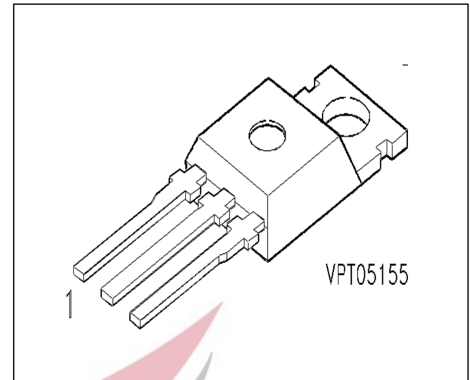
**SIEMENS** **BUZ 171**

### SIPMOS ® Power Transistor

- P 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 171 | -50 V | -8 A | 0.3 Ω | TO-220 AB | C67078-S1450-A2 |

**Maximum Ratings**

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Continuous drain current<br>$T_C$ = 30 °C | $I_D$ | <br>-8 | A |
| Pulsed drain current<br>$T_C$ = 25 °C | $I_{Dpuls}$ | <br>-32 | |
| Avalanche energy, single pulse<br>$I_D$ = -8 A, $V_{DD}$ = -25 V, $R_{GS}$ = 25 Ω<br>$L$ = 1.1 mH, $T_j$ = 25 °C | $E_{AS}$ | <br><br>70 | mJ |
| Gate source voltage | $V_{GS}$ | ± 20 | V |
| Power dissipation<br>$T_C$ = 25 °C | $P_{tot}$ | <br>40 | W |
| Operating temperature | $T_j$ | -55 ... + 150 | °C |
| Storage temperature | $T_{stg}$ | -55 ... + 150 | |
| Thermal resistance, chip case | $R_{thJC}$ | ≤ 3.1 | 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 | |

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**Electrical Characteristics,** at $T_j$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Static Characteristics** | | | | | |
| Drain- source breakdown voltage<br>$V_{GS}$ = 0 V, $I_D$ = -0.25 mA, $T_j$ = 25 °C | $V_{(BR)DSS}$ | -50 | - | - | V |
| Gate threshold voltage<br>$V_{GS}$=$V_{DS}$, $I_D$ = 1 mA | $V_{GS(th)}$ | -2.1 | -3 | -4 | |
| Zero gate voltage drain current<br>$V_{DS}$ = -50 V, $V_{GS}$ = 0 V, $T_j$ = 25 °C<br>$V_{DS}$ = -50 V, $V_{GS}$ = 0 V, $T_j$ = 125 °C | $I_{DSS}$ | -<br>- | -0.1<br>-10 | -1<br>-100 | µA |
| Gate-source leakage current<br>$V_{GS}$ = -20 V, $V_{DS}$ = 0 V | $I_{GSS}$ | - | -10 | -100 | nA |
| Drain-Source on-resistance<br>$V_{GS}$ = -10 V, $I_D$ = -5 A | $R_{DS(on)}$ | - | 0.25 | 0.3 | Ω |

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**Electrical Characteristics,** at $T_j$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance<br>$V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D$ = -5 A | $g_{fs}$ | 1.5 | 2.3 | - | S |
| Input capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{iss}$ | - | 750 | 1000 | pF |
| Output capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{oss}$ | - | 270 | 400 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{rss}$ | - | 120 | 180 | |
| Turn-on delay time<br>$V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.9 A<br>$R_{GS}$ = 50 Ω | $t_{d(on)}$ | - | 20 | 30 | ns |
| Rise time<br>$V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.9 A<br>$R_{GS}$ = 50 Ω | $t_r$ | - | 110 | 170 | |
| Turn-off delay time<br>$V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.9 A<br>$R_{GS}$ = 50 Ω | $t_{d(off)}$ | - | 70 | 90 | |
| Fall time<br>$V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.9 A<br>$R_{GS}$ = 50 Ω | $t_f$ | - | 100 | 140 | |



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**Electrical Characteristics,** at $T_j$ = 25°C, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Reverse Diode** | | | | | |
| Inverse diode continuous forward current<br>$T_C$ = 25 °C | $I_S$ | - | - | -8 | A |
| Inverse diode direct current,pulsed<br>$T_C$ = 25 °C | $I_{SM}$ | - | - | -32 | |
| Inverse diode forward voltage<br>$V_{GS}$ = 0 V, $I_F$ = -16 A | $V_{SD}$ | - | -1.25 | -1.7 | V |
| Reverse recovery time<br>$V_R$ = -30 V, $I_F$=$I_S$, $di_F/dt$ = 100 A/µs | $t_{rr}$ | - | 90 | - | ns |
| Reverse recovery charge<br>$V_R$ = -30 V, $I_F$=$I_S$, $di_F/dt$ = 100 A/µs | $Q_{rr}$ | - | 0.23 | - | µC |

