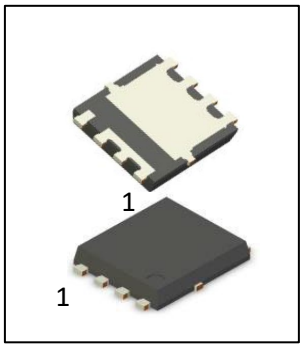
英飞凌40V 175°C N沟道增强型

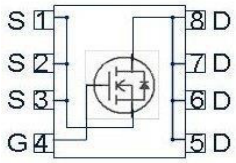
OptiMOS™ 5 功率晶体管

产品概述

V_{DS}	40	V
$R_{DS(on),max}$	4.6	mΩ
I_D	70	A

PG-TDSON-8-33





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

Type	Package	Marking
IPC70N04S5-4R6	PG-TDSON-8-33	5N044R6

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	70	A
		T_C=100°C, V_{GS}=10V[1]	54	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25°C	280	
Avalanche energy, single pulse[2]	E_{AS}	I_D=35A	32	mJ
Avalanche current, single pulse[4]	I_{AS}	-	70	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	T_C=25°C	50	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}	-	-	-	3.0	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm² cooling area[3)]	-	-	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=17µA	2.2	2.8	3.4	
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[1)]	-	-	100	
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=35A	-	4.7	5.7	mΩ
		V_{GS}=10V, I_D=35A	-	3.9	4.6	

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	-	1100	1430	pF
Output capacitance	C_{oss}		-	310	412	
Reverse transfer capacitance	C_{rss}		-	20	30	
Turn-on delay time	$t_{d(on)}$	V_{DD}=20V, V_{GS}=10V, I_D=70A, $R_{G,ext}$=3.5Ω	-	4	-	ns
Rise time	t_r		-	2	-	
Turn-off delay time	$t_{d(off)}$		-	7	-	
Fall time	t_f		-	3	-	
栅极电荷特性[2)]						
Gate to source charge	Q_{gs}	V_{DD}=32V, I_D=70A, V_{GS}=0 to 10V	-	5.0	6.5	nC
Gate to drain charge	Q_{gd}		-	4.3	6.5	
Gate charge total	Q_g		-	18.2	24.2	
Gate plateau voltage	$V_{plateau}$		-	4.9	-	V
体内寄生反向二极管						
Diode continous forward current[2)]	I_S	T_C=25°C	-	-	70	A
Diode pulse current[2)]	$I_{S,pulse}$		-	-	280	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=35A, T_j=25°C	-	0.8	1.1	V
Reverse recovery time[2)]	t_{rr}	V_R=20V, I_F=50A, di_F/dt=100A/µs	-	32	-	ns
Reverse recovery charge[2)]	Q_{rr}		-	20	-	nC

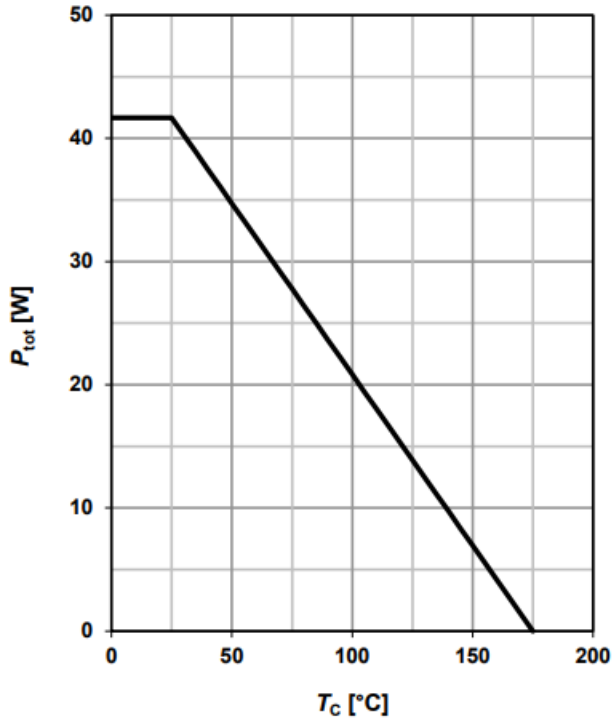
[1)] 电流受封装限制；当 R_{thJC} = 3 K/W 时，该芯片在25°C时能够承载 75 A .
[2)]这些参数不经过生产测试，但经过设计和/或特性验证。

