

英飞凌40V 175°C N沟道

增强型OptiMOS®-T2 功率晶体管



产品概述

V_{DS}	40	V
$R_{DS(on),max}$	1.7	mΩ
I_D	120	A

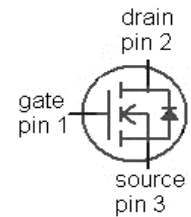
特性

- N沟道-逻辑电平-增强模式
- 符合 AEC-Q100
- 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

PG-T0263-3-2



Type	Package	Marking
IPB120N04S4L-02	PG-T0263-3	4N04L02



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	$T_c=25^\circ\text{C}, V_{GS}=10\text{V}$	120	A
		$T_c=100^\circ\text{C}, V_{GS}=10\text{V}^{2)}$	120	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_c=25^\circ\text{C}$	480	
Avalanche energy, single pulse ²⁾	E_{AS}	$I_D=60\text{A}$	480	mJ
Avalanche current, single pulse	I_{AS}	-	120	A
Gate source voltage	V_{GS}	-	+20/-16	V
Power dissipation	P_{tot}	$T_c=25^\circ\text{C}$	158	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）。

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}	-	-	-	0.95	K/W
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除非另有规定，否则均为 $T_j=25^\circ\text{C}$ 的电气特性。

静态参数特性

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	40	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=110\mu A$	1.2	1.7	2.2	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=40V, V_{GS}=0V$	-	0.05	1	μA
		$V_{DS}=18V, V_{GS}=0V,$ $T_j=85^\circ\text{C}^{2)}$	-	1	20	
Gate-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=50A$	-	1.9	2.3	m Ω
		$V_{GS}=10V, I_D=100A$	-	1.4	1.7	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

动态参数特性²⁾

Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V,$ $f=1MHz$	-	11200	14560	pF
Output capacitance	C_{oss}		-	1900	2470	
Reverse transfer capacitance	C_{rss}		-	95	220	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V,$ $I_D=120A, R_G=3.5\Omega$	-	16	-	ns
Rise time	t_r		-	16	-	
Turn-off delay time	$t_{d(off)}$		-	80	-	
Fall time	t_f		-	70	-	

栅极电荷特性²⁾

Gate to source charge	Q_{gs}	$V_{DD}=32V, I_D=120A,$ $V_{GS}=0 \text{ to } 10V$	-	32	42	nC
Gate to drain charge	Q_{gd}		-	16	37	
Gate charge total	Q_g		-	143	190	
Gate plateau voltage	$V_{plateau}$		-	2.9	-	V

体内寄生反向二极管

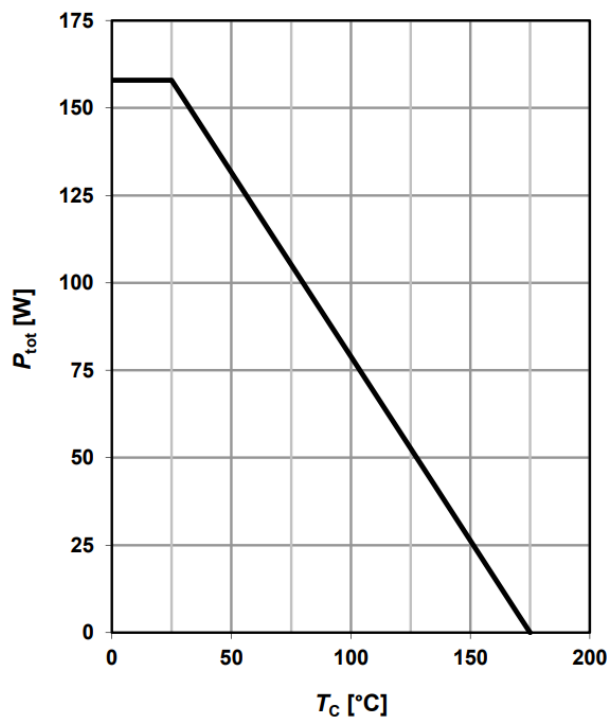
Diode continuous forward current ²⁾	I_s	$T_C=25^\circ C$	-	-	120	A
Diode pulse current ²⁾	$I_{S,pulse}$		-	-	480	
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=100A,$ $T_j=25^\circ C$	-	0.9	1.3	V
Reverse recovery time ²⁾	t_{rr}	$V_R=20V, I_F=50A,$ $di_F/dt=100A/\mu s$	-	65	-	ns
Reverse recovery charge ²⁾	Q_{rr}		-	85	-	nC

