

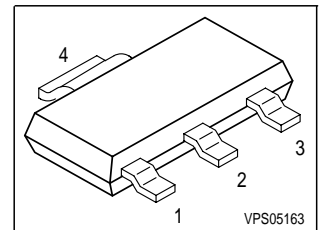
SIPMOS[®] Small-Signal-Transistor

Features

- P-Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- dv/dt rated

Product Summary

Drain source voltage	V_{DS}	-60	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.8	Ω
Continuous drain current	I_D	-1.17	A



Type	Package	Ordering Code
BSP 315 P	SOT-223	Q67042-S4004

Pin 1	Pin2/4	PIN 3
G	D	S

Maximum Ratings, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current $T_A = 25\text{ °C}$ $T_A = 70\text{ °C}$	I_D	-1.17 -0.94	A
Pulsed drain current $T_A = 25\text{ °C}$	I_D puls	-4.68	
Avalanche energy, single pulse $I_D = -1.17\text{ A}$, $V_{DD} = -25\text{ V}$, $R_{GS} = 25\ \Omega$	E_{AS}	24	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.18	
Reverse diode dv/dt $I_S = -1.17\text{ A}$, $V_{DS} = -48\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 150\text{ °C}$	dv/dt	6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_A = 25\text{ °C}$	P_{tot}	1.8	W
Operating and storage temperature	T_j , T_{stg}	-55...+150	$^{\circ}\text{C}$
IEC climatic category; DIN IEC 68-1		55/150/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point (Pin 4)	R_{thJS}	-	-	25	K/W
SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ¹⁾	R_{thJA}	- -	- -	115 70	K/W

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$	$V_{(BR)DSS}$	-60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = -160\text{ }\mu\text{A}$	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ °C}$ $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125\text{ °C}$	I_{DSS}	- -	-0.1 -10	-1 -100	μA
Gate-source leakage current $V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	-10	-100	nA
Drain-Source on-state resistance $V_{GS} = -4.5\text{ V}$, $I_D = -0.89\text{ A}$	$R_{DS(on)}$	-	0.8	1.4	Ω
Drain-Source on-state resistance $V_{GS} = -10\text{ V}$, $I_D = -1.17\text{ A}$	$R_{DS(on)}$	-	0.5	0.8	Ω

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \leq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = -0.89\text{ A}$	g_{fs}	0.7	1.4	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	130	160	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	40	50	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	17	21	
Turn-on delay time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.89\text{ A}$, $R_G = 18\text{ }\Omega$	$t_{d(on)}$	-	24	36	ns
Rise time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.89\text{ A}$, $R_G = 18\text{ }\Omega$	t_r	-	9	14	
Turn-off delay time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.89\text{ A}$, $R_G = 18\text{ }\Omega$	$t_{d(off)}$	-	32	48	
Fall time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.89\text{ A}$, $R_G = 18\text{ }\Omega$	t_f	-	19	28	

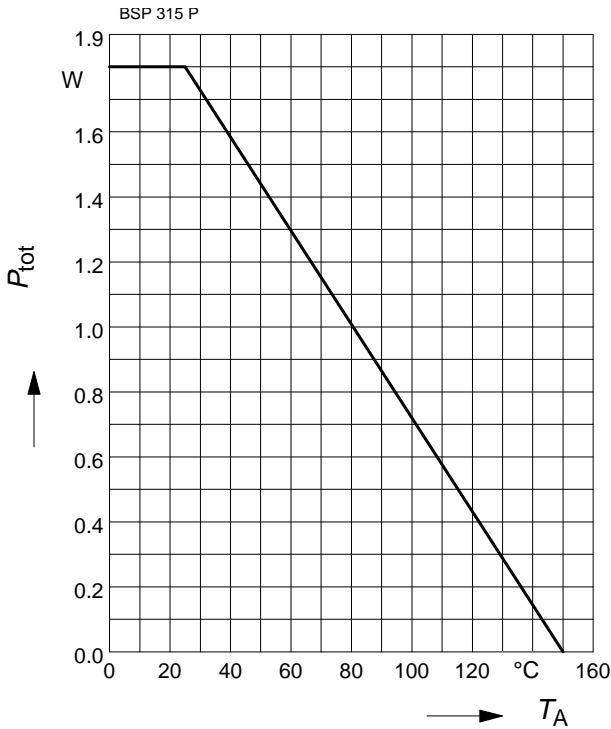
Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate to source charge $V_{DD} = -48\text{ V}, I_D = -1.17\text{ A}$	Q_{gs}	-	0.7	1.1	nC
Gate to drain charge $V_{DD} = -48\text{ V}, I_D = -1.17\text{ A}$	Q_{gd}	-	1.8	2.6	
Gate charge total $V_{DD} = -48\text{ V}, I_D = -1.17\text{ A}, V_{GS} = 0\text{ to }-10\text{ V}$	Q_g	-	5.2	7.8	
Gate plateau voltage $V_{DD} = -48\text{ V}, I_D = -1.17\text{ A}$	$V_{(plateau)}$	-	-3.14	-	V

