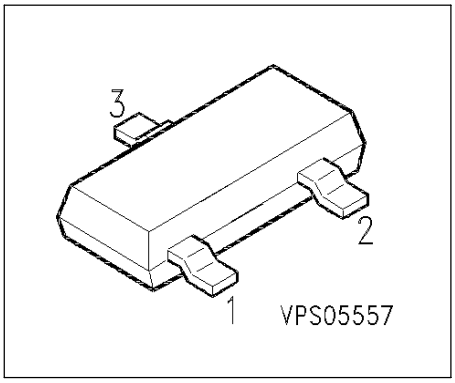
# BSS 145

**SIPMOS ® Small-Signal Transistor**

- N channel
- Enhancement mode
- $V_{GS(th)}$ = 1.4 ...2.3 V




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

| Type | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | Package | Marking |
|---|---|---|---|---|---|
| BSS 145 | 65 V | 0.22 A | 3.5 Ω | SOT-23 | SBs |

| Type | Ordering Code | Tape and Reel Information |
|---|---|---|
| BSS 145 | Q67000-S132 | E6327 |

**Maximum Ratings**

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Drain source voltage | $V_{DS}$ | 65 | V |
| Drain-gate voltage<br>$R_{GS}$ = 20 kΩ | $V_{DGR}$ | 65 | |
| Gate source voltage | $V_{GS}$ | ± 20 | |
| ESD Sensitivity (HBM) as per MIL-STD 883 | | Class 1 | |
| Continuous drain current<br>$T_A$ = 31 °C | $I_D$ | 0.22 | A |
| DC drain current, pulsed<br>$T_A$ = 25 °C | $I_{Dpuls}$ | 0.88 | |
| Power dissipation<br>$T_A$ = 25 °C | $P_{tot}$ | 0.36 | W |

**Maximum Ratings**

| Parameter | Symbol | Values | Unit |
|---|---|---|---|
| Chip or operating temperature | $T_j$ | -55 ... + 150 | °C |
| Storage temperature | $T_{stg}$ | -55 ... + 150 | |
| Thermal resistance, chip to ambient air | $R_{thJA}$ | ≤ 350 | K/W |
| Therminal resistance, chip-substrate- reverse side [1)] | $R_{thJSR}$ | ≤ 285 | |
| DIN humidity category, DIN 40 040 | | E | |
| IEC climatic category, DIN IEC 68-1 | | 55 / 150 / 56 | |

1) For package mounted on aluminium 15 mm x 16.7 mm x 0.7 mm

**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 | $V_{(BR)DSS}$ | 65 | - | - | V |
| Gate threshold voltage<br>$V_{GS}$=$V_{DS}$, $I_D$ = 1 mA | $V_{GS(th)}$ | 1.4 | 2 | 2.3 | |
| Zero gate voltage drain current<br>$V_{DS}$ = 65 V, $V_{GS}$ = 0 V, $T_j$ = 25 °C<br>$V_{DS}$ = 65 V, $V_{GS}$ = 0 V, $T_j$ = 125 °C | $I_{DSS}$ | -<br>- | 0.1<br>8 | 0.5<br>50 | µA |
| Gate-source leakage current<br>$V_{GS}$ = 20 V, $V_{DS}$ = 0 V | $I_{GSS}$ | - | 10 | 100 | nA |
| Drain-Source on-state resistance<br>$V_{GS}$ = 10 V, $I_D$ = 0.2 A<br>$V_{GS}$ = 3.5 V, $I_D$ = 0.02 A | $R_{DS(on)}$ | -<br>- | 1.6<br>- | 3.5<br>6.5 | Ω |

