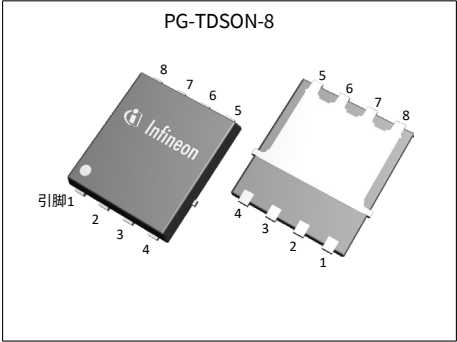


英飞凌MOSFET功率晶体管

英飞凌BSC0302LS OptiMOS™ 3 120 V 150°C功率晶体管

特性

- N沟道，逻辑电平
- 100% 雪崩测试
- 出色的栅极电荷与 RDS(on) 乘积 (FOM)
- 极低的导通电阻RDS(on)
- 工作温度150°C
- 无铅镀层；符合RoHS标准
- 非常适合高频开关和同步整流
- 符合 IEC61249-2-21 标准的无卤素

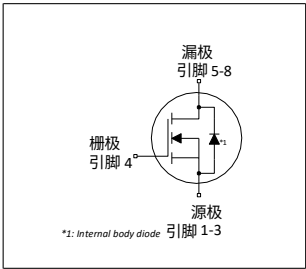


产品验证

符合 JEDEC 标准

表 1 主要性能参数

Parameter	Value	Unit
V_{DS}	120	V
$R_{DS(on),max}$	8.0	mΩ
I_D	99	A
Q_{oss}	79	nC
$Q_G(0V..10V)$	79	nC



Type / Ordering Code	Package	Marking	Related Links
BSC0302LS	PG-TDSON-8	0302LS	-

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OptiMOS™ 3 功率晶体管，120 V

BSC0302LS

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1 最大额定值

除非另有规定, $T_A = 25\text{ °C}$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	-	-	99 77 12	A	$V_{GS}=10\text{ V}$, $T_C=25\text{ °C}$ $V_{GS}=10\text{ V}$, $T_C=100\text{ °C}$ $V_{GS}=4.5\text{ V}$, $T_A=25\text{ °C}$, $R_{thJA}=45\text{ °C/W}^{1)}$
Pulsed drain current ²⁾	$I_{D,pulse}$	-	-	394	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse ³⁾	E_{AS}	-	-	377	mJ	$I_D=50\text{ A}$, $R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	156	W	$T_C=25\text{ °C}$
Operating and storage temperature	T_j , T_{stg}	-55	-	150	°C	IEC climatic category; DIN IEC 68-1: 55/150/56

2 热特性

表3 热特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case, bottom	R_{thJC}	-	0.45	0.8	°C/W	-
Thermal resistance, junction - case, top	R_{thJC}	-	-	18	°C/W	-
Thermal resistance, junction - ambient, minimal footprint	R_{thJA}	-	-	62	°C/W	-
Thermal resistance, junction - ambient, 6 cm ² cooling area ²⁾	R_{thJA}	-	-	45	°C/W	-

¹⁾器件位于 40 mm x 40 mm x 1.5 mm 环氧树脂 PCB FR4 上, 具有 6 cm² (一层, 70 µm 厚) 的铜面积用于漏极连接。PCB 在静止空气中垂直放置。

²⁾详细信息请参见图 3

³⁾详细信息请参见图 13

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3 电气特性

除非另有规定, $T_j = 25\text{ °C}$

表4 静态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	120	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	1.2	1.85	2.4	V	$V_{DS}=V_{GS}$, $I_D=112\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.01 1	1 100	μA	$V_{DS}=120\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=120\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	1	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	6.5 7.8	8.0 9.5	m Ω	$V_{GS}=10\text{ V}$, $I_D=50\text{ A}$ $V_{GS}=4.5\text{ V}$, $I_D=25\text{ A}$
Gate resistance	R_G	-	0.85	-	Ω	-
Transconductance	g_{fs}	60	120	-	S	$ V_{DS} \geq 2 I_D R_{DS(on)max}$, $I_D=50\text{ A}$

表5 动态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance ¹⁾	C_{iss}	-	5600	7400	pF	$V_{GS}=0\text{ V}$, $V_{DS}=60\text{ V}$, $f=1\text{ MHz}$
Output capacitance ¹⁾	C_{oss}	-	590	770	pF	$V_{GS}=0\text{ V}$, $V_{DS}=60\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance ¹⁾	C_{rss}	-	28	42	pF	$V_{GS}=0\text{ V}$, $V_{DS}=60\text{ V}$, $f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	$V_{DD}=60\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=25\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Rise time	t_r	-	9	-	ns	$V_{DD}=60\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=25\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	37	-	ns	$V_{DD}=60\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=25\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$
Fall time	t_f	-	13	-	ns	$V_{DD}=60\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=25\text{ A}$, $R_{G,ext}=1.6\text{ }\Omega$

