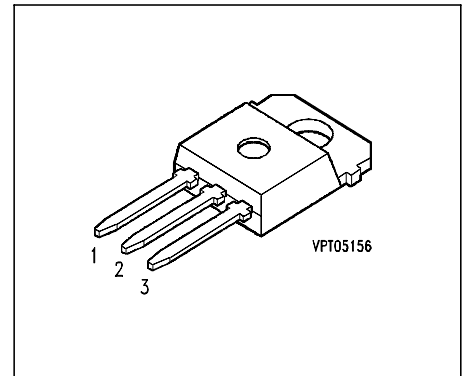


## BUZ 342

### SIPMOS® Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- dv/dt rated
- Ultra low on-resistance
- 175°C operating temperature



| 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 342 | 50 V            | 60 A           | 0.01 Ω              | TO-218 AA | C67078-S3135-A2 |

#### Maximum Ratings

| Parameter   | Symbol      | Values        | Unit  |
|---|-------------|---------------|-------|
| Continuous drain current<br>$T_C = 150\text{ °C}$   | $I_D$       | 60            | A     |
| Pulsed drain current<br>$T_C = 25\text{ °C}$  | $I_{Dpuls}$ | 240           |       |
| Avalanche energy, single pulse<br>$I_D = 60\text{ A}$ , $V_{DD} = 25\text{ V}$ , $R_{GS} = 25\text{ Ω}$<br>$L = 128\text{ μH}$ , $T_j = 25\text{ °C}$ | $E_{AS}$    | 460           | mJ    |
| Reverse diode dv/dt<br>$I_S = 60\text{ A}$ , $V_{DS} = 40\text{ V}$ , $di_F/dt = 200\text{ A/μs}$<br>$T_{jmax} = 175\text{ °C}$                       | dv/dt       | 6             | kV/μs |
| Gate source voltage   | $V_{GS}$    | ± 20          | V     |
| Power dissipation<br>$T_C = 25\text{ °C}$   | $P_{tot}$   | 400           | W     |
| Operating temperature   | $T_j$       | -55 ... + 175 | °C    |
| Storage temperature   | $T_{stg}$   | -55 ... + 175 |       |
| Thermal resistance, chip case   | $R_{thJC}$  | ≤ 0.37        | 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 / 175 / 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>$V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = -40\text{ }^\circ\text{C}$ | $V_{(BR)DSS}$ | 50     | -     | -    | 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>$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, T_j = 25\text{ }^\circ\text{C}$  | $I_{DSS}$     | -      | 0.1   | 1    | $\mu\text{A}$ |
| $V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, T_j = -40\text{ }^\circ\text{C}$                                    |               | -      | 1     | 100  | nA            |
| $V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, T_j = 150\text{ }^\circ\text{C}$                                    |               | -      | 10    | 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>$V_{GS} = 10\text{ V}, I_D = 60\text{ A}$   | $R_{DS(on)}$  | -      | 0.007 | 0.01 | $\Omega$      |

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

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

**Dynamic Characteristics**

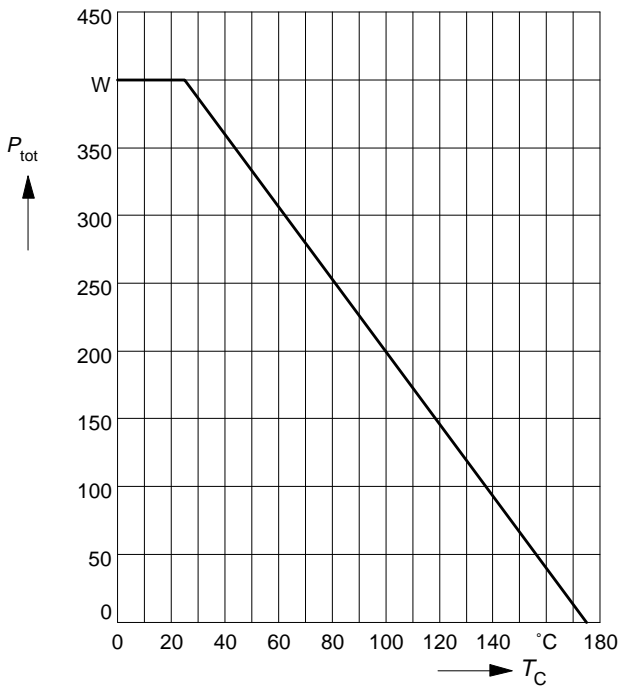
|  |              |    |      |      |    |
|--|--------------|----|------|------|----|
| Transconductance<br>$V_{DS} \geq 2 * I_D * R_{DS(on)max}$ , $I_D = 60\text{ A}$                                      | $g_{fs}$     | 30 | 55   | -    | S  |
| Input capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                             | $C_{iss}$    | -  | 4450 | 6000 | pF |
| Output capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                            | $C_{oss}$    | -  | 1450 | 2200 |    |
| Reverse transfer capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                  | $C_{rss}$    | -  | 650  | 1000 |    |
| Turn-on delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$  | $t_{d(on)}$  | -  | 85   | 130  | ns |
| Rise time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_r$        | -  | 220  | 330  |    |
| Turn-off delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$ | $t_{d(off)}$ | -  | 285  | 380  |    |
| Fall time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_f$        | -  | 155  | 210  |    |

