

SIPMOS® Small-Signal-Transistor

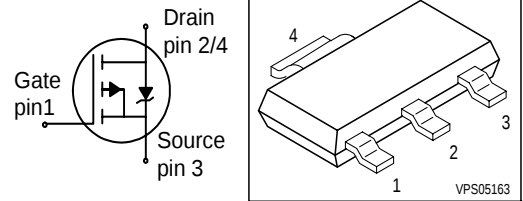
Feature

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

Product Summary

V_{DS}	-250	V
$R_{DS(on)}$	4	Ω
I_D	-0.43	A

SOT-223



Type	Package	Ordering Code	Tape and Reel Information	Marking
BSP 317 P	SOT-223	Q67042-S4167	-	BSP317P

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	-0.43 -0.34	A
Pulsed drain current $T_A=25\text{ °C}$	$I_{D\text{ puls}}$	-1.72	
Reverse diode dv/dt $I_S=-0.43\text{ A}$, $V_{DS}=-200\text{ V}$, $di/dt=-200\text{ A}/\mu\text{s}$, $T_{j\text{ max}}=150\text{ °C}$	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	°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}	-	15	25	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	80	115	
@ 6 cm ² cooling area ¹⁾		-	48	70	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage $V_{GS}=0, I_D=-250\mu A$	$V_{(BR)DSS}$	-250	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=-370\mu A$	$V_{GS(th)}$	-1	-1.5	-2	
Zero gate voltage drain current $V_{DS}=-250V, V_{GS}=0, T_j=25^{\circ}C$ $V_{DS}=-250V, V_{GS}=0, T_j=150^{\circ}C$	I_{DSS}	- -	-0.1 -10	-0.2 -100	μA
Gate-source leakage current $V_{GS}=-20V, V_{DS}=0$	I_{GSS}	-	-10	-100	
Drain-source on-state resistance $V_{GS}=-4.5V, I_D=-0.39A$	$R_{DS(on)}$	-	3.3	5	Ω
Drain-source on-state resistance $V_{GS}=-10V, I_D=-0.43A$	$R_{DS(on)}$	-	3	4	

¹⁾Device 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 $T_j = 25\text{ }^{\circ}\text{C}$, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic Characteristics

Transconductance	g_{fs}	$ V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ $I_D = -0.34\text{A}$	0.38	0.76	-	S
Input capacitance	C_{iss}	$V_{GS} = 0, V_{DS} = -25\text{V},$ $f = 1\text{MHz}$	-	210	262	pF
Output capacitance	C_{oss}		-	30	37	
Reverse transfer capacitance	C_{rss}		-	13.4	16.7	
Turn-on delay time	$t_{d(on)}$	$V_{DD} = -30\text{V}, V_{GS} = -10\text{V},$ $I_D = -0.43\text{A}, R_G = 6\Omega$	-	5.7	8.5	ns
Rise time	t_r		-	11.1	16.6	
Turn-off delay time	$t_{d(off)}$		-	254	381	
Fall time	t_f		-	67	100	

Gate Charge Characteristics

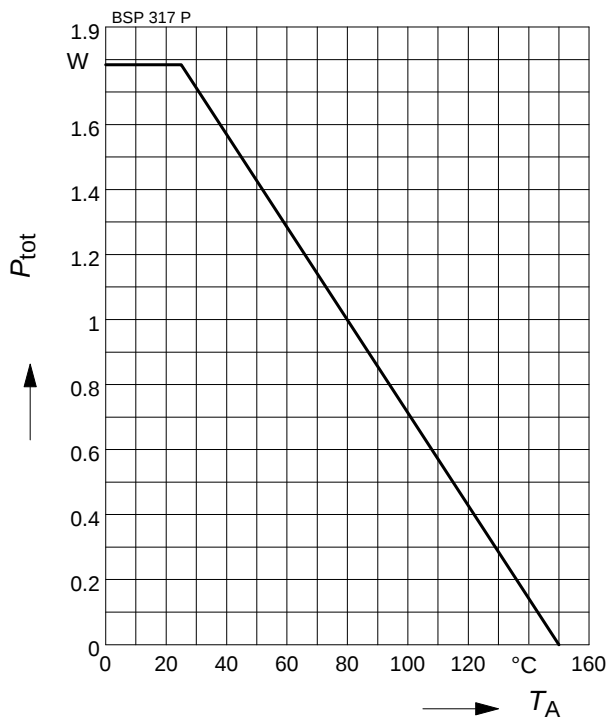
Gate to source charge	Q_{gs}	$V_{DD} = -200\text{V}, I_D = -0.43\text{A}$	-	-0.5	-0.65	nC
Gate to drain charge	Q_{gd}		-	-4	-5.2	
Gate charge total	Q_g	$V_{DD} = -200\text{V}, I_D = -0.43\text{A},$ $V_{GS} = 0 \text{ to } -10\text{V}$	-	-11.6	-15.1	
Gate plateau voltage	$V_{(plateau)}$	$V_{DD} = -200\text{V}, I_D = -0.43\text{A}$	-	-2.8	-	V

