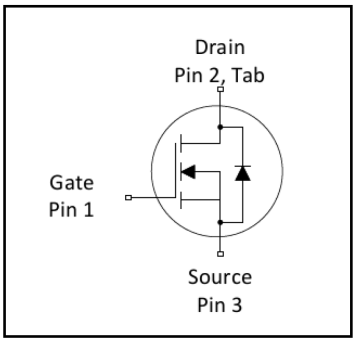
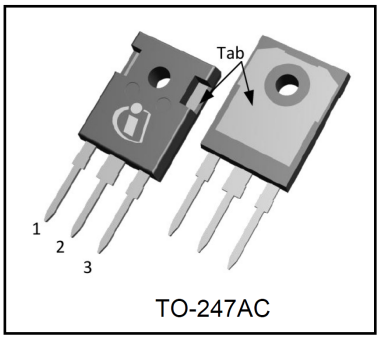
V_{DSS}	150V
$R_{DS(on)}$ typ.	12mΩ
max.	15.5mΩ
I_D	78A

扫码加入myInfineon
获取更多配套资源





应用

- 运动控制应用
- SMPS 中的高效同步整流
- 不间断电源
- 硬开关和高频电路

优点

- 低$_{RDSON}$可降低损耗
- 低栅极电荷可提升开关性能
- 二极管恢复特性得到改善，从而提升了开关性能和电磁干扰（EMI）性能
- 30V栅极电压额定值提升了可靠性
- 已全面表征的雪崩型SOA

Base Part Number	Package Type	Standard Pack		Orderable Part Number
		Form	Quantity	
IRFP4321PbF	TO-247AC	Tube	25	IRFP4321PbF

绝对最大额定值

Symbol	Parameter	Max.	Units
I_D @ T_C = 25°C	Continuous Drain Current, V_{GS} @ 10V	78①	A
I_D @ T_C = 100°C	Continuous Drain Current, V_{GS} @ 10V	55	
I_{DM}	Pulsed Drain Current ②	330	
P_D @T_C = 25°C	Maximum Power Dissipation	310	W
	Linear Derating Factor	2.0	W/°C
V_{GS}	Gate-to-Source Voltage	± 30	V
$E_{AS\ (Thermally\ limited)}$	Single Pulse Avalanche Energy ③	210	mJ
T_J T_{STG}	Operating Junction and Storage Temperature Range	-55 to + 175	°C
	Soldering Temperature, for 10 seconds (1.6mm from case)	300	
	Mounting torque, 6-32 or M3 screw	10lbf·in (1.1N·m)	

热阻

Symbol	Parameter	Typ.	Max.	Units
$R_{\theta JC}$	Junction-to-Case ⑤	---	0.49	°C/W
$R_{\theta CS}$	Case-to-Sink, Flat Greased Surface	0.24	---	
$R_{\theta JA}$	Junction-to-Ambient⑤	---	40	

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

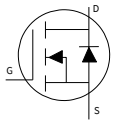
静态参数特性在 T_J = 25°C 时测得（除非另有规定）

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
$V_{(BR)DSS}$	Drain-to-Source Breakdown Voltage	150	---	---	V	V_{GS} = 0V, I_D = 250µA
$\Delta V_{(BR)DSS}/\Delta T_J$	Breakdown Voltage Temp. Coefficient	---	150	---	mV/°C	Reference to 25°C, I_D = 1mA②
$R_{DS(on)}$	Static Drain-to-Source On-Resistance	---	12	15.5	mΩ	V_{GS} = 10V, I_D =33A ④
$V_{GS(th)}$	Gate Threshold Voltage	3.0	---	5.0	V	V_{DS} = V_{GS}, I_D = 250µA
I_{DSS}	Drain-to-Source Leakage Current	---	---	20	µA	V_{DS} = 150V, V_{GS} = 0V
		---	---	1.0	mA	V_{DS} = 150V, V_{GS} = 0V, T_J = 125°C
I_{GSS}	Gate-to-Source Forward Leakage	---	---	100	nA	V_{GS} = 20V
	Gate-to-Source Reverse Leakage	---	---	-100		V_{GS} = -20V
R_G	Internal Gate Resistance	---	0.8	---	Ω	

动态 @ T_J = 25°C（除非另有说明）

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
gfs	Forward Transconductance	130	---	---	S	V_{DS} = 25V, I_D = 50A
Q_g	Total Gate Charge	---	71	110	nC	I_D = 50A
Q_{gs}	Gate-to-Source Charge	---	24	---		V_{DS} = 75V
Q_{gd}	Gate-to-Drain ("Miller") Charge	---	21	---		V_{GS} = 10V ④
$t_{d(on)}$	Turn-On Delay Time	---	18	---	ns	V_{DD} = 75V
t_r	Rise Time	---	60	---		I_D = 50A
$t_{d(off)}$	Turn-Off Delay Time	---	25	---		R_G = 2.5Ω
t_f	Fall Time	---	35	---		V_{GS} = 10V ④
C_{iss}	Input Capacitance	---	4460	---	pF	V_{GS} = 0V
C_{oss}	Output Capacitance	---	390	---		V_{DS} = 25V
C_{rss}	Reverse Transfer Capacitance	---	82	---		f = 1.0 MHz

二极管特性

Symbol	Parameter	Min.	Typ.	Max.	Units	Conditions
I_S	Continuous Source Current (Body Diode)	---	---	78①	A	MOSFET symbol showing the integral reverse p-n junction diode. 
I_{SM}	Pulsed Source Current (Body Diode) ②	---	---	330	A	
V_{SD}	Diode Forward Voltage	---	---	1.3	V	T_J = 25°C, I_S =50 A, V_{GS} = 0V ④
t_{rr}	Reverse Recovery Time	---	89	130	ns	I_F = 50A
Q_{rr}	Reverse Recovery Charge	---	300	450	nC	V_R = 128V
I_{RRM}	Reverse Recovery Current	---	6.5	---	A	di/dt = 100A/µs ④
t_{on}	Forward Turn-On Time	Intrinsic turn-on time is negligible (turn-on is dominated by L_S+L_D)				

