

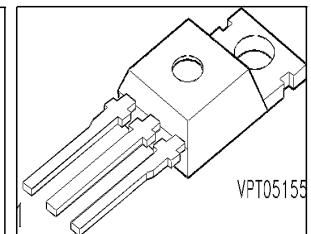
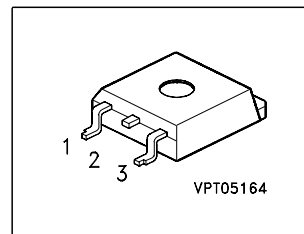
SIPMOS® Power Transistor

Features

- N channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- 175°C operating temperature

Product Summary

Drain source voltage	V_{DS}	30	V
Drain-Source on-state resistance	$R_{DS(on)}$	0.006	Ω
Continuous drain current	I_D	80	A



Type	Package	Ordering Code	Packaging
SPP80N03	P-TO220-3-1	Q67040-S4734-A2	Tube
SPB80N03	P-TO263-3-2	Q67040-S4734-A3	Tube and Reel

Pin 1	Pin 2	Pin 3
G	D	S

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

Parameter	Symbol	Value	Unit
Continuous drain current $T_C = 25\text{ °C}$, ¹⁾ $T_C = 100\text{ °C}$	I_D	80 80	A
Pulsed drain current $T_C = 25\text{ °C}$	I_{Dpulse}	320	
Avalanche energy, single pulse $I_D = 80\text{ A}$, $V_{DD} = 25\text{ V}$, $R_{GS} = 25\ \Omega$	E_{AS}	700	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}	30	
Reverse diode dv/dt $I_S = 80\text{ A}$, $V_{DS} = 24\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{jmax} = 175\text{ °C}$	dv/dt	6	kV/ μs
Gate source voltage	V_{GS}	± 20	V
Power dissipation $T_C = 25\text{ °C}$	P_{tot}	300	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.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	-	0.5	K/W
Thermal resistance, junction - ambient, leded	R_{thJA}	-	-	62	
SMD version, device on PCB: @ min. footprint @ 6 cm ² cooling area ²⁾	R_{thJA}	-	-	62 40	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain- source breakdown voltage $V_{GS} = 0\text{ V}$, $I_D = 0.25\text{ mA}$, $T_j = 25\text{ °C}$	$V_{(BR)DSS}$	30	-	-	V
Gate threshold voltage, $V_{GS} = V_{DS}$ $I_D = 240\text{ }\mu\text{A}$	$V_{GS(th)}$	2.1	3	4	
Zero gate voltage drain current $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25\text{ °C}$ $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 150\text{ °C}$	I_{DSS}	-	0.1	1 100	μA
Gate-source leakage current $V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$	I_{GSS}	-	10	100	
Drain-Source on-state resistance $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$	$R_{DS(on)}$	-	0.0038	0.006	Ω

¹current limited by bond wire

² Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6 cm² (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 $V_{DS} \geq 2 \cdot I_D \cdot R_{DS(on)max}$, $I_D = 80\text{ A}$	g_{fs}	30	93	-	S
Input capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{iss}	-	3970	5000	pF
Output capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{oss}	-	1920	2500	
Reverse transfer capacitance $V_{GS} = 0\text{ V}$, $V_{DS} = 25\text{ V}$, $f = 1\text{ MHz}$	C_{rss}	-	775	1000	
Turn-on delay time $V_{DD} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$, $R_G = 2.5\ \Omega$	$t_{d(on)}$	-	22	33	ns
Rise time $V_{DD} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$, $R_G = 2.5\ \Omega$	t_r	-	25	38	
Turn-off delay time $V_{DD} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$, $R_G = 2.5\ \Omega$	$t_{d(off)}$	-	55	85	
Fall time $V_{DD} = 15\text{ V}$, $V_{GS} = 10\text{ V}$, $I_D = 80\text{ A}$, $R_G = 2.5\ \Omega$	t_f	-	40	60	

