CSD19533KCS 100V N 沟道 NexFET™ 功率 MOSFET

1 特性

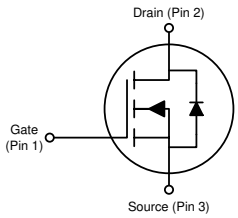
- 超低 Q_g 和 Q_{gd}
- 低热阻
- 雪崩级
- 无铅引脚镀层
- 符合 RoHS
- 无卤素
- TO-220 塑料封装

2 应用

- 次级侧同步整流器
- 电机控制

3 说明

这款 100V、8.7mΩ、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)	27		nC
Q_{gd}	栅极电荷（栅极到漏极）	5.4		nC
$R_{DS(on)}$	漏源导通电阻	V_{GS} = 6V	9.7	mΩ
		V_{GS} = 10V	8.7	mΩ
$V_{GS(th)}$	阈值电压	2.8		V

订购信息(1)

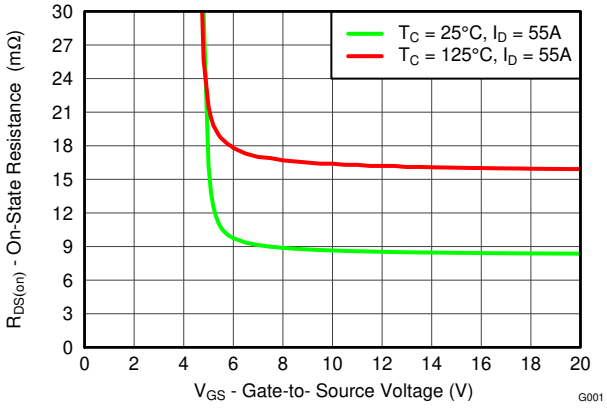
器件	封装	介质	数量	运输
CSD19533KCS	TO-220 塑料封装	管装	50	管装

(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。

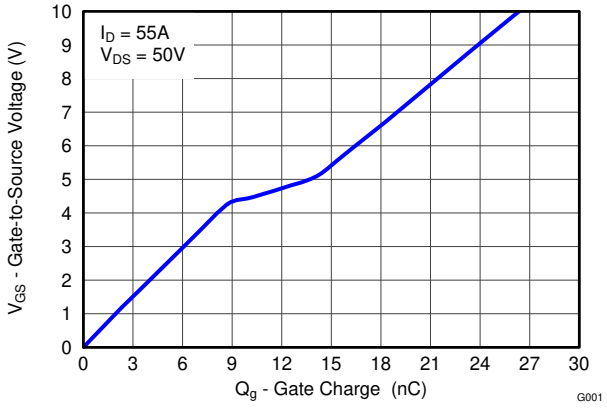
绝对最大额定值

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	86	
	持续漏极电流（受器件限制），T_C = 100°C 时测得	61	
I_{DM}	脉冲漏极电流(1)	207	A
P_D	功率耗散	188	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 = 46A，L = 0.1mH，R_G = 25Ω	106	mJ

(1) 最大 $R_{\theta JC}$ = 0.8°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	2.2	2.8	3.4	V
$R_{DS(on)}$	Drain-to-Source On-Resistance	V_{GS} = 6V, I_D = 55A		9.7	12.2	mΩ
		V_{GS} = 10V, I_D = 55A		8.7	10.5	mΩ
g_{fs}	Transconductance	V_{DS} = 10V, I_D = 55A		115		S
DYNAMIC CHARACTERISTICS						
C_{iss}	Input Capacitance	V_{GS} = 0V, V_{DS} = 50V, f = 1MHz		2050	2670	pF
C_{oss}	Output Capacitance			395	514	pF
C_{rss}	Reverse Transfer Capacitance			9.6	12.5	pF
R_G	Series Gate Resistance			1.2	2.4	Ω
Q_g	Gate Charge Total (10V)	V_{DS} = 50V, I_D = 55A		27	35	nC
Q_{gd}	Gate Charge Gate-to-Drain			5.4		nC
Q_{gs}	Gate Charge Gate-to-Source			9		nC
$Q_{g(th)}$	Gate Charge at V_{th}			3.9		nC
Q_{oss}	Output Charge	V_{DS} = 50V, V_{GS} = 0V		79		nC
$t_{d(on)}$	Turn On Delay Time	V_{DS} = 50V, V_{GS} = 10V, I_{DS} = 55A, R_G = 0Ω		7		ns
t_r	Rise Time			5		ns
$t_{d(off)}$	Turn Off Delay Time			12		ns
t_f	Fall Time			2		ns
DIODE CHARACTERISTICS						
V_{SD}	Diode Forward Voltage	I_{SD} = 55A, V_{GS} = 0V		0.9	1.1	V
Q_{rr}	Reverse Recovery Charge	V_{DS}= 50V, I_F = 55A, di/dt = 300A/µs		211		nC
t_{rr}	Reverse Recovery Time			77		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			0.8	°C/W
$R_{\theta JA}$	Junction-to-Ambient Thermal Resistance			62	

