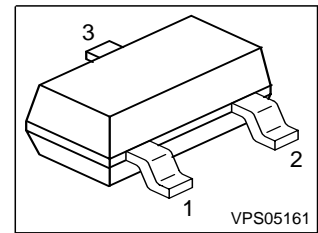


SIPMOS[®] Small-Signal-Transistor
Features

- P-Channel
- Enhancement mode
- Avalanche rated
- Logic Level
- dv/dt rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

| | | | |
|----------------------------------|--------------|-------|----------|
| Drain source voltage | V_{DS} | -60 | V |
| Drain-source on-state resistance | $R_{DS(on)}$ | 2 | Ω |
| Continuous drain current | I_D | -0.33 | A |



| Type | Package | Tape and Reel | Marking | Pin 1 | PIN 2 | PIN 3 |
|----------|-----------|-------------------|---------|-------|-------|-------|
| BSS 83 P | PG-SOT-23 | H6327: 3000pcs/r. | YAs | G | S | D |

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

| Parameter | Symbol | Value | Unit |
|--|----------------|----------------|--------------------|
| Continuous drain current $T_A = 25\text{ °C}$ $T_A = 70\text{ °C}$ | I_D | -0.33 -0.27 | A |
| Pulsed drain current $T_A = 25\text{ °C}$ | I_D puls | -1.32 | |
| Avalanche energy, single pulse $I_D = -0.33\text{ A}$, $V_{DD} = -25\text{ V}$, $R_{GS} = 25\ \Omega$ | E_{AS} | 9.5 | mJ |
| Avalanche energy, periodic limited by T_{jmax} | E_{AR} | 0.036 | |
| Reverse diode dv/dt $I_S = -0.33\text{ A}$, $V_{DS} = -48\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 150\text{ °C}$ | dv/dt | 6 | kV/ μs |
| Gate source voltage | V_{GS} | ± 20 | V |
| Power dissipation $T_A = 25\text{ °C}$ | 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 | |
| ESD Class; JESD22-A114-HBM | | Class 0 | |

Thermal Characteristics

| Parameter | Symbol | Values | | | Unit |
|---|------------|--------|------|------------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Thermal resistance, junction - soldering point (Pin 3) | R_{thJS} | - | - | 150 | K/W |
| SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ¹⁾ | R_{thJA} | - | - | 350 300 | |

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

| Parameter | Symbol | Values | | | Unit |
|--|---------------|--------|-------------|------------|---------------|
| | | min. | typ. | max. | |
| Static Characteristics | | | | | |
| Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = -250\text{ }\mu\text{A}$ | $V_{(BR)DSS}$ | -60 | - | - | V |
| Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = -80\text{ }\mu\text{A}$ | $V_{GS(th)}$ | -1 | -1.5 | -2 | |
| Zero gate voltage drain current $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ °C}$ $V_{DS} = -60\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 125\text{ °C}$ | I_{DSS} | - | -0.1 -10 | -1 -100 | μA |
| Gate-source leakage current $V_{GS} = -20\text{ V}$, $V_{DS} = 0\text{ V}$ | I_{GSS} | - | -10 | -100 | nA |
| Drain-source on-state resistance $V_{GS} = -4.5\text{ V}$, $I_D = -0.27\text{ A}$ | $R_{DS(on)}$ | - | 2 | 3 | Ω |
| Drain-source on-state resistance $V_{GS} = -10\text{ V}$, $I_D = -0.33\text{ A}$ | $R_{DS(on)}$ | - | 1.4 | 2 | |

¹Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 μm 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 | Values | | | Unit |
|--|--------------|--------|------|------|------|
| | | min. | typ. | max. | |
| Dynamic Characteristics | | | | | |
| Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = -0.27\text{ A}$ | g_{fs} | 0.24 | 0.47 | - | S |
| Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$ | C_{iss} | - | 62 | 78 | pF |
| Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$ | C_{oss} | - | 19 | 24 | |
| Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = -25\text{ V}$, $f = 1\text{ MHz}$ | C_{rss} | - | 7 | 9 | |
| Turn-on delay time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.27\text{ A}$, $R_G = 43\text{ }\Omega$ | $t_{d(on)}$ | - | 23 | 35 | ns |
| Rise time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.27\text{ A}$, $R_G = 43\text{ }\Omega$ | t_r | - | 71 | 106 | |
| Turn-off delay time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.27\text{ A}$, $R_G = 43\text{ }\Omega$ | $t_{d(off)}$ | - | 56 | 70 | |
| Fall time $V_{DD} = -30\text{ V}$, $V_{GS} = -4.5\text{ V}$, $I_D = -0.27\text{ A}$, $R_G = 43\text{ }\Omega$ | t_f | - | 61 | 76 | |

