# SIEMENS

# BUZ 271

## SIPMOS ® Power Transistor

- P channel
- Enhancement mode
- Avalanche rated

VPT05155
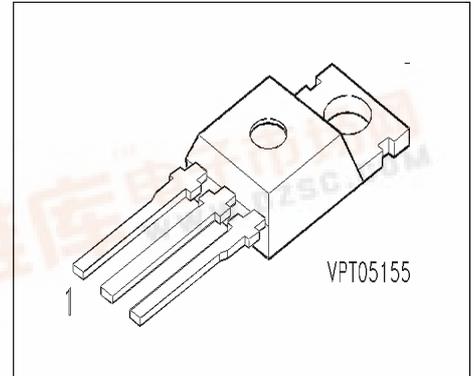
| | Pin 1 | Pin 2 | Pin 3 |
|---|---|---|---|
| | G | D | S |

| Type | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package | Ordering Code |
|---|---|---|---|---|---|
| BUZ 271 | -50 V | -22 A | 0.15 Ω | TO-220 AB | C67078-S1453-A2 |

## Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Continuous drain current $T_C$ = 26 °C | $I_D$ | -22 | A |
| Pulsed drain current $T_C$ = 25 °C | $I_{Dpuls}$ | -88 | |
| Avalanche energy, single pulse $I_D$ = -22 A, $V_{DD}$ = -25 V, $R_{GS}$ = 25 Ω $L$ = 413 µH, $T_j$ = 25 °C | $E_{AS}$ | 200 | mJ |
| Gate source voltage | $V_{GS}$ | ± 20 | V |
| Power dissipation $T_C$ = 25 °C | $P_{tot}$ | 125 | W |
| Operating temperature | $T_j$ | -55 ... + 150 | °C |
| Storage temperature | $T_{stg}$ | -55 ... + 150 | |
| Thermal resistance, chip case | $R_{thJC}$ | ≤ 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 | |

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

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Static Characteristics** | | | | | |
| Drain- source breakdown voltage | $V_{(BR)DSS}$ | | | | V |
| $V_{GS}$ = 0 V, $I_D$ = -0.25 mA, $T_j$ = 25 °C | | -50 | - | - | |
| Gate threshold voltage | $V_{GS(th)}$ | | | | |
| $V_{GS}$=$V_{DS}$, $I_D$ = 1 mA | | -2.1 | -3 | -4 | |
| Zero gate voltage drain current | $I_{DSS}$ | | | | µA |
| $V_{DS}$ = -50 V, $V_{GS}$ = 0 V, $T_j$ = 25 °C | | - | -0.1 | -1 | |
| $V_{DS}$ = -50 V, $V_{GS}$ = 0 V, $T_j$ = 125 °C | | - | -10 | -100 | |
| Gate-source leakage current | $I_{GSS}$ | | | | nA |
| $V_{GS}$ = -20 V, $V_{DS}$ = 0 V | | - | -10 | -100 | |
| Drain-Source on-resistance | $R_{DS(on)}$ | | | | Ω |
| $V_{GS}$ = -10 V, $I_D$ = -14 A | | - | 0.12 | 0.15 | |

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

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D$ = -14 A | $g_{fs}$ | 1.5 | 4 | - | S |
| Input capacitance $V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{iss}$ | - | 2000 | 2700 | pF |
| Output capacitance $V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{oss}$ | - | 650 | 975 | |
| Reverse transfer capacitance $V_{GS}$ = 0 V, $V_{DS}$ = -25 V, $f$ = 1 MHz | $C_{rss}$ | - | 250 | 375 | |
| Turn-on delay time $V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.95 A $R_{GS}$ = 50 Ω | $t_{d(on)}$ | - | 30 | 45 | ns |
| Rise time $V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.95 A $R_{GS}$ = 50 Ω | $t_r$ | - | 120 | 180 | |
| Turn-off delay time $V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.95 A $R_{GS}$ = 50 Ω | $t_{d(off)}$ | - | 130 | 175 | |
| Fall time $V_{DD}$ = -30 V, $V_{GS}$ = -10 V, $I_D$ = -2.95 A $R_{GS}$ = 50 Ω | $t_f$ | - | 140 | 190 | |