¹⁾ 电流受封装限制；当 $R_{thJC} = 0.95 \text{ K/W}$ 时，该芯片在 $25^\circ C$ 时能够承载 290 A。

²⁾ 由设计标定，不受限于生产测试。

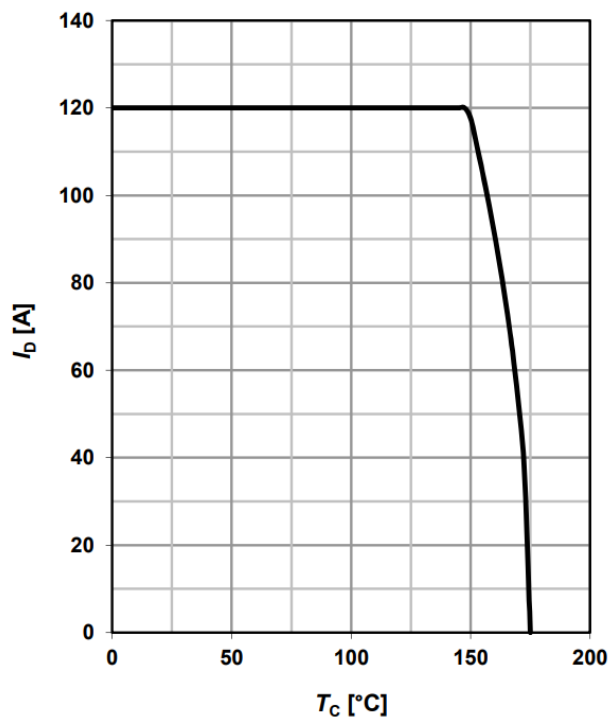
1 功率耗散

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



2 漏极电流

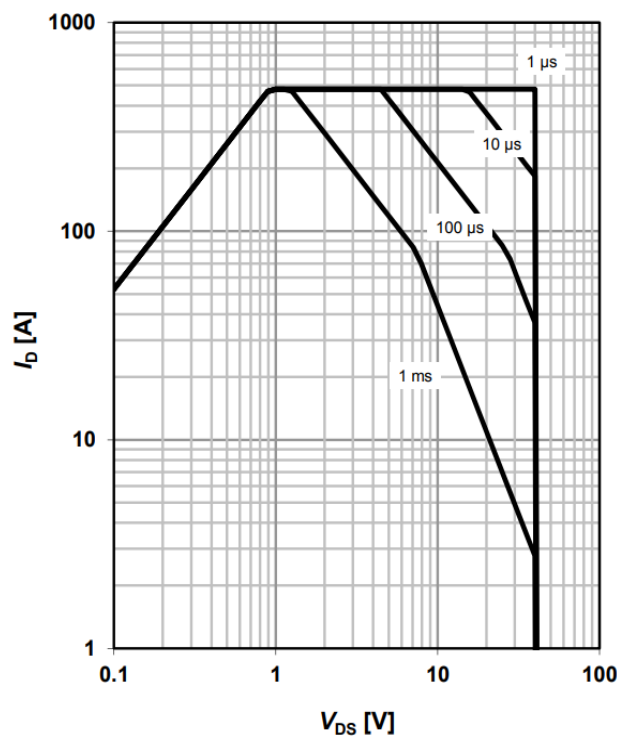
$$I_D = f(T_C); V_{\text{GS}} \geq 6 \text{ V}$$



