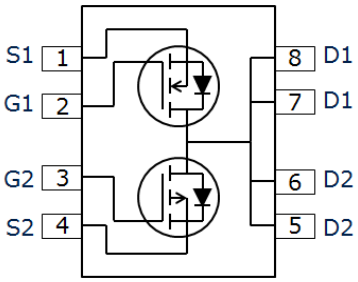
英飞凌OptiMOS™ 2 + OptiMOS™P 2 小信号晶体管

特性

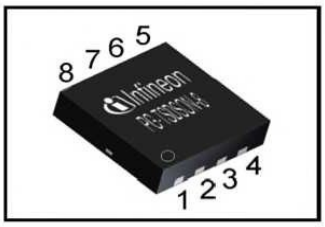
- 互补的 P 沟道 + N 沟道
- 增强型
- 超级逻辑电平（额定2.5V）
- 共漏极
- 雪崩额定
- 工作温度 175°C
- 符合 AEC-Q101 标准
- 100% 无铅；符合 RoHS 标准
- 符合 IEC61246-21 标准的无卤素

产品概述

		P	N	
V_{DS}		-20	20	V
$R_{DS(on),max}$	V_{GS}=±4.5 V	150	55	m Ω
	V_{GS}=±2.5 V	310	95	
I_D		-3.2	5.1	A



PG-TSDSON-8



AEC Qualified RoHS Halogen-Free

Type	Package	Marking	Lead Free	Halogen Free	Packing
BSZ15DC02KD H	PG-TSDSON-8	15DC02K	Yes	Yes	Non dry

除非另有规定，否则均为T_j=25 °C 时的**最大额定值。**

Parameter	Symbol	Conditions	Value		Unit
			P	N	
Continuous drain current	I_D	T_A=25 °C	-3.2	5.1	A
		T_A=100 °C	-2.2	3.6	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	-13	20	
Avalanche energy, single pulse	E_{AS}	P: I_D=-3.2 A, N: I_D=5.1 A, R_{GS}=25 Ω	11	11	mJ
Gate source voltage	V_{GS}		±12		V
Power dissipation	P_{tot} [2]	T_A=25 °C	2.5		W
Operating and storage temperature	T_j, T_{stg}		-55 ... 175		°C
ESD class		JESD22-A114-HBM	0 (<250V)		
Soldering temperature	T_{solder}		260		°C
IEC climatic category; DIN IEC 68-1			55/175/56		

[1] 备注：两个晶体管中只有一个工作

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
热特性							
Thermal resistance, junction – case	P	R_{thJC}		-	-	8	K/W
	N						
Device on PCB		R_{thJA}	6 cm² cooling area[2)]	-	-	60	K/W

除非另有规定，否则均为 T_j=25 °C的**电气特性**。

Static characteristics							
Drain-source breakdown voltage	P	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=-250 µA	-	-	-20	V
	N		V_{GS}=0 V, I_D=250 µA	20	-	-	
Gate threshold voltage	P	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-110 µA	-1.4	-1.0	-0.7	
	N		V_{DS}=V_{GS}, I_D=110 µA	0.8	1.1	1.4	
Zero gate voltage drain current	P	I_{DSS}	V_{DS}=-20 V, V_{GS}=0 V, T_j=25 °C	-	-	-0.1	µA
	N		V_{DS}=20 V, V_{GS}=0 V, T_j=25 °C	-	-	0.1	
	P		V_{DS}=-20 V, V_{GS}=0 V, T_j=175 °C	-	-	-50	
	N		V_{DS}=20 V, V_{GS}=0 V, T_j=175 °C	-	-	50	
Gate-source leakage current	P	I_{GSS}	V_{GS}=±12 V, V_{DS}=0 V	-	-	±100	nA
	N						
Drain-source on-state resistance	P	$R_{DS(on)}$	V_{GS}=-2.5 V, I_D=2.1 A	-	164	310	mΩ
	N		V_{GS}=2.5 V, I_D=1.9 A	-	63	95	
	P		V_{GS}=-4.5 V, I_D=-3.2 A	-	97	150	
	N		V_{GS}=4.5 V, I_D=5.1 A	-	41	55	
Transconductance	P	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-2.2 A	3.4	6.9	-	S
	N		$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=3.6 A	5.5	11	-	

[2)] 器件置于 40 mm x 40 mm x 1.5 mm 环氧 PCB FR4 上，具有 6 cm²（一层，70 µm 厚）铜层面积用于漏极连接。

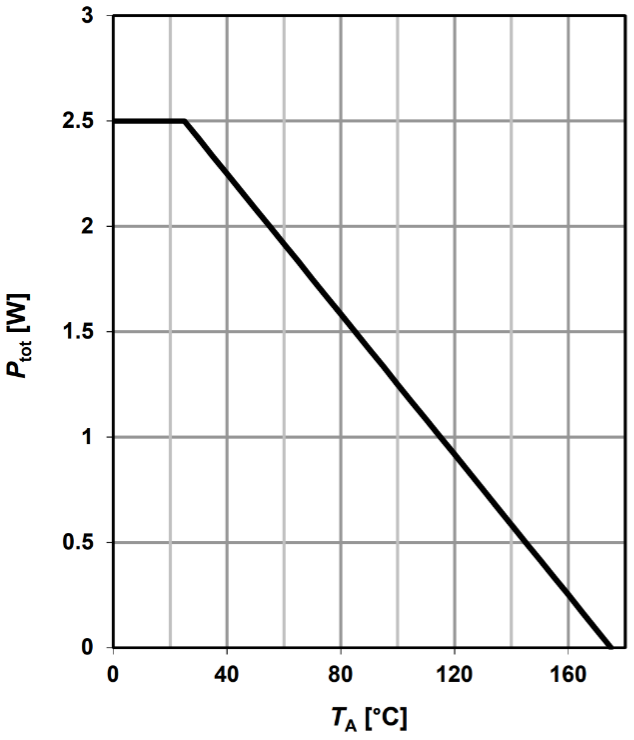
PCB 在静止空气中垂直放置。

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Dynamic characteristics							
Input capacitance	P	C_{iss}	V_{GS}=0 V, P: V_{DS}=-10 V, N: V_{DS}= 10 V, f=1 MHz	-	270	360	pF
	N			-	315	419	
Output capacitance	P	C_{oss}		-	110	150	
	N			-	114	152	
Reverse transfer capacitance	P	C_{rss}		-	94	140	
	N			-	16	24	
Turn-on delay time	P	$t_{d(on)}$	P: V_{DD}=-10 V, V_{GS}=-4.5 V, R_G=6 Ω, I_D=-3.2 A N: V_{DD}=10 V, V_{GS}=4.5 V, R_G=6 Ω, I_D=5.1 A	-	7.4	-	ns
	N			-	4.9	-	
Rise time	P	t_r		-	3.7	-	
	N			-	2.0	-	
Turn-off delay time	P	$t_{d(off)}$		-	11.3	-	
	N			-	12.2	-	
Fall time	P	t_f		-	4.7	-	
	N			-	1.4	-	
Gate Charge Characteristics							
Gate to source charge	P	Q_{gs}	V_{DD}=-10 V, I_D=-3.2 A, V_{GS}=0 to -4.5 V	-	-0.59	-0.8	nC
Gate to drain charge		Q_{gd}		-	-1.4	-1.8	
Switching charge		Q_g		-	-3.0	-4.5	
Gate plateau voltage		$V_{plateau}$		-	-2.2	-	
Gate to source charge	N	Q_{gs}	V_{DD}=10 V, I_D=5.1 A, V_{GS}=0 to 4.5 V	-	0.7	1.0	
Gate to drain charge		Q_{gd}		-	0.4	-	
Switching charge		Q_g			2.1	2.8	
Gate plateau voltage		$V_{plateau}$			2.3		

