IAUMN04S7N006G

Automotive MOSFET

OptiMOS™ 7 Power-Transistor

RoHS

Infineon Automotive Quality

AEC Qualified

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
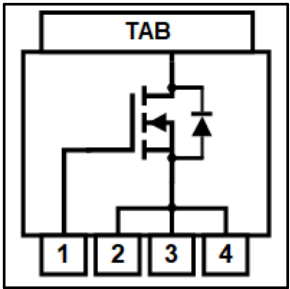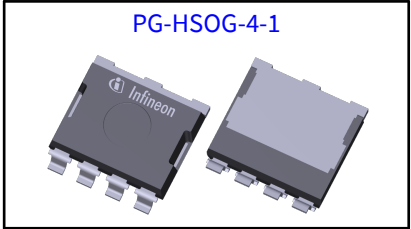- RoHS compliant
- 100% Avalanche tested

Potential Applications

General automotive applications.

Product Validation

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

TAB

Product Summary

V_{DS}	40	V
$R_{DS(on)}$	0.60	mΩ
I_D (chip limited)	500	A

Type	Package	Marking
IAUMN04S7N006G	PG-HSOG-4-1	7N04N006

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]	500	A
		V_{GS} = 10 V, DC current	200	
		T_a = 100°C, V_{GS} = 10 V, R_{thJA} on 2s2p[2,3]	53	
Pulsed drain current[2]	$I_{D,pulse}$	T_C = 25°C, t_p = 100 µs	1390	
Avalanche energy, single pulse[2]	E_{AS}	I_D = 100 A	310	mJ
Avalanche current, single pulse	I_{AS}	–	200	A
Gate source voltage	V_{GS}	–	±20	V
Power dissipation	P_{tot}	T_C = 25°C	193	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}	–	–	–	0.78	K/W
Thermal resistance, junction - ambient[3]	R_{thJA}	–	–	23.3	–	

Electrical Characteristics

at T_j=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	40	–	–	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS} = V_{GS}, I_D = 105$ µA	2.2	2.6	3.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS} = 40$ V, $V_{GS} = 0$ V, $T_j = 25°C$	–	–	1	µA
		$V_{DS} = 40$ V, $V_{GS} = 0$ V, $T_j = 100°C$[2]	–	–	26	
Gate-source leakage current	I_{GSS}	$V_{GS} = 20$ V, $V_{DS} = 0$ V	–	–	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS} = 7$ V, $I_D = 50$ A	–	0.66	0.74	mΩ
		$V_{GS} = 10$ V, $I_D = 100$ A	–	0.55	0.60	
Gate resistance[2]	R_G	–	–	1.2	–	Ω

Dynamic Characteristics[2]

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Input capacitance	C_{iss}	$V_{GS} = 0$ V, $V_{DS} = 20$ V, $f = 1$ MHz	–	7095	9224	pF
Output capacitance	C_{oss}		–	4133	5373	
Reverse transfer capacitance	C_{rss}		–	152	228	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = 20$ V, $V_{GS} = 10$ V, $I_D = 125$ A, $R_G = 3.5$ Ω	–	13	–	ns
Rise time	t_r		–	10	–	
Turn-off delay time	$t_{d(off)}$		–	36	–	
Fall time	t_f		–	22	–	

Gate Charge Characteristics[2]

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Gate to source charge	Q_{gs}	$V_{DD} = 20$ V, $I_D = 100$ A, $V_{GS} = 0$ to 10 V	–	29	38	nC
Gate to drain charge	Q_{gd}		–	20	30	
Gate charge total	Q_g		–	103	134	
Gate plateau voltage	$V_{plateau}$		–	4.1	–	V

