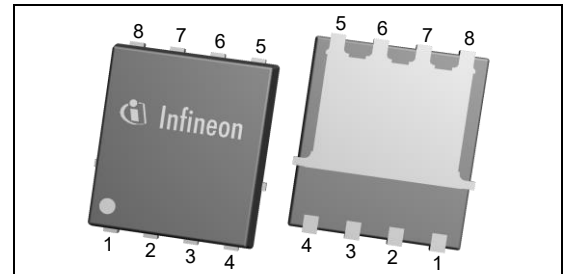


30V p-channel radiation tolerant power MOSFET

BUP03CP008C-01

Features

- LOW $R_{DS(on)}$
- Single Event Effect (SEE) tolerant up to Linear Energy Transfer (LET) = 45 MeVcm²/mg
- Total Ionisation Dose (TID) tolerant up to 30 kRad(Si)
- P-channel



RoHS



Product validation

Qualified for space applications according to the relevant tests of JEDEC¹

TID irradiation according to ESCC 22900 standard²

Description

Table 1 Product information

Type	Comment	Pin Configuration			Package
		1-3	4	5-8	
BUP03CP008C-01		S	G	D	SuperSO8 (PG-TDSON-8)

¹ J-STD20 and JESD22

² TID irradiation testing for this device conforms to the ESCC 22900 standard. Parameters specified in this datasheet reflect post irradiation performance only. Rad report can be provided by request. Please contact sales to request a report.

Table of contents

Features 1

Product validation 1

Description 1

Table of contents 2

1 Maximum ratings 3

2 Thermal characteristics 4

3 Electrical characteristics 5

4 Electrical characteristics diagrams 6

5 Package outlines and footprint 9

Maximum ratings

1 Maximum ratings

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain source voltage	V_{DS}	-	-	-30	V	
Gate source voltage	V_{GS}	-20	-	20	V	static
Drain gate voltage	V_{DG}	-	-	-30	V	
Continuous drain current ¹	I_D	-	-	-100 -64	A	$T_C = 25\text{ °C}$ $T_C = 100\text{ °C}$
Continuous source current	I_S	-	-	-100	A	
Drain current pulsed	I_{DM}	-	-	-200	Apk	
Total power dissipation ²	P_{tot}	-	-	83	W	$T_C \leq 25\text{ °C}$
Operating temperature	T_{op}	-55	-	150	°C	
Junction temperature	T_j	-55	-	150	°C	
Storage temperature	T_{stg}	-55	-	150	°C	
Avalanche energy	E_{AS}	-	-	135	mJ	$I_D = -50\text{ A}, R_{GS} = 25\ \Omega$

¹ Limited by junction temperature

² For $T_C > 25\text{ °C}$ derating is required.

Thermal characteristics

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - case	$R_{th,JC}$	-	-	1.5	K/W	
Thermal resistance, junction - ambient	$R_{th,JA}$	-	-	50	K/W	Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm ² (one layer, 70 μm thickness) copper area for drain connection. PCB is vertical without air stream cooling
Soldering temperature	T_{sol}	-	-	260	°C	1.6 mm (0.063 in.) from case for 10 s