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current $T_A = 25\text{ °C}$	I_S	-	-	-1.17	A
Inverse diode direct current,pulsed $T_A = 25\text{ °C}$	I_{SM}	-	-	-4.68	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = -1.17\text{ A}$	V_{SD}	-	-0.97	-1.3	V
Reverse recovery time $V_R = -30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	30.5	46	ns
Reverse recovery charge $V_R = -30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	36	54	μC

Power Dissipation

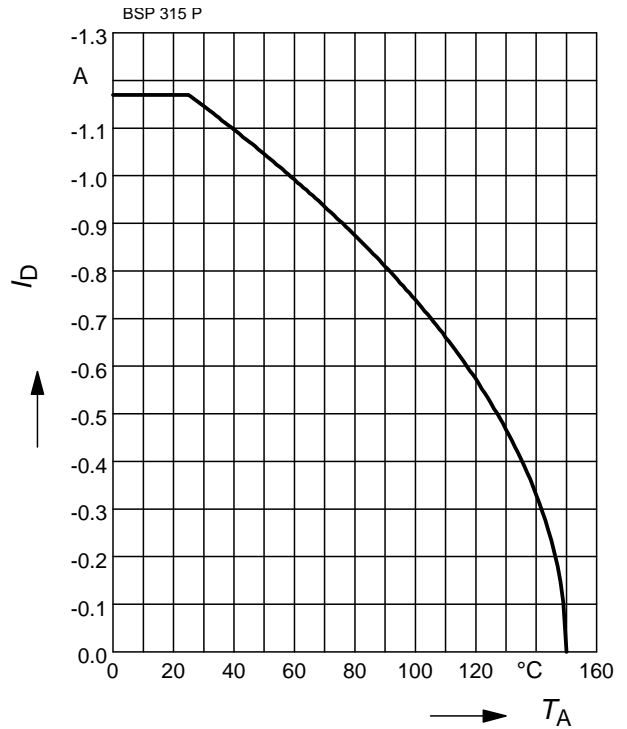
$$P_{tot} = f(T_A)$$



Drain current

$$I_D = f(T_A)$$

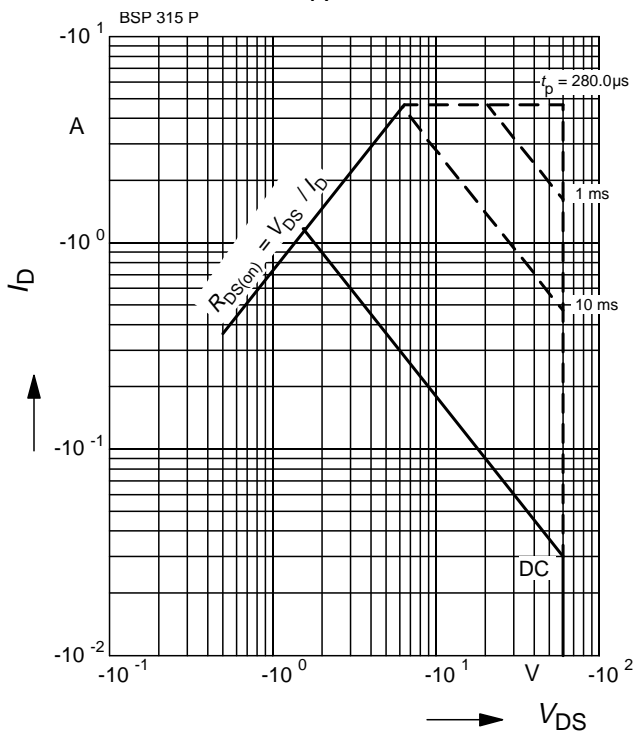
parameter : $V_{GS} \geq -10V$



Safe operating area

$$I_D = f(V_{DS})$$

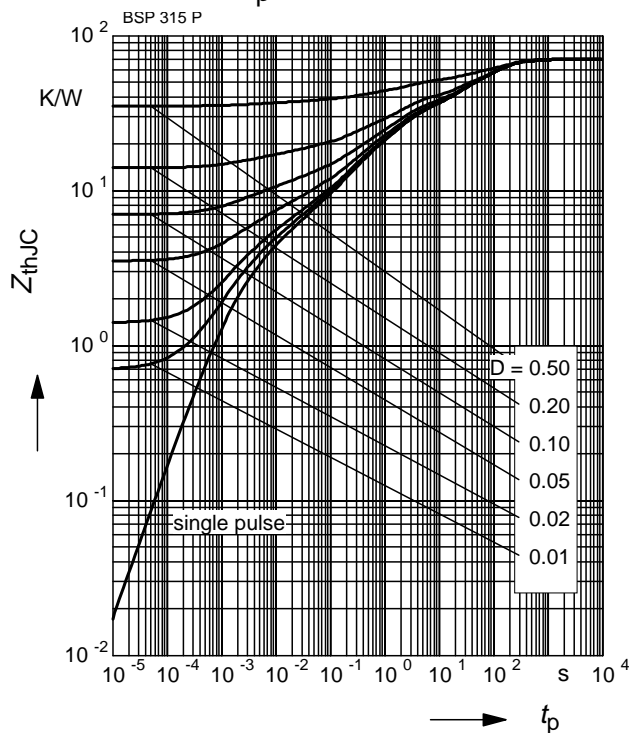
parameter : $D = 0, T_A = 25\text{ °C}$



Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

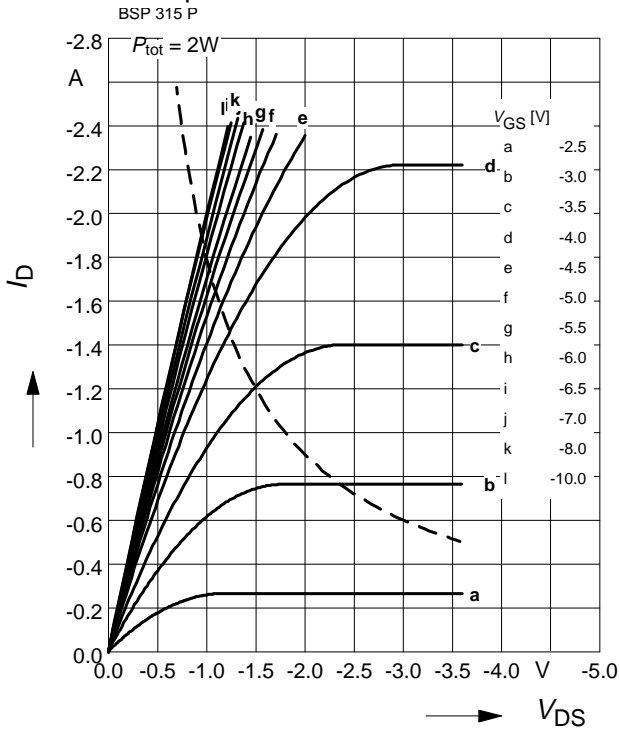
parameter : $D = t_p/T$



Typ. output characteristics

$$I_D = f(V_{DS})$$

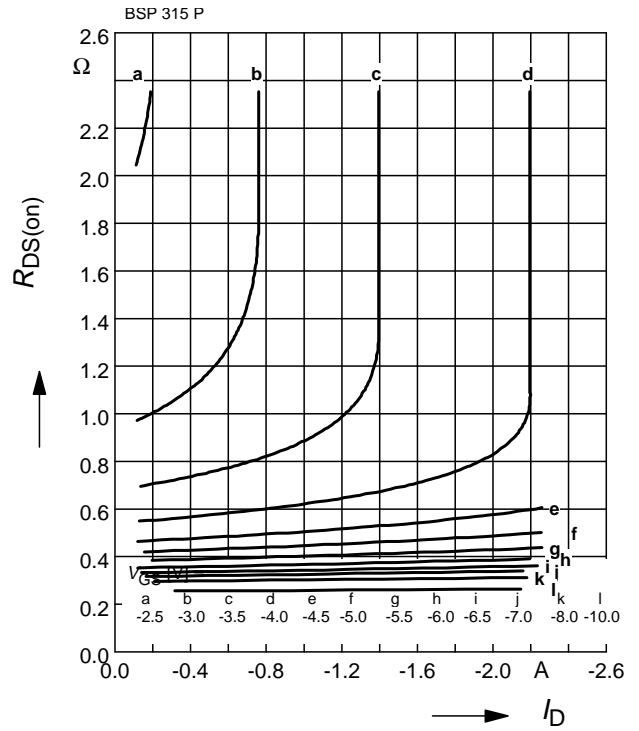
parameter: $t_p = 80 \mu s$



Typ. drain-source-on-resistance

$$R_{DS(on)} = f(I_D)$$

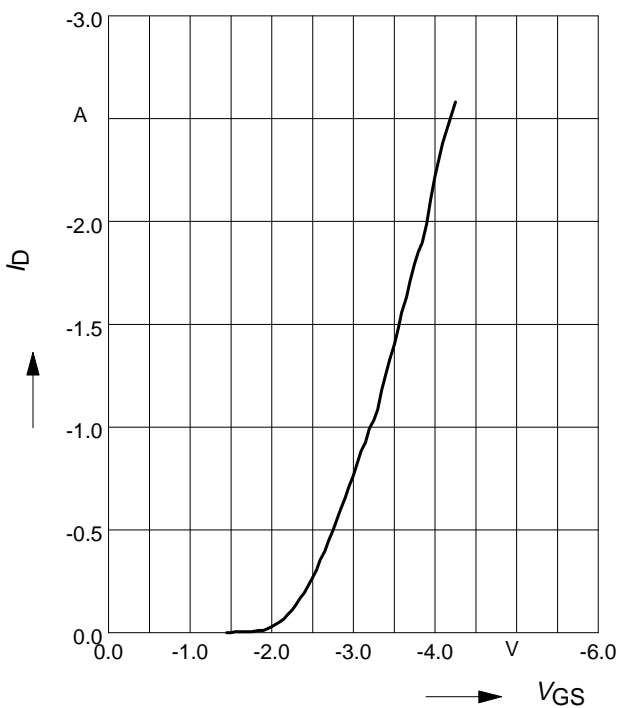
parameter: V_{GS}



Typ. transfer characteristics $I_D = f(V_{GS})$

