

英飞凌MOSFET功率晶体管

英飞凌BSC034N10LS5 OptiMOS™ 5 100 V功率晶体管

特性

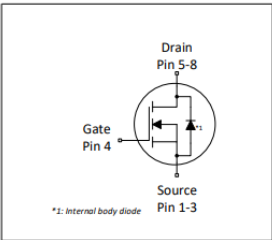
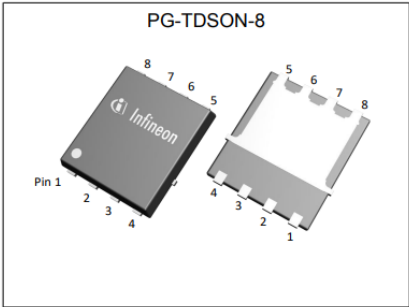
- 针对高性能 SMPS（例如同步整流）进行优化
- 100% 雪崩测试
- 卓越的耐热性
- N沟道，逻辑电平
- 无铅镀层；符合RoHS标准
- 符合 IEC61249-2-21 标准的无卤素

产品验证

完全符合 JEDEC 工业应用标准

表 1 主要性能参数

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),max}$	3.4	mΩ
I_D	156	A
Q_{oss}	91	nC
$Q_G(0V..4.5V)$	37	nC



Type / Ordering Code	Package	Marking	Related Links
BSC034N10LS5	PG-TDSON-8	034N10LS	-

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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 ¹⁾	I_D	-	-	156 99 20	A	$V_{GS}=10\text{ V}$, $T_C=25\text{ °C}$ $V_{GS}=10\text{ V}$, $T_C=100\text{ °C}$ $V_{GS}=10\text{ V}$, $T_A=25\text{ °C}$, $R_{thJA}=50\text{ °C/W}^{2)}$
Pulsed drain current ³⁾	$I_{D,pulse}$	-	-	624	A	$T_A=25\text{ °C}$
Avalanche energy, single pulse ⁴⁾	E_{AS}	-	-	301	mJ	$I_D=50\text{ A}$, $R_{GS}=25\text{ }\Omega$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	156 2.5	W	$T_C=25\text{ °C}$ $T_A=25\text{ °C}$, $R_{thJA}=50\text{ °C/W}^{3)}$
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	R_{thJC}	-	0.5	0.8	°C/W	-
Device on PCB, 6 cm ² cooling area ²⁾	R_{thJA}	-	-	50	°C/W	-

¹⁾ 额定值指产品仅具有数据表指定的绝对最大值, 保持外壳温度符合规定要求。其他外壳温度请参见图 2。需要根据实际环境条件降低额定值。

²⁾ 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 cm² (一层, 70 μm 厚)。印刷电路板垂直放置在静止空气中。

³⁾ 详细信息请参见图 3

⁴⁾ 详细信息请参见图 13

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	$V_{(BR)DSS}$	100	-	-	V	$V_{GS}=0\text{ V}$, $I_D=1\text{ mA}$
Gate threshold voltage	$V_{GS(th)}$	1.1	1.7	2.3	V	$V_{DS}=V_{GS}$, $I_D=115\text{ }\mu\text{A}$
Zero gate voltage drain current	I_{DSS}	-	0.1 10	1 100	μA	$V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$ $V_{DS}=100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=125\text{ °C}$
Gate-source leakage current	I_{GSS}	-	10	100	nA	$V_{GS}=20\text{ V}$, $V_{DS}=0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	2.8 3.5	3.4 4.6	$\text{m}\Omega$	$V_{GS}=10\text{ V}$, $I_D=50\text{ A}$ $V_{GS}=4.5\text{ V}$, $I_D=25\text{ A}$
Gate resistance	R_G	-	1.5	2.3	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	C_{iss}	-	5000	6500	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$
Output capacitance ¹⁾	C_{oss}	-	770	1000	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$
Reverse transfer capacitance ¹⁾	C_{rss}	-	34	60	pF	$V_{GS}=0\text{ V}$, $V_{DS}=50\text{ V}$, $f=1\text{ MHz}$
Turn-on delay time	$t_{d(on)}$	-	9.6	-	ns	$V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=3\text{ }\Omega$
Rise time	t_r	-	10	-	ns	$V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=3\text{ }\Omega$
Turn-off delay time	$t_{d(off)}$	-	40	-	ns	$V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=3\text{ }\Omega$
Fall time	t_f	-	16.0	-	ns	$V_{DD}=50\text{ V}$, $V_{GS}=10\text{ V}$, $I_D=50\text{ A}$, $R_{G,ext}=3\text{ }\Omega$