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

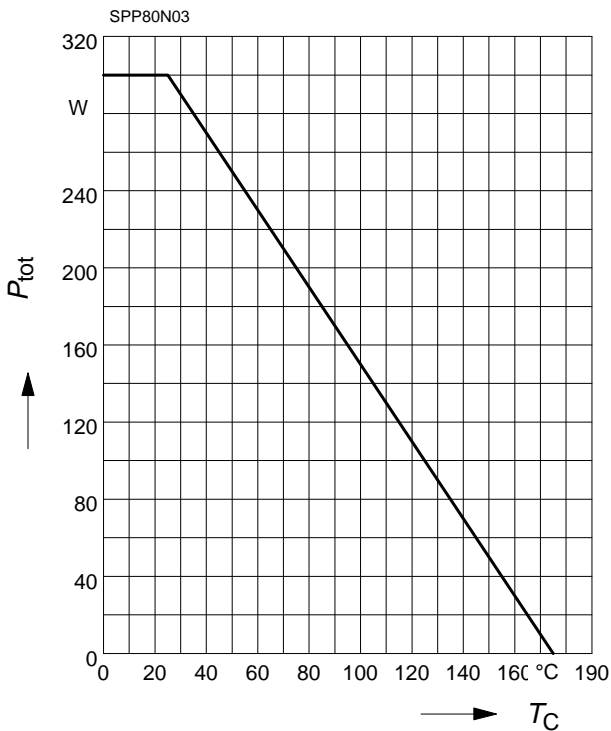
Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Dynamic Characteristics					
Gate to source charge $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	Q_{gs}	-	20	30	nC
Gate to drain charge $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	Q_{gd}	-	51	76.5	
Gate charge total $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$, $V_{GS} = 0\text{ to }10\text{ V}$	Q_g	-	112	175	
Gate plateau voltage $V_{DD} = 24\text{ V}$, $I_D = 80\text{ A}$	$V_{(plateau)}$	-	4.7	-	V

Reverse Diode

Inverse diode continuous forward current $T_C = 25\text{ °C}$	I_S	-	-	80	A
Inverse diode direct current, pulsed $T_C = 25\text{ °C}$	I_{SM}	-	-	320	
Inverse diode forward voltage $V_{GS} = 0\text{ V}$, $I_F = 160\text{ A}$	V_{SD}	-	1.1	1.7	V
Reverse recovery time $V_R = 15\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	t_{rr}	-	60	90	ns
Reverse recovery charge $V_R = 15\text{ V}$, $I_F = I_S$, $di_F/dt = 100\text{ A}/\mu\text{s}$	Q_{rr}	-	0.06	0.09	μC

