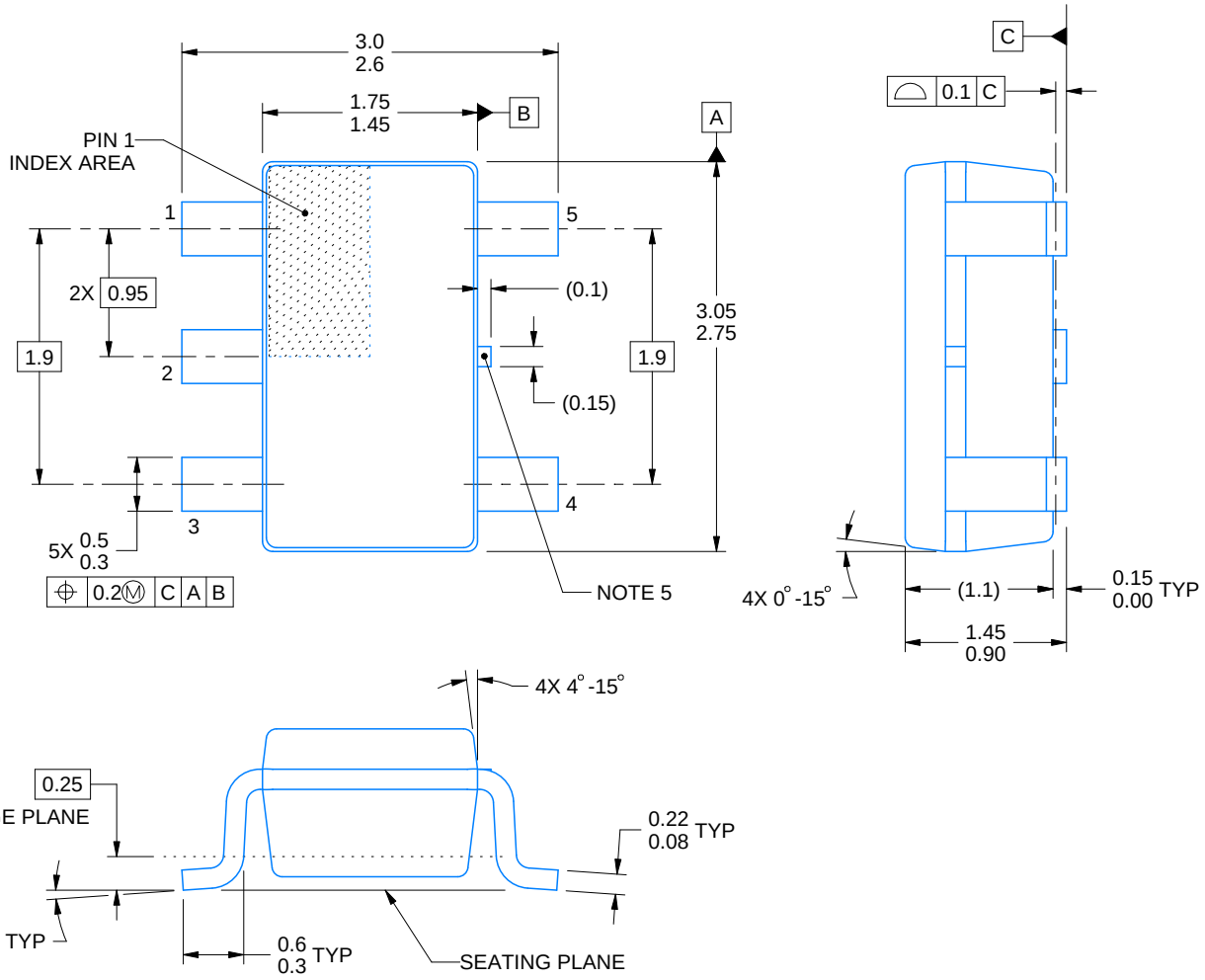
1. All linear dimensions are in inches. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.

