英飞凌30V 175℃ N沟道

增强型OptiMOS™-T2功率晶体管

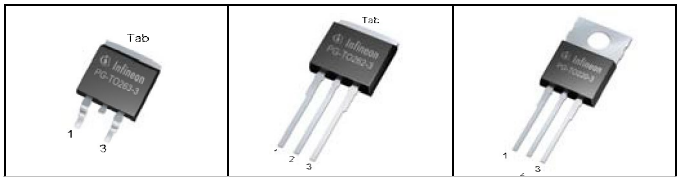
AEC Qualified

RoHS

产品概述

V_{DS}	30	V
$R_{DS(on),max}$ (SMD version)	3.4	mΩ
I_D	80	A

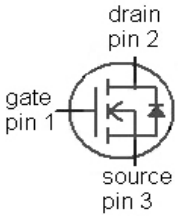
PG-TO263-3-2 PG-TO262-3-1 PG-TO220-3-1



特性

- N沟道-增强模式
- 符合汽车级 AEC Q101 标准
- 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

Type	Package	Marking
IPB80N03S4L-03	PG-TO263-3-2	4N03L03
IPI80N03S4L-04	PG-TO262-3-1	4N03L04
IPP80N03S4L-04	PG-TO220-3-1	4N03L04



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}=10 V	80	A
		T_C=100 °C, V_{GS}=10 V[2]	80	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	320	
Avalanche energy, single pulse	E_{AS}	I_D=80 A	95	mJ
Avalanche current, single pulse	I_{AS}	T_C=25 °C	80	A
Gate source voltage	V_{GS}	-	±16	V
Power dissipation	P_{tot}	T_C=25 °C	94	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C
IEC climatic category; DIN IEC 68-1	-	-	55/175/56	

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Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

热特性[2)]

Thermal resistance, junction - case	R_{thJC}	-	-	-	1.6	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	-	62	
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm² 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}=0 V, I_D= 1 mA	30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=45 µA	1.0	1.6	2.2	
Zero gate voltage drain current	I_{DSS}	V_{DS}=30 V, V_{GS}=0 V, T_j=25 °C	-	0.01	1	µA
		V_{DS}=30 V, V_{GS}=0 V, T_j=125 °C[2)]	-	10	1000	
		V_{DS}=18 V, V_{GS}=0 V, T_j=85 °C[2)]	-	5	60	
Gate-source leakage current	I_{GSS}	V_{GS}=16 V, V_{DS}=0 V	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=40 A	-	3.9	5	mΩ
		V_{GS}=4.5 V, I_D=40 A, SMD version	-	3.6	4.7	
		V_{GS}=10 V, I_D=80 A	-	3.0	3.7	
		V_{GS}=10 V, I_D=80 A, SMD version	-	2.7	3.4	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
动态参数特性[2)]						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=25 V, f=1 MHz	-	4000	5100	pF
Output capacitance	C_{oss}		-	1000	1300	
Reverse transfer capacitance	C_{rss}		-	53	100	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15 V, V_{GS}=10 V, I_D=80 A, R_G=3.5 Ω	-	9	-	ns
Rise time	t_r		-	6	-	
Turn-off delay time	$t_{d(off)}$		-	37	-	
Fall time	t_f		-	7	-	
栅极电荷特性[2)]						
Gate to source charge	Q_{gs}	V_{DD}=24 V, I_D=80 A, V_{GS}=0 to 10 V	-	12	15	nC
Gate to drain charge	Q_{gd}		-	8	16	
Gate charge total	Q_g		-	60	75	
Gate plateau voltage	$V_{plateau}$		-	3.1	-	V
反向二极管						
Diode continuous forward current[2)]	I_S	T_C=25 °C	-	-	80	A
Diode pulse current[2)]	$I_{S,pulse}$		-	-	320	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=80 A, T_j=25 °C	0.6	0.9	1.3	V
Reverse recovery time[2)]	t_{rr}	V_R=15 V, I_F=I_S, di_F/dt =100 A/µs	-	60	-	ns
Reverse recovery charge[2)]	Q_{rr}		-	50	-	nC

