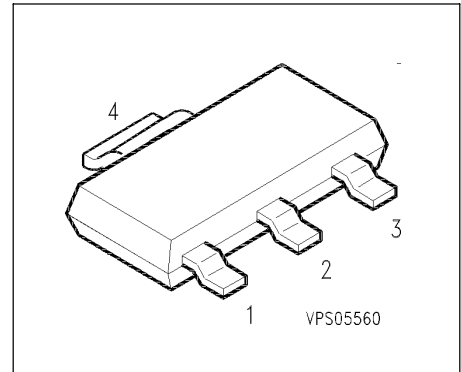


## BSP 373

### SIPMOS® Small-Signal Transistor

- N channel
- Enhancement mode
- Avalanche rated
- $V_{GS(th)} = 2.1 \dots 4.0 \text{ V}$
- Pb-free lead plating; RoHS compliant available



| Pin 1 | Pin 2 | Pin 3 | Pin 4 |
|-------|-------|-------|-------|
| G     | D     | S     | D     |

| Type    | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package    | Marking |
|---------|----------|-------|--------------|------------|---------|
| BSP 373 | 100 V    | 1.7 A | 0.3 $\Omega$ | PG-SOT-223 | BSP 373 |

| Type    | RoHS compliant | Tape and Reel Information |
|---------|----------------|---------------------------|
| BSP 373 | No             | E6327                     |
| BSP 373 | Yes            | L6327                     |

### Maximum Ratings

| Parameter  | Symbol      | Values   | Unit |
|--|-------------|----------|------|
| Continuous drain current<br>$T_A = 28 \text{ }^\circ\text{C}$  | $I_D$       | 1.7      | A    |
| DC drain current, pulsed<br>$T_A = 25 \text{ }^\circ\text{C}$  | $I_{Dpuls}$ | 6.8      |      |
| Avalanche energy, single pulse<br>$I_D = 1.7 \text{ A}$ , $V_{DD} = 25 \text{ V}$ , $R_{GS} = 25 \text{ } \Omega$<br>$L = 23.3 \text{ mH}$ , $T_j = 25 \text{ }^\circ\text{C}$ | $E_{AS}$    | 45       | mJ   |
| Gate source voltage  | $V_{GS}$    | $\pm 20$ | V    |
| Power dissipation<br>$T_A = 25 \text{ }^\circ\text{C}$   | $P_{tot}$   | 1.8      | W    |

**Maximum Ratings**

| Parameter  | Symbol     | Values        | Unit |
|--|------------|---------------|------|
| Chip or operating temperature                              | $T_j$      | -55 ... + 150 | °C   |
| Storage temperature  | $T_{stg}$  | -55 ... + 150 |      |
| Thermal resistance, chip to ambient air                    | $R_{thJA}$ | ≤ 70          | K/W  |
| Thermal resistance, junction-soldering point <sup>1)</sup> | $R_{thJS}$ | ≤ 10          |      |
| DIN humidity category, DIN 40 040                          |            | E             |      |
| IEC climatic category, DIN IEC 68-1                        |            | 55 / 150 / 56 |      |

1) Transistor on epoxy pcb 40 mm x 40 mm x 1,5 mm with 6 cm<sup>2</sup> copper area for drain connection

**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>$V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = 0^\circ\text{C}$  | $V_{(BR)DSS}$ | 100 | -         | -        | 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>$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_j = 25^\circ\text{C}$<br>$V_{DS} = 100\text{ V}, V_{GS} = 0\text{ V}, T_j = 125^\circ\text{C}$ | $I_{DSS}$     | -   | 0.1<br>10 | 1<br>100 | μA |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}, V_{DS} = 0\text{ V}$   | $I_{GSS}$     | -   | 10        | 100      |    |
| Drain-Source on-state resistance<br>$V_{GS} = 10\text{ V}, I_D = 1.7\text{ A}$   | $R_{DS(on)}$  | -   | 0.16      | 0.3      | Ω  |

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

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

**Dynamic Characteristics**

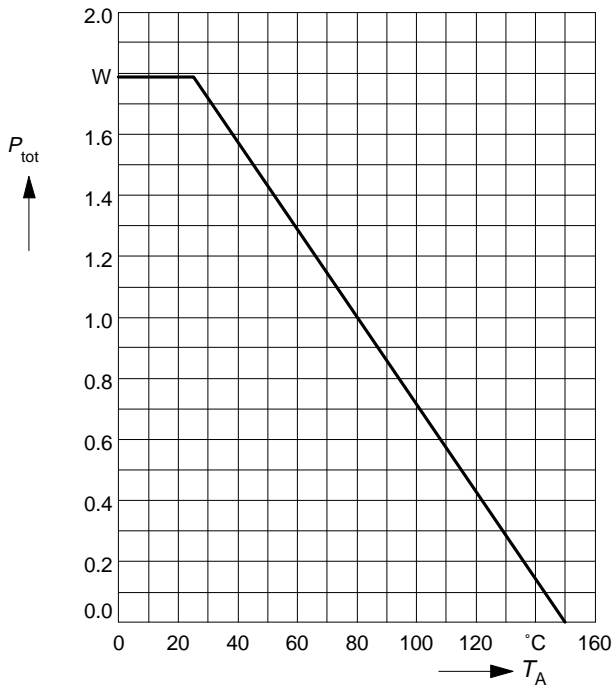
|  |              |     |     |     |    |
|--|--------------|-----|-----|-----|----|
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 1.7\text{ A}$                               | $g_{fs}$     | 1.5 | 2.8 | -   | S  |
| Input capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                               | $C_{iss}$    | -   | 400 | 550 | pF |
| Output capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                              | $C_{oss}$    | -   | 125 | 190 |    |
| Reverse transfer capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                    | $C_{rss}$    | -   | 70  | 105 |    |
| Turn-on delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 0.3\text{ A}$<br>$R_{GS} = 50\ \Omega$  | $t_{d(on)}$  | -   | 10  | 15  | ns |
| Rise time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 0.3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_r$        | -   | 30  | 45  |    |
| Turn-off delay time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 0.3\text{ A}$<br>$R_{GS} = 50\ \Omega$ | $t_{d(off)}$ | -   | 85  | 115 |    |
| Fall time<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 0.3\text{ A}$<br>$R_{GS} = 50\ \Omega$           | $t_f$        | -   | 60  | 80  |    |

**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>$T_A = 25^\circ\text{C}$                               | $I_S$    | -      | -    | 1.7  | A             |
| Inverse diode direct current, pulsed<br>$T_A = 25^\circ\text{C}$                                   | $I_{SM}$ | -      | -    | 6.8  |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 1.7\text{ A}, T_j = 25^\circ\text{C}$ | $V_{SD}$ | -      | 0.8  | 1.1  | V             |
| Reverse recovery time<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$        | $t_{rr}$ | -      | -    | -    | ns            |
| Reverse recovery charge<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$      | $Q_{rr}$ | -      | -    | -    | $\mu\text{C}$ |

**Power dissipation**

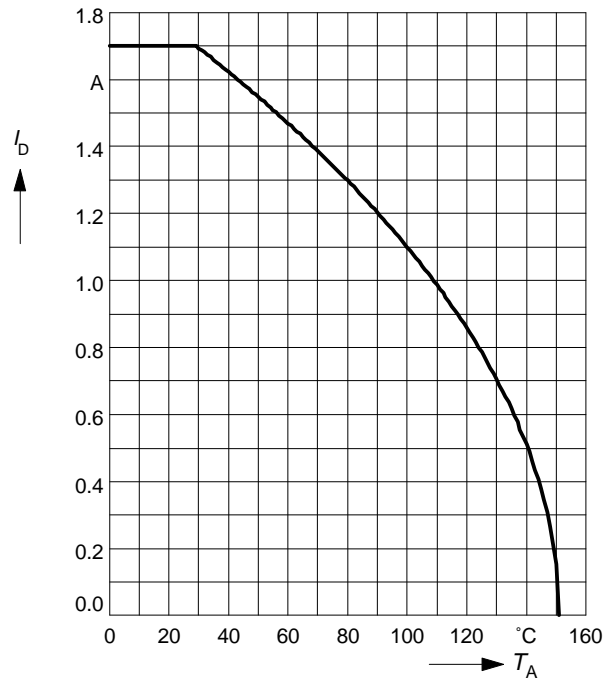
$P_{tot} = f(T_A)$



**Drain current**

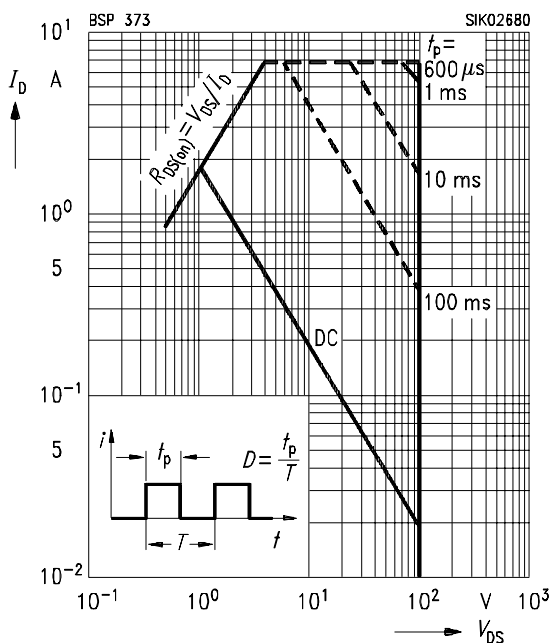
$I_D = f(T_A)$

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



**Safe operating area  $I_D = f(V_{DS})$**

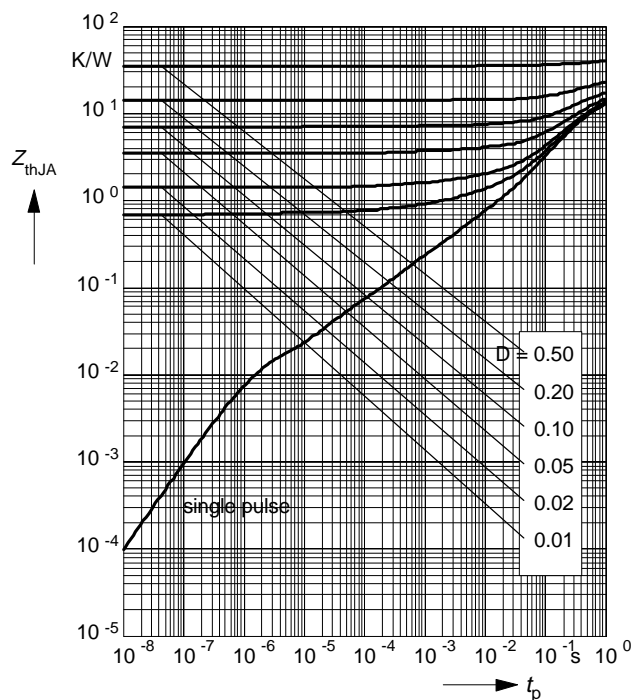
parameter :  $D = 0, T_C = 25^\circ\text{C}$



**Transient thermal impedance**

$Z_{thJA} = f(t_p)$

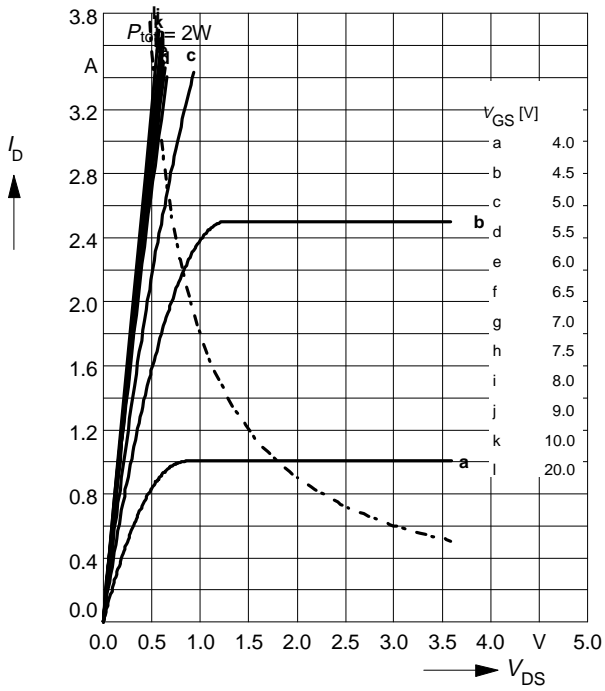
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

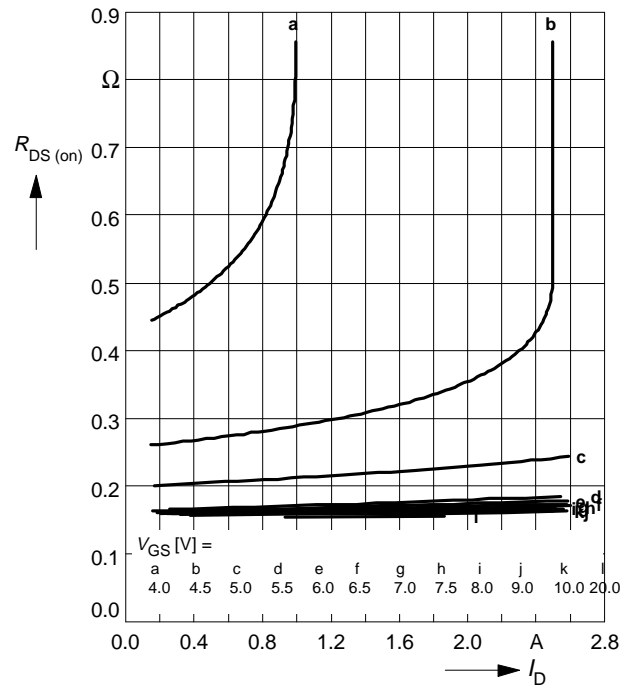
parameter:  $t_p = 80 \mu s$



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

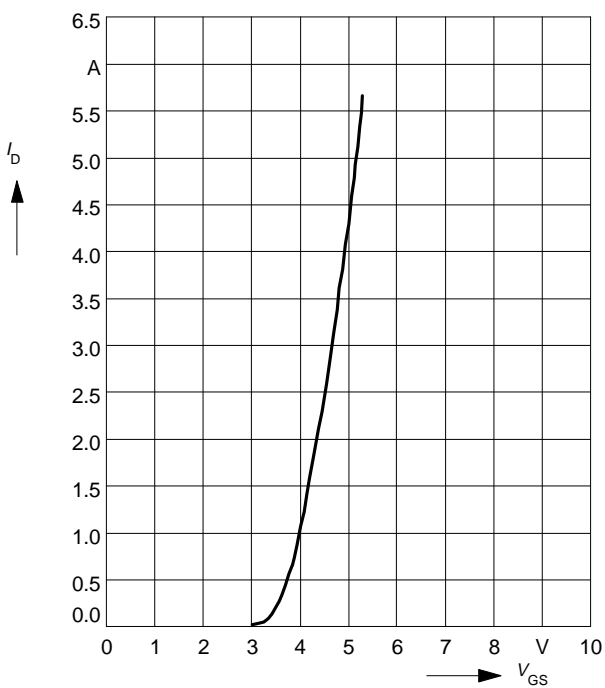
$R_{DS(on)} = f(I_D)$

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



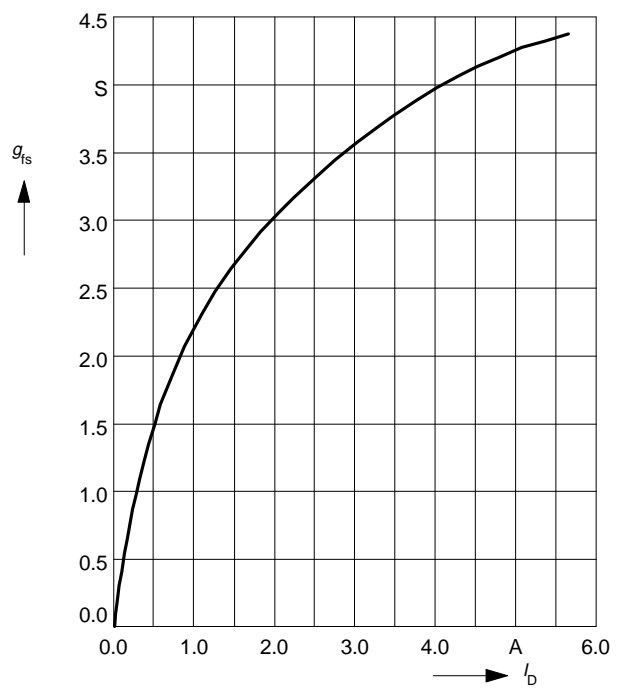
**Typ. transfer characteristics  $I_D = f(V_{GS})$**

parameter:  $t_p = 80 \mu s$



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

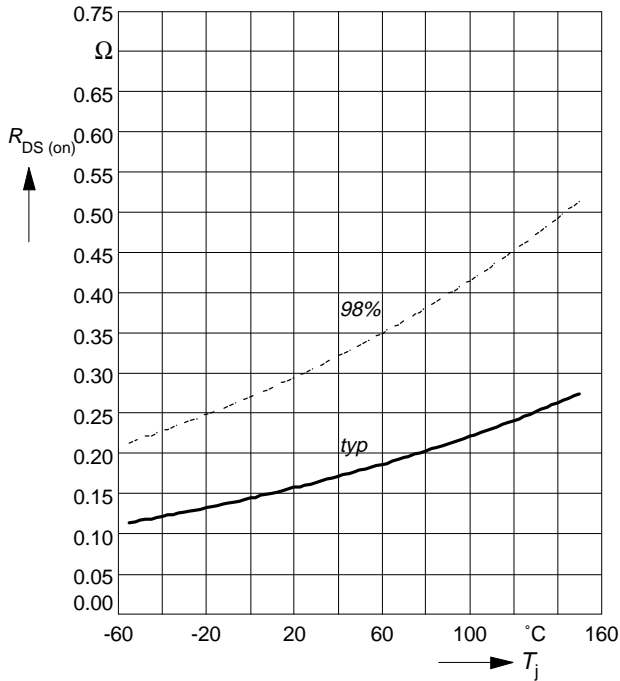
parameter:  $t_p = 80 \mu s,$



**Drain-source on-resistance**

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

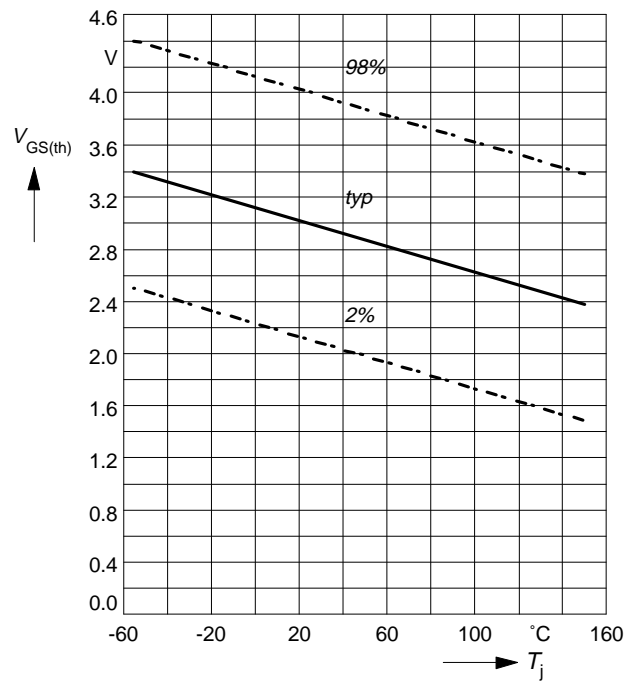
parameter:  $I_D = 1.7 \text{ A}$ ,  $V_{GS} = 10 \text{ V}$



**Gate threshold voltage**

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

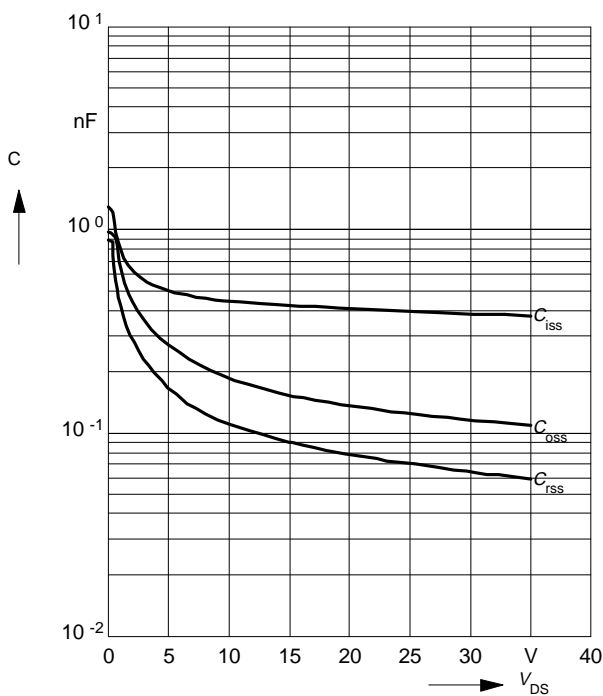
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1 \text{ mA}$



**Typ. capacitances**

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

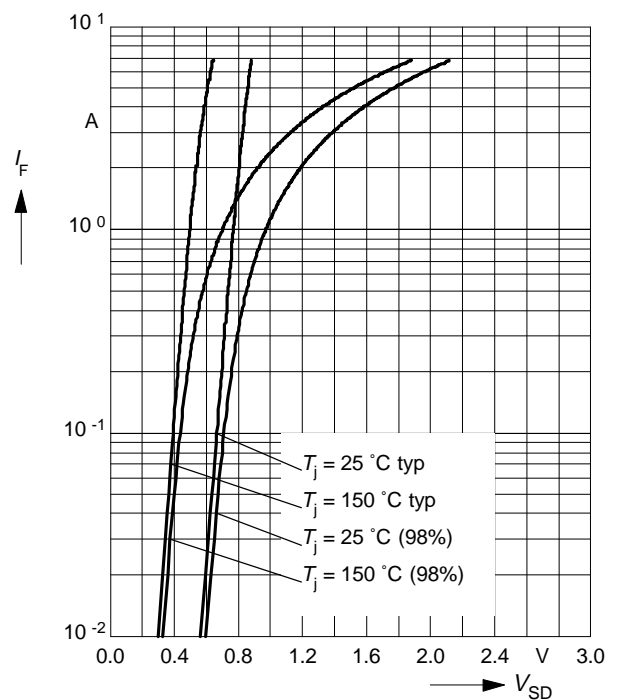
parameter:  $V_{GS} = 0 \text{ V}$ ,  $f = 1 \text{ MHz}$



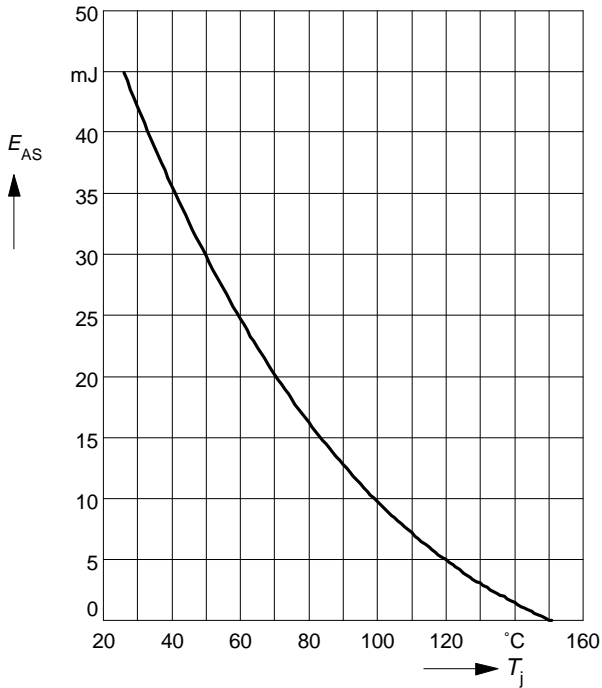
**Forward characteristics of reverse diode**

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

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

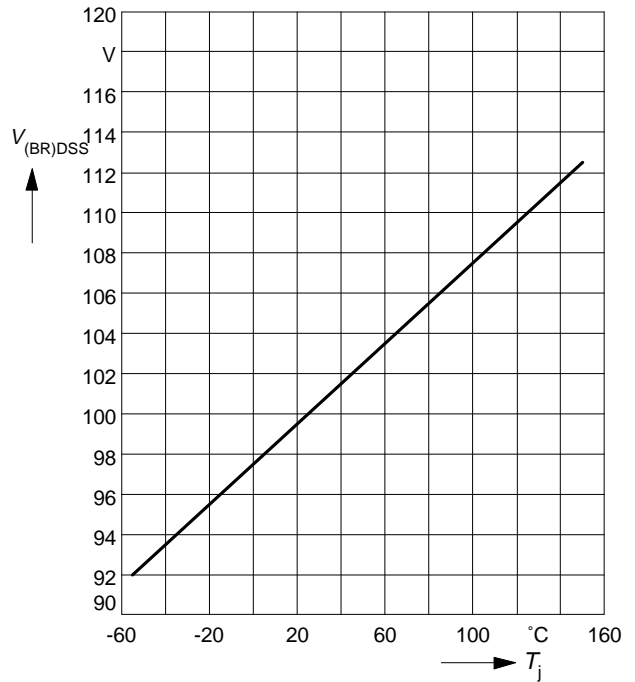


**Avalanche energy**  $E_{AS} = f(T_j)$   
 parameter:  $I_D = 1.7 \text{ A}$ ,  $V_{DD} = 25 \text{ V}$   
 $R_{GS} = 25 \text{ } \Omega$ ,  $L = 23.3 \text{ mH}$



**Drain-source breakdown voltage**

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



**Safe operating area**  $I_D = f(V_{DS})$   
 parameter :  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$

