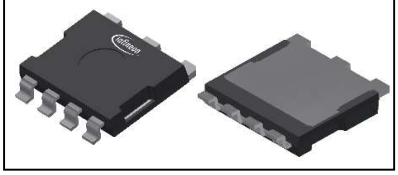
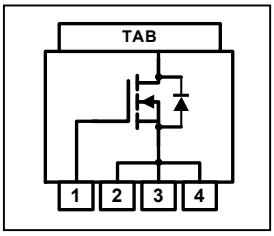
Automotive MOSFET

OptiMOS™ 5 Power-Transistor

RoHS Infineon Automotive Quality AEC Qualified

PG-HSOG-4-1





Features

- OptiMOS™ power MOSFET for automotive applications
- N-channel – Enhancement mode – Normal Level
- Extended qualification beyond AEC-Q101
- Enhanced electrical testing
- Robust design
- MSL2 up to 260°C peak reflow
- 175°C operating temperature
- RoHS compliant
- 100% Avalanche tested

Potential applications

General automotive applications.

Product validation

Qualified for automotive applications. Product validation according to AEC-Q101.

Product Summary

V_{DS}	100	V
$R_{DS(on)}$	1.7	mΩ
I_D (chip limited)	290	A

Type	Package	Marking
IAUMN10S5N017G	PG-HSOG-4-1	5N10N017

Table of Contents

Maximum ratings

at T_j=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, Chip limitation[1,2)]	290	A
		V_{GS}=10V, DC current[3)]	200	
		T_a=100 °C, V_{GS}=10 V, R_{thJA} on 2s2p[2,4)]	62	
Pulsed drain current[2)]	$I_{D,pulse}$	T_C=25 °C, t_p= 100 µs	1000	
Avalanche energy, single pulse[2)]	E_{AS}	I_D=100 A	578	mJ
Avalanche current, single pulse	I_{AS}	–	200	A
Gate source voltage	V_{GS}	–	±20	V
Power dissipation	P_{tot}	T_C=25 °C	307	W
Operating and storage temperature	T_j, T_{stg}	–	-55 ... +175	°C

Thermal characteristics[2)]

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal resistance, junction - case	R_{thJC}	–	–	–	0.49	K/W
Thermal resistance, junction - ambient[3)]	R_{thJA}	–	–	7.8	–	

Electrical characteristics

at Tj=25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Static characteristics						
Drain-source breakdown voltage	$V_{(Br)DSS}$	V_{GS}=0 V, I_D=1 mA	100	–	–	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=215 µA	2.2	3	3.8	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_j=25 °C	–	–	1	µA
		V_{DS}=100 V, V_{GS}=0 V, T_j=100 °C[2)]	–	–	100	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	–	–	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=6 V, I_D=50 A	–	1.8	2.2	mΩ
		V_{GS}=10 V, I_D=100 A	–	1.3	1.7	
Gate resistance[2)]	R_G	–	–	1.3	–	Ω

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[2]						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz	–	9626	12514	pF
Output capacitance	C_{oss}		–	1545	2010	
Reverse transfer capacitance	C_{rss}		–	67	90	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50 V, V_{GS}=10 V, I_D=100 A, R_G=3.5 Ω	–	23	–	ns
Rise time	t_r		–	12	–	
Turn-off delay time	$t_{d(off)}$		–	50	–	
Fall time	t_f		–	48	–	
Gate Charge Characteristics[2]						
Gate to source charge	Q_{gs}	V_{DD}=50 V, I_D=100 A, V_{GS}=0 to 10 V	–	44	57	nC
Gate to drain charge	Q_{gd}		–	26	39	
Gate charge total	Q_g		–	131	170	
Gate plateau voltage	$V_{plateau}$		–	4.5	–	V
Reverse Diode						
Diode continous forward current[2]	I_S	T_C=25 °C	–	–	200	A
Diode pulse current[2]	$I_{S,pulse}$	T_C=25 °C, t_p= 100 µs	–	–	1000	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=100 A, T_j=25 °C	–	0.9	1.2	V
Reverse recovery time[2]	t_{rr}	V_R=50 V, I_F=50A, di_F/dt=100 A/µs	–	77	116	ns
Reverse recovery charge[2]	Q_{rr}		–	166	332	nC

[1] Practically the current is limited by the overall system design including the customer-specific PCB.