Reverse Diode

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Diode continuous 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	–	–	1390	
Diode forward voltage	V_{SD}	$V_{GS} = 0$ V, $I_F = 100$ A, $T_j = 25$°C	–	0.8	0.95	V
Reverse recovery time[2]	t_{rr}	$V_R = 40$ V, $I_F = 50$ A, $di_F/dt = 100$ A/μs	–	53	80	ns
Reverse recovery charge[2]	Q_{rr}		–	50	100	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] 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
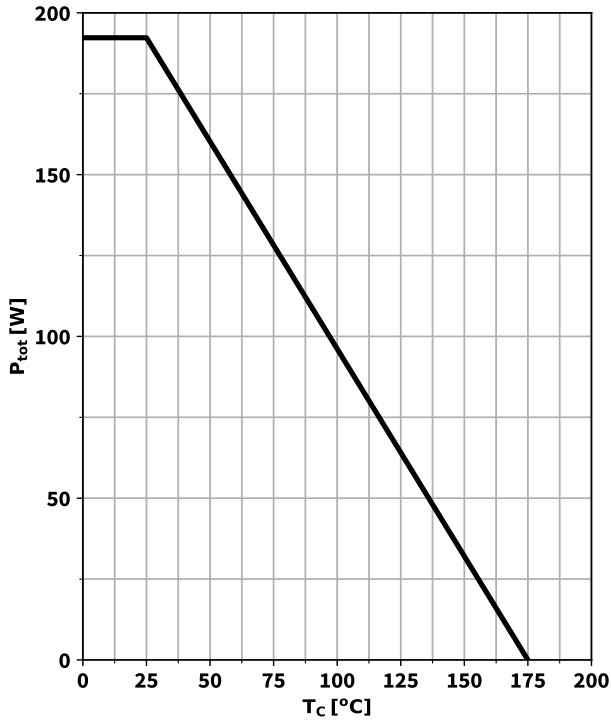
2 Drain current
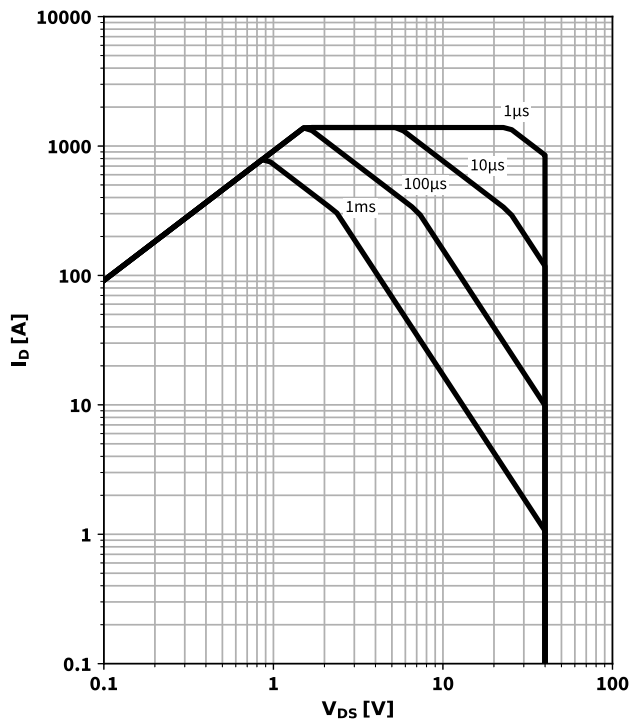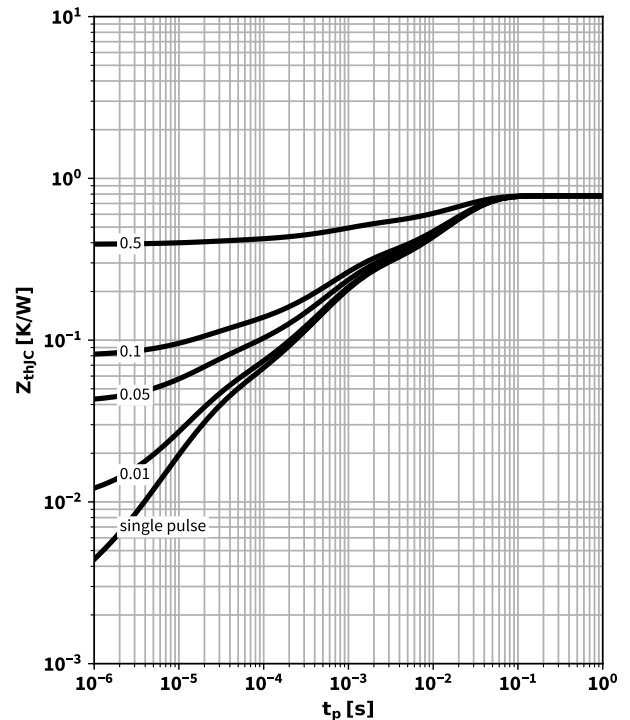
I_D = f(T_C); $V_{GS} \geq 6$ V
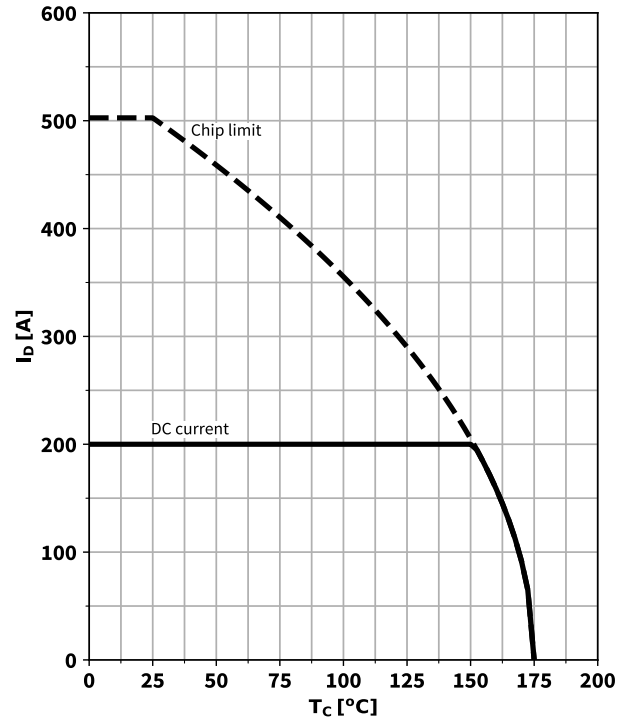
3 Safe operating area
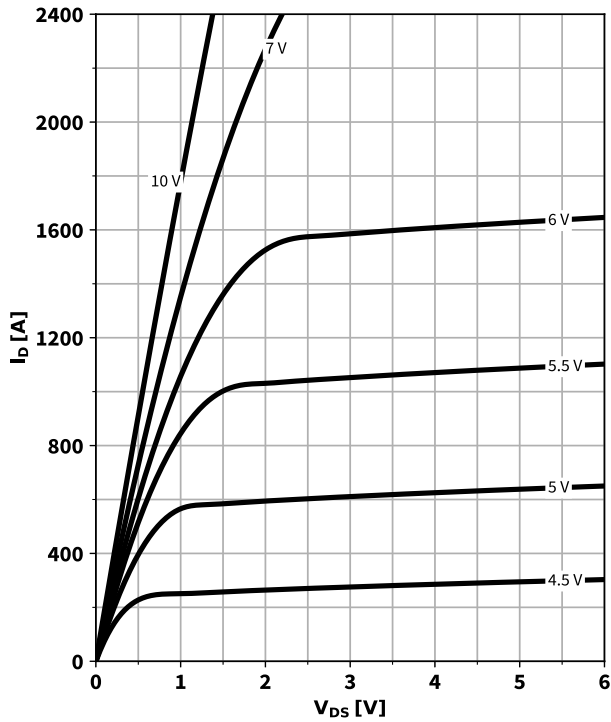
I_D = f(V_{DS}); T_C = 25 °C; D = 0; parameter: t_p

