# SIEMENS

## SIPMOS ® Power Transistor

• N channel

• Enhancement mode
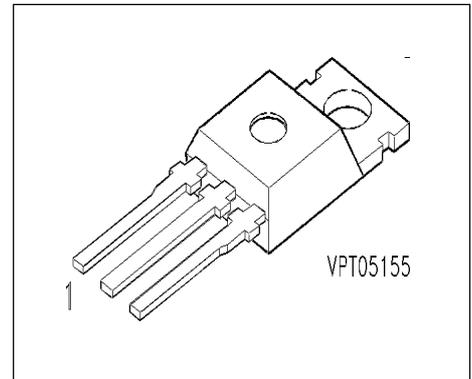


| Pin 1 | Pin 2 | Pin 3 |
|-------|-------|-------|
| G | D | S |

| Type | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package | Ordering Code |
|------|----------|-------|--------------|---------|---------------|
| BUZ 50 A | 1000 V | 2.5 A | 5 Ω | TO-220 AB | C67078-A1307-A3 |

## Maximum Ratings

| Parameter | Symbol | Values | Unit |
|-----------|--------|--------|------|
| Drain source voltage | $V_{DS}$ | 1000 | V |
| Drain-gate voltage $R_{GS} = 20 \text{ k}\Omega$ | $V_{DGR}$ | 1000 | |
| Continuous drain current $T_C = 25\ °C$ | $I_D$ | 2.5 | A |
| Pulsed drain current $T_C = 25\ °C$ | $I_{Dpuls}$ | 10 | |
| Gate source voltage | $V_{GS}$ | ± 20 | V |
| Power dissipation $T_C = 25\ °C$ | $P_{tot}$ | 75 | W |
| Operating temperature | $T_j$ | -55 ... ...+ 150 | °C |
| Storage temperature | $T_{stg}$ | -55 ... ...+ 150 | |
| Thermal resistance, chip case | $R_{thJC}$ | ≤ 1.6 | 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 $V_{GS} = 0$ V, $I_D = 0.25$ mA, $T_j = 25$ °C | $V_{(BR)DSS}$ | 1000 | - | - | V |
| Gate threshold voltage $V_{GS} = V_{DS}$, $I_D = 1$ mA | $V_{GS(th)}$ | 2.1 | 3 | 4 | |
| Zero gate voltage drain current $V_{DS} = 1000$ V, $V_{GS} = 0$ V, $T_j = 25$ °C $V_{DS} = 1000$ V, $V_{GS} = 0$ V, $T_j = 125$ °C | $I_{DSS}$ | - - | 20 100 | 250 1000 | µA |
| Gate-source leakage current $V_{GS} = 20$ V, $V_{DS} = 0$ V | $I_{GSS}$ | - | 10 | 100 | nA |
| Drain-Source on-resistance $V_{GS} = 10$ V, $I_D = 1.5$ A | $R_{DS(on)}$ | - | 4.5 | 5 | Ω |

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

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance $V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D = 1.5$ A | $g_{fs}$ | 0.7 | 1.5 | - | S |
| Input capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{iss}$ | - | 1600 | 2100 | pF |
| Output capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{oss}$ | - | 70 | 120 | |
| Reverse transfer capacitance $V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{rss}$ | - | 30 | 55 | |
| Turn-on delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2$ A $R_{GS} = 50$ $\Omega$ | $t_{d(on)}$ | - | 30 | 45 | ns |
| Rise time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2$ A $R_{GS} = 50$ $\Omega$ | $t_r$ | - | 40 | 60 | |
| Turn-off delay time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2$ A $R_{GS} = 50$ $\Omega$ | $t_{d(off)}$ | - | 110 | 140 | |
| Fall time $V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2$ A $R_{GS} = 50$ $\Omega$ | $t_f$ | - | 60 | 80 | |