3 安全工作区

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

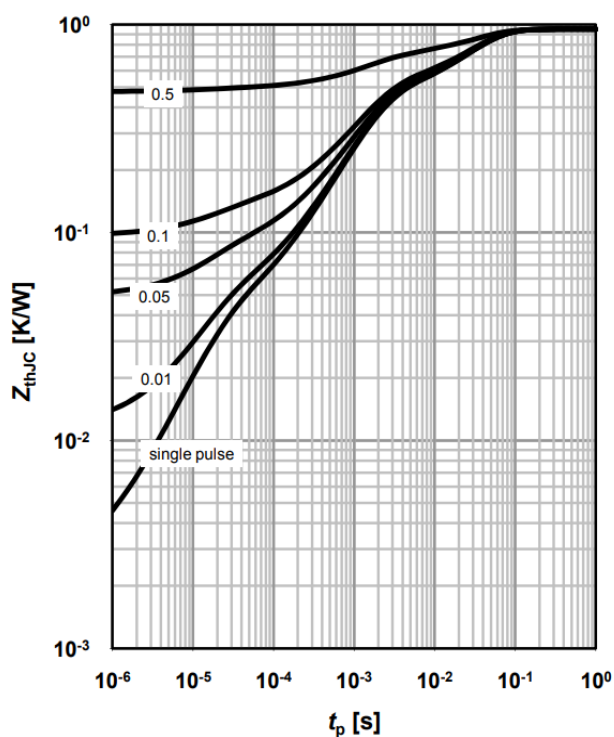
parameter: t_p



4 最大瞬态热阻抗

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

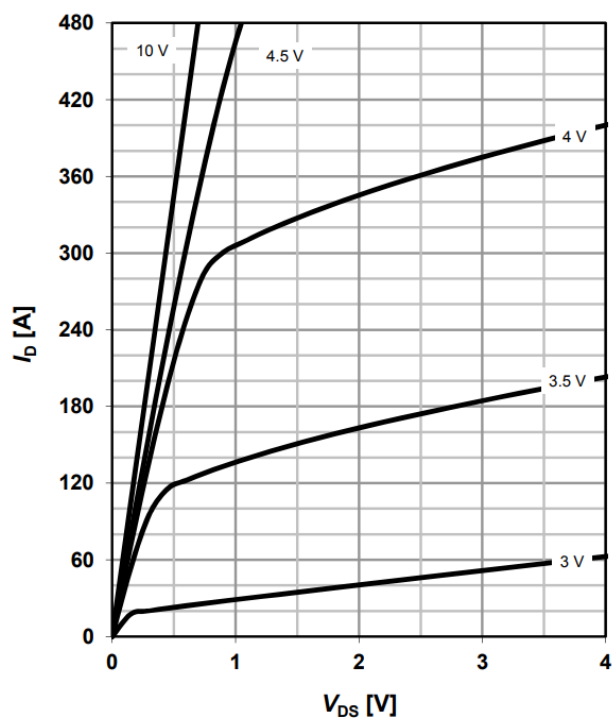
parameter: $D = t_p/T$



5 典型输出特性

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

