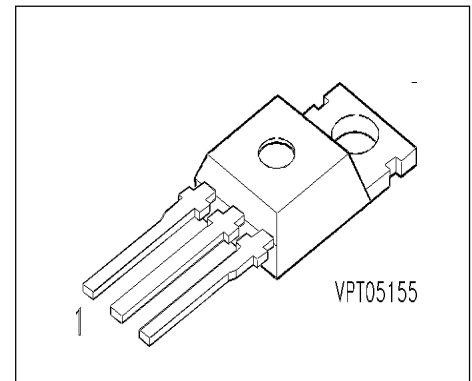


### SIPMOS<sup>®</sup> Power Transistor

- N channel
- Enhancement mode
- Avalanche-rated
- Logic Level



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

| Type      | $V_{DS}$ | $I_D$ | $R_{DS(on)}$   | Package   | Ordering Code   |
|-----------|----------|-------|----------------|-----------|-----------------|
| BUZ 11 AL | 50 V     | 26 A  | 0.055 $\Omega$ | TO-220 AB | C67078-S1330-A3 |

### Maximum Ratings

| Parameter  | Symbol      | Values        | Unit             |
|--|-------------|---------------|------------------|
| Continuous drain current<br>$T_C = 25\text{ }^\circ\text{C}$   | $I_D$       | 26            | A                |
| Pulsed drain current<br>$T_C = 25\text{ }^\circ\text{C}$   | $I_{Dpuls}$ | 104           |                  |
| Avalanche current, limited by $T_{jmax}$   | $I_{AR}$    | 30            |                  |
| Avalanche energy, periodic limited by $T_{jmax}$   | $E_{AR}$    | 1.9           | mJ               |
| Avalanche energy, single pulse<br>$I_D = 30\text{ A}$ , $V_{DD} = 25\text{ V}$ , $R_{GS} = 25\text{ }\Omega$<br>$L = 15.6\text{ }\mu\text{H}$ , $T_j = 25\text{ }^\circ\text{C}$ | $E_{AS}$    | 14            |                  |
| Gate source voltage  | $V_{GS}$    | $\pm 14$      | V                |
| Gate-source peak voltage, aperiodic  | $V_{gs}$    | $\pm 20$      |                  |
| 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  | $R_{thJA}$  | $\leq 75$     |                  |
| 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>$V_{GS} = 0\text{ V}, I_D = 0.25\text{ mA}, T_j = 25\text{ }^\circ\text{C}$   | $V_{(BR)DSS}$ | 50     | -         | -        | V             |
| Gate threshold voltage<br>$V_{GS} = V_{DS}, I_D = 1\text{ mA}$   | $V_{GS(th)}$  | 1.2    | 1.6       | 2        |               |
| Zero gate voltage drain current<br>$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, T_j = 25\text{ }^\circ\text{C}$<br>$V_{DS} = 50\text{ V}, V_{GS} = 0\text{ V}, T_j = 125\text{ }^\circ\text{C}$ | $I_{DSS}$     | -      | 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>$V_{GS} = 5\text{ V}, I_D = 13\text{ A}$   | $R_{DS(on)}$  | -      | 0.04      | 0.055    | $\Omega$      |

