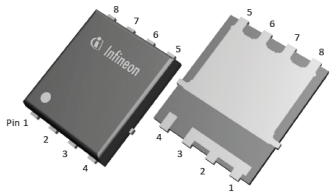
英飞凌MOSFET

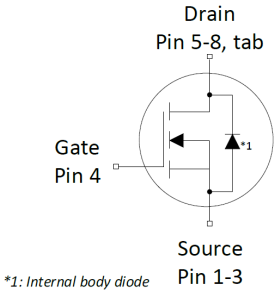
PG-TDSON-8



英飞凌OptiMOS™ 8 功率晶体管， 100 V

特性

- N沟道，标准电平
- 极低的导通电阻$R_{DS(on)}$
- 高I_D额定电流
- 较窄的$VGS_{(th)}$差值
- 软体二极管的恢复特性与低Q_{rr}
- 100% 雪崩测试
- 无铅镀层；符合 RoHS 标准
- 符合 IEC61249-2-21 标准的无卤素
- 基于 J-STD-020 的 MSL 1 分类



*1: Internal body diode

产品验证

已通过 JEDEC 相关测试。

表 1　　主要性能参数

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),max}$	4.04	mΩ
I_D	126	A
Q_{oss}	93	nC
Q_G (0 V...10 V)	49	nC
Q_{rr} (100 A/µs)	36	nC

Part number	Package	Marking	Related links
ISC040N10NM8	PG-TDSON-8	040N10N8	-

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1 最大额定值

除非另有规定，T_A =25 °C

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Continuous drain current [1]	I_D	-	-	126	A	V_{GS}=10 V, T_C=25 °C
				89		V_{GS}=10 V, T_C=100 °C
				89		V_{GS}=15 V, T_C=100 °C
				18		V_{GS}=10 V, T_A=25 °C, R_{THJA}=50 °C/W [2]
Pulsed drain current [3]	$I_{D,pulse}$	-	-	504	A	T_A=25 °C
Avalanche energy, single pulse [4]	E_{AS}	-	-	160	mJ	I_D=25 A, R_{GS}=25 Ω
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	150	W	T_C=25 °C
				3.0		T_A=25 °C, R_{THJA}=50 °C/W [2]
Operating and storage temperature	T_j, T_{stg}	-55	-	175	°C	IEC climatic category; DIN IEC 68-1: 55/175/56

[1] 额定值的适用条件：产品在数据手册中规定的绝对最大值条件下运行、确保外壳温度为25°C更高的外壳温度请参见图 2。需要根据实际环境条件降低额定值。

[2] 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂 PCB FR4 上，配有6 cm^2（单层，70 µm厚）铜层面积用于漏极连接。PCB在静止空气中垂直放置。

[3] 详细信息请参见图 3。

[4] 详细信息请参见图 14。

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}	-	0.67	1.0	°C/W	-
Thermal resistance, junction - case, top	R_{thJC}		-	20		
Thermal resistance, junction - ambient, 6 cm^2 cooling area [5)]	R_{thJA}		-	50		

5) 器件置于40 mm × 40 mm × 1.5 mm 环氧树脂印刷电路板 FR4 上，配有6 cm^2（单层，70微米厚）铜层面积用于漏极连接。印刷电路板在静止空气中垂直放置。

3 电气特性

除非另有规定，T_j = 25°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 V, I_D=1 mA
Gate threshold voltage	$V_{GS(th)}$	2.4	2.8	3.2	V	V_{DS}=V_{GS}, I_D=52 µA
Zero gate voltage drain current	I_{DSS}	-	0.1	1	µA	V_{DS}=80 V, V_{GS}=0 V, T_j=25 °C
Zero gate voltage drain current [6]	I_{DSS}	-	10	100	µA	V_{DS}=80 V, V_{GS}=0 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	10	100	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	-	3.33	4.04	mΩ	V_{GS}=15 V, I_D=25 A
			3.57	4.08		V_{GS}=10 V, I_D=25 A
			3.88	4.43		V_{GS}=8 V, I_D=12.5 A
Gate resistance [6]	R_G	-	0.8	1.6	Ω	-
Transconductance [6]	g_{fs}	38	75	-	S	$\|V_{DS}\|\geq 2\|I_D\|R_{DS(on)max}$, I_D=25 A

[6] 由设计指定，未经过生产测试。

表 5 动态特性

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Input capacitance [7]	C_{iss}	-	3100	4000	pF	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz
Output capacitance [7]	C_{oss}		460	600		
Reverse transfer capacitance [7]	C_{rss}		93	160		
Turn-on delay time	$t_{d(on)}$	-	11	-	ns	V_{DD}=50 V, V_{GS}=10 V, I_D=12.5 A, $R_{G,ext}$=1.6 Ω
Rise time	t_r		2.4			
Turn-off delay time	$t_{d(off)}$		23			
Fall time	t_f		12			

[7] 由设计指定，未经过生产测试。

表 6　　栅极电荷特性 [8)]

