英飞凌60V 175℃ N沟道

增强型OptiMOS®-T2 功率晶体管

AEC Qualified

RoHS

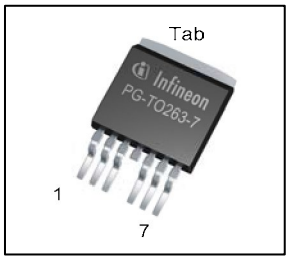
产品概述

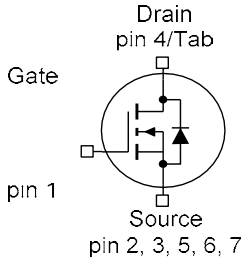
V_{DS}	60	V
$R_{DS(on),max}$	1.7	mΩ
I_D	180	A

特性

- N沟道-增强模式
- 通过 AEC-Q101 认证
- MSL1 回流焊峰值温度高达 260°C
- 工作温度 175°C
- 绿色产品：符合 RoHS 标准
- 100% 雪崩测试
- 超低 Rds(on)
- 超高 I_D

PG-TO263-7-3





Type	Package	Marking
IPB180N06S4-H1	PG-TO263-7-3	4N06H1

除非另有规定，否则均为T_j=25 °C 的**最大额定值。**

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current[1]	I_D	T_C=25°C, V_{GS}=10V	180	A
		T_C=100°C, V_{GS}=10V[2]	180	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25°C	720	
Avalanche energy, single pulse[2]	E_{AS}	I_D=90A	700	mJ
Avalanche current, single pulse	I_{AS}	-	180	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	T_C=25°C	250	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C

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IEC climatic category; DIN IEC 68-1	-	-	55/175/56			
Parameter	**Symbol**	**Conditions**	**Values**			**Unit**
			min.	**typ.**	**max.**	

热特性[2)]

Thermal resistance, junction - case	R_{thJC}	-	-	-	0.60	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm^2 cooling area[3)]	-	-	40	

除非另有规定，否则均为T_j=25 °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	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=200µA	2.0	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	V_{DS}=60V, V_{GS}=0V, T_j=25°C	-	0.03	1	µA
		V_{DS}=60V, V_{GS}=0V, T_j=125°C[2)]	-	10	200	
Gate-source leakage current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10V, I_D=100A	-	1.3	1.7	mΩ

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
动态参数特性[2)]						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	16840	21900	pF
Output capacitance	C_{oss}		-	4120	5360	
Reverse transfer capacitance	C_{rss}		-	160	320	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30V, V_{GS}=10V, I_D=180A, R_G=3.5Ω	-	30	-	ns
Rise time	t_r		-	5	-	
Turn-off delay time	$t_{d(off)}$		-	60	-	
Fall time	t_f		-	15	-	
栅极电荷特性[2)]						
Gate to source charge	Q_{gs}	V_{DD}=48V, I_D=180A, V_{GS}=0 to 10V	-	84	110	nC
Gate to drain charge	Q_{gd}		-	22.5	45	
Gate charge total	Q_g		-	208	270	
Gate plateau voltage	$V_{plateau}$		-	5.0	-	V
体内寄生反向二极管						
Diode continous forward current[2)]	I_S	T_C=25°C	-	-	180	A
Diode pulse current[2)]	$I_{S,pulse}$		-	-	720	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=100A, T_j=25°C	0.6	0.95	1.3	V
Reverse recovery time[2)]	t_{rr}	V_R=30V, I_F=180A, di_F/dt=100A/µs	-	60	-	ns
Reverse recovery charge[2)]	Q_{rr}		-	90	-	nC

