英飞凌100V 175°C N沟道
增强型OptiMOS™ -T 功率晶体管

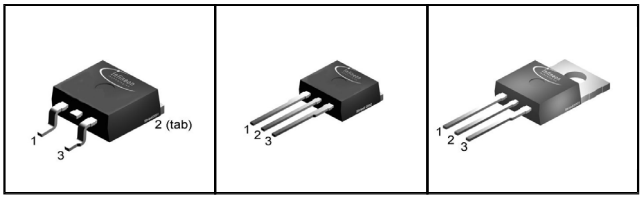
产品概述

V_{DS}	100	V
$R_{DS(on),max}$ (SMD version)	15.4	mΩ
I_D	50	A

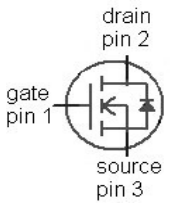
特点

- N沟道-增强模式
- 符合汽车 AEC Q101 标准
- MSL1 回流焊峰值温度高达 260°C
- 工作温度 175°C
- 符合 RoHS 标准
- 100% 雪崩测试

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



Type	Package	Marking
IPB50N10S3L-16	PG-TO263-3-2	3N10L16
IPI50N10S3L-16	PG-TO262-3-1	3N10L16
IPP50N10S3L-16	PG-TO220-3-1	3N10L16



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	I_D	T_C=25 °C, V_{GS}=10 V	50	A
		T_C=100 °C, V_{GS}=10 V[1]	37	
Pulsed drain current[1]	$I_{D,pulse}$	T_C=25 °C	200	
Avalanche energy, single pulse[1]	E_{AS}	I_D=25A	330	mJ
Avalanche current, single pulse	I_{AS}		50	A
Gate source voltage[2]	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	100	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[1)]

Thermal resistance, junction - case	R_{thJC}		-	-	1.5	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	62	
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}=0 V, I_D= 1 mA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=60µA	1.2	1.7	2.4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=80 V, V_{GS}=0 V, T_j=25 °C	-	0.01	1	µA
		V_{DS}=80 V, V_{GS}=0 V, T_j=125 °C[2)]	-	1	100	
Gate-source leakage current	I_{GSS}	V_{GS}=16V, V_{DS}=0V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5V, I_D=50A	-	16.1	20.9	mW
		V_{GS}=4.5V, I_D=50A, SMD version	-	15.8	20.6	
		V_{GS}=10 V, I_D=50 A	-	13.1	15.7	
		V_{GS}=10 V, I_D=50 A, SMD version	-	12.8	15.4	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
动态参数特性[1)]						
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	3215	4180	pF
Output capacitance	C_{oss}		-	730	949	
Reverse transfer capacitance	C_{rss}		-	63	95	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20 V, V_{GS}=10 V, I_D=50 A, R_G=3.5 W	-	10	-	ns
Rise time	t_r		-	5	-	
Turn-off delay time	$t_{d(off)}$		-	28	-	
Fall time	t_f		-	5	-	
门极电荷特点[1)]						
Gate to source charge	Q_{gs}	V_{DD}=80 V, I_D=70 A, V_{GS}=0 to 10 V	-	9	12	nC
Gate to drain charge	Q_{gd}		-	8	12	
Gate charge total	Q_g		-	49	64	
Gate plateau voltage	$V_{plateau}$		-	3.7	-	V
反向二极管						
Diode continous forward current[1)]	I_S	T_C=25°C	-	-	50	A
Diode pulse current[1)]	$I_{S,pulse}$		-	-	200	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=50 A, T_j=25 °C	0.6	1	1.2	V
Reverse recovery time[1)]	t_{rr}	V_R=50V, I_F=I_S, di_F/dt=100A/µs	-	80	-	ns
Reverse recovery charge[1)]	Q_{rr}		-	185	-	nC

