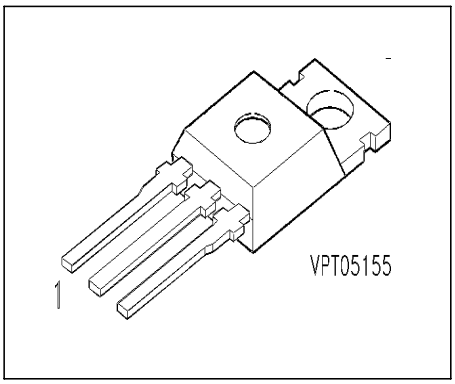
BUZ 21

SIPMOS ® Power Transistor



- N channel
- Enhancement mode
- Avalanche-rated

Pin 1	Pin 2	Pin 3
G	D	S

Type	V_{DS}	I_D	$R_{DS(on)}$	Package	Ordering Code
BUZ 21	100 V	21 A	0.085 Ω	TO-220 AB	C67078-S1308-A2

Maximum Ratings

Parameter	Symbol	Values	Unit
Continuous drain current T_C = 25 ˚C	I_D	21	A
Pulsed drain current T_C = 25 ˚C	I_{Dpuls}	84	
Avalanche current,limited by T_{jmax}	I_{AR}	21	
Avalanche energy,periodic limited by T_{jmax}	E_{AR}	11	mJ
Avalanche energy, single pulse I_D = 21 A, V_{DD} = 25 V, R_{GS} = 25 Ω L = 340 µH, T_j = 25 ˚C	E_{AS}	100	
Gate source voltage	V_{GS}	± 20	V
Power dissipation T_C = 25 ˚C	P_{tot}	75	W
Operating temperature	T_j	-55 ... + 150	˚C
Storage temperature	T_{stg}	-55 ... + 150	
Thermal resistance, chip case	R_{thJC}	≤ 1.67	K/W
Thermal resistance, chip to ambient	R_{thJA}	75	
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 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_{GS} = 0 V, I_D = 0.25 mA, T_j = 25 ˚C	$V_{(BR)DSS}$	100	-	-	V
Gate threshold voltage V_{GS}=V_{DS}, I_D = 1 mA	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current V_{DS} = 100 V, V_{GS} = 0 V, T_j = 25 ˚C V_{DS} = 100 V, V_{GS} = 0 V, T_j = 125 ˚C	I_{DSS}	- -	0.1 10	1 100	µA
Gate-source leakage current V_{GS} = 20 V, V_{DS} = 0 V	I_{GSS}	-	10	100	nA
Drain-Source on-resistance V_{GS} = 10 V, I_D = 13 A	$R_{DS(on)}$	-	0.065	0.085	Ω

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

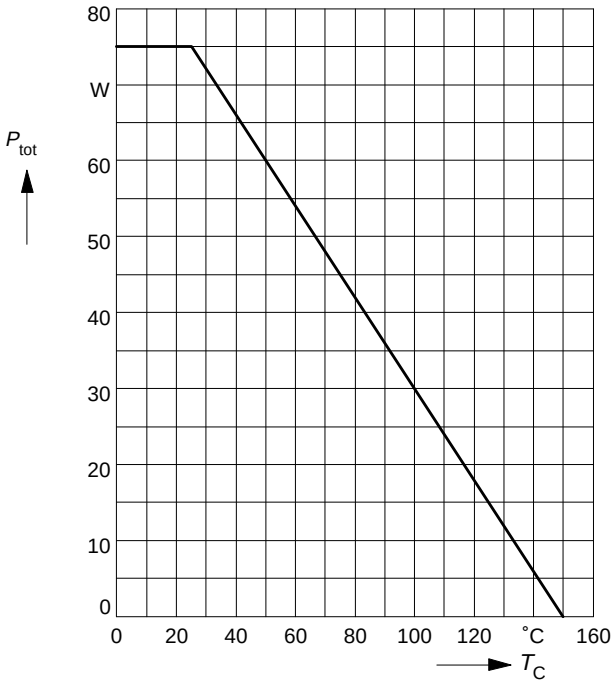
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, I_D = 13 A	g_{fs}	8	11	-	S
Input capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{iss}	-	1000	1300	pF
Output capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{oss}	-	300	530	
Reverse transfer capacitance V_{GS} = 0 V, V_{DS} = 25 V, f = 1 MHz	C_{rss}	-	150	240	
Turn-on delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(on)}$	-	25	40	ns
Rise time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	t_r	-	50	75	
Turn-off delay time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	$t_{d(off)}$	-	160	210	
Fall time V_{DD} = 30 V, V_{GS} = 10 V, I_D = 3 A R_{GS} = 50 Ω	t_f	-	80	110	

