

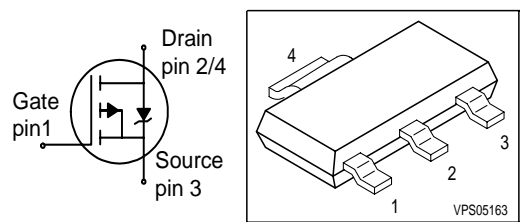
**SIPMOS® Small-Signal-Transistor**
**Feature**

- P-Channel
- Enhancement mode
- Logic Level
- dv/dt rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101


**Product Summary**

|              |       |          |
|--------------|-------|----------|
| $V_{DS}$     | -250  | V        |
| $R_{DS(on)}$ | 12    | $\Omega$ |
| $I_D$        | -0.26 | A        |

PG-SOT223



| Type   | Package   | Pb-free | Tape and Reel Information | Marking |
|--------|-----------|---------|---------------------------|---------|
| BSP92P | PG-SOT223 | Yes     | L6327: 1000 pcs/reel      | BSP92P  |

**Packaging**

Non dry

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

| Parameter   | Symbol              | Value       | Unit              |
|---|---------------------|-------------|-------------------|
| Continuous drain current  | $I_D$               | -0.26       | A                 |
| $T_A=25\text{ }^\circ\text{C}$  |                     | -0.26       |                   |
| $T_A=70\text{ }^\circ\text{C}$  |                     | -0.23       |                   |
| Pulsed drain current  | $I_{D\text{ puls}}$ | -1.04       |                   |
| $T_A=25\text{ }^\circ\text{C}$  |                     |             |                   |
| Reverse diode dv/dt   | dv/dt               | 6           | kV/ $\mu\text{s}$ |
| $I_S=-0.26\text{ A}$ , $V_{DS}=-200\text{ V}$ , $di/dt=-200\text{ A}/\mu\text{s}$ , $T_{j\text{max}}=150\text{ }^\circ\text{C}$ |                     |             |                   |
| Gate source voltage   | $V_{GS}$            | $\pm 20$    | V                 |
| Power dissipation   | $P_{tot}$           | 1.8         | W                 |
| $T_A=25\text{ }^\circ\text{C}$  |                     |             |                   |
| 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. |      |
| <b>Characteristics</b>                                    |            |        |      |      |      |
| Thermal resistance, junction - soldering point<br>(Pin 4) | $R_{thJS}$ | -      | 15   | 25   | K/W  |
| SMD version, device on PCB:                               | $R_{thJA}$ | -      | 80   | 115  |      |
| @ min. footprint  |            | -      | 80   | 115  |      |
| @ 6 cm <sup>2</sup> cooling area <sup>1)</sup>            |            | -      | 48   | 70   |      |

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

| Parameter  | Symbol        | Values |      |      | Unit          |
|--|---------------|--------|------|------|---------------|
|  |               | min.   | typ. | max. |               |
| <b>Static Characteristics</b>  |               |        |      |      |               |
| Drain-source breakdown voltage<br>$V_{GS}=0, I_D=-250\mu\text{A}$  | $V_{(BR)DSS}$ | -250   | -    | -    | V             |
| Gate threshold voltage, $V_{GS} = V_{DS}$<br>$I_D=-130\mu\text{A}$   | $V_{GS(th)}$  | -1     | -1.5 | -2   |               |
| Zero gate voltage drain current<br>$V_{DS}=-250\text{V}, V_{GS}=0, T_j=25^\circ\text{C}$<br>$V_{DS}=-250\text{V}, V_{GS}=0, T_j=150^\circ\text{C}$ | $I_{DSS}$     | -      | -0.1 | -0.2 | $\mu\text{A}$ |
|  |               | -      | -10  | -100 |               |
| Gate-source leakage current<br>$V_{GS}=-20\text{V}, V_{DS}=0$  | $I_{GSS}$     | -      | -10  | -100 | nA            |
| Drain-source on-state resistance<br>$V_{GS}=-2.8\text{V}, I_D=-0.025\text{A}$  | $R_{DS(on)}$  | -      | 10   | 20   | $\Omega$      |
| Drain-source on-state resistance<br>$V_{GS}=-4.5\text{V}, I_D=-0.23\text{A}$   | $R_{DS(on)}$  | -      | 8.2  | 15   |               |
| Drain-source on-state resistance<br>$V_{GS}=-10\text{V}, I_D=-0.26\text{A}$  | $R_{DS(on)}$  | -      | 7.5  | 12   |               |

<sup>1)</sup>Device on 40mm\*40mm\*1.5mm epoxy PCB FR4 with 6cm<sup>2</sup> (one layer, 70  $\mu\text{m}$  thick) copper area for drain connection. PCB is vertical without blown air.