Electrical characteristics

3 Electrical characteristics

at $T_A = 25\text{ °C}$, unless otherwise specified

Table 4 Static characteristics

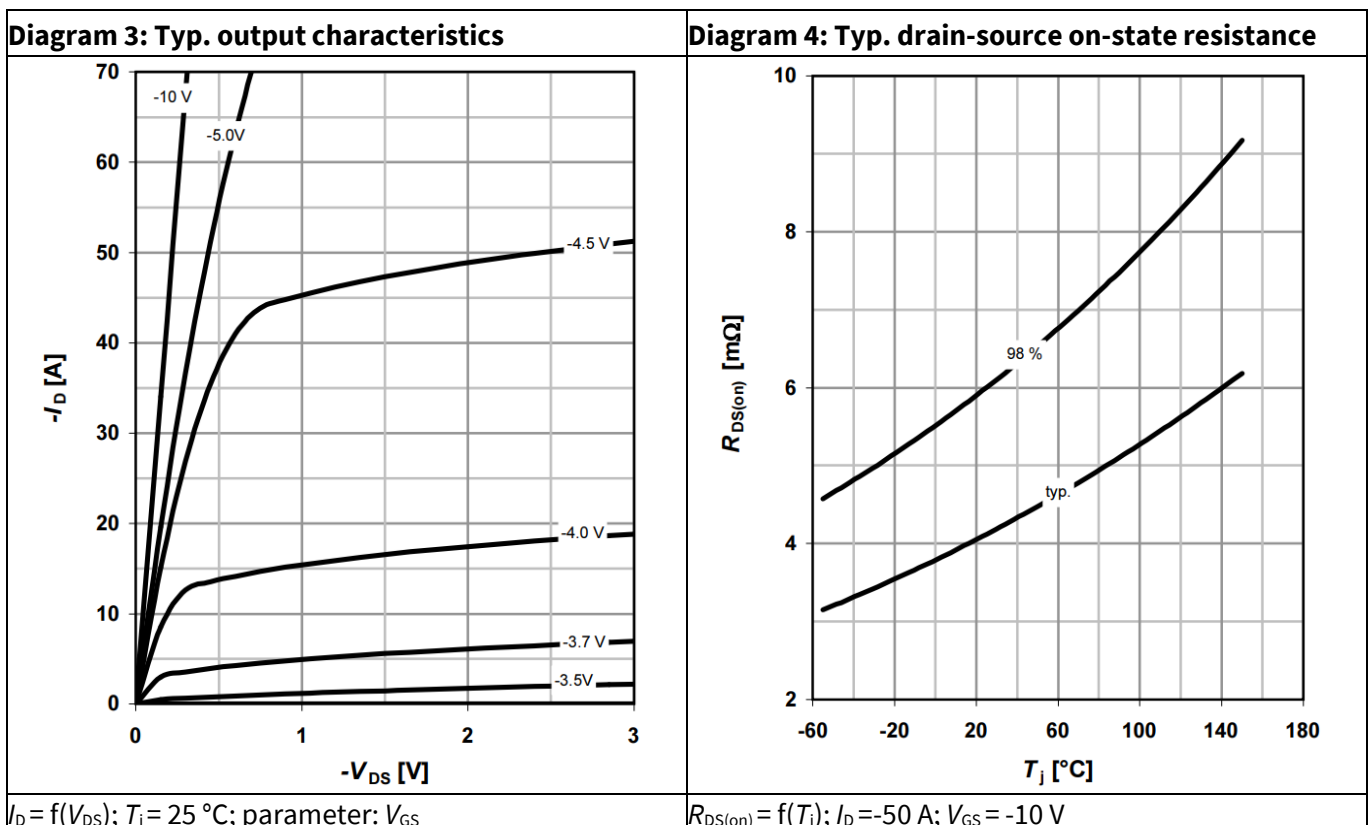
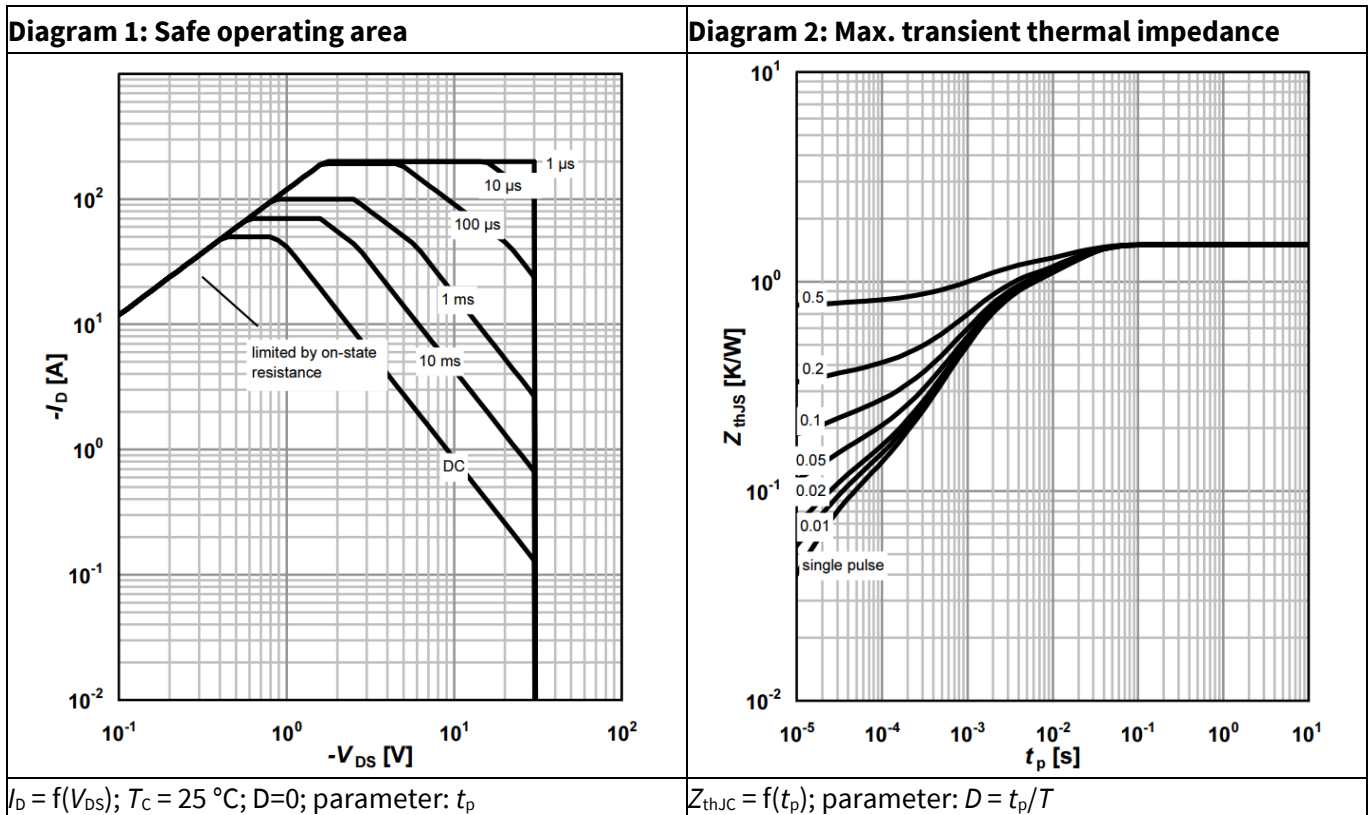
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	BV_{DSS}	-30	-	-	V	$I_D = -250\ \mu\text{A}$, $V_{GS} = 0\ \text{V}$
Gate threshold voltage	$V_{GS(th)}$	-2	-	-4.6	V	$I_D = -150\ \mu\text{A}$, $V_{DS} = V_{GS}$
Gate to source leakage current	I_{GSS}	-	-	-10	μA	$V_{DS} = 0\ \text{V}$, $V_{GS} = \pm 20\ \text{V}$
Zero gate voltage drain current	I_{DSS}	-	-	-1 -100	μA	$V_{DS} = -24\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_A = 25\text{ °C}$ $V_{DS} = -24\ \text{V}$, $V_{GS} = 0\ \text{V}$, $T_A = 125\text{ °C}$
Drain source on-state resistance ¹	$R_{DS(ON)}$	-	-	8	m Ω	$V_{GS} = -10\ \text{V}$, $I_D = -50\ \text{A}$
Diode forward voltage	V_{SD}	-	-	-1.1	V	$V_{GS} = 0\ \text{V}$, $I_S = -50\ \text{A}$