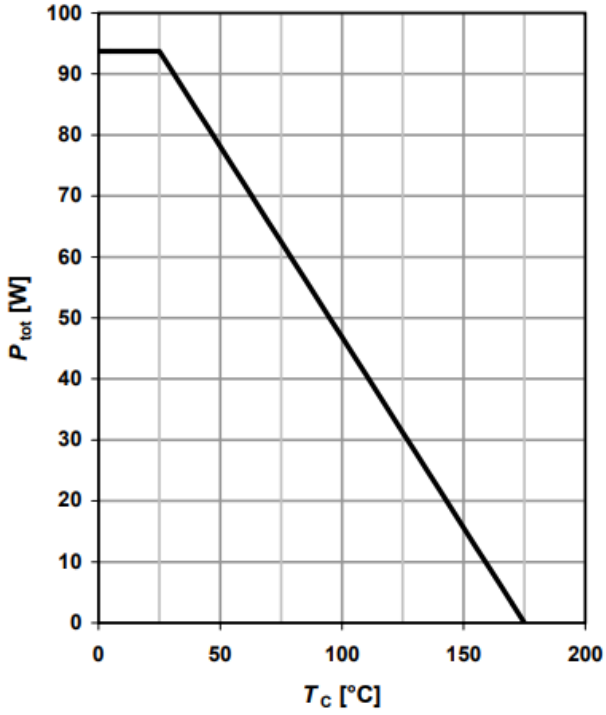
[1)]电流受封装限制；当R_{thJC} = 1.6 K/W时，该芯片在25°C时能够承载128 A。

[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 cm² （一层，70 µm厚）。印刷电路板垂直放置在静止空气中。

