

TL4050 精密低功耗并联电压基准

1 特性

- 2.5V、4.096V、5V 和 10V 的固定输出电压
- 严格输出容差和低温度系数
 - 0.1% (最大值), 50ppm/°C-A 级
 - 0.2% (最大值), 50ppm/°C-B 级
 - 0.5% (最大值), 50ppm/°C-C 级
- 低输出噪声: 41 μV_{RMS} 典型值
- 宽工作电流范围:
60 μA (典型值) 至 15mA
- 与所有容性负载一起工作时保持稳定; 无需输出电容器
- 工作温度范围: -40°C 至 125°C

2 应用

- 数据采集系统
- 电源和电源监控器
- 仪表和测试设备
- 过程控制
- 精密音频
- 汽车电子产品
- 能源管理
- 电池供电设备

3 说明

TL4050 系列并联电压基准功能多样、易于使用, 适合各种应用。该二端子固定输出器件无需外部电容器即可运行, 与所有容性负载一起工作时也可保持稳定。此外, 该基准具备低动态阻抗、低噪声和低温度系数, 可确保在宽工作电流和温度范围内实现稳定的输出电压。

TL4050 具有三个初始容差, 范围从 A 级的 0.1% (最大值) 到 C 级的 0.5% (最大值)。这样设计人员可以非常灵活地为任何应用选择具有高性价比的产品。TL4050 采用节省空间的 SOT-23-3 和 SC-70 封装, 最低电流为 45 μA (典型值), 是便携式应用的上佳选择。

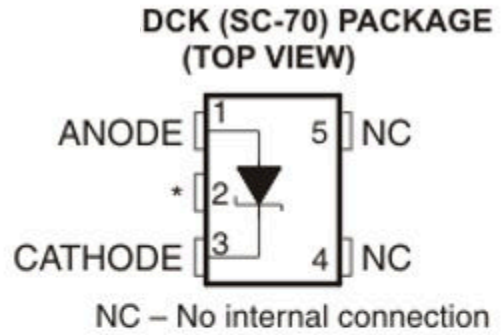
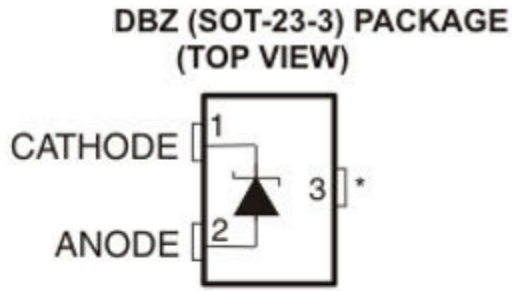
TL4050xI 的额定工作环境温度范围是 -40°C 至 85°C。TL4050xQ 的额定工作环境温度范围是 -40°C 至 125°C。



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4 引脚配置和功能



在具有高电磁干扰（例如放置在变压器或其他电磁源附近时）或显著高频开关噪声的应用中，TI 建议将该引脚连接到阳极。

5 规格

5.1 绝对最大额定值⁽¹⁾

在自然通风条件下的温度范围内测得（除非另有说明）

| | | 最小值 | 最大值 | 单位 |
|---------------|-------------------------------------|--------|-----|------|
| I_Z | 连续阴极电流 | -10 | 20 | mA |
| θ_{JA} | 封装热阻抗 ⁽²⁾ ⁽³⁾ | DBV 封装 | 206 | °C/W |
| | | DCK 封装 | 252 | |
| T_J | 工作虚拟结温 | | 150 | °C |
| T_{stg} | 贮存温度范围 | -65 | 150 | °C |

- 应力超出绝对最大额定值下列出的值可能会对器件造成永久损坏。这些列出的值仅仅是应力额定值，并不表示器件在这些条件下以及在建议运行条件以外的任何其他条件下能够正常运行。长时间处于绝对最大额定条件下可能会影响器件的可靠性。
- 最大功耗是与 $T_J(\max)$ 、 θ_{JA} 和 T_A 相关的函数。在任何允许的环境温度下，允许的最大功耗为 $P_D = (T_J(\max) - T_A) / \theta_{JA}$ 。在 150°C 的绝对最大 T_J 下运行可能会影响可靠性。
- 封装热阻抗根据 JESD 51-7 计算。

5.2 ESD 等级

| | | 值 | 单位 |
|-------------|--|-------|----|
| $V_{(ESD)}$ | 静电放电 | | V |
| | 人体放电模型 (HBM), 符合 ANSI/ESDA/JEDEC JS-001 标准 ⁽¹⁾ ⁽²⁾ | ±2000 | |
| | 充电器件模型 (CDM), 符合 JEDEC 规范 JESD22-C101 ⁽³⁾ | ±500 | |

- JEDEC 文档 JEP155 指出：500V HBM 时能够在标准 ESD 控制流程下安全生产。
- 人体放电模型是一个通过 1.5k Ω 电阻器对每个引脚放电的 100pF 电容器。对于人体放电模型，所有引脚的额定值均为 2kV，而反馈引脚的额定值为 1kV。
- JEDEC 文档 JEP157 指出：250V CDM 时能够在标准 ESD 控制流程下安全生产。若部署必要的预防措施，不足 250V CDM 时也能进行生产。

5.3 建议运行条件

| | | 最小值 | 最大值 | 单位 |
|-------|--------|----------------|-----|----|
| I_Z | 阴极电流 | ⁽¹⁾ | 15 | mA |
| T_A | 自然通风温度 | I 温度 | -40 | °C |
| | | Q 温度 | -40 | |

- 查看参数表

5.4 TL4050x25I 电气特性

在工业温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 85°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A25I | | | TL4050B25I | | | TL4050C25I | | | 单位 |
|---|---|----------------------|------------|-----|-----|------------|-----|-----|------------|-----|-----|----------------------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | |
| V_Z 反向击穿电压 | $I_Z = 100 \mu\text{A}$ | 25°C | 2.5 | | | 2.5 | | | 2.5 | | | V |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100 \mu\text{A}$ | 25°C | -2.5 | | 2.5 | -5 | | 5 | -13 | | 13 | mV |
| | | 完整范围 | -11 | | 11 | -14 | | 14 | -21 | | 21 | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 41 60 | | | 41 60 | | | 41 60 | | | μA |
| | | 完整范围 | 65 | | | 65 | | | 65 | | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | ppm/ $^{\circ}\text{C}$ |
| | $I_Z = 1\text{mA}$ | 25°C | ± 15 | | | ± 15 | | | ± 15 | | | |
| | $I_Z = 100 \mu\text{A}$ | 25°C | ± 15 | | | ± 15 | | | ± 15 | | | |
| | | 完整范围 | ± 50 | | | ± 50 | | | ± 50 | | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.3 | 0.8 | | 0.3 | 0.8 | | 0.3 | 0.8 | mV | |
| | | 完整范围 | 1.2 | | | 1.2 | | | 1.2 | | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 2.3 6 | | | 2.3 6 | | | 2.3 6 | | | |
| | | 完整范围 | 8 | | | 8 | | | 8 | | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{\text{AC}} = 0.1 I_Z$ | 25°C | 0.3 | | | 0.3 | | | 0.3 | | | Ω |
| e_N 宽带噪声 | $I_Z = 100 \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 41 | | | 41 | | | 41 | | | μV_{RMS} |
| 反向击穿电压的长期稳定性 | $t = 1000\text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100 \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 0.7 | | | 0.7 | | | 0.7 | | | mV |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.5 TL4050x25Q 电气特性