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	13	-	nC	V_{DD}=50 V, I_D=12.5 A, V_{GS}=0 to 10 V
Gate charge at threshold	$Q_{g(th)}$		8.7	-	nC	
Gate to drain charge [9)]	Q_{gd}		12	19	nC	
Switching charge	Q_{sw}		16.3	-	nC	
Gate charge total [9)]	Q_g		49	61	nC	
Gate plateau voltage	$V_{plateau}$		4.2	-	V	
Gate charge total, sync. FET	$Q_{g(sync)}$	-	40	53	nC	V_{DS}=0.1 V, V_{GS}=0 to 10 V
Output charge [9)]	Q_{oss}	-	93	124	nC	V_{DS}=50 V, V_{GS}=0 V

[8)] 参数定义请参数见“栅极电荷波形”。

[9)] 由设计指定。未经过生产测试。

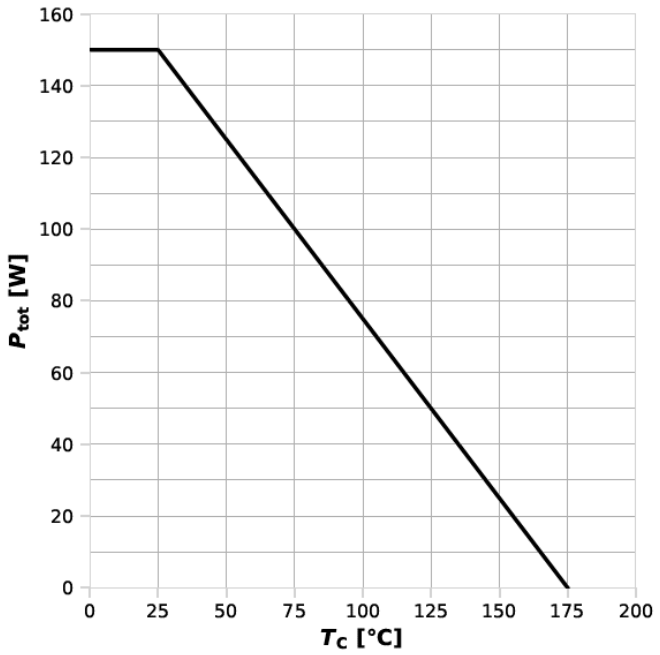
表 7　　反向二极管

Parameter	Symbol	Values			Unit	Note / Test condition
		Min.	Typ.	Max.		
Diode continuous forward current	I_S	-	-	126	A	T_C=25 °C
Diode pulse current	$I_{S,pulse}$			504		
Diode forward voltage	V_{SD}	-	0.82	1	V	V_{GS}=0 V, I_F=25 A, T_j=25 °C
Reverse recovery time [10)]	t_{rr}	-	29	58	ns	V_R=50 V, I_F=12.5 A, di_F/dt=100 A/µs
Reverse recovery charge [10)]	Q_{rr}		36	72	nC	
Reverse recovery time [10)]	t_{rr}	-	25	50	ns	V_R=50 V, I_F=12.5 A, di_F/dt=1000 A /µs
Reverse recovery charge [10)]	Q_{rr}		247	494	nC	

