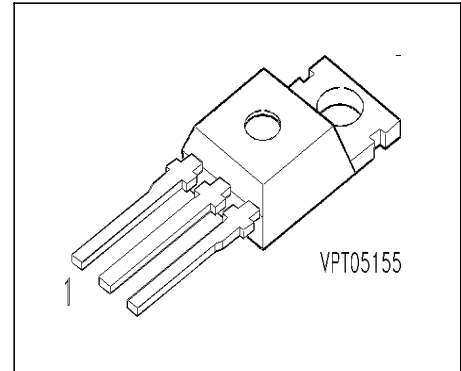


**SIPMOS® Power Transistor**

- 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 32 | 200 V    | 9.5 A | 0.4 $\Omega$ | TO-220 AB | C67078-S1310-A2 |

**Maximum Ratings**

| Parameter   | Symbol      | Values        | Unit             |
|---|-------------|---------------|------------------|
| Continuous drain current<br>$T_C = 29\text{ }^\circ\text{C}$  | $I_D$       | 9.5           | A                |
| Pulsed drain current<br>$T_C = 25\text{ }^\circ\text{C}$  | $I_{Dpuls}$ | 38            |                  |
| Avalanche current, limited by $T_{jmax}$  | $I_{AR}$    | 9.5           |                  |
| Avalanche energy, periodic limited by $T_{jmax}$  | $E_{AR}$    | 6.5           | mJ               |
| Avalanche energy, single pulse<br>$I_D = 9.5\text{ A}$ , $V_{DD} = 50\text{ V}$ , $R_{GS} = 25\text{ }\Omega$<br>$L = 2\text{ mH}$ , $T_j = 25\text{ }^\circ\text{C}$ | $E_{AS}$    | 120           |                  |
| Gate source voltage   | $V_{GS}$    | $\pm 20$      | V                |
| Power dissipation<br>$T_C = 25\text{ }^\circ\text{C}$   | $P_{tot}$   | 75            | W                |
| Operating temperature   | $T_j$       | -55 ... + 150 | $^\circ\text{C}$ |
| Storage temperature   | $T_{stg}$   | -55 ... + 150 |                  |
| Thermal resistance, chip case   | $R_{thJC}$  | $\leq 1.67$   | 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  $T_j = 25^\circ\text{C}$ , unless otherwise specified

| Parameter  | Symbol        | Values |           |          | Unit          |
|--|---------------|--------|-----------|----------|---------------|
|  |               | min.   | typ.      | max.     |               |
| <b>Static Characteristics</b>  |               |        |           |          |               |
| Drain- source breakdown voltage<br>$V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$ , $T_j = 25^\circ\text{C}$   | $V_{(BR)DSS}$ | 200    | -         | -        | V             |
| Gate threshold voltage<br>$V_{GS} = V_{DS}$ , $I_D = 1\text{ mA}$  | $V_{GS(th)}$  | 2.1    | 3         | 4        |               |
| Zero gate voltage drain current<br>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25^\circ\text{C}$<br>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 125^\circ\text{C}$ | $I_{DSS}$     | -      | 0.1<br>10 | 1<br>100 | $\mu\text{A}$ |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$  | $I_{GSS}$     | -      | 10        | 100      | nA            |
| Drain-Source on-resistance<br>$V_{GS} = 10\text{ V}$ , $I_D = 6\text{ A}$  | $R_{DS(on)}$  | -      | 0.3       | 0.4      | $\Omega$      |

