SIPMOS® Small-Signal-Transistor

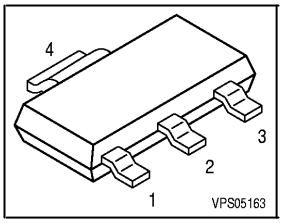
Feature

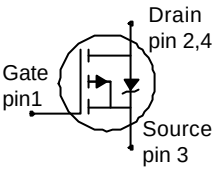
- P-Channel
- Enhancement mode
- Avalanche rated
- d*v*/d*t* rated
- Ideal for fast switching buck converter

Product Summary

V_{DS}	-60	V
$R_{DS(on)}$	0.13	Ω
I_D	-2.9	A

SOT-223





Type	Package	Ordering Code
BSP613P	SOT-223	Q67040-S4190

Maximum Ratings, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_A=25°C		-2.9	
T_A=70°C		-2.3	
Pulsed drain current	$I_{D\ puls}$	-11.6	
T_A=25°C			
Avalanche energy, single pulse	E_{AS}	150	mJ
I_D=2.9 A , V_{DD}=-25V, R_{GS}=25Ω			
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	0.18	
Reverse diode d*v*/d*t*	d*v*/d*t*	6	kV/µs
I_S=2.9A, V_{DS}=-48V, d*i*/d*t*=-200A/µs, T_{jmax}=150°C			
Gate source voltage	V_{GS}	±20	V
Power dissipation	P_{tot}	1.8	W
T_A=25°C			
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}	-	-	19	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	100	-	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	100	
@ 6 cm^2 cooling area [1)]		-	-	70	

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS}=0, I_D=-250µA	$V_{(BR)DSS}$	-60	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=-1mA	$V_{GS(th)}$	-2.1	-3	-4	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=-60V, V_{GS}=0, T_j=25°C		-	-0.1	-1	
V_{DS}=-60V, V_{GS}=0, T_j=125°C		-	-10	-100	
Gate-source leakage current V_{GS}=-20V, V_{DS}=0	I_{GSS}	-	-10	-100	nA
Drain-source on-state resistance V_{GS}=-10V, I_D=2.9A	$R_{DS(on)}$	-	0.11	0.13	Ω

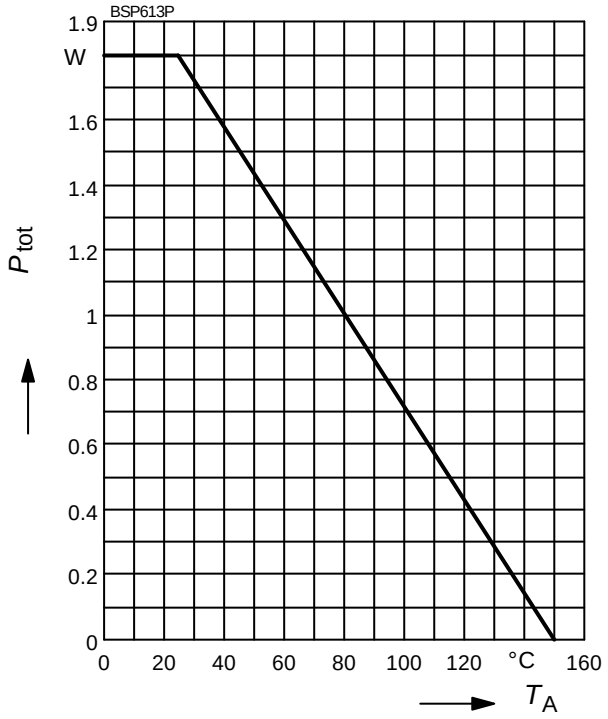
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

