SIPMOS® Small-Signal-Transistor

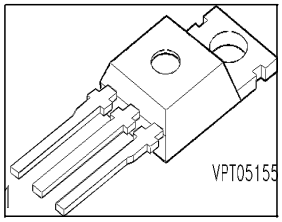
Feature

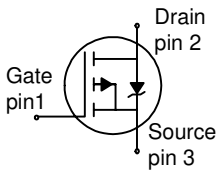
- P-Channel
- Enhancement mode
- Avalanche rated
- d*v*/d*t* rated
- Pb-free lead plating; RoHS compliant

Product Summary

V_{DS}	-100	V
$R_{DS(on)}$	0.24	Ω
I_D	-15	A

PG-TO220-3-1





Type	Package	Marking
SPP15P10P	PG-TO220-3-1	15P10P

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

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_C=25°C		-15	
T_C=100°C		-10.6	
Pulsed drain current	$I_{D\ puls}$	-60	
T_C=25°C			
Avalanche energy, single pulse	E_{AS}	230	mJ
I_D=-15 A , V_{DD}=-25V, R_{GS}=25Ω			
Reverse diode d*v*/d*t*	d*v*/d*t*	6	kV/µs
I_S=-15A, V_{DS}=-48V, d*i*/d*t*=-200A/µs, T_{jmax}=150°C			
Gate source voltage	V_{GS}	±20	V
Power dissipation	P_{tot}	128	W
T_C=25°C			
Operating and storage temperature	T_j , T_{stg}	-55... +175	°C
IEC climatic category; DIN IEC 68-1		55/175/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	1.17	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	75	
@ 6 cm^2 cooling area [1)]		-	-	45	

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	$V_{(BR)DSS}$	-100	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=-1.54mA	$V_{GS(th)}$	-4	-3	-2.1	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=-100V, V_{GS}=0, T_j=25°C		-	-0.1	-1	
V_{DS}=-100V, V_{GS}=0, T_j=150°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=-10.6A	$R_{DS(on)}$	-	0.18	0.24	Ω

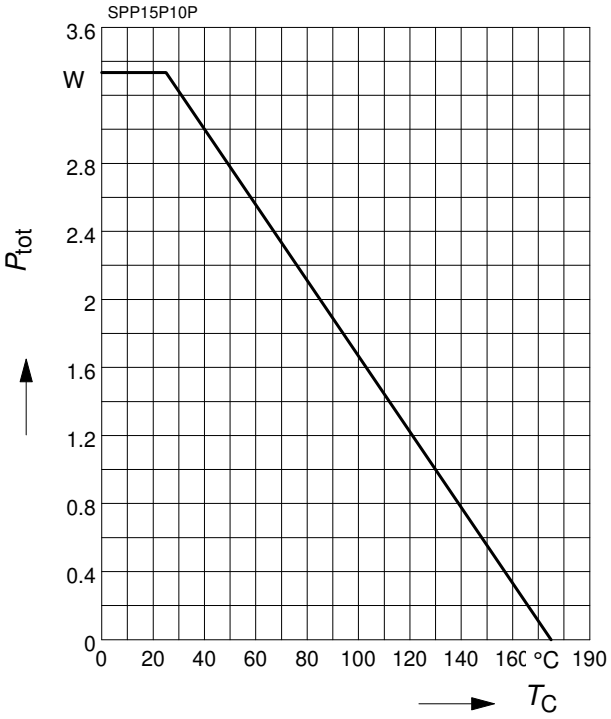
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

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

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	$\|V_{DS}\| \geq 2*\|I_D\|*R_{DS(on)max}$, I_D=-10.7A	4.7	9.3	-	S
Input capacitance	C_{iss}	V_{GS}=0, V_{DS}=-25V, f=1MHz	-	944	1180	pF
Output capacitance	C_{oss}		-	226	283	
Reverse transfer capacitance	C_{rss}		-	91	114	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-50V, V_{GS}=-10V, I_D=-15A, R_G=6Ω	-	8.9	13.4	ns
Rise time	t_r		-	30	45	
Turn-off delay time	$t_{d(off)}$		-	35	53	
Fall time	t_f		-	22	33	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=-80V, I_D=-15A	-	-4.5	-6.7	nC
Gate to drain charge	Q_{gd}		-	-15.3	-23	
Gate charge total	Q_g	V_{DD}=-80V, I_D=-15A, V_{GS}=0 to -10V	-	-33.4	-50	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=-80V, I_D=-15A	-	-5.7	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	-15	A
Inv. diode direct current, pulsed	I_{SM}		-	-	-60	
Inverse diode forward voltage	V_{SD}	V_{GS}=0, $\|I_F\| = \|I_S\|$	-	-0.94	-1.35	V
Reverse recovery time	t_{rr}	V_R=-50V, $\|I_F\| = \|I_S\|$, di_F/dt=100A/µs	-	100	150	ns
Reverse recovery charge	Q_{rr}		-	419	628	nC

