英飞凌汽车级 MOSFET

英飞凌OptiMOS™7 功率晶体管

RoHS Infineon Automotive Quality AEC Qualified

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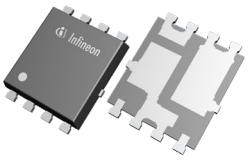
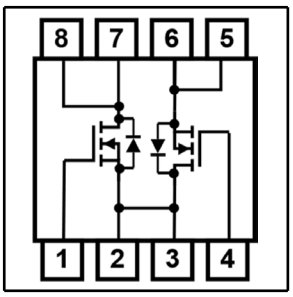
PG-TDSON-8-57





特性

- OptiMOS™适用于汽车应用的 MOSFET
- N 沟道 - 增强型 - 逻辑电平
- 严苛于 AEC-Q101 的扩展认证
- 加强电气测试
- 坚固的设计
- MSL1 回流焊峰值温度高达 260°C
- 工作温度 175°C
- 符合 RoHS 标准
- 100% 雪崩测试

潜在应用

通用汽车应用

产品验证

汽车应用认证。根据 AEC-Q101 进行产品验证。

产品概述

V_{DS}	40	V
$R_{DS(on),\ M1}$	2.56	mΩ
$R_{DS(on),\ M2}$	5.04	mΩ
I_D (chip limited) M1	127	A
I_D (chip limited) M2	65	A

引脚分配

Function	Symbol	Pin
Gate M1	G1	1
Source M1, Drain M2	S1, D2	2, 3
Gate M2	G2	4
Source M2	S2	5, 6
Drain M1	D1	7, 8

Type	Package	Marking
IAUCN04S7L025AH	PG-TDSON-8-57	7N4L02AH

本数据手册的原文使用英文撰写。为方便起见，英飞凌提供了译文；由于翻译过程中可能使用了自动化工具，英飞凌不保证译文的准确性。 为确认准确性，请务必访问 infineon.com 参考最新的英文版本（控制文档）。

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最大额定值

除非另有规定，否则均为 T_j = 25°C

Parameter	Symbol	Conditions	Value		Unit
			M1	M2	
Continuous drain current	I_D	V_{GS} = 10 V, Chip limitation[1,2)]	127	65	A
		V_{GS} = 10 V, DC current	100	65	
		T_a = 100°C, V_{GS} = 10 V, R_{thJA} on 2s2p[2,3)]	20	14	
Pulsed drain current[2)]	$I_{D,pulse}$	T_C = 25°C, t_p = 100 µs	349	149	
Avalanche energy, single pulse[2)]	E_{AS}	$I_{D,M1}$ = 38 A, $I_{D,M2}$ = 14 A	58	25	mJ
Avalanche current, single pulse	I_{AS}	–	75	27	A
Gate source voltage	V_{GS}	–	±16		V
		Limited to duty factor of 1%	+20		
Power dissipation	P_{tot}	T_C = 25°C	75	40	W
Operating temperature	T_j	–	-55 ... +175		°C

热特性[2)]

Parameter	M1/M2	Symbol	Conditions	Values			Unit
				min.	typ.	max.	
Thermal resistance, junction - case	M1	R_{thJC}	–	–	–	2	K/W
	M2			–	–	3.7	
Thermal resistance, junction - ambient[3)]	M1	R_{thJA}	–	–	41	–	
	M2			–	43	–	

电气特性

除非另有规定，T_j = 25°C

Parameter	M1/M2	Symbol	Conditions	Values			Unit
				min.	typ.	max.	
静态特性							
Drain-source breakdown voltage	M1	$V_{(Br)DSS}$	V_{GS} = 0 V, I_D = 1 mA	40	–	–	V
	M2						
Gate threshold voltage	M1	$V_{GS(th)}$	V_{GS} = V_{DS}, I_D = 25 µA	1.2	1.5	1.8	
	M2		V_{GS} = V_{DS}, I_D = 10 µA	1.2	1.5	1.8	
Zero gate voltage drain current	M1	I_{DSS}	V_{DS} = 40 V, V_{GS} = 0 V, T_j = 25°C[2)]	–	–	1	µA
	M2						
	M1		V_{DS} = 40 V, V_{GS} = 0 V, T_j = 100°C[2)]	–	–	6	
	M2			–	–	3	
Gate-source leakage current	M1	I_{GSS}	V_{GS} = 16 V, V_{DS} = 0 V	–	–	100	nA
	M2						
Drain-source on-state resistance	M1	$R_{DS(on)}$	V_{GS} = 4.5 V, I_D = 50 A	–	3.04	3.43	mΩ
	M2		V_{GS} = 4.5 V, I_D = 30 A	–	6.46	7.49	
	M1		V_{GS} = 10 V, I_D = 50 A	–	2.34	2.56	
	M2		V_{GS} = 10 V, I_D = 30 A	–	4.46	5.04	
Gate resistance[2)]	M1	R_G	–	–	1.4	–	Ω
	M2		–	–	2	–	

[1)] 实际上，电流能力受到包括客户特定的印刷电路板在内的整体系统设计的限制。

[2)] 该参数不受制于生产测试 – 由设计标定。

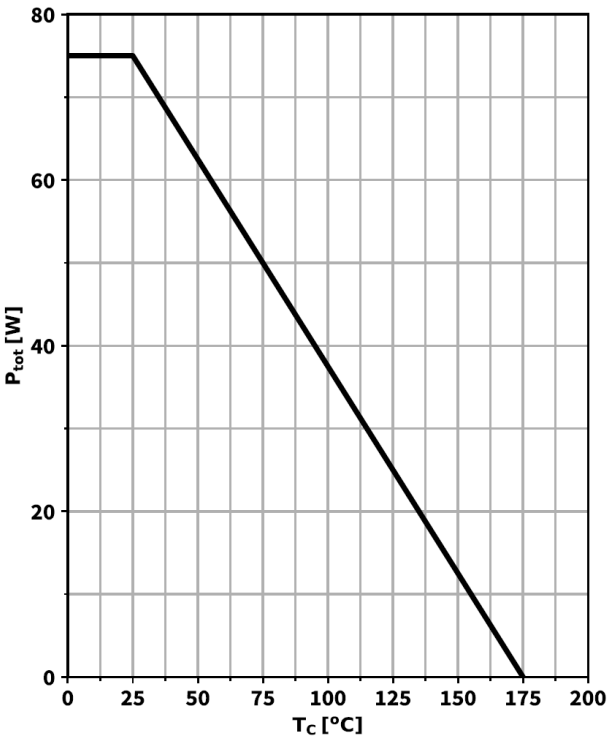
[3)] 器件放置于根据 JEDEC 标准 (JESD51-5, -7) 定义的 2s2p FR4 印刷电路板上。印刷电路板垂直放置在静止空气中。