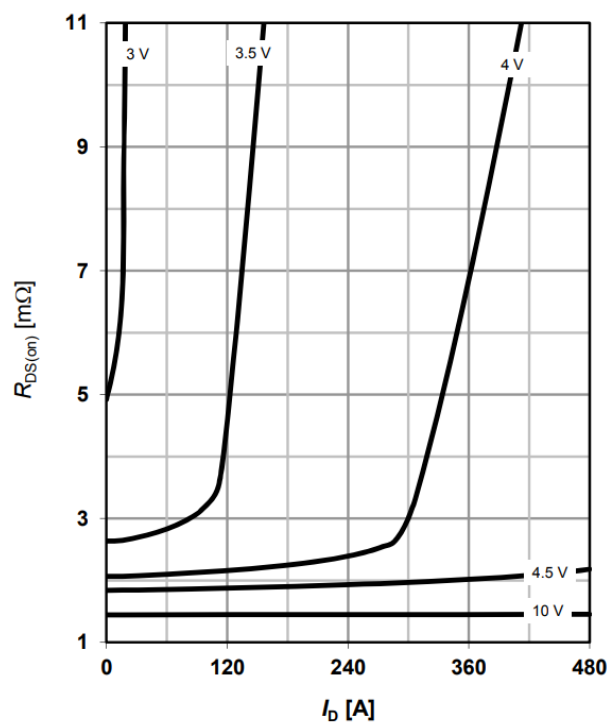
parameter: V_{GS}



6 典型漏源导通电阻

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

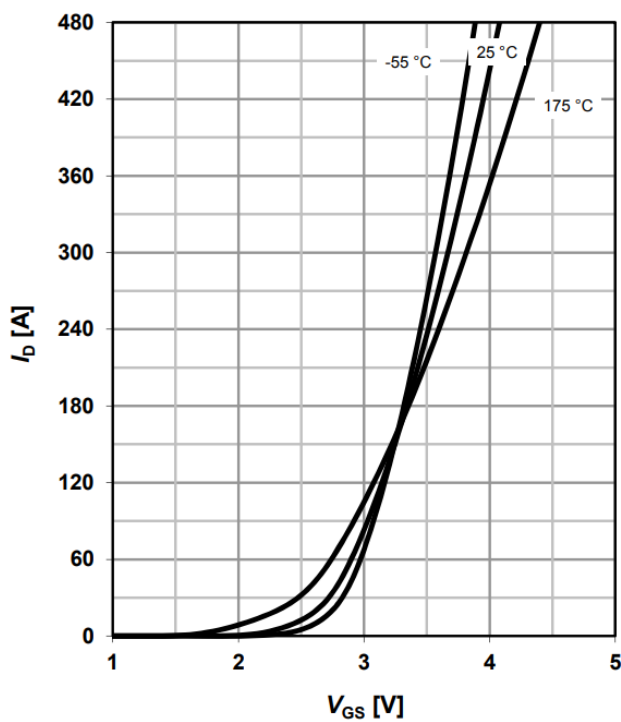
parameter: V_{GS}



7 典型转移特性

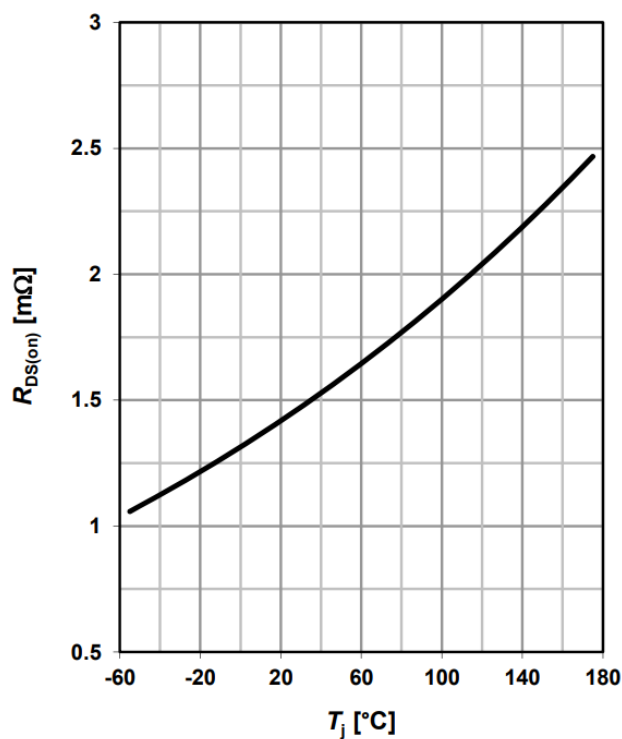
$$I_D = f(V_{GS}); V_{DS} = 6\text{ V}$$