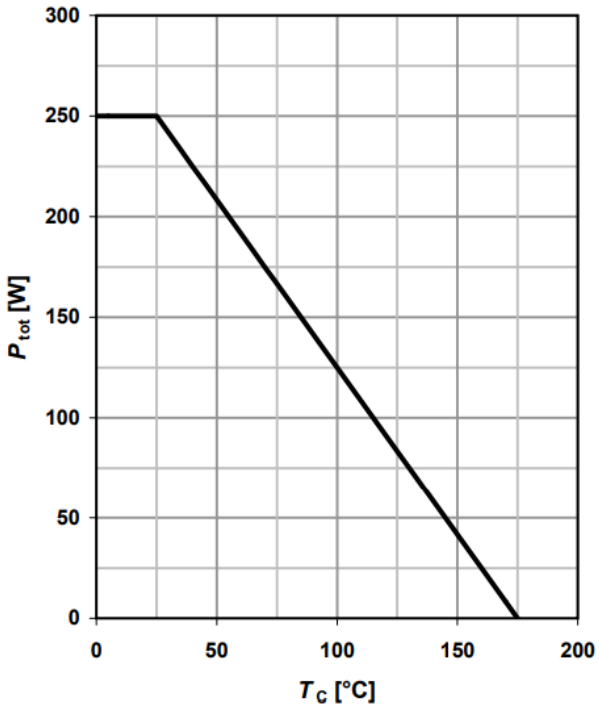
[1)]电流受封装限制；当R_{thJC}= 0.6 K/W时，该芯片在25°C时能够承载299 A。

[2)]由设计标定，不受制于生产测试。

[3)]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 cm^2（一层，70 µm厚）。印刷电路板垂直放置在静止空气中。

