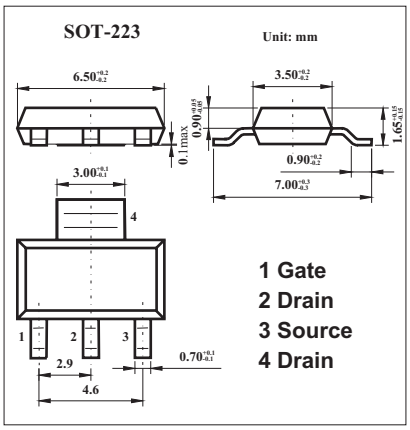
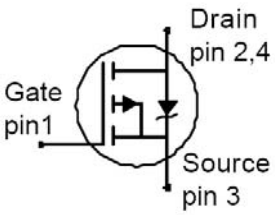
SIPMOS Small-Signal-Transistor

BSP613P



■ Features

- P-Channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- Ideal for fast switching buck converter



■ Absolute Maximum Ratings Ta = 25℃

Parameter	Symbol	Rating	Unit
Continuous drain current TA=25℃	ID	-2.9	A
Pulsed drain current TA=25 ℃	I DP	-11.6	A
Avalanche energy, single pulse *1	EAS	150	mJ
Avalanche energy, periodic limited by Tjmax	EAR	0.18	mJ
Reverse diode dv /dt *2	dv /dt	6	kV/ μ s
Gate source voltage	VGS	±20	V
Power dissipation	PD	1.8	W
Operating and storage temperature	Tj , Tstg	-55 to +150	℃
Thermal resistance,junction - soldering point	RthJS	19	K/W
Operating and storage temperature	T j, T stg	-55 to 150	℃

*1 ID=-2.9A,VDS=-25 V, RGS=25 Ω

*2 Is=2.9A, VDS=-48 V,di /dt =-200 A/ μ s,Tj,max=150℃

BSP613P

■ Electrical Characteristics Ta = 25℃

Parameter	Symbol	Testconditons	Min	Typ	Max	Unit
Drain-source breakdown voltage	V_{DSS}	V_{GS}=0 V, I_D=-250 μ A	-60			V
Zero gate voltage drain current	I_{DSS}	V_{DS}=-60V, V_{GS}=0V,T_j=25 ℃		-0.1	-1	μ A
		V_{DS}=-60 V, V_{GS}=0 V,T_j=125 ℃		-10	-100	
Gate-source leakage current	I_{GSS}	V_{GS}=-20 V, V_{DS}=0 V		-10	-100	nA
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-1mA	-2.1	-3	-4	V
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-10V, I_D=2.9A		0.11	0.13	Ω
Forward Transconductance	g_{fs}	|V_{DS}|>2|I_D|$R_{DS(on)max}$,I_D=2.9 A	2.7	5.4		S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=-25V,f =1 MHz		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}=-30 V,V_{GS}=-10 V,I_D=-2.9A, R_G=2.7 Ω		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 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 recovery time	trr	V_R=-30V, |I_F| = |I_S|, di_F/dt=100A/ μ s		37.2	79	ns
Reverse recovery charge	Q_{rr}			59.8	112	nC
Diode continous forward current	I_S	T_A=25℃			-2.9	A
Diode pulse curret	I_{SM}				-11.6	A
Diode forward voltage	V_{SD}	V_{GS}=0V, |I_F| = |I_S|		-0.88	-1.1	V

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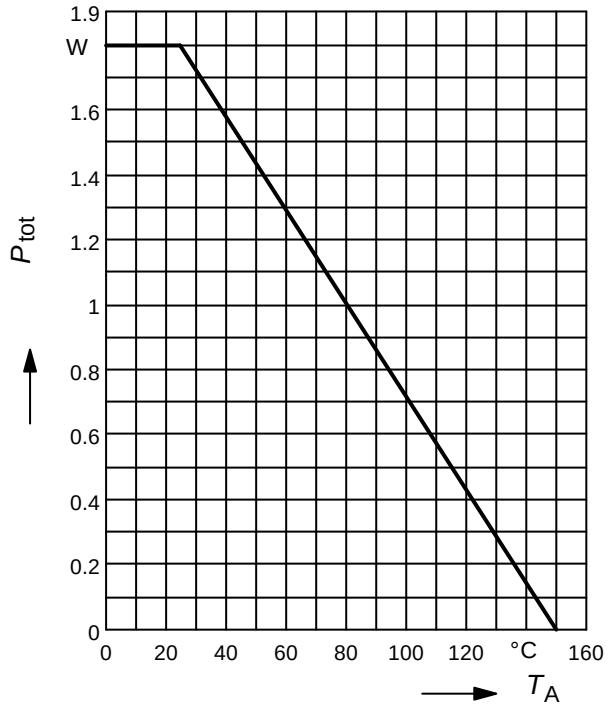
1 Power Dissipation

