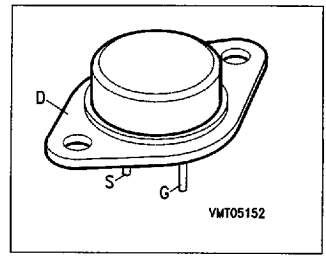
# SIEMENS

## SIPMOS® Power Transistor — BUZ 24

- N channel
- Enhancement mode
- Avalanche-rated




| Type | $V_{DS}$ | $I_D$ | $R_{DS\,(on)}$ | Package [1] | Ordering Code |
|---|---|---|---|---|---|
| **BUZ 24** | 100 V | 32 A | 0.06 Ω | TO-204 AE | C67078-S1003-A2 |

### Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Continuous drain current, $T_C$ = 27 °C | $I_D$ | **32** | A |
| Pulsed drain current, $T_C$ = 25 °C | $I_{D\,puls}$ | **128** | |
| Avalanche current, limited by $T_{j\,max}$ | $I_{AR}$ | **32** | |
| Avalanche energy, periodic limited by $T_{j\,(max)}$ | $E_{AR}$ | **15** | mJ |
| Avalanche energy, single pulse<br>$I_D$ = 32 A, $V_{DD}$ = 25 V, $R_{GS}$ = 25 Ω<br>$L$ = 322 µH, $T_j$ = 25 °C | $E_{AS}$ | **220** | |
| Gate-source voltage | $V_{GS}$ | **± 20** | V |
| Power dissipation, $T_C$ = 25 °C | $P_{tot}$ | **125** | W |
| Operating and storage temperature range | $T_j$ , $T_{stg}$ | **– 55 ... + 150** | °C |

| | | | |
|---|---|---|---|
| Thermal resistance, chip-case | $R_{th\,JC}$ | **≤ 1.0** | K/W |
| DIN humidity category, DIN 40 040 | – | **C** | – |
| IEC climatic category, DIN IEC 68-1 | – | **55/150/56** | |

1) See chapter Package Outlines.

**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 | $V_{(BR)\,DSS}$ | 100 | – | – | V |
| Gate threshold voltage<br>$V_{GS}$ = $V_{DS}$, $I_D$ = 1 mA | $V_{GS\,(th)}$ | 2.1 | 3.0 | 4.0 | |
| Zero gate voltage drain current<br>$V_{DS}$ = 100 V, $V_{GS}$ = 0 V<br>$T_j$ = 25 °C<br>$T_j$ = 125 °C | $I_{DSS}$ | <br><br>–<br>– | <br><br>0.1<br>10 | <br><br>1.0<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, $I_D$ = 20 A | $R_{DS\,(on)}$ | – | 0.05 | 0.06 | Ω |
| **Dynamic characteristics** | | | | | |
| Forward transconductance<br>$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D$ = 20 A | $g_{fs}$ | 10 | 17 | – | S |
| Input capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{iss}$ | – | 1400 | 1850 | pF |
| Output capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{oss}$ | – | 450 | 700 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{rss}$ | – | 230 | 370 | |
| Turn-on time $t_{on}$, ($t_{on} = t_{d\,(on)} + t_r$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 3 A, $R_{GS}$ = 50 Ω | $t_{d\,(on)}$ | – | 30 | 45 | ns |
| | $t_r$ | – | 80 | 125 | |
| Turn-off time $t_{off}$, ($t_{off} = t_{d\,(off)} + t_f$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 3 A, $R_{GS}$ = 50 Ω | $t_{d\,(off)}$ | – | 250 | 320 | |
| | $t_f$ | – | 120 | 160 | |