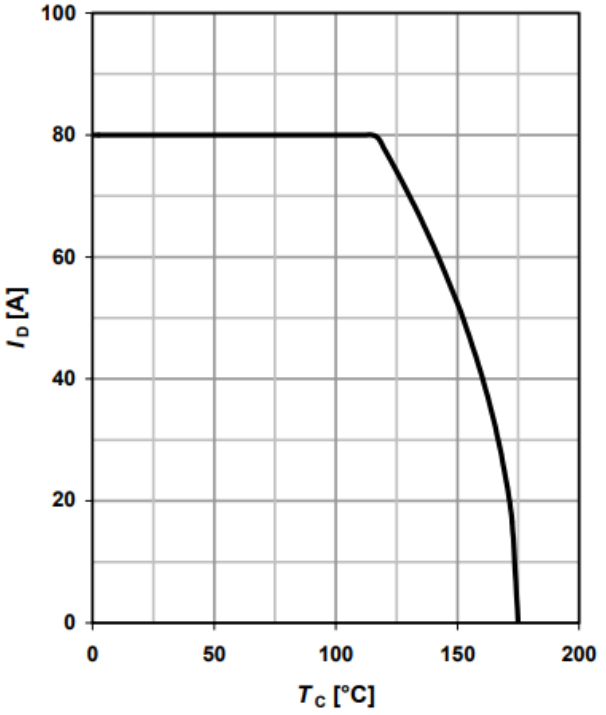
1 功率耗散

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



2 漏极电流

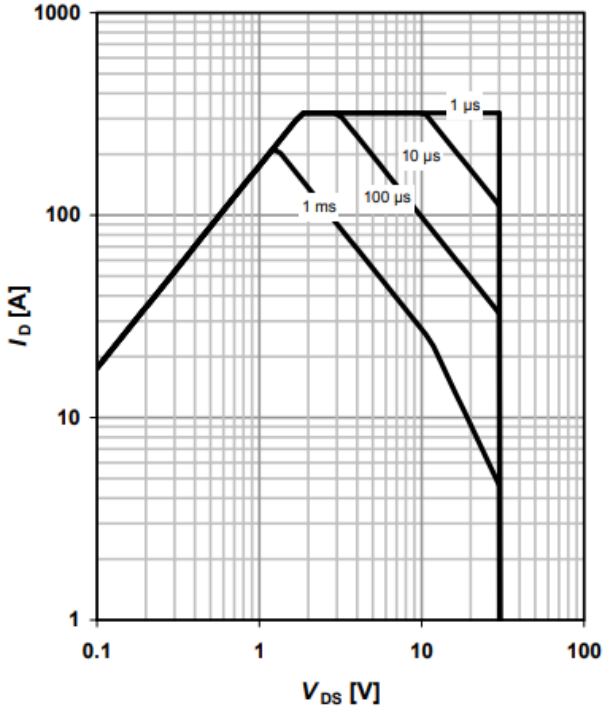
$I_D = f(T_C)$; $V_{GS} \geq 6$ V; SMD



3 安全工作区

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

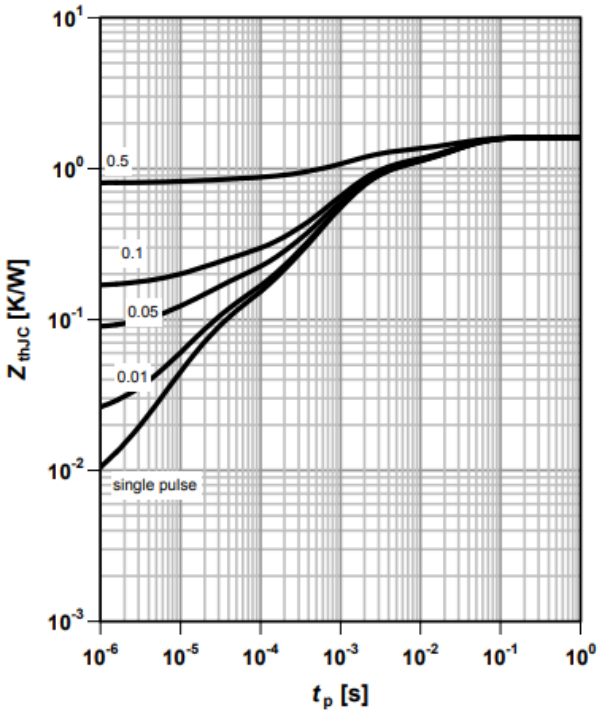
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

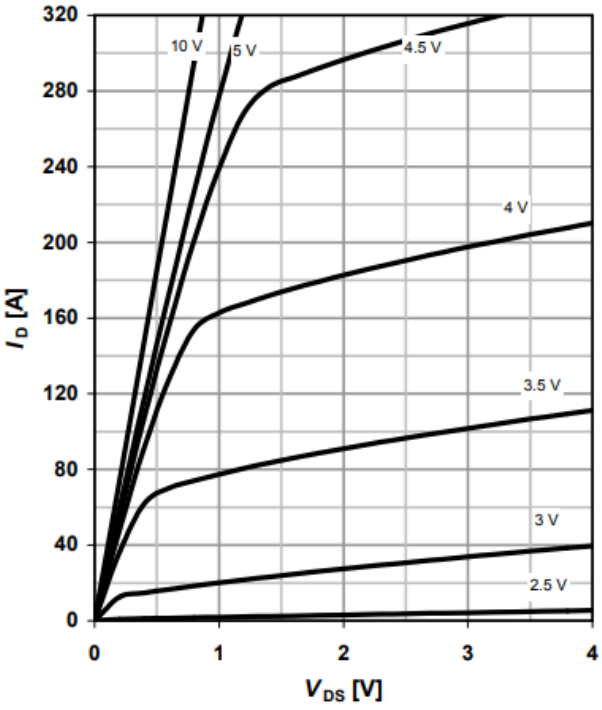
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C, SMD