Reverse Diode

Inverse diode continuous forward current	I_S	$T_A = 25^{\circ}\text{C}$	-	-	-0.43	A
Inv. diode direct current, pulsed	I_{SM}		-	-	-1.72	
Inverse diode forward voltage	V_{SD}	$V_{GS} = 0, I_F = -0.43\text{A}$	-	-0.84	-1.2	V
Reverse recovery time	t_{rr}	$V_R = -125\text{V}, I_F = I_S,$ $di_F/dt = 100\text{A}/\mu\text{s}$	-	92	138	ns
Reverse recovery charge	Q_{rr}		-	210	315	

1 Power dissipation

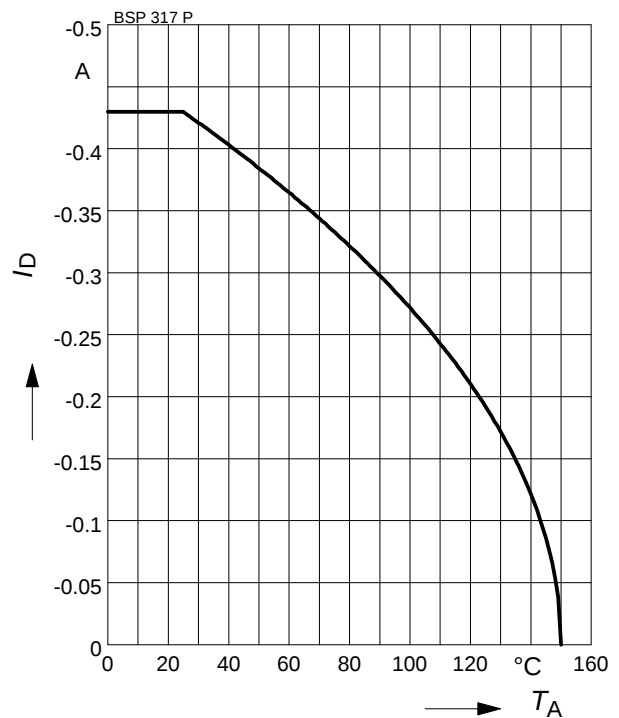
$$P_{\text{tot}} = f(T_A)$$



2 Drain current

$$I_D = f(T_A)$$