[10)] 由设计指定，未经过生产测试。

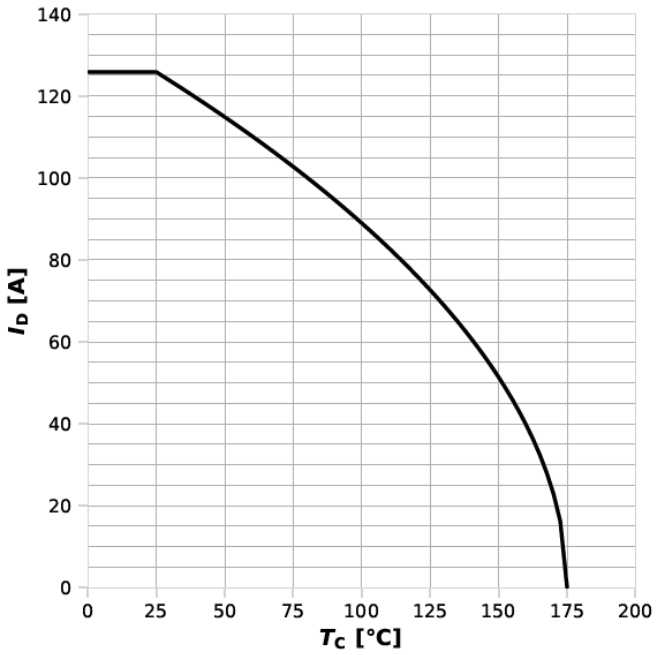
4 电气特性图

Diagram 1: Power dissipation



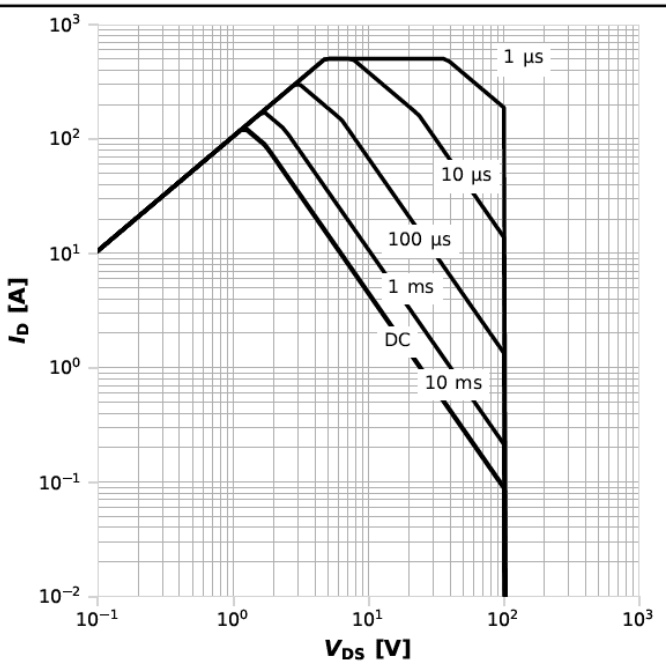
$P_{tot}=f(T_C)$

Diagram 2: Drain current



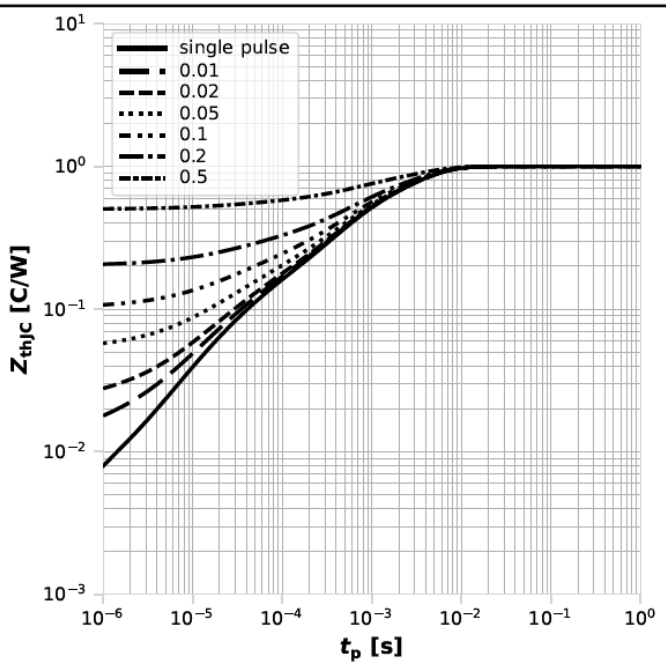
$I_D=f(T_C)$; $V_{GS}\geq 10$ V

Diagram 3: Safe operating area



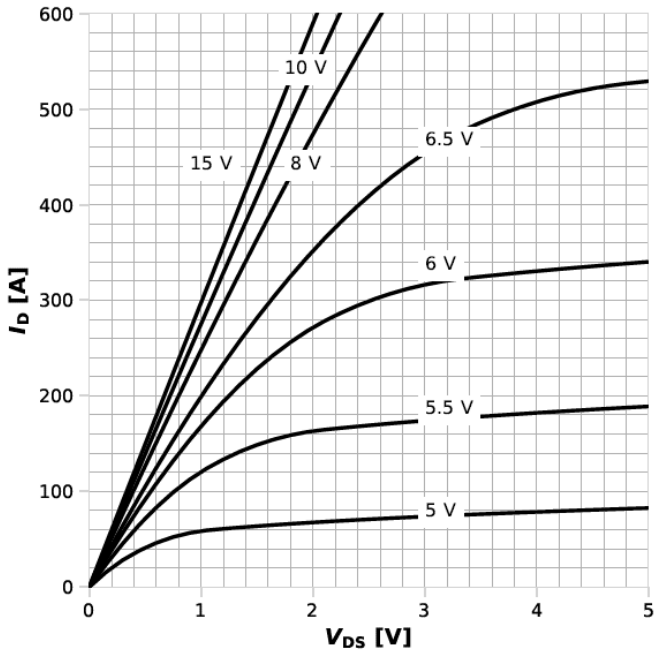
$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



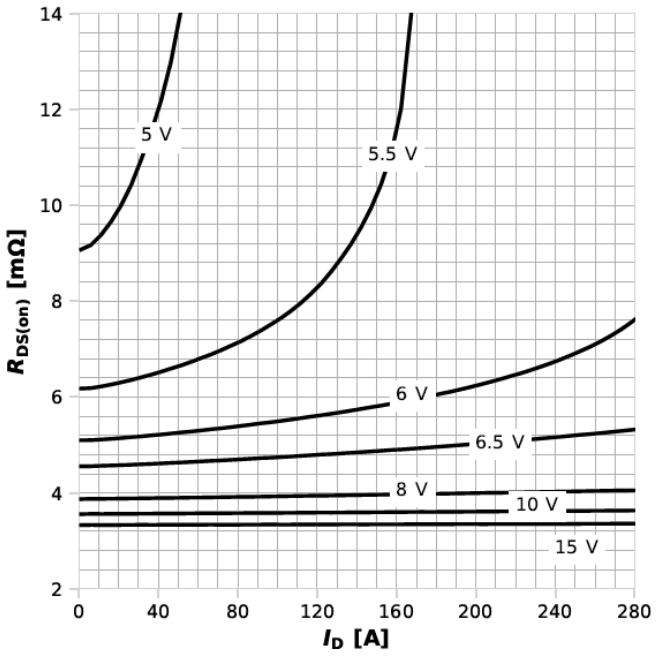
$Z_{thJC}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