Parameter		Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Reverse Diode							
Diode continuous forward current	P	I_S	T_C=25 °C	-	-	-2.1	A
	N					2.3	
Diode pulse current	P	$I_{S,pulse}$		-	-	-13	
	N					20	
Diode forward voltage	P	V_{SD}	V_{GS}=0 V, I_F=3.2 A, T_j=25 °C	-	-0.98	-1.2	V
	N		V_{GS}=0 V, I_F=5.1 A, T_j=25 °C	-	0.9	1.2	
Reverse recovery time	P	t_{rr}	V_R=±10 V, I_F=I_S, di_F/dt =100 A/µs		12.2		ns
	N			-	10.9	-	
Reverse recovery charge	P	Q_{rr}			4.6		nC
	N			-	3.4	-	

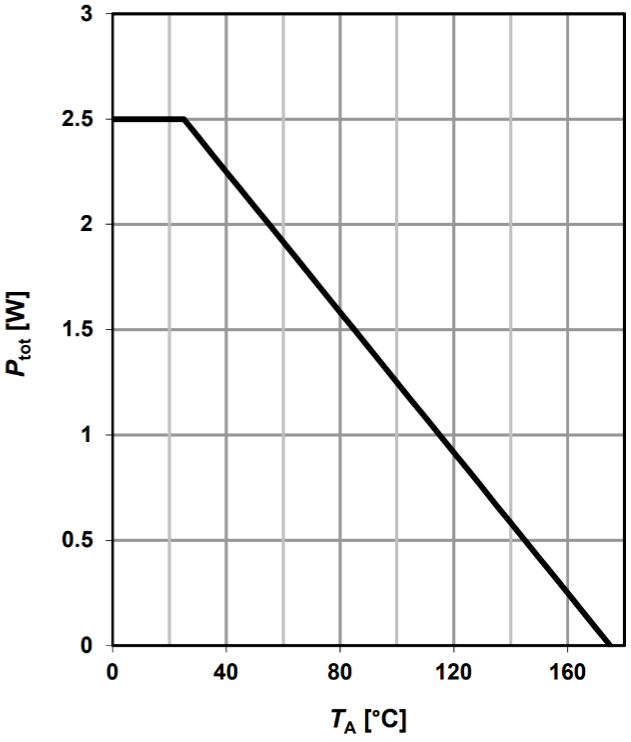
1 功率耗散 (P)

$P_{tot}=f(T_A)$



2 功率耗散(N)

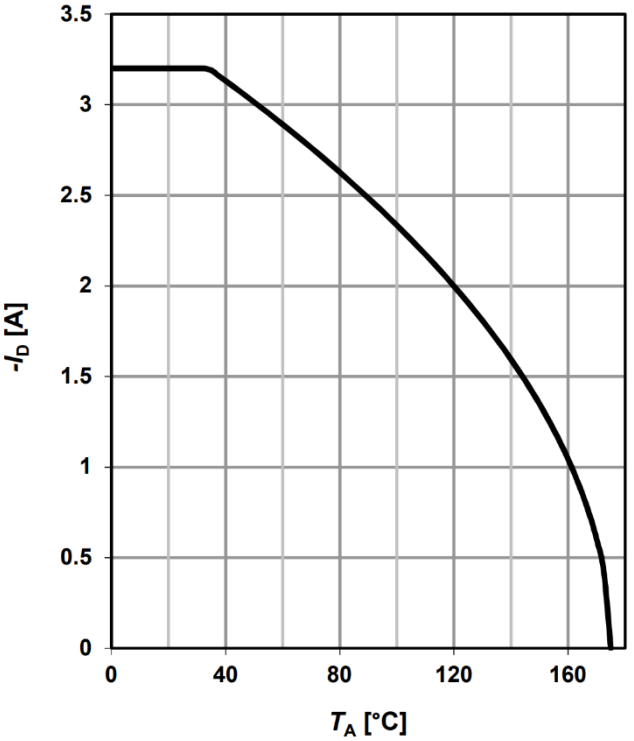
$P_{tot}=f(T_A)$



3 漏极电流 (P)

$I_D=f(T_A)$

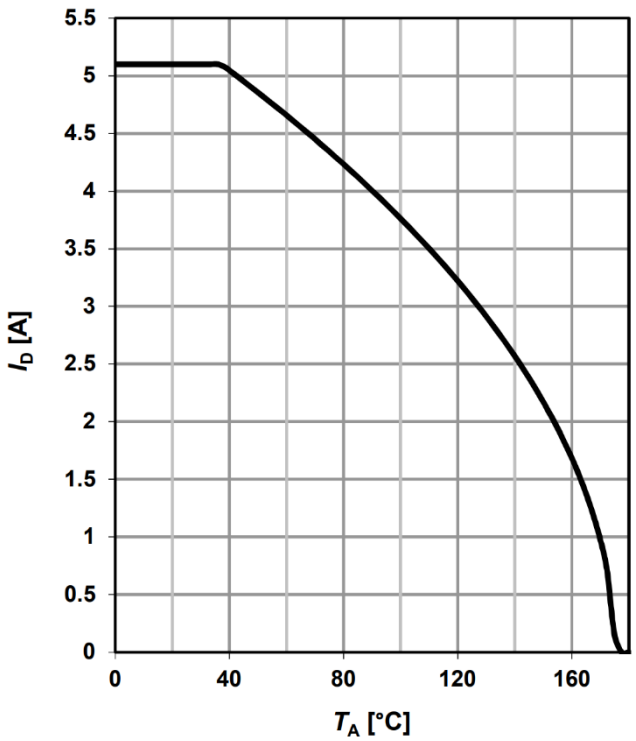
parameter: $V_{GS}\leq$-4.5 V



4 漏极电流 (N)

$I_D=f(T_A)$

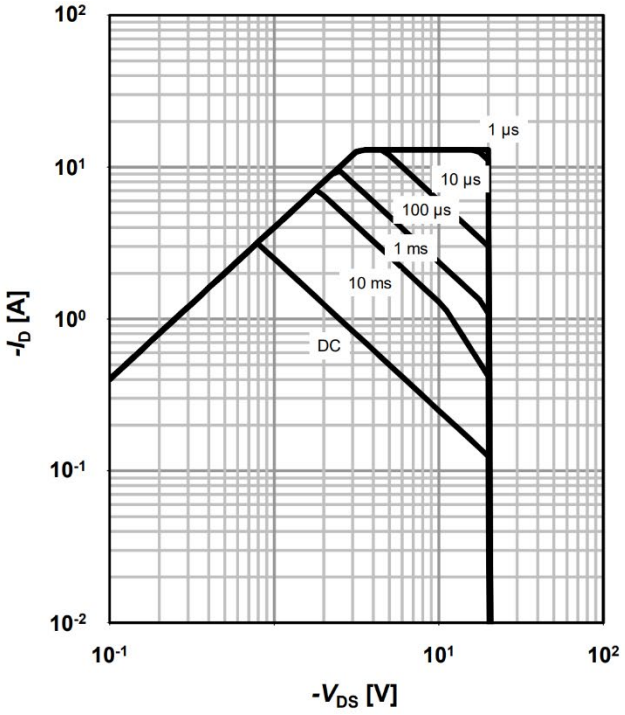
parameter: $V_{GS}\geq$4.5 V



6 安全工作区(P)