parameter: T_j



8 典型漏源导通电阻

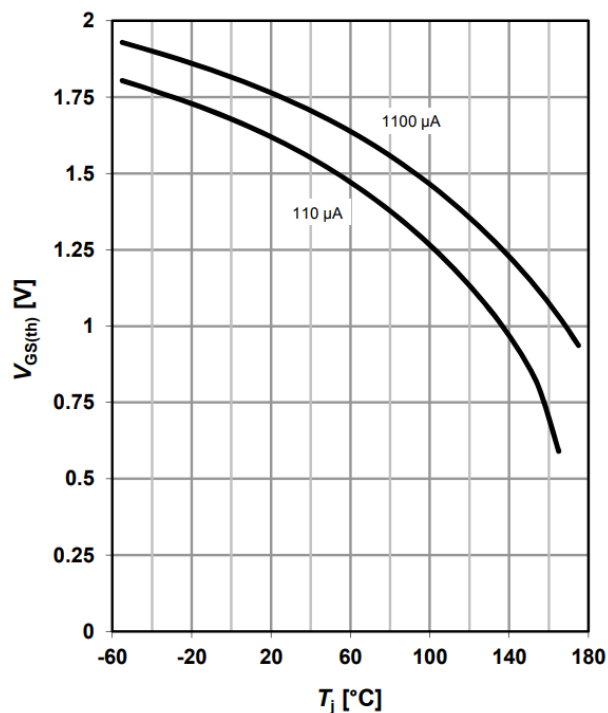
$$R_{DS(on)} = f(T_j); I_D = 100\text{ A}; V_{GS} = 10\text{ V}$$



9 典型栅极阈值电压

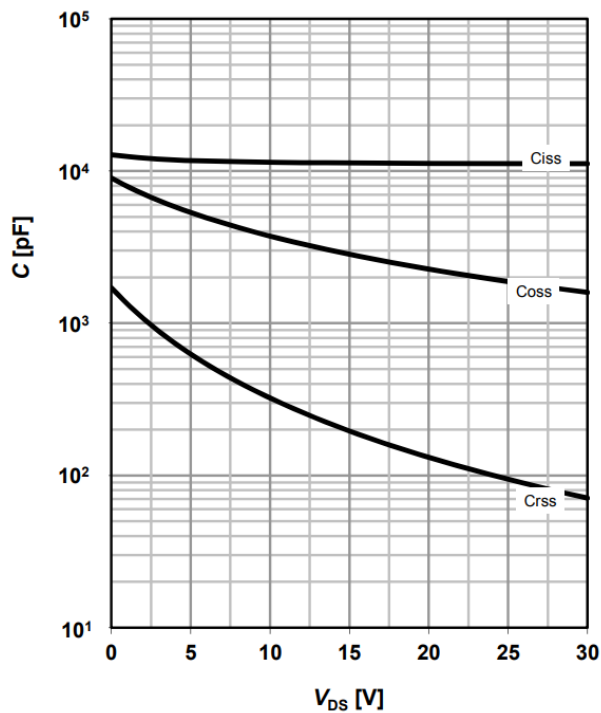
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 典型电容值

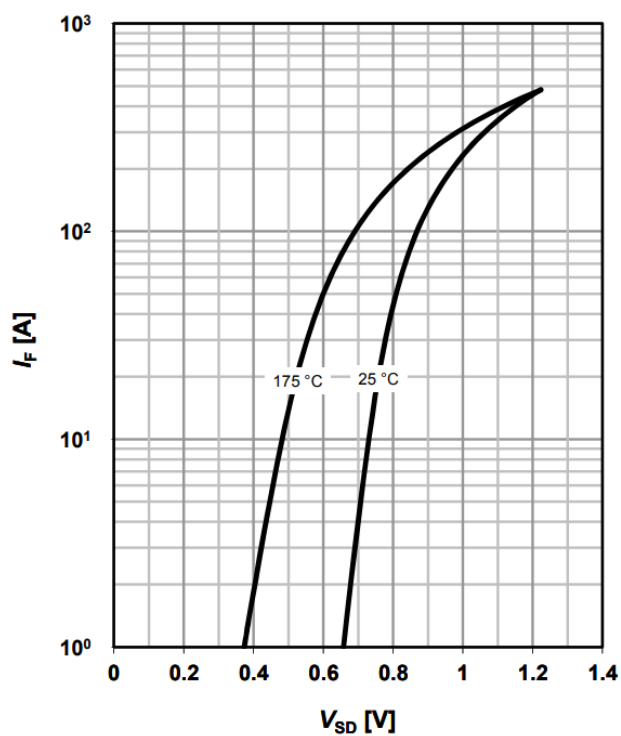
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



