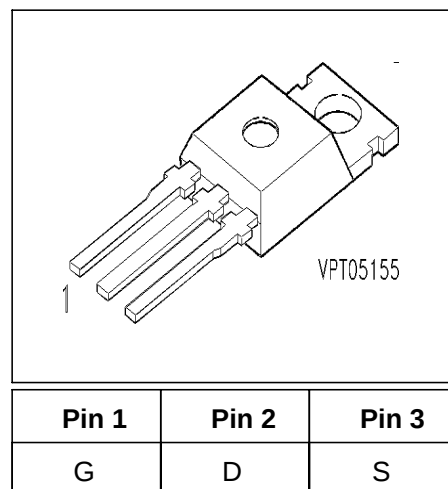


## BUZ 32

### SIPMOS<sup>®</sup> Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated



| 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. |      |

**Static Characteristics**

|                                                                                                                                                                                              |               |        |           |          |               |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|--------|-----------|----------|---------------|
| 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>$V_{DS} = 200\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 125^\circ\text{C}$ | $I_{DSS}$     | -<br>- | 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      |               |
| 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. |      |

#### Dynamic Characteristics

|                                                                                                                      |              |   |     |     |    |
|----------------------------------------------------------------------------------------------------------------------|--------------|---|-----|-----|----|
| 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

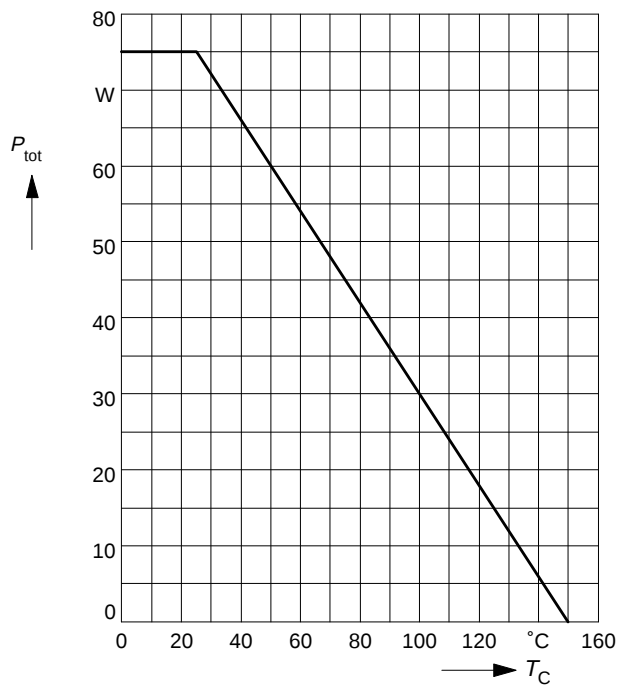
| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

#### Reverse Diode

|                                                                                                      |          |   |     |     |               |
|------------------------------------------------------------------------------------------------------|----------|---|-----|-----|---------------|
| 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 | -   | $\mu\text{C}$ |

