

英飞凌120V 175°C N沟道

增强型OptiMOS™ -T 功率晶体管



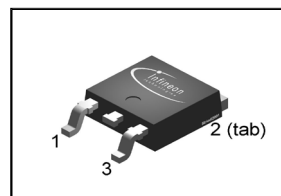
产品概述

V_{DS}	120	V
$R_{DS(on),max}$	24	mΩ
I_D	35	A

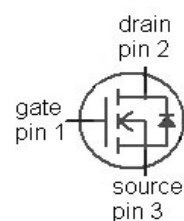
特点

- 适用于汽车应用的功率MOSFET
- N沟道-增强模式
- 符合汽车级 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-TO252-3-11



Type	Package	Marking
IPD35N12S3L-24	PG-TO252-3-11	3N12L24



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	I_D	$T_c=25^\circ\text{C}, V_{GS}=10\text{V}$	35	A
		$T_c=100^\circ\text{C}, V_{GS}=10\text{V}^{(1)}$	25	
Pulsed drain current ⁽¹⁾	$I_{D,pulse}$	$T_c=25^\circ\text{C}$	140	
Avalanche energy, single pulse ⁽¹⁾	E_{AS}	$I_D=17\text{A}$	175	mJ
Avalanche current, single pulse	I_{AS}	-	35	A
Gate source voltage ⁽³⁾	V_{GS}	-	± 20	V
Power dissipation	P_{tot}	$T_c=25^\circ\text{C}$	71	W
Operating and storage temperature	T_j, T_{stg}	-	-55 ... +175	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

热特性¹⁾

Thermal resistance, junction - case	R_{thJC}	-	-	-	2.1	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm ² cooling area ²⁾	-	-	40	

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	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=1mA$	120	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=39\mu A$	1.2	1.7	2.4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=120V, V_{GS}=0V, T_j=25^\circ\text{C}$	-	0.01	0.1	μA
		$V_{DS}=120V, V_{GS}=0V, T_j=125^\circ\text{C}^{1)}$	-	1	10	
Gate-source leakage current	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5V, I_D=35A$	-	25	32	m Ω
		$V_{GS}=10V, I_D=35A$	-	20	24	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

动态参数特性¹⁾

Input capacitance	C_{iss}	$V_{GS}=0V, V_{DS}=25V,$ $f=1MHz$	-	2070	2691	pF
Output capacitance	C_{oss}		-	460	598	
Reverse transfer capacitance	C_{rss}		-	50	75	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=20V, V_{GS}=10V,$ $I_D=35A, R_G=3.5\Omega$	-	6	-	ns
Rise time	t_r		-	4	-	
Turn-off delay time	$t_{d(off)}$		-	18	-	
Fall time	t_f		-	3	-	

门极电荷特点¹⁾

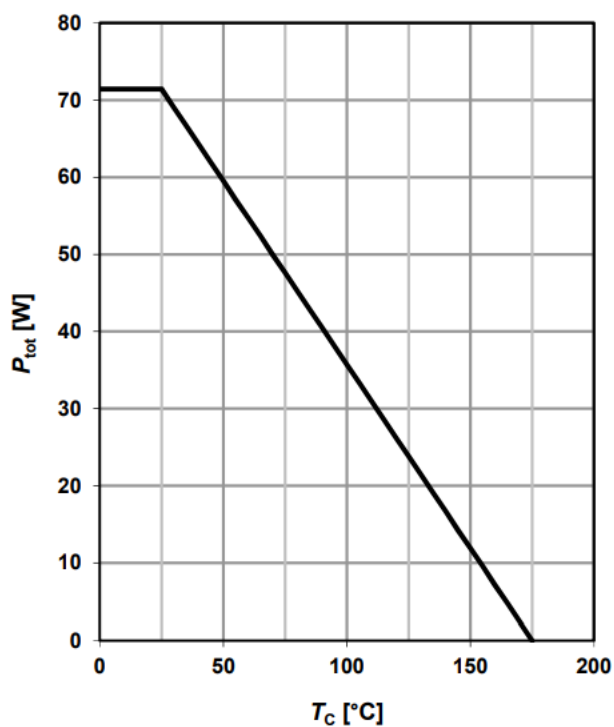
Gate to source charge	Q_{gs}	$V_{DD}=96V, I_D=35A,$ $V_{GS}=0 \text{ to } 10V$	-	8	10	nC
Gate to drain charge	Q_{gd}		-	5	8	
Gate charge total	Q_g		-	30	39	
Gate plateau voltage	$V_{plateau}$		-	3.7	-	V

