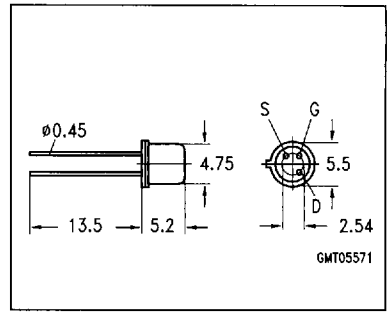
# SIEMENS

## SIPMOS® Small-Signal Transistor — BSS 91

$V_{DS}$ = 240 V
$I_D$ = 0.35 A
$R_{DS(on)}$ = 6.0 Ω

- N channel
- Enhancement mode
- Package: TO-18 [1]

**Not for new design!**




| Type | Ordering code for version in bulk |
|---|---|
| BSS 91 | Q 62702-S457 |

### Maximum Ratings

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Drain-source voltage | $V_{DS}$ | 240 | V |
| Drain-gate voltage, $R_{GS}$ = 20 kΩ | $V_{DGR}$ | 240 | |
| Gate-source voltage | $V_{GS}$ | ± 14 | |
| Gate-source peak voltage, aperiodic | $V_{gs}$ | ± 20 | |
| Continuous drain current, $T_C$ = 25 °C | $I_D$ | 0.35 | A |
| Pulsed drain current, $T_C$ = 25 °C | $I_{D\,puls}$ | 1.4 | |
| Max. power dissipation, $T_A$ = 25 °C | $P_{tot}$ | 1.5 | W |
| Operating and storage temperature range | $T_j$, $T_{stg}$ | – 55 ... + 150 | °C |

| | | | |
|---|---|---|---|
| Thermal resistance, chip-ambient (without heat sink), chip-case | $R_{thJA}$<br>$R_{thJC}$ | ≤ 300<br>≤ 83 | 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, $I_D$ = 0.25 mA | $V_{(BR)DSS}$ | 240 | – | – | V |
| Gate threshold voltage<br>$V_{GS}$ = $V_{DS}$, $I_D$ = 1 mA | $V_{GS(th)}$ | 0.8 | 1.5 | 2.0 | |
| Zero gate voltage drain current<br>$V_{DS}$ = 240 V, $V_{GS}$ = 0<br>$T_j$ = 25 °C<br>$T_j$ = 125 °C | $I_{DSS}$ | <br>–<br>– | <br>0.1<br>10 | <br>1.0<br>100 | µA |
| $V_{DS}$ = 60 V, $V_{GS}$ = 0<br>$T_j$ = 25 °C | | – | – | 200 | nA |
| Gate-source leakage current<br>$V_{GS}$ = 20 V, $V_{DS}$ = 0 | $I_{GSS}$ | – | 10 | 100 | nA |
| Drain-source on-resistance<br>$V_{GS}$ = 10 V, $I_D$ = 0.35 A<br>$V_{GS}$ = 4.5 V, $I_D$ = 0.35 A | $R_{DS(on)}$ | –<br>– | 3.5<br>5.0 | 6.0<br>10.0 | Ω |
| **Dynamic Characteristics** | | | | | |
| Forward transconductance<br>$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $I_D$ = 0.35 A | $g_{fs}$ | 0.14 | 0.37 | – | S |
| Input capacitance<br>$V_{GS}$ = 0, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{iss}$ | – | 115 | 155 | pF |
| Output capacitance<br>$V_{GS}$ = 0, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{oss}$ | – | 15 | 25 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{rss}$ | – | 8 | 12 | |
| Turn-on time $t_{on}$, ($t_{on} = t_{d(on)} + t_r$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $R_{GS}$ = 50 Ω, $I_D$ = 0.28 A | $t_{d(on)}$ | – | 6 | 9 | ns |
| | $t_r$ | – | 10 | 15 | |
| Turn-off time $t_{off}$, ($t_{off} = t_{d(off)} + t_f$)<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $R_{GS}$ = 50 Ω, $I_D$ = 0.28 A | $t_{d(off)}$ | – | 33 | 45 | |
| | $t_f$ | – | 22 | 30 | |

