查询SPD30N03供应商

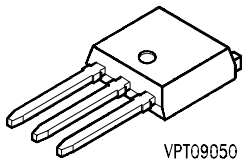
# SIEMENS

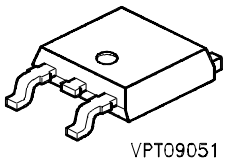
**Preliminary data**

**SPD30N03**
**SPU30N03**

**SIPMOS® Power Transistor**

- N-Channel
- Enhancement mode
- Avalanche rated
- d*v*/d*t* rated
- 175°C operating temperature




| Pin 1 | Pin 2 | Pin 3 |
|---|---|---|
| G | D | S |

| Type | $V_{DS}$ | $I_D$ | $R_{DS(on)}$ | @ $V_{GS}$ | Package | Ordering Code |
|---|---|---|---|---|---|---|
| SPD30N03 | 30 V | 30 A | 0.015 Ω | $V_{GS}$ = 10 V | P-TO252 | Q67040-S4144-A2 |
| SPU30N03 | | | | | P-TO251-3-1 | Q67040-S4146-A2 |

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

| Parameter | Symbol | Value | Unit |
|---|---|---|---|
| Continuous drain current | $I_D$ | | A |
| $T_C$ = 25 °C, 1) | | 30 | |
| $T_C$ = 100 °C | | 30 | |
| Pulsed drain current | $I_{D\ puls}$ | 120 | |
| $T_C$ = 25 °C | | | |
| Avalanche energy, single pulse | $E_{AS}$ | 250 | mJ |
| $I_D$ = 30 A, $V_{DD}$ = 25 V, $R_{GS}$ = 25 Ω | | | |
| Avalanche current,periodic limited by $T_{jmax}$ | $I_{AR}$ | 30 | A |
| Avalanche energy,periodic limited by $T_{j(max)}$ | $E_{AR}$ | 12 | mJ |
| Reverse diode d*v*/d*t* | d*v*/d*t* | 6 | kV/µs |
| $I_S$ = 30 A, $V_{DS}$ = 24 V, d*i*/d*t* = 200 A/µs, | | | |
| $T_{jmax}$ = 175 °C | | | |
| Gate source voltage | $V_{GS}$ | ±20 | V |
| Power dissipation | $P_{tot}$ | 120 | W |
| $T_C$ = 25 °C | | | |
| Operating temperature | $T_j$ | -55 ... +175 | °C |
| Storage temperature | $T_{stg}$ | -55 ... +175 | |
| IEC climatic category; DIN IEC 68-1 | | 55/175/56 | |

[1]current limited by bond wire

## Electrical Characteristics

| Parameter<br>at $T_j$ = 25 °C, unless otherwise specified | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Thermal Characteristics** | | | | | |
| Thermal resistance, junction - case | $R_{thJC}$ | - | | 1.25 | K/W |
| Thermal resistance, junction - ambient | $R_{thJA}$ | - | 100 | - | |
| SMD version, device on PCB: | $R_{thJA}$ | | | | |
| @ min. footprint | | - | 50 | - | |
| @ 6 cm$^2$ cooling area[1)] | | - | tbd | - | |

## Static Characteristics

| | | | | | |
|---|---|---|---|---|---|
| Drain- source breakdown voltage<br>$V_{GS}$ = 0 V, $I_D$ = 0.25 mA | $V_{(BR)DSS}$ | 30 | - | - | V |
| Gate threshold voltage, $V_{GS}$ = $V_{DS}$<br>$I_D$ = 80 µA, $T_j$ = 25 °C | $V_{GS(th)}$ | 2.1 | 3 | 4 | |
| Zero gate voltage drain current | $I_{DSS}$ | | | | µA |
| $V_{DS}$ = 30 V, $V_{GS}$ = 0 V, $T_j$ = 25 °C | | - | 0.1 | 1 | |
| $V_{DS}$ = 30 V, $V_{GS}$ = 0 V, $T_j$ = 150 °C | | - | - | 100 | |
| Gate-source leakage current<br>$V_{GS}$ = 20 V, $V_{DS}$ = 0 V | $I_{GSS}$ | - | 10 | 100 | nA |
| Drain-Source on-state resistance<br>$V_{GS}$ = 10 V, $I_D$ = 30 A | $R_{DS(on)}$ | - | 0.0085 | 0.015 | Ω |

1 Device on 50mm*50mm*1.5mm epoxy PCB FR4 with 6 cm2 (one layer, 70µm thick) copper area for drain connection. PCB is vertical without blown air.