表6 栅极电荷特性²⁾

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	17.5	-	nC	$V_{DD}=60\text{ V}$, $I_D=25\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate to drain charge	Q_{gd}	-	12.9	-	nC	$V_{DD}=60\text{ V}$, $I_D=25\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Switching charge	Q_{sw}	-	20.1	-	nC	$V_{DD}=60\text{ V}$, $I_D=25\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate charge total	Q_g	-	79	-	nC	$V_{DD}=60\text{ V}$, $I_D=25\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	3.1	-	V	$V_{DD}=60\text{ V}$, $I_D=25\text{ A}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge	Q_{oss}	-	79	-	nC	$V_{DD}=60\text{ V}$, $V_{GS}=0\text{ V}$

¹⁾由设计标定, 不受限于生产测试。

²⁾参数定义请参见“栅极充电波形”

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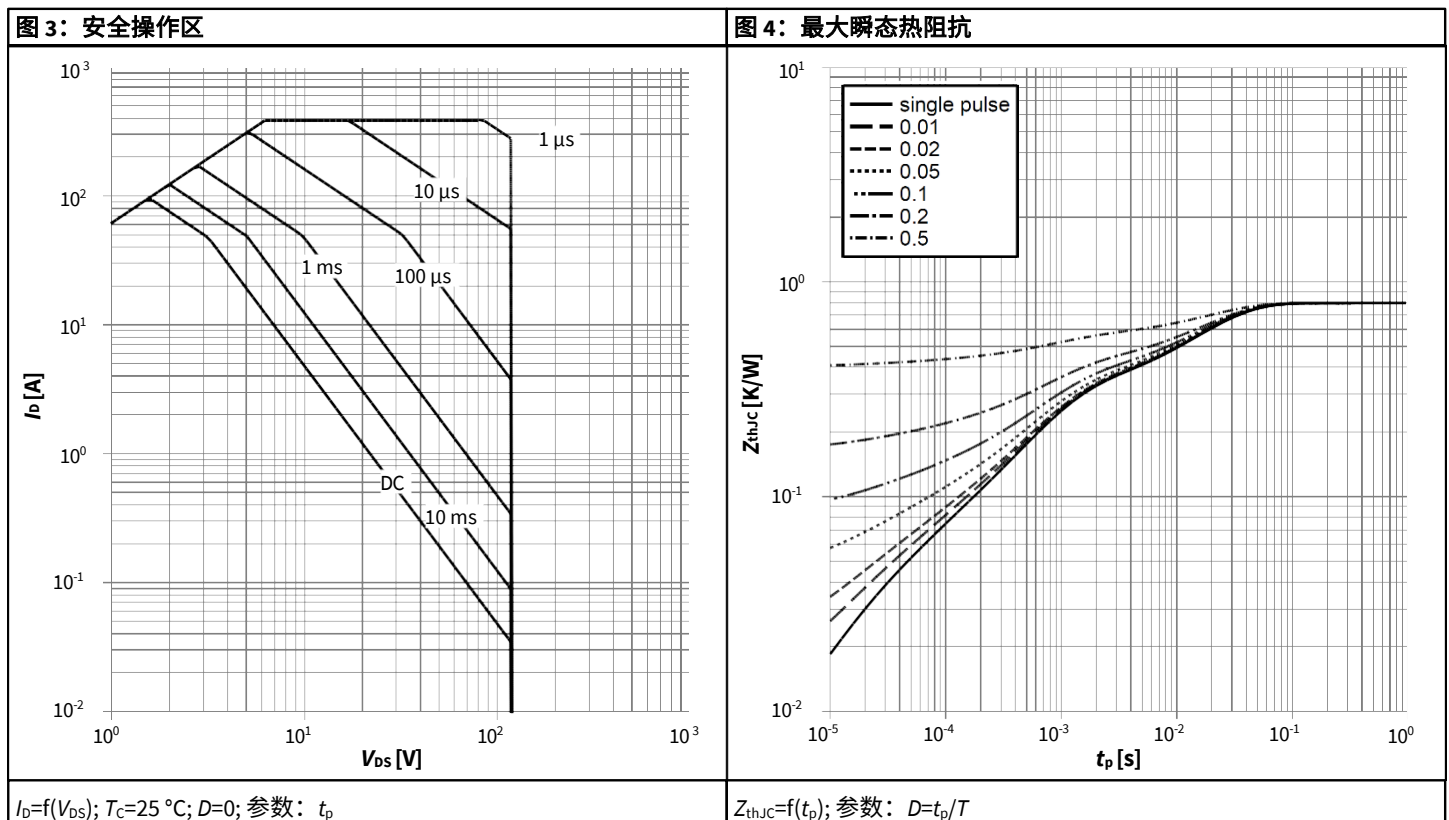
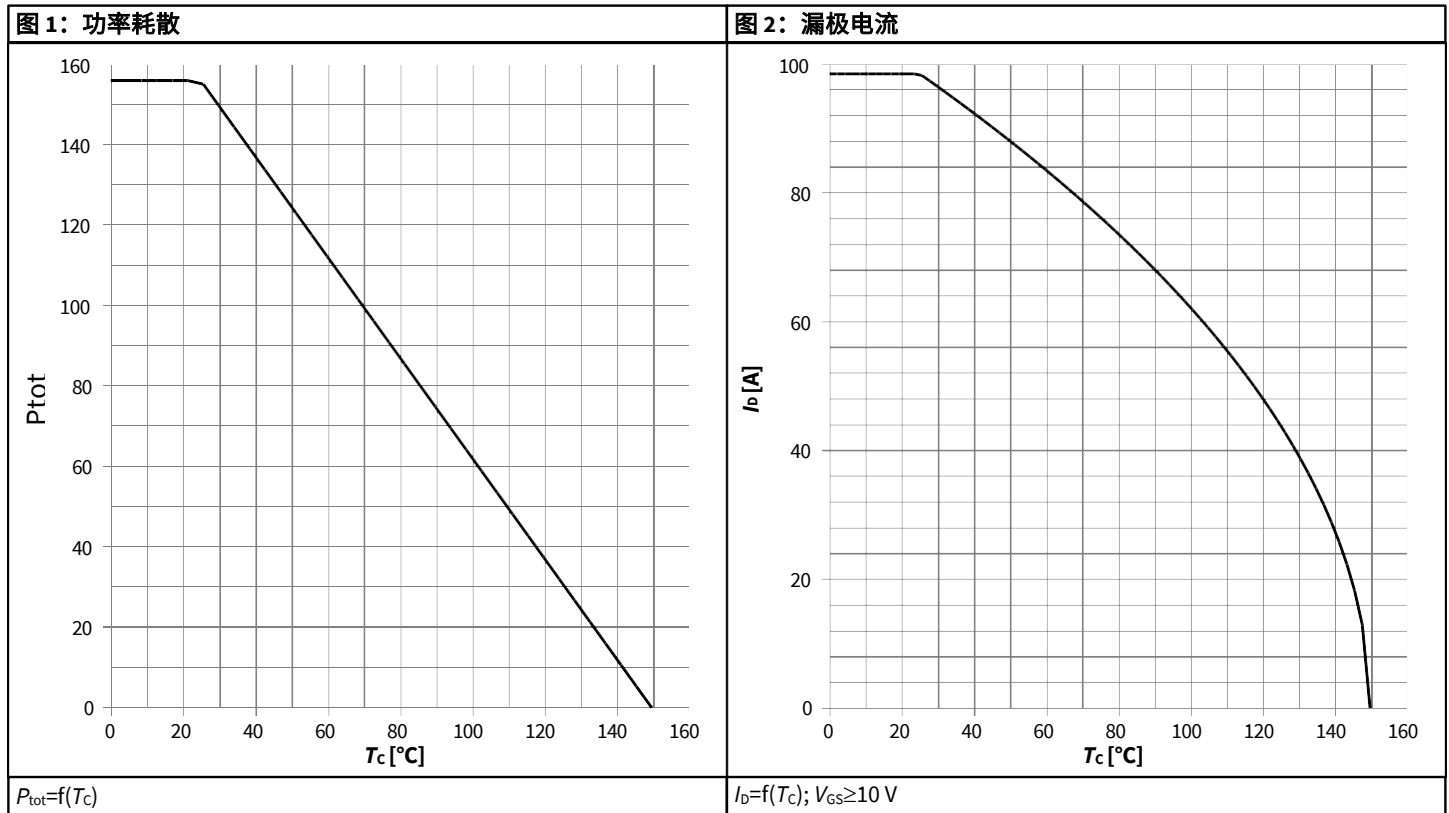
表 7 反向二极管