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

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Reverse Diode** | | | | | |
| Inverse diode continuous forward current $T_C$ = 25 °C | $I_S$ | - | - | -22 | A |
| Inverse diode direct current,pulsed $T_C$ = 25 °C | $I_{SM}$ | - | - | -88 | |
| Inverse diode forward voltage $V_{GS}$ = 0 V, $I_F$ = -44 A | $V_{SD}$ | - | -1.25 | -1.7 | V |
| Reverse recovery time $V_R$ = -30 V, $I_F$=$I_S$, d$i_F$/d$t$ = 100 A/µs | $t_{rr}$ | - | 90 | - | ns |
| Reverse recovery charge $V_R$ = -30 V, $I_F$=$I_S$, d$i_F$/d$t$ = 100 A/µs | $Q_{rr}$ | - | 0.23 | - | µC |

## Power dissipation

$P_{tot} = f(T_C)$
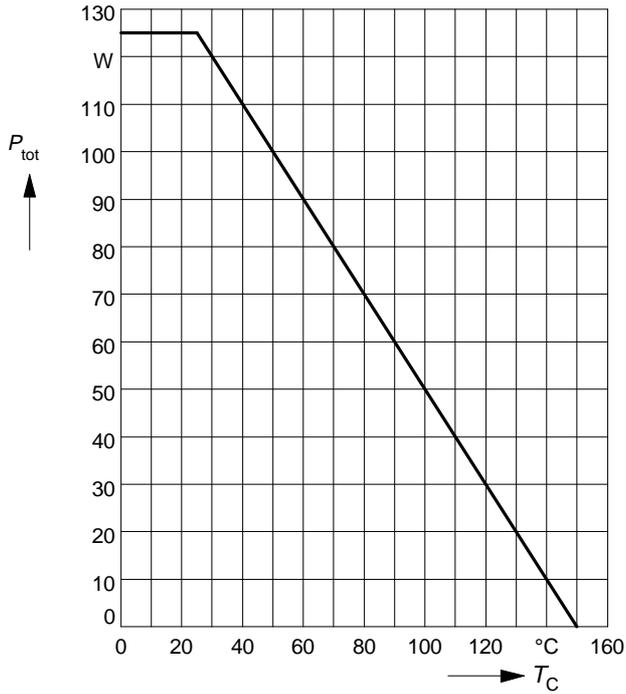


## Drain current

$I_D = f(T_C)$

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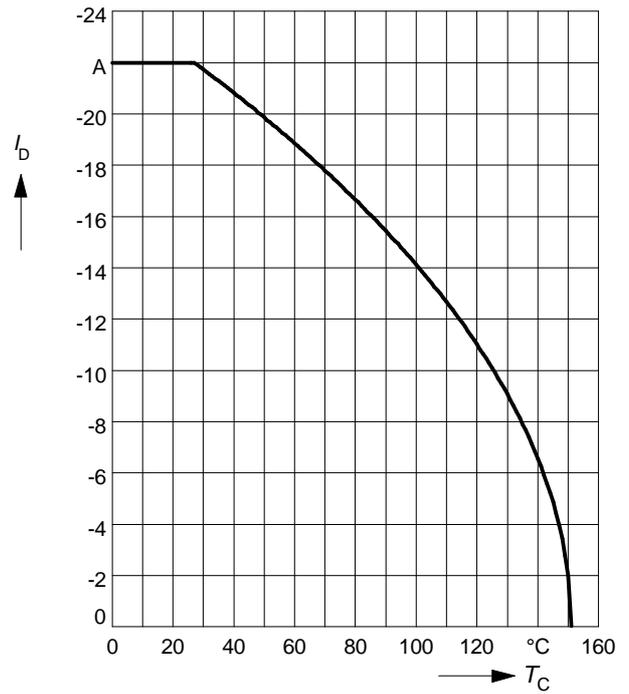


