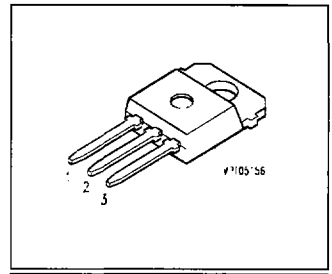
**SIPMOS® Power Transistor**

- N channel
- Enhancement mode
- FREDFET



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

| Type | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package | Ordering Code |
|---|---|---|---|---|---|
| BUZ 382 | 400 V | 12.5 A | 0.4 Ω | TO-218 AA | C67078-A3207-A2 |

**Maximum Ratings**

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Drain source voltage | $V_{DS}$ | 400 | V |
| Drain-gate voltage<br>$R_{GS}$ = 20 kΩ | $V_{DGR}$ | 400 | |
| Continuous drain current<br>$T_C$ = 30 °C | $I_D$ | 12.5 | A |
| Pulsed drain current<br>$T_C$ = 25 °C | $I_{Dpuls}$ | 50 | |
| Gate source voltage | $V_{GS}$ | ± 20 | V |
| Power dissipation<br>$T_C$ = 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<br>$V_{GS}$ = 0 V, $I_D$ = 0.25 mA, $T_j$ = 25 °C | $V_{(BR)DSS}$ | 400 | - | - | V |
| Gate threshold voltage<br>$V_{GS}$=$V_{DS}$, $I_D$ = 1 mA | $V_{GS(th)}$ | 2.1 | 3.5 | 4 | |
| Zero gate voltage drain current<br>$V_{DS}$ = 400 V, $V_{GS}$ = 0 V, $T_j$ = 25 °C<br>$V_{DS}$ = 400 V, $V_{GS}$ = 0 V, $T_j$ = 125 °C | $I_{DSS}$ | -<br>- | 20<br>100 | 250<br>1000 | 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, $I_D$ = 8 A | $R_{DS(on)}$ | - | 0.35 | 0.4 | Ω |

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

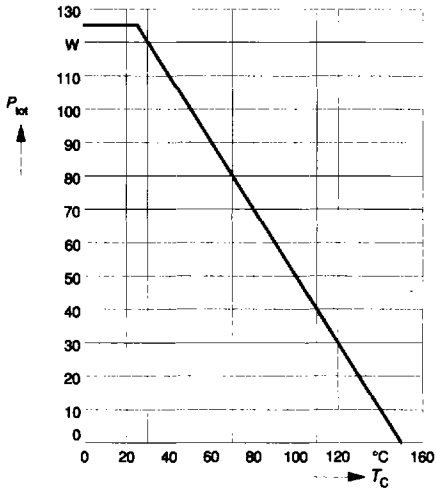
| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance<br>$V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 8$ A | $g_{fs}$ | 3.3 | 6.2 | - | S |
| Input capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{iss}$ | - | 3800 | 4900 | pF |
| Output capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{oss}$ | - | 300 | 500 | |
| Reverse transfer capacitance<br>$V_{GS} = 0$ V, $V_{DS} = 25$ V, $f = 1$ MHz | $C_{rss}$ | - | 120 | 200 | |
| Turn-on delay time<br>$V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2.9$ A<br>$R_{GS} = 50$ Ω | $t_{d(on)}$ | - | 50 | 75 | ns |
| Rise time<br>$V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2.9$ A<br>$R_{GS} = 50$ Ω | $t_r$ | - | 80 | 120 | |
| Turn-off delay time<br>$V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2.9$ A<br>$R_{GS} = 50$ Ω | $t_{d(off)}$ | - | 330 | 430 | |
| Fall time<br>$V_{DD} = 30$ V, $V_{GS} = 10$ V, $I_D = 2.9$ A<br>$R_{GS} = 50$ Ω | $t_f$ | - | 110 | 140 | |