在工作温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 125°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A25Q | | | TL4050B25Q | | | TL4050C25Q | | | 单位 |
|---|--|----------------------|------------|-----|----------|------------|-----|----------|------------|-----|----------|----------------------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | |
| V_Z 反向击穿电压 | $I_Z = 100\ \mu\text{A}$ | 25°C | 2.5 | | | 2.5 | | | 2.5 | | | V |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100\ \mu\text{A}$ | 25°C | -2.5 | | 2.5 | -5 | | 5 | -13 | | 13 | mV |
| | | 完整范围 | -15 | | 15 | -18 | | 18 | -25 | | 25 | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 41 | | 60 | 41 | | 60 | 41 | | 60 | μA |
| | | 完整范围 | | | 65 | | | 65 | | | 65 | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | ppm/ $^{\circ}\text{C}$ |
| | $I_Z = 1\text{mA}$ | 25°C | ± 15 | | | ± 15 | | | ± 15 | | | |
| | $I_Z = 100\ \mu\text{A}$ | 25°C | ± 15 | | | ± 15 | | | ± 15 | | | |
| | | 完整范围 | | | ± 50 | | | ± 50 | | | ± 50 | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.3 | | 0.8 | 0.3 | | 0.8 | 0.3 | | 0.8 | mV |
| | | 完整范围 | | | 1.2 | | | 1.2 | | | 1.2 | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 2.3 | | 6 | 2.3 | | 6 | 2.3 | | 6 | |
| | | 完整范围 | | | 8 | | | 8 | | | 8 | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1 I_Z$ | 25°C | 0.3 | | | 0.3 | | | 0.3 | | | Ω |
| e_N 宽带噪声 | $I_Z = 100\ \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 41 | | | 41 | | | 41 | | | μV_{RMS} |
| 反向击穿电压的长期稳定性 | $t = 1000\text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100\ \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 0.7 | | | 0.7 | | | 0.7 | | | mV |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.6 TL4050x41I 电气特性

在工业温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 85°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A41I | | | TL4050B41I | | | TL4050C41I | | | 单位 | | | |
|---|--|----------------------|------------|-----|-----|------------|----------|-----|------------|-----|-----|----------------------------|----|--|---------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | | | | |
| V_Z 反向击穿电压 | $I_Z = 100\ \mu\text{A}$ | 25°C | 4.096 | | | 4.096 | | | 4.096 | | | V | | | |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100\ \mu\text{A}$ | 25°C | -4.1 | 典型值 | 4.1 | -8.2 | 典型值 | 8.2 | -21 | 典型值 | 21 | mV | | | |
| | | 完整范围 | -18 | | 18 | | -22 | | 22 | | -34 | | 34 | | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 52 | | 68 | | 52 | | 68 | | 52 | | 68 | | μA |
| | | 完整范围 | 73 | | | | 73 | | | | | | | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 30 | | | ± 30 | | | ± 30 | | | ppm/ $^{\circ}\text{C}$ | | | |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | $I_Z = 100\ \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | | 完整范围 | ± 50 | | | | ± 50 | | | | | | | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.2 | 典型值 | 0.9 | 0.2 | 典型值 | 0.9 | 0.2 | 典型值 | 0.9 | mV | | | |
| | | 完整范围 | 1.2 | | | | 1.2 | | | | | | | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 2 | | 7 | | 2 | | 7 | | 2 | | 7 | | |
| | | 完整范围 | 10 | | | | 10 | | | | | | | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1 I_Z$ | 25°C | 0.5 | | | 0.5 | | | 0.5 | | | Ω | | | |
| e_N 宽带噪声 | $I_Z = 100\ \mu\text{A}$, $10\text{Hz} \leq f \leq 10\ \text{kHz}$ | 25°C | 93 | | | 93 | | | 93 | | | μV_{RMS} | | | |
| 反向击穿电压的长期稳定性 | $t = 1000\ \text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100\ \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm | | | |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 1.148 | | | 1.148 | | | 1.148 | | | mV | | | |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.7 TL4050x41Q 电气特性

在工作温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 125°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A41Q | | | TL4050B41Q | | | TL4050C41Q | | | 单位 | | |
|---|--|----------------------|------------|-----|----------|------------|-----|-----|------------|-----|----------|----------------------------|---------------|--|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | | | |
| V_Z 反向击穿电压 | $I_Z = 100\ \mu\text{A}$ | 25°C | 4.096 | | | 4.096 | | | 4.096 | | | V | | |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100\ \mu\text{A}$ | 25°C | -4.1 | 典型值 | 4.1 | -8.2 | 典型值 | 8.2 | -21 | 典型值 | 21 | mV | | |
| | | 完整范围 | -25 | | 25 | | -29 | | 29 | | -41 | | 41 | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 52 | | 68 | | 52 | | 68 | | 52 | | μA | |
| | | 完整范围 | | | 78 | | | | 78 | | 78 | | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 30 | | | ± 30 | | | ± 30 | | | ppm/ $^{\circ}\text{C}$ | | |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | |
| | $I_Z = 100\ \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | |
| | | 完整范围 | | | ± 50 | | | | ± 50 | | ± 50 | | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.2 | 典型值 | 0.9 | 0.2 | 典型值 | 0.9 | 0.2 | 典型值 | 0.9 | mV | | |
| | | 完整范围 | | | 1.2 | | | | 1.2 | | 1.2 | | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 2 | | 7 | | 2 | | 7 | | 2 | | 7 | |
| | | 完整范围 | | | 10 | | | | 10 | | 10 | | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{\text{AC}} = 0.1 I_Z$ | 25°C | 0.5 | | | 0.5 | | | 0.5 | | | Ω | | |
| e_N 宽带噪声 | $I_Z = 100\ \mu\text{A}$, $10\text{Hz} \leq f \leq 10\ \text{kHz}$ | 25°C | 93 | | | 93 | | | 93 | | | μV_{RMS} | | |
| 反向击穿电压的长期稳定性 | $t = 1000\ \text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100\ \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm | | |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 1.148 | | | 1.148 | | | 1.148 | | | mV | | |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.8 TL4050x50I 电气特性

在工业温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 85°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A50I | | | TL4050B50I | | | TL4050C50I | | | 单位 |
|---|---|----------------------|------------|-----|-----|------------|-----|-----|------------|-----|-----|----------------------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | |
| V_Z 反向击穿电压 | $I_Z = 100 \mu\text{A}$ | 25°C | 5 | | | 5 | | | 5 | | | V |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100 \mu\text{A}$ | 25°C | -5 | | 5 | -10 | | 10 | -25 | | 25 | mV |
| | | 完整范围 | -22 | | 22 | -27 | | 27 | -42 | | 42 | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 56 | | 74 | 56 | | 74 | 56 | | 74 | μA |
| | | 完整范围 | | | 80 | | | 80 | | | 80 | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 30 | | | ± 30 | | | ± 30 | | | ppm/ $^{\circ}\text{C}$ |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | |
| | $I_Z = 100 \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | |
| | | 完整范围 | ± 50 | | | ± 50 | | | ± 50 | | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.2 | | 1 | 0.2 | | 1 | 0.2 | | 1 | mV |
| | | 完整范围 | | | 1.4 | | | 1.4 | | | 1.4 | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 2 | | 8 | 2 | | 8 | 2 | | 8 | |
| | | 完整范围 | | | 12 | | | 12 | | | 12 | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{\text{AC}} = 0.1 I_Z$ | 25°C | 0.5 | | | 0.5 | | | 0.5 | | | Ω |
| e_N 宽带噪声 | $I_Z = 100 \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 93 | | | 93 | | | 93 | | | μV_{RMS} |
| 反向击穿电压的长期稳定性 | $t = 1000\text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100 \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 1.4 | | | 1.4 | | | 1.4 | | | mV |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.9 TL4050x50Q 电气特性

在工作温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 125°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A50Q | | | TL4050B50Q | | | TL4050C50Q | | | 单位 | |
|---|--|----------------------|------------|-----|----------|------------|-----|----------|------------|-----|----------|----------------------------|---|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | | |
| V_Z 反向击穿电压 | $I_Z = 100\ \mu\text{A}$ | 25°C | 5 | | | 5 | | | 5 | | | V | |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100\ \mu\text{A}$ | 25°C | -5 | | 5 | -10 | | 10 | -25 | | 25 | mV | |
| | | 完整范围 | -30 | | 30 | -35 | | 35 | -50 | | 50 | | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 56 | | 74 | 56 | | 74 | 56 | | 74 | μA | |
| | | 完整范围 | | | 90 | | | 90 | | | 90 | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 30 | | | ± 30 | | | ± 30 | | | ppm/ $^{\circ}\text{C}$ | |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | |
| | $I_Z = 100\ \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | |
| | | 完整范围 | | | ± 50 | | | ± 50 | | | ± 50 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.2 | | 1 | 0.2 | | 1 | 0.2 | | 1 | mV | |
| | | 完整范围 | | | 1.4 | | | 1.4 | | | 1.4 | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | | 2 | | 8 | | 2 | | 8 | | | 8 |
| | | 完整范围 | | | 12 | | | 12 | | | 12 | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1 I_Z$ | 25°C | 0.5 | | | 0.5 | | | 0.5 | | | Ω | |
| e_N 宽带噪声 | $I_Z = 100\ \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 93 | | | 93 | | | 93 | | | μV_{RMS} | |
| 反向击穿电压的长期稳定性 | $t = 1000\ \text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100\ \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm | |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 1.4 | | | 1.4 | | | 1.4 | | | mV | |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

