

英飞凌55V 175°C N沟道

增强型OptiMOS® 功率晶体管

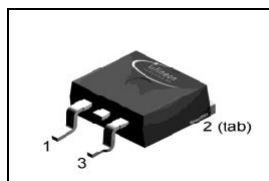
特性

- 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
- 绿色封装（无铅）
- 超低 $R_{DS(on)}$
- 100% 雪崩测试

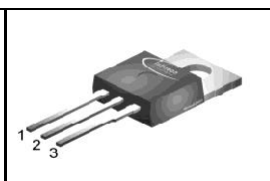
产品概述

V_{DS}	55	V
$R_{DS(on),max}$ (SMD version)	4.7	mΩ
I_D	100	A

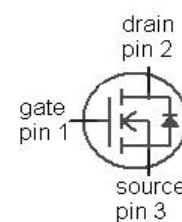
PG-TO263-3-2



PG-TO220-3-1



Type	Package	Marking
IPB100N06S2-05	PG-TO263-3-2	PN0605
IPP100N06S2-05	PG-TO220-3-1	PN0605



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	$T_c=25^\circ\text{C}$, $V_{GS}=10\text{ V}$	100	A
		$T_c=100^\circ\text{C}$, $V_{GS}=10\text{ V}^{2)}$	100	
Pulsed drain current ²⁾	$I_{D,pulse}$	$T_c=25^\circ\text{C}$	400	
Avalanche energy, single pulse ²⁾	E_{AS}	$I_D=80\text{ A}$	810	mJ
Gate source voltage ⁴⁾	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_c=25^\circ\text{C}$	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
Thermal resistance, junction - ambient, leaded	R_{thJA}		-	-	62	
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm ² cooling area ⁵⁾	-	-	40	

除非另有规定，否则均为 $T_j=25\text{ °C}$ 的电气特性。

静态参数特性

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=1\text{ mA}$	55	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=250\text{ }\mu\text{A}$	2.1	3.0	4.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=55\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	0.01	1	μA
		$V_{DS}=55\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}^{2)}$	-	1	100	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=80\text{ A}$	-	4.0	5.0	m Ω
		$V_{GS}=10\text{ V}, I_D=80\text{ A},$ SMD version	-	3.7	4.7	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

动态参数特性²⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	5110	-	pF
Output capacitance	C_{oss}		-	1330	-	
Reverse transfer capacitance	C_{rss}		-	320	-	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=30\text{ V}, V_{GS}=10\text{ V},$ $I_D=80\text{ A}, R_G=2.2\ \Omega$	-	21	-	ns
Rise time	t_r		-	31	-	
Turn-off delay time	$t_{d(off)}$		-	59	-	
Fall time	t_f		-	30	-	

栅极电荷特性²⁾

Gate to source charge	Q_{gs}	$V_{DD}=44\text{ V}, I_D=100\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	27	35	nC
Gate to drain charge	Q_{gd}		-	53	80	
Gate charge total	Q_g		-	130	170	
Gate plateau voltage	$V_{plateau}$		-	5.4	-	V

反向二极管

Diode continuous forward current ²⁾	I_S	$T_C=25\text{ °C}$	-	-	100	A
Diode pulse current ²⁾	$I_{S,pulse}$		-	-	400	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=80\text{ A},$ $T_J=25\text{ °C}$	0.6	0.9	1.3	V
Reverse recovery time ²⁾	t_{rr}	$V_R=30\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	60	75	ns
Reverse recovery charge ²⁾	Q_{rr}	$V_R=30\text{ V}, I_F=I_S,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	130	160	nC

¹⁾ 电流受到接合线的限制；当 $R_{thJC} = 0.5\text{ K/W}$ 时，芯片能够在 25 °C 时承载 170 A 。有关详细信息，请参阅应用注释 ANPS071E，网址：www.infineon.com/optimos