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

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

**Dynamic Characteristics**

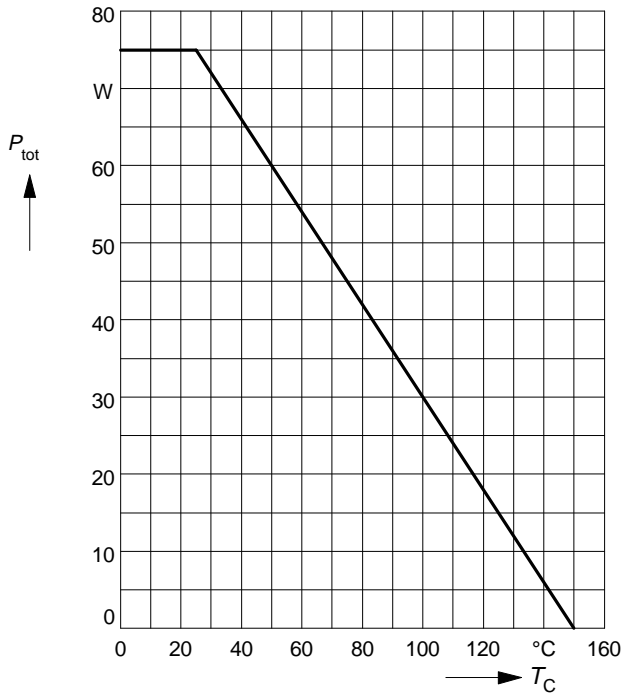
|   |              |    |      |      |    |
|---|--------------|----|------|------|----|
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = 13 \text{ A}$                              | $g_{fs}$     | 10 | 22   | -    | S  |
| Input capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                           | $C_{iss}$    | -  | 1500 | 2000 | pF |
| Output capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                          | $C_{oss}$    | -  | 580  | 840  |    |
| Reverse transfer capacitance<br>$V_{GS} = 0 \text{ V}$ , $V_{DS} = 25 \text{ V}$ , $f = 1 \text{ MHz}$                | $C_{rss}$    | -  | 190  | 300  |    |
| Turn-on delay time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$  | $t_{d(on)}$  | -  | 25   | 40   | ns |
| Rise time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$           | $t_r$        | -  | 80   | 120  |    |
| Turn-off delay time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$ | $t_{d(off)}$ | -  | 110  | 160  |    |
| Fall time<br>$V_{DD} = 30 \text{ V}$ , $V_{GS} = 5 \text{ V}$ , $I_D = 3 \text{ A}$<br>$R_{GS} = 50 \Omega$           | $t_f$        | -  | 80   | 110  |    |

**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>$T_C = 25^\circ\text{C}$                          | $I_S$    | -      | -    | 26   | A             |
| Inverse diode direct current,pulsed<br>$T_C = 25^\circ\text{C}$                               | $I_{SM}$ | -      | -    | 104  |               |
| Inverse diode forward voltage<br>$V_{GS} = 0\text{ V}, I_F = 60\text{ A}$                     | $V_{SD}$ | -      | 1.6  | 1.8  | V             |
| Reverse recovery time<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | -      | 100  | -    | ns            |
| Reverse recovery charge<br>$V_R = 30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | -      | 0.2  | -    | $\mu\text{C}$ |

