Infineon technologies

SPI100N03S2L-03
SPP100N03S2L-03,SPB100N03S2L-03

OptiMOS® Power-Transistor

Feature

- N-Channel

- Enhancement mode

- Logic Level

- Excellent Gate Charge x $R_{DS(on)}$ product (FOM)

- Superior thermal resistance

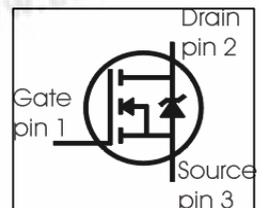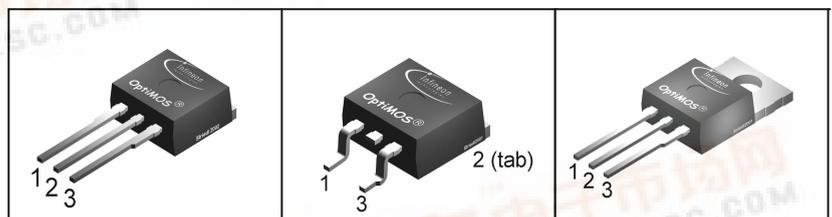- 175°C operating temperature

- Avalanche rated

- dv/dt rated

Product Summary

V_{DS}		30	V
$R_{DS(on)}$ max. SMD version		2.7	mΩ
I_D		100	A

P- TO262 -3-1   P- TO263 -3-2   P- TO220 -3-1

Type	Package	Ordering Code	Marking
SPP100N03S2L-03	P- TO220 -3-1	Q67042-S4056	PN03L03
SPB100N03S2L-03	P- TO263 -3-2	Q67042-S4055	PN03L03
SPI100N03S2L-03	P- TO262 -3-1	Q67042-S4094	PN03L03

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

Parameter	Symbol	Value	Unit
Continuous drain current [1] T_C=25°C	I_D	100 100	A
Pulsed drain current T_C=25°C	$I_{D\ puls}$	400	
Avalanche energy, single pulse I_D=80 , V_{DD}=25V, R_{GS}=25Ω	E_{AS}	810	mJ
Repetitive avalanche energy, limited by T_{jmax} [2]	E_{AR}	30	
Reverse diode dv/dt I_S=100A, V_{DS}=24V, di/dt=200A/µs, T_{jmax}=175°C	dv/dt	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation T_C=25°C	P_{tot}	300	W
Operating and storage temperature	T_j, T_{stg}	-55... +175	°C
IEC climatic category; DIN IEC 68-1		55/175/56	
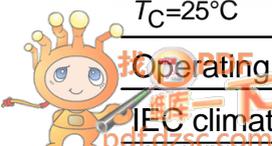
Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - case	R_{thJC}	-	0.3	0.5	K/W
Thermal resistance, junction - ambient, leaded	R_{thJA}	-	-	62	
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	62	
@ 6 cm^2 cooling area [3]		-	-	40	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	-	-	V
V_{GS}=0V, I_D=1mA					
Gate threshold voltage, $V_{GS} = V_{DS}$	$V_{GS(th)}$	1.2	1.6	2	
I_D = 250 µA					
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=30V, V_{GS}=0V, T_j=25°C		-	0.01	1	
V_{DS}=30V, V_{GS}=0V, T_j=125°C		-	1	100	
Gate-source leakage current	I_{GSS}	-	1	100	nA
V_{GS}=20V, V_{DS}=0V					
Drain-source on-state resistance	$R_{DS(on)}$				mΩ
V_{GS}=4.5V, I_D=80A		-	2.8	3.7	
V_{GS}=4.5V, I_D=80A, SMD version		-	2.5	3.4	
Drain-source on-state resistance	$R_{DS(on)}$				
V_{GS}=10V, I_D=80A		-	2.2	3	
V_{GS}=10V, I_D=80A, SMD version		-	1.9	2.7	

[1]Current limited by bondwire ; with an R_{thJC} = 0.5K/W the chip is able to carry I_D= 245A at 25°C, for detailed information see app.-note ANPS071E available at *www.infineon.com/optimos*

[2]Defined by design. Not subject to production test.