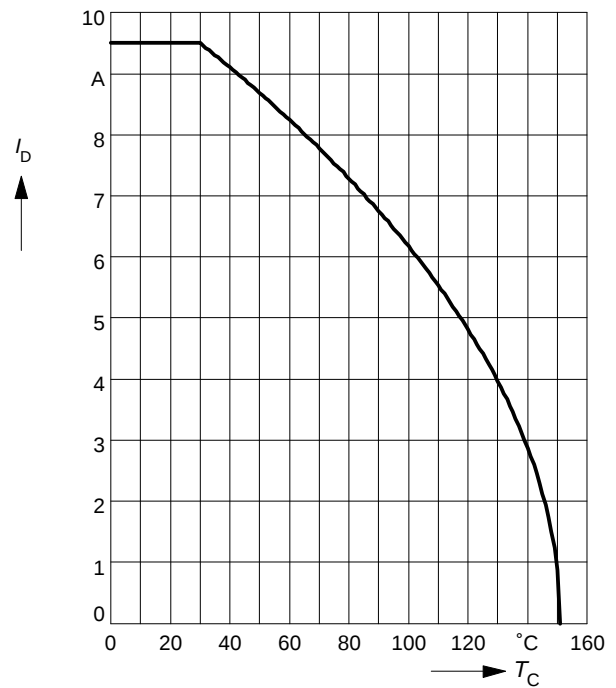
**Power dissipation**

$$P_{\text{tot}} = f(T_C)$$


**Drain current**

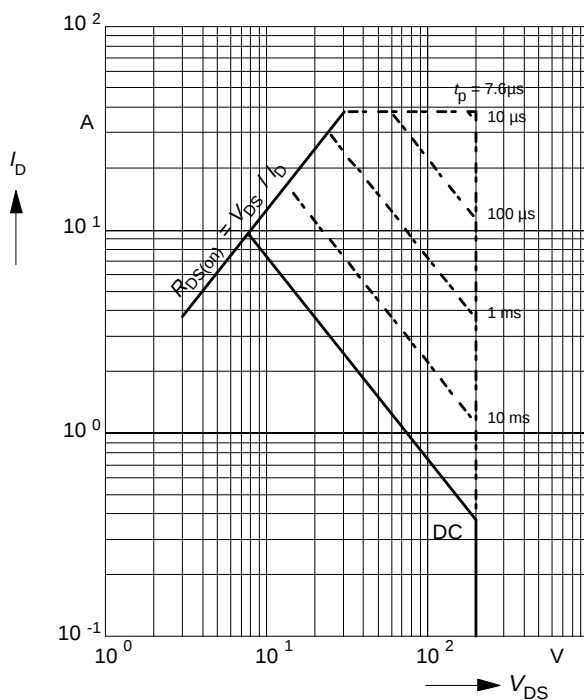
$$I_D = f(T_C)$$

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


**Safe operating area**

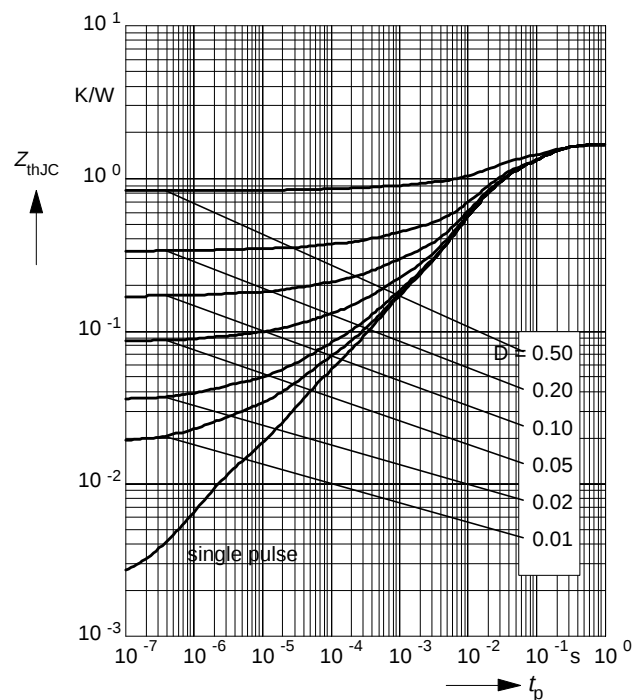
$$I_D = f(V_{DS})$$

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


**Transient thermal impedance**

$$Z_{\text{thJC}} = f(t_p)$$

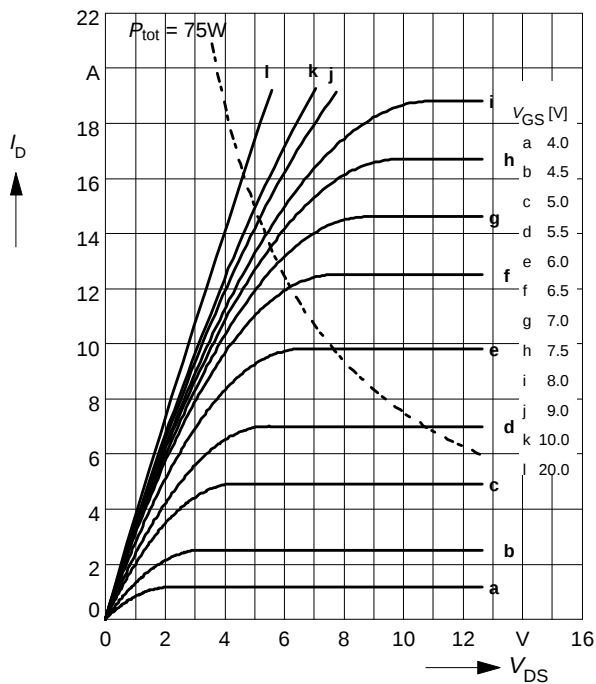