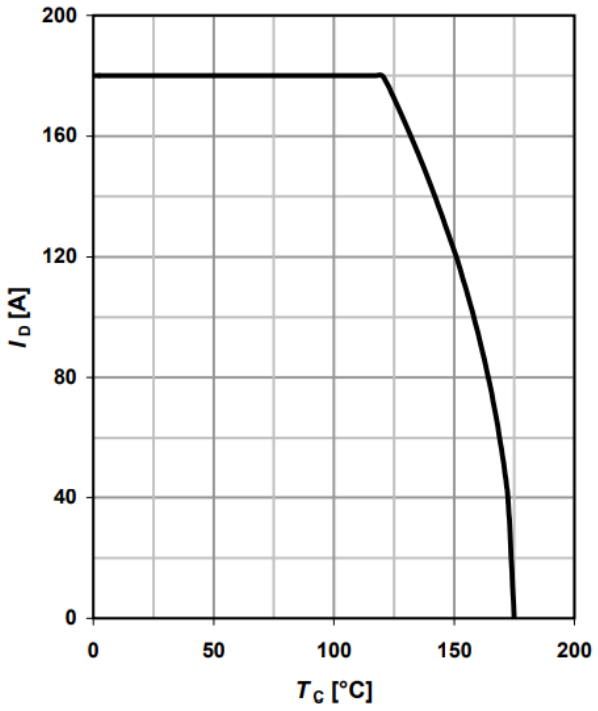
1 功率耗散

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



2 漏极电流

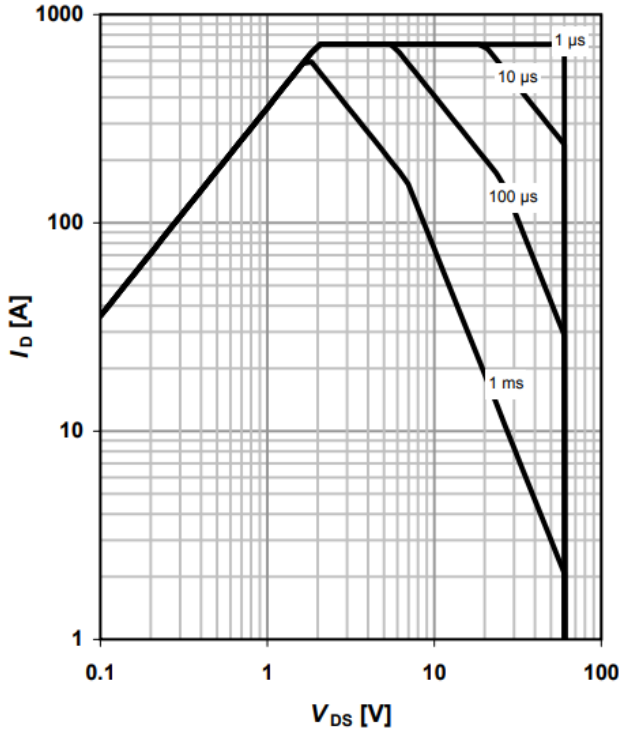
$I_D = f(T_C)$; $V_{GS} \geq 6$ V; SMD



3 安全工作区

$I_D = f(V_{DS})$; $T_C = 25$ °C; $D = 0$; SMD

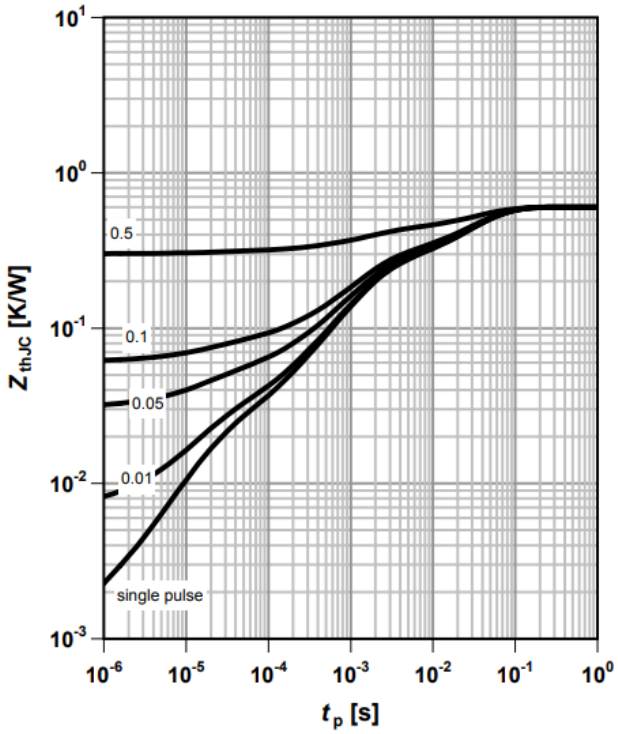
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

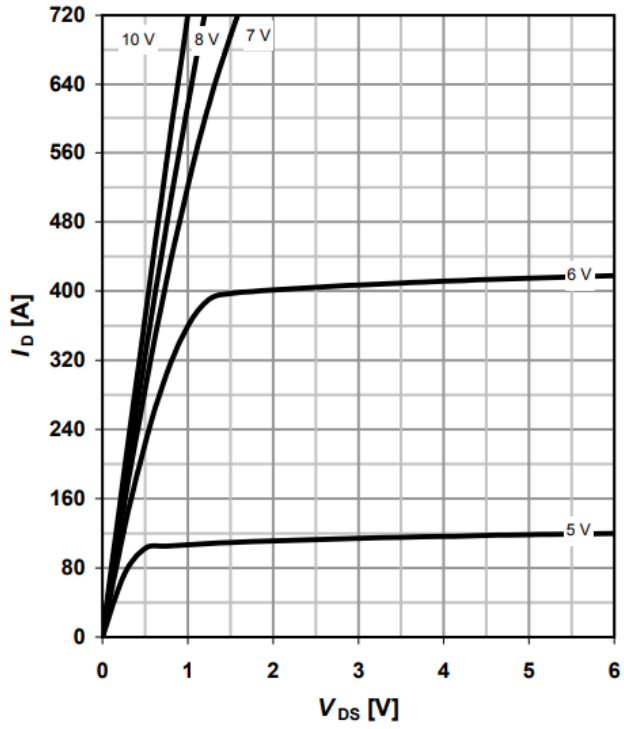
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C; SMD