4.3 Typical MOSFET Characteristics

(T_A = 25°C unless otherwise stated)

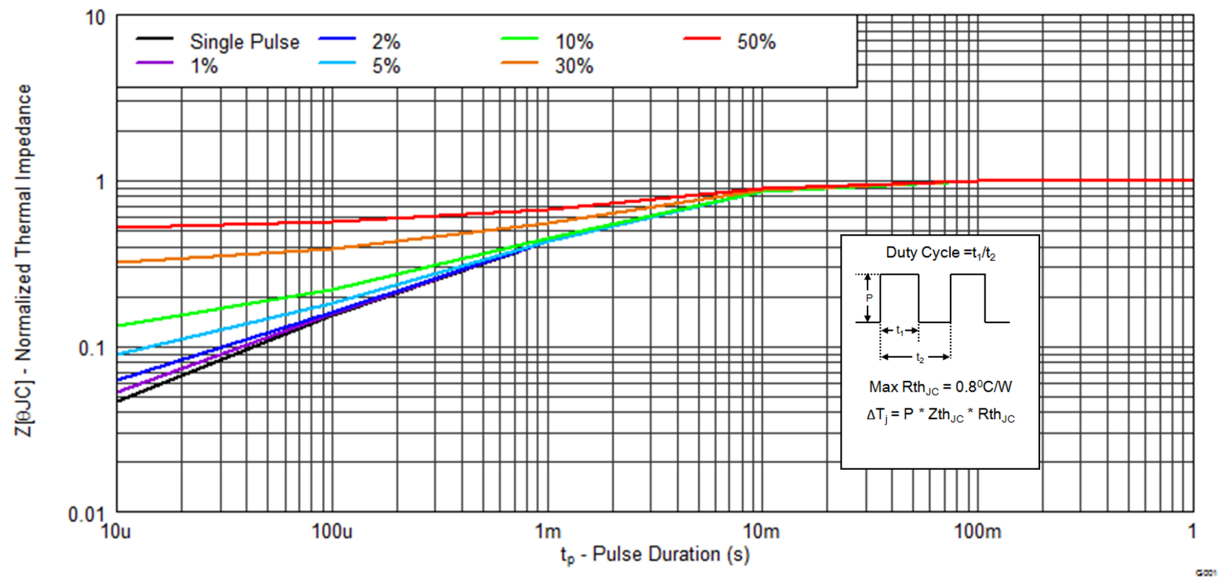


图 4-1. Transient Thermal Impedance

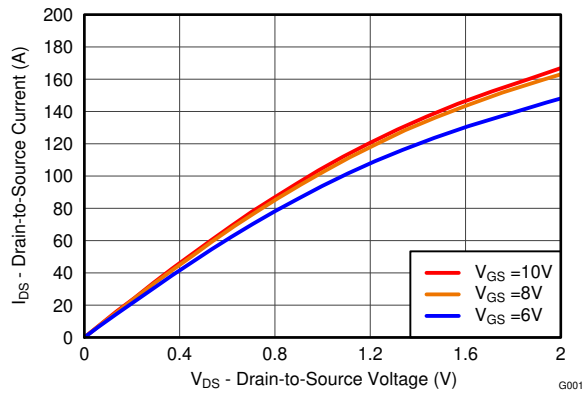


图 4-2. Saturation Characteristics

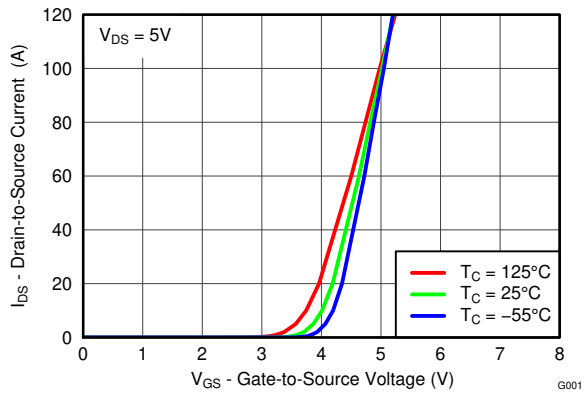


图 4-3. Transfer Characteristics

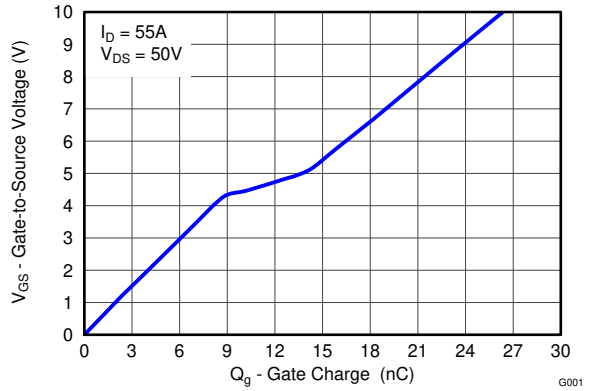


图 4-4. Gate Charge

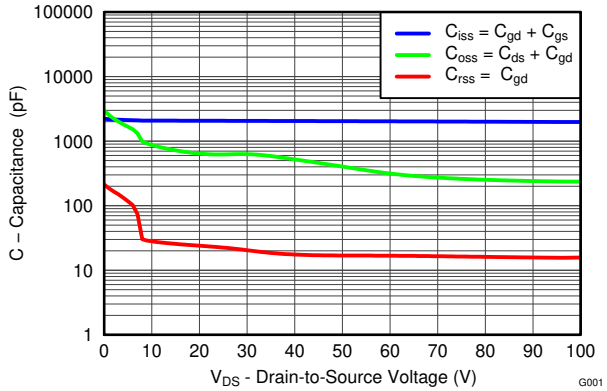


图 4-5. Capacitance

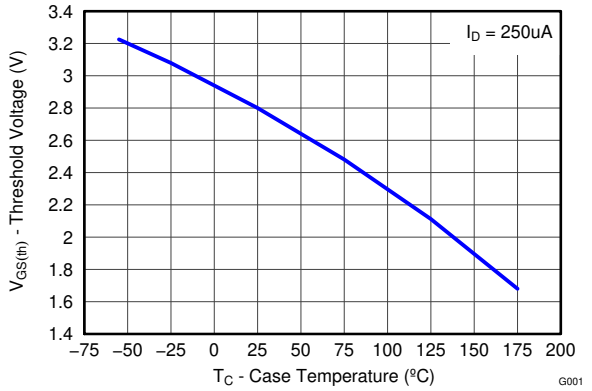


图 4-6. Threshold Voltage vs Temperature

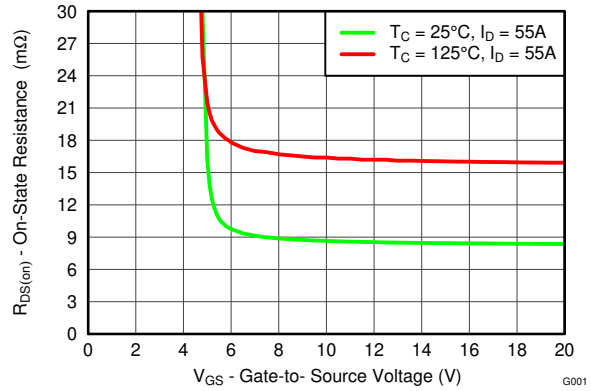


图 4-7. On-State Resistance vs Gate-to-Source Voltage