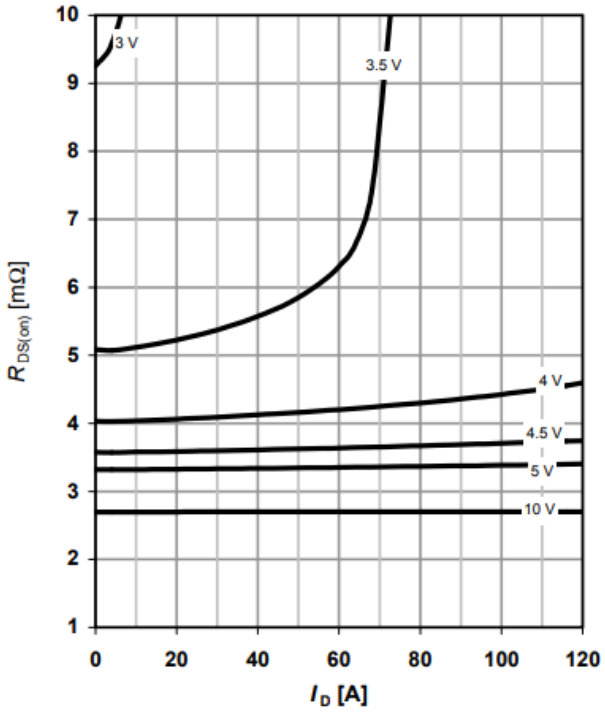
parameter: V_{GS}



6 典型漏源导通电阻

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

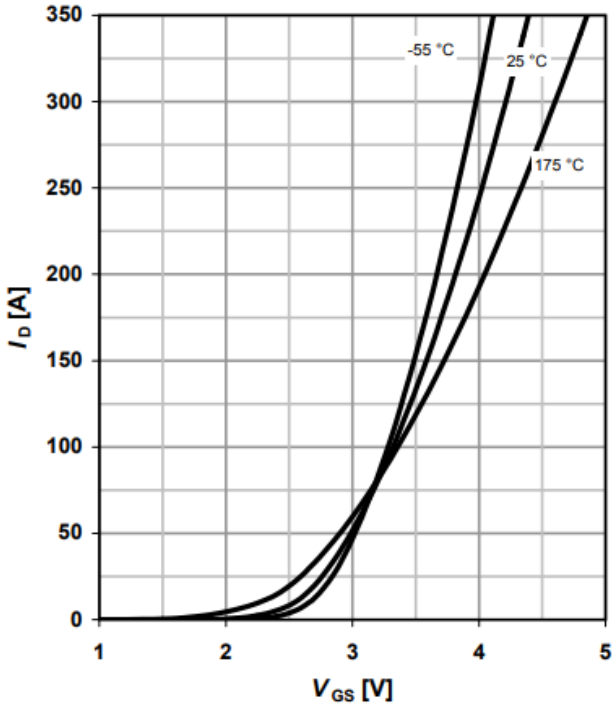
parameter: V_{GS}



7 典型转移特性

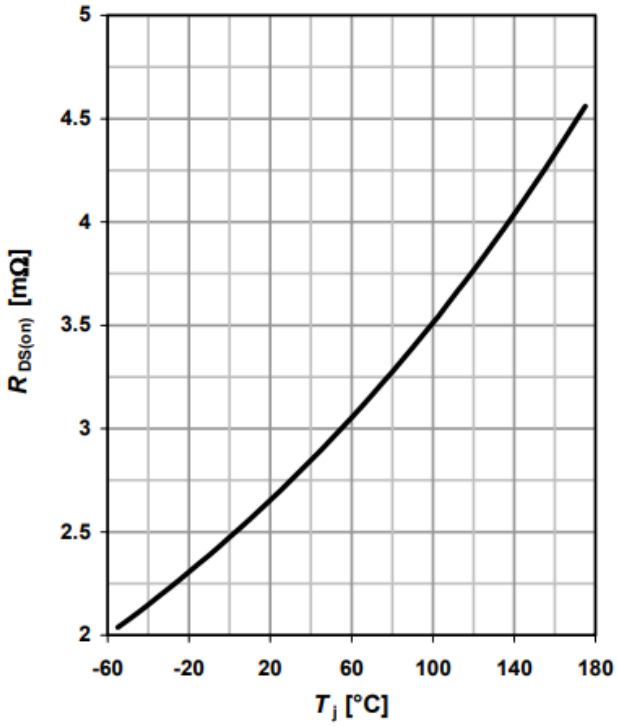
$I_D = f(V_{GS})$; $V_{DS} = 6$V

parameter: T_j



8 典型漏源导通电阻