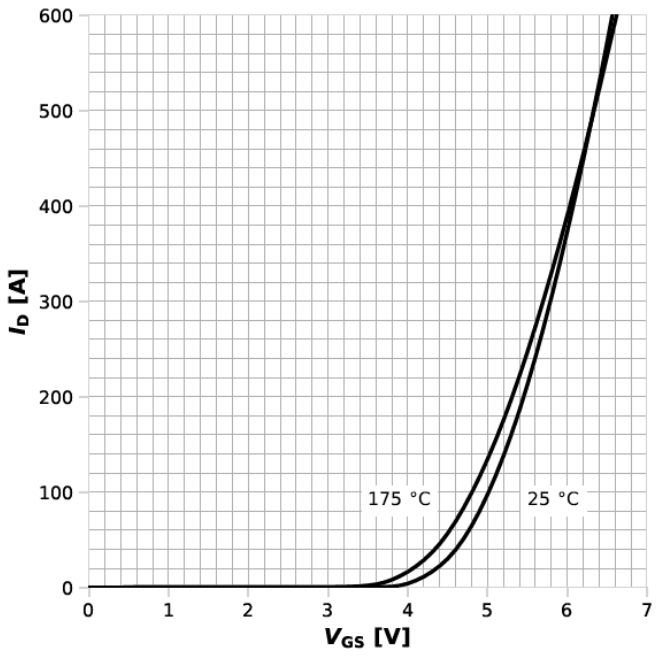
I_D=f(V_{DS}), T_j=25 °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



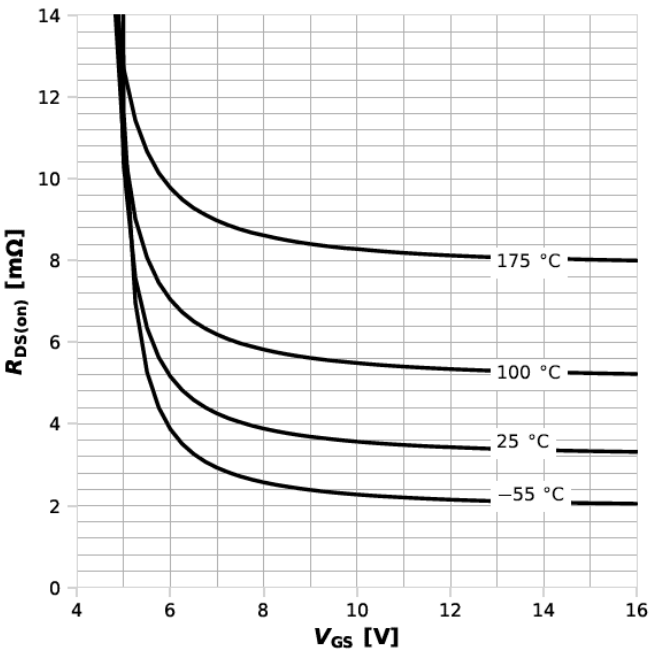
$R_{DS(on)}$=f(I_D), T_j=25 °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



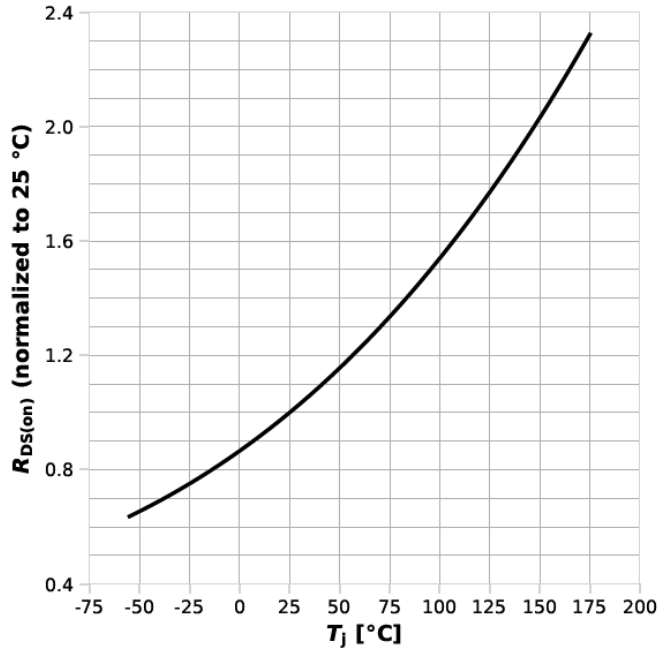
I_D=f(V_{GS}), $|V_{DS}|>2|I_D|R_{DS(on)max}$; parameter: T_j

