SIPMOS® Small-Signal-Transistor