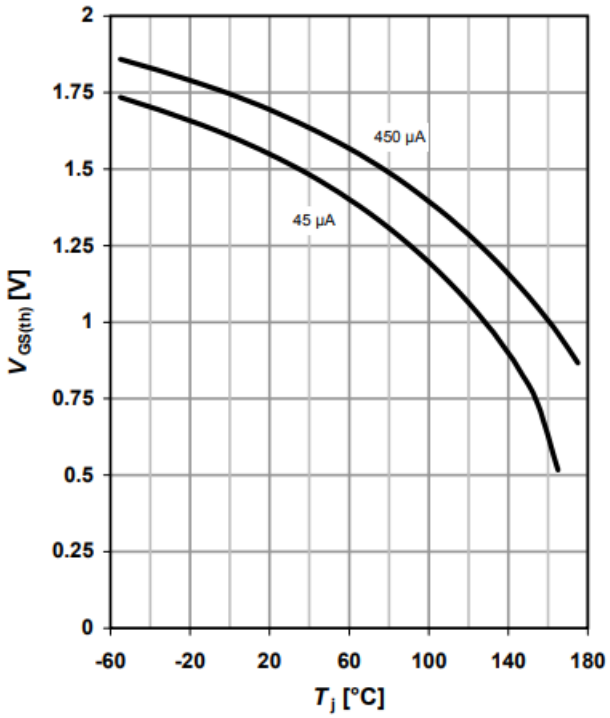
$R_{DS(on)} = f(T_j)$; $I_D = 80$ A; $V_{GS} = 10$ V, SMD



9 典型栅极阈值电压

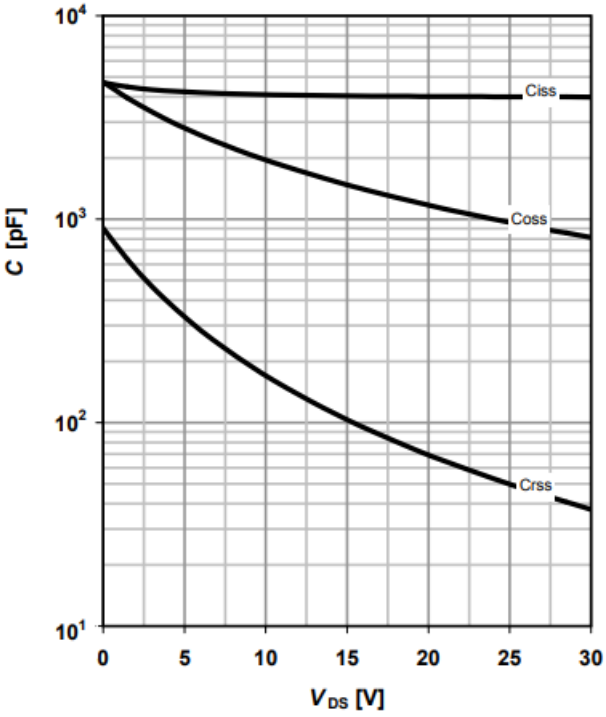
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

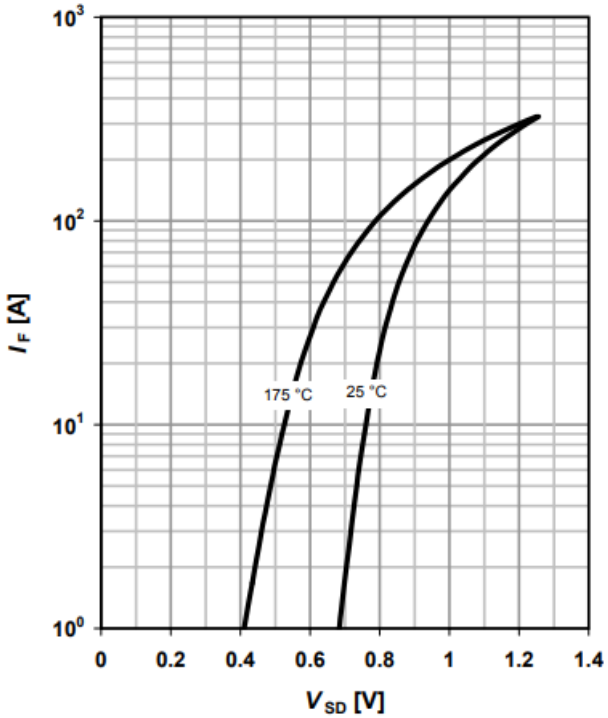
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

