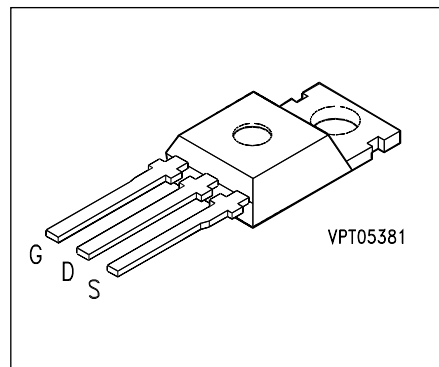


## SIPMOS® Power Transistors

- N channel
- Enhancement mode

## BUZ 50 A BUZ 50 B, BUZ 50 C



| Type            | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package <sup>1)</sup> | Ordering Code   |
|-----------------|----------|-------|--------------|-----------------------|-----------------|
| <b>BUZ 50 A</b> | 1000 V   | 2.5 A | 5.0 $\Omega$ | TO-220 AB             | C67078-A1307-A3 |
| <b>BUZ 50 B</b> | 1000 V   | 2.0 A | 8.0 $\Omega$ | TO-220 AB             | C67078-A1307-A4 |
| <b>BUZ 50 C</b> | 1000 V   | 2.3 A | 6.0 $\Omega$ | TO-220 AB             | C67078-A1307-A5 |

### Maximum Ratings

| Parameter                                                 | Symbol              | BUZ                           |            |            | Unit             |
|-----------------------------------------------------------|---------------------|-------------------------------|------------|------------|------------------|
|                                                           |                     | 50 A                          | 50 B       | 50 C       |                  |
| Continuous drain current $T_C = 25\text{ }^\circ\text{C}$ | $I_D$               | <b>2.5</b>                    | <b>2.0</b> | <b>2.3</b> | A                |
| Pulsed drain current, $T_C = 25\text{ }^\circ\text{C}$    | $I_{D\text{ puls}}$ | <b>10.0</b>                   | <b>8.0</b> | <b>9.0</b> |                  |
| Drain-source voltage                                      | $V_{DS}$            | <b>1000</b>                   |            |            | V                |
| Drain-gate voltage, $R_{GS} = 20\text{ k}\Omega$          | $V_{DGR}$           | <b>1000</b>                   |            |            |                  |
| Gate-source voltage                                       | $V_{GS}$            | <b><math>\pm 20</math></b>    |            |            |                  |
| Power dissipation, $T_C = 25\text{ }^\circ\text{C}$       | $P_{tot}$           | <b>75</b>                     |            |            | W                |
| Operating and storage temperature range                   | $T_j, T_{stg}$      | <b>- 55 ... + 150</b>         |            |            | $^\circ\text{C}$ |
| Thermal resistance, chip-case                             | $R_{th\text{ JC}}$  | <b><math>\leq 1.67</math></b> |            |            | K/W              |
| DIN humidity category, DIN 40 040                         |                     | <b>E</b>                      |            |            | —                |
| IEC climatic category, DIN IEC 68-1                       |                     | <b>55/150/56</b>              |            |            |                  |

1) See chapter Package Outlines.

### Electrical Characteristics

at  $T_j = 25\text{ °C}$ , unless otherwise specified.

| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

### Static characteristics

|                                                                                                                                                        |               |             |                   |                   |    |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|-------------|-------------------|-------------------|----|
| Drain-source breakdown voltage<br>$V_{GS} = 0\text{ V}$ , $I_D = 0.25\text{ mA}$                                                                       | $V_{(BR)DSS}$ | 1000        | –                 | –                 | V  |
| Gate threshold voltage<br>$V_{GS} = V_{DS}$ , $I_D = 1\text{ mA}$                                                                                      | $V_{GS(th)}$  | 2.1         | 3.0               | 4.0               |    |
| Zero gate voltage drain current<br>$V_{DS} = 1000\text{ V}$ , $V_{GS} = 0\text{ V}$<br>$T_j = 25\text{ °C}$<br>$T_j = 125\text{ °C}$                   | $I_{DSS}$     | –<br>–      | 20<br>100         | 250<br>1000       | μA |
| Gate-source leakage current<br>$V_{GS} = 20\text{ V}$ , $V_{DS} = 0\text{ V}$                                                                          | $I_{GSS}$     | –           | 10                | 100               | nA |
| Drain-source on-resistance<br>$V_{GS} = 10\text{ V}$ , $I_D = 1.5\text{ A}$ BUZ 50 A<br>$I_D = 1.5\text{ A}$ BUZ 50 B<br>$I_D = 1.5\text{ A}$ BUZ 50 C | $R_{DS(on)}$  | –<br>–<br>– | 4.5<br>6.5<br>5.0 | 5.0<br>8.0<br>6.0 | Ω  |