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}	-	14	-	nC	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge at threshold	$Q_{g(th)}$	-	8	-	nC	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate to drain charge ¹⁾	Q_{gd}	-	13	19	nC	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Switching charge	Q_{sw}	-	18	-	nC	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total ¹⁾	Q_g	-	37	46	nC	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate plateau voltage	$V_{plateau}$	-	2.9	-	V	$V_{DD}=50\text{ V}$, $I_D=50\text{ A}$, $V_{GS}=0\text{ to }4.5\text{ V}$
Gate charge total, sync. FET	$Q_{g(sync)}$	-	61	-	nC	$V_{DS}=0.1\text{ V}$, $V_{GS}=0\text{ to }10\text{ V}$
Output charge ¹⁾	Q_{oss}	-	91	121	nC	$V_{DS}=50\text{ V}$, $V_{GS}=0\text{ V}$

¹⁾由设计标定, 不受限于生产测试。

²⁾参数定义请参见“栅极电荷波形”

表 7 反向二极管

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	115	A	$T_C=25\text{ °C}$
Diode pulse current	$I_{S,pulse}$	-	-	624	A	$T_C=25\text{ °C}$
Diode forward voltage	V_{SD}	-	0.85	1.1	V	$V_{GS}=0\text{ V}$, $I_F=50\text{ A}$, $T_J=25\text{ °C}$
Reverse recovery time ¹⁾	t_{rr}	-	40	80	ns	$V_R=50\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$
Reverse recovery charge ¹⁾	Q_{rr}	-	42	84	nC	$V_R=50\text{ V}$, $I_F=50\text{ A}$, $di_F/dt=100\text{ A}/\mu\text{s}$

