# CSD19534KCS 100V N 沟道 NexFET™ 功率 MOSFET

## 1 特性

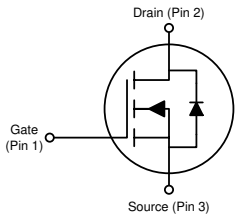
- 超低 $Q_g$ 和 $Q_{gd}$
- 低热阻
- 具有雪崩能力
- 无铅端子镀层
- 符合 RoHS
- 无卤素
- TO-220 塑料封装

## 2 应用

- 次级侧同步整流器
- 电机控制

## 3 说明

这款 100V、13.7mΩ、TO-220 NexFET™ 功率 MOSFET 旨在用于更大限度地降低功率转换应用中的损耗。




**产品概要**

| $T_A$ = 25°C | | 典型值 | | 单位 |
|---|---|---|---|---|
| $V_{DS}$ | 漏源电压 | 100 | | V |
| $Q_g$ | 栅极电荷总量 (10V) | 16.4 | | nC |
| $Q_{gd}$ | 栅极电荷（栅极到漏极） | 3.3 | | nC |
| $R_{DS(on)}$ | 漏源导通电阻 | $V_{GS}$ = 6V | 16.3 | mΩ |
| | | $V_{GS}$ = 10V | 13.7 | mΩ |
| $V_{GS(th)}$ | 阈值电压 | 2.8 | | V |

**订购信息** (1)

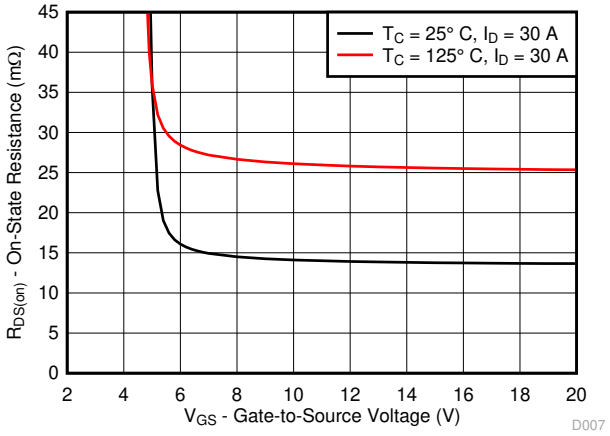
| 器件 | 封装 | 介质 | 数量 | 运输 |
|---|---|---|---|---|
| CSD19534KCS | TO-220 塑料封装 | 管装 | 50 | 管装 |

(1) 如需了解所有可用封装，请参阅数据表末尾的可订购产品附录。

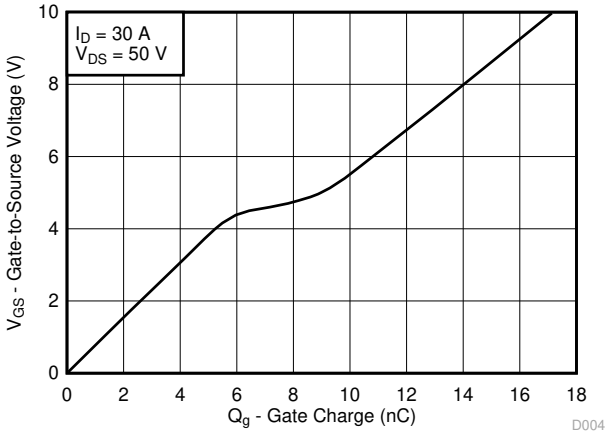
**绝对最大额定值**

| $T_A$ = 25°C | | 值 | 单位 |
|---|---|---|---|
| $V_{DS}$ | 漏源电压 | 100 | V |
| $V_{GS}$ | 栅源电压 | ±20 | V |
| $I_D$ | 持续漏极电流（受封装限制） | 100 | A |
| | 持续漏极电流（受器件限制），$T_C$ = 25°C 时测得 | 54 | |
| | 持续漏极电流（受器件限制），$T_C$ = 100°C 时测得 | 38 | |
| $I_{DM}$ | 脉冲漏极电流(1) | 138 | A |
| $P_D$ | 功率耗散 | 118 | W |
| $T_J$、$T_{stg}$ | 工作结温和贮存温度范围 | -55 至 175 | °C |
| $E_{AS}$ | 雪崩能量，单脉冲 $I_D$ = 33A，L = 0.1mH，$R_G$ = 25Ω | 54 | mJ |