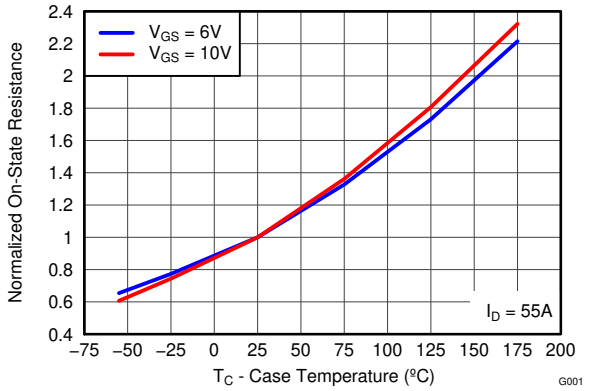


图 4-8. Normalized On-State Resistance vs Temperature

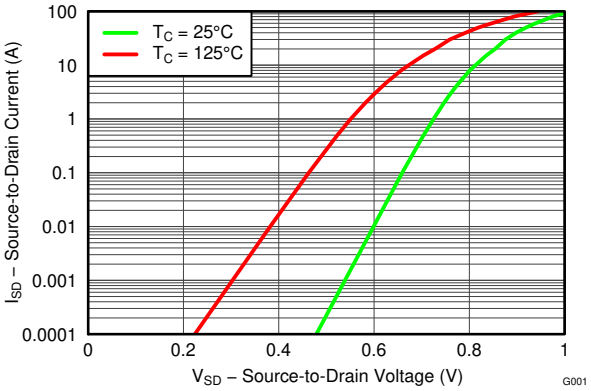


图 4-9. Typical Diode Forward Voltage

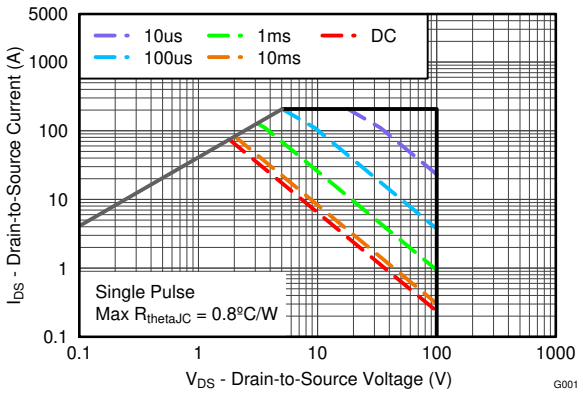


图 4-10. Maximum Safe Operating Area

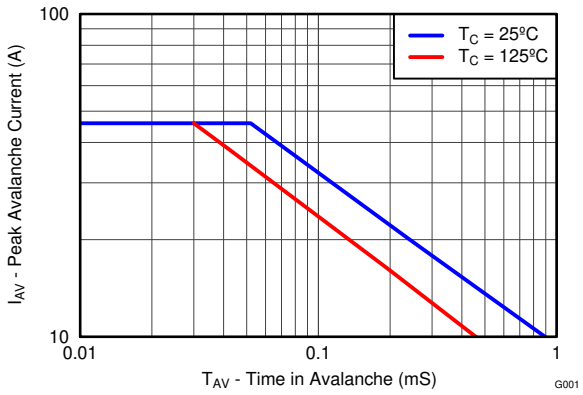


图 4-11. Single Pulse Unclamped Inductive Switching

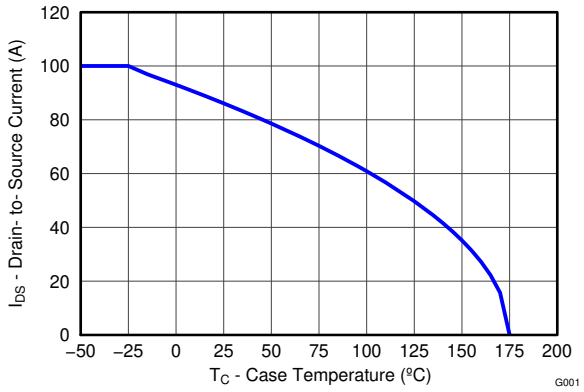


图 4-12. Maximum Drain Current vs Temperature

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 B (January 2015) to Revision C (May 2024)	Page
• 通篇更新了表格、图和交叉参考的编号格式	1

Changes from Revision A (July 2014) to Revision B (January 2015)	Page
• Changed Q_{rr} to 211nC	3

Changes from Revision * (December 2013) to Revision A (July 2014)	Page
• 已将脉冲漏极电流从 104A 增加为 207A	1
• 更新了脉冲电流条件	1
• Updated 图 4-10 to reflect increased pulsed drain current.	4

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)
CSD19533KCS	Active	Production	TO-220 (KCS) | 3	50 | TUBE	ROHS Exempt	SN	N/A for Pkg Type	-55 to 175	CSD19533KCS
CSD19533KCS.B	Active	Production	TO-220 (KCS) | 3	50 | TUBE	ROHS Exempt	SN	N/A for Pkg Type	-55 to 175	CSD19533KCS

(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.

