英飞凌汽车级40V 175°C N沟道

增强型OptiMOS™ 6 功率晶体管

AEC Qualified

RoHS

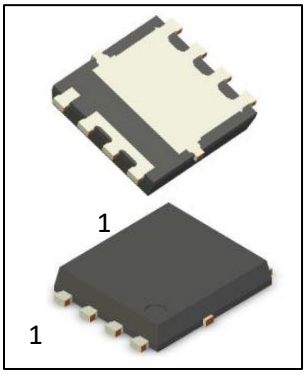
产品概述

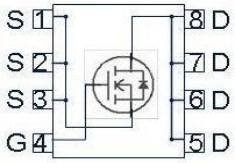
V_{DS}	40	V
$R_{DS(on),max}$	1.3	mΩ
I_D	120	A

特点

- 适用于汽车应用的功率MOSFET
- N 沟道 - 增强型 - 标准电平
- 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

PG-TDSON-8





Type	Package	Marking
IAUC120N04S6N013	PG-TDSON-8	6N04N013

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	120	A
		T_C=25°C, V_{GS}=10V[2,3]	150	
		T_C=100°C, V_{GS}=10V[2]	120	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25°C	480	
Avalanche energy, single pulse[2]	E_{AS}	I_D=60A, $R_{G,min}$=25Ω	184	mJ
Avalanche current, single pulse	I_{AS}	$R_{G,min}$=25Ω	60	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	T_C=25°C	115	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	°C

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Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

热特性[2)]

Thermal resistance, junction - case	R_{thJC}	-	-	-	1.3	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm² cooling area[4)]	-	-	50	

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	40	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=60µA	2.2	2.6	3.0	
Zero gate voltage drain current	I_{DSS}	V_{DS}=40V, V_{GS}=0V, T_j=25°C	-	-	1	µA
		V_{DS}=40V, V_{GS}=0V, T_j=125°C[2)]	-	-	15	
Gate-source leakage current	I_{GSS}	V_{GS}=20V, V_{DS}=0V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=7V, I_D=60A	-	1.21	1.90	mΩ
		V_{GS}=10V, I_D=60A	-	1.02	1.34	

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	-	3277	4260	pF
Output capacitance	C_{oss}		-	1001	1301	
Reverse transfer capacitance	C_{rss}		-	44	66	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, I_D=120A, R_G=3.5Ω	-	6	-	ns
Rise time	t_r		-	3	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Fall time	t_f		-	7	-	
栅极电荷特性[2)]						
Gate to source charge	Q_{gs}	V_{DD}=32V, I_D=120A, V_{GS}=0 to 10V	-	14	19	nC
Gate to drain charge	Q_{gd}		-	10	15	
Gate charge total	Q_g		-	51	68	
Gate plateau voltage	$V_{plateau}$		-	4.3	-	V
反向二极管						
Diode continous forward current[2)]	I_S	T_C=25°C	-	-	120	A
Diode pulse current[2)]	$I_{S,pulse}$		-	-	480	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=60A, T_j=25°C	-	0.8	1.1	V
Reverse recovery time[2)]	t_{rr}	V_R=20V, I_F=50A, di_F/dt=50A/µs	-	49	-	ns
Reverse recovery charge[2)]	Q_{rr}		-	49	-	nC

