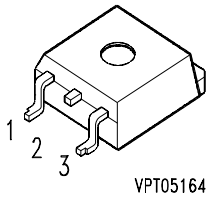
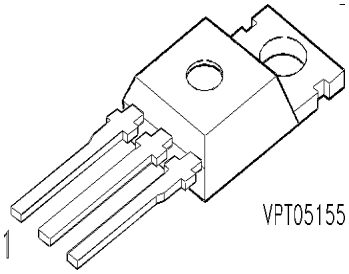
SIPMOS ® Power Transistor

- N channel
- Enhancement mode
- Logic Level
- Avalanche-rated
- d*v*/d*t* rated
- 175°C operating temperature
- also in SMD available





Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ111SL	55 V	80 A	0.01 Ω	TO-220 AB	Q67040-S4003-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 100 °C	I_D	80	A
Pulsed drain current T_C = 25 °C	I_{Dpuls}	320	
Avalanche energy, single pulse I_D = 80 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 220 µH, T_j = 25 °C	E_{AS}	700	mJ
Avalanche current,limited by T_{jmax}	I_{AR}	80	A
Avalanche energy,periodic limited by T_{jmax}	E_{AR}	25	mJ
Reverse diode d*v*/d*t* I_S = 80 A, V_{DS} = 40 V, di_F/dt = 200 A/µs T_{jmax} = 175 °C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	± 14	V
Power dissipation T_C = 25 °C	P_{tot}	250	W

Maximum Ratings

Parameter	Symbol	Values	Unit
Operating temperature	T_j	-55 ... + 175	°C
Storage temperature	T_{stg}	-55 ... + 175	
Thermal resistance, junction - case	R_{thJC}	≤ 0.6	K/W
Thermal resistance, junction - ambient	R_{thJA}	≤ 62	
IEC climatic category, DIN IEC 68-1		55 / 175 / 56	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage	$V_{(BR)DSS}$				V
V_{GS} = 0 V, I_D = 0.25 mA, T_j = 25 °C		55	-	-	
Gate threshold voltage	$V_{GS(th)}$				
V_{GS}=V_{DS}, I_D = 240 µA		1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS} = 50 V, V_{GS} = 0 V, T_j = -40 °C		-	-	0.1	
V_{DS} = 50 V, V_{GS} = 0 V, T_j = 25 °C		-	0.1	1	
V_{DS} = 50 V, V_{GS} = 0 V, T_j = 150 °C		-	-	100	
Gate-source leakage current	I_{GSS}				nA
V_{GS} = 20 V, V_{DS} = 0 V		-	10	100	
Drain-Source on-resistance	$R_{DS(on)}$				Ω
V_{GS} = 4.5 V, I_D = 80 A		-	0.0085	0.01	
V_{GS} = 10 V, I_D = 80 A		-	0.0055	0.007	