[3)] 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。

[4)]该器件在生产中经过 60 A 雪崩电流测试。

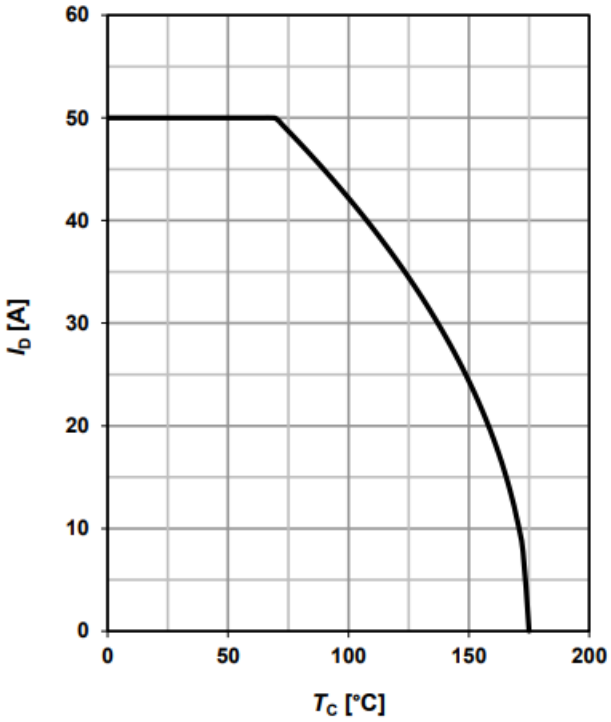
1 功率耗散

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



2 漏极电流

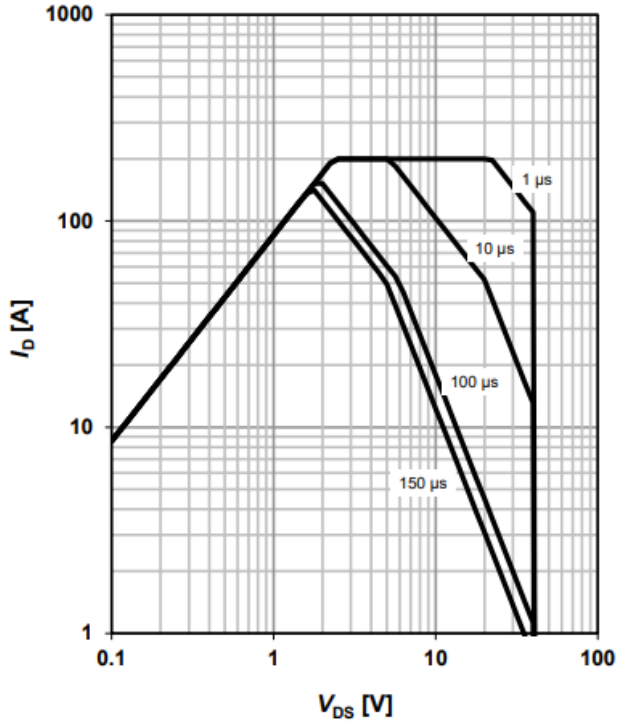
$I_D = f(T_C)$; $V_{GS} = 10$ V