**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>$T_C = 25^\circ\text{C}$                          | $I_S$    | -      | -    | 60   | A    |
| Inverse diode direct current, pulsed<br>$T_C = 25^\circ\text{C}$                              | $I_{SM}$ | -      | -    | 240  |      |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 120\text{ A}$                    | $V_{SD}$ | -      | 1.1  | 1.6  | V    |
| Reverse recovery time<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | -      | 85   | -    | ns   |
| Reverse recovery charge<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | -      | 200  | -    | nC   |

**Power dissipation**

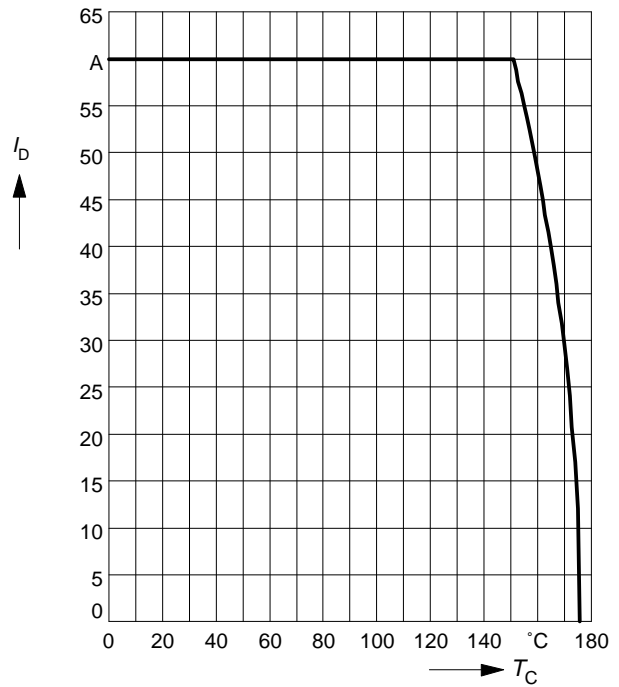
$P_{tot} = f(T_C)$



**Drain current**

$I_D = f(T_C)$

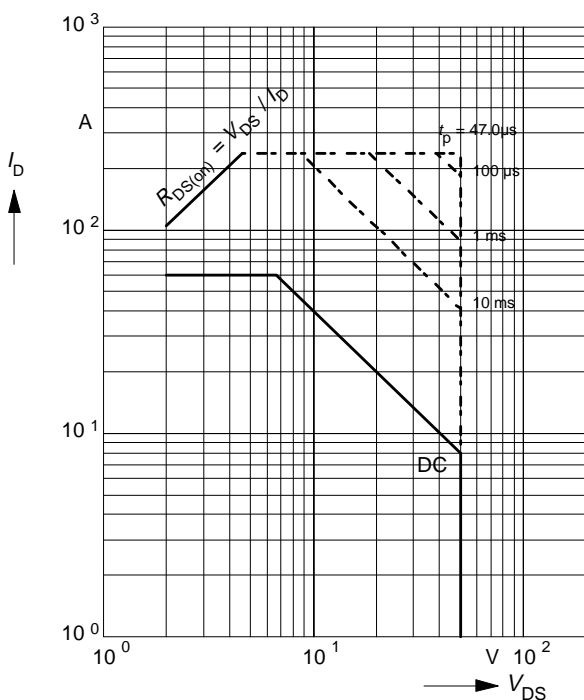
parameter:  $V_{GS} \geq 10\text{ V}$



**Safe operating area**

$I_D = f(V_{DS})$

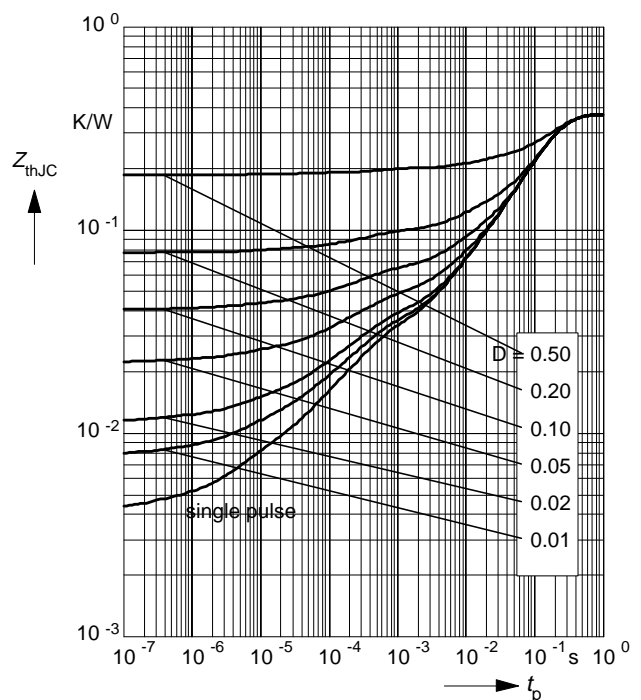
parameter:  $D = 0.01, T_C = 25^\circ\text{C}$



**Transient thermal impedance**

$Z_{thJC} = f(t_p)$

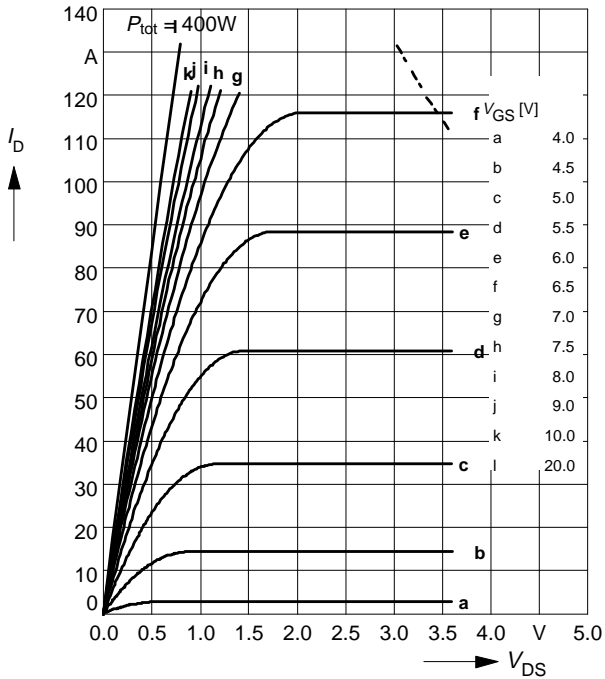
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

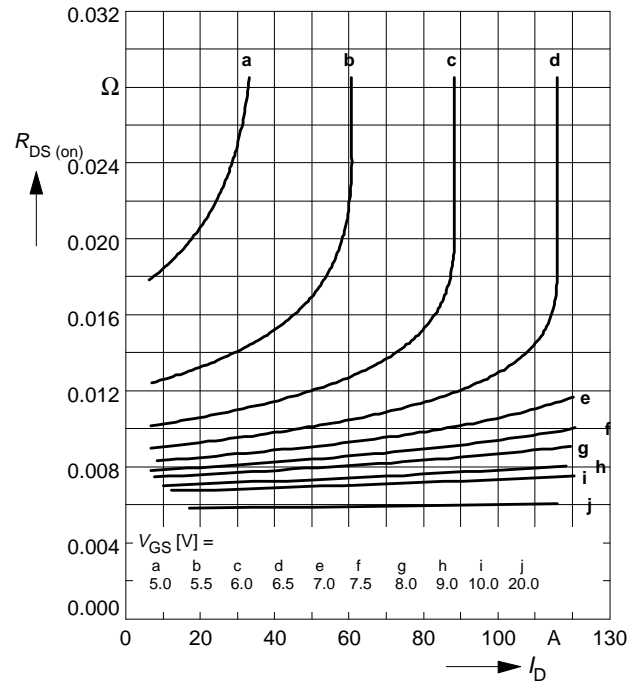
parameter:  $t_p = 80 \mu s$ ,  $T_j = 25 \text{ }^\circ\text{C}$