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

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

**Dynamic Characteristics**

|                              |              |   |      |      |     |    |
|------------------------------|--------------|---|------|------|-----|----|
| Transconductance             | $g_{fs}$     | $ V_{DS}  \geq 2 *  I_D  * R_{DS(on)max}$ ,<br>$I_D = -0.23A$     | 0.29 | 0.57 | -   | S  |
| Input capacitance            | $C_{iss}$    | $V_{GS} = 0, V_{DS} = -25V,$<br>$f = 1MHz$                        | -    | 83   | 104 | pF |
| Output capacitance           | $C_{oss}$    |   | -    | 13   | 16  |    |
| Reverse transfer capacitance | $C_{rss}$    |   | -    | 6    | 8   |    |
| Turn-on delay time           | $t_{d(on)}$  | $V_{DD} = -125V, V_{GS} = -10V,$<br>$I_D = -0.26A, R_G = 6\Omega$ | -    | 5    | 8   | ns |
| Rise time                    | $t_r$        |   | -    | 6    | 9   |    |
| Turn-off delay time          | $t_{d(off)}$ |   | -    | 67   | 101 |    |
| Fall time                    | $t_f$        |   | -    | 33   | 50  |    |

**Gate Charge Characteristics**

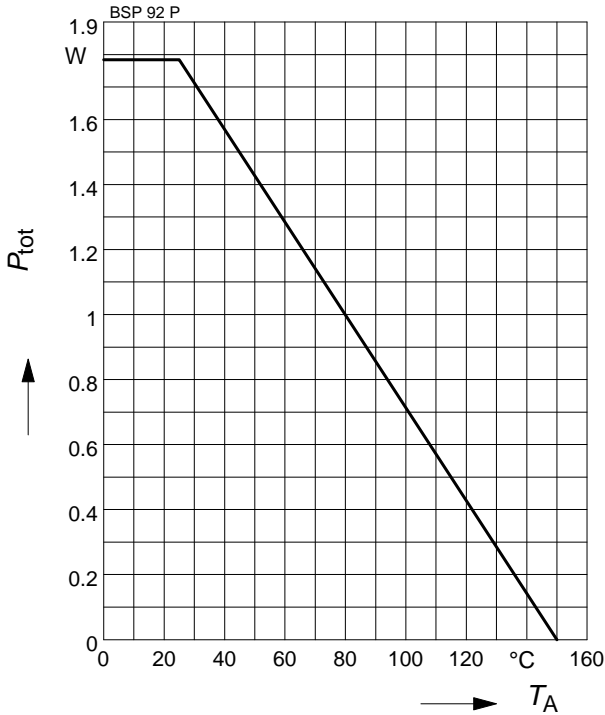
|                       |                 |  |   |      |       |    |
|-----------------------|-----------------|--|---|------|-------|----|
| Gate to source charge | $Q_{gs}$        | $V_{DD} = -200V, I_D = -0.26A$                                   | - | -0.1 | -0.13 | nC |
| Gate to drain charge  | $Q_{gd}$        |  | - | -1.9 | -2.4  |    |
| Gate charge total     | $Q_g$           | $V_{DD} = -200V, I_D = -0.26A,$<br>$V_{GS} = 0 \text{ to } -10V$ | - | -4.3 | -5.4  |    |
| Gate plateau voltage  | $V_{(plateau)}$ | $V_{DD} = -200V, I_D = -0.26A$                                   | - | -2.9 | -3.6  | V  |