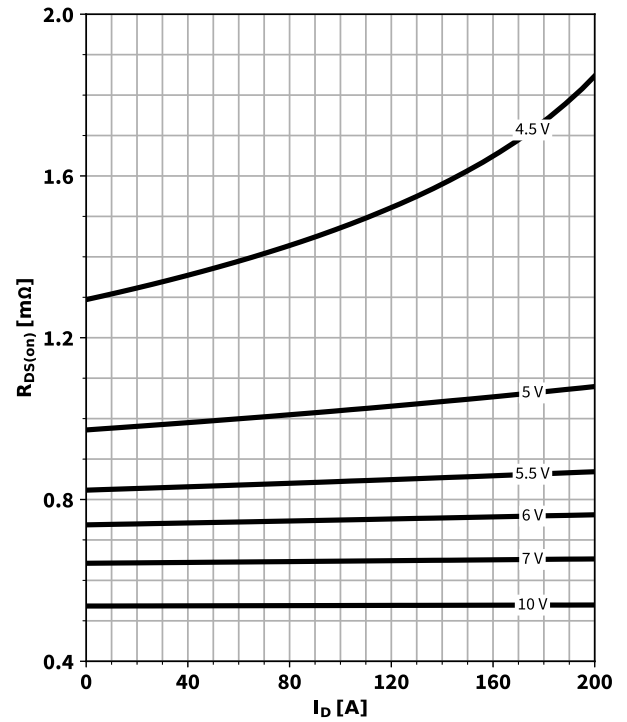### 4 Max. transient thermal impedance

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

5 Typ. output characteristics
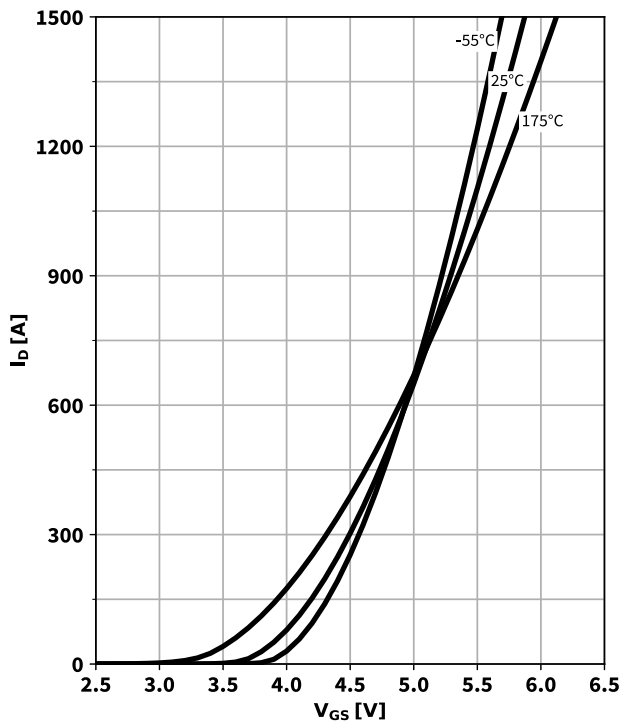
$I_D = f(V_{DS})$; $T_j = 25\ °C$; parameter: V_{GS}

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}
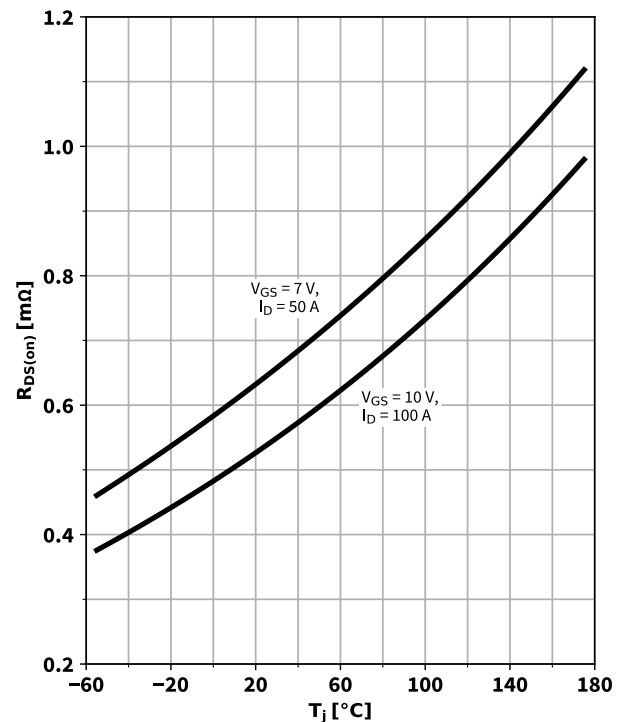
9 Typ. gate threshold voltage