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

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

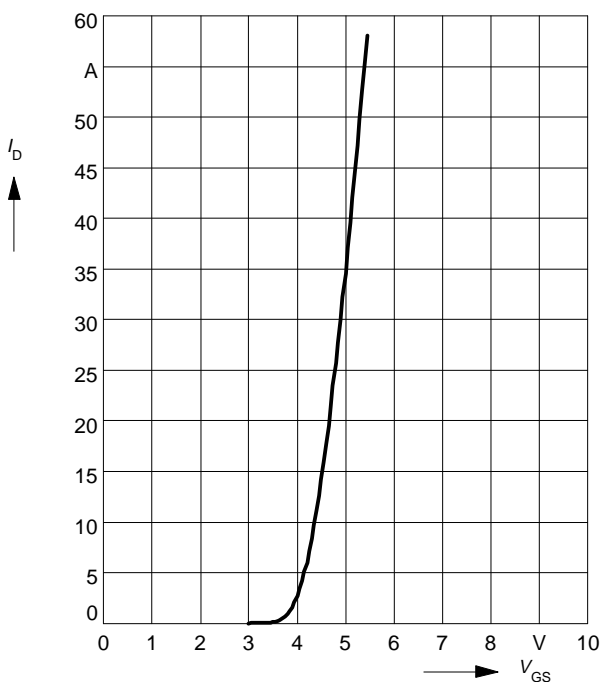
parameter:  $t_p = 80 \mu s$ ,  $T_j = 25 \text{ }^\circ\text{C}$



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

parameter:  $t_p = 80 \mu s$

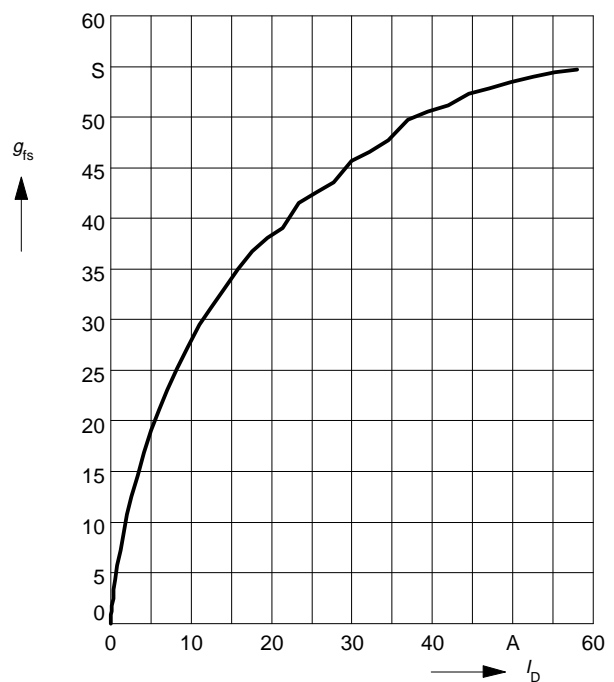
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter:  $t_p = 80 \mu s$ ,

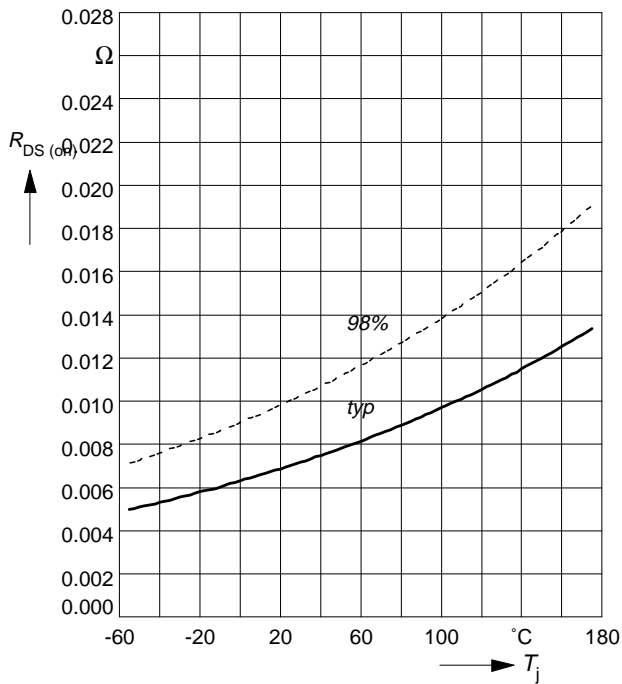
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Drain-source on-resistance**