1 Power dissipation

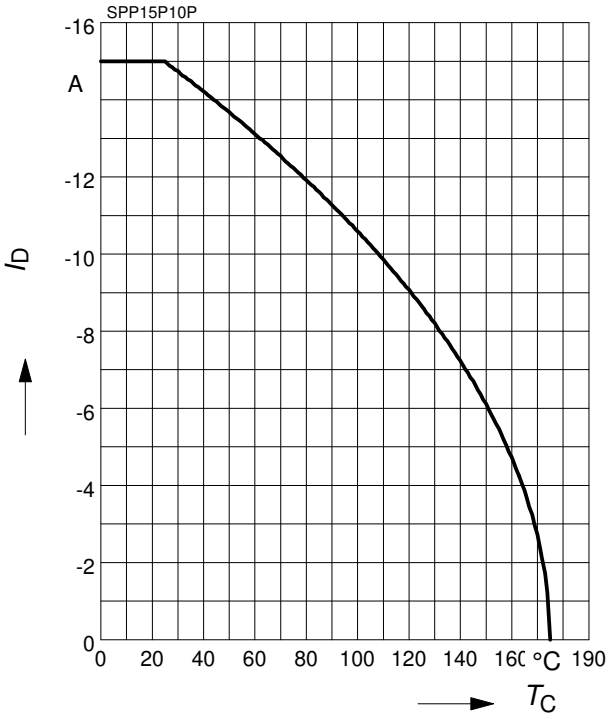
$P_{tot} = f(T_C)$



2 Drain current

$I_D = f(T_C)$

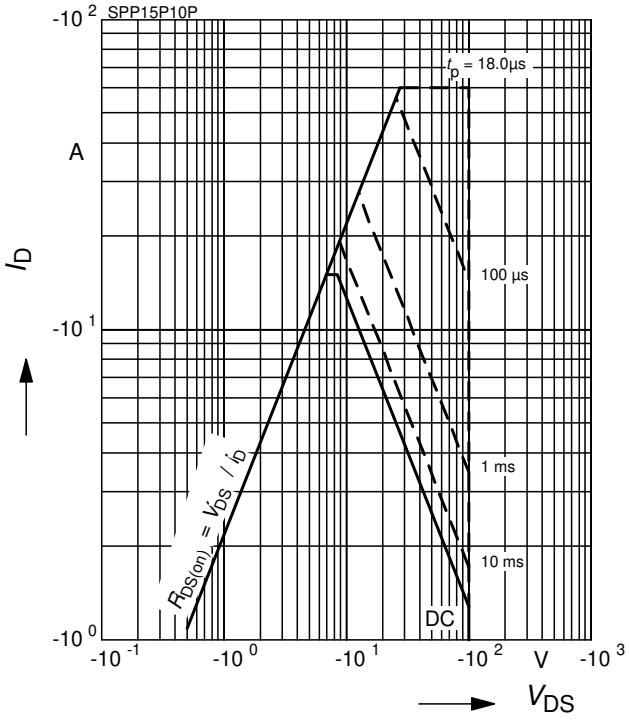
parameter: $|V_{GS}| \geq 10V$



3 Safe operating area

$I_D = f(V_{DS})$

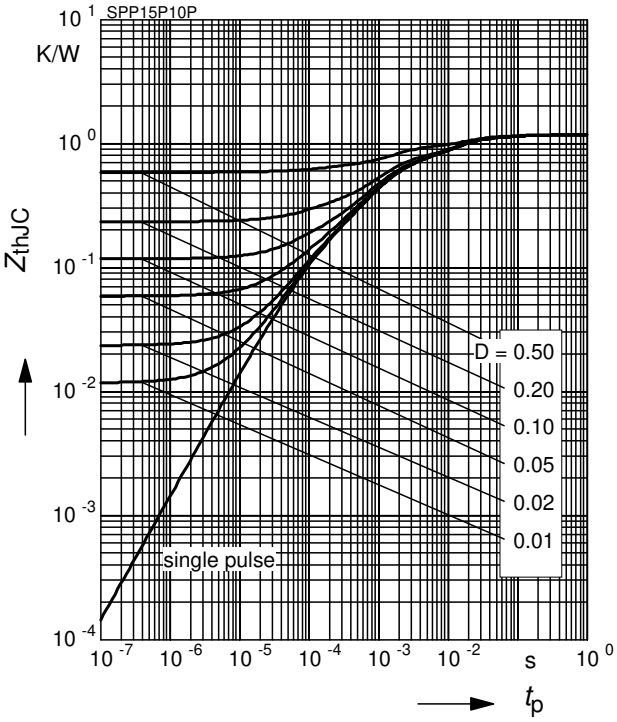
parameter : $D = 0$, $T_C = 25$ °C