体内寄生反向二极管

Diode continuous forward current ¹⁾	I_s	$T_C=25^\circ C$	-	-	35	A
Diode pulse current ¹⁾	$I_{S,pulse}$		-	-	140	
Diode forward voltage	V_{SD}	$V_{GS}=0V, I_F=35A,$ $T_j=25^\circ C$	0.6	1	1.2	V
Reverse recovery time ¹⁾	t_{rr}					

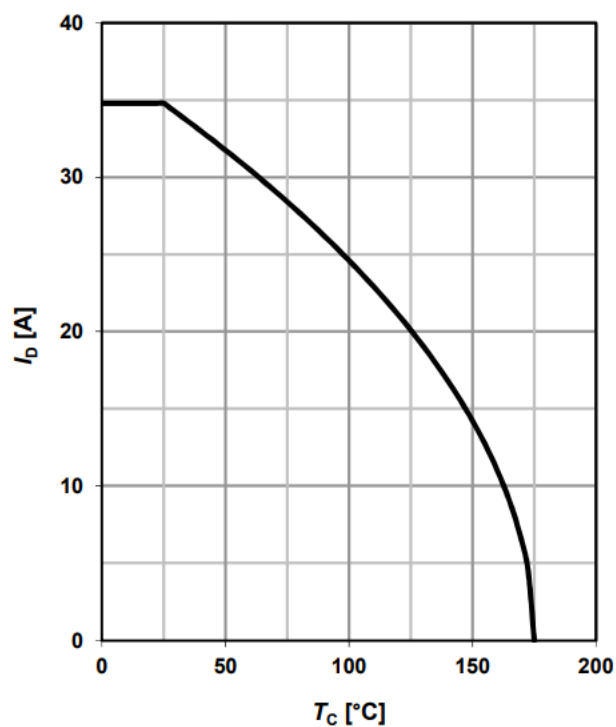
1 功率耗散

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



2 漏极电流

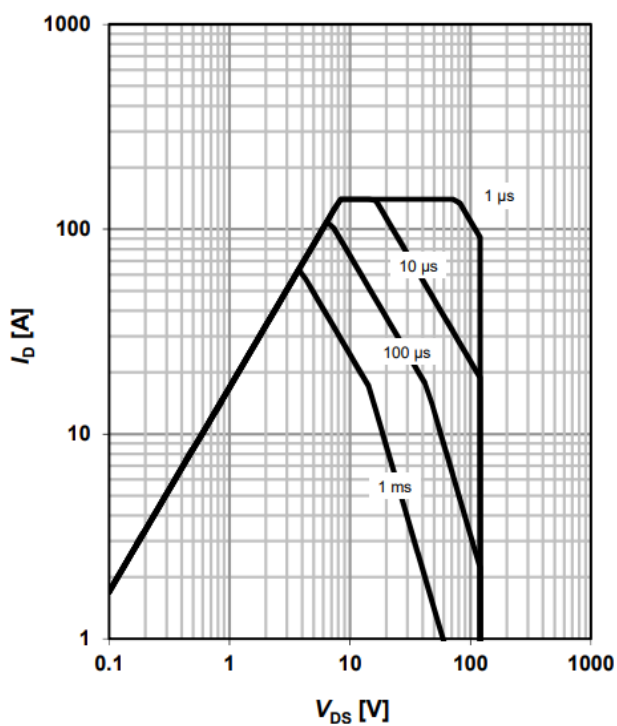
$$I_D = f(T_C); V_{\text{GS}} = 10 \text{ V}$$



