

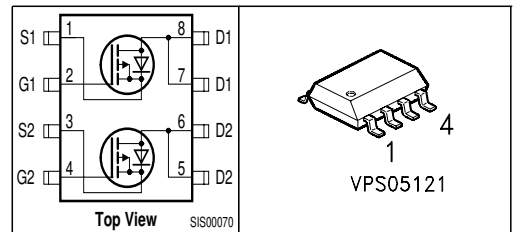
OptiMOS™ -P Power-Transistor

Feature

- Dual P-Channel
- Enhancement mode
- Logic Level
- 150°C operating temperature
- Avalanche rated
- dv/dt rated

Product Summary

| | | |
|--------------|------|----|
| V_{DS} | -30 | V |
| $R_{DS(on)}$ | 21 | mΩ |
| I_D | -8.2 | A |



| Type | Package |
|---------|---------|
| BSO303P | P-SO 8 |

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 | -8.2 -6.6 | A |
| Pulsed drain current $T_A=25\text{ °C}$ | $I_{D\text{ puls}}$ | -32.4 | |
| Avalanche energy, single pulse $I_D=-8.2\text{ A}$, $V_{DD}=-25\text{ V}$, $R_{GS}=25\text{ }\Omega$ | E_{AS} | 97 | mJ |
| Reverse diode dv/dt $I_S=-8.2\text{ A}$, $V_{DS}=-24\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{jmax}=150\text{ °C}$ | dv/dt | -6 | kV/ μs |
| Gate source voltage | V_{GS} | ± 20 | V |
| Power dissipation $T_A=25\text{ °C}$ | P_{tot} | 2 | W |
| Operating and storage temperature | T_j, T_{stg} | -55... +150 | °C |
| IEC climatic category; DIN IEC 68-1 | | 55/150/56 | |

Thermal Characteristics

| Parameter | Symbol | Values | | | Unit |
|--|------------|--------|------|------|------|
| | | min. | typ. | max. | |
| Characteristics | | | | | |
| Thermal resistance, junction - soldering point | R_{thJS} | - | - | 50 | K/W |
| SMD version, device on PCB: | R_{thJA} | | | | |
| @ min. footprint, $t < 10s$ | | - | - | 110 | |
| @ 6 cm ² cooling area ¹⁾ | | - | - | 62.5 | |

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 $V_{GS}=0, I_D=-250\mu A$ | $V_{(BR)DSS}$ | -30 | - | - | V |
| Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D=-100\mu A$ | $V_{GS(th)}$ | -1 | -1.5 | -2 | |
| Zero gate voltage drain current $V_{DS}=-30V, V_{GS}=0, T_j=25^\circ C$ $V_{DS}=-30V, V_{GS}=0, T_j=150^\circ C$ | I_{DSS} | - | -0.1 | -1 | μA |
| Gate-source leakage current $V_{GS}=-20V, V_{DS}=0$ | I_{GSS} | - | -10 | -100 | |
| Drain-source on-state resistance $V_{GS}=-4.5V, I_D=-6.6A$ | $R_{DS(on)}$ | - | 26 | 32 | m Ω |
| Drain-source on-state resistance $V_{GS}=-10V, I_D=-8.2A$ | $R_{DS(on)}$ | - | 18 | 21 | |

¹⁾Device 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; $t \leq 10$ sec.

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}$ $I_D = -6.6\text{A}$ | 11 | 22 | - | S |
| Input capacitance | C_{iss} | $V_{GS} = 0, V_{DS} = -25\text{V},$ $f = 1\text{MHz}$ | - | 1761 | - | pF |
| Output capacitance | C_{oss} | | - | 495 | - | |
| Reverse transfer capacitance | C_{rss} | | - | 410 | - | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD} = -15\text{V}, V_{GS} = -10\text{V},$ $I_D = -1\text{A}, R_G = 6\Omega$ | - | 10.6 | 15.9 | ns |
| Rise time | t_r | | - | 12.9 | 19.3 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 55.4 | 83.1 | |
| Fall time | t_f | | - | 39.3 | 59 | |