I_D=f(V_{DS}); T_A=25 °C; D =0

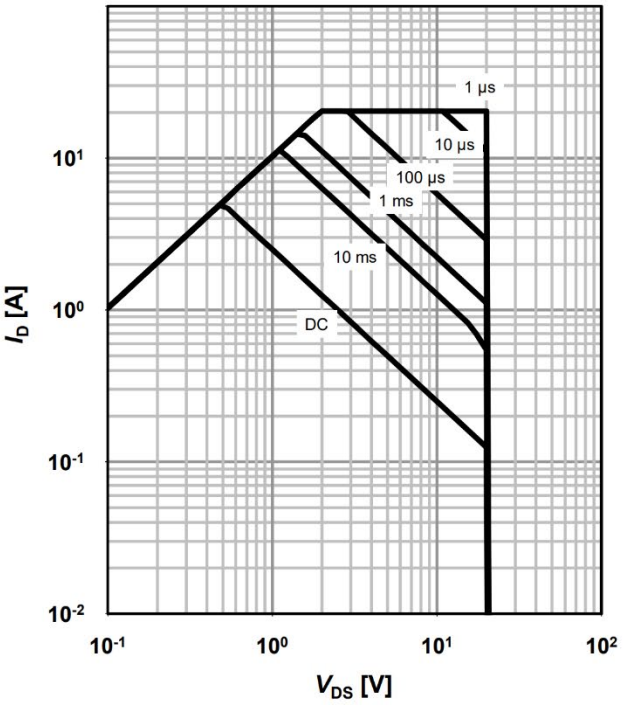
parameter: t_p



6 安全工作区 (N)

I_D=f(V_{DS}); T_A=25 °C; D =0

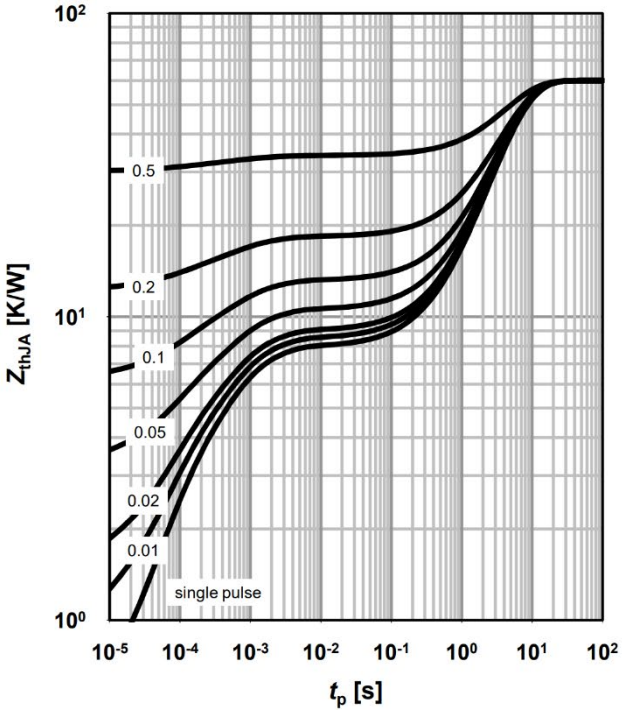
parameter: t_p



7 最大瞬态热阻抗(P)

Z_{thJA}=f(t_p)

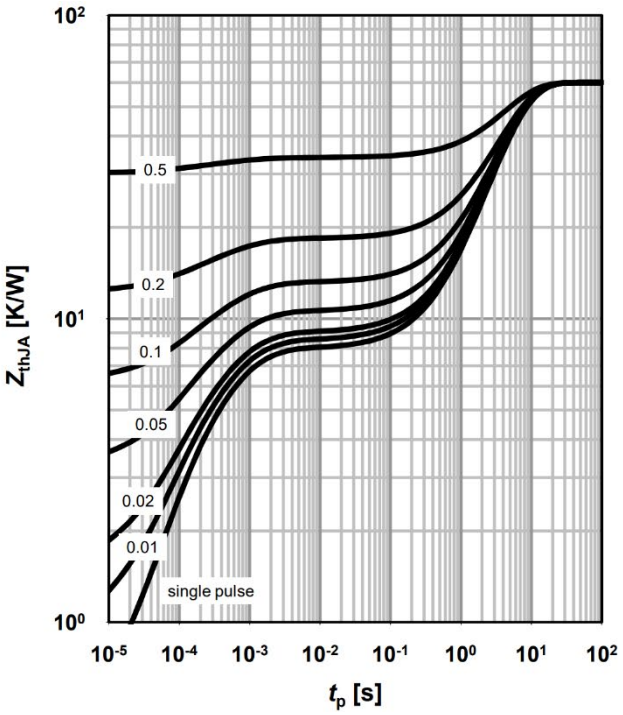
parameter: D =t_p/T



8 最大瞬态热阻抗 (N)

Z_{thJA}=f(t_p)

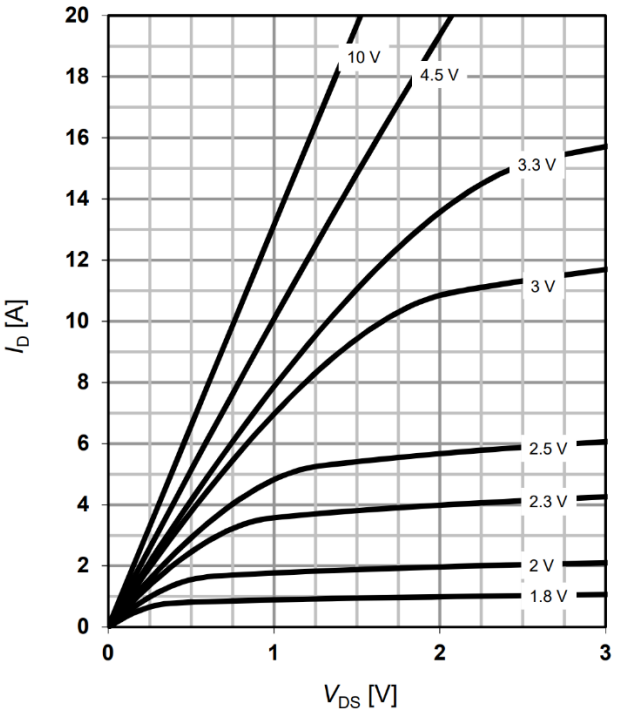
parameter: D =t_p/T



10 典型输出特性(P)

