

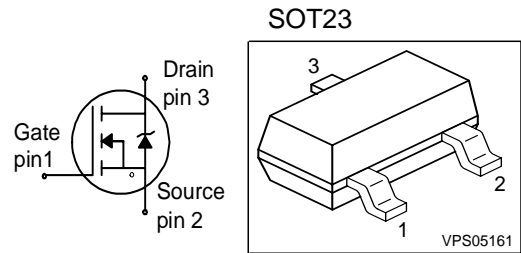
SIPMOS[®] Small-Signal-Transistor

Feature

- N-Channel
- Enhancement mode
- Logic Level
- dv/dt rated

Product Summary

| | | |
|--------------|------|----------|
| V_{DS} | 100 | V |
| $R_{DS(on)}$ | 6 | Ω |
| I_D | 0.17 | A |



| Type | Package | Ordering Code | Tape and Reel Information | Marking |
|--------|---------|---------------|---------------------------|---------|
| BSS123 | SOT23 | Q62702-S512 | E6327: 3000 pcs/reel | SAs |
| BSS123 | SOT23 | Q67000-S245 | E6433: 10000 pcs/reel | SAs |

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

| Parameter | Symbol | Value | Unit |
|---|-----------------------|--------------|-------------------|
| Continuous drain current $T_A=25^\circ\text{C}$ $T_A=70^\circ\text{C}$ | I_D | 0.17 0.14 | A |
| Pulsed drain current $T_A=25^\circ\text{C}$ | $I_{D\text{ puls}}$ | 0.68 | |
| Reverse diode dv/dt $I_S=0.17\text{A}$, $V_{DS}=80\text{V}$, $di/dt=200\text{A}/\mu\text{s}$, $T_{j\text{max}}=150^\circ\text{C}$ | dv/dt | 6 | kV/ μs |
| Gate source voltage | V_{GS} | ± 20 | V |
| ESD Sensitivity (HBM) as per MIL-STD 883 | | Class 1 | |
| Power dissipation $T_A=25^\circ\text{C}$ | P_{tot} | 0.36 | W |
| Operating and storage temperature | T_j, T_{stg} | -55... +150 | $^\circ\text{C}$ |
| IEC climatic category; DIN IEC 68-1 | | 55/150/56 | |

Thermal Characteristics

| Parameter | Symbol | Values | | | Unit |
|--|------------|--------|------|------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Thermal resistance, junction - ambient at minimum footprint | R_{thJA} | - | - | 350 | K/W |

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

| Parameter | Symbol | Values | | | Unit |
|--|---------------|--------|------|-----------|---------------|
| | | min. | typ. | max. | |
| Static Characteristics | | | | | |
| Drain-source breakdown voltage $V_{GS}=0, I_D=250\mu\text{A}$ | $V_{(BR)DSS}$ | 100 | - | - | V |
| Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=50\mu\text{A}$ | $V_{GS(th)}$ | 0.8 | 1.4 | 1.8 | |
| Zero gate voltage drain current $V_{DS}=100\text{V}, V_{GS}=0, T_j=25^\circ\text{C}$ $V_{DS}=100\text{V}, V_{GS}=0, T_j=150^\circ\text{C}$ | I_{DSS} | - | - | 0.01 5 | μA |
| Gate-source leakage current $V_{GS}=20\text{V}, V_{DS}=0$ | I_{GSS} | - | - | 10 | nA |
| Drain-source on-state resistance $V_{GS}=4.5\text{V}, I_D=0.13\text{A}$ | $R_{DS(on)}$ | - | 4 | 10 | Ω |
| Drain-source on-state resistance $V_{GS}=10\text{V}, I_D=0.17\text{A}$ | $R_{DS(on)}$ | - | 3 | 6 | |