3 安全工作区

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

parameter: t_p



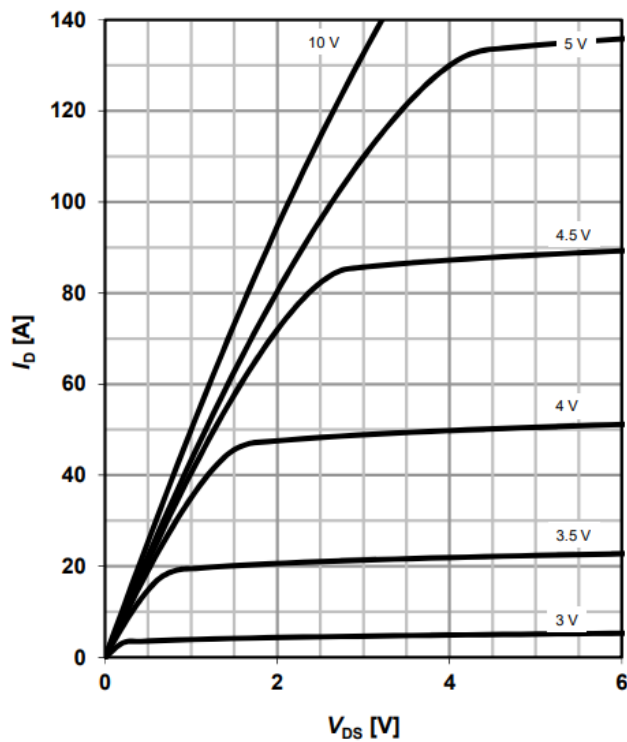
4 最大瞬态热阻抗

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

5 典型输出特性

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

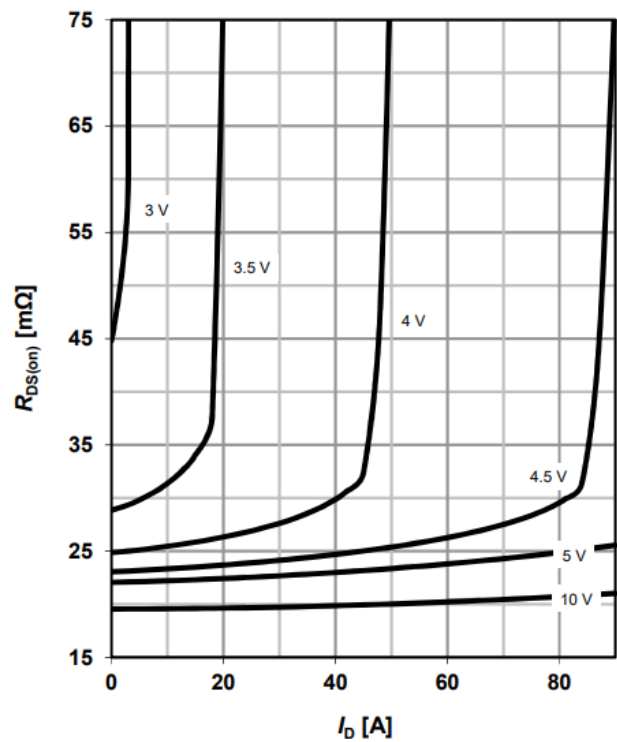
parameter: V_{GS}



6 典型漏源导通电阻

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

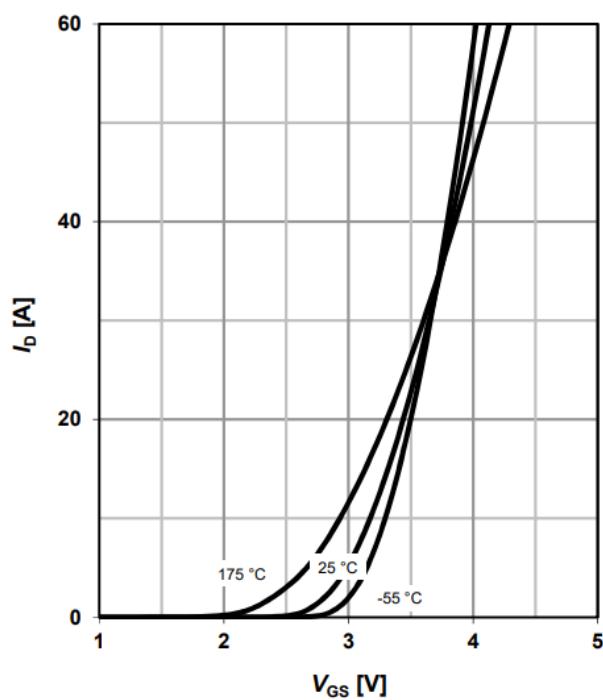