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	109	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	394	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.88	1.2	V	$V_{GS}=0\text{ V}$, $I_F=50\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time	t_{rr}	-	107	-	ns	$V_R=60\text{ V}$, $I_F=25\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge	Q_{rr}	-	220	-	nC	$V_R=60\text{ V}$, $I_F=25\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$

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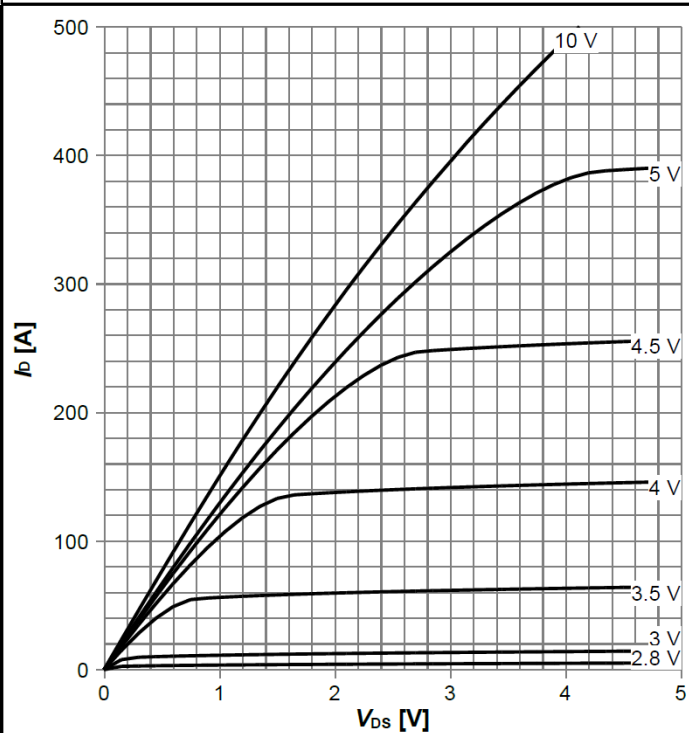
4 电气特性图



