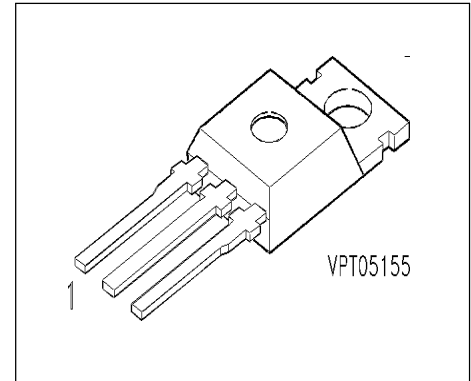


**SIPMOS® Power Transistor**

- 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 91 | 600 V    | 8.5 A | 0.8 $\Omega$ | TO-220 AB | C67078-S1342-A2 |

**Maximum Ratings**

| Parameter  | Symbol      | Values        | Unit               |
|--|-------------|---------------|--------------------|
| Continuous drain current<br>$T_C = 32\text{ °C}$   | $I_D$       | 8.5           | A                  |
| Pulsed drain current<br>$T_C = 25\text{ °C}$   | $I_{Dpuls}$ | 34            |                    |
| Avalanche current, limited by $T_{jmax}$   | $I_{AR}$    | 8             |                    |
| Avalanche energy, periodic limited by $T_{jmax}$   | $E_{AR}$    | 13            | mJ                 |
| Avalanche energy, single pulse<br>$I_D = 8\text{ A}$ , $V_{DD} = 50\text{ V}$ , $R_{GS} = 25\ \Omega$<br>$L = 16.3\text{ mH}$ , $T_j = 25\text{ °C}$ | $E_{AS}$    | 570           |                    |
| Gate source voltage  | $V_{GS}$    | $\pm 20$      | V                  |
| Power dissipation<br>$T_C = 25\text{ °C}$  | $P_{tot}$   | 150           | W                  |
| Operating temperature  | $T_j$       | -55 ... + 150 | $^{\circ}\text{C}$ |
| Storage temperature  | $T_{stg}$   | -55 ... + 150 |                    |
| Thermal resistance, chip case  | $R_{thJC}$  | $\leq 0.83$   | 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>$V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = 25\text{ }^\circ\text{C}$   | $V_{(BR)DSS}$ | 600    | -         | -        | 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>$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}, T_j = 25\text{ }^\circ\text{C}$<br>$V_{DS} = 600\text{ V}, V_{GS} = 0\text{ V}, T_j = 125\text{ }^\circ\text{C}$ | $I_{DSS}$     | -      | 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>$V_{GS} = 10\text{ V}, I_D = 5\text{ A}$   | $R_{DS(on)}$  | -      | 0.7       | 0.8      | $\Omega$      |

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

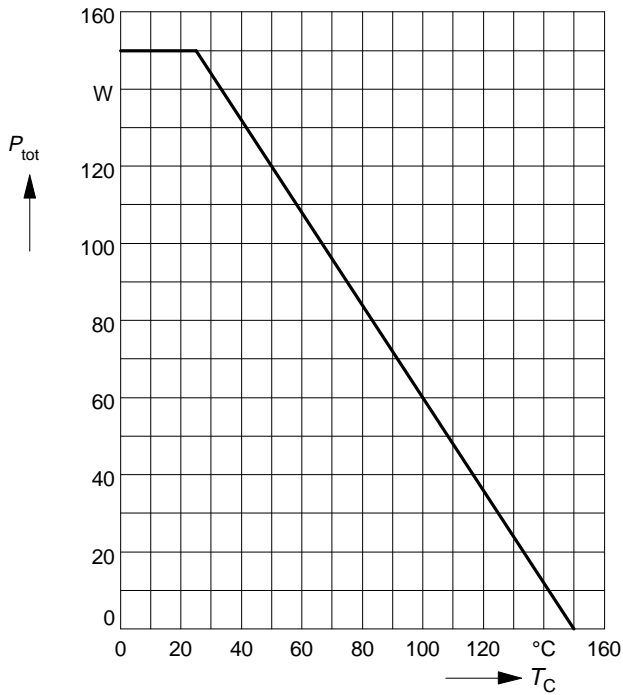
| Parameter  | Symbol       | Values |      |      | Unit |
|--|--------------|--------|------|------|------|
|  |              | min.   | typ. | max. |      |
| <b>Dynamic Characteristics</b>   |              |        |      |      |      |
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 5 \text{ A}$                                | $g_{fs}$     | 5      | 8.5  | -    | S    |
| Input capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                            | $C_{iss}$    | -      | 1400 | 2100 | pF   |
| Output capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                           | $C_{oss}$    | -      | 180  | 270  |      |
| Reverse transfer capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                 | $C_{rss}$    | -      | 65   | 100  |      |
| Turn-on delay time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$  | $t_{d(on)}$  | -      | 20   | 30   | ns   |
| Rise time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$           | $t_r$        | -      | 70   | 110  |      |
| Turn-off delay time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$ | $t_{d(off)}$ | -      | 250  | 330  |      |
| Fall time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 10 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$           | $t_f$        | -      | 80   | 100  |      |