**Electrical Characteristics** (cont'd)

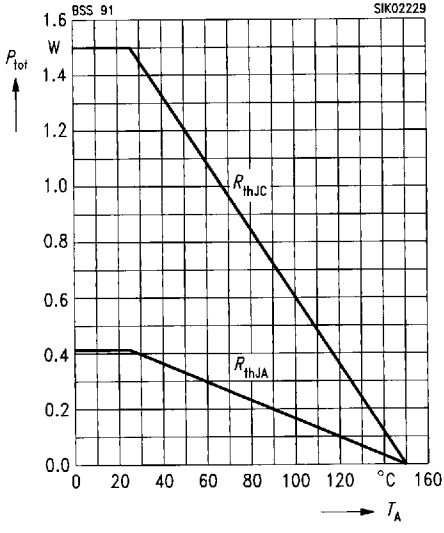
at $T_j$ = 25 °C, unless otherwise specified.

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Reverse Diode** | | | | | |
| Continuous reverse drain current<br>$T_A$ = 25 °C | $I_S$ | – | – | 0.35 | A |
| Pulsed reverse drain current<br>$T_A$ = 25 °C | $I_{SM}$ | – | – | 1.4 | |
| Diode forward on-voltage<br>$I_F$ = 0.7 A, $V_{GS}$ = 0 | $V_{SD}$ | – | 0.9 | 1.4 | V |

**Characteristics**

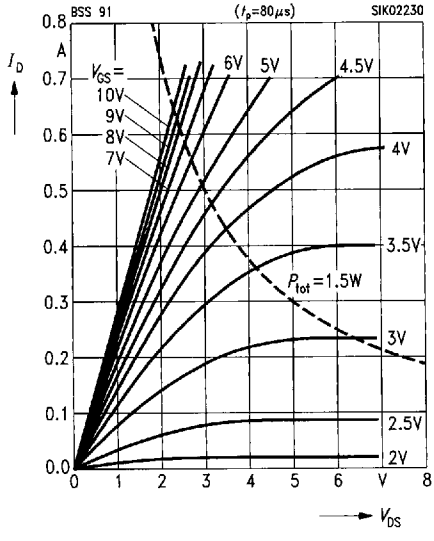
at $T_j$ = 25 °C, unless otherwise specified.