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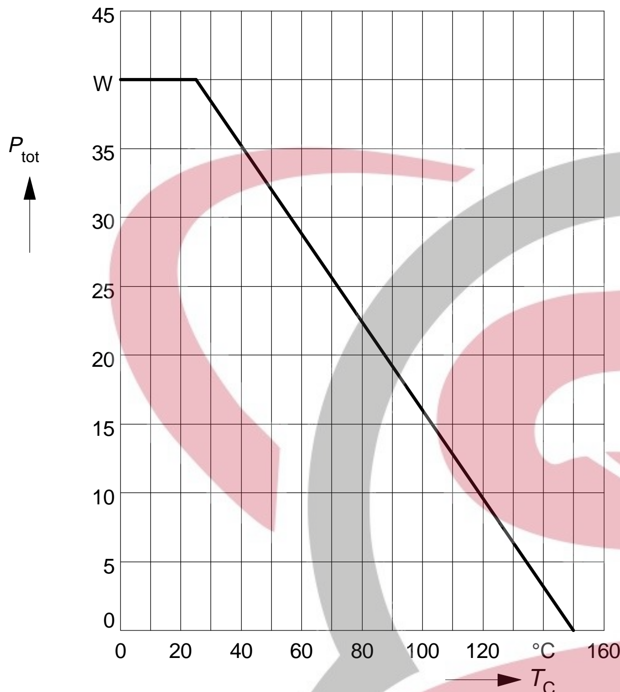
**Power dissipation**