## Electrical Characteristics

| Parameter<br>at $T_j$ = 25 °C, unless otherwise specified | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Transconductance<br>$V_{DS}\geq 2*I_D*R_{DS(on)max}$ , $I_D$ = 30 A | $g_{fs}$ | 18 | 34 | - | S |
| Input capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{iss}$ | - | 1400 | 1750 | pF |
| Output capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{oss}$ | - | 645 | 810 | |
| Reverse transfer capacitance<br>$V_{GS}$ = 0 V, $V_{DS}$ = 25 V, $f$ = 1 MHz | $C_{rss}$ | - | 260 | 325 | |
| Turn-on delay time<br>$V_{DD}$ = 15 V, $V_{GS}$ = 10 V, $I_D$ = 30 A,<br>$R_G$ = 6.8 Ω | $t_{d(on)}$ | - | 20 | 30 | ns |
| Rise time<br>$V_{DD}$ = 15 V, $V_{GS}$ = 10 V, $I_D$ = 30 A,<br>$R_G$ = 6.8 Ω | $t_r$ | - | 35 | 52 | |
| Turn-off delay time<br>$V_{DD}$ = 15 V, $V_{GS}$ = 10 V, $I_D$ = 30 A,<br>$R_G$ = 6.8 Ω | $t_{d(off)}$ | - | 50 | 75 | |
| Fall time<br>$V_{DD}$ = 15 V, $V_{GS}$ = 10 V, $I_D$ = 30 A | $t_f$ | - | 45 | 65 | |

## Electrical Characteristics

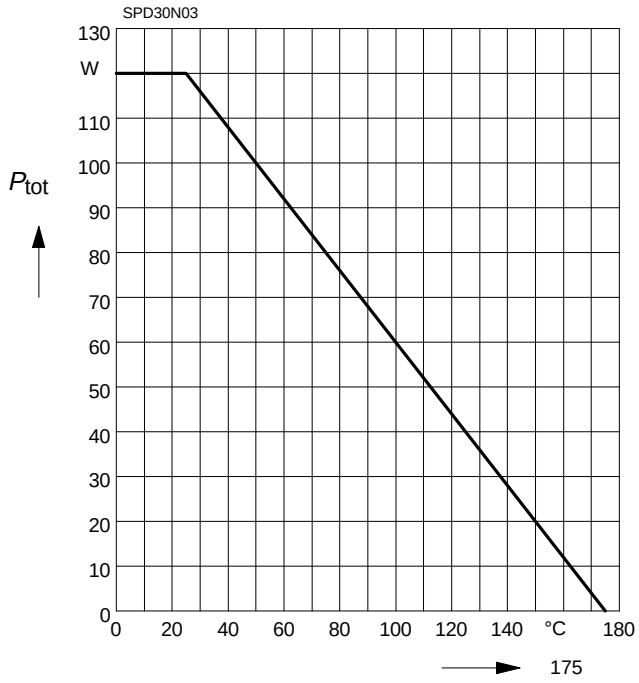
| Parameter<br>at $T_j$ = 25 °C, unless otherwise specified | Symbol | Values | | | Unit |
|---|---|---|---|---|---|
| | | min. | typ. | max. | |
| **Dynamic Characteristics** | | | | | |
| Gate charge at threshold<br>$V_{DD}$ = 24 V, $I_D$ = 30 A, $V_{GS}$ = 0 to 1 V | $Q_{G(th)}$ | - | 1 | 1.5 | nC |
| Gate charge at $V_{gs}$=7V<br>$V_{DD}$ = 24 V, $I_D$ = 30 A, $V_{GS}$ = 0 to 7 V | $Q_{g(7)}$ | - | 30 | 45 | nC |
| Gate charge total<br>$V_{DD}$ = 24 V, $I_D$ = 30 A, $V_{GS}$ = 0 to 10 V | $Q_g$ | - | 39 | 60 | |
| Gate plateau voltage<br>$V_{DD}$ = 24 V, $I_D$ = 30 A | $V_{(plateau)}$ | - | 4.8 | - | V |