Parameter	M1/M2	Symbol	Conditions	Values			Unit
				min.	typ.	max.	
动态特性[2)]							
Input capacitance	M1	C_{iss}	V_{GS} = 0 V, V_{DS} = 20 V, f = 1 MHz	–	1937	2518	pF
	M2			–	704	915	
Output capacitance	M1	C_{oss}		–	970	1261	
	M2			–	349	454	
Reverse transfer capacitance	M1	C_{oss}		–	35	53	
	M2			–	16	24	
Turn-on delay time	M1	$t_{d(on)}$	V_{DD} = 20 V, V_{GS} = 10 V, $I_{D,M1}$ = 50 A, $I_{D,M2}$ = 30 A, R_G = 3.5 Ω	–	4.5	–	ns
	M2			–	2.5	–	
Rise time	M1	t_r		–	10	–	
	M2			–	6	–	
Turn-off delay time	M1	$t_{d(off)}$		–	21	–	
	M2			–	9	–	
Fall time	M1	t_f		–	25	–	
	M2			–	12	–	
栅极电荷特性[2)]							
Gate to source charge	M1	Q_{gs}	V_{DD} = 20 V, $I_{D,M1}$ = 50 A, $I_{D,M2}$ = 30 A, V_{GS} = 0 to 10 V	–	5.5	7.2	nC
	M2			–	2.1	2.7	
Gate to drain charge	M1	Q_{gd}		–	5.1	7.7	
	M2			–	1.9	2.9	
Gate charge total	M1	Q_g		–	29	38	
	M2			–	11	14	
Gate plateau voltage	M1	$V_{plateau}$		–	2.8	–	V
	M2			–	3	–	
反向二极管							
Diode continuous forward current[2)]	M1	I_S	T_C = 25°C	–	–	100	A
	M2			–	–	65	
Diode pulse current[2)]	M1	$I_{S,pulse}$	T_C = 25°C, t_p = 100 µs	–	–	349	
	M2			–	–	149	
Diode forward voltage	M1	V_{SD}	V_{GS} = 0 V, $I_{F,M1}$ = 50 A, $I_{F,M2}$ = 30 A, T_j = 25° C	–	0.87	1.02	V
	M2			–	0.87	1.02	
Reverse recovery time[2)]	M1	t_{rr}	V_R = 20 V, I_F = 50 A di_F/dt = 100 A/µs	–	23	35	ns
Reverse recovery charge[2)]		Q_{rr}		–	8	16	nC
Reverse recovery time[2)]	M2	t_{rr}	V_R = 20 V, I_F = 50 A di_F/dt = 100 A/µs	–	6	9	ns
Reverse recovery charge[2)]		Q_{rr}		–	0.5	1	nC