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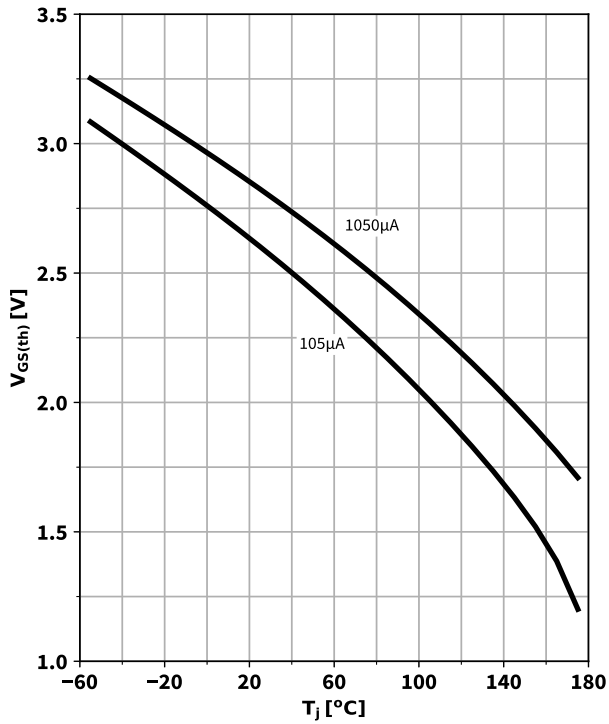
10 Typ. capacitances

$C = f(V_{DS})$; $V_{GS} = 0$ V; $f = 1$ MHz
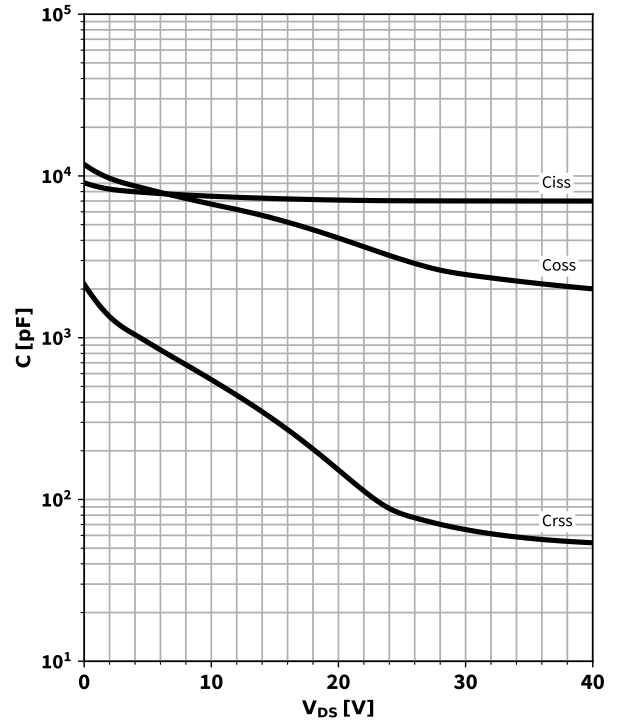
11 Typ. forward diode characteristics