5.10 TL4050x10I 电气特性

在工业温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 85°C (除非另有说明)

| 参数 | 测试条件 | T_A | TL4050A10I | | | TL4050B10I | | | TL4050C10I | | | 单位 | | | |
|---|---|----------------------|------------|-----|-----|------------|-----|-----|------------|-----|-----|----------------------------|----------|--|---------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | | | | |
| V_Z 反向击穿电压 | $I_Z = 100 \mu\text{A}$ | 25°C | 10 | | | 10 | | | 10 | | | V | | | |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100 \mu\text{A}$ | 25°C | -10 | 10 | | -20 | 20 | | -50 | 50 | | mV | | | |
| | | 完整范围 | -43 | | 43 | | -53 | | 53 | | -83 | | 83 | | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 80 | | 100 | | 80 | | 100 | | 80 | | 100 | | μA |
| | | 完整范围 | | | 103 | | | | 103 | | | | 103 | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 40 | | | ± 40 | | | ± 40 | | | ppm/ $^{\circ}\text{C}$ | | | |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | $I_Z = 100 \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | | 完整范围 | | | | ± 50 | | | ± 50 | | | | ± 50 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.8 | | 1.5 | | 0.8 | | 1.5 | | 0.8 | | 1.5 | | mV |
| | | 完整范围 | | | 3.8 | | | | 3.8 | | | | 3.8 | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 8 | | 12 | | 8 | | 12 | | 8 | | 12 | | |
| | | 完整范围 | | | 23 | | | | 23 | | | | 23 | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{AC} = 0.1 I_Z$ | 25°C | 0.7 | | | 0.7 | | | 0.7 | | | Ω | | | |
| e_N 宽带噪声 | $I_Z = 100 \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 150 | | | 150 | | | 150 | | | μV_{RMS} | | | |
| 反向击穿电压的长期稳定性 | $t = 1000\text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100 \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm | | | |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 2.8 | | | 2.8 | | | 2.8 | | | mV | | | |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

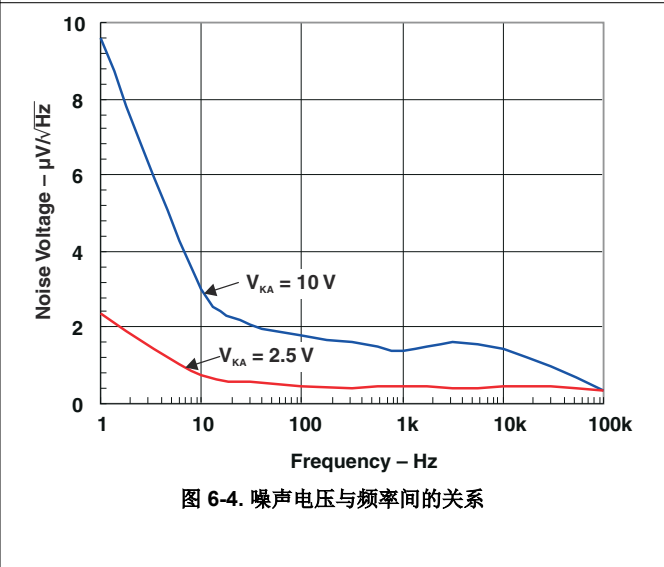
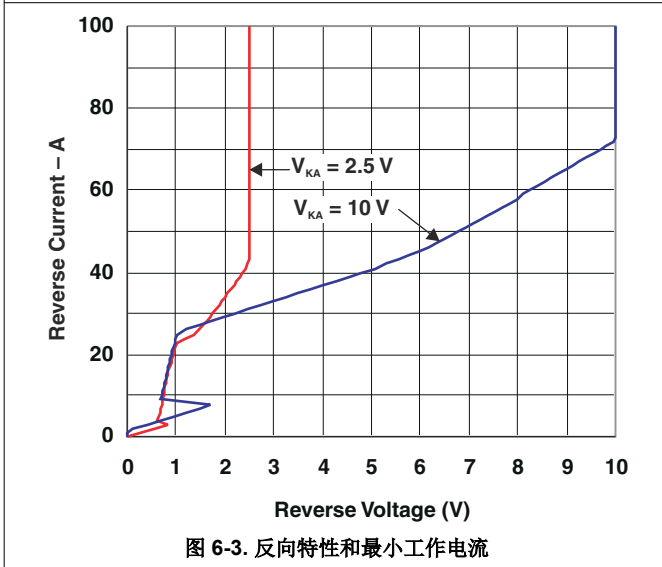
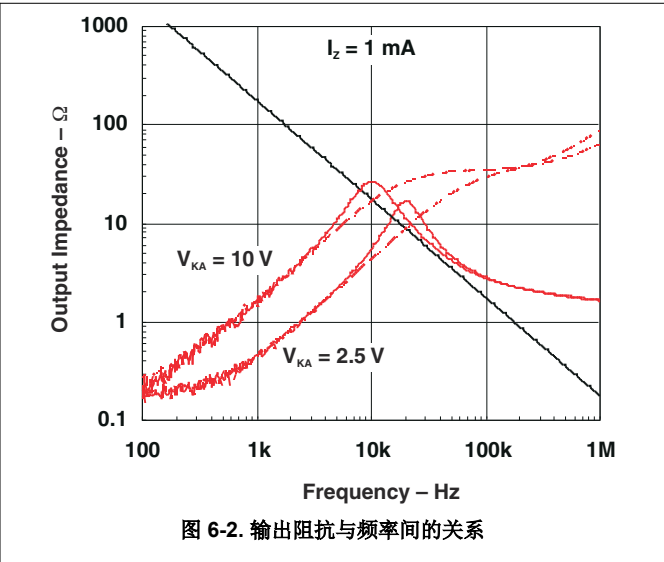
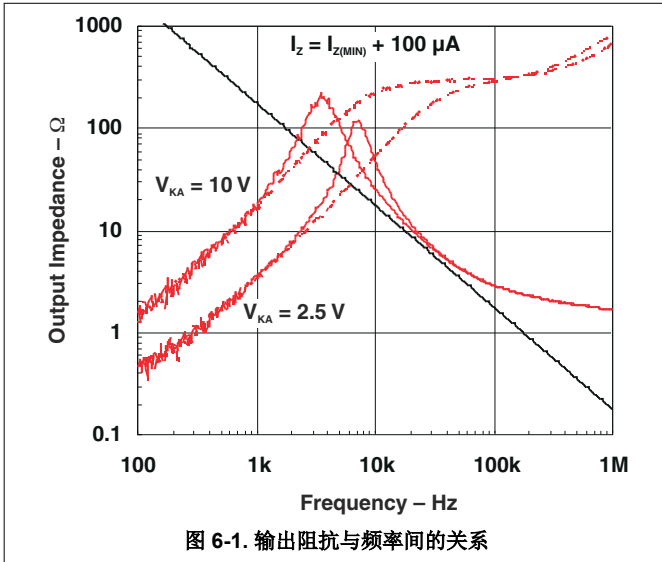
5.11 TL4050x10Q 电气特性

在工作温度范围内，全范围 $T_A = -40^{\circ}\text{C}$ 至 125°C (除非另有说明)