**Total power dissipation** $P_{tot} = f(T_A)$

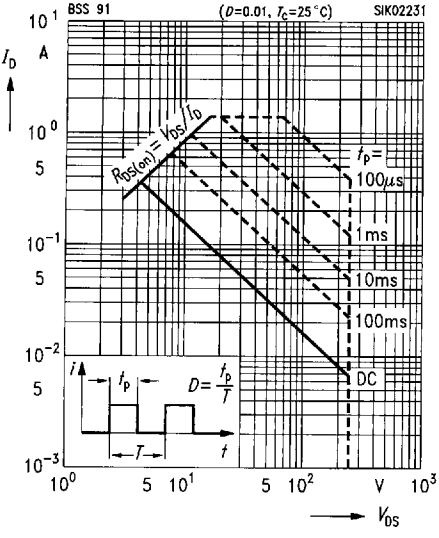



**Typ. output characteristics** $I_D = f(V_{DS})$

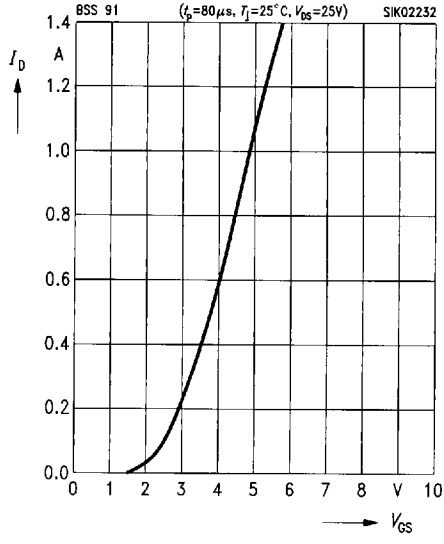
parameter: $t_p$ = 80 µs



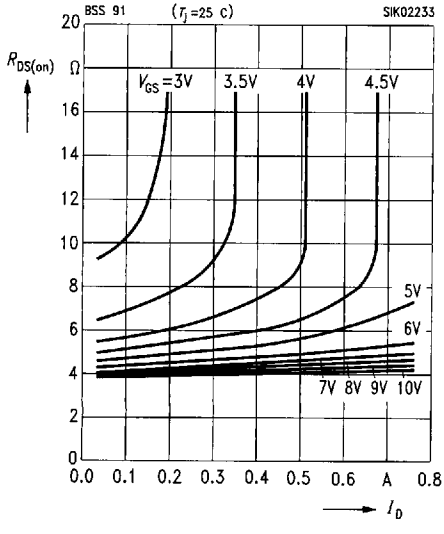
**Safe operating area** $I_D = f(V_{DS})$
parameter: $D = 0.01$, $T_C = 25$ °C