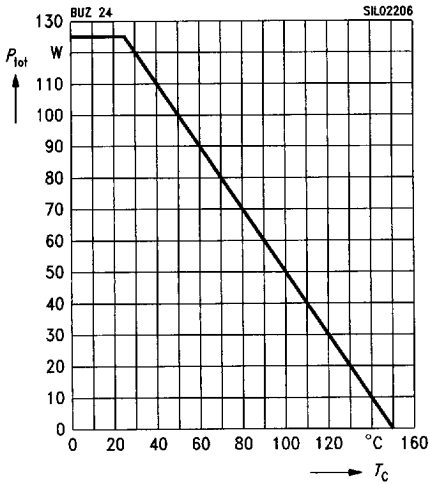
**Electrical Characteristics** (cont'd)
at $T_j$ = 25 °C, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Reverse diode** | | | | | |
| Continuous reverse drain current<br>$T_C$ = 25 °C | $I_S$ | – | – | 32 | A |
| Pulsed reverse drain current<br>$T_C$ = 25 °C | $I_{SM}$ | – | – | 128 | |
| Diode forward on-voltage<br>$I_S$ = 64 A, $V_{GS}$ = 0 V | $V_{SD}$ | – | 1.4 | 1.7 | V |
| Reverse recovery time<br>$V_R$ = 30 V, $I_F = I_S$, $di_F/dt$ = 100 A/µs | $t_{rr}$ | – | 130 | – | ns |
| Reverse recovery charge<br>$V_R$ = 30 V, $I_F = I_S$, $di_F/dt$ = 100 A/µs | $Q_{rr}$ | – | 0.7 | – | µC |