Diagram 8: Typ. drain-source on resistance



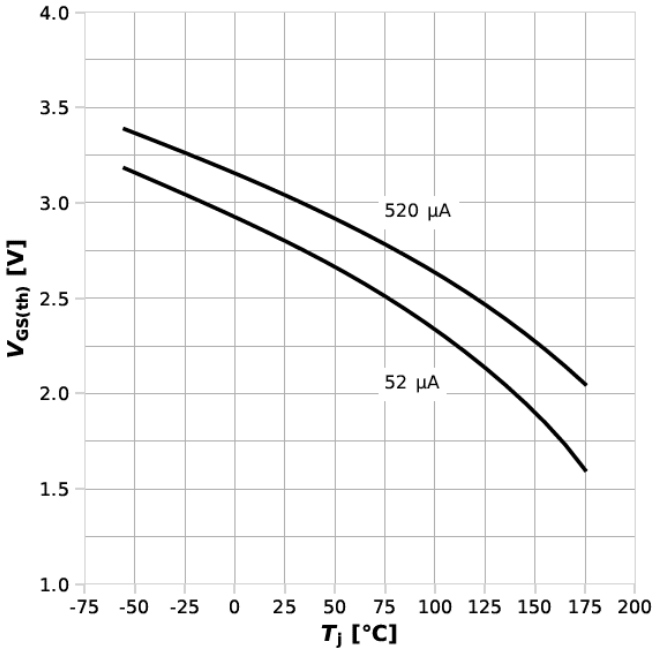
$R_{DS(on)}$=f(V_{GS}), I_D=25 A; parameter: T_j

Diagram 9: Normalized drain-source on resistance



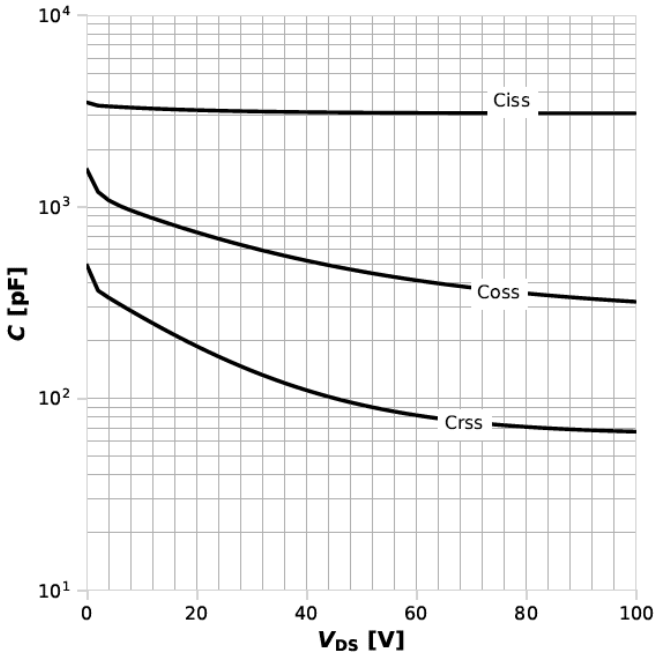
$R_{DS(on)}$=f(T_j), I_D=25 A, V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



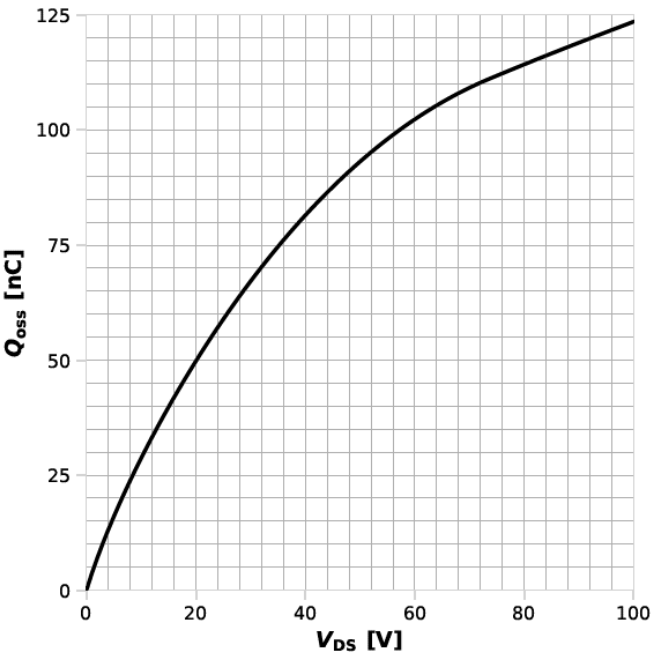
$V_{GS(th}$=f(T_j), V_{GS}=V_{DS}; parameter: I_D

Diagram 11: Typ. capacitances



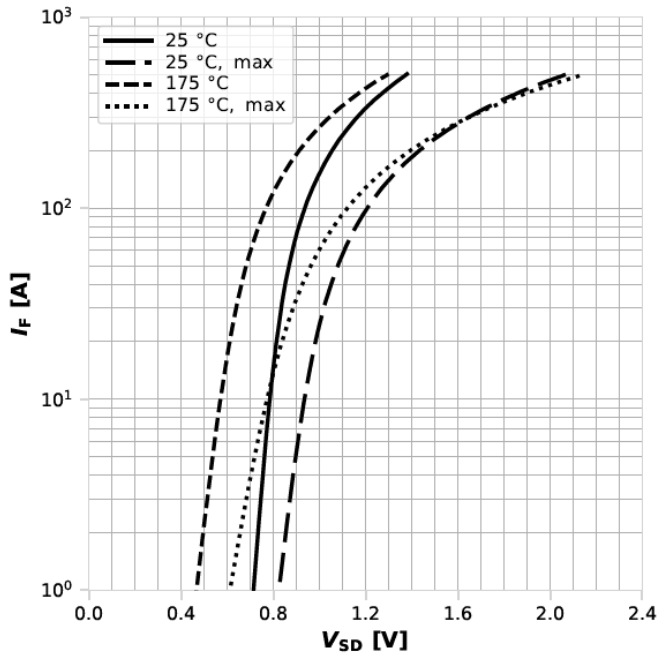
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz

Diagram 12: Typ. output charge



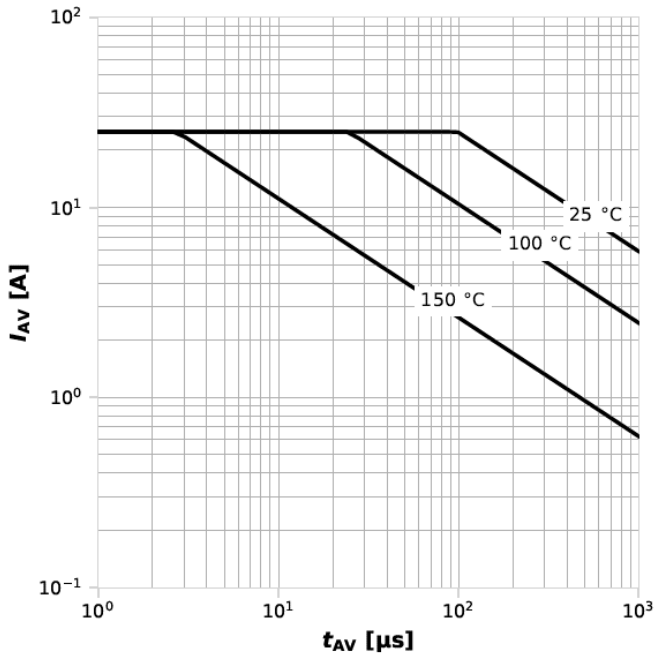
Q_{oss}=f(V_{DS}), V_{GS}=0 V

Diagram 13: Forward characteristics of reverse diode



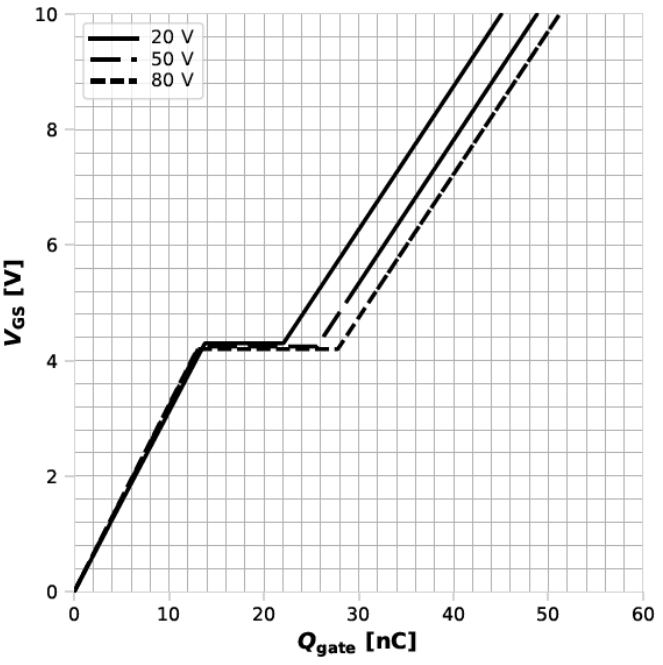
$I_F=f(V_{SD})$; parameter: T_j

Diagram 14: Avalanche characteristics



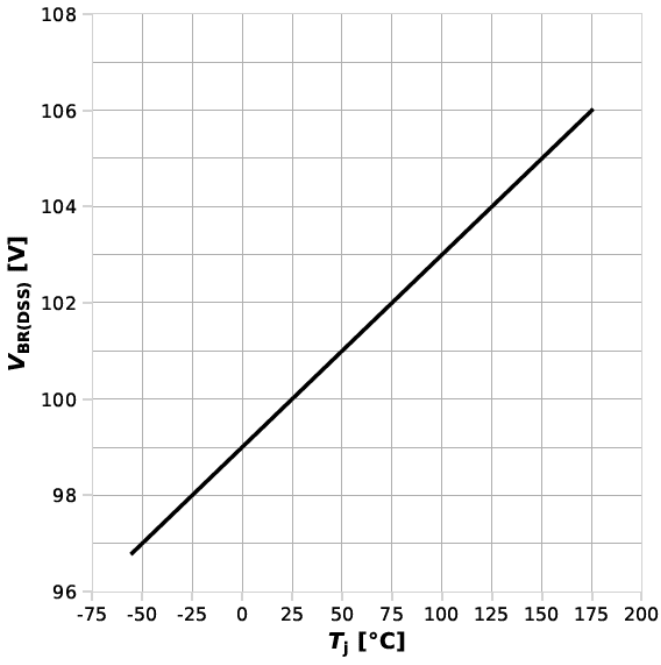
$I_{AS}=f(t_{AV})$; R_{GS}=25 Ω; parameter: $T_{j,start}$

