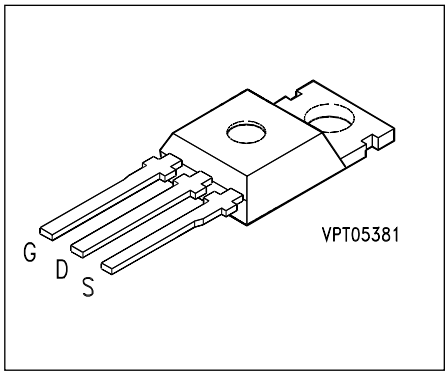
SIEMENS

## SIPMOS® Power Transistors

**BUZ 77 A**
**BUZ 77 B**

- N channel
- Enhancement mode
- Avalanche-rated




| Type | $V_{DS}$ | $I_D$ | $T_C$ | $R_{DS\ (on)}$ | Package [1] | Ordering Code |
|---|---|---|---|---|---|---|
| **BUZ 77 A** | 600 V | 2.7 A | 31 ˚C | 4.0 Ω | TO-220 AB | C67078-S1320-A3 |
| **BUZ 77 B** | 600 V | 2.9 A | 29 ˚C | 3.5 Ω | TO-220 AB | C67078-S1320-A5 |

**Maximum Ratings**

| Parameter | Symbol | BUZ | | Unit |
|---|---|---|---|---|
| | | 77 A | 77 B | |
| Continuous drain current | $I_D$ | **2.7** | **2.9** | A |
| Pulsed drain current, $T_C$ = 25 ˚C | $I_{D\ puls}$ | **11** | **11.5** | |
| Avalanche current, limited by $T_{j\ max}$ | $I_{AR}$ | **2.7** | | |
| Avalanche energy, periodic limited by $T_{j\ (max)}$ | $E_{AR}$ | **5.0** | | mJ |
| Avalanche energy, single pulse<br>$I_D$ = 2.7 A, $V_{DD}$ = 50 V, $R_{GS}$ = 25 Ω<br>$L$ = 45.3 mH, $T_j$ = 25 ˚C | $E_{AS}$ | **180** | | |
| Gate-source voltage | $V_{GS}$ | ± **20** | | V |
| Power dissipation, $T_C$ = 25 ˚C | $P_{tot}$ | **75** | | W |
| Operating and storage temperature range | $T_j$ , $T_{stg}$ | **– 55 ... + 150** | | ˚C |

| | | | |
|---|---|---|---|
| Thermal resistance, chip-case | $R_{th\ JC}$ | ≤ **1.67** | K/W |
| DIN humidity category, DIN 40 040 | – | **E** | – |
| 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 | $V_{(BR)\ DSS}$ | 600 | – | – | 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>$V_{DS}$ = 600 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, $I_D$ = 1.7 A BUZ 77 A<br>BUZ 77 B | $R_{DS\ (on)}$ | <br>–<br>– | <br>3.5<br>3.0 | <br>4.0<br>3.5 | Ω |
| **Dynamic characteristics** | | | | | |
| Forward transconductance<br>$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ , $I_D$ = 1.7 A | $g_{fs}$ | 1.5 | 3.0 | – | S |
| Input capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{iss}$ | – | 460 | 690 | pF |
| Output capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{oss}$ | – | 55 | 85 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0 V , $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{rss}$ | – | 20 | 30 | |
| Turn-on time $t_{on}$ , ($t_{on}$ = $t_{d\ (on)}$ + $t_r$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 2 A, $R_{GS}$ = 50 Ω | $t_{d\ (on)}$ | – | 8 | 12 | ns |
| | $t_r$ | – | 30 | 40 | |
| Turn-off time $t_{off}$ , ($t_{off}$ = $t_{d\ (off)}$ + $t_f$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 2 A, $R_{GS}$ = 50 Ω | $t_{d\ (off)}$ | – | 50 | 65 | |
| | $t_f$ | – | 30 | 40 | |