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

**Total power dissipation**

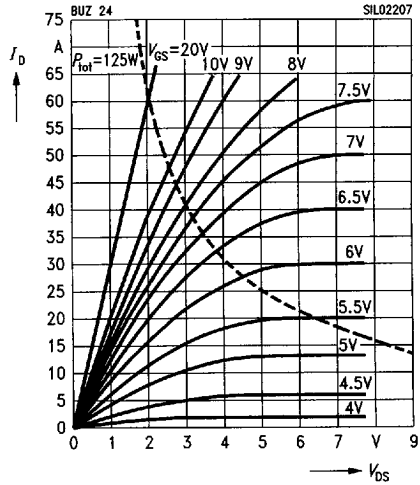
$P_{tot} = f(T_C)$




**Typ. output characteristics**

$I_D = f(V_{DS})$

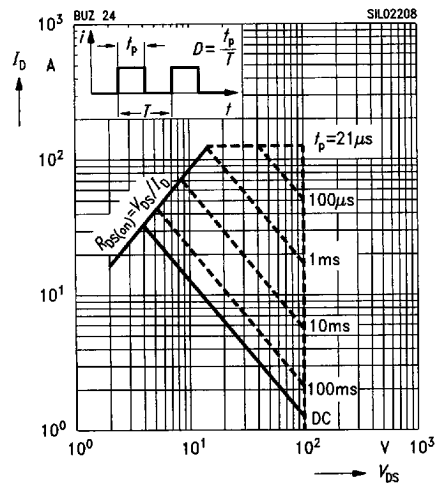
parameter: $t_p$ = 80 µs




**Safe operating area**

$I_D = f(V_{DS})$

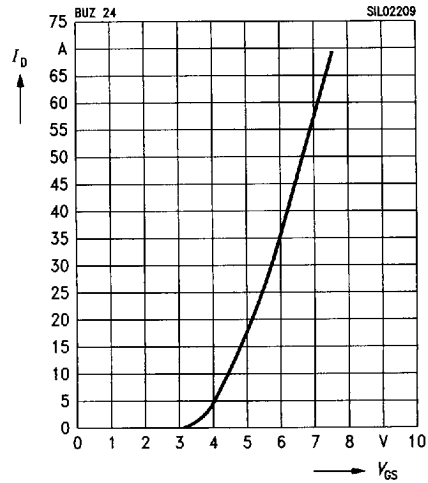
parameter: $D$ = 0.01, $T_C$ = 25 °C



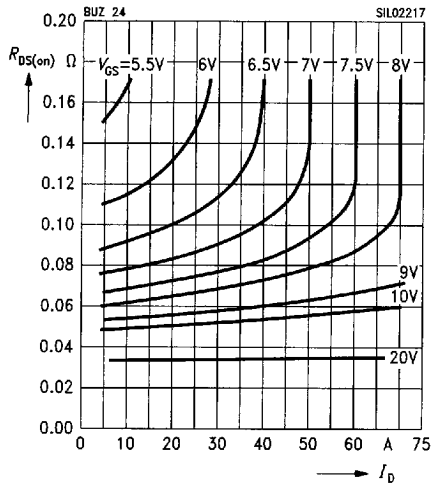

**Typ. transfer characteristics**

$I_D = f(V_{GS})$

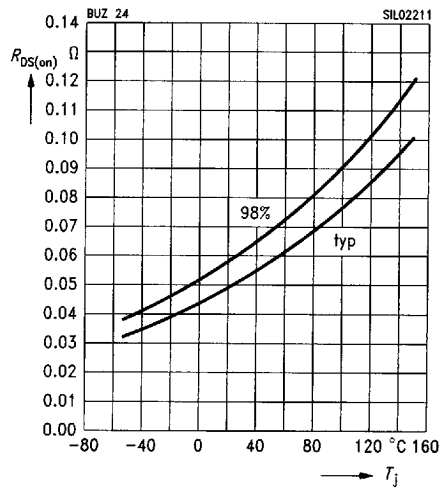
parameter: $t_p$ = 80 µs, $V_{DS}$ = 25 V



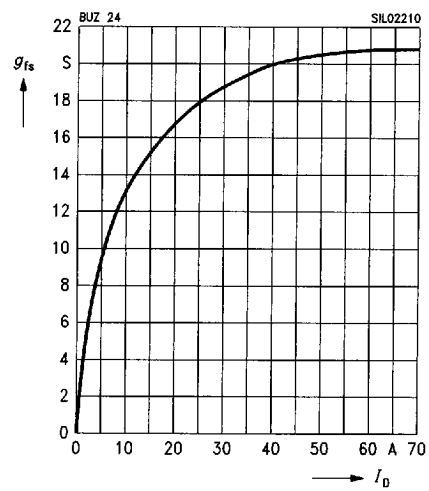
**Typ. drain-source on-resistance**
$R_{DS\,(on)} = f(I_D)$
parameter: $V_{GS}$