Gate Charge Characteristics

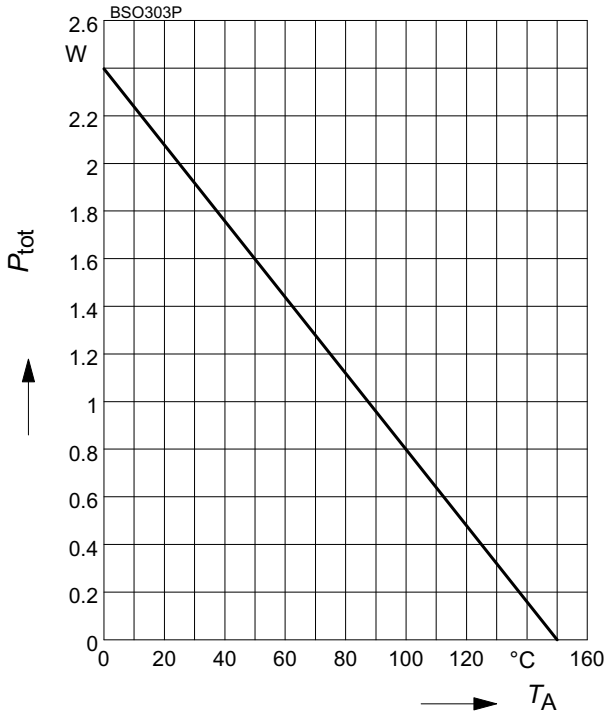
| | | | | | | |
|-----------------------|-----------------|---|---|-------|-------|----|
| Gate to source charge | Q_{gs} | $V_{DD} = -24\text{V}, I_D = -8.2\text{A}$ | - | -4.25 | -6.4 | nC |
| Gate to drain charge | Q_{gd} | | - | -15.2 | -23 | |
| Gate charge total | Q_g | $V_{DD} = -24\text{V}, I_D = -8.2\text{A},$ $V_{GS} = 0 \text{ to } -10\text{V}$ | - | -48.3 | -72.5 | |
| Gate plateau voltage | $V_{(plateau)}$ | $V_{DD} = -24\text{V}, I_D = -8.2\text{A}$ | - | -2.4 | - | V |

Reverse Diode

| | | | | | | |
|--|----------|--|---|-------|-------|----|
| Inverse diode continuous forward current | I_S | $T_A = 25\text{ }^\circ\text{C}$ | - | - | -2.2 | A |
| Inverse diode direct current, pulsed | I_{SM} | | - | - | -32.4 | |
| Inverse diode forward voltage | V_{SD} | $V_{GS} = 0, I_F = I_D $ | - | -0.88 | -1.32 | |
| Reverse recovery time | t_{rr} | $V_R = -15\text{V}, I_F = I_D ,$ $di_F/dt = 100\text{A}/\mu\text{s}$ | - | 24.4 | 36.6 | ns |
| Reverse recovery charge | Q_{rr} | | - | 12.8 | 19.2 | nC |