注：

① 根据最大允许结温计算连续电流。封装限制电流为 75A。
② 重复额定值；脉冲宽度受最高结温限制。
③ 受TJmax限制，初始TJ = 25°C，L = 0.17mH，RG = 25Ω，IAS = 50A，VGS = 10V。不建议在此值以上使用该器件。
④ 脉冲宽度 ≤ 400µs; 占空比 ≤ 2%。
⑤ R_θ 在 T_J 约 90°C 时测得。

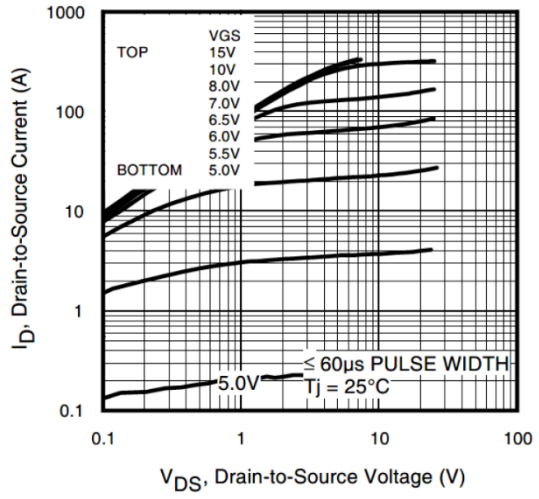


图 1.典型输出特性

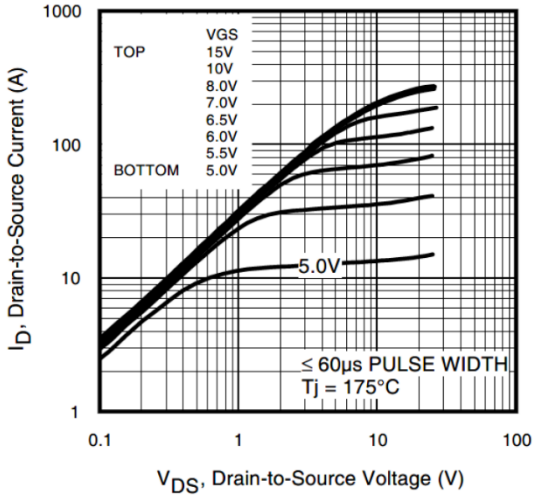


图 2.典型输出特性

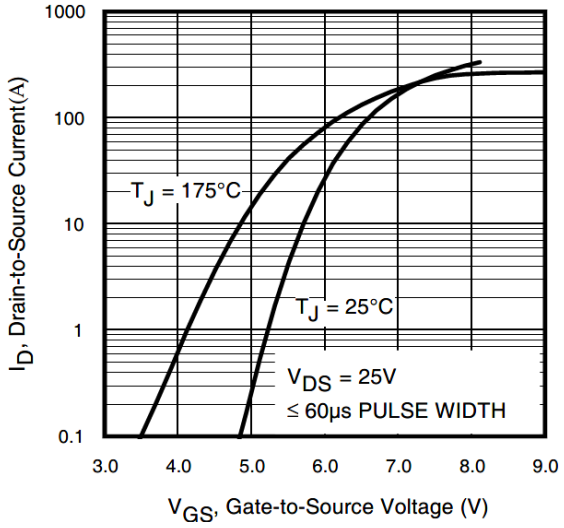


图3.典型转移特性

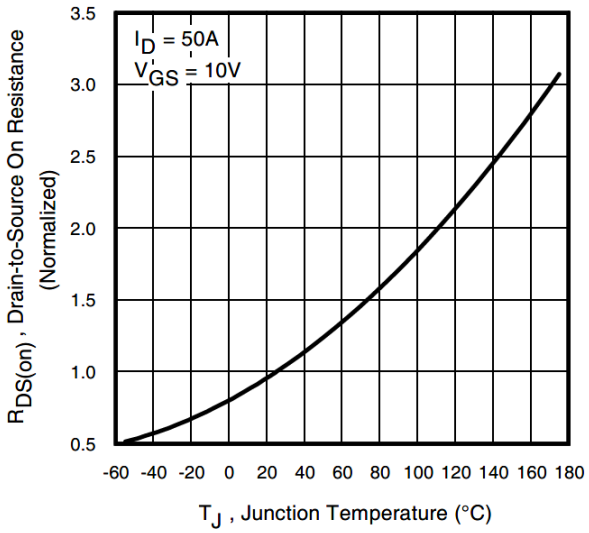


图 4.归一化导通电阻与温度的关系曲线

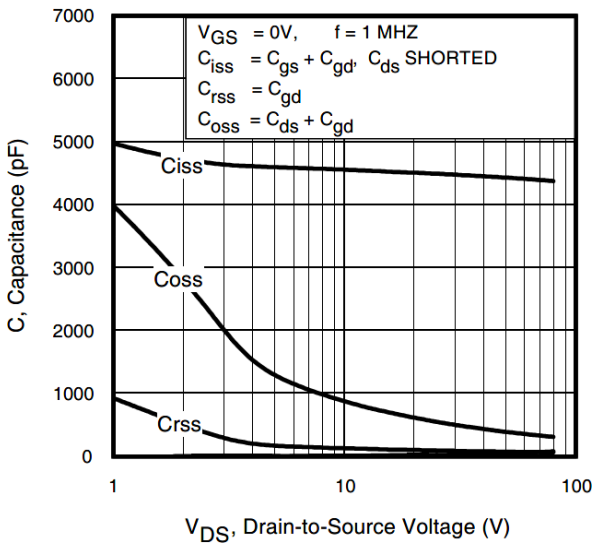


图 2.典型电容与漏源电压关系曲线

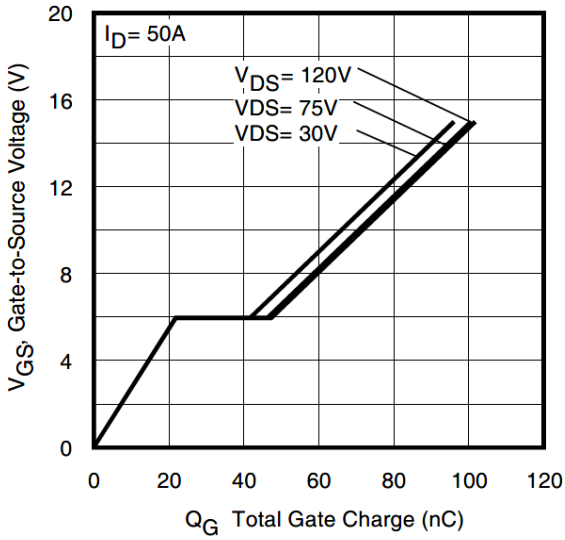


图 6.典型栅极电荷与栅源电压关系曲线