### Power dissipation

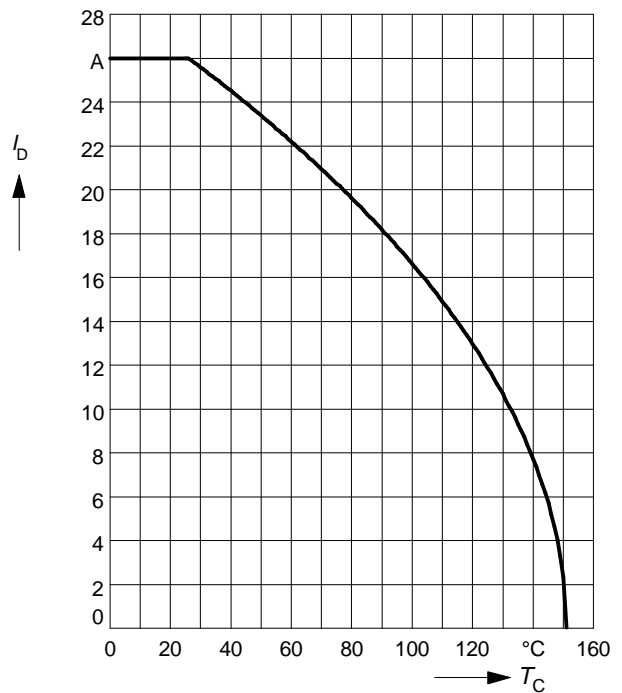
$$P_{\text{tot}} = f(T_C)$$



### Drain current

$$I_D = f(T_C)$$

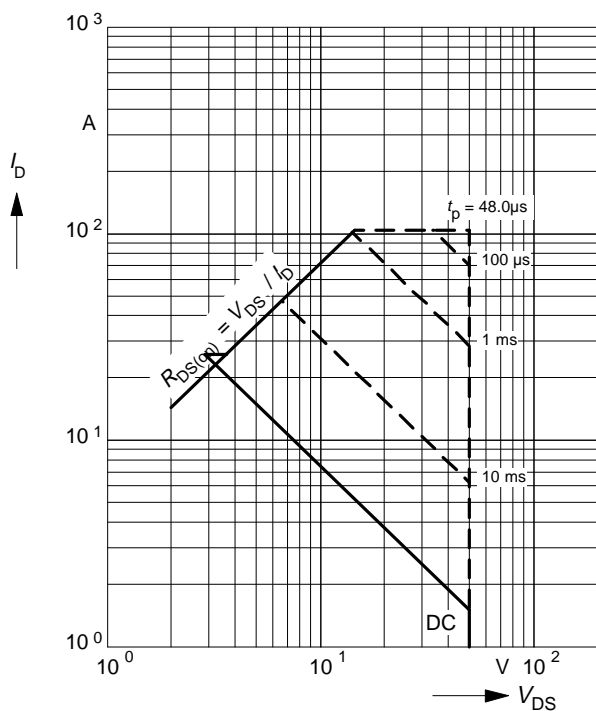
parameter:  $V_{GS} \geq 5 \text{ V}$



### Safe operating area

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

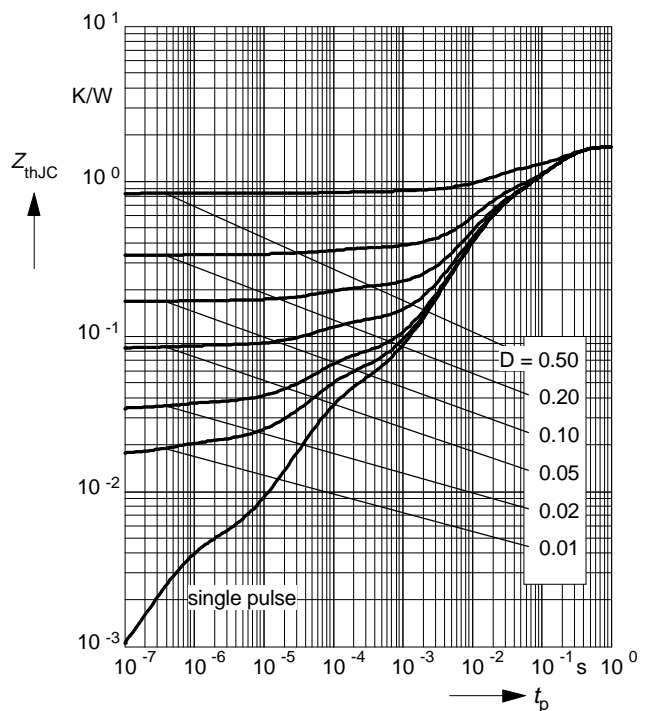
parameter:  $D = 0, T_C = 25^\circ\text{C}$