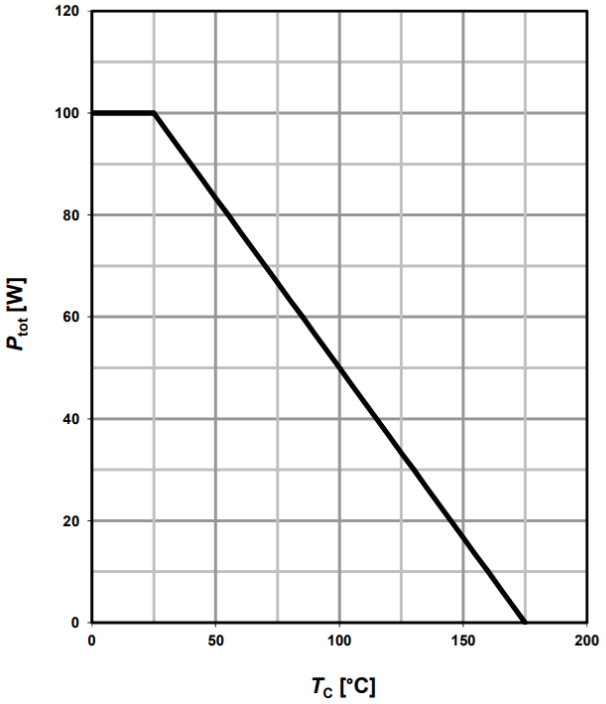
[1)]由设计标定，不受制于生产测试。

[2)] -5V 至 -20V，最长非连续时间为 168 小时。

[3)]在 40 mm x 40 mm x 1.5 mm 环氧树脂印刷电路板 FR4 上器件，具有 6 cm2（一层，70 µm 厚）铜区域用于漏极连接。印刷电路板在静止空气中是垂直的。