### Dynamic characteristics

|                                                                                                                                                             |              |     |      |      |    |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----|------|------|----|
| Forward transconductance<br>$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$ , $I_D = 1.5\text{ A}$                                                          | $g_{fs}$     | 0.7 | 1.5  | –    | S  |
| Input capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                                                    | $C_{iss}$    | –   | 1600 | 2100 | pF |
| Output capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                                                   | $C_{oss}$    | –   | 70   | 120  |    |
| Reverse transfer capacitance<br>$V_{GS} = 0\text{ V}$ , $V_{DS} = 25\text{ V}$ , $f = 1\text{ MHz}$                                                         | $C_{rss}$    | –   | 30   | 55   |    |
| Turn-on time $t_{on}$ , ( $t_{on} = t_{d(on)} + t_r$ )<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 2\text{ A}$ , $R_{GS} = 50\text{ Ω}$     | $t_{d(on)}$  | –   | 30   | 45   | ns |
|                                                                                                                                                             | $t_r$        | –   | 40   | 60   |    |
| Turn-off time $t_{off}$ , ( $t_{off} = t_{d(off)} + t_f$ )<br>$V_{DD} = 30\text{ V}$ , $V_{GS} = 10\text{ V}$ , $I_D = 2\text{ A}$ , $R_{GS} = 50\text{ Ω}$ | $t_{d(off)}$ | –   | 110  | 140  |    |
|                                                                                                                                                             | $t_f$        | –   | 60   | 80   |    |

### Electrical Characteristics (cont'd)

at  $T_j = 25\text{ °C}$ , unless otherwise specified.

| Parameter | Symbol | Values |      |      | Unit |
|-----------|--------|--------|------|------|------|
|           |        | min.   | typ. | max. |      |

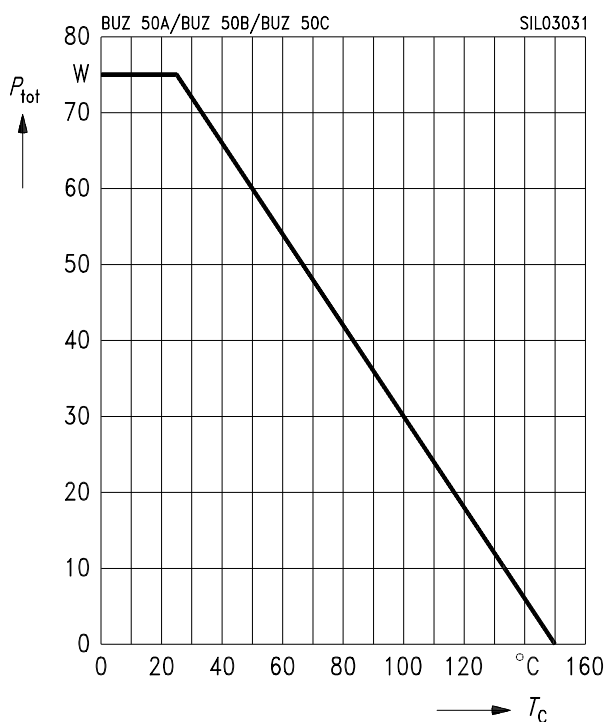
### Reverse diode

|                                                                                                        |          |   |      |      |               |
|--------------------------------------------------------------------------------------------------------|----------|---|------|------|---------------|
| Continuous reverse drain current<br>$T_C = 25\text{ °C}$                                               | $I_S$    |   |      |      | A             |
| BUZ 50 A                                                                                               |          | – | –    | 2.5  |               |
| BUZ 50 B                                                                                               |          | – | –    | 2.0  |               |
| BUZ 50 C                                                                                               |          | – | –    | 2.3  |               |
| Pulsed reverse drain current<br>$T_C = 25\text{ °C}$                                                   | $I_{SM}$ |   |      |      | A             |
| BUZ 50 A                                                                                               |          | – | –    | 10.0 |               |
| BUZ 50 B                                                                                               |          | – | –    | 8.0  |               |
| BUZ 50 C                                                                                               |          | – | –    | 9.0  |               |
| Diode forward on-voltage<br>$I_S = 6\text{ A}$ , $V_{GS} = 0\text{ V}$                                 | $V_{SD}$ | – | 1.05 | 1.3  | V             |
| Reverse recovery time<br>$V_R = 100\text{ V}$ , $I_F = I_S$ , $di_F / dt = 100\text{ A}/\mu\text{s}$   | $t_{rr}$ | – | 2.0  | –    | ns            |
| Reverse recovery charge<br>$V_R = 100\text{ V}$ , $I_F = I_S$ , $di_F / dt = 100\text{ A}/\mu\text{s}$ | $Q_{rr}$ | – | 15   | –    | $\mu\text{C}$ |

Characteristics at  $T_j = 25^\circ\text{C}$ , unless otherwise specified.

