

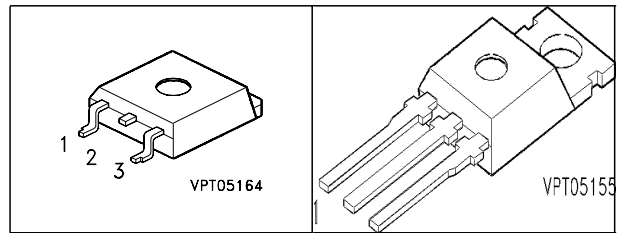
## SIPMOS® Power-Transistor

### Features

- P-Channel
- Enhancement mode
- Avalanche rated
- $dv/dt$  rated
- 175°C operating temperature

### Product Summary

Drain source voltage	$V_{DS}$	-60	V
Drain-source on-state resistance	$R_{DS(on)}$	0.13	$\Omega$
Continuous drain current	$I_D$	-18.6	A



Type	Package	Ordering Code
SPP18P06P	P-TO220-3-1	Q67040-S4182
SPB18P06P	P-TO263-3-2	Q67040-S4191

Pin 1	PIN 2/4	PIN 3
G	D	S

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

Parameter	Symbol	Value	Unit
Continuous drain current $T_C = 25\text{ °C}$ $T_C = 100\text{ °C}$	$I_D$	-18.6 -13.2	A
Pulsed drain current $T_C = 25\text{ °C}$	$I_D$ puls	-74.4	
Avalanche energy, single pulse $I_D = -18.6\text{ A}$ , $V_{DD} = -25\text{ V}$ , $R_{GS} = 25\ \Omega$	$E_{AS}$	150	mJ
Avalanche energy, periodic limited by $T_{jmax}$	$E_{AR}$	8	
Reverse diode $dv/dt$ $I_S = -18.6\text{ A}$ , $V_{DS} = -48\text{ V}$ , $di/dt = 200\text{ A}/\mu\text{s}$ , $T_{jmax} = 175\text{ °C}$	$dv/dt$	6	kV/ $\mu\text{s}$
Gate source voltage	$V_{GS}$	$\pm 20$	V
Power dissipation $T_C = 25\text{ °C}$	$P_{tot}$	80	W
Operating and storage temperature	$T_j, T_{stg}$	-55...+175	$^{\circ}\text{C}$
IEC climatic category; DIN IEC 68-1		55/175/56	

**Thermal Characteristics**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Characteristics</b>					
Thermal resistance, junction - case	$R_{thJC}$	-	-	1.85	K/W
Thermal resistance, junction - ambient, leaded	$R_{thJA}$	-	-	62	
SMD version, device on PCB: @ min. footprint @ 6 cm <sup>2</sup> cooling area <sup>1)</sup>	$R_{thJA}$	-	-	62 40	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Static Characteristics</b>					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$ , $I_D = -250\text{ }\mu\text{A}$	$V_{(BR)DSS}$	-60	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = -1\text{ mA}$	$V_{GS(th)}$	-2.1	-3	-4	
Zero gate voltage drain current $V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 25\text{ °C}$ $V_{DS} = -60\text{ V}$ , $V_{GS} = 0\text{ V}$ , $T_j = 150\text{ °C}$	$I_{DSS}$	-	-0.1 -10	-1 -100	$\mu\text{A}$
Gate-source leakage current $V_{GS} = -20\text{ V}$ , $V_{DS} = 0\text{ V}$	$I_{GSS}$	-	-10	-100	nA
Drain-source on-state resistance $V_{GS} = -10\text{ V}$ , $I_D = -13.2\text{ A}$	$R_{DS(on)}$	-	0.1	0.13	$\Omega$