$I_F = f(V_{SD})$; parameter: T_j
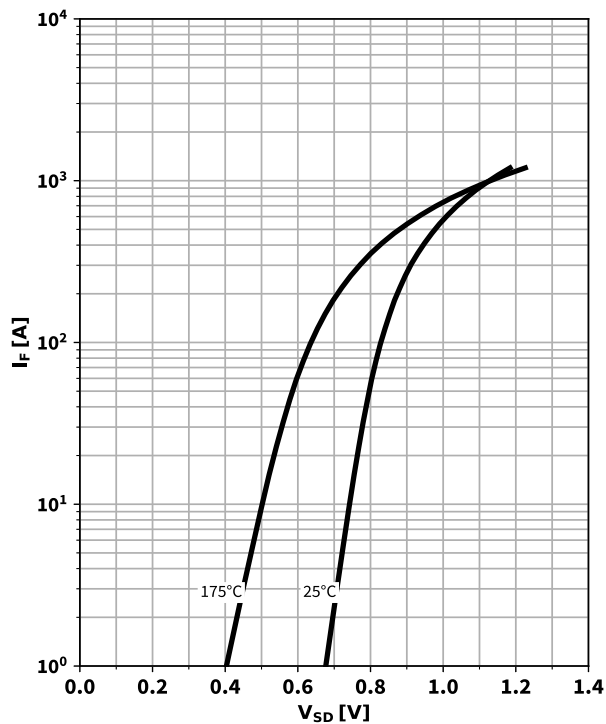
12 Typ. avalanche characteristics

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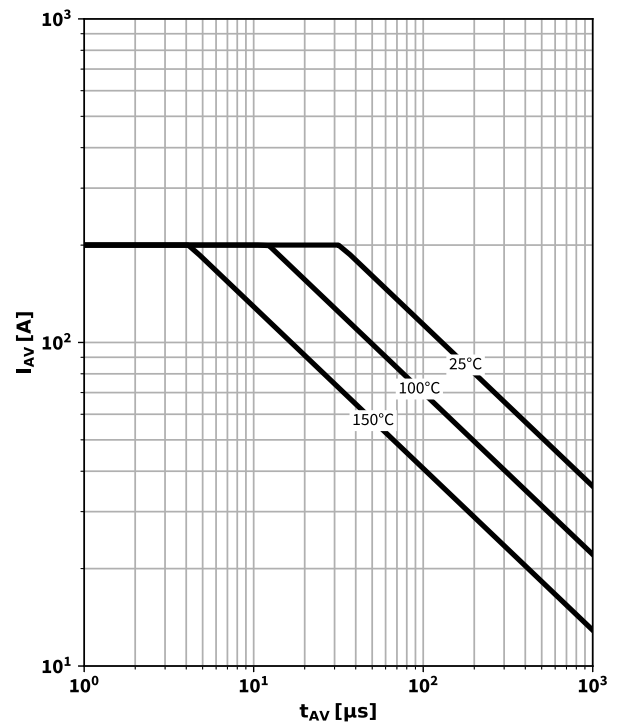
13 Typical avalanche energy

E_{AS} = f(T_j); parameter: I_D
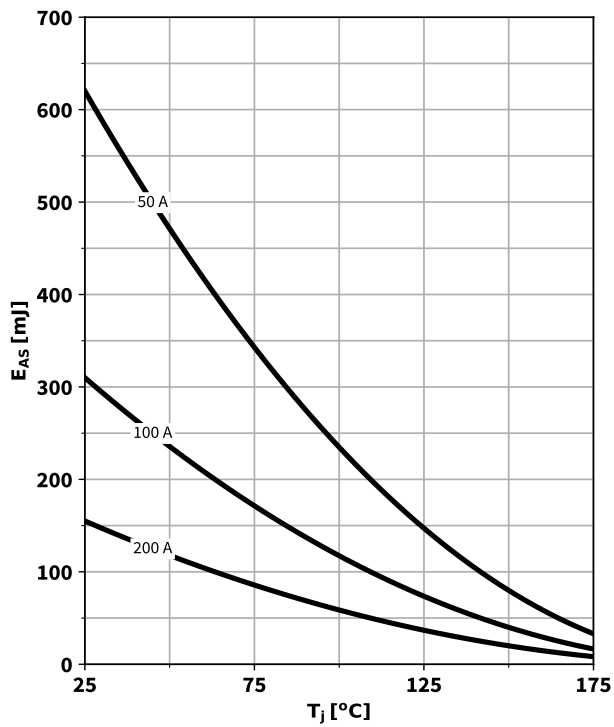
14 Drain-source breakdown voltage