I_D=f(V_{DS}); T_j=25 °C

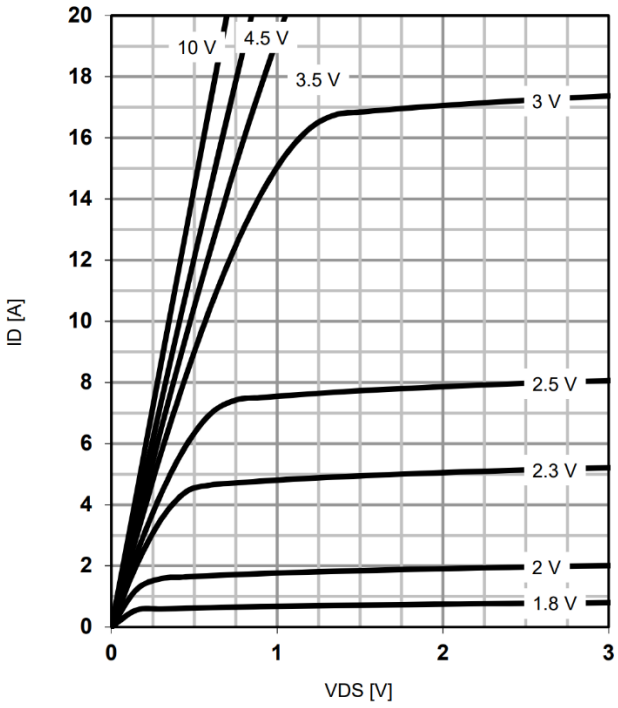
parameter: V_{GS}



10 典型输出特性(N)

I_D=f(V_{DS}); T_j=25 °C

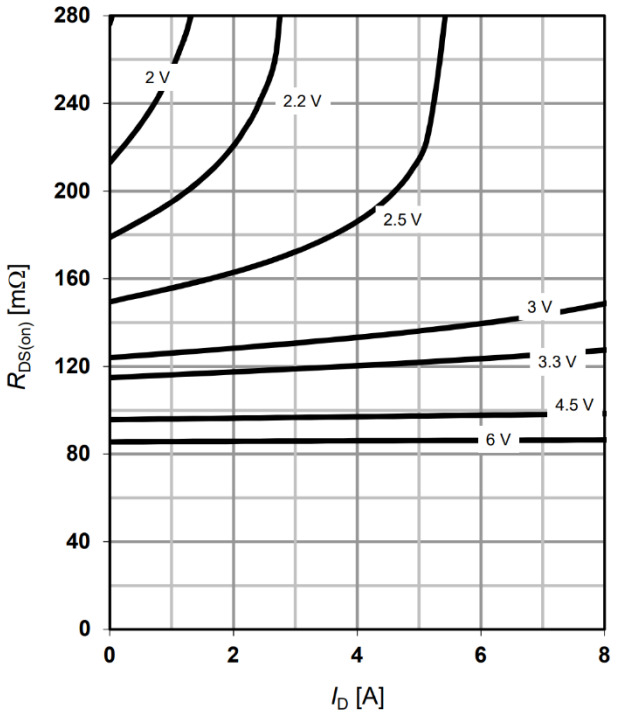
parameter: V_{GS}



11 典型漏源导通电阻 (P)

$R_{DS(on)}$=f(I_D); T_j=25 °C

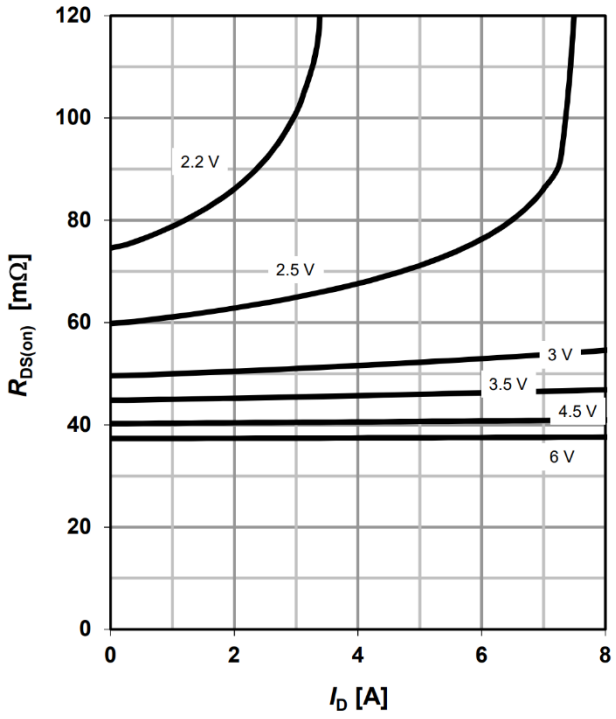
parameter: V_{GS}



12 典型漏源导通电阻 (N)

$R_{DS(on)}$=f(I_D); T_j=25 °C

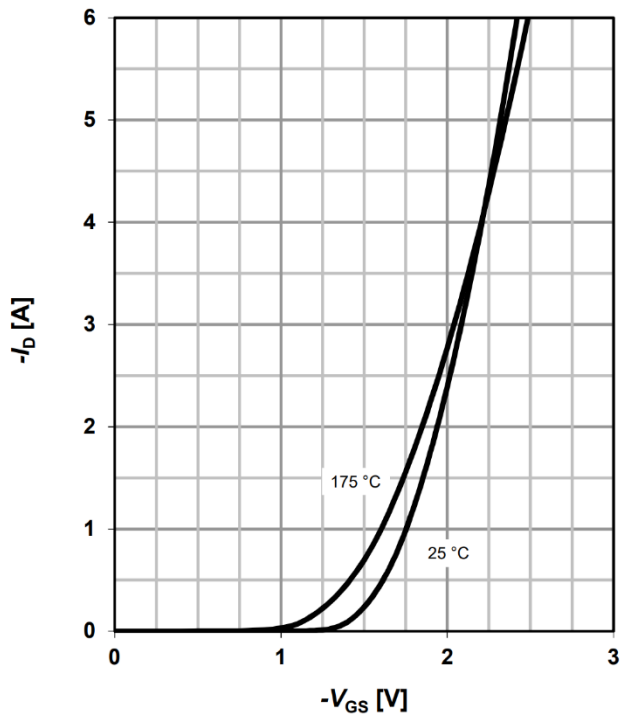
parameter: V_{GS}



14 典型转移特性 (P)