## Safe operating area

$I_D = f(V_{DS})$

parameter: $D = 0.01$, $T_C = 25°C$
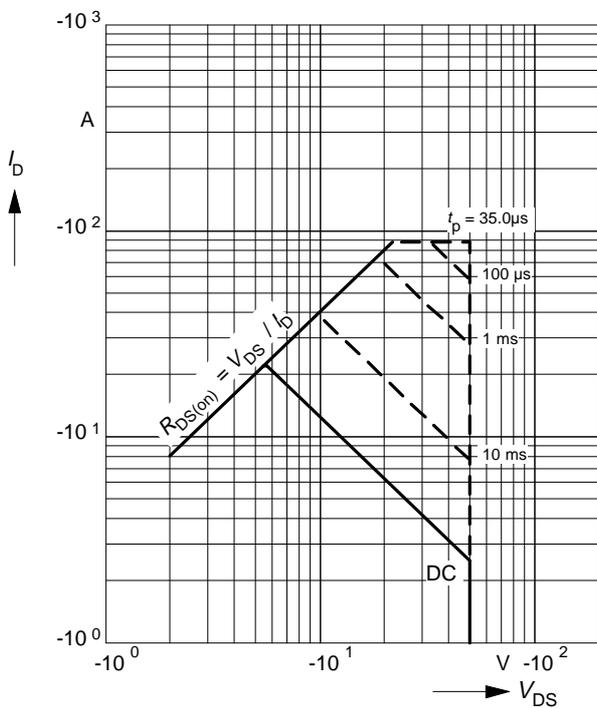


## Transient thermal impedance

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

parameter: $D = t_p / T$
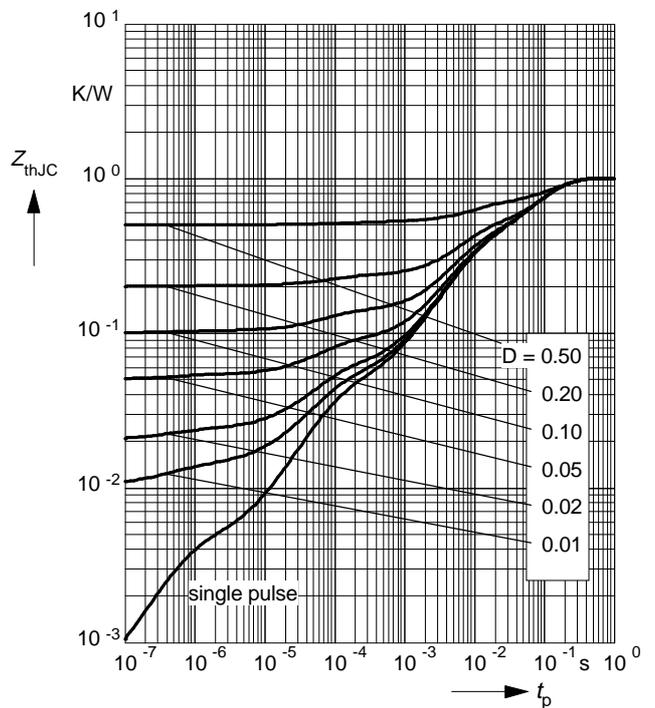
## Typ. output characteristics