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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 $T_C$ = 25 °C | $I_S$ | - | - | 2.5 | A |
| Inverse diode direct current, pulsed $T_C$ = 25 °C | $I_{SM}$ | - | - | 10 | |
| Inverse diode forward voltage $V_{GS}$ = 0 V, $I_F$ = 6 A | $V_{SD}$ | - | 1.05 | 1.3 | V |
| Reverse recovery time $V_R$ = 100 V, $I_F$=$I_S$, d$i_F$/d$t$ = 100 A/µs | $t_{rr}$ | - | 2 | - | µs |
| Reverse recovery charge $V_R$ = 100 V, $I_F$=$I_S$, d$i_F$/d$t$ = 100 A/µs | $Q_{rr}$ | - | 15 | - | µC |

## Power dissipation

$P_{tot} = f(T_C)$
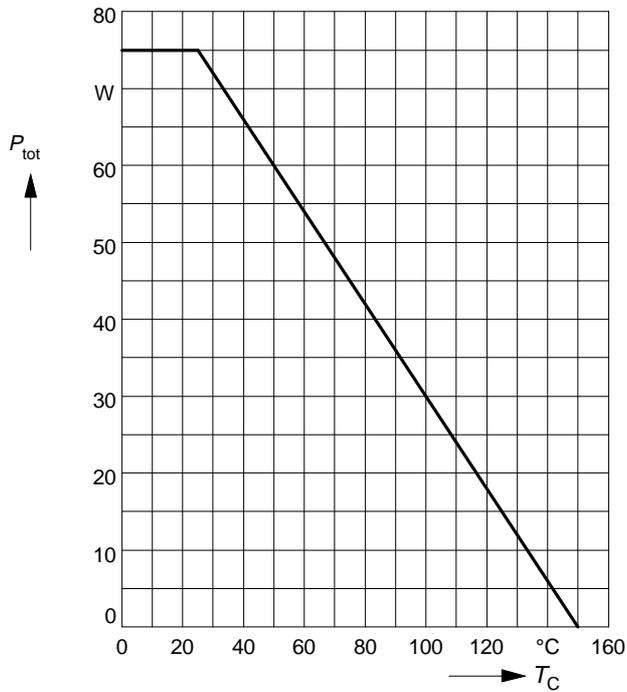


## Drain current

$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V
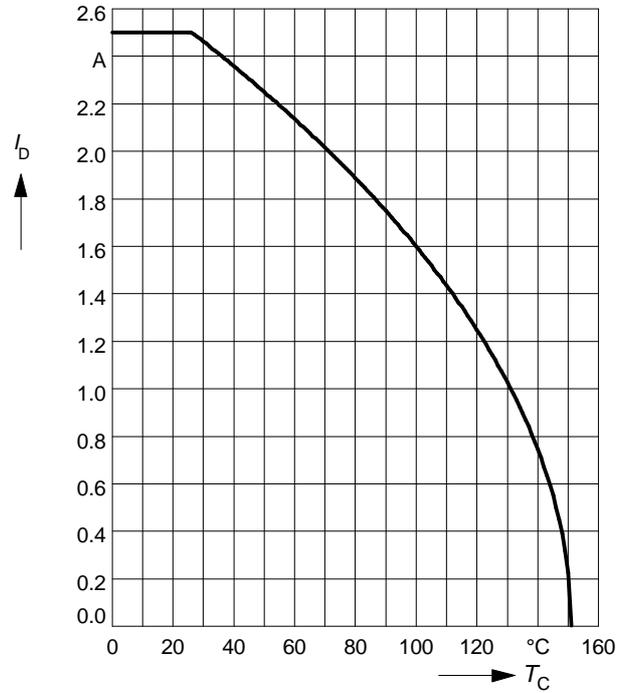