<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  $T_j = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Transconductance $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$ , $I_D = -13.2\text{ A}$	$g_{fs}$	4	8	-	S
Input capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{iss}$	-	690	860	pF
Output capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{oss}$	-	230	290	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$ , $V_{DS} = -25\text{ V}$ , $f = 1\text{ MHz}$	$C_{rss}$	-	95	120	
Turn-on delay time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -13.2\text{ A}$ , $R_G = 2.7\text{ }\Omega$	$t_{d(on)}$	-	12	18	ns
Rise time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -13.2\text{ A}$ , $R_G = 2.7\text{ }\Omega$	$t_r$	-	5.8	8.7	
Turn-off delay time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -13.2\text{ A}$ , $R_G = 2.7\text{ }\Omega$	$t_{d(off)}$	-	24.5	37	
Fall time $V_{DD} = -30\text{ V}$ , $V_{GS} = -10\text{ V}$ , $I_D = -13.2\text{ A}$ , $R_G = 2.7\text{ }\Omega$	$t_f$	-	11	16.5	

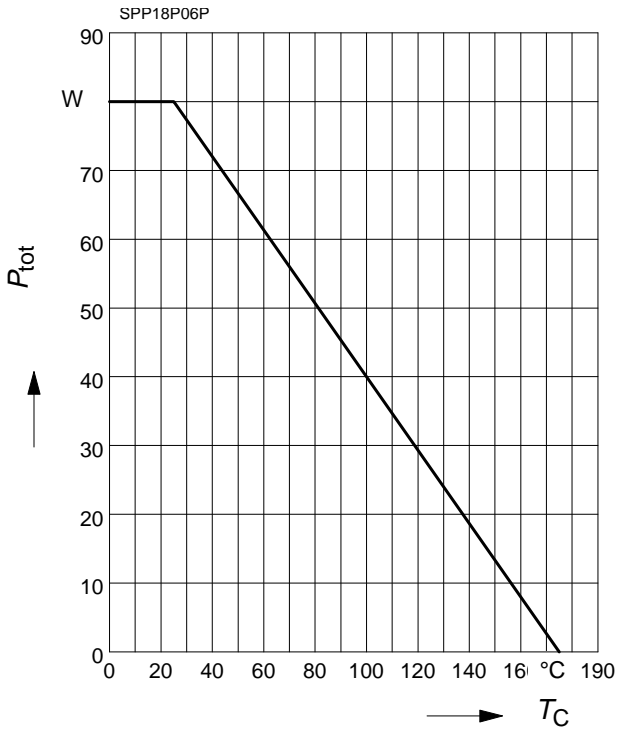
**Electrical Characteristics, at  $T_j = 25\text{ °C}$ , unless otherwise specified**

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Dynamic Characteristics</b>					
Gate to source charge $V_{DD} = -48\text{ V}, I_D = -18.6\text{ A}$	$Q_{gs}$	-	4.4	6.6	nC
Gate to drain charge $V_{DD} = -48\text{ V}, I_D = -18.6\text{ A}$	$Q_{gd}$	-	9.3	14	
Gate charge total $V_{DD} = -48\text{ V}, I_D = -18.6\text{ A}, V_{GS} = 0\text{ to }-10\text{ V}$	$Q_g$	-	22	33	
Gate plateau voltage $V_{DD} = -48\text{ V}, I_D = -18.6\text{ A}$	$V_{(plateau)}$	-	-5.56	-	V

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
<b>Reverse Diode</b>					
Inverse diode continuous forward current $T_C = 25\text{ °C}$	$I_S$	-	-	-18.6	A
Inverse diode direct current, pulsed $T_C = 25\text{ °C}$	$I_{SM}$	-	-	-74.4	
Inverse diode forward voltage $V_{GS} = 0\text{ V}, I_F = -18.6\text{ A}$	$V_{SD}$	-	-1	-1.33	V
Reverse recovery time $V_R = -30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$t_{rr}$	-	70	105	ns
Reverse recovery charge $V_R = -30\text{ V}, I_F = I_S, di_F/dt = 100\text{ A}/\mu\text{s}$	$Q_{rr}$	-	139	208	nC