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

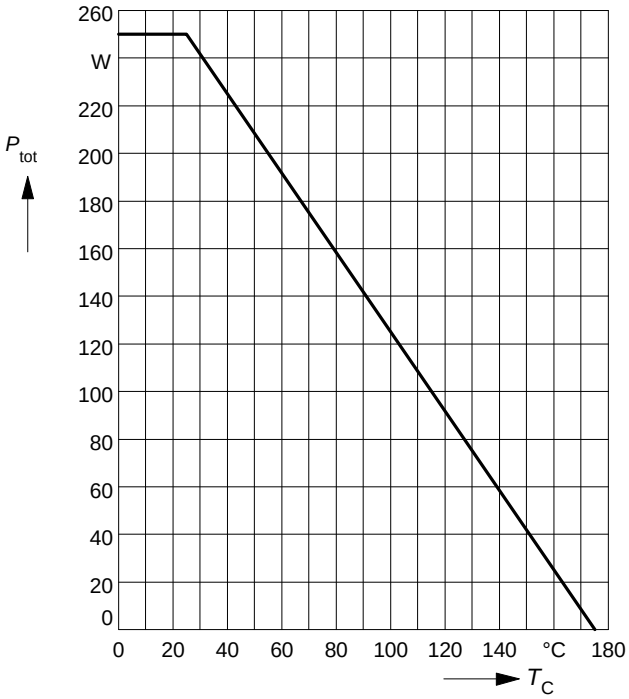
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$ = 2 V, I_D = 80 A	g_{fs}	30	95	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	3850	4800	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	1090	1357	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	570	715	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 80 A R_G = 1.3 Ω	$t_{d(on)}$	-	30	45	ns
Rise time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 80 A R_G = 1.3 Ω	t_r	-	37	56	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 80 A R_G = 1.3 Ω	$t_{d(off)}$	-	70	105	
Fall time V_{DD} = 30 V, V_{GS} = 4.5 V, I_D = 80 A R_G = 1.3 Ω	t_f	-	36	55	
Gate charge at threshold V_{DD} = 40 V, $I_D \geq$ 0.1 A, V_{GS} =0 to 1 V	$Q_{g(th)}$	-	3.8	5.7	nC
Gate charge at 5.0 V V_{DD} = 40 V, I_D = 80 A, V_{GS} =0 to 5 V	$Q_{g(5)}$	-	92	138	
Gate charge total V_{DD} = 40 V, I_D = 80 A, V_{GS} =0 to 10 V	$Q_{g(total)}$	-	155	232	
Gate plateau voltage V_{DD} = 40 V, I_D = 80 A	$V_{(plateau)}$	-	3.4	-	V

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Reverse Diode					
Inverse diode continuous forward current T_C = 25 °C	I_S	-	-	80	A
Inverse diode direct current,pulsed T_C = 25 °C	I_{SM}	-	-	320	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 160 A	V_{SD}	-	1.25	1.8	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	105	157	ns
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	0.31	0.47	µC

Power dissipation

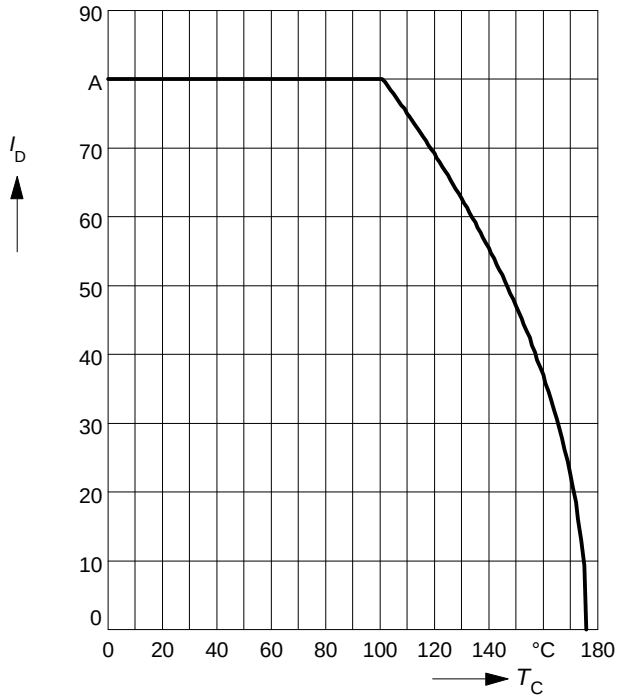
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

