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Infineon Technologies
SPP15P10P

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# SPP15P10P G

## SIPMOS® Small-Signal-Transistor

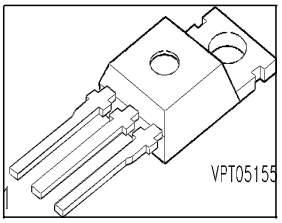
### Feature

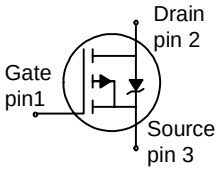
- P-Channel
- Enhancement mode
- Avalanche rated
- d*v*/d*t* rated
- Pb-free lead plating; RoHS compliant

### Product Summary

| | | |
|---|---|---|
| $V_{DS}$ | -100 | V |
| $R_{DS(on)}$ | 0.24 | Ω |
| $I_D$ | -15 | A |

PG-TO220-3-1




| Type | Package | Marking |
|---|---|---|
| SPP15P10P | PG-TO220-3-1 | 15P10P |

**Maximum Ratings**, at $T_j$ = 25 °C, unless otherwise specified

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Continuous drain current<br>$T_C$=25°C<br>$T_C$=100°C | $I_D$ | <br>-15<br>-10.6 | A |
| Pulsed drain current<br>$T_C$=25°C | $I_{D\ puls}$ | -60 | |
| Avalanche energy, single pulse<br>$I_D$=-15 A , $V_{DD}$=-25V, $R_{GS}$=25Ω | $E_{AS}$ | 230 | mJ |
| Reverse diode d*v*/d*t*<br>$I_S$=-15A, $V_{DS}$=-48V, d*i*/d*t*=-200A/µs, $T_{jmax}$=150°C | d*v*/d*t* | 6 | kV/µs |
| Gate source voltage | $V_{GS}$ | ±20 | V |
| Power dissipation<br>$T_C$=25°C | $P_{tot}$ | 128 | W |
| Operating and storage temperature | $T_j$ , $T_{stg}$ | -55... +175 | °C |
| IEC climatic category; DIN IEC 68-1 | | 55/175/56 | |

**Thermal Characteristics**

| Parameter | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Characteristics** | | | | | |
| Thermal resistance, junction - case | $R_{thJC}$ | - | - | 1.17 | K/W |
| SMD version, device on PCB: | $R_{thJA}$ | | | | |
| @ min. footprint | | - | - | 75 | |
| @ 6 cm$^2$ cooling area [1)] | | - | - | 45 | |

**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, $I_D$=-250µA | $V_{(BR)DSS}$ | -100 | - | - | V |
| Gate threshold voltage, $V_{GS}$ = $V_{DS}$<br>$I_D$=-1.54mA | $V_{GS(th)}$ | -4 | -3 | -2.1 | |
| Zero gate voltage drain current | $I_{DSS}$ | | | | µA |
| $V_{DS}$=-100V, $V_{GS}$=0, $T_j$=25°C | | - | -0.1 | -1 | |
| $V_{DS}$=-100V, $V_{GS}$=0, $T_j$=150°C | | - | -10 | -100 | |
| Gate-source leakage current<br>$V_{GS}$=-20V, $V_{DS}$=0 | $I_{GSS}$ | - | -10 | -100 | nA |
| Drain-source on-state resistance<br>$V_{GS}$=-10V, $I_D$=-10.6A | $R_{DS(on)}$ | - | 0.18 | 0.24 | Ω |

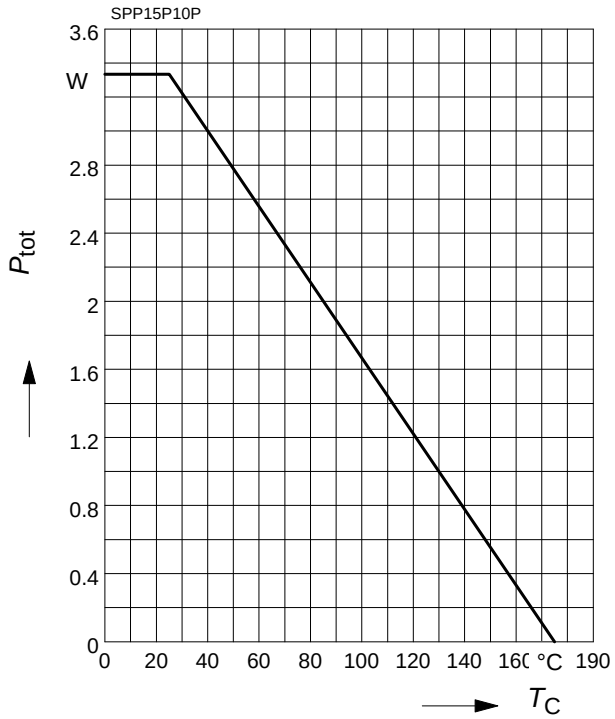
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