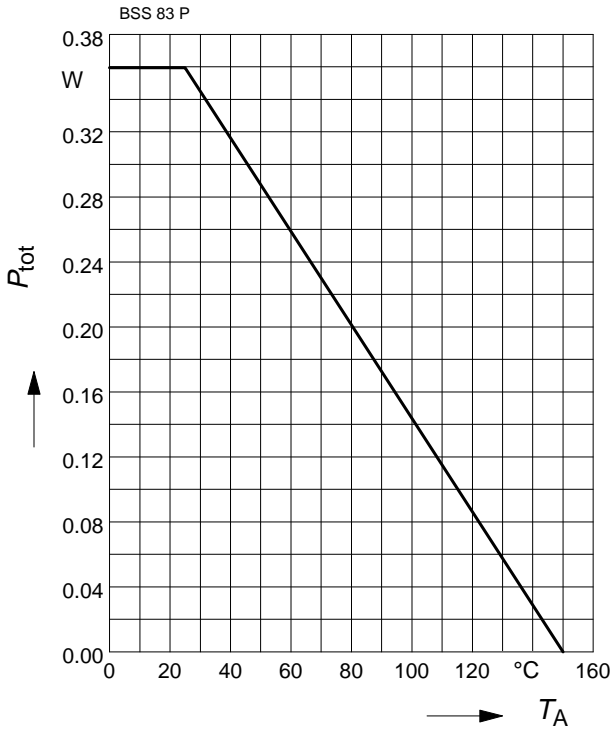
Electrical Characteristics, at $T_j = 25\text{ °C}$, unless otherwise specified

| Parameter | Symbol | Values | | | Unit |
|---|------------------------|--------|-------|------|------|
| | | min. | typ. | max. | |
| Dynamic Characteristics | | | | | |
| Gate to source charge $V_{DD} = -48\text{ V}$, $I_D = -0.33\text{ A}$ | Q_{gs} | - | 0.12 | 0.18 | nC |
| Gate to drain charge $V_{DD} = -48$, $I_D = -0.33\text{ A}$ | Q_{gd} | - | 1.1 | 1.65 | |
| Gate charge total $V_{DD} = -48\text{ V}$, $I_D = -0.33\text{ A}$, $V_{GS} = 0\text{ to }-10\text{ V}$ | Q_g | - | 2.38 | 3.57 | |
| Gate plateau voltage $V_{DD} = -48\text{ V}$, $I_D = -0.33\text{ A}$ | $V_{(\text{plateau})}$ | - | -2.94 | - | V |

| Parameter | Symbol | Values | | | Unit |
|---|----------|--------|-------|-------|------|
| | | min. | typ. | max. | |
| Reverse Diode | | | | | |
| Inverse diode continuous forward current $T_A = 25\text{ °C}$ | I_S | - | - | -0.33 | A |
| Inverse diode direct current, pulsed $T_A = 25\text{ °C}$ | I_{SM} | - | - | -1.32 | |
| Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = -0.33$ | V_{SD} | - | -0.84 | -1.1 | V |
| Reverse recovery time $V_R = -30\text{ V}$, $I_F = I_S$, $di_F/dt = 80\text{ A}/\mu\text{s}$ | t_{rr} | - | 59.4 | 89 | ns |
| Reverse recovery charge $V_R = -30\text{ V}$, $I_F = I_S$, $di_F/dt = 80\text{ A}/\mu\text{s}$ | Q_{rr} | - | 37.5 | 56 | nC |