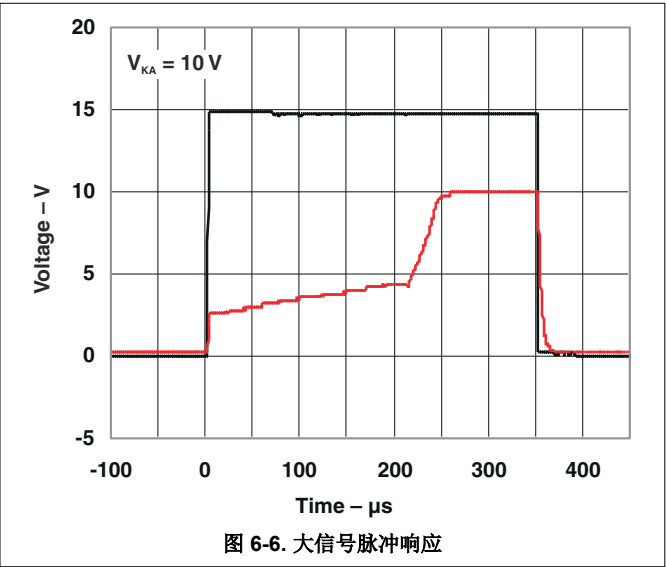
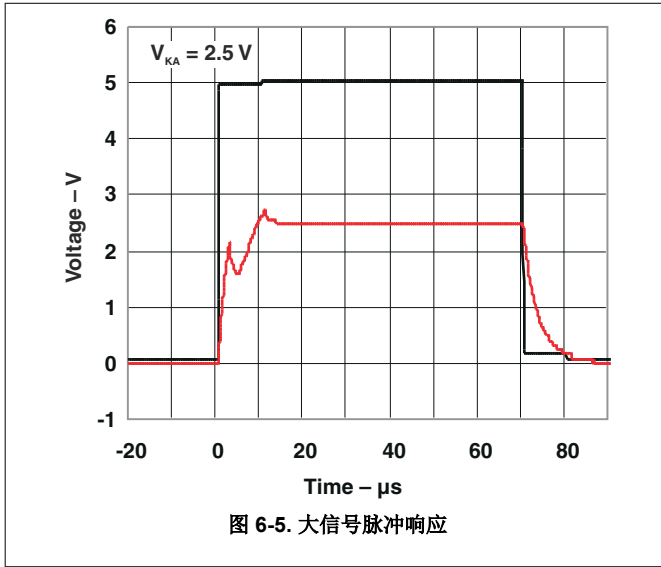
| 参数 | 测试条件 | T_A | TL4050A10Q | | | TL4050B10Q | | | TL4050C10Q | | | 单位 | | | |
|---|---|----------------------|------------|-----|----------|------------|-----|-----|------------|-----|------|----------------------------|----------|--|---------------|
| | | | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | 最小值 | 典型值 | 最大值 | | | | |
| V_Z 反向击穿电压 | $I_Z = 100 \mu\text{A}$ | 25°C | 10 | | | 10 | | | 10 | | | V | | | |
| ΔV_Z 反向击穿电压容差 | $I_Z = 100 \mu\text{A}$ | 25°C | -10 | 10 | | -20 | 20 | | -50 | 50 | | mV | | | |
| | | 完整范围 | -60 | | 60 | | -70 | | 70 | | -100 | | 100 | | |
| $I_{Z,\text{min}}$ 最小阴极电流 | | 25°C | 80 | | 100 | | 80 | | 100 | | 80 | | 100 | | μA |
| | | 完整范围 | | | 110 | | | | 110 | | | | 110 | | |
| α_{VZ} 反向击穿电压的平均温度系数 | $I_Z = 10\text{mA}$ | 25°C | ± 40 | | | ± 40 | | | ± 40 | | | ppm/ $^{\circ}\text{C}$ | | | |
| | $I_Z = 1\text{mA}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | $I_Z = 100 \mu\text{A}$ | 25°C | ± 20 | | | ± 20 | | | ± 20 | | | | | | |
| | | 完整范围 | | | ± 50 | | | | ± 50 | | | | ± 50 | | |
| $\frac{\Delta V_Z}{\Delta I_Z}$ 随着阴极电流的变化，反向击穿电压会发生变化 | $I_{Z,\text{min}} < I_Z < 1\text{mA}$ | 25°C | 0.8 | | 1.5 | | 0.8 | | 1.5 | | 0.8 | | 1.5 | | mV |
| | | 完整范围 | | | 3.8 | | | | 3.8 | | | | 3.8 | | |
| | $1\text{mA} < I_Z < 15\text{mA}$ | 25°C | 8 | | 12 | | 8 | | 12 | | 8 | | 12 | | |
| | | 完整范围 | | | 23 | | | | 23 | | | | 23 | | |
| Z_Z 反向动态阻抗 | $I_Z = 1\text{mA}$, $f = 120\text{Hz}$, $I_{\text{AC}} = 0.1 I_Z$ | 25°C | 0.7 | | | 0.7 | | | 0.7 | | | Ω | | | |
| e_N 宽带噪声 | $I_Z = 100 \mu\text{A}$, $10\text{Hz} \leq f \leq 10\text{kHz}$ | 25°C | 150 | | | 150 | | | 150 | | | μV_{RMS} | | | |
| 反向击穿电压的长期稳定性 | $t = 1000\text{h}$, $T_A = 25^{\circ}\text{C} \pm 0.1^{\circ}\text{C}$, $I_Z = 100 \mu\text{A}$ | | 120 | | | 120 | | | 120 | | | ppm | | | |
| V_{HYST} 热滞后 ⁽¹⁾ | $\Delta T_A = -40^{\circ}\text{C}$ 至 125°C | | 2.8 | | | 2.8 | | | 2.8 | | | mV | | | |

(1) 热迟滞定义为 $V_{Z,25^{\circ}\text{C}}$ (在循环至 -40°C 之后) - $V_{Z,25^{\circ}\text{C}}$ (在循环至 125°C 之后)。

6 典型特性



6 典型特性 (续)



7 详细说明

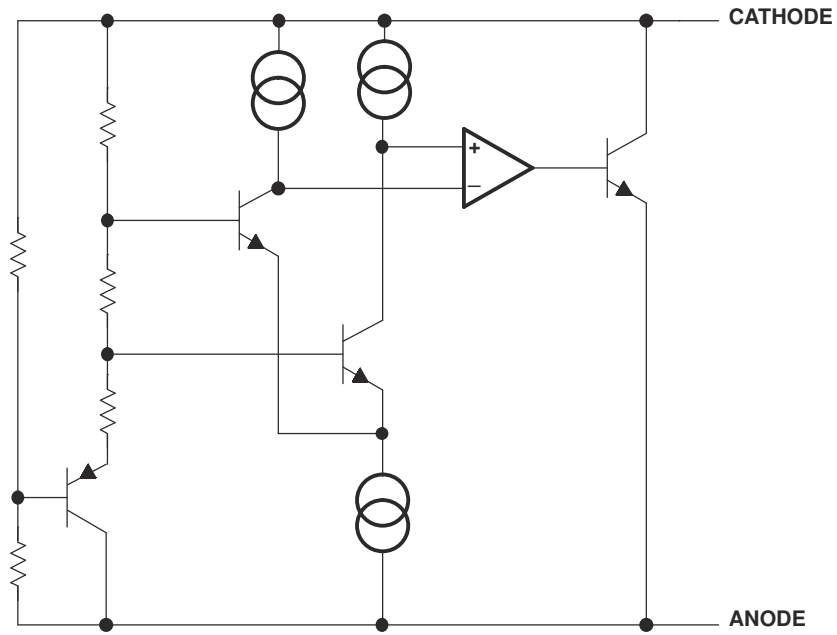


图 7-1. 功能方框图

8 应用信息

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。

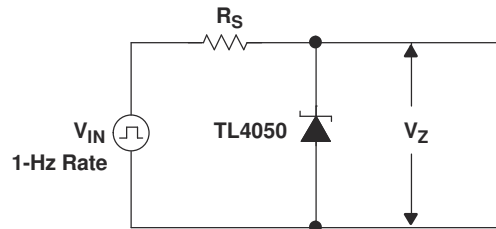


图 8-1. 启动测试电路

8.1 输出电容器

TL4050 无需在阴极和阳极之间使用输出电容器即可实现稳定性。不过，如果需要输出旁路电容器，TL4050 也可在所有容性负载下保持稳定。

8.2 SOT-23 引脚连接

在 SOT-23 封装器件的引脚 2 和 3 之间连接了一个寄生肖特基二极管。因此，SOT-23 封装的引脚 3 必须悬空或连接到引脚 2。

8.3 可与 ADC 或 DAC 搭配使用

TL4050x-41 旨在成为 12 位数据采集系统中所要求的具有成本效益的电压基准。对于由 5V 电源供电的 12 位系统（如 ADS7842（请参阅图 8-2）、TL4050x-41（4.096V）），允许使用 1mV 的 LSB 进行工作。