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

| Parameter | Symbol | Conditions | Values | | | Unit |
|---|---|---|---|---|---|---|
| | | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | | |
| Transconductance | $g_{fs}$ | $\|V_{DS}\| \geq 2*\|I_D\|*R_{DS(on)max}$ $I_D$=-10.7A | 4.7 | 9.3 | - | S |
| Input capacitance | $C_{iss}$ | $V_{GS}$=0, $V_{DS}$=-25V, $f$=1MHz | - | 944 | 1180 | pF |
| Output capacitance | $C_{oss}$ | | - | 226 | 283 | |
| Reverse transfer capacitance | $C_{rss}$ | | - | 91 | 114 | |
| Turn-on delay time | $t_{d(on)}$ | $V_{DD}$=-50V, $V_{GS}$=-10V, $I_D$=-15A, $R_G$=6Ω | - | 8.9 | 13.4 | ns |
| Rise time | $t_r$ | | - | 30 | 45 | |
| Turn-off delay time | $t_{d(off)}$ | | - | 35 | 53 | |
| Fall time | $t_f$ | | - | 22 | 33 | |
| **Gate Charge Characteristics** | | | | | | |
| Gate to source charge | $Q_{gs}$ | $V_{DD}$=-80V, $I_D$=-15A | - | -4.5 | -6.7 | nC |
| Gate to drain charge | $Q_{gd}$ | | - | -15.3 | -23 | |
| Gate charge total | $Q_g$ | $V_{DD}$=-80V, $I_D$=-15A, $V_{GS}$=0 to -10V | - | -33.4 | -50 | |
| Gate plateau voltage | $V_{(plateau)}$ | $V_{DD}$=-80V, $I_D$=-15A | - | -5.7 | - | V |
| **Reverse Diode** | | | | | | |
| Inverse diode continuous forward current | $I_S$ | $T_A$=25°C | - | - | -15 | A |
| Inv. diode direct current, pulsed | $I_{SM}$ | | - | - | -60 | |
| Inverse diode forward voltage | $V_{SD}$ | $V_{GS}$=0, $\|I_F\| = \|I_S\|$ | - | -0.94 | -1.35 | V |
| Reverse recovery time | $t_{rr}$ | $V_R$=-50V, $\|I_F\| = \|I_S\|$, $di_F/dt$=100A/µs | - | 100 | 150 | ns |
| Reverse recovery charge | $Q_{rr}$ | | - | 419 | 628 | nC |