[2] The parameter is not subject to production testing – specified by design.

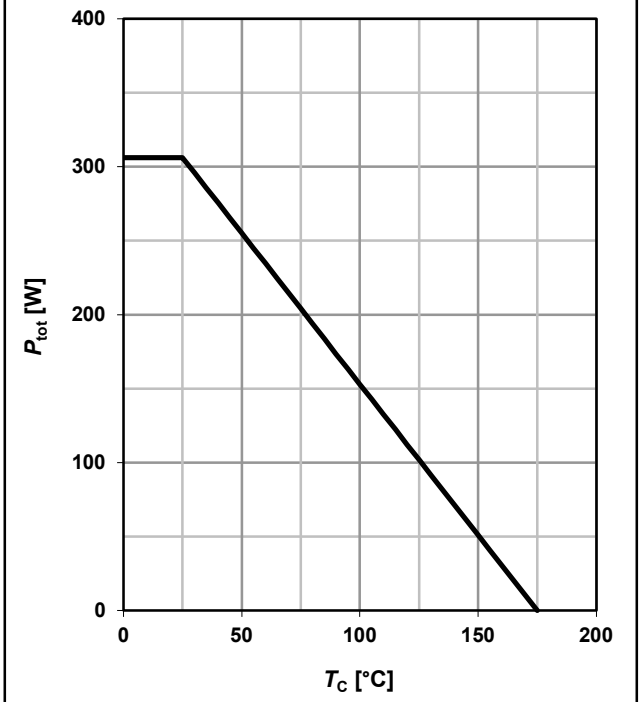
[3] Current is limited by package.

[4] Device on 2s2p FR4 PCB defined in accordance with JEDEC standards (JESD51-5, -7). PCB is vertical in still air.