¹⁾由设计标定，不受制于生产测试。

4 电气特性图

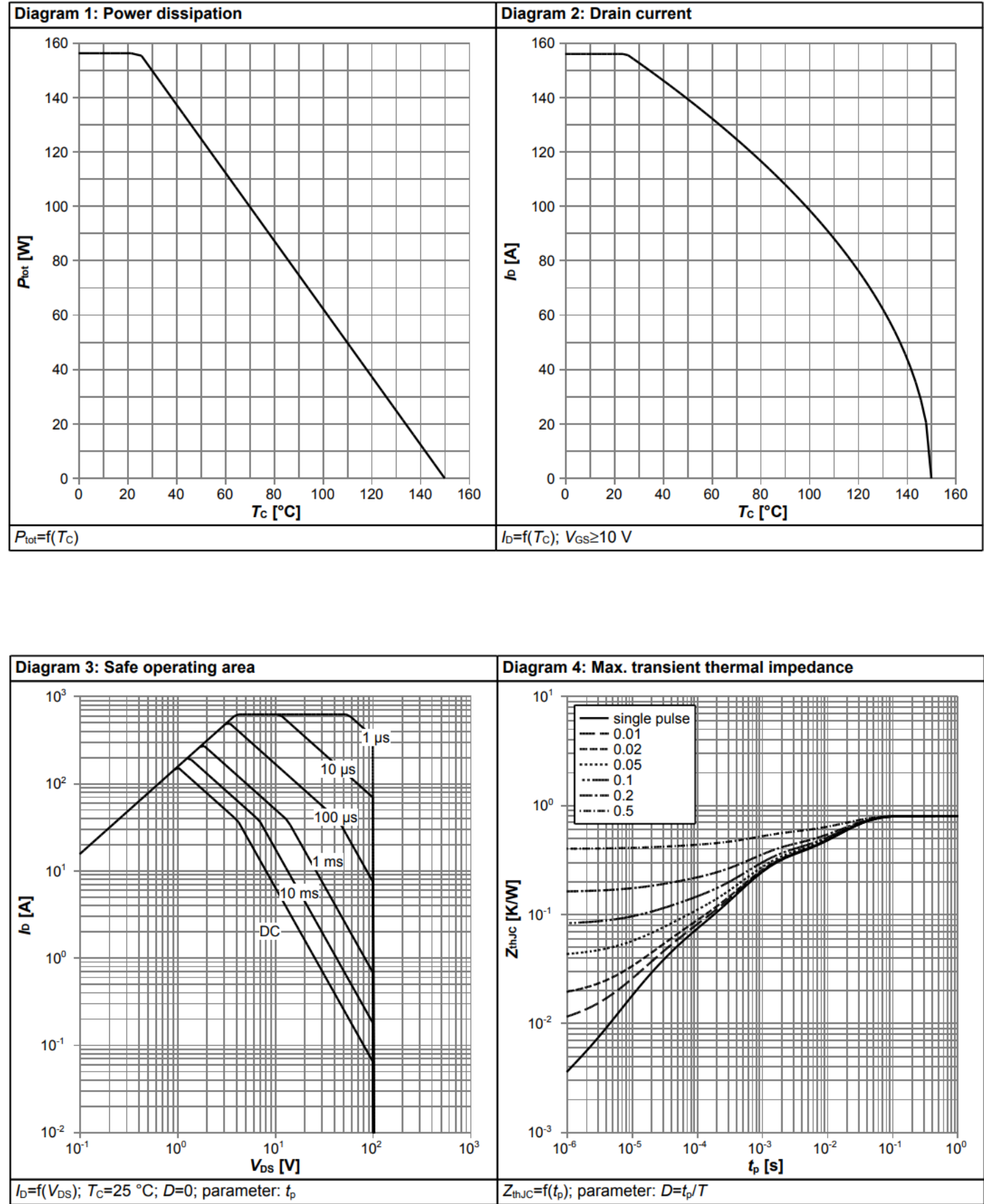
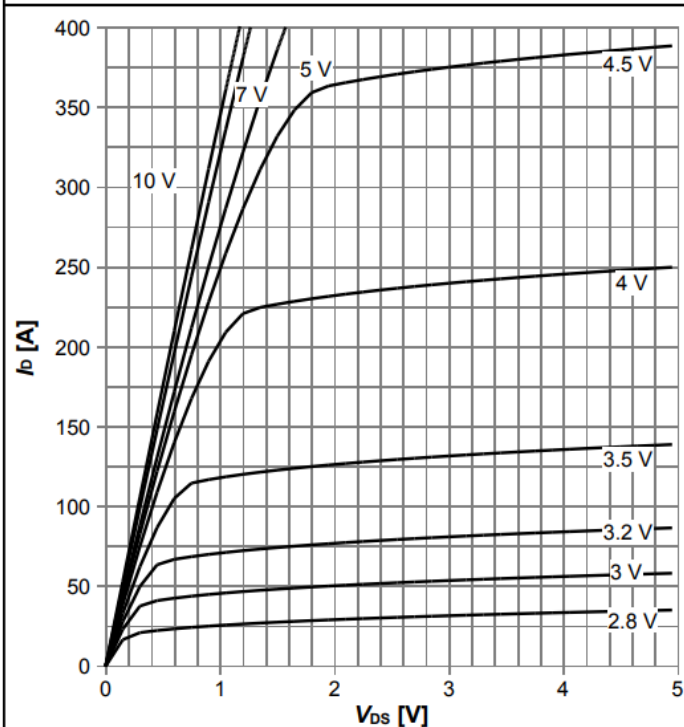
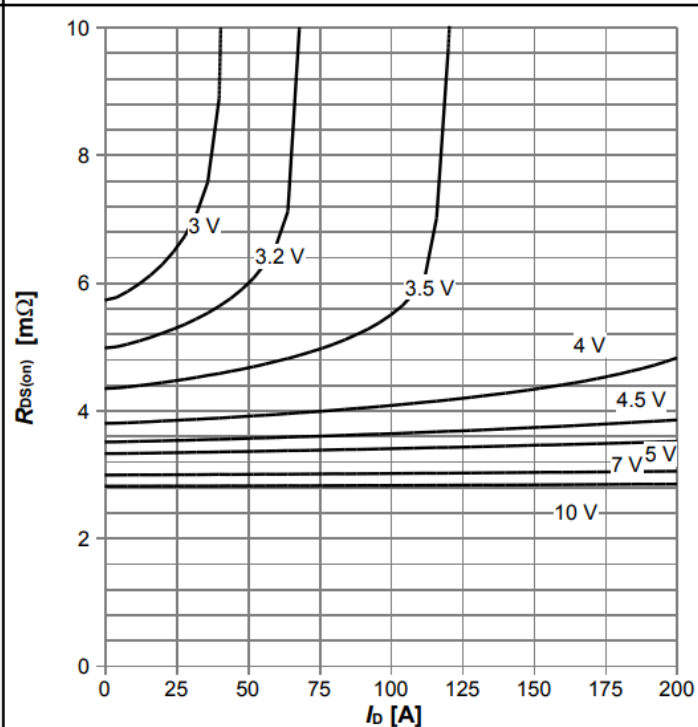


