

英飞凌汽车级100V 175°C N沟道

增强型OptiMOS™ 5 功率晶体管



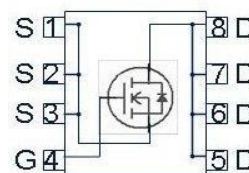
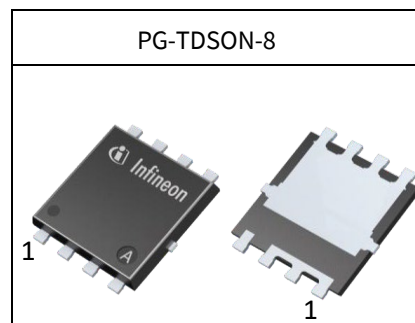
特点

- 适用于汽车应用的功率MOSFET
- N 沟道 - 增强型 - 逻辑电平
- 通过 AEC-Q101 认证
- MSL1 回流焊峰值温度高达 260°C
- 绿色产品：符合 RoHS 标准
- 100% 雪崩测试
- 可进行自动光学检测 (AOI)

Type	Package	Marking
IAUC24N10S5L300	PG-TDSON-8	5N10L300

产品概述

V_{DS}	100	V
$R_{DS(on)}$	30	mΩ
I_D	24	A



除非另有规定，否则均为 $T_j=25^\circ\text{C}$ 的**最大额定值**。

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current ¹⁾	I_D	$T_c=25^\circ\text{C}, V_{GS}=10\text{V}$	24	A
		$T_c=100^\circ\text{C}, V_{GS}=10\text{V}$	16	
		$T_c=25^\circ\text{C}$	96	
Pulsed drain current ¹⁾	$I_{D,pulse}$	$T_c=25^\circ\text{C}$	96	
Avalanche energy, single pulse ¹⁾	E_{AS}	$I_D=10\text{A}$	15	mJ
Avalanche current, single pulse	I_{AS}	-	10	A
Gate source voltage	V_{GS}	-	± 20	V
Power dissipation	P_{tot}	$T_c=25^\circ\text{C}, T_j=175^\circ\text{C}$	38	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C

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）。

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

热特性¹⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	3.9	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	6 cm ² cooling area ²⁾	-	-	50	

除非另有规定，否则均为 $T_j=25\text{ °C}$ 的**电气特性**。

静态参数特性

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=12\mu A$	1.2	1.7	2.2	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=100V, V_{GS}=0V, T_j=25\text{ °C}$	-	-	1	μA
		$V_{DS}=100V, V_{GS}=0V, T_j=125\text{ °C}^{1)}$	-	-	20	
Gate-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=12A$	-	31	37	m Ω
		$V_{GS}=10V, I_D=12A$	-	23.5	30	
Gate resistance ¹⁾	R_G		-	1.2	-	Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

动态参数特性¹⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=50\text{ V},$ $f=1\text{ MHz}$	-	515	670	pF
Output capacitance	C_{oss}		-	93	121	
Reverse transfer capacitance	C_{rss}		-	7	11	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=50\text{ V}, V_{GS}=10\text{ V},$ $I_D=24\text{ A}, R_G=3.5\ \Omega$	-	2	-	ns
Rise time	t_r		-	1	-	
Turn-off delay time	$t_{d(off)}$		-	4	-	
Fall time	t_f		-	3	-	

门极电荷特点¹⁾

Gate to source charge	Q_{gs}	$V_{DD}=50\text{ V}, I_D=12\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	1.7	2.2	nC
Gate to drain charge	Q_{gd}		-	1.6	2.4	
Gate charge total	Q_g		-	7.6	11	
Gate plateau voltage	$V_{plateau}$		-	3.3	-	V