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

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

Dynamic Characteristics

| | | | | | | |
|------------------------------|--------------|---|------|------|------|----|
| Transconductance | g_{fs} | $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 0.14\text{A}$ | 0.09 | 0.19 | - | S |
| Input capacitance | C_{iss} | $V_{GS} = 0$, $V_{DS} = 25\text{V}$, $f = 1\text{MHz}$ | - | 55 | 69 | pF |
| Output capacitance | C_{oss} | | - | 8.5 | 10.6 | |
| Reverse transfer capacitance | C_{rss} | | - | 5 | 6.3 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = 50\text{V}$, $V_{GS} = 10\text{V}$, $I_D = 0.17\text{A}$, $R_G = 6\Omega$ | - | 2.7 | 4 | ns |
| Rise time | t_r | | - | 3.1 | 4.6 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 9.9 | 14.8 | |
| Fall time | t_f | | - | 25 | 37 | |

Gate Charge Characteristics

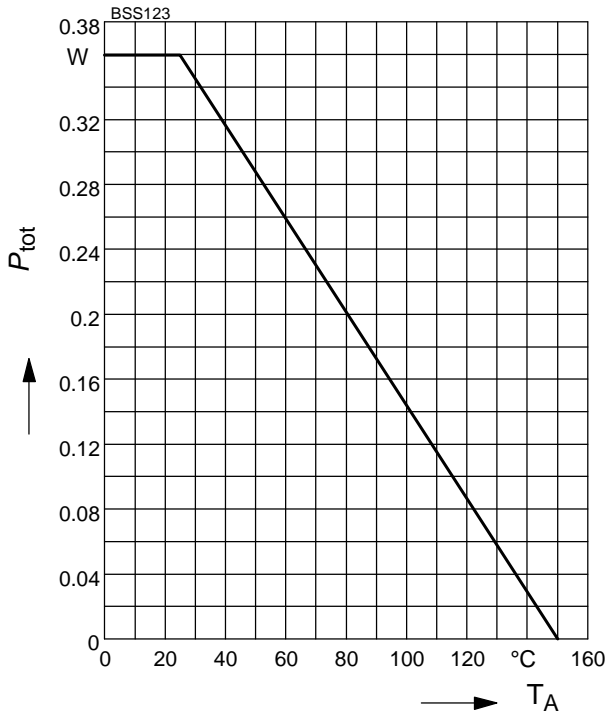
| | | | | | | |
|-----------------------|-----------------|--|---|-------|-------|----|
| Gate to source charge | Q_{gs} | $V_{DD} = 80\text{V}$, $I_D = 0.17\text{A}$ | - | 0.055 | 0.082 | nC |
| Gate to drain charge | Q_{gd} | | - | 0.77 | 1.15 | |
| Gate charge total | Q_g | $V_{DD} = 80\text{V}$, $I_D = 0.17\text{A}$, $V_{GS} = 0$ to 10V | - | 1.78 | 2.67 | |
| Gate plateau voltage | $V_{(plateau)}$ | $V_{DD} = 80\text{V}$, $I_D = 0.17\text{A}$ | - | 2.6 | - | V |

Reverse Diode

| | | | | | | |
|--|----------|---|---|------|------|----|
| Inverse diode continuous forward current | I_S | $T_A = 25\text{ }^\circ\text{C}$ | - | - | 0.17 | A |
| Inv. diode direct current, pulsed | I_{SM} | | - | - | 0.68 | |
| Inverse diode forward voltage | V_{SD} | $V_{GS} = 0$, $I_F = I_S$ | - | 0.81 | 1.2 | V |
| Reverse recovery time | t_{rr} | $V_R = 50\text{V}$, $I_F = I_S$, $di_F/dt = 100\text{A}/\mu\text{s}$ | - | 27.6 | 41.1 | ns |
| Reverse recovery charge | Q_{rr} | | - | 10.5 | 15.7 | nC |