(1) 最大 $R_{\theta JC}$ = 1.3°C/W，脉冲持续时间 ≤ 100μs，占空比 ≤ 1%




**$R_{DS(on)}$ 与 $V_{GS}$ 之间的关系**




**栅极电荷**

# Table of Contents

# 4 Specifications

## 4.1 Electrical Characteristics

($T_A$ = 25°C unless otherwise stated)

| PARAMETER | | TEST CONDITIONS | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|---|
| **STATIC CHARACTERISTICS** | | | | | | |
| $BV_{DSS}$ | Drain-to-Source Voltage | $V_{GS}$ = 0V, $I_D$ = 250 μA | 100 | | | V |
| $I_{DSS}$ | Drain-to-Source Leakage Current | $V_{GS}$ = 0V, $V_{DS}$ = 80V | | | 1 | μA |
| $I_{GSS}$ | Gate-to-Source Leakage Current | $V_{DS}$ = 0V, $V_{GS}$ = 20V | | | 100 | nA |
| $V_{GS(th)}$ | Gate-to-Source Threshold Voltage | $V_{DS}$ = $V_{GS}$, $I_D$ = 250 μA | 2.4 | 2.8 | 3.4 | V |
| $R_{DS(on)}$ | Drain-to-Source On-Resistance | $V_{GS}$ = 6V, $I_D$ = 30A | | 16.3 | 20.0 | mΩ |
| | | $V_{GS}$ = 10V, $I_D$ = 30A | | 13.7 | 16.5 | mΩ |
| $g_{fs}$ | Transconductance | $V_{DS}$ = 10V, $I_D$ = 30A | | 80 | | S |
| **DYNAMIC CHARACTERISTICS** | | | | | | |
| $C_{iss}$ | Input Capacitance | $V_{GS}$ = 0V, $V_{DS}$ = 50V, $f$ = 1MHz | | 1290 | 1670 | pF |
| $C_{oss}$ | Output Capacitance | | | 257 | 334 | pF |
| $C_{rss}$ | Reverse Transfer Capacitance | | | 5.7 | 7.4 | pF |
| $R_G$ | Series Gate Resistance | | | 1.1 | 2.2 | Ω |
| $Q_g$ | Gate Charge Total (10V) | $V_{DS}$ = 50V, $I_D$ = 30A | | 17.1 | 22.2 | nC |
| $Q_{gd}$ | Gate Charge Gate-to-Drain | | | 3.2 | | nC |
| $Q_{gs}$ | Gate Charge Gate-to-Source | | | 5.1 | | nC |
| $Q_{g(th)}$ | Gate Charge at $V_{th}$ | | | 3.3 | | nC |
| $Q_{oss}$ | Output Charge | $V_{DS}$ = 50V, $V_{GS}$ = 0V | | 44 | | nC |
| $t_{d(on)}$ | Turn On Delay Time | $V_{DS}$ = 50V, $V_{GS}$ = 10V, $I_{DS}$ = 30A, $R_G$ = 0Ω | | 6 | | ns |
| $t_r$ | Rise Time | | | 2 | | ns |
| $t_{d(off)}$ | Turn Off Delay Time | | | 9 | | ns |
| $t_f$ | Fall Time | | | 1 | | ns |
| **DIODE CHARACTERISTICS** | | | | | | |
| $V_{SD}$ | Diode Forward Voltage | $I_{SD}$ = 30A, $V_{GS}$ = 0V | | 0.9 | 1.1 | V |
| $Q_{rr}$ | Reverse Recovery Charge | $V_{DS}$= 50V, $I_F$ = 30A, di/dt = 300A/μs | | 195 | | nC |
| $t_{rr}$ | Reverse Recovery Time | | | 72 | | ns |