Electrical Characteristics, at T_j = 25 °C, unless otherwise specified

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	$\lvert V_{DS}\rvert \geq 2 * \lvert I_D\rvert * R_{DS(on)max}$, I_D=2.9A	2.7	5.4	-	S
Input capacitance	C_{iss}	V_{GS}=0, V_{DS}=-25V, f=1MHz	-	715	875	pF
Output capacitance	C_{oss}		-	230	295	
Reverse transfer capacitance	C_{rss}		-	90	120	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-30V, V_{GS}=-10V, I_D=2.9A, R_G=2.7Ω	-	6.7	17	ns
Rise time	t_r		-	9	18	
Turn-off delay time	$t_{d(off)}$		-	26	52	
Fall time	t_f		-	7	19	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-48V, I_D=2.9A	-	2.5	3.8	nC
Gate to drain charge	Q_{gd}		-	8.9	14.3	
Gate charge total	Q_g	V_{DD}=-48V, I_D=2.9A, V_{GS}=0 to -10V	-	22	33	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=-48V, I_D=2.9A	-	-3.9	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	-2.9	A
Inv. diode direct current, pulsed	I_{SM}		-	-	-11.6	
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, $\lvert I_F\rvert = \lvert I_S\rvert$	-	-0.8	-1.1	V
Reverse recovery time	t_{rr}	V_R=-30V, $\lvert I_F\rvert = \lvert I_S\rvert$, di_F/dt=100A/µs	-	37.2	79	ns
Reverse recovery charge	Q_{rr}		-	59.8	112	nC