### Transient thermal impedance

$$Z_{\text{th JC}} = f(t_p)$$

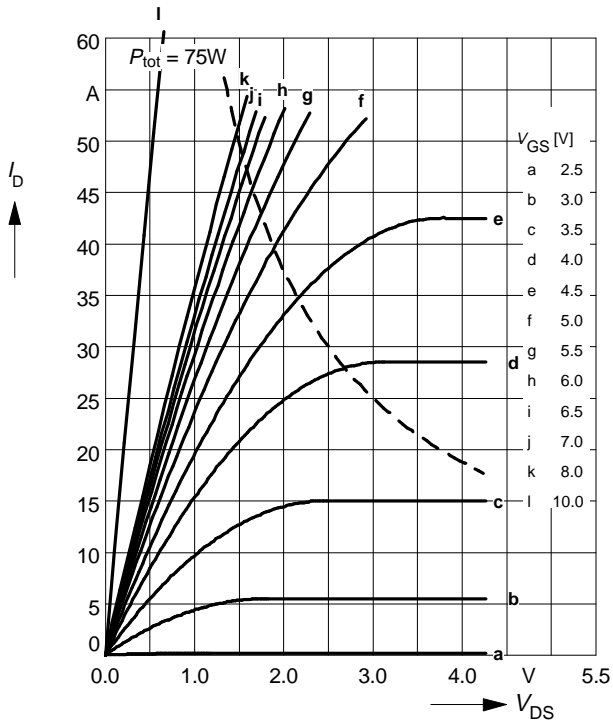
parameter:  $D = t_p / T$



### Typ. output characteristics

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

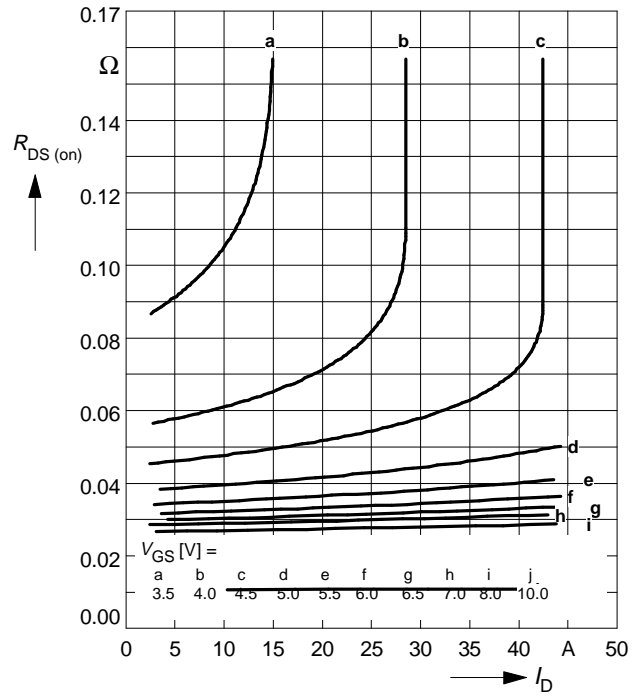
parameter:  $t_p = 80 \mu s$



### Typ. drain-source on-resistance

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

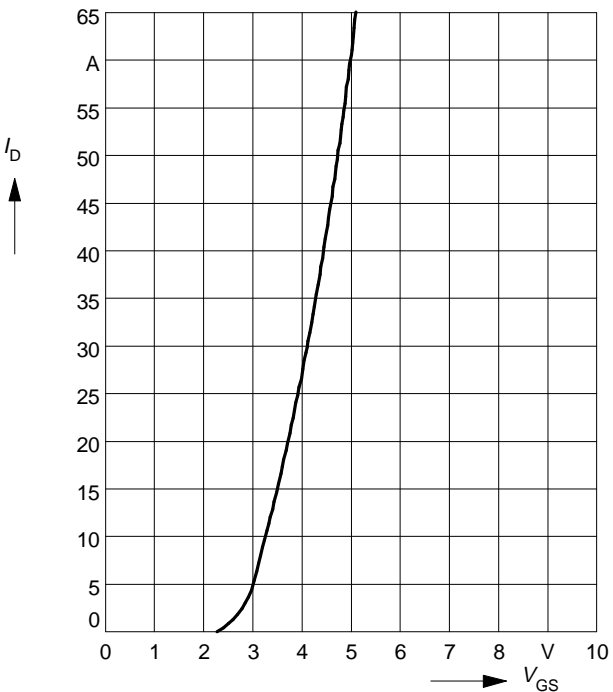
parameter:  $V_{GS}$



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

parameter:  $t_p = 80 \mu s$

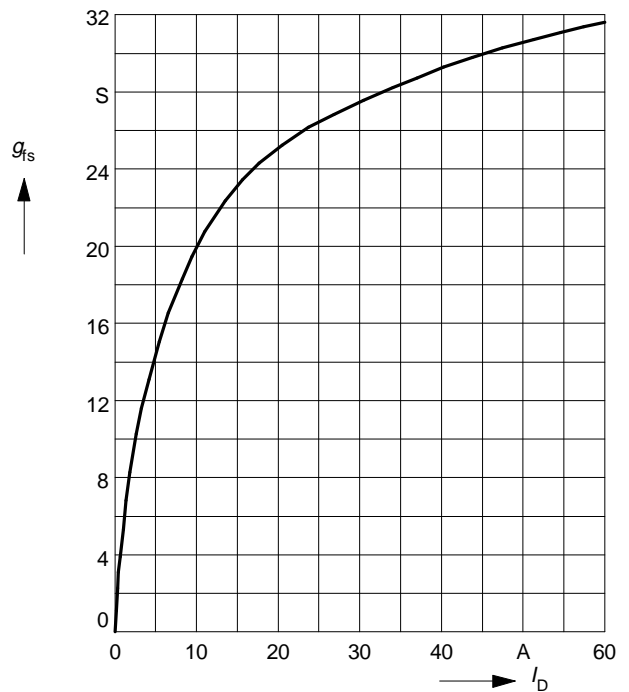
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