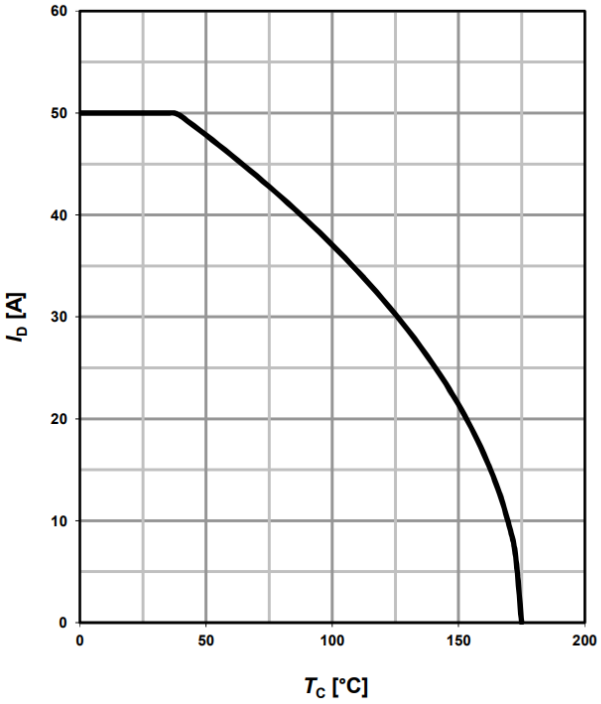
1 功率耗散

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



2 漏极电流

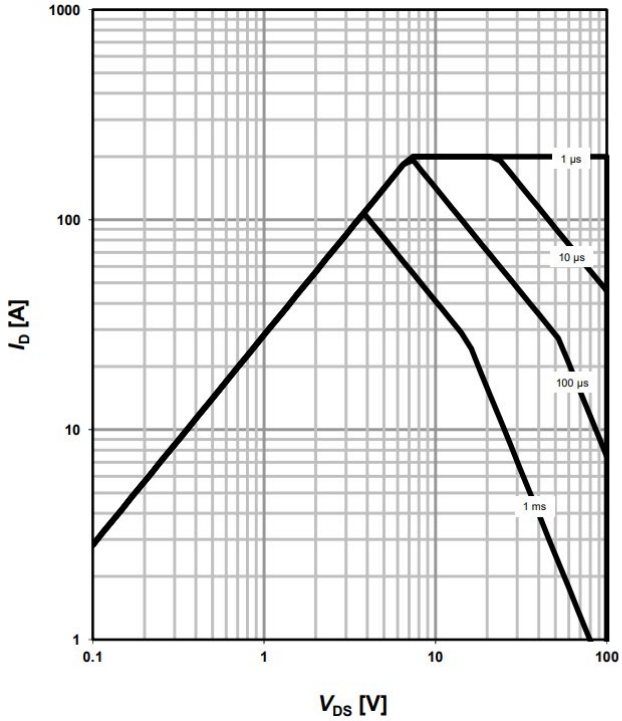
$I_D = f(T_C)$; $V_{GS} \geq 6$ V; SMD



3 安全工作区

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

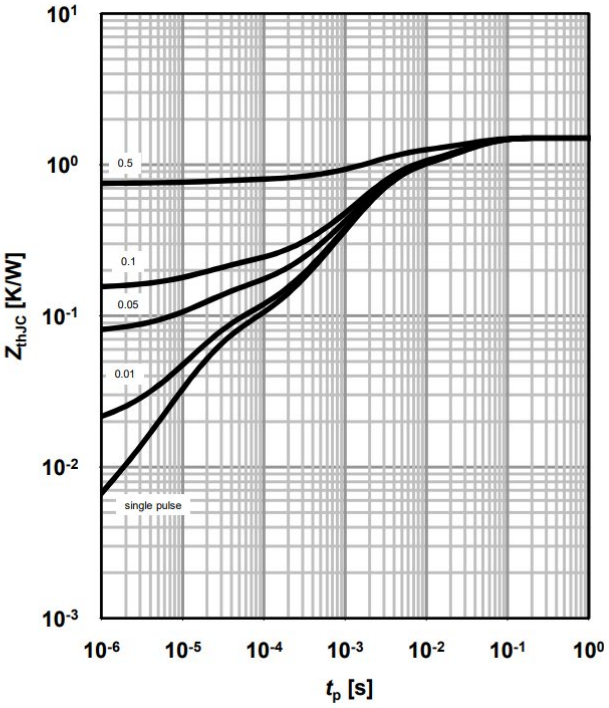
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

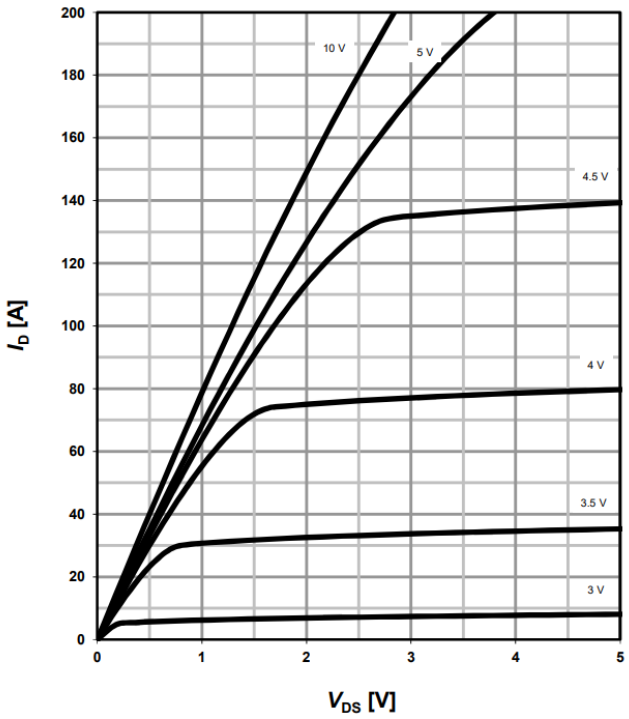
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C; SMD