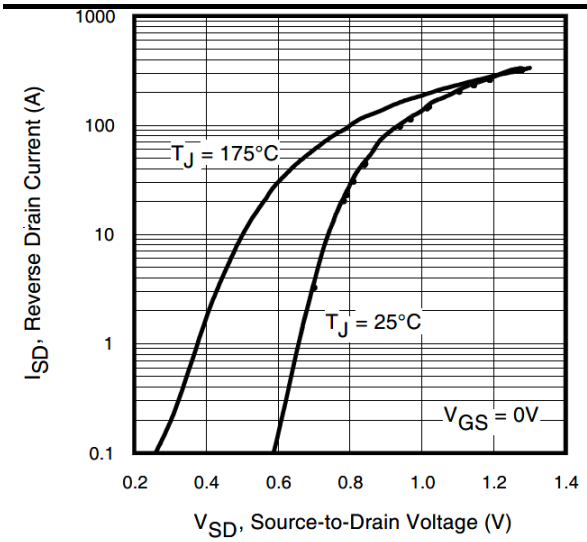


图 7. 典型的源极-漏极二极管 正向电压

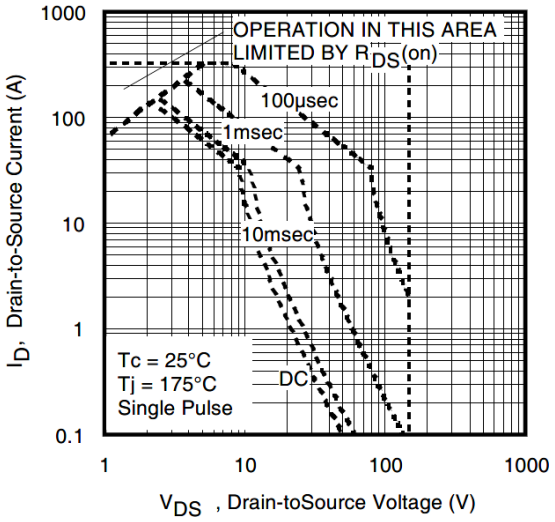


图 8.最大安全工作区

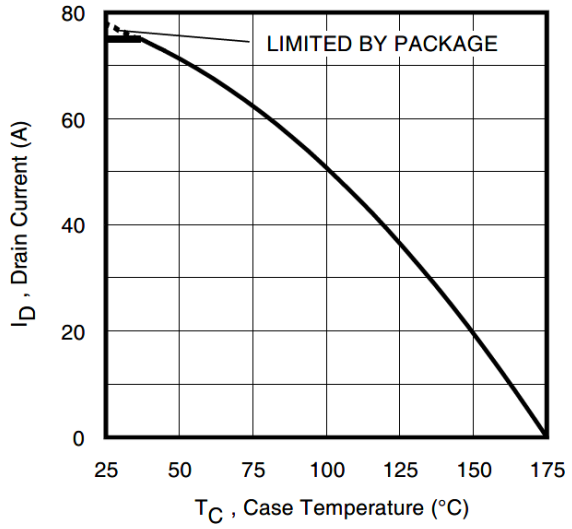


图 9.最大漏极电流与壳温的关系

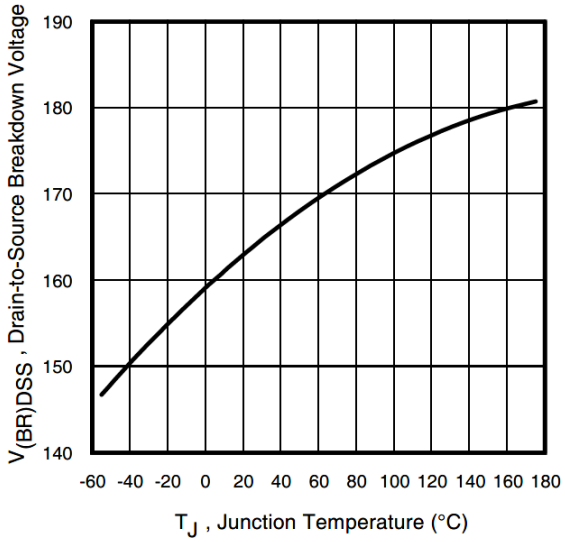


图 10.漏源击穿电压

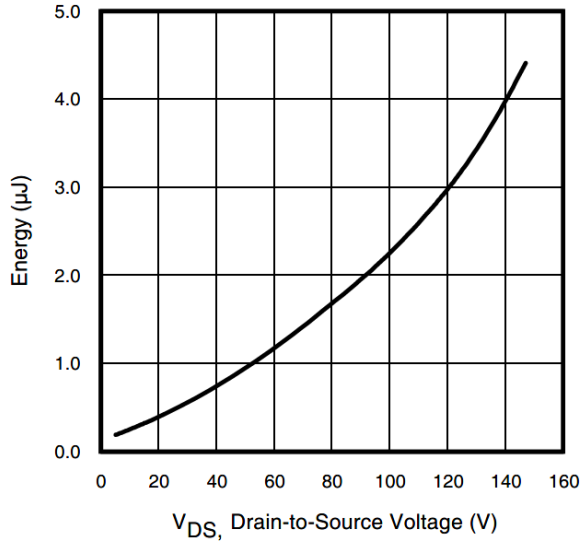


图 11典型 Coss 存储能量

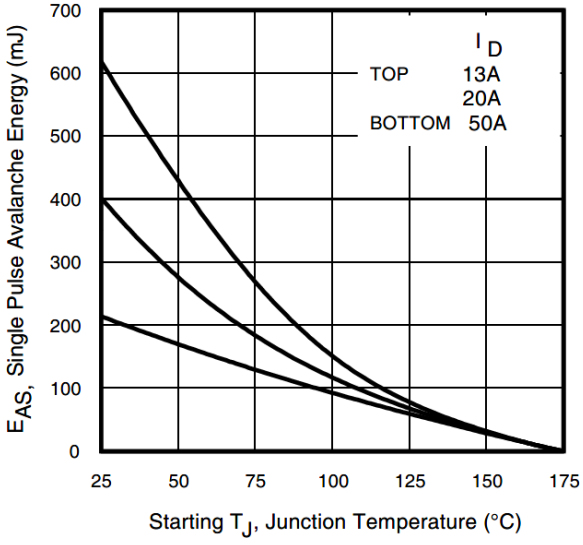


图 12c.最大雪崩能量与漏极电流

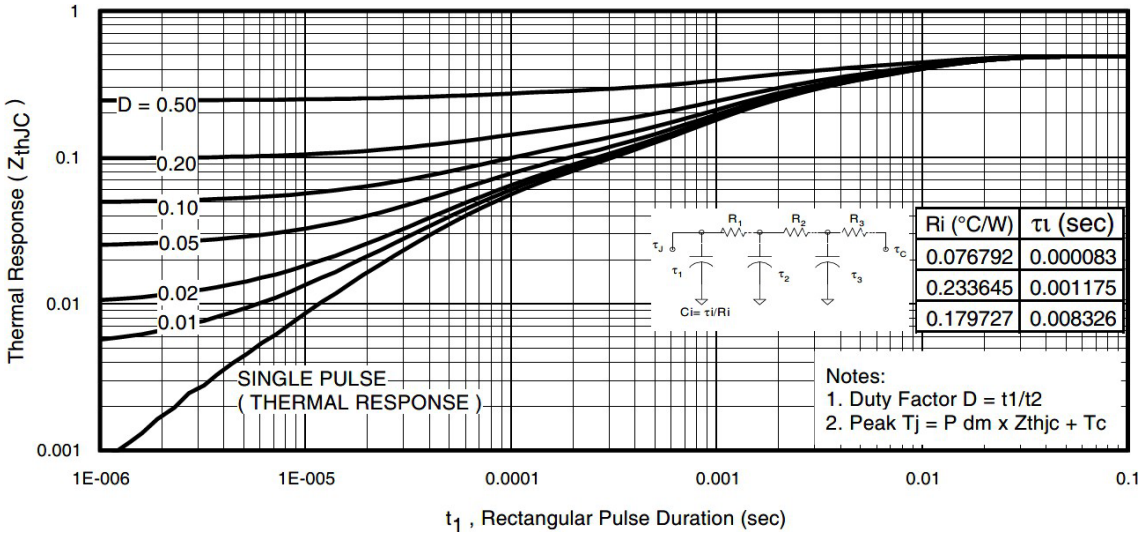


图 13.最大有效瞬态热阻，结到壳

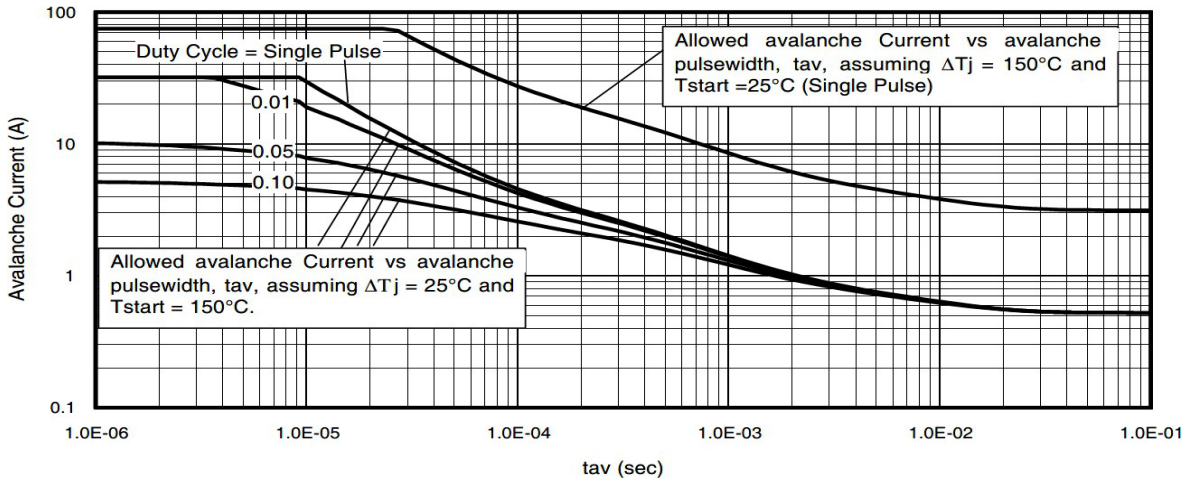


图 14.典型雪崩电流与脉冲宽度

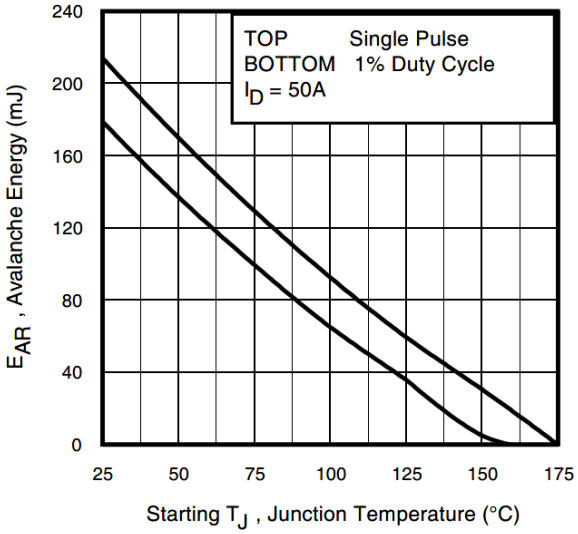


图 15.最大雪崩能量与温度的关系曲线

关于重复的雪崩曲线的注释，图 14、15：（有关详细信息，请参阅www.irf.com 上的 AN-1005）

1. 雪崩失效假设：
   纯粹的热现象和故障发生在温度远远超过Tjmax的时候。这对每种零件类型都是有效的。
2. 只要不超过Tjmax，就可以在雪崩中安全运行。
3. 如下公式基于图
   16a、16b 所示的电路和波形。
4. $P_{D\,(ave)}$ = 每个雪崩脉冲的平均功率耗散。
5. BV = 额定击穿电压（1.3 倍系数，考虑雪崩期间的电压增加）。
6. I_{av} = 可允许的雪崩电流。
7. ΔT = Allowable rise in junction temperature, not to exceed Tjmax (assumed as 25°C in Figure 14, 15).
   t_{av} = 雪崩的平均时间。
   D = 雪崩占空比 = tav ·f
   $Z_{thJC}(D, t_{av})$ = 瞬态热阻抗，见图 13)

$$P_{D\,(ave)} = 1/2\,(1.3 \cdot BV \cdot I_{av}) = \Delta T / Z_{thJC}\, I_{av} = 2\Delta T / [1.3 \cdot BV \cdot Z_{th}]$$