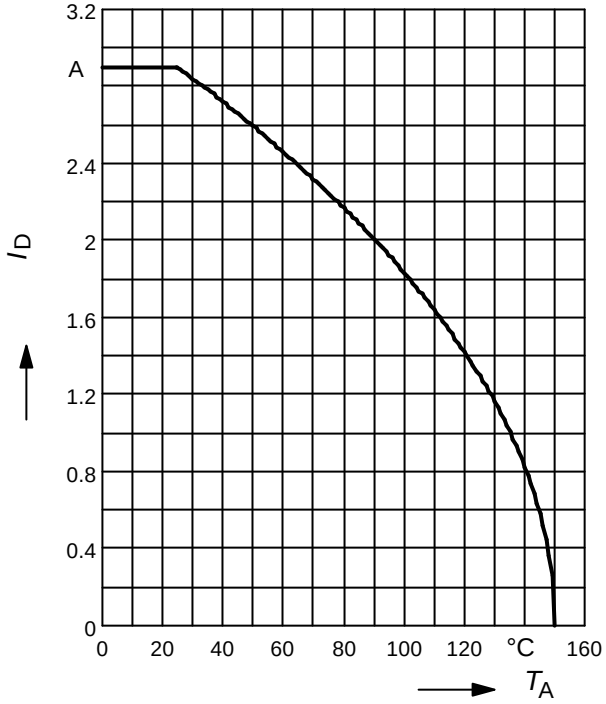
$P_{tot} = f(T_A)$



2 Drain current

$I_D = f(T_A)$

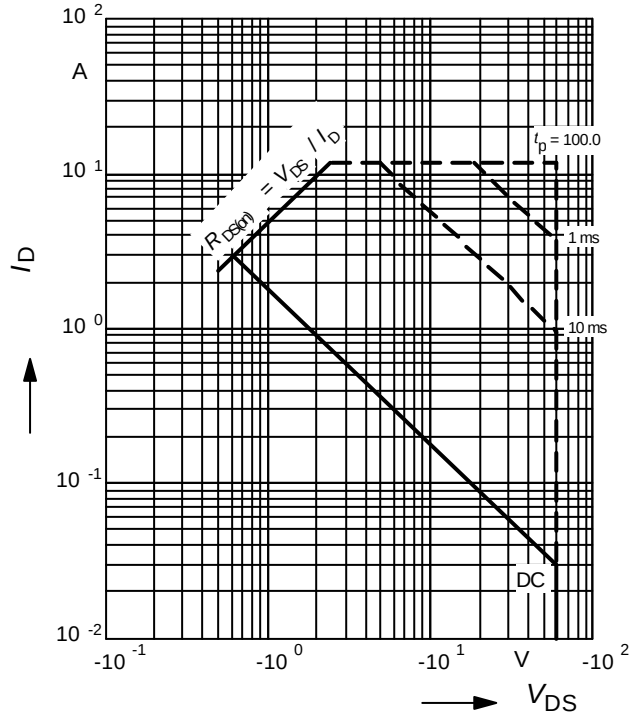
parameter: $V_{GS} \geq 10$ V



3 Safe operating area

$I_D = f(V_{DS})$

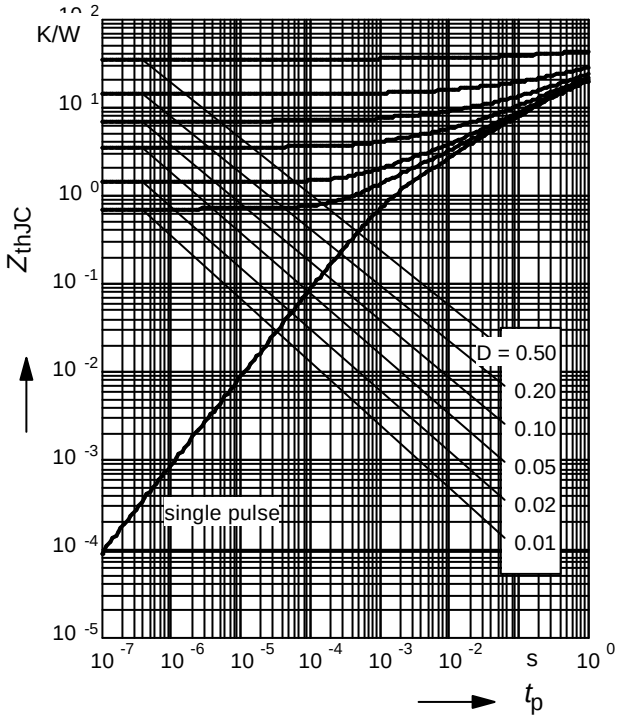