parameter:  $D = t_p / T$



### Typ. output characteristics

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

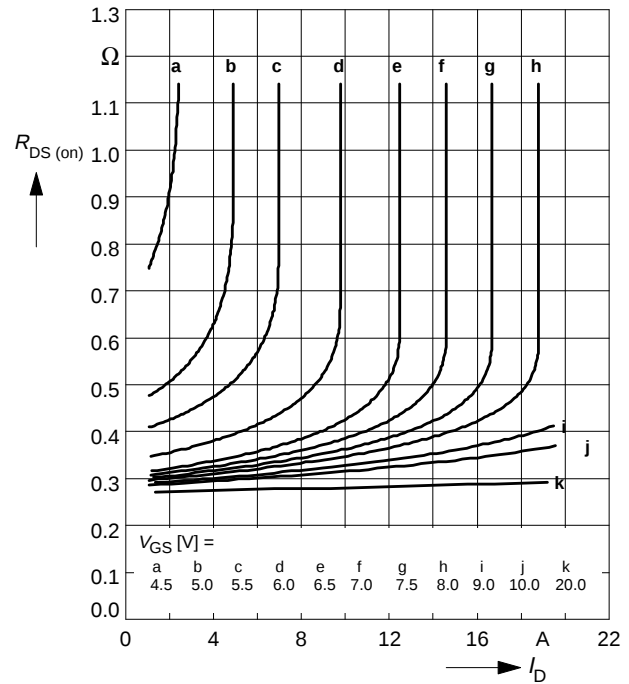
parameter:  $t_p = 80 \mu s$



### Typ. drain-source on-resistance

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

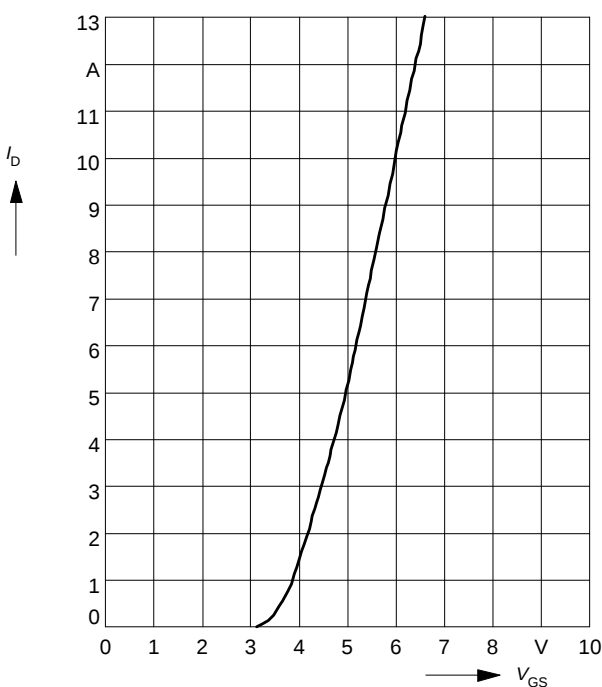
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

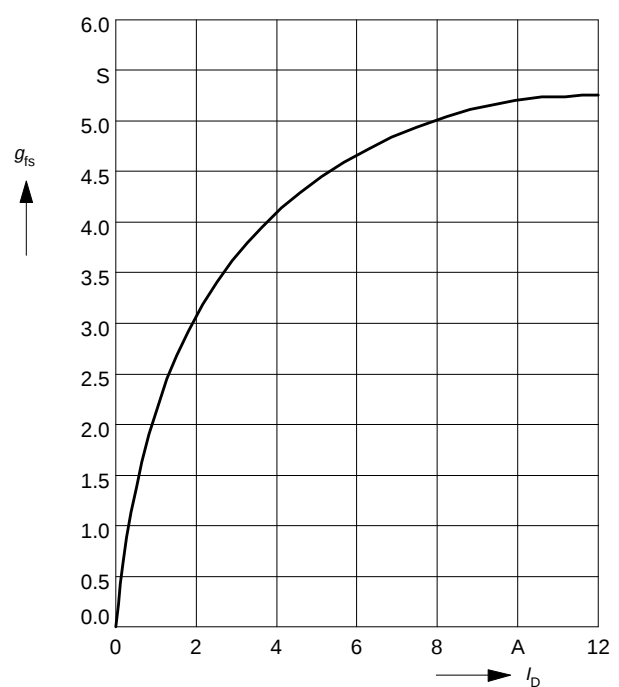
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