## 4.2 Thermal Information

($T_A$ = 25°C unless otherwise stated)

| THERMAL METRIC | | MIN | TYP | MAX | UNIT |
|---|---|---|---|---|---|
| $R_{\theta JC}$ | Junction-to-Case Thermal Resistance | | | 1.3 | °C/W |
| $R_{\theta JA}$ | Junction-to-Ambient Thermal Resistance | | | 62 | |

## 4.3 Typical MOSFET Characteristics

($T_A$ = 25°C unless otherwise stated)

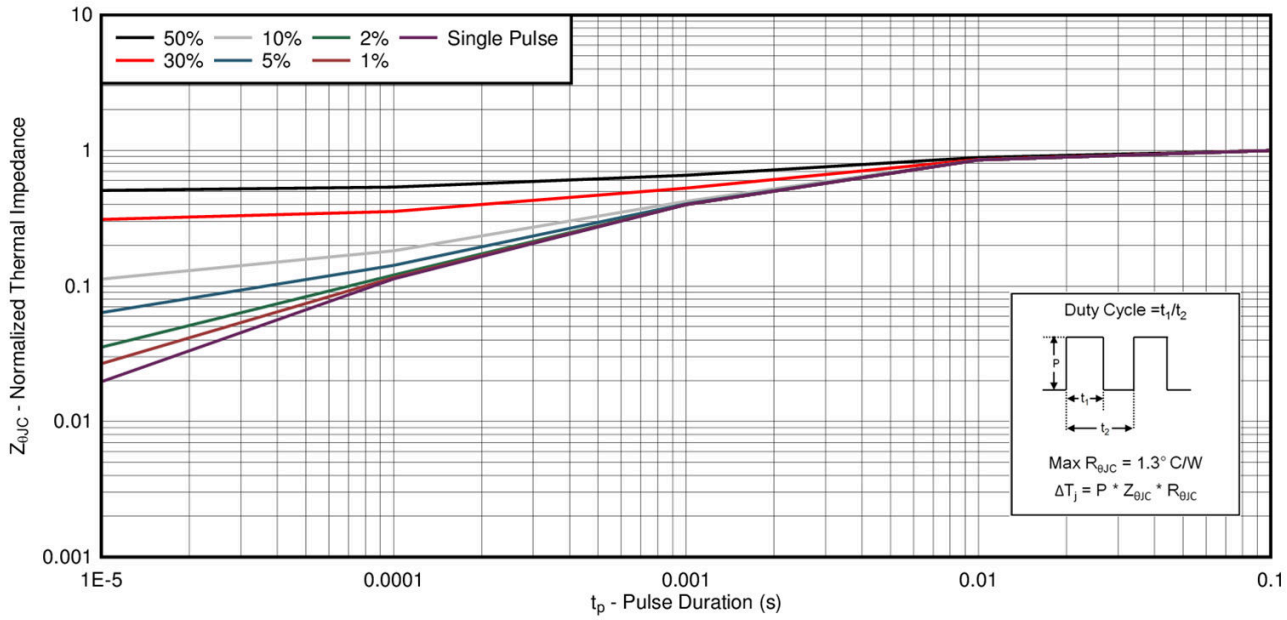