1 Power dissipation

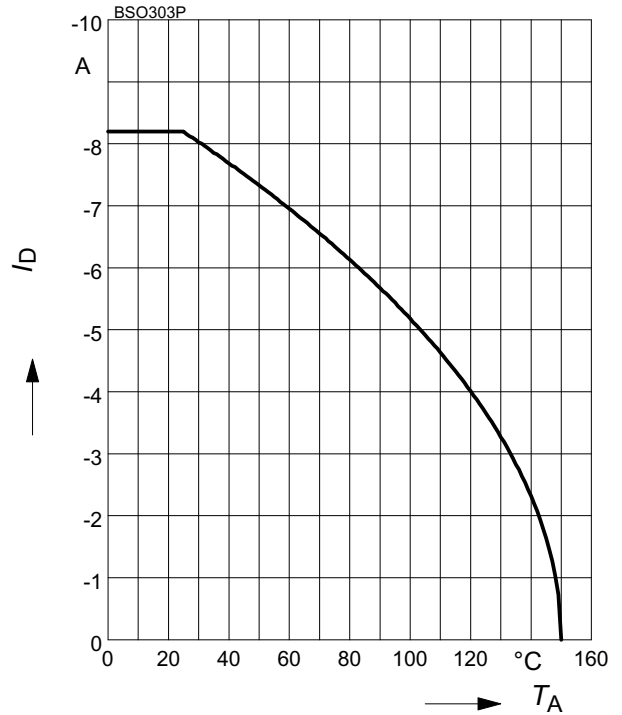
$$P_{tot} = f(T_A)$$



2 Drain current

$$I_D = f(T_A)$$

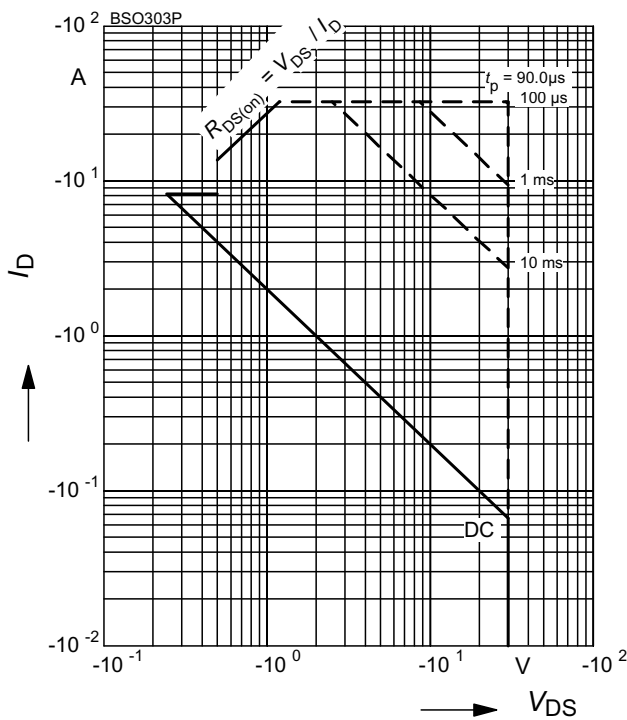
parameter: $|V_{GS}| \geq 10 \text{ V}$



3 Safe operating area

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

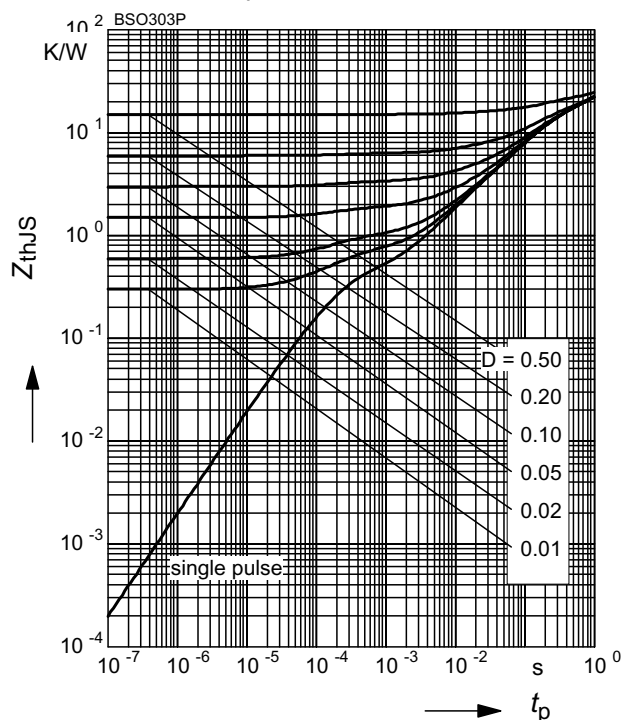
parameter: $D = 0, T_A = 25 \text{ °C}$



4 Transient thermal impedance

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