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

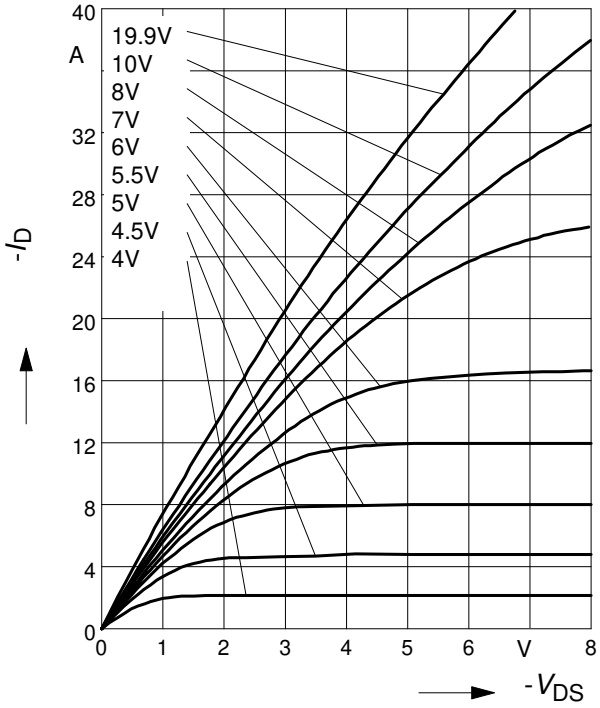
parameter : $D = t_p/T$



5 Typ. output characteristic

$I_D = f(V_{DS})$

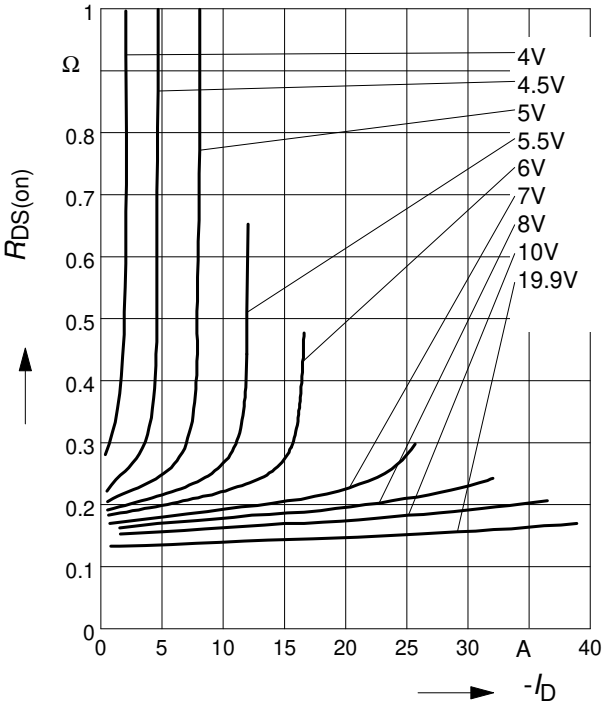
parameter: T_j =25°C, $-V_{GS}$



6 Typ. drain-source on resistance