[3]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

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=100A	81	192	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	6160	8180	pF
Output capacitance	C_{oss}		-	2400	3200	
Reverse transfer capacitance	C_{rss}		-	540	810	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15V, V_{GS}=10V, I_D=100A, R_G=1.1Ω	-	15	23	ns
Rise time	t_r		-	67	100	
Turn-off delay time	$t_{d(off)}$		-	83	125	
Fall time	t_f		-	65	98	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=24V, I_D=100A	-	19	26	nC
Gate to drain charge	Q_{gd}		-	57	86	
Gate charge total	Q_g	V_{DD}=24V, I_D=100A, V_{GS}=0 to 10V	-	166	220	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=24V, I_D=100A	-	3.1	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_C=25°C	-	-	100	A
Inv. diode direct current, pulsed	I_{SM}		-	-	400	
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, I_F=80A	-	0.9	1.3	V
Reverse recovery time	t_{rr}	V_R=15V, I_F=I_S, di_F/dt=100A/µs	-	86	108	ns
Reverse recovery charge	Q_{rr}		-	100	125	nC

1 Power dissipation

$P_{tot} = f(T_C)$

parameter: $V_{GS} \geq 4$ V

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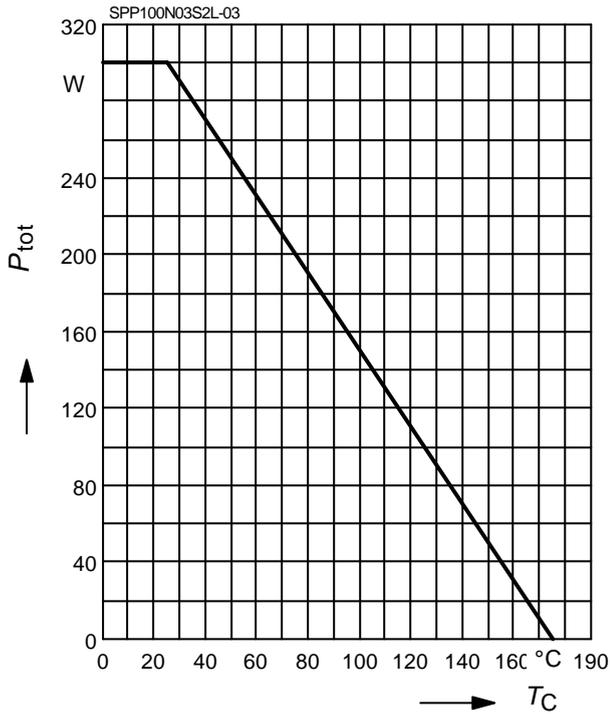
2 Drain current

$I_D = f(T_C)$

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

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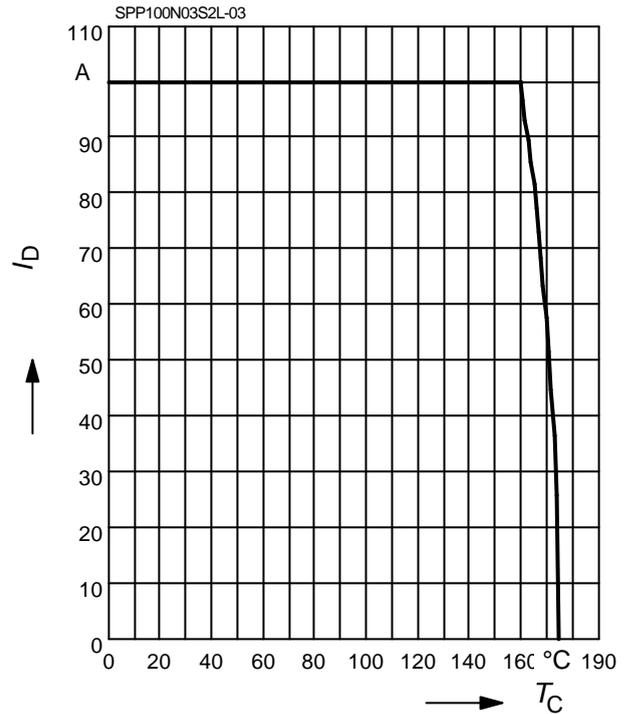
3 Safe operating area