Power Dissipation

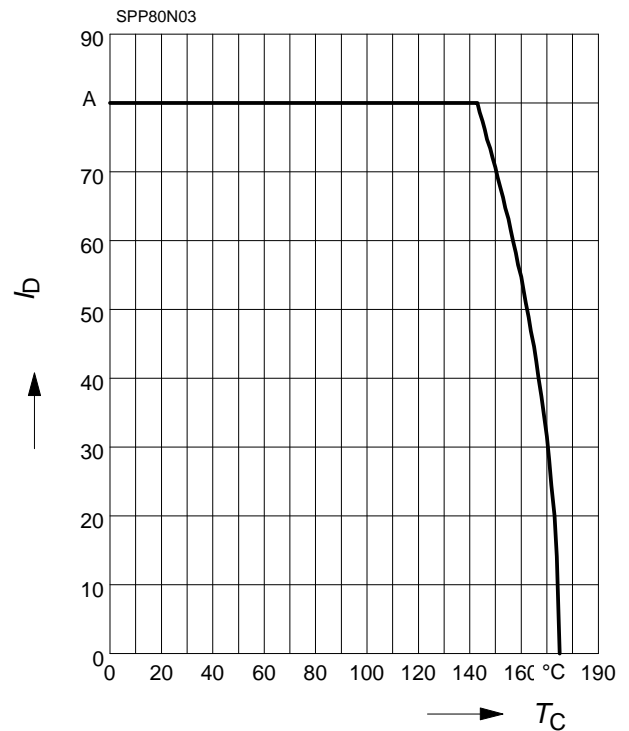
$$P_{\text{tot}} = f(T_C)$$



Drain current

$$I_D = f(T_C)$$

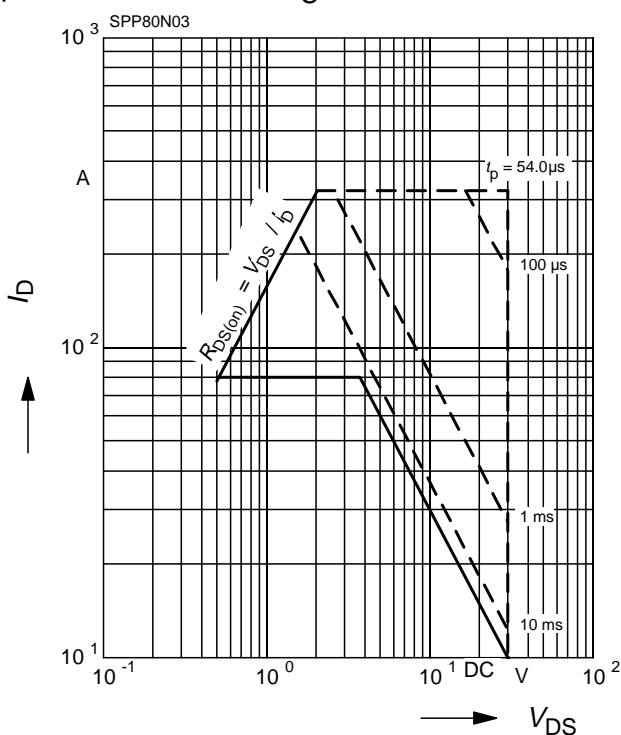
parameter: $V_{GS} \geq 10 \text{ V}$



Safe operating area

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

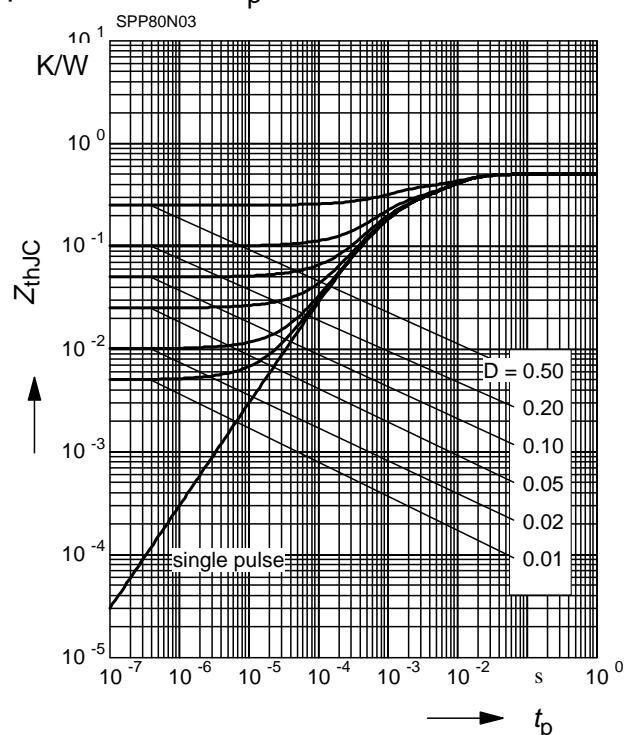
parameter: $D = 0$, $T_C = 25 \text{ °C}$