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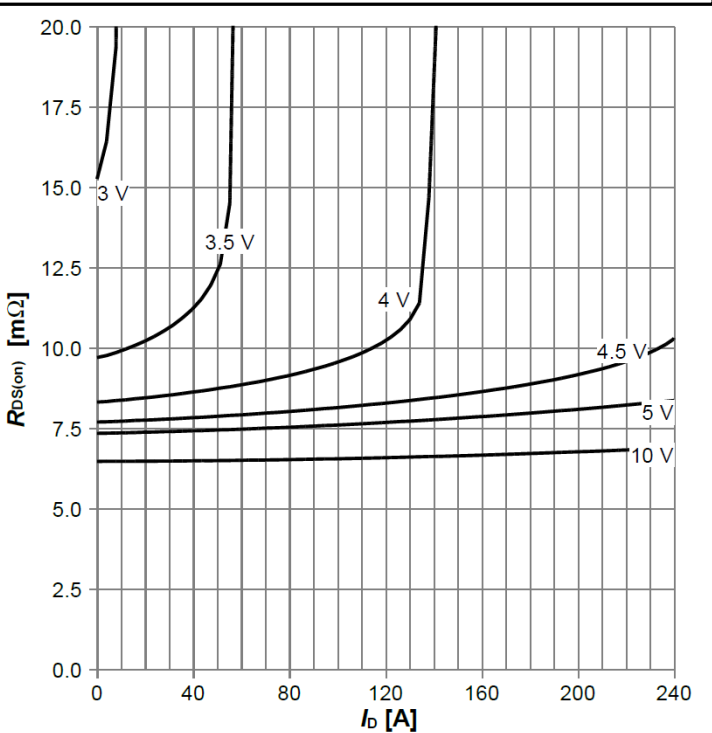
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图 5：典型输出特性



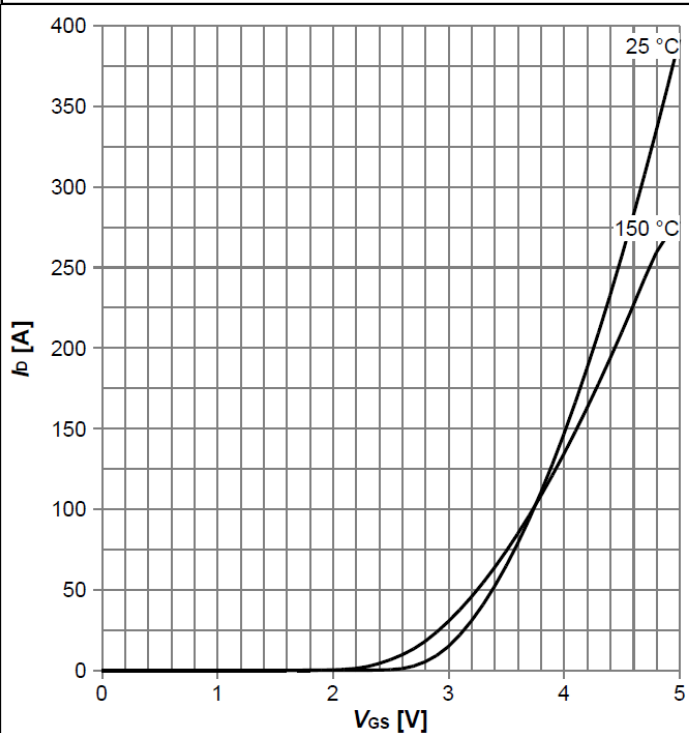
$I_D = f(V_{DS})$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

图 6：典型漏源导通电阻



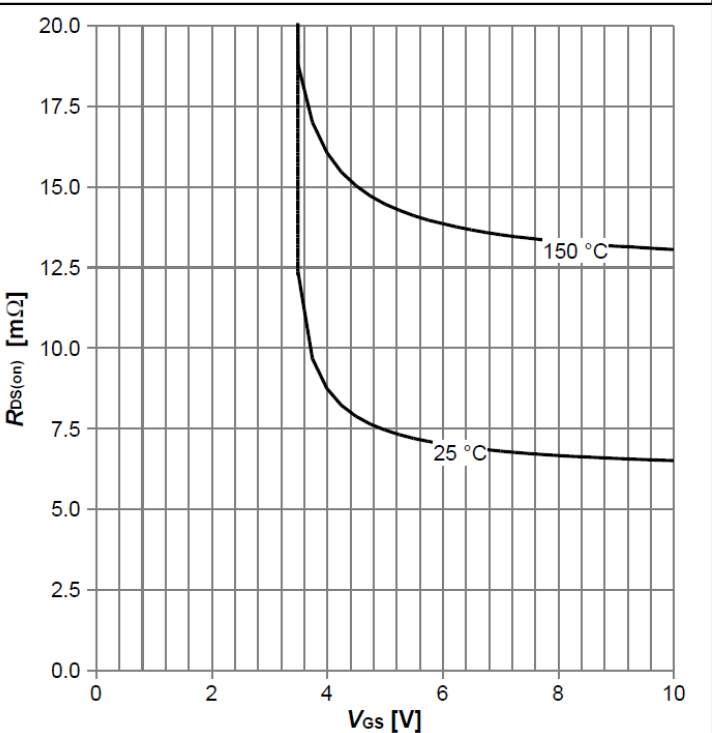
$R_{DS(on)} = f(I_D)$, $T_j = 25^\circ\text{C}$; 参数: V_{GS}