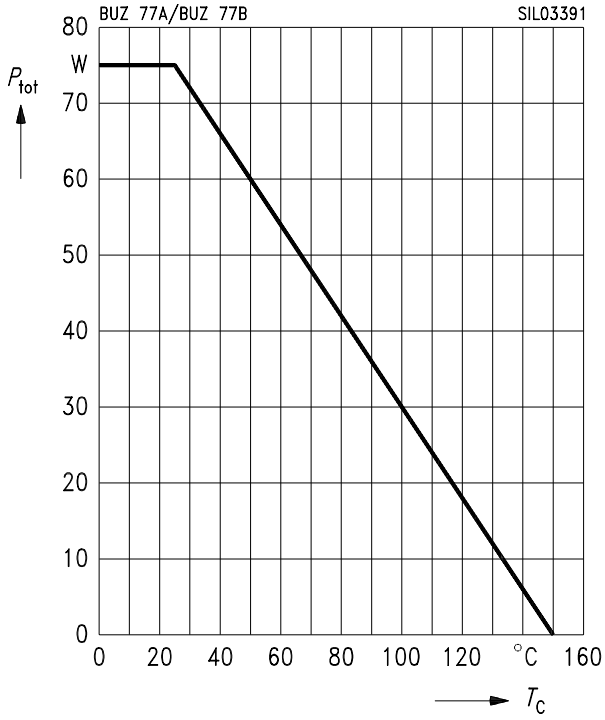
**Electrical Characteristics** (cont'd)
at $T_j$ = 25 ˚C, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Reverse diode** | | | | | |
| Continuous reverse drain current<br>$T_C$ = 25 ˚C | $I_S$ | – | – | 2.7 | A |
| Pulsed reverse drain current<br>$T_C$ = 25 ˚C | $I_{SM}$ | – | – | 11.0 | |
| Diode forward on-voltage<br>$I_S$ = 5.4 A, $V_{GS}$ = 0 V | $V_{SD}$ | – | 0.95 | 1.3 | V |
| Reverse recovery time<br>$V_R$ = 100 V, $I_F = I_S$ , d$i_F$ / d$t$ = 100 A/µs | $t_{rr}$ | – | 350 | – | ns |
| Reverse recovery charge<br>$V_R$ = 100 V, $I_F = I_S$ , d$i_F$ / d$t$ = 100 A/µs | $Q_{rr}$ | – | 3.5 | – | µC |