Transient thermal impedance

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

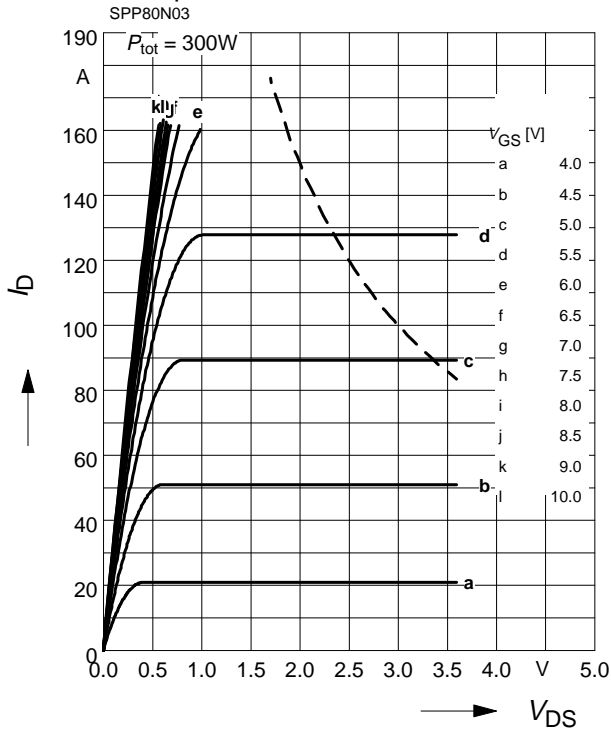
parameter: $D = t_p / T$



Typ. output characteristics

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

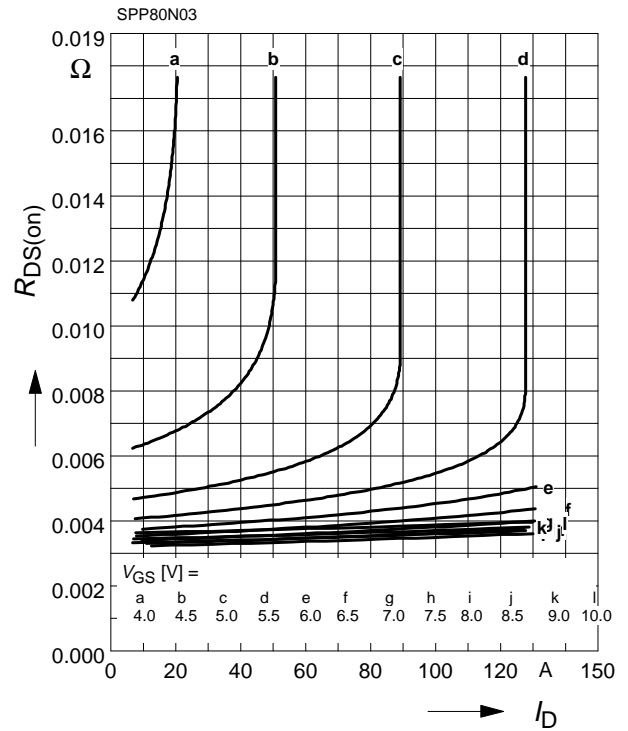
parameter: $t_p = 80 \mu s$



Typ. drain-source-on-resistance

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

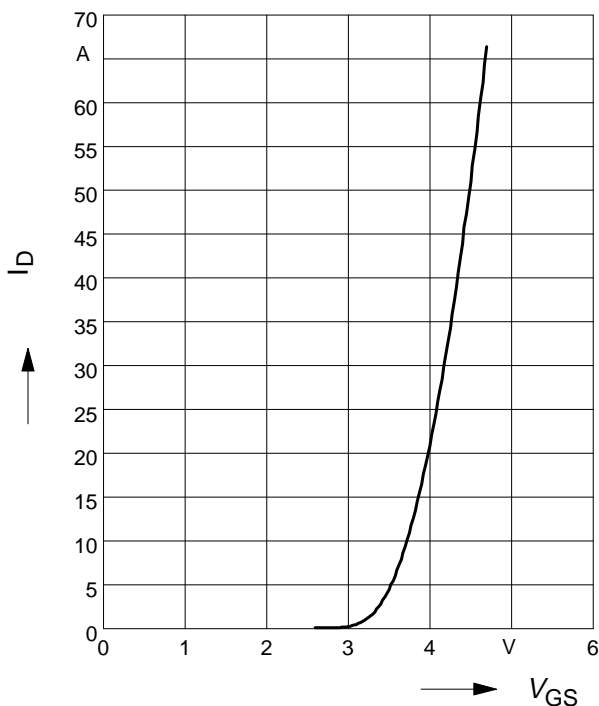
parameter: V_{GS}



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

parameter: $t_p = 80 \mu s$

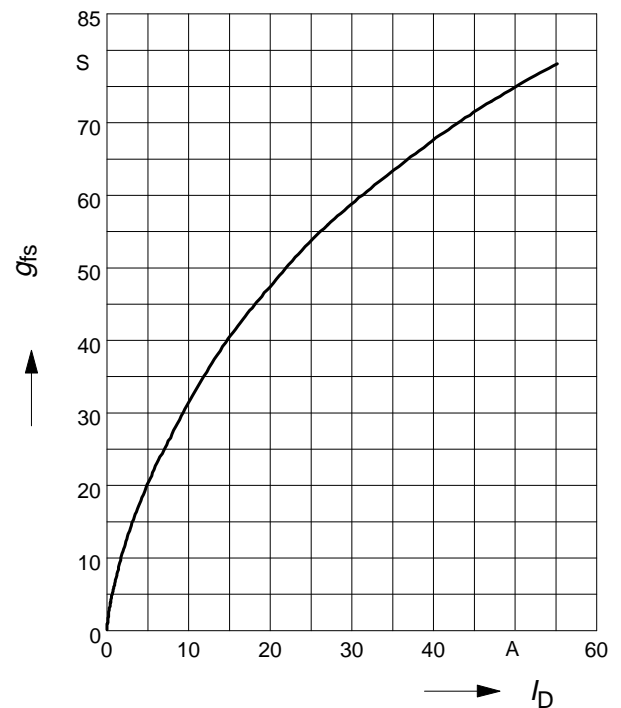
$V_{DS} \geq 2 \times I_D \times R_{DS(on) max}$