$V_{(Br)DSS}$ = f(T_j); I_D = 1 mA
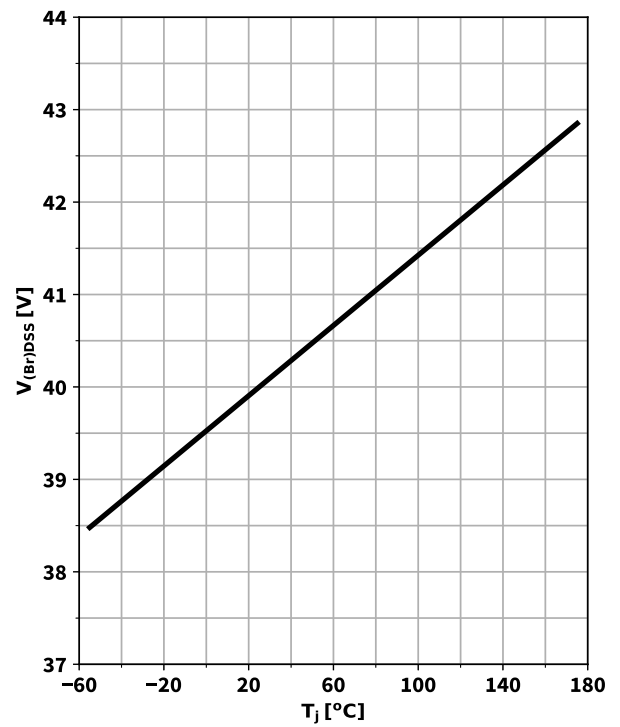
15 Typ. gate charge

V_{GS} = f(Q_{gate}); I_D = 100 A pulsed; parameter: V_{DD}
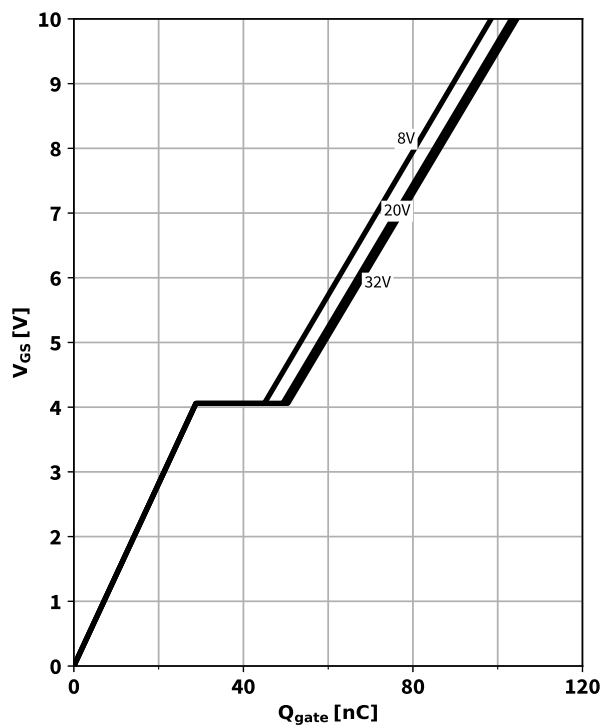
16 Gate charge waveforms