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

**Total power dissipation**

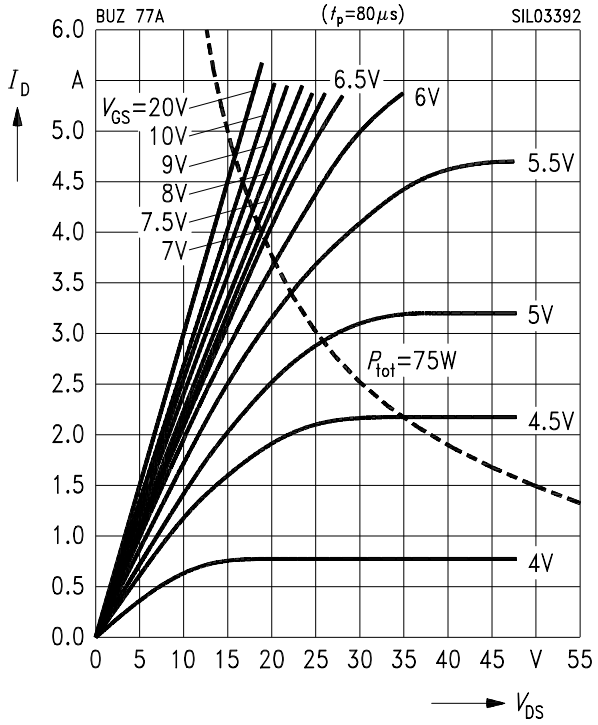
$P_{tot} = f(T_C)$




**Typ. output characteristics**

$I_D = f(V_{DS})$ **BUZ 77 A**

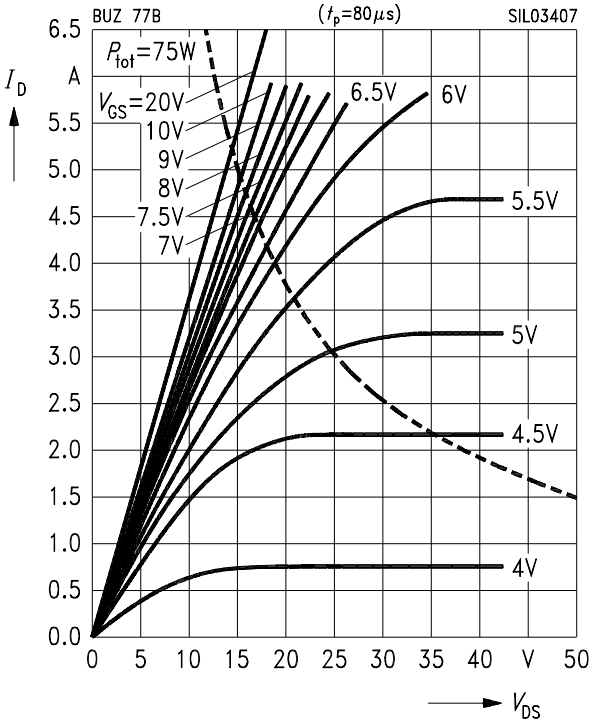
parameter: $t_p$ = 80 µs




**Typ. output characteristics**

$I_D = f(V_{DS})$ **BUZ 77 B**

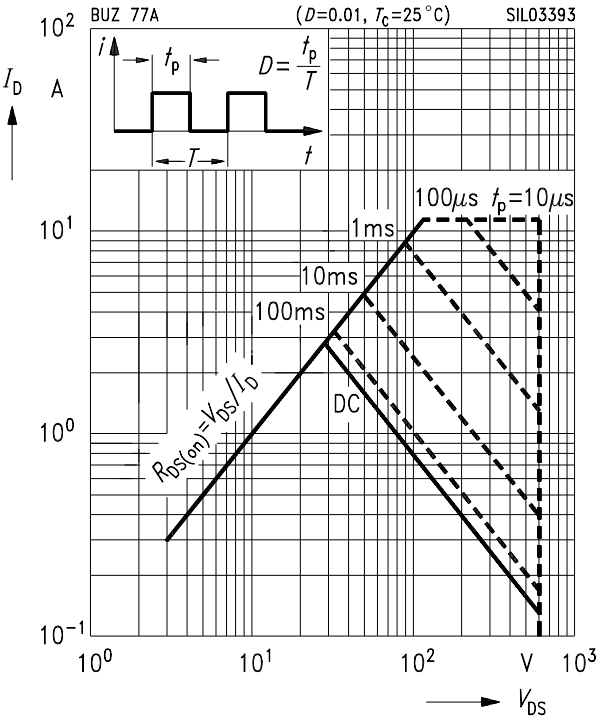
parameter: $t_p$ = 80 µs