反向二极管

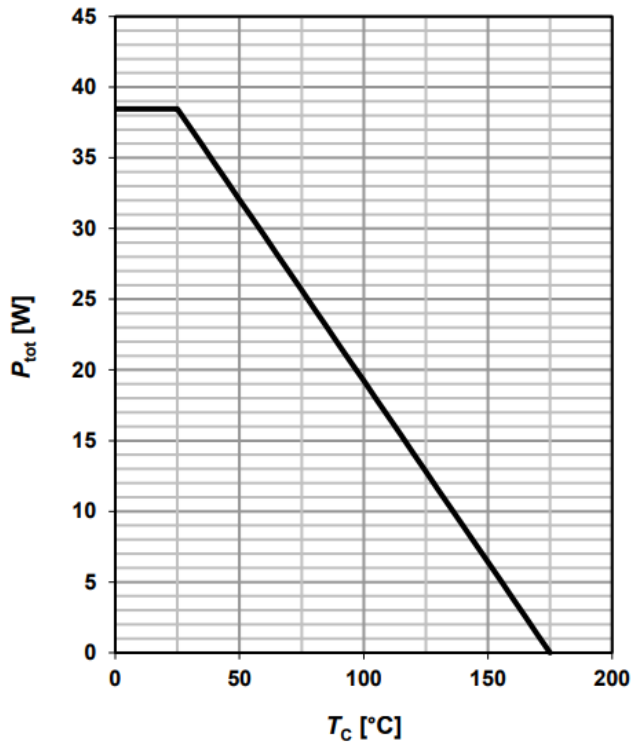
Diode continuous forward current ¹⁾	I_S	$T_C=25^\circ\text{C}$	-	-	24	A
Diode pulse current ¹⁾	$I_{S,pulse}$		-	-	96	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=12\text{ A},$ $T_J=25^\circ\text{C}$	-	0.9	1.1	V
Reverse recovery time ¹⁾	t_{rr}	$V_R=50\text{ V}, I_F=24\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	37	-	ns
Reverse recovery charge ¹⁾	Q_{rr}		-	32	-	nC

¹⁾由设计标定，不受限于生产测试。

²⁾器件安装在 40 mm x 40 mm x 1.5 mm 环氧树脂印刷电路板 FR4 上，漏极连接用铜面积为 6 cm²（一层，70 μm 厚）。印刷电路板垂直放置在静止空气中。