[1)]电流受封装限制；当R_{thJC} = 1.3 K/W时，该芯片在25°C时能够承载 218 A。

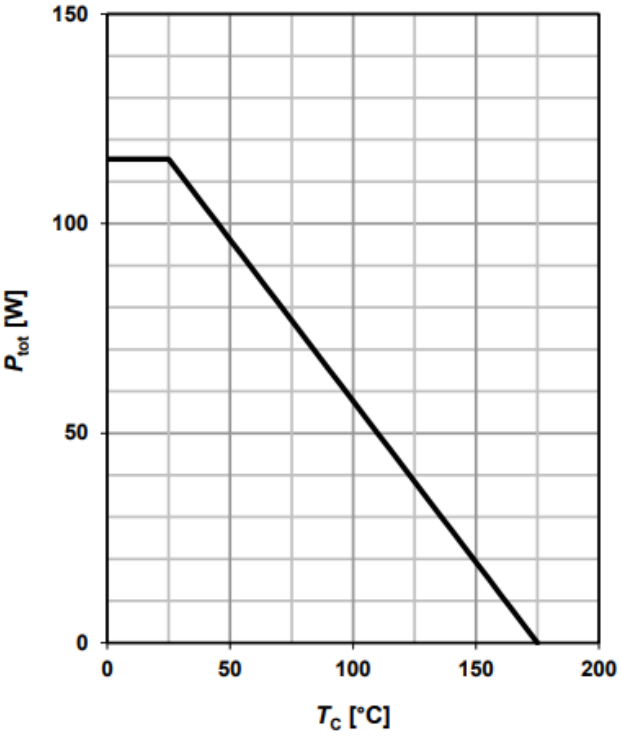
[2)]这些参数不经过生产测试，但经过设计和/或特性验证。

[3)] 产品可在电流 I_D =150A 下运行，T_c =25 °C 时最长运行时间 t=100h

[4)] 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。

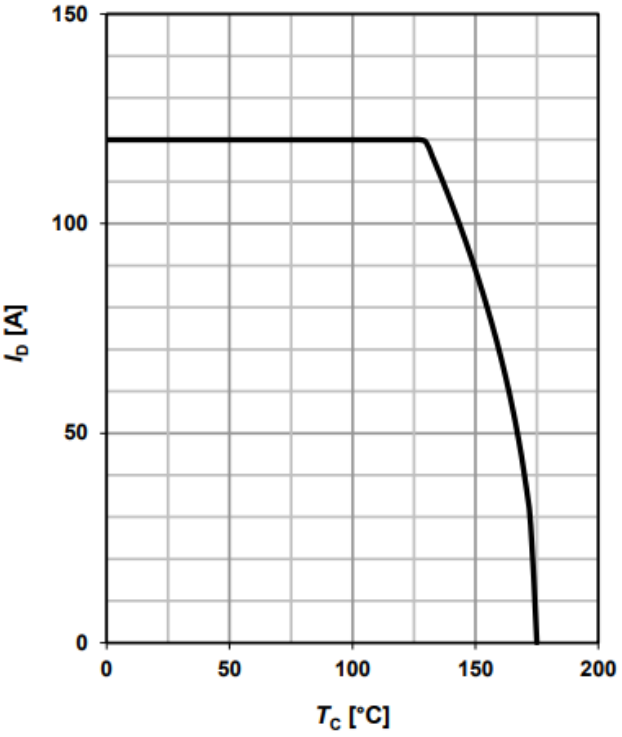
1 功率耗散

$P_{tot} = f(T_C)$; $V_{GS} = 10$ V



2 漏极电流

