英飞凌100V 175℃ N沟道

增强型OptiMOS™ -T2 功率晶体管

AEC Qualified

RoHS

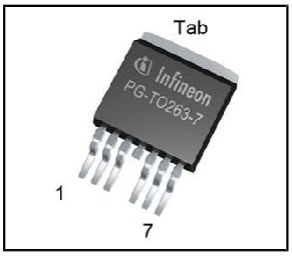
产品概述

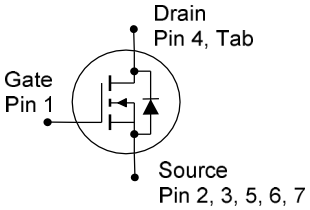
V_{DS}	100	V
$R_{DS(on)}$	2.5	mΩ
I_D	180	A

特点

- N沟道-增强模式
- 通过 AEC-Q101 认证
- 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-TO263-7-3





Type	Package	Marking
IPB180N10S4-02	PG-TO263-7-3	4N1002

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}=10V[1]	180	A
		T_C=100°C, V_{GS}=10V[2]	171	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25°C	720	
Avalanche energy, single pulse[2]	E_{AS}	I_D=90A	1110	mJ
Avalanche current, single pulse	I_{AS}	-	180	A
Gate source voltage	V_{GS}	-	±20	V
Power dissipation	P_{tot}	T_C=25°C	300	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}	-	-	-	0.5	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6cm² 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}=0V, I_D= 1mA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=275µA	2.0	2.7	3.5	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100V, V_{GS}=0V, T_j=25°C	-	0.1	1	µA
		V_{DS}=100V, V_{GS}=0V, T_j=125°C[2)]	-	10	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}=10V, I_D=100A	-	2.0	2.5	mΩ

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	-	11240	14600	pF
Output capacitance	C_{oss}		-	3660	4760	
Reverse transfer capacitance	C_{rss}		-	230	460	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50V, V_{GS}=10V, I_D=180A, R_G=1.6 Ω	-	15	-	ns
Rise time	t_r		-	9	-	
Turn-off delay time	$t_{d(off)}$		-	30	-	
Fall time	t_f		-	40	-	
栅极电荷特性[2)]						
Gate to source charge	Q_{gs}	V_{DD}=80V, I_D=180A, V_{GS}=0 to 10V	-	52	68	nC
Gate to drain charge	Q_{gd}		-	30	60	
Gate charge total	Q_g		-	156	200	
Gate plateau voltage	$V_{plateau}$		-	4.7	-	V
反向二极管						
Diode continous forward current[2)]	I_S	T_C=25°C	-	-	180	A
Diode pulse current[2)]	$I_{S,pulse}$		-	-	720	
Diode forward voltage	V_{SD}	V_{GS}=0V, I_F=100A, T_j=25°C	-	1.0	1.2	V
Reverse recovery time[2)]	t_{rr}	V_R=50V, I_F=50A, di_F/dt =100A/µs	-	100	-	ns
Reverse recovery charge[2)]	Q_{rr}		-	230	-	nC

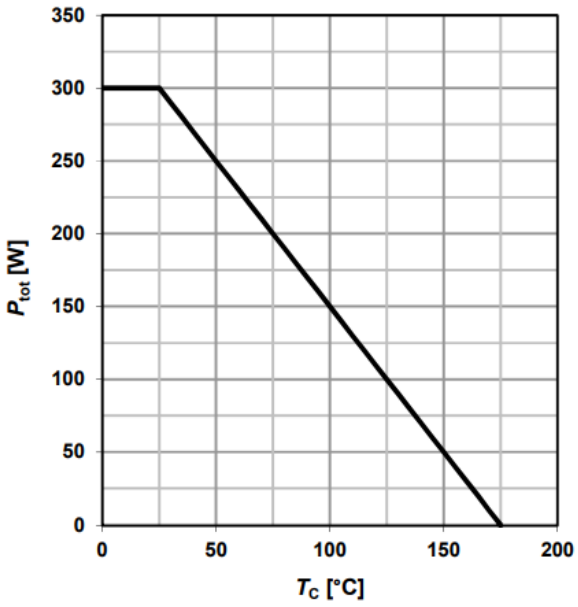
[1)]电流受封装限制；当R_{thJC}= 0.5 K/W时，该芯片在25°C时能够承载242 A。