## Total power dissipation

$$P_{\text{tot}} = f(T_c)$$

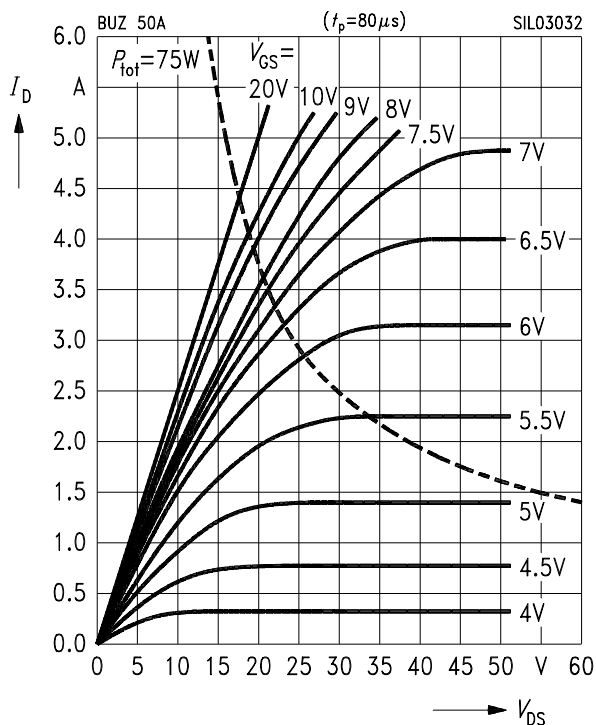


## Typ. output characteristics

$$I_D = f(V_{\text{DS}})$$

parameter:  $t_p = 80\ \mu\text{s}$

BUZ 50 A

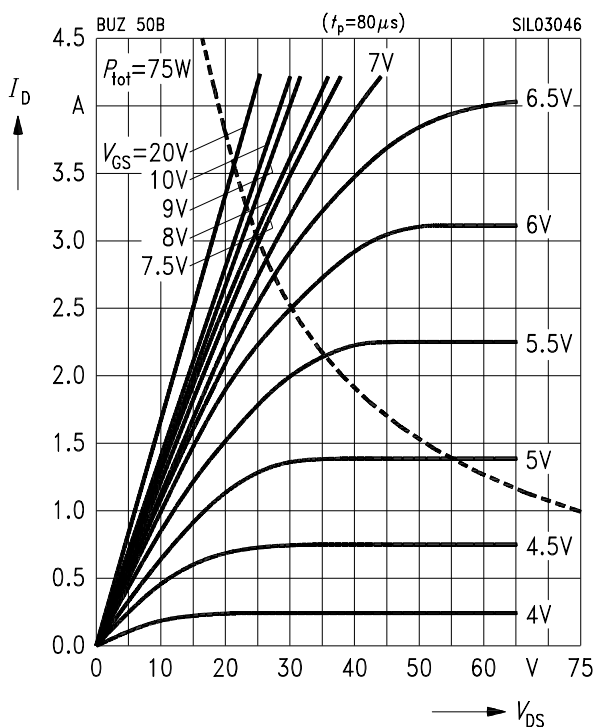


## Typ. output characteristics

$$I_D = f(V_{\text{DS}})$$

parameter:  $t_p = 80\ \mu\text{s}$

BUZ 50 B

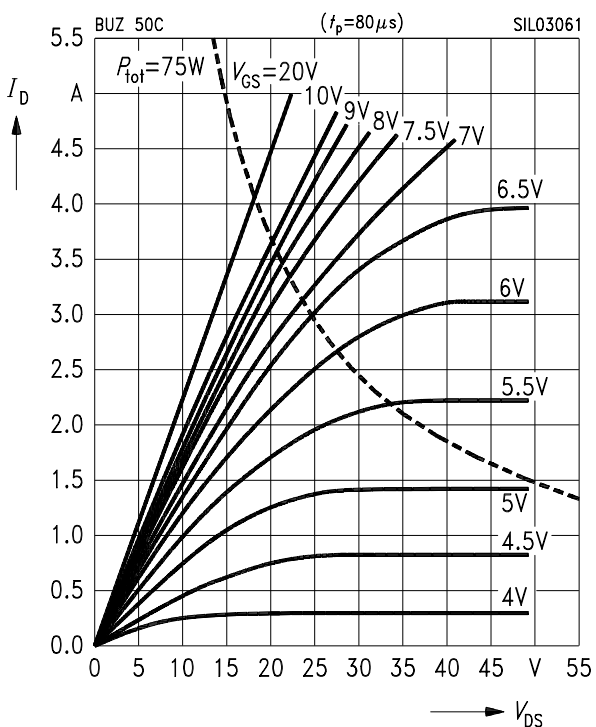


## Typ. output characteristics

$$I_D = f(V_{\text{DS}})$$

parameter:  $t_p = 80\ \mu\text{s}$

BUZ 50 C