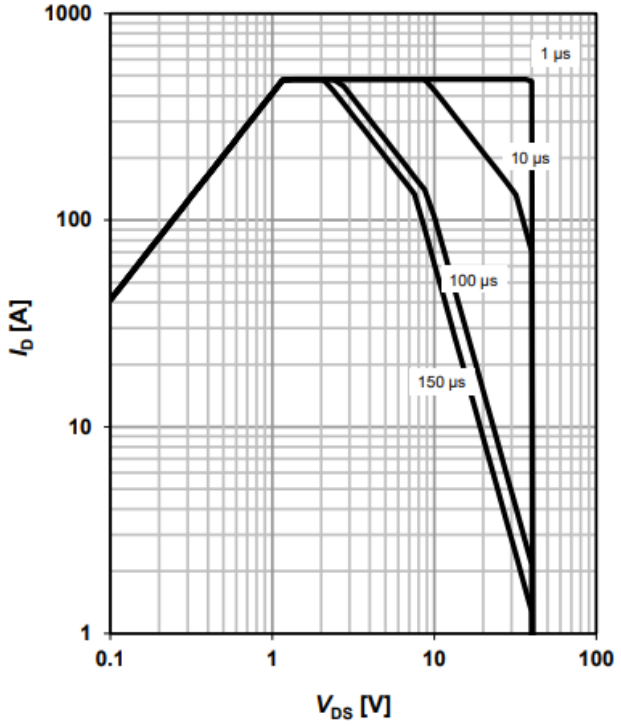
$I_D = f(T_C)$; $V_{GS} = 10$ V



3 安全工作区

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

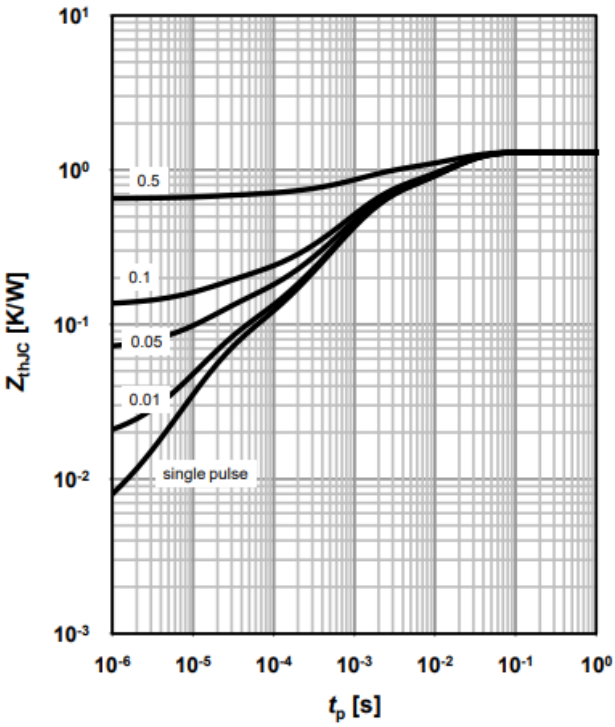
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

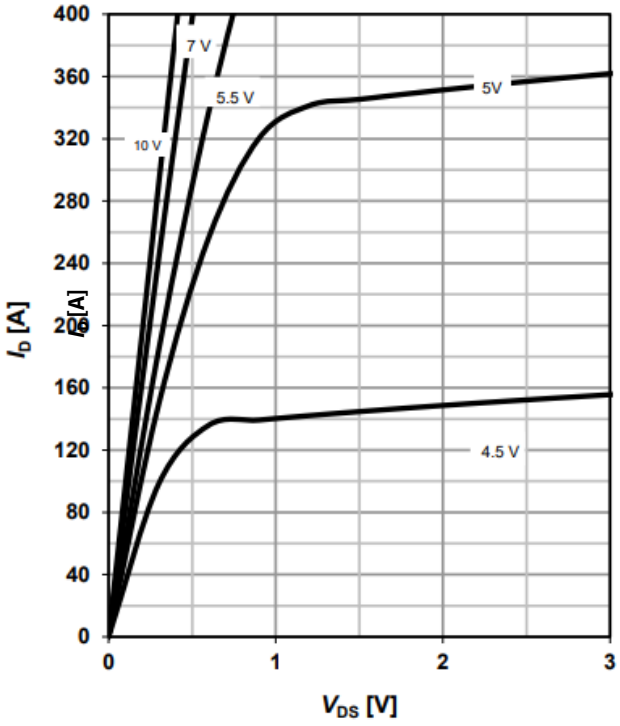
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C