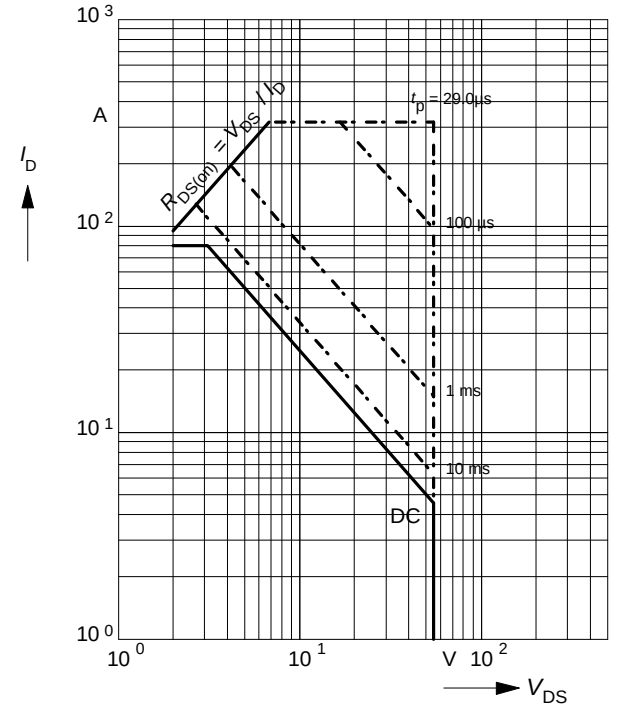
parameter: $V_{GS} \geq 4$ V



Safe operating area

$I_D = f(V_{DS})$

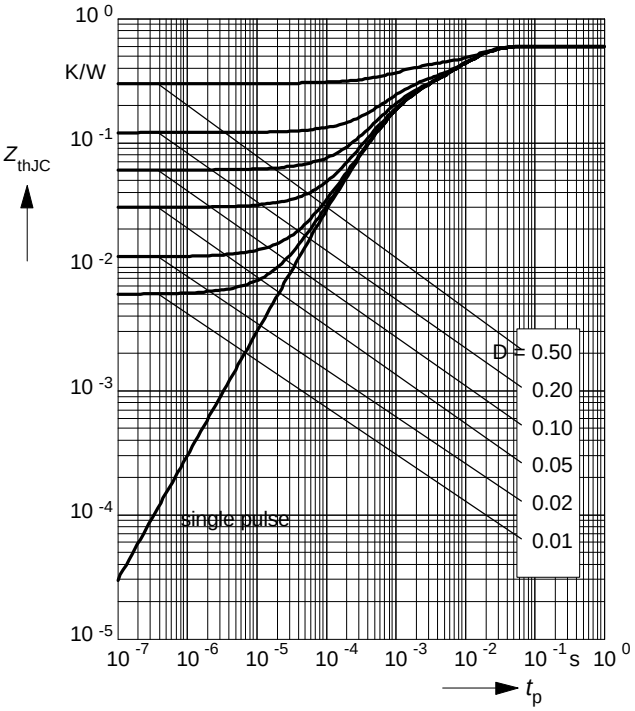
parameter: $D = 0$, $T_C = 25$°C



Transient thermal impedance

$Z_{th\,JC} = f(t_p)$

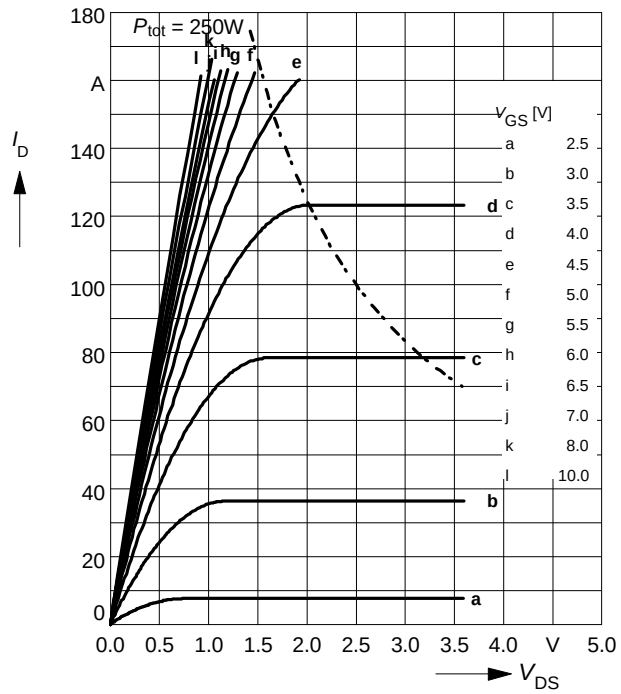
parameter: $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