$$E_{AS\,(AR)} = P_{D\,(ave)} \cdot t_{av}$$

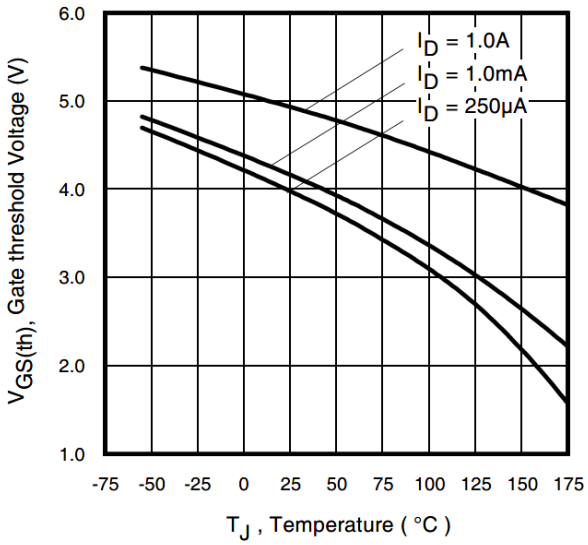


图16 阈值电压与温度

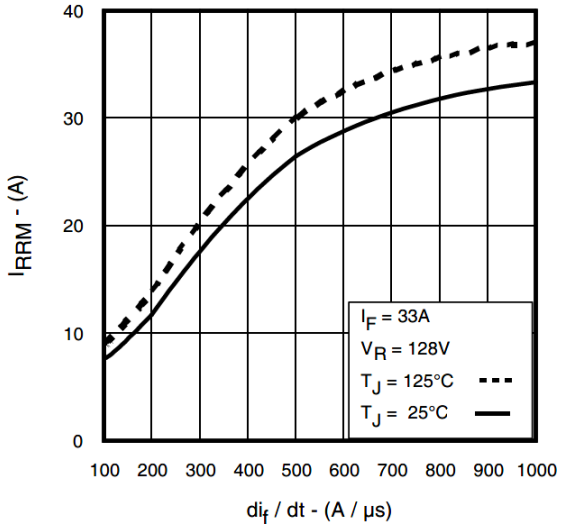


图 17 典型恢复电流与 dif/dt 的关系

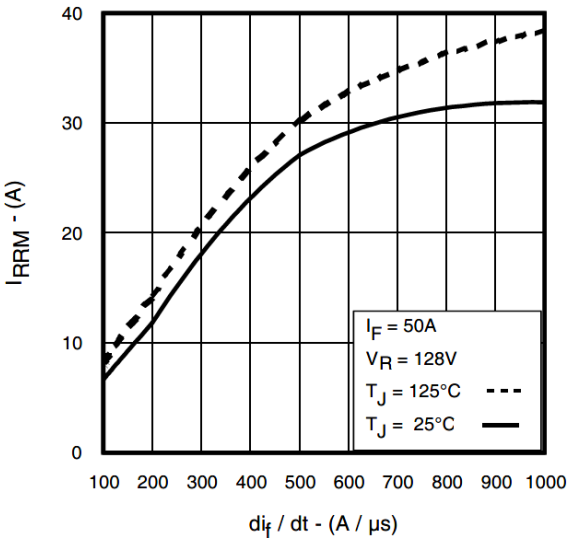


图 18. 典型恢复电流与di_f/dt的关系

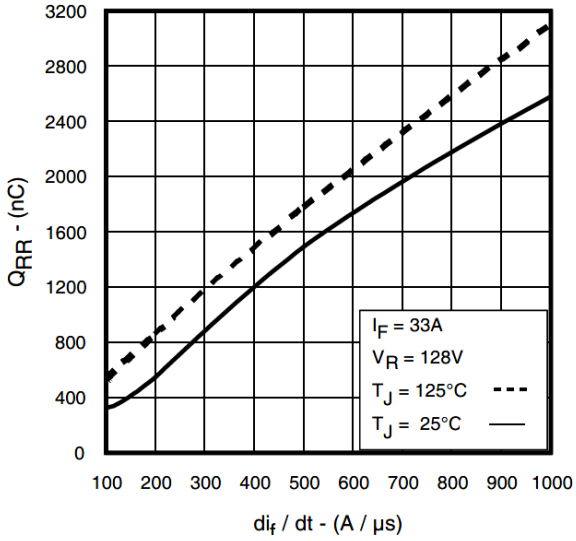


图19. 典型储电量与di_f/dt的关系

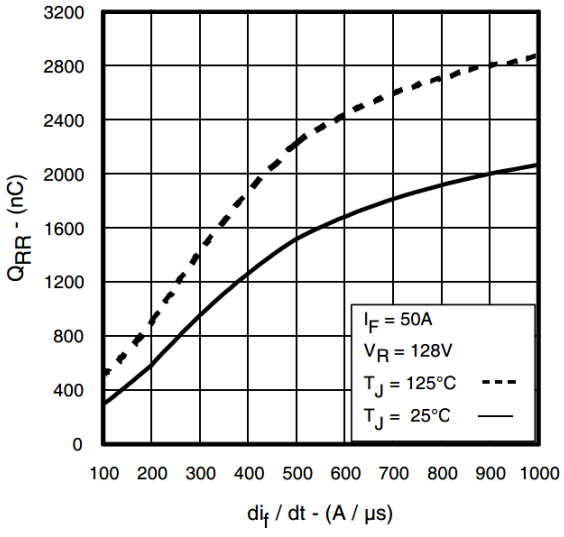


图 20. 典型储电量与 di_f/dt的关系

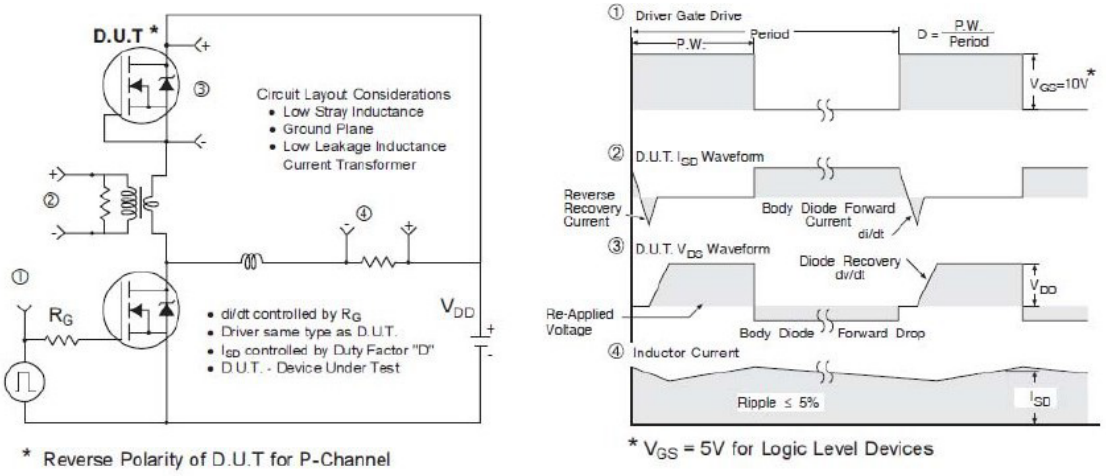


图 21. N 沟道 HEXFET® 功率 MOSFET 二极管峰值恢复 dv/dt 测试电路

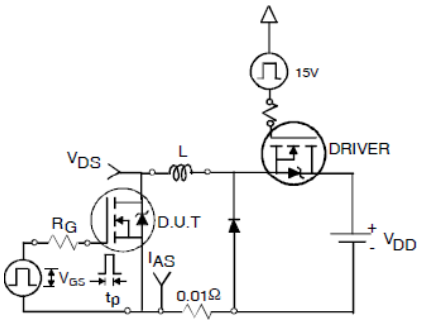


图 22a.未钳位电感性测试电路

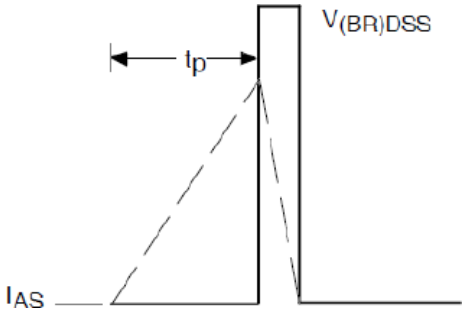


图 22b.未钳位电感性电路测试波形

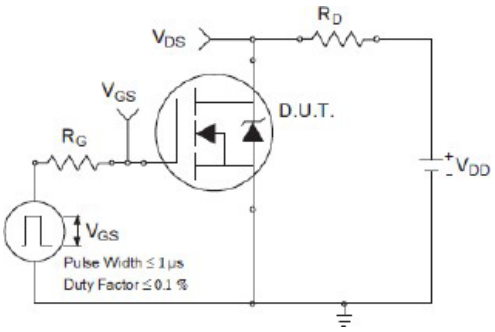


图 23a.开关时间测试电路

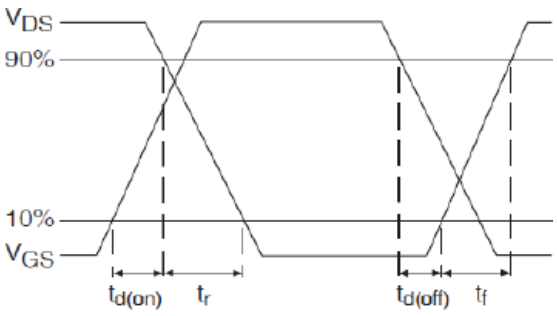


图 23b.开关时间波形

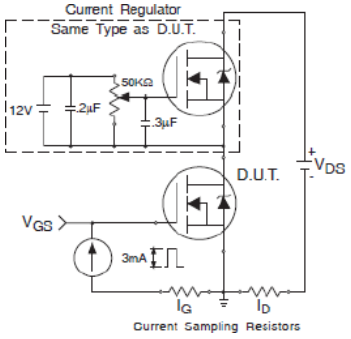


图 24a.栅极电荷测试电路