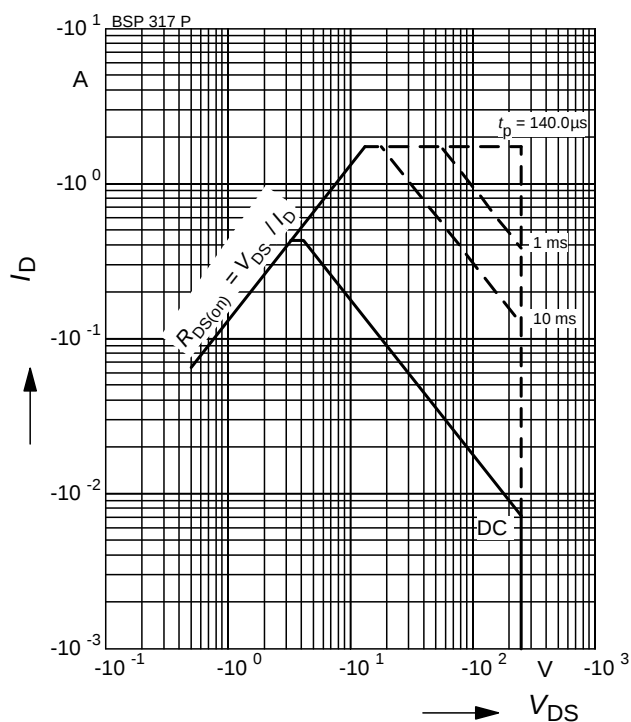
parameter: $|V_{GS}| \geq 10V$



3 Safe operating area

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

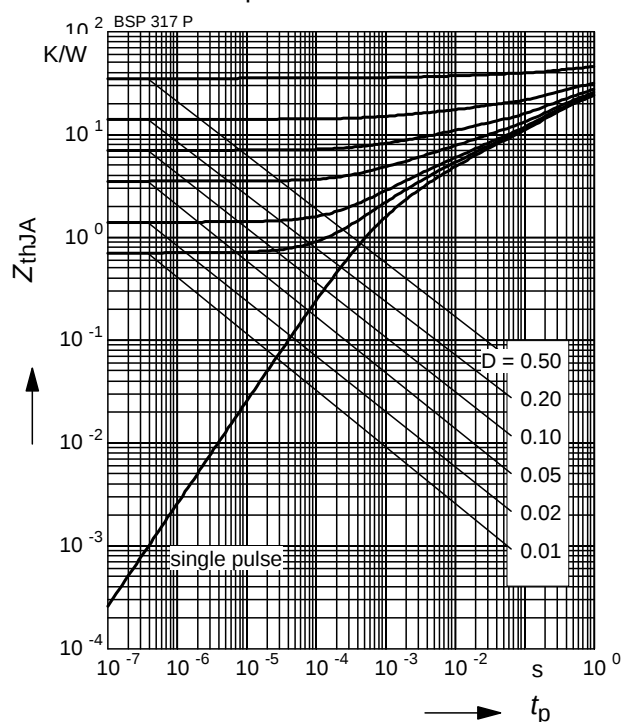
parameter: $D = 0$, $T_A = 25^\circ\text{C}$



4 Transient thermal impedance

$$Z_{\text{thJA}} = f(t_p)$$

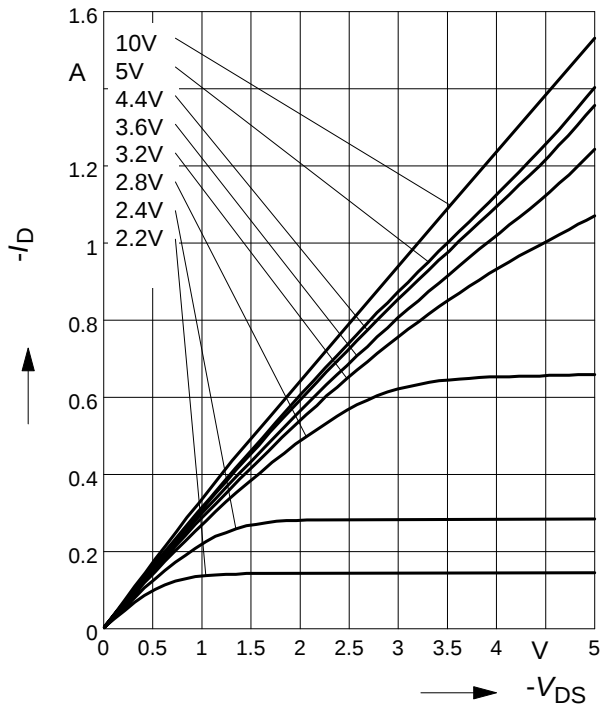
parameter: $D = t_p/T$



5 Typ. output characteristic

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

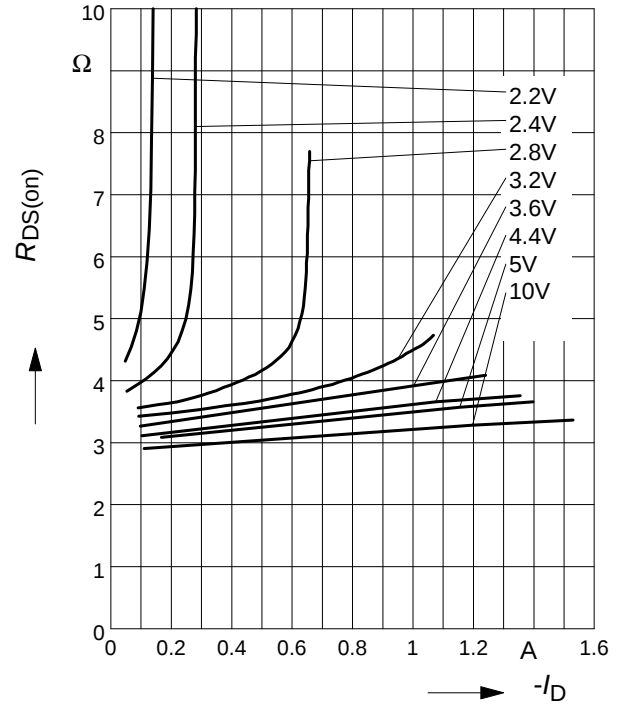
parameter: $T_j = 25^\circ\text{C}$, $-V_{GS}$