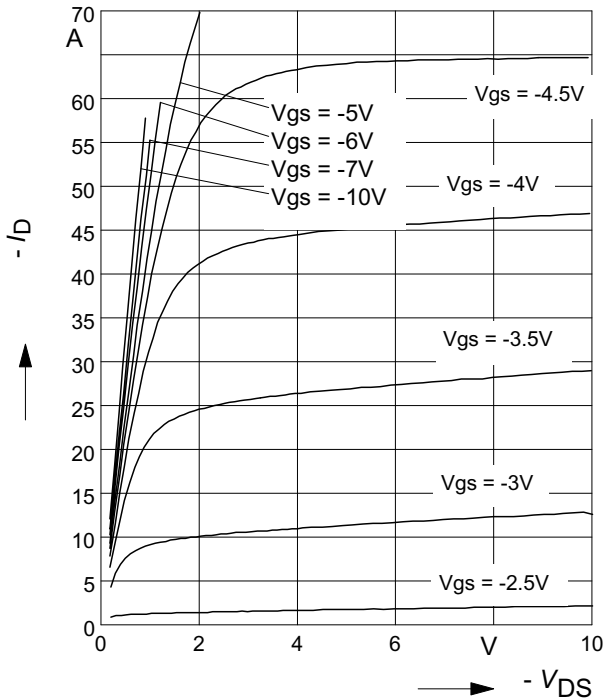
parameter: $D = t_p/T$



5 Typ. output characteristic

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

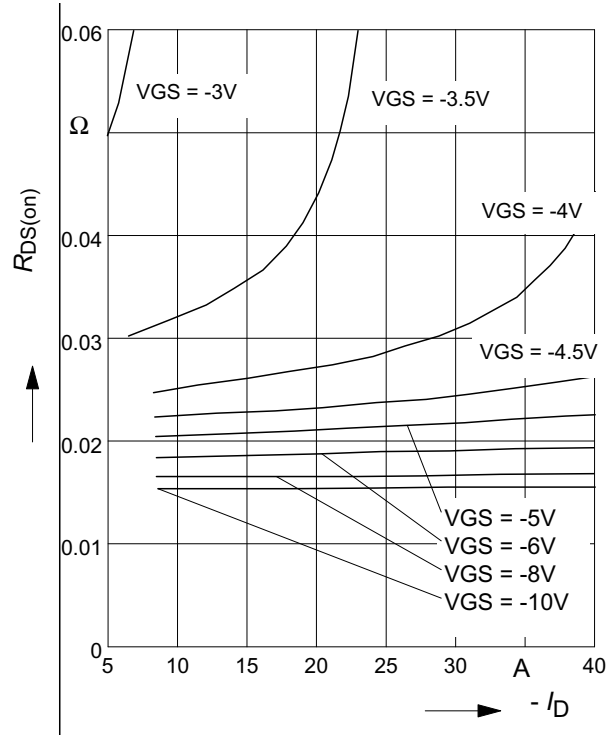
parameter: $t_p = 80 \mu\text{s}$



6 Typ. drain-source on resistance

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

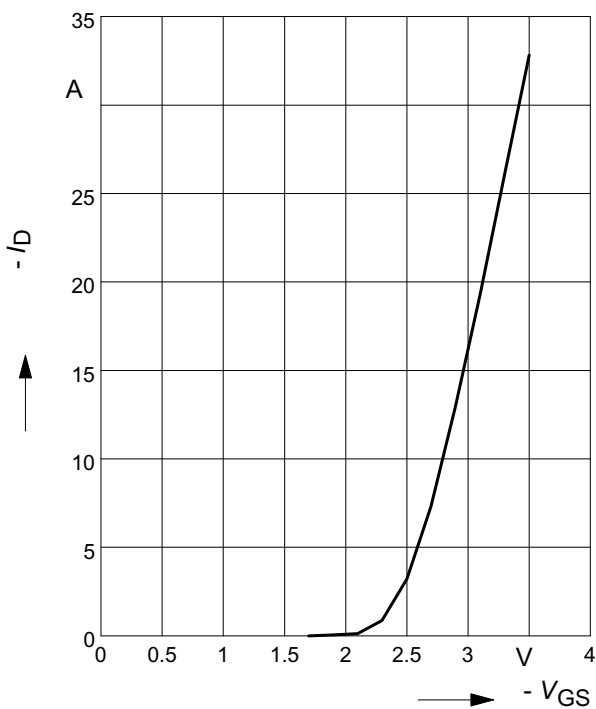
parameter: V_{GS}



7 Typ. transfer characteristics

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