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Turn-on delay time	$t_{d(ON)}$	-	15	-	ns	$V_{DD} = -15\ \text{V}$, $V_{GS} = -10\ \text{V}$, $I_D = -50\ \text{A}$, $R_G = 6\ \Omega$
Rise time	t_r	-	139	-	ns	$V_{DD} = -15\ \text{V}$, $V_{GS} = -10\ \text{V}$, $I_D = -50\ \text{A}$, $R_G = 6\ \Omega$
Turn-off delay time	$t_{d(OFF)}$	-	66	-	ns	$V_{DD} = -15\ \text{V}$, $V_{GS} = -10\ \text{V}$, $I_D = -50\ \text{A}$, $R_G = 6\ \Omega$
Fall time	t_f	-	34	-	ns	$V_{DD} = -15\ \text{V}$, $V_{GS} = -10\ \text{V}$, $I_D = -50\ \text{A}$, $R_G = 6\ \Omega$
Reverse recovery time	t_{rr}	-	51	-	ns	$V_{DD} = -15\ \text{V}$, $I_F = I_S$, $di_F/dt = 100\ \text{A}/\mu\text{s}$
Common source input capacitance	C_{iss}	-	4.5	-	nF	$V_{DS} = -15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1.0\ \text{MHz}$
Common source output capacitance	C_{oss}	-	2.1	-	nF	$V_{DS} = -15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1.0\ \text{MHz}$
Common source reverse transfer capacitance	C_{rss}	-	150	-	pF	$V_{DS} = -15\ \text{V}$, $V_{GS} = 0\ \text{V}$, $f = 1.0\ \text{MHz}$
Total gate charge	Q_G	-	61	-	nC	$V_{DD} = -15\ \text{V}$, $V_{GS} = 0\ \text{to} -10\ \text{V}$, $I_D = -50\ \text{A}$