图 7：典型转移特性



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

图 8：典型漏源导通电阻

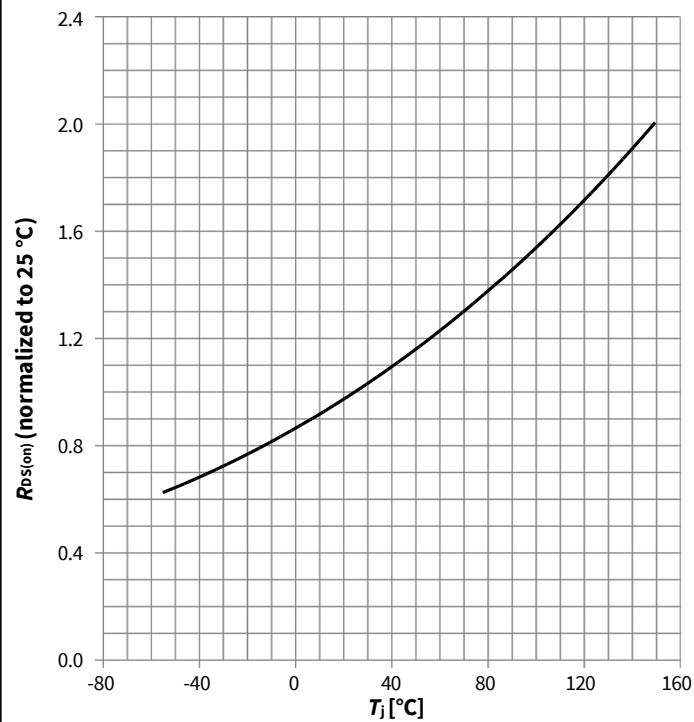


$R_{DS(on)} = f(V_{GS})$, $I_D = 50\text{ A}$; parameter: T_j

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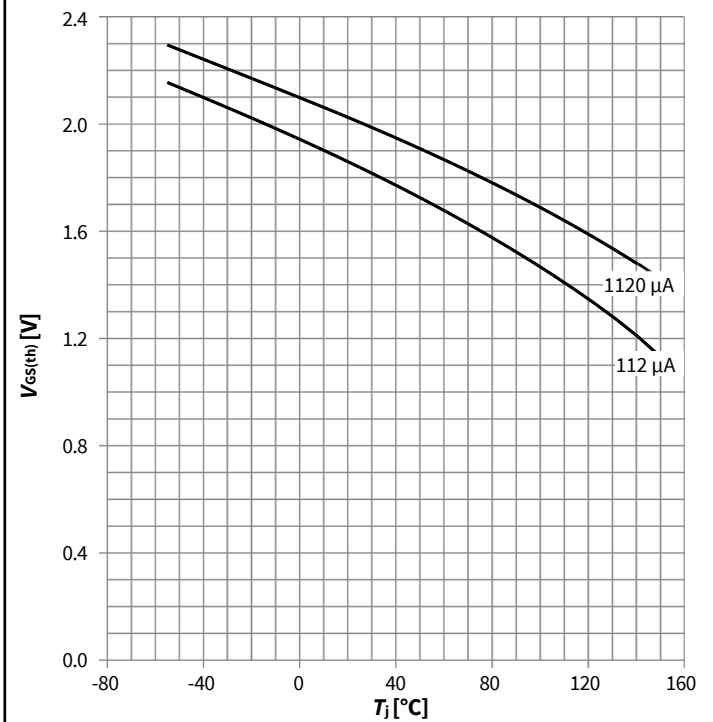
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图 9：典型漏源导通电阻