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

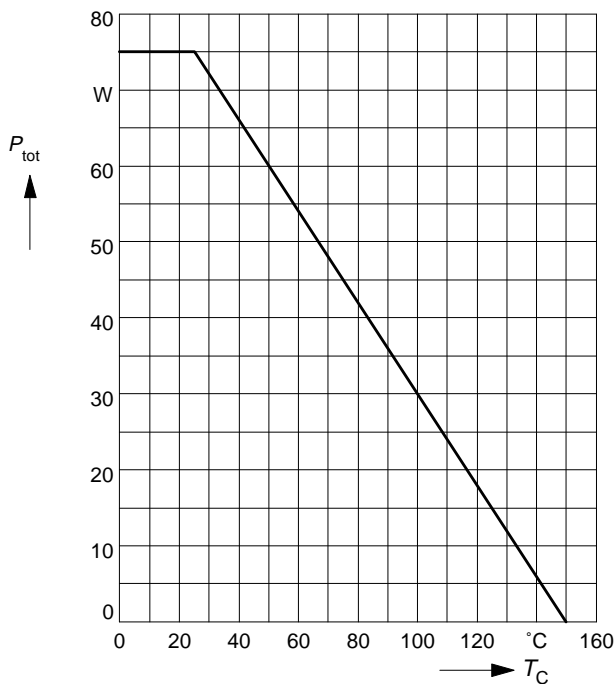
| Parameter  | Symbol       | Values |      |      | Unit |
|--|--------------|--------|------|------|------|
|  |              | min.   | typ. | max. |      |
| <b>Dynamic Characteristics</b>   |              |        |      |      |      |
| Transconductance<br>$V_{DS} \geq 2 * I_D * R_{DS(on)max}$ , $I_D = 6\text{ A}$                                       | $g_{fs}$     | 3      | 4.6  | -    | S    |
| Input capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                             | $C_{iss}$    | -      | 400  | 530  | pF   |
| Output capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                            | $C_{oss}$    | -      | 85   | 130  |      |
| Reverse transfer capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                  | $C_{rss}$    | -      | 45   | 70   |      |
| Turn-on delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$  | $t_{d(on)}$  | -      | 10   | 15   | ns   |
| Rise time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_r$        | -      | 40   | 60   |      |
| Turn-off delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$ | $t_{d(off)}$ | -      | 55   | 75   |      |
| Fall time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_f$        | -      | 30   | 40   |      |

**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<br>$T_C = 25^\circ\text{C}$                           | $I_S$    | -      | -    | 9.5  | A             |
| Inverse diode direct current, pulsed<br>$T_C = 25^\circ\text{C}$                               | $I_{SM}$ | -      | -    | 38   |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 19\text{ A}$                      | $V_{SD}$ | -      | 1.4  | 1.7  | V             |
| Reverse recovery time<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | -      | 200  | -    | ns            |
| Reverse recovery charge<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | -      | 0.6  | -    | $\mu\text{C}$ |