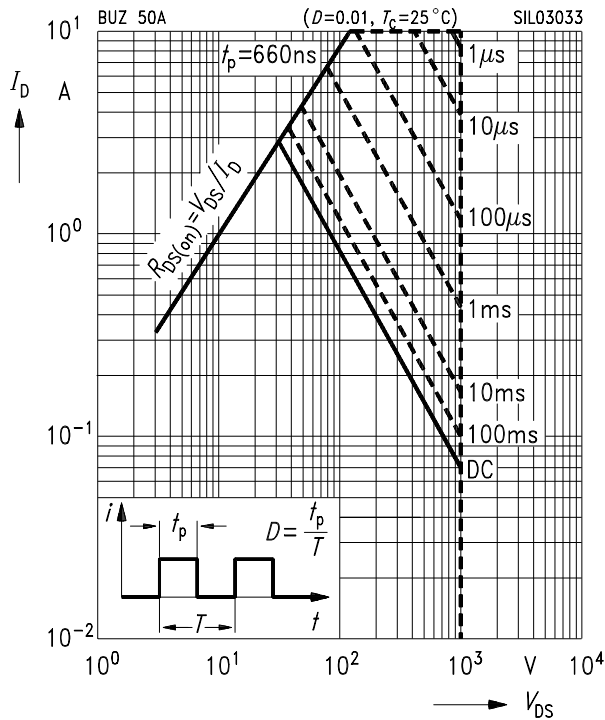


## Safe operating area

$$I_D = f(V_{DS})$$

parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$

## BUZ 50 A

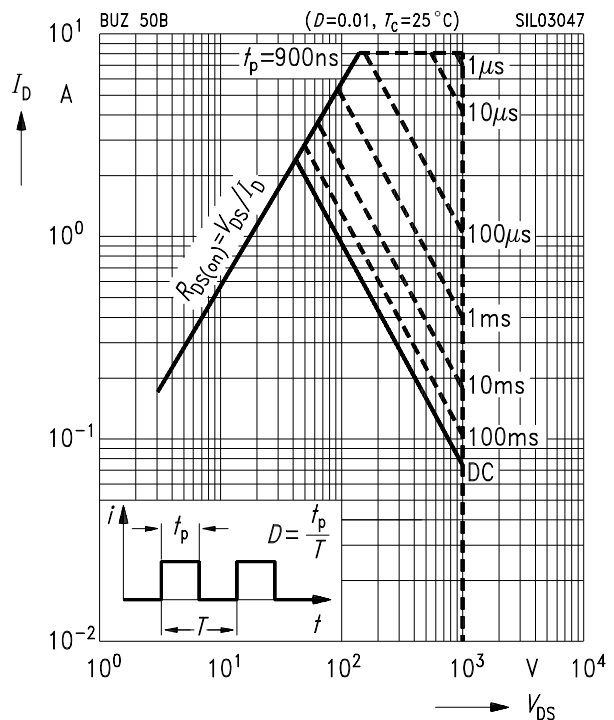


## Safe operating area

$$I_D = f(V_{DS})$$

parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$

## BUZ 50 B

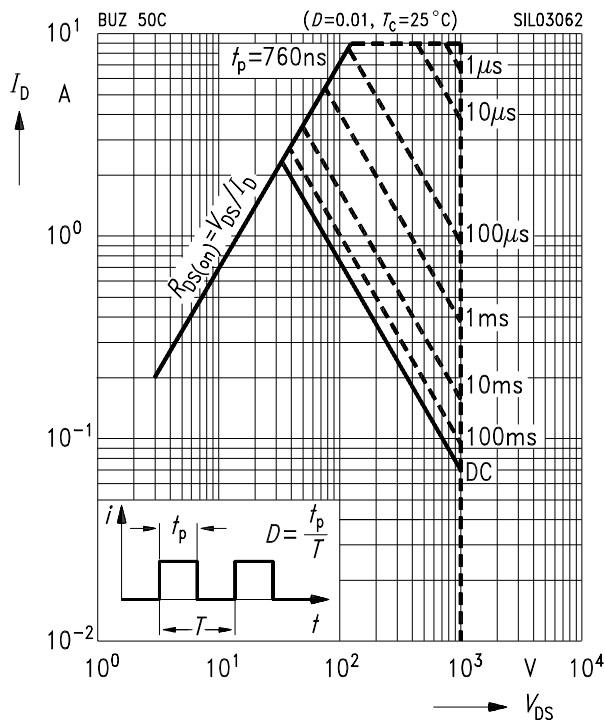


## Safe operating area

$$I_D = f(V_{DS})$$

parameter:  $D = 0.01$ ,  $T_C = 25^\circ\text{C}$

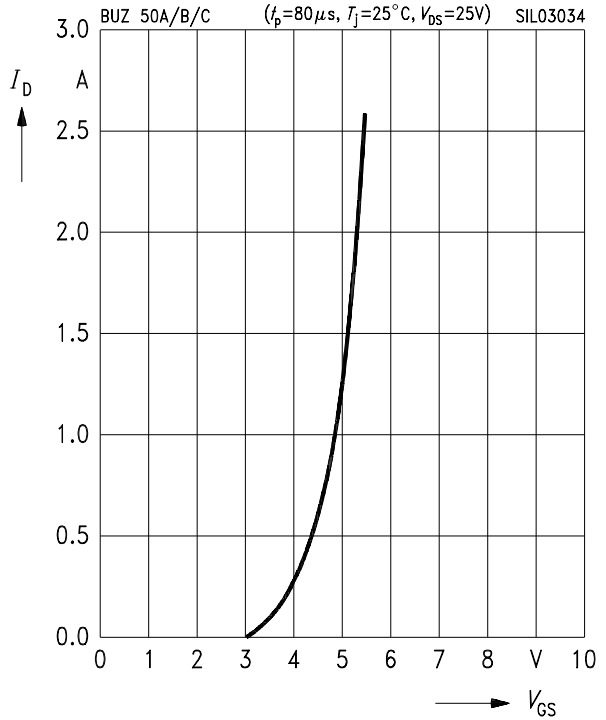
## BUZ 50 C



## Typ. transfer characteristics

$$I_D = f(V_{GS})$$