1 Power Dissipation

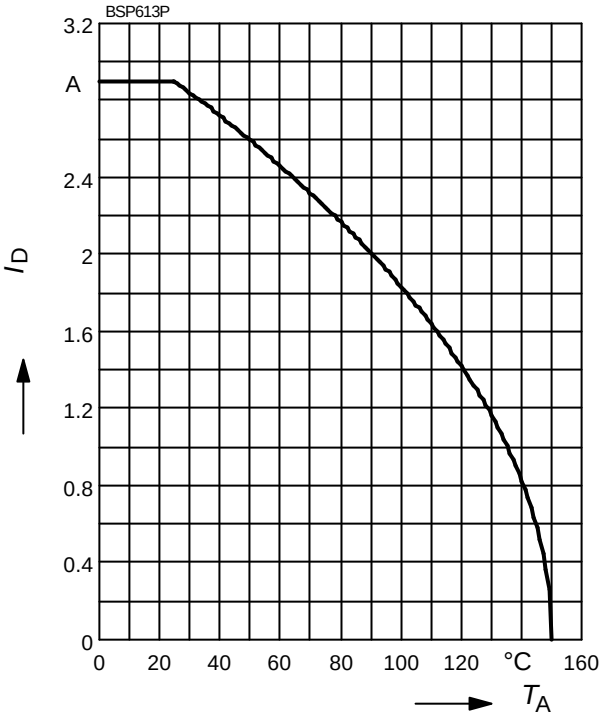
$P_{tot} = f(T_A)$



2 Drain current

$I_D = f(T_A)$

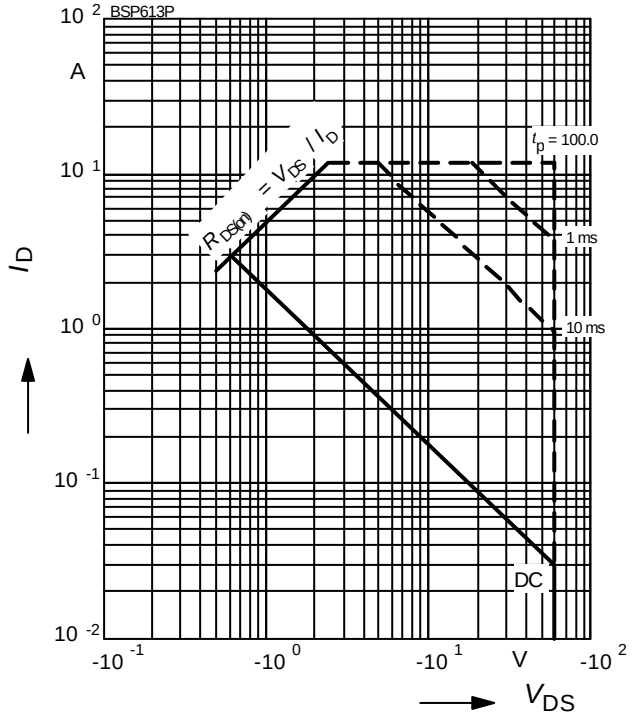
parameter: $V_{GS} \geq 10$ V



3 Safe operating area

$I_D = f(V_{DS})$

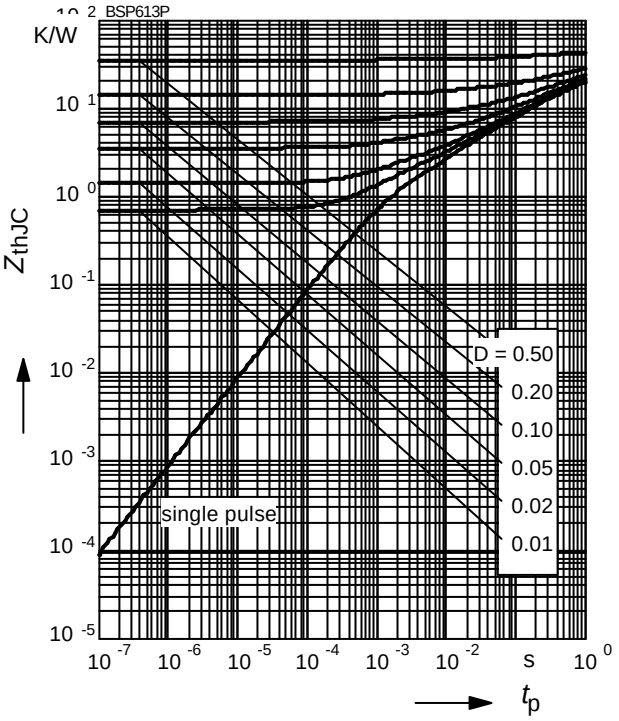
parameter : $D = 0$, $T_A = 25$ °C



4 Transient thermal impedance

$Z_{thJC} = f(t_p)$

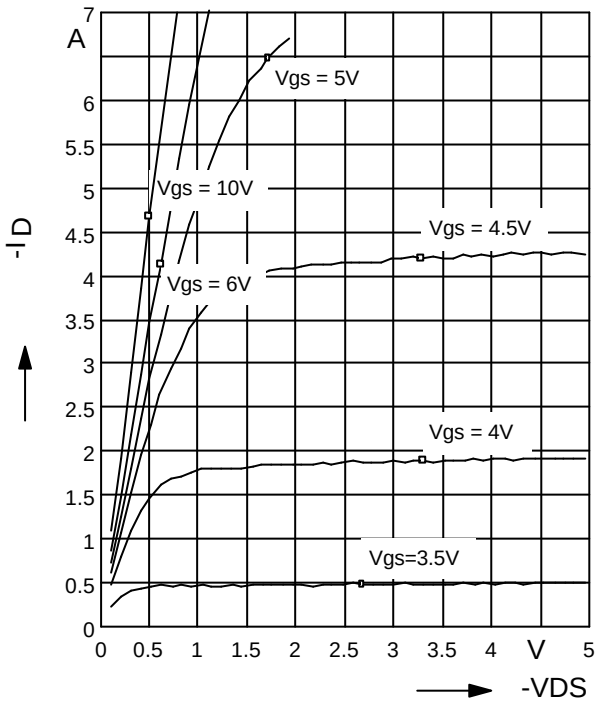
parameter: $D = t_p / T$