**图 4-1. Transient Thermal Impedance**

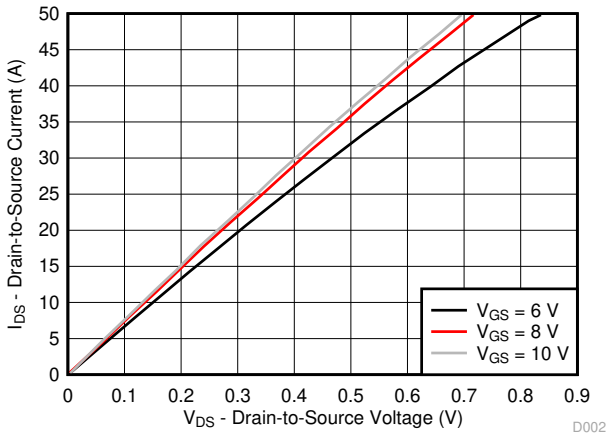
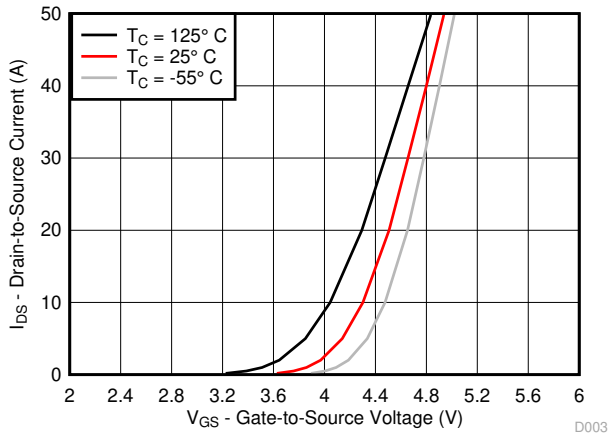
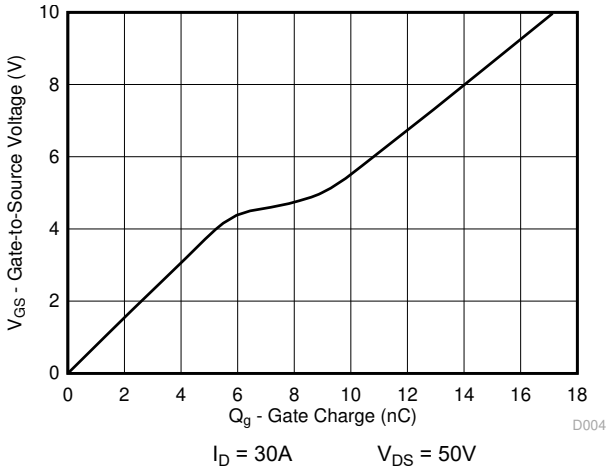



**图 4-2. Saturation Characteristics**




$V_{DS}$ = 5V

**图 4-3. Transfer Characteristics**




$I_D$ = 30A $V_{DS}$ = 50V

**图 4-4. Gate Charge**

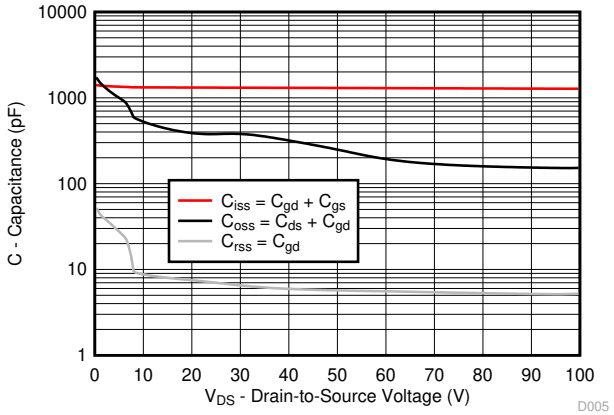
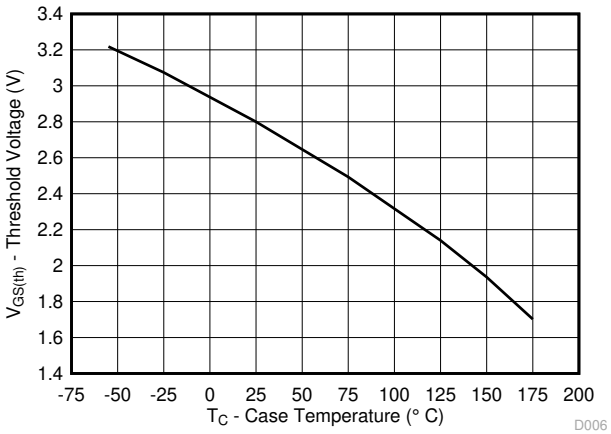