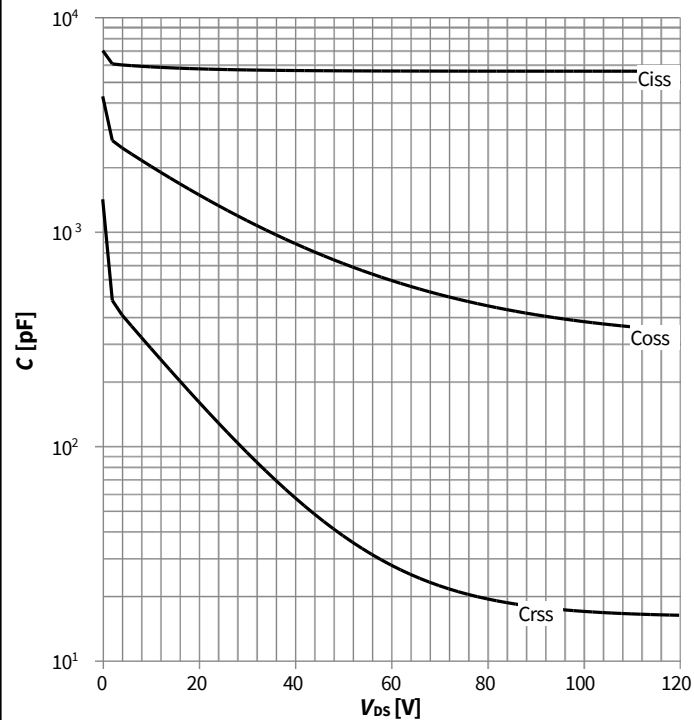
$R_{DS(on)} = f(T_j)$, $I_D = 50 \text{ A}$, $V_{GS} = 10 \text{ V}$

图 10：典型栅极阈值电压



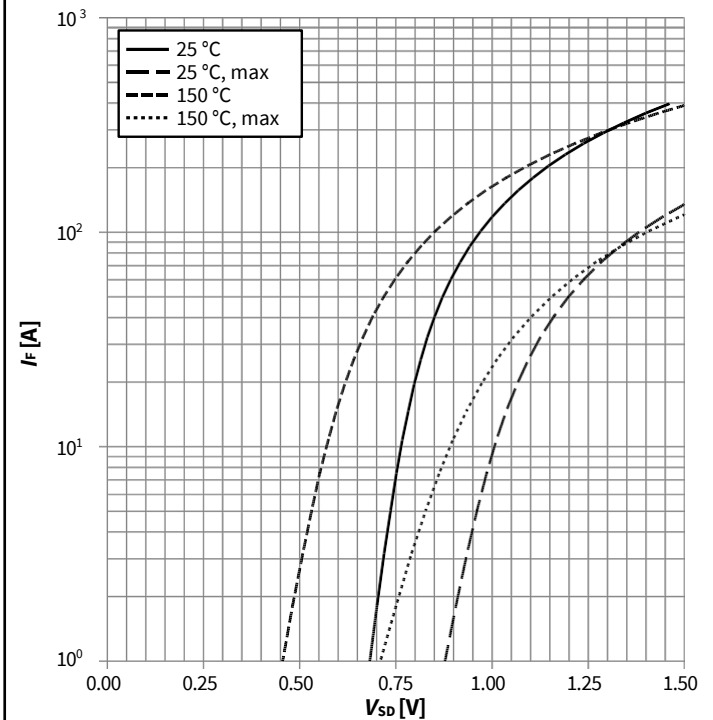
$V_{GS(th)} = f(T_j)$, $V_{GS} = V_{DS}$; 参数: I_D