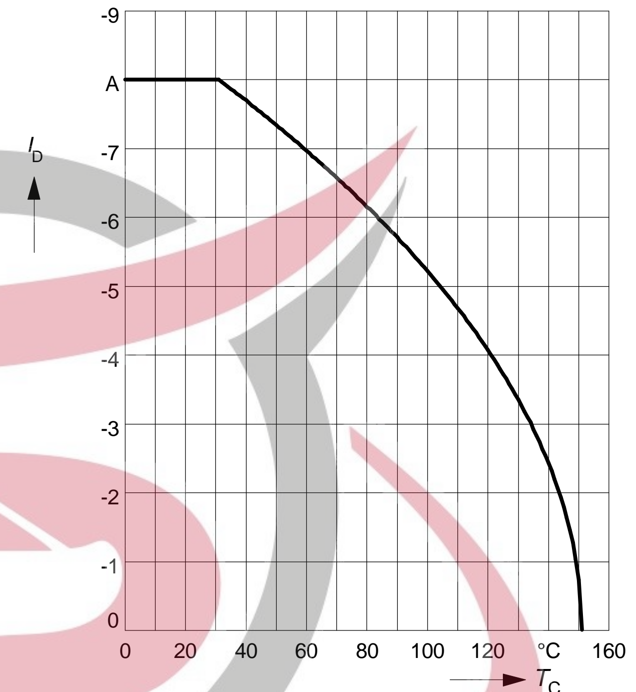
$P_{tot} = f(T_C)$




**Drain current**

$I_D = f(T_C)$

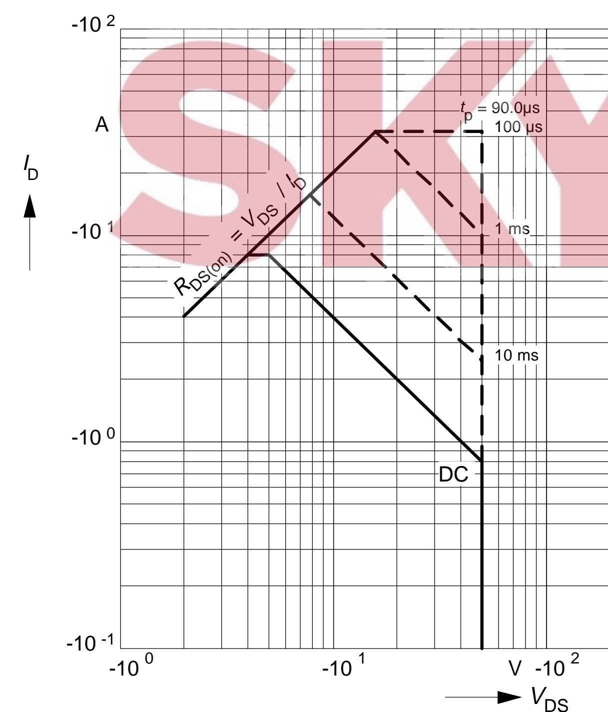
parameter: $V_{GS} \geq$ -10 V




**Safe operating area**

$I_D = f(V_{DS})$

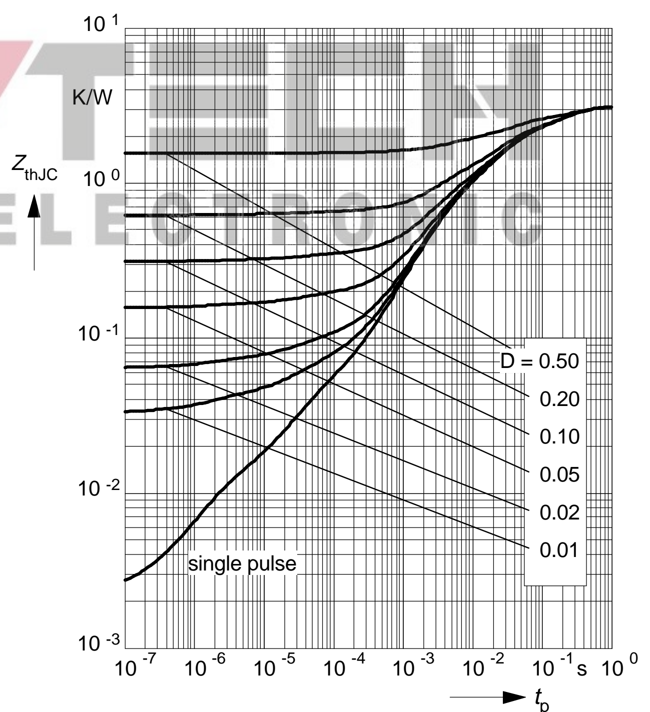
parameter: $D$ = 0.01, $T_C$ = 25°C




**Transient thermal impedance**

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

parameter: $D = t_p / T$



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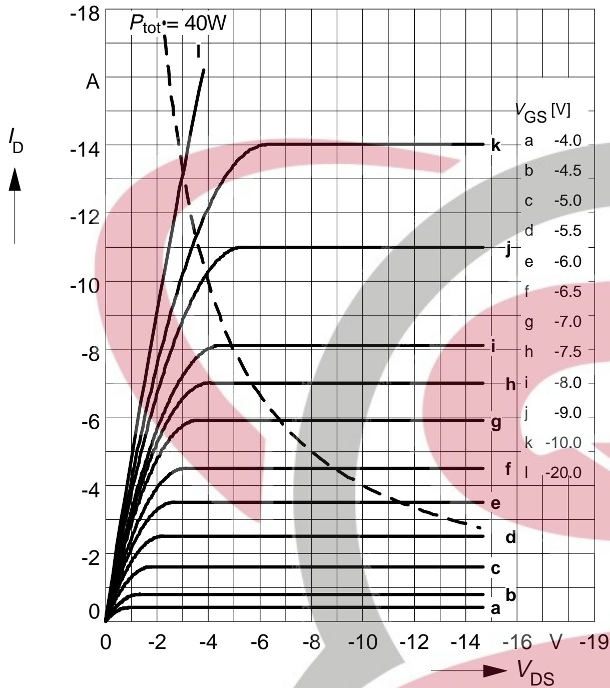
**Typ. output characteristics**