[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 cm^2（一层，70 µm厚）。印刷电路板垂直放置在静止空气中。

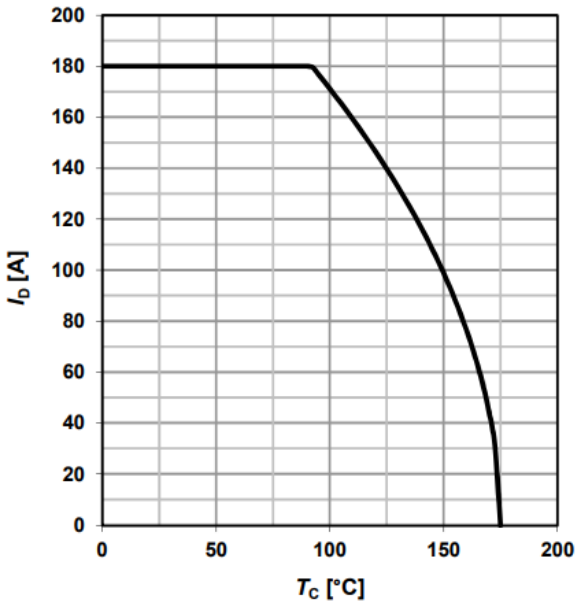
1 功率耗散

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



2 漏极电流

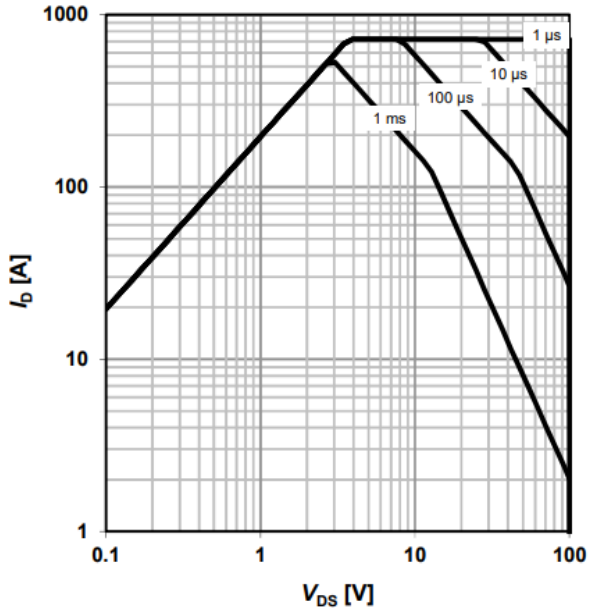
$I_D = f(T_C)$; $V_{GS} \geq 6$ V



3 安全工作区

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