$I_D = f(V_{DS})$

parameter : $D = 0$, $T_C = 25$ °C

SPP100N03S2L-03
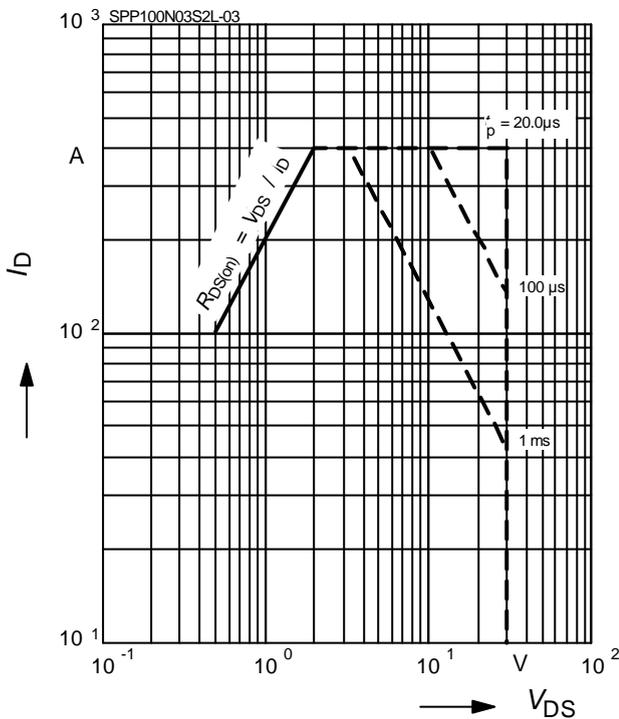
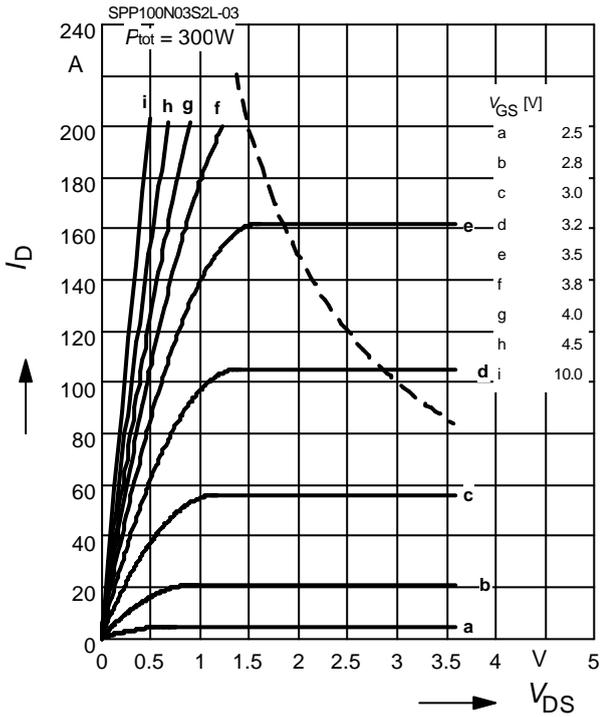## 4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