$I_D=f(V_{GS})$; $|V_{DS}|>2\,|I_D|\,R_{DS(on)max}$

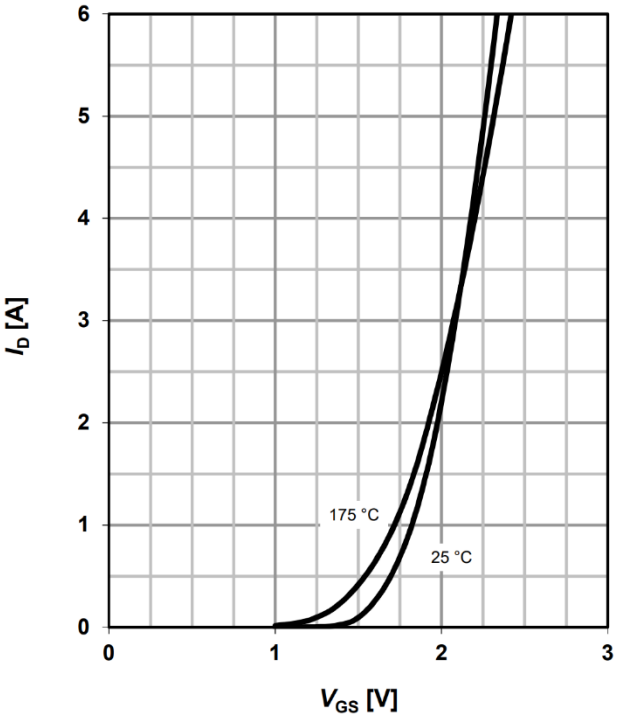
parameter: T_j



14 典型转移特性(N)

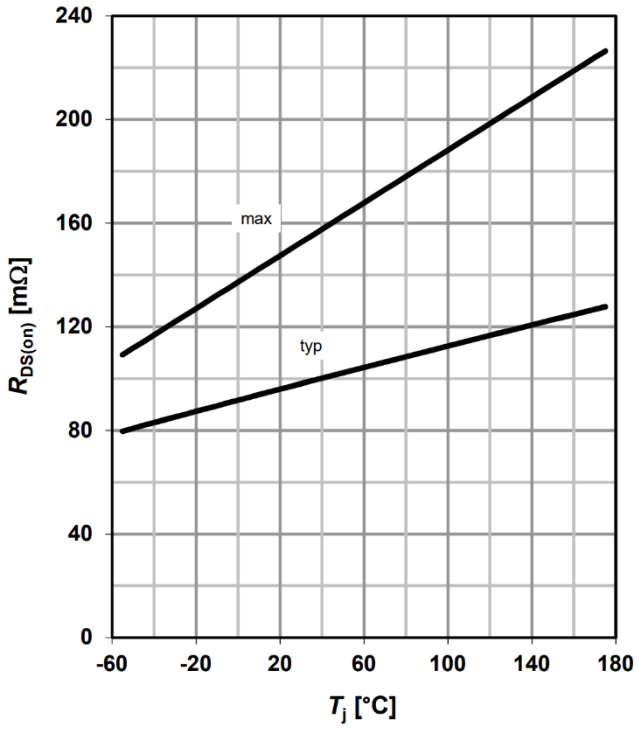
$I_D=f(V_{GS})$; $|V_{DS}|>2\,|I_D|\,R_{DS(on)max}$

parameter: T_j



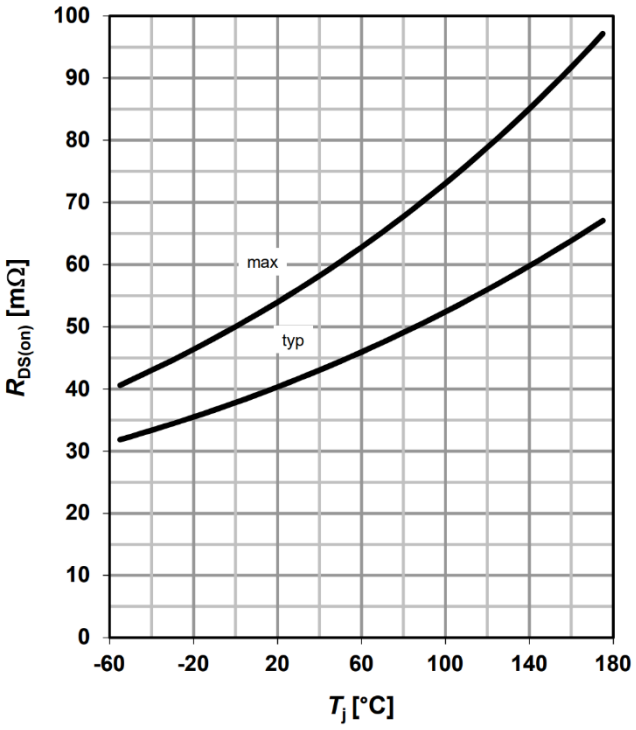
15 漏源导通电阻(P)

$R_{DS(on)}=f(T_j)$; I_D=-3.2 A; V_{GS}=-4.5 V



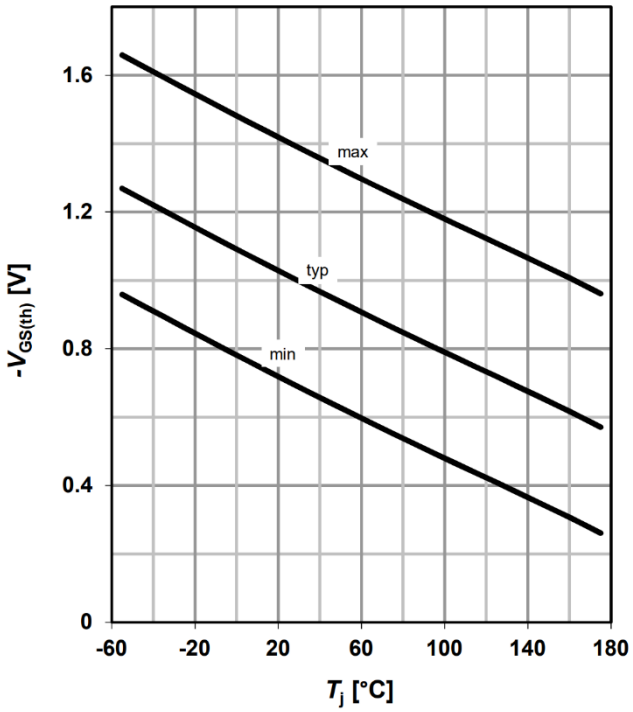
16 漏源导通电阻(N)

$R_{DS(on)}=f(T_j)$; I_D=5.1A; V_{GS}=4.5 V



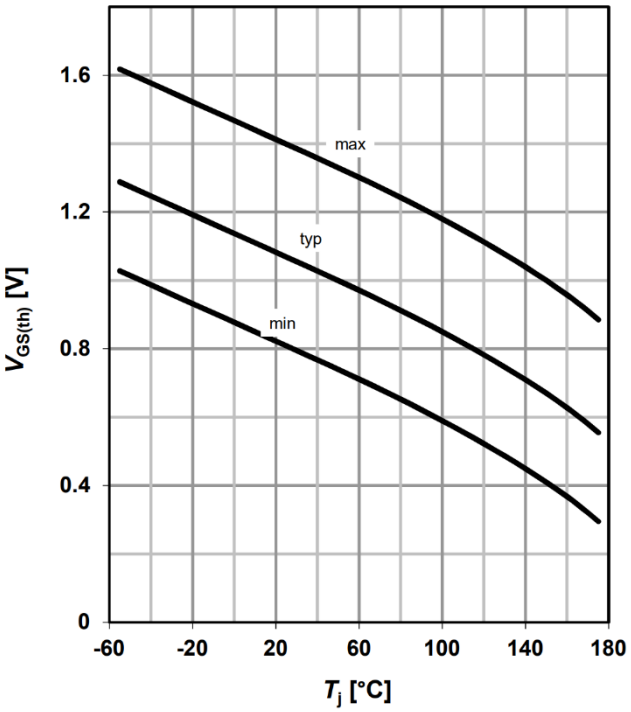
18 典型栅极阈值电压(P)