## 1 Power dissipation

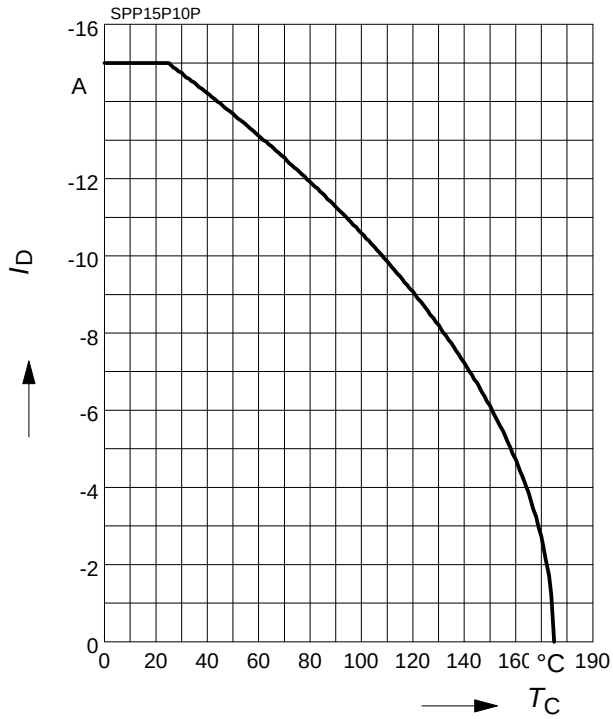
$P_{tot} = f(T_C)$




## 2 Drain current

$I_D = f(T_C)$

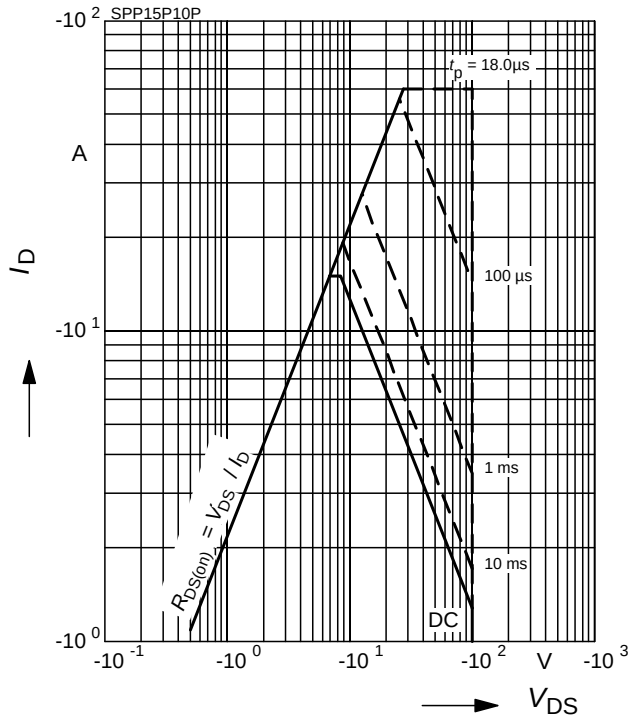
parameter: $|V_{GS}| \geq 10V$




## 3 Safe operating area

$I_D = f(V_{DS})$

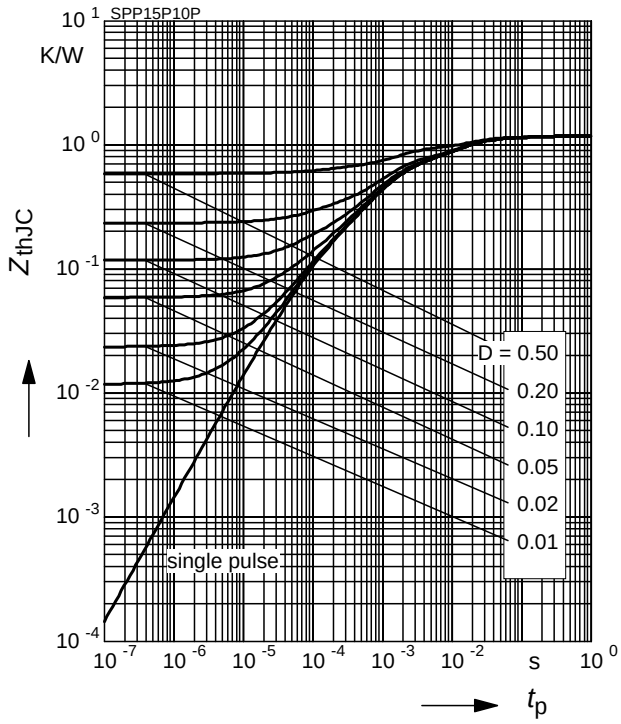
parameter : $D = 0$ , $T_C = 25$ °C




## 4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

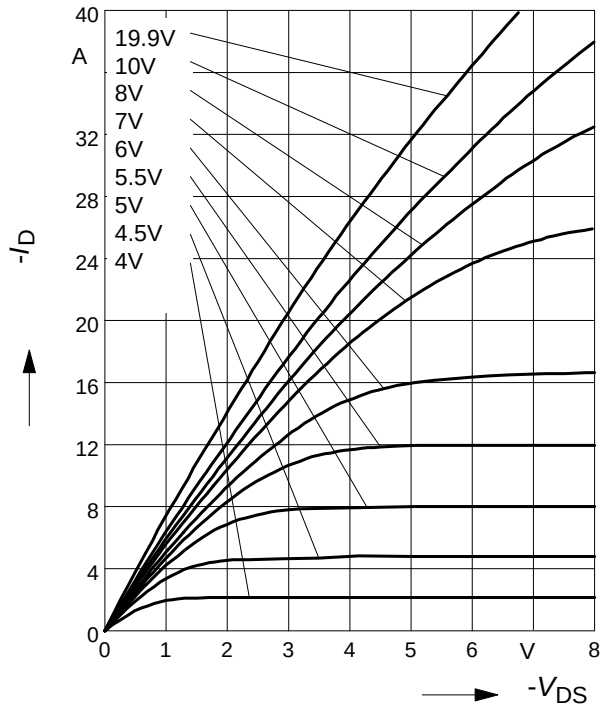