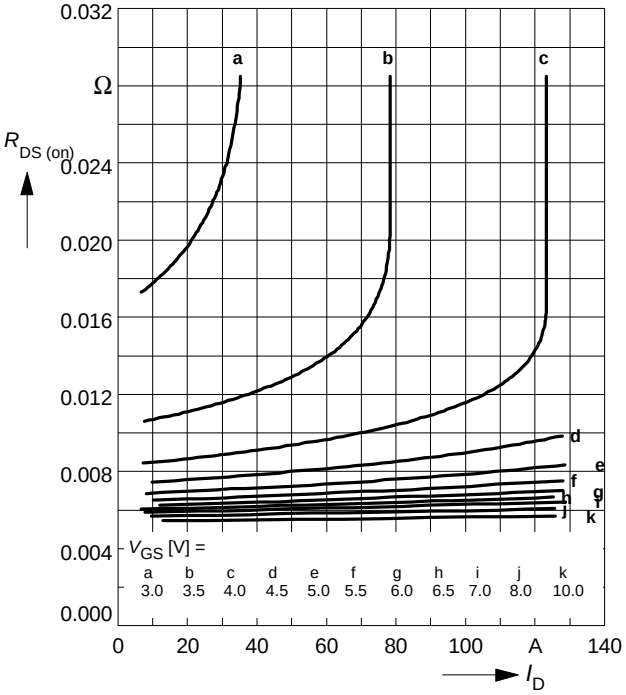
parameter: t_p = 80 µs



Typ. drain-source on-resistance

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

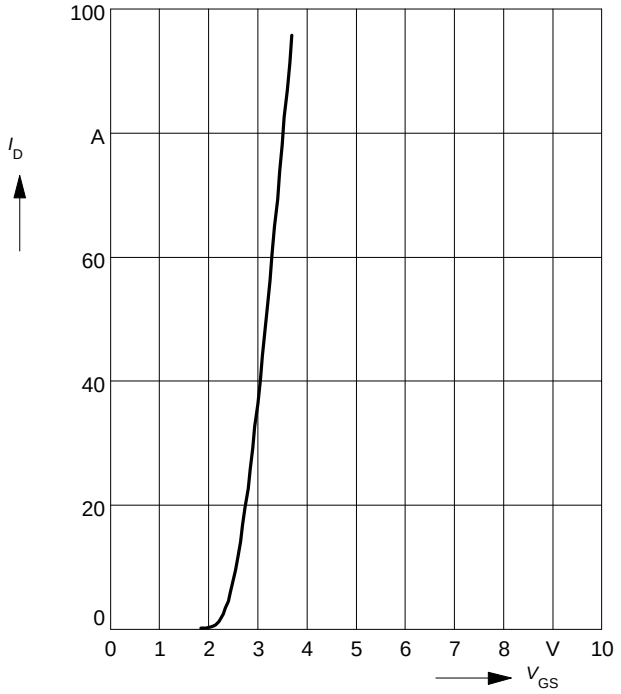
parameter: t_p = 80 µs, T_j = 25 °C



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

parameter: t_p = 80 µs

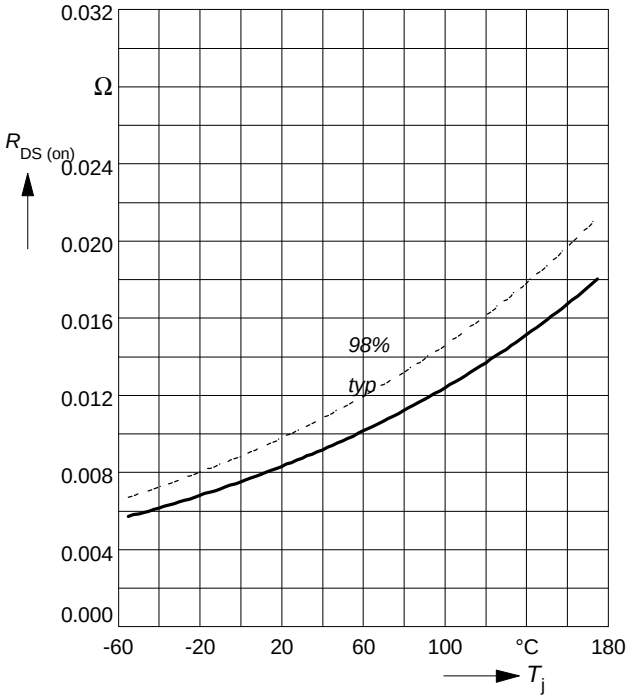
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