$IF = f(V_{SD})$

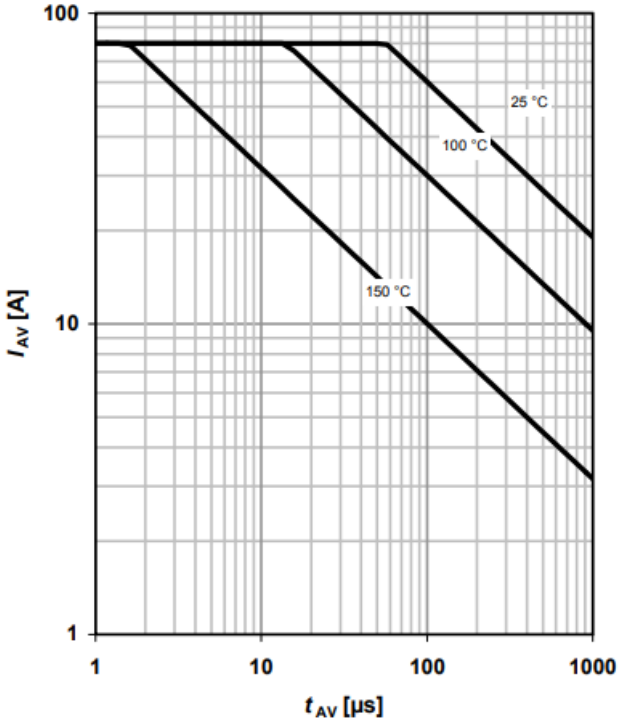
parameter: T_j



12 典型雪崩特性

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

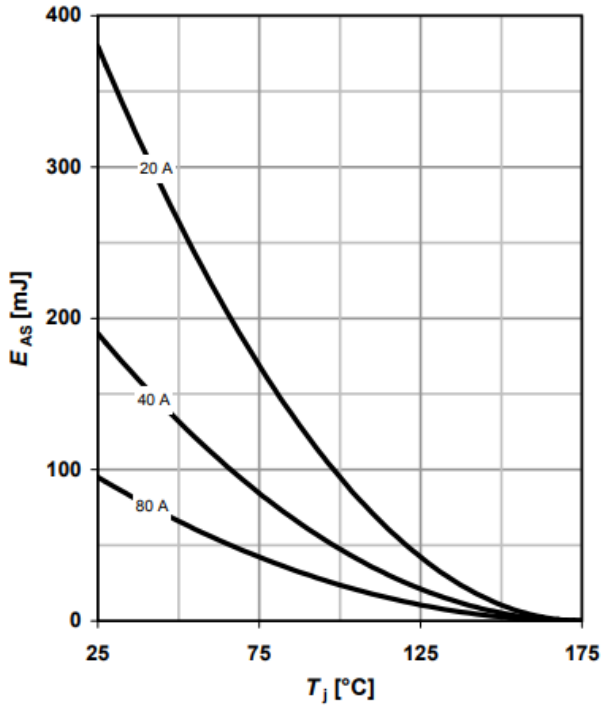
parameter: $T_{j(start)}$



17 典型雪崩能量

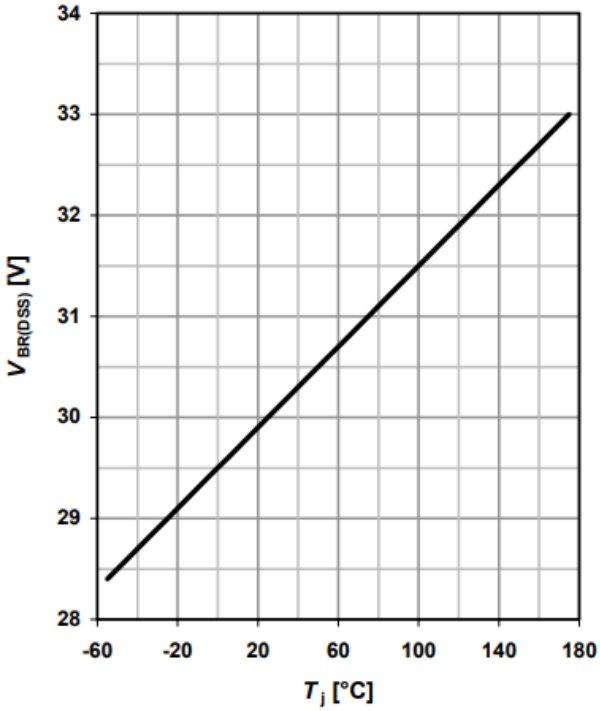
$E_{AS} = f(T_j)$

parameter: I_D



18 典型漏源击穿电压

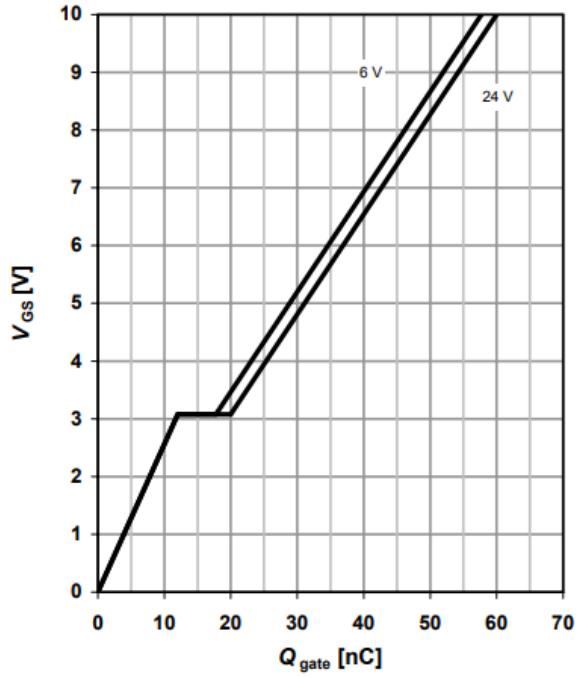