1 Power dissipation

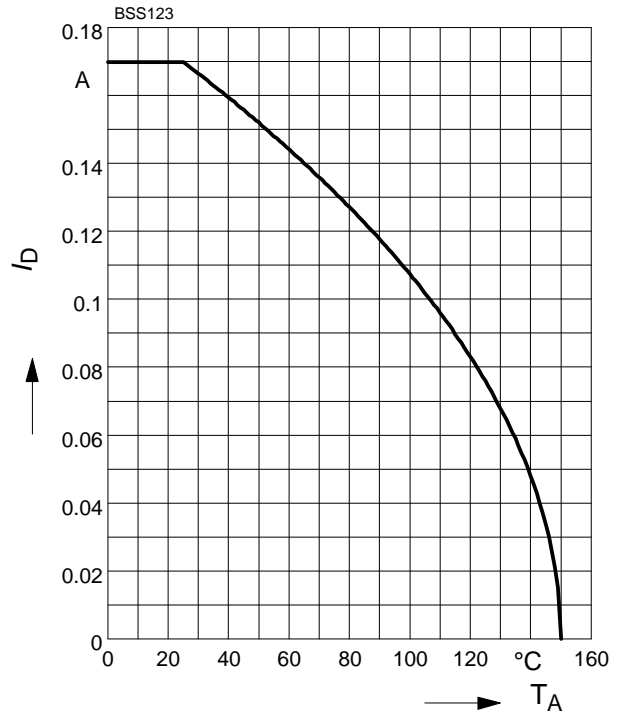
$$P_{tot} = f(T_A)$$



2 Drain current

$$I_D = f(T_A)$$

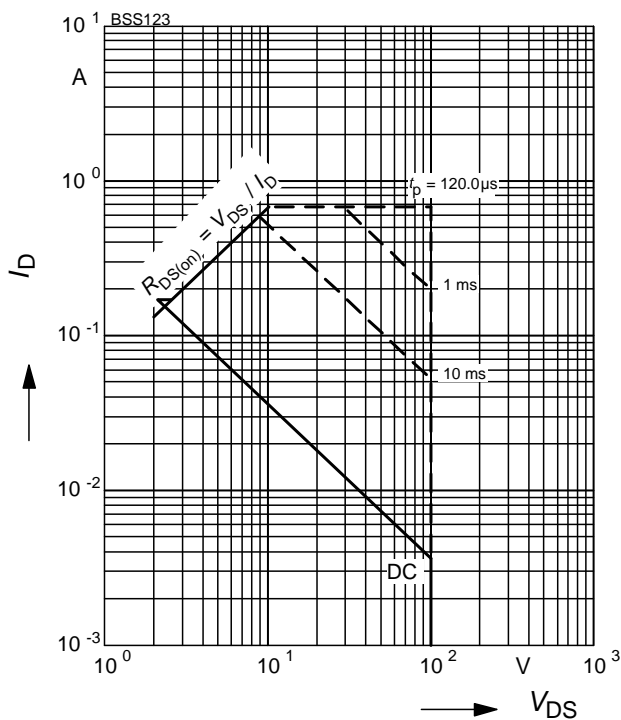
parameter: $V_{GS} \geq 10 \text{ V}$



3 Safe operating area

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

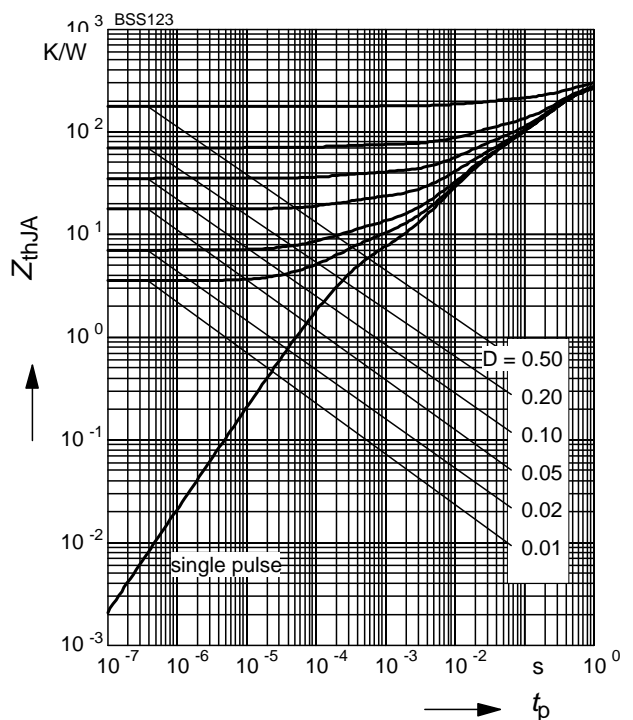
parameter: $D = 0$, $T_A = 25 \text{ °C}$