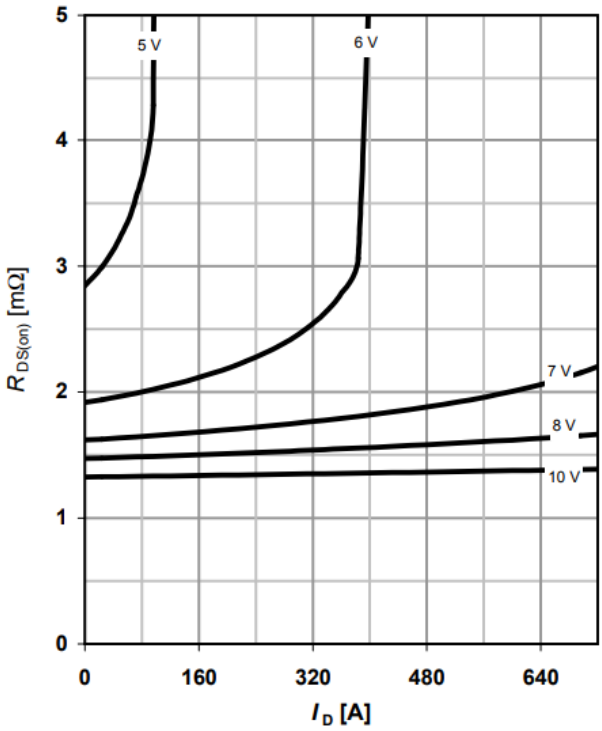
parameter: V_{GS}



6 典型漏源导通电阻

$R_{DS(on)} = f(I_D)$; $T_j = 25$ °C; SMD

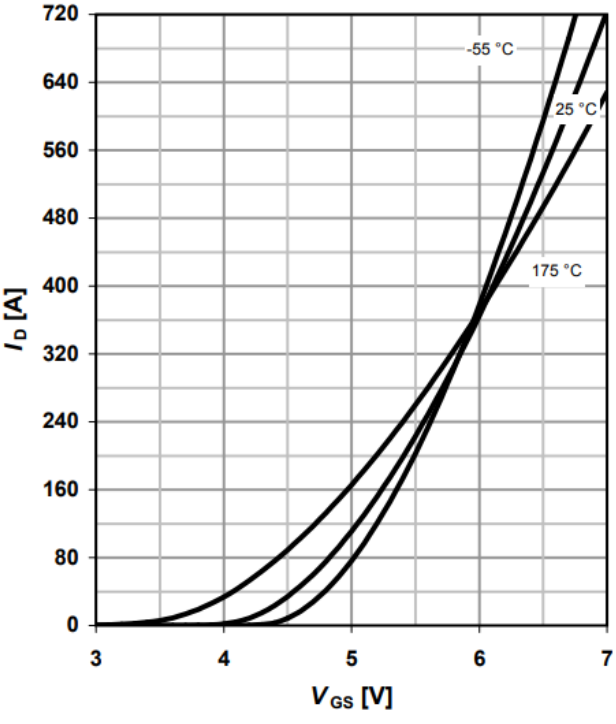
parameter: V_{GS}



7 典型转移特性

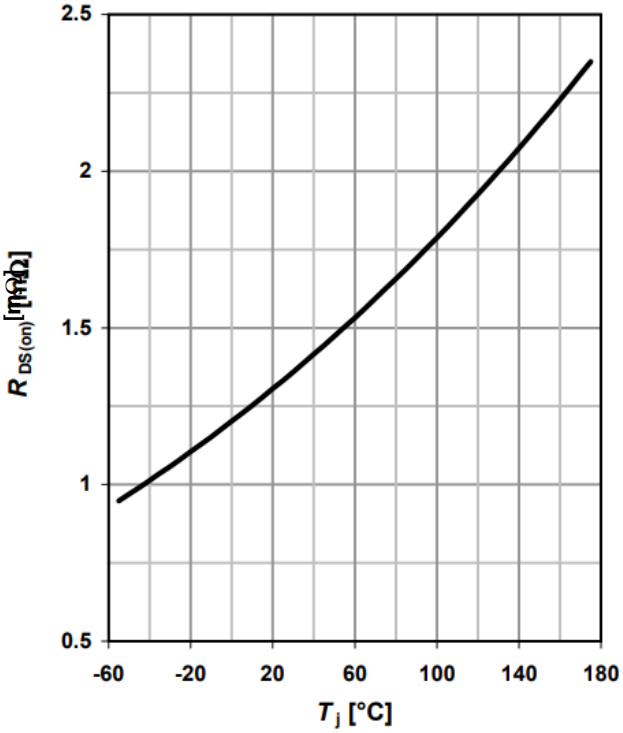
$I_D = f(V_{GS})$; $V_{DS} = 6V$

parameter: T_j



8 典型漏源导通电阻