parameter:  $t_p = 80 \mu\text{s}$ ,  $V_{DS} = 25 \text{ V}$

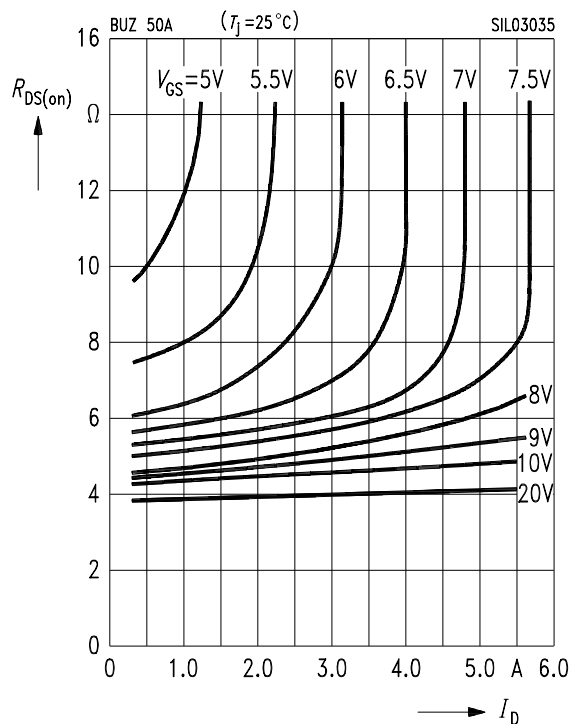


### Typ. drain-source on-resistance

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

parameter:  $V_{GS}$

BUZ 50 A

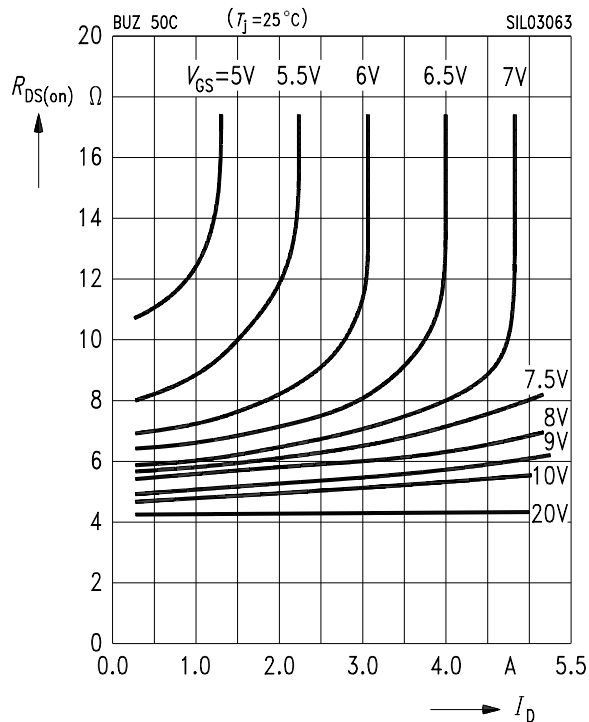


### Typ. drain-source on-resistance

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

parameter:  $V_{GS}$

BUZ 50 C

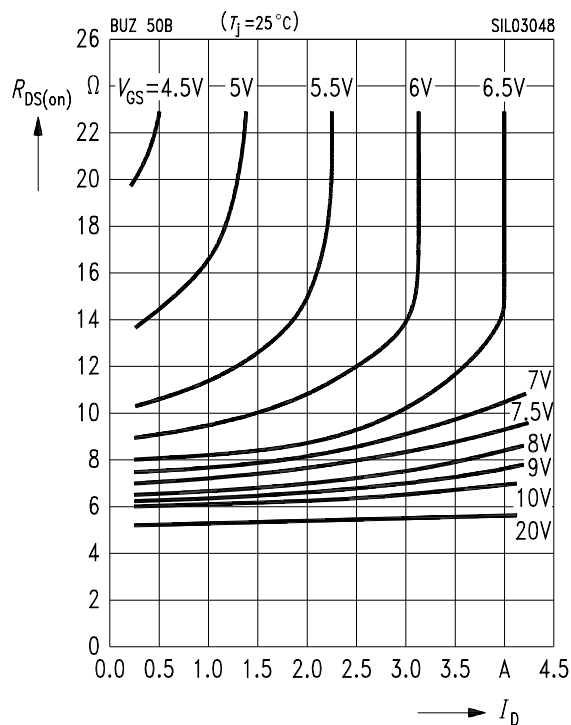


### Drain-source on-resistance

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