电气特性图

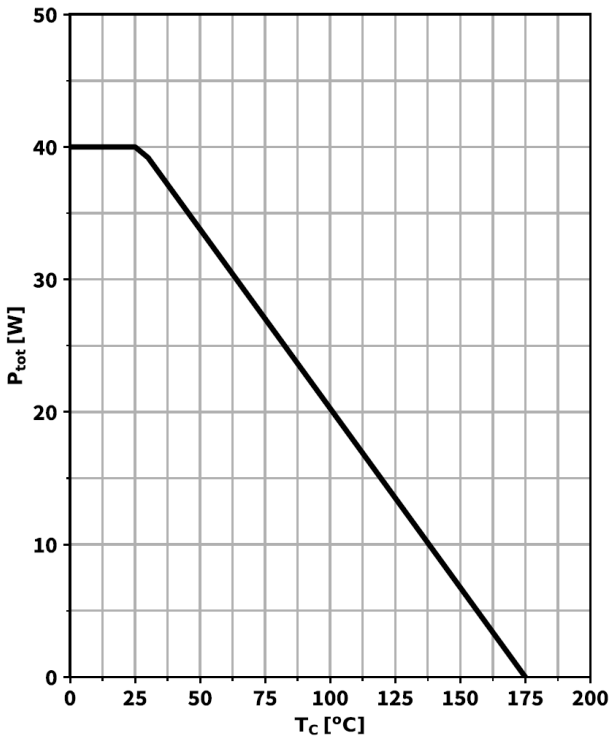
1 Power dissipation M1

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



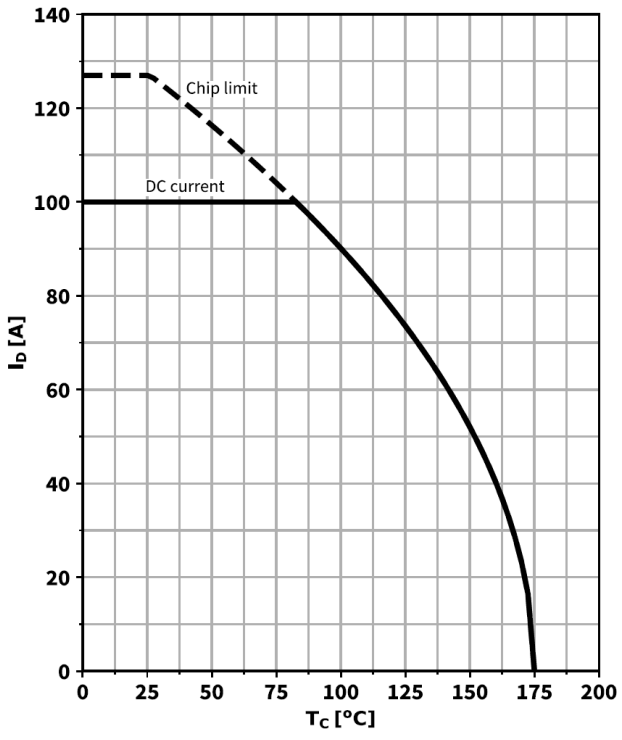
2 Power dissipation M2

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



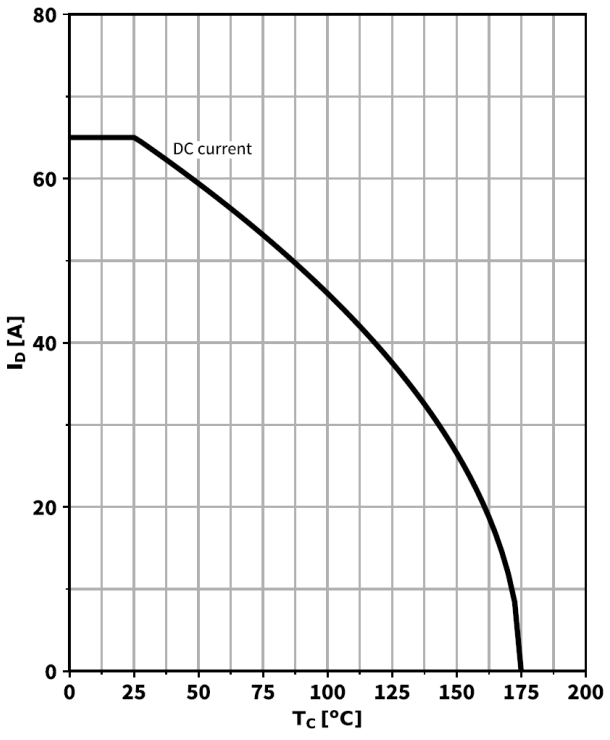
3 Drain current M1

$I_D = f(T_C); V_{GS} \geq 6\ V$



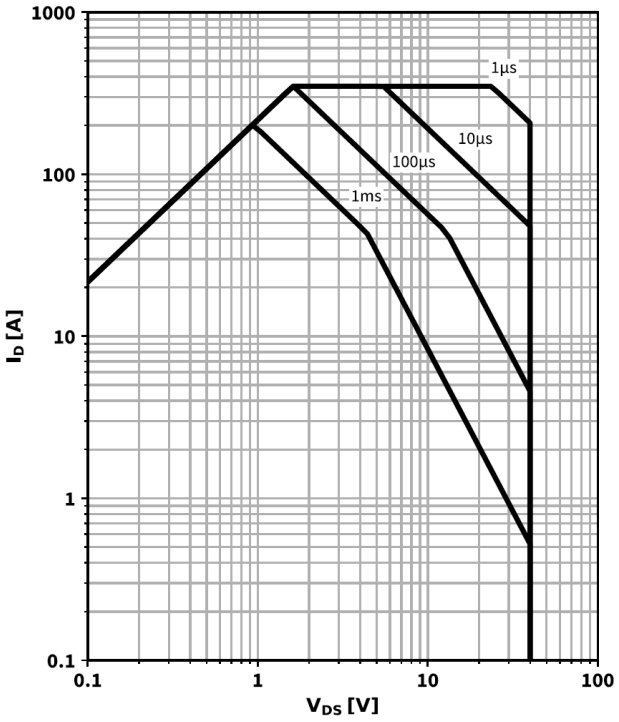
4 Drain current M2

$I_D = f(T_C); V_{GS} \geq 6\ V$



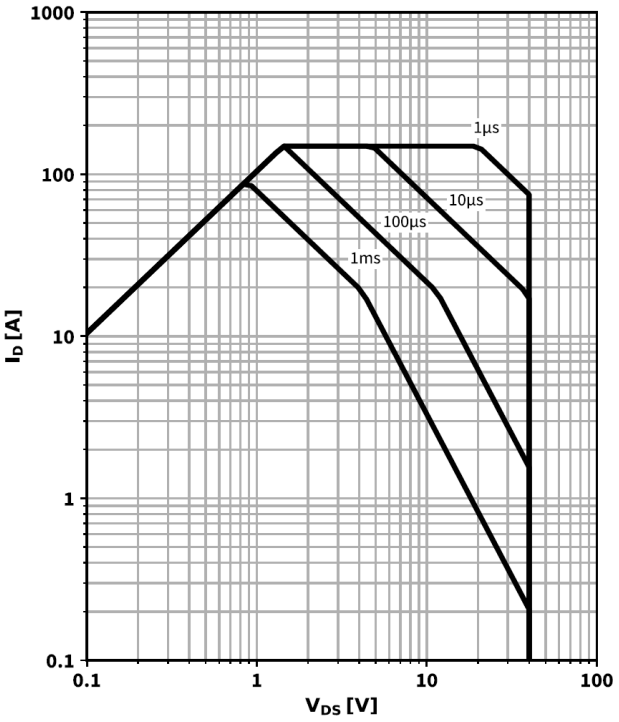
5 Safe operating area M1

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



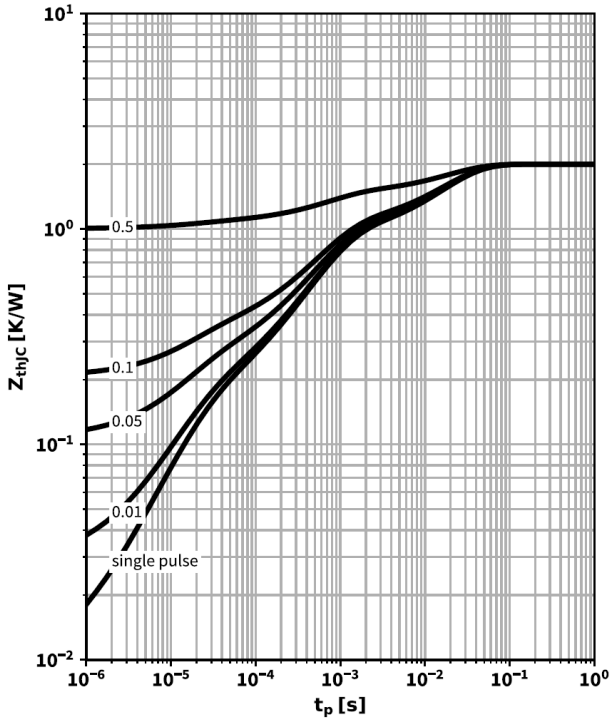
6 Safe operating area M2

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



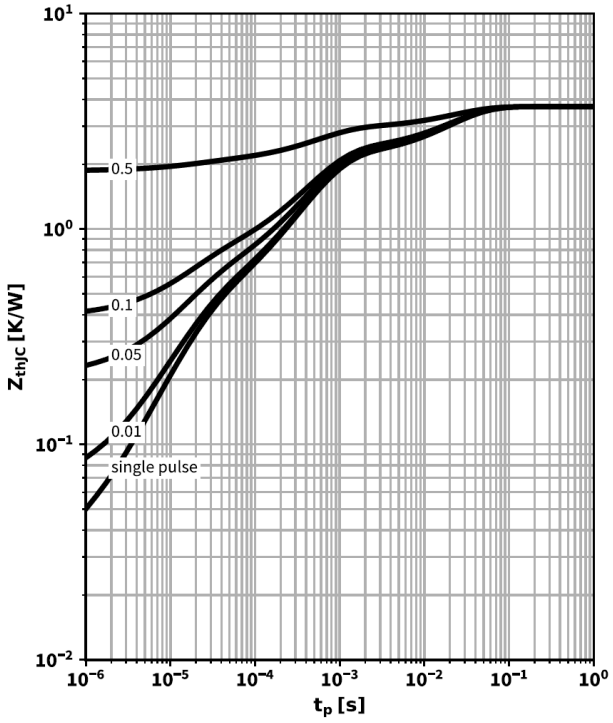