**Safe operating area**

$I_D = f(V_{DS})$ **BUZ 77 A**

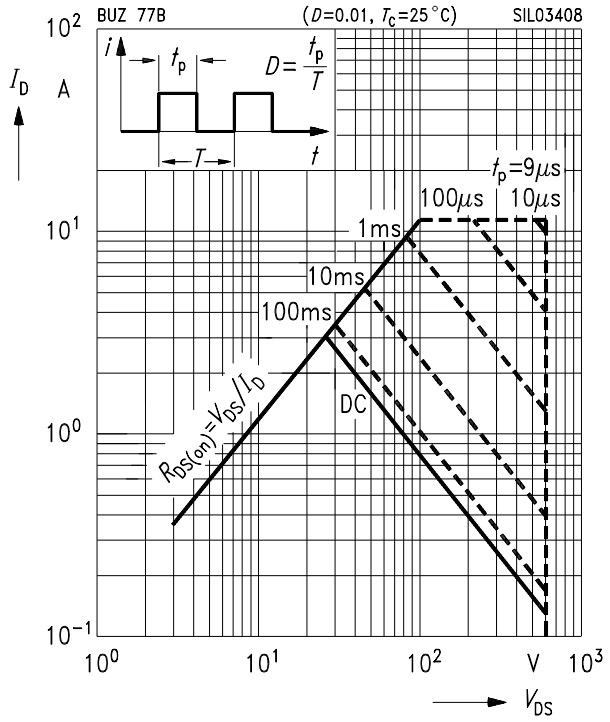
parameter: $D$ = 0.01, $T_C$ = 25 °C



**Safe operating area**

$I_D = f(V_{DS})$ **BUZ 77 B**

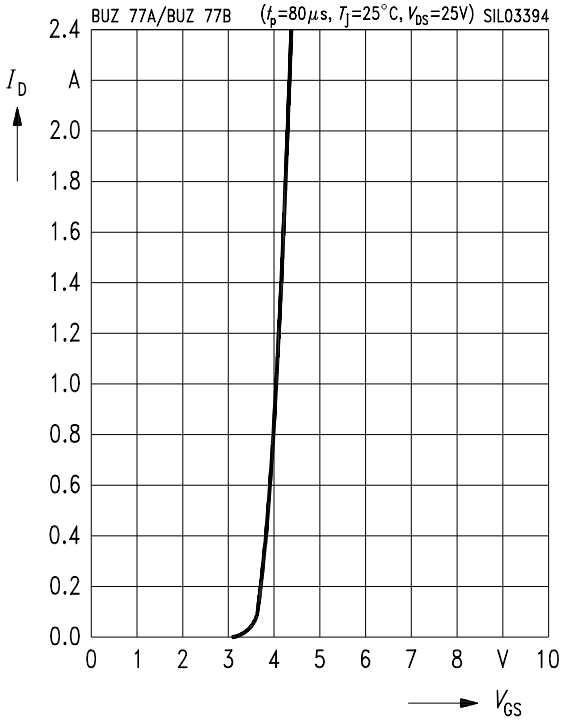
parameter: $D$ = 0.01, $T_C$ = 25 °C




**Typ. transfer characteristics**

$I_D = f(V_{GS})$

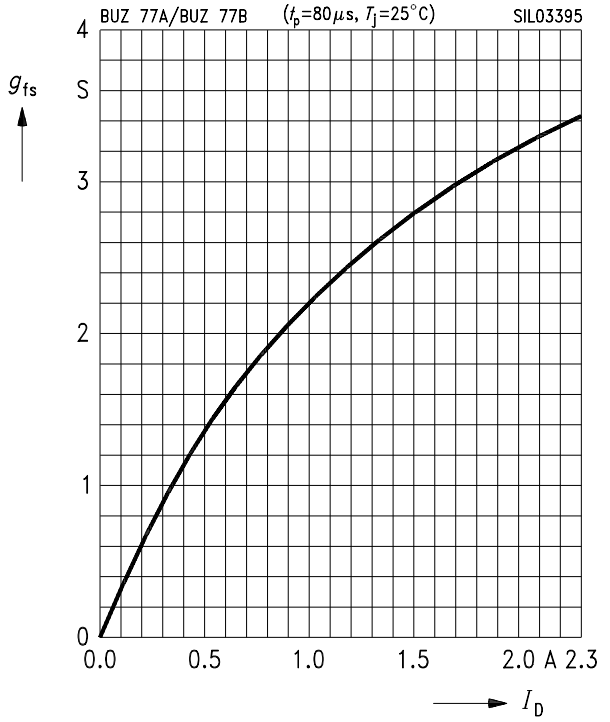
parameter: $t_p$ = 80 µs, $V_{DS}$ = 25 V