4 Transient thermal impedance

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

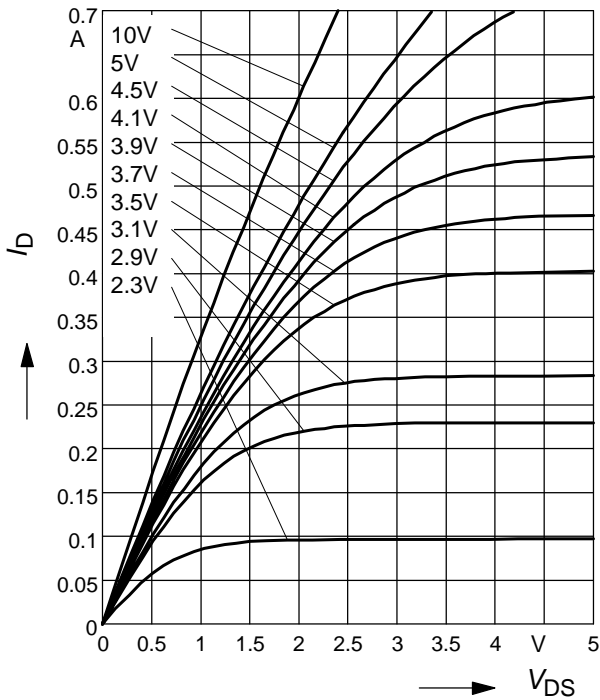
parameter: $D = t_p/T$



5 Typ. output characteristic

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

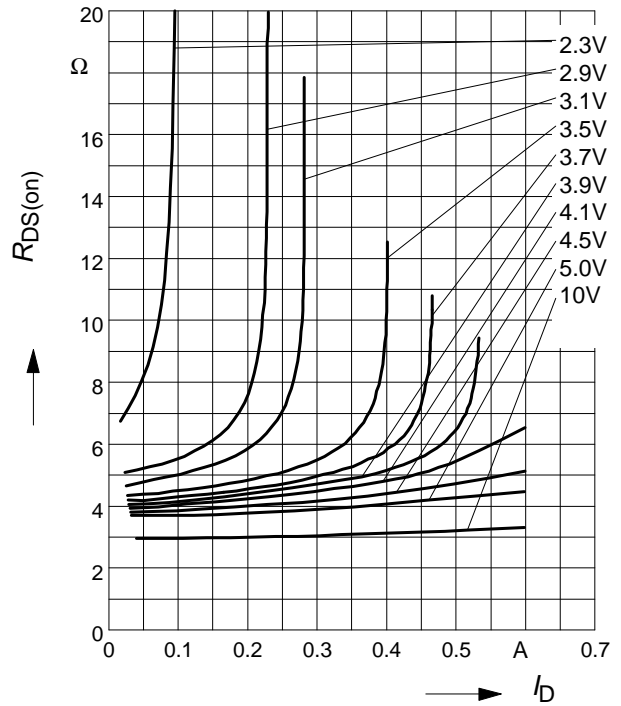
parameter: $T_j = 25\text{ }^\circ\text{C}$, V_{GS}