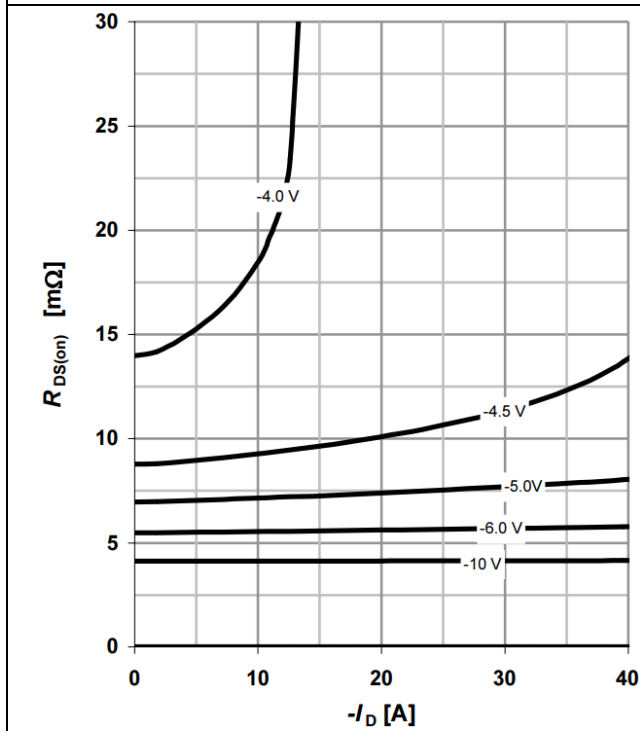
¹ Pulsed measurement: Pulse Width < 300 μs , Duty Cycle < 2.0%.