parameter : $D = 0$, $T_A = 25$ °C



4 Transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter: $D = t_p / T$



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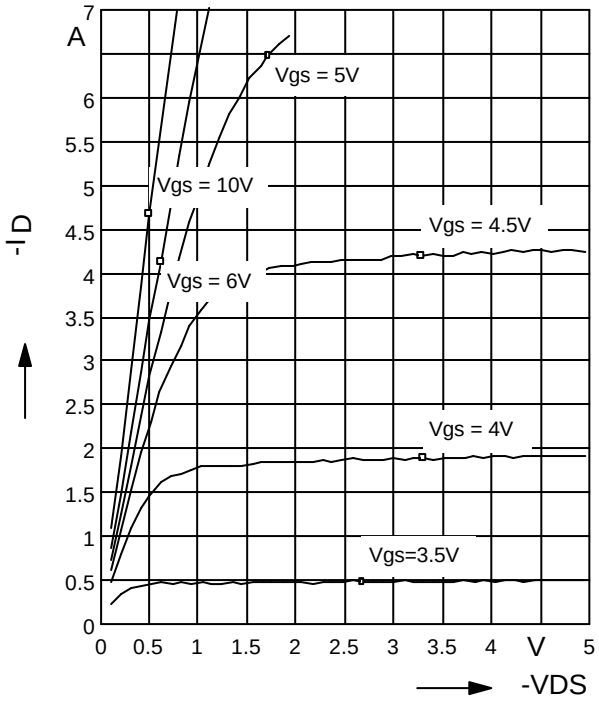
5 Typ. output characteristic