6 Typ. drain-source on resistance

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

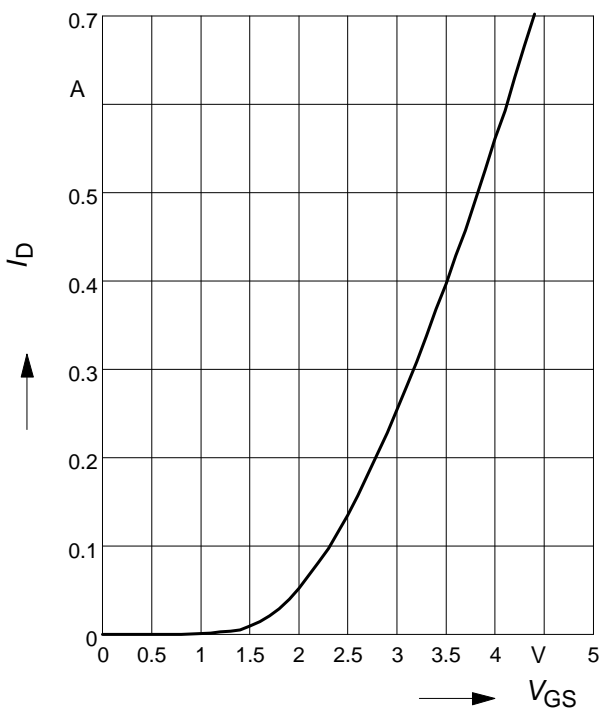
parameter: $T_j = 25\text{ }^\circ\text{C}$, V_{GS}



7 Typ. transfer characteristics

$$I_D = f(V_{GS}); V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$$

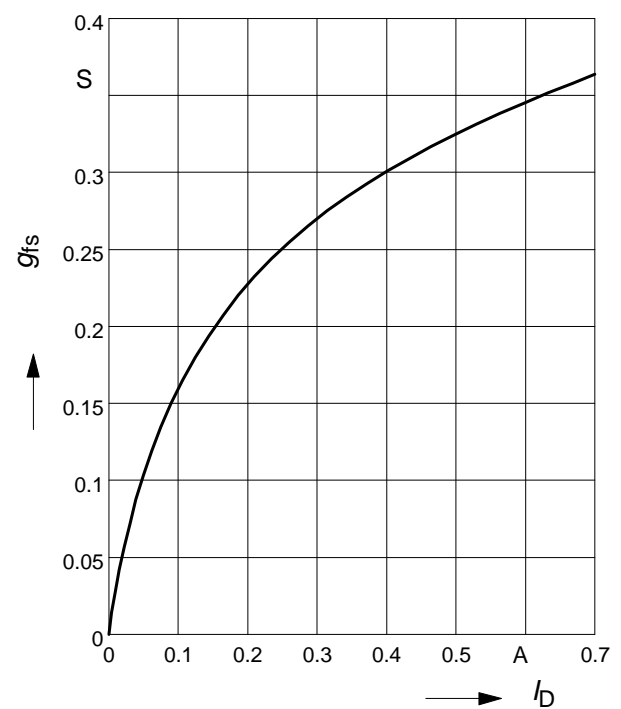
parameter: $T_j = 25\text{ }^\circ\text{C}$



8 Typ. forward transconductance

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

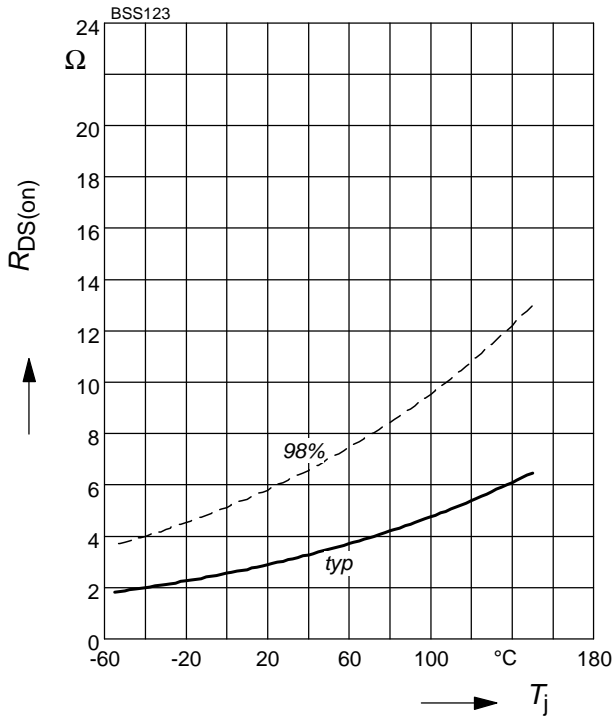
parameter: $T_j = 25\text{ }^\circ\text{C}$