$I_D = f(V_{DS})$

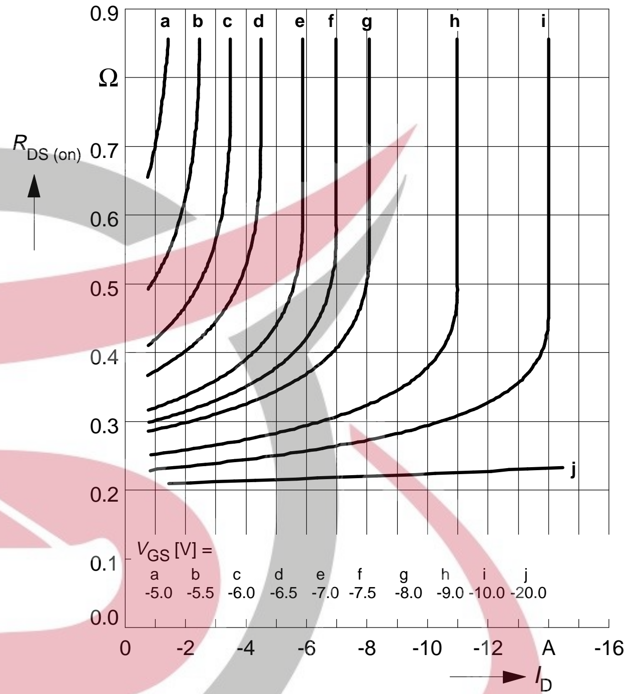
parameter: $t_p$ = 80 µs




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

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

parameter: $V_{GS}$




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

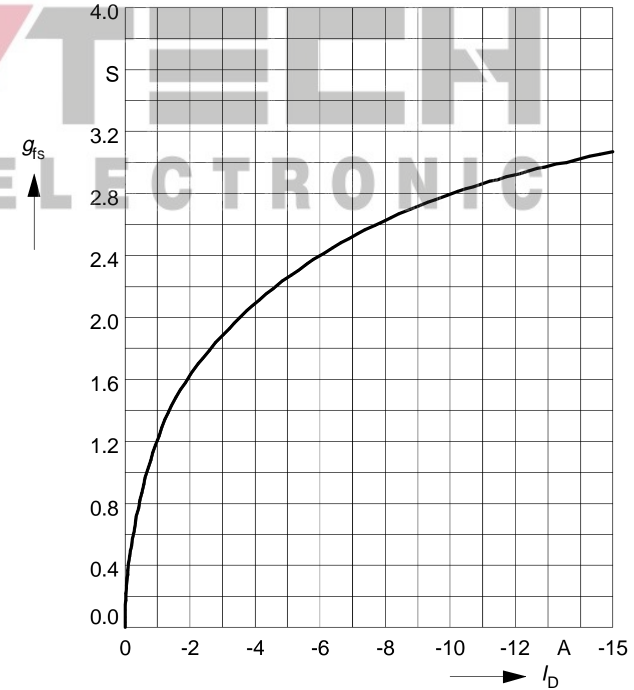
parameter: $t_p$ = 80 µs

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

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

parameter: $t_p$ = 80 µs,

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



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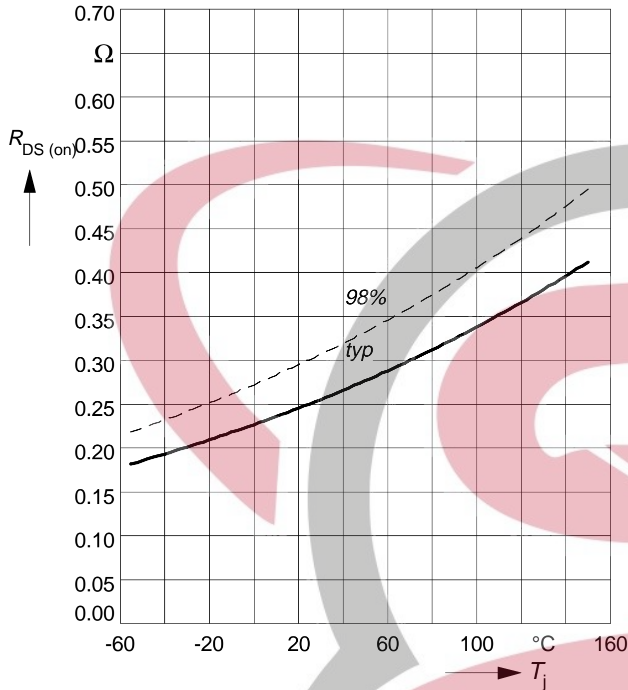
**Drain-source on-resistance**