Power Dissipation

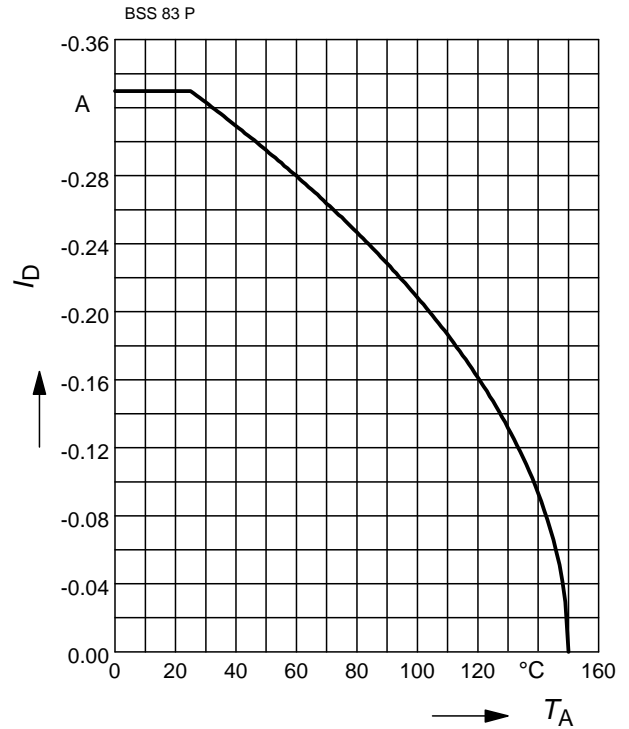
$$P_{tot} = f(T_A)$$



Drain current

$$I_D = f(T_A)$$

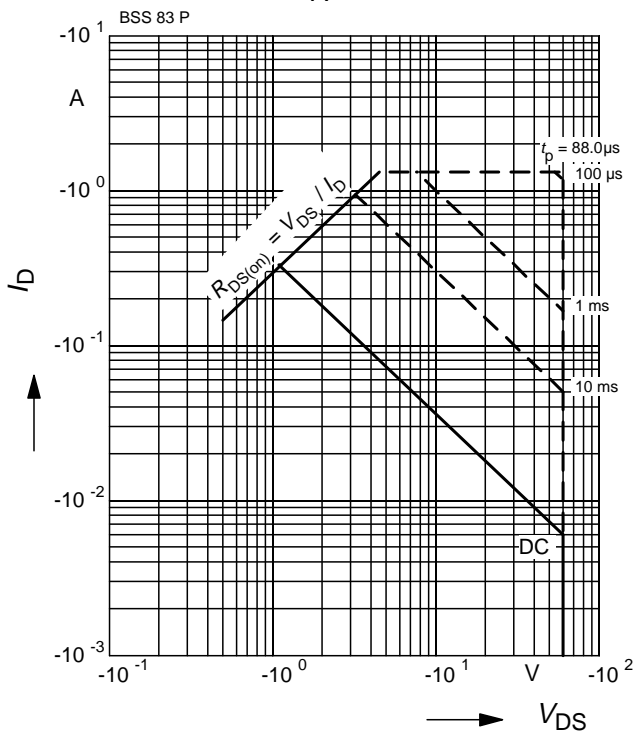
parameter: $V_{GS} \geq 10 \text{ V}$



Safe operating area

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

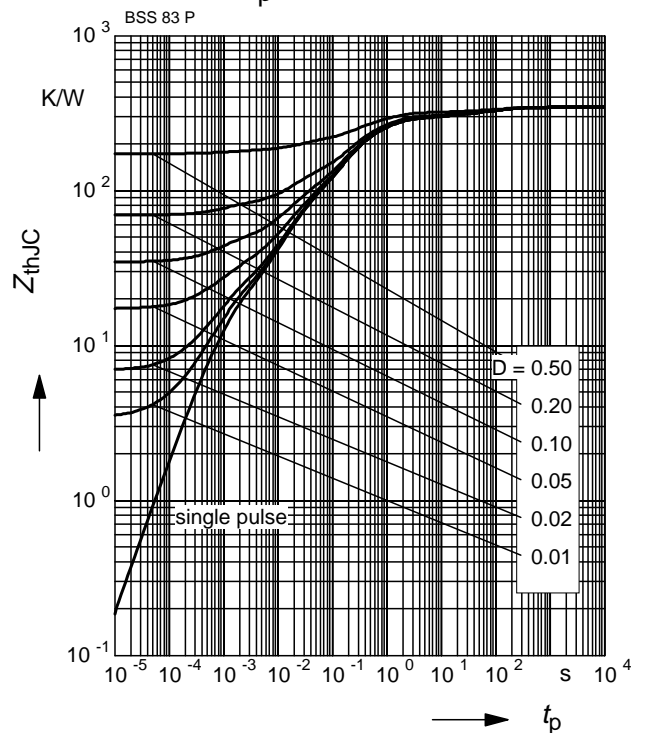
parameter: $D = 0, T_A = 25 \text{ °C}$



Transient thermal impedance

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