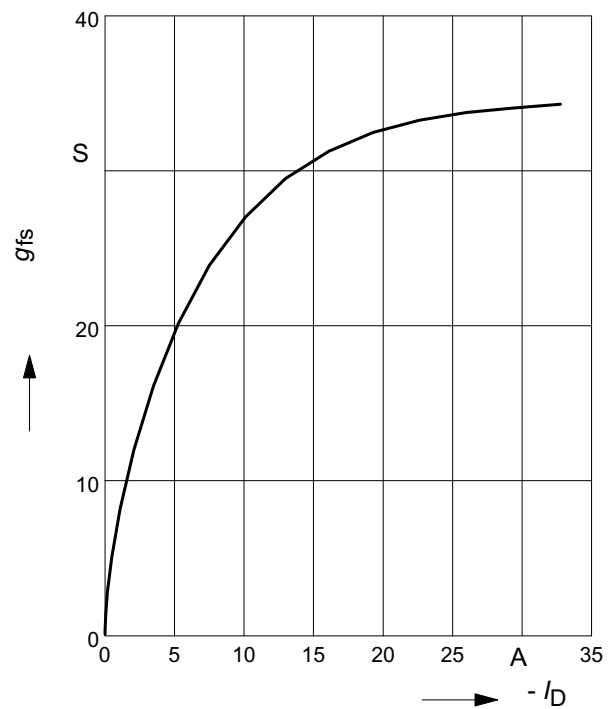
parameter: $t_p = 80 \mu\text{s}$



8 Typ. forward transconductance

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

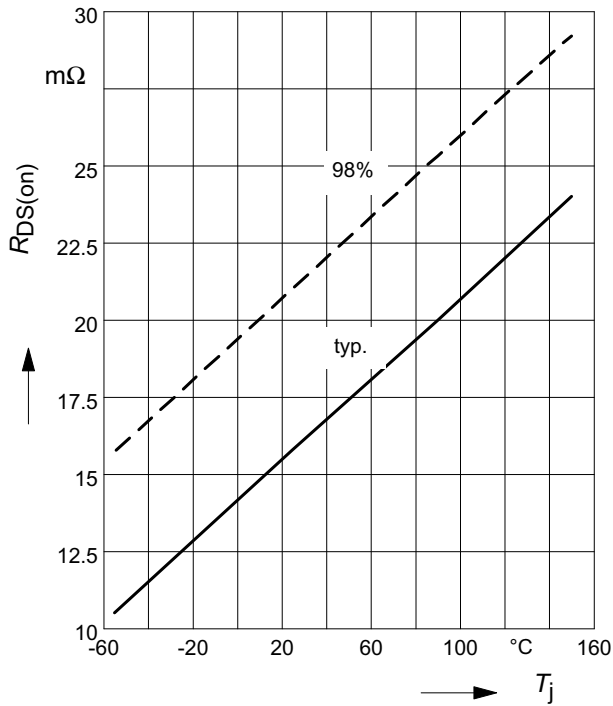
parameter: $t_p = 80 \mu\text{s}$



9 Drain-source on-resistance

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

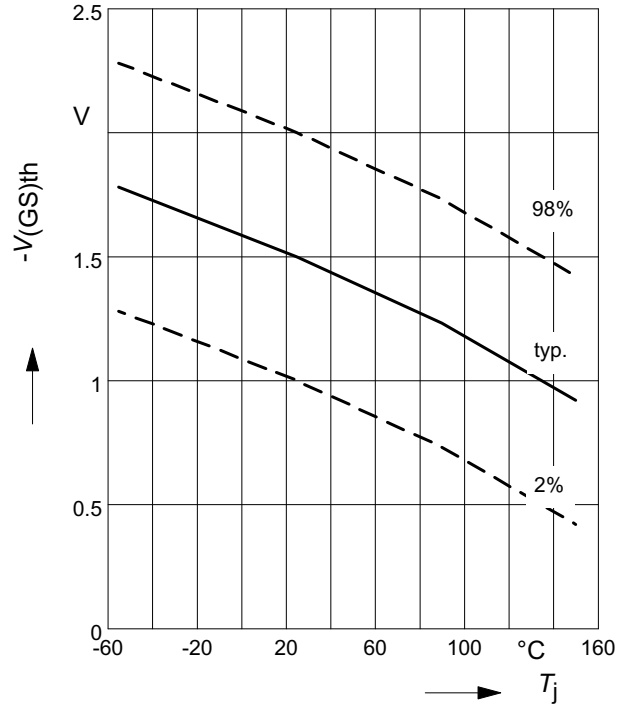
parameter: $I_D = -8.2 \text{ A}$, $V_{GS} = -10 \text{ V}$