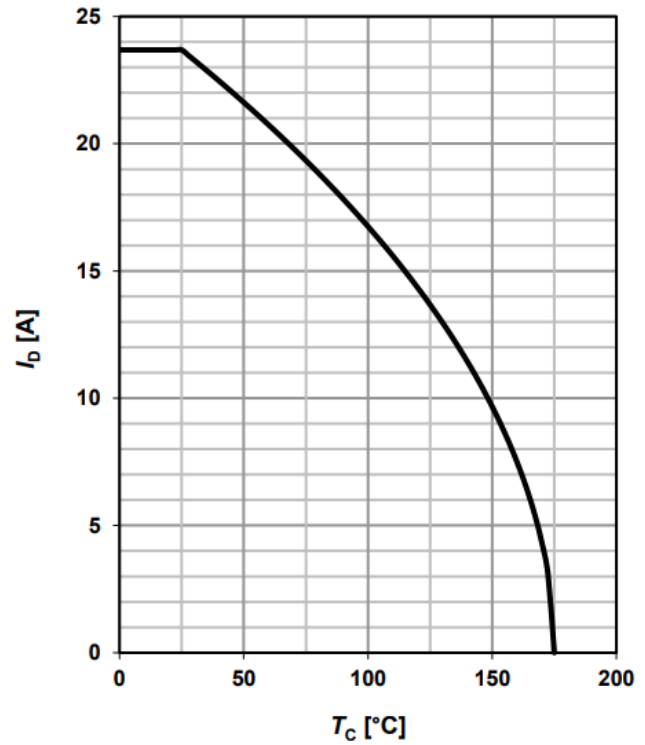
1 功率耗散

$$P_{\text{tot}} = f(T_c); V_{\text{GS}} \geq 6 \text{ V}$$



2 漏极电流

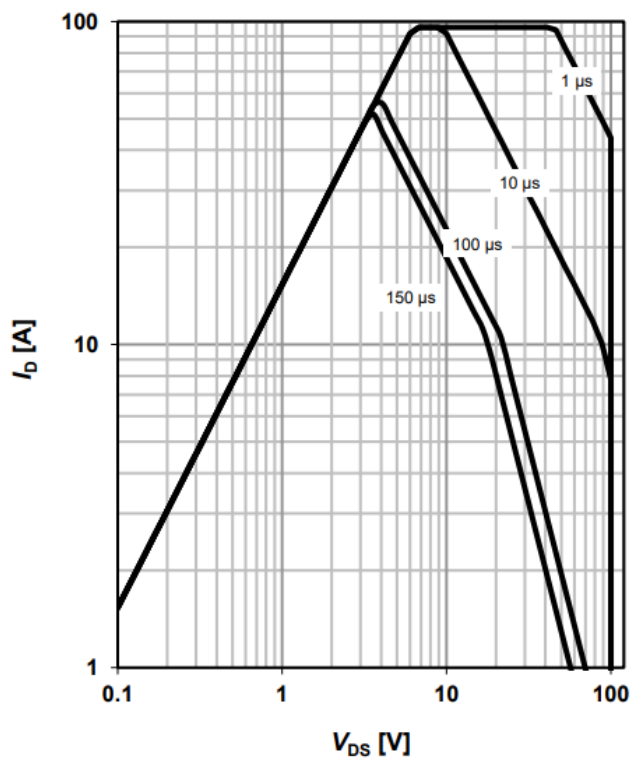
$$I_D = f(T_c); V_{\text{GS}} \geq 6 \text{ V}$$