**图 4-5. Capacitance**




$I_D$ = 250µA

**图 4-6. Threshold Voltage vs Temperature**

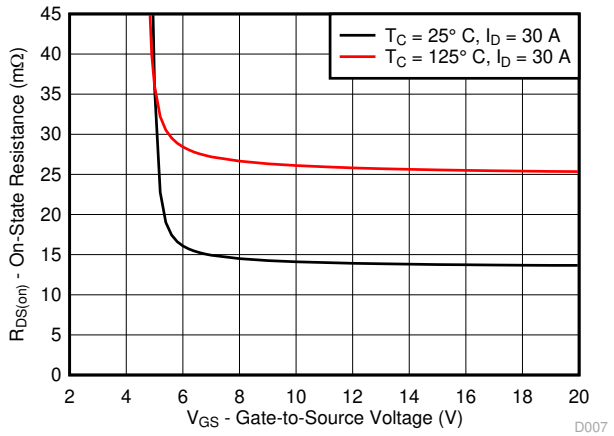
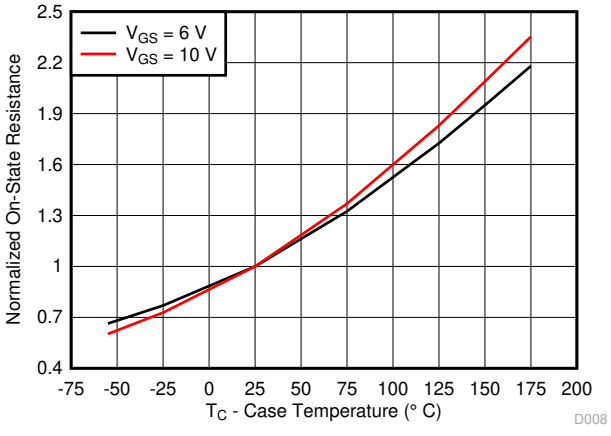



**图 4-7. On-State Resistance vs Gate-to-Source Voltage**




$I_D$ = 30A

**图 4-8. Normalized On-State Resistance vs Temperature**

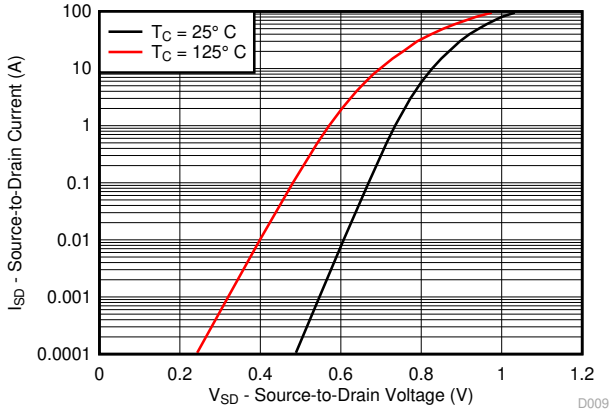
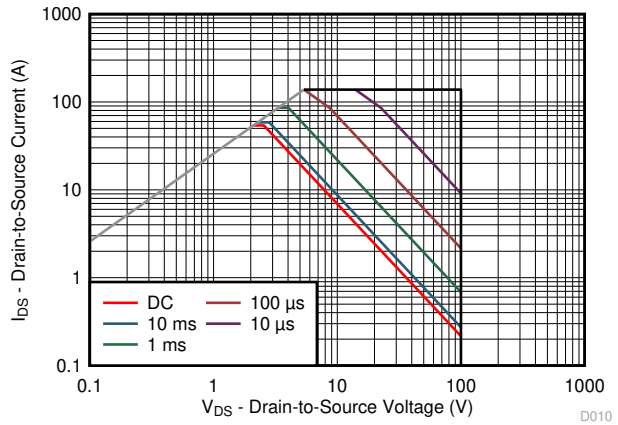