6 Typ. drain-source on resistance

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

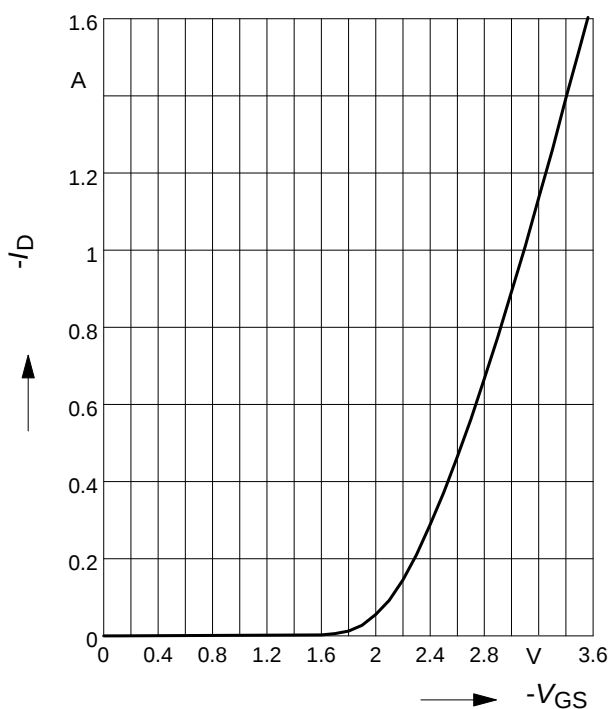
parameter: V_{GS} ; $T_j = 25^\circ\text{C}$, $-V_{GS}$