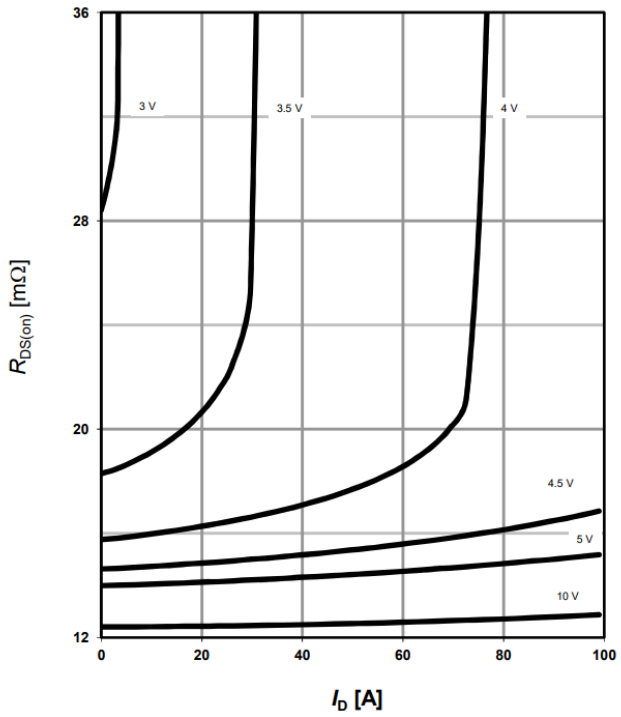
parameter: V_{GS}



6 典型漏源导通电阻

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

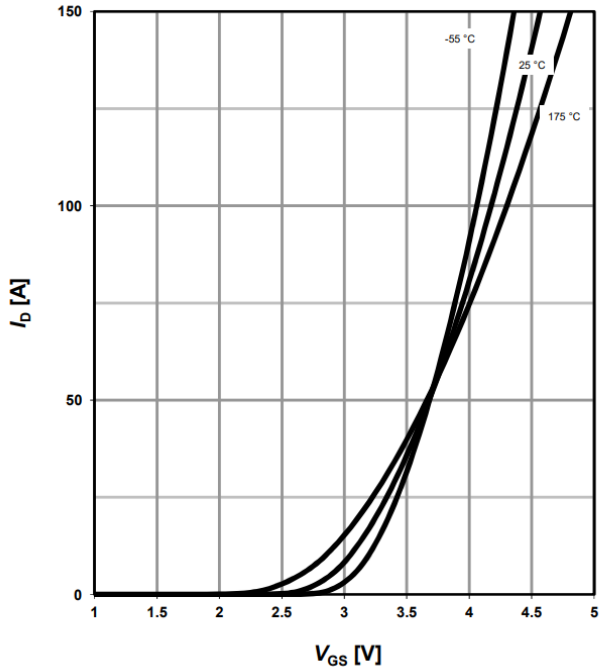
parameter: V_{GS}



7 典型转移特性

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

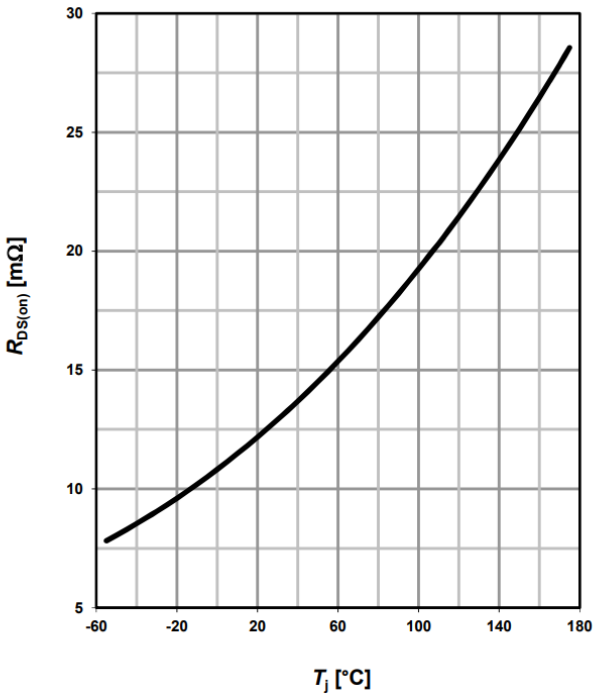
parameter: T_j



8 典型漏源导通电阻