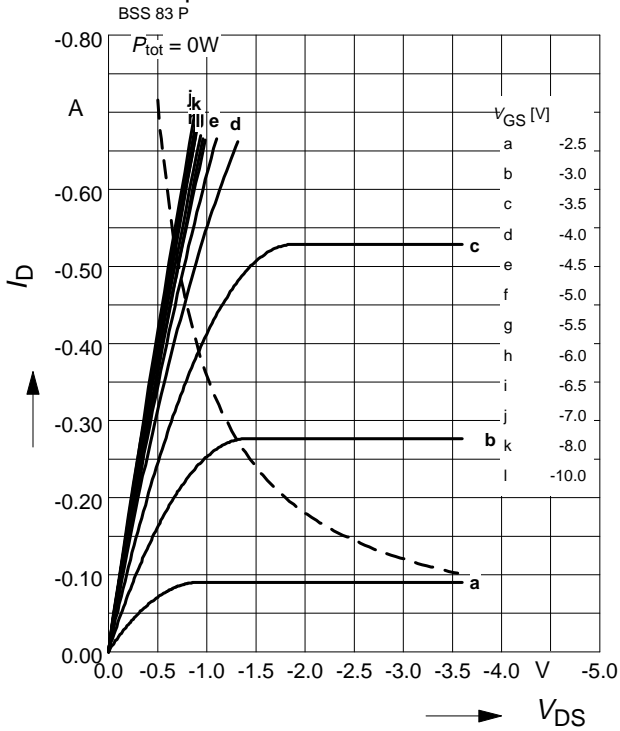
parameter: $D = t_p/T$



Typ. output characteristic

$I_D = f(V_{DS}); T_j = 25^\circ\text{C}$

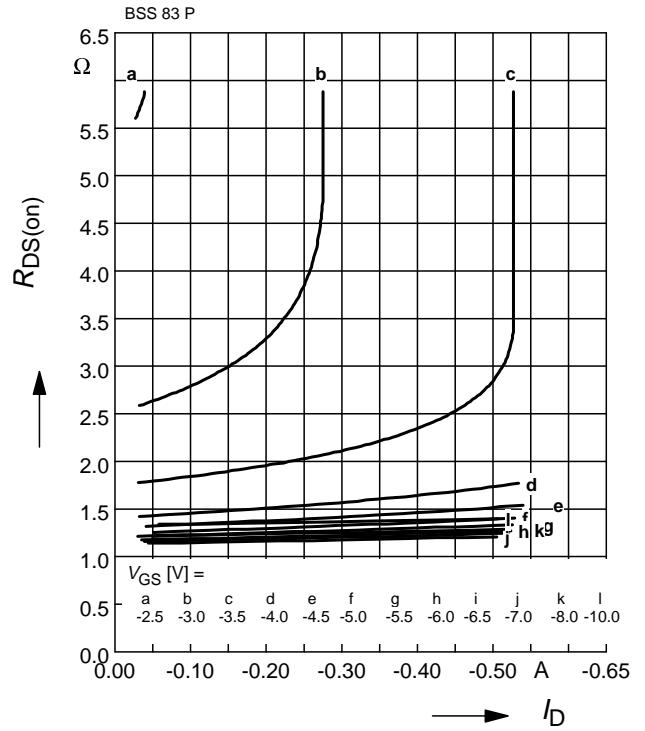
parameter: $t_p = 80 \mu\text{s}$



Typ. drain-source-on-resistance

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

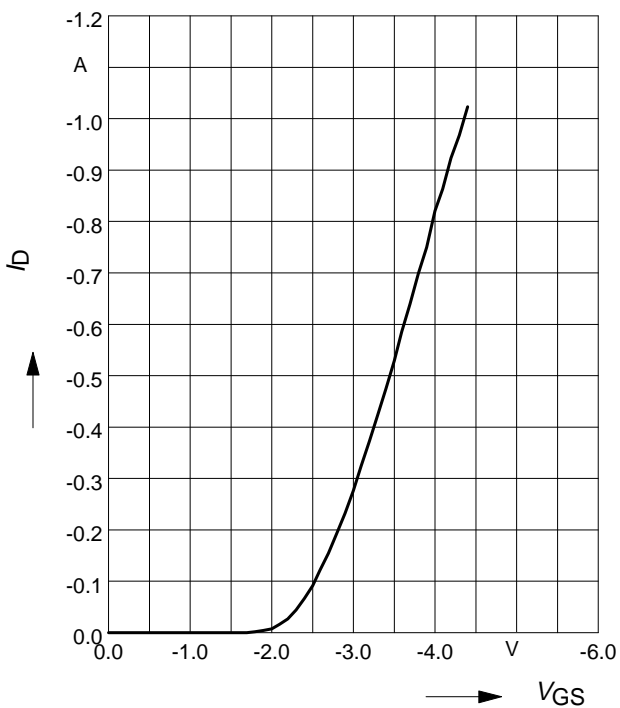
parameter: V_{GS}



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