7 Typ. transfer characteristics

$$I_D = f(V_{GS}); |V_{DS}| \geq 2 \times |I_D| \times R_{DS(on)max}$$

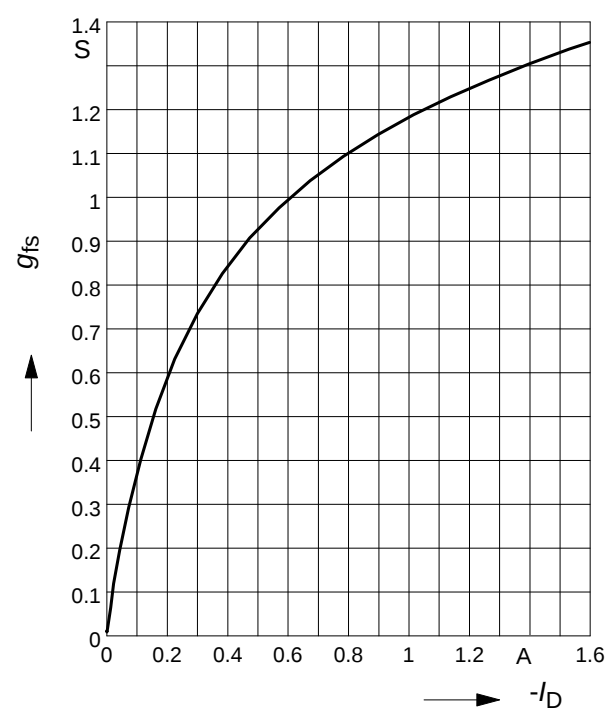
parameter: $T_j = 25^\circ\text{C}$



8 Typ. forward transconductance

$$g_{fs} = f(I_D)$$

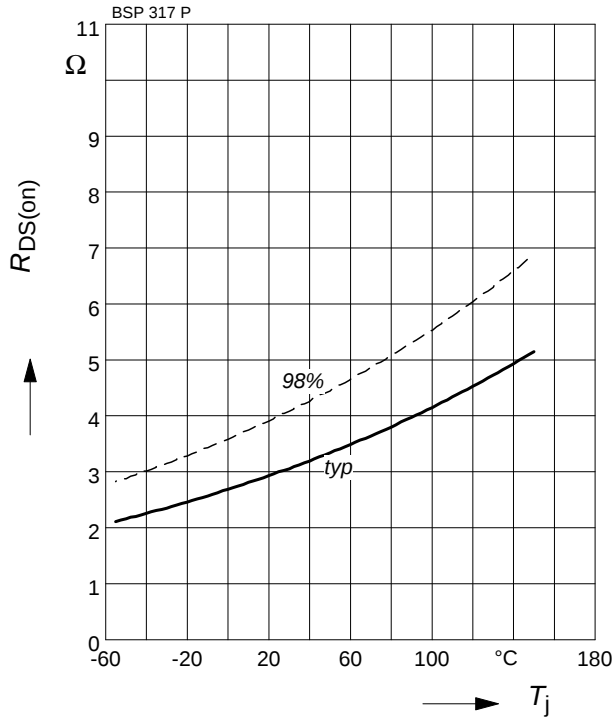
parameter: $T_j = 25^\circ\text{C}$



9 Drain-source on-state resistance

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

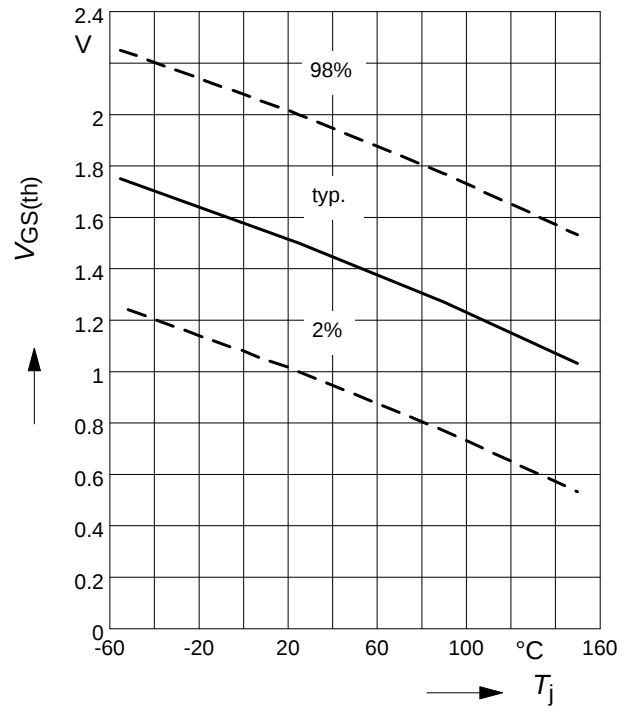
parameter: $I_D = -0.43$ A, $V_{GS} = -10$ V