Package Outline
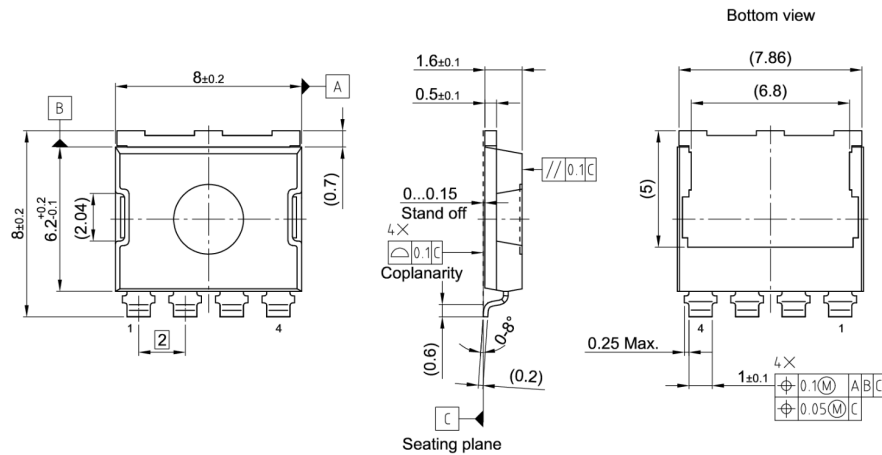
Bottom view

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

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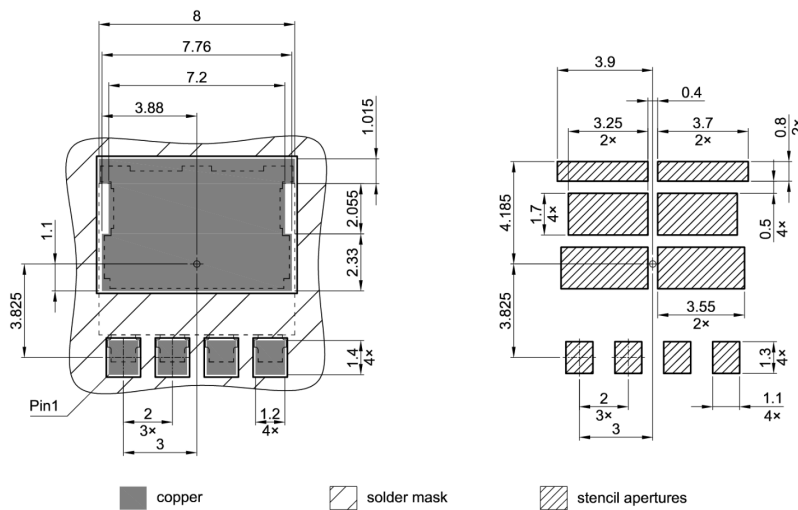
All dimensions are in units mm
All pads are non-solder mask defined

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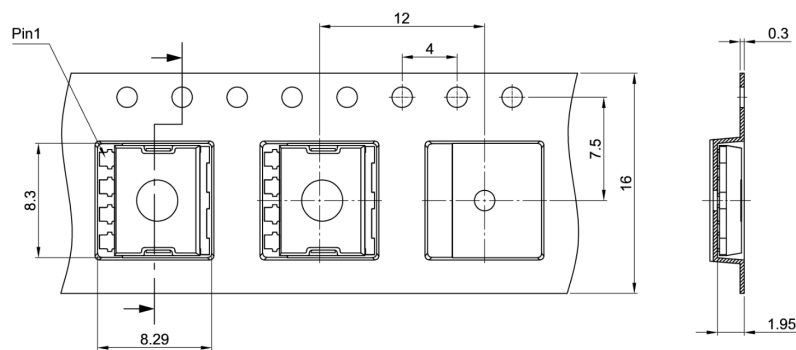
All dimensions are in units mm
The drawing is in compliance with ISO 128-30, Projection Method 1 [⊲⊕]

Revision History

Revision	Date	Changes
Revision 1.0	2024-09-24	Final Data Sheet

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