## Safe operating area

$I_D = f(V_{DS})$
parameter: $D = 0.01$, $T_C = 25°C$
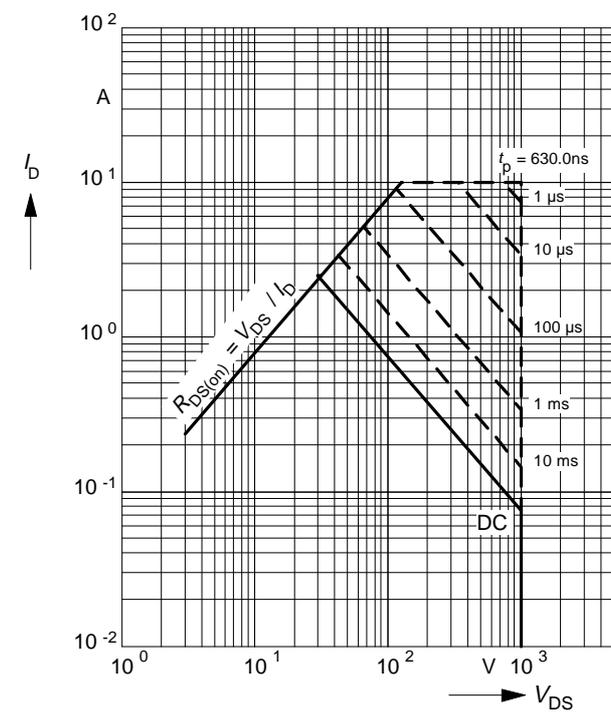


## Transient thermal impedance

$Z_{th\ JC} = f(t_p)$
parameter: $D = t_p / T$
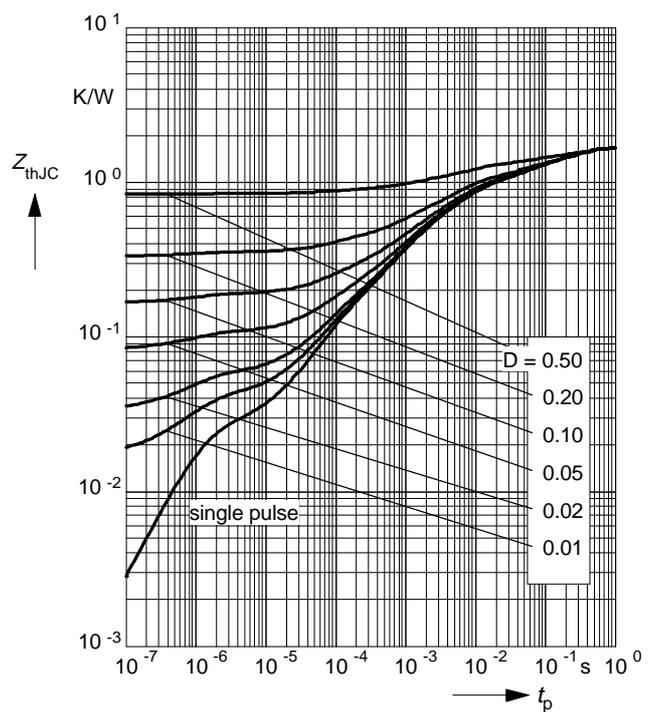
## Typ. output characteristics

$I_D = f(V_{DS})$
parameter: $t_p = 80\ \mu s$

$P_{tot} = 75W$

$V_{GS}$ [V]
| | |
|---|---|
| a | 4.0 |
| b | 4.5 |
| c | 5.0 |
| d | 5.5 |
| e | 6.0 |
| f | 6.5 |
| g | 7.0 |
| h | 7.5 |
| i | 8.0 |
| j | 9.0 |
| k | 10.0 |
| l | 20.0 |
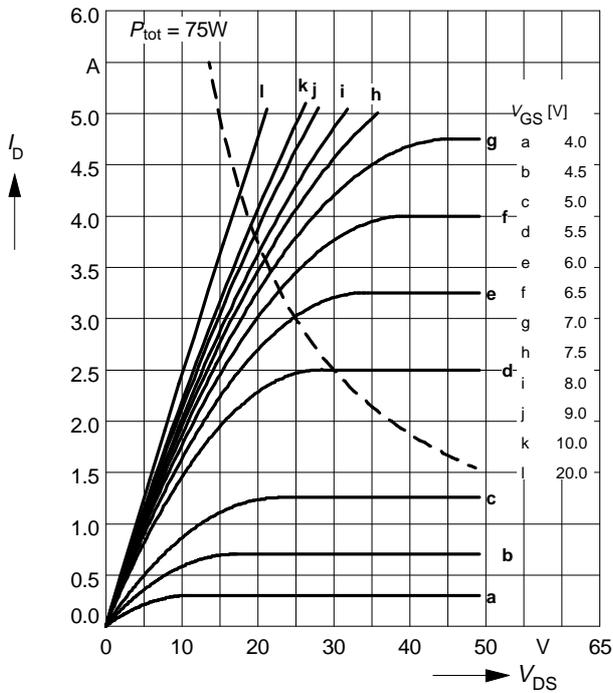
## Typ. drain-source on-resistance