Electrical characteristics diagrams

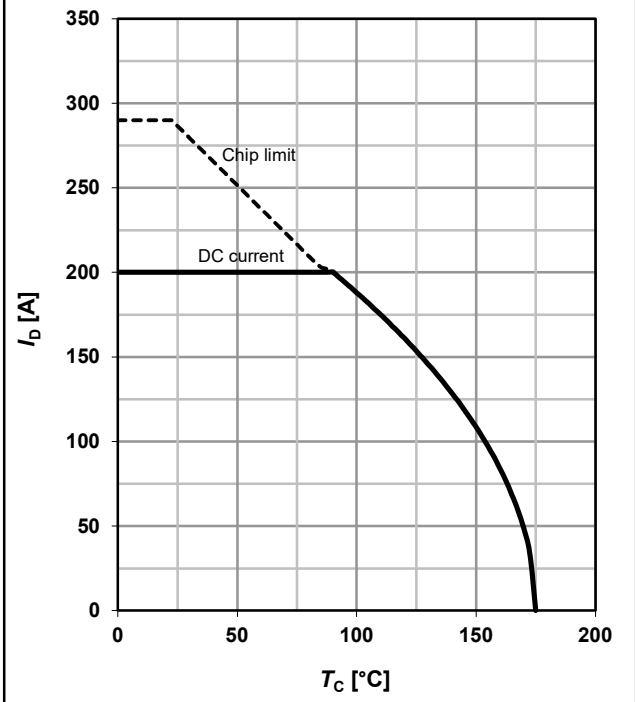
1 Power dissipation

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



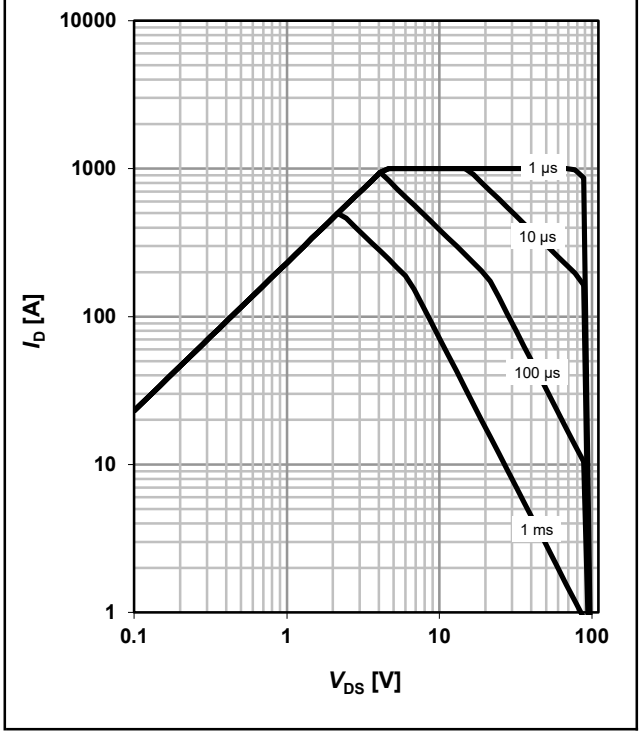
2 Drain current

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



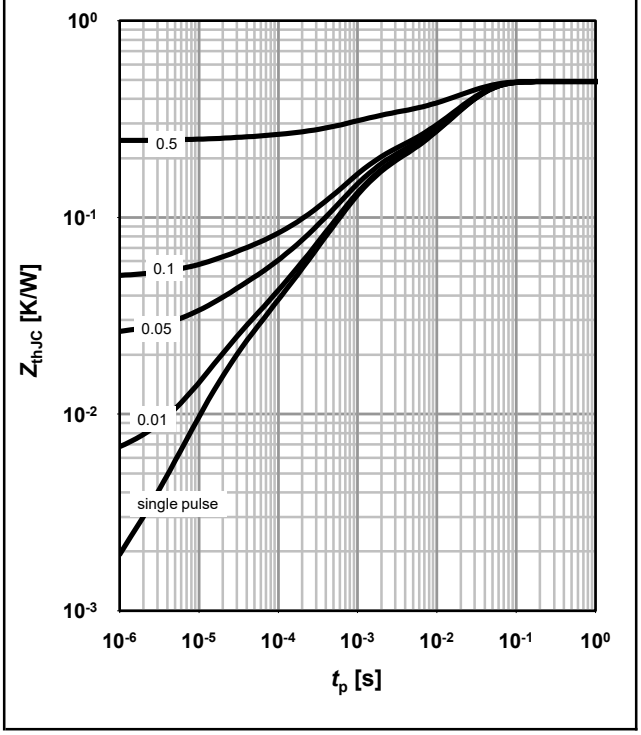
3 Safe operating area

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



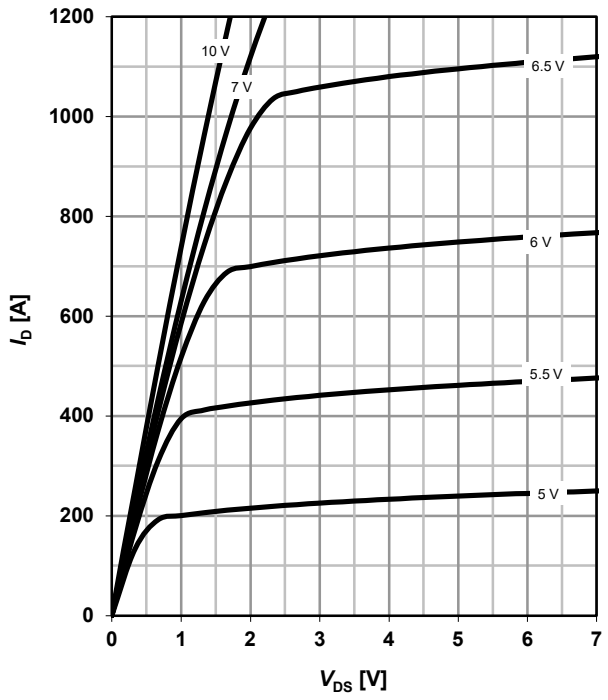
4 Max. transient thermal impedance