**Typ.forward transconductance**

$g_{fs} = f(I_D)$

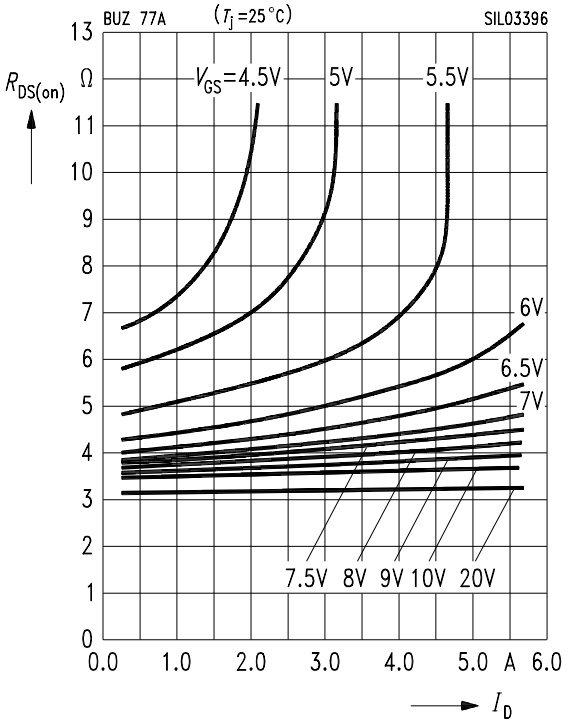
parameter: $t_p$ = 80 µs



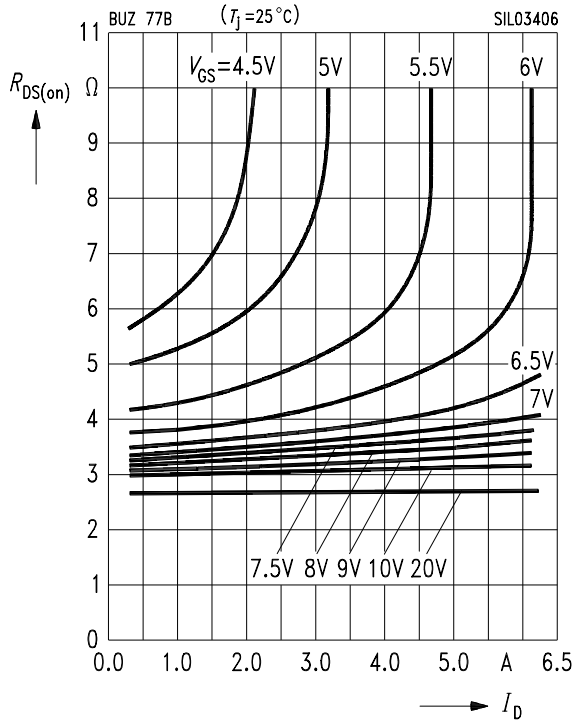

**Typ. drain-source on-resistance**

$R_{DS\,(on)} = f(I_D)$ **BUZ 77 A**

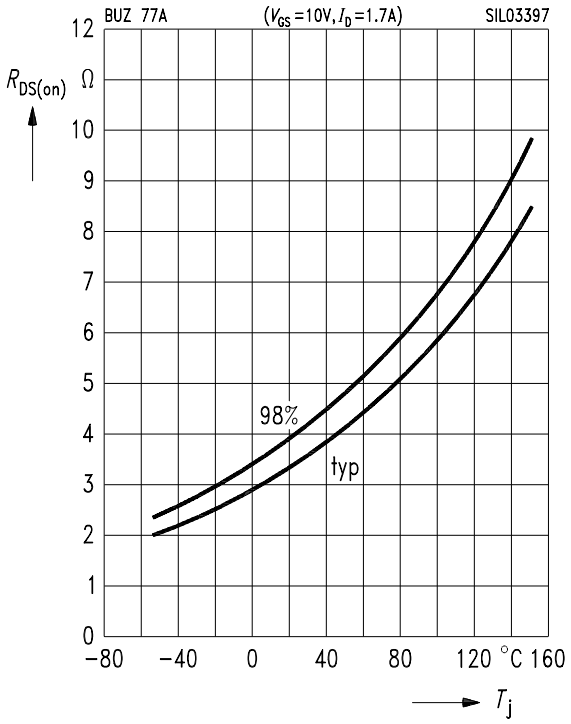
parameter: $V_{GS}$