**Power dissipation**

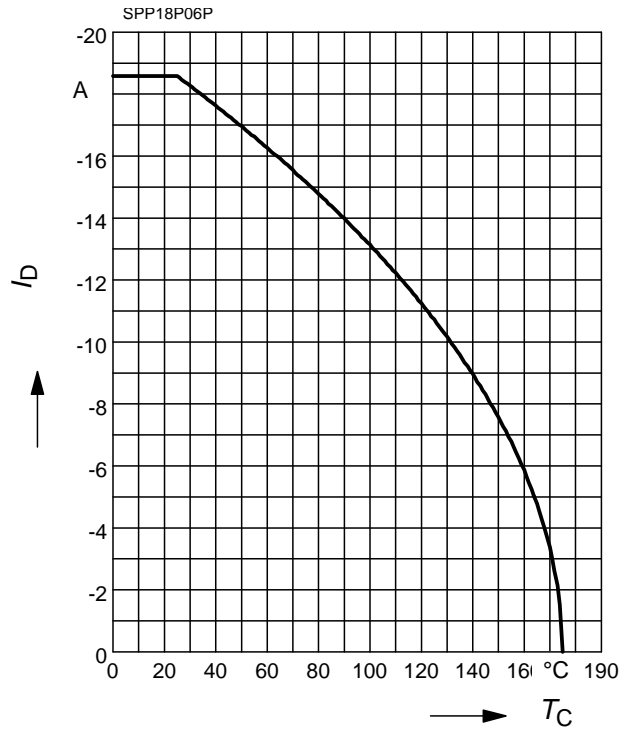
$$P_{tot} = f(T_C)$$



**Drain current**

$$I_D = f(T_C)$$

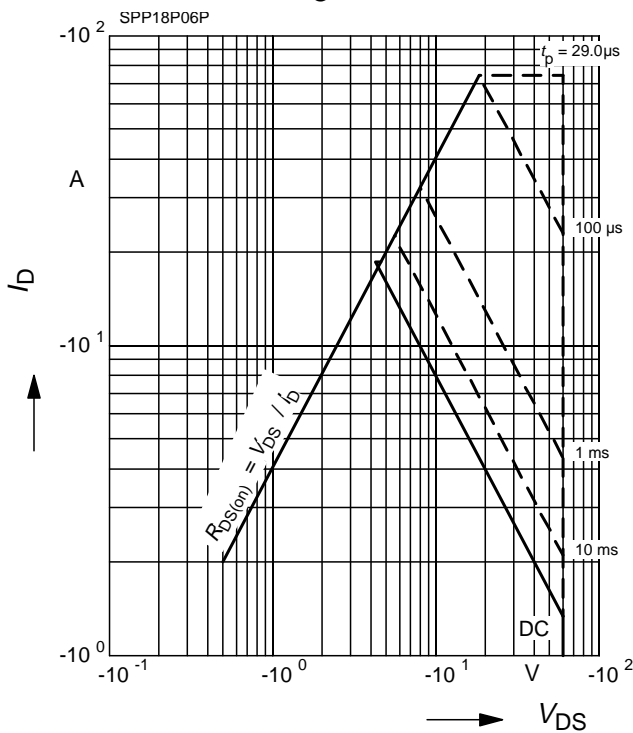
parameter:  $V_{GS} \geq 10\text{ V}$



**Safe operating area**

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

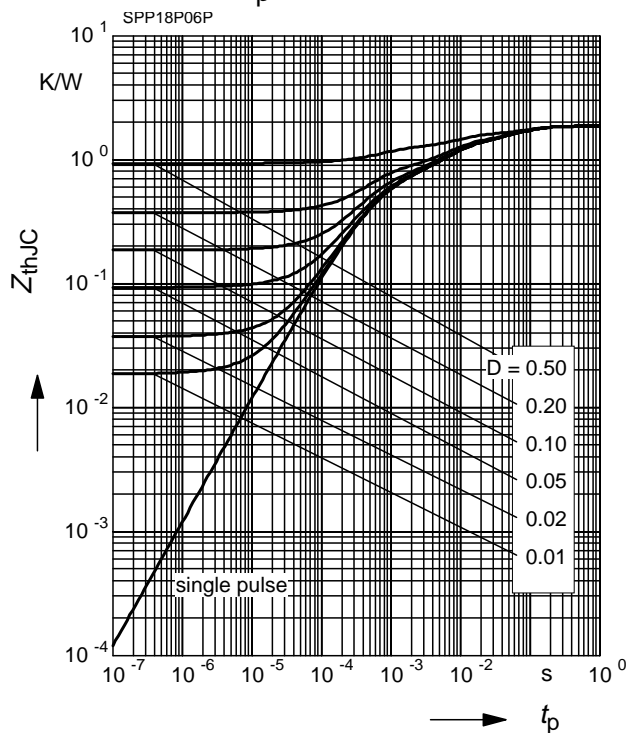
parameter:  $D = 0$ ,  $T_C = 25\text{ }^\circ\text{C}$