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



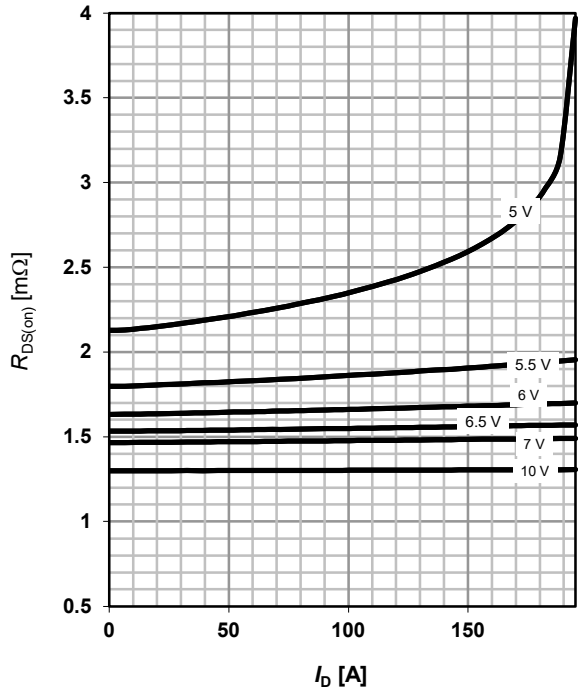
5 Typ. output characteristics

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



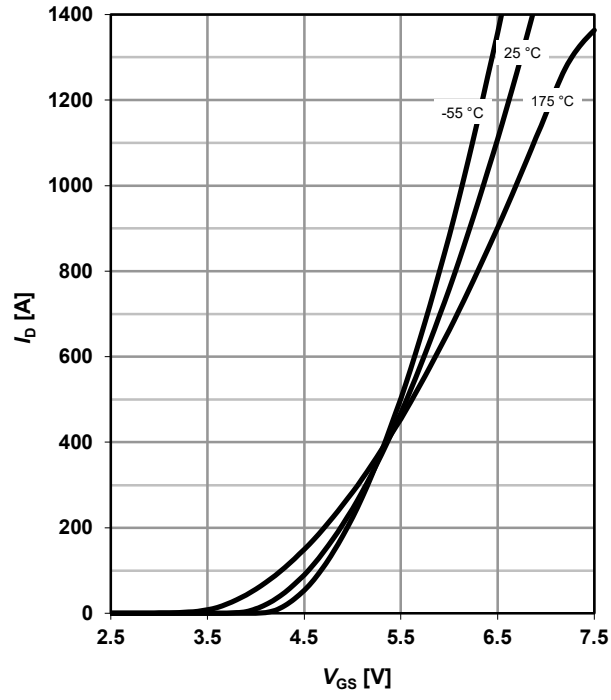
6 Typ. drain-source on-state resistance

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



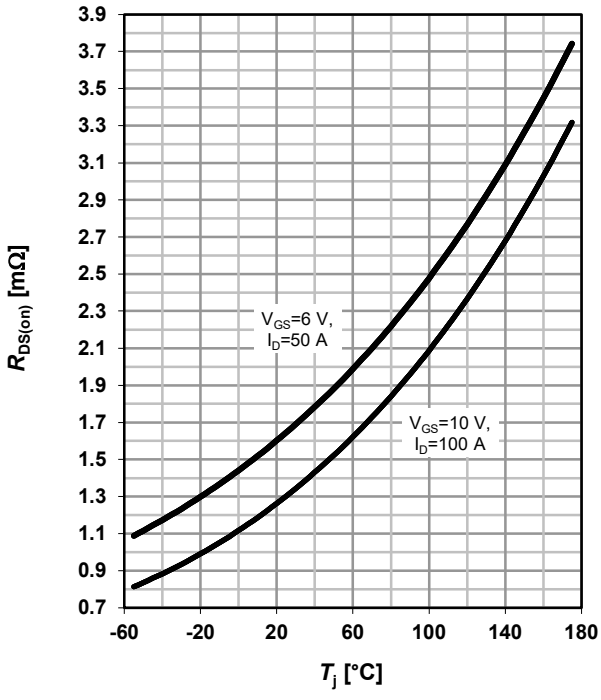
7 Typ. transfer characteristics

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