**Reverse Diode**

|  |          |   |   |       |       |    |
|--|----------|---|---|-------|-------|----|
| Inverse diode continuous forward current | $I_S$    | $T_A = 25\text{ °C}$                                | - | -     | -0.26 | A  |
| Inv. diode direct current, pulsed        | $I_{SM}$ |   | - | -     | -1.04 |    |
| Inverse diode forward voltage            | $V_{SD}$ | $V_{GS} = 0, I_F = -0.26A$                          | - | -0.83 | -1.21 | V  |
| Reverse recovery time                    | $t_{rr}$ | $V_R = -125V, I_F = I_S,$<br>$di_F/dt = 100A/\mu s$ | - | 51    | 64    | ns |
| Reverse recovery charge                  | $Q_{rr}$ |   | - | 76    | 95    |    |

### 1 Power dissipation

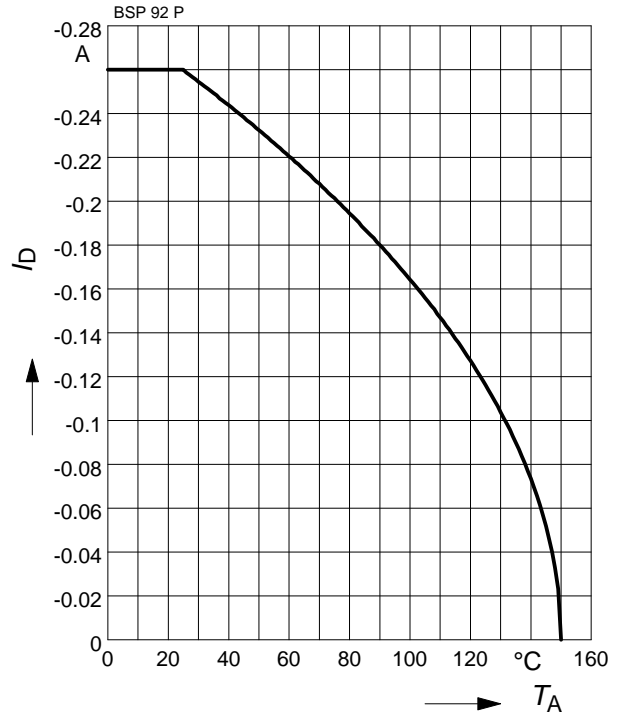
$$P_{tot} = f(T_A)$$



### 2 Drain current

$$I_D = f(T_A)$$

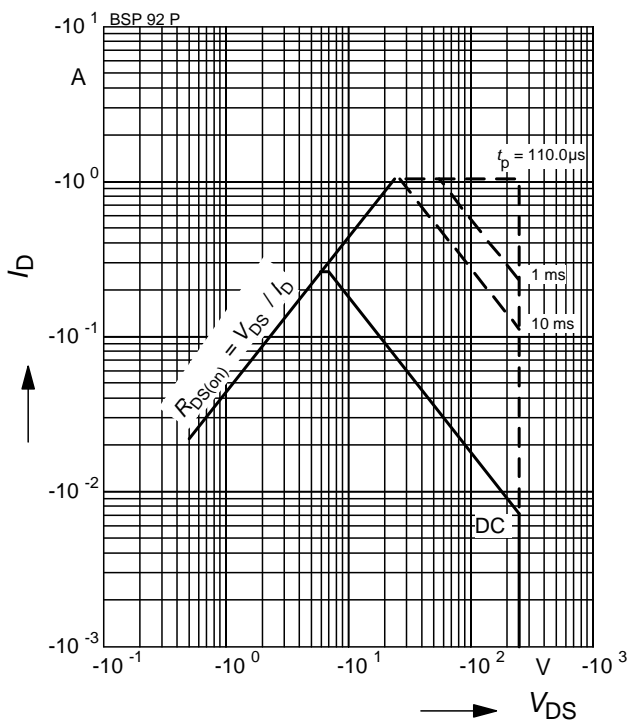
parameter:  $|V_{GS}| \geq 10V$



### 3 Safe operating area

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

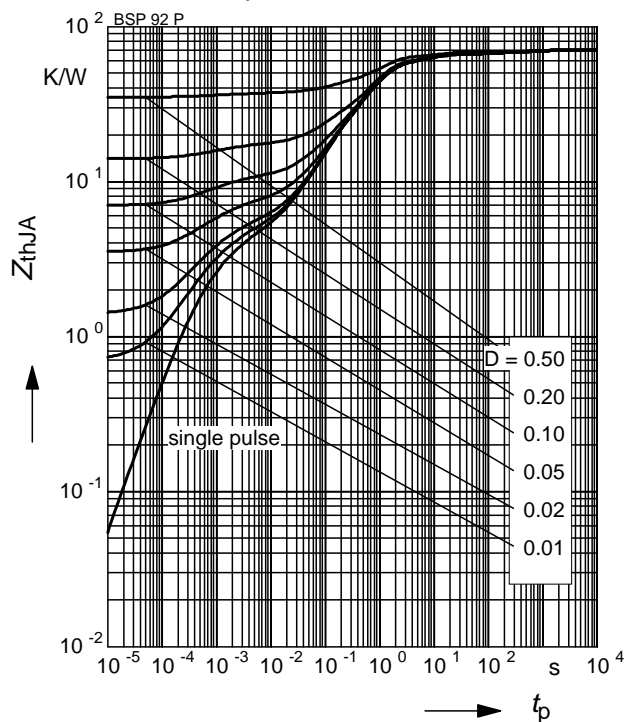
parameter:  $D = 0, T_A = 25^\circ C$



### 4 Transient thermal impedance

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

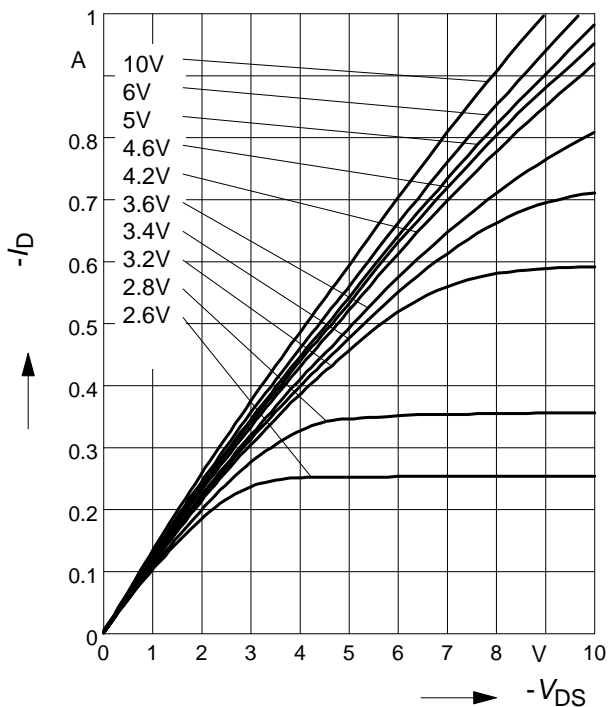
parameter:  $D = t_p/T$



**5 Typ. output characteristic**

$I_D = f(V_{DS})$

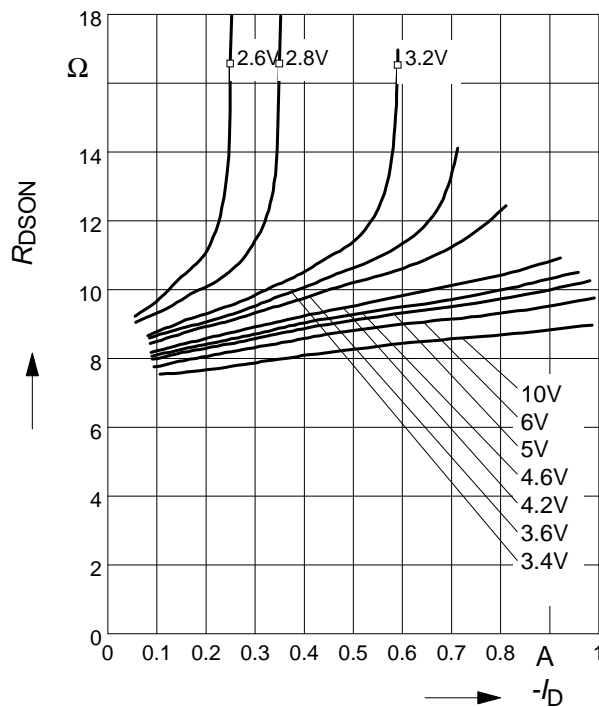
parameter:  $T_j = 25^\circ\text{C}$ ,  $-V_{GS}$