# PACKAGE OUTLINE

## DBV0005A

## SOT-23 - 1.45 mm max height

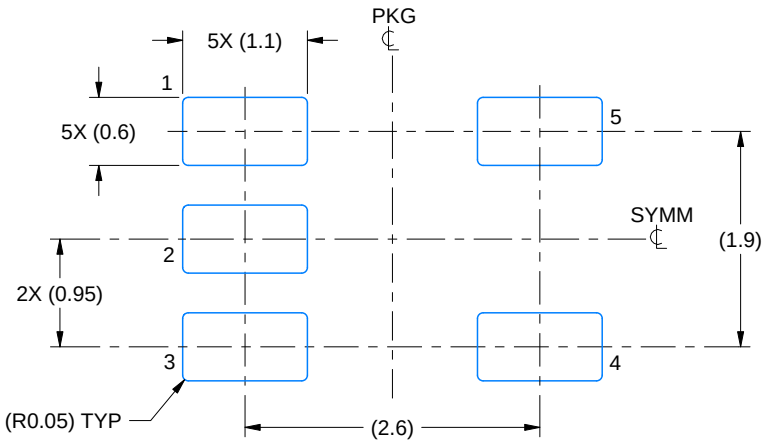
SMALL OUTLINE TRANSISTOR



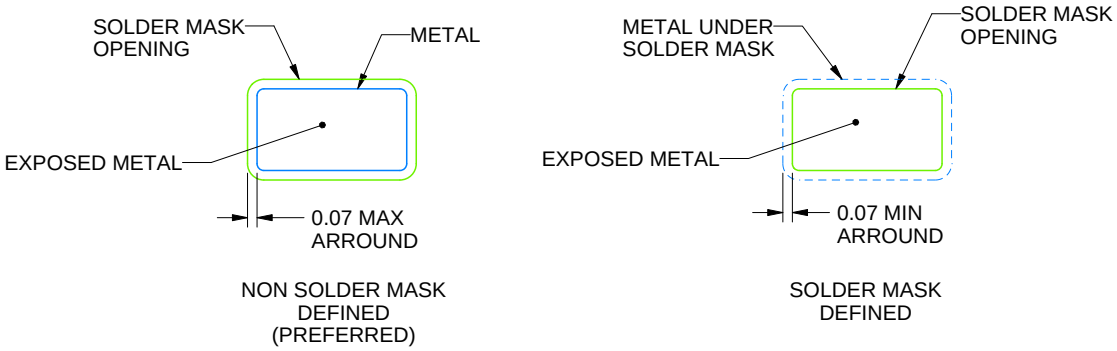

4214839/K 08/2024

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. Refernce JEDEC MO-178.
4. Body dimensions do not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.25 mm per side.
5. Support pin may differ or may not be present.




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE:15X

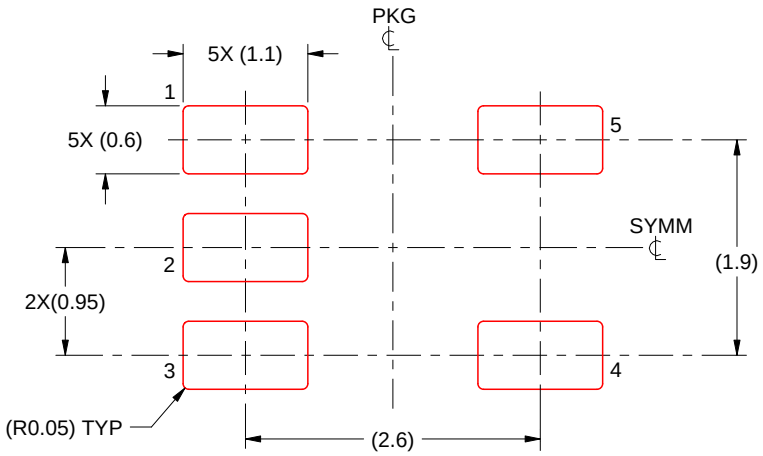



SOLDER MASK DETAILS

4214839/K 08/2024

NOTES: (continued)

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




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE:15X

4214839/K 08/2024

NOTES: (continued)