$I_D = f(V_{DS})$

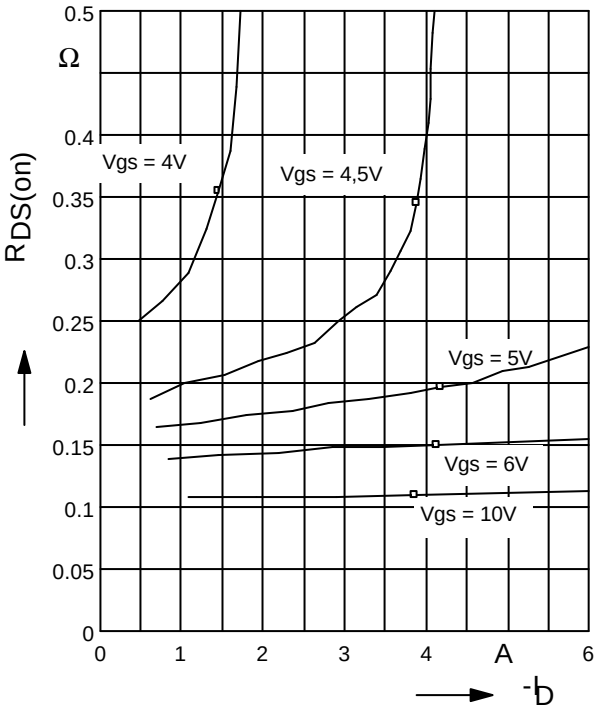
parameter: T_j =25°C



6 Typ. drain-source on resistance

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

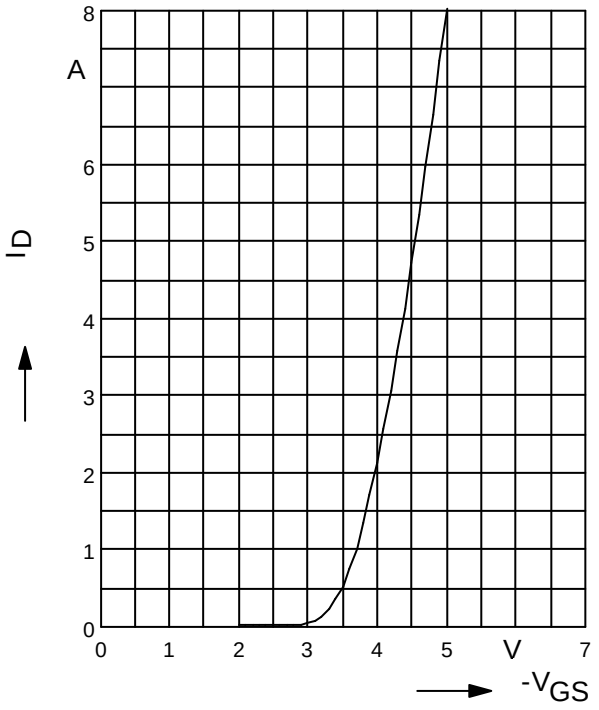
parameter: V_{GS}; T_j = 25 °C



7 Typ. transfer characteristics

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

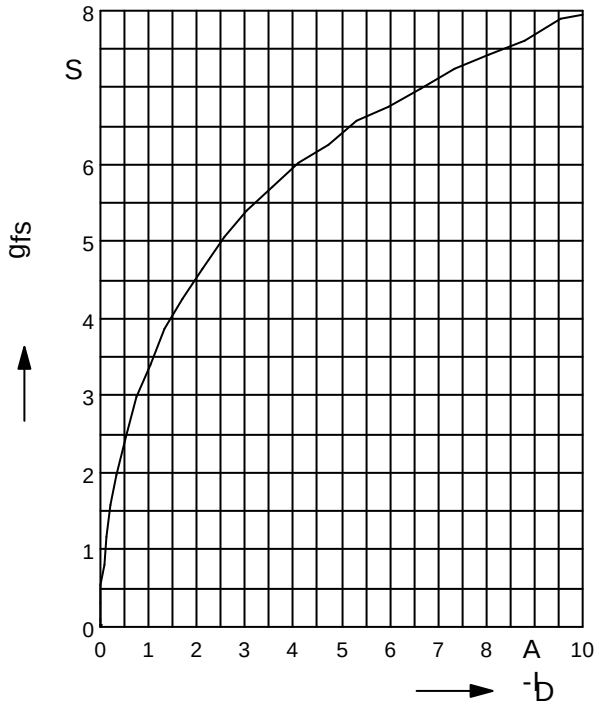
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

parameter: T_j = 25 °C



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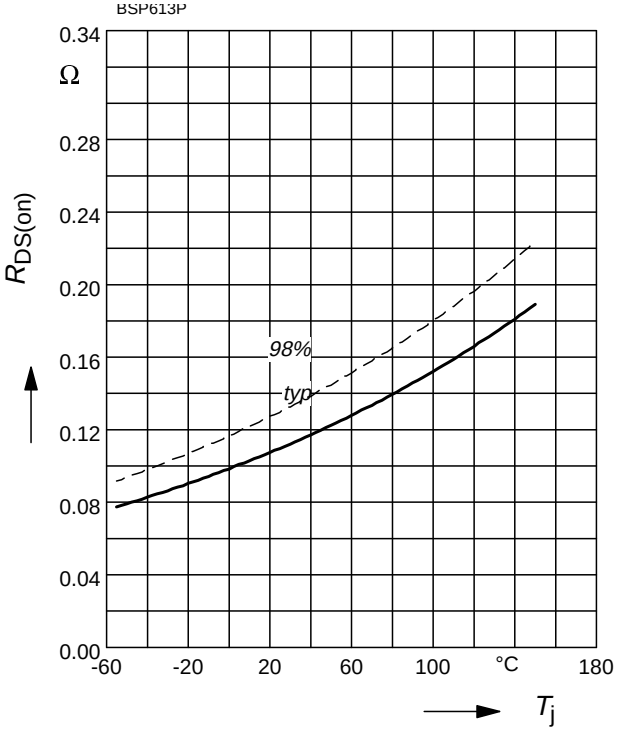
9 Drain-source on-state resistance