3 安全工作区

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

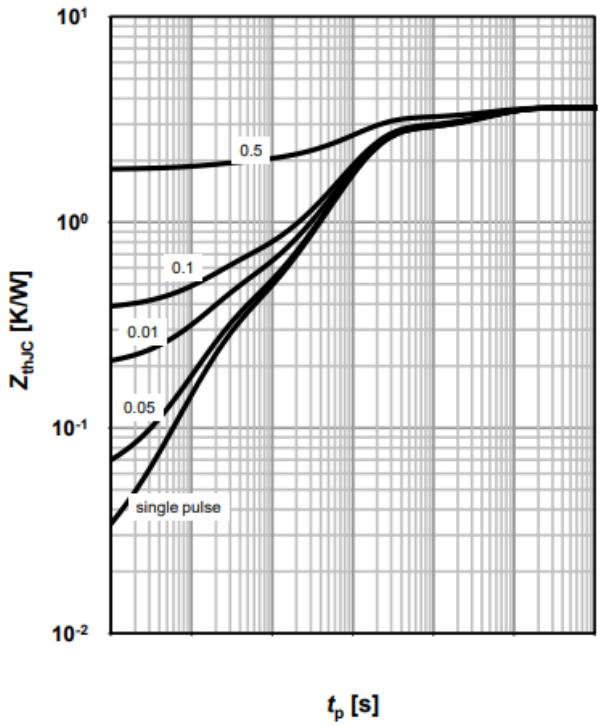
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

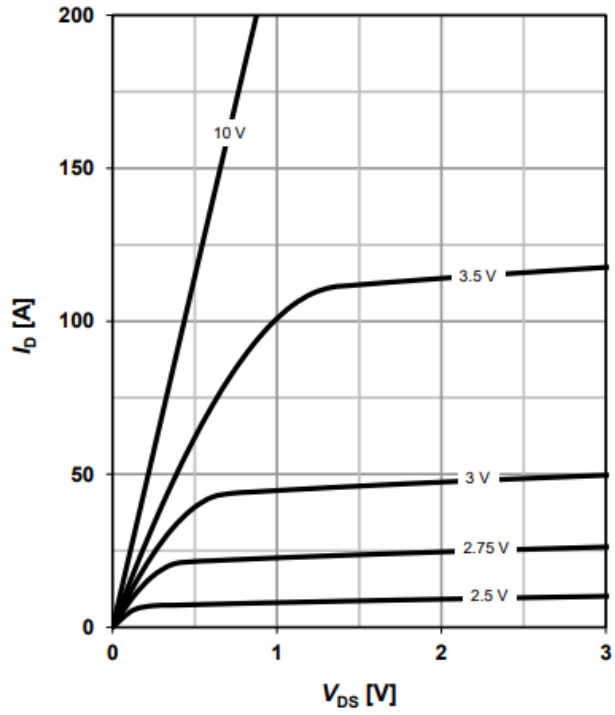
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C