parameter : $D = t_p/T$



**5 Typ. output characteristic**

$I_D = f(V_{DS})$

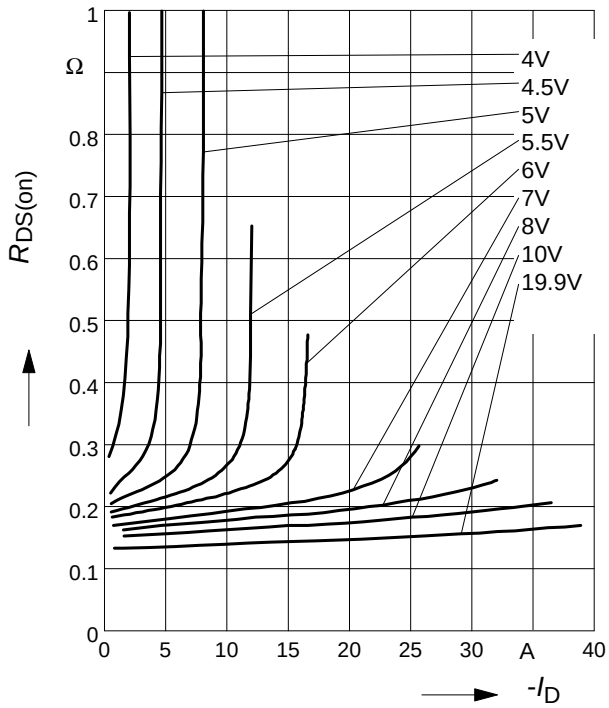
parameter: $T_j$ =25°C, $-V_{GS}$




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

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

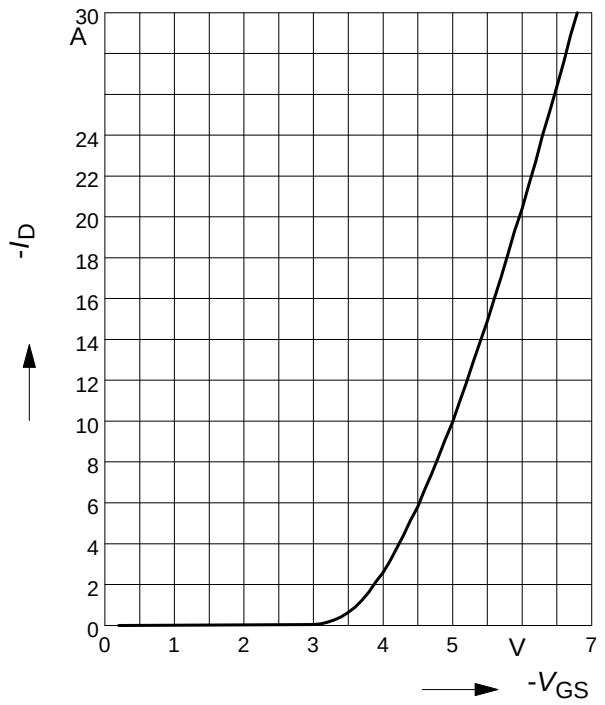
parameter: $V_{GS}$; $T_j$ =25°C, $-V_{GS}$