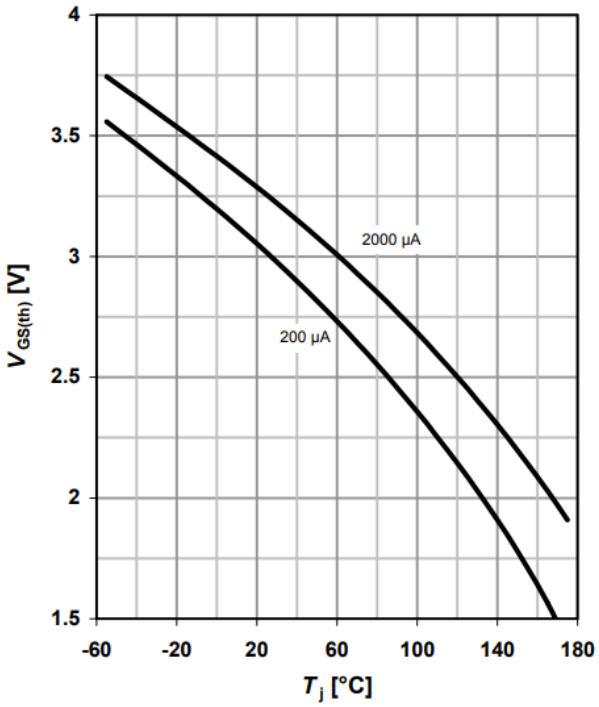
$R_{DS(on)} = f(T_j)$; $I_D = 100$ A; $V_{GS} = 10$ V; SMD



9 典型栅极阈值电压

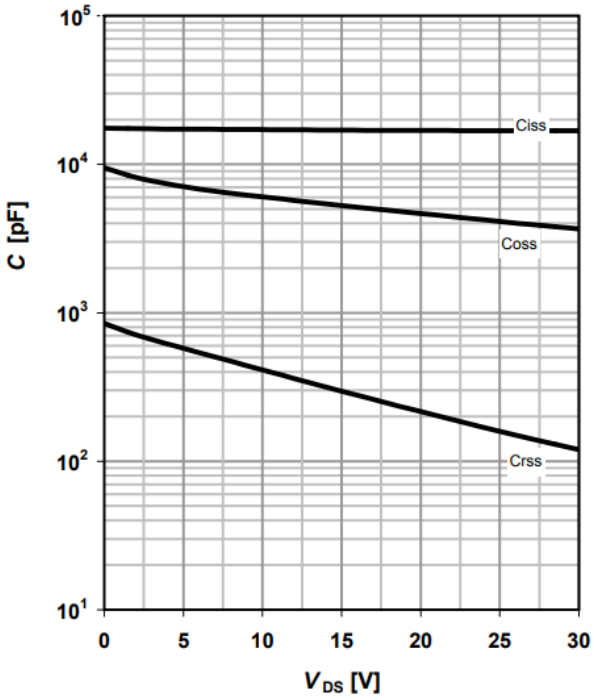
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

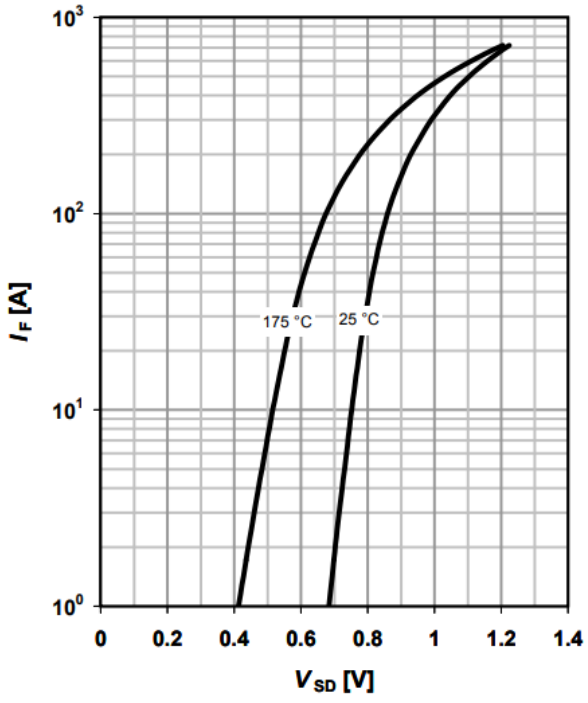
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