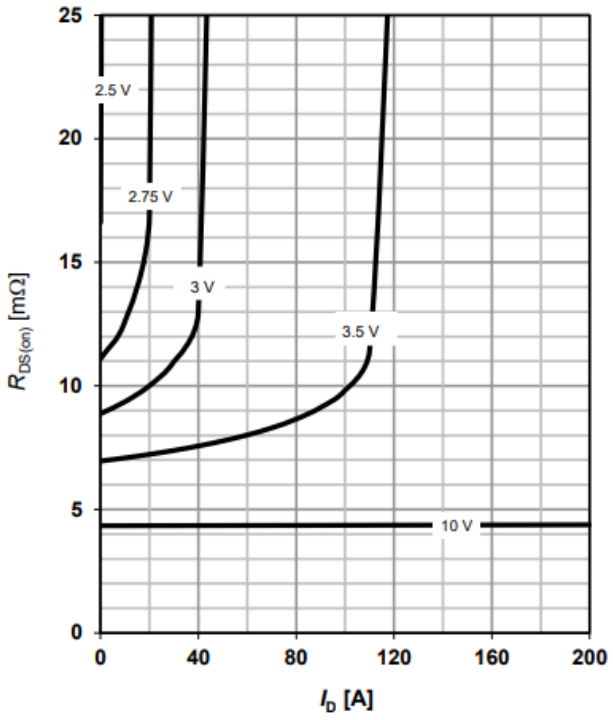
parameter: V_{GS}



6 典型漏源导通电阻

$R_{DS(on)} = f(I_D)$; $T_j = 25$ °C

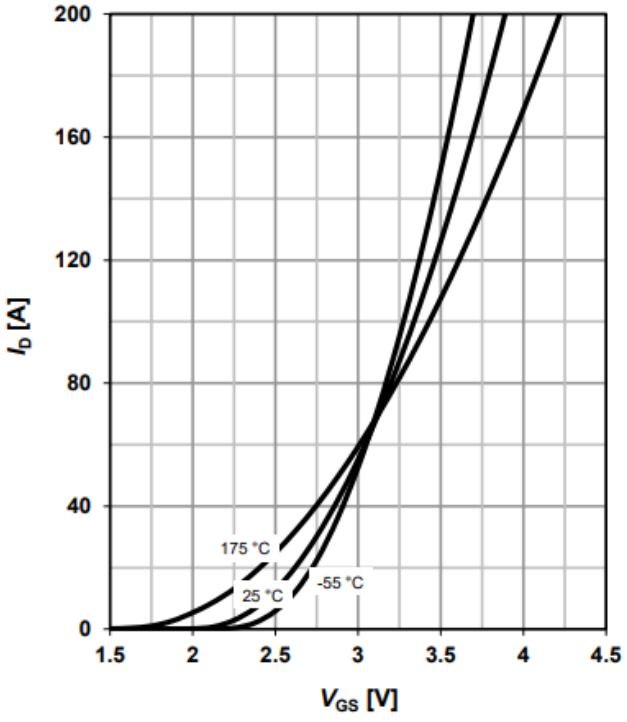
parameter: V_{GS}



7 典型转移特性

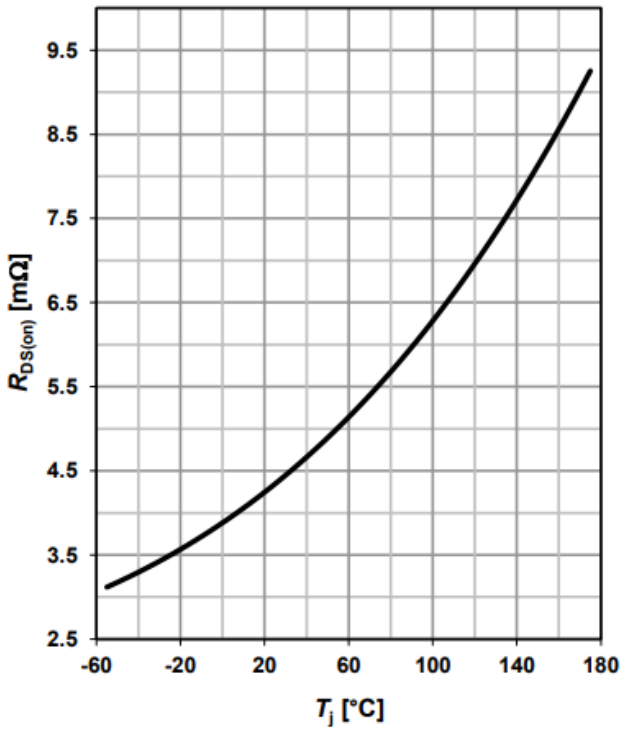
$I_D = f(V_{GS})$; $V_{DS} = 6$V

parameter: T_j



8 典型漏源导通电阻