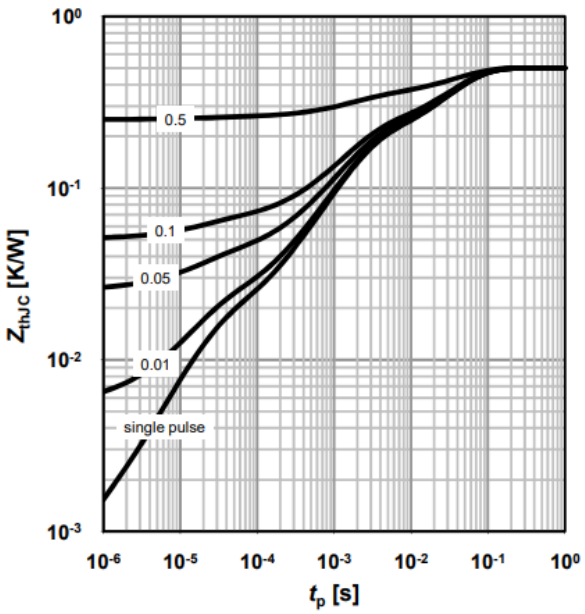
parameter: t_p



4 最大瞬态热阻抗

$Z_{thJC} = f(t_p)$

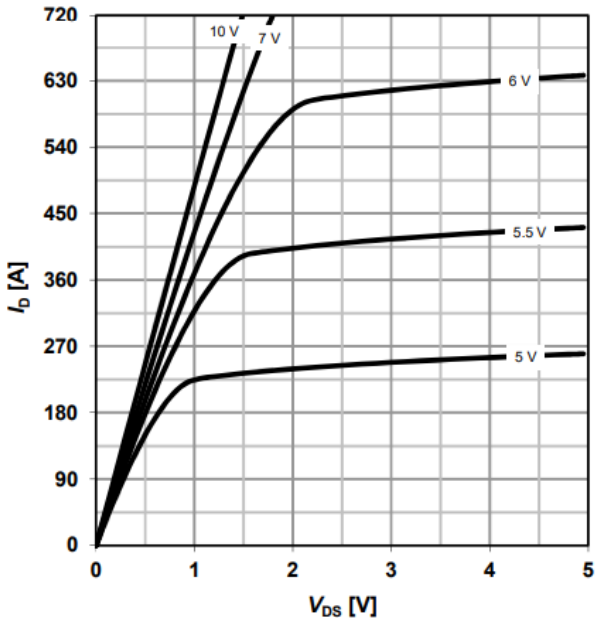
parameter: $D = t_p/T$



5 典型输出特性

$I_D = f(V_{DS})$; $T_j = 25$ °C

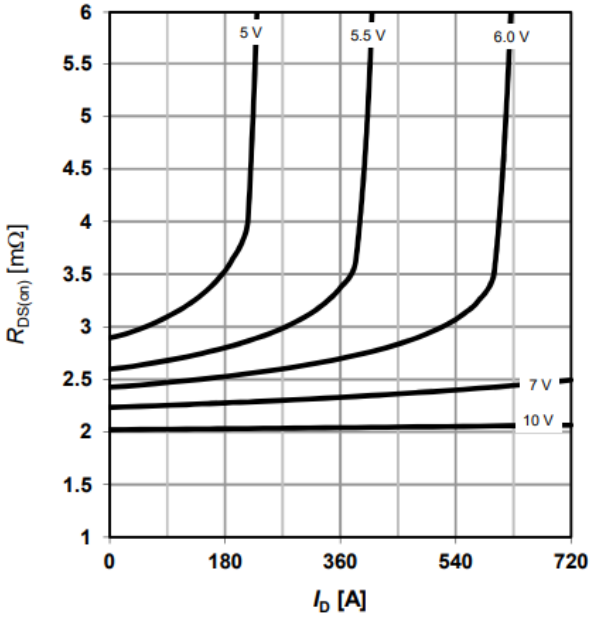
parameter: V_{GS}



6 典型漏源导通电阻

$R_{DS(on)} = (I_D)$; $T_j = 25$ °C

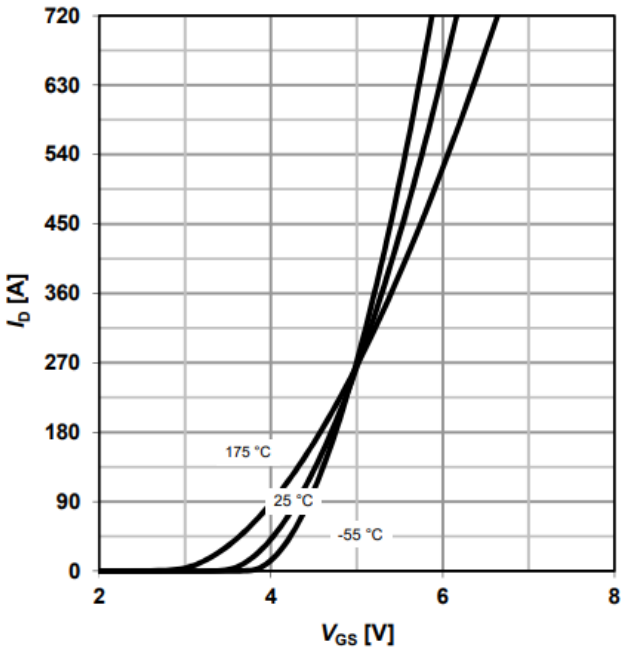