**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>$T_C = 25^\circ\text{C}$                           | $I_S$    | -      | -    | 8.5  | A             |
| Inverse diode direct current, pulsed<br>$T_C = 25^\circ\text{C}$                               | $I_{SM}$ | -      | -    | 34   |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 16\text{ A}$                      | $V_{SD}$ | -      | 1.1  | 1.2  | V             |
| Reverse recovery time<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | -      | 480  | -    | ns            |
| Reverse recovery charge<br>$V_R = 100\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | -      | 6.5  | -    | $\mu\text{C}$ |

### Power dissipation

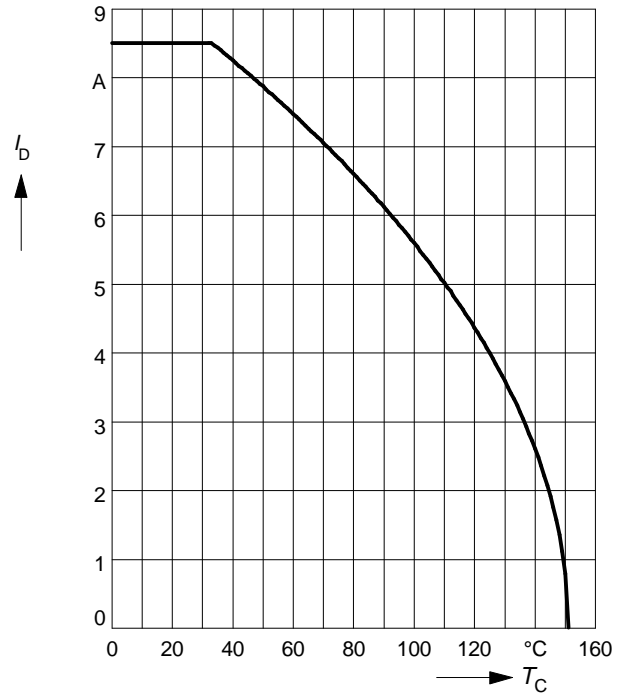
$$P_{\text{tot}} = f(T_C)$$



### Drain current

$$I_D = f(T_C)$$

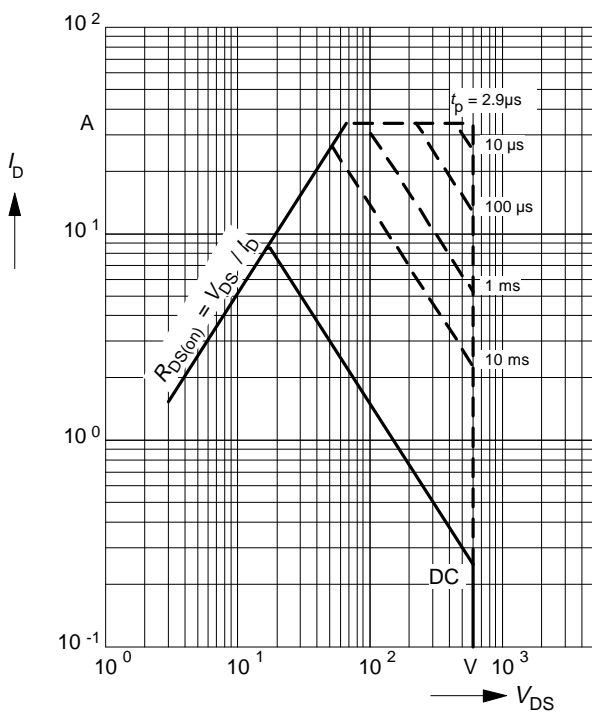
parameter:  $V_{GS} \geq 10 \text{ V}$



### Safe operating area

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

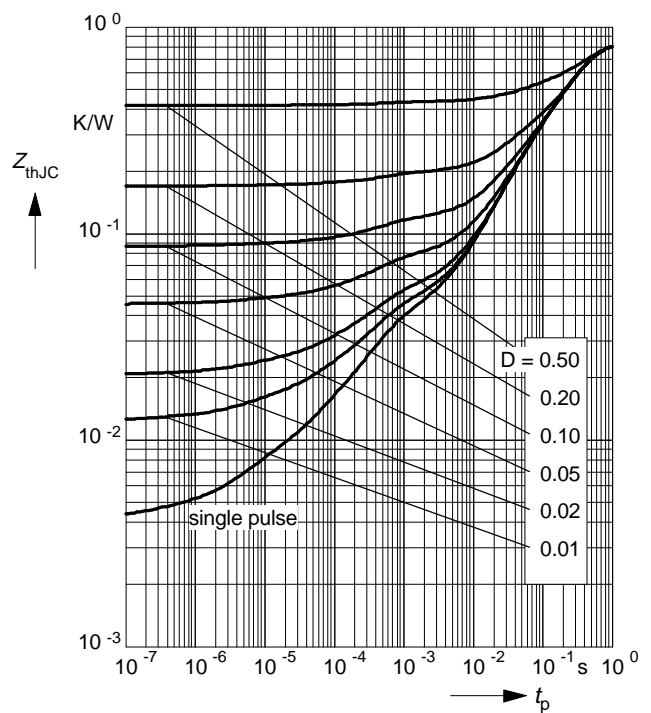
parameter:  $D = 0.01, T_C = 25^\circ\text{C}$