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

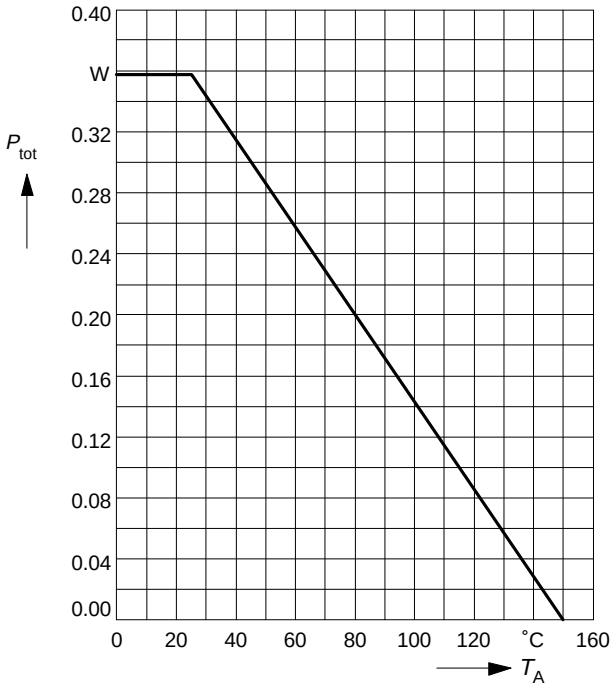
| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance<br>$V_{DS} \geq 2 * I_D * R_{DS(on)max}$, $I_D$ = 0.2 A | $g_{fs}$ | 0.12 | 0.2 | - | S |
| Input capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{iss}$ | - | 60 | 80 | pF |
| Output capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{oss}$ | - | 15 | 20 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{rss}$ | - | 5 | 8 | |
| Turn-on delay time<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 0.2 A<br>$R_{GS}$ = 50 Ω | $t_{d(on)}$ | - | 5 | 8 | ns |
| Rise time<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 0.2 A<br>$R_{GS}$ = 50 Ω | $t_r$ | - | 6 | 10 | |
| Turn-off delay time<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 0.2 A<br>$R_{GS}$ = 50 Ω | $t_{d(off)}$ | - | 12 | 16 | |
| Fall time<br>$V_{DD}$ = 30 V, $V_{GS}$ = 10 V, $I_D$ = 0.2 A<br>$R_{GS}$ = 50 Ω | $t_f$ | - | 15 | 20 | |

**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>$T_A$ = 25 ˚C | $I_S$ | - | - | 0.22 | A |
| Inverse diode direct current,pulsed<br>$T_A$ = 25 ˚C | $I_{SM}$ | - | - | 0.88 | |
| Inverse diode forward voltage<br>$V_{GS}$ = 0 V, $I_F$ = 0.4 A, $T_j$ = 25 ˚C | $V_{SD}$ | - | 0.9 | 1.4 | V |