7 Max. transient thermal impedance M1

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



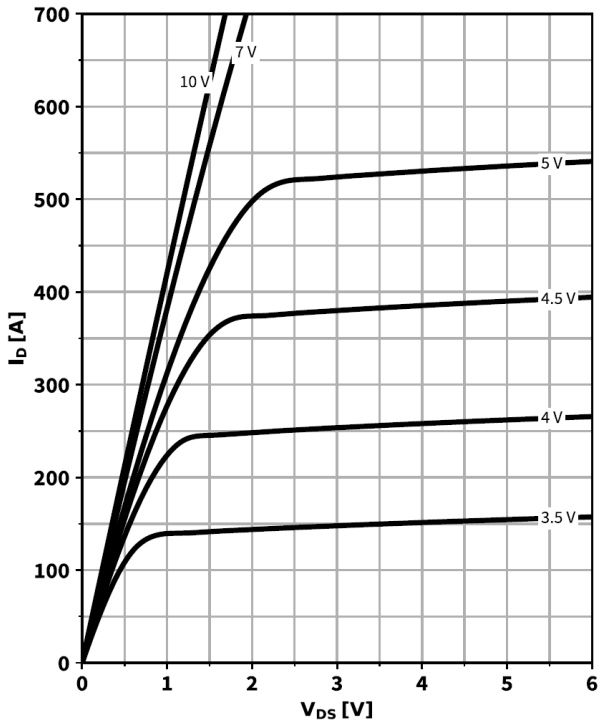
8 Max. transient thermal impedance M2

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



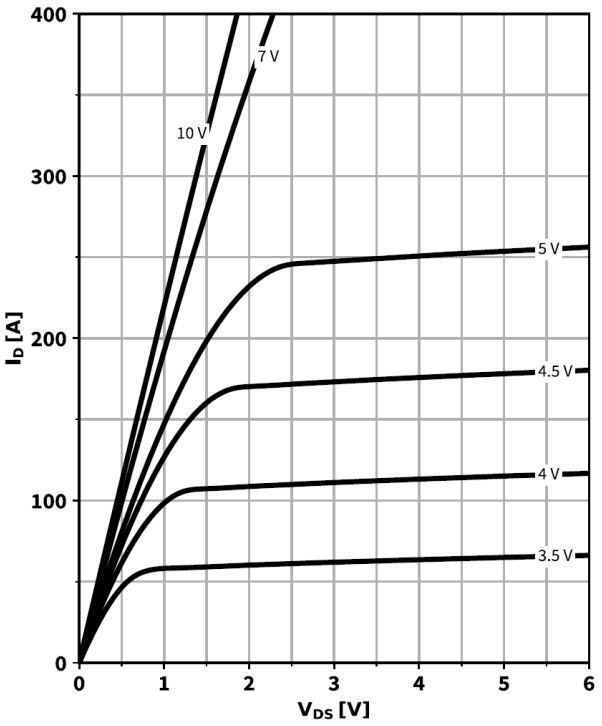
9 Typ. output characteristics M1

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



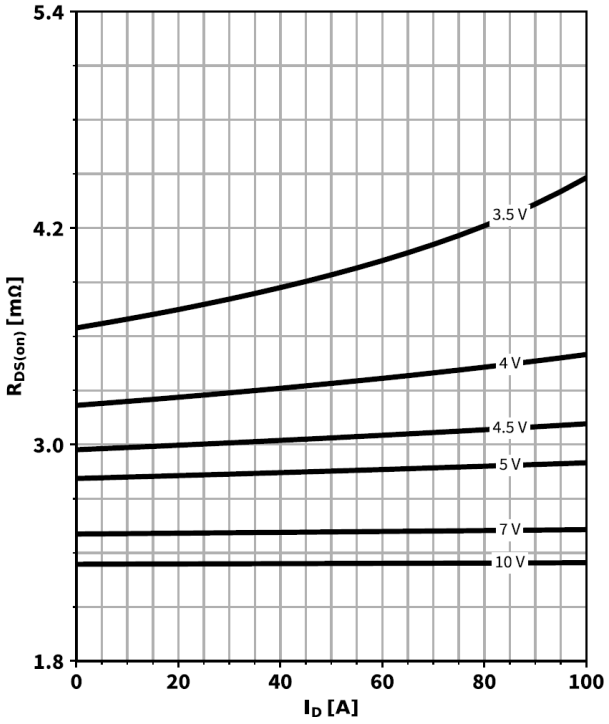
10 Typ. output characteristics M2

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



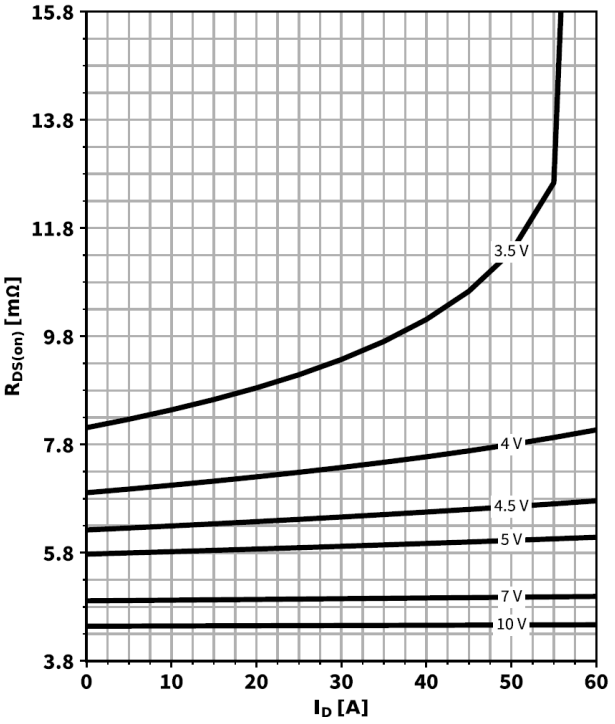
11 Typ. drain-source on-state resistance M1

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



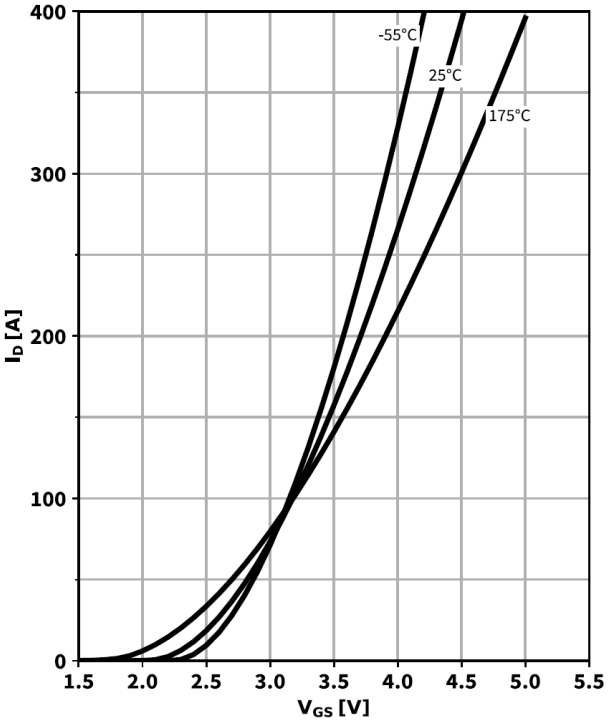
12 Typ. drain-source on-state resistance M2