**Transient thermal impedance**

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

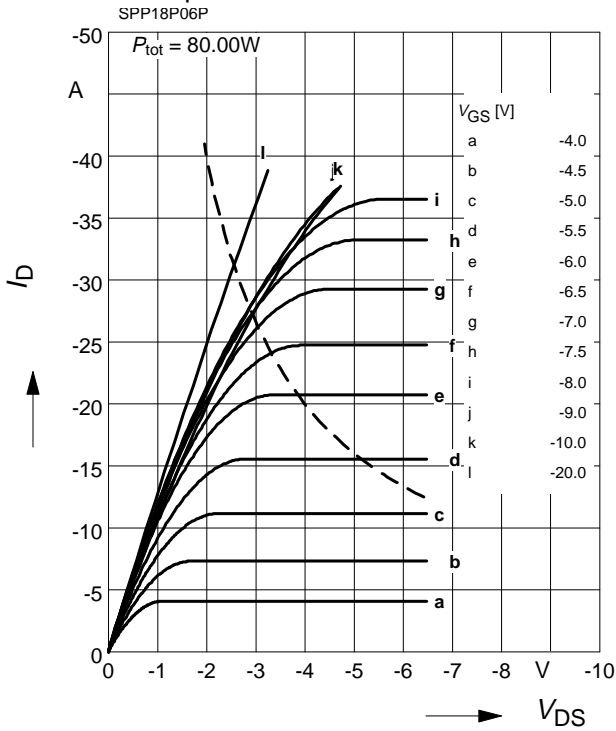
parameter:  $D = t_p/T$



**Typ. output characteristic**

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

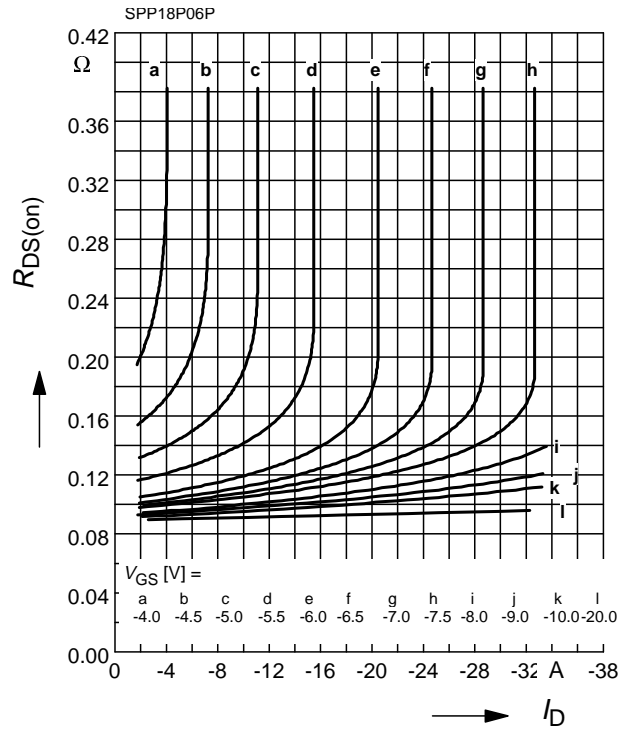
parameter:  $t_p = 80 \mu\text{s}$



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

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