Diagram 5: Typ. output characteristics



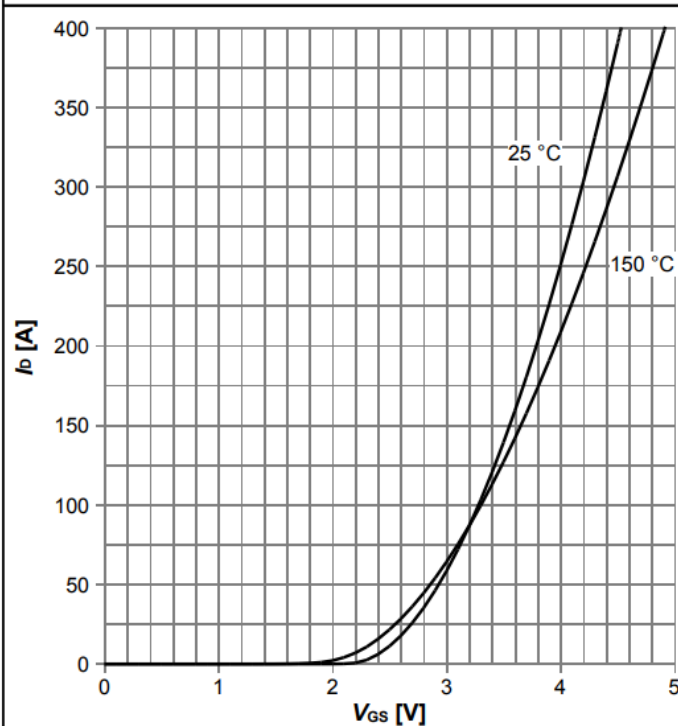
$I_D = f(V_{DS})$, $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



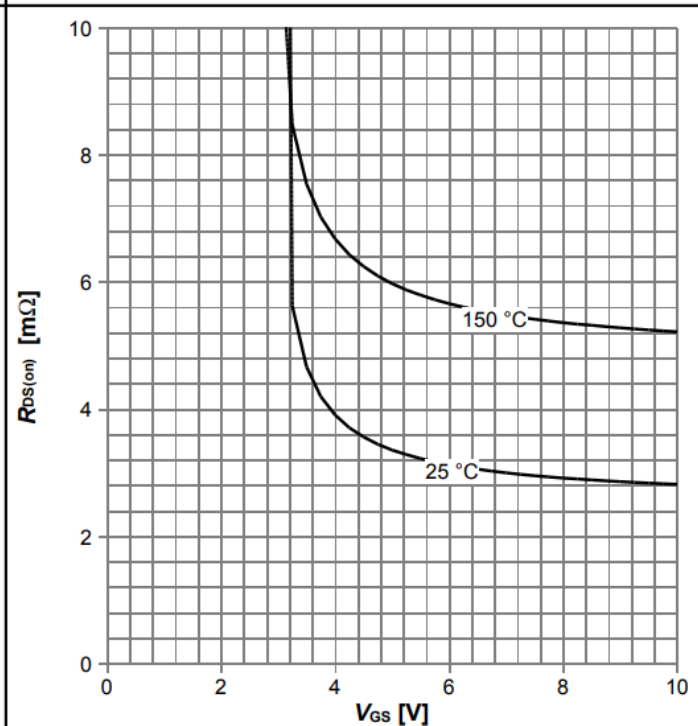
$R_{DS(on)} = f(I_D)$, $T_j = 25^\circ\text{C}$; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



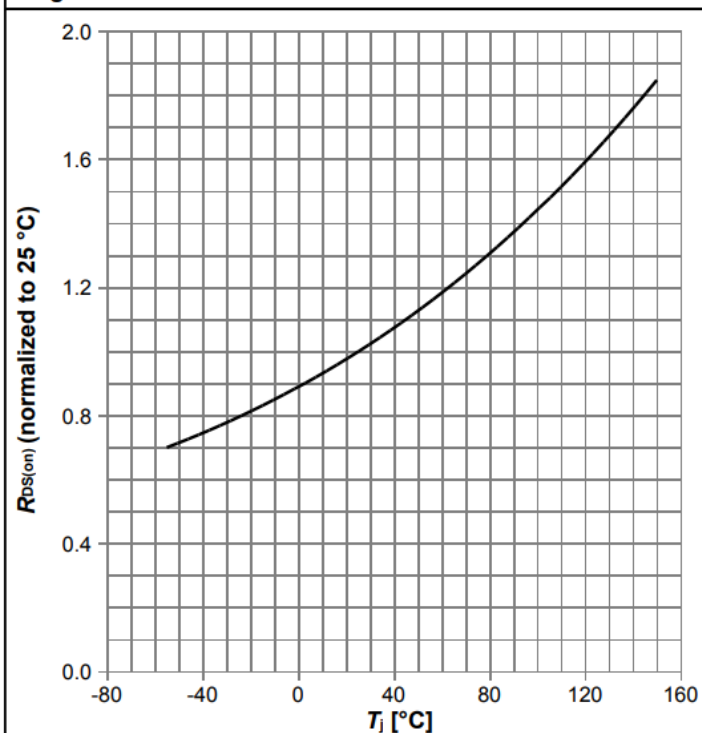
$I_D = f(V_{GS})$, $|V_{DS}| > 2|I_D|R_{DS(on)\text{max}}$; parameter: T_j