$R_{DS\,(on)} = f(I_D)$
parameter: $V_{GS}$

$V_{GS}$ [V] =
| a | b | c | d | e | f | g | h | i | j | k |
|---|---|---|---|---|---|---|---|---|---|---|
| 4.5 | 5.0 | 5.5 | 6.0 | 6.5 | 7.0 | 7.5 | 8.0 | 9.0 | 10.0 | 20.0 |
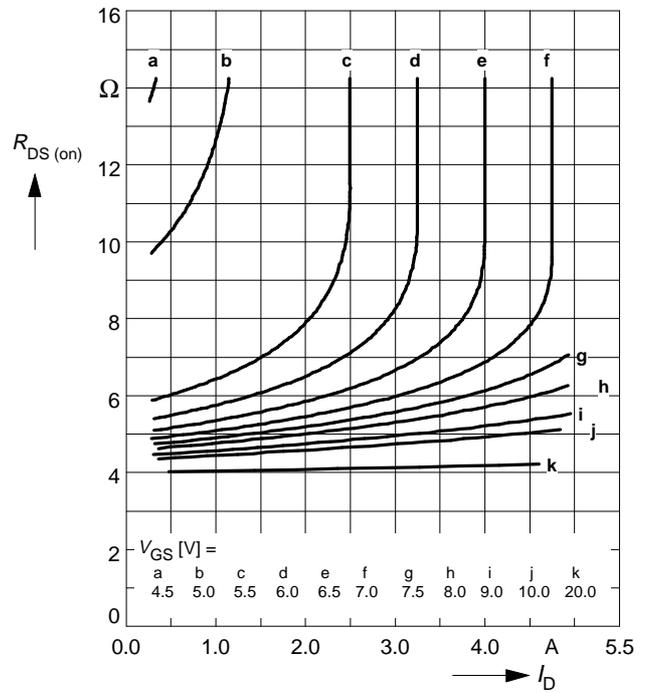
## Typ. transfer characteristics $I_D = f(V_{GS})$
parameter: $t_p = 80\ \mu s$
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$
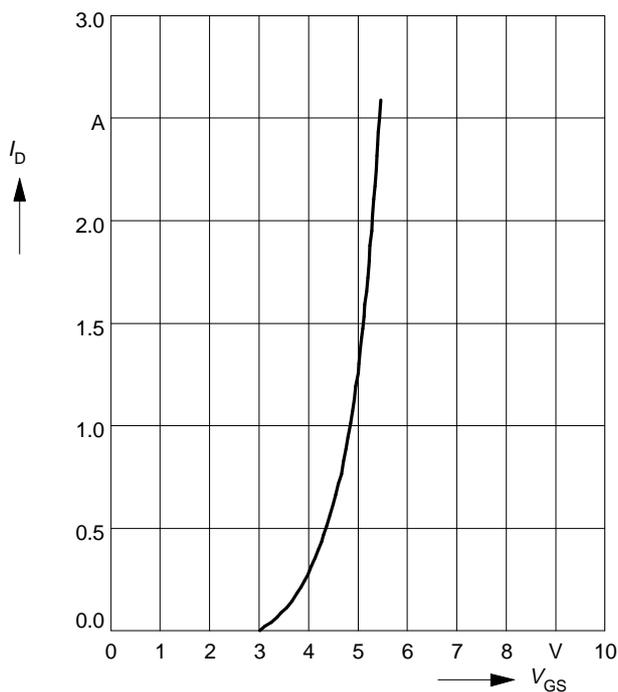
## Typ. forward transconductance $g_{fs} = f(I_D)$
parameter: $t_p = 80\ \mu s$,
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$
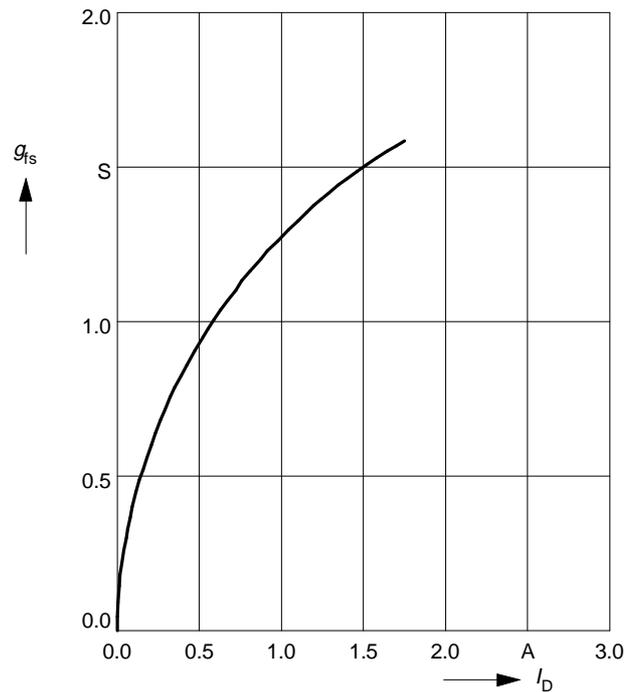
## Drain-source on-resistance