## Reverse Diode

| | | | | | |
|---|---|---|---|---|---|
| Inverse diode continuous forward current<br>$T_C$ = 25 °C | $I_S$ | - | - | 30 | A |
| Inverse diode direct current,pulsed<br>$T_C$ = 25 °C | $I_{SM}$ | - | - | 120 | |
| Inverse diode forward voltage<br>$V_{GS}$ = 0 V, $I_F$ = 60 A | $V_{SD}$ | - | 1 | 1.6 | V |
| Reverse recovery time<br>$V_R$ = 15 V, $I_F$=$I_S$ , d$i_F$/d$t$ = 100 A/µs | $t_{rr}$ | - | 40 | 60 | ns |
| Reverse recovery charge<br>$V_R$ = 15 V, $I_F$=$I_S$ , d$i_F$/d$t$ = 100 A/µs | $Q_{rr}$ | - | 0.035 | 0.052 | µC |

### Power Dissipation

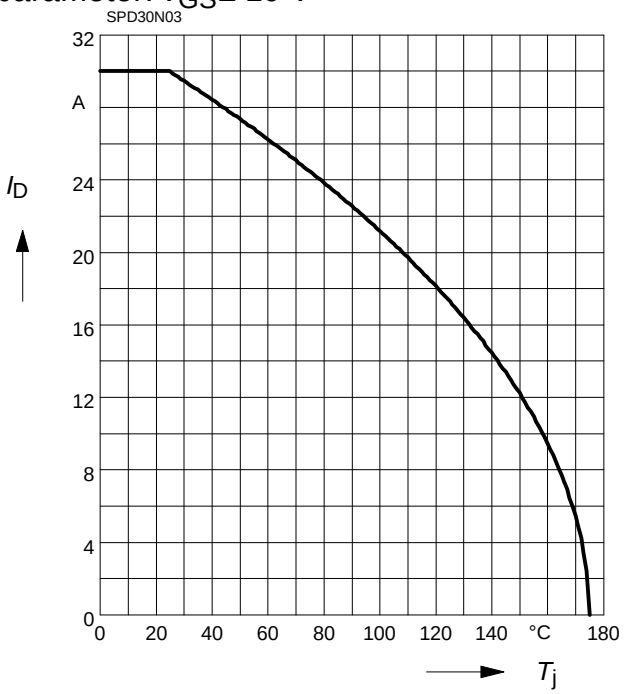
$P_{tot} = f(T_C)$




### Drain current

$I_D = f(T_C)$