4 Electrical characteristics diagrams



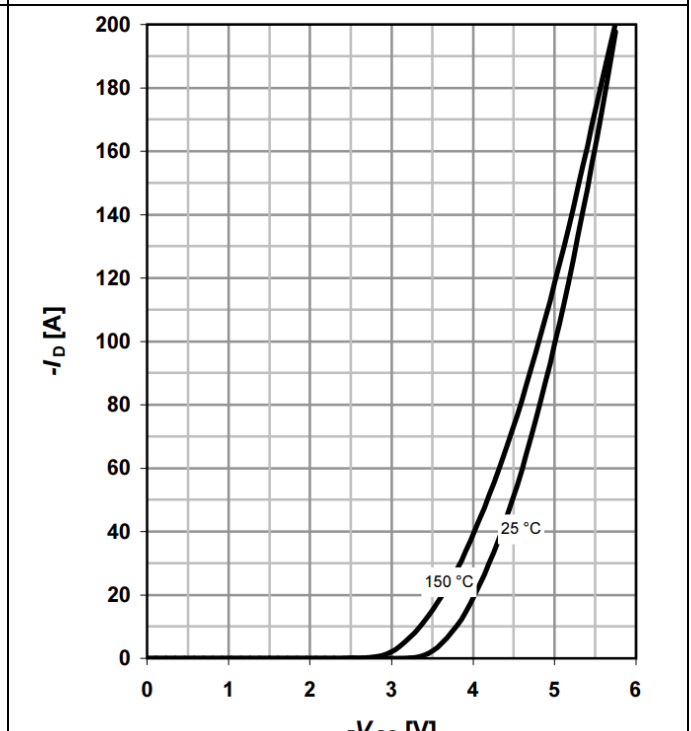
Electrical characteristics diagrams

Diagram 5: Typ. drain-source on-state resistance



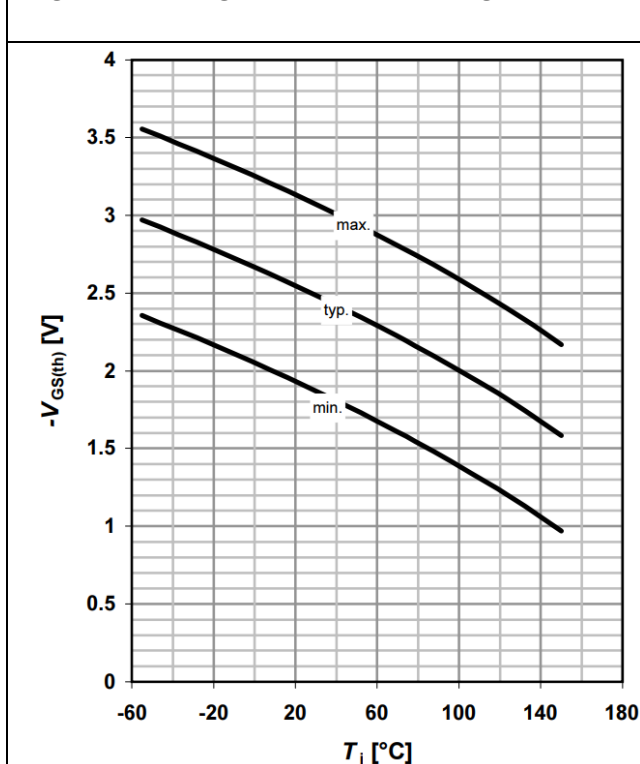
$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}; \text{parameter: } V_{GS}$

Diagram 6: Typ. transfer characteristics



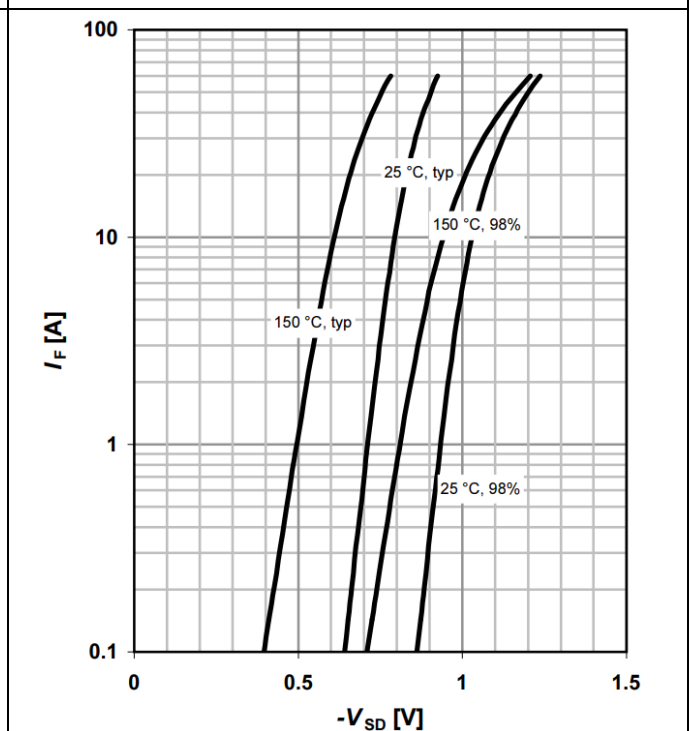
$I_D = f(V_{GS}), V_{DS} \geq 2 \times I_D \times R_{DS(on)max}; \text{parameter: } T_j$