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

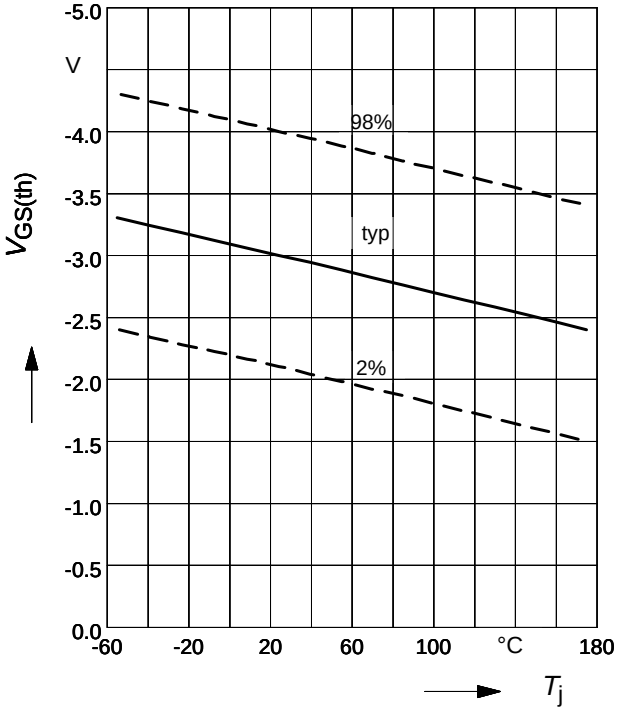
parameter : I_D = -2.9 A, V_{GS} = -10 V



10 Gate threshold voltage

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

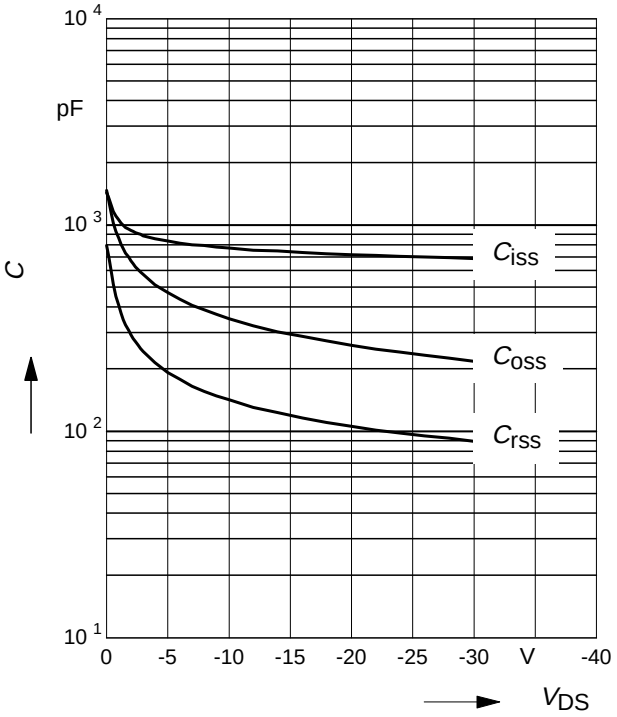
parameter: $V_{GS} = V_{DS}$, I_D = -1 mA