**Power dissipation**

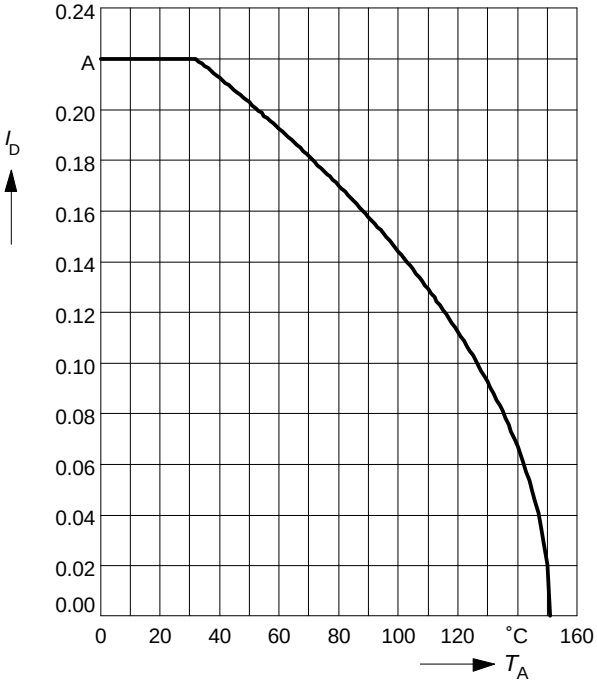
$P_{tot} = f(T_A)$




**Drain current**

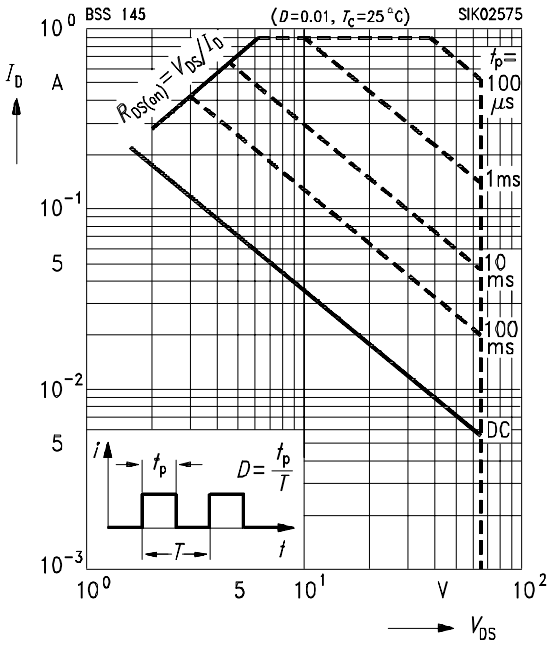
$I_D = f(T_A)$

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



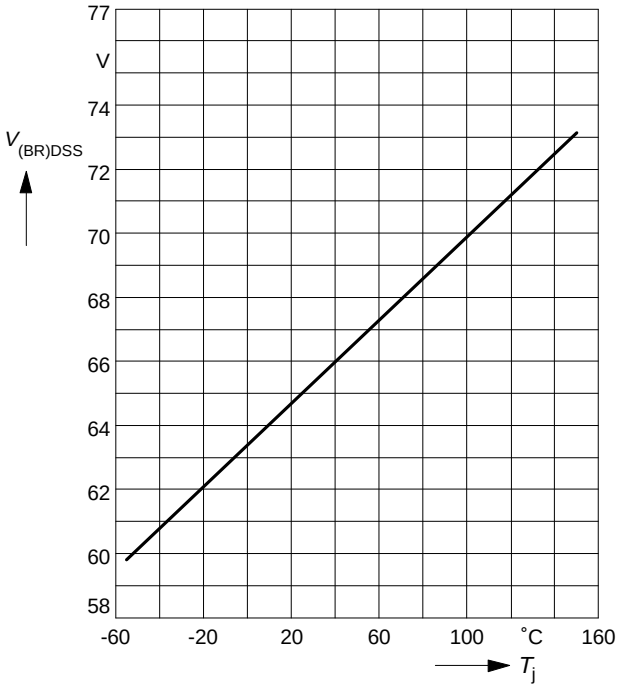

**Safe operating area** $I_D$=f($V_{DS}$)

parameter : $D$ = 0.01, $T_C$=25°C




**Drain-source breakdown voltage**

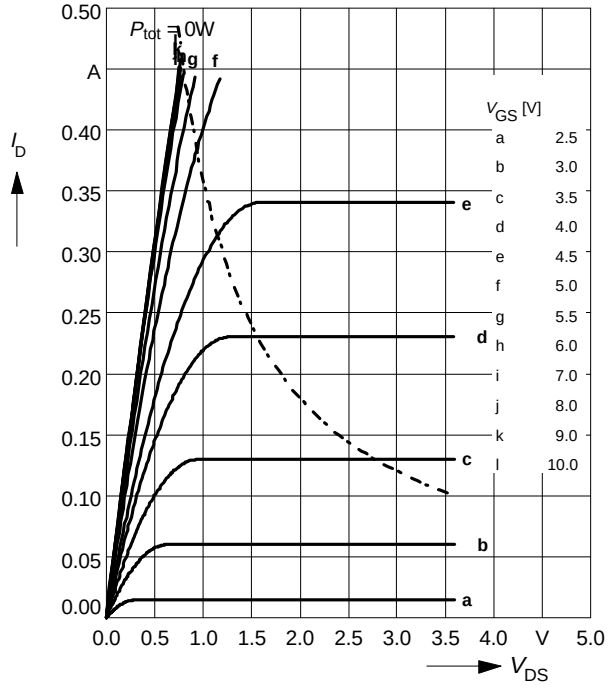
$V_{(BR)DSS} = f(T_j)$



**Typ. output characteristics**

$I_D = f(V_{DS})$

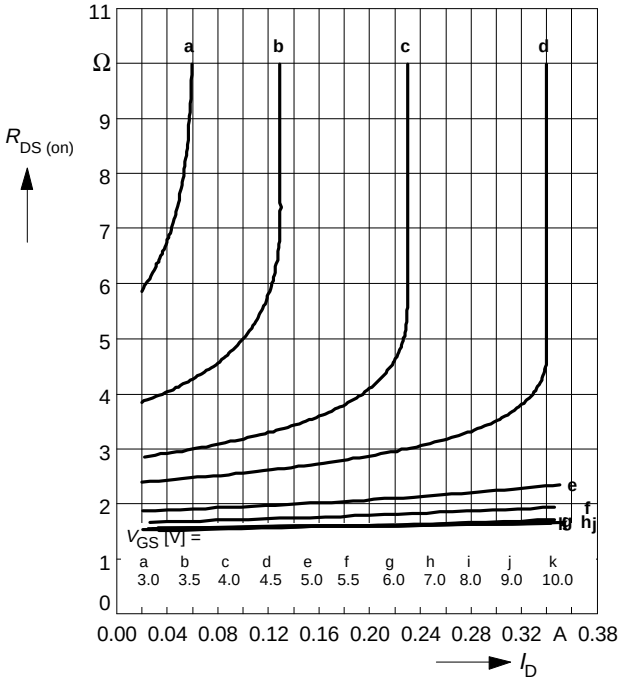
parameter: $t_p$ = 80 µs , $T_j$ = 25 ˚C