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	-	-	21	A
Inverse diode direct current,pulsed T_C = 25 ˚C	I_{SM}	-	-	84	
Inverse diode forward voltage V_{GS} = 0 V, I_F = 42 A	V_{SD}	-	1.3	1.7	V
Reverse recovery time V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	t_{rr}	-	150	-	ns
Reverse recovery charge V_R = 30 V, I_F=I_S, di_F/dt = 100 A/µs	Q_{rr}	-	0.48	-	µC

Power dissipation

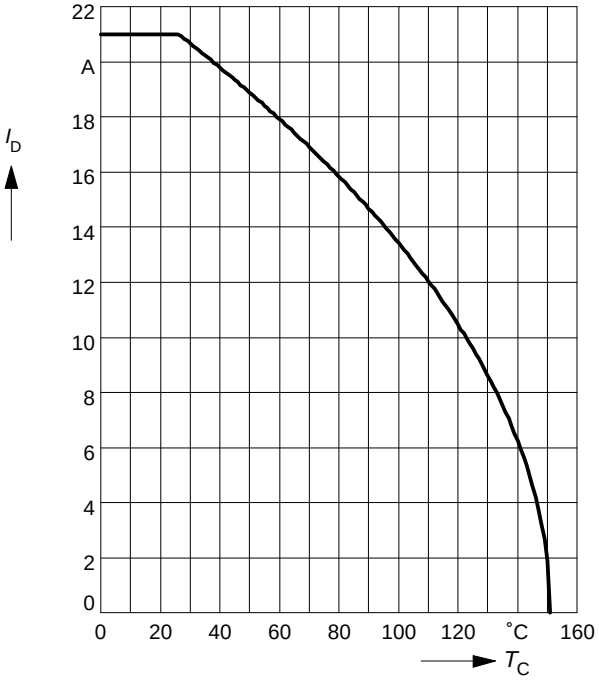
$P_{tot} = f(T_C)$



Drain current

$I_D = f(T_C)$