$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$

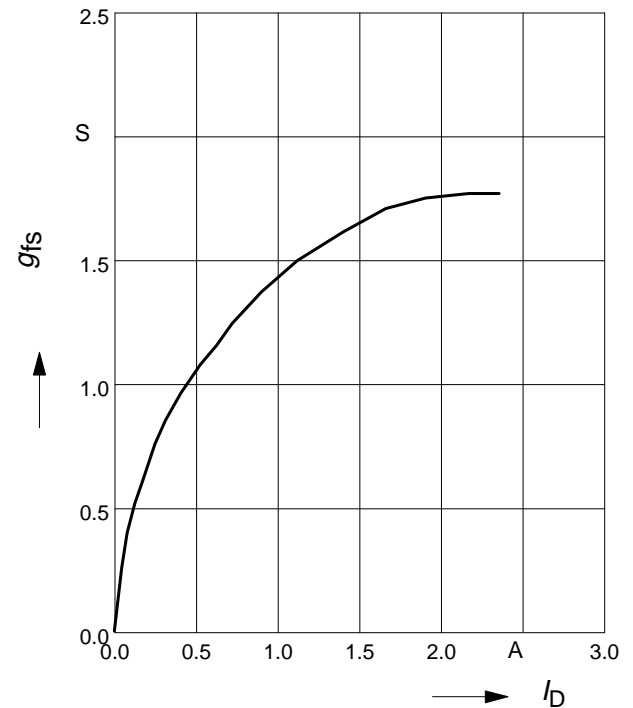
parameter: $t_p = 80 \mu s$



Typ. forward transconductance

$$g_{fs} = f(I_D); T_j = 25^\circ C$$

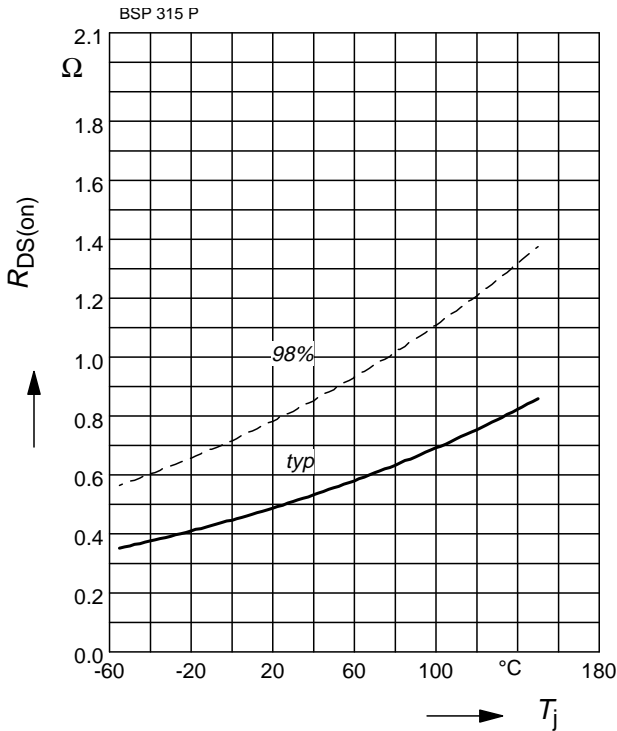
parameter: g_{fs}



Drain-source on-resistance

$$R_{DS(on)} = f(T_j)$$

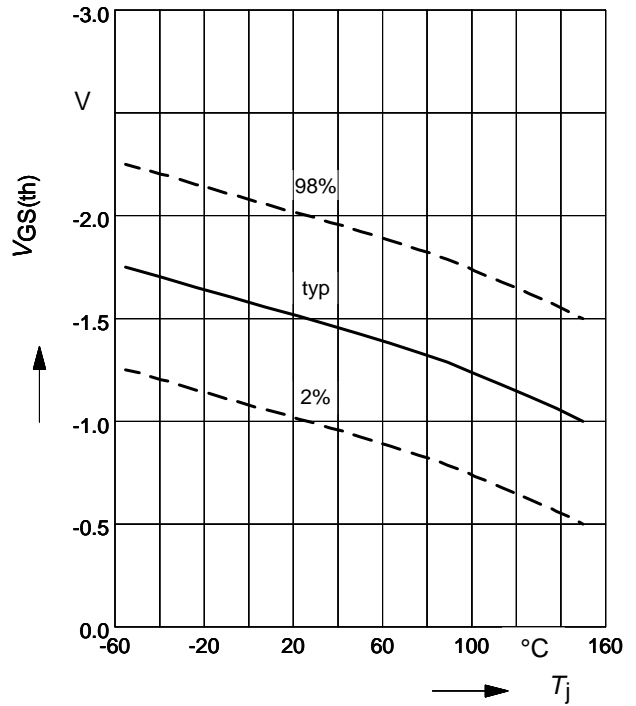
parameter: $I_D = -1.17 \text{ A}$, $V_{GS} = -10 \text{ V}$