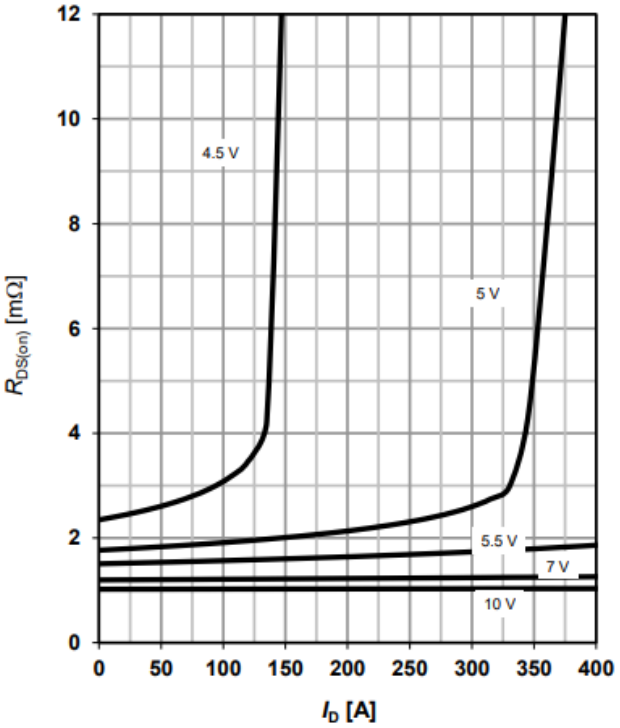
parameter: V_{GS}



6 典型漏源导通电阻

$R_{DS(on)} = f(I_D)$; $T_j = 25$ °C

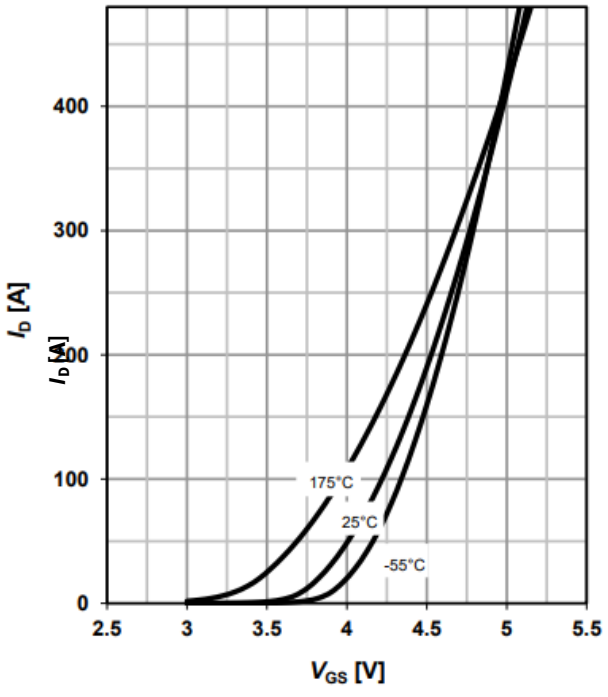
parameter: V_{GS}



7 典型转移特性

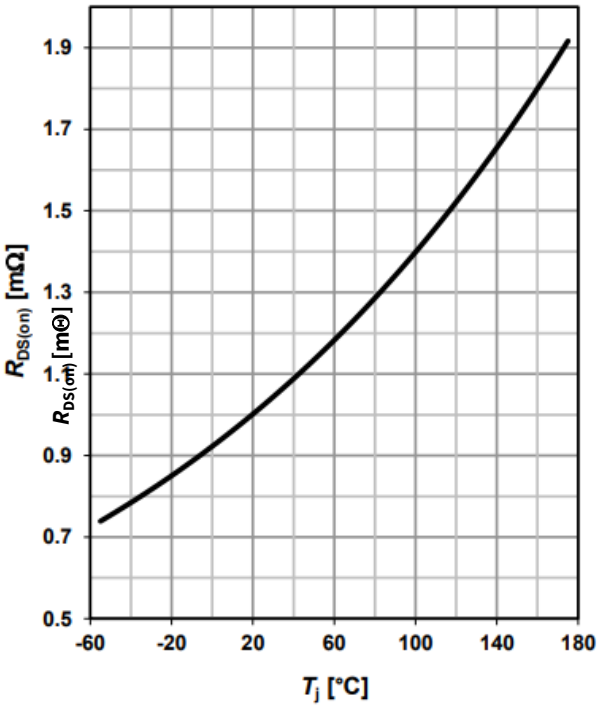
$I_D = f(V_{GS})$; $V_{DS} = 6$V

parameter: T_j



8 典型漏源导通电阻