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



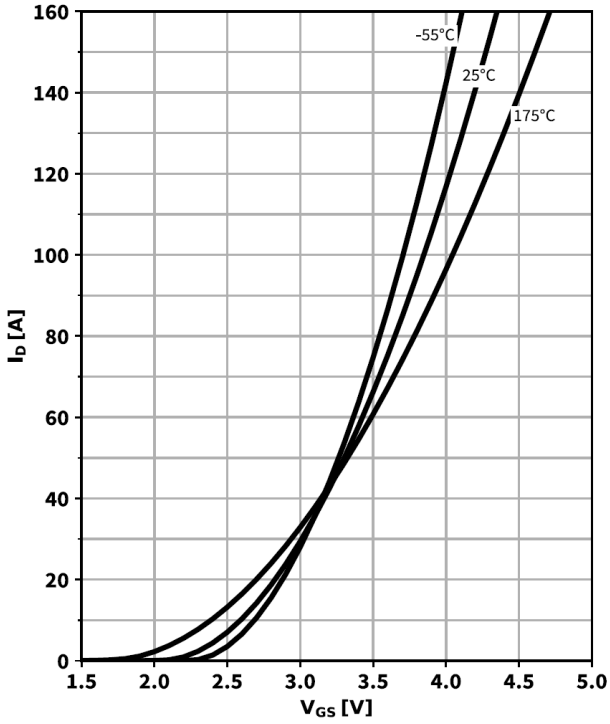
13 Typ. transfer characteristics M1

$I_D = f(V_{GS})$; V_{DS} = 6 V; parameter: T_j



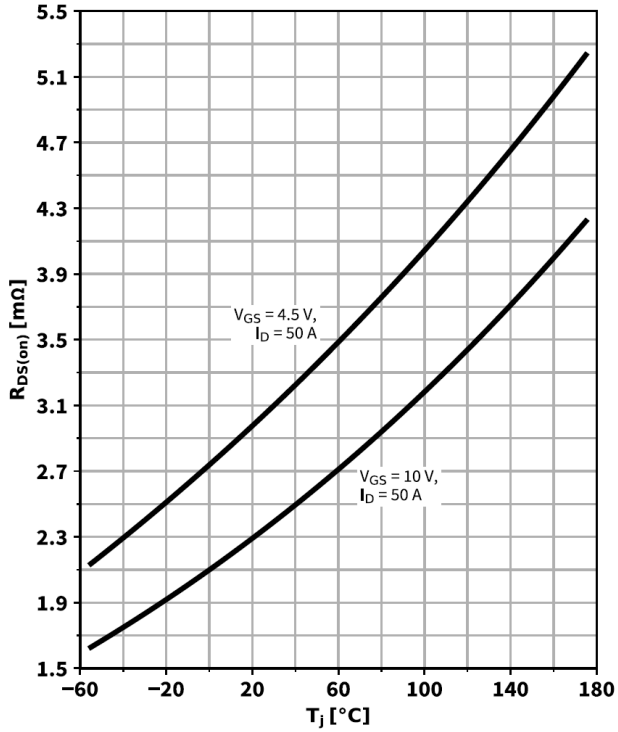
14 Typ. transfer characteristics M2

$I_D = f(V_{GS})$; V_{DS} = 6 V; parameter: T_j



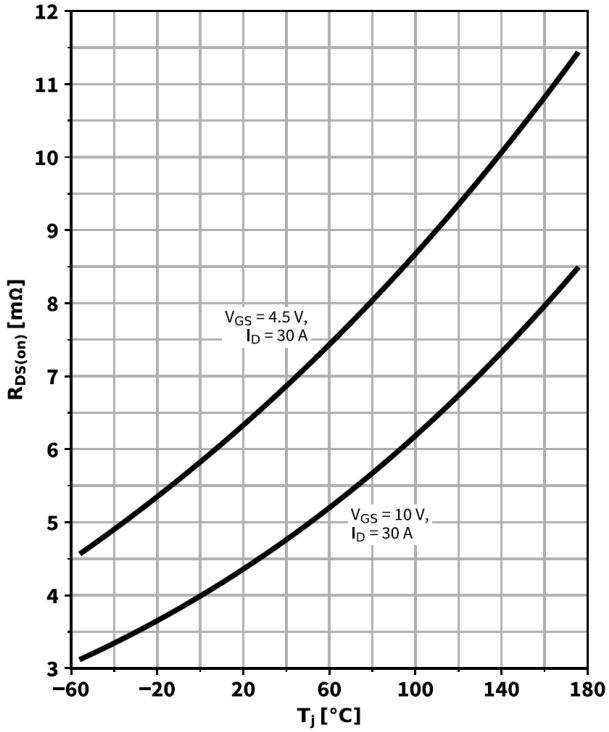
15 Typ. drain-source on-state resistance M1

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



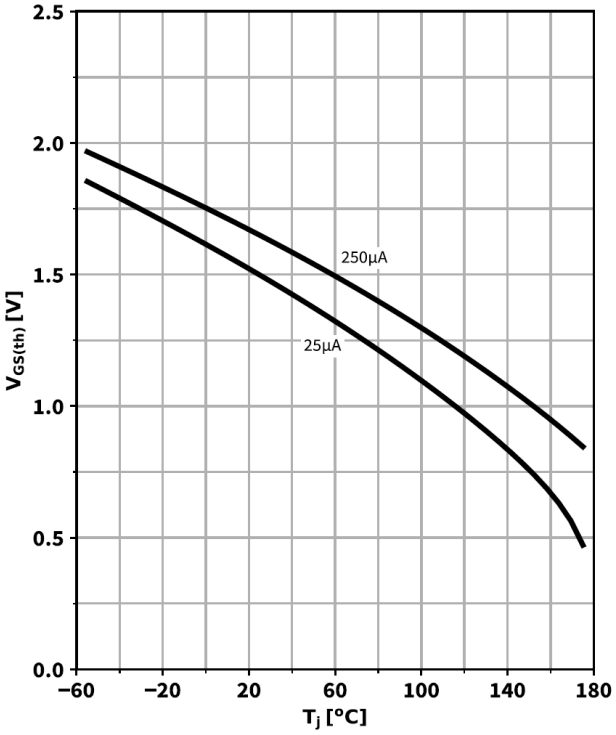
16 Typ. drain-source on-state resistance M2