$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$

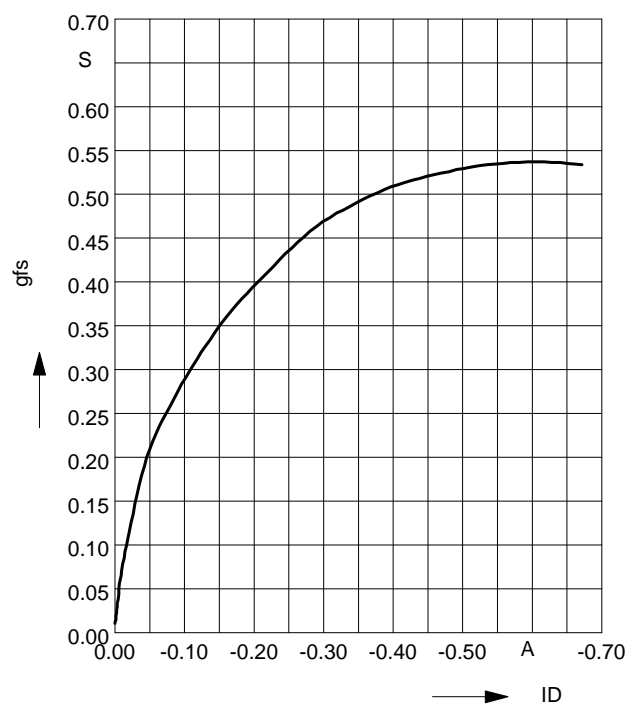
parameter: $t_p = 80 \mu\text{s}$



Typ. forward transconductance

$g_{fs} = f(I_D); T_j = 25^\circ\text{C}$

parameter: g_{fs}

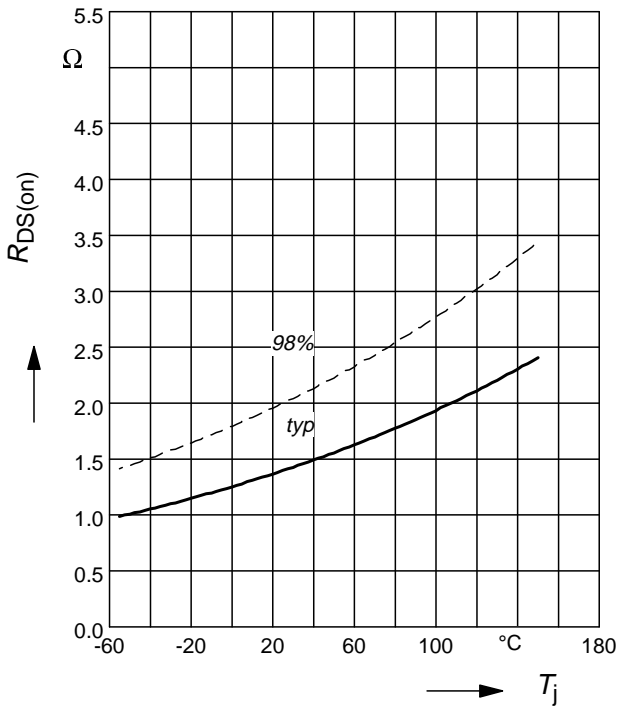


Drain-source on-state resistance

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

parameter: $I_D = -0.33 \text{ A}$, $V_{GS} = -10 \text{ V}$