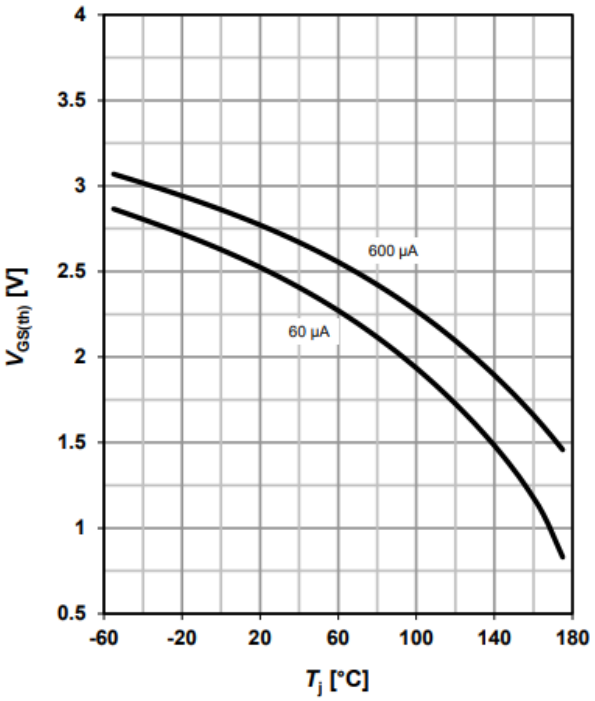
$R_{DS(on)} = f(T_j)$; $I_D = 60$ A; $V_{GS} = 10$ V



9 典型栅极阈值电压

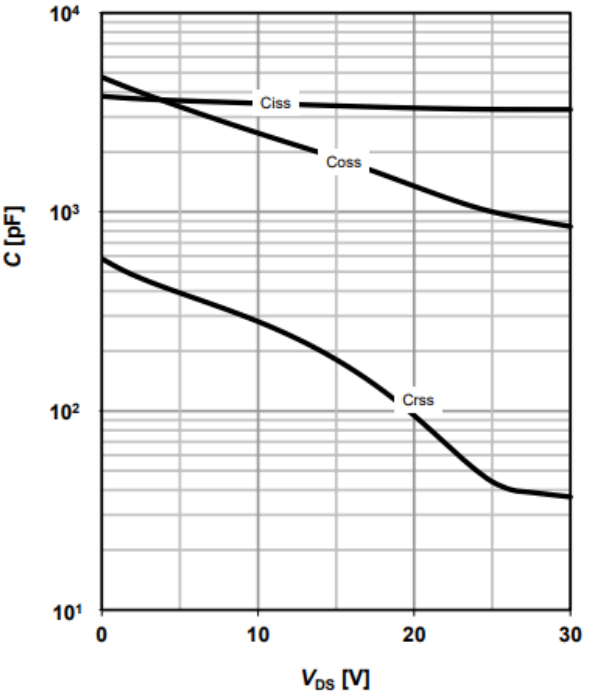
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

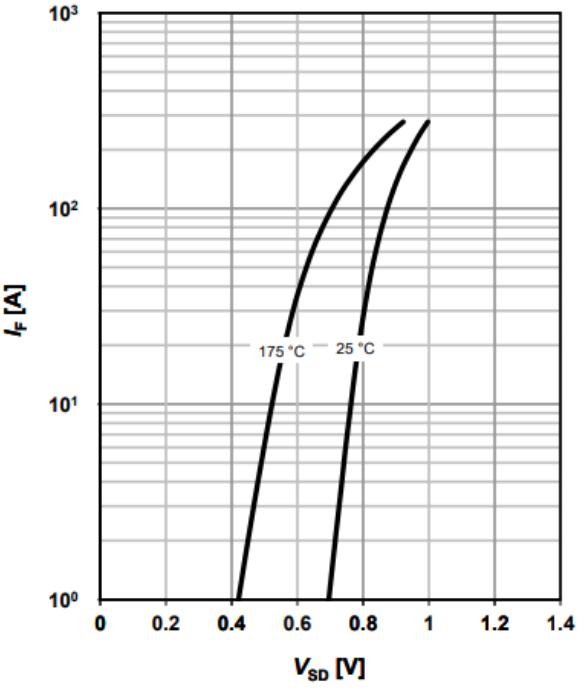
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