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



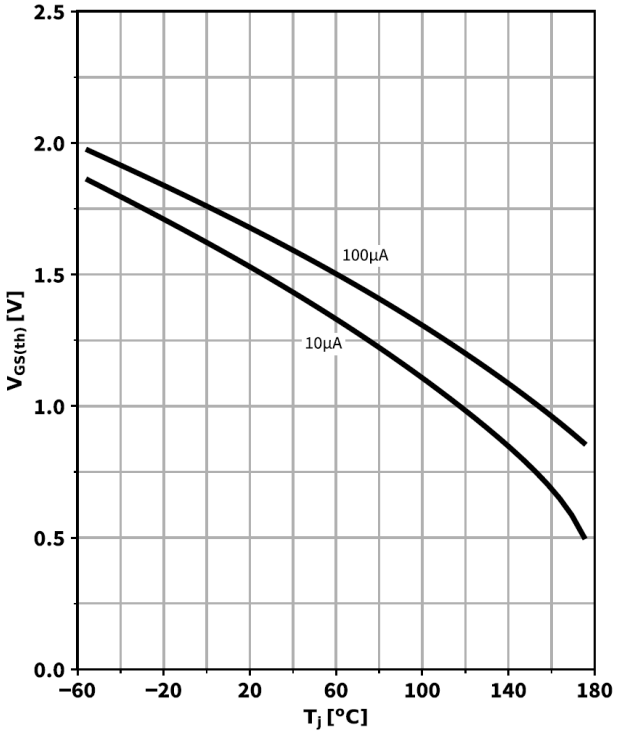
17 Typ. gate threshold voltage M1

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



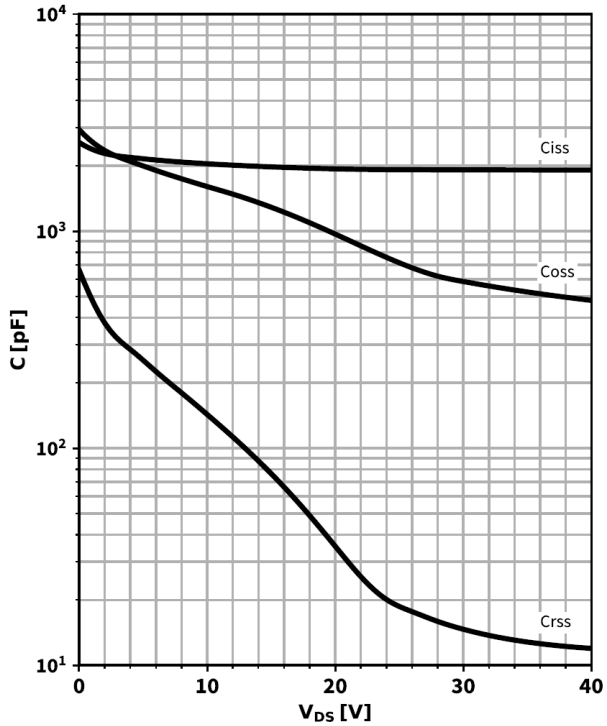
18 Typ. gate threshold voltage M2

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



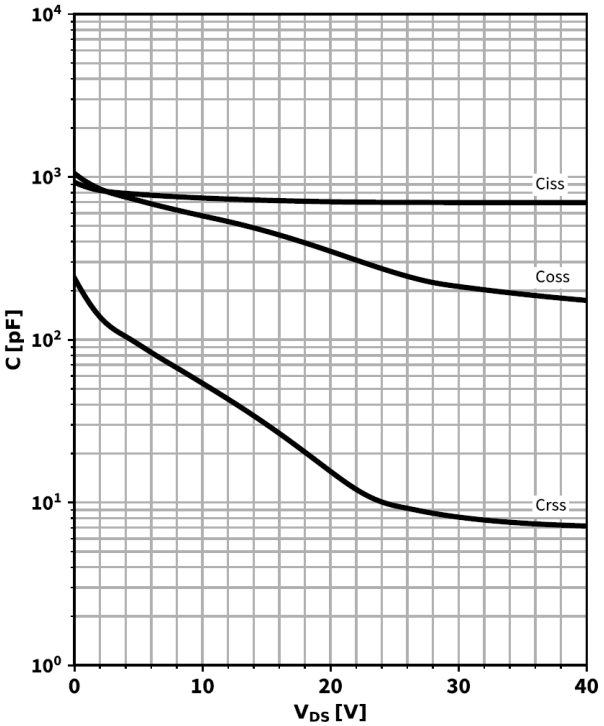
19 Typ. capacitances M1

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



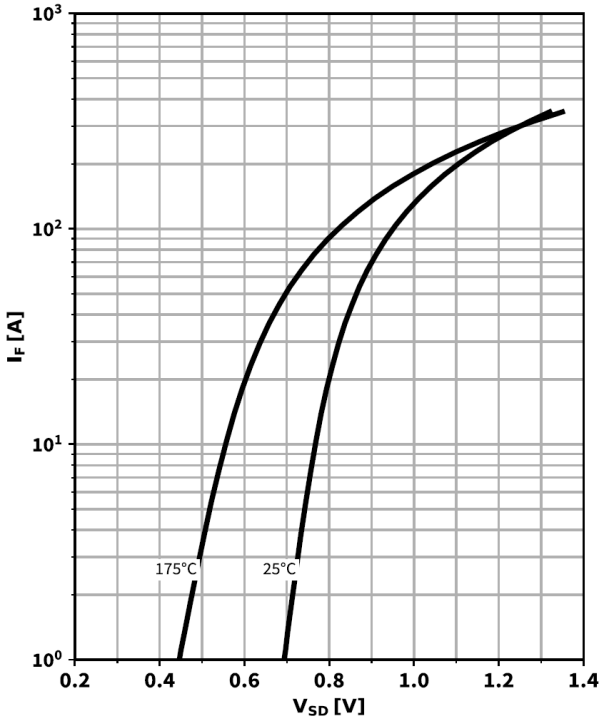
20 Typ. capacitances current M2

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



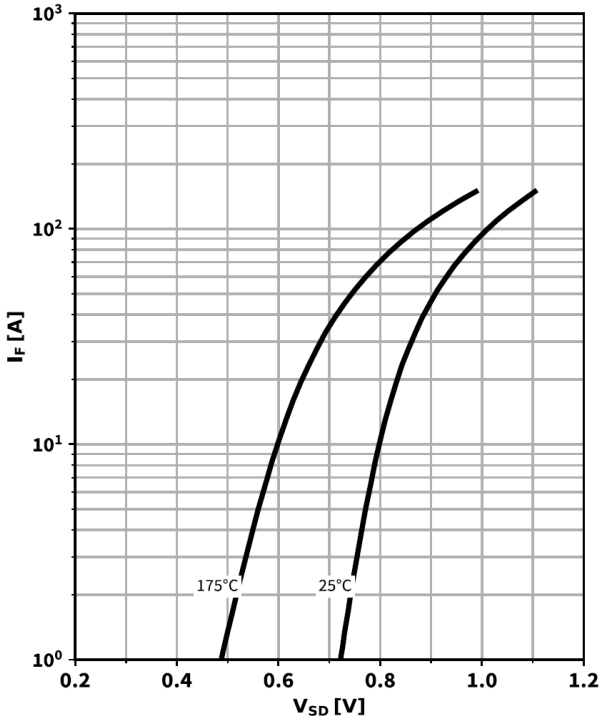
21 Typ. forward diode characteristics M1

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



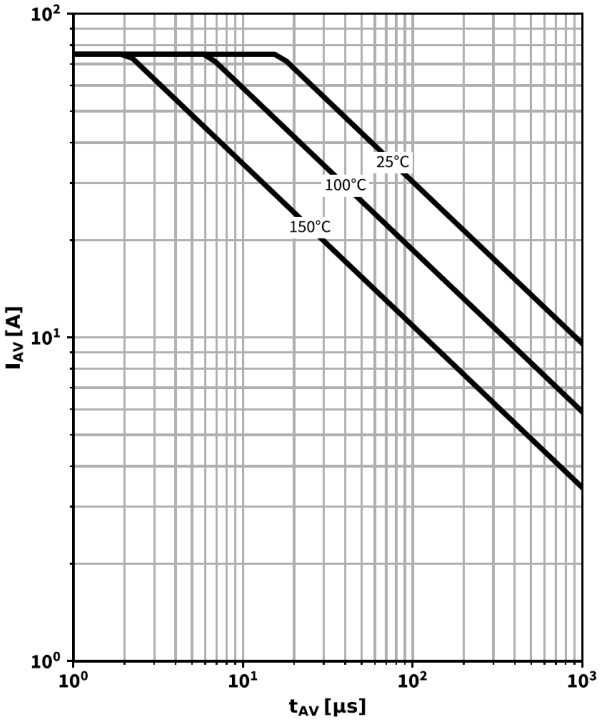
22 Typ. forward diode characteristics M2