5 Typ. output characteristic

$I_D = f(V_{DS})$

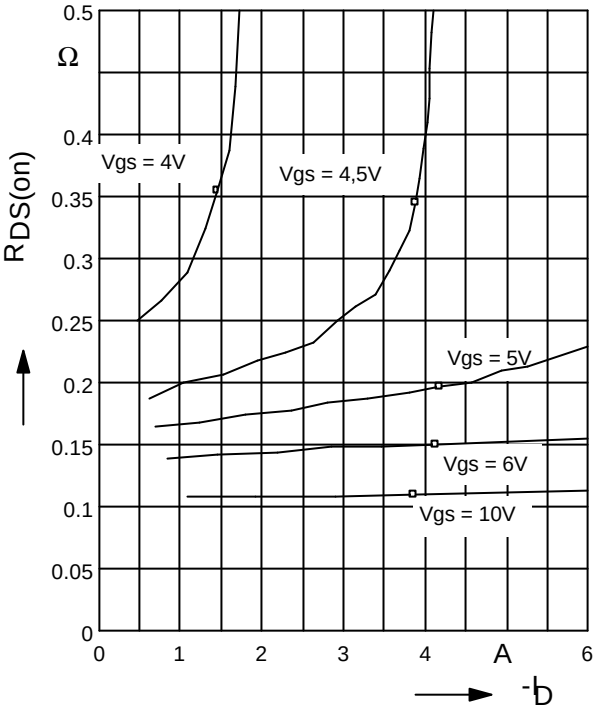
parameter: T_j =25°C



6 Typ. drain-source on resistance

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

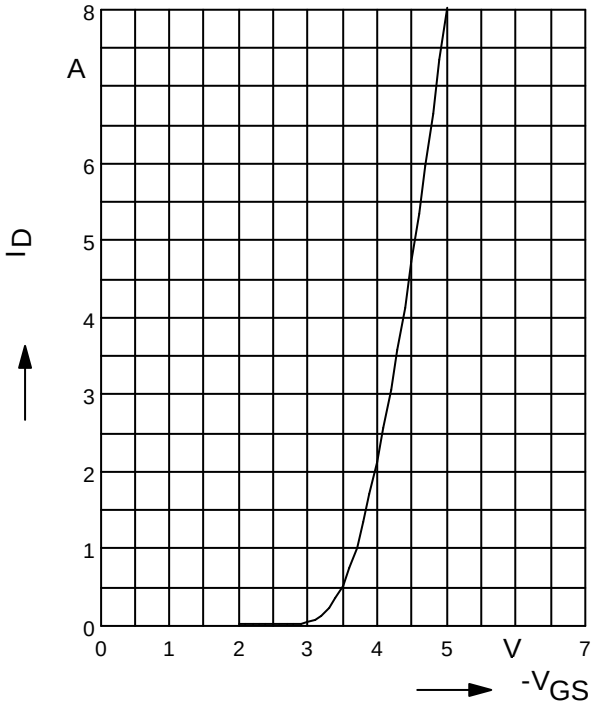
parameter: V_{GS}; T_j = 25 °C



7 Typ. transfer characteristics

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

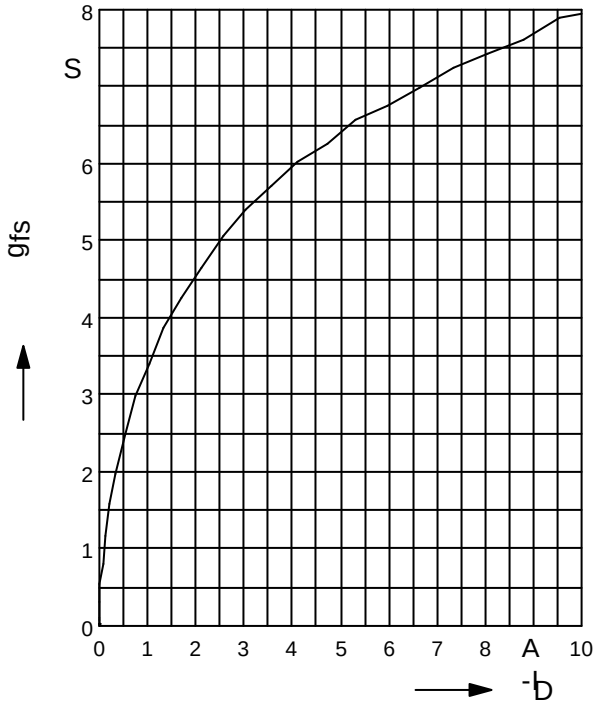
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