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

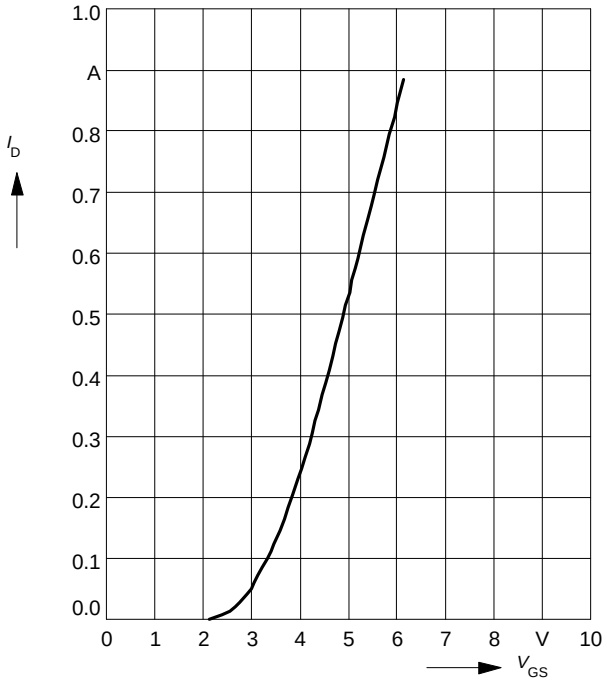
$R_{DS\,(on)} = f(I_D)$

parameter: $t_p$ = 80 µs, $T_j$ = 25 ˚C



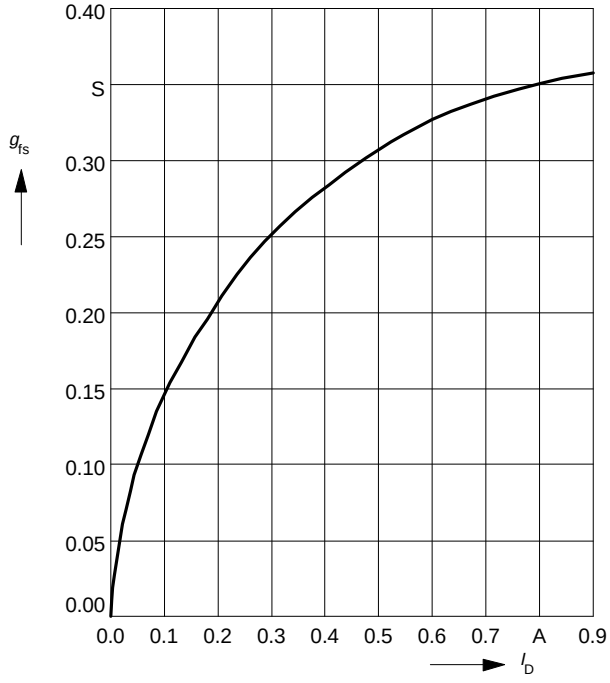

Typ. transfer characteristics $I_D = f(V_{GS})$

parameter: $t_p$ = 80 µs




Typ. forward transconductance $g_{fs} = f(I_D)$

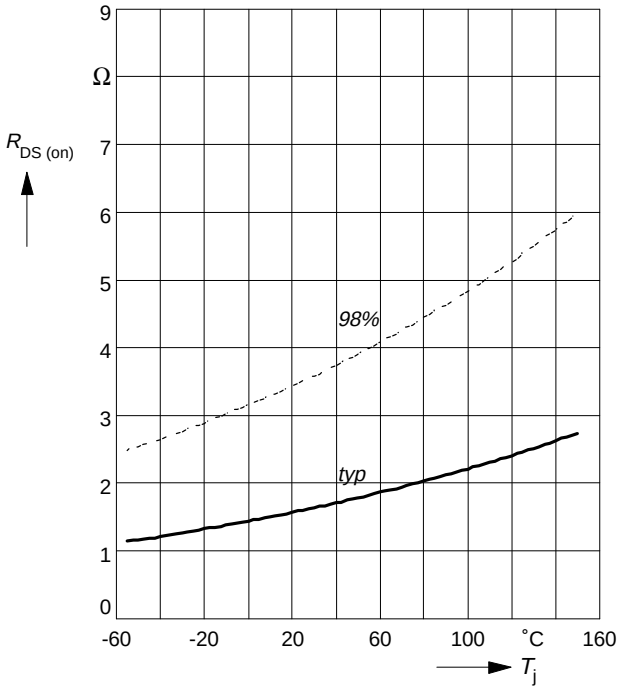
parameter: $t_p$ = 80 µs,



**Drain-source on-resistance**

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