parameter : $D = t_p/T$

SPP100N03S2L-03
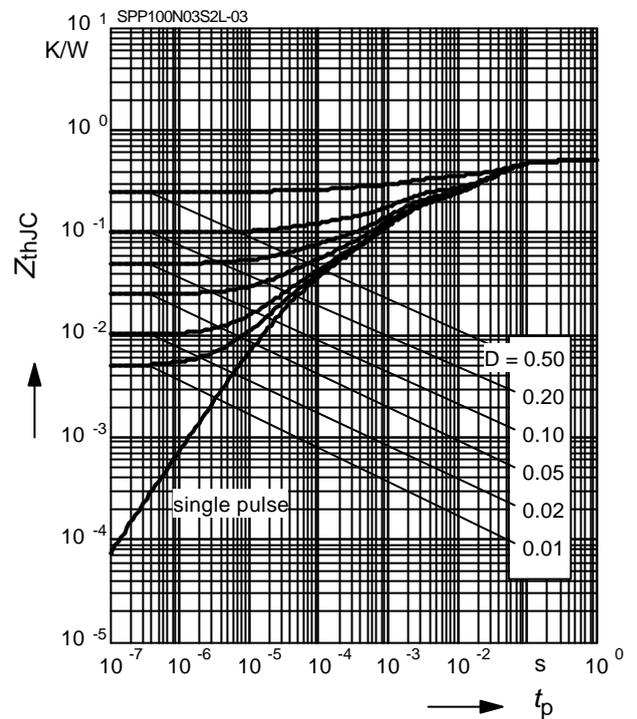
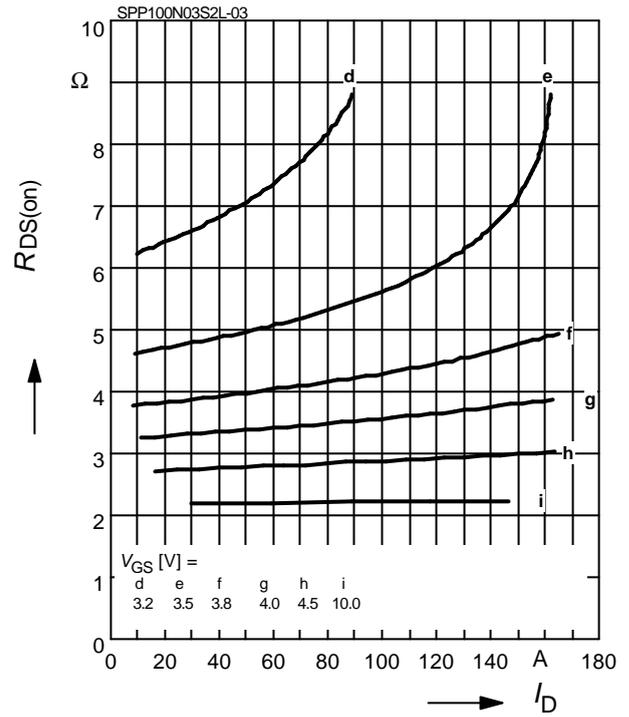## 5 Typ. output characteristic

$I_D = f(V_{DS})$; T_j=25°C

parameter: t_p = 80 µs

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	V_{GS} [V]
a	2.5
b	2.8
c	3.0
d	3.2
e	3.5
f	3.8
g	4.0
h	4.5
i	10.0

6 Typ. drain-source on resistance

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

parameter: V_{GS}

SPP100N03S2L-03

V_{GS} [V] =					
d	e	f	g	h	i
3.2	3.5	3.8	4.0	4.5	10.0

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 µs
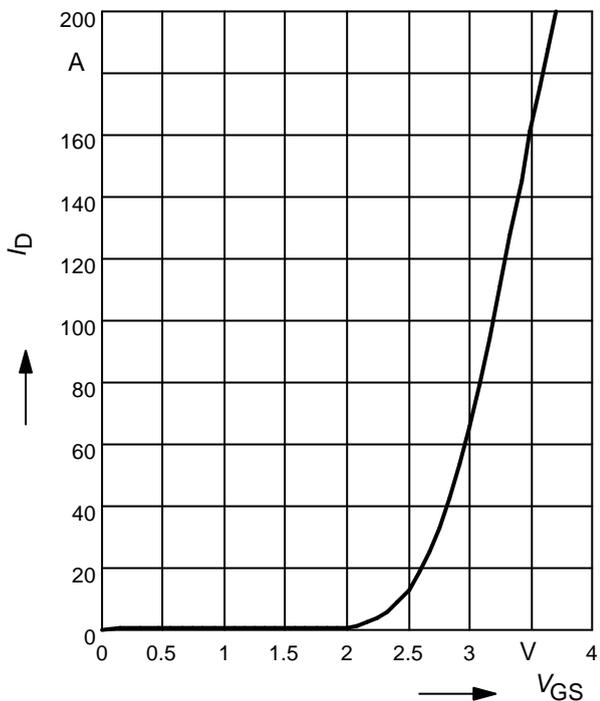
8 Typ. forward transconductance

