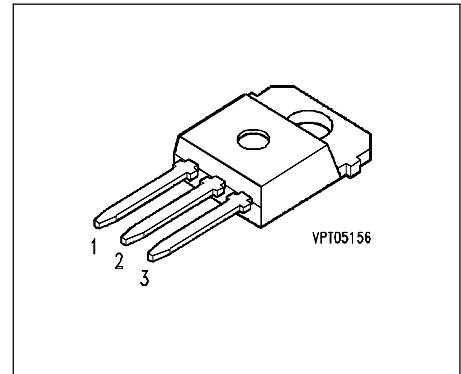




**BUZ 349**

**SIPMOS® Power Transistor**

- N channel
- Enhancement mode
- Avalanche-rated



Pin 1	Pin 2	Pin 3
G	D	S

Type	V <sub>DS</sub>	I <sub>D</sub>	R <sub>DS(on)</sub>	Package	Ordering Code
BUZ 349	100 V	32 A	0.06 Ω	TO-218 AA	C67078-S3113-A2

**Maximum Ratings**

Parameter	Symbol	Values	Unit
Continuous drain current <i>T<sub>C</sub></i> = 27 °C	I <sub>D</sub>	32	A
Pulsed drain current <i>T<sub>C</sub></i> = 25 °C	I <sub>Dpuls</sub>	128	
Avalanche current, limited by <i>T<sub>jmax</sub></i>	I <sub>AR</sub>	32	
Avalanche energy, periodic limited by <i>T<sub>jmax</sub></i>	E <sub>AR</sub>	15	mJ
Avalanche energy, single pulse I <sub>D</sub> = 32 A, V <sub>DD</sub> = 25 V, R <sub>GS</sub> = 25 Ω L = 322 μH, <i>T<sub>j</sub></i> = 25 °C	E <sub>AS</sub>	220	
Gate source voltage	V <sub>GS</sub>	± 20	V
Power dissipation <i>T<sub>C</sub></i> = 25 °C	P <sub>tot</sub>	125	W
Operating temperature	<i>T<sub>j</sub></i>	-55 ... + 150	°C
Storage temperature	<i>T<sub>stg</sub></i>	-55 ... + 150	
Thermal resistance, chip case	R <sub>thJC</sub>	≤ 1	K/W
Thermal resistance, chip to ambient	R <sub>thJA</sub>	75	
DIN humidity category, DIN 40 040		E	
IEC climatic category, DIN IEC 68-1		55 / 150 / 56	

**Electrical Characteristics, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = 25^\circ\text{C}$	$V_{(BR)DSS}$	100	-	-	V
Gate threshold voltage $V_{GS} = V_{DS}, I_D = 1\text{ mA}$	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_j = 25^\circ\text{C}$ $V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_j = 125^\circ\text{C}$	$I_{DSS}$	-	0.1 10	1 100	$\mu\text{A}$
Gate-source leakage current $V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$	$I_{GSS}$	-	10	100	nA
Drain-Source on-resistance $V_{GS} = 10\text{ V}, I_D = 21\text{ A}$	$R_{DS(on)}$	-	0.05	0.06	$\Omega$

**Electrical Characteristics, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified**

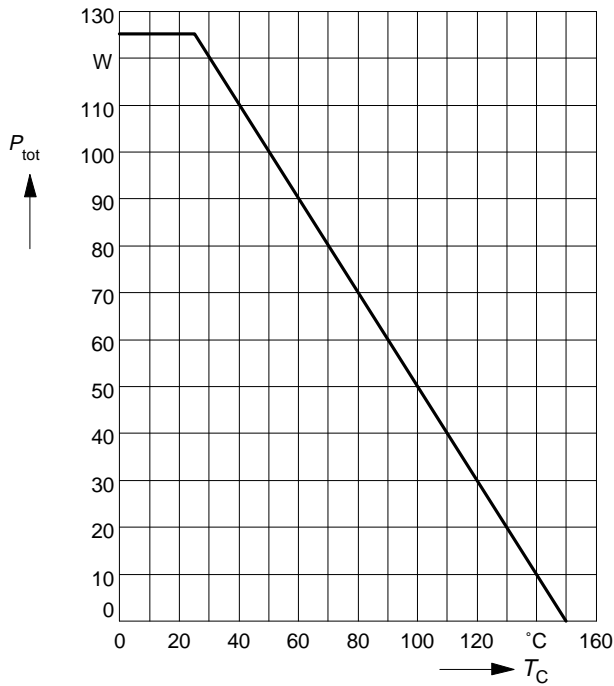
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 21\text{ A}$	$g_{fs}$	10	17	-	S
Input capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{iss}$	-	1400	1850	pF
Output capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{oss}$	-	450	700	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$	$C_{rss}$	-	230	370	
Turn-on delay time $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_{d(on)}$	-	20	30	ns
Rise time $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_r$	-	80	120	
Turn-off delay time $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_{d(off)}$	-	230	300	
Fall time $V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$ $R_{GS} = 50\ \Omega$	$t_f$	-	120	160	