3 安全工作区

$$I_D = f(V_{\text{DS}}); T_c = 25^\circ\text{C}; D = 0$$

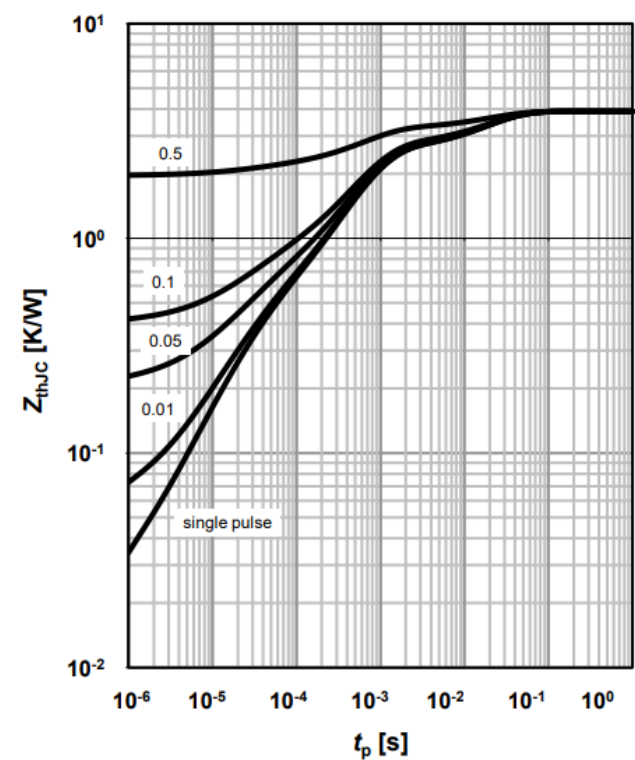
parameter: t_p



4 最大瞬态热阻抗

$$Z_{\text{thJC}} = f(t_p)$$

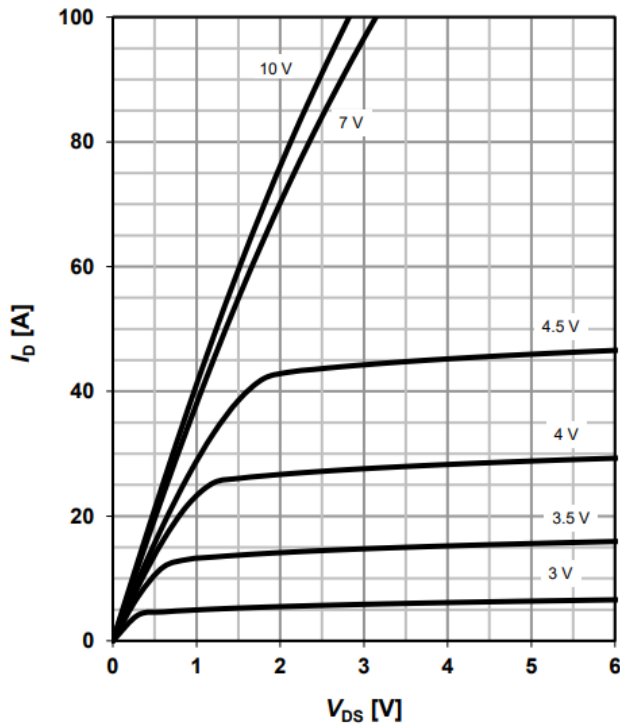
parameter: $D = t_p/T$



5 典型输出特性

$$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$$