Gate threshold voltage

$$V_{GS(th)} = f(T_j)$$

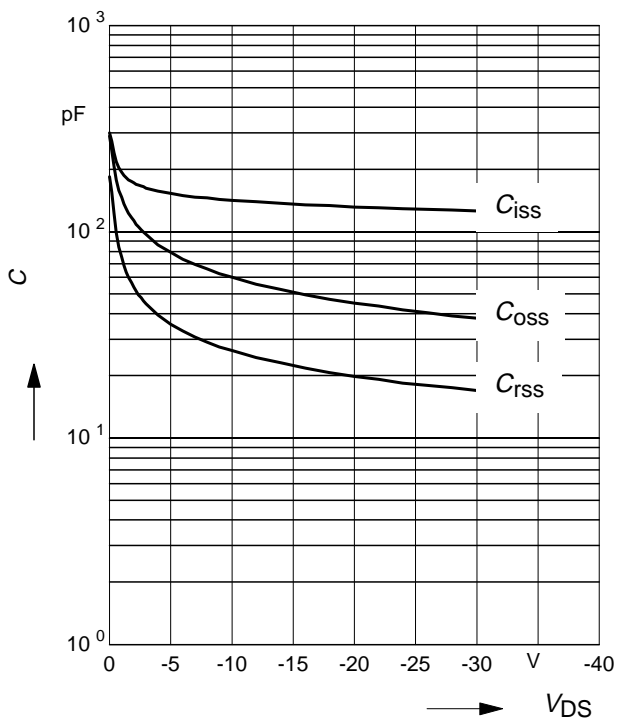
parameter: $V_{GS} = V_{DS}$, $I_D = -160 \mu\text{A}$



Typ. capacitances

$$C = f(V_{DS})$$

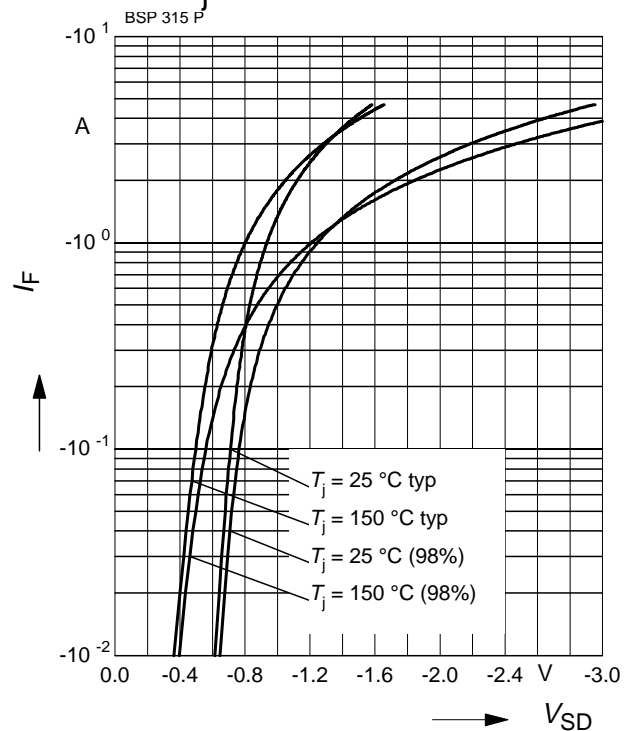
Parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