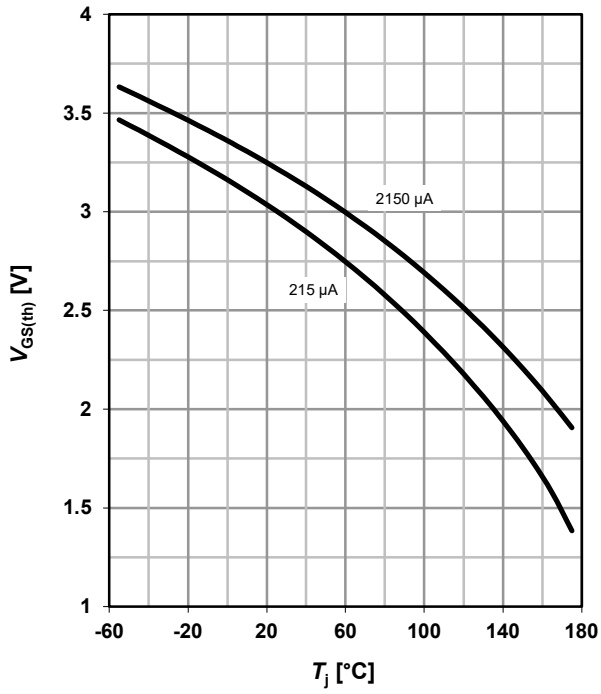
8 Typ. drain-source on-state resistance

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



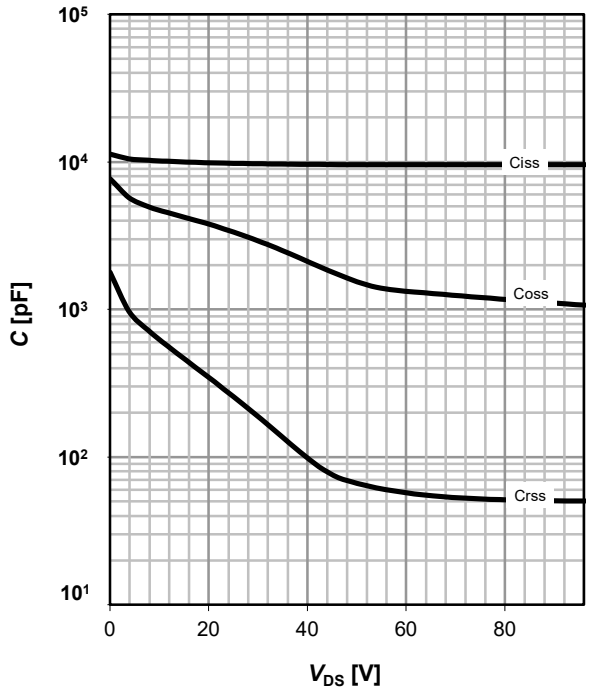
9 Typ. gate threshold voltage

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



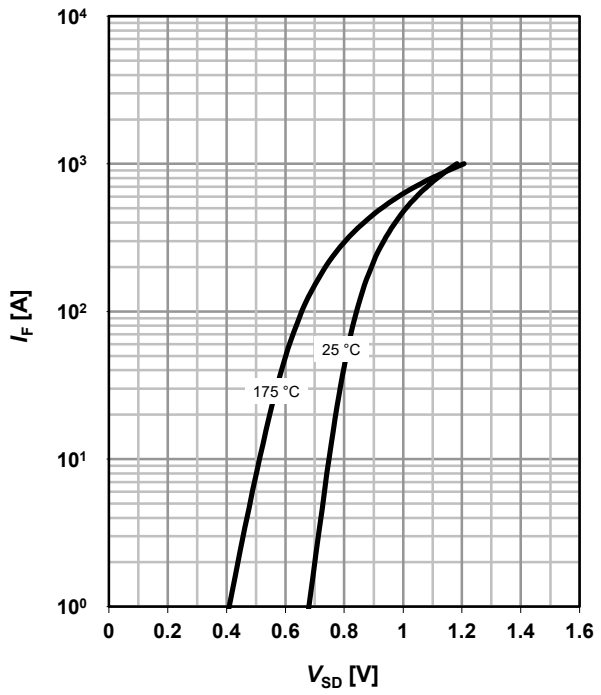
10 Typ. capacitances

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



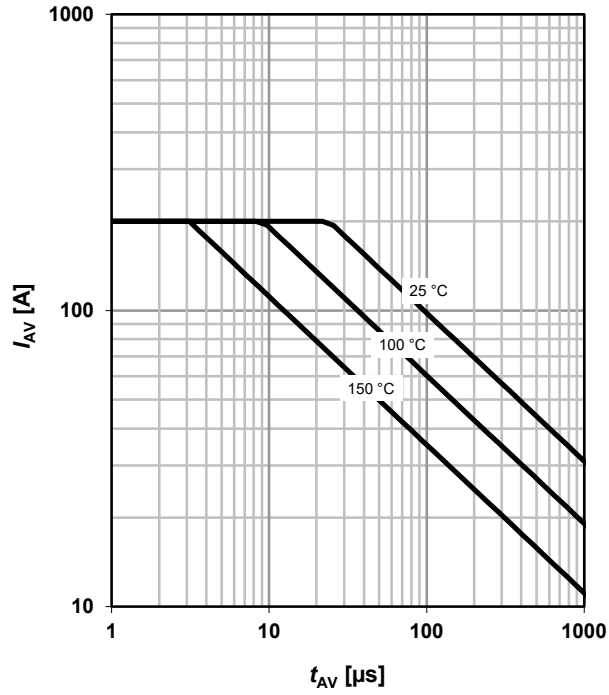
11 Typical forward diode characteristics