**Electrical Characteristics, at  $T_j = 25^\circ\text{C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Reverse Diode</b>					
Inverse diode continuous forward current $T_C = 25^\circ\text{C}$	$I_S$	-	-	32	A
Inverse diode direct current, pulsed $T_C = 25^\circ\text{C}$	$I_{SM}$	-	-	128	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = 64\text{ A}$	$V_{SD}$	-	1.4	1.7	V
Reverse recovery time $V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$t_{rr}$	-	130	-	ns
Reverse recovery charge $V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$Q_{rr}$	-	0.7	-	$\mu\text{C}$

**Power dissipation**

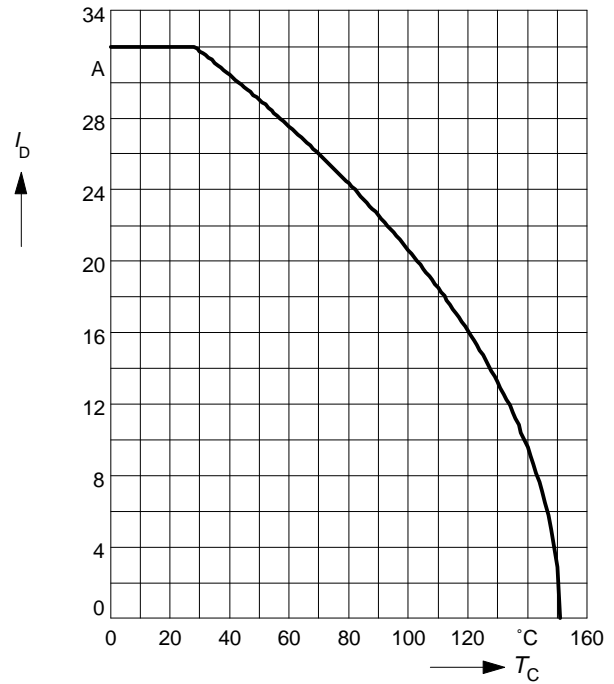
$P_{tot} = f(T_C)$



**Drain current**

$I_D = f(T_C)$

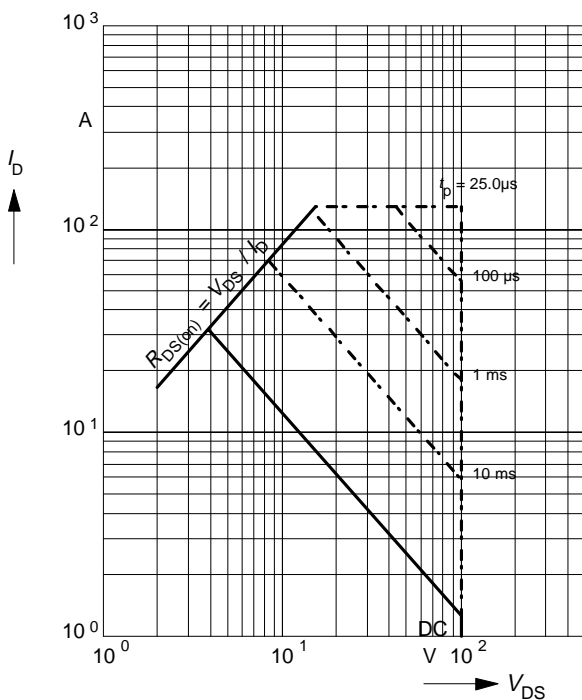
parameter:  $V_{GS} \geq 10\text{ V}$



**Safe operating area**

$I_D = f(V_{DS})$

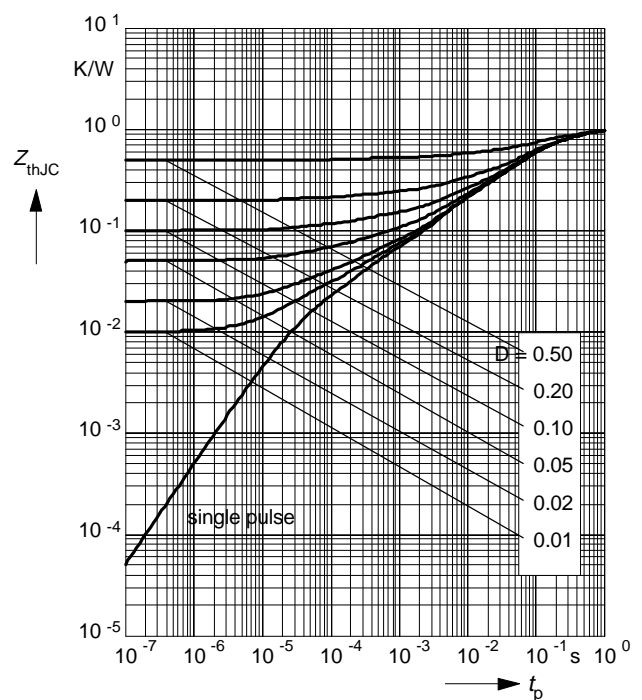
parameter:  $D = 0.01, T_C = 25^\circ\text{C}$



**Transient thermal impedance**

$Z_{thJC} = f(t_p)$

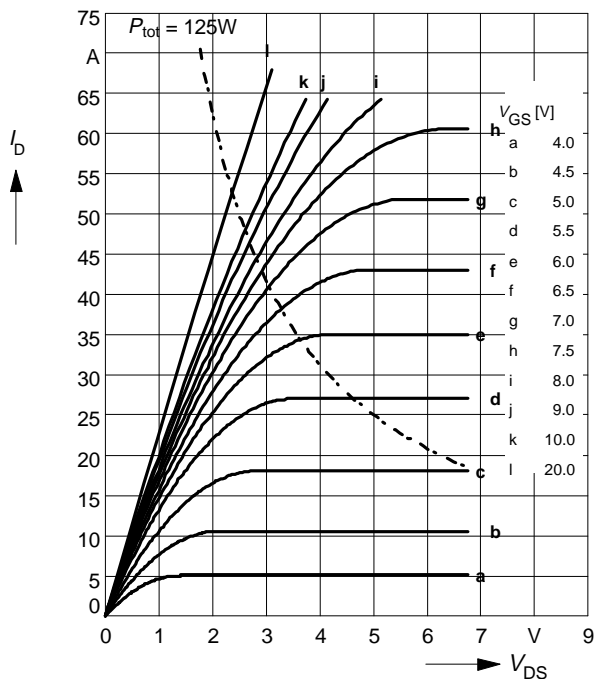
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