$R_{DS(on)} = f(T_j)$; $I_D = 50$ A; $V_{GS} = 10$ V; SMD

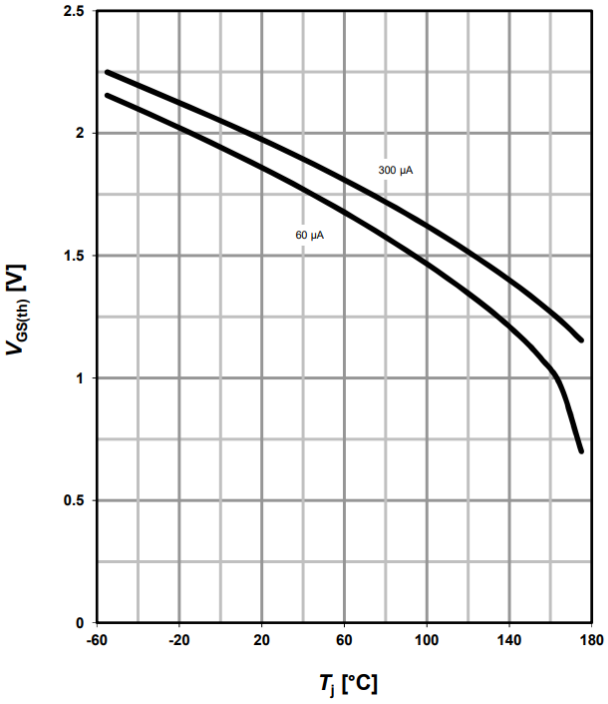
α = 0.56



9 典型栅极阈值电压

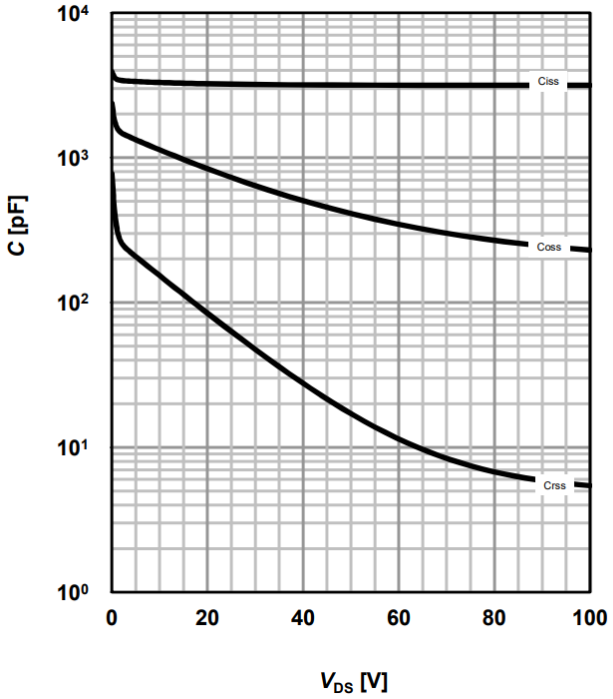
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

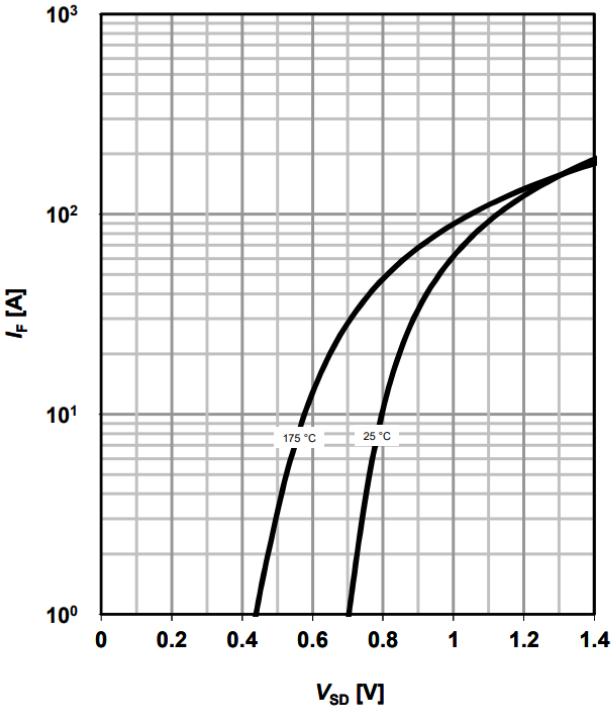
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