$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$; I_D=-110 µA



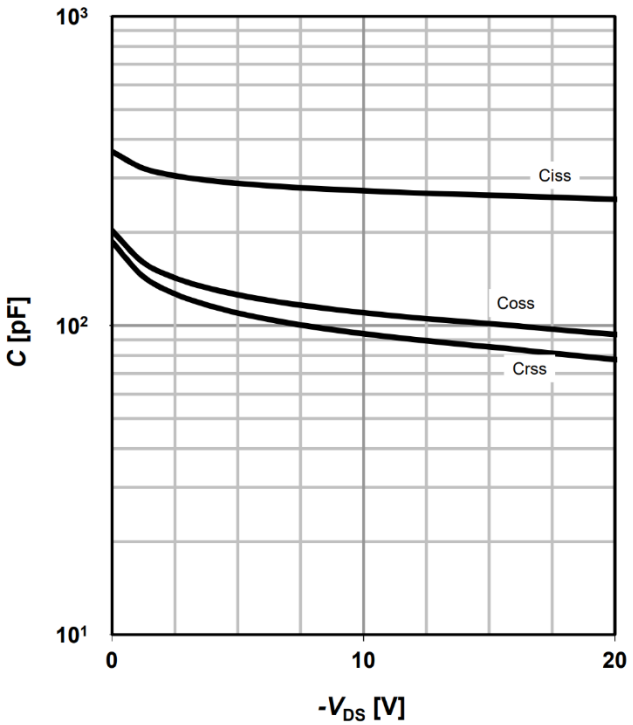
18 典型栅极阈值电压(N)

$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$; I_D=110 µA



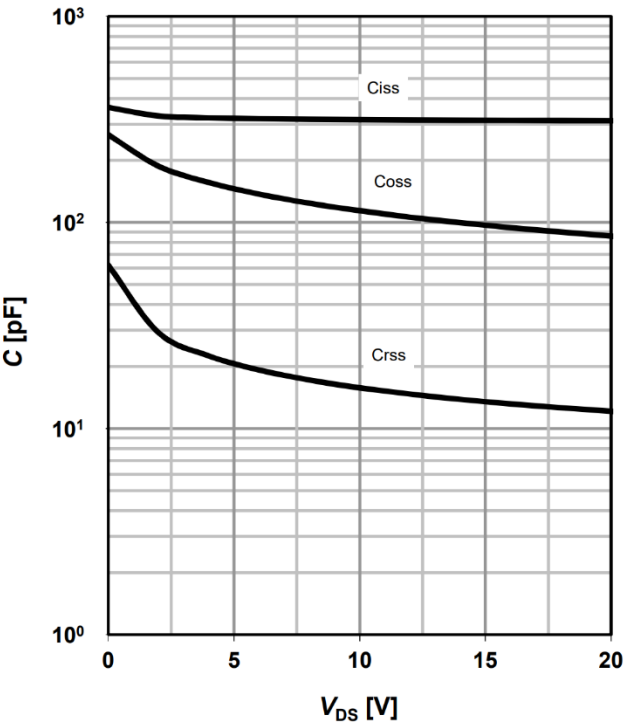
19 典型电容值(P)

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



20 典型电容值 (N)

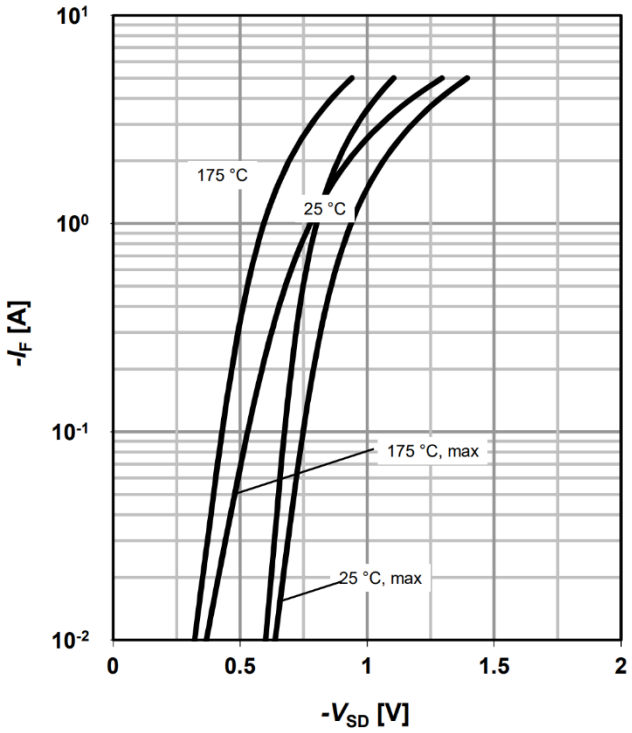
$C=f(V_{DS})$; V_{GS}=0 V; f=1 MHz



22 反向二极管的正向特性 (P)

$I_F=f(V_{SD})$

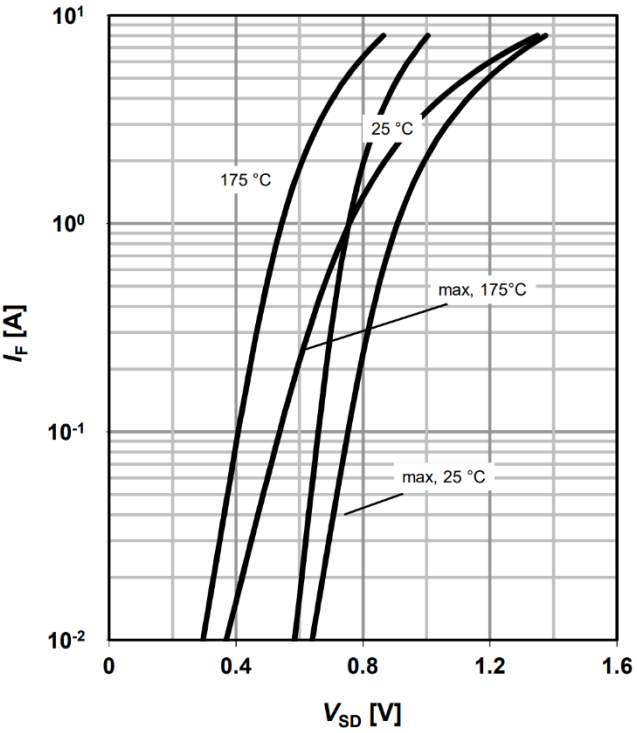
parameter: T_j



22 反向二极管的正向特性 (N)