图 11：典型电容值



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

图 12：反向二极管的正向特性

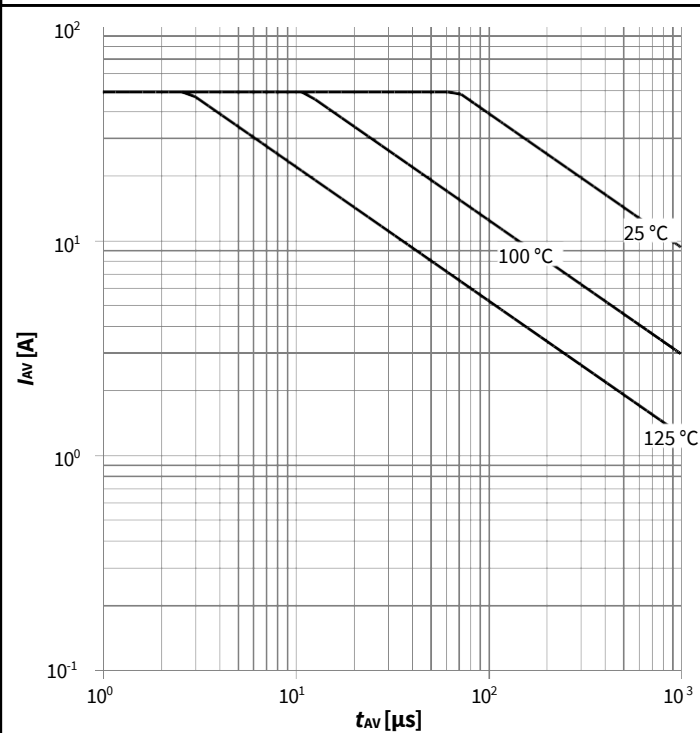


$I_F = f(V_{SD})$; 参数: T_j

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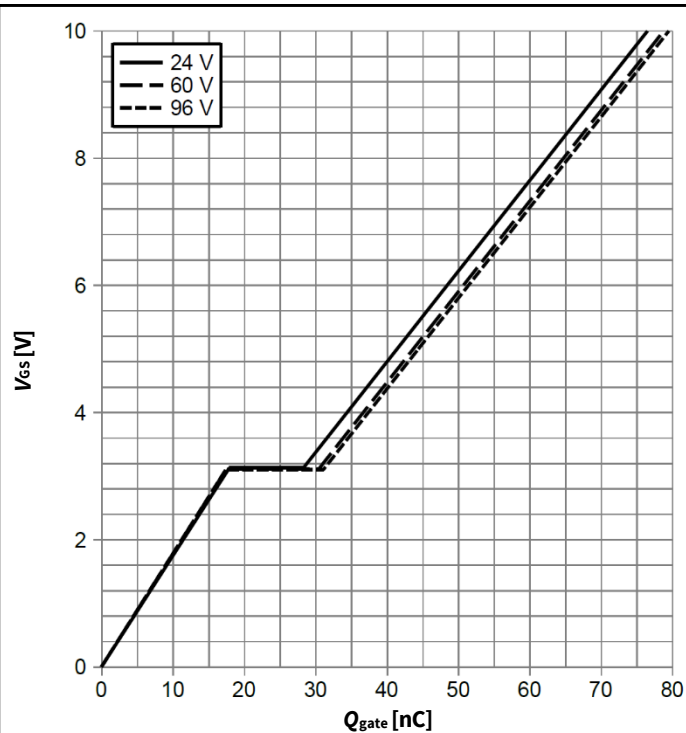
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图 13：雪崩特性



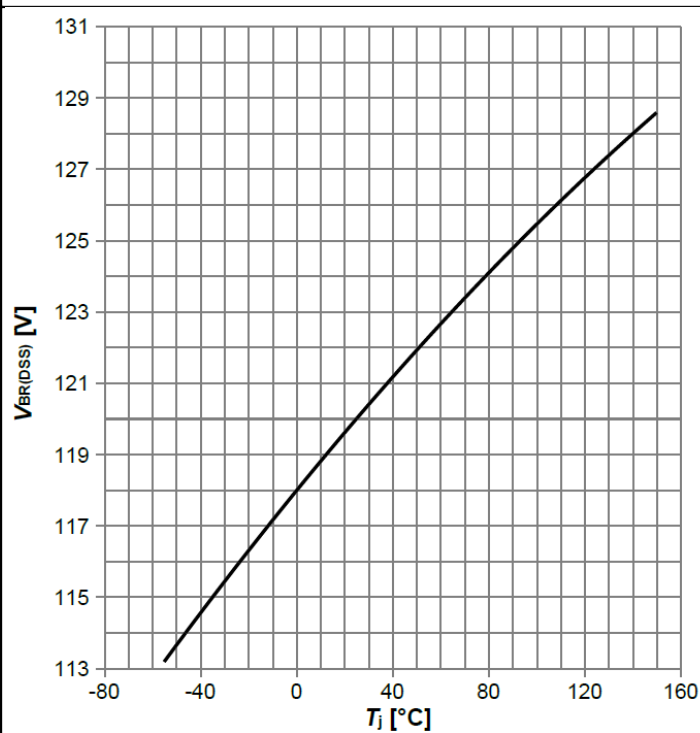
$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$; parameter: $T_{j,start}$

图 14：典型栅极电荷



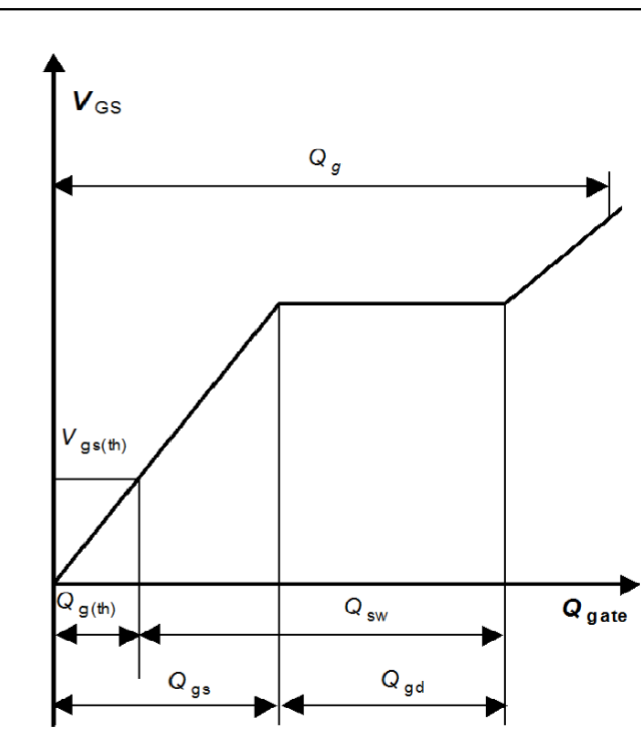
$V_{GS}=f(Q_{gate})$, $I_D=25\text{ A}$ 脉冲, $T_j=25\text{ °C}$; parameter: V_{DD}