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

parameter:  $t_p = 80 \mu s$ ,

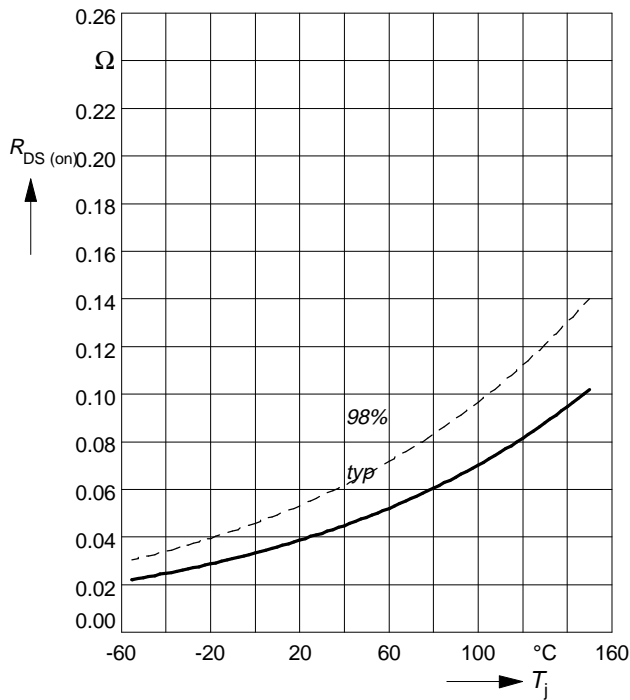
$$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$



### Drain-source on-resistance

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

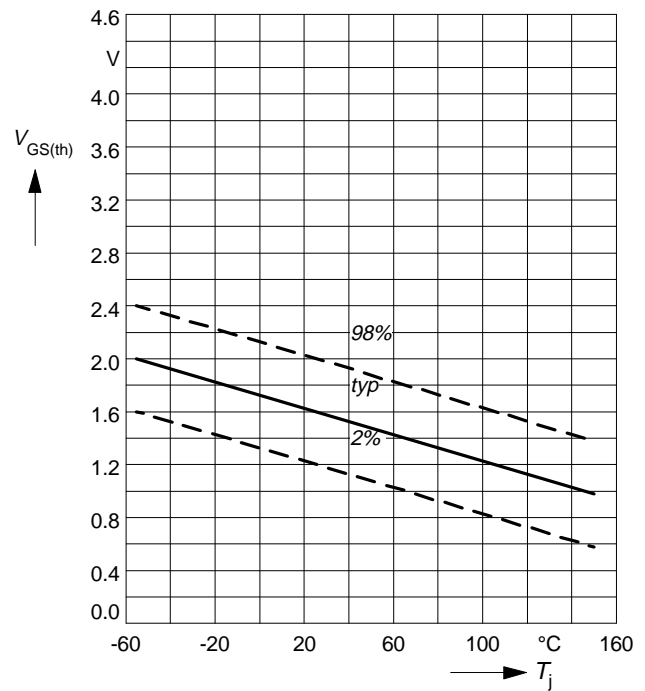
parameter:  $I_D = 13 \text{ A}$ ,  $V_{GS} = 5 \text{ V}$



### Gate threshold voltage

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

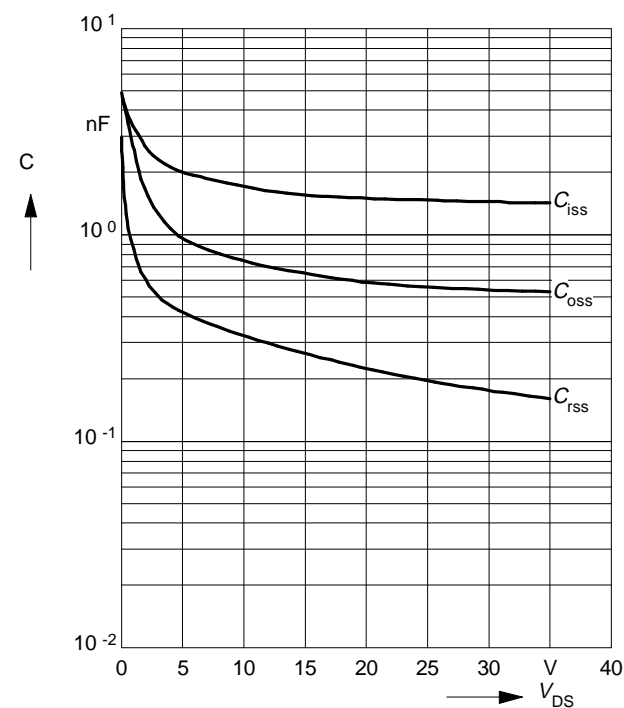
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1 \text{ mA}$