$I_D = f(V_{DS})$

parameter: $t_p = 80$ µs
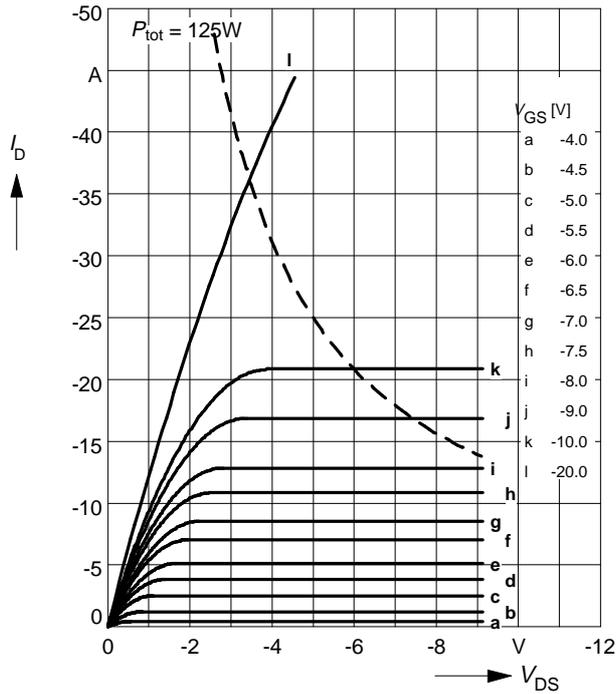


## Typ. drain-source on-resistance

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

parameter: $V_{GS}$
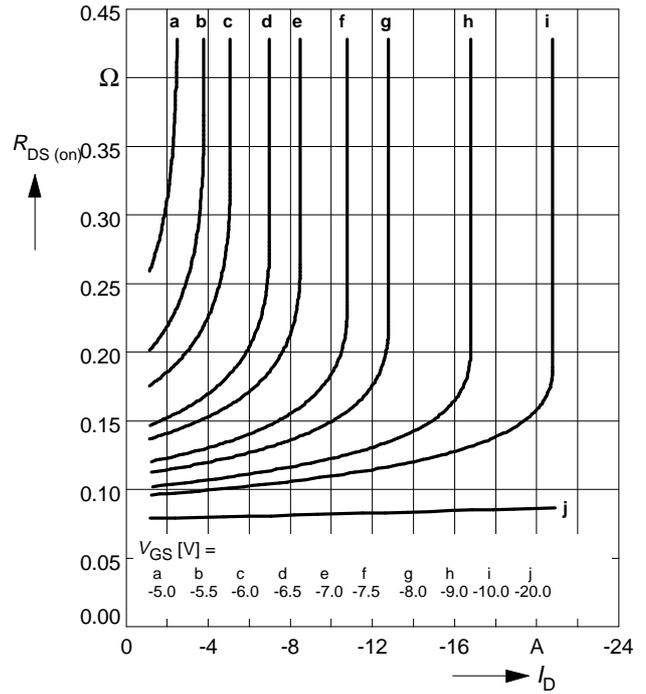


## Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p = 80$ µs
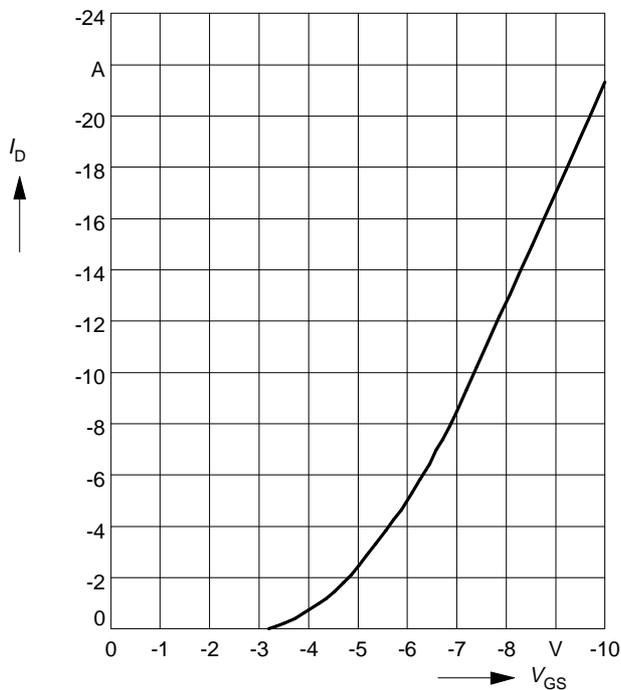
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