$R_{DS\,(on)} = f(T_j)$
parameter: $I_D = 1.5\ A$, $V_{GS} = 10\ V$
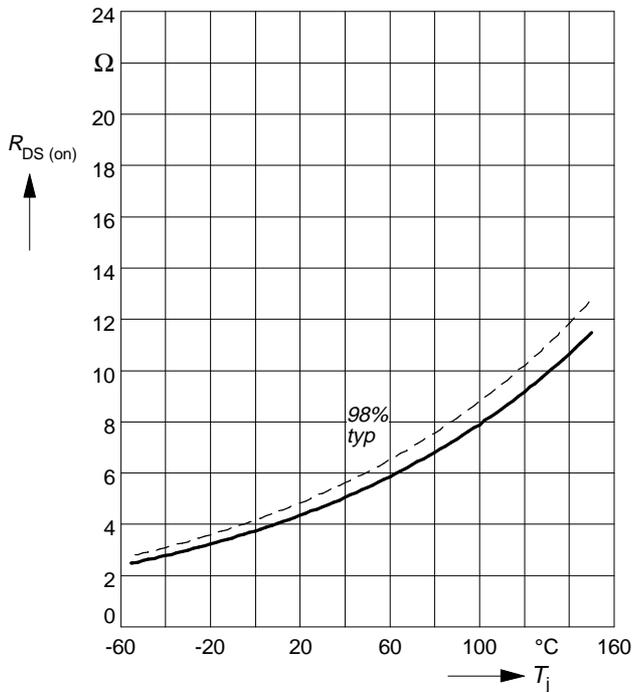
## Gate threshold voltage

$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D = 1\ mA$
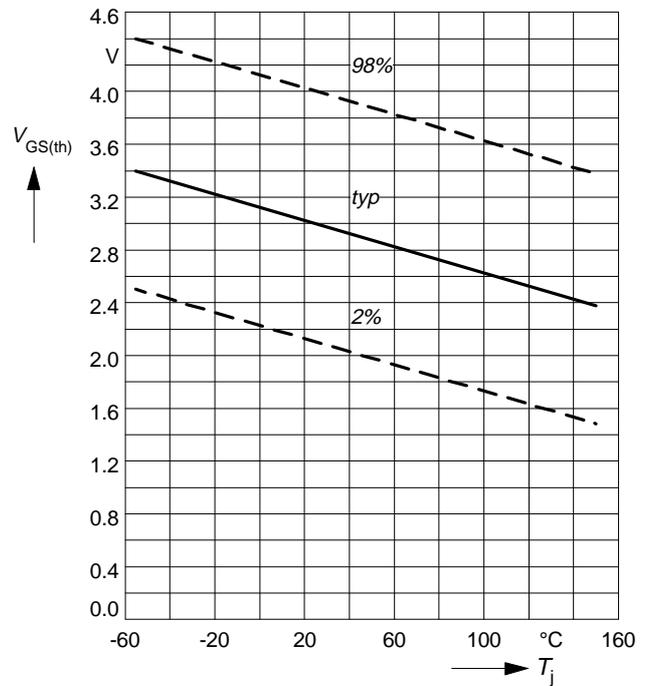
## Typ. capacitances