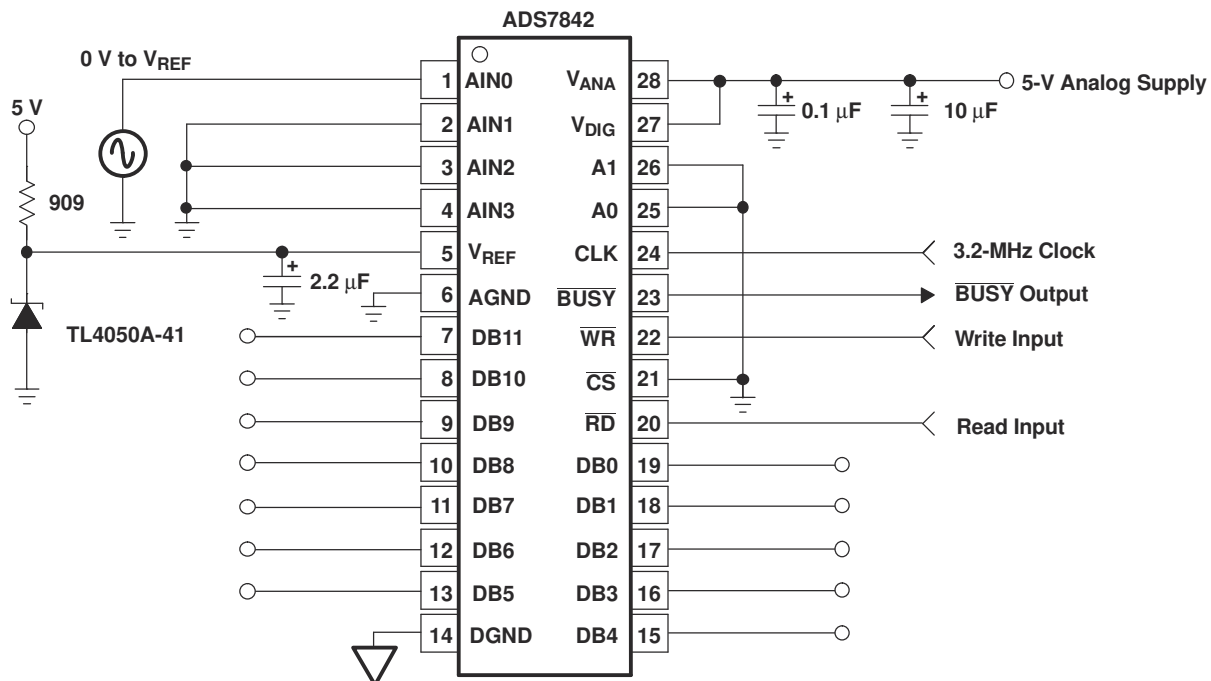


图 8-2. 使用 TL4050x-41 的数据采集电路

8.4 阴极和负载电流

在典型的分流稳压器配置 (请参阅图 8-3) 中, 在电源和 TL4050 的阴极之间连接了一个外部电阻器 R_S 。必须正确设置 R_S , 因为 R_S 设置可用于为负载供电 (I_L) 和偏置 TL4050 (I_Z) 的总电流。在所有情况下, I_Z 都必须保持在指定范围内, 才能使基准正常运行。考虑到负载和电源电压变化的一个极端情况 (最大 I_L 和最小 V_S), R_S 必须足够小, 以提供稳压器运行所需的最小 I_Z , 如数据表参数所示。在另一个极端情况下, 即使用最大 V_S 和最小 I_L , 则 R_S 必须足够大, 才能将 I_Z 限制为小于最大额定值 15mA 的电流。

R_S 根据方程式 1 计算得出:

$$R_S = \frac{(V_S - V_Z)}{(I_L + I_Z)} \quad (1)$$

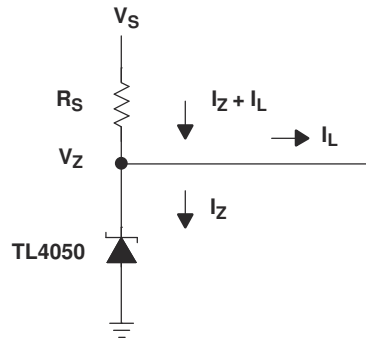


图 8-3. 并联稳压器

9 器件和文档支持

9.1 订购信息

表 9-1. 订购信息 (1)

| T _A | 器件等级 | V _{KA} | 封装 ⁽²⁾ | 可订购器件型号 | 正面标识 ⁽³⁾ | |
|----------------|--------------------------------------|-----------------|-------------------|----------------|---------------------|------|
| -40°C 至 85°C | A 级： 0.1% 初始精度 和 50ppm/°C 温度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A25IDBZR | TKE_ |
| | | | | 卷带 (250 个) | TL4050A25IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A25IDCKR | 82_ |
| | | | | 卷带 (250 个) | TL4050A25IDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A41IDBZR | TKL_ |
| | | | | 卷带 (250 个) | TL4050A41IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A41IDCKR | 8E_ |
| | | | | 卷带 (250 个) | TL4050A41IDCKT | |
| | | 5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A50IDBZR | TKS_ |
| | | | | 卷带 (250 个) | TL4050A50IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A50IDCKR | 8L_ |
| | | | | 卷带 (250 个) | TL4050A50IDCKT | |
| | 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A10IDBZR | TK2_ | |
| | | | 卷带 (250 个) | TL4050A10IDBZT | | |
| | | SC-70 - DCK | 卷带 (3000 个) | TL4050A10IDCKR | 8Z_ | |
| | | | 卷带 (250 个) | TL4050A10IDCKT | | |
| | B 级： 0.2% 初始精度 和 50ppm/°C 温度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B25IDBZR | TKF_ |
| | | | | 卷带 (250 个) | TL4050B25IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050B25IDCKR | 83_ |
| | | | | 卷带 (250 个) | TL4050B25IDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B41IDBZR | TKM_ |
| | | | | 卷带 (250 个) | TL4050B41IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050B41IDCKR | 8F_ |
| | | | | 卷带 (250 个) | TL4050B41IDCKT | |
| 5V | | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B50IDBZR | TKT_ | |
| | | | 卷带 (250 个) | TL4050B50IDBZT | | |
| | | SC-70 - DCK | 卷带 (3000 个) | TL4050B50IDCKR | 8M_ | |
| | | | 卷带 (250 个) | TL4050B50IDCKT | | |
| 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B10IDBZR | TK3_ | | |
| | | 卷带 (250 个) | TL4050B10IDBZT | | | |
| | SC-70 - DCK | 卷带 (3000 个) | TL4050B10IDCKR | 92_ | | |
| | | 卷带 (250 个) | TL4050B10IDCKT | | | |

表 9-1. 订购信息 (1) (续)

| T _A | 器件等级 | V _{KA} | 封装 ⁽²⁾ | | 可订购器件型号 | 正面标识 ⁽³⁾ |
|----------------|--|-----------------|-------------------|-------------|----------------|---------------------|
| -40°C 至 85°C | C 级： 0.5% 初始精度 和 50ppm/°C 温 度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C25IDBZR | TKG_ |
| | | | | 卷带 (250 个) | TL4050C25IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050C25IDCKR | 84_ |
| | | | | 卷带 (250 个) | TL4050C25IDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C41IDBZR | TKN_ |
| | | | | 卷带 (250 个) | TL4050C41IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050C41IDCKR | 8G_ |
| | | | | 卷带 (250 个) | TL4050C41IDCKT | |
| | | 5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C50IDBZR | TKU_ |
| | | | | 卷带 (250 个) | TL4050C50IDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050C50IDCKR | 8N_ |
| | | | | 卷带 (250 个) | TL4050C50IDCKT | |
| 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C10IDBZR | TK4_ | | |
| | | 卷带 (250 个) | TL4050C10IDBZT | | | |
| | SC-70 - DCK | 卷带 (3000 个) | TL4050C10IDCKR | 93_ | | |
| | | 卷带 (250 个) | TL4050C10IDCKT | | | |
| -40°C 至 125°C | A 级： 0.1% 初始精度 和 50ppm/°C 温 度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A25QDBZR | TKH_ |
| | | | | 卷带 (250 个) | TL4050A25QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A25QDCKR | 85_ |
| | | | | 卷带 (250 个) | TL4050A25QDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A41QDBZR | TKP_ |
| | | | | 卷带 (250 个) | TL4050A41QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A41QDCKR | 8H_ |
| | | | | 卷带 (250 个) | TL4050A41QDCKT | |
| | | 5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A50QDBZR | TKV_ |
| | | | | 卷带 (250 个) | TL4050A50QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A50QDCKR | 8P_ |
| | | | | 卷带 (250 个) | TL4050A50QDCKT | |
| | | 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050A10QDBZR | TK5_ |
| | | | | 卷带 (250 个) | TL4050A10QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050A10QDCKR | 94_ |
| | | | | 卷带 (250 个) | TL4050A10QDCKT | |