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

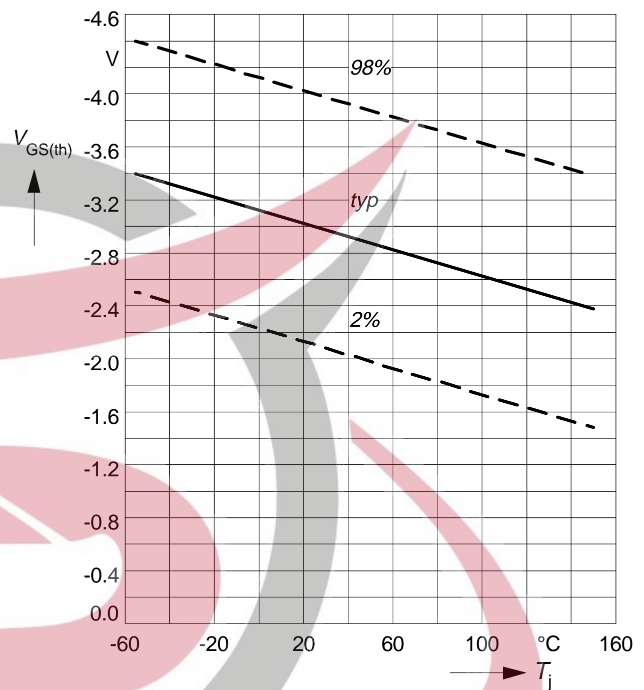
parameter: $I_D$ = -5 A, $V_{GS}$ = -10 V




**Gate threshold voltage**

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

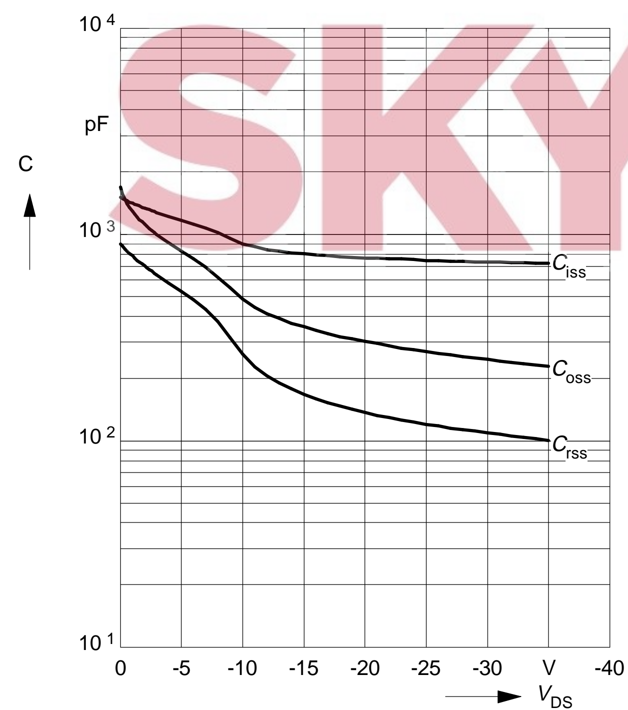
parameter: $V_{GS} = V_{DS}$, $I_D$ = 1 mA