Typ. forward transconductance

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

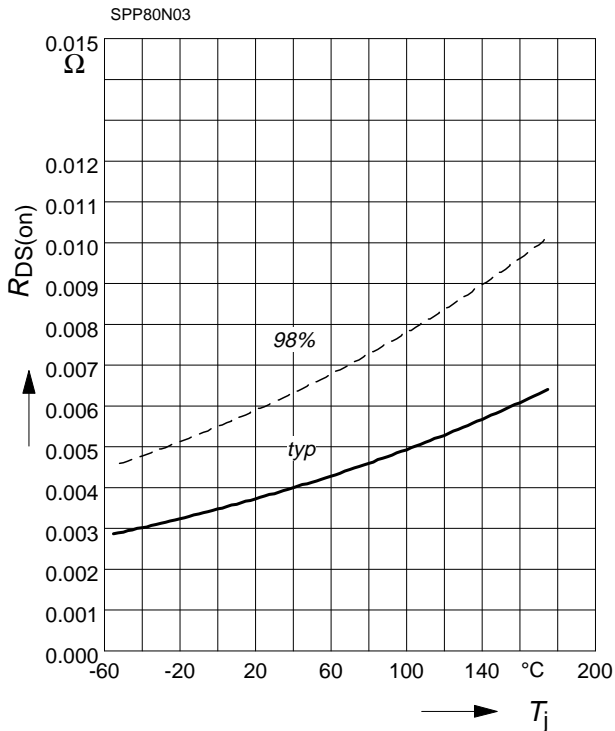
parameter: g_{fs}



Drain-source on-resistance

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

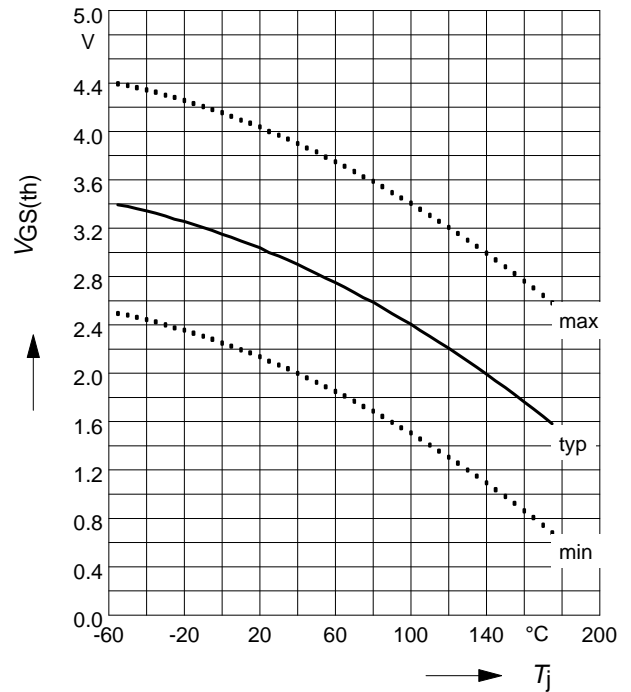
parameter : $I_D = 80 \text{ A}$, $V_{GS} = 10 \text{ V}$



Gate threshold voltage

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

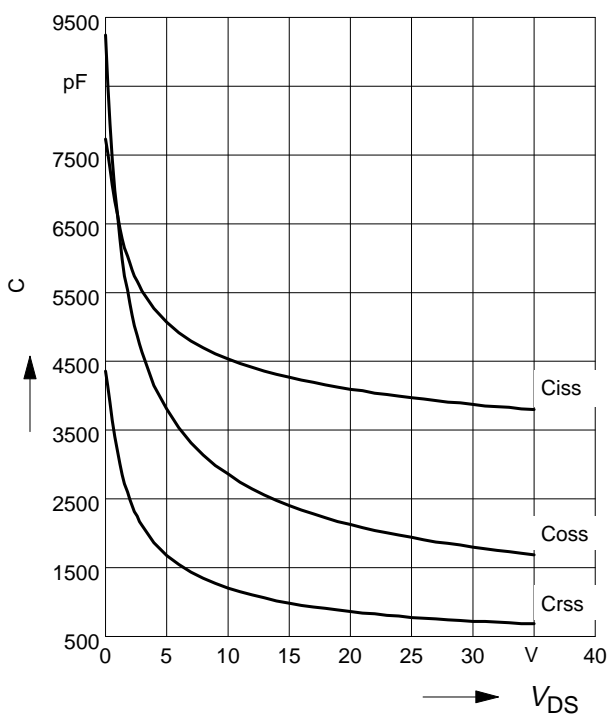
parameter : $V_{GS} = V_{DS}$, $I_D = 240 \mu\text{A}$