²⁾ 由设计标定，不受限于生产测试。

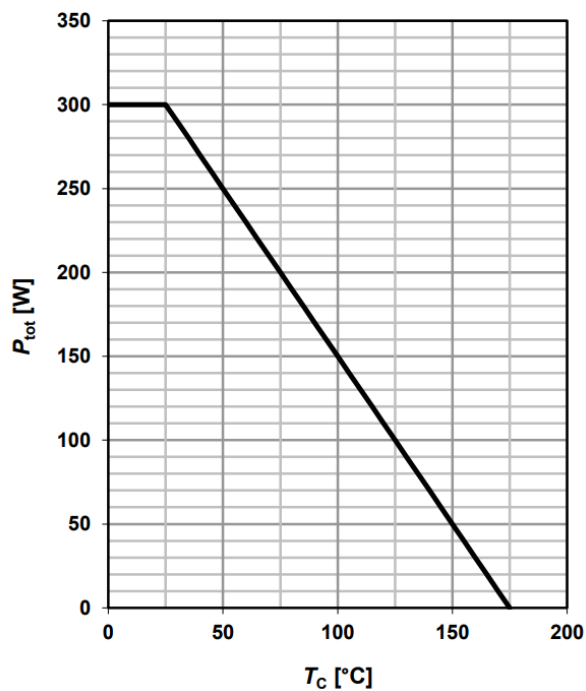
³⁾ 见图13。

⁴⁾ 在 -20 V 和 $+20\text{ V}$ 条件下检验合格。

⁵⁾ 器件安装在 $40\text{ mm} \times 40\text{ mm} \times 1.5\text{ mm}$ 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， $70\text{ }\mu\text{m}$ 厚）。印刷电路板垂直放置在静止空气中。

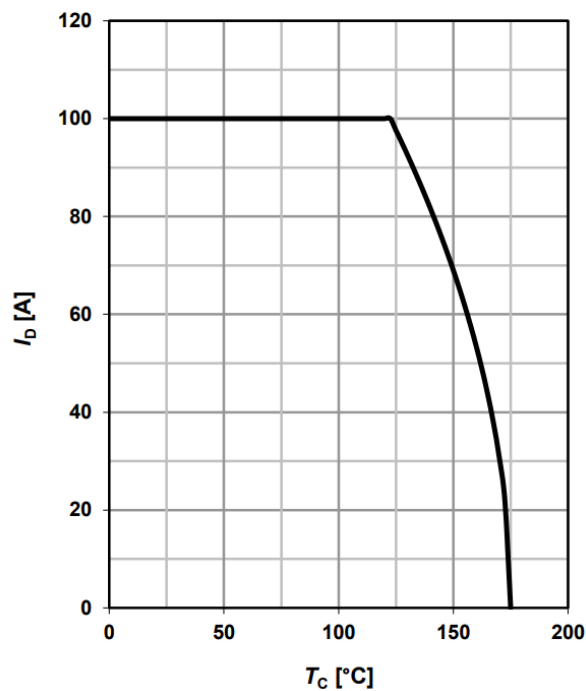
1 功率耗散

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



2 漏极电流

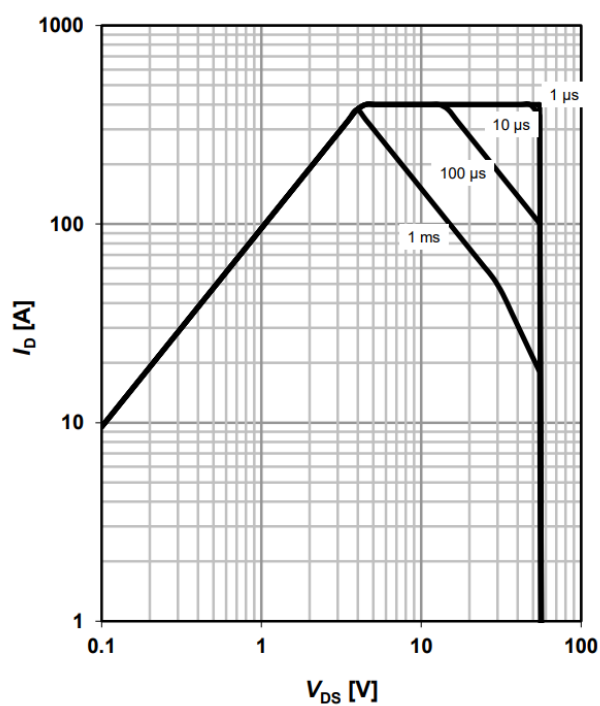
$$I_D = f(T_C); V_{\text{GS}} \geq 10 \text{ V}$$