### Typ. capacitances

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

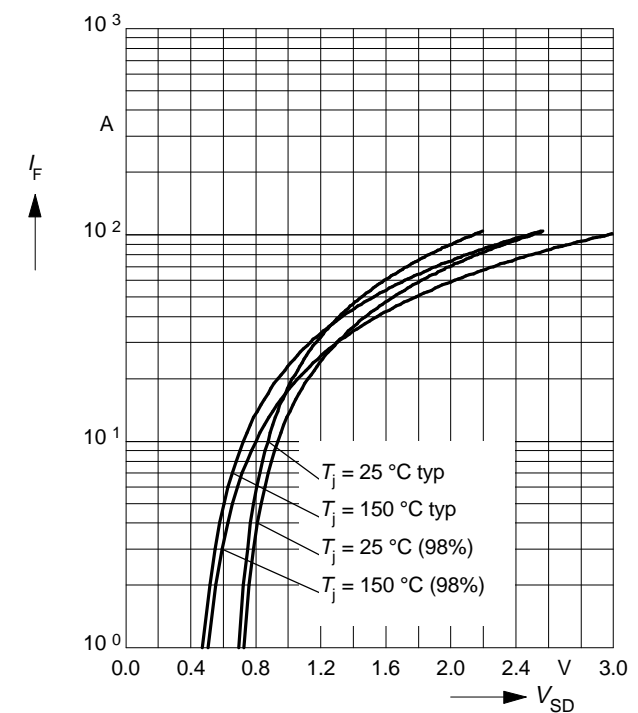
parameter:  $V_{GS} = 0 \text{ V}$ ,  $f = 1 \text{ MHz}$



### Forward characteristics of reverse diode

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

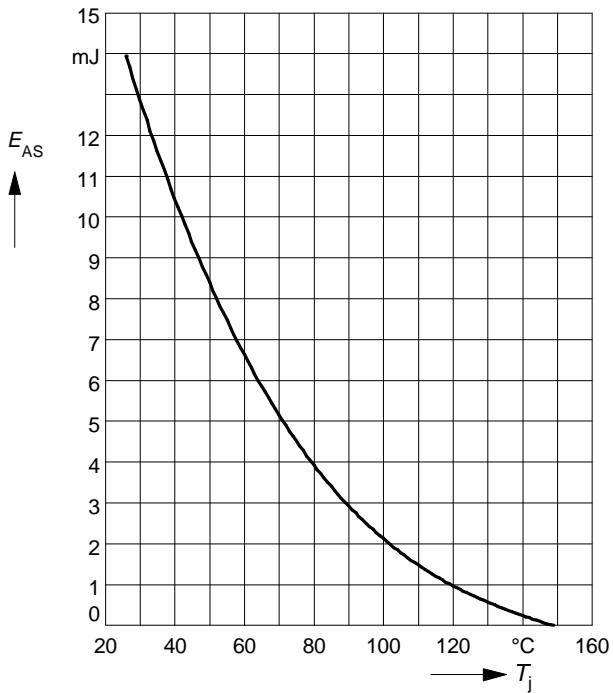
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