**7 Typ. transfer characteristics**

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

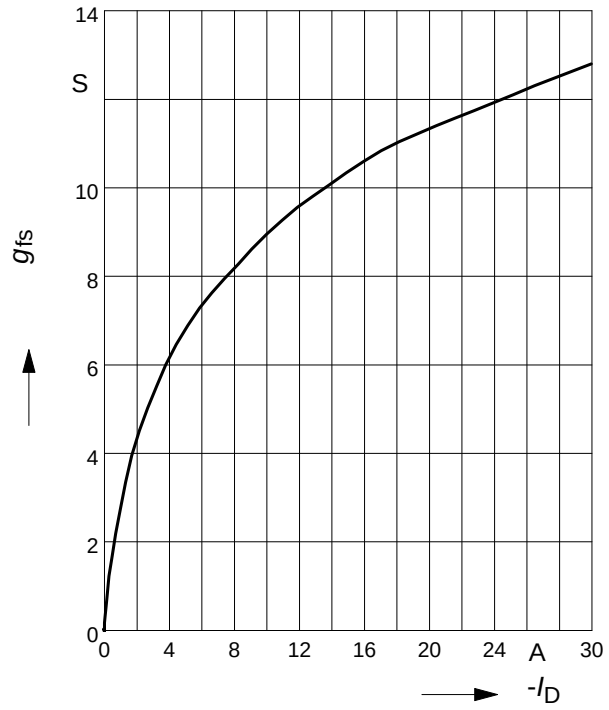
parameter: $T_j$ = 25 °C




**8 Typ. forward transconductance**

$g_{fs} = f(I_D)$

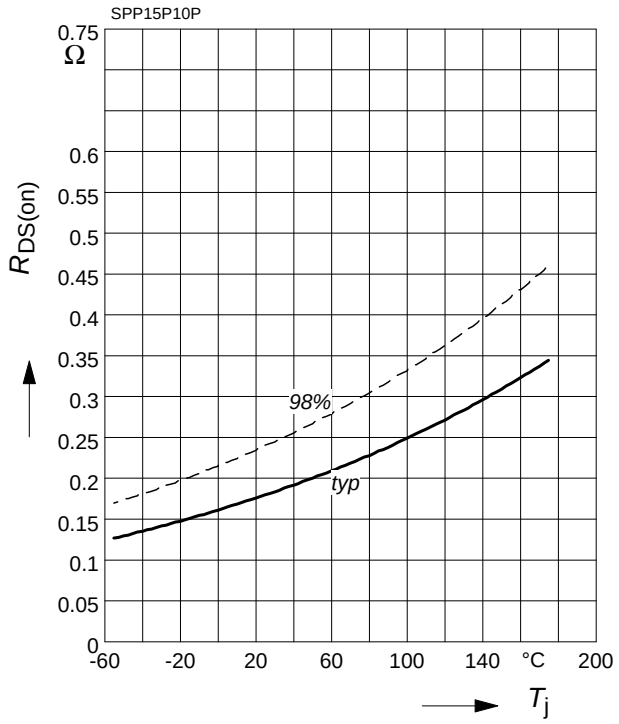
parameter: $T_j$ =25°C



### 9 Drain-source on-state resistance

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

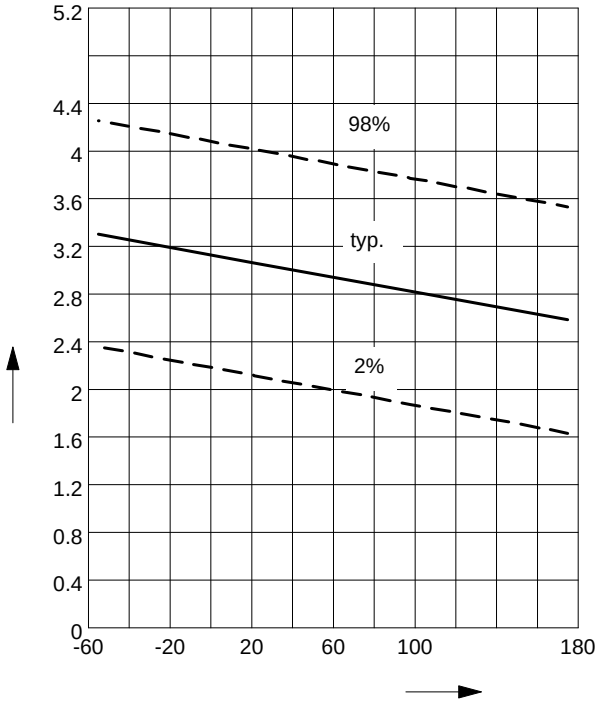
parameter : $I_D$ = -10.6 A, $V_{GS}$ = -10 V