Diagram 8: Typ. drain-source on resistance



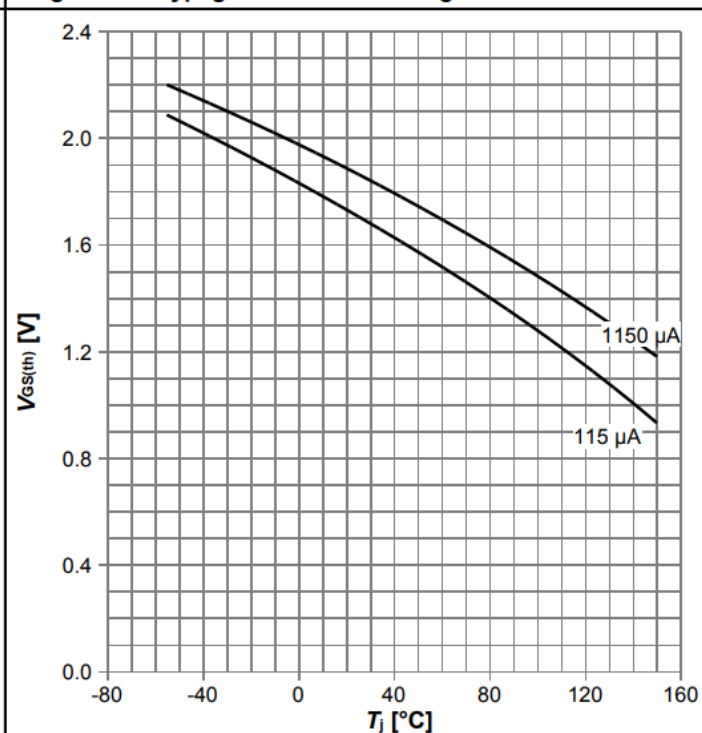
$R_{DS(on)} = f(V_{GS})$, $I_D = 50\text{ A}$; parameter: T_j

Diagram 9: Normalized drain-source on resistance



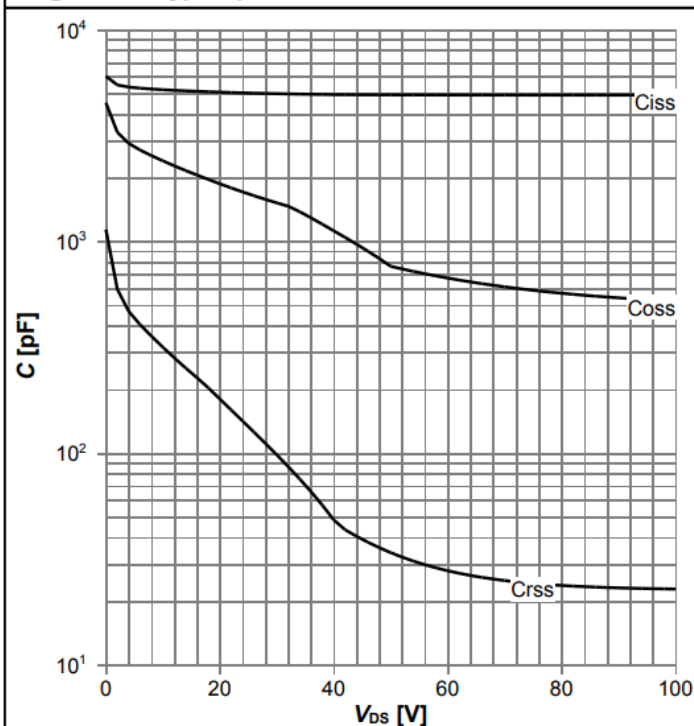
$$R_{DS(on)} = f(T_j), I_D = 50 \text{ A}, V_{GS} = 10 \text{ V}$$