图 15：漏源击穿电压

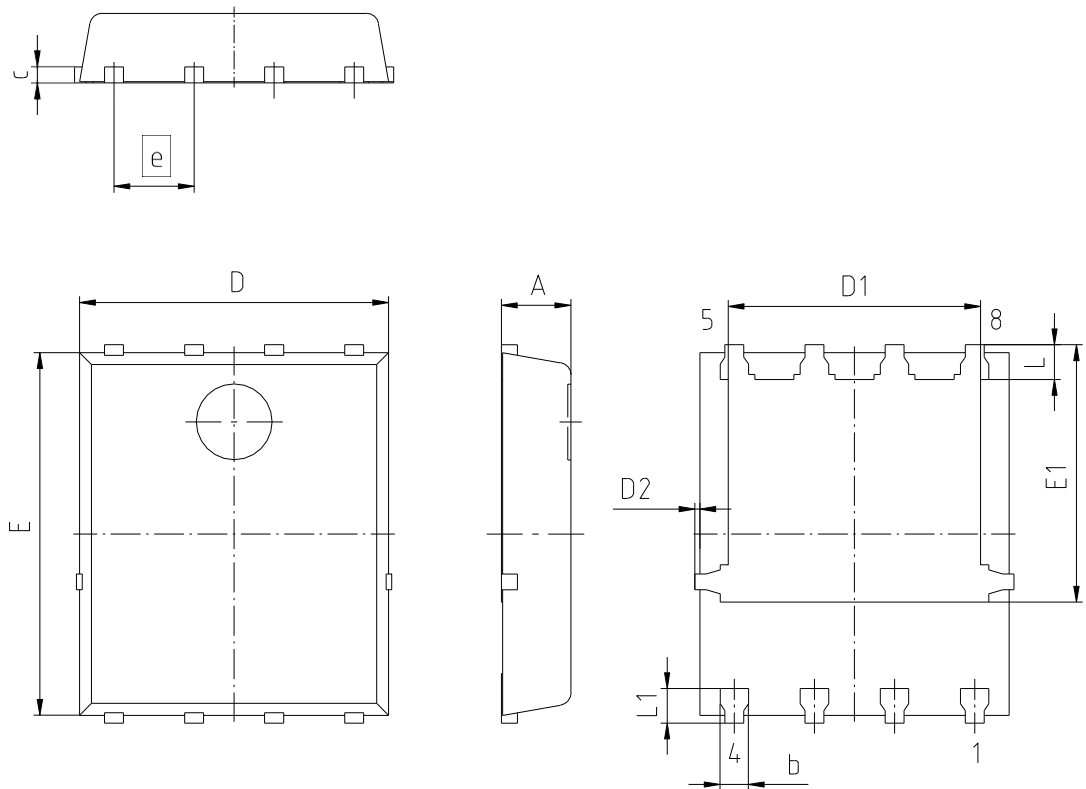


$V_{BR(DSS)}=f(T_j)$; $I_D=1\text{ mA}$

图 栅极充电波形



5 封装外形



PACKAGE - GROUP NUMBER: PG-TDSON-8-U08		
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.20
b	0.34	0.54
c	0.15	0.35
D	4.80	5.35
D1	3.90	4.40
D2	0.00	0.22
E	5.70	6.10
E1	4.05	4.25
e	1.27	
L	0.45	0.65
L1	0.45	0.65

- 1) EXCLUDING MOLD FLASH
- 2) REMOVAL ON MOLD GATE INTRUSION 0.1 MM PROTRUSION 0.1 MM
- 3) ALL METAL SURFACES ARE PLATED, EXCEPT AREA OF CUT

图 1 PG-TDSON-8 外形图，尺寸单位为毫米

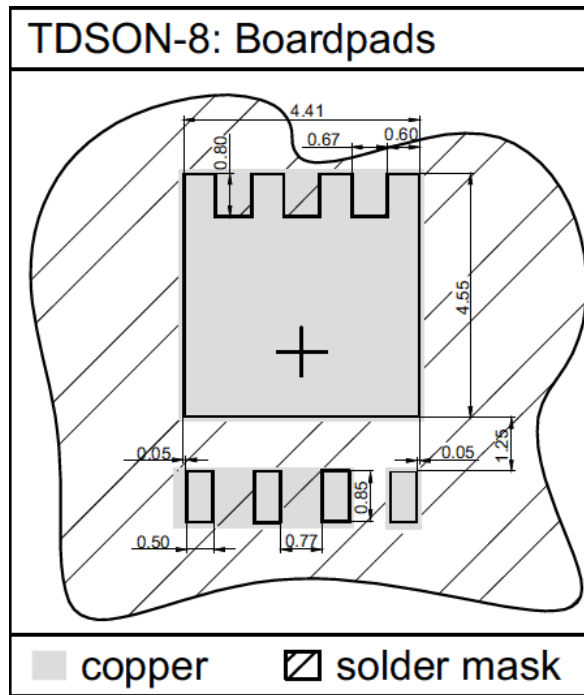
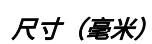


图 2 外形封装 (TDSON-8)



Rev. 2.2, 2022-09-21

OptiMOS™ 3 功率晶体管，120 V

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修订记录

BSC0302LS

Revision: 2022-09-21, Rev. 2.2

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2019-12-02	Release of final version
2.1	2022-08-09	Update "Features", qualification, footnotes and fix bug.
2.2	2022-09-21	Update outline drawing

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