$C = f(V_{DS})$
parameter: $V_{GS} = 0V$, $f = 1MHz$
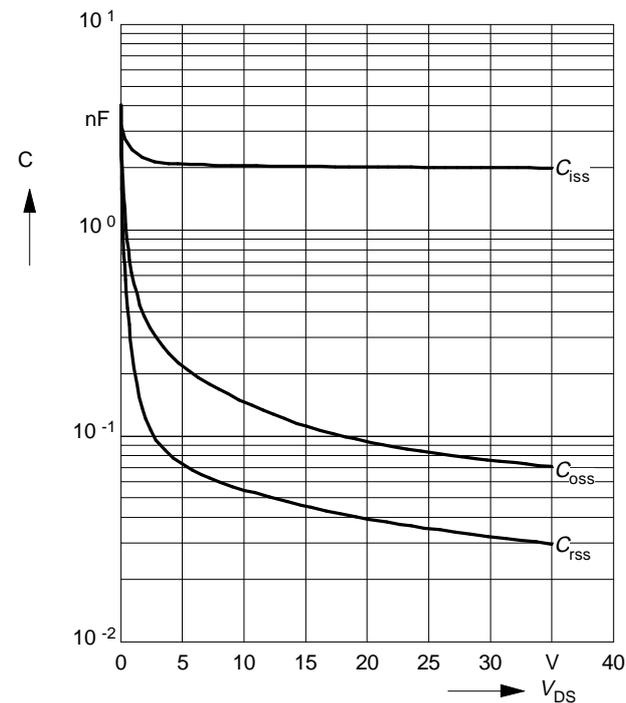
## Forward characteristics of reverse diode

$I_F = f(V_{SD})$
parameter: $T_j$, $t_p = 80\ \mu s$
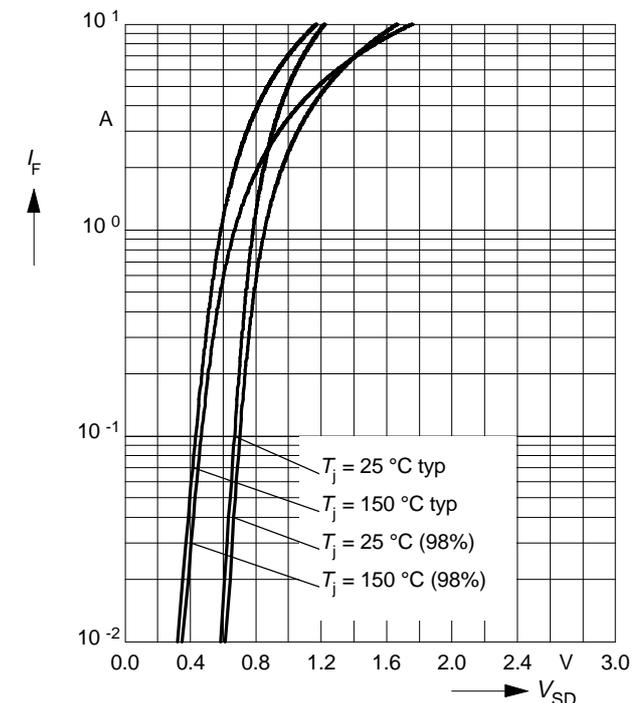
**Drain-source breakdown voltage**