表 9-1. 订购信息 (1) (续)

| T _A | 器件等级 | V _{KA} | 封装 ⁽²⁾ | 可订购器件型号 | 正面标识 ⁽³⁾ | |
|----------------|--------------------------------------|-----------------|-------------------|----------------|---------------------|------|
| -40°C 至 125°C | B 级： 0.2% 初始精度 和 50ppm/°C 温度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B25QDBZR | TKJ_ |
| | | | | 卷带 (250 个) | TL4050B25QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050B25QDCKR | 86_ |
| | | | | 卷带 (250 个) | TL4050B25QDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B41QDBZR | TKQ_ |
| | | | | 卷带 (250 个) | TL4050B41QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050B41QDCKR | 8J_ |
| | | | | 卷带 (250 个) | TL4050B41QDCKT | |
| | | 5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B50QDBZR | TKW_ |
| | | | | 卷带 (250 个) | TL4050B50QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050B50QDCKR | 8R_ |
| | | | | 卷带 (250 个) | TL4050B50QDCKT | |
| | 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050B10QDBZR | TK6_ | |
| | | | 卷带 (250 个) | TL4050B10QDBZT | | |
| | | SC-70 - DCK | 卷带 (3000 个) | TL4050B10QDCKR | 95_ | |
| | | | 卷带 (250 个) | TL4050B10QDCKT | | |
| | C 级： 0.5% 初始精度 和 50ppm/°C 温度系数 | 2.5V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C25QDBZR | TKK_ |
| | | | | 卷带 (250 个) | TL4050C25QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050C25QDCKR | 87_ |
| | | | | 卷带 (250 个) | TL4050C25QDCKT | |
| | | 4.096V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C41QDBZR | TKR_ |
| | | | | 卷带 (250 个) | TL4050C41QDBZT | |
| | | | SC-70 - DCK | 卷带 (3000 个) | TL4050C41QDCKR | 8K_ |
| | | | | 卷带 (250 个) | TL4050C41QDCKT | |
| 5V | | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C50QDBZR | TKY_ | |
| | | | 卷带 (250 个) | TL4050C50QDBZT | | |
| | | SC-70 - DCK | 卷带 (3000 个) | TL4050C50QDCKR | 8S_ | |
| | | | 卷带 (250 个) | TL4050C50QDCKT | | |
| 10V | SOT-23-3 - DBZ | 卷带 (3000 个) | TL4050C10QDBZR | TK7_ | | |
| | | 卷带 (250 个) | TL4050C10QDBZT | | | |
| | SC-70 - DCK | 卷带 (3000 个) | TL4050C10QDCKR | 96_ | | |
| | | 卷带 (250 个) | TL4050C10QDCKT | | | |

(1) 有关最新的封装和订购信息，请参阅本文档结尾的“封装选项附录”，或访问 TI 网站：www.ti.com。

(2) 封装图、热数据和符号可登录 www.ti.com/packaging 获取。

(3) 实际的顶端标记有一个用于标明晶圆制造/组装场所的附加字符。

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 A (June 2007) to Revision B (March 2025) | Page |
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| • 更新了反向击穿电压与工作电流之间的变化关系。..... | 12 |

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可用的最新数据。数据如有变更，恕不另行通知，且不会对此文档进行修订。有关此数据表的浏览器版本，请查阅左侧的导航栏。

PACKAGING INFORMATION

| Orderable part number | Status (1) | Material type (2) | Package Pins | Package qty Carrier | RoHS (3) | Lead finish/ Ball material (4) | MSL rating/ Peak reflow (5) | Op temp (°C) | Part marking (6) |
|--------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TL4050A10IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK2U |
| TL4050A10IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK2U |
| TL4050A10IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK2U |
| TL4050A10IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK2U |
| TL4050A10IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8ZU |
| TL4050A10IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8ZU |
| TL4050A10IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8ZU |
| TL4050A10IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8ZU |
| TL4050A10QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK5U |
| TL4050A10QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK5U |
| TL4050A10QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 94U |
| TL4050A10QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 94U |
| TL4050A25IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKEU |
| TL4050A25IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKEU |
| TL4050A25IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKEU |
| TL4050A25IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKEU |
| TL4050A25IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 82U |
| TL4050A25IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 82U |
| TL4050A25IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 82U |
| TL4050A25IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 82U |
| TL4050A25QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | TKHU |
| TL4050A25QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | TKHU |
| TL4050A25QDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | TKHU |
| TL4050A25QDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | TKHU |
| TL4050A25QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 85U |
| TL4050A25QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 85U |
| TL4050A41IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKL3, TKLU) |
| TL4050A41IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKL3, TKLU) |
| TL4050A41IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKL3, TKLU) |

| 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) |
|--------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TL4050A41IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKL3, TKLU) |
| TL4050A41QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKP3, TKPU) |
| TL4050A41QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKP3, TKPU) |
| TL4050A41QDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKP3, TKPU) |
| TL4050A41QDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKP3, TKPU) |
| TL4050A41QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8HU |
| TL4050A41QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8HU |
| TL4050A50IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKS3, TKSU) |
| TL4050A50IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKS3, TKSU) |
| TL4050A50IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKS3, TKSU) |
| TL4050A50IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKS3, TKSU) |
| TL4050A50IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8LU |
| TL4050A50IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8LU |
| TL4050A50IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8LU |
| TL4050A50IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8LU |
| TL4050A50QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKV3, TKVU) |
| TL4050A50QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKV3, TKVU) |
| TL4050A50QDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKV3, TKVU) |
| TL4050A50QDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKV3, TKVU) |
| TL4050A50QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8PU |
| TL4050A50QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8PU |
| TL4050B10IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK3U |
| TL4050B10IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK3U |
| TL4050B10IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK3U |
| TL4050B10IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | TK3U |
| TL4050B10QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK6U |
| TL4050B10QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK6U |
| TL4050B10QDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK6U |
| TL4050B10QDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | TK6U |
| TL4050B10QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 95U |
| TL4050B10QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 95U |

| 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) |
|----------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TL4050B10QDCKRG4 | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | 95U |
| TL4050B10QDCKRG4.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | 95U |
| TL4050B25IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKFU |
| TL4050B25IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKFU |
| TL4050B25IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKFU |
| TL4050B25IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKFU |
| TL4050B25IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 83U |
| TL4050B25IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 83U |
| TL4050B25QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | TKJU |
| TL4050B25QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | TKJU |
| TL4050B25QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 86U |
| TL4050B25QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 86U |
| TL4050B41IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKMU |
| TL4050B41IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKMU |
| TL4050B41IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKMU |
| TL4050B41IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKMU |
| TL4050B41IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8FU |
| TL4050B41IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8FU |
| TL4050B41IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8FU |
| TL4050B41IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8FU |
| TL4050B41QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKQ3, TKQU) |
| TL4050B41QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKQ3, TKQU) |
| TL4050B41QDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKQ3, TKQU) |
| TL4050B41QDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKQ3, TKQU) |
| TL4050B50IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKT3, TKTU) |
| TL4050B50IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKT3, TKTU) |
| TL4050B50IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKT3, TKTU) |
| TL4050B50IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKT3, TKTU) |
| TL4050B50IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8MU |
| TL4050B50IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8MU |
| TL4050B50QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKW3, TKWU) |