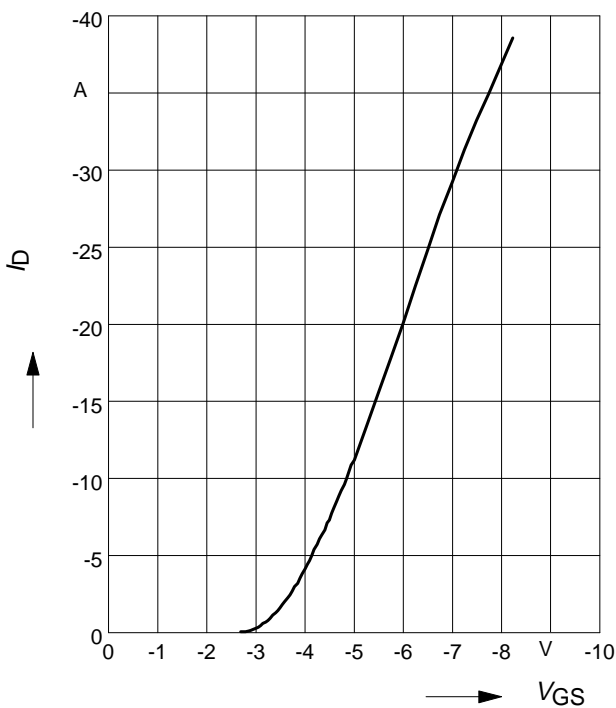
parameter:  $V_{GS}$



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

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

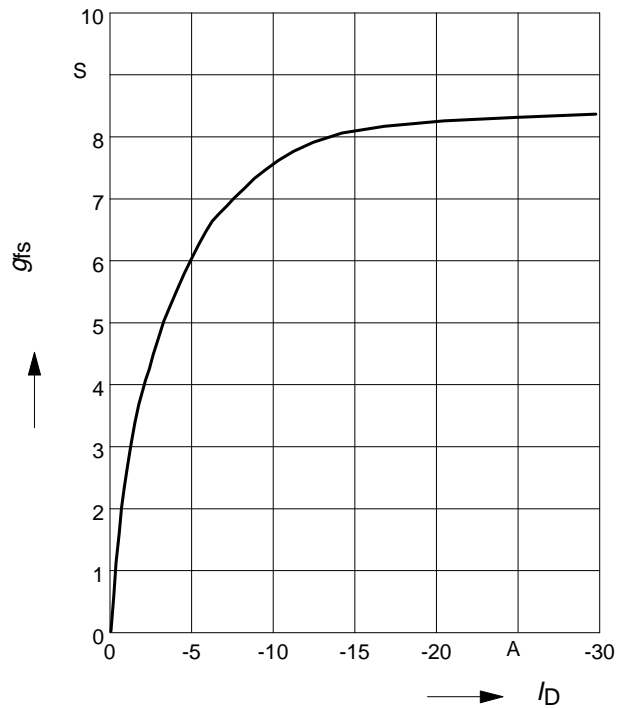
parameter:  $t_p = 80 \mu\text{s}$



**Typ. forward transconductance**

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

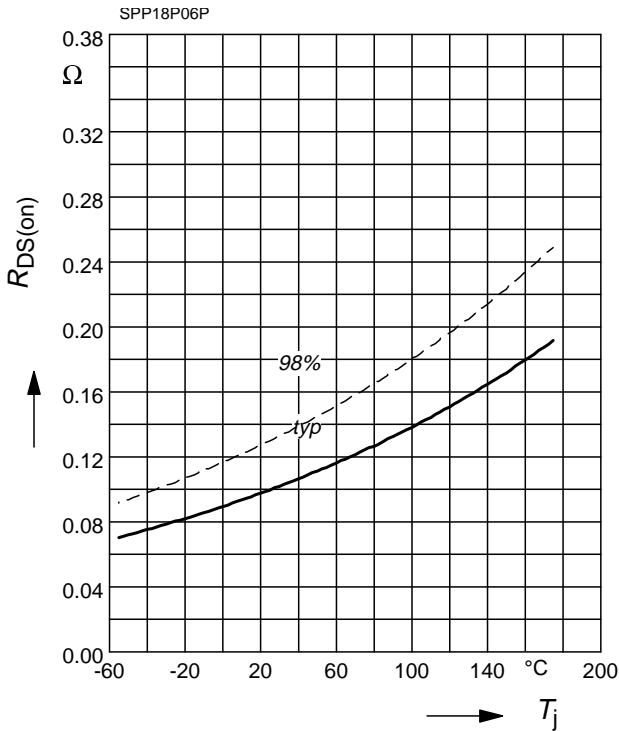