3 安全工作区

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

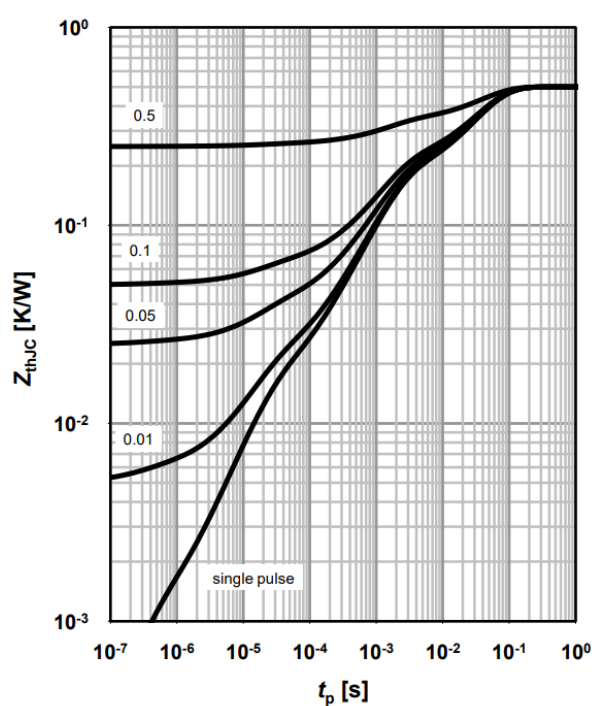
parameter: t_p



4 最大瞬态热阻抗

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

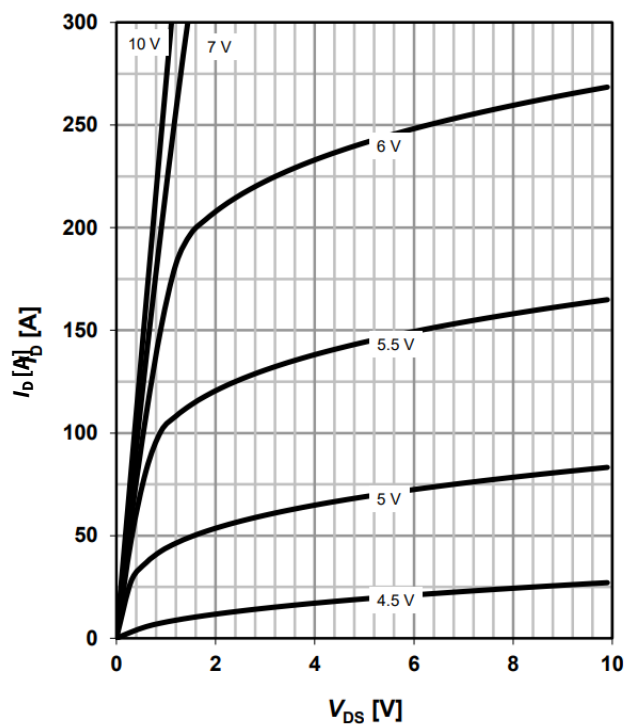
parameter: $D = t_p/T$



5 典型输出特性

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

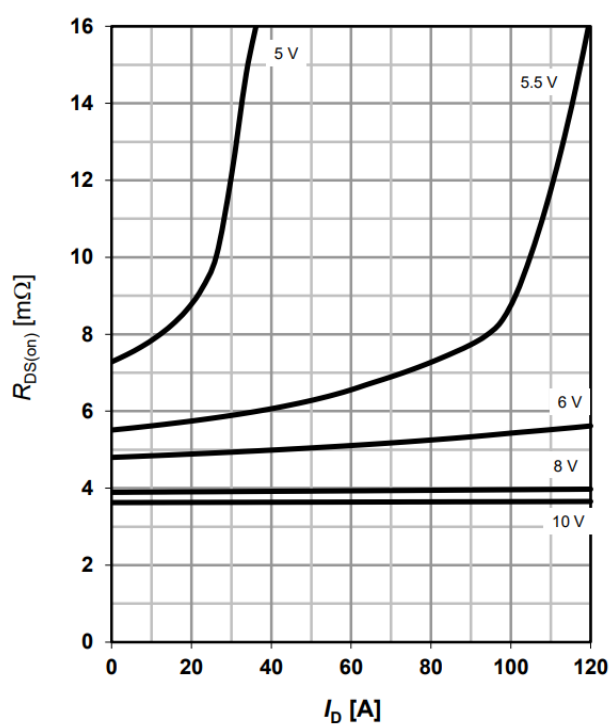
parameter: V_{GS}