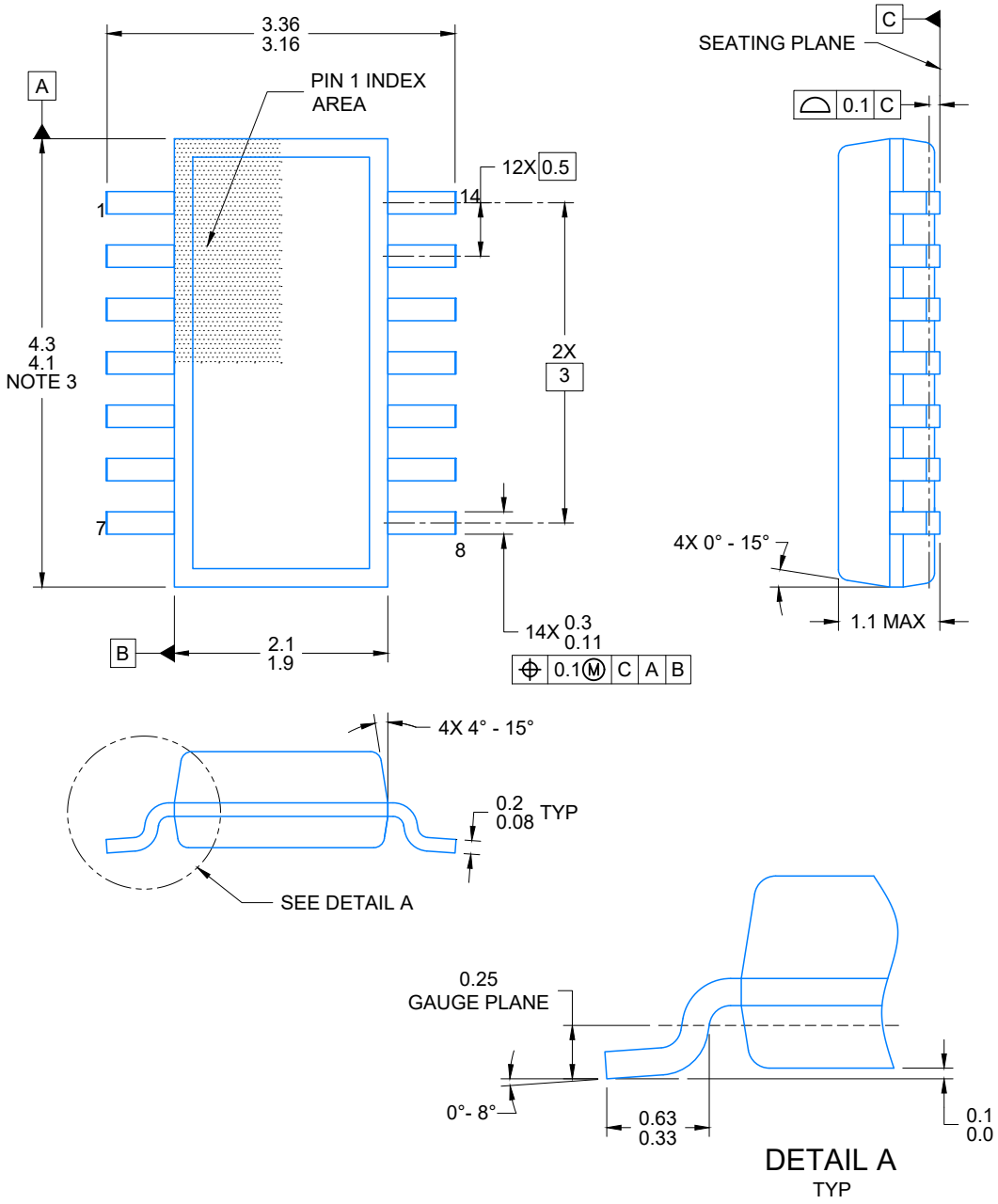
8. Laser cutting apertures with trapezoidal walls and rounded corners may offer better paste release. IPC-7525 may have alternate design recommendations.
9. Board assembly site may have different recommendations for stencil design.