parameter:  $g_{fs}$



**Drain-source on-state resistance**

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

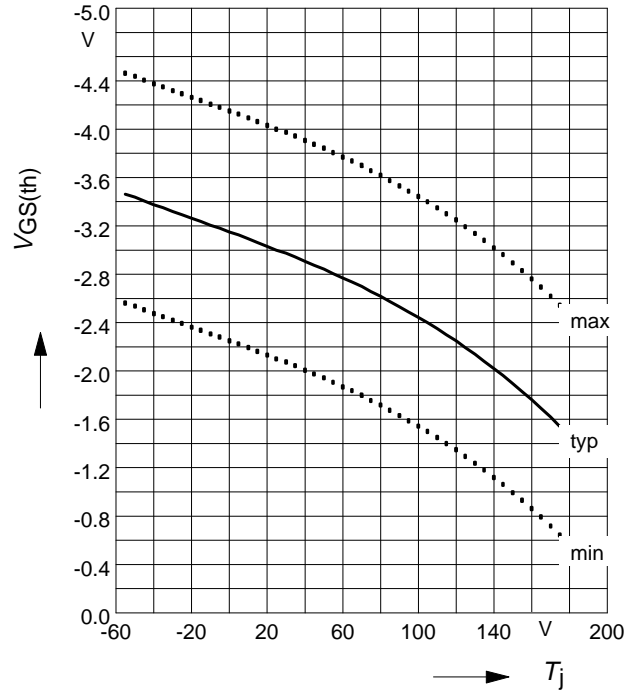
parameter:  $I_D = -13.2 \text{ A}$ ,  $V_{GS} = -10 \text{ V}$



**Gate threshold voltage**

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

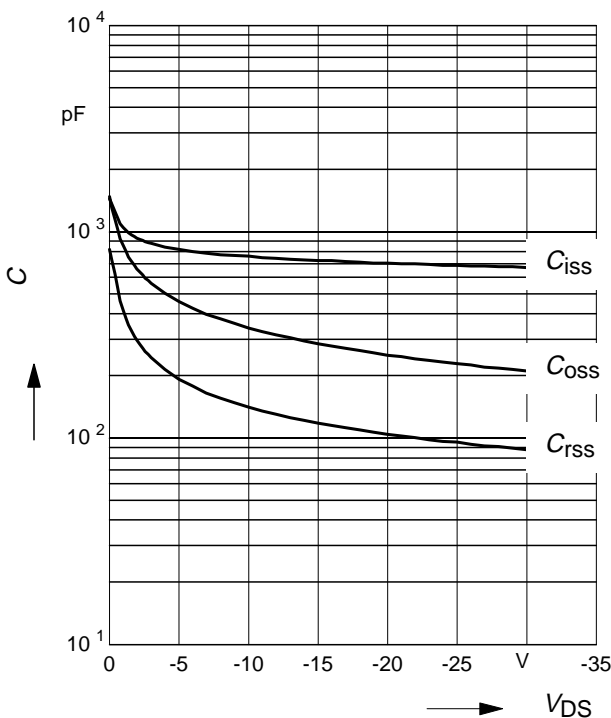
parameter:  $V_{GS} = V_{DS}$ ,  $I_D = -1 \text{ mA}$