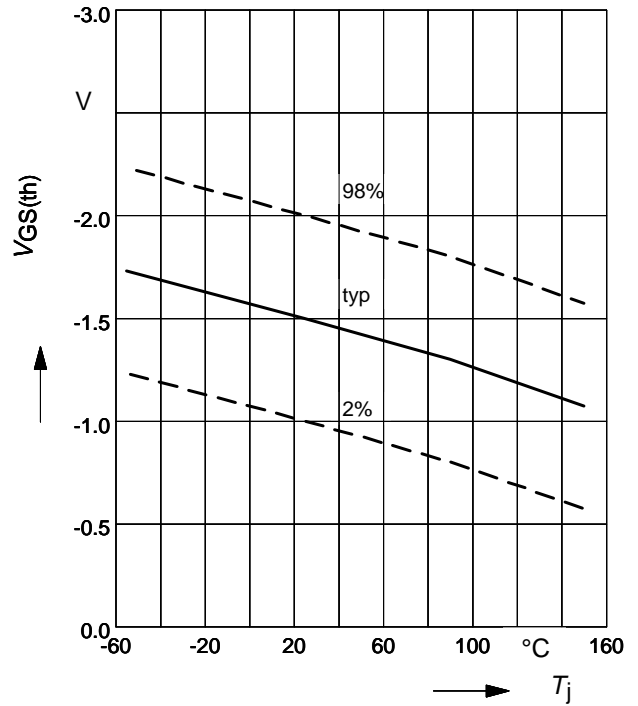
BSS 83 P



Gate threshold voltage

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

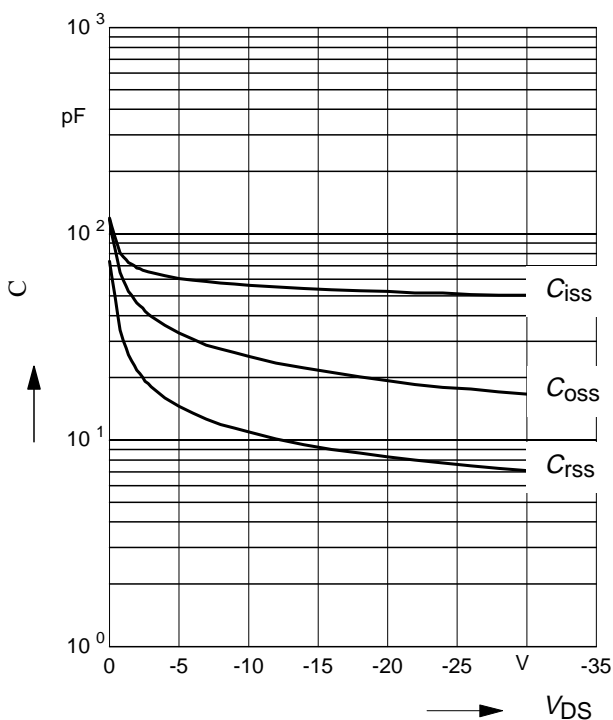
parameter: $V_{GS} = V_{DS}$, $I_D = -80 \mu\text{A}$



Typ. capacitances

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

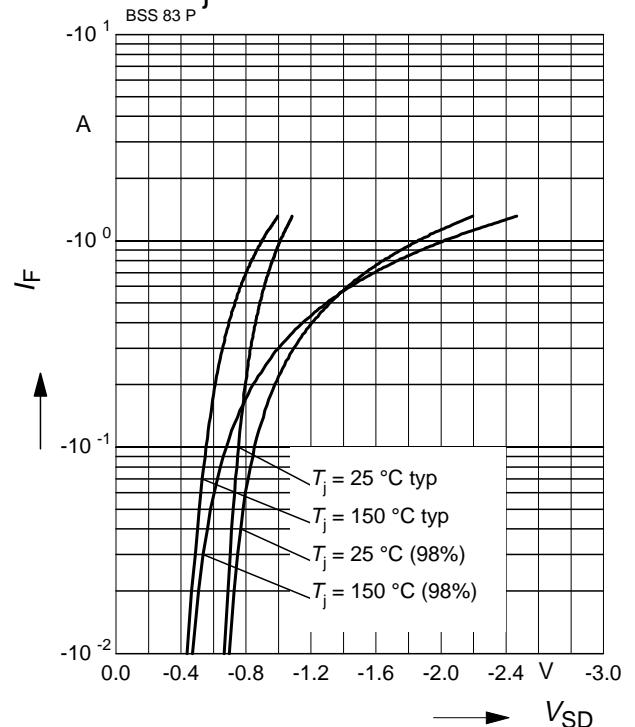
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