$I_F = f(V_{SD})$

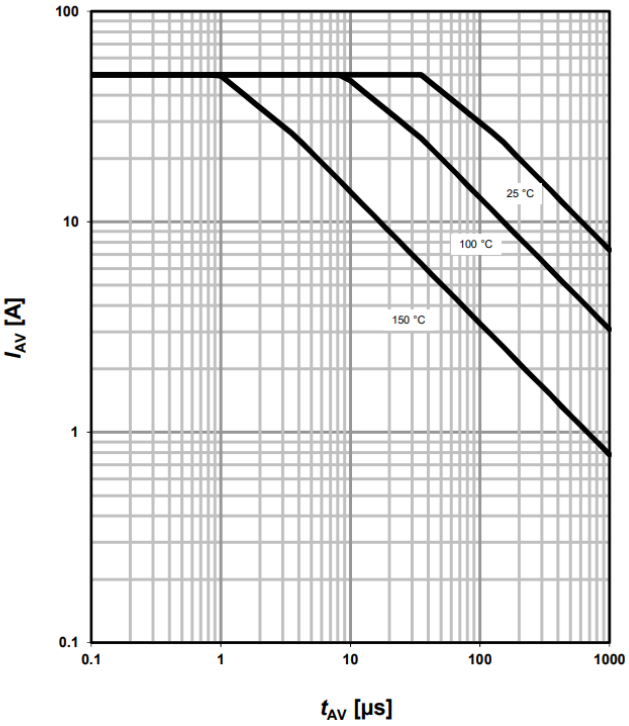
parameter: T_j



12 典型雪崩特性

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

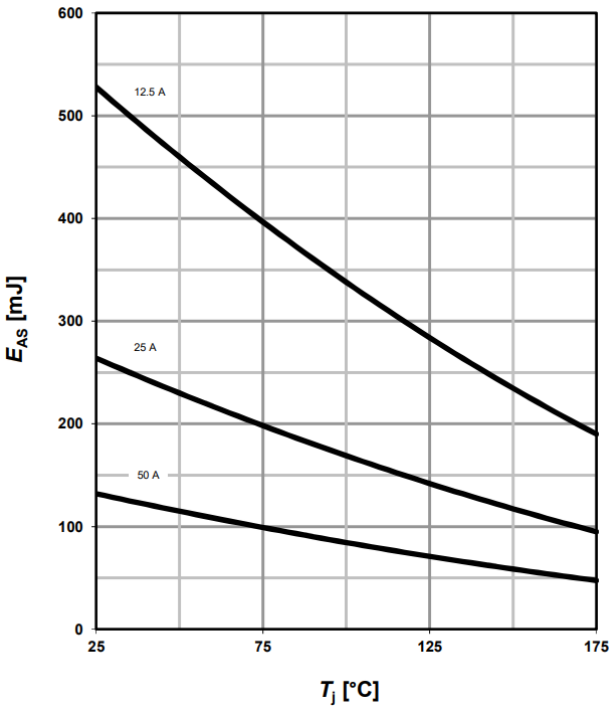
parameter: $T_{j(start)}$



13 典型雪崩能量

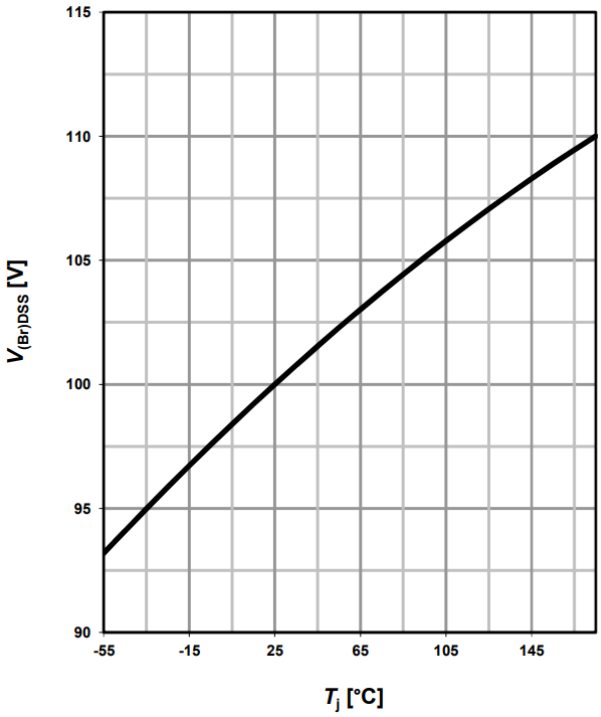
$E_{AS} = f(T_j)$

parameter: I_D



14 典型漏源击穿电压

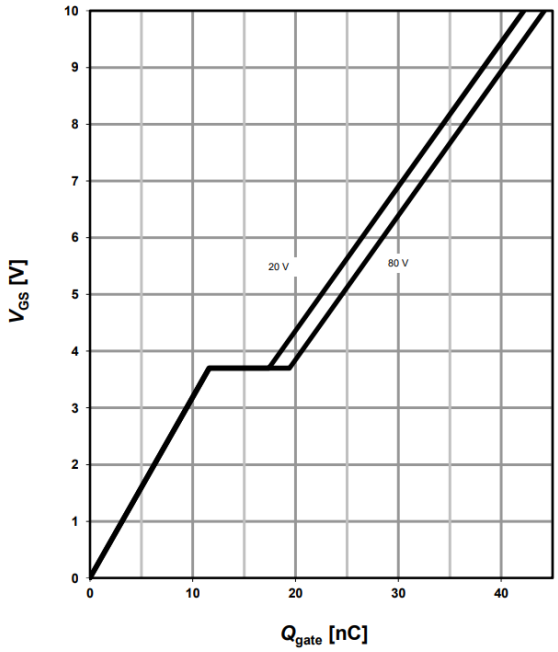
$V_{(Br)DSS} = f(T_j)$; $I_D = 1$ mA



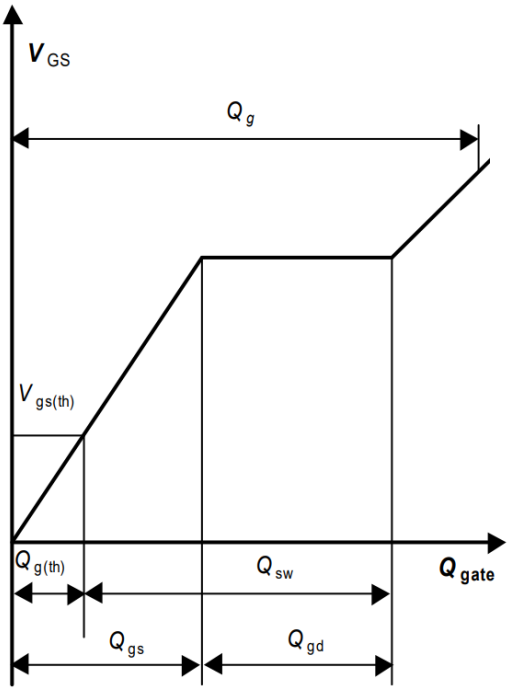
15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; $I_D = 50$ A pulsed

parameter: V_{DD}



16 栅极充电波形



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修订记录

Version	Date	Changes
Rev 1.1	2008-04-09	Page 1: E_{AS} changed from 264mJ to 330mJ
		Page 1: V_{GS} changed from ±16V to ±20V
		Page 3: Footnote [2)] added
Rev 1.2	2023-06-15	Diagram 8 Typ. drain-source on-state resistance: used α value clarified
Rev 1.2	2023-06-15	Ratings of Gate Source Voltage V_{GS} refined in footnote [2)]
Rev 1.2	2023-06-15	Corrected diagram 3 safe operating area
Rev 1.2	2023-06-15	Corrected diagram 10 typical capacitances

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