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

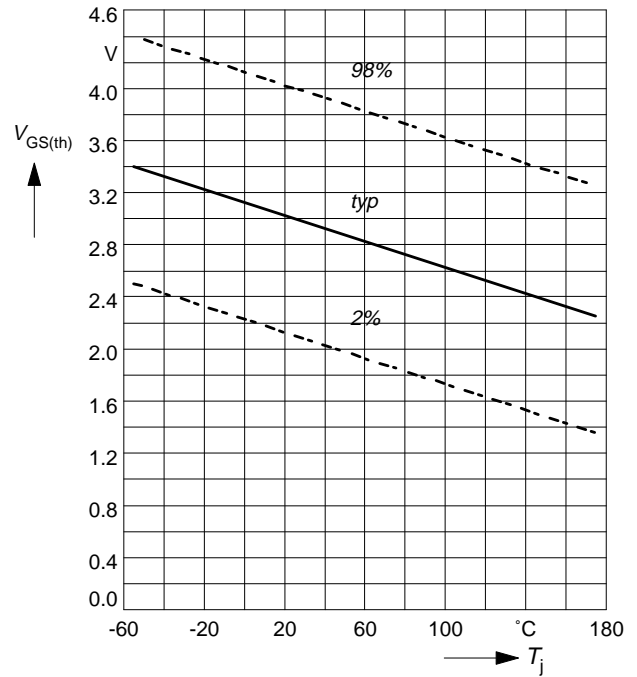
parameter:  $I_D = 60\text{ A}$ ,  $V_{GS} = 10\text{ V}$



**Gate threshold voltage**

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

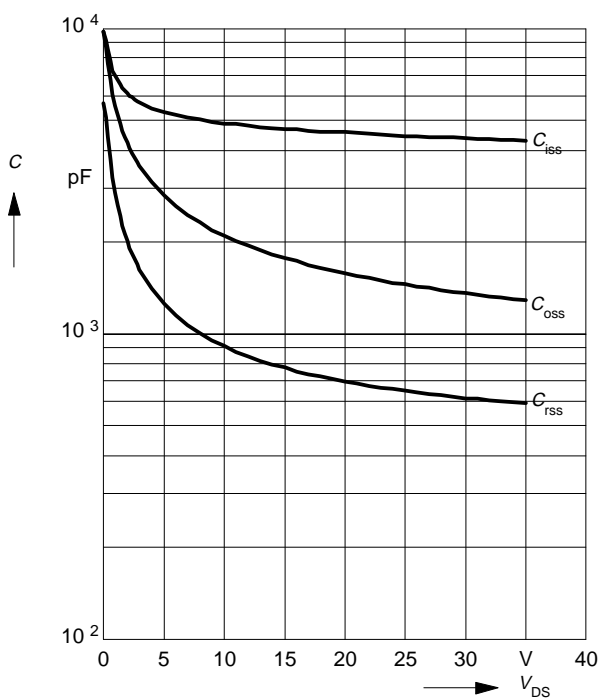
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