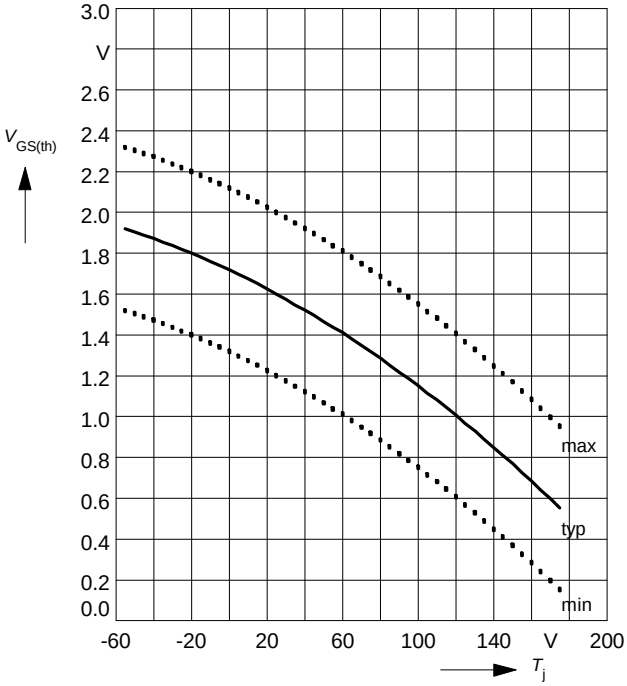
parameter: I_D = 80 A, V_{GS} = 4.5 V



Gate threshold voltage

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

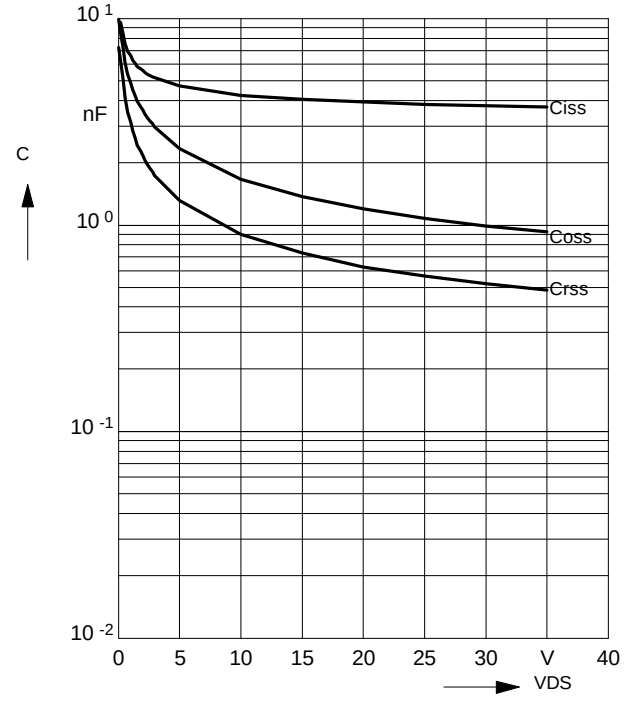
parameter: V_{GS}=V_{DS}, I_D = 240µA



Typ. capacitances

$C = f(V_{DS})$

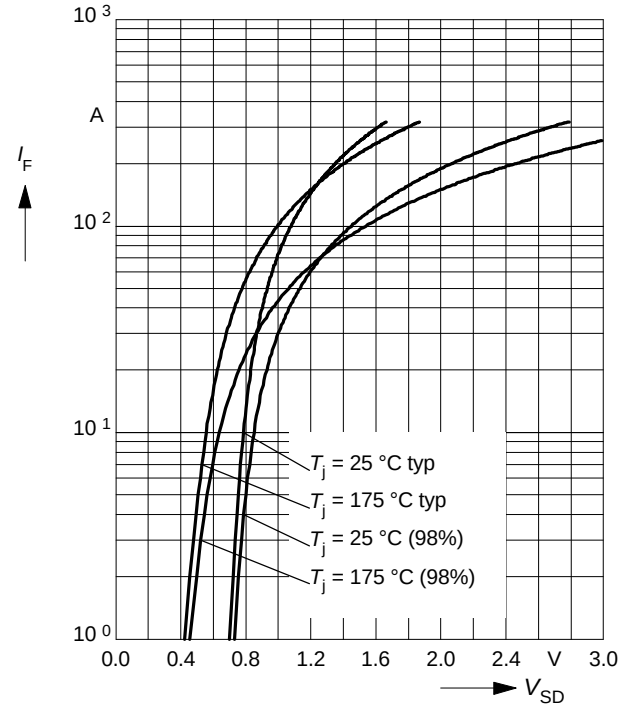
parameter: V_{GS} = 0V, f = 1MHz



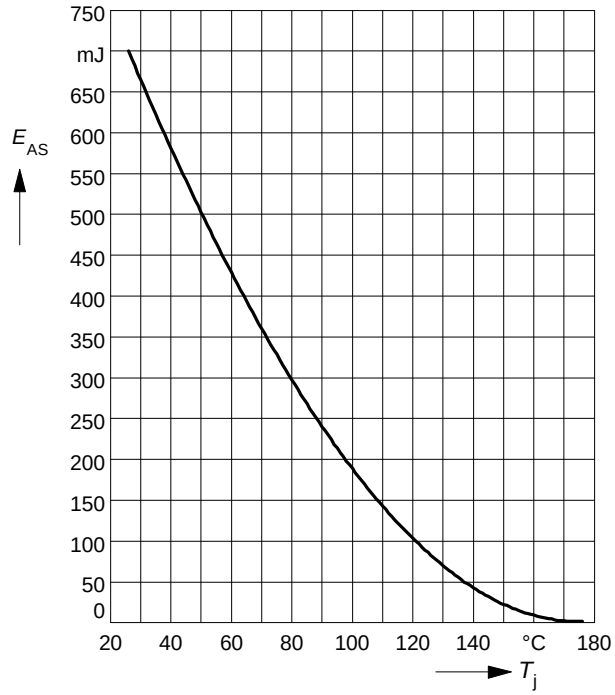