$g_{fs} = f(I_D)$; T_j=25°C

parameter: g_{fs}
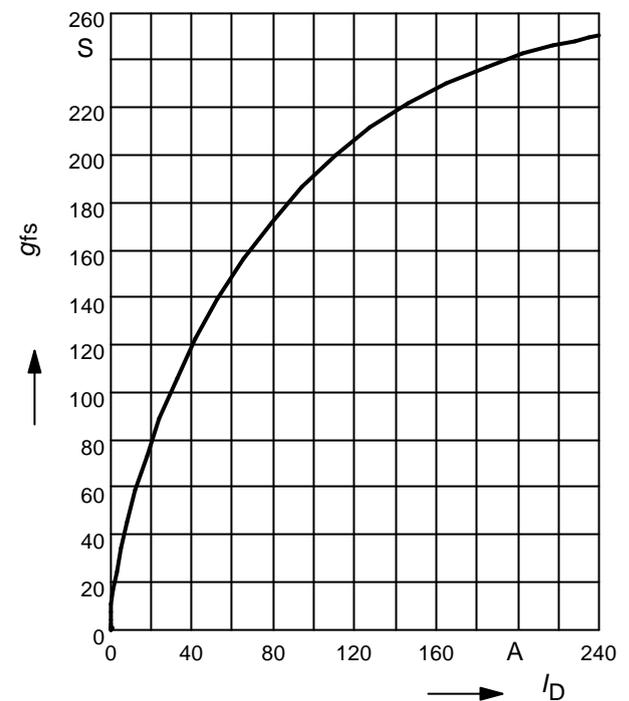
9 Drain-source on-state resistance

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

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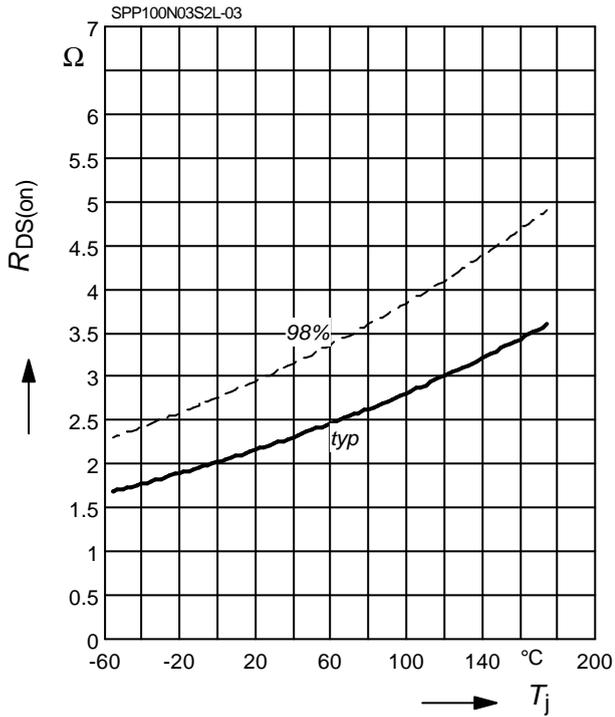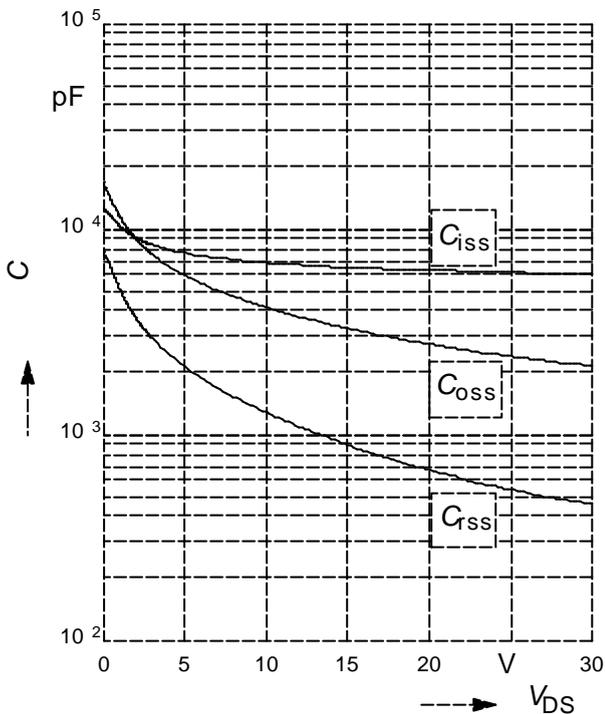