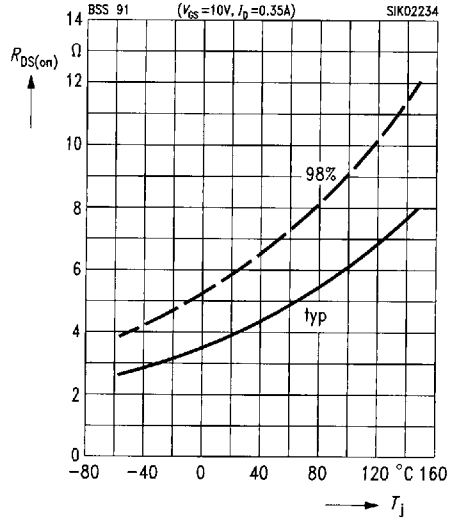

**Typ. transfer characteristics** $I_D = f(V_{GS})$
parameter: $t_p = 80$ µs, $V_{DS} = 25$ V



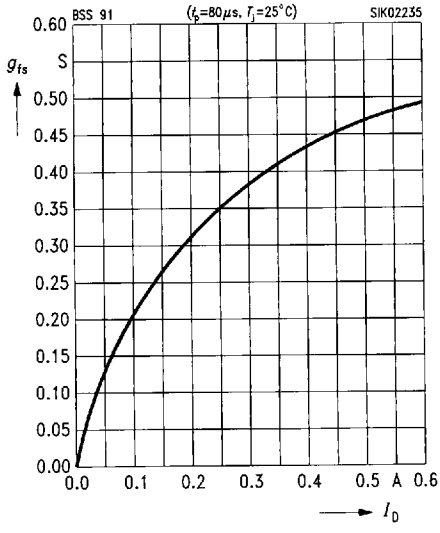

**Typ. drain-source on-resistance**
$R_{DS(on)} = f(I_D)$
parameter: $V_{GS}$



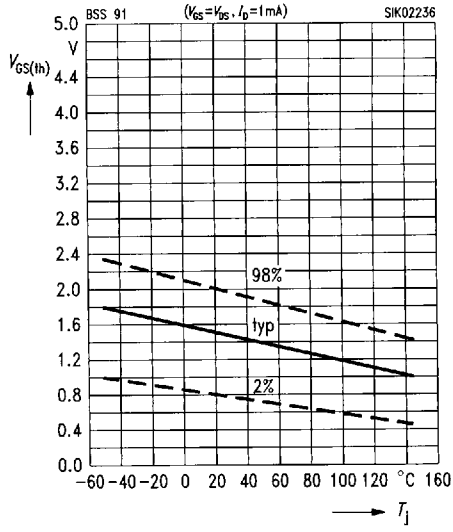

**Drain-source on-resistance**
$R_{DS(on)} = f(T_j)$
parameter: $I_D = 0.35$ A, $V_{GS} = 10$ V, (spread)



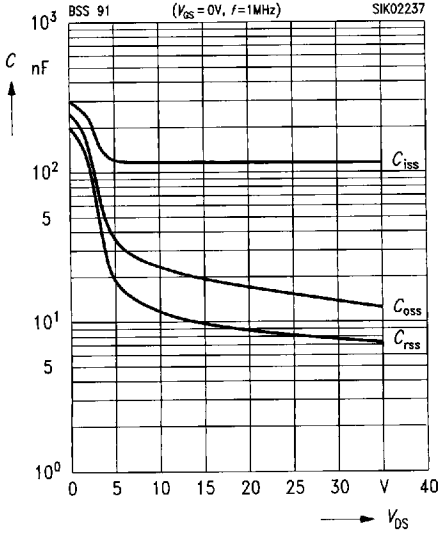
**Typ. forward transconductance** $g_{fs} = f(I_D)$
parameter: $V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$, $t_p = 80\ \mu s$



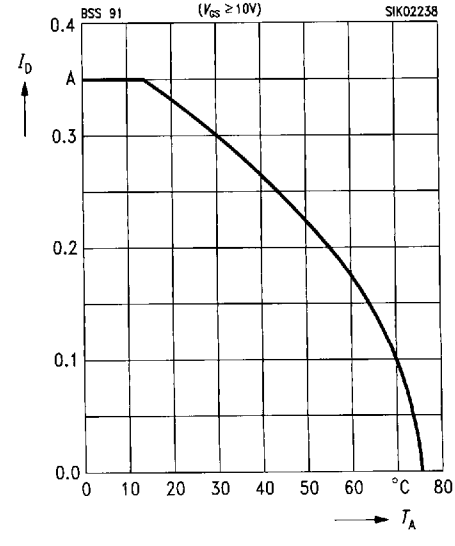

**Gate threshold voltage** $V_{GS(th)} = f(T_j)$
parameter: $V_{DS} = V_{GS}$, $I_D = 1$ mA, (spread)



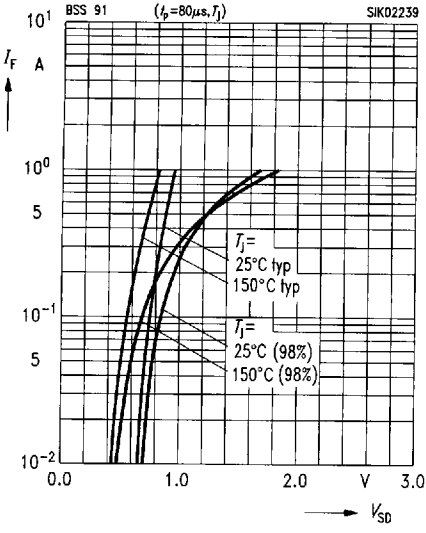

**Typ. capacitances** $C = f(V_{DS})$
parameter: $V_{GS} = 0$, $f = 1$ MHz



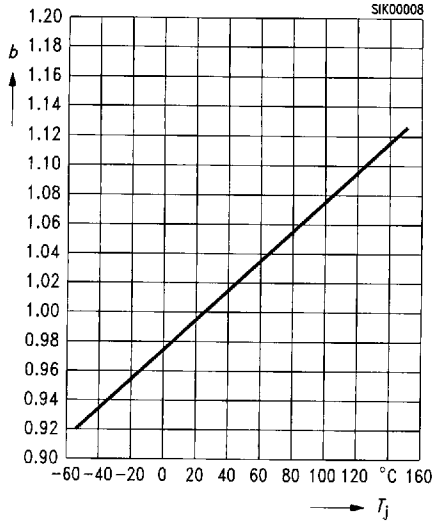

**Drain current** $I_D = f(T_A)$
parameter: $V_{GS} \geq 10$ V



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




**Drain-source breakdown voltage**
$V_{(BR)\,DSS} = b \times V_{(BR)DSS}$ (25 °C)



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