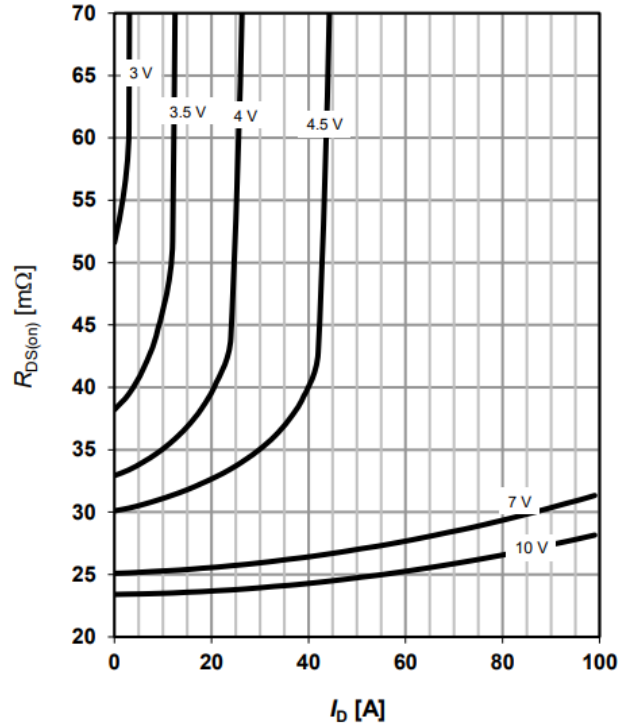
parameter: V_{GS}



6 典型漏源导通电阻

$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

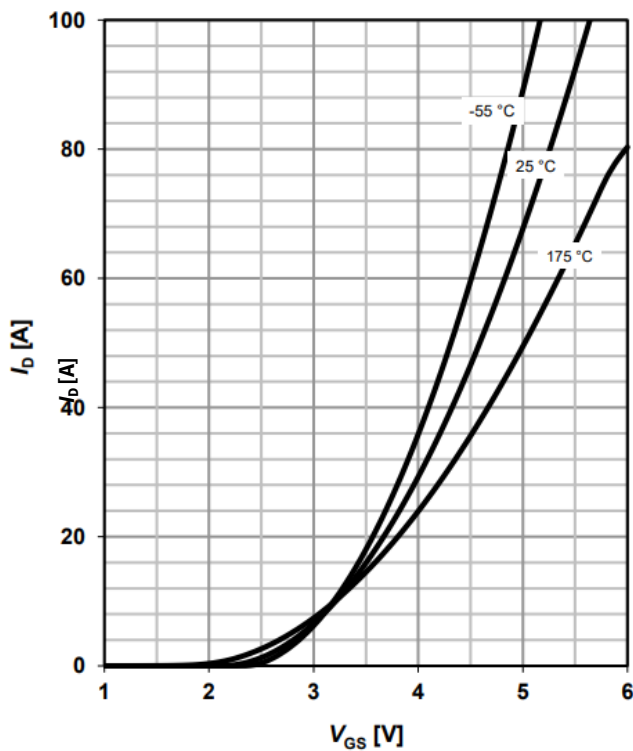
parameter: V_{GS}



7 典型转移特性

$$I_D = f(V_{GS}); V_{DS} = 6\text{V}$$

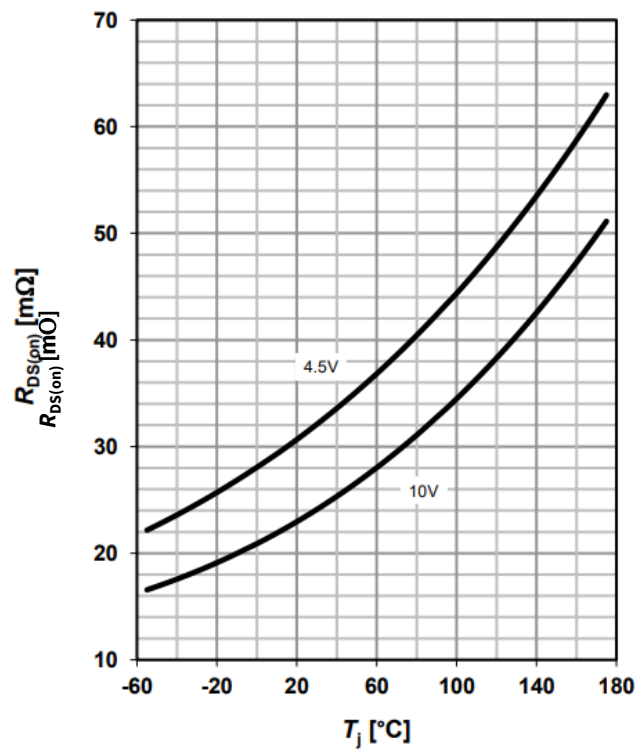
parameter: T_j



8 典型漏源导通电阻