parameter: V_{GS}



7 典型转移特性

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

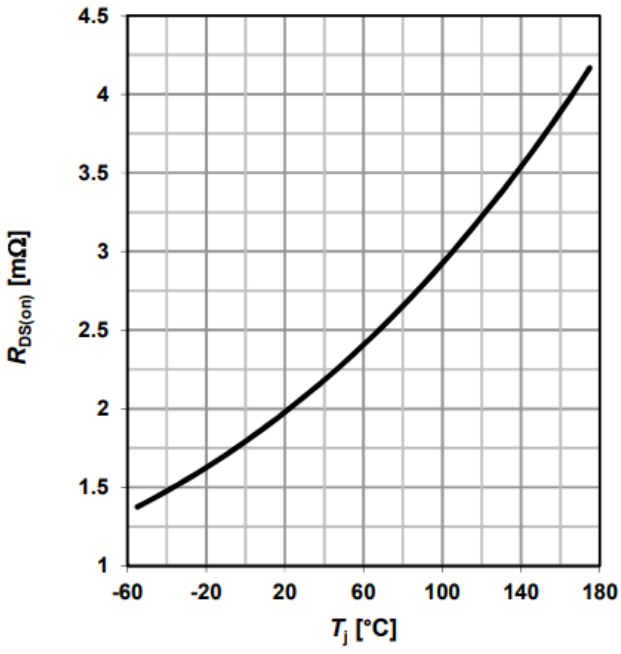
parameter: T_j



8 典型漏源导通电阻

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

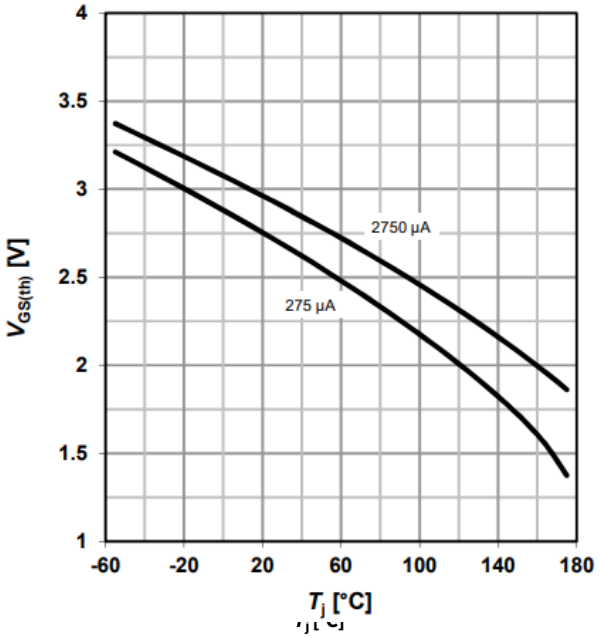
α = 0.4



9 典型栅极阈值电压

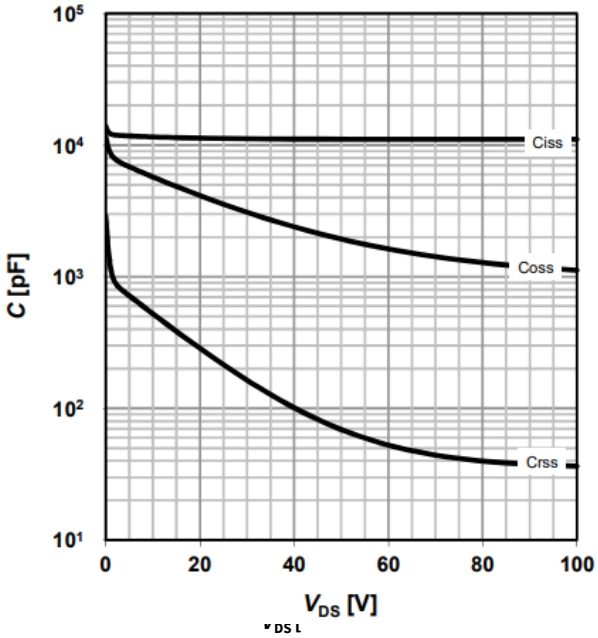
$V_{GS(th)} = f(T_j)$; $V_{GS} = V_{DS}$