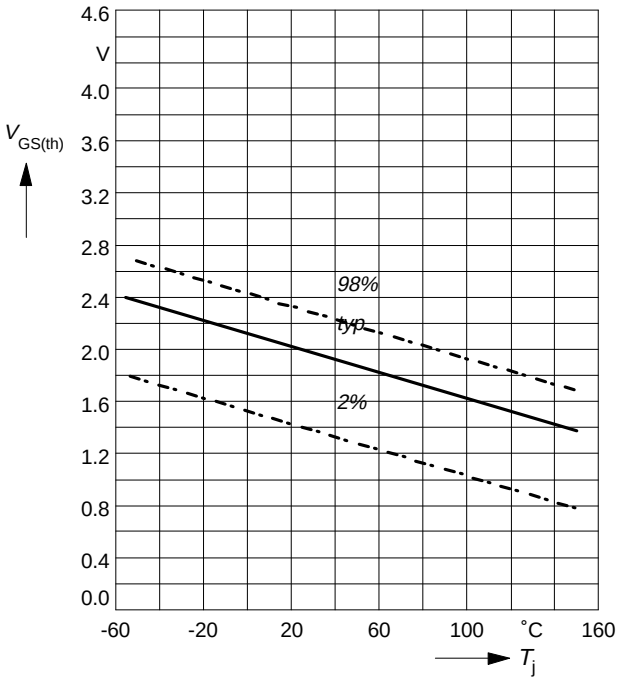
parameter: $I_D$ = 0.2 A, $V_{GS}$ = 10 V




**Gate threshold voltage**

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

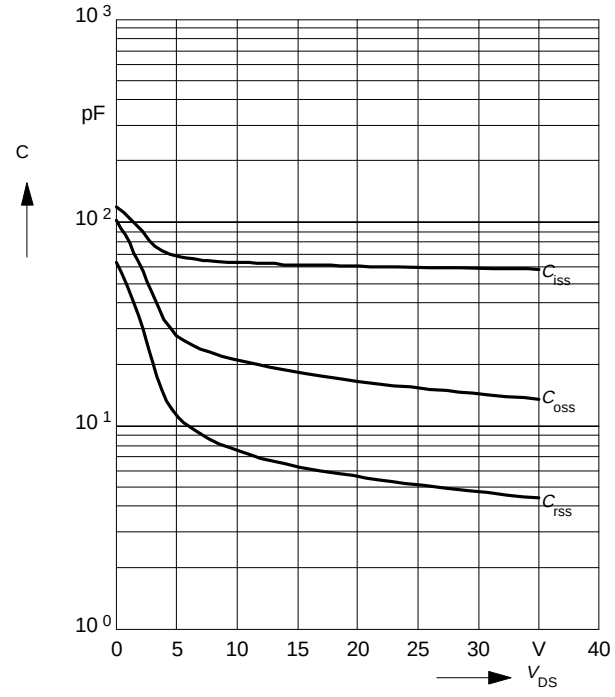
parameter: $V_{GS} = V_{DS}$, $I_D$ = 1 mA




**Typ. capacitances**

$C = f(V_{DS})$

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




**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

parameter: $T_j$, $t_p$ = 80 µs