$$R_{DS(on)} = f(T_j); I_D = 12\text{A}$$

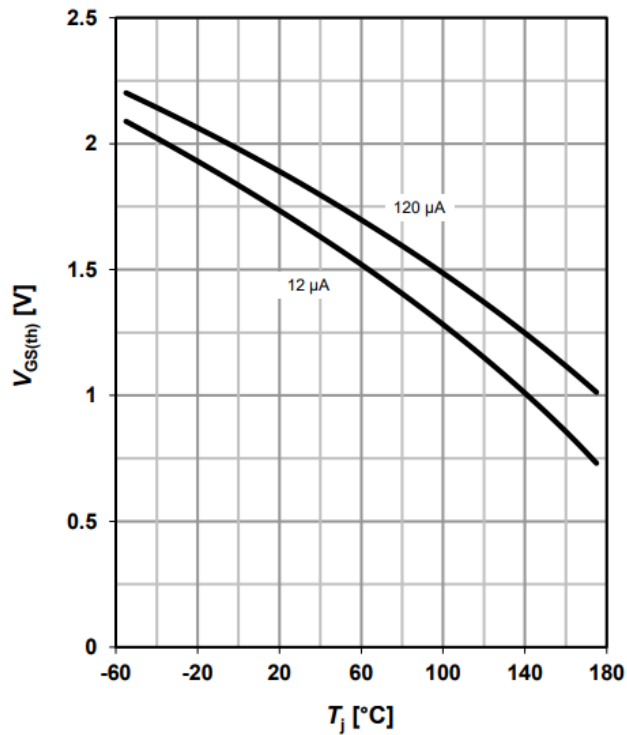
parameter: V_{GS}



9 典型栅极阈值电压

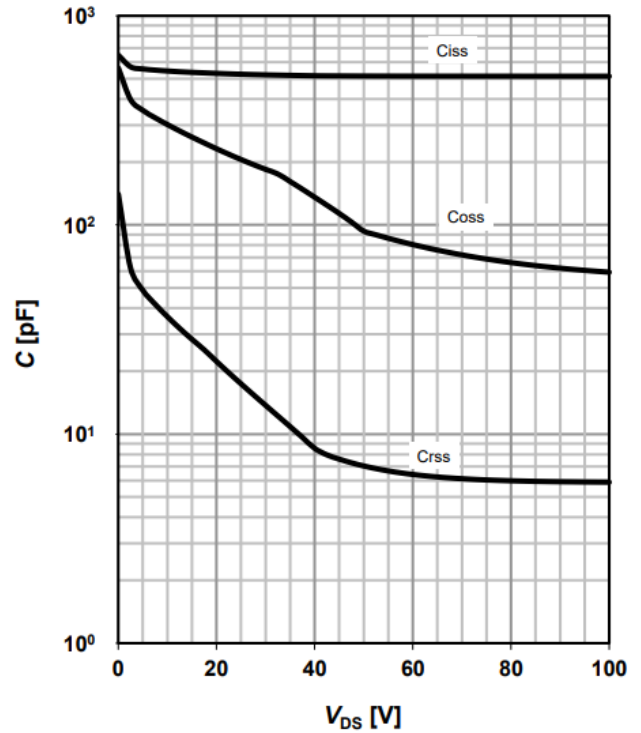
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 典型电容值

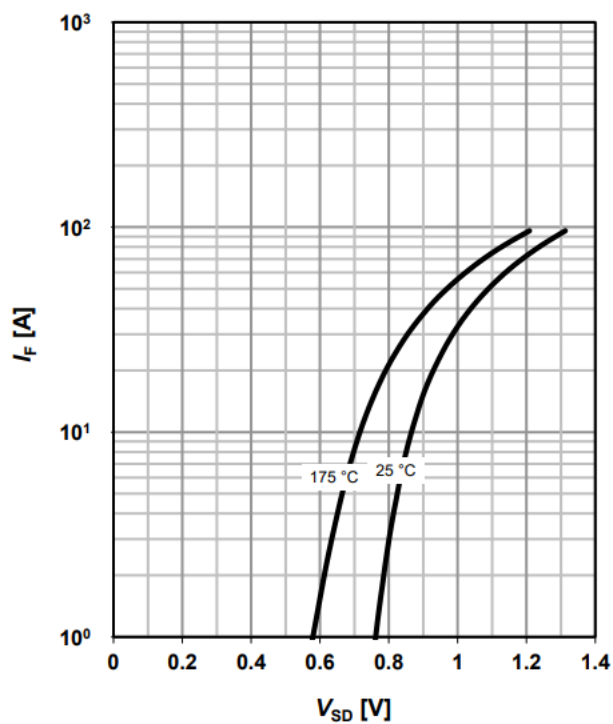
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