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



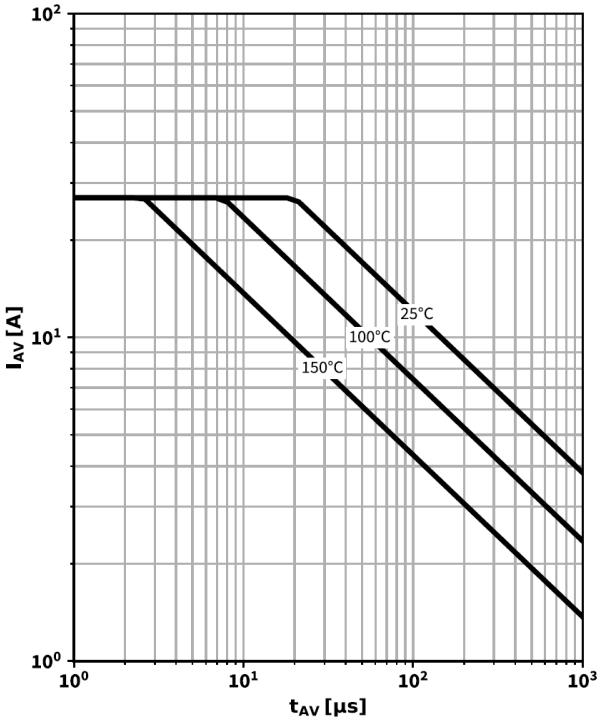
23 Typ. avalanche characteristics M1

$I_{AS} = f(t_{AV})$; parameter: $T_{j(start)}$



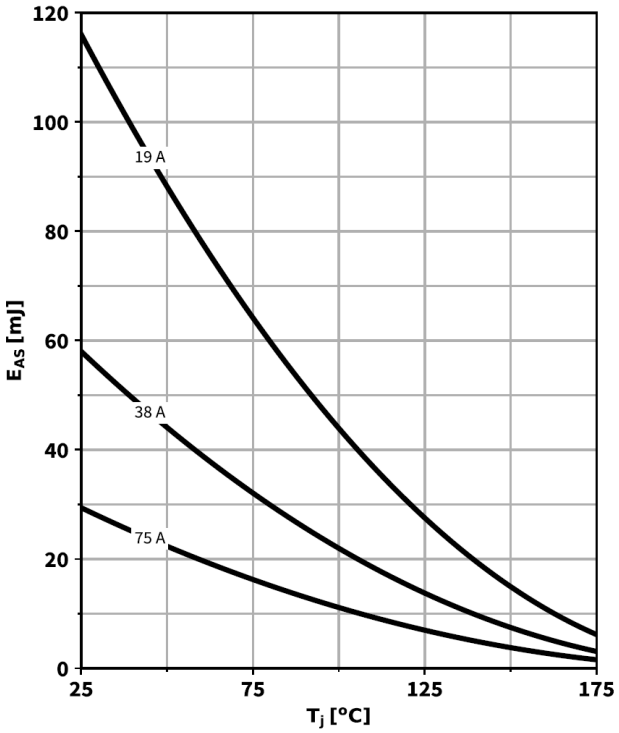
24 Typ. avalanche characteristics M2

$I_{AS} = f(t_{AV})$; parameter: $T_{j(start)}$



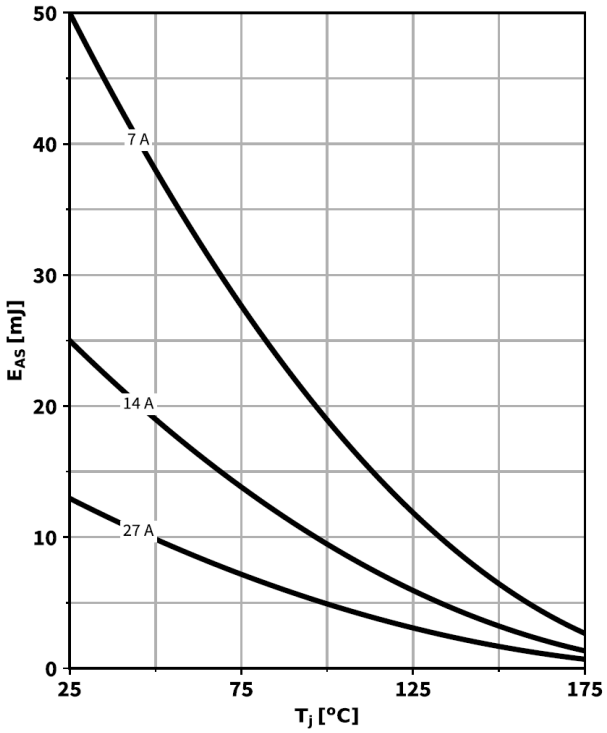
25 Typical avalanche energy M1

$E_{AS} = f(T_j)$; parameter: I_D



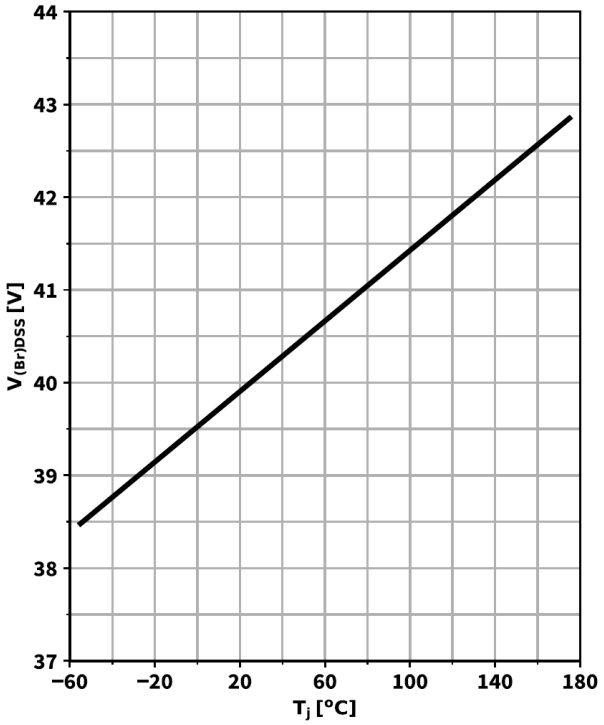
26 Typical avalanche energy M2

$E_{AS} = f(T_j)$; parameter: I_D



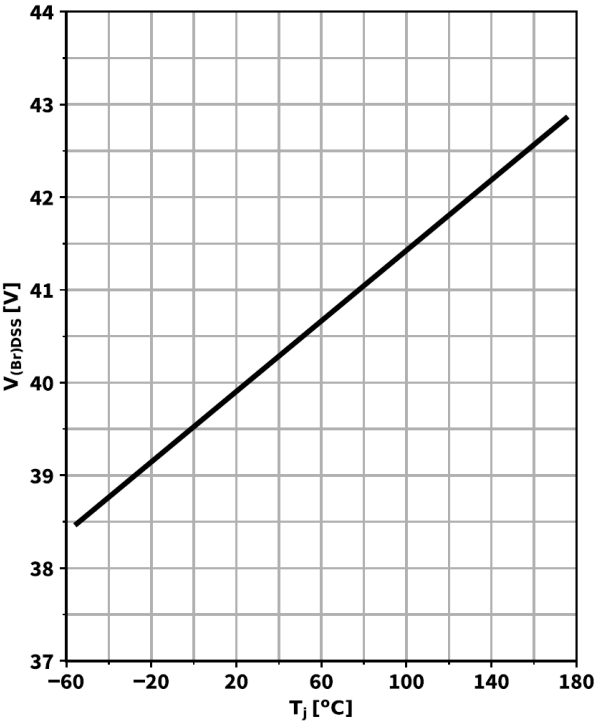
27 Drain-source breakdown voltage M1

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



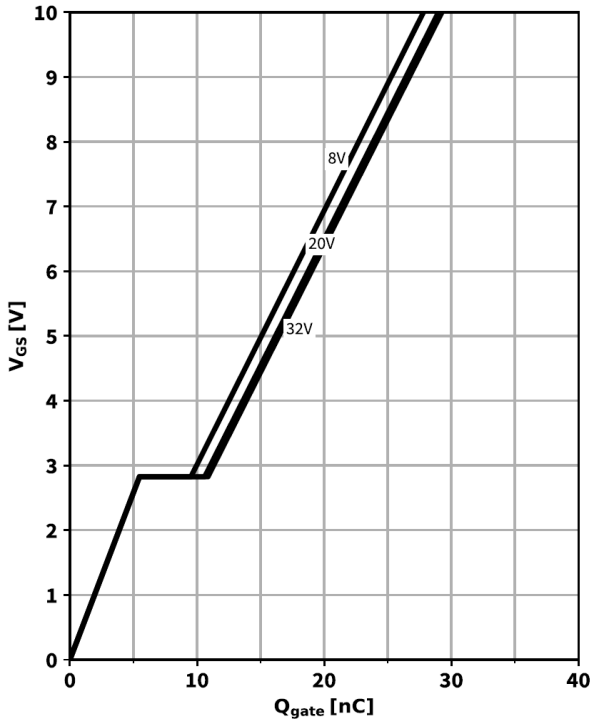
28 Drain-source breakdown voltage M2

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



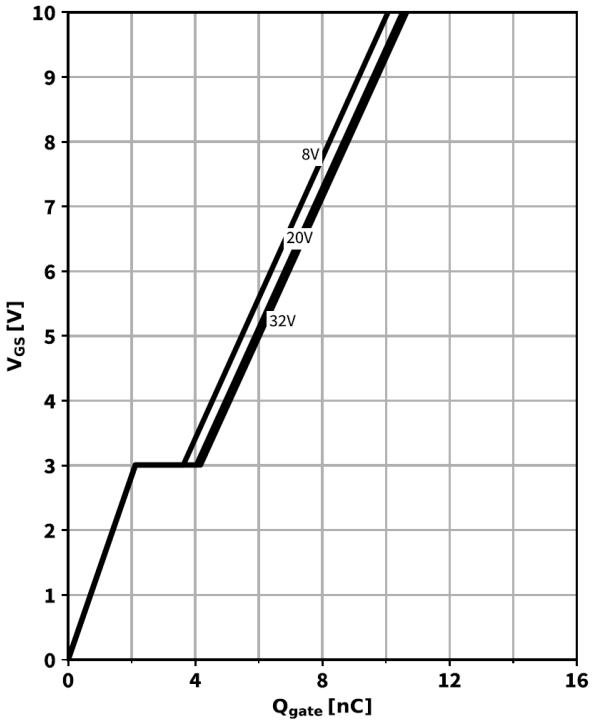
29 Typ. gate charge M1