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

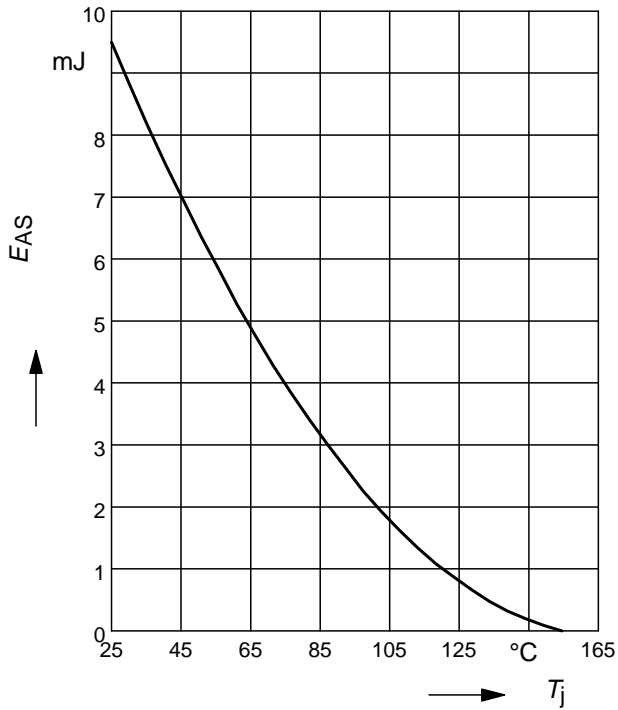
parameter: T_j , $t_p = 80 \mu\text{s}$



Avalanche energy

$$E_{AS} = f(T_j)$$

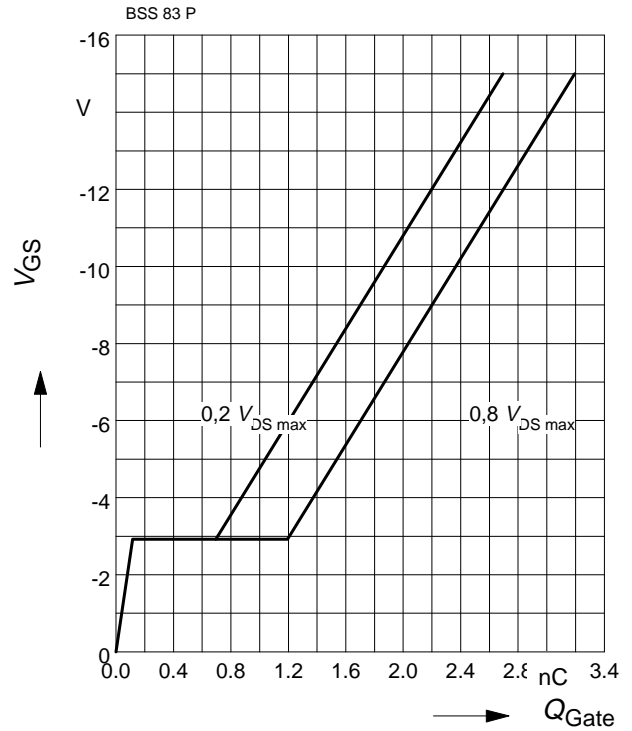
para.: $I_D = -0.33 \text{ A}$, $V_{DD} = -25 \text{ V}$, $R_{GS} = 25$