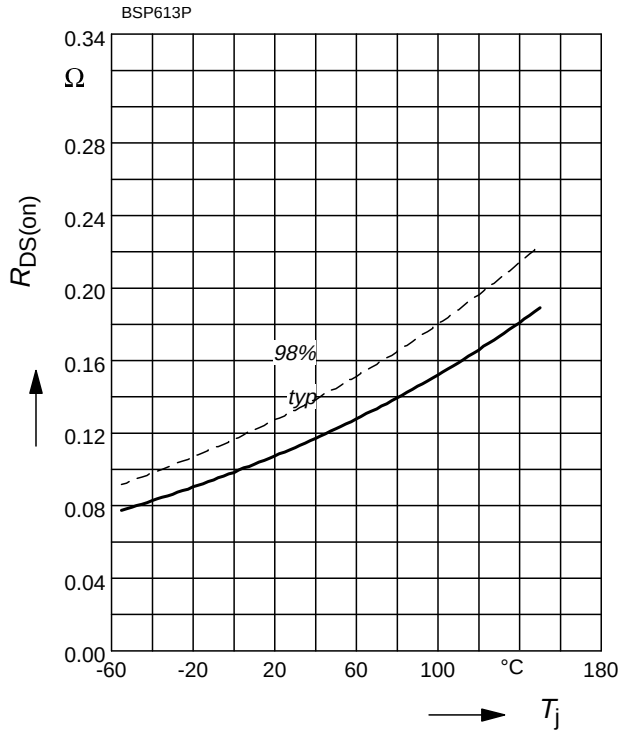
parameter: T_j = 25 °C



9 Drain-source on-state resistance

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

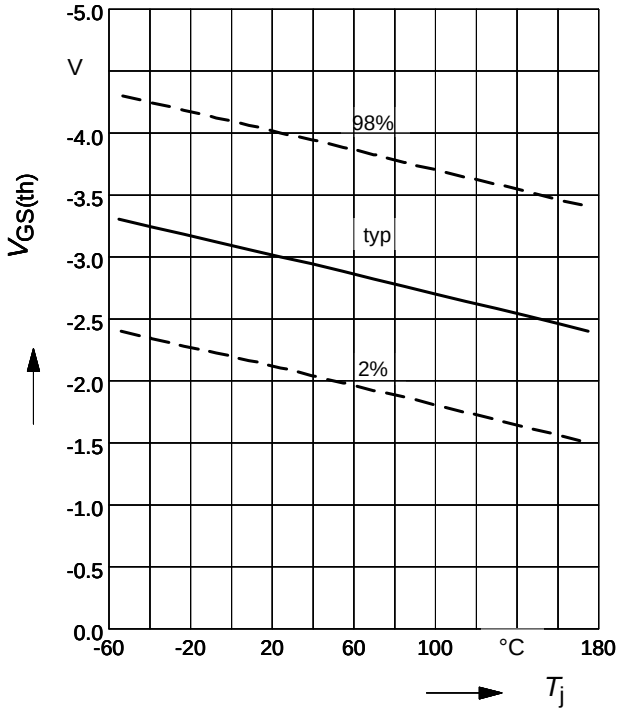
parameter : I_D = -2.9 A, V_{GS} = -10 V