IF = f(V_{SD})

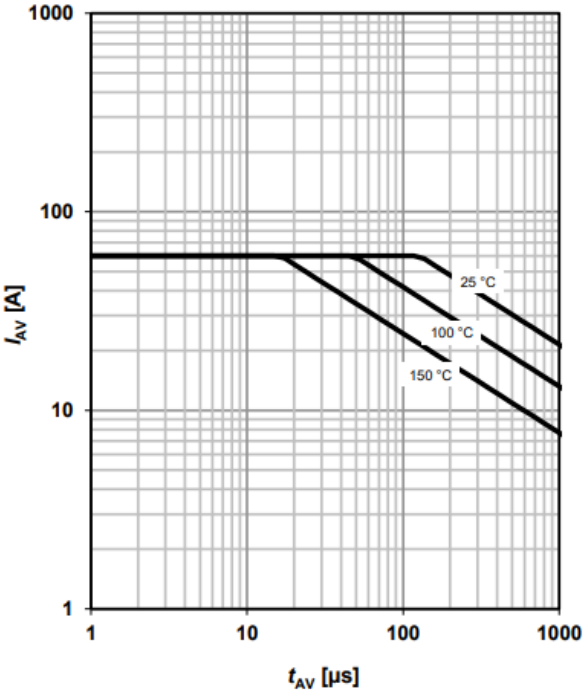
parameter: T_j



12 典型雪崩特性

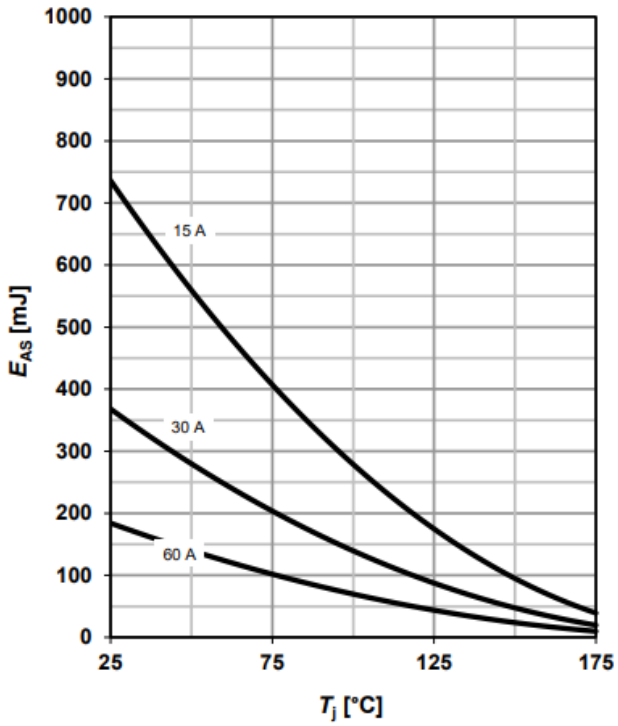
$I_{AS} = f(t_{AV})$

parameter: $T_{j(start)}$



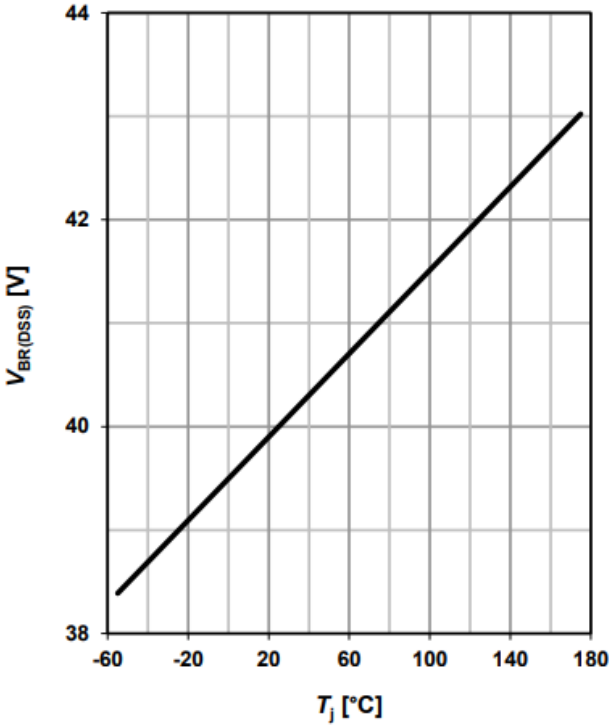
13 典型雪崩能量

$E_{AS} = f(T_j)$



14 漏源击穿电压

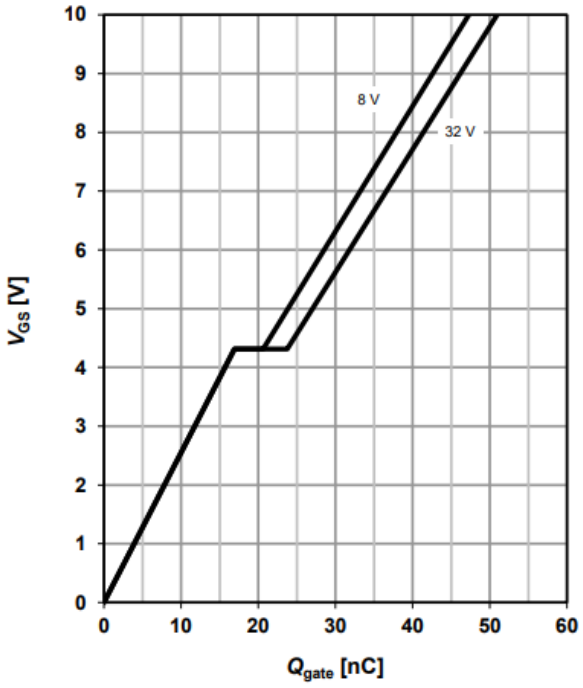