Diagram 7: Typ. gate threshold voltage

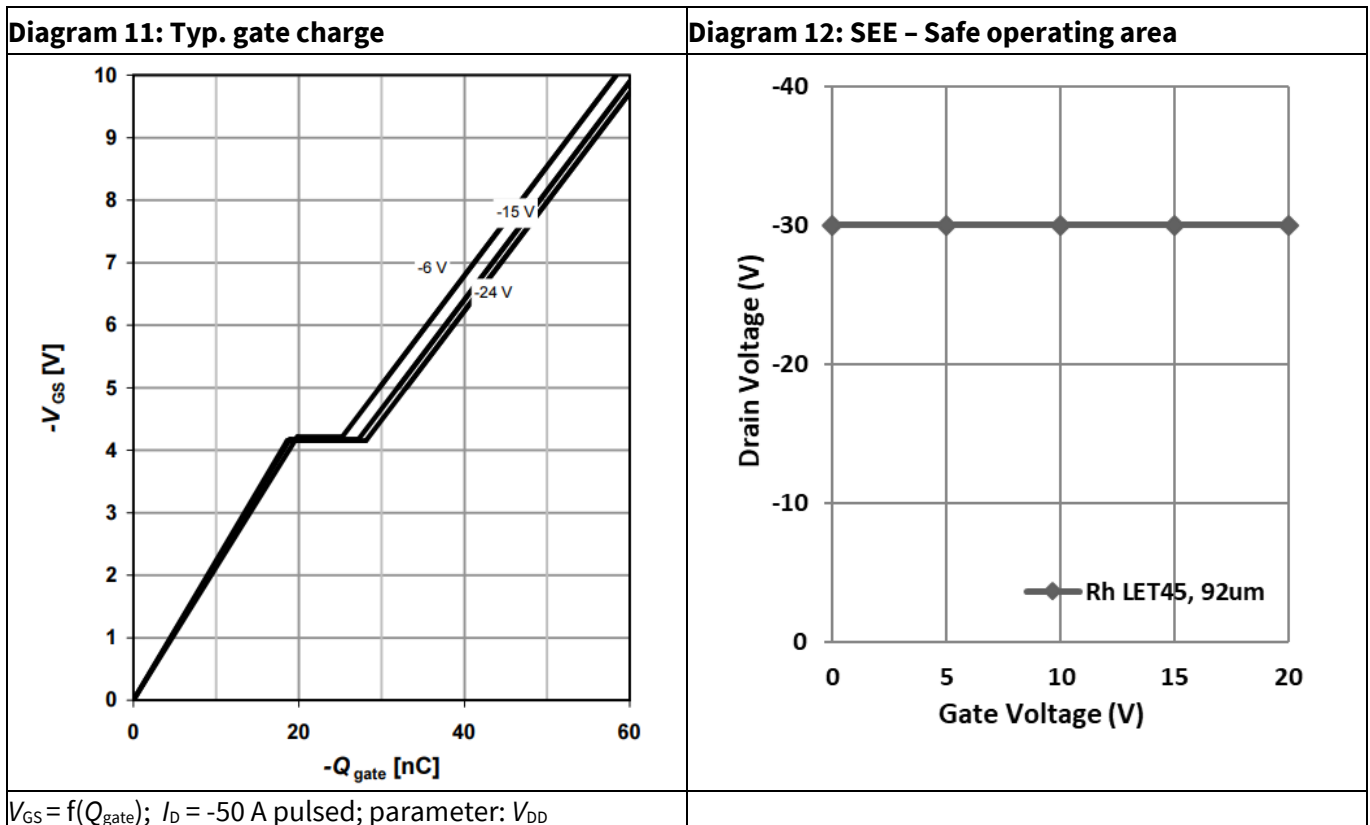
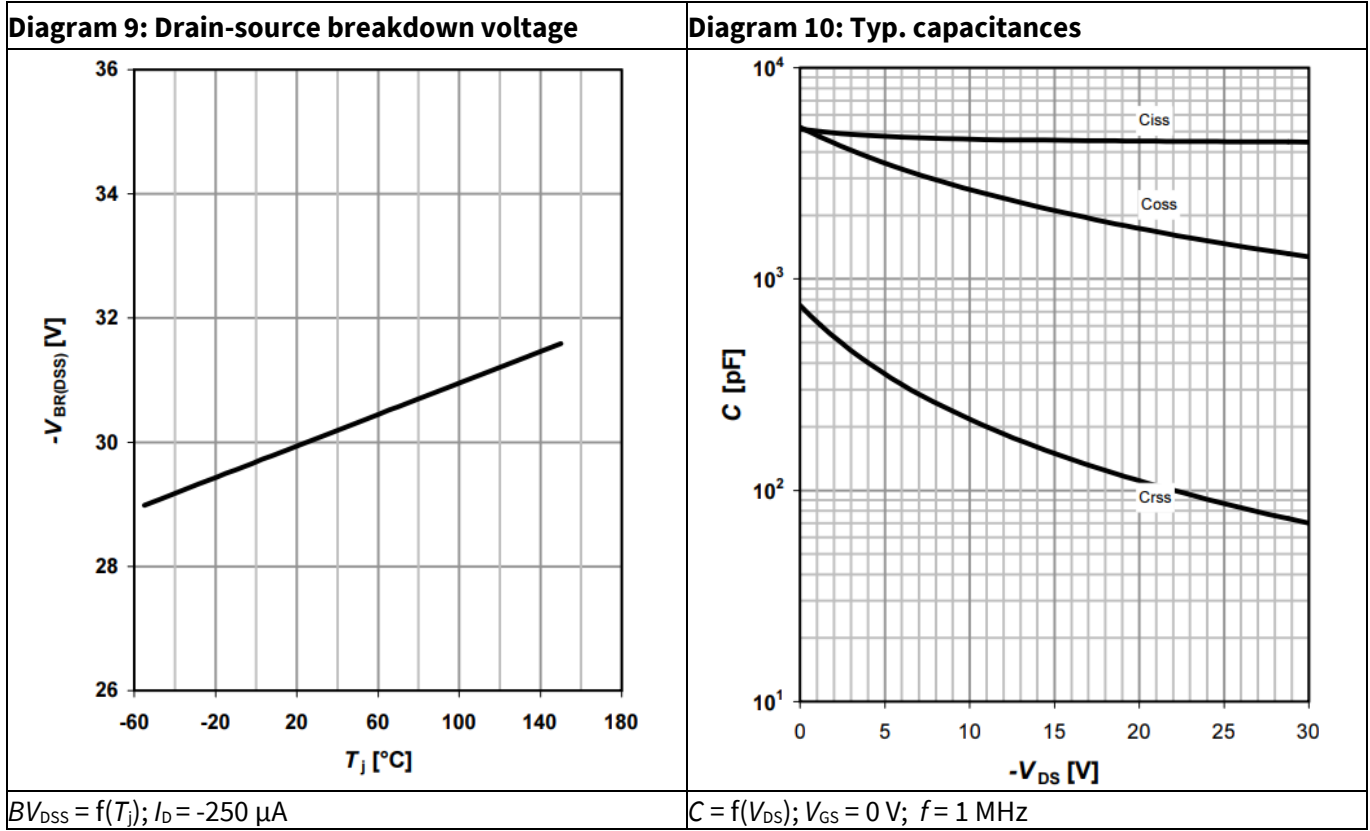