6 典型漏源导通电阻

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

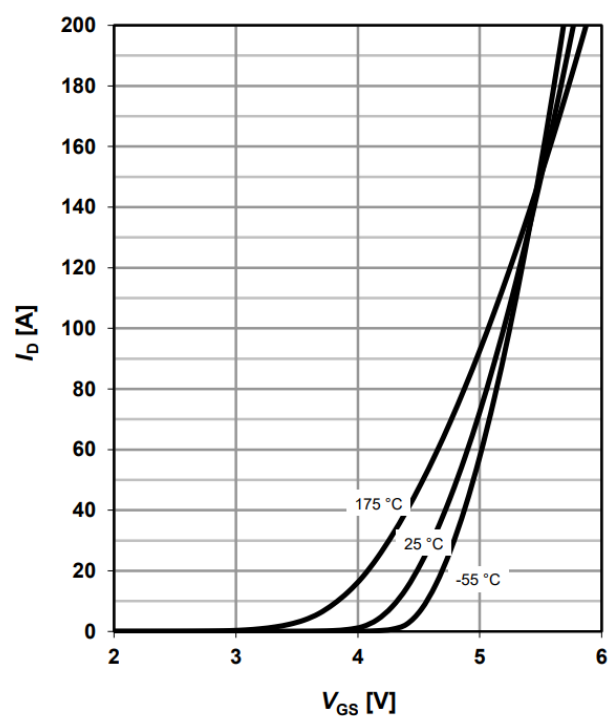
parameter: V_{GS}



7 典型传输特性

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

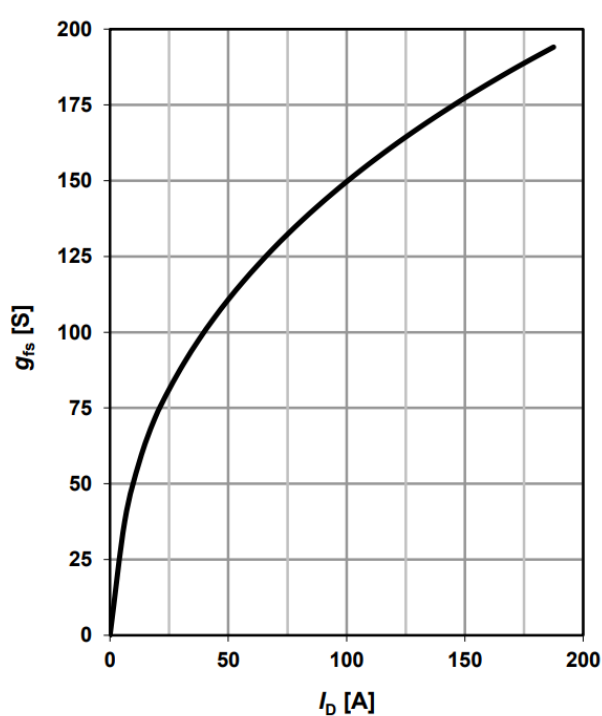
parameter: T_j



8 典型正向跨导

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

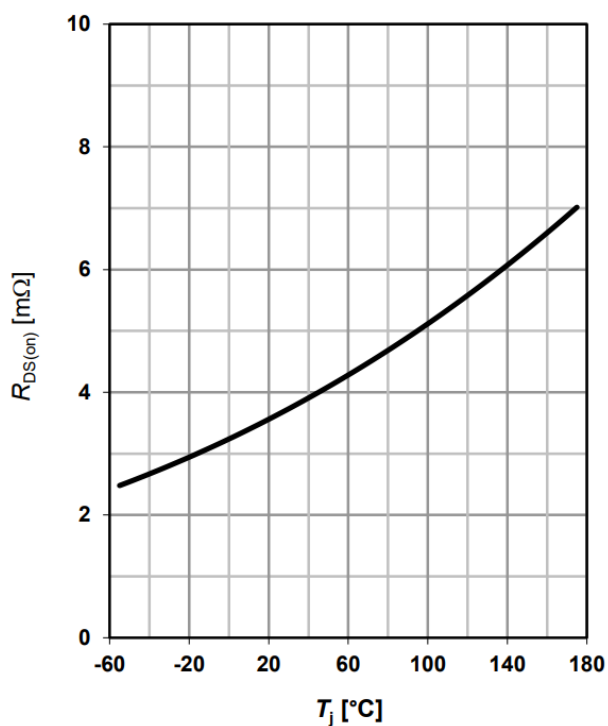
parameter: g_{fs}