V_{GS} = f(Q_{gate}); I_D = 50 A pulsed; parameter: V_{DD}

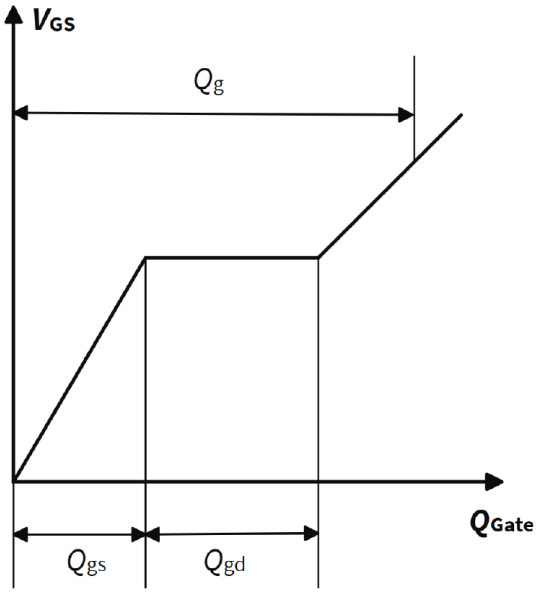


30 Typ. gate charge M2

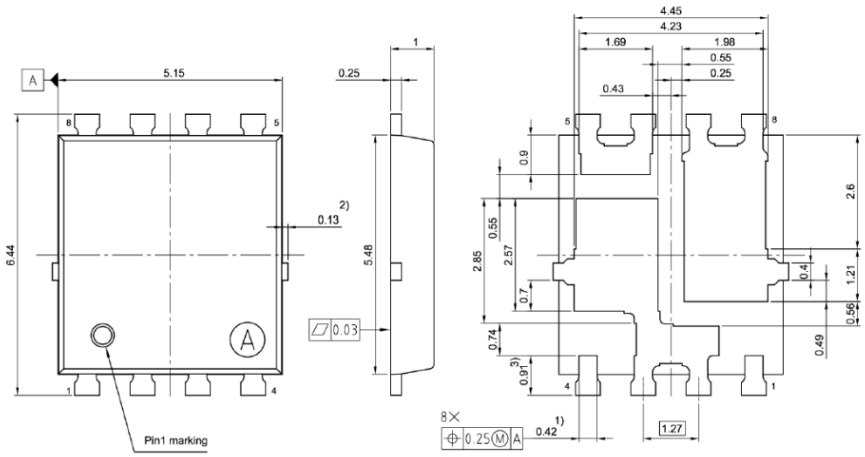
V_{GS} = f(Q_{gate}); I_D = 30 A pulsed; parameter: V_{DD}



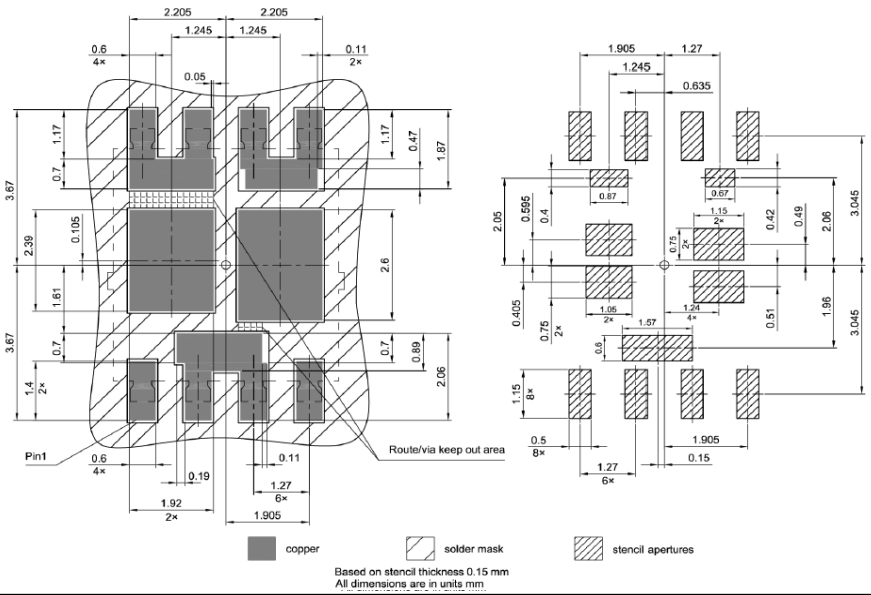
31 Gate charge waveforms M1, M2



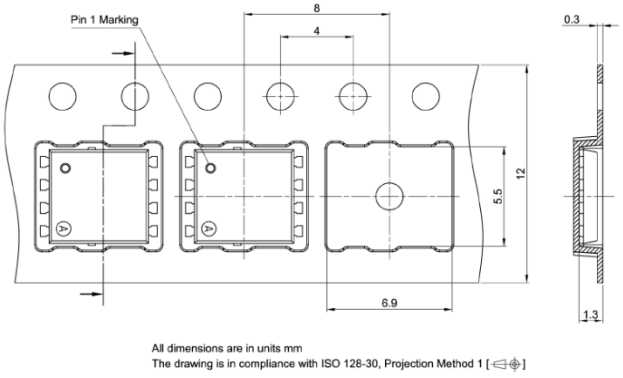
封装外形


Pin1 marking
1) Excluded mold flash
2) Removal on mold gate: Intrusion 0.1mm, Protrusion 0.1mm
3) Lead length up to anti flash line
All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1

焊盘图


Pin1
Route/via keep out area
copper
solder mask
stencil apertures
Based on stencil thickness 0.15 mm
All dimensions are in units mm

封装


Pin 1 Marking
All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1

修订记录

Revision	Date	Changes
Revision 1.0	2025-04-11	Final Data Sheet

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