IF = f(V_{SD})

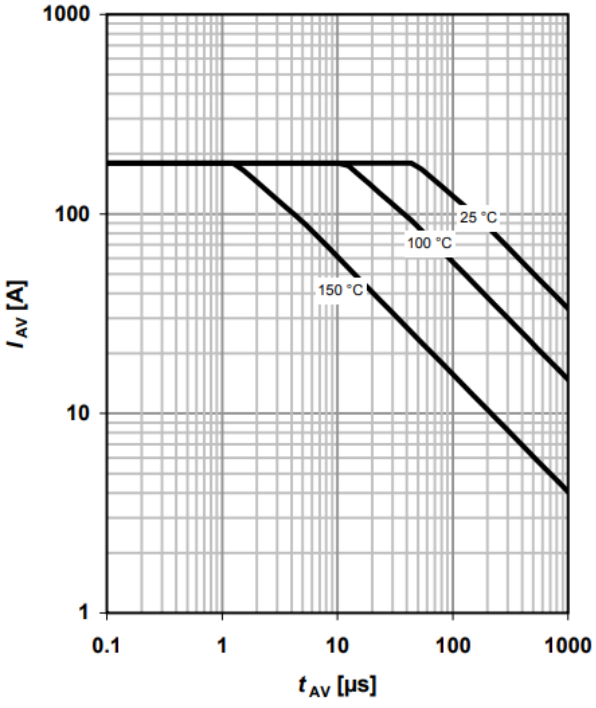
parameter: T_j



12 典型雪崩特性

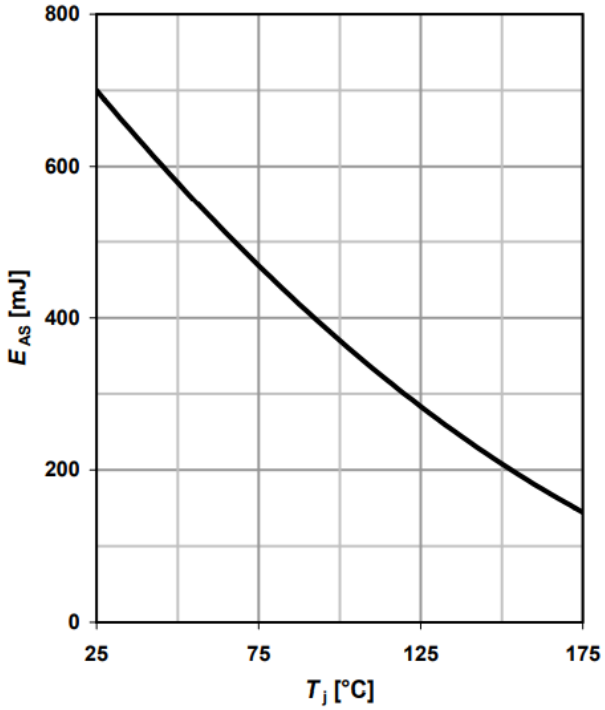
$I_{AS} = f(t_{AV})$

parameter: $T_{j(start)}$



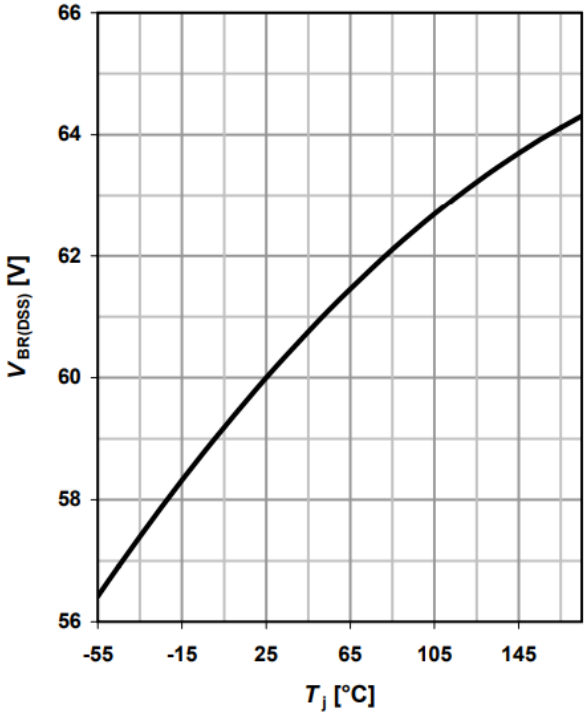
13 典型雪崩能量

$E_{AS} = f(T_j)$; I_D = 90 A



14 漏源击穿电压

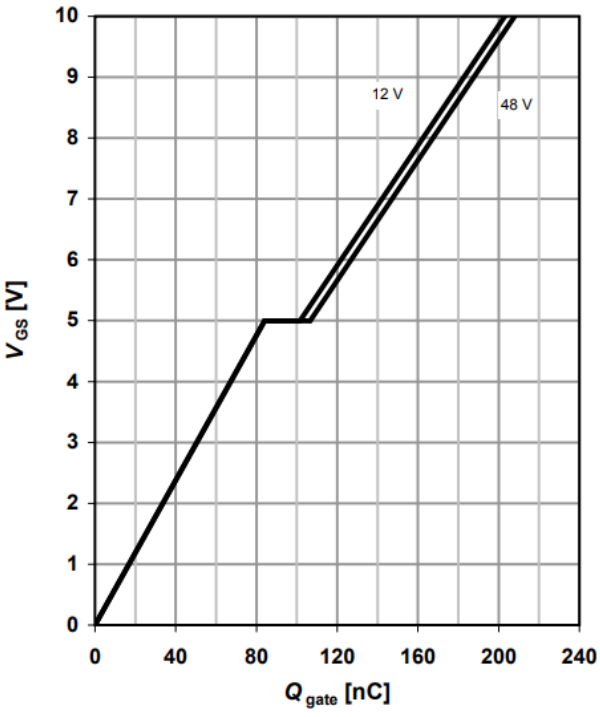
$V_{BR(DSS)} = f(T_j)$; I_D = 1 mA