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

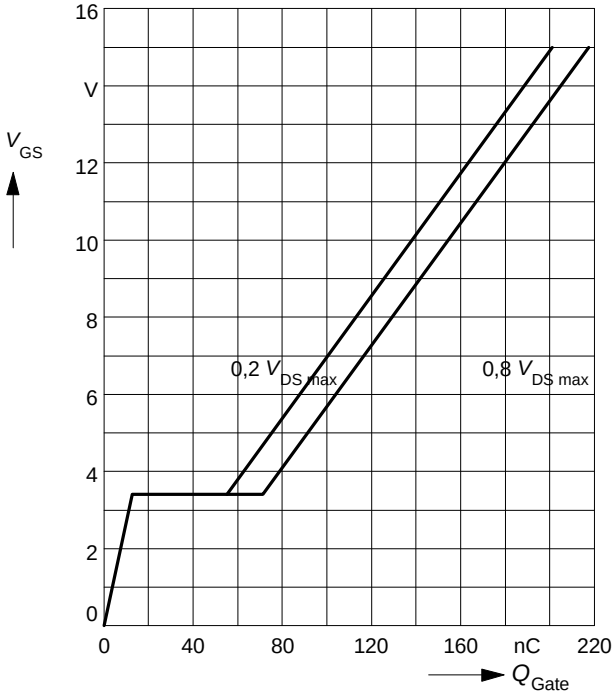
parameter: T_j, t_p = 80 µs



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 80 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 220 µH



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 80 A



Drain-source breakdown voltage
$V_{(BR)DSS} = f(T_j)$