9 Drain-source on-state resistance

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

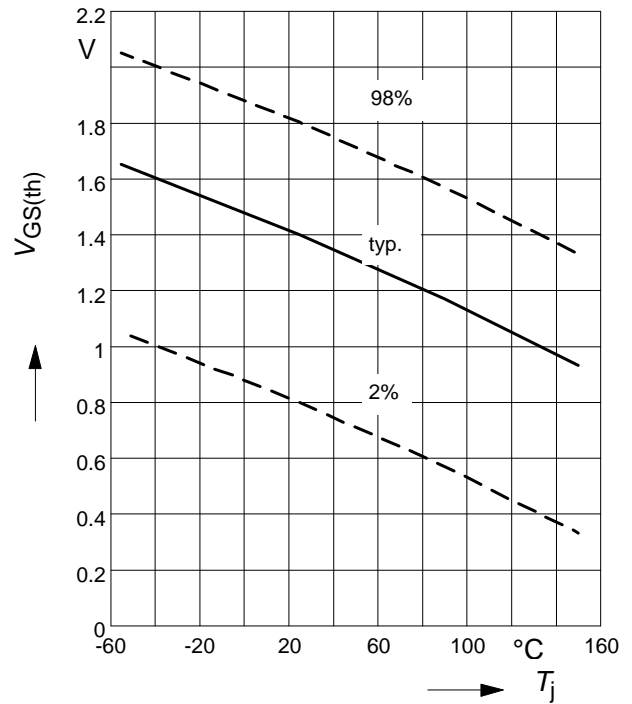
parameter: $I_D = 0.17\text{ A}$, $V_{GS} = 10\text{ V}$



10 Typ. gate threshold voltage

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

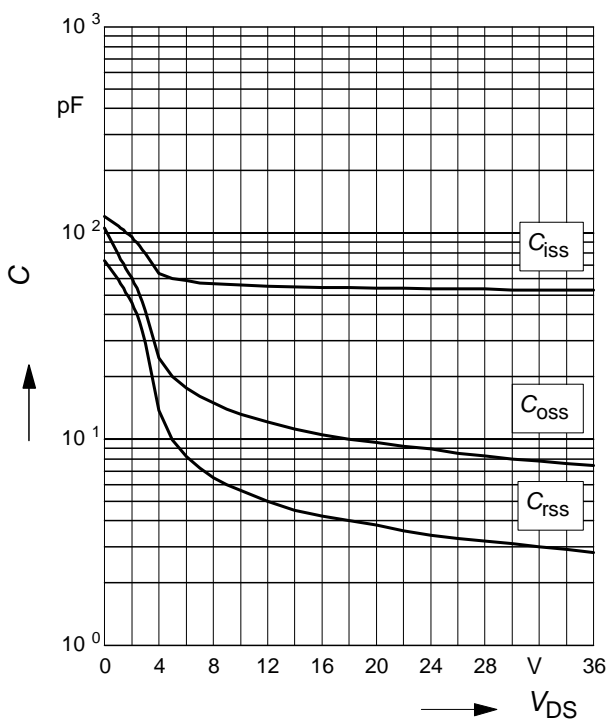
parameter: $V_{GS} = V_{DS}$; $I_D = 50\mu\text{A}$



11 Typ. capacitances

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

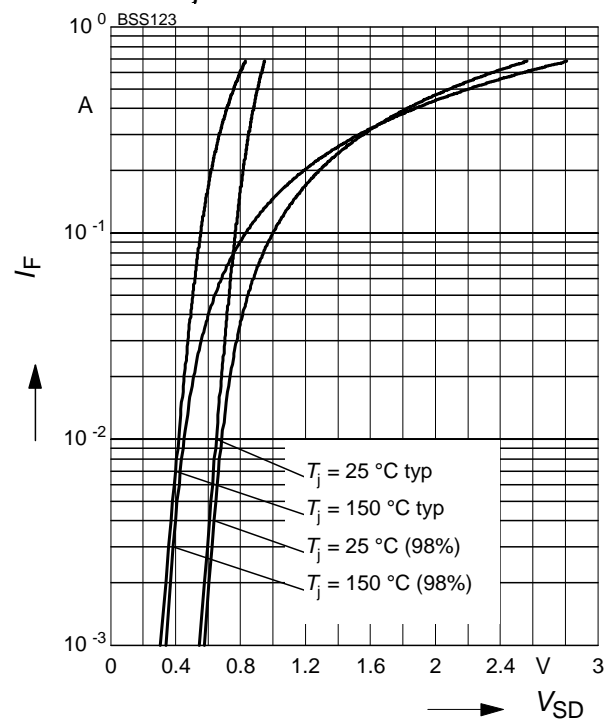
parameter: $V_{GS} = 0$, $f = 1\text{ MHz}$, $T_j = 25\text{ }^\circ\text{C}$