10 Typ. gate threshold voltage

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

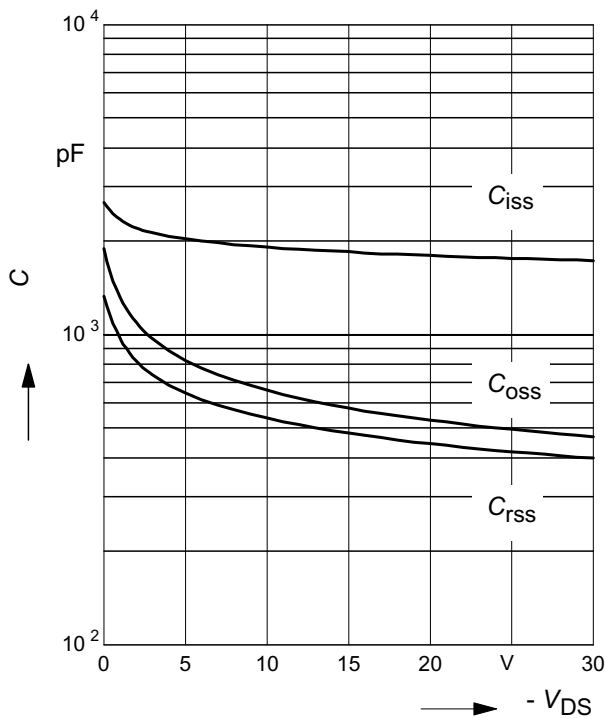
parameter: $V_{GS} = V_{DS}$



11 Typ. capacitances

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

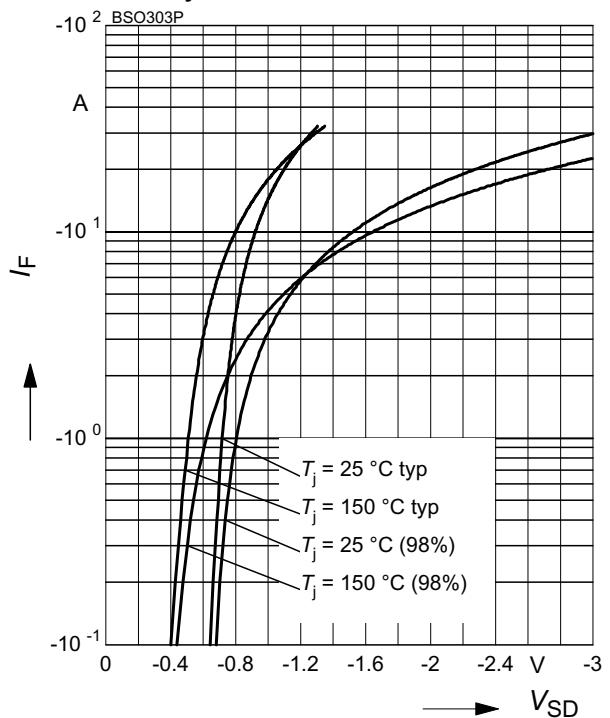
parameter: $V_{GS}=0$, $f=1 \text{ MHz}$