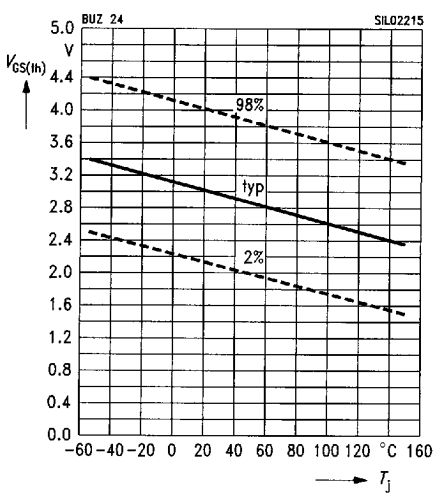

**Drain-source on-resistance**
$R_{DS\,(on)} = f(T_j)$
parameter: $I_D$ = 20 A, $V_{GS}$ = 10 V, (spread)



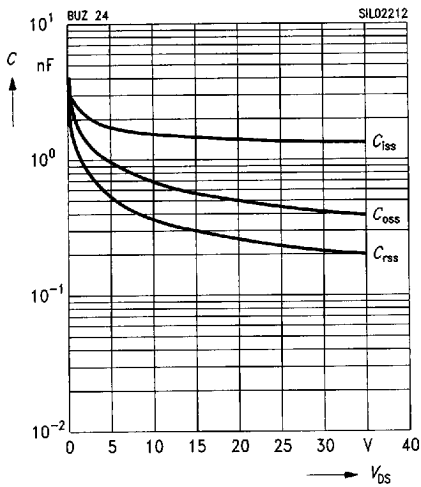

**Typ. forward transconductance**
$g_{fs} = f(I_D)$
parameter: $t_p$ = 80 µs



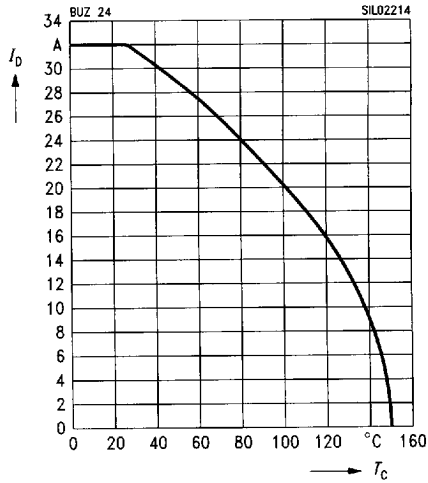

**Gate threshold voltage**
$V_{GS\,(th)} = f(T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D$ = 1 mA, (spread)



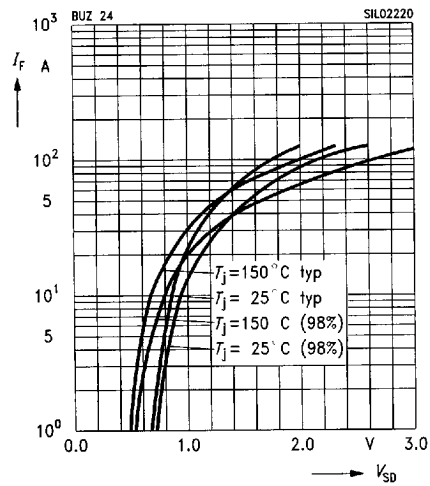
**Typ. capacitances**
$C = f(V_{DS})$
parameter: $V_{GS}$ = 0 V, $f$ = 1 MHz



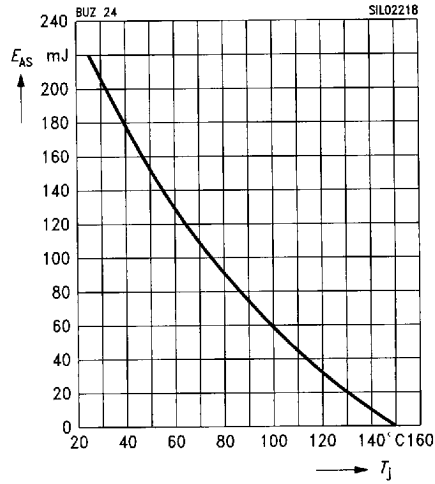

**Drain current**
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V



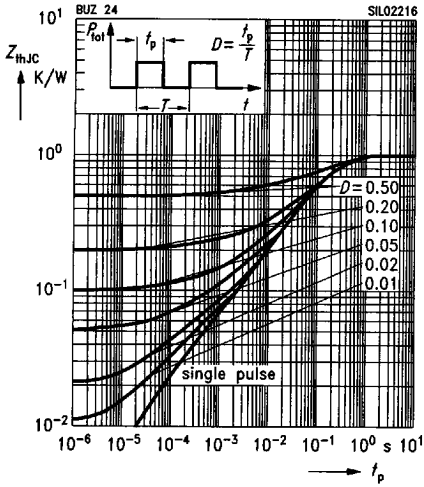

**Forward characteristics of reverse diode**
$I_F = f(V_{SD})$
parameter: $T_j$, $t_p$ = 80 µs, (spread)




**Avalanche energy** $E_{AS} = f(T_j)$
parameter: $I_D$ = 32 A, $V_{DD}$ = 25 V
$R_{GS}$ = 25 Ω, $L$ = 322 µH



**Transient thermal impedance**
$Z_{th\,JC} = f(t_p)$
parameter: $D = t_p / T$




**Typ. gate charge**
$V_{GS} = f(Q_{Gate})$
parameter: $I_{D\,puls} = 51.0$ A