parameter:  $V_{GS}$

BUZ 50 B

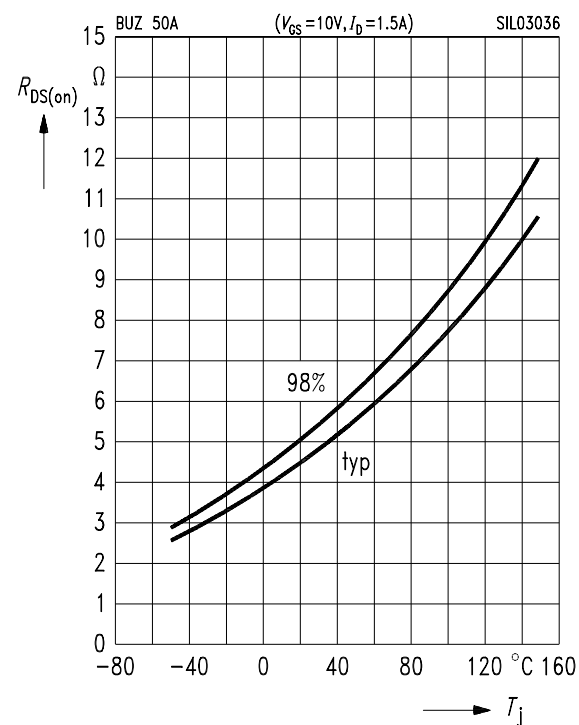


### Drain-source on-resistance

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

parameter:  $V_{GS} = 10\text{ V}, I_D = 1.5\text{ A}$

BUZ 50 A

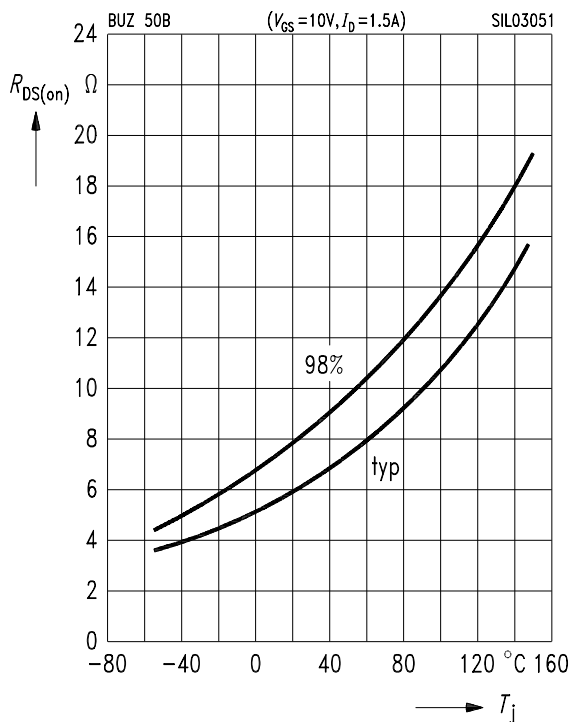


## Drain-source on-resistance

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

BUZ 50 B

parameter:  $V_{GS} = 10\text{ V}$ ,  $I_D = 1.5\text{ A}$

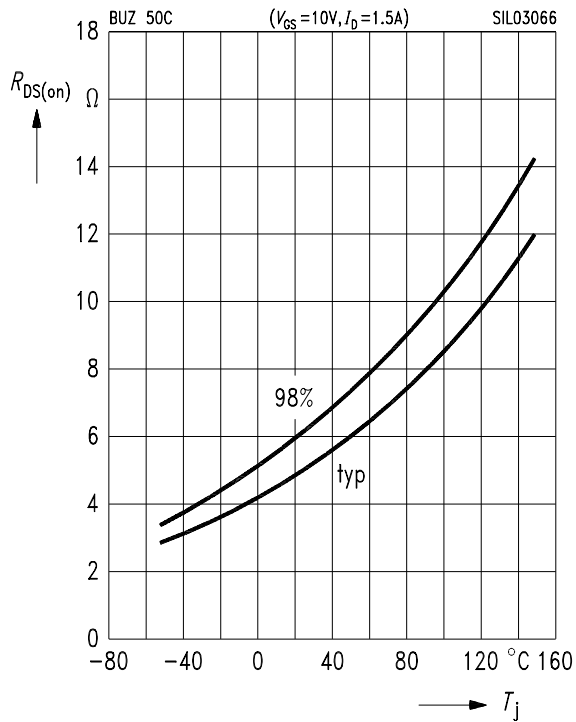