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

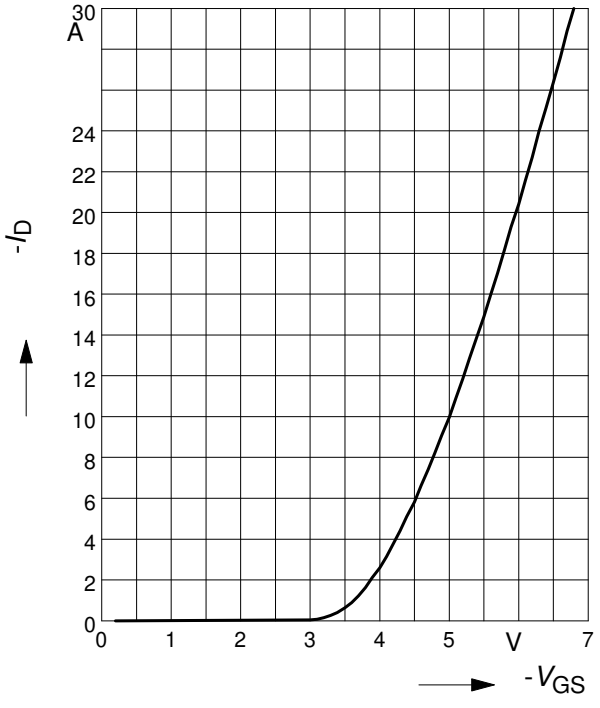
parameter: V_{GS}; T_j =25°C, $-V_{GS}$



7 Typ. transfer characteristics

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

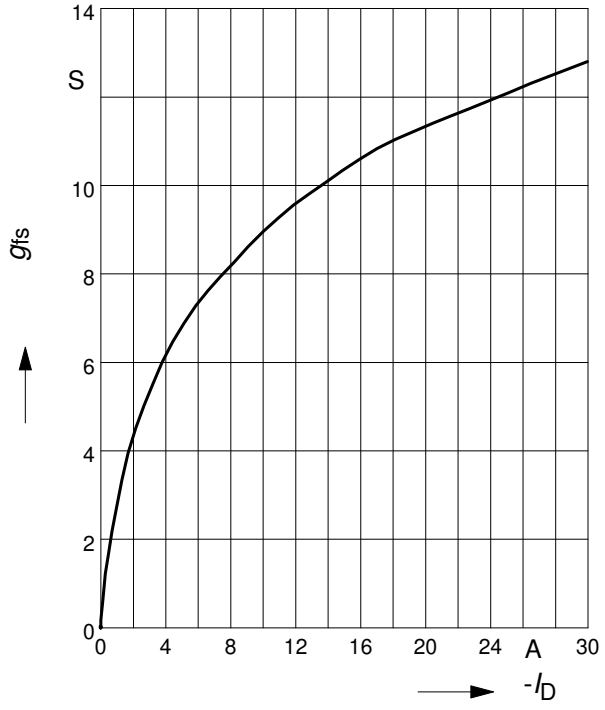
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