**图 4-9. Typical Diode Forward Voltage**




Single Pulse, Max $R_{\theta JC}$ = 1.3°C/W

**图 4-10. Maximum Safe Operating Area**

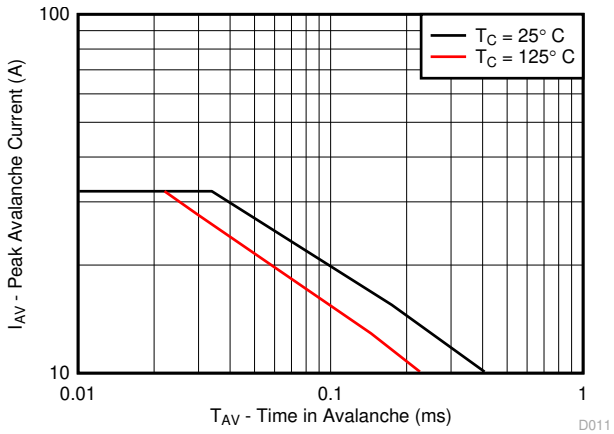



**图 4-11. Single Pulse Unclamped Inductive Switching**

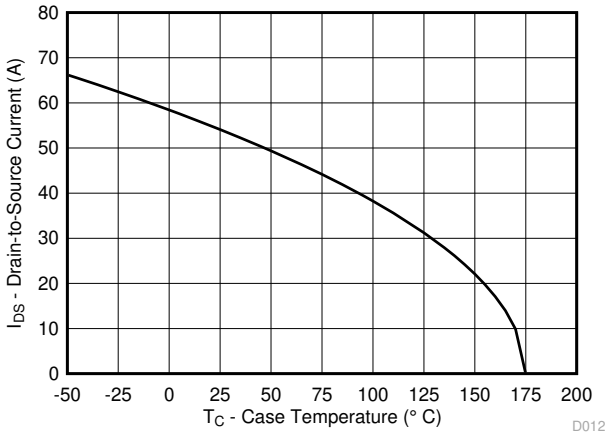



**图 4-12. Maximum Drain Current vs Temperature**

# 5 Device and Documentation Support

## 5.1 第三方产品免责声明

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## 5.2 Documentation Support

### *5.2.1 Related Documentation*

## 5.3 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。

## 5.4 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。

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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。

## 5.7 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。

# 6 Revision History

| Changes from Revision * (January 2015) to Revision A (December 2024) | Page |
|---|---|
| • 更新了整个文档中的表格、图和交叉参考的编号格式 | 1 |

## 7 Mechanical, Packaging, and Orderable Information

The following pages include mechanical, packaging, and orderable information. This information is the most current data available for the designated devices. This data is subject to change without notice and revision of this document. For browser-based versions of this data sheet, refer to the left-hand navigation.

## 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) |
|---|---|---|---|---|---|---|---|---|---|
| CSD19534KCS | Active | Production | TO-220 (KCS) \| 3 | 50 \| TUBE | ROHS Exempt | SN | N/A for Pkg Type | -55 to 175 | CSD19534KCS |