$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -150 \mu\text{A}$

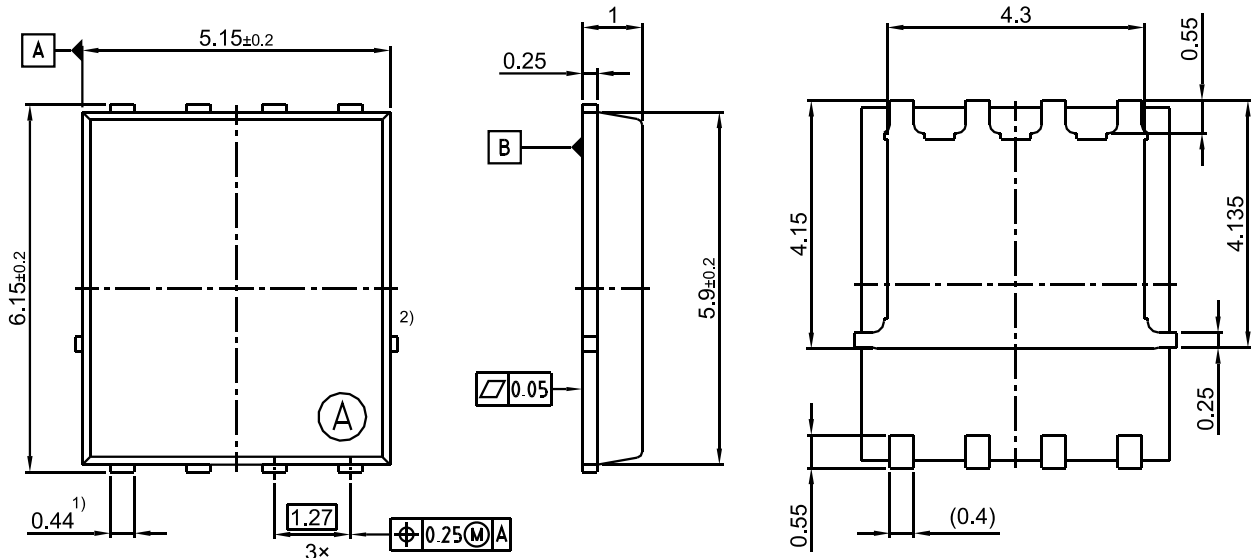
Diagram 8: Forward characteristics of reverse diode



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



5 Package outlines and footprint



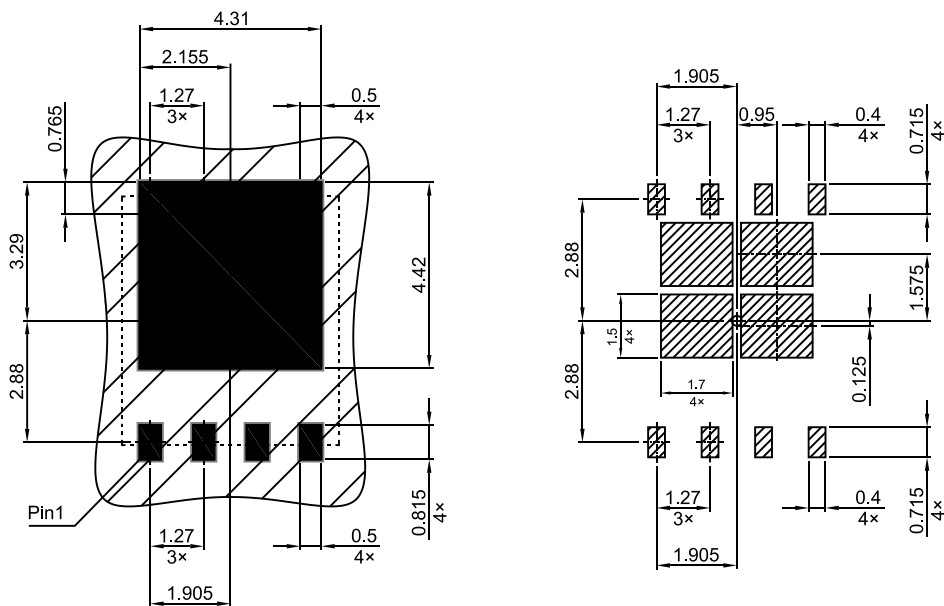
- 1) Exclude mold flash
- 2) Removal on mold gate, Intrusion 0.1mm
Protrusion 0.1mm

All metal surfaces are plated except area of cut

All dimensions are in units mm

The drawing is in compliance with ISO 128-30, Projection Method 1 []

Drawings according to ISO 8015, general tolerances $\pm 0.1 / 1^\circ 30'$



copper solder mask stencil apertures

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

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