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

parameter:  $t_p = 80 \mu s$ ,

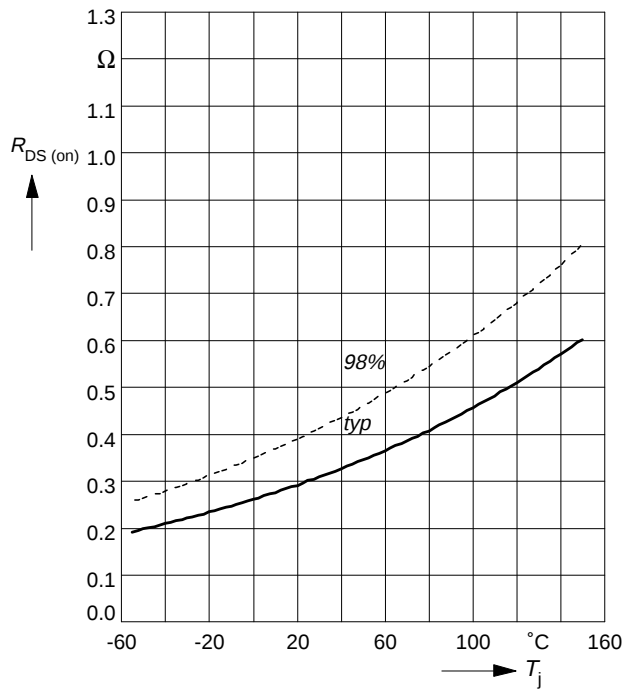
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



### Drain-source on-resistance

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

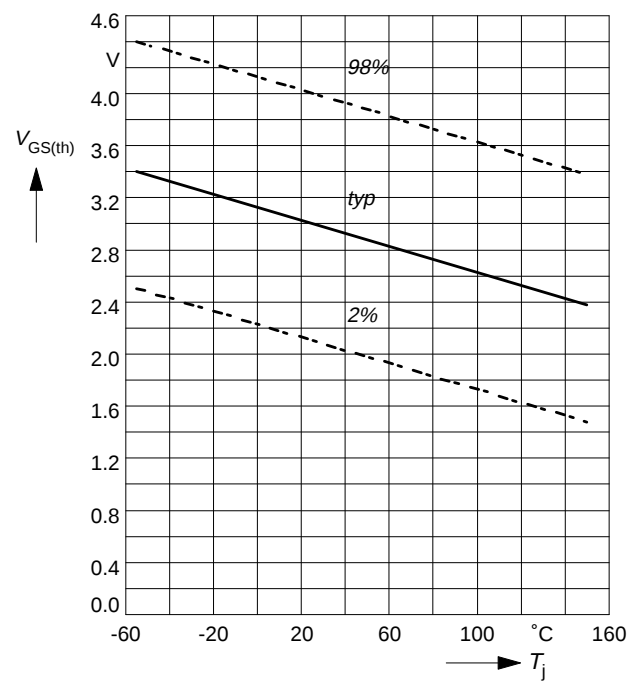
parameter:  $I_D = 6\text{ A}$ ,  $V_{GS} = 10\text{ V}$



### Gate threshold voltage

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

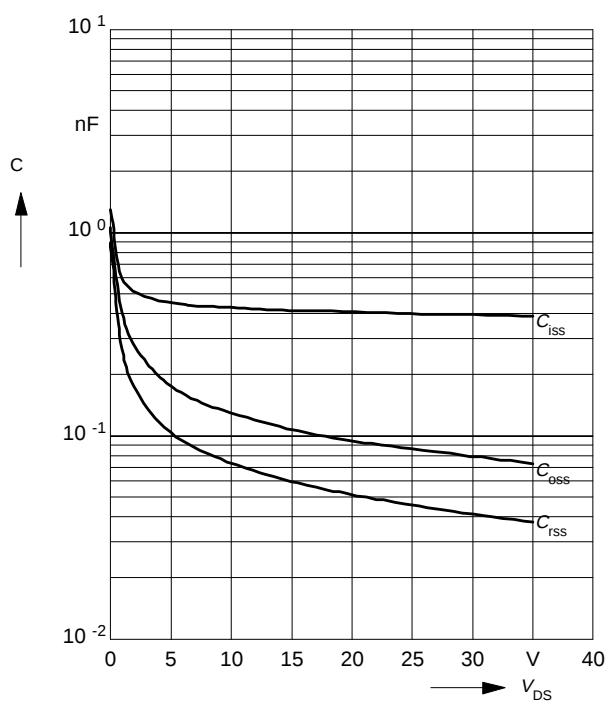
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