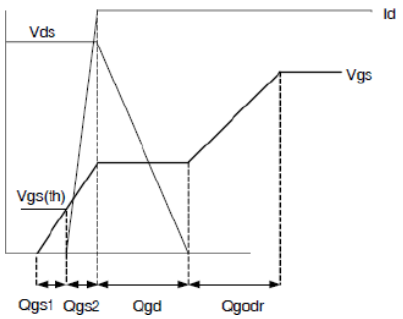
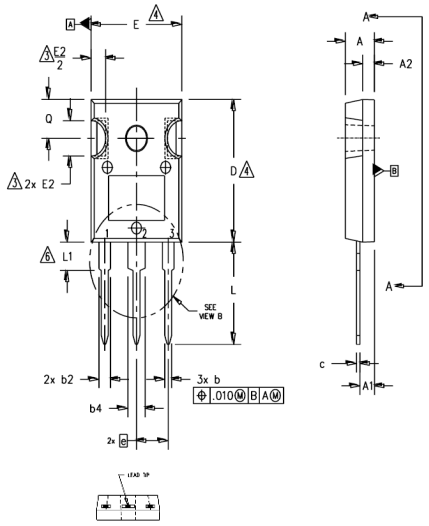


图 24b.栅极电荷波形

TO-247AC 封装外形图（尺寸为



NOTES:

1. DIMENSIONING AND TOLERANCING AS PER ASME Y14.5M 1994.
2. DIMENSIONS ARE SHOWN IN INCHES.
3. CONTOUR OF SLOT OPTIONAL.
4. DIMENSION D & E DO NOT INCLUDE MOLD FLASH. MOLD FLASH SHALL NOT EXCEED .005" (0.127) PER SIDE. THESE DIMENSIONS ARE MEASURED AT THE OUTERMOST EXTREMES OF THE PLASTIC BODY.
5. THERMAL PAD CONTOUR OPTIONAL WITHIN DIMENSIONS D1 & E1.
6. LEAD FINISH UNCONTROLLED IN L1.
7. øP TO HAVE A MAXIMUM DRAFT ANGLE OF 1.5 ° TO THE TOP OF THE PART WITH A MAXIMUM HOLE DIAMETER OF .154 INCH.
8. OUTLINE CONFORMS TO JEDEC OUTLINE TO-247AC .

SYMBOL	DIMENSIONS				NOTES
	INCHES		MILLIMETERS		
	MIN.	MAX.	MIN.	MAX.	
A	.183	.209	4.65	5.31	