11 典型二极管正向导通特性

$$I_F = f(V_{SD})$$

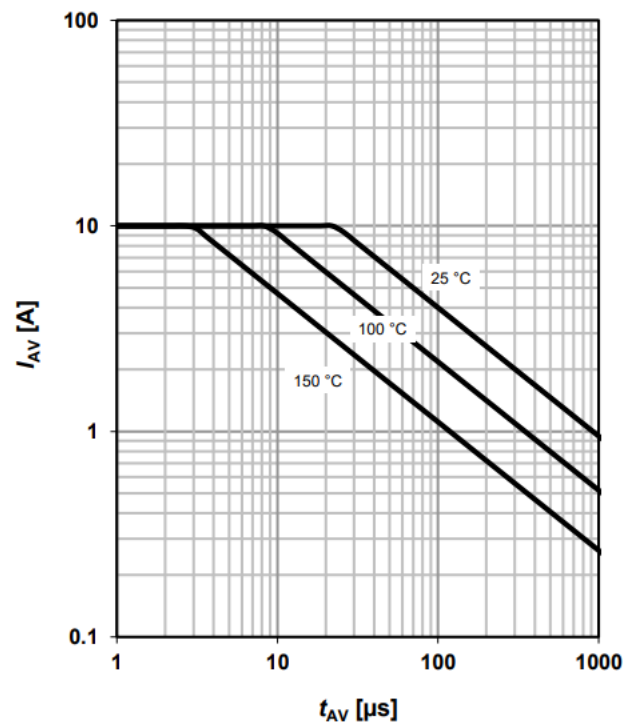
parameter: T_j



12 典型雪崩特性

$$I_{AS} = f(t_{AV})$$

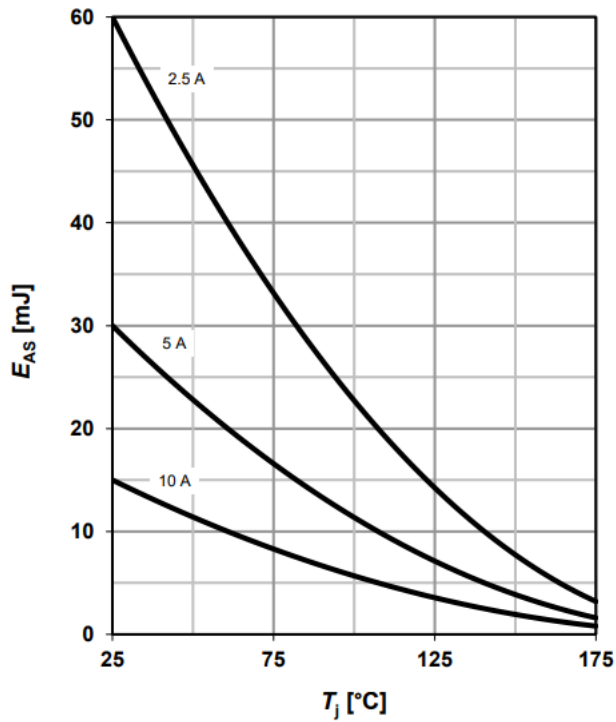
parameter: $T_{j(start)}$



13 典型雪崩能量

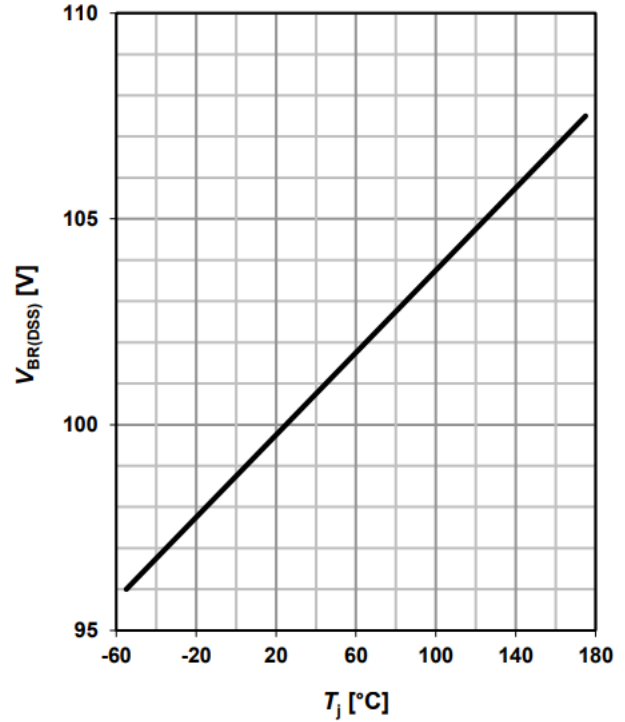
$$E_{AS} = f(T_j)$$

parameter: I_D



14 漏源击穿电压

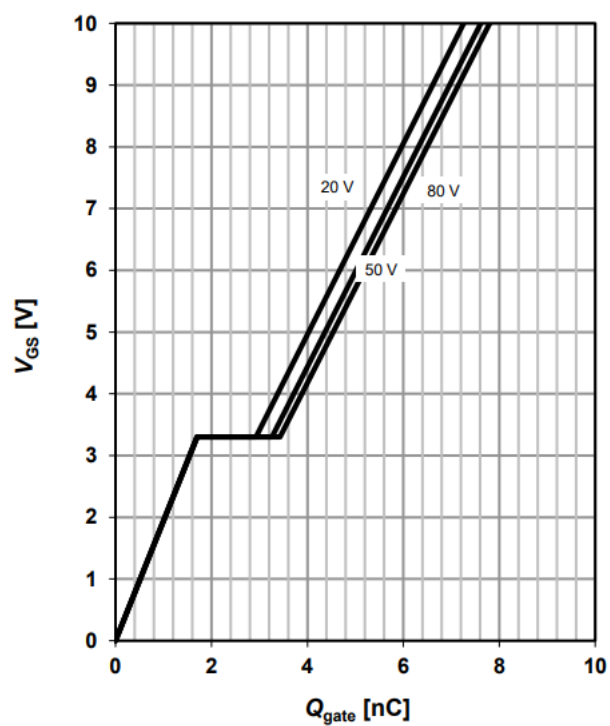
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$



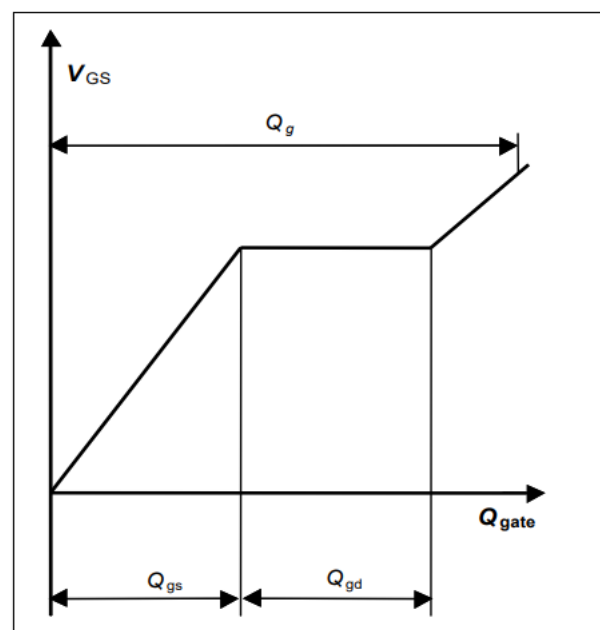
15 典型栅极电荷

$$V_{GS} = f(Q_{gate}); I_D = 12 \text{ A pulsed}$$

parameter: V_{DD}



16 栅极充电波形



[illegible]

-
- 1000 Series PCB Mounting Dimensions**
- Technical drawing showing the dimensions for the 1000 Series PCB mounting. The drawing includes a top view and a side view.
- Top View Dimensions:**
- Overall width: 12
 - Overall height: 5.5
 - Mounting hole spacing: 8
 - Offset from center to mounting hole: 4
 - Pin 1 Index Marking: Indicated by a circle with a dot on the first component.
- Side View Dimensions:**
- Thickness: 0.3

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修订记录

Version	Date	Changes
Revision 1.0	23.07.2019	Final Data Sheet



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