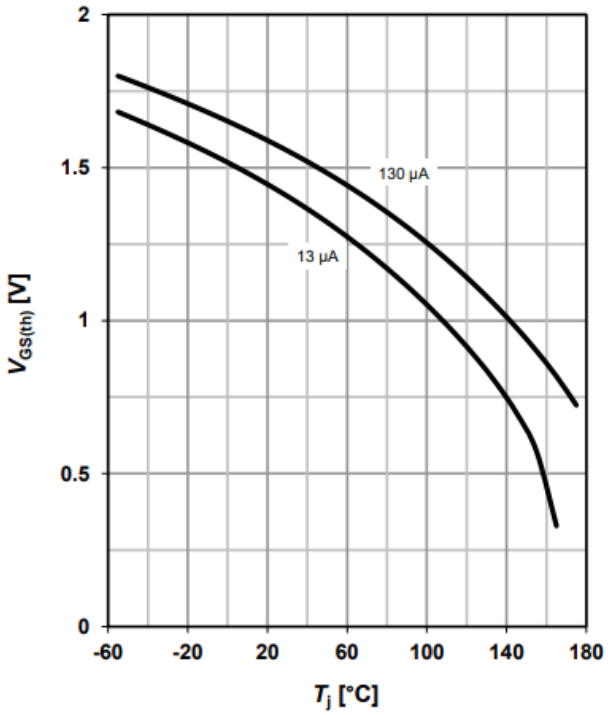
$R_{DS(on)} = f(T_j)$; $I_D = 25$ A; $V_{GS} = 10$ V



9 典型栅极阈值电压

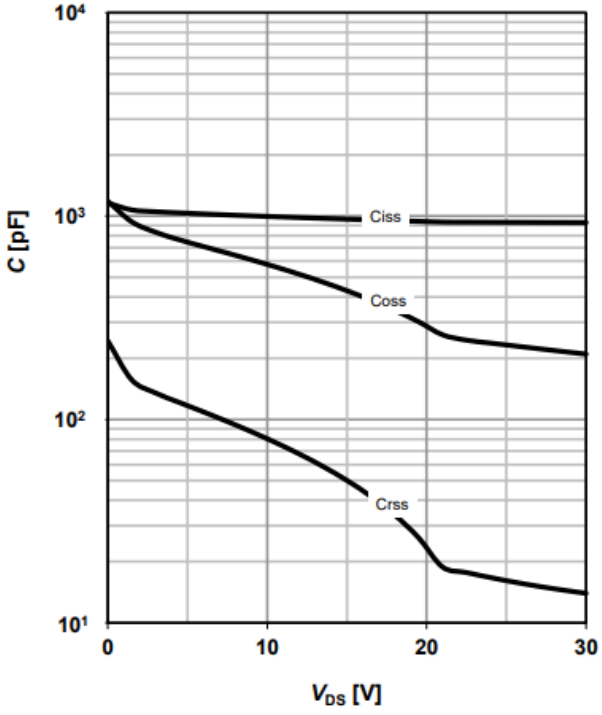
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

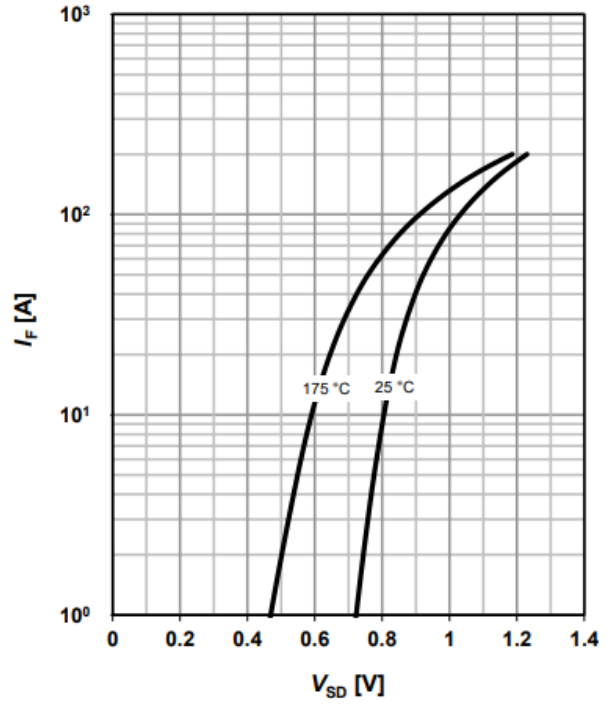
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