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




### Transient thermal impedance

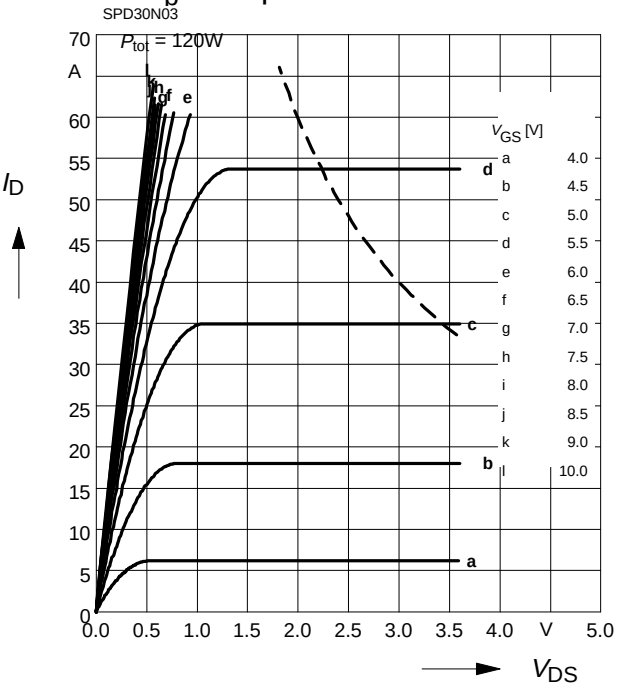
$Z_{thJC} = f(t_p)$

parameter: D = tp/T

### Typ. output characteristics

$I_D = f(V_{DS})$

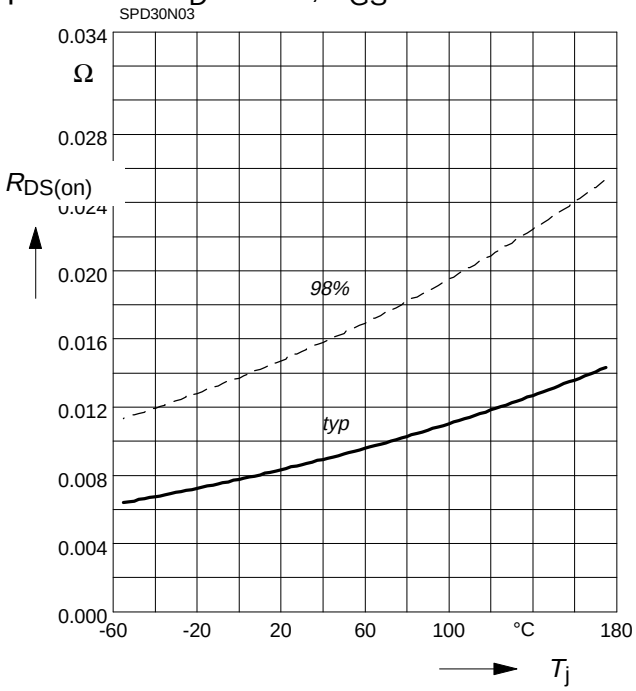
parameter: $t_p$ = 80 µs




### Drain-source on-resistance

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

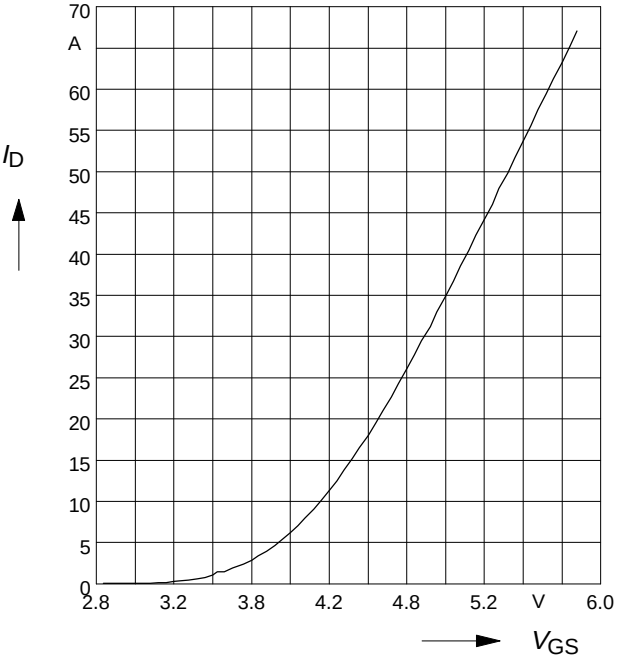
parameter : $I_D$ = 30 A, $V_{GS}$ = 10 V



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

parameter: $t_p$ = 80 µs

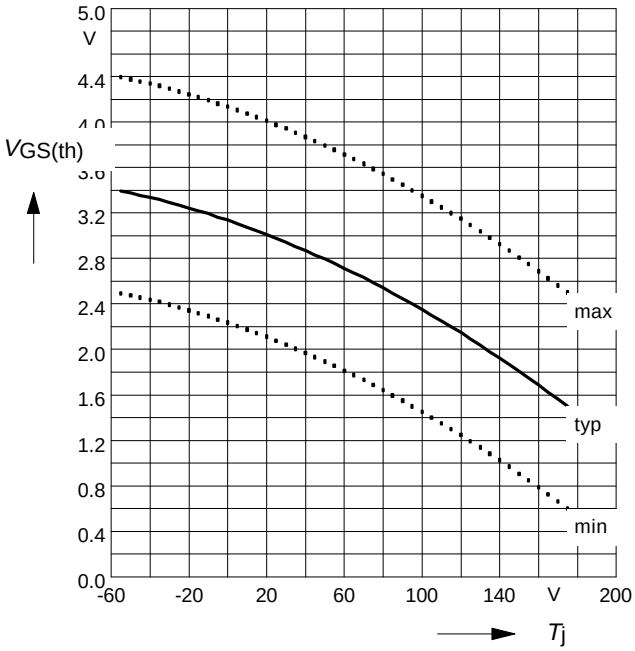
$V_{DS} \geq 2 \times I_D \times R_{DS(on)max}$