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



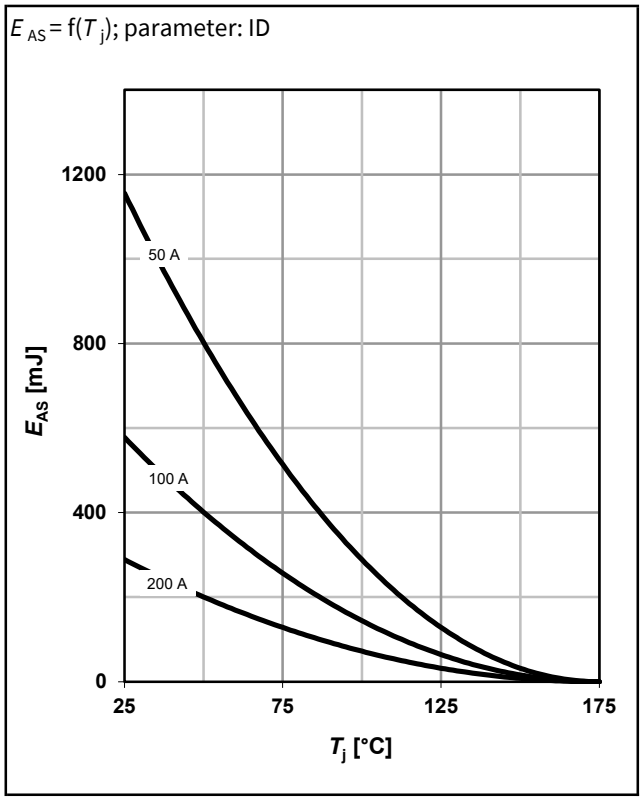
12 Typ. avalanche characteristics

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



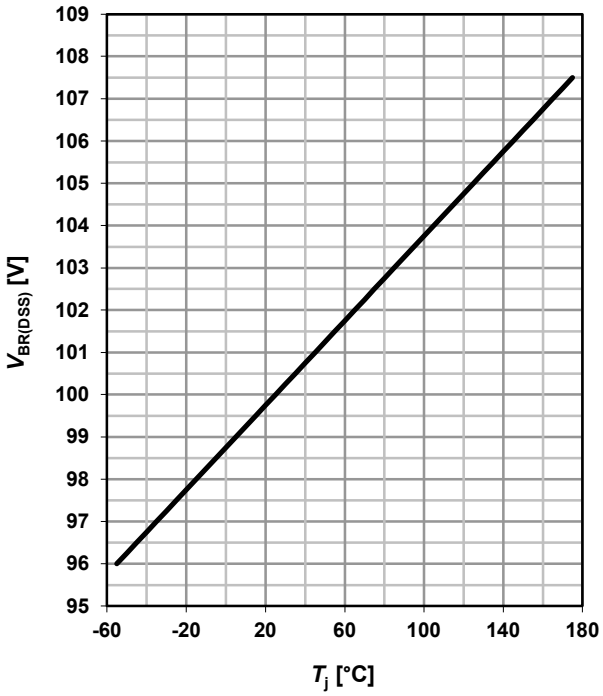
13 Typical avalanche energy

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