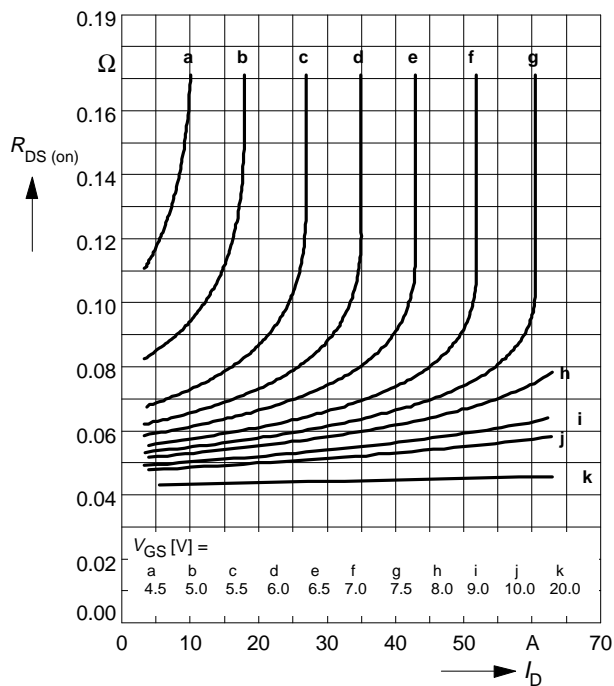
parameter:  $t_p = 80 \mu s$



**Typ. drain-source on-resistance**

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

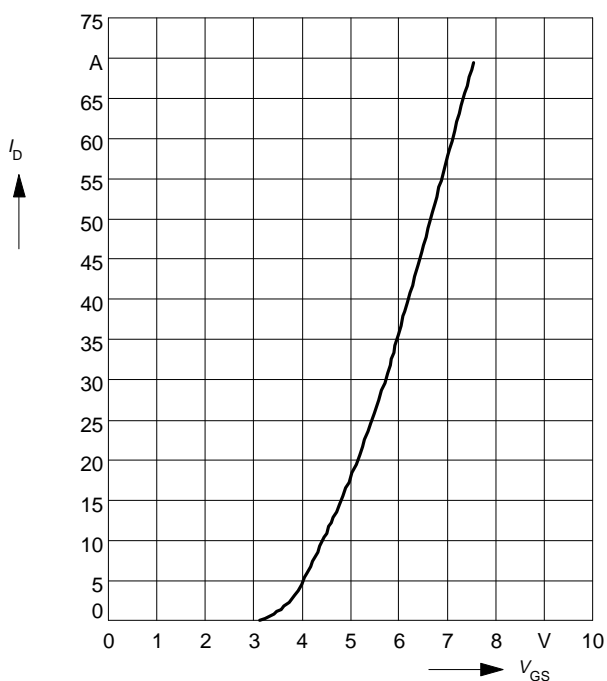
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

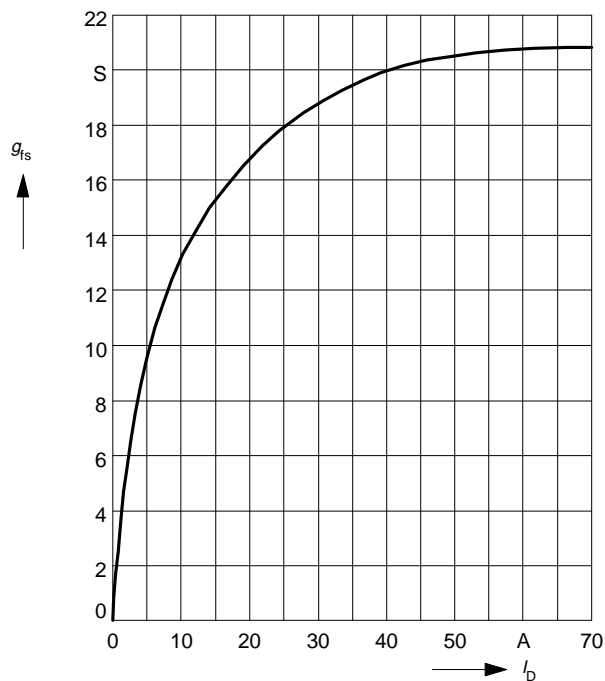
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter:  $t_p = 80 \mu s$ ,

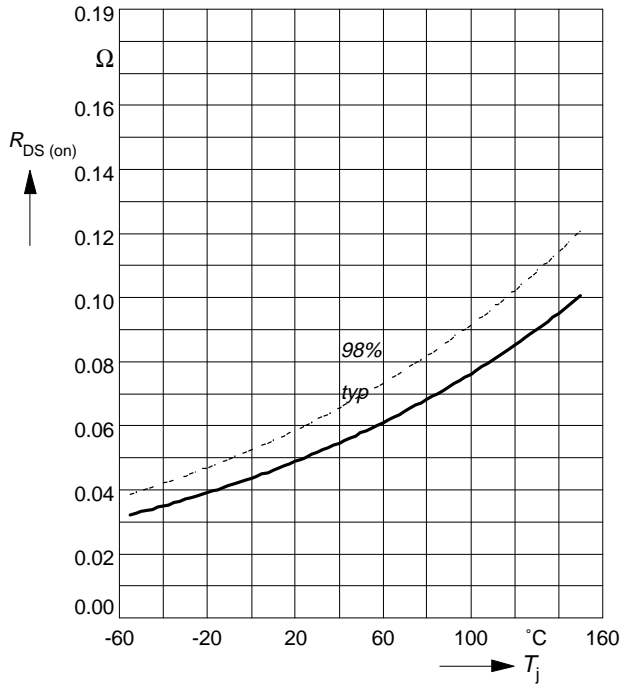
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Drain-source on-resistance**