**Typ. capacitances**

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

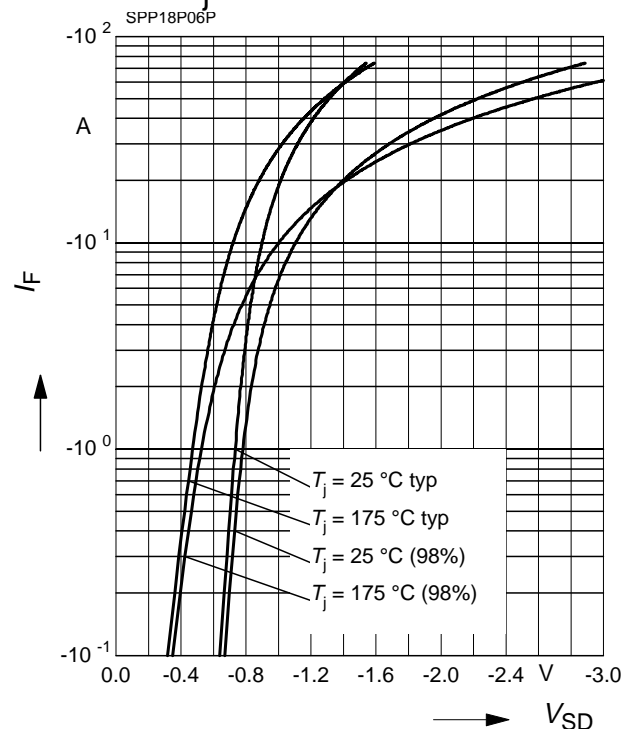
parameter:  $V_{GS}=0\text{V}$ ,  $f=1 \text{ MHz}$



**Forward characteristics of reverse diode**

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

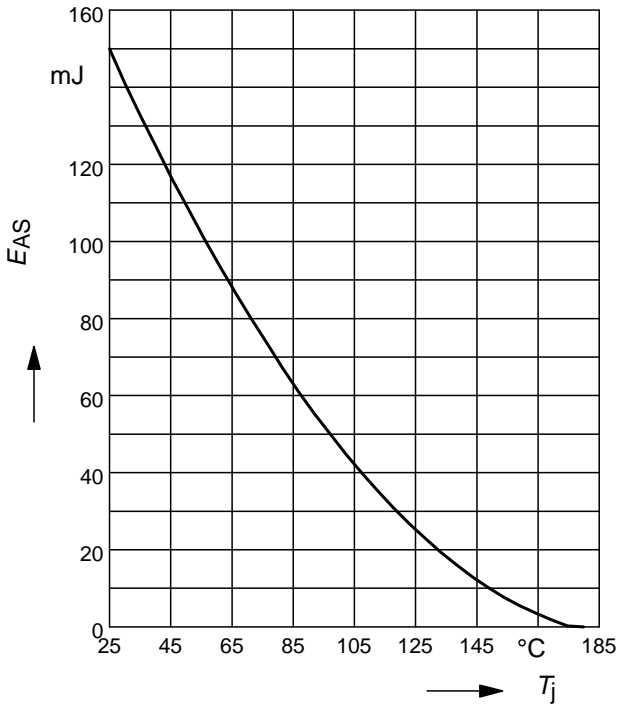
parameter:  $T_j$ ,  $t_p = 80 \mu\text{s}$