9 典型漏源导通电阻

$$R_{DS(on)} = f(T_j)$$

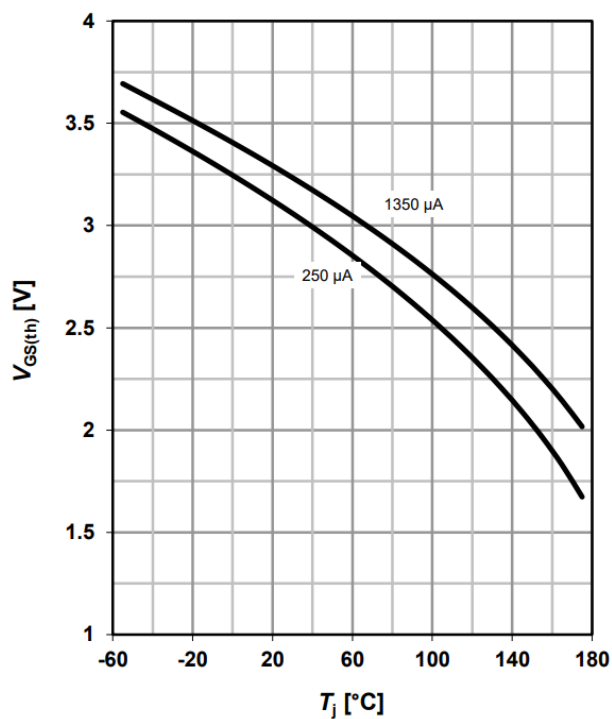
parameter: $I_D = 80 \text{ A}$; $V_{GS} = 10 \text{ V}$



10 典型栅极阈值电压

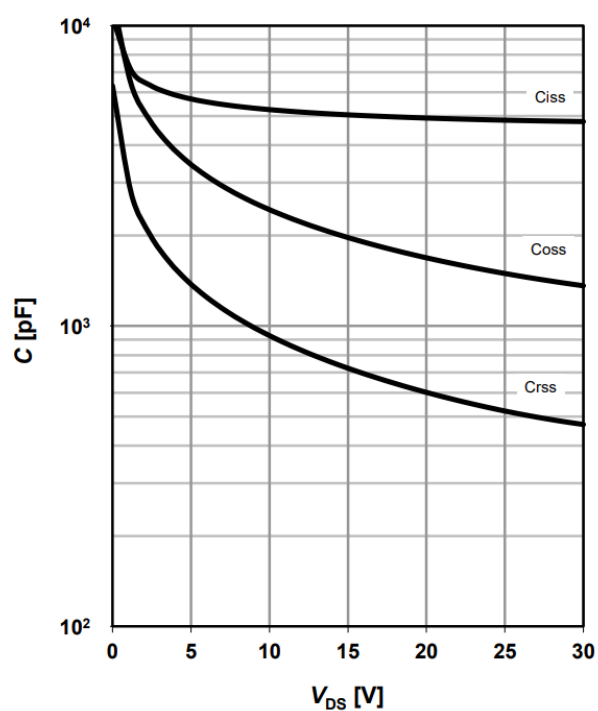
$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}$$

parameter: I_D



11 典型电容值

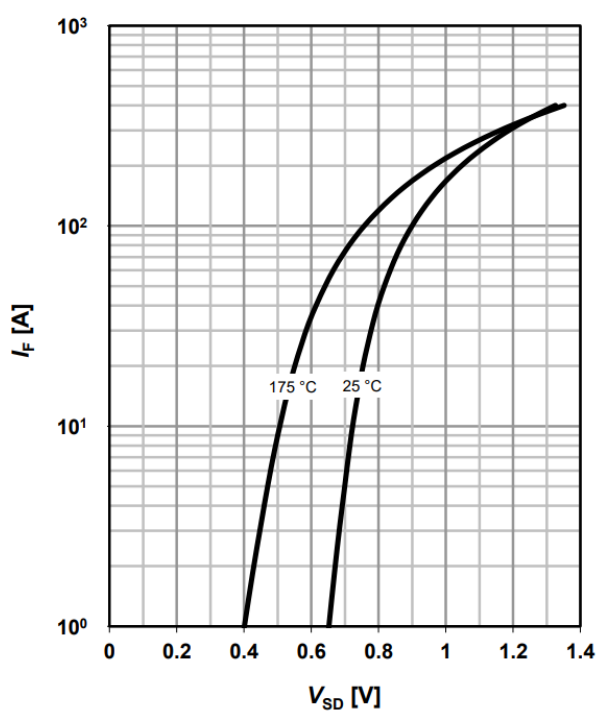
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 典型正向二极管特性