$IF = f(V_{SD})$

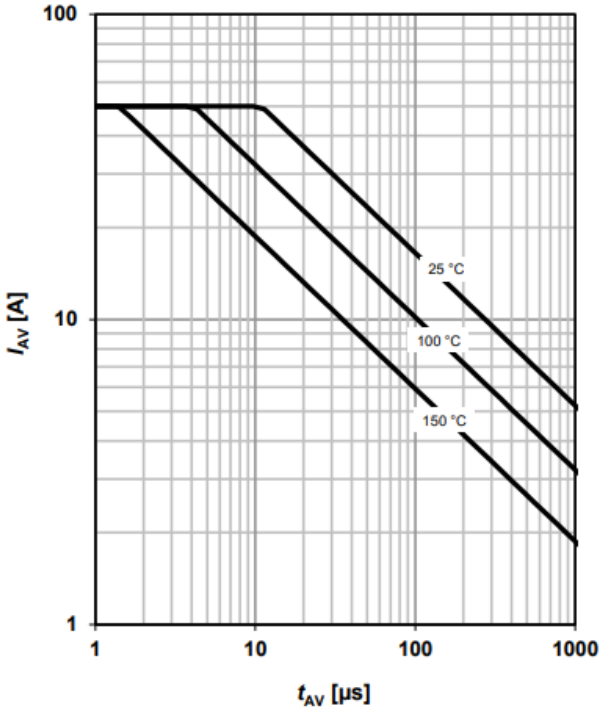
parameter: T_j



12 典型雪崩特性

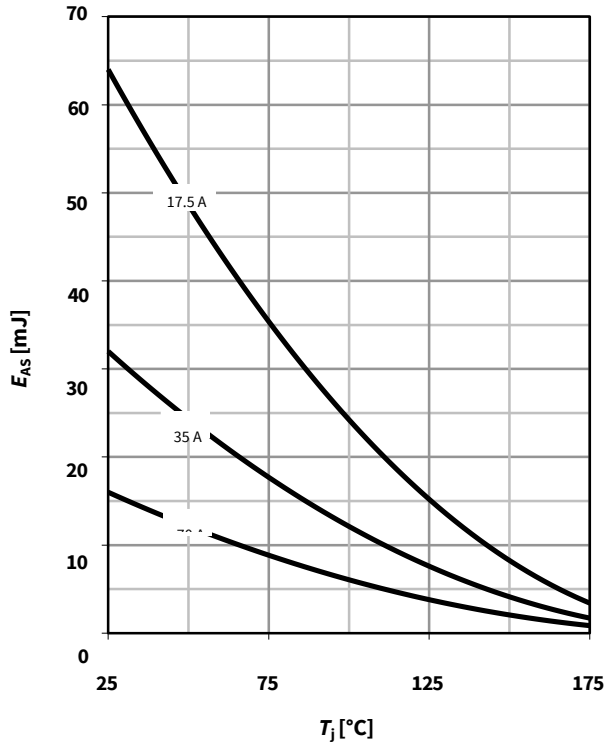
$I_{AS} = f(t_{AV})$

parameter: $T_{j(start)}$



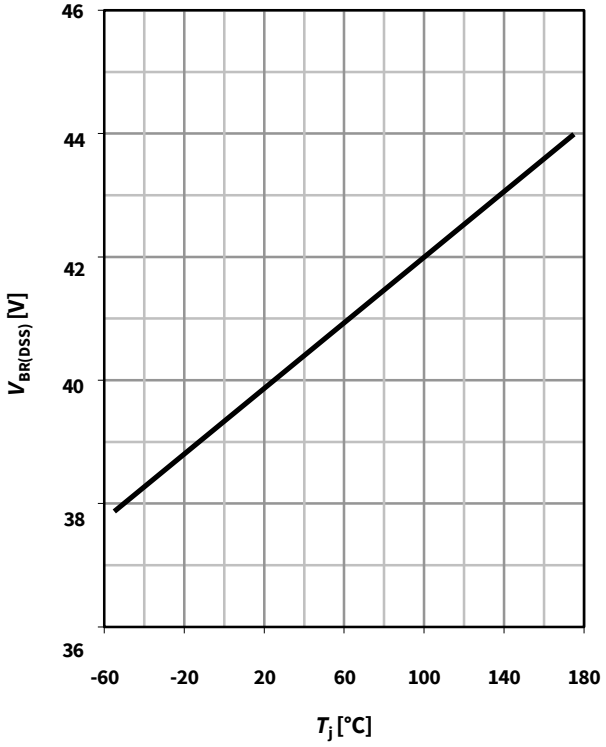
13 典型雪崩能量

$E_{AS} = f(T_j)$



14 漏源击穿电压

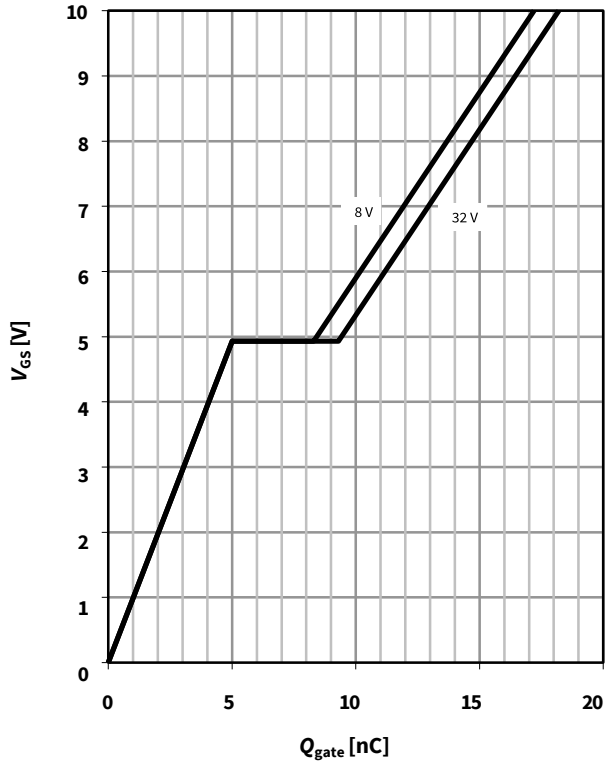
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA



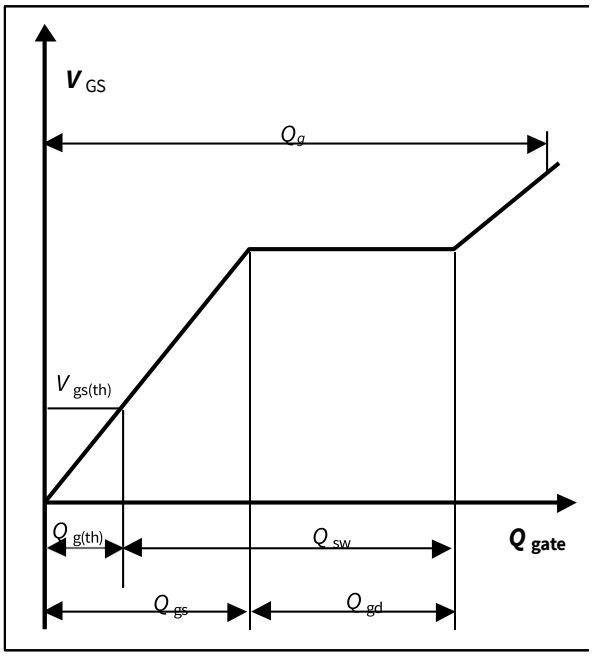
15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; $I_D = 40$ A pulsed

parameter: V_{DD}



16 栅极充电波形



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Revision History

Version	Date	Changes
Revision 1.0	06.12.2016	Final Data Sheet

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