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

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

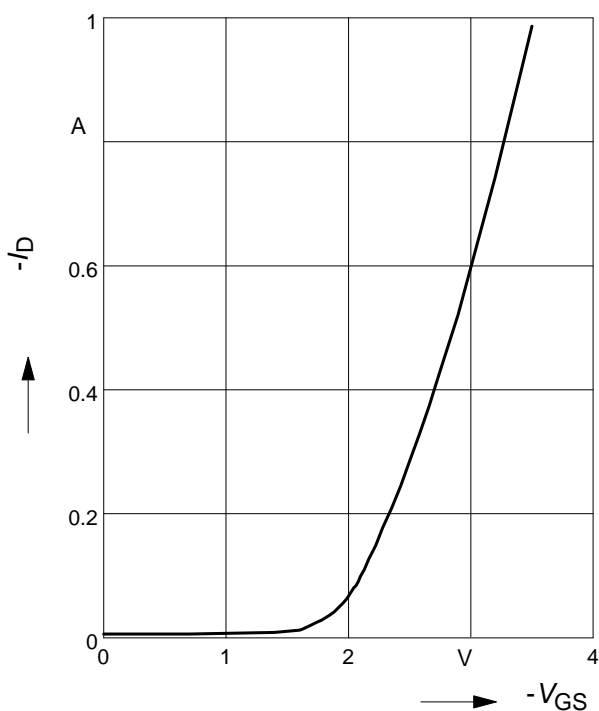
parameter:  $V_{GS}$ ;  $T_j = 25^\circ\text{C}$ ,  $-V_{GS}$