11 典型二极管正向导通特性

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

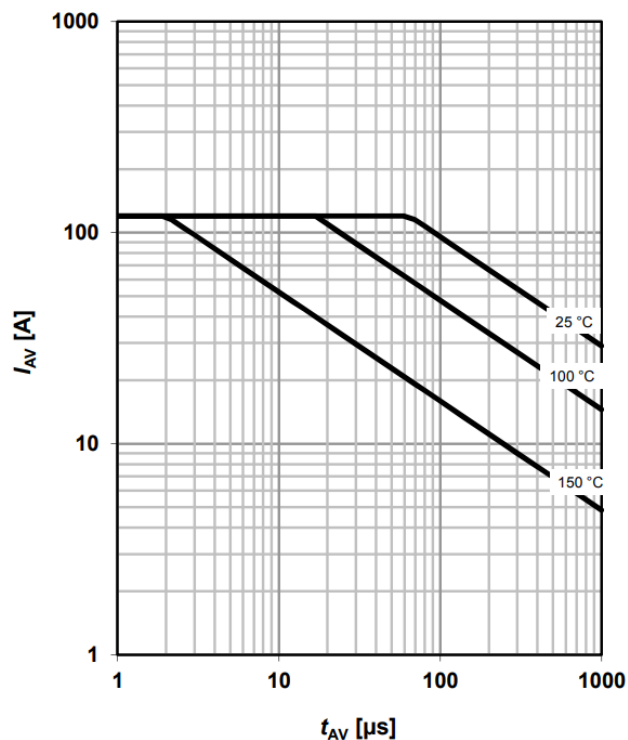
parameter: T_j



12 典型雪崩特性

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

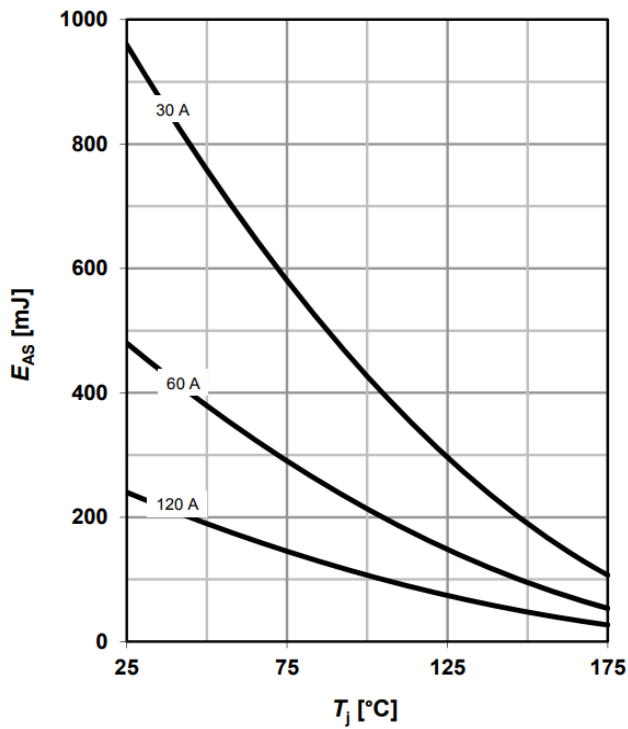
parameter: $T_{j(start)}$



13 典型雪崩能量

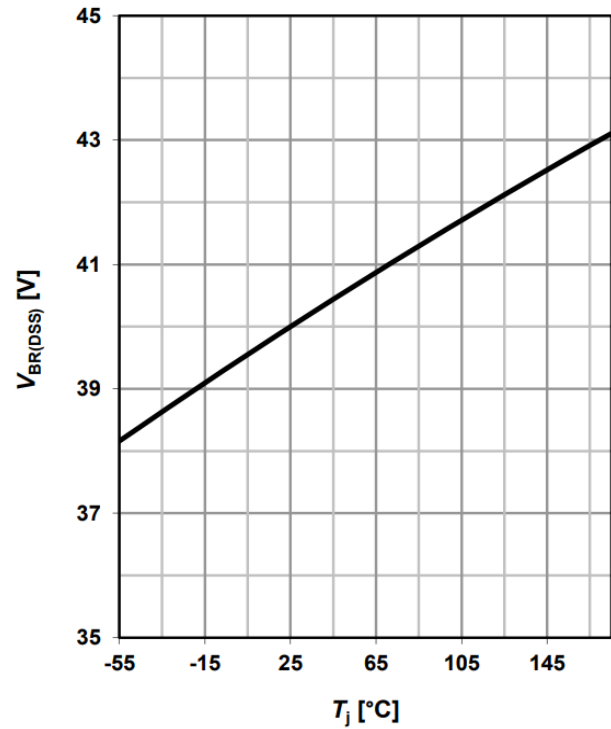
$$E_{AS} = f(T_j)$$

parameter: I_D



14 漏源击穿电压