**Power dissipation**

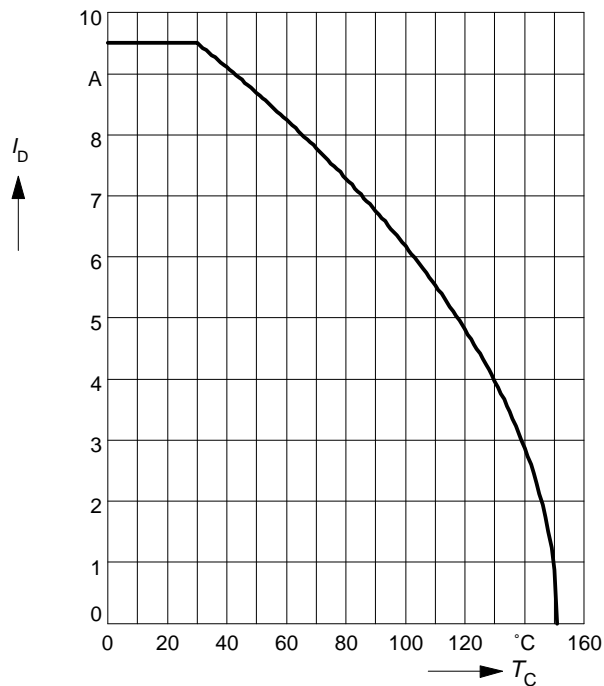
$P_{tot} = f(T_C)$



**Drain current**

$I_D = f(T_C)$

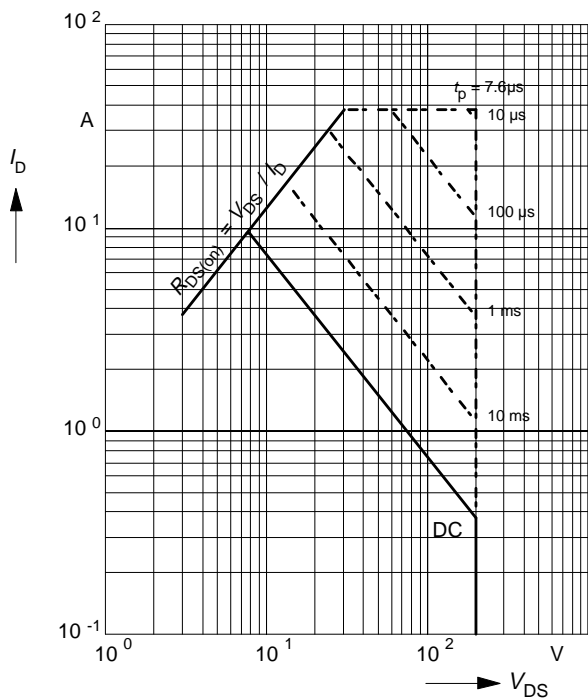
parameter:  $V_{GS} \geq 10\text{ V}$



**Safe operating area**

$I_D = f(V_{DS})$

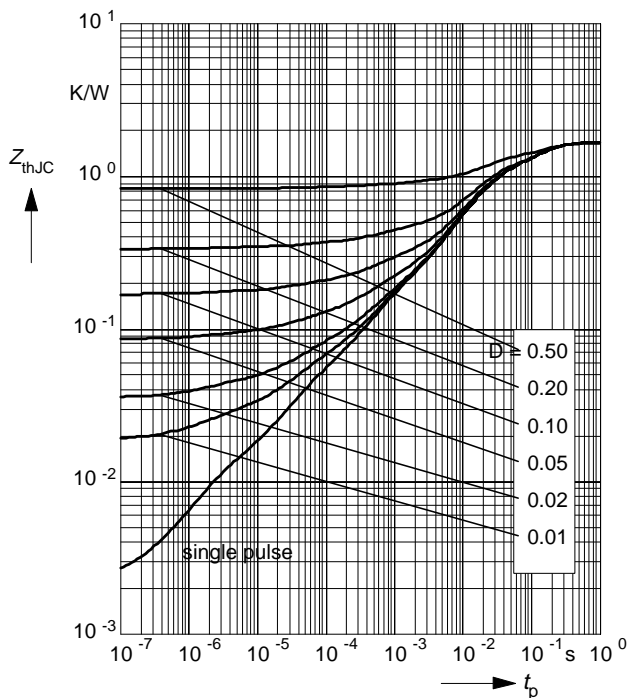
parameter:  $D = 0.01, T_C = 25^\circ\text{C}$



**Transient thermal impedance**

$Z_{thJC} = f(t_p)$

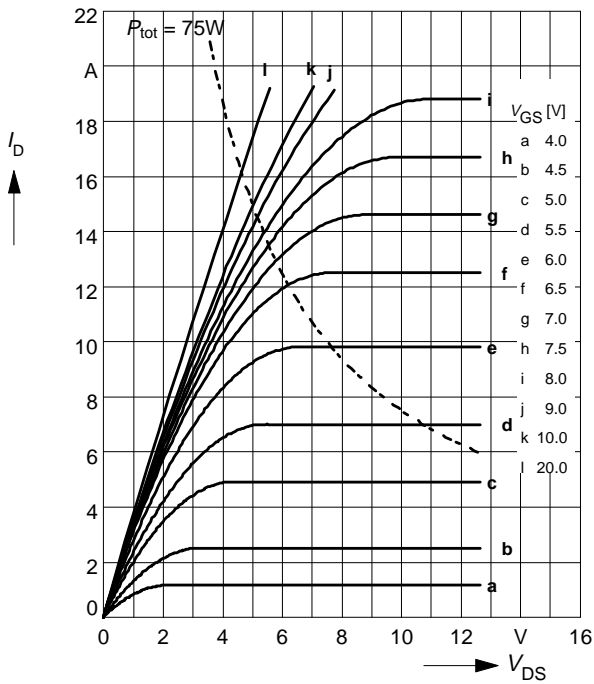
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