Typ. gate charge

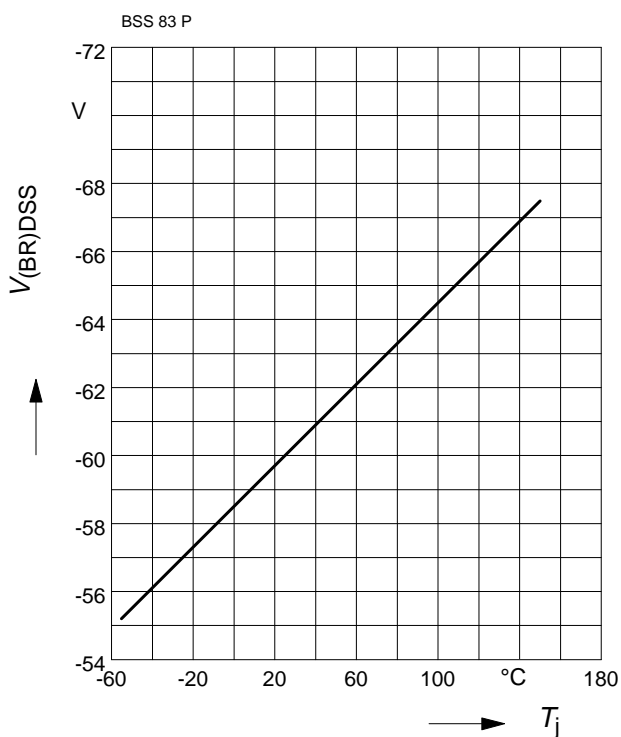
$$V_{GS} = f(Q_{Gate})$$

parameter: $I_D = -0.33 \text{ A}$ pulsed

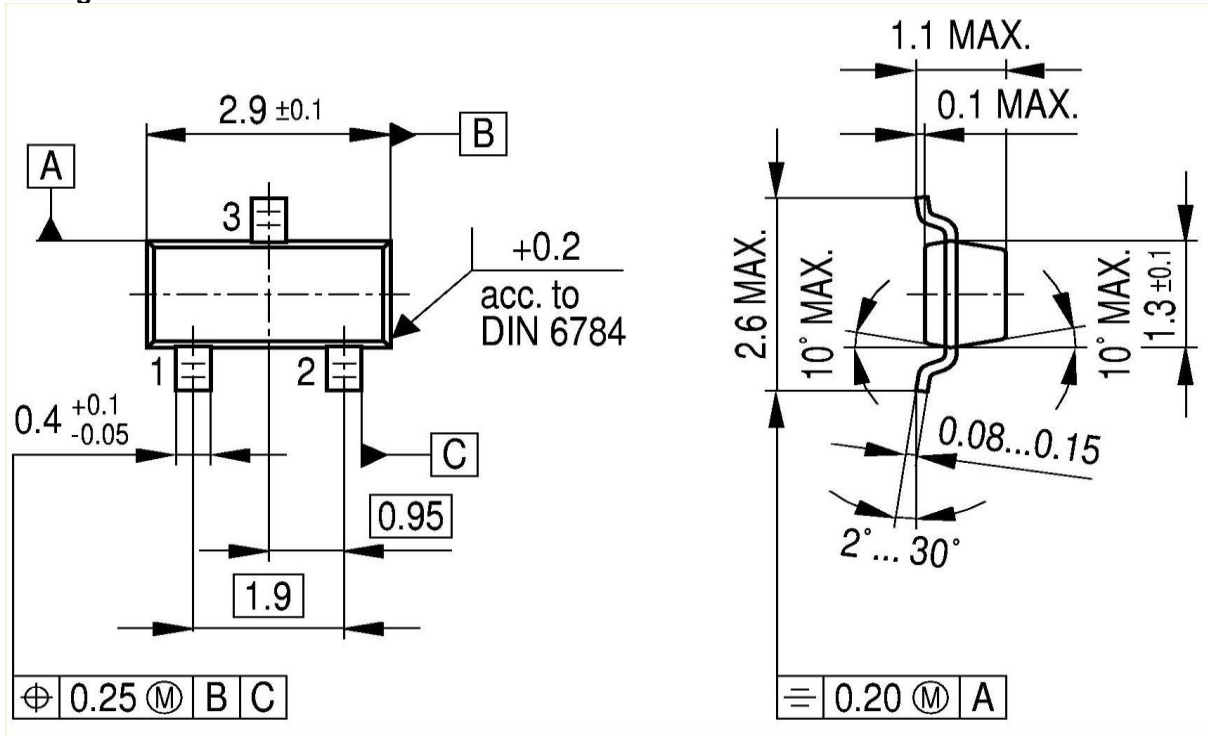


Drain-source breakdown voltage

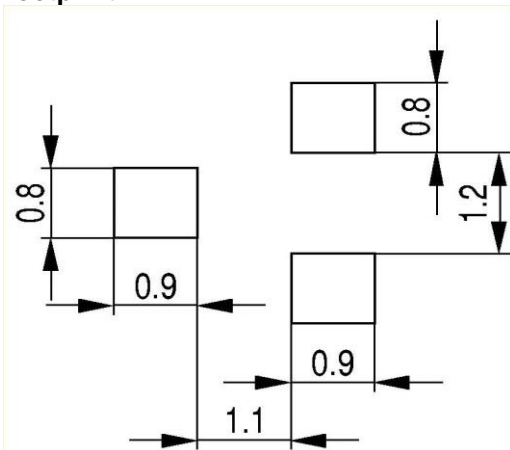
$$V_{(BR)DSS} = f(T_j)$$



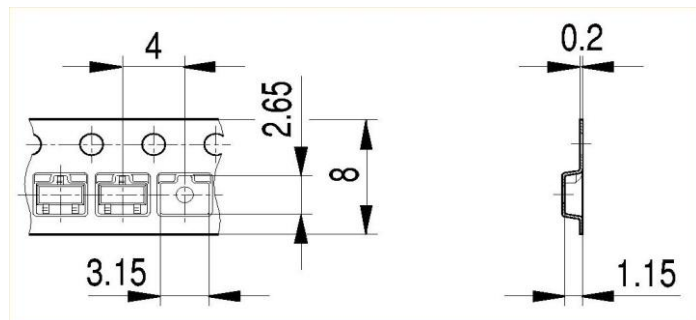
Package Outline:



Footprint:



Packaging:



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