**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 | $I_S$ | - | - | 12.5 | A |
| Inverse diode direct current,pulsed<br>$T_C$ = 25 °C | $I_{SM}$ | - | - | 50 | |
| Inverse diode forward voltage<br>$V_{GS}$ = 0 V, $I_F$ = 25 A | $V_{SD}$ | - | 1.3 | 1.7 | V |
| Reverse recovery time<br>$V_R$ = 100 V, $I_F$=$I_S$, $di_F/dt$ = 100 A/µs | $t_{rr}$ | - | 180 | 250 | ns |
| Reverse recovery charge<br>$V_R$ = 100 V, $I_F$=$I_S$, $di_F/dt$ = 100 A/µs | $Q_{rr}$ | - | 0.65 | 1.2 | µC |

**Power dissipation**

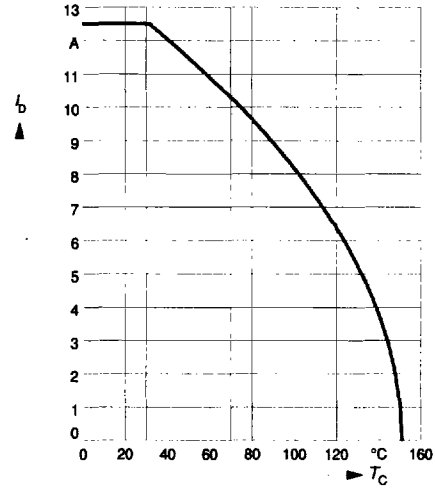
$P_{tot} = f(T_C)$




**Drain current**

$I_D = f(T_C)$

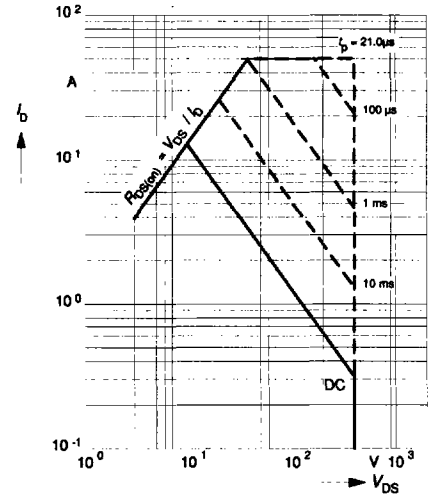
parameter: $V_{GS} \geq 10$ V




**Safe operating area**

$I_D = f(V_{DS})$

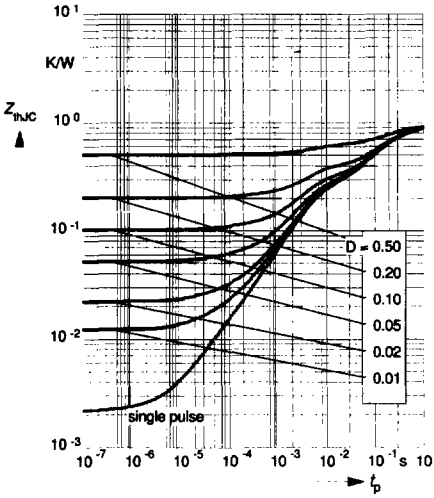
parameter: $D = 0.01$, $T_C = 25$°C



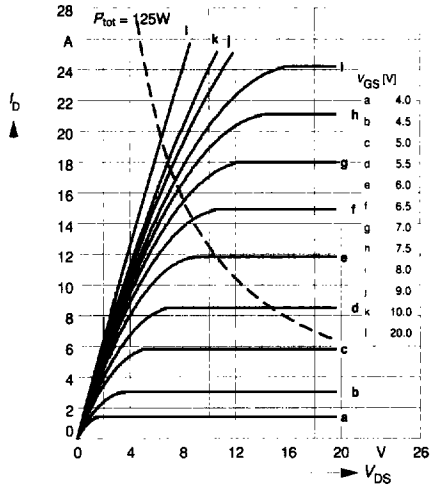

**Transient thermal impedance**

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