### 10 Typ. gate threshold voltage

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

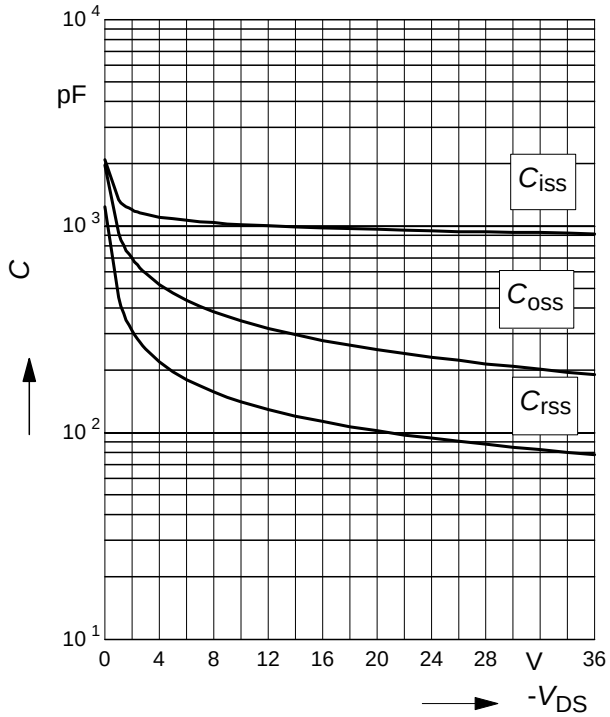
parameter: $V_{GS} = V_{DS}$




### 11 Typ. capacitances

$C = f(V_{DS})$

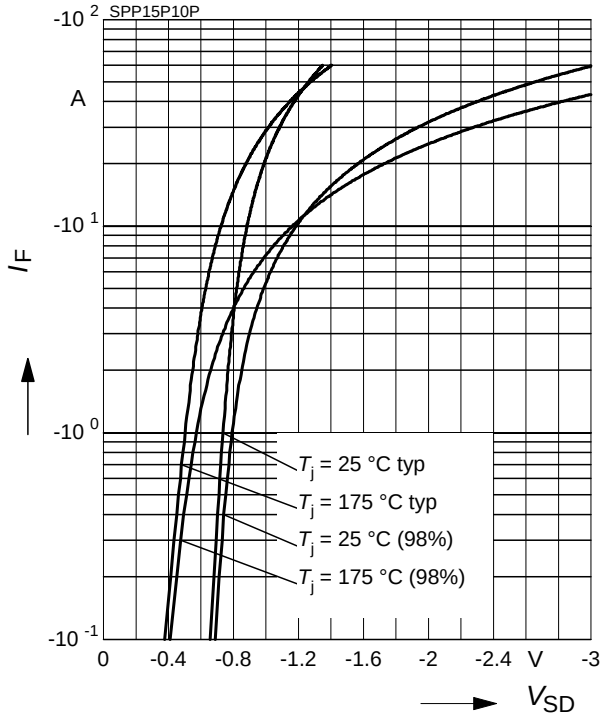
parameter: $V_{GS}$=0, $f$=1 MHz, $T_j$ = 25 °C