## Drain-source on-resistance

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

BUZ 50 C

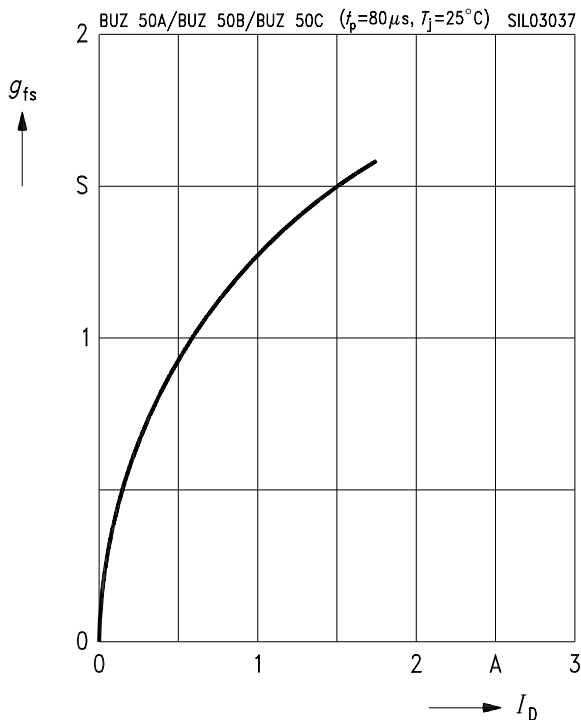
parameter:  $V_{GS} = 10\text{ V}$ ,  $I_D = 1.5\text{ A}$



## Typ. forward transconductance

$$g_{fs} = f(I_D)$$

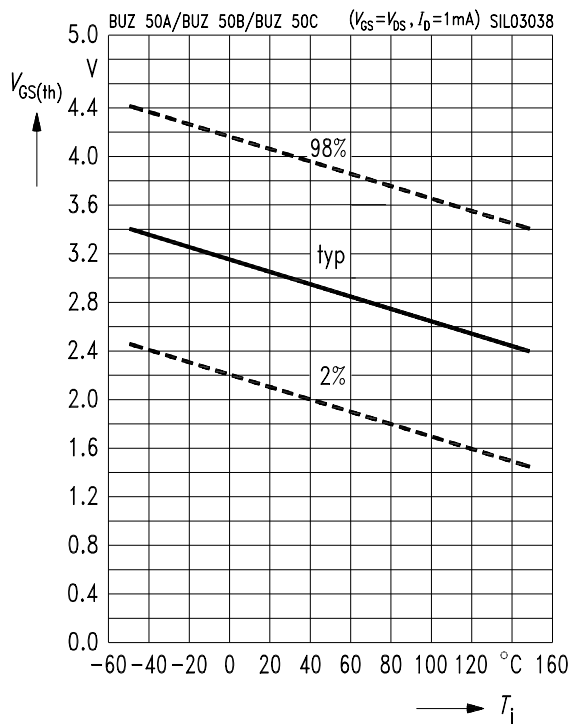
parameter:  $t_p = 80\text{ }\mu\text{s}$



## Gate threshold voltage

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

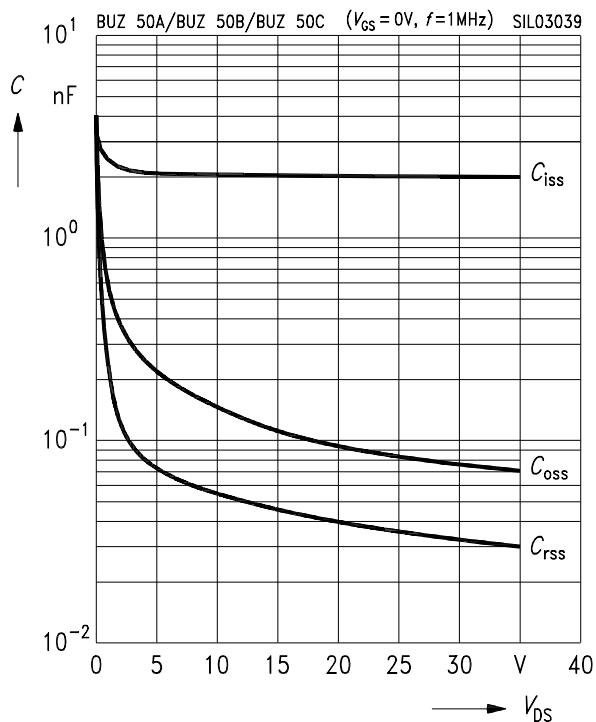
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = 1\text{ mA}$ , (spread)