### Transient thermal impedance

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

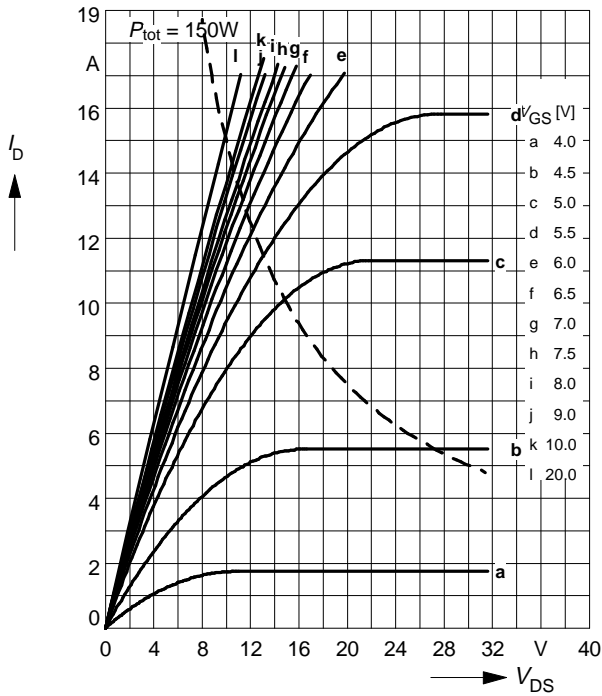
parameter:  $D = t_p / T$



**Typ. output characteristics**

$I_D = f(V_{DS})$

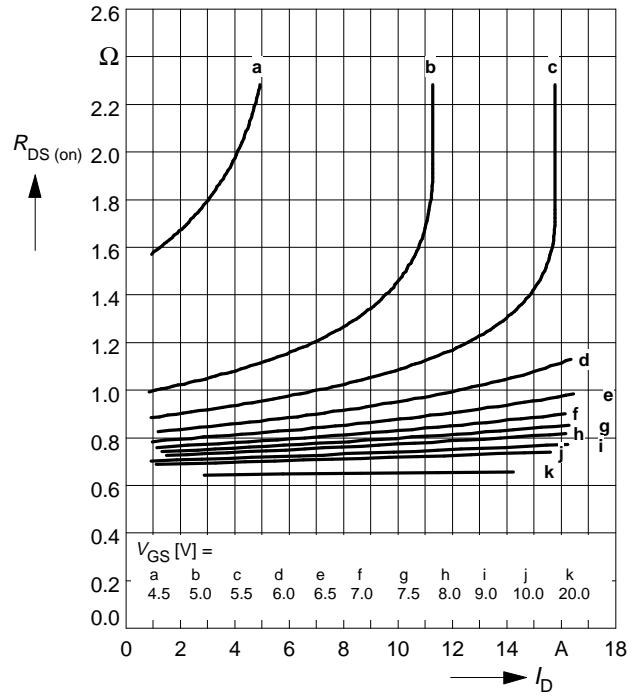
parameter:  $t_p = 80 \mu s$