11 Typ. capacitances

$C = f(V_{DS})$

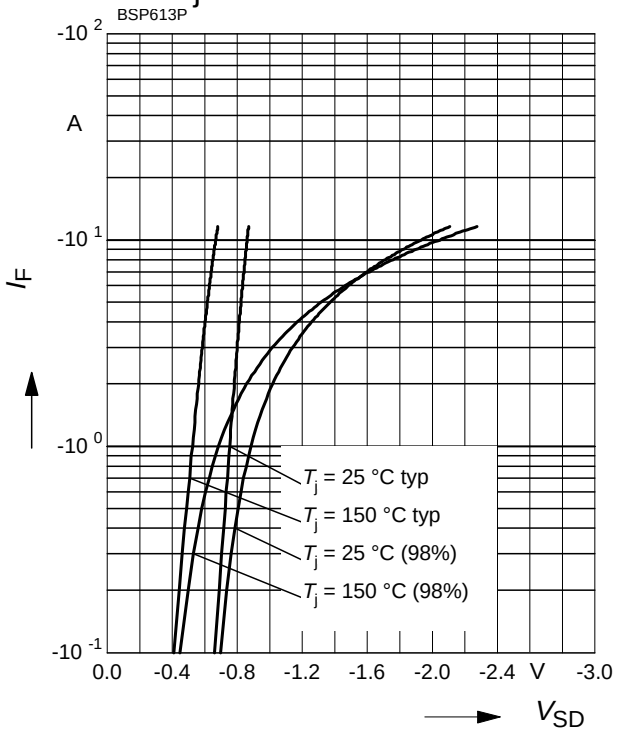
parameter: V_{GS}=0V, f=1 MHz



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

parameter: T_j , tp = 80 µs



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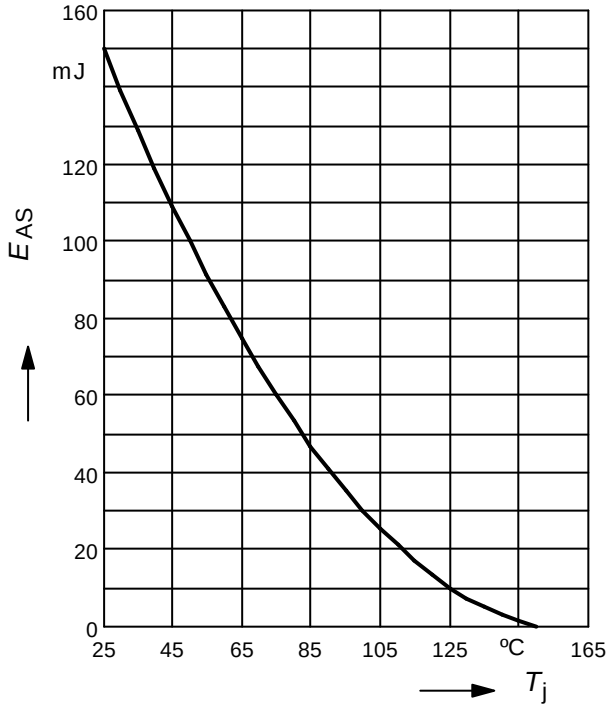
13 Typ. avalanche energy

$E_{AS} = f(T_j)$

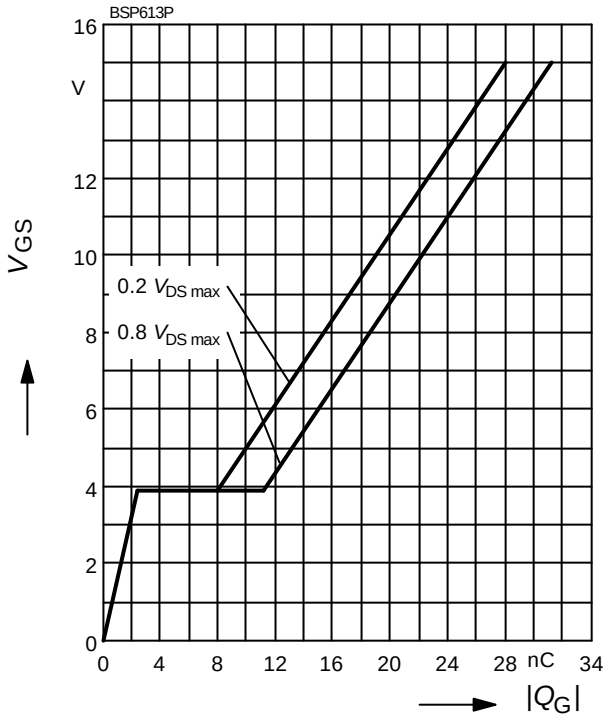
par.: I_D = 2.9 A , V_{DD} = -25 V, R_{GS} = 25 Ω



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

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