**Avalanche energy**

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

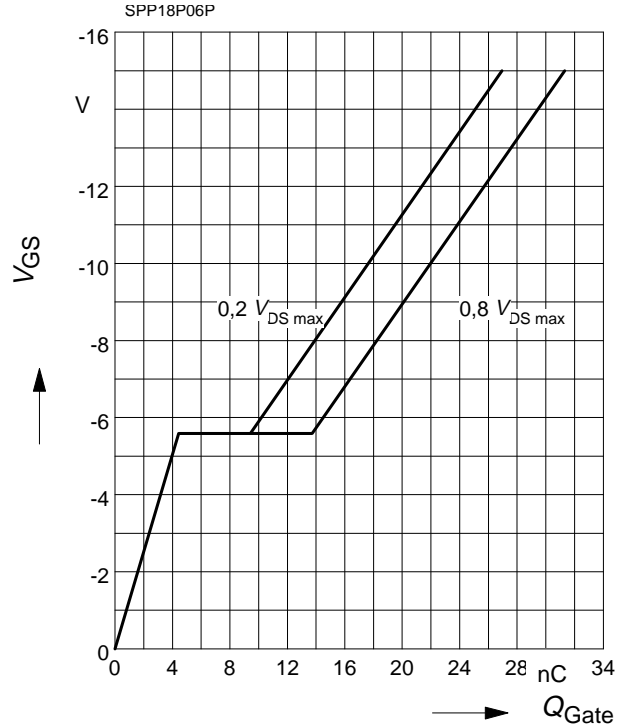
para.:  $I_D = -18.6 \text{ A}$  ,  $V_{DD} = -25 \text{ V}$  ,  $R_{GS} = 25$



**Typ. gate charge**

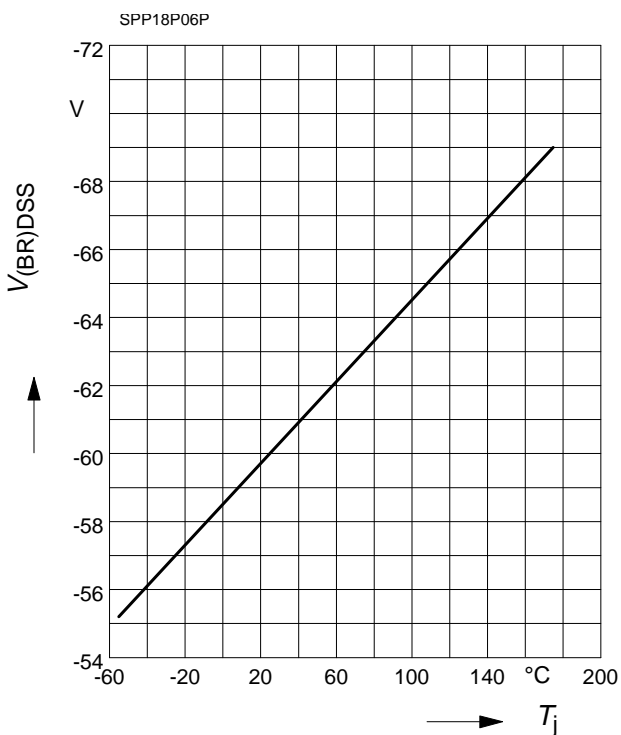
$$V_{GS} = f(Q_{Gate})$$

parameter:  $I_D = -18.6 \text{ A}$  pulsed



**Drain-source breakdown voltage**

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





**Published by**  
**Infineon Technologies AG,**  
**Bereichs Kommunikation**  
**St.-Martin-Strasse 53,**  
**D-81541 München**  
**© Infineon Technologies AG 1999**  
**All Rights Reserved.**

**Attention please!**

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

Terms of delivery and rights to technical change reserved.

We hereby disclaim any and all warranties, including but not limited to warranties of non-infringement, regarding circuits, descriptions and charts stated herein.

Infineon Technologies is an approved CECC manufacturer.

**Information**

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office in Germany or our Infineon Technologies Representatives worldwide (see address list).

**Warnings**

Due to technical requirements components may contain dangerous substances.

For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.