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

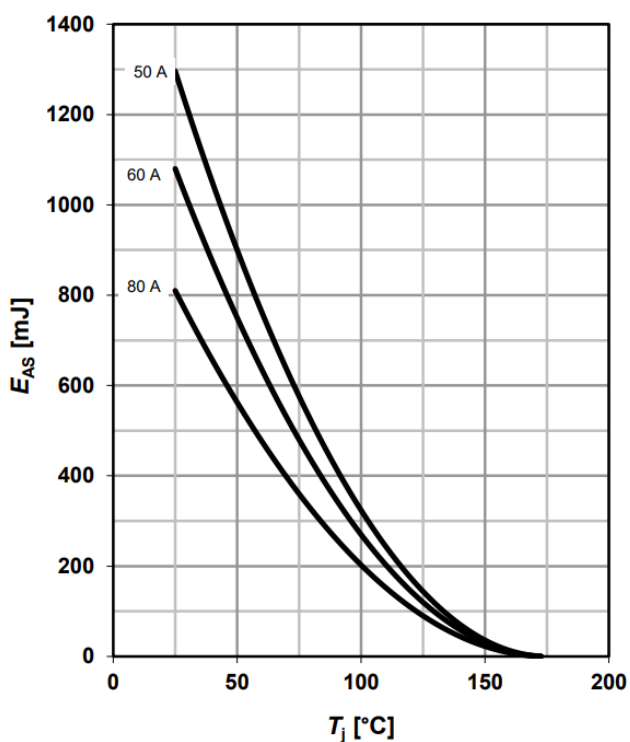
parameter: T_j



13 典型雪崩能量

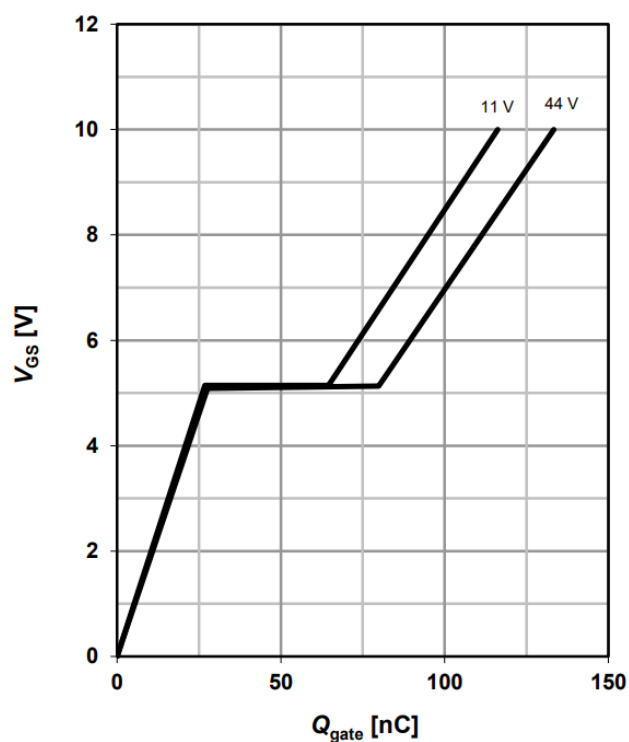
$$E_{AS} = f(T_j)$$

parameter: I_D



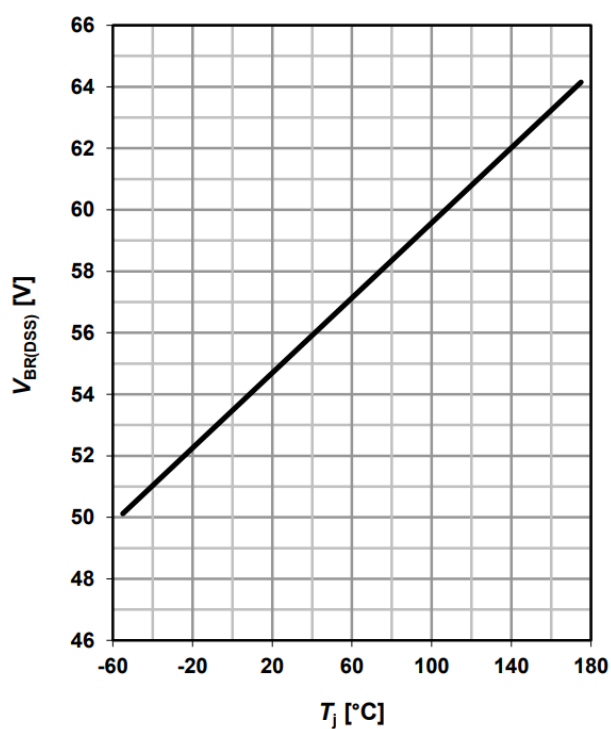
14 典型栅极电荷

$$V_{GS} = f(Q_{gate}); I_D = 80 \text{ A pulsed}$$

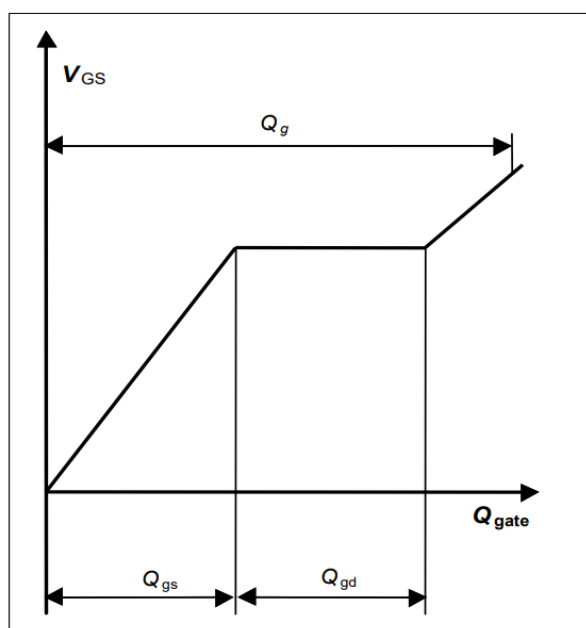


15 典型漏源击穿电压

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