**7 Typ. transfer characteristics**

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

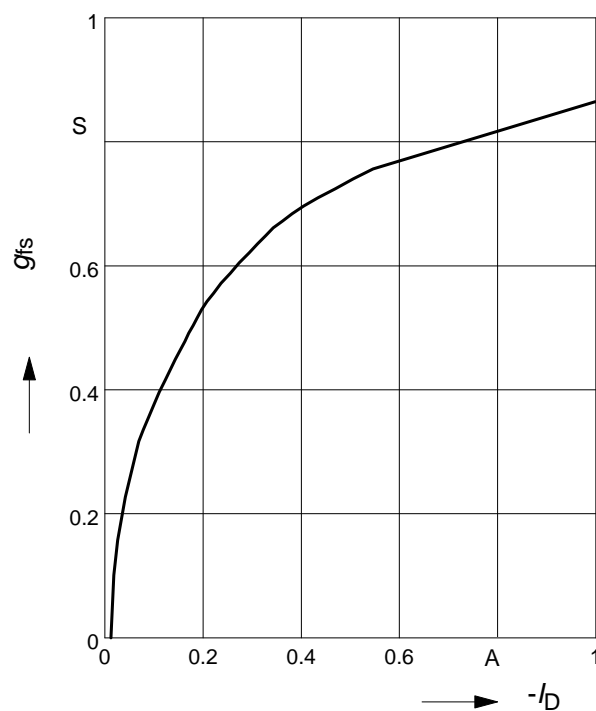
parameter:  $T_j = 25^\circ\text{C}$



**8 Typ. forward transconductance**

$g_{fs} = f(I_D)$

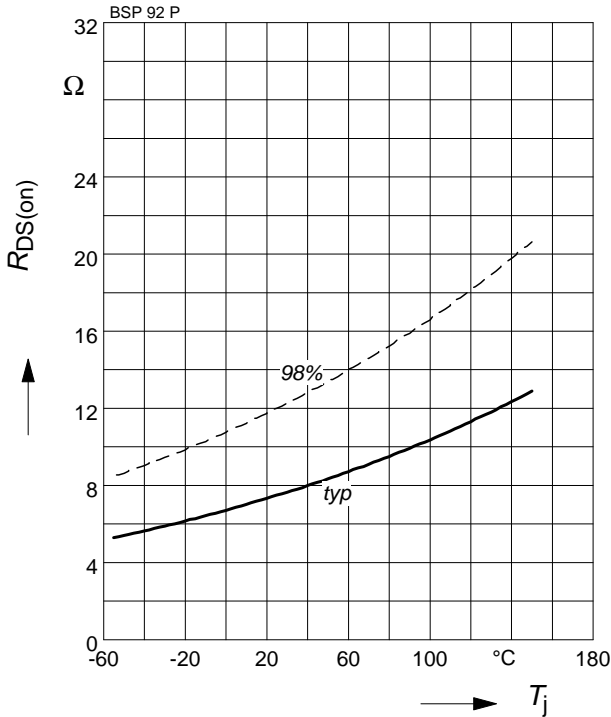
parameter:  $T_j = 25^\circ\text{C}$



**9 Drain-source on-state resistance**

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

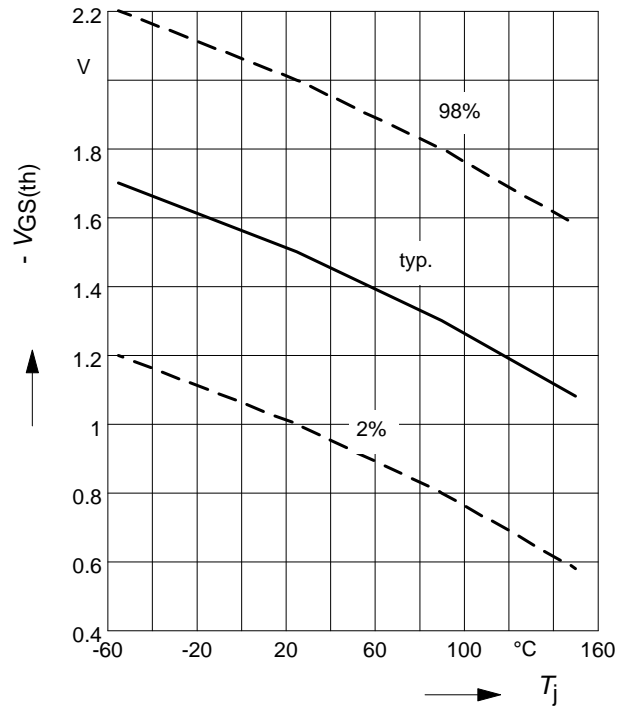
parameter:  $I_D = -0.26 \text{ A}$ ,  $V_{GS} = -10 \text{ V}$



**10 Gate threshold voltage**

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

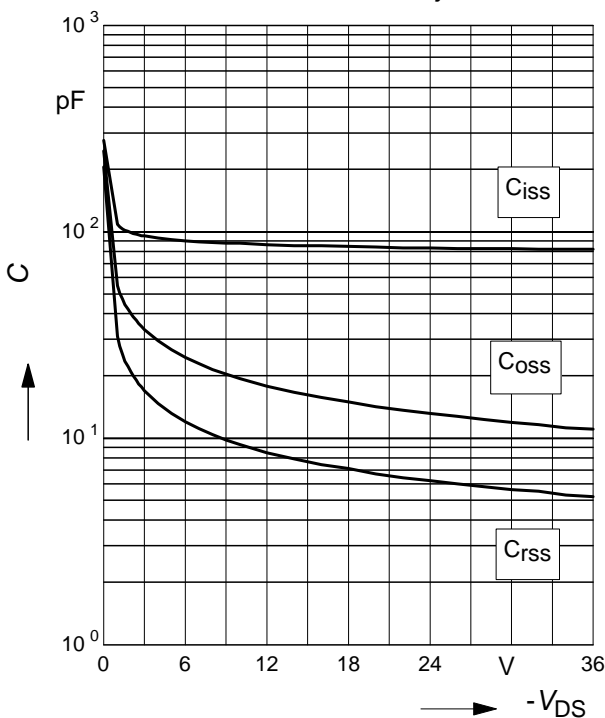
parameter:  $V_{GS} = V_{DS}$ ;  $I_D = -130 \mu\text{A}$