Diagram 10: Typ. gate threshold voltage



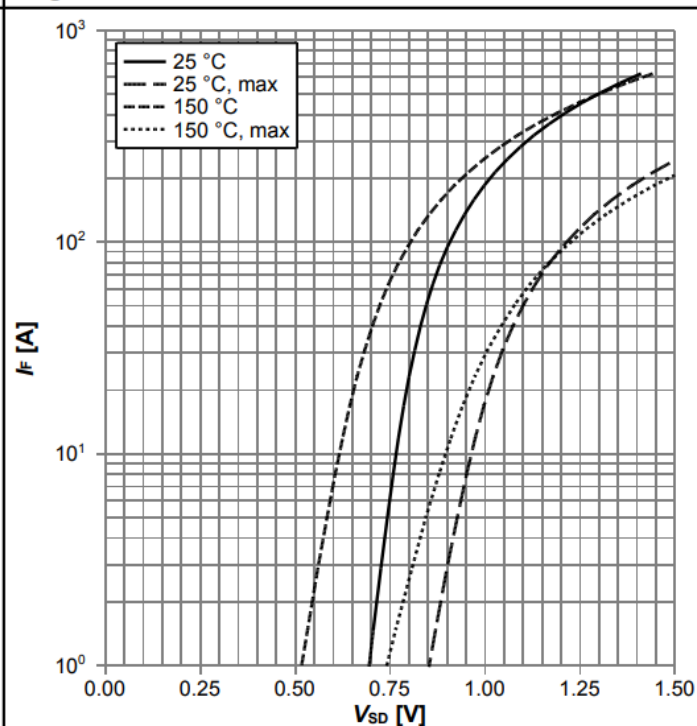
$$V_{GS(th)} = f(T_j), V_{GS} = V_{DS}; \text{ parameter: } I_D$$

Diagram 11: Typ. capacitances



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

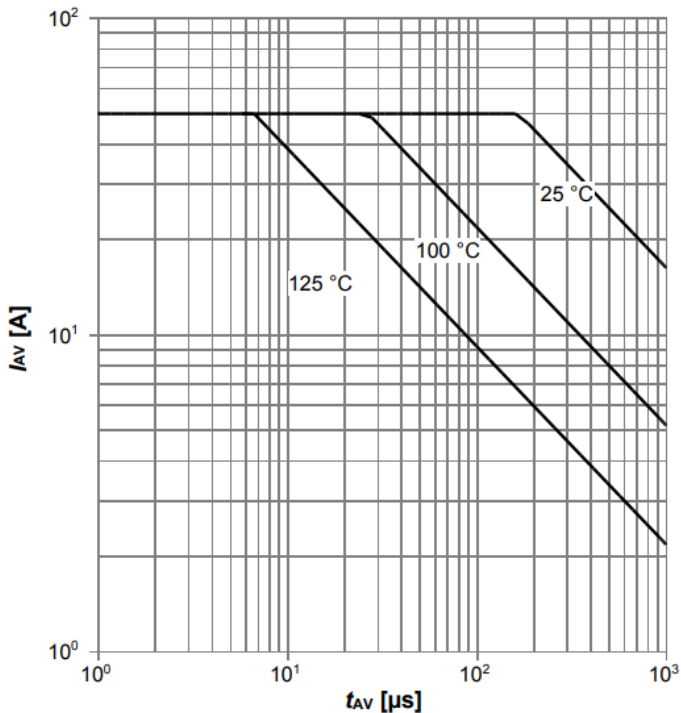
Diagram 12: Forward characteristics of reverse diode



$$I_F = f(V_{SD}); \text{ parameter: } T_j$$

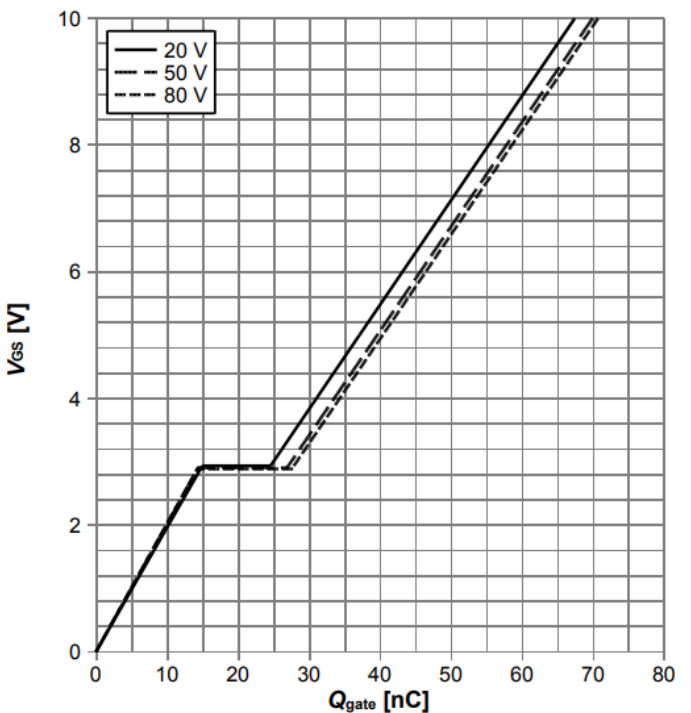
OptiMOS™ 5 Power-Transistor, 100 V BSC034N10LS5