A1	.087	.102	2.21	2.59	
A2	.059	.098	1.50	2.49	
b	.039	.055	0.99	1.40	
b1	.039	.053	0.99	1.35	
b2	.065	.094	1.65	2.39	
b3	.065	.092	1.65	2.34	
b4	.102	.135	2.59	3.43	
b5	.102	.133	2.59	3.38	
c	.015	.035	0.38	0.89	
c1	.015	.033	0.38	0.84	
D	.776	.815	19.71	20.70	4
D1	.515	-	13.08	-	5
D2	.020	.053	0.51	1.35	
E	.602	.625	15.29	15.87	4
E1	.530	-	13.46	-	
E2	.178	.216	4.52	5.49	
e	.215 BSC		5.46 BSC		
øk	.010		0.25		
L	.559	.634	14.20	16.10	
L1	.146	.169	3.71	4.29	
øP	.140	.144	3.56	3.66	
øP1	-	.291	-	7.39	
Q	.209	.224	5.31	5.69	
S	.217 BSC		5.51 BSC		

LEAD ASSIGNMENTS

HEXFET

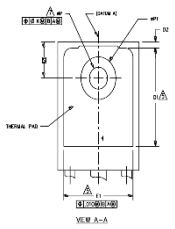
1.- GATE
2.- DRAIN
3.- SOURCE
4.- DRAIN

IGBTs, CoPACK

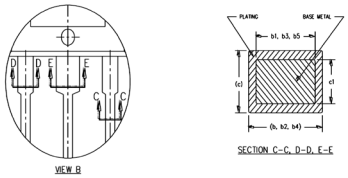
1.- GATE
2.- COLLECTOR
3.- EMITTER
4.- COLLECTOR