parameter: I_D



10 典型电容值

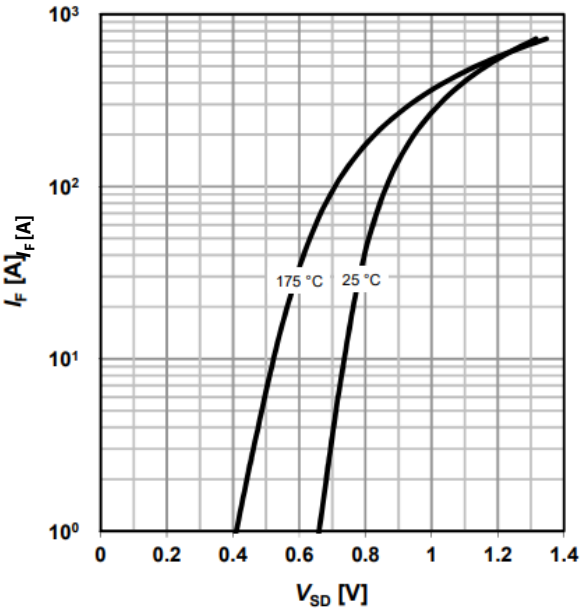
$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz



11 典型二极管正向导通特性

IF = f(V_{SD})

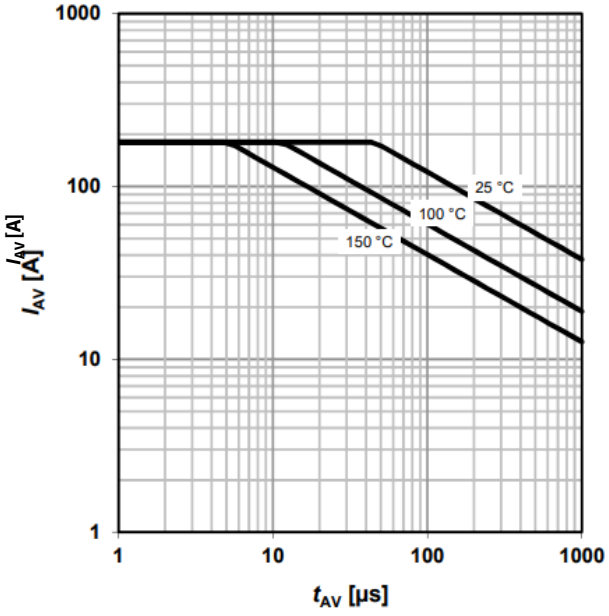
parameter: T_j



12 典型雪崩特性

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

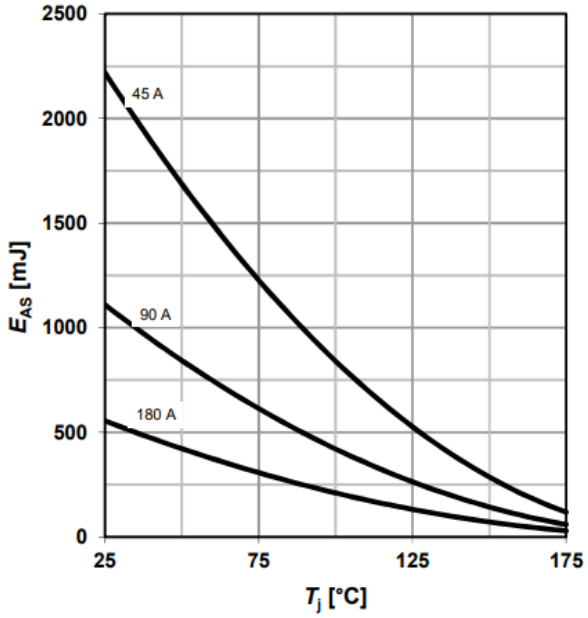
parameter: $T_{j(start)}$



13 典型雪崩能量

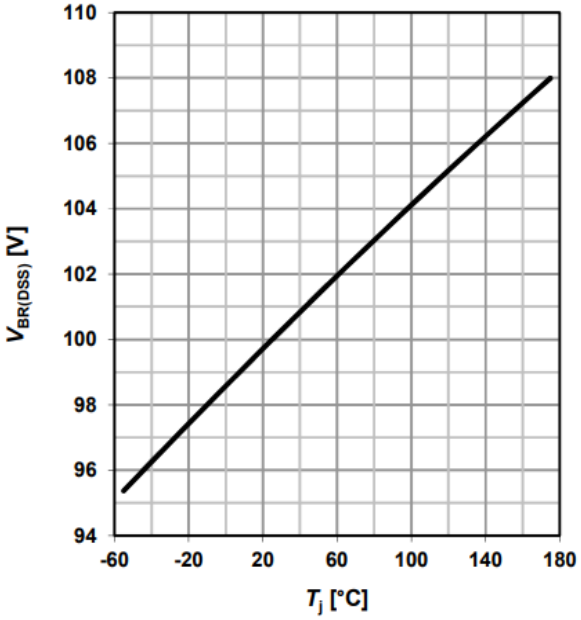
$E_{AS} = f(T_j)$