| 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) |
|--------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TL4050B50QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKW3, TKWU) |
| TL4050B50QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8RU |
| TL4050B50QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8RU |
| TL4050C10IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (TK43, TK4U) |
| TL4050C10IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (TK43, TK4U) |
| TL4050C10IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (TK43, TK4U) |
| TL4050C10IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 85 | (TK43, TK4U) |
| TL4050C10QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (TK73, TK7U) |
| TL4050C10QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU | Level-1-260C-UNLIM | -40 to 125 | (TK73, TK7U) |
| TL4050C25IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKGU |
| TL4050C25IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKGU |
| TL4050C25IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKGU |
| TL4050C25IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKGU |
| TL4050C25IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 84U |
| TL4050C25IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 84U |
| TL4050C25IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 84U |
| TL4050C25IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 84U |
| TL4050C25QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | TKKU |
| TL4050C25QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | TKKU |
| TL4050C25QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 87U |
| TL4050C25QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 87U |
| TL4050C41IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKNU |
| TL4050C41IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKNU |
| TL4050C41IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | TKNU |
| TL4050C41IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | TKNU |
| TL4050C41IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8GU |
| TL4050C41IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8GU |
| TL4050C41QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | TKRU |
| TL4050C41QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | TKRU |
| TL4050C41QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8KU |
| TL4050C41QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8KU |

| 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) |
|--------------------------------|---------------|----------------------|------------------|-----------------------|-------------|--------------------------------------|-----------------------------------|--------------|---------------------|
| TL4050C41QDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8KU |
| TL4050C41QDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8KU |
| TL4050C50IDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKU3, TKUU) |
| TL4050C50IDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKU3, TKUU) |
| TL4050C50IDBZT | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | (TKU3, TKUU) |
| TL4050C50IDBZT.A | Active | Production | SOT-23 (DBZ) 3 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | (TKU3, TKUU) |
| TL4050C50IDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8NU |
| TL4050C50IDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8NU |
| TL4050C50IDCKT | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 85 | 8NU |
| TL4050C50IDCKT.A | Active | Production | SC70 (DCK) 5 | 250 SMALL T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 85 | 8NU |
| TL4050C50QDBZR | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | (TKY3, TKYU) |
| TL4050C50QDBZR.A | Active | Production | SOT-23 (DBZ) 3 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | (TKY3, TKYU) |
| TL4050C50QDCKR | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | NIPDAU SN | Level-1-260C-UNLIM | -40 to 125 | 8SU |
| TL4050C50QDCKR.A | Active | Production | SC70 (DCK) 5 | 3000 LARGE T&R | Yes | SN | Level-1-260C-UNLIM | -40 to 125 | 8SU |

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

⁽²⁾ **Material type:** When designated, preproduction parts are prototypes/experimental devices, and are not yet approved or released for full production. Testing and final process, including without limitation quality assurance, reliability performance testing, and/or process qualification, may not yet be complete, and this item is subject to further changes or possible discontinuation. If available for ordering, purchases will be subject to an additional waiver at checkout, and are intended for early internal evaluation purposes only. These items are sold without warranties of any kind.

⁽³⁾ **RoHS values:** Yes, No, RoHS Exempt. See the [TI RoHS Statement](#) for additional information and value definition.

⁽⁴⁾ **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

⁽⁵⁾ **MSL rating/Peak reflow:** The moisture sensitivity level ratings and peak solder (reflow) temperatures. In the event that a part has multiple moisture sensitivity ratings, only the lowest level per JEDEC standards is shown. Refer to the shipping label for the actual reflow temperature that will be used to mount the part to the printed circuit board.

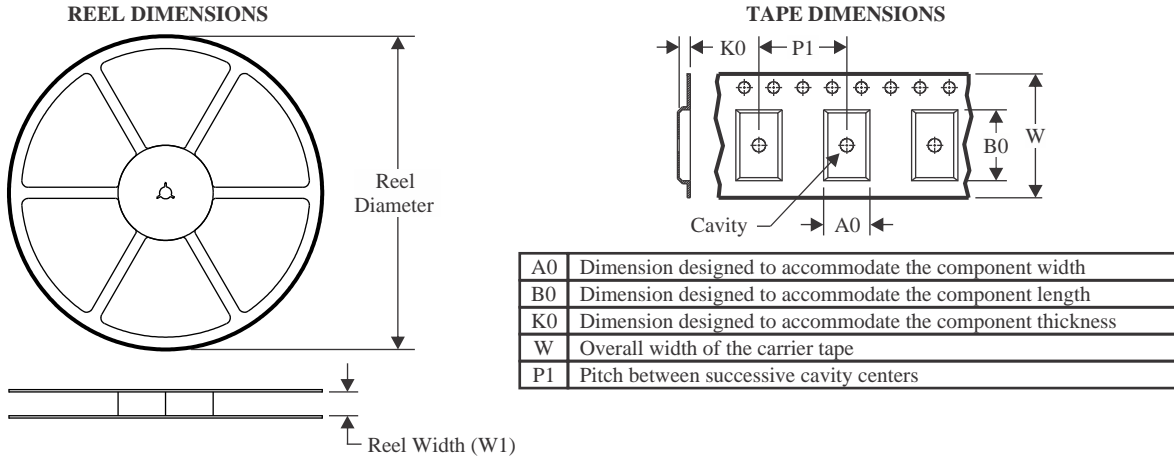
⁽⁶⁾ **Part marking:** There may be an additional marking, which relates to the logo, the lot trace code information, or the environmental category of the part.

Multiple part markings will be inside parentheses. Only one part marking contained in parentheses and separated by a "-" will appear on a part. If a line is indented then it is a continuation of the previous line and the two combined represent the entire part marking for that device.

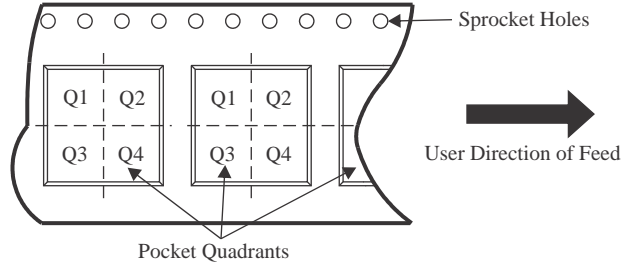
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TAPE AND REEL INFORMATION



QUADRANT ASSIGNMENTS FOR PIN 1 ORIENTATION IN TAPE



*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Reel Diameter (mm) | Reel Width W1 (mm) | A0 (mm) | B0 (mm) | K0 (mm) | P1 (mm) | W (mm) | Pin1 Quadrant |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TL4050A10IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A10IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A10IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A10IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A10QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A10QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A25IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25IDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A25QDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A25QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |

| 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 |
|------------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TL4050A25QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A25QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A41QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A41QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A41QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A41QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A50IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A50IDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050A50QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050A50QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B10IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B10IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B10QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B10QDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B10QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B10QDCKRG4 | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B25IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B25QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B25QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B25QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B41IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B41IDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B41IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B41QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B41QDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |

| 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 |
|----------------|--------------|-----------------|------|------|--------------------|--------------------|---------|---------|---------|---------|--------|---------------|
| TL4050B50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B50IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050B50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050B50QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C10IDBZT | SOT-23 | DBZ | 3 | 250 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C10IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C10QDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C10QDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C25IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C25IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C25IDBZT | SOT-23 | DBZ | 3 | 250 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C25IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C25IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C25IDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C25IDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C25QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C25QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C25QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C41IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C41IDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C41QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41QDCKR | SC70 | DCK | 5 | 3000 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41QDCKT | SC70 | DCK | 5 | 250 | 179.0 | 8.4 | 2.2 | 2.5 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C41QDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 179.0 | 8.4 | 3.15 | 2.95 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 178.0 | 9.2 | 3.15 | 2.77 | 1.22 | 4.0 | 8.0 | Q3 |
| TL4050C50IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C50IDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C50IDCKT | SC70 | DCK | 5 | 250 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |
| TL4050C50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 8.4 | 3.2 | 2.85 | 1.3 | 4.0 | 8.0 | Q3 |
| TL4050C50QDCKR | SC70 | DCK | 5 | 3000 | 180.0 | 8.4 | 2.3 | 2.55 | 1.2 | 4.0 | 8.0 | Q3 |