$V_{BR(DSS)} = f(T_j)$; I_D = 1 mA



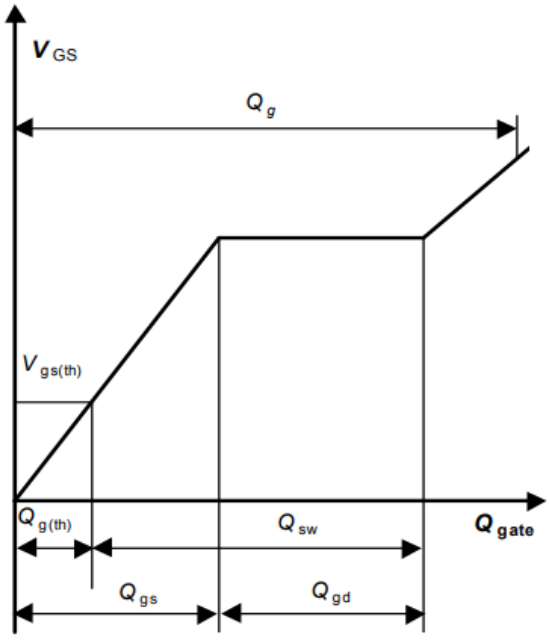
15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; I_D = 80 A pulsed

parameter: V_{DD}



16 栅极充电波形



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修订记录

Version	Date	Changes
Rev 2.0	09.03.2007	Final data sheet
Rev 2.1	08.03.2010	Update of RDSon

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