**Typ. capacitances**

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

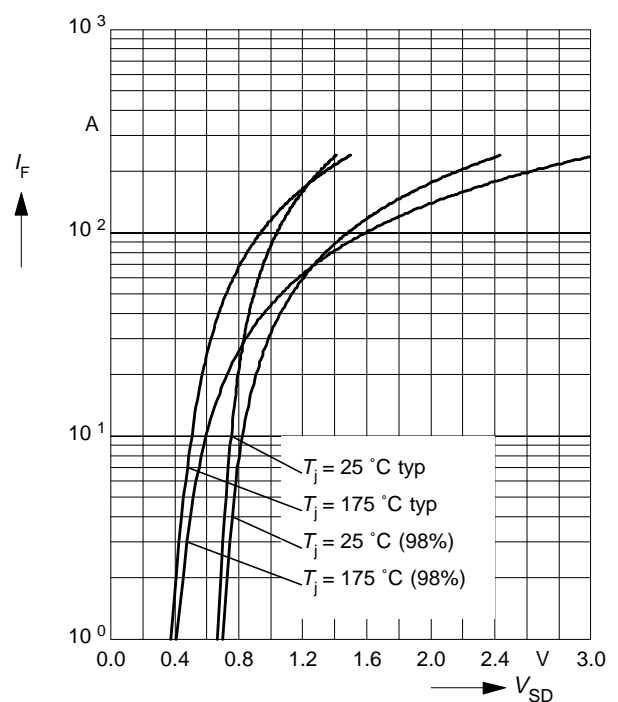
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



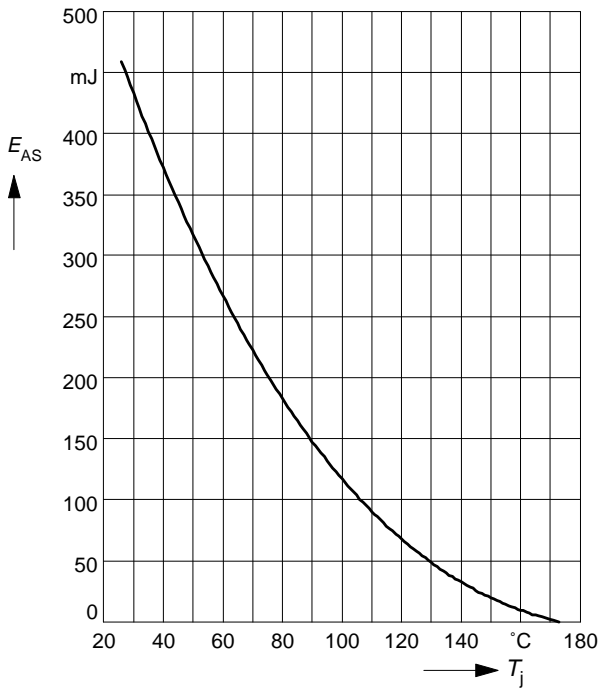
**Forward characteristics of reverse diode**

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

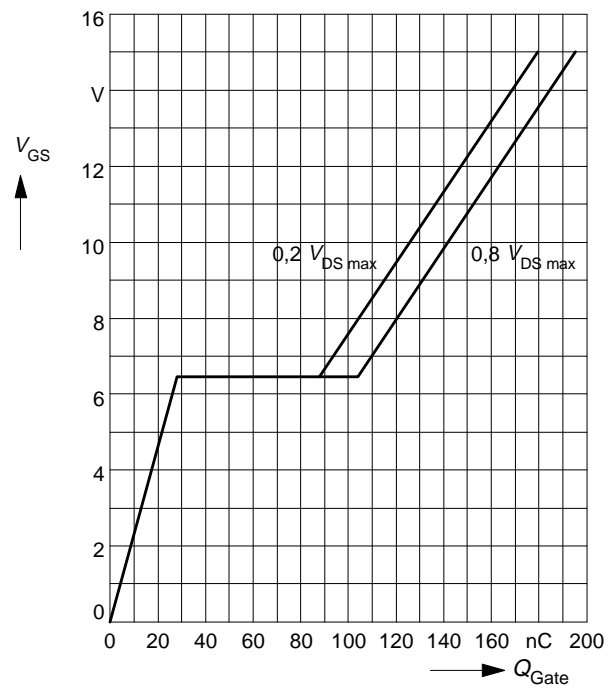
parameter:  $T_j$ ,  $t_p = 80\text{ }\mu\text{s}$



**Avalanche energy**  $E_{AS} = f(T_j)$   
 parameter:  $I_D = 60\text{ A}$ ,  $V_{DD} = 25\text{ V}$   
 $R_{GS} = 25\ \Omega$ ,  $L = 128\ \mu\text{H}$



**Typ. gate charge**  
 $V_{GS} = f(Q_{Gate})$   
 parameter:  $I_{D\text{ puls}} = 90\text{ A}$



**Drain-source breakdown voltage**

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