Diagram 13: Avalanche characteristics



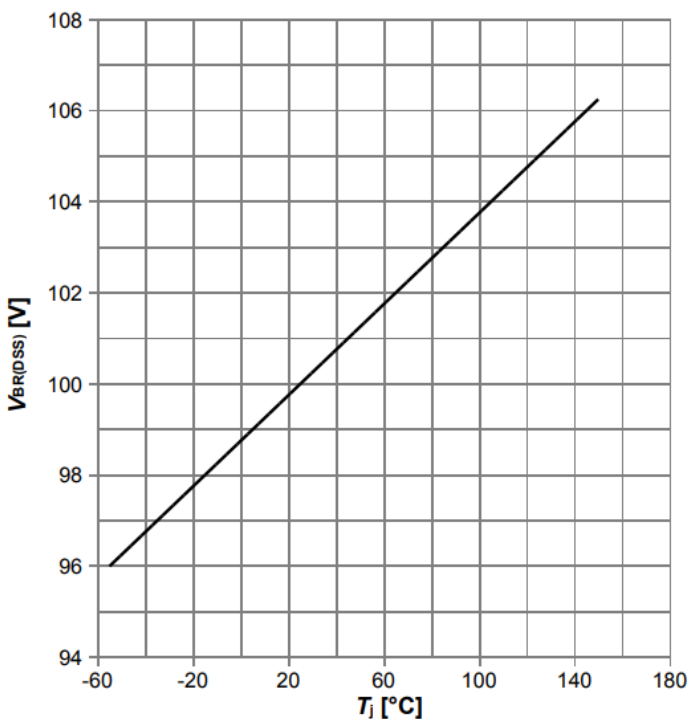
$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$; parameter: $T_{j,start}$

Diagram 14: Typ. gate charge



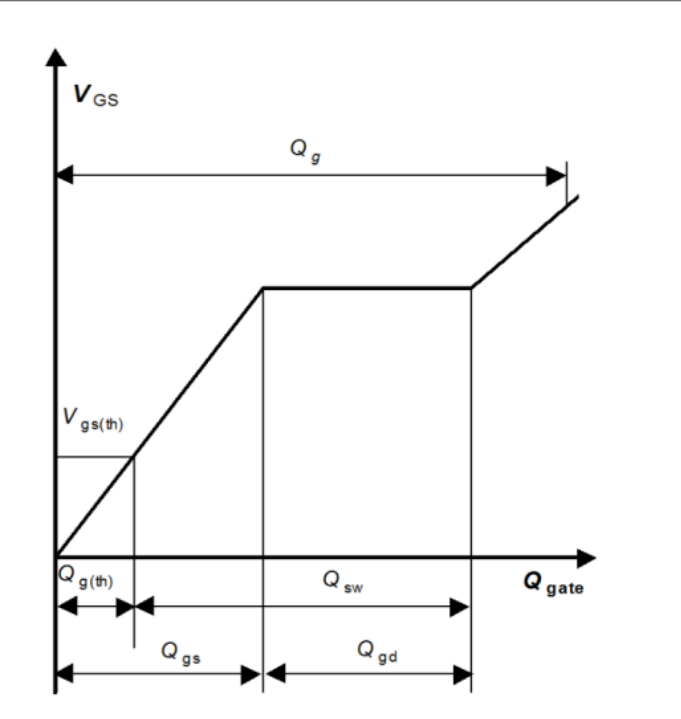
$V_{GS}=f(Q_{gate})$, $I_D=50$ A pulsed, $T_j=25\ ^\circ\text{C}$; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage



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

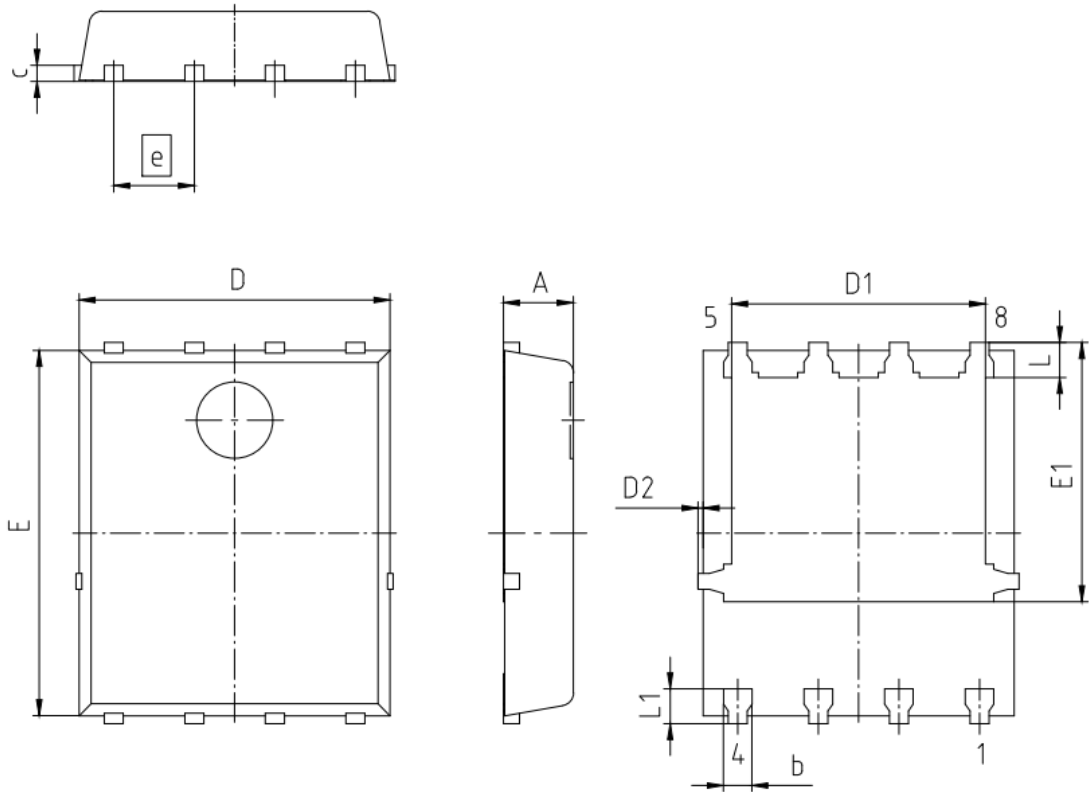
Diagram Gate charge waveforms



OptiMOS™ 5 Power-Transistor, 100 V

BSC034N10LS5

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

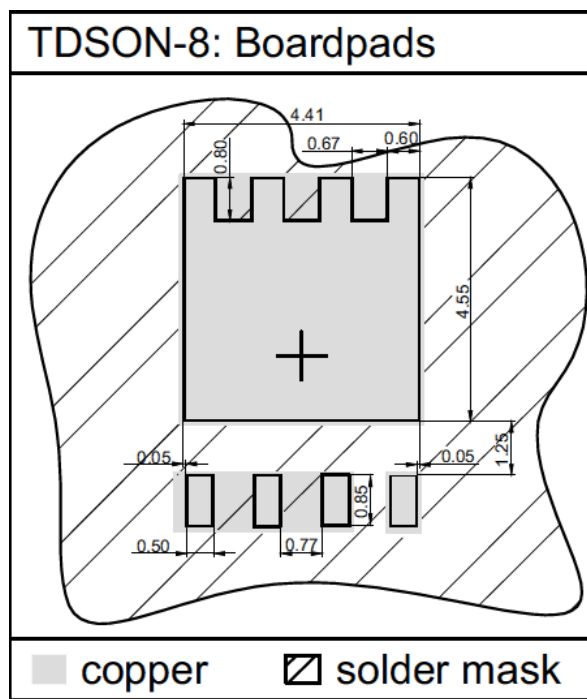


图 2 外形封装 (TDSON-8)

修订记录

BSC034N10LS5

Revision: 2022-10-11, Rev. 2.4

历史修订版本

Revision	Date	Subjects (major changes since last revision)
2.0	2016-09-30	Release of final version
2.1	2019-05-10	Update Diagrams 5, 8 and 9
2.2	2020-10-28	Update current rating
2.3	2022-01-31	Update Vsd typ and IS max
2.4	2022-10-11	Update outline drawing and footnotes

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Edition 2025-07-28

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