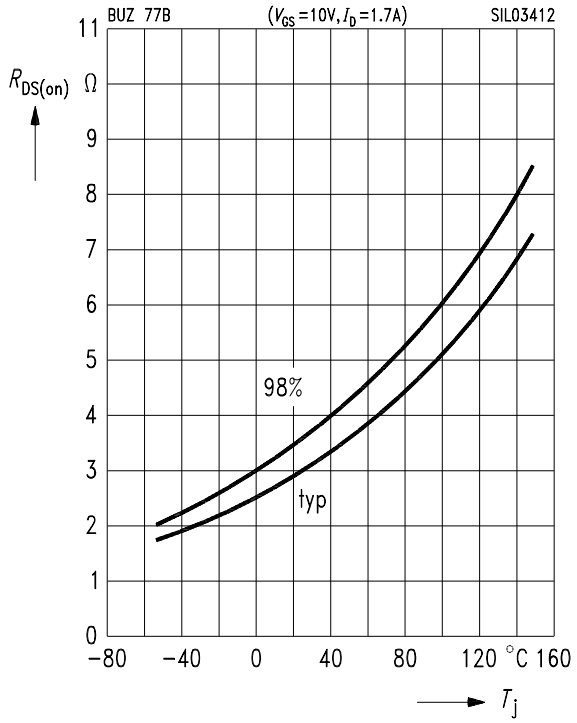
**Typ. drain-source on-resistance**
$R_{DS\ (on)} = f\ (I_D)$ **BUZ 77 B**
parameter: $V_{GS}$



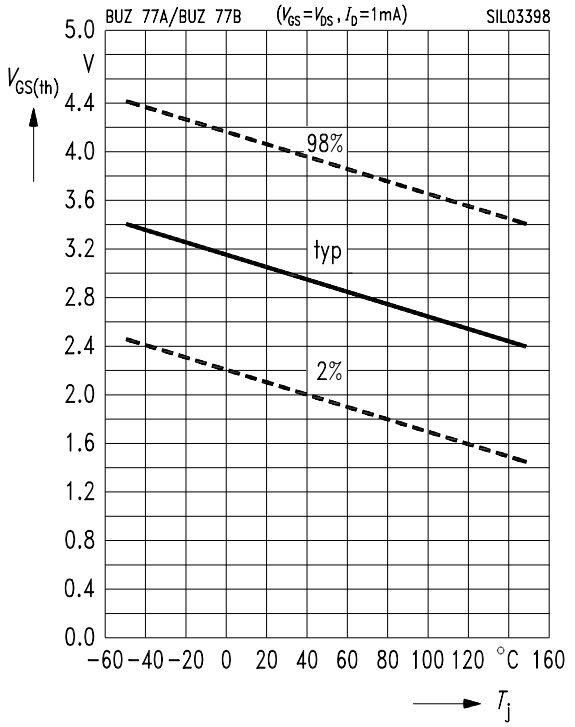

**Drain-source on-resistance**
$R_{DS\ (on)} = f\ (T_j)$ **BUZ 77 A**
parameter: $I_D$ = 1.7 A, $V_{GS}$ = 10 V, (spread)