**11 Typ. capacitances**

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

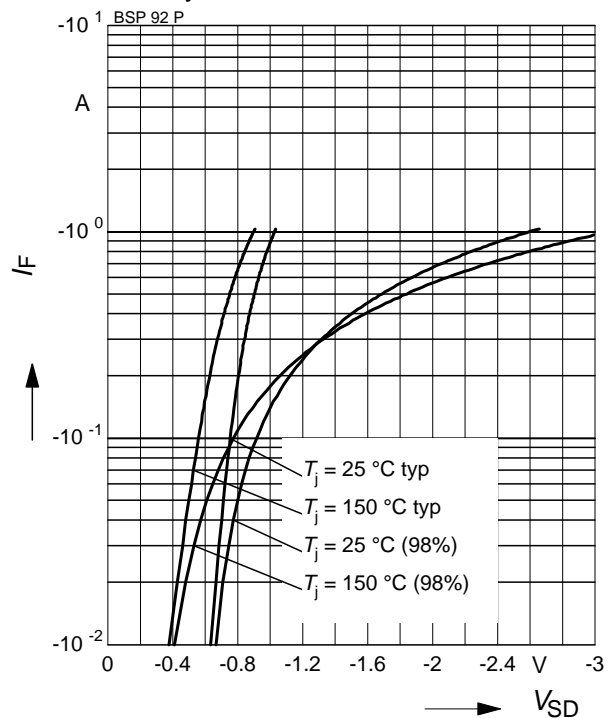
parameter:  $V_{GS}=0$ ,  $f=1 \text{ MHz}$ ,  $T_j = 25 \text{ }^\circ\text{C}$



**12 Forward character. of reverse diode**

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

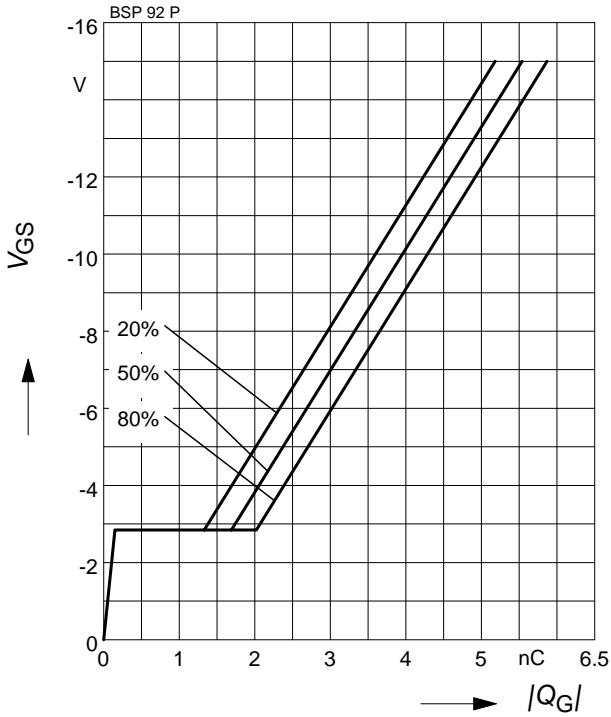
parameter:  $T_j$



**13 Typ. gate charge**

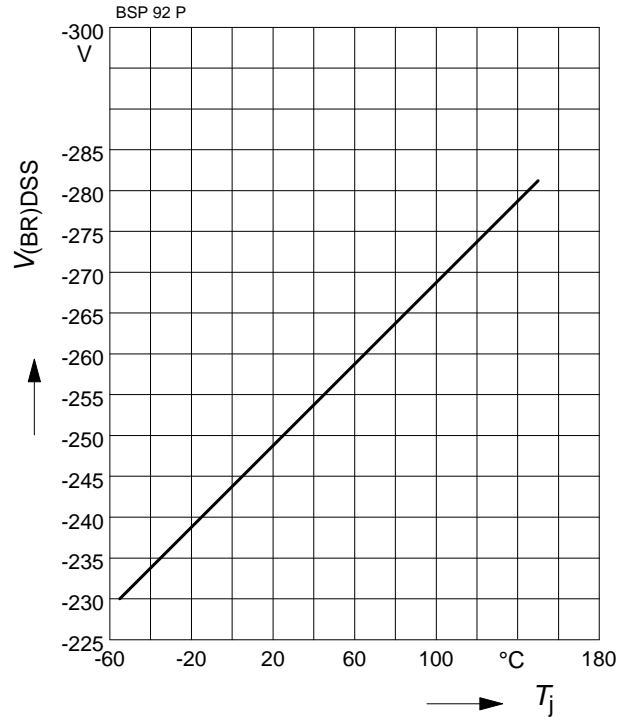
$$V_{GS} = f(Q_{Gate})$$

parameter:  $I_D = -0.26$  A pulsed



**14 Drain-source breakdown voltage**

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



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