### 12 Forward character. of reverse diode

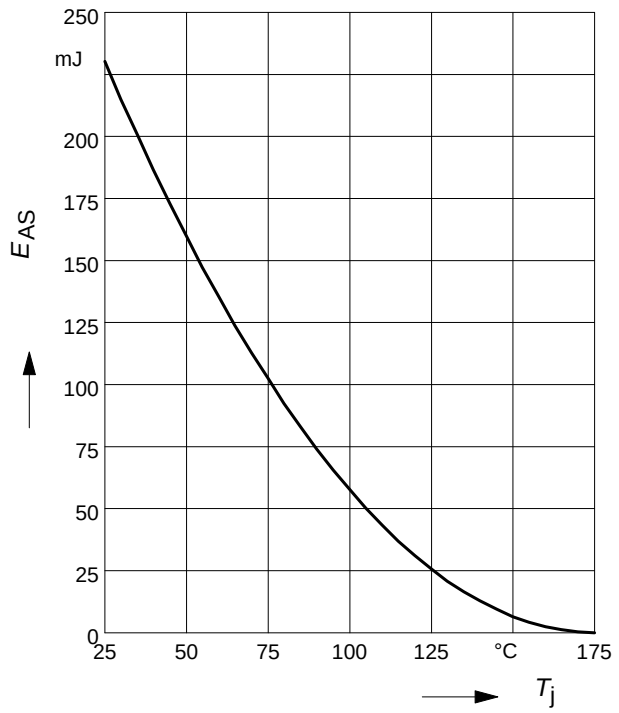
$I_F = f(V_{SD})$

parameter: $T_j$



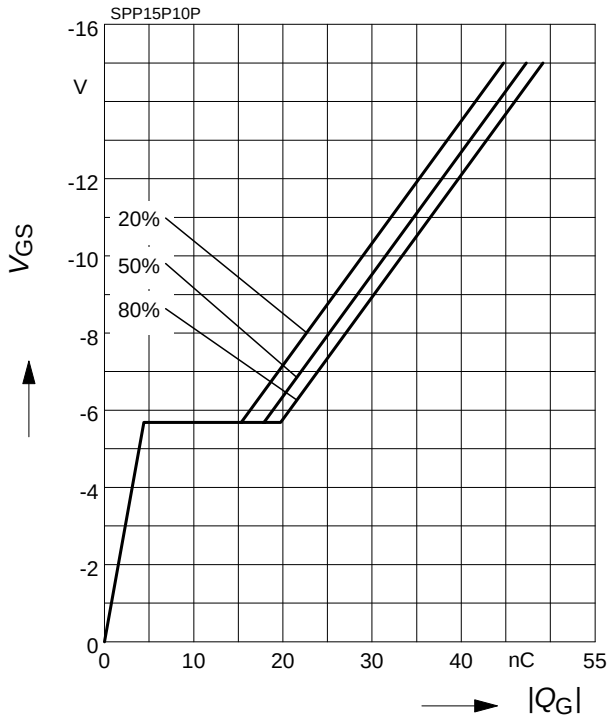
## 13 Typ. avalanche energy

$E_{AS} = f(T_j)$; par.: $I_D$ = -15 A ,
$V_{DD}$ = -25 V, $R_{GS}$ = 25 Ω



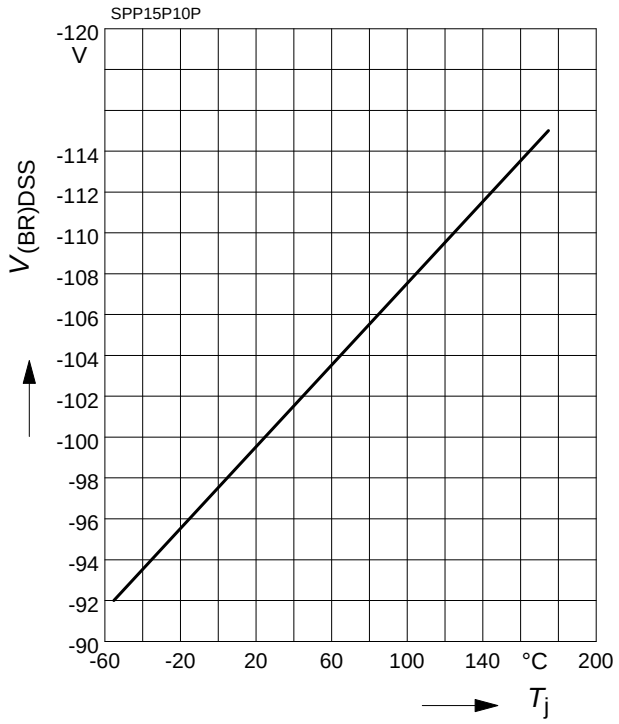

## 14 Typ. gate charge

$V_{GS} = f(Q_{Gate})$
parameter: $I_D$ = -15 A pulsed, $T_j$ = 25°C




## 15 Drain-source breakdown voltage

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



# SPP15P10P G

**Published by**
**Infineon Technologies AG,**
**Bereichs Kommunikation**
**St.-Martin-Strasse 53,**
**D-81541 München**
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