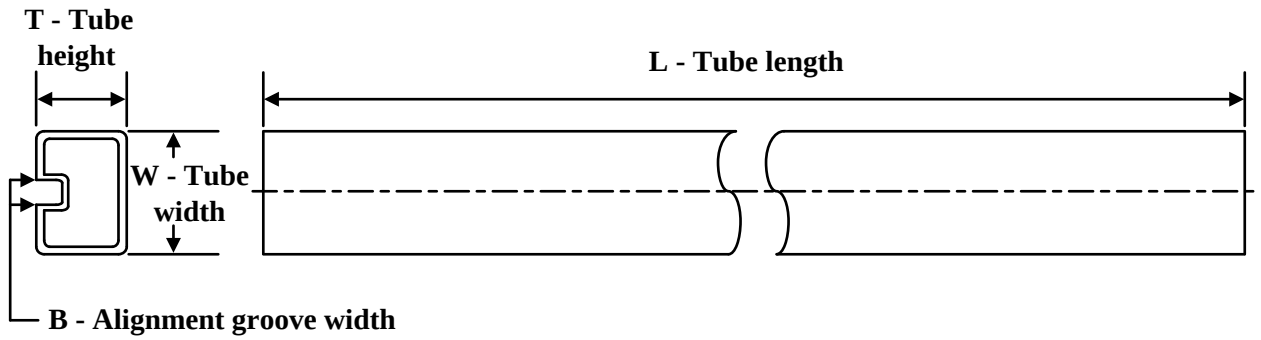
(4) **Lead finish/Ball material:** Parts may have multiple material finish options. Finish options are separated by a vertical ruled line. Lead finish/Ball material values may wrap to two lines if the finish value exceeds the maximum column width.

(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.

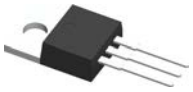
TUBE



*All dimensions are nominal

Device	Package Name	Package Type	Pins	SPQ	L (mm)	W (mm)	T (µm)	B (mm)
CSD19533KCS	KCS	TO-220	3	50	532	34.1	700	9.6
CSD19533KCS.B	KCS	TO-220	3	50	532	34.1	700	9.6