parameter: V_{GS}



7 典型转移特性

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

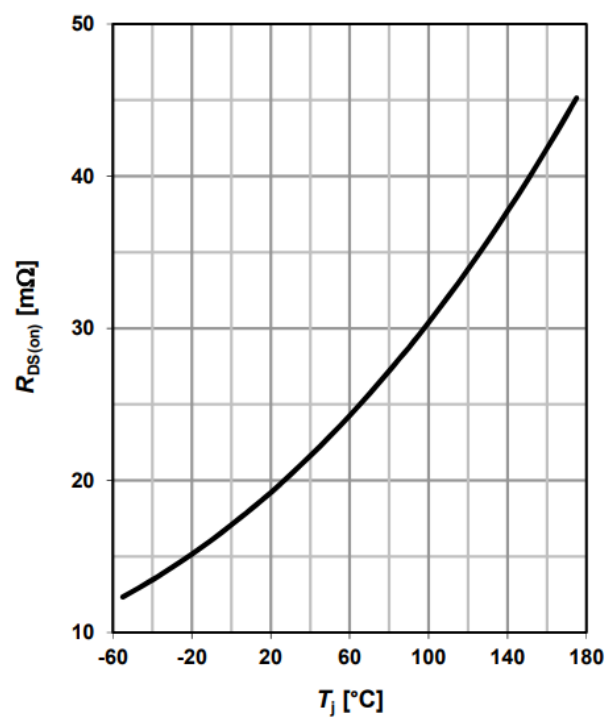
parameter: T_j



8 典型漏源导通电阻

$$R_{DS(on)} = f(T_j); I_D = 30\text{ A}; V_{GS} = 10\text{ V}$$

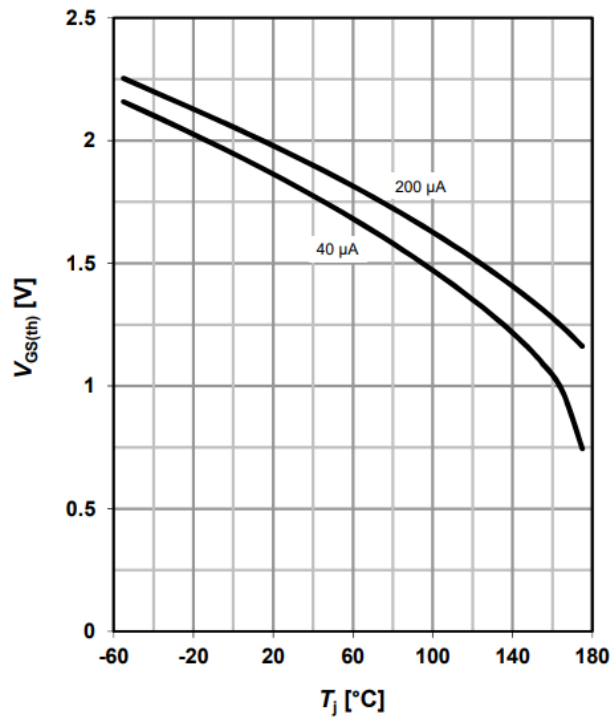
$\alpha = 0.4$



9 典型栅极阈值电压

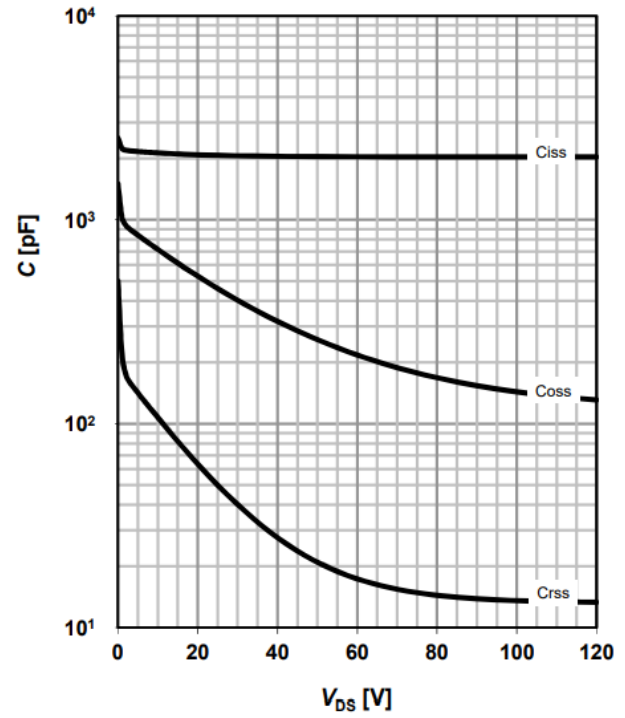
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