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

parameter: $t_p = 80$ µs,

$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$
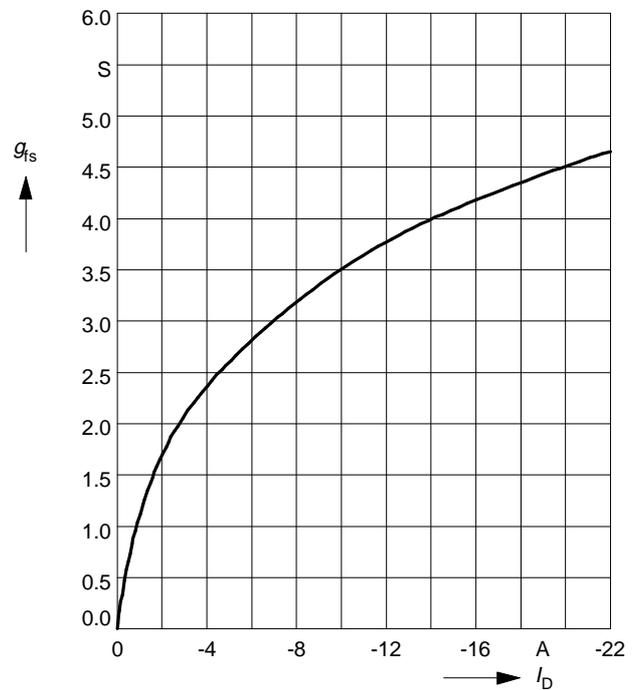
## Drain-source on-resistance

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

parameter: $I_D$ = -14 A, $V_{GS}$ = -10 V
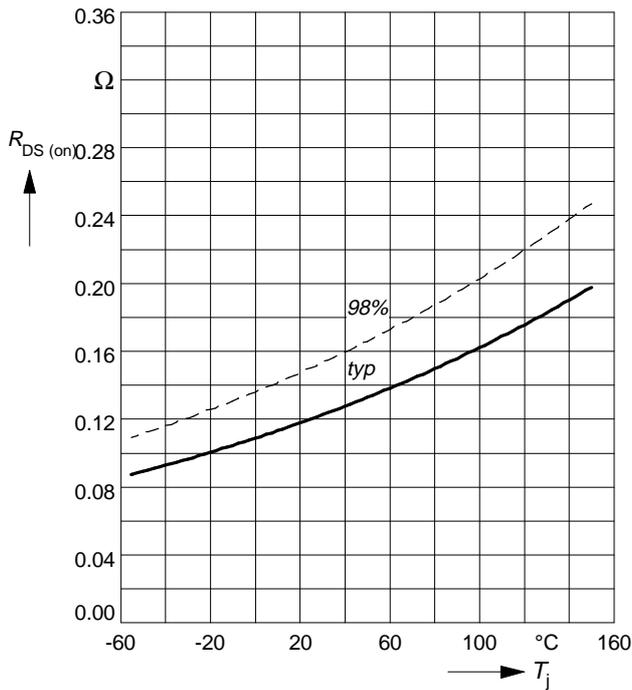


## Gate threshold voltage

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

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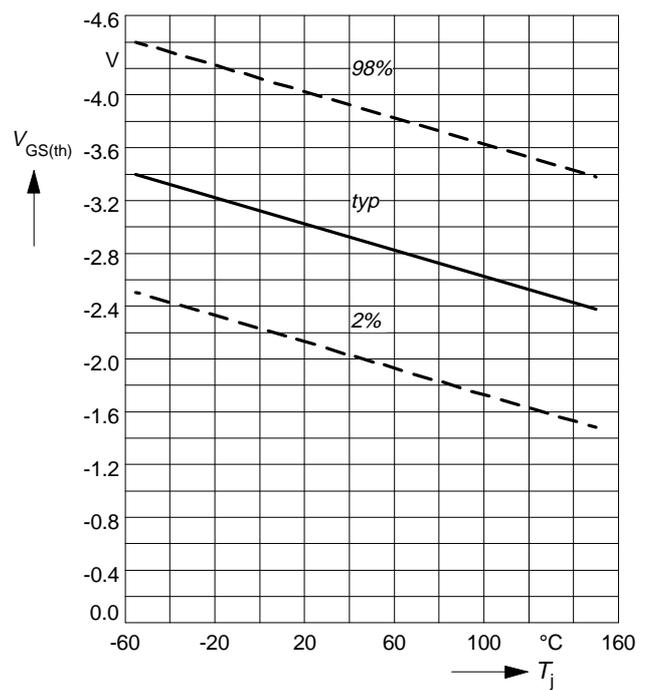