**Typ. capacitances**

$C = f(V_{DS})$

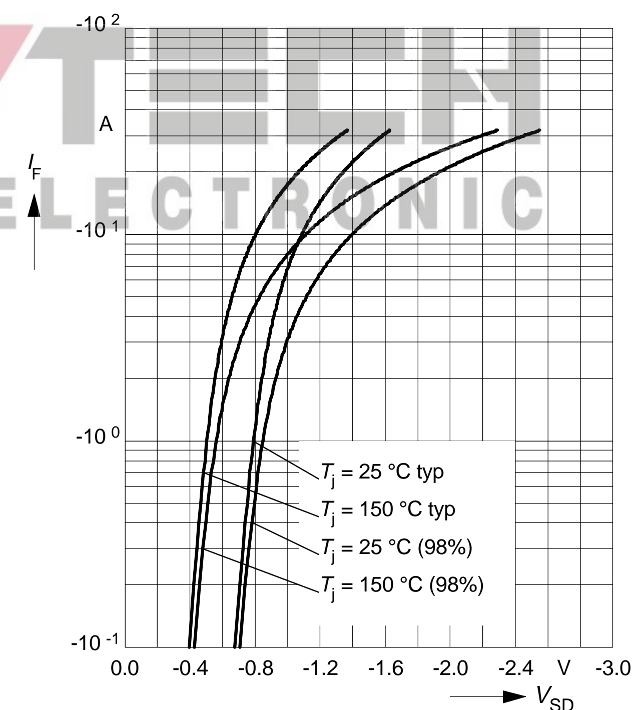
parameter: $V_{GS}$ = 0V, $f$ = 1MHz




**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

parameter: $T_j$, $t_p$ = 80 µs



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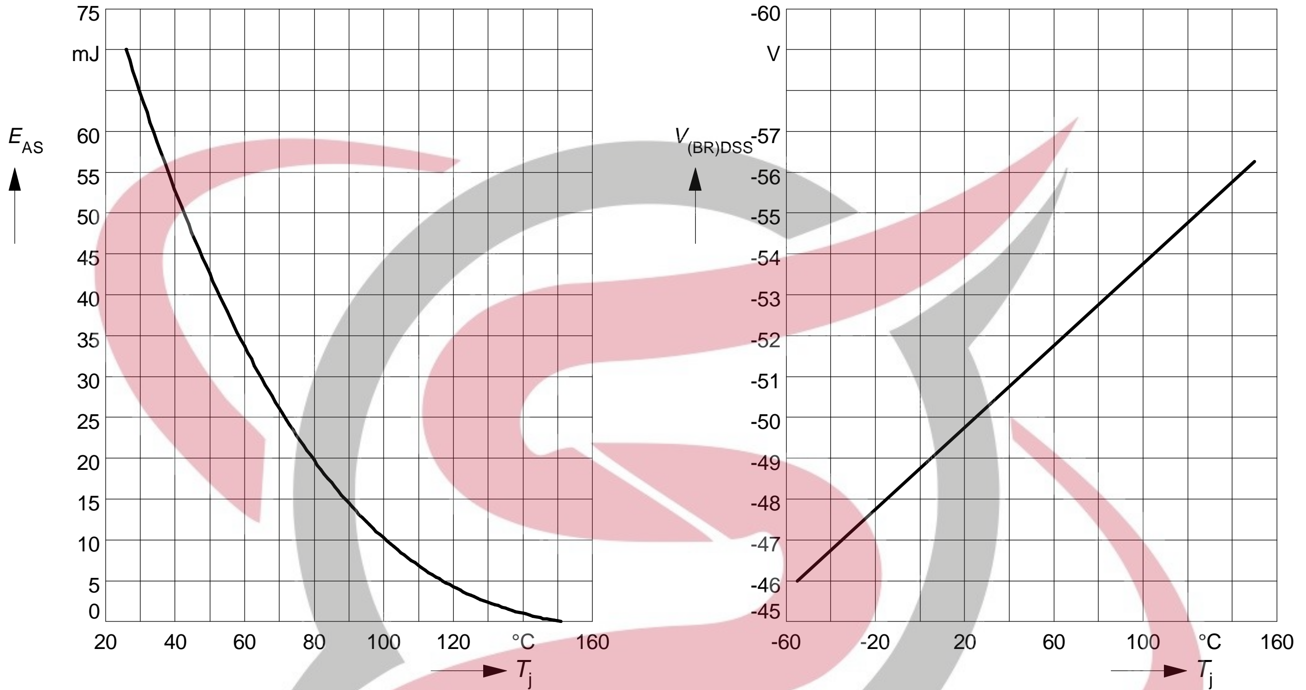
**Avalanche energy** $E_{AS} = f(T_j)$
parameter: $I_D$ = -8 A, $V_{DD}$ = -25 V
$R_{GS}$ = 25 Ω, $L$ = 1.1 mH

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



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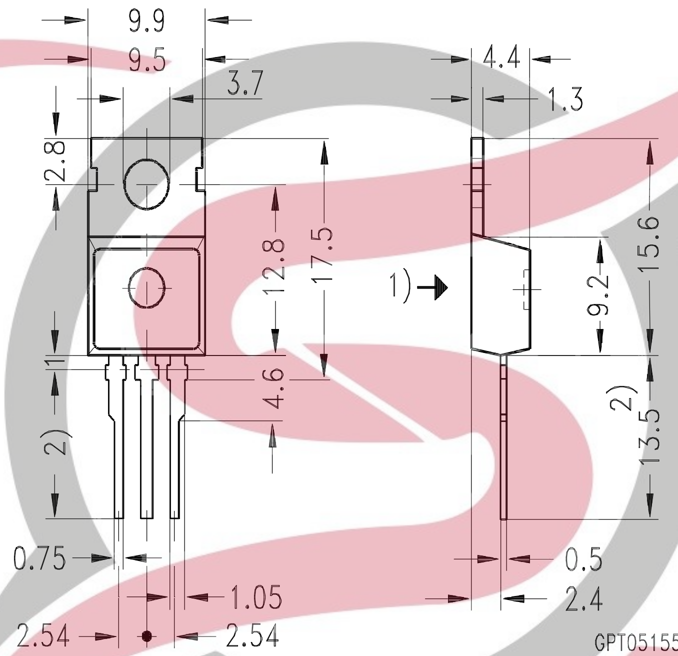
**Package Outlines**

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

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