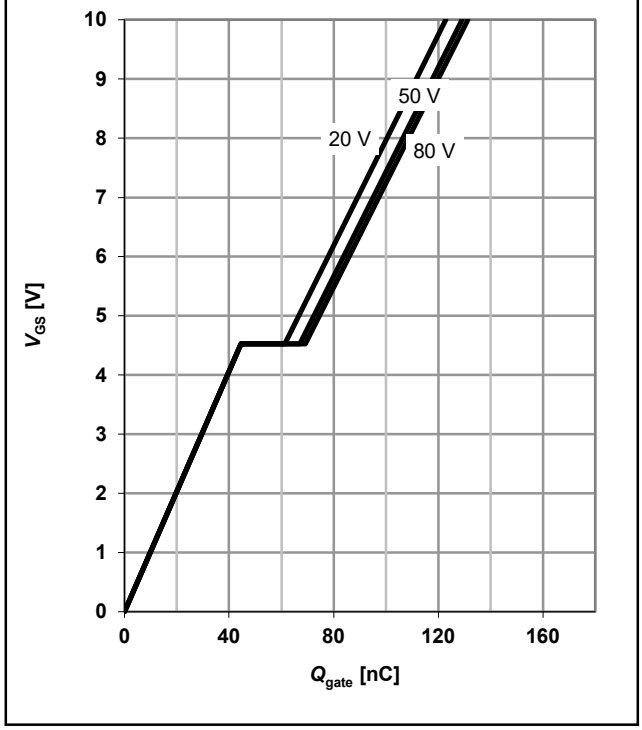
14 Drain-source breakdown voltage

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

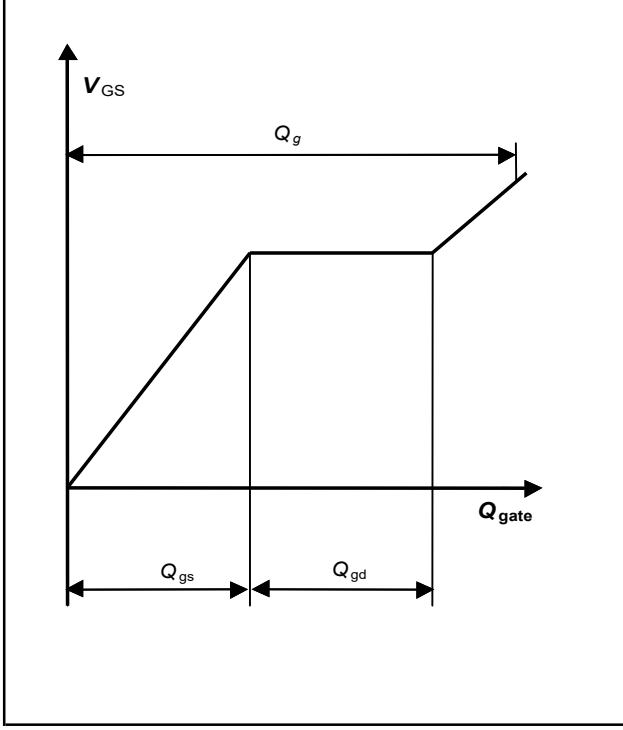


15 Typ. gate charge

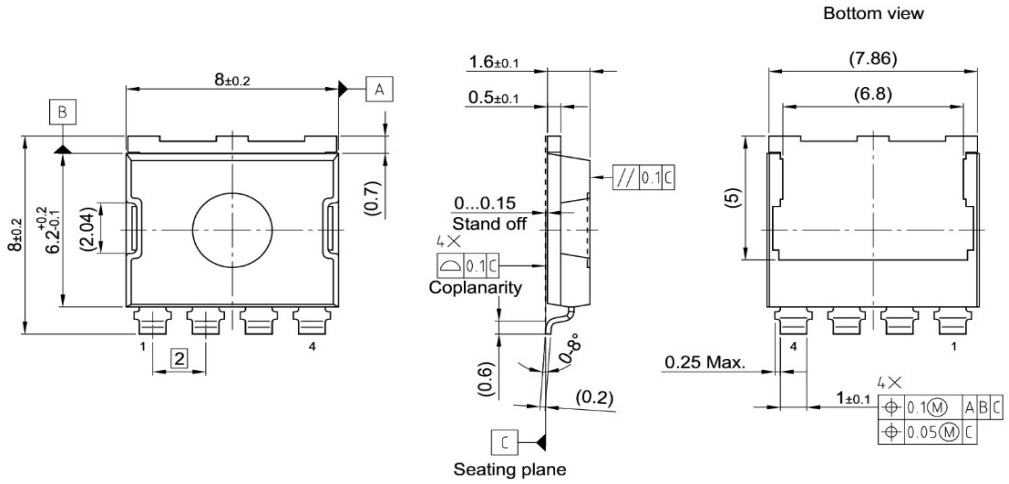
$V_{GS} = f(Q_{gate})$; I_D = 100 A pulsed; parameter: V_{DD}