Diagram 15: Typ. gate charge



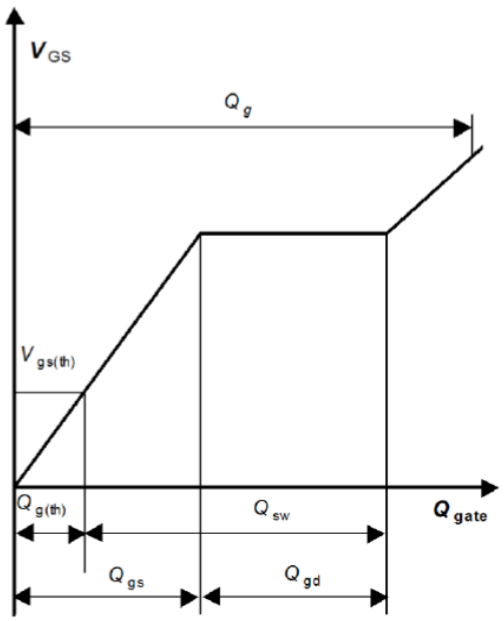
$V_{GS}=f(Q_{gate})$, I_D=12.5 A pulsed, T_j=25 °C; parameter: V_{DD}

Diagram 16: Min. drain-source breakdown voltage



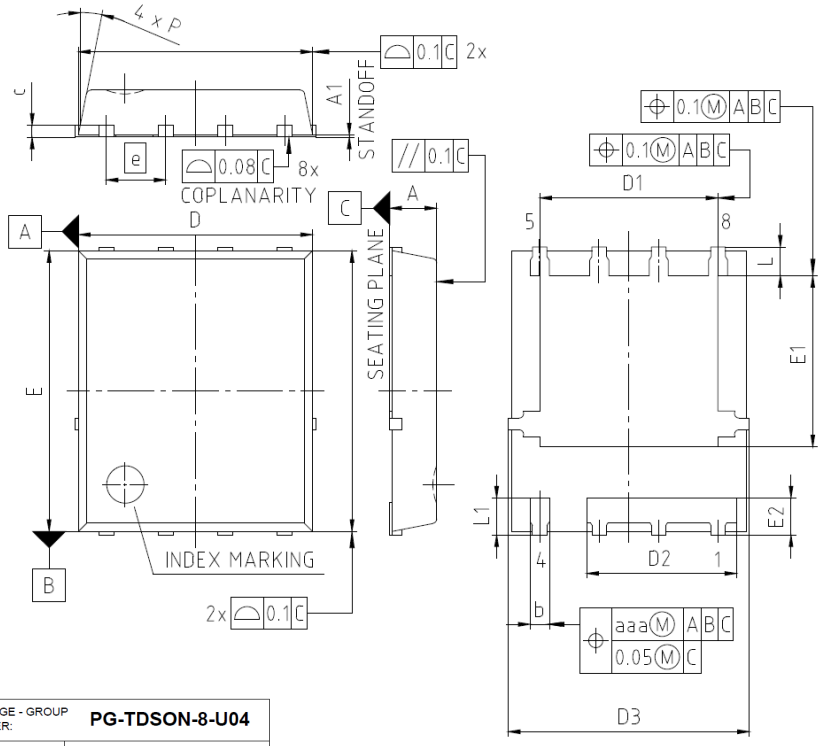
$V_{BR(DSS)}=f(T_j)$; I_D=1 mA

Gate charge waveforms



-

5 封装外形



PACKAGE - GROUP NUMBER:	PG-TDSON-8-U04	
DIMENSIONS	MILLIMETERS	
	MIN.	MAX.
A	0.90	1.20
A1	0	0.05
b	0.26	0.54
c	0.15	0.35
D	4.80	5.35
D1	3.70	4.40
D2	2.94	3.25
D3	4.80	5.61
E	5.70	6.10
E1	3.40	3.76
E2	0.69	0.90
e	1.27	
L	0.45	0.72
L1	0.69	0.90
aaa	0.10	0.25
P	8°	12°

1) EXCLUDING MOLD FLASH
2) REMOVAL ON MOLD GATE
INTRUSION 0.1 MM
PROTRUSION 0.1 MM
3) LEAD LENGTH UP TO ANTI FLASH LINE
4) ALL METAL SURFACES ARE PLATED,
EXCEPT AREA OF CUT