**(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.

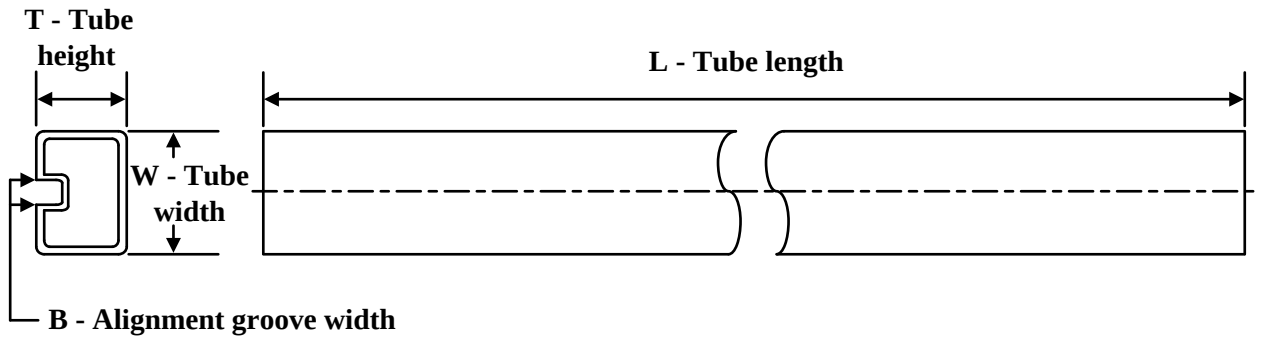
**(4) Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

**(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.

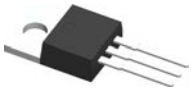
## TUBE




*All dimensions are nominal

| Device | Package Name | Package Type | Pins | SPQ | L (mm) | W (mm) | T (µm) | B (mm) |
|---|---|---|---|---|---|---|---|---|
| CSD19534KCS | KCS | TO-220 | 3 | 50 | 532 | 34.1 | 700 | 9.6 |
| CSD19534KCS | KCS | TO-220 | 3 | 50 | 532 | 34.1 | 700 | 9.6 |
| CSD19534KCS.Z | KCS | TO-220 | 3 | 50 | 532 | 34.1 | 700 | 9.6 |
| CSD19534KCS.Z | KCS | TO-220 | 3 | 50 | 532 | 34.1 | 700 | 9.6 |