$I_F=f(V_{SD})$

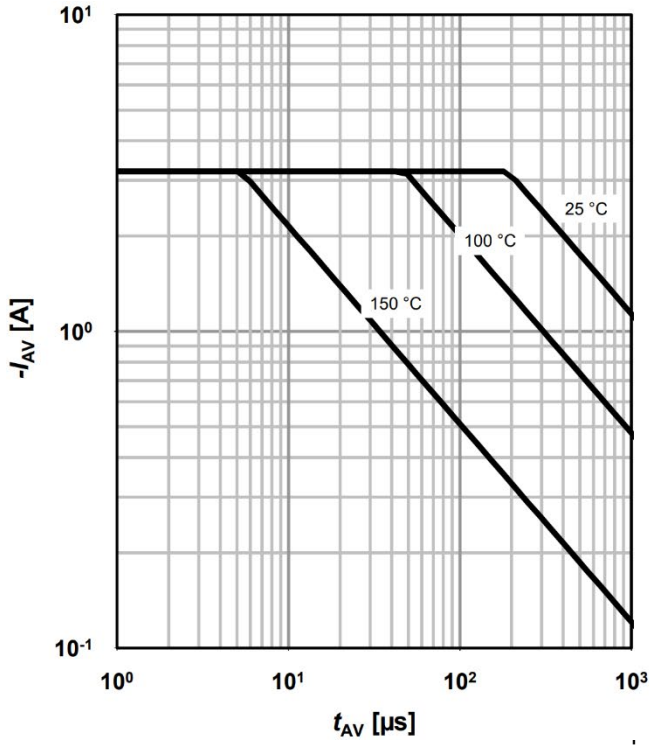
parameter: T_j



23 雪崩特性(P)

$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$

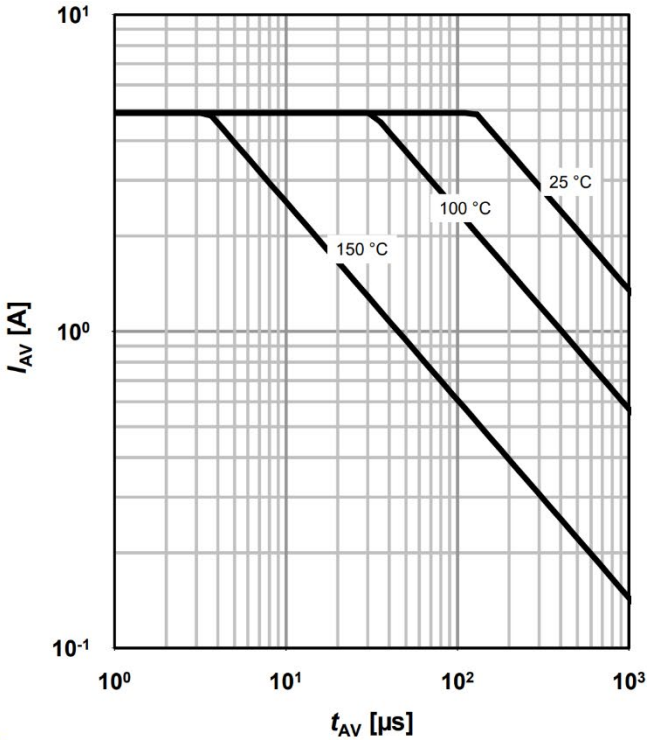
parameter: $T_{j(start)}$



24 雪崩特性(N)

$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$

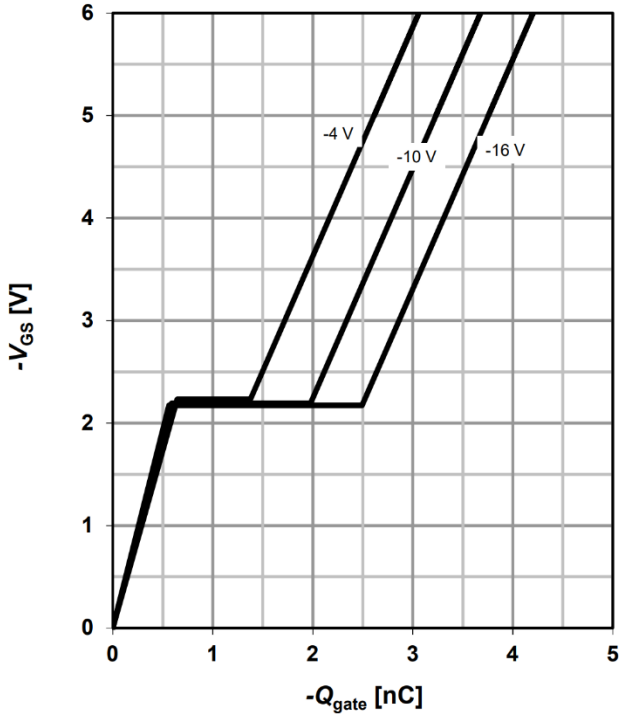
parameter: $T_{j(start)}$



26 典型栅极电荷 (P)

V_{GS}=f(Q_{gate}); I_D=-3.2A pulsed

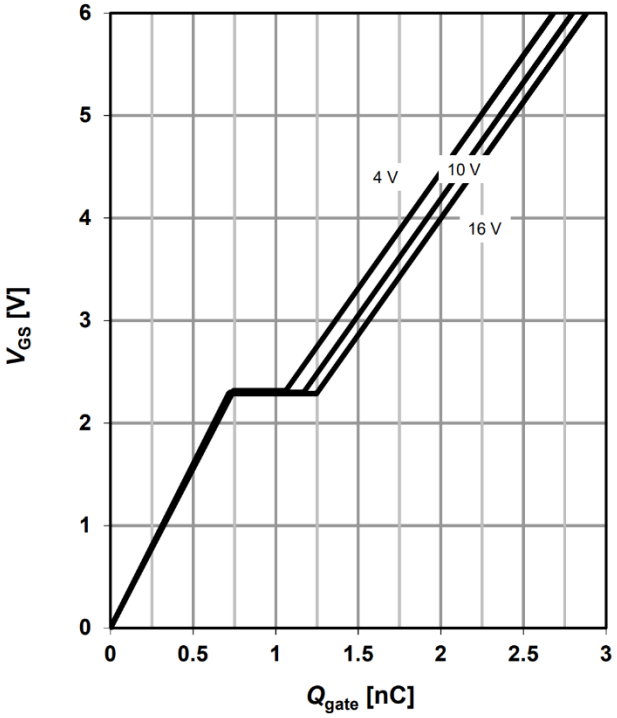
parameter: V_{DD}



26 典型栅极电荷 (N)