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

parameter:  $I_D = 30\text{ A}$ ,  $V_{DD} = 25\text{ V}$

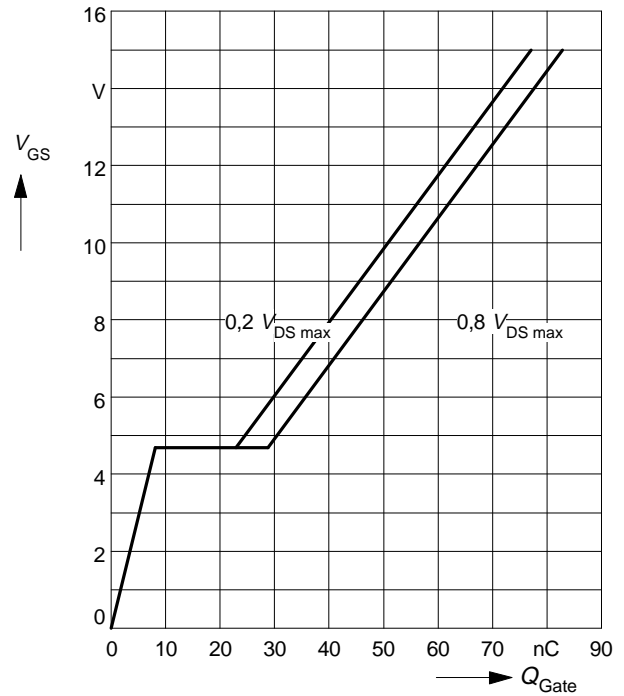
$R_{GS} = 25\ \Omega$ ,  $L = 15.6\ \mu\text{H}$



### Typ. gate charge

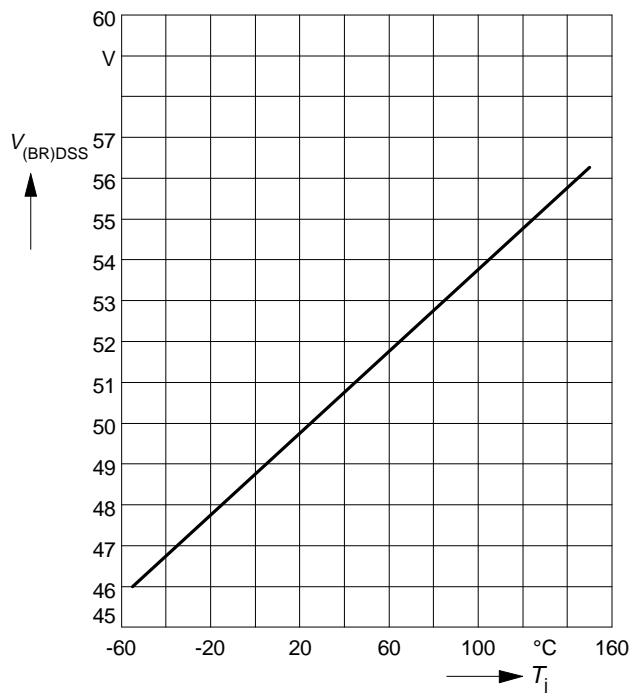
$V_{GS} = f(Q_{Gate})$

parameter:  $I_{D\text{ puls}} = 39\text{ A}$



### Drain-source breakdown voltage

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

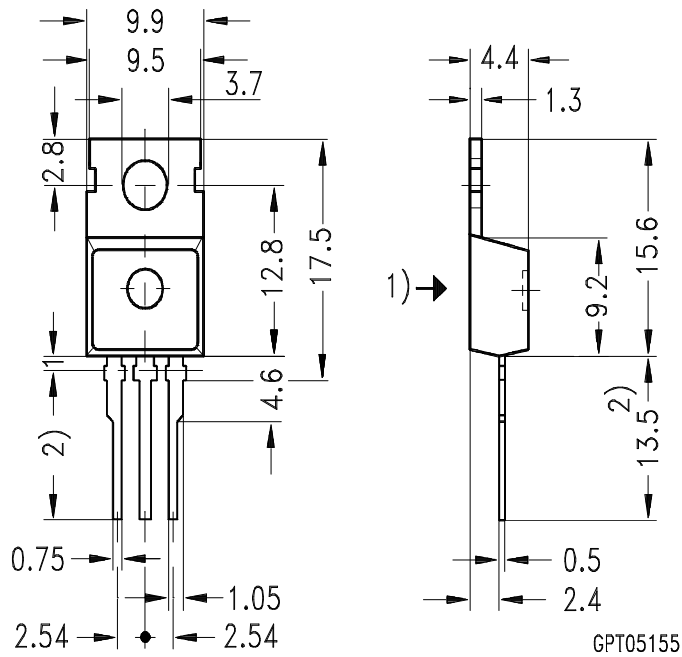




### Package Outlines

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