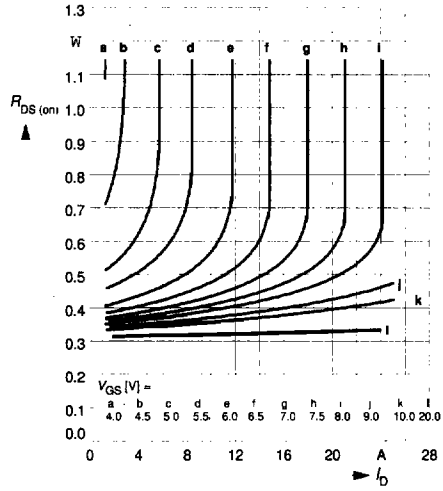
parameter: $D = t_p / T$



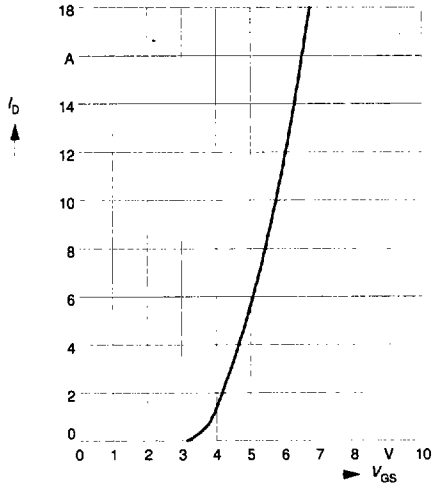
**Typ. output characteristics**
$I_D = f(V_{DS})$
parameter: $t_p$ = 80 µs



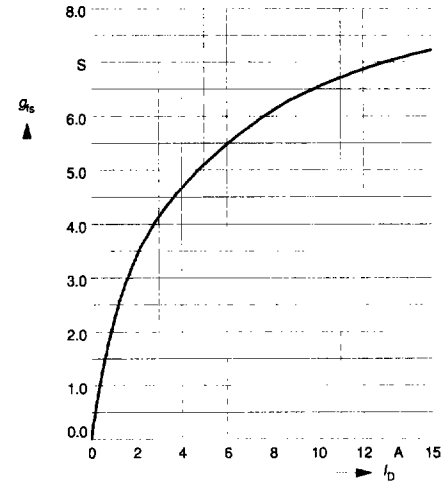

**Typ. drain-source on-resistance**
$R_{DS\,(on)} = f(I_D)$
parameter: $V_{GS}$




**Typ. transfer characteristics** $I_D = f(V_{GS})$
parameter: $t_p$ = 80 µs
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



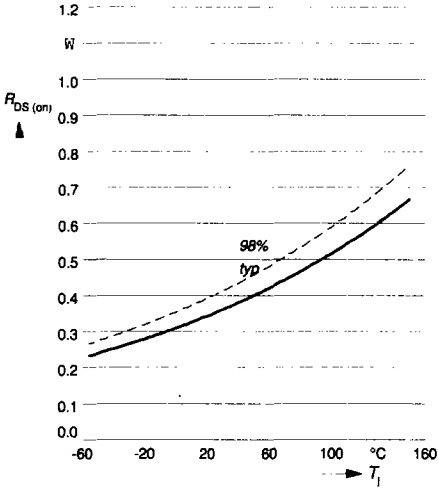

**Typ. forward transconductance** $g_{fs} = f(I_D)$
parameter: $t_p$ = 80 µs,
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$



**Drain-source on-resistance**

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

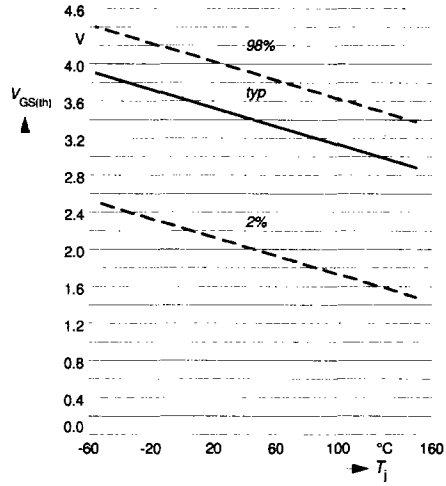
parameter: $I_D = 8$ A, $V_{GS} = 10$ V




**Gate threshold voltage**

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

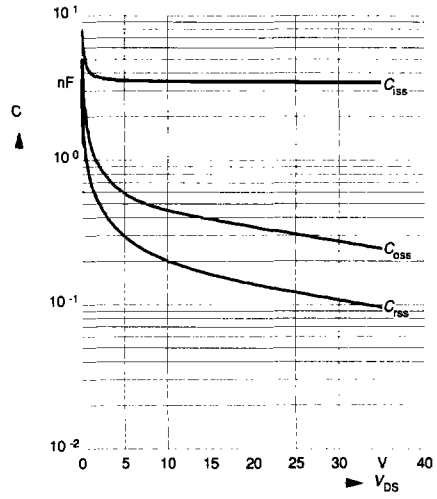
parameter: $V_{GS} = V_{DS}$, $I_D = 1$ mA