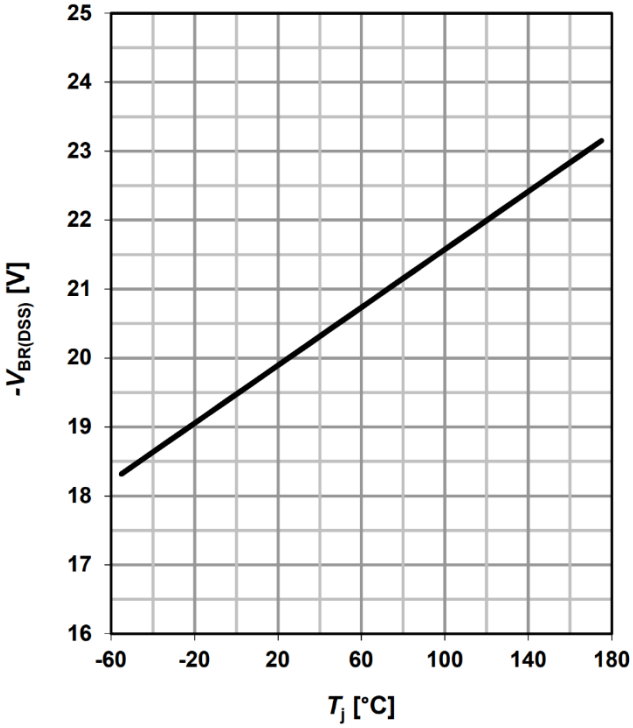
V_{GS}=f(Q_{gate}); I_D=5.1A pulsed

parameter: V_{DD}



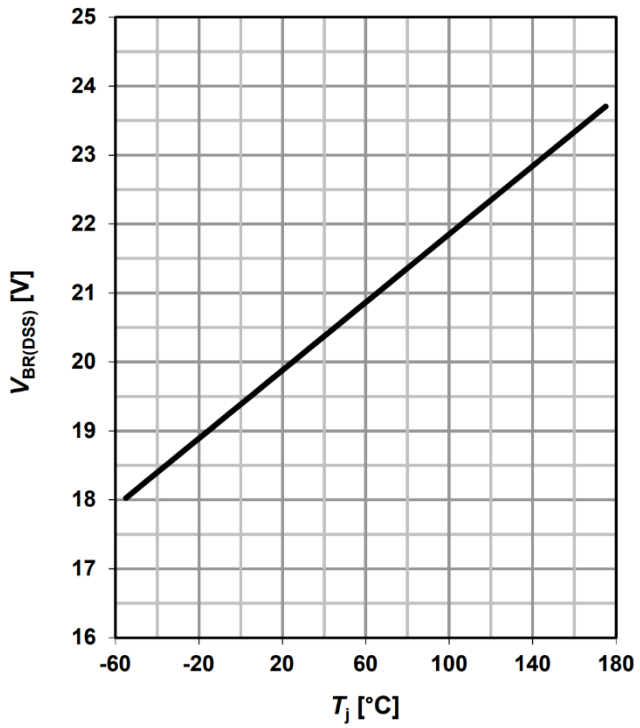
27 漏源击穿电压 (P)

$V_{BR(DSS)}$=f(T_j); I_D=-250 µA

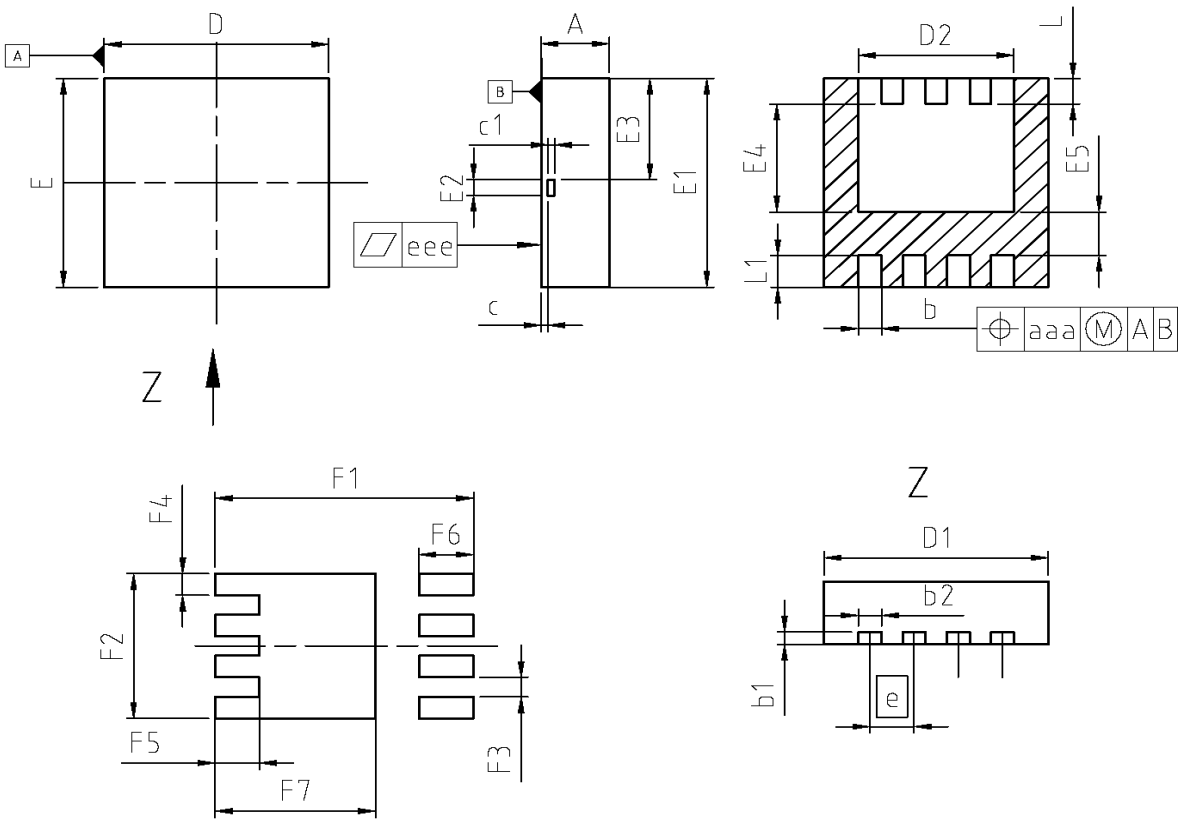


28 漏源击穿电压 (N)

$V_{BR(DSS)}$=f(T_j); I_D=250 µA



封装外形：PG-TSDSON-8



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.95	1.00	0.037	0.039
b	0.25	0.35	0.010	0.014
b1	0.10	0.30	0.004	0.012
b2	0.20	0.40	0.008	0.016
c	0.00	0.20	0.000	0.008
D=D1	3.20	3.40	0.126	0.134
D2	2.15	2.35	0.085	0.093
E=E1	3.20	3.40	0.126	0.134
E2	0.10	0.30	0.004	0.012
E3	1.35	1.55	0.053	0.061
E4	1.60	1.80	0.063	0.071
E5	0.66	0.86	0.026	0.034
e	0.60	0.70	0.024	0.028
N	8		8	
L	0.31	0.51	0.012	0.020
L1	0.33	0.53	0.013	0.021
aaa	0.25		0.010	
eee	0.05		0.002	
F1	3.70	3.90	0.146	0.154
F2	2.19	2.39	0.086	0.094
F3	0.21	0.41	0.008	0.016
F4	0.24	0.44	0.009	0.017
F5	0.55	0.75	0.022	0.030
F6	0.70	0.90	0.028	0.035
F7	2.26	2.46	0.089	0.097

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英飞凌OptiMOS™ 2 + OptiMOS™P 2 小信号晶体管

BSZ15DC02KD H

修订记录

BSZ15DC02KD H

Revision: 2019-01-30, Rev. 2.3

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.3	2019-01-30	Update Marking

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