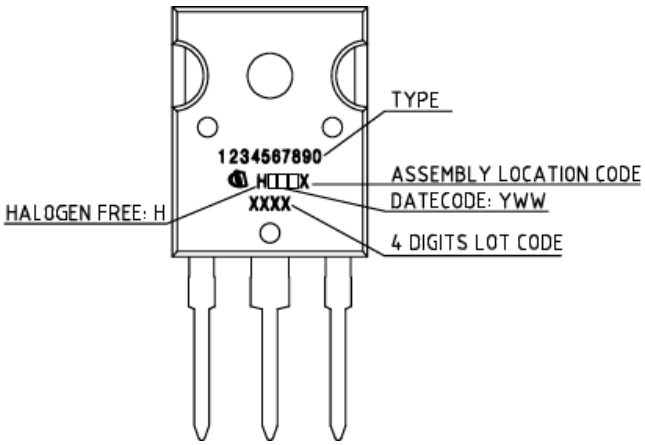
DIODES

1.- ANODE/OPEN
2.- CATHODE
3.- ANODE



TO-247AC 零件标识





TO-247AC 封装不建议用于表面贴装应用。

修订记录

Date	Rev.	Comments
11/25/2024	2.1	• Update datasheet to Infineon format • Updated Part marking –page 8 • Added disclaimer on last page.

Trademarks

All referenced product or service names and trademarks are the property of their respective owners.

We Listen to Your Comments

Any information within this document that you feel is wrong, unclear or missing at all? Your feedback will help us to continuously improve the quality of this document. Please send your proposal (including a reference to this document) to: **erratum@infineon.com**

Published by

Infineon Technologies AG

81726 München, Germany

© 2024 Infineon T echnologies AG

All Rights Reserved.

Legal Disclaimer

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics

(“Beschaffenheitsgarantie”).

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer’s compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer’s products and any use of the product of Infineon Technologies in customer’s applications.

The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer’s technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

Information

For further information on the product, technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies office (www.infineon.com).

Warnings

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies office.

The Infineon Technologies component described in this Data Sheet may be used in life support devices or systems and or automotive, aviation and aerospace applications or systems only with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life support, automotive, aviation and aerospace device or system or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.

免责声明

请注意，本文件的原文使用英文撰写，为方便客户浏览英飞凌提供了中文译文。该中文译文仅供参考，并不可作为任何论点之依据。
由于翻译过程中可能使用了自动化程序，以及语言翻译和转换过程中的差异，最后的中文译文与最新的英文版本原文含义可能存在不尽相同之处。
因此，我们同时提供该中文译文版本的最新英文原文供您阅读，请参见 http://www.infineon.com
英文原文和中文译文版本之间若存有任何歧异，以最新的英文版本为准，并且仅认可英文版本为正式文件。
您如果使用本文件，即表示您同意并理解上述说明。英飞凌不对因翻译过程中可能存在的任何不完整或不准确信息而产生的任何直接或间接损失或损害负责。英飞凌不承担中文译文版本的完整性和准确性责任。如果您不同意上述说明，请不要使用本文件。

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

版本 **2026-11-04**

Infineon Technologies AG 出版，
德国 **Neubiberg 85579**

版权 © **2026 Infineon Technologies AG**
及其关联公司。
保留所有权利。

Do you have a question about this document?

Email:

erratum@infineon.com

重要通知

Infineon Technologies AG 及其关联公司（以下简称 "英飞凌"）销售或提供和交付的产品（可能也包括样品，且可能由硬件或软件或两者组成）（以下简称 "产品"），应遵守客户与英飞凌签订的框架供应合同或其他书面协议的条款和条件，如无上述合同或其他书面协议，则应遵守适用的英飞凌销售条件。只有在英飞凌明确书面同意的情况下，客户的一般条款和条件或对适用的英飞凌销售条件的偏离才对英飞凌具有约束力。

为避免疑义，英飞凌不承担不侵犯第三方权利的所有保证和默示保证，例如对特定用途/目的的适用性或适销性的保证。

英飞凌对与样品、应用或客户对任何产品的具体使用有关的任何信息或本文档中给出的任何示例或典型值概不负责。

本文件中包含的数据仅供具有技术资格和技能的客户代表使用。客户有责任评估产品对预期应用和客户特定用途的适用性，并在预期应用和客户特定用途中验证本文件中包含的所有相关技术数据。客户有责任正确设计、编程和测试预期应用的功能性和安全性，并遵守与其使用相关的法律要求。

除非英飞凌另行明确批准，否则产品不得用于任何因产品故障或使用产品的任何后果可合理预期会导致人身伤害的应用。但是，上述规定并不妨碍客户在英飞凌明确设计和销售的使用领域中使用任何产品，但是客户对应用负有全部责任。

英飞凌明确保留根据适用法律，如《德国版权法》（UrhG）第 44b 条，将其内容用于商业资料和数据探勘（TDM）的权利。

如果产品包含安全功能：
由于任何计算设备都不可能绝对安全，尽管产品采取了安全措施，但英飞凌不保证产品不会被入侵、数据不会被盗或遗失，或不会发生其他漏洞（以下简称"安全漏洞"），英飞凌对任何安全漏洞不承担任何责任。

如果本文档包含或引用软件：
根据美国、德国和世界其他国家的知识产权法律和条约，该软件归英飞凌所有。英飞凌保留所有权利。因此，您只能按照软件附带的软件授权协议的规定使用本软件。

如果没有适用的软件授权协议，英飞凌特此授予您个人的、非排他性的、不可转让的软件知识产权授权（无权转授权）：(a) 对于以源代码形式提供的软件，仅在贵组织内部修改和复制该软件用于英飞凌硬件产品；及 (b) 对于以二进制代码(binary code)形式对外向终端用户分发该软件，仅得用于英飞凌硬件产品。禁止对本软件进行任何其他使用、复制、修改、翻译或编译。有关产品、技术、交货条款和条件以及价格的详细信息，请联系离您最近的英飞凌办公室或访问 **https://www.infineon.com**。