Typ. capacitances

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

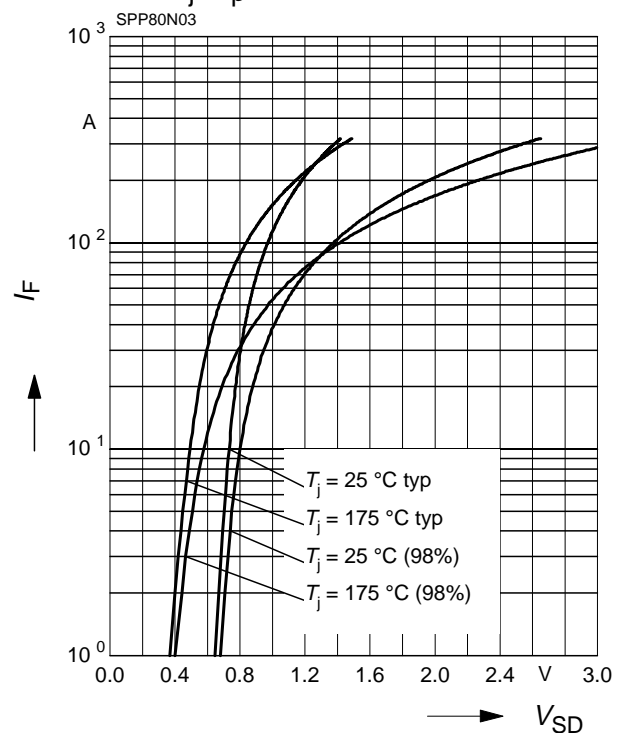
parameter: $V_{GS} = 0 \text{ V}$, $f = 1 \text{ MHz}$