12 Forward character. of reverse diode

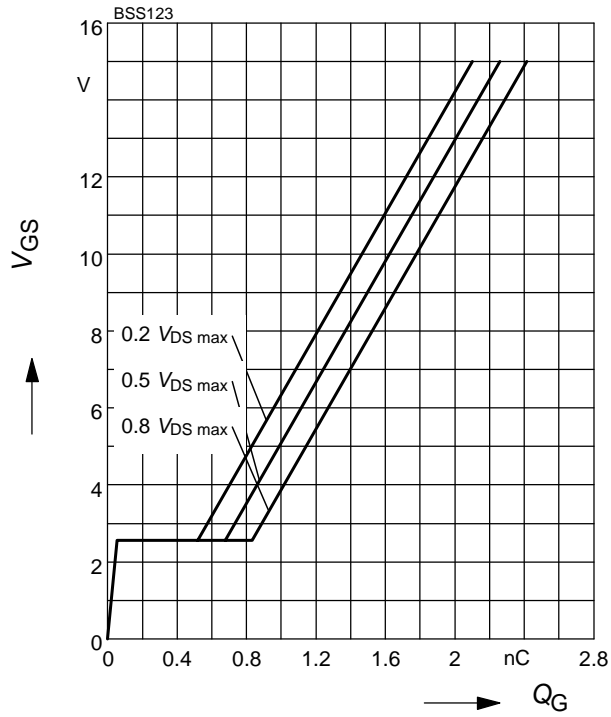
$$I_F = f(V_{SD})$$

parameter: T_j



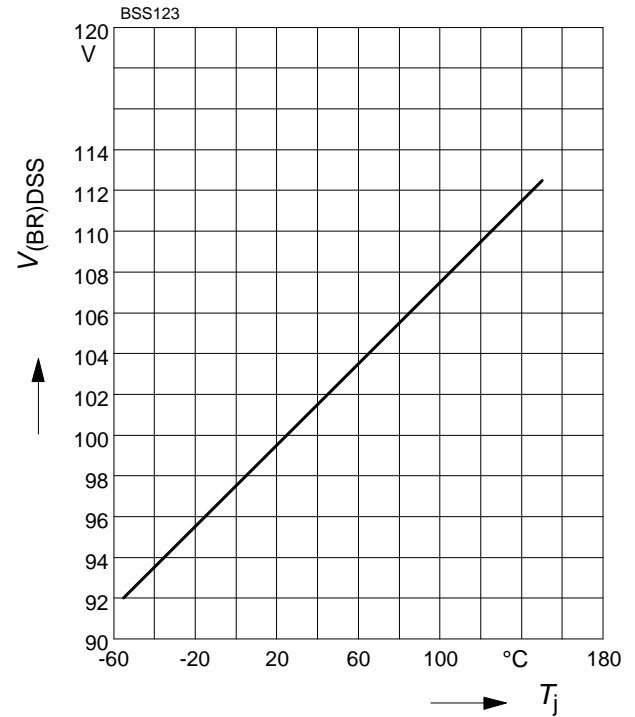
13 Typ. gate charge

$V_{GS} = f(Q_G)$; parameter: V_{DS} ,
 $I_D = 0.17$ A pulsed, $T_j = 25$ °C



14 Drain-source breakdown voltage

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



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