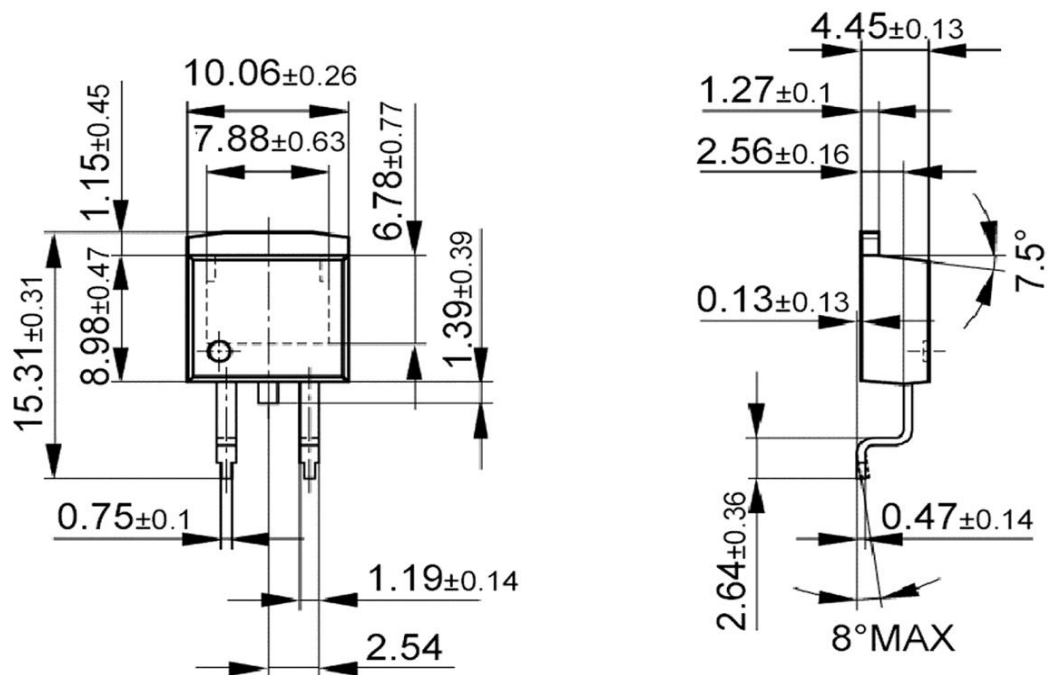


16 栅极充电波形

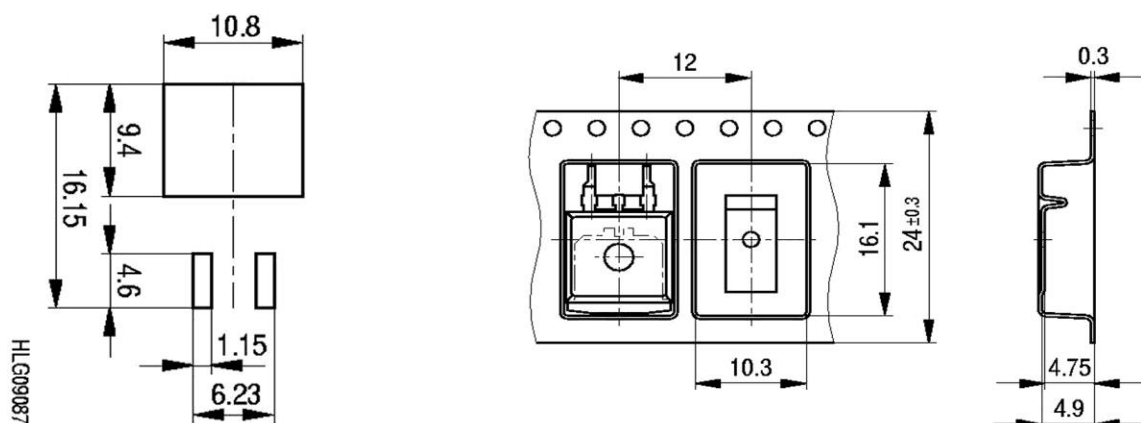


封装外形尺寸

P-T0263-3-2: 封装外形

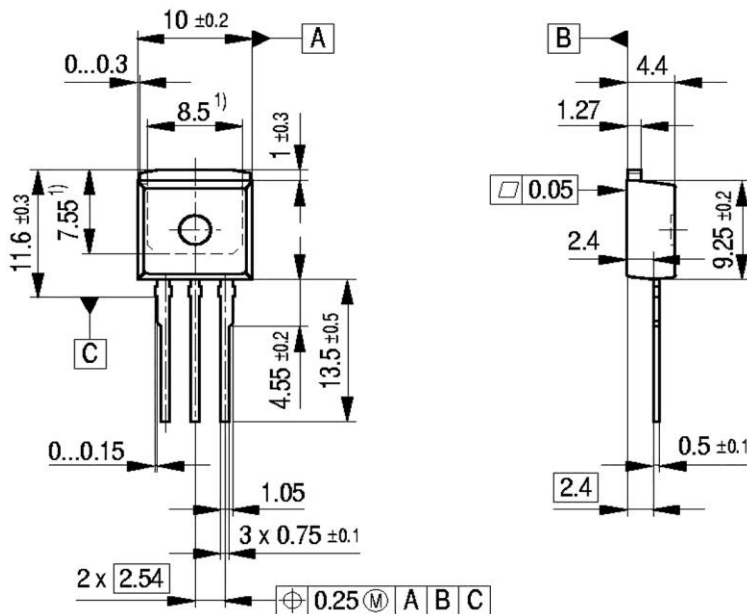


Footprint



Dimensions in mm

P-T0262-3-1: 封装外形

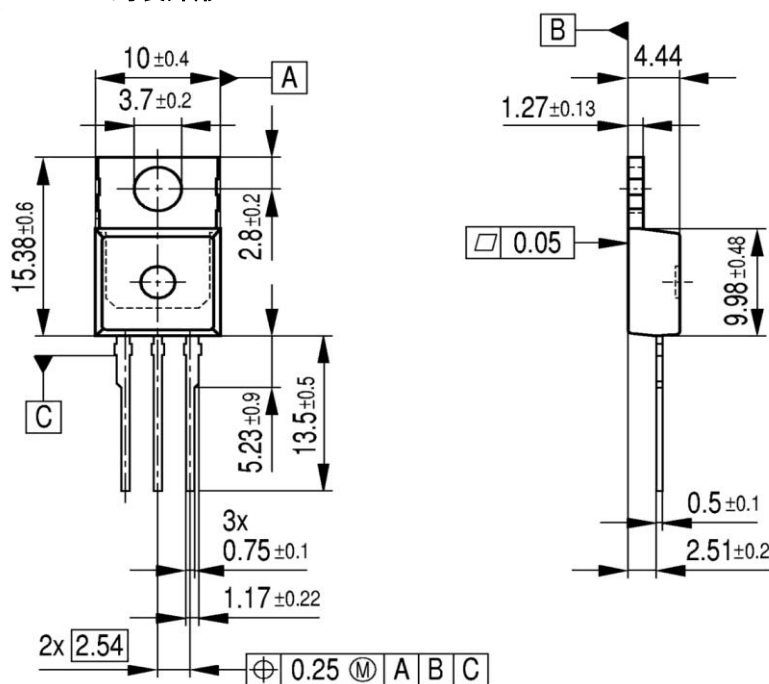


¹⁾ Typical

Metal surface min. X = 7.25, Y = 6.9

All metal surfaces tin plated, except area of cut.

P-T0220-3-1: 封装外形

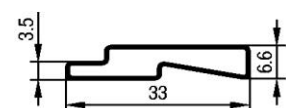


All metal surfaces tin plated, except area of cut.

Metal surface min. x=7.25, y=12.3

Dimensions in mm

包装信息



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Revision History

Version	Date	Changes
Version 1.0	13.03.2006	Final Data Sheet
Version 1.01	24.08.2020	Removal of ordering code Correction of condition parameter I_D related to $V_{GS(th)}$ in figure 10



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