Forward characteristics of reverse diode

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

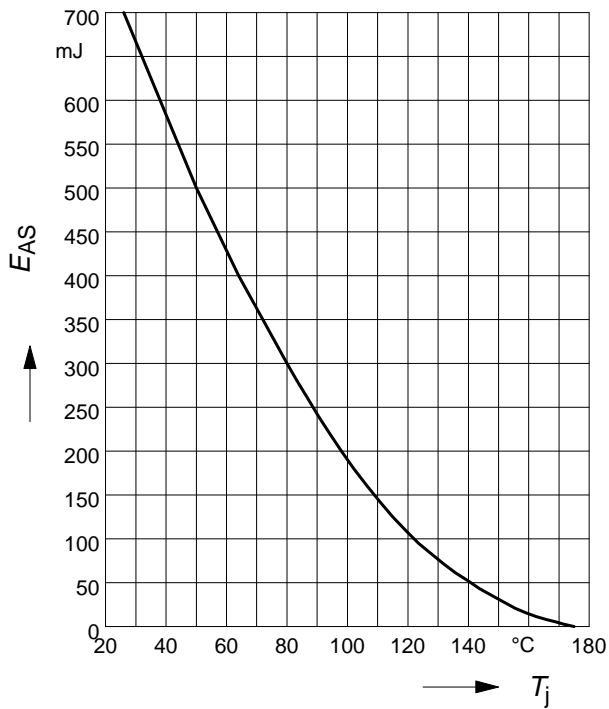
parameter: T_j , $t_p = 80 \mu\text{s}$



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

parameter: $I_D = 80\text{ A}$, $V_{DD} = 25\text{ V}$

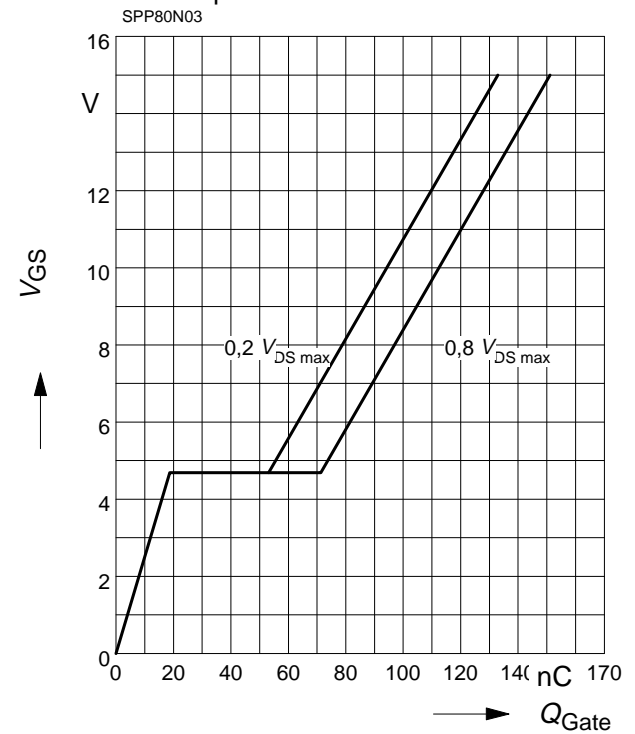
$R_{GS} = 25\ \Omega$



Typ. gate charge

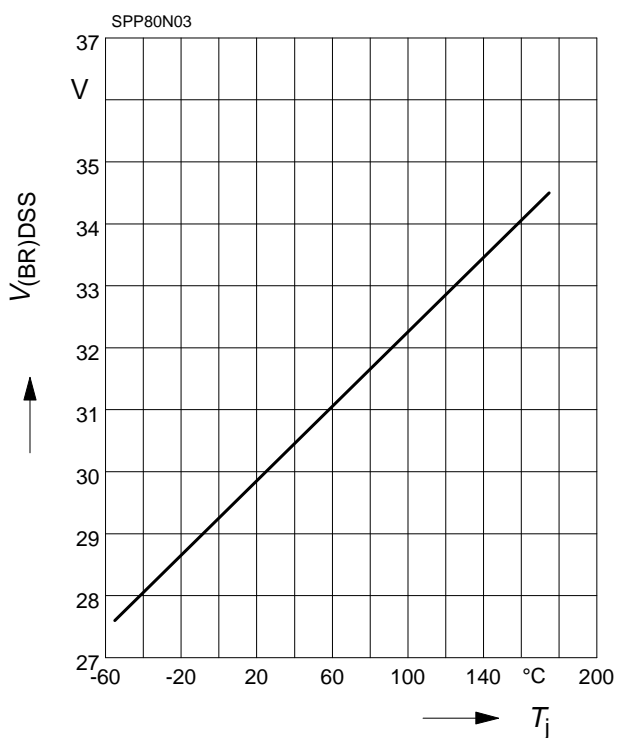
$V_{GS} = f(Q_{Gate})$

parameter: $I_{D\text{ puls}} = 80\text{ A}$



Drain-source breakdown voltage

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



Edition 03 / 1999

**Published by Siemens AG,
Bereich Halbleiter Vertrieb,
Werbung, Balanstraße 73,
81541 München**

© Siemens AG 1997

All Rights Reserved.

Attention please!

As far as patents or other rights of third parties are concerned, liability is only assumed for components, not for applications, processes and circuits implemented within components or assemblies.

The information describes a type of component and shall not be considered as warranted characteristics.

Terms of delivery and rights to change design reserved.

For questions on technology, delivery and prices please contact the Semiconductor Group Offices in Germany or the Siemens Companies and Representatives worldwide (see address list).

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Siemens Office, Semiconductor Group.

Siemens AG is an approved CECC manufacturer.

Packing

Please use the recycling operators known to you. We can also help you - get in touch with your nearest sales office. By agreement we will take packing material back, if it is sorted. You must bear the costs of transport.

For packing material that is returned to us unsorted or which we are not obliged to accept, we shall have to invoice you for any costs incurred.

Components used in life-support devices or systems must be expressly authorized for such purpose!

Critical components¹ of the Semiconductor Group of Siemens AG, may only be used in life-support devices or systems² with the express written approval of the Semiconductor Group of Siemens AG.

1) A critical component is a component used in a life-support device or system whose failure can reasonably be expected to cause the failure of that life-support device or system, or to affect its safety or effectiveness of that device or system.

2) Life support devices or systems are intended (a) to be implanted in the human body, or (b) 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.

This datasheet has been downloaded from:

www.DatasheetCatalog.com

Datasheets for electronic components.