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

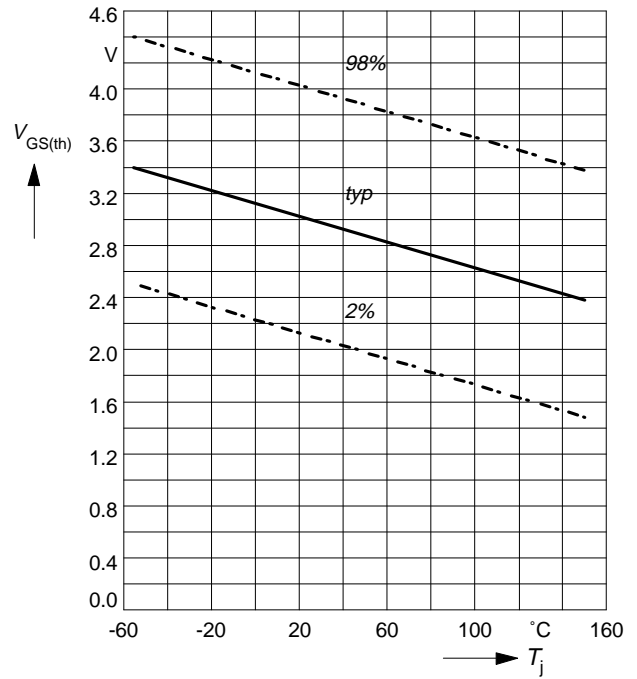
parameter:  $I_D = 21\text{ A}$ ,  $V_{GS} = 10\text{ V}$



**Gate threshold voltage**

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

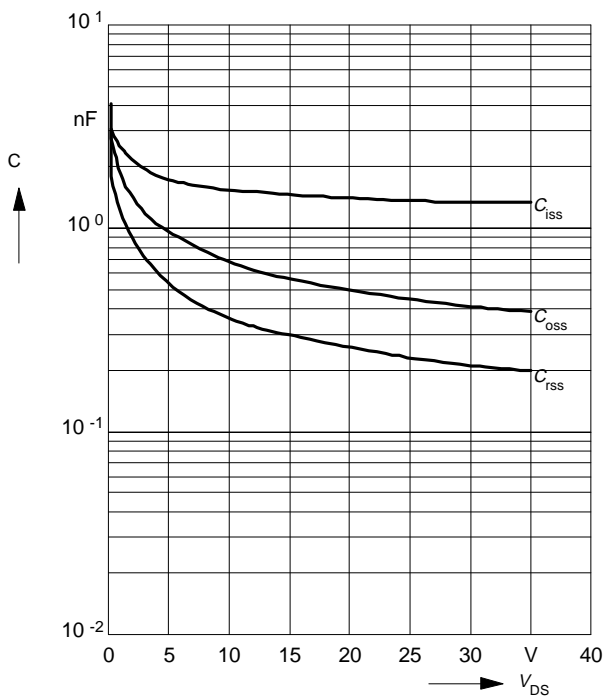
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