10 Typ. gate threshold voltage

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

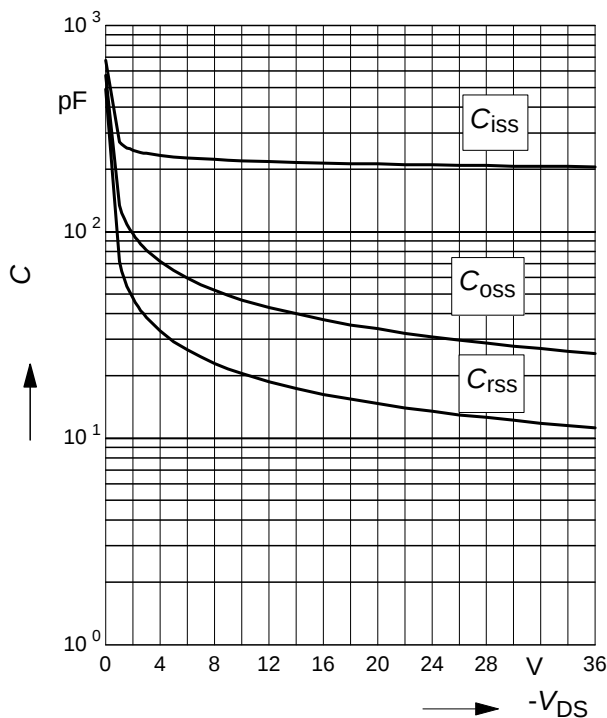
parameter: $V_{GS} = V_{DS}$



11 Typ. capacitances

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

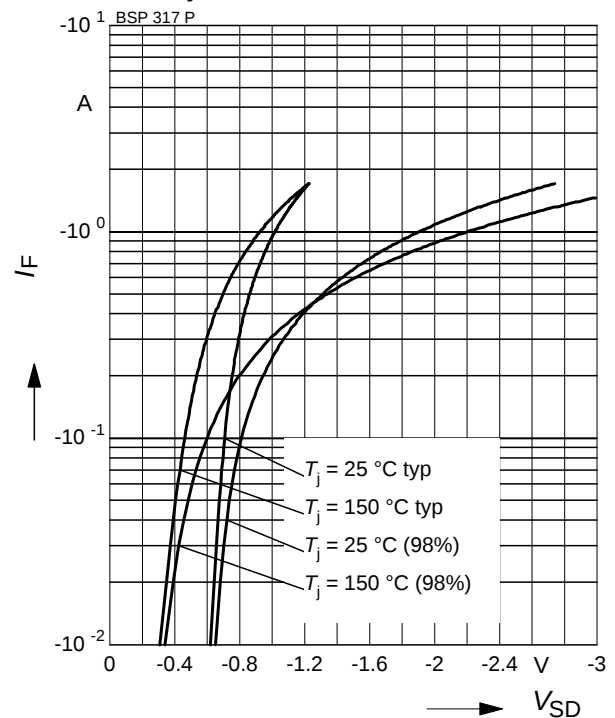
parameter: $V_{GS}=0$, $f=1$ MHz, $T_j = 25^{\circ}\text{C}$



12 Forward character. of reverse diode

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

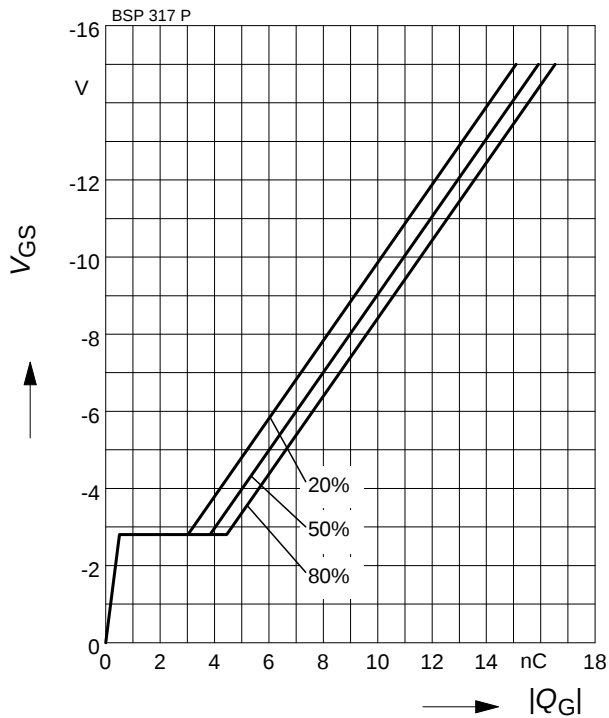
parameter: T_j



13 Typ. gate charge

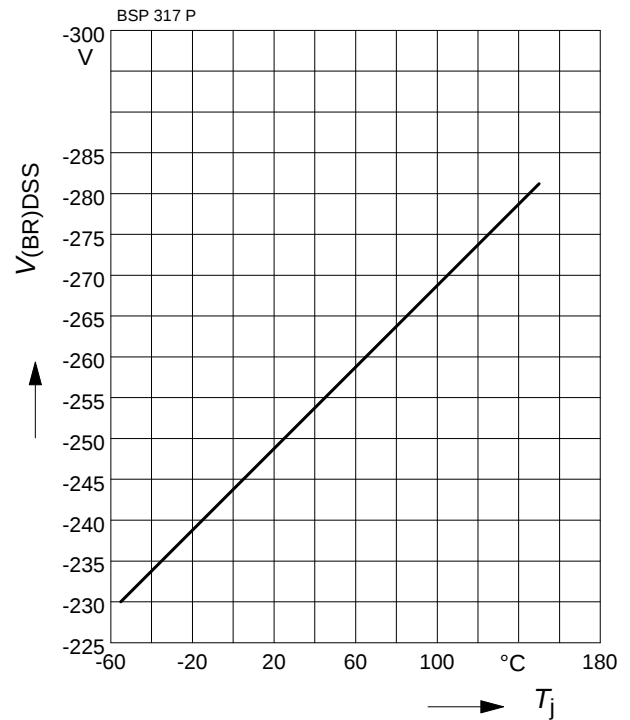
$$V_{GS} = f(Q_{Gate})$$

parameter: $I_D = -0.43$ A pulsed, $T_j = 25^\circ\text{C}$



14 Drain-source breakdown voltage

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



Published by
Infineon Technologies AG,
Bereichs Kommunikation
St.-Martin-Strasse 53,
D-81541 München
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