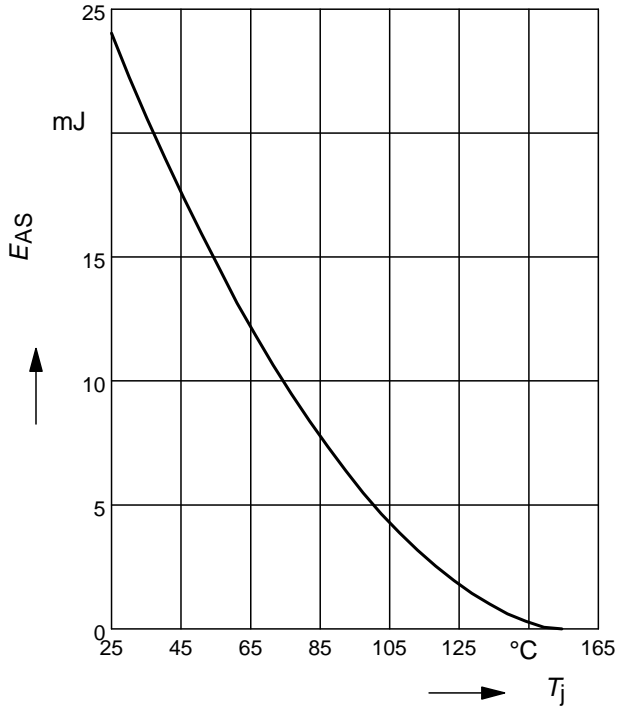
parameter: T_j , $t_p = 80 \mu\text{s}$



Avalanche Energy $E_{AS} = f(T_j)$

parameter: $I_D = -1.17\text{ A}$, $V_{DD} = -25\text{ V}$

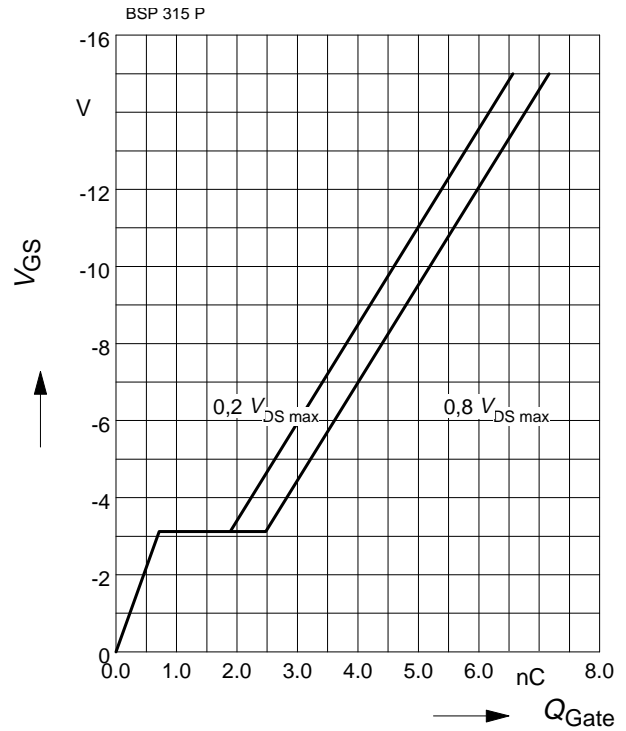
$R_{GS} = 25\ \Omega$



Typ. gate charge

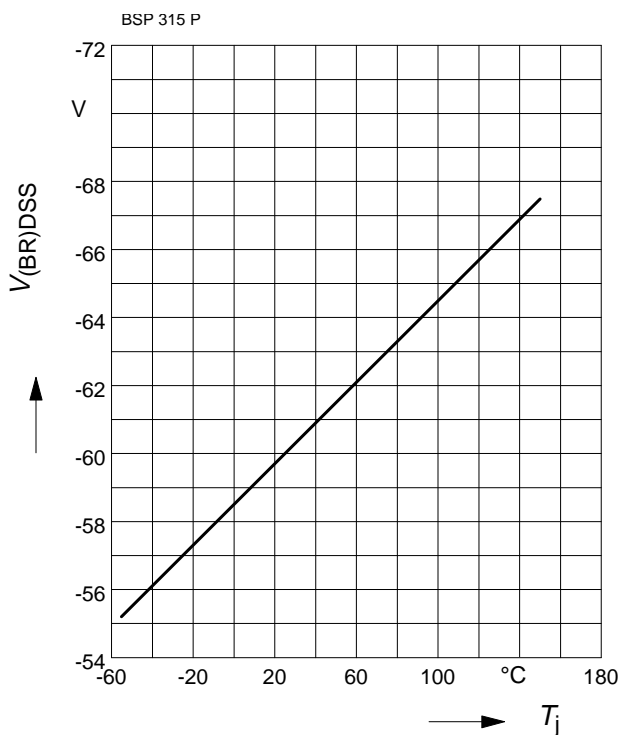
$V_{GS} = f(Q_{Gate})$

parameter: $I_D = -1.17\text{ A pulsed}$



Drain-source breakdown voltage

$V_{(BR)DSS} = f(T_j)$



Published by
Infineon Technologies AG,
Bereichs Kommunikation
St.-Martin-Strasse 53,
D-81541 München
© Infineon Technologies AG 1999
All Rights Reserved.

Attention please!

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Infineon Technologies is an approved CECC manufacturer.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives worldwide (see address list).

Warnings

Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.