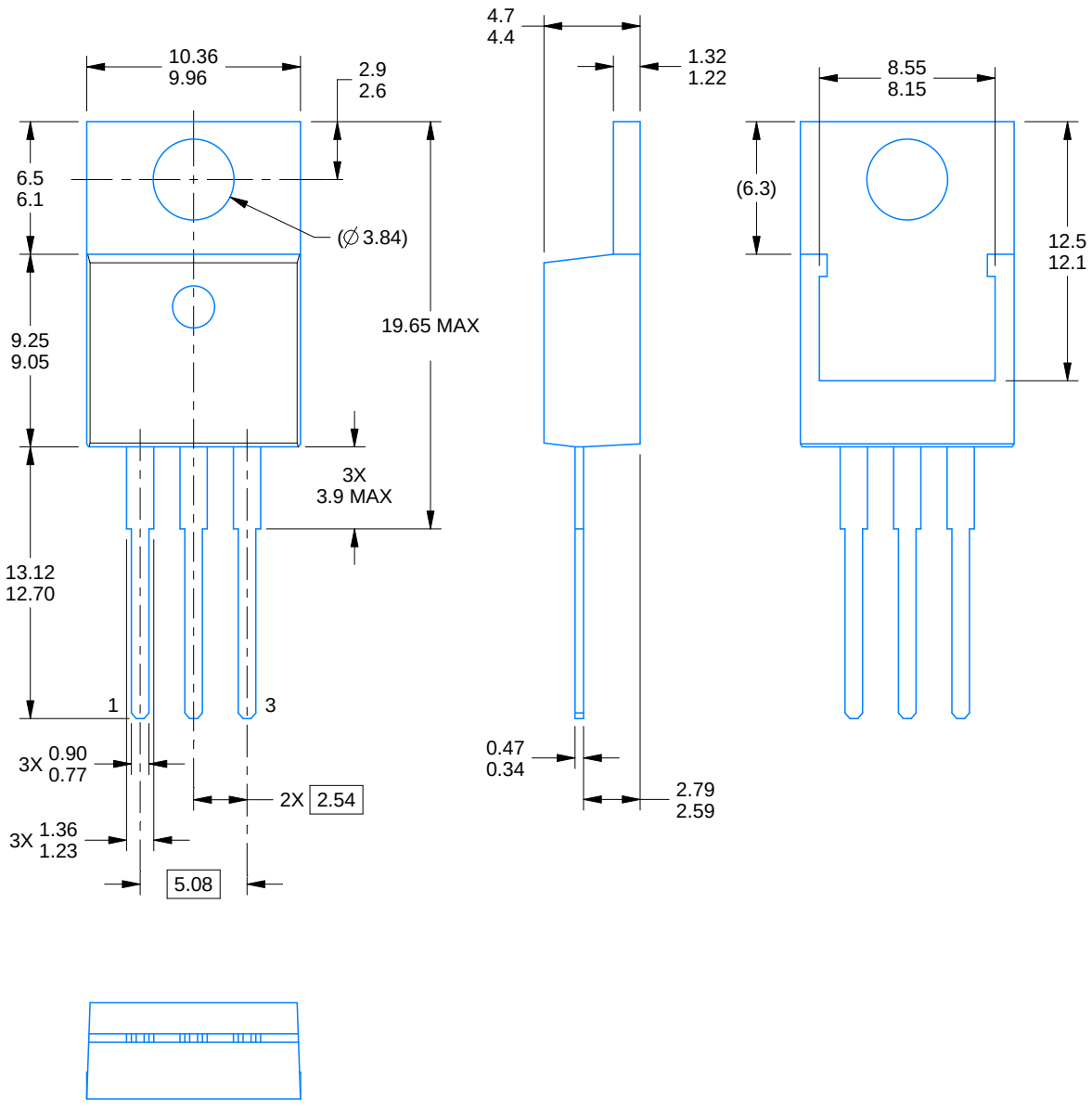
# KCS0003B



# PACKAGE OUTLINE

## TO-220 - 19.65 mm max height

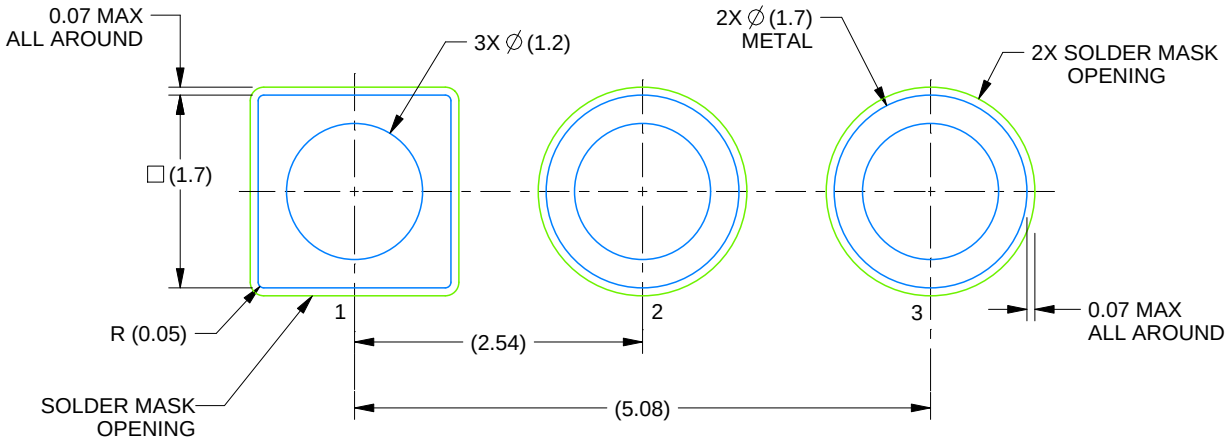
TO-220




4222214/B 08/2018

NOTES:

1. Dimensions 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. Reference JEDEC registration TO-220.




LAND PATTERN EXAMPLE
NON-SOLDER MASK DEFINED
SCALE:15X

4222214/B 08/2018

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