## Typ. capacitances

$C = f(V_{DS})$

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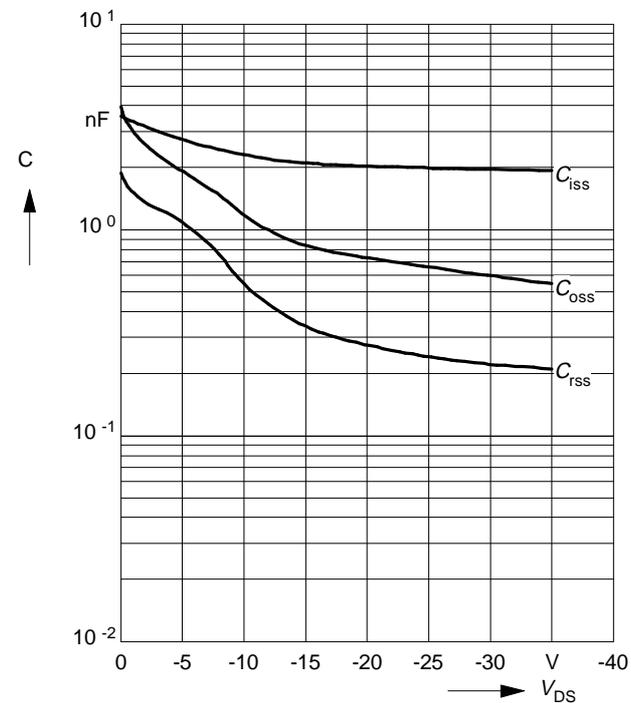


## Forward characteristics of reverse diode

$I_F = f(V_{SD})$

parameter: $T_j$, $t_p$ = 80 µs
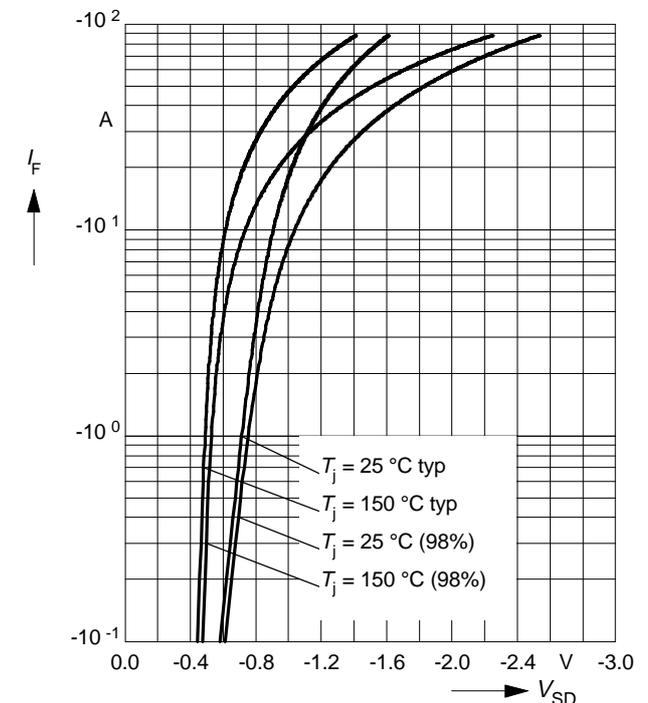
**Avalanche energy**  $E_{AS} = f(T_j)$
parameter: $I_D = -22$ A, $V_{DD} = -25$ V
$R_{GS} = 25$ Ω, $L = 413$ µH
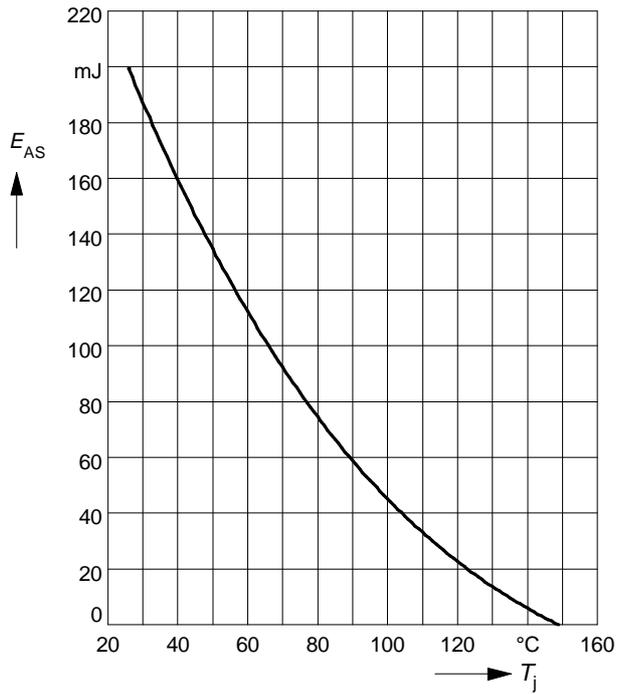
**Drain-source breakdown voltage**
$V_{(BR)DSS} = f(T_j)$
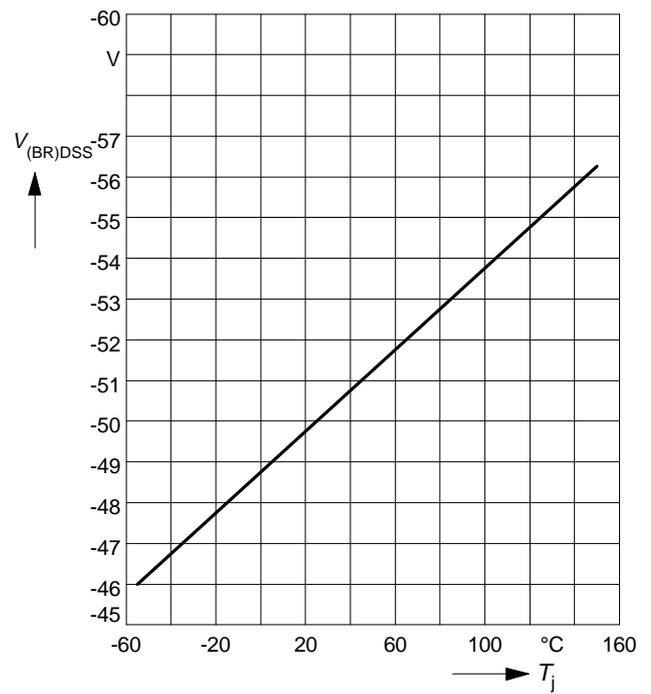
**Package Outlines**