**Gate threshold voltage**

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

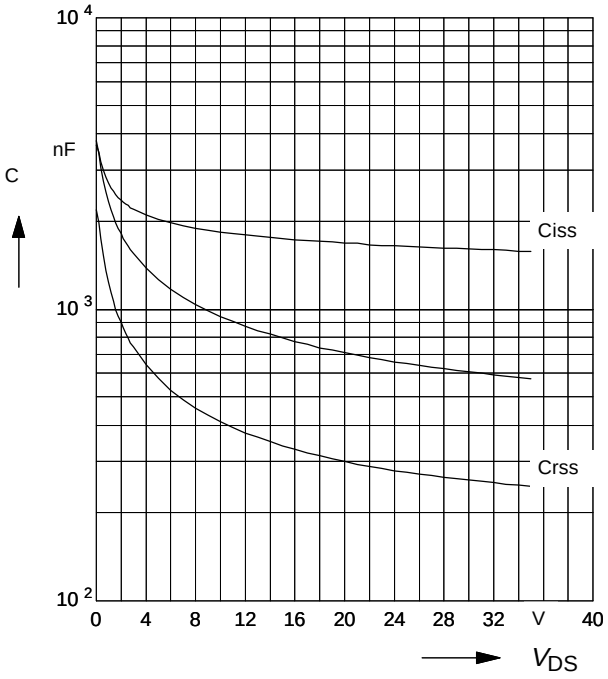
parameter : $V_{GS} = V_{DS}$, $I_D$ = 80 µA