### Typ. capacitances

$$C = f(V_{DS})$$

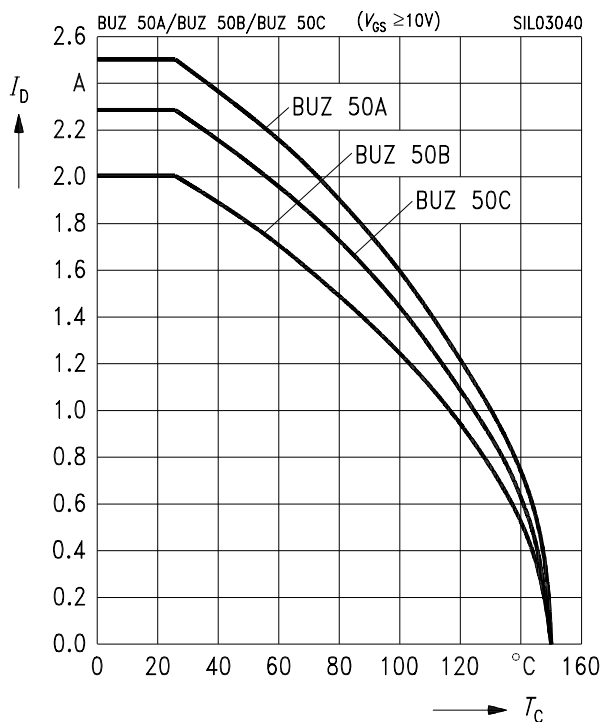
parameter:  $V_{GS} = 0 \text{ V}$ ,  $f = 1 \text{ MHz}$



### Drain current

$$I_D = f(T_C)$$

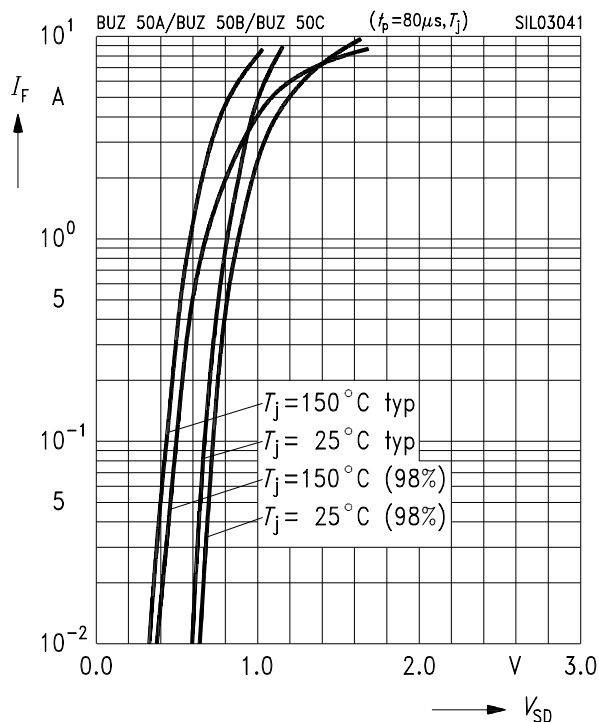
parameter:  $V_{GS} \geq 10 \text{ V}$



### Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

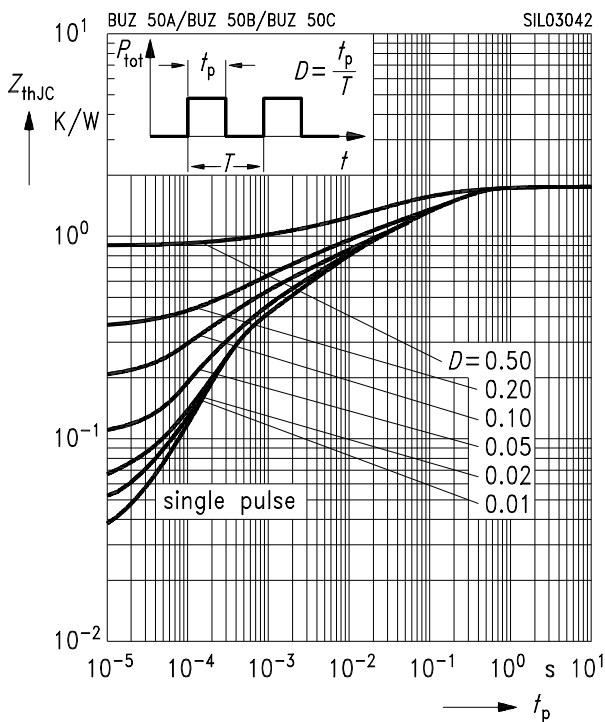
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$ , (spread)



### Transient thermal impedance

$$Z_{thJC} = f(t_p)$$

parameter:  $D = t_p / T$





### Typ. gate charge

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

parameter:  $I_{D\ puls} = 3.75\ A$