10 Typ. gate threshold voltage

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

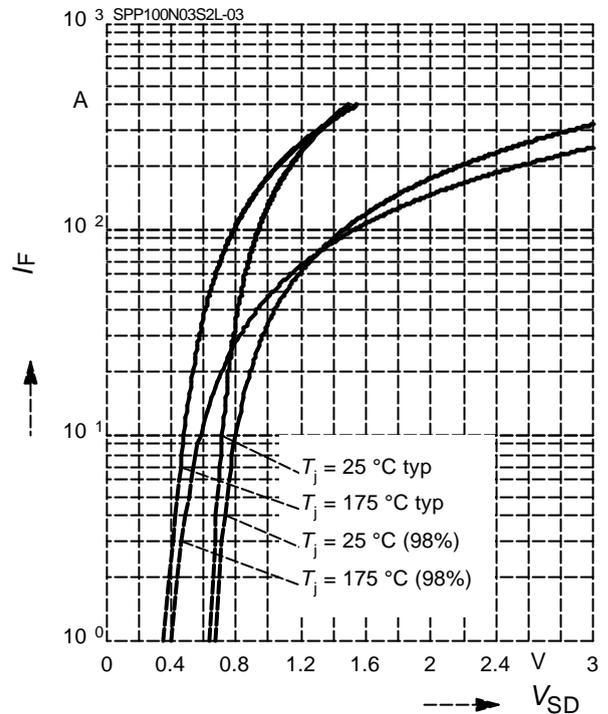parameter: $V_{GS} = V_{DS}$
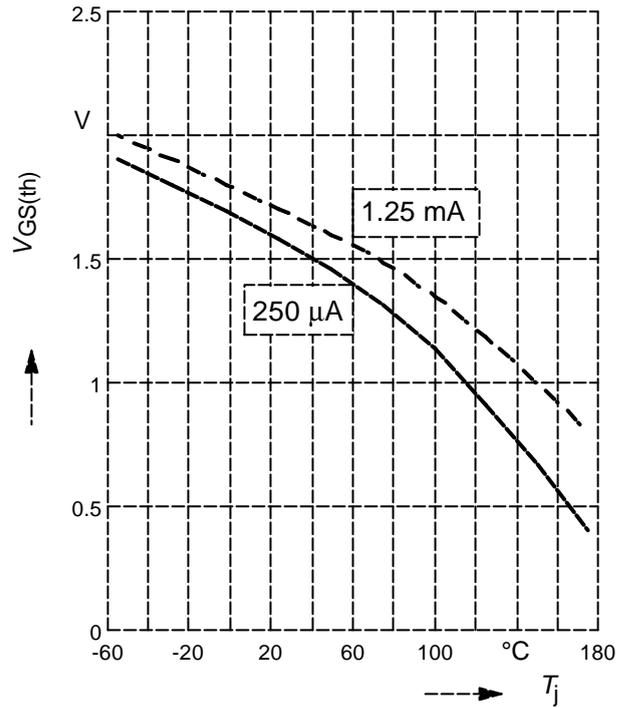
11 Typ. capacitances

$C = f(V_{DS})$

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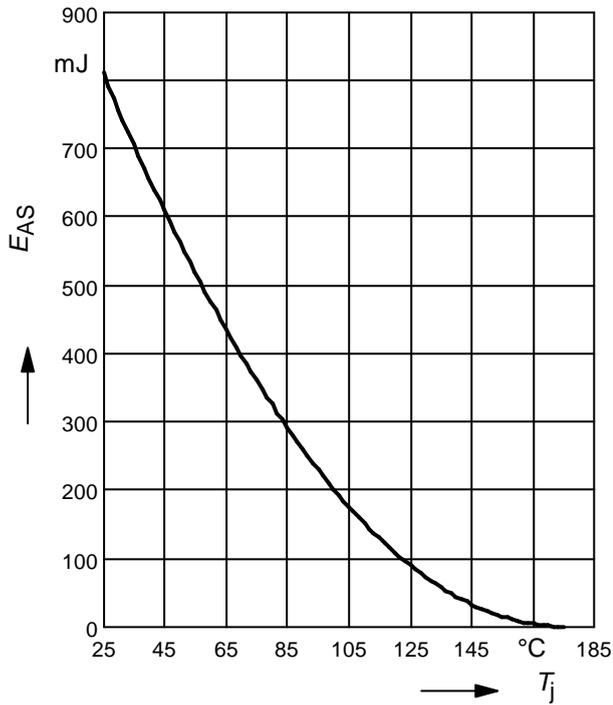