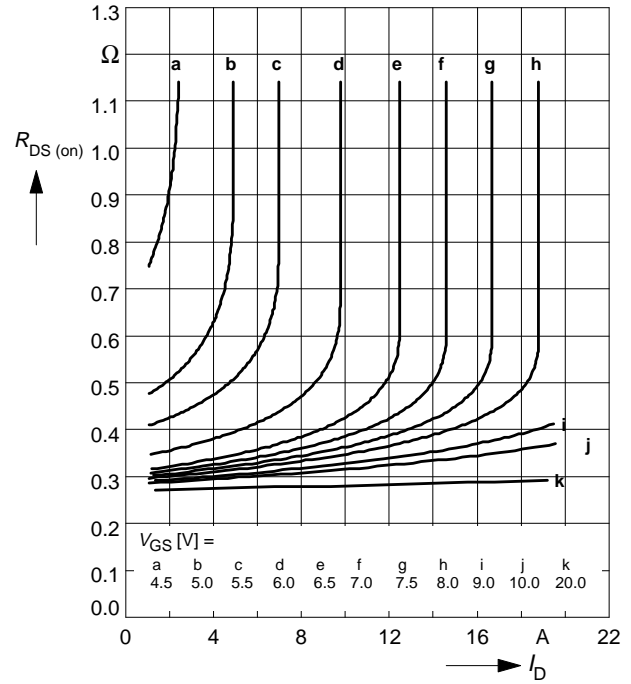
parameter:  $t_p = 80 \mu s$



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

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

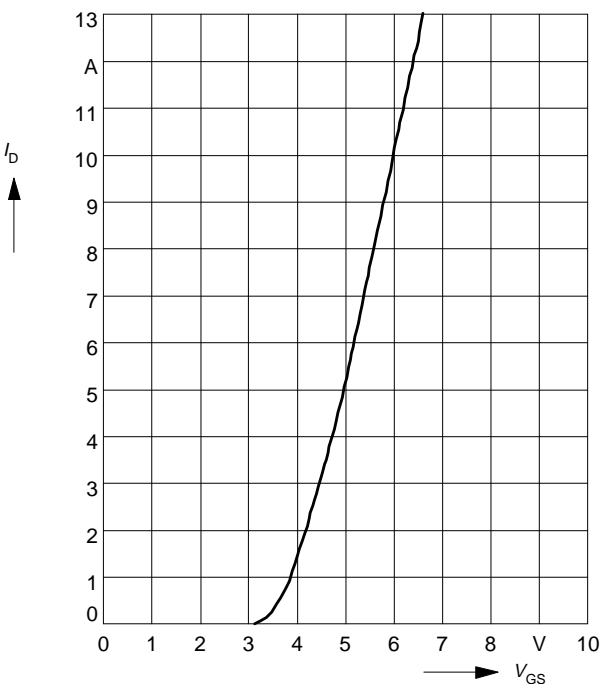
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

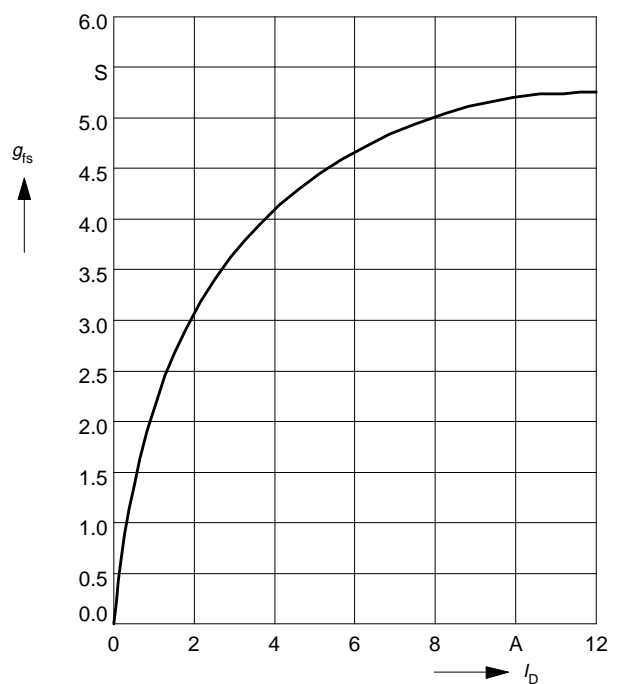
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter:  $t_p = 80 \mu s$ ,