TO-220 AB

Dimension in mm



GPT05155
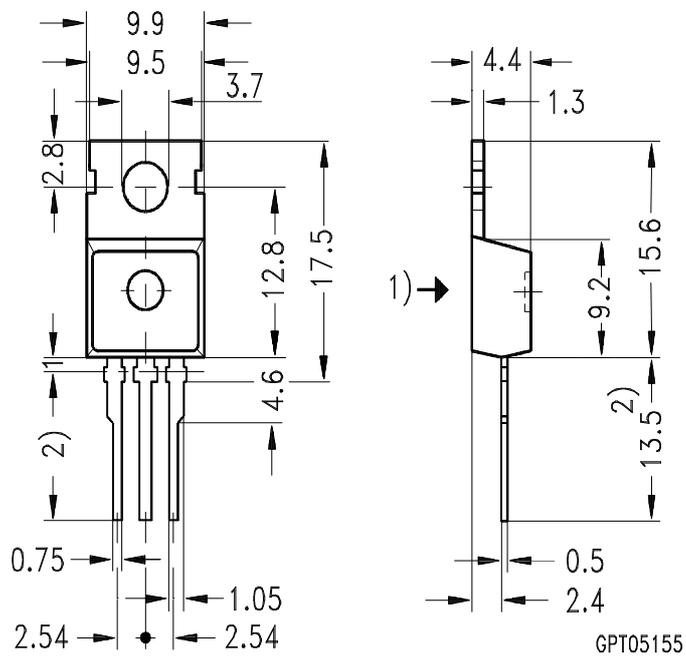
1) punch direction, burr max. 0.04
2) dip tinning
3) max. 14.5 by dip tinning press burr max. 0.05