$V_{BR(DSS)} = f(T_j)$; I_D = 1 mA



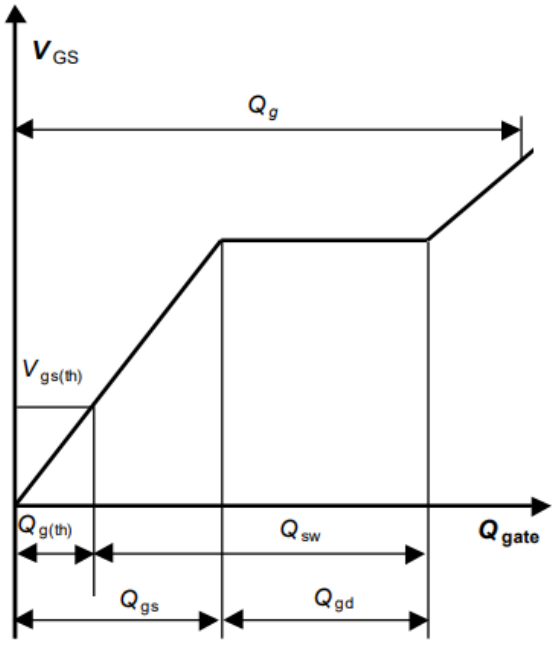
15 典型栅极电荷

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

parameter: V_{DD}



16 栅极充电波形



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Version	Date	Changes

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