**Typ. capacitances**

$C = f(V_{DS})$

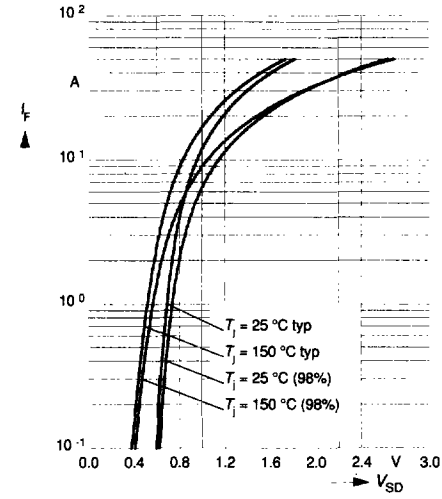
parameter: $V_{GS} = 0$V, $f = 1$MHz




**Forward characteristics of reverse diode**

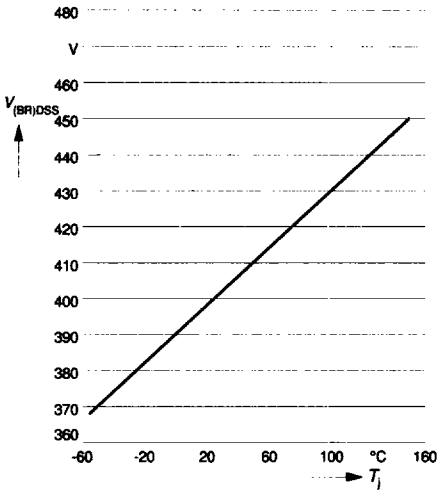
$I_F = f(V_{SD})$

parameter: $T_j$, $t_p = 80$ µs



**Drain-source breakdown voltage**

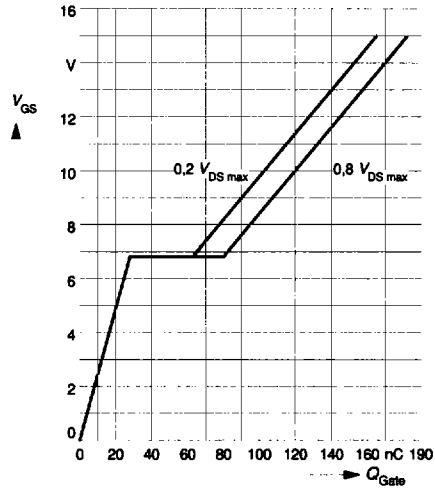
$V_{(BR)DSS} = f(T_j)$



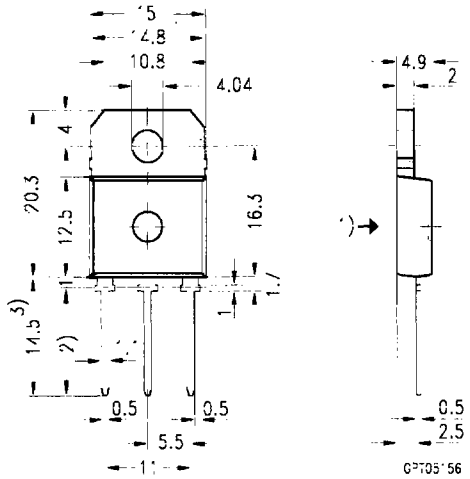

**Typ. gate charge**

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

parameter: $I_{D\ puls} = 17$ A



**Package Outlines**
TO-218 AA
Dimension in mm




1) punch direction, burr max. 0.04
2) dip tinning
3) max. 15.5 by dip tinning press burr max. 0.05