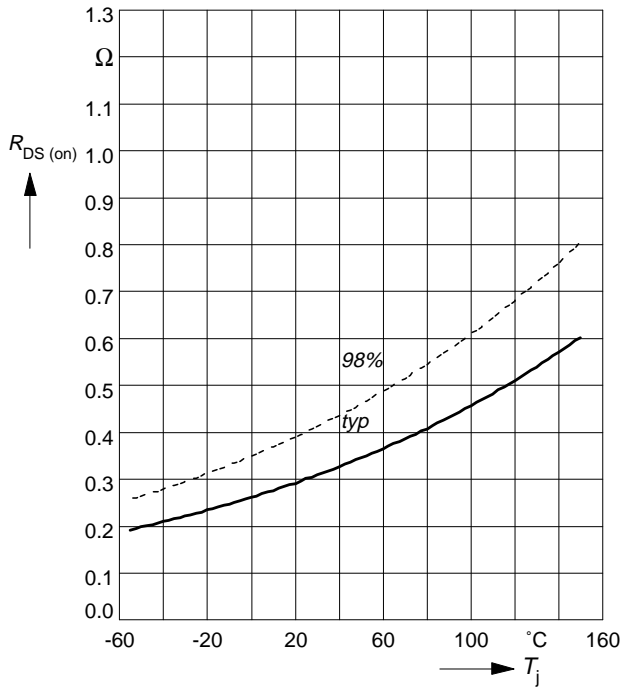
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Drain-source on-resistance**

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

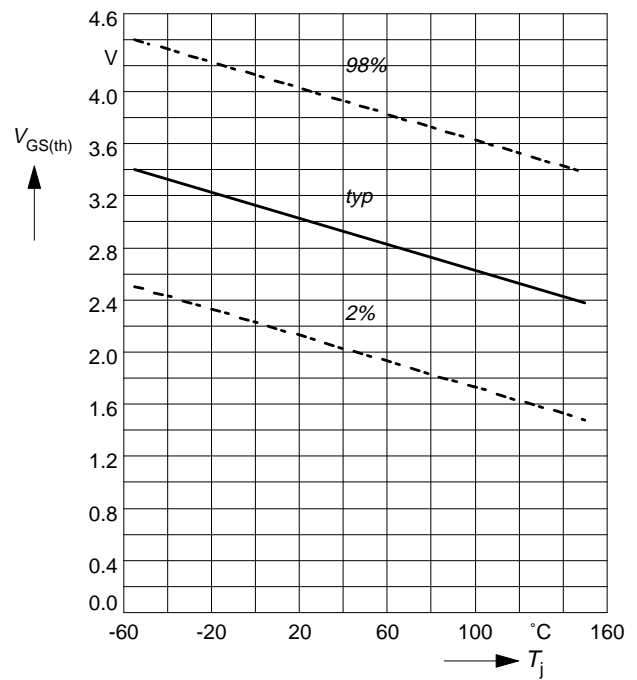
parameter:  $I_D = 6\text{ A}$ ,  $V_{GS} = 10\text{ V}$



**Gate threshold voltage**

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

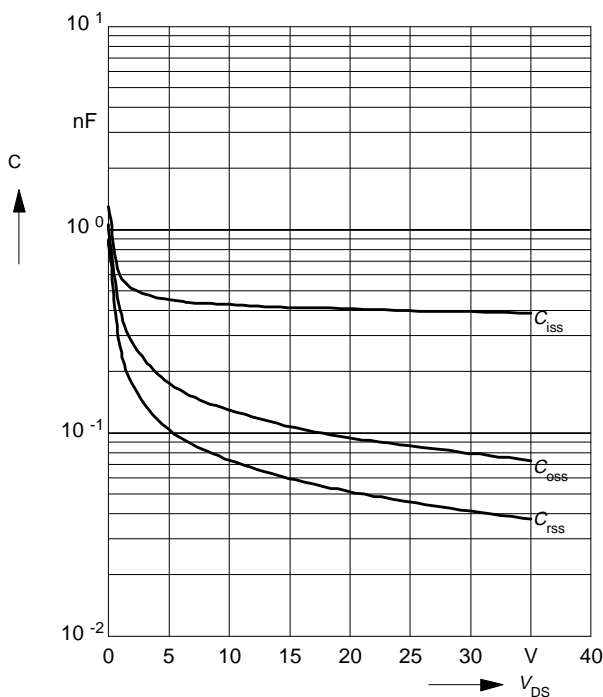
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