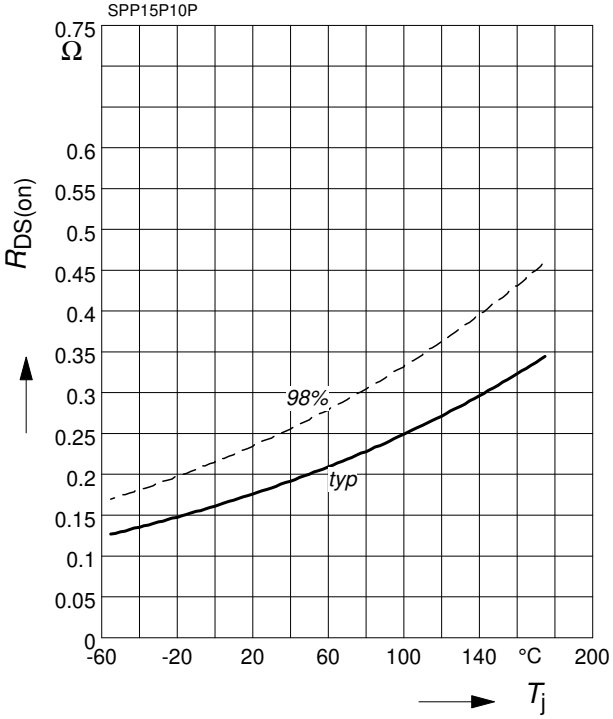
parameter: T_j =25°C



9 Drain-source on-state resistance

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

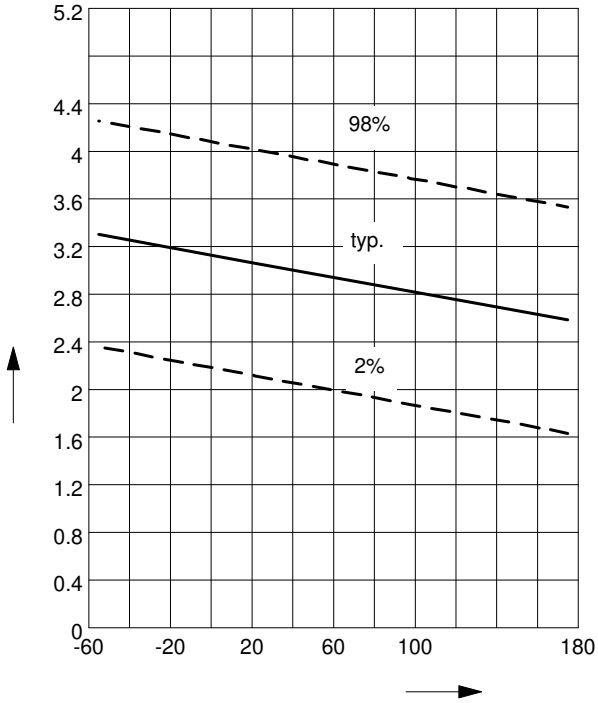
parameter : I_D = -10.6 A, V_{GS} = -10 V



10 Typ. gate threshold voltage

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

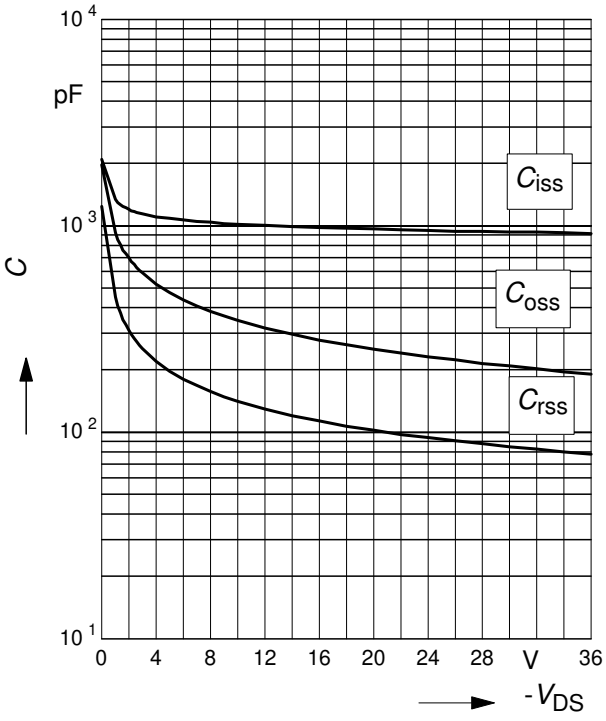
parameter: $V_{GS} = V_{DS}$



11 Typ. capacitances

$C = f(V_{DS})$

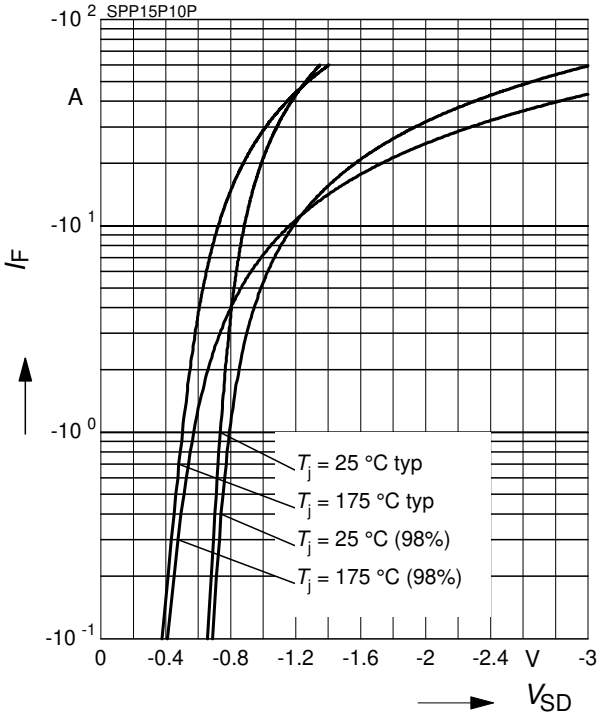
parameter: V_{GS}=0, f=1 MHz, T_j = 25 °C