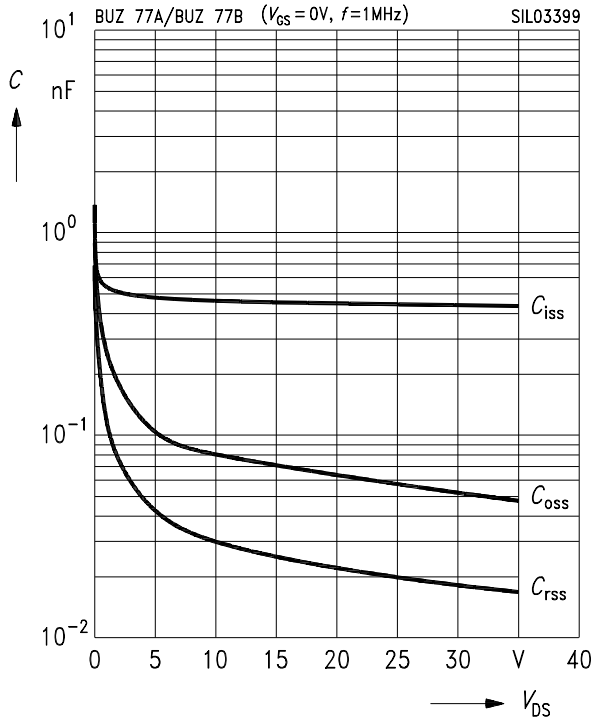

**Drain-source on-resistance**
$R_{DS\ (on)} = f\ (T_j)$ **BUZ 77 B**
parameter: $I_D$ = 1.7 A, $V_{GS}$ = 10 V, (spread)



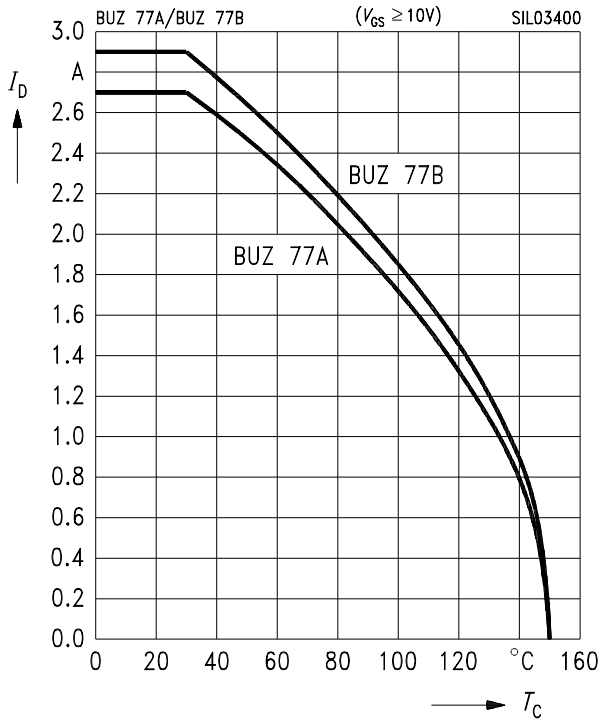

**Gate threshold voltage**
$V_{GS\ (th)} = f\ (T_j)$
parameter: $V_{GS} = V_{DS}$, $I_D$ = 1 mA, (spread)



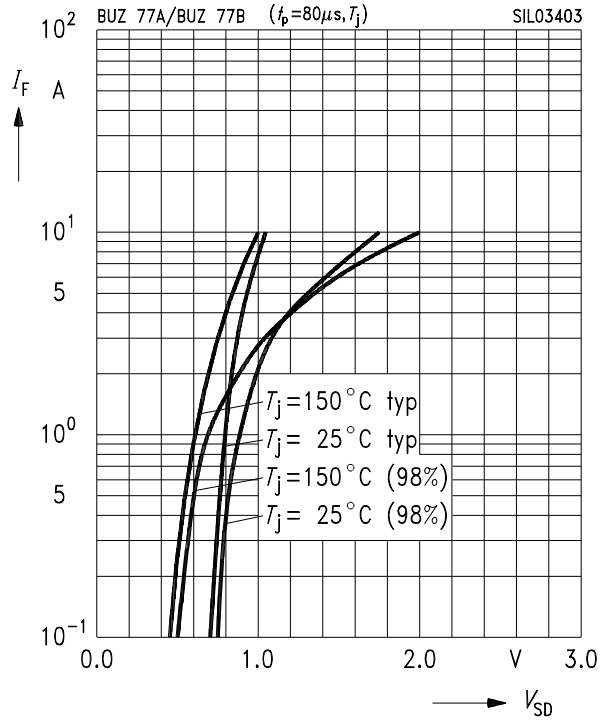
**Typ. capacitances**
$C = f(V_{DS})$
parameter: $V_{GS}$ = 0 V, $f$ = 1 MHz