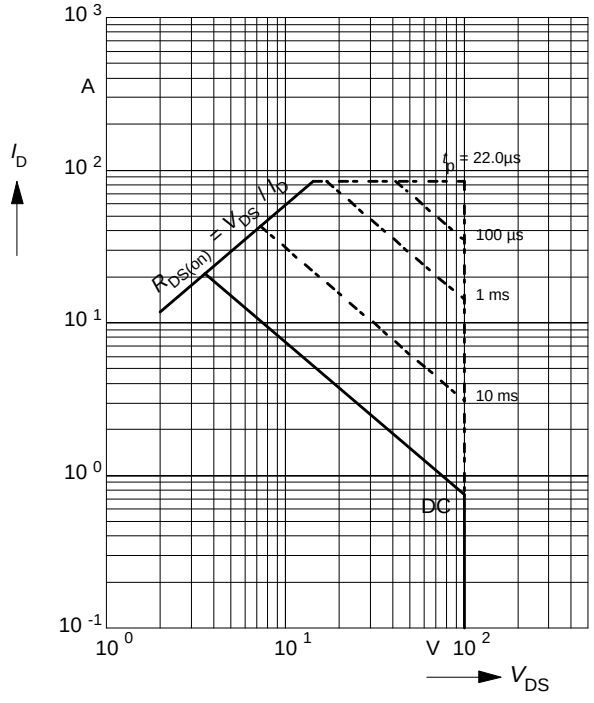
parameter: $V_{GS} \geq 10$ V



Safe operating area

$I_D = f(V_{DS})$

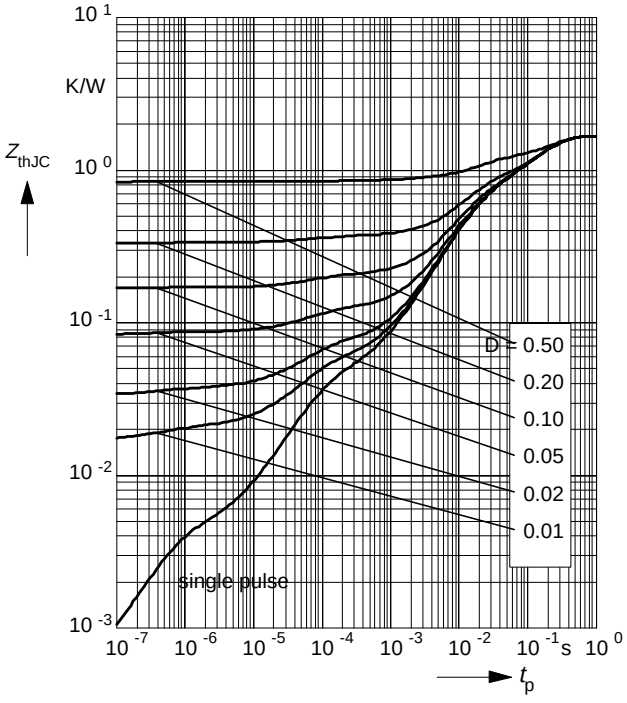
parameter: $D = 0.01$, $T_C = 25$°C



Transient thermal impedance

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

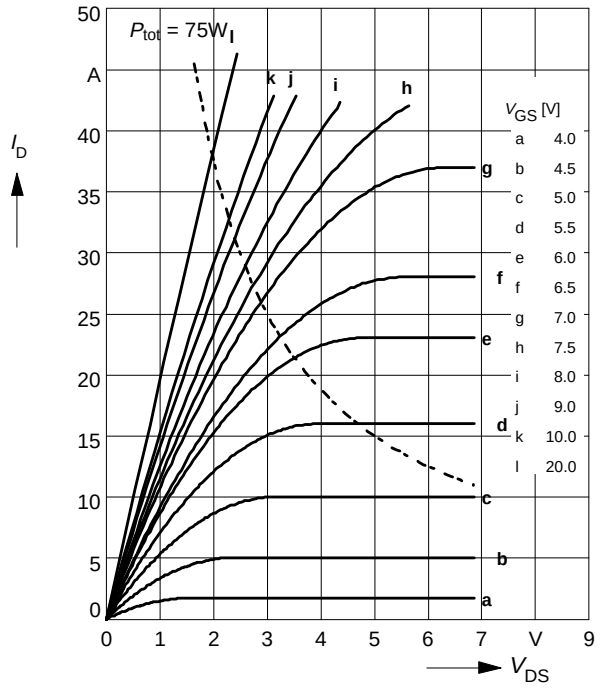
parameter: $D = t_p / T$



Typ. output characteristics

$I_D = f(V_{DS})$

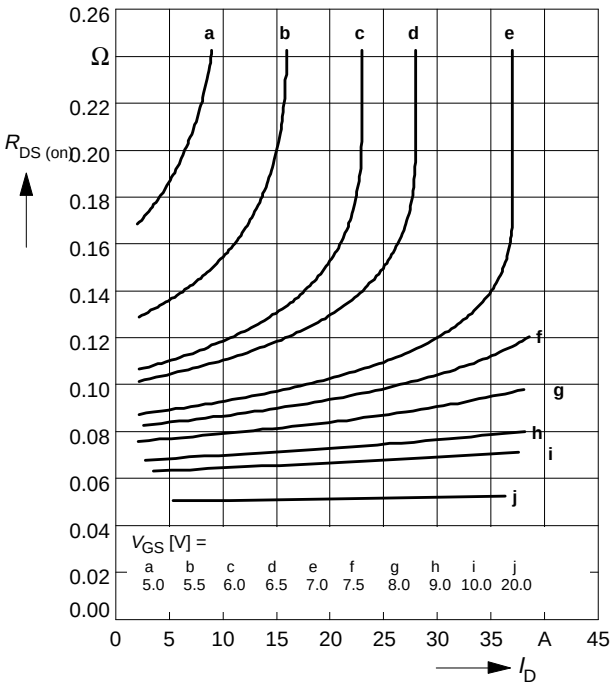
parameter: t_p = 80 µs



Typ. drain-source on-resistance