10 Gate threshold voltage

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

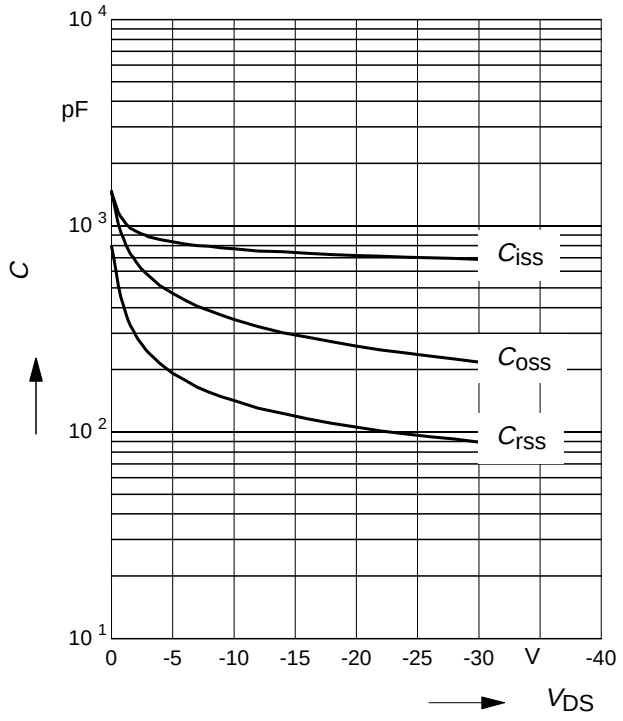
parameter: $V_{GS} = V_{DS}$, I_D = -1 mA