parameter: I_D



14 漏源击穿电压

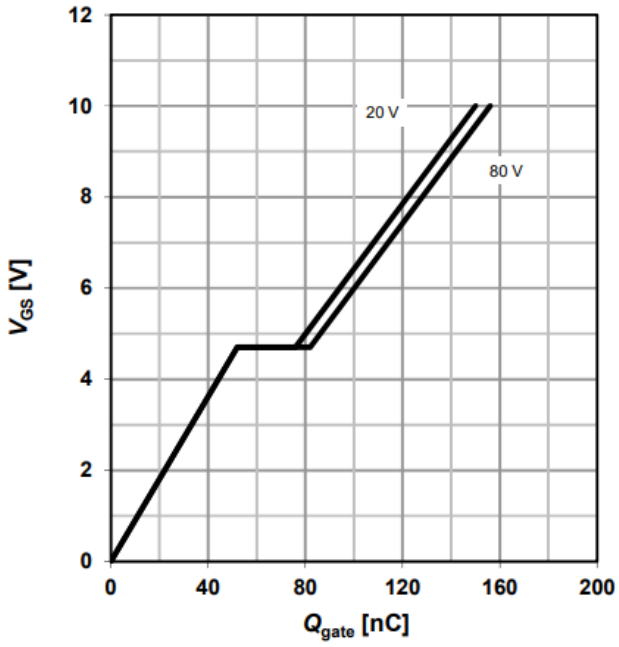
$V_{BR(DSS)} = f(T_j)$; $I_D = 1$ mA



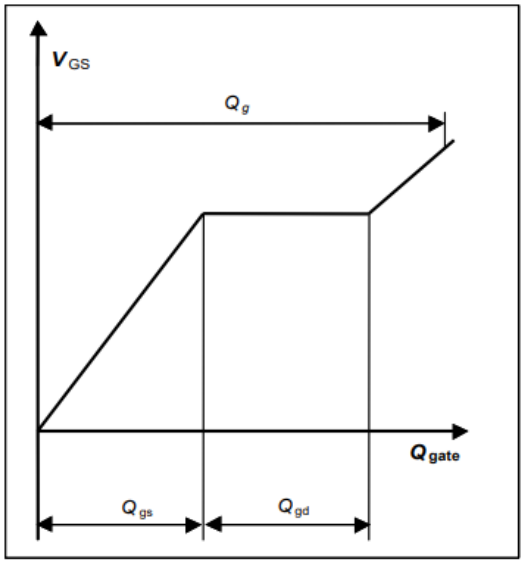
15 典型栅极电荷

$V_{GS} = f(Q_{gate})$; $I_D = 180$ 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	2013-01-30	Final Data Sheet
Revision 1.1	2023-01-30	Diagram 8 Typ. drain-source on-state resistance: used α value clarified

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