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

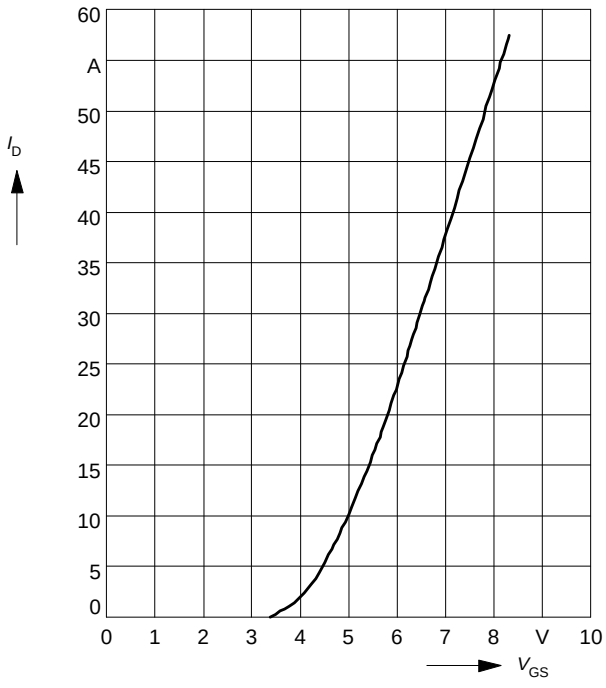
parameter: t_p = 80 µs, T_j = 25 ˚C



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

parameter: t_p = 80 µs

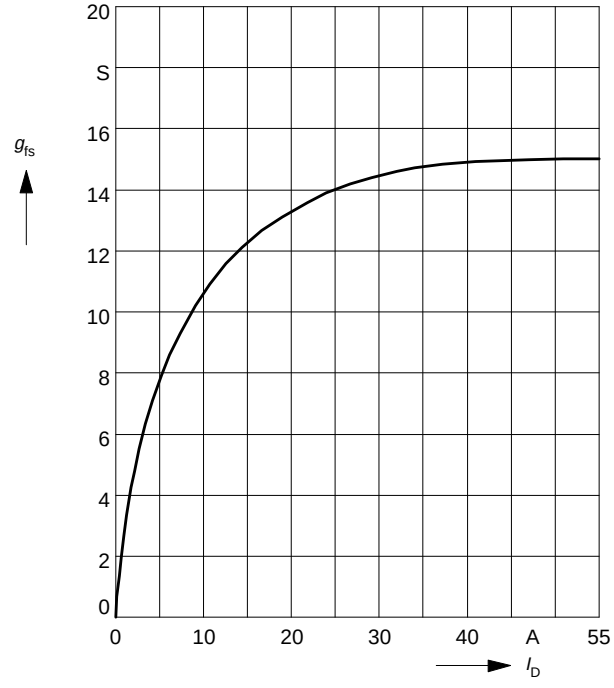
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Typ. forward transconductance $g_{fs} = f(I_D)$

parameter: t_p = 80 µs,

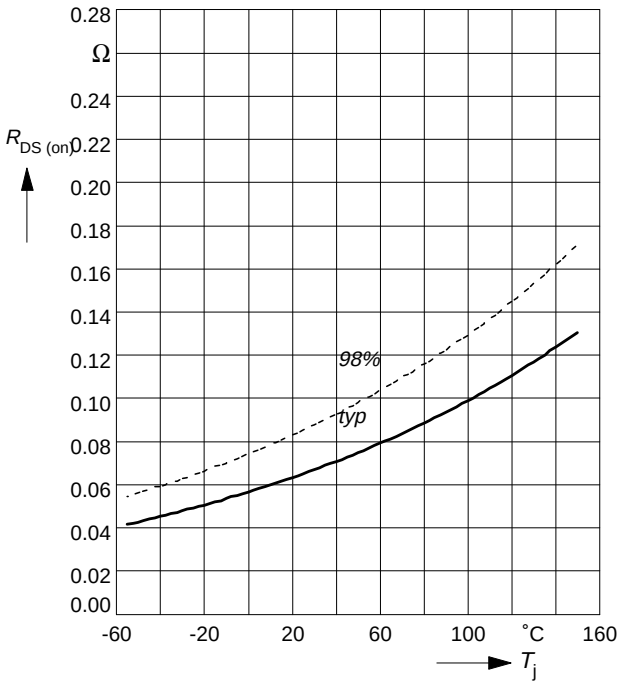
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