### Typ. capacitances

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

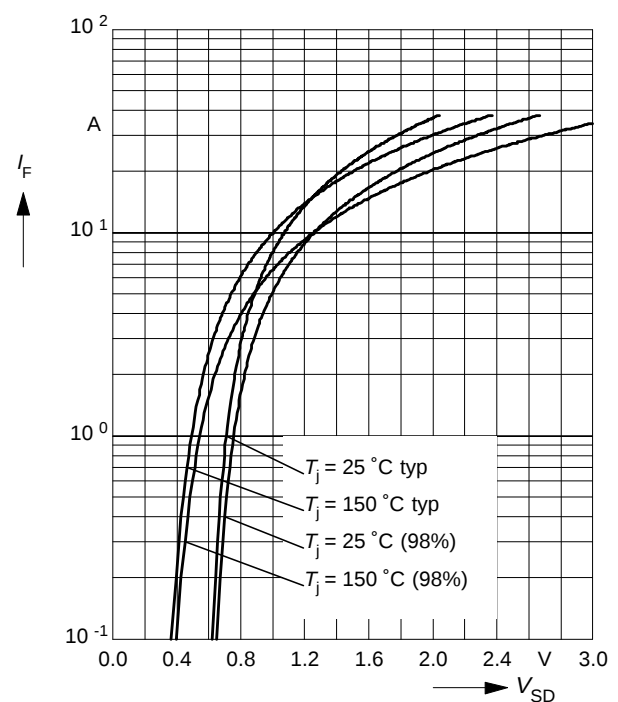
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



### Forward characteristics of reverse diode

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

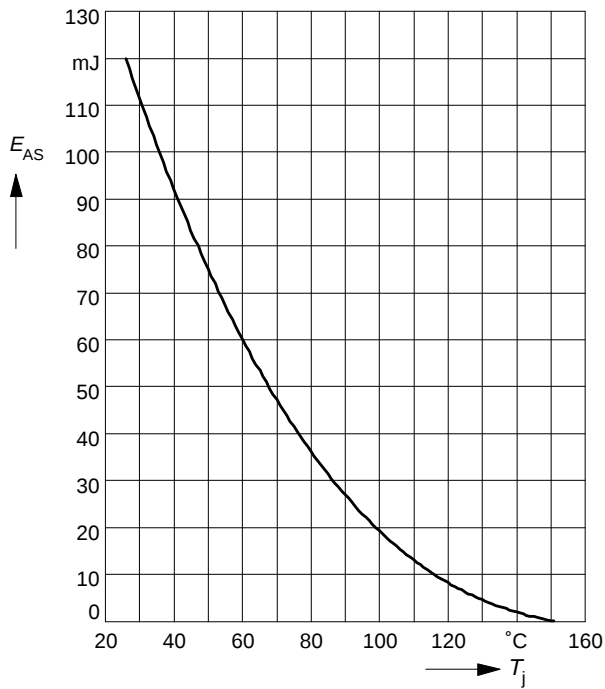
parameter:  $T_j$ ,  $t_p = 80\text{ }\mu\text{s}$



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

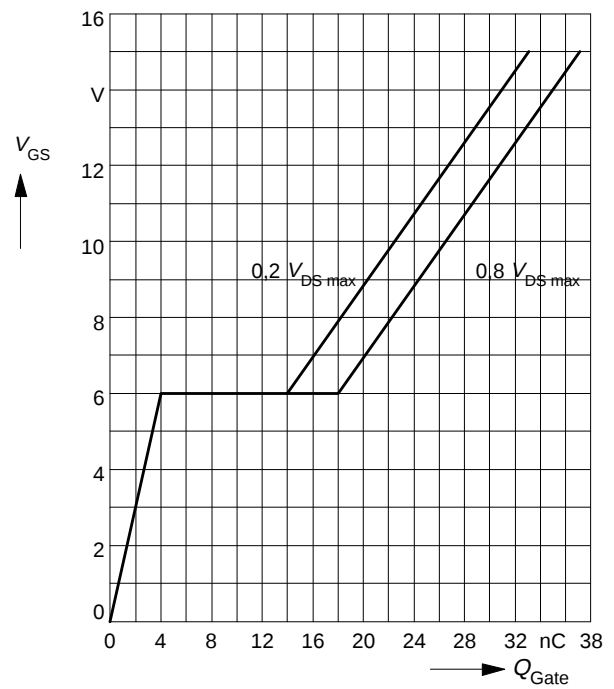
parameter:  $I_D = 9.5 \text{ A}$ ,  $V_{DD} = 50 \text{ V}$

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


**Typ. gate charge**

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

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


**Drain-source breakdown voltage**

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