10 典型电容值

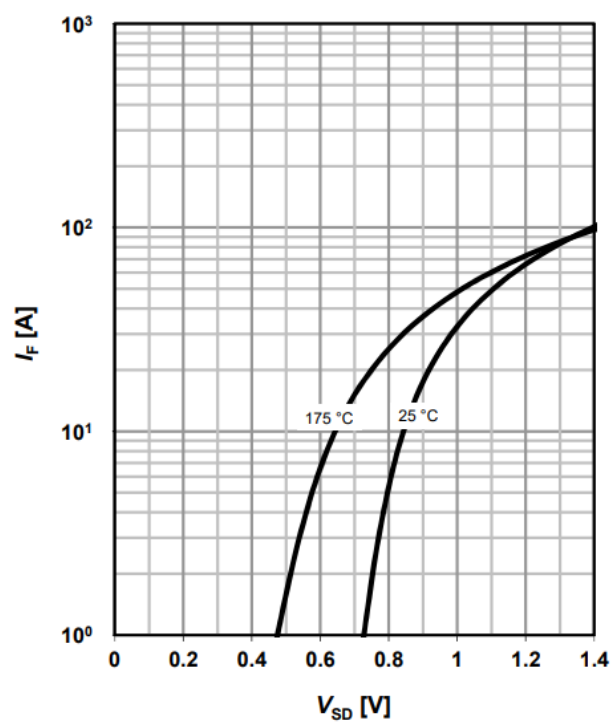
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