**Typ. capacitances**

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

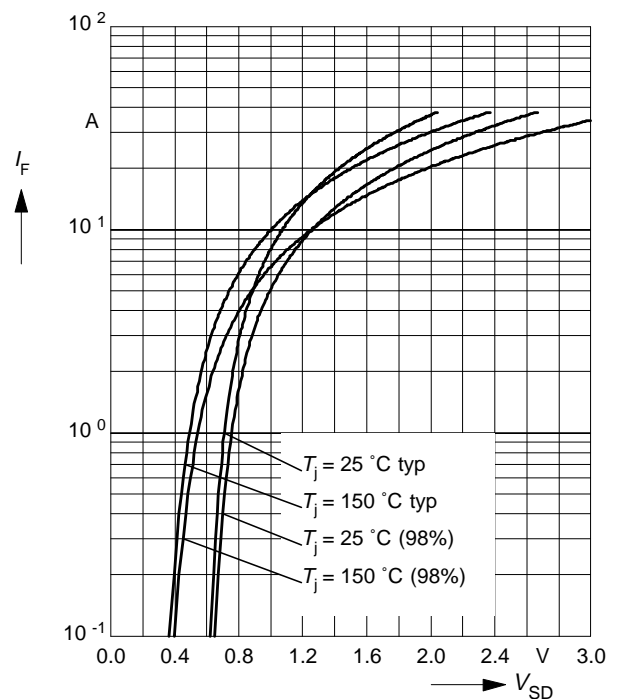
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



**Forward characteristics of reverse diode**

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

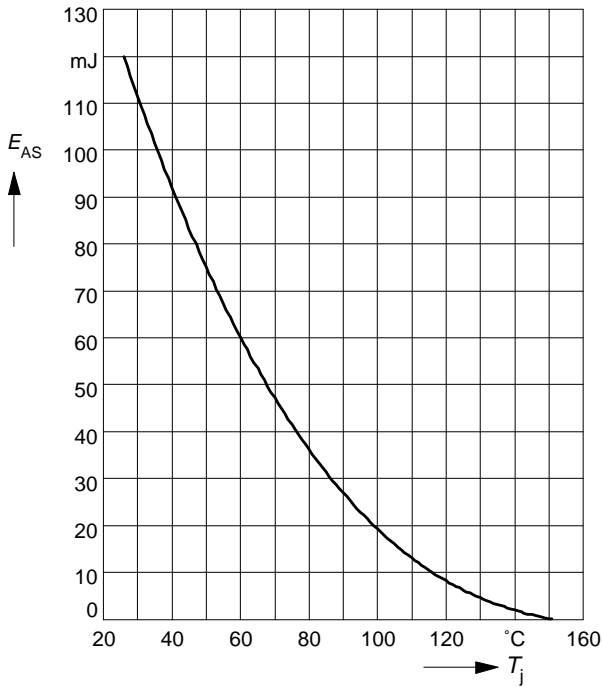
parameter:  $T_j, t_p = 80\text{ }\mu\text{s}$



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

parameter:  $I_D = 9.5 \text{ A}$ ,  $V_{DD} = 50 \text{ V}$

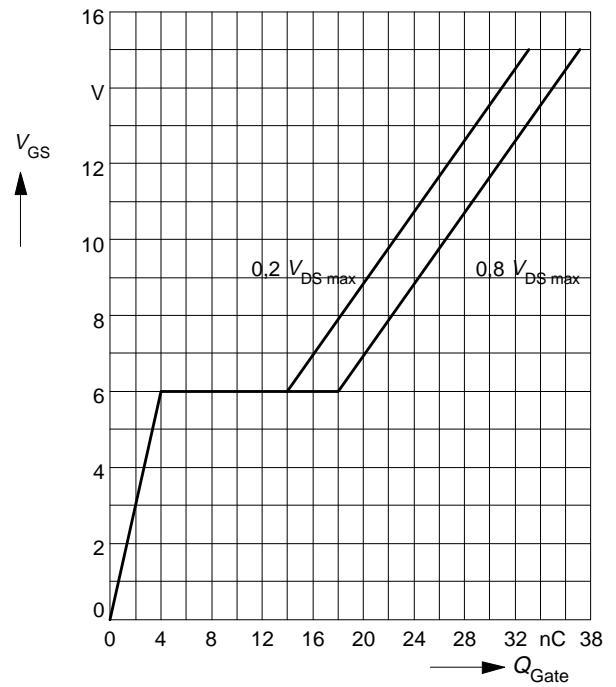
$R_{GS} = 25 \Omega$ ,  $L = 2 \text{ mH}$



**Typ. gate charge**

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

parameter:  $I_{D \text{ puls}} = 14 \text{ A}$



**Drain-source breakdown voltage**

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