$V_{(BR)DSS} = f(T_j)$
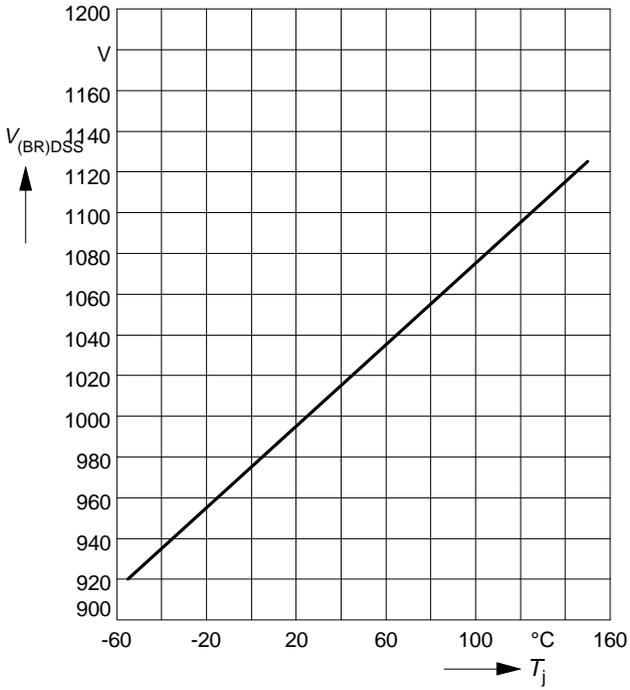
**Typ. gate charge**

$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls} = 4$ A

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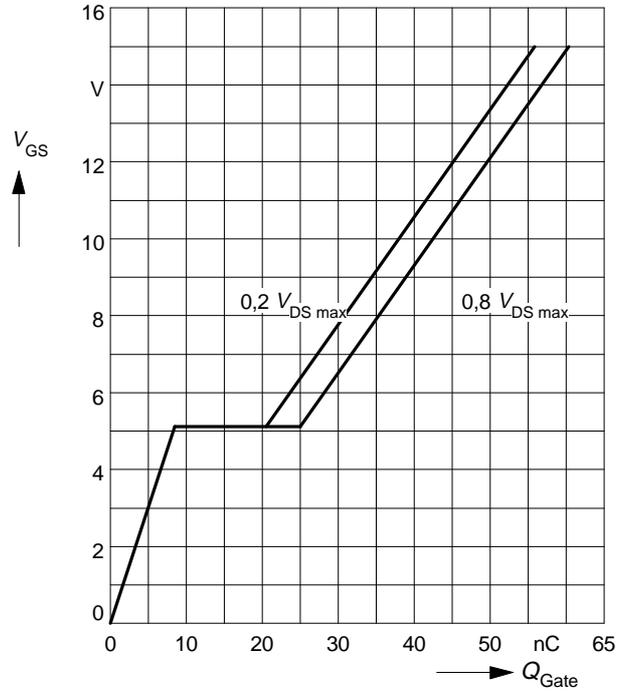
**Package Outlines**

TO-220 AB

Dimension in mm



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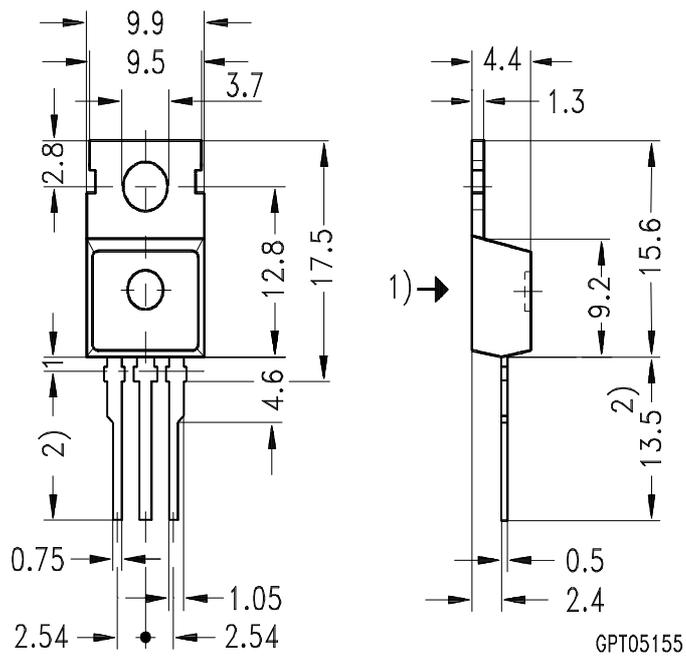
1) punch direction, burr max. 0.04
2) dip tinning
3) max. 14.5 by dip tinning press burr max. 0.05