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

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

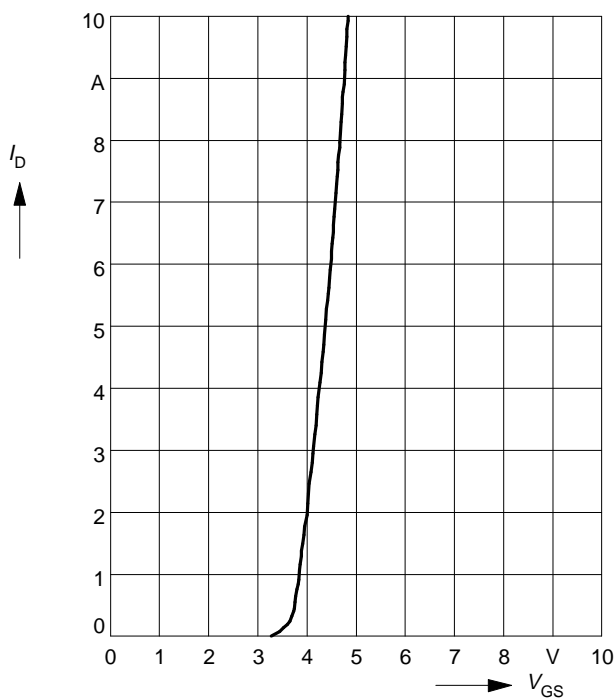
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

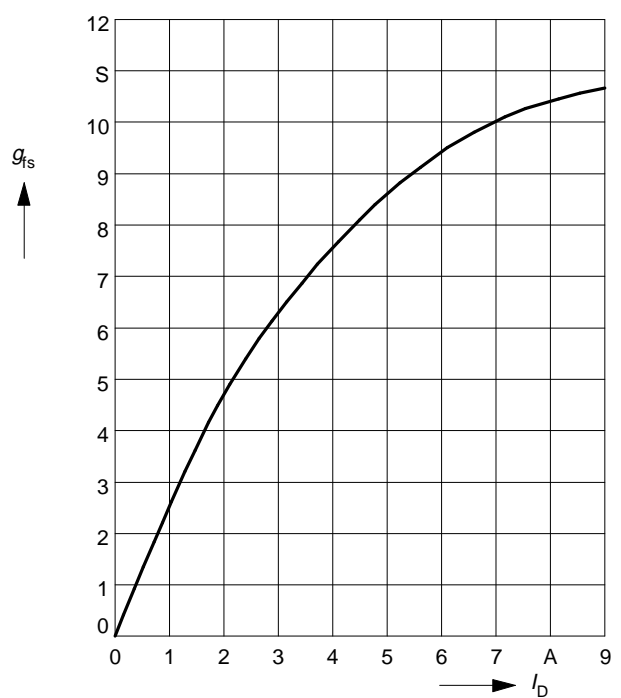
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter:  $t_p = 80 \mu s$ ,