12 Forward character. of reverse diode

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

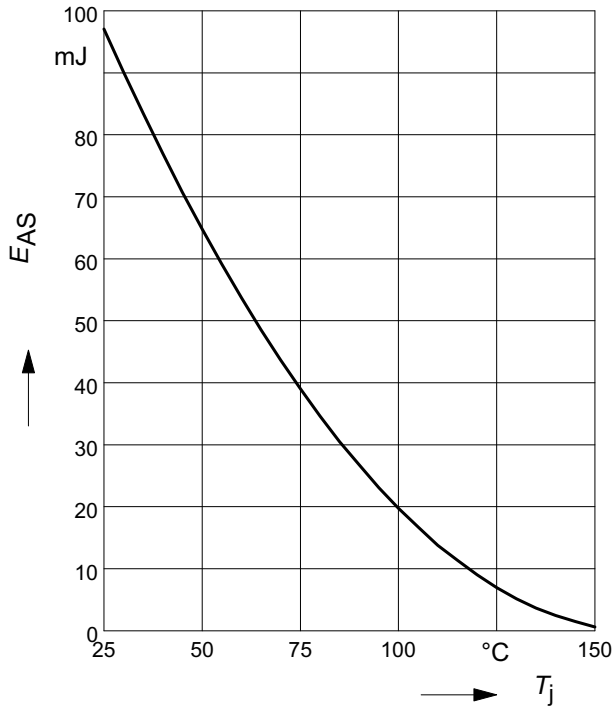
parameter: T_j , $t_p = 80 \mu\text{s}$



13 Typ. avalanche energy

$E_{AS} = f(T_j)$, par.: $I_D = -8.2\text{ A}$

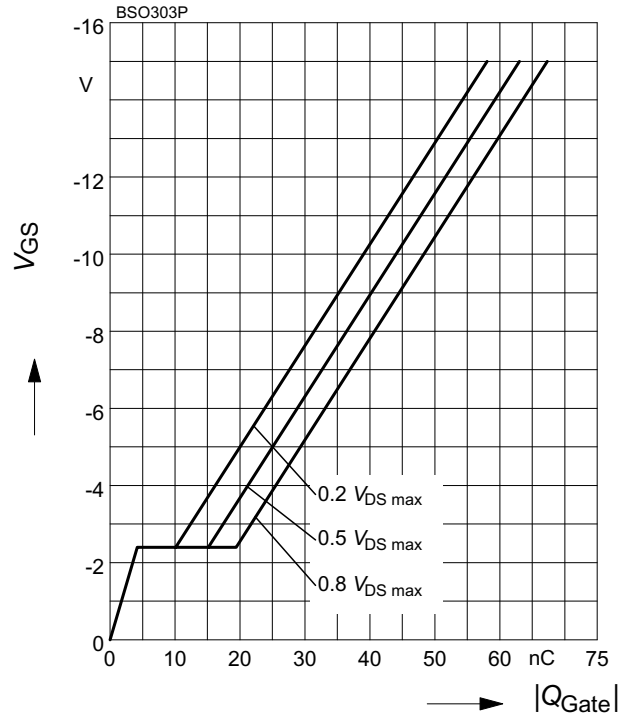
$V_{DD} = -25\text{ V}$, $R_{GS} = 25\ \Omega$



14 Typ. gate charge

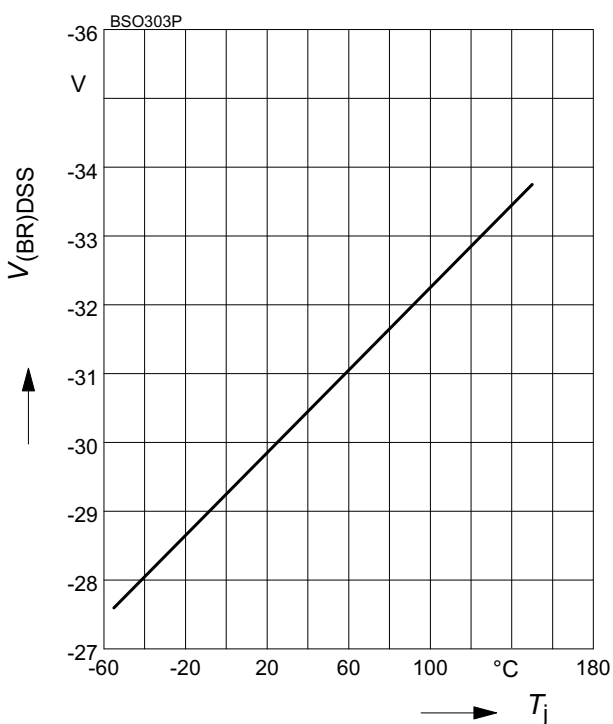
$V_{GS} = f(Q_{Gate})$

parameter: $I_D = -8.2\text{ A}$ pulsed



15 Drain-source breakdown voltage

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



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