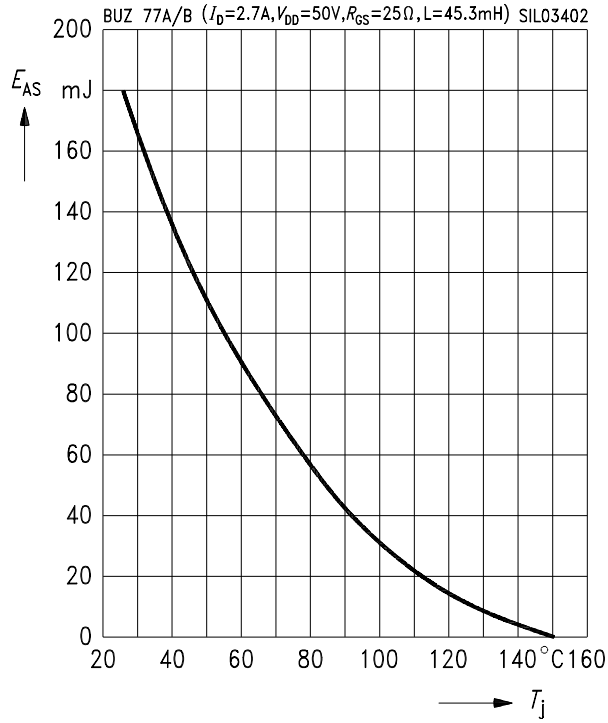

**Drain current**
$I_D = f(T_C)$
parameter: $V_{GS} \geq 10$ V




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



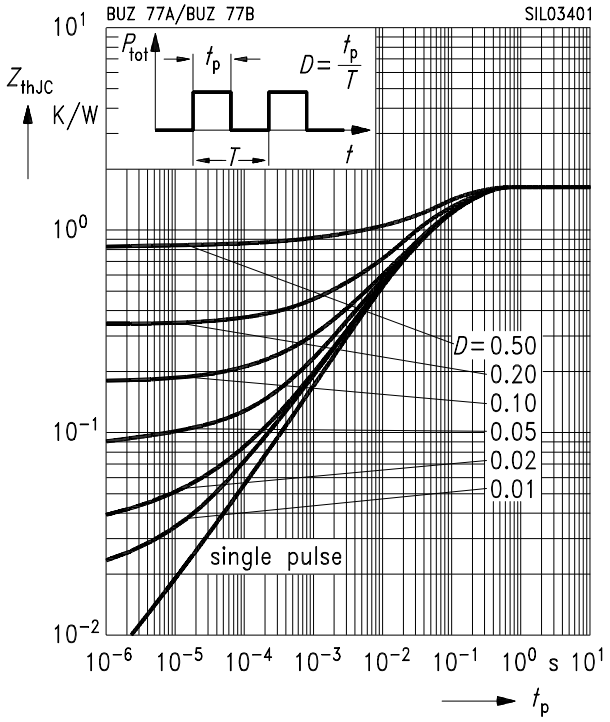

**Avalanche energy** $E_{AS} = f(T_j)$
parameter: $I_D$ = 2.7 A, $V_{DD}$ = 50 V
$R_{GS}$ = 25 Ω, $L$ = 45.3 mH



**Transient thermal impedance**

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

parameter: $D = t_p / T$




**Typ. gate charge**

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

parameter: $I_{D\,puls}$ = 4.4 A