**Typ. capacitances**

$$C = f(V_{DS})$$

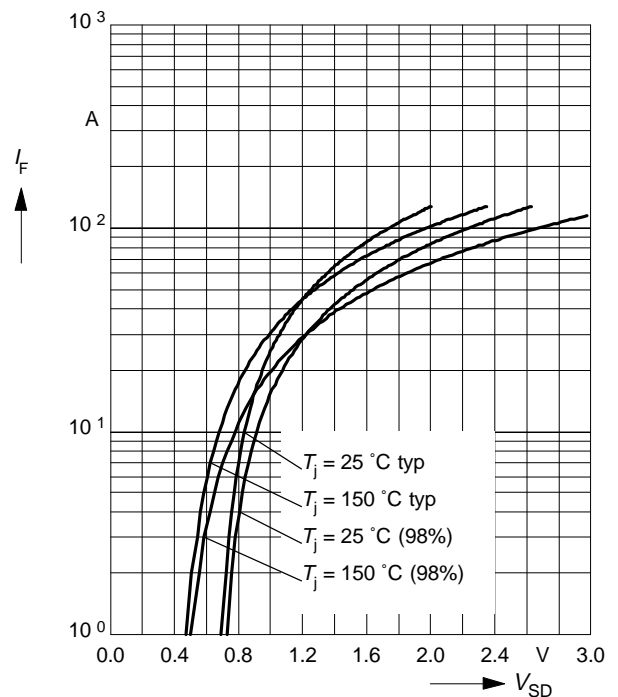
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



**Forward characteristics of reverse diode**

$$I_F = f(V_{SD})$$

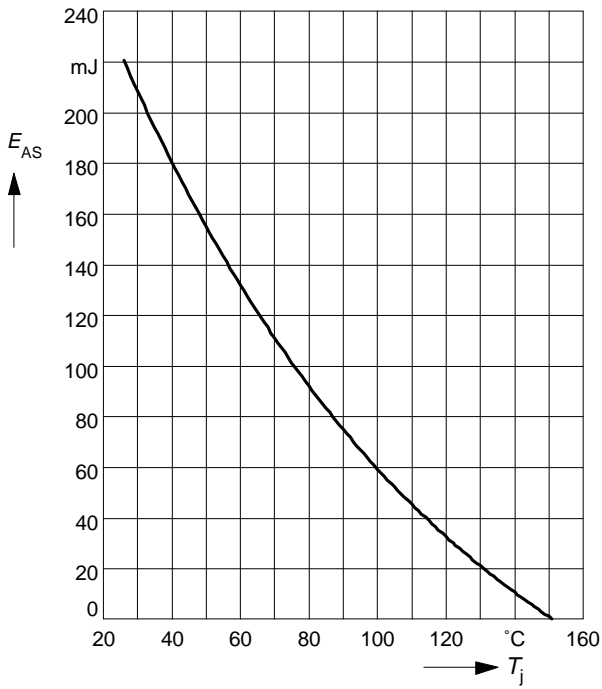
parameter:  $T_j$ ,  $t_p = 80\text{ }\mu\text{s}$



**Avalanche energy**  $E_{AS} = f(T_j)$

parameter:  $I_D = 32\text{ A}$ ,  $V_{DD} = 25\text{ V}$

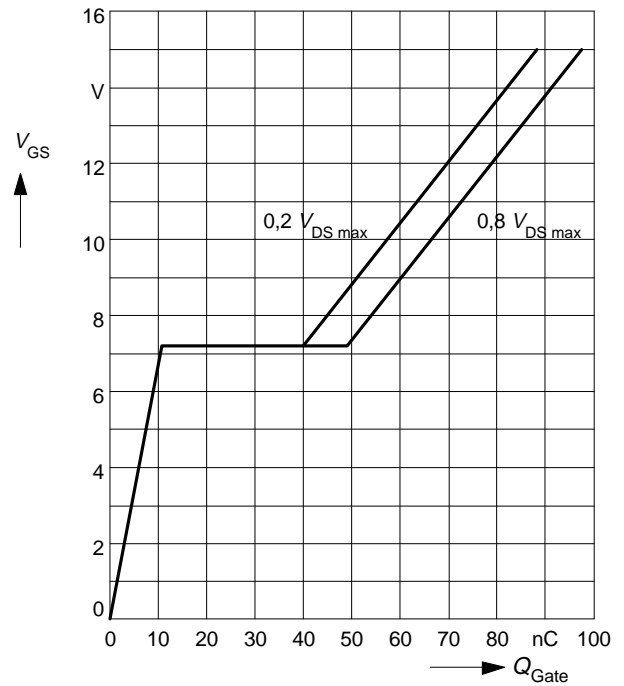
$R_{GS} = 25\ \Omega$ ,  $L = 322\ \mu\text{H}$



**Typ. gate charge**

$V_{GS} = f(Q_{Gate})$

parameter:  $I_{D\text{ puls}} = 51\text{ A}$



**Drain-source breakdown voltage**

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