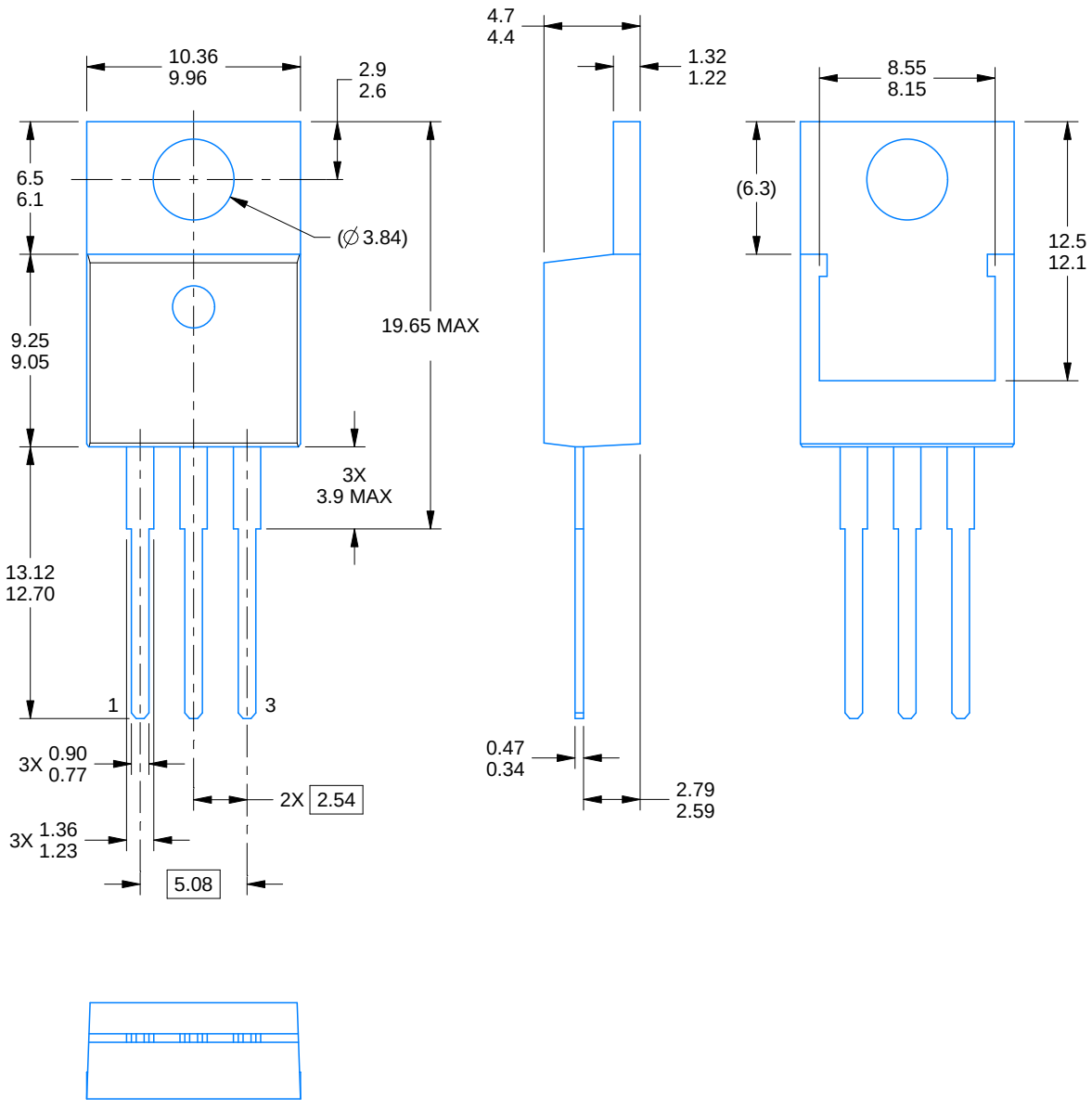
KCS0003B



PACKAGE OUTLINE

TO-220 - 19.65 mm max height

TO-220



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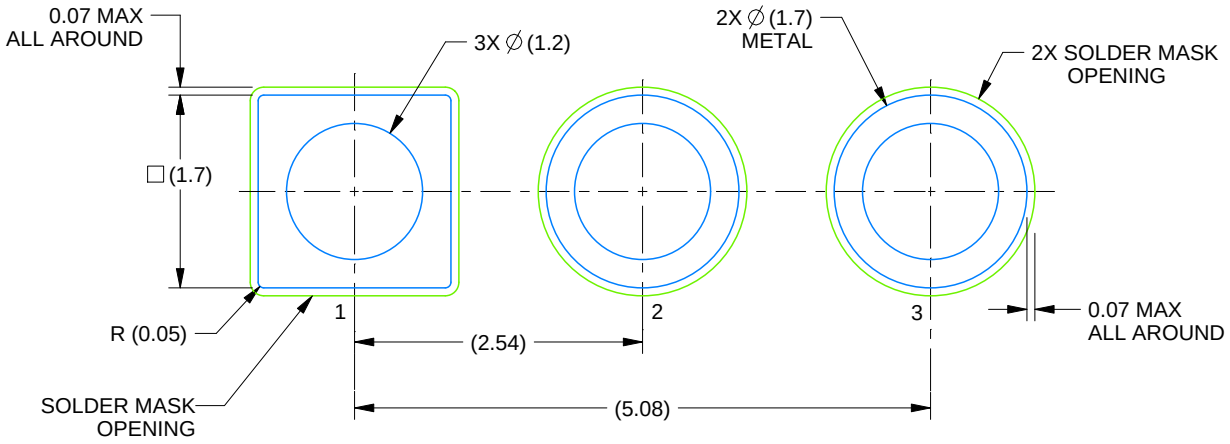
NOTES:

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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最后更新日期：2025 年 10 月