# PACKAGE OUTLINE

## DYY0014A

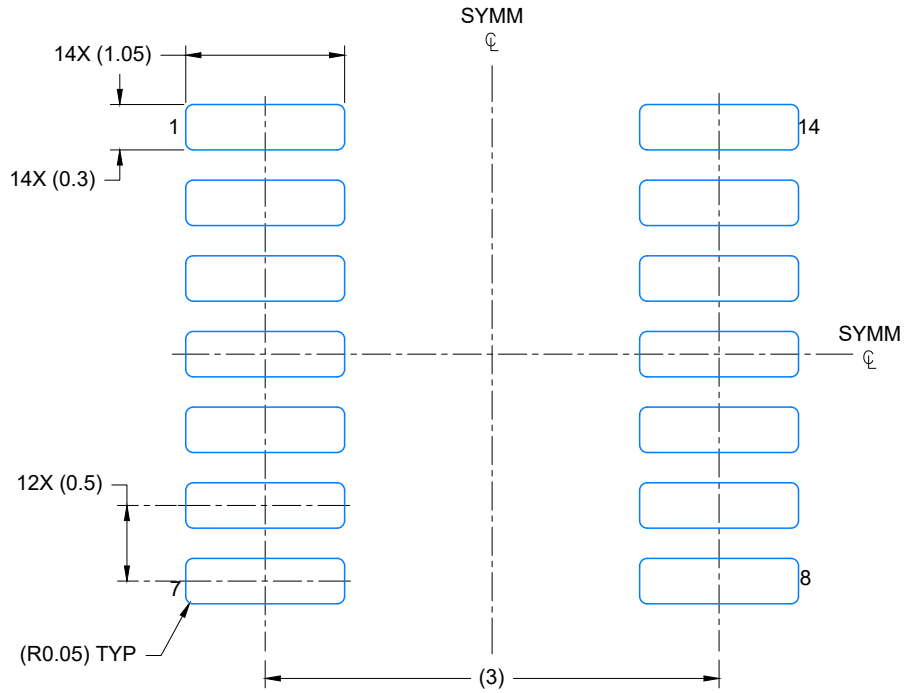
## SOT-23-THIN - 1.1 mm max height

PLASTIC SMALL OUTLINE

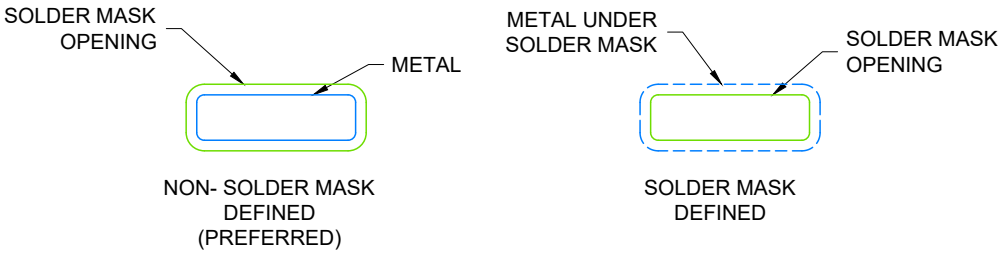



NOTES:

1. All linear dimensions are in millimeters. Any dimensions in parenthesis are for reference only. Dimensioning and tolerancing per ASME Y14.5M.
2. This drawing is subject to change without notice.
3. This dimension does not include mold flash, protrusions, or gate burrs. Mold flash, protrusions, or gate burrs shall not exceed 0.15 per side.
4. This dimension does not include interlead flash. Interlead flash shall not exceed 0.50 per side.
5. Reference JEDEC Registration MO-345, Variation AB




LAND PATTERN EXAMPLE
EXPOSED METAL SHOWN
SCALE: 20X

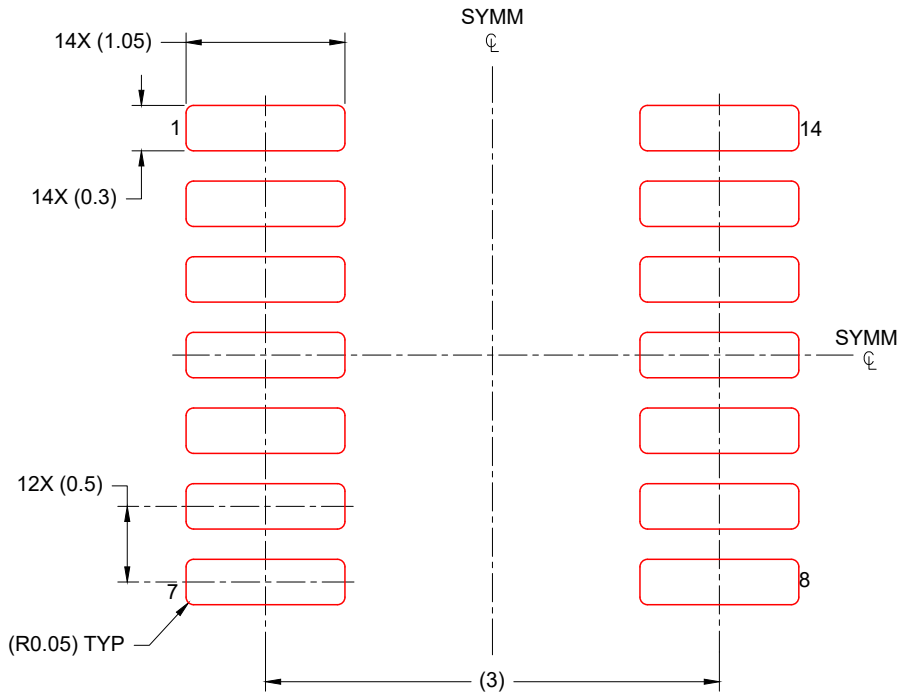



SOLDER MASK DETAILS

4224643/D 07/2024

NOTES: (continued)

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




SOLDER PASTE EXAMPLE
BASED ON 0.125 mm THICK STENCIL
SCALE: 20X

4224643/D 07/2024

NOTES: (continued)

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

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最后更新日期：2025 年 10 月