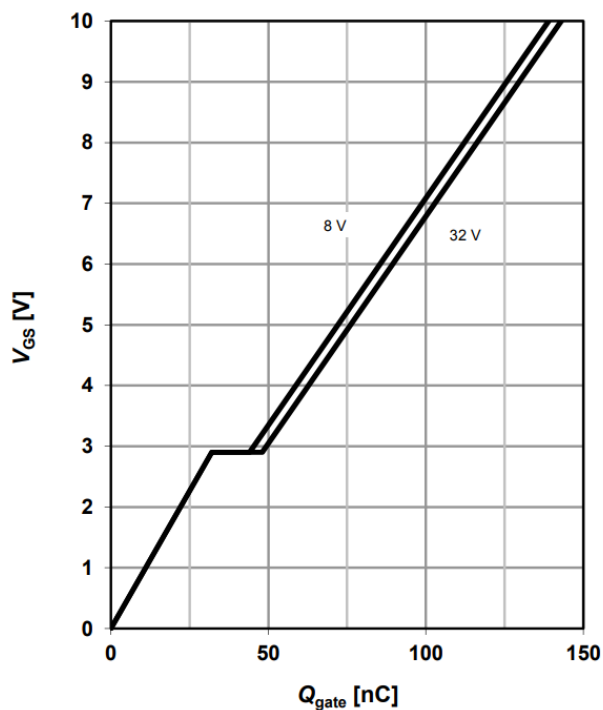
$$V_{BR(DSS)} = f(T_j); I_D = 1 \text{ mA}$$



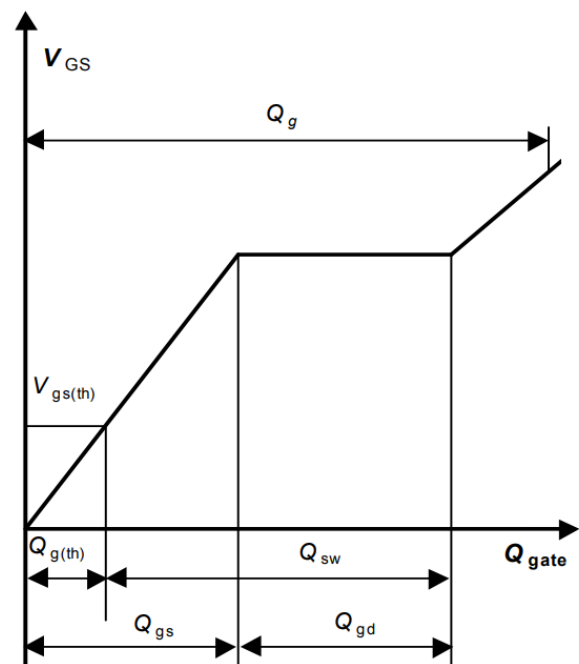
15 典型栅极电荷

$$V_{GS} = f(Q_{gate}); I_D = 120 \text{ A pulsed}$$

parameter: V_{DD}



16 栅极充电波形



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修订记录

Version	Date	Changes
Revision 1.0	03.06.2013	Final Data Sheet



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