11 典型二极管正向导通特性

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

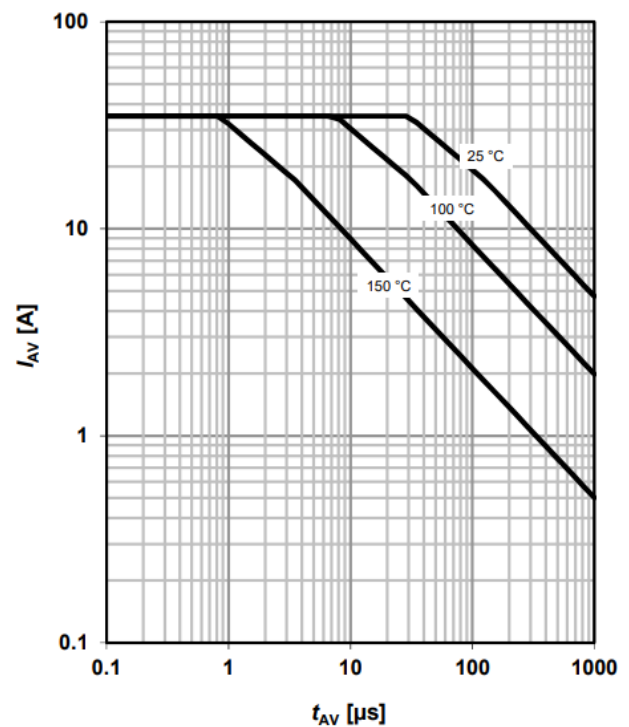
parameter: T_j



12 典型雪崩特性

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

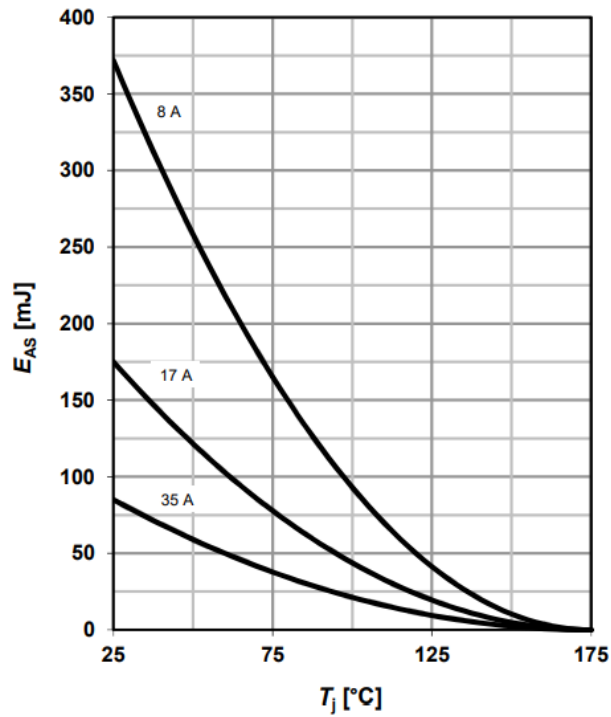
parameter: $T_{j(start)}$



13 典型雪崩能量

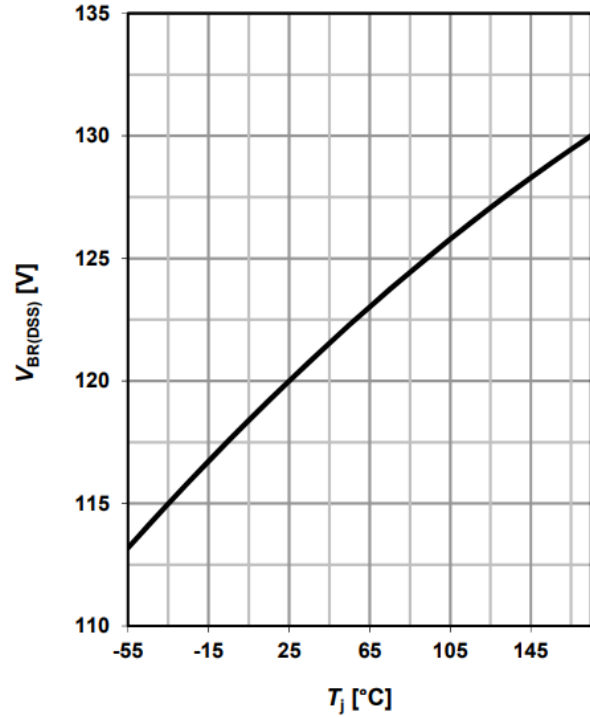
$$E_{AS} = f(T_j)$$

parameter: I_D



14 典型漏源击穿电压

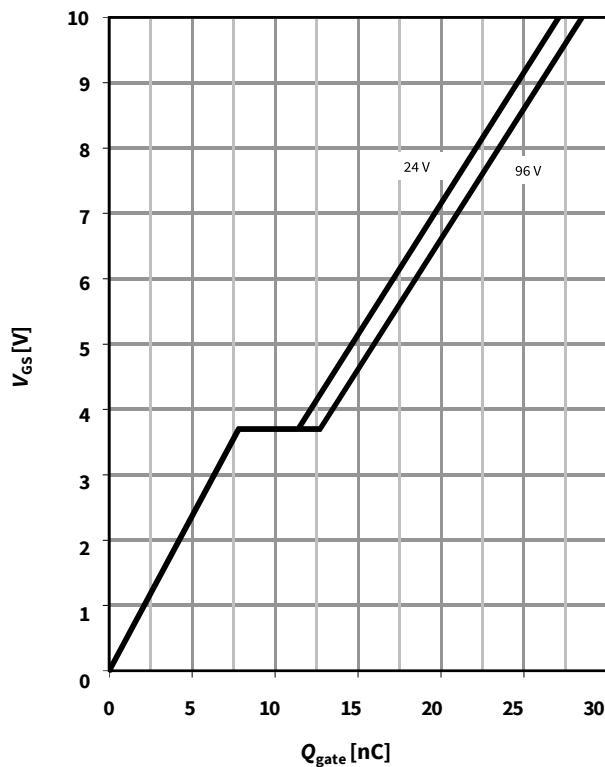
$$V_{BR(DSS)} = f(T_j); I_D = 1\text{ mA}$$



15 典型栅极电荷

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

parameter: V_{DD}



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修订记录

Version	Date	Changes
Revision 1.0	2016-06-20	Final Data Sheet
Revision 1.1	2023-06-15	Diagram 8 Typ. drain-source on-state resistance: used α value clarified
Revision 1.1	2023-06-15	Ratings of V_{GS} refined in footnote ³⁾
Revision 1.1	2023-06-15	Corrected diagram 10 typical capacitances



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