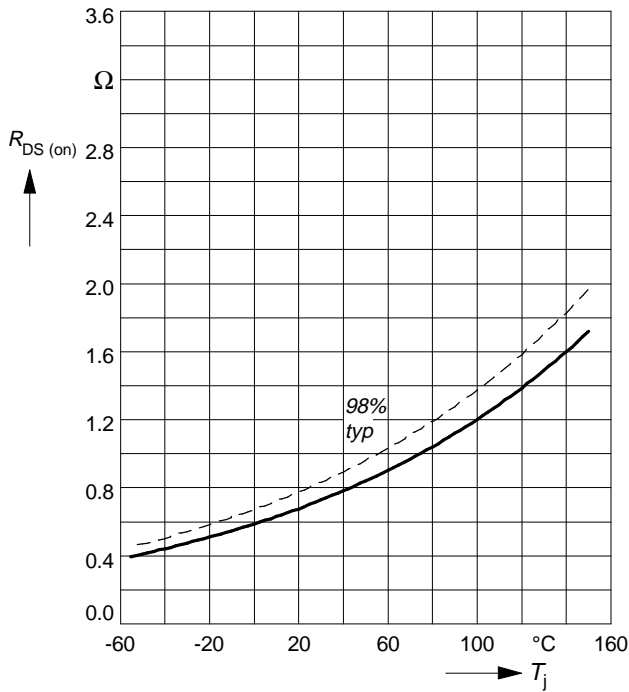
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



### Drain-source on-resistance

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

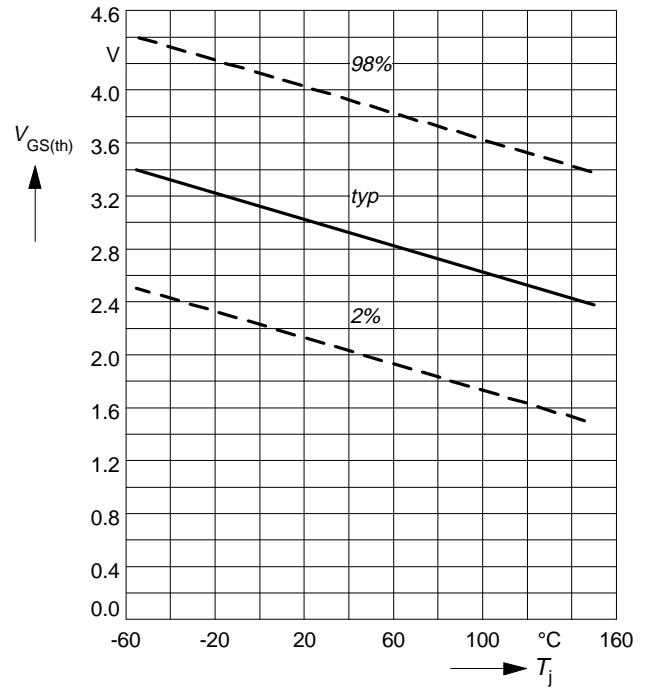
parameter:  $I_D = 5\text{ A}$ ,  $V_{GS} = 10\text{ V}$



### Gate threshold voltage

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

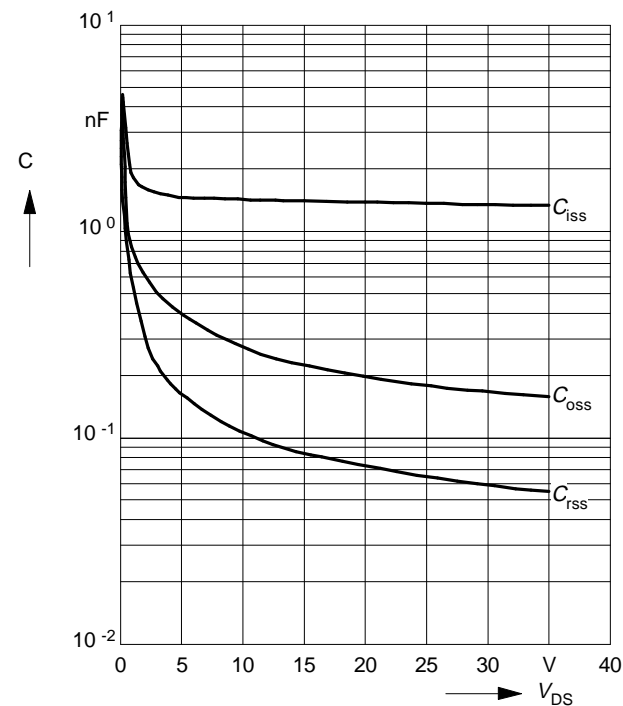
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$