16 Gate charge waveforms

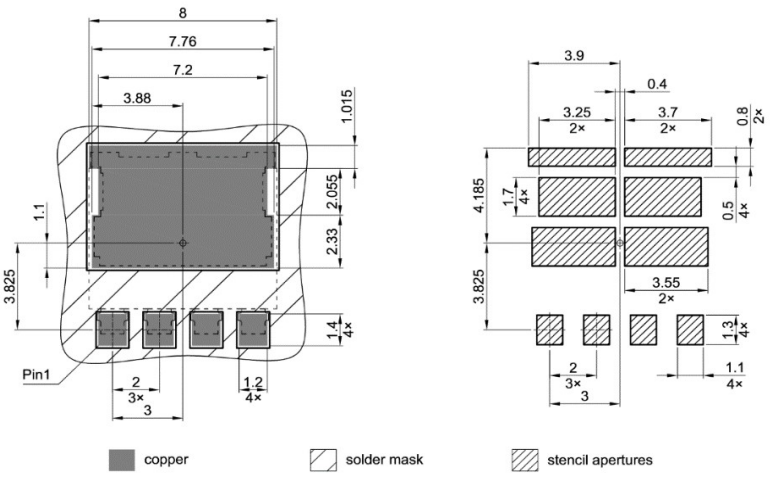


Package Outline



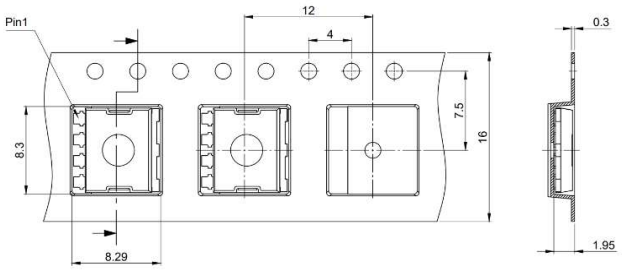
All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1 [⇹]
Drawing according to ISO 8015, general tolerances ISO 2768-mK

Footprint



All dimensions are in units mm
All pads are non-solder mask defined

Packaging



All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1 [⇹]

Revision History

Revision	Date	Changes
Revision 1.0	02.05.2024	Final data sheet

Trademarks
All referenced product or service names and trademarks are the property of their respective owners.

Edition 2024-05-02

Published by

Infeon Technologies AG

81726 Munich, Germany

Do you have any questions about any aspect of this document?

Email: erratum@infeon.com

Document reference
IAUMN10S5N017G-Data-Sheet-01-Infeon

IMPORTANT NOTICE

The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie").

With respect to any examples, hints or any typical values stated herein and/or any information regarding the application of the product, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

In addition, any information given in this document is subject to customer's compliance with its obligations stated in this document and any applicable legal requirements, norms and standards concerning customer's products and any use of the product of Infineon Technologies in customer's applications. The data contained in this document is exclusively intended for technically trained staff. It is the responsibility of customer's technical departments to evaluate the suitability of the product for the intended application and the completeness of the product information given in this document with respect to such application.

For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (**www.infineon.com**).

WARNINGS

Due to technical requirements products may contain dangerous substances. For information on the types in question please contact the nearest Infineon Technologies Office.

Except as otherwise explicitly approved by Infineon Technologies in a written document signed by authorized representatives of Infineon Technologies, Infineon Technologies' products may not be used in any applications where a failure of the product or any consequences of the use thereof can reasonably be expected to result in personal injury.