Drain-source on-resistance

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

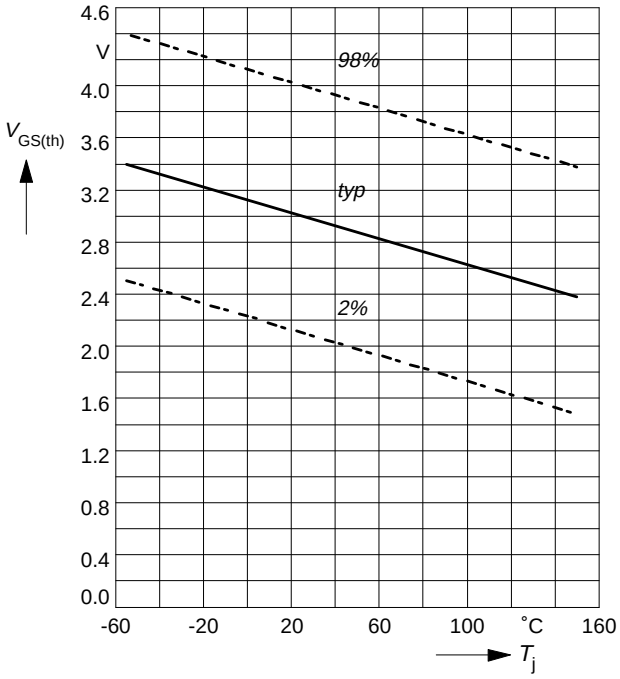
parameter: I_D = 13 A, V_{GS} = 10 V



Gate threshold voltage

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

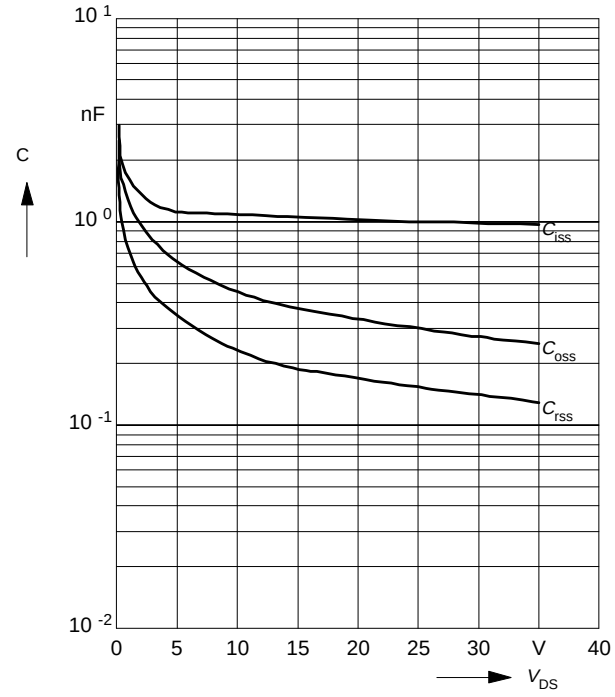
parameter: $V_{GS} = V_{DS}$, I_D = 1 mA