11 Typ. capacitances

$C = f(V_{DS})$

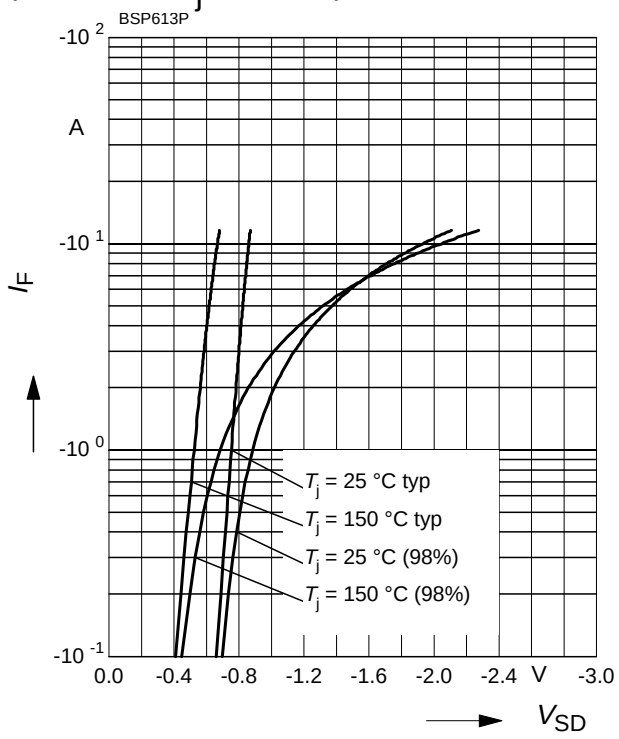
parameter: V_{GS}=0V, f=1 MHz



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

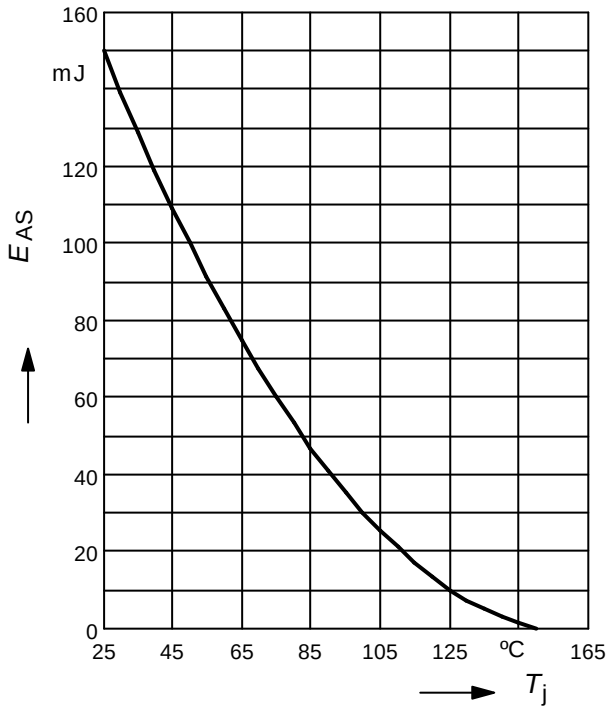
parameter: T_j , tp = 80 µs



13 Typ. avalanche energy

$E_{AS} = f(T_j)$

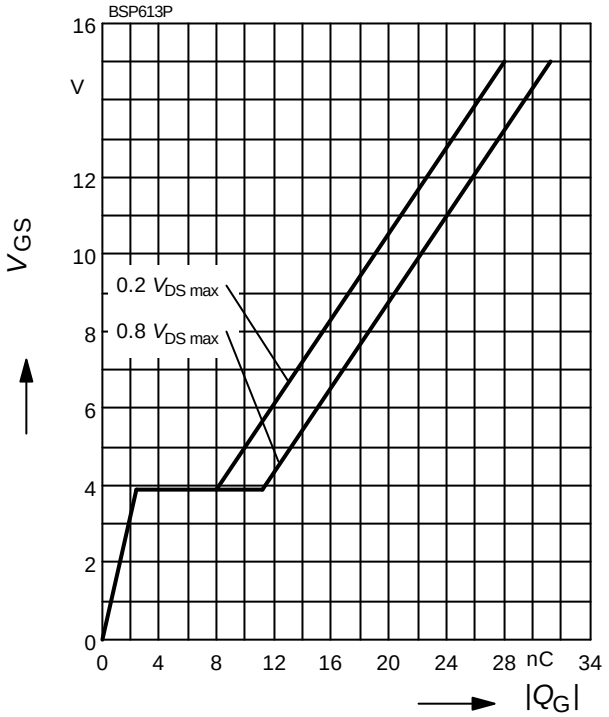
par.: I_D = 2.9 A , V_{DD} = -25 V, R_{GS} = 25 Ω



14 Typ. gate charge

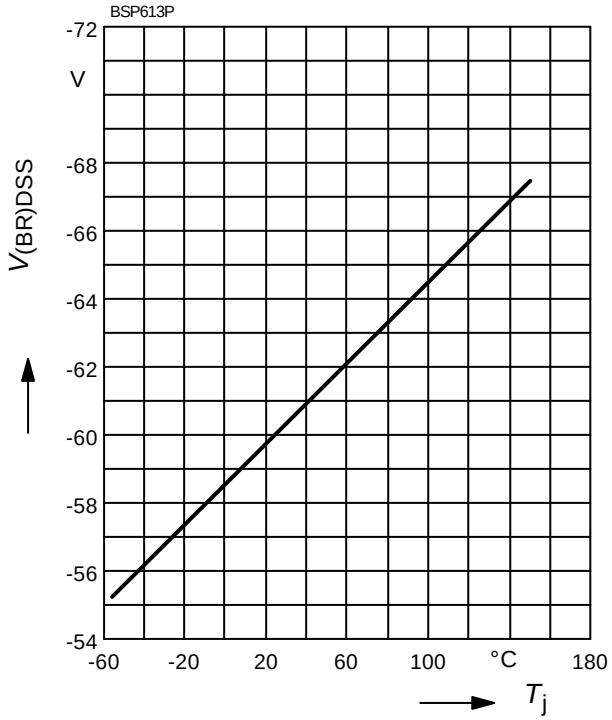
$V_{GS} = f(Q_G)$, parameter: V_{DS} ; T_j = 25 °C

I_D = 2.9 A pulsed;



15 Drain-source breakdown voltage

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



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

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 Reprensatives 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.