TAPE AND REEL BOX DIMENSIONS


*All dimensions are nominal

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TL4050A10IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A10IDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050A10IDCKR | SC70 | DCK | 5 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A10IDCKT | SC70 | DCK | 5 | 250 | 200.0 | 183.0 | 25.0 |
| TL4050A10QDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A10QDCKR | SC70 | DCK | 5 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A25IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A25IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A25IDBZT | SOT-23 | DBZ | 3 | 250 | 200.0 | 183.0 | 25.0 |
| TL4050A25IDCKR | SC70 | DCK | 5 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A25IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A25IDCKT | SC70 | DCK | 5 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050A25IDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A25QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A25QDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050A25QDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A25QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050A25QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |

| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|------------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TL4050A41IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A41IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A41QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A41QDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A41QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A41QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050A50IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A50IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A50IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A50IDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050A50QDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050A50QDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050A50QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B10IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050B10IDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050B10QDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B10QDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050B10QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B10QDCKRG4 | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B25IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B25IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050B25IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B25QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B25QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B25QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050B41IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B41IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050B41IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050B41IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B41IDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050B41IDCKT | SC70 | DCK | 5 | 250 | 200.0 | 183.0 | 25.0 |
| TL4050B41QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B41QDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050B50IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B50IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050B50IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B50QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050B50QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |

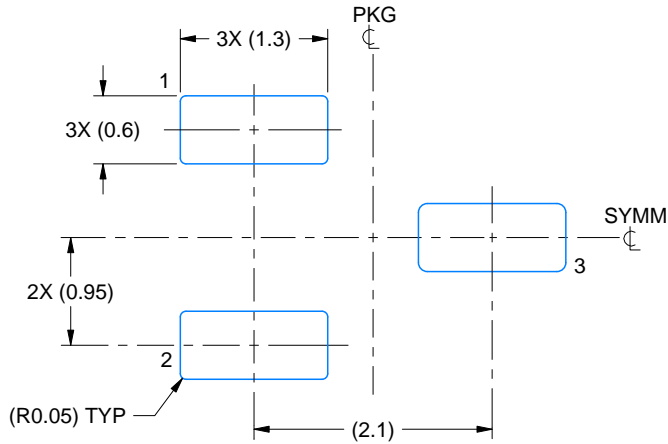
| Device | Package Type | Package Drawing | Pins | SPQ | Length (mm) | Width (mm) | Height (mm) |
|----------------|--------------|-----------------|------|------|-------------|------------|-------------|
| TL4050C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TL4050C10IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050C10IDBZT | SOT-23 | DBZ | 3 | 250 | 180.0 | 180.0 | 18.0 |
| TL4050C10IDBZT | SOT-23 | DBZ | 3 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050C10QDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TL4050C10QDBZR | SOT-23 | DBZ | 3 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050C25IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C25IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C25IDBZT | SOT-23 | DBZ | 3 | 250 | 200.0 | 183.0 | 25.0 |
| TL4050C25IDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050C25IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C25IDCKT | SC70 | DCK | 5 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050C25IDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C25QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C25QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050C25QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C41IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C41IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C41IDCKR | SC70 | DCK | 5 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050C41IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C41QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C41QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C41QDCKR | SC70 | DCK | 5 | 3000 | 203.0 | 203.0 | 35.0 |
| TL4050C41QDCKT | SC70 | DCK | 5 | 250 | 203.0 | 203.0 | 35.0 |
| TL4050C41QDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 200.0 | 183.0 | 25.0 |
| TL4050C50IDBZR | SOT-23 | DBZ | 3 | 3000 | 180.0 | 180.0 | 18.0 |
| TL4050C50IDBZT | SOT-23 | DBZ | 3 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C50IDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C50IDCKT | SC70 | DCK | 5 | 250 | 210.0 | 185.0 | 35.0 |
| TL4050C50QDBZR | SOT-23 | DBZ | 3 | 3000 | 210.0 | 185.0 | 35.0 |
| TL4050C50QDCKR | SC70 | DCK | 5 | 3000 | 210.0 | 185.0 | 35.0 |

EXAMPLE BOARD LAYOUT

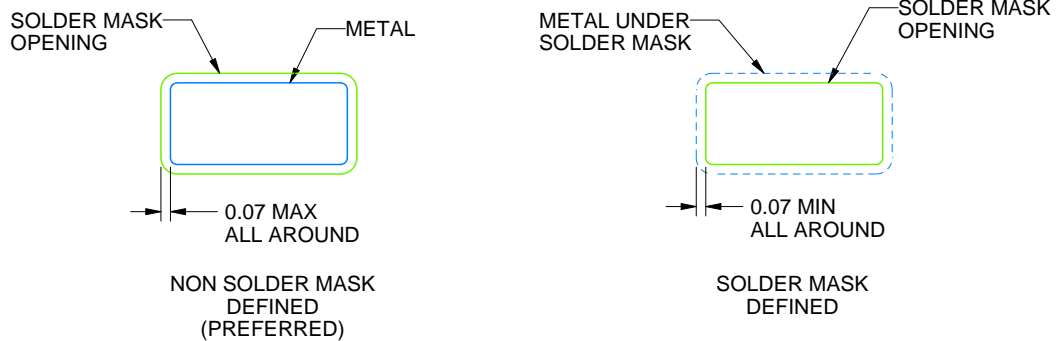
DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



LAND PATTERN EXAMPLE
SCALE:15X



SOLDER MASK DETAILS

4214838/F 08/2024

NOTES: (continued)

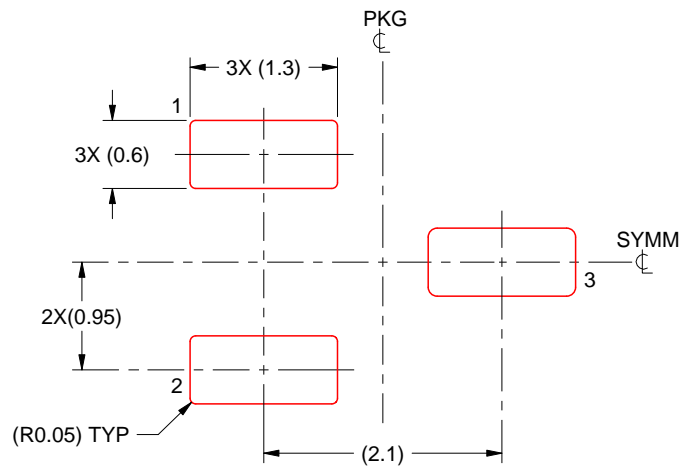
- 5. Publication IPC-7351 may have alternate designs.
- 6. Solder mask tolerances between and around signal pads can vary based on board fabrication site.

EXAMPLE STENCIL DESIGN

DBZ0003A

SOT-23 - 1.12 mm max height

SMALL OUTLINE TRANSISTOR



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

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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.

EXAMPLE BOARD LAYOUT

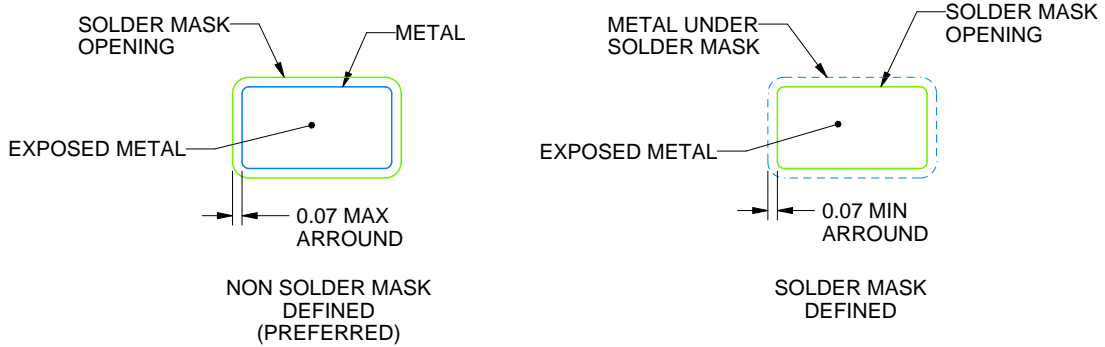
DCK0005A

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR



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.

EXAMPLE STENCIL DESIGN

DCK0005A

SOT - 1.1 max height

SMALL OUTLINE TRANSISTOR



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.

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最后更新日期：2025 年 10 月