图 1 PG- TDSON- 8 封装外形，尺寸单位为毫米

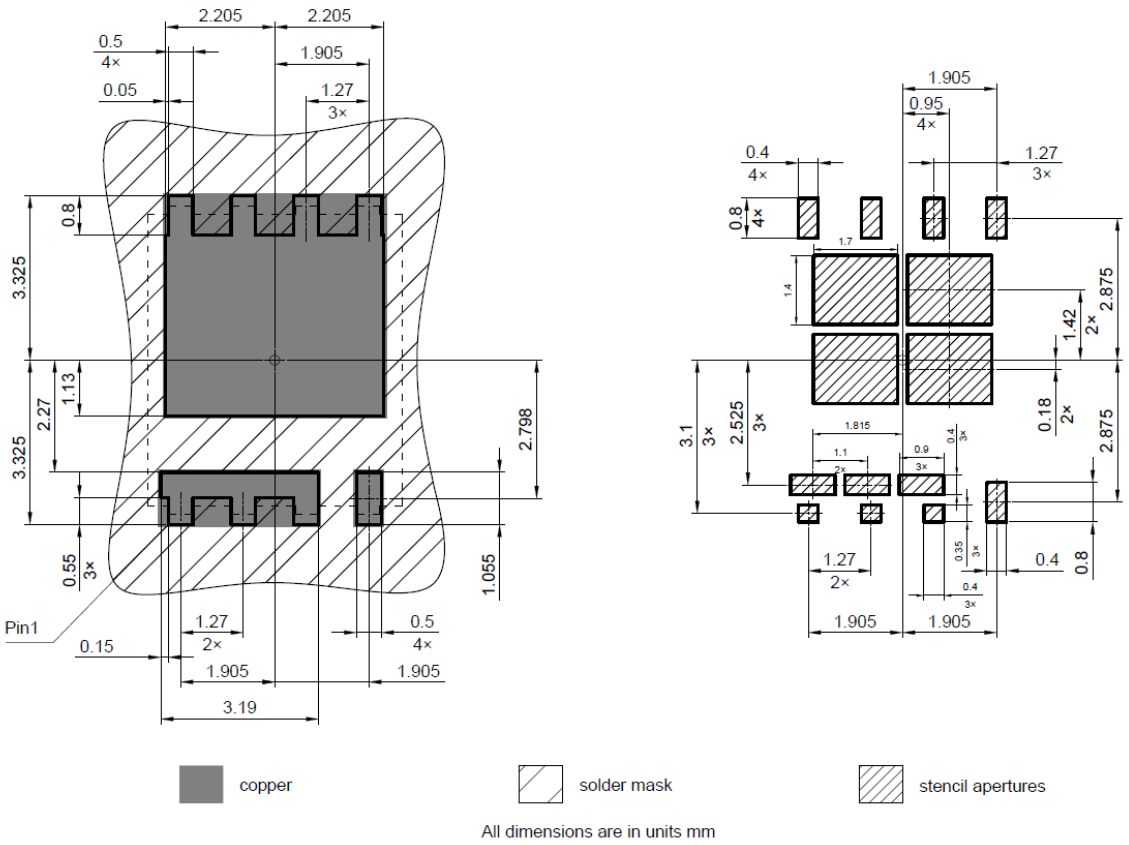


图 2　　PG- TDSON- 8 封装图，尺寸单位为毫米

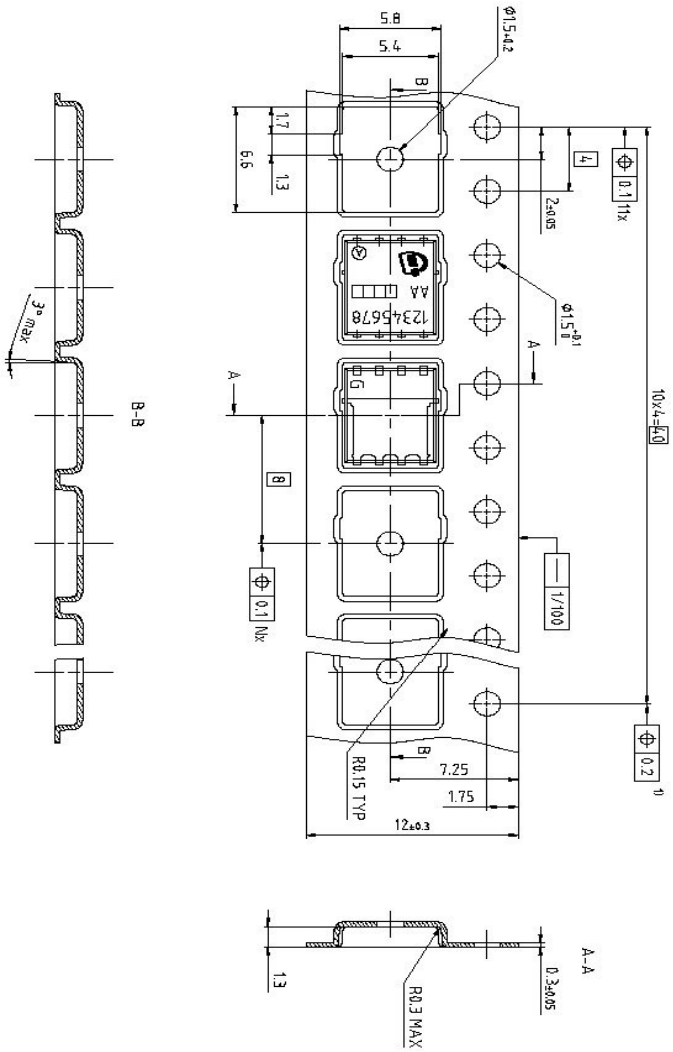


图 3　　PG- TDSON- 8 封装变体，尺寸单位为毫米

修订记录

ISC040N10NM8

Revision 2025 - 12 - 11 , Rev. 1 . 1

Previous revisions

Revision	Date	Subjects (major changes since last revision)
1.0	2025-11-24	Release of final version
1.1	2025-12-11	Added footnote to Gate resistance

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