Typ. capacitances

$C = f(V_{DS})$

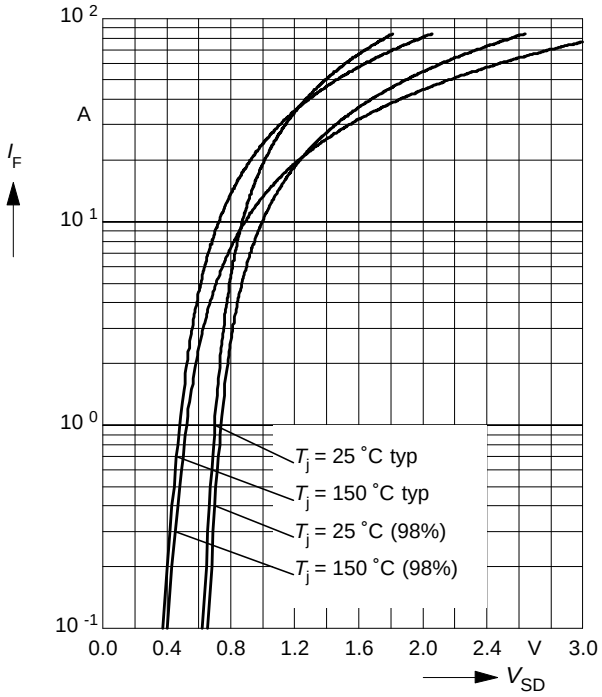
parameter: V_{GS} = 0V, f = 1MHz



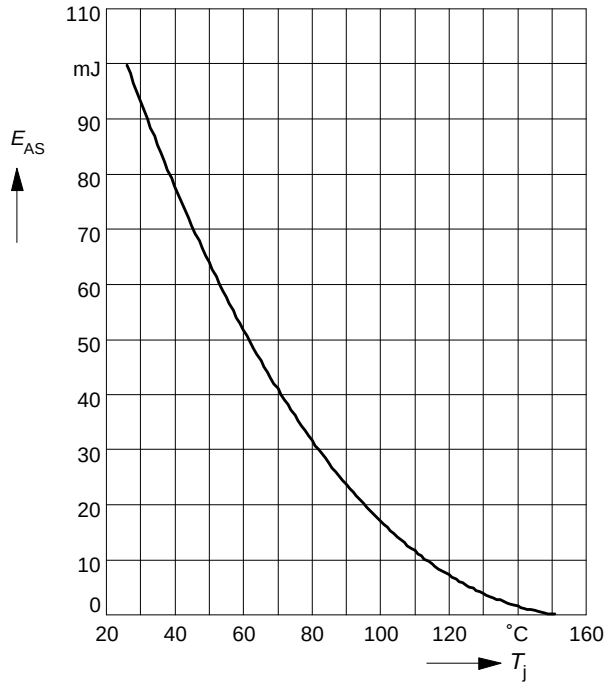
Forward characteristics of reverse diode

$I_F = f(V_{SD})$

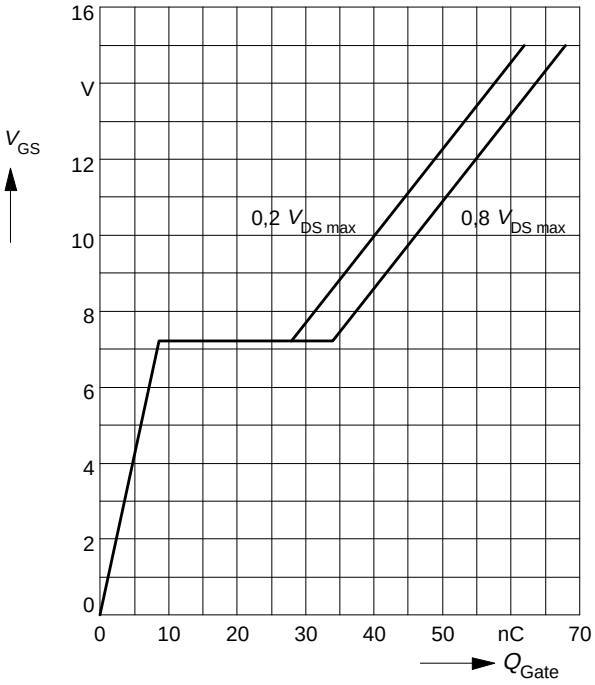
parameter: T_j, t_p = 80 µs



Avalanche energy $E_{AS} = f(T_j)$
parameter: I_D = 21 A, V_{DD} = 25 V
R_{GS} = 25 Ω, L = 340 µH



Typ. gate charge
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\ puls}$ = 36 A



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