12 Forward character. of reverse diode

$I_F = f(V_{SD})$

parameter: T_j, tp = 80 µs
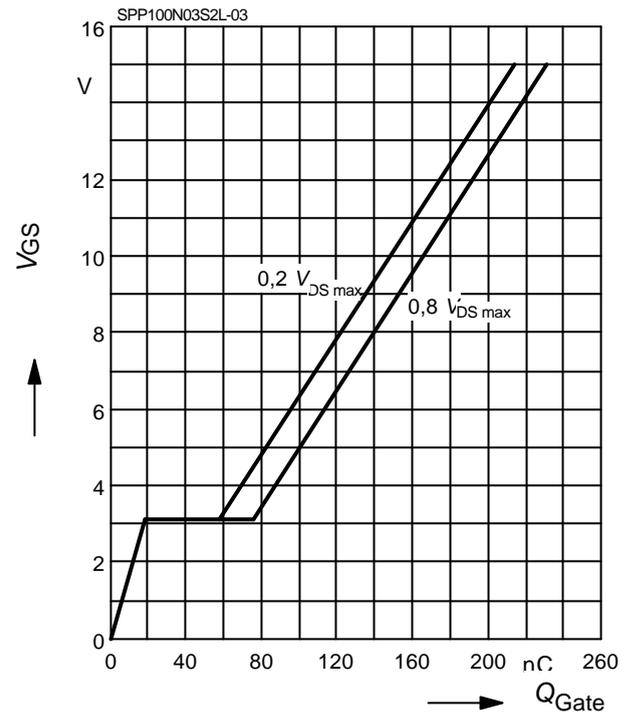
13 Typ. avalanche energy

$E_{AS} = f(T_j)$

par.: $I_D = 80$, $V_{DD} = 25$ V, $R_{GS} = 25$ Ω
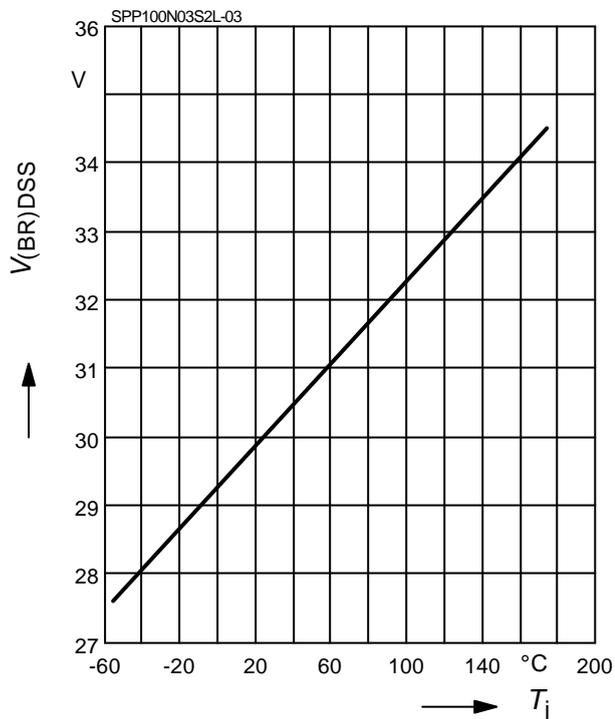

14 Typ. gate charge

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

parameter: $I_D = 100$ A pulsed

15 Drain-source breakdown voltage

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

parameter: $I_D = 10$ mA

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 Reprensatives 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.

Further information
Please notice that the part number is BSPP100N03S2L-03, BSPB100N03S2L-03 and BSPI100N03S2L-03, for simplicity the device is referred to by the term SPP100N03S2L-03, SPB100N03S2L-03 and SPI100N03S2L-03 throughout this documentation