12 Forward character. of reverse diode

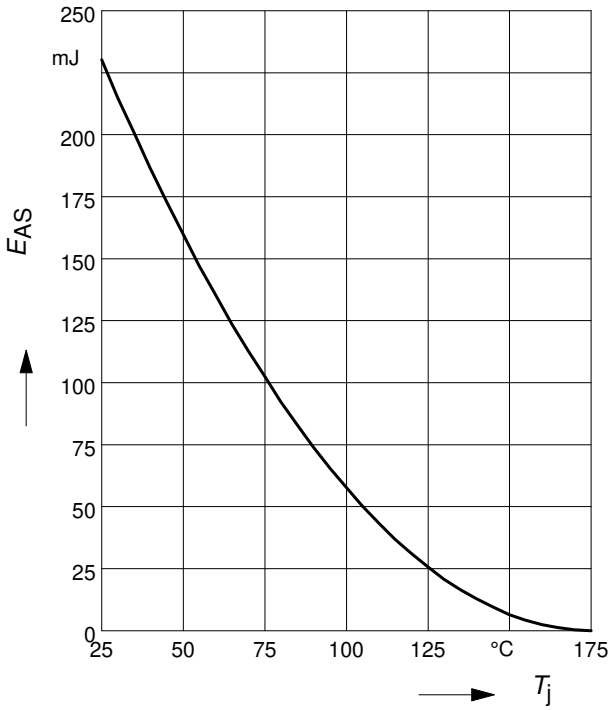
$I_F = f(V_{SD})$

parameter: T_j



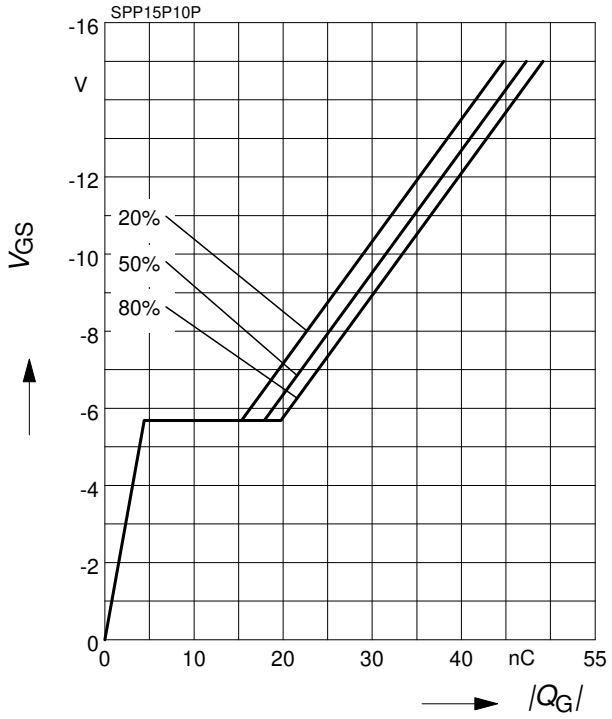
13 Typ. avalanche energy

$E_{AS} = f(T_j)$; par.: I_D = -15 A ,
V_{DD} = -25 V, R_{GS} = 25 Ω



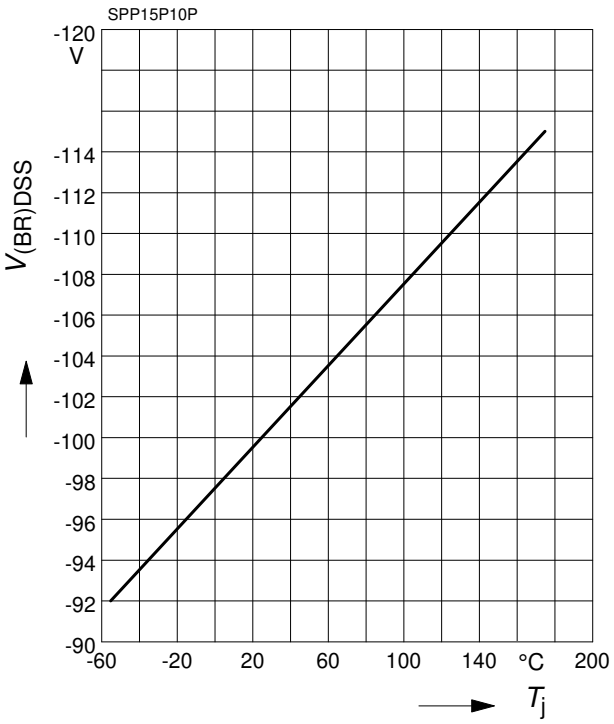
14 Typ. gate charge

$V_{GS} = f(Q_{Gate})$
parameter: I_D = -15 A pulsed, T_j = 25°C



15 Drain-source breakdown voltage

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



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