**Typ. capacitances**

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

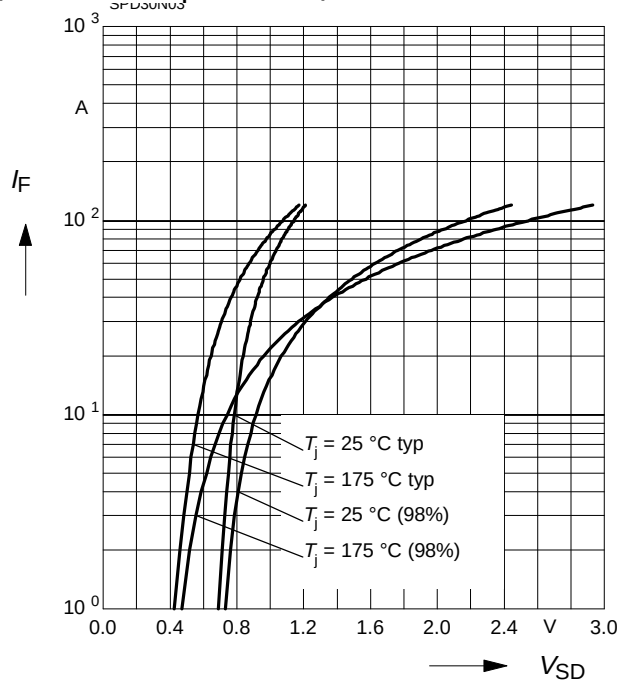
Parameter: $V_{GS}$=0 V, *f*=1 MHz




**Forward characteristics of reverse diode**

$I_F = f(V_{SD})$

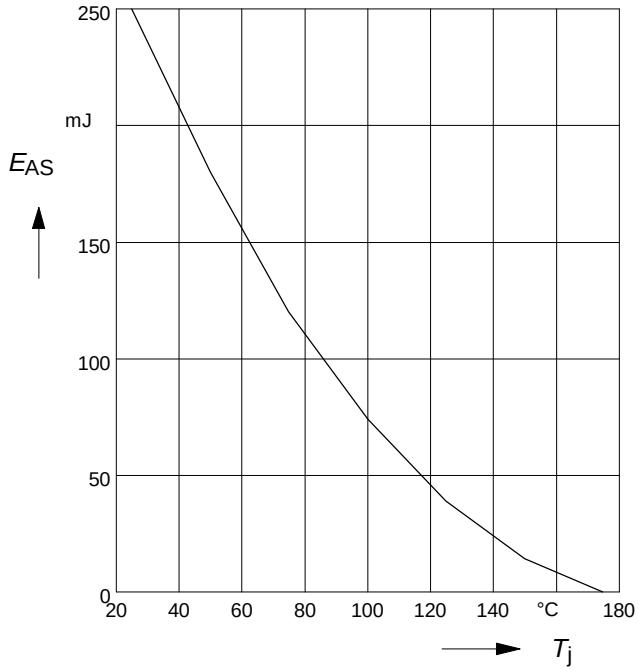
parameter: $T_j$ , tp = 80 µs



**Avalanche Energy** $E_{AS} = f(T_j)$

parameter: $I_D$ = 30 A, $V_{DD}$ = 25 V

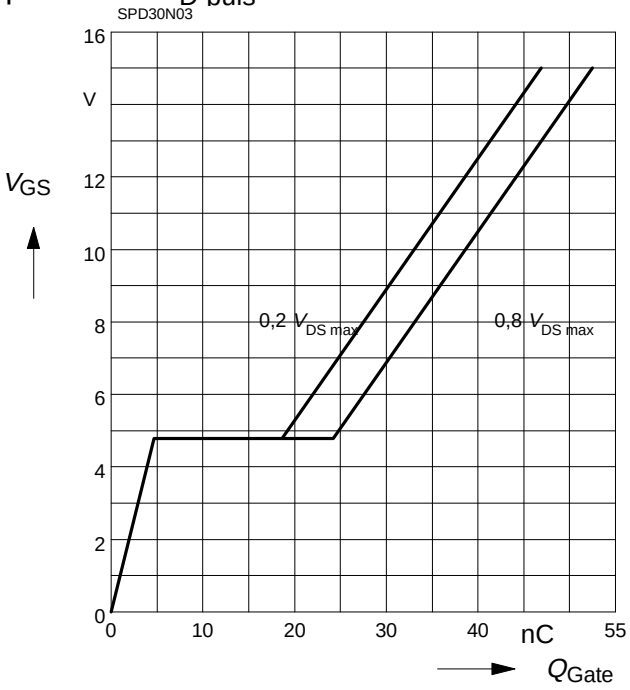
$R_{GS}$ = 25 Ω




**Typ. gate charge**

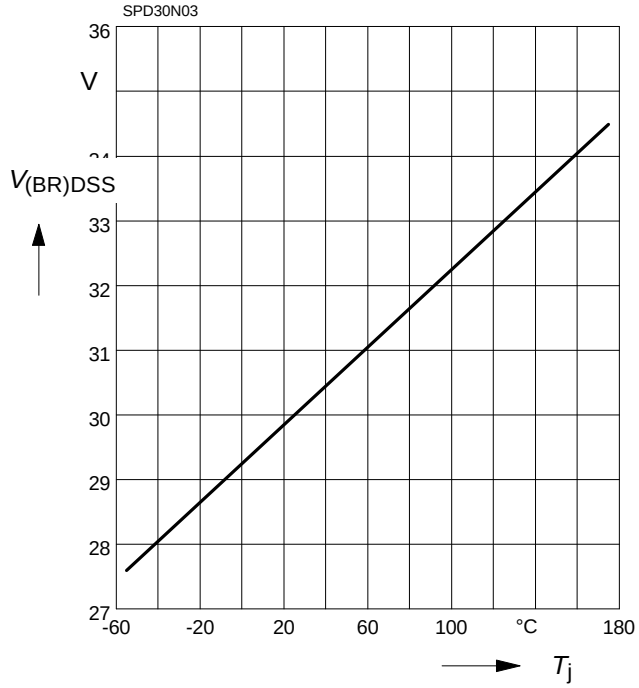
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\ puls}$ =30A




**Drain-source breakdown voltage**

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



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