### Typ. capacitances

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

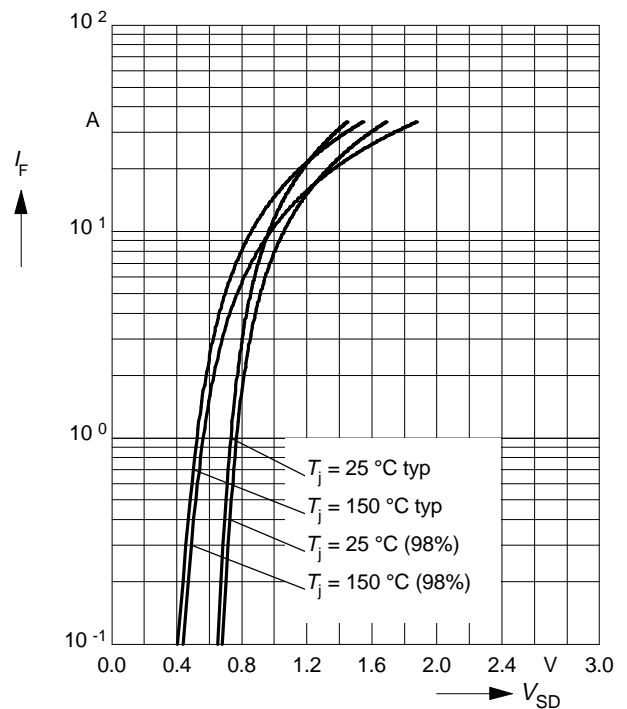
parameter:  $V_{GS} = 0\text{ V}$ ,  $f = 1\text{ MHz}$



### Forward characteristics of reverse diode

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

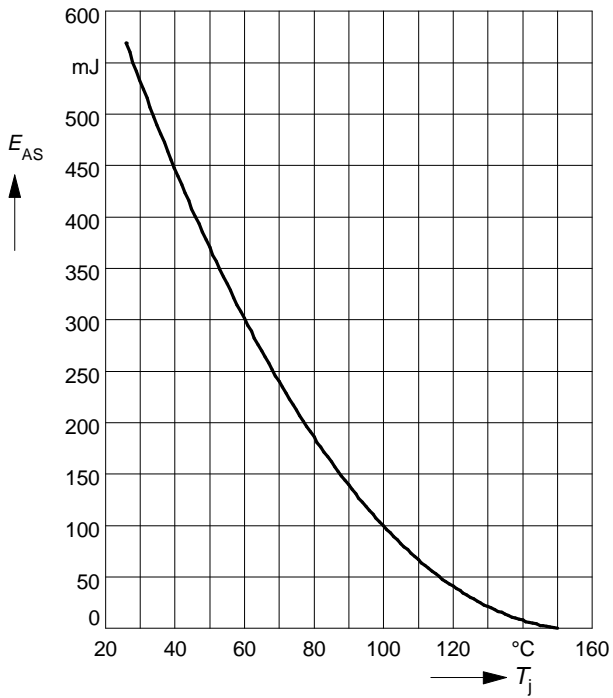
parameter:  $T_j$ ,  $t_p = 80\text{ }\mu\text{s}$



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

parameter:  $I_D = 8\text{ A}$ ,  $V_{DD} = 50\text{ V}$

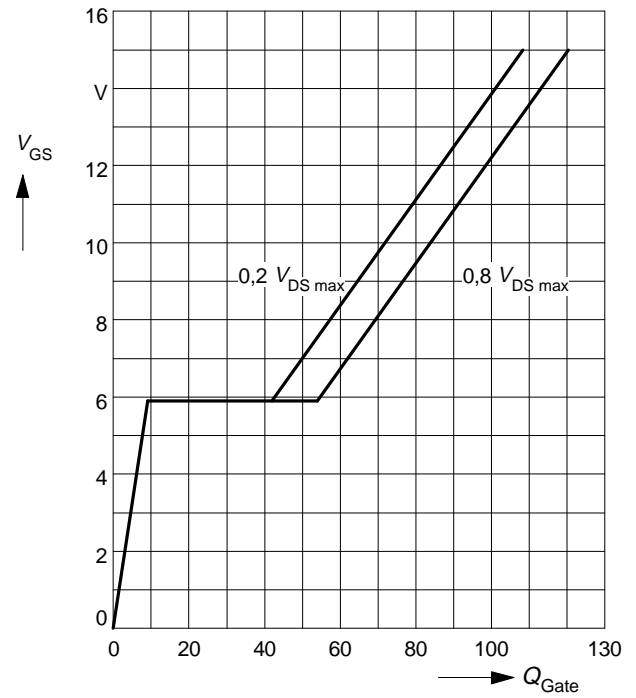
$R_{GS} = 25\ \Omega$ ,  $L = 16.3\text{ mH}$