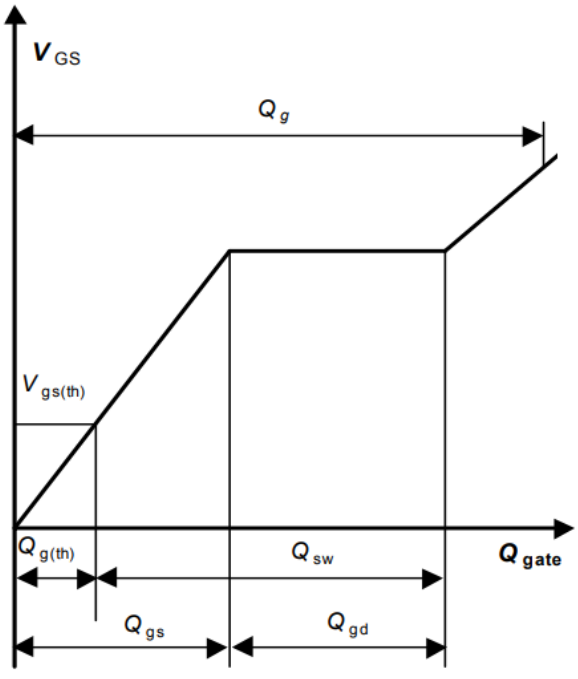
15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; I_D = 180 A pulsed

parameter: V_{DD}



16 栅极充电波形



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修订记录

Version	Date	Changes
Revision 1.0	25.03.2009	Final data sheet

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