### Typ. gate charge $V_{GS} = f(Q_{Gate})$

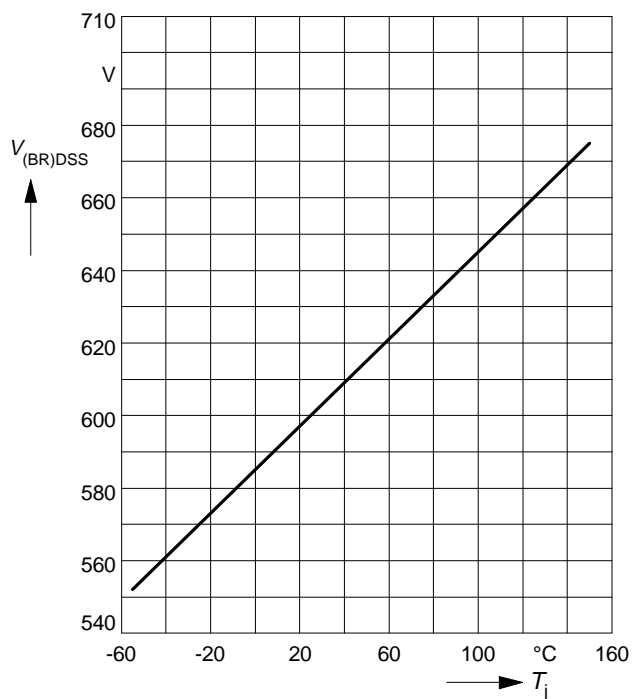
parameter:  $I_{D\text{ puls}} = 12\text{ A}$

parameter:  $I_{D\text{ puls}} = 12\text{ A}$



### Drain-source breakdown voltage $V_{(BR)DSS} = f(T_j)$

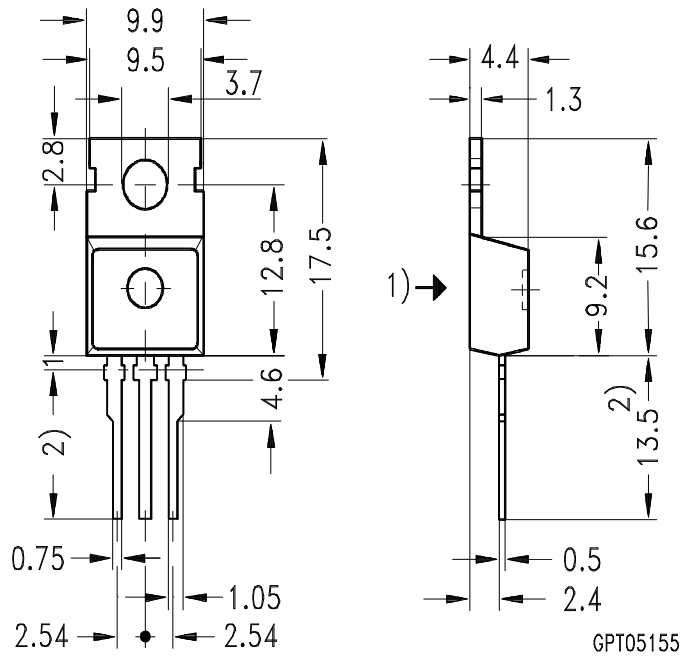
$V_{(BR)DSS} = f(T_j)$



### Package Outlines

TO-220 AB

Dimension in mm



- 1) punch direction, burr max. 0.04
- 2) dip tinning
- 3) max. 14.5 by dip tinning press burr max. 0.05



LittleDiode supplies new, hard to find or obsolete electronic components and semiconductors all over the world.

With over two million different components listed you are sure to find the part you need.

Feel free to visit us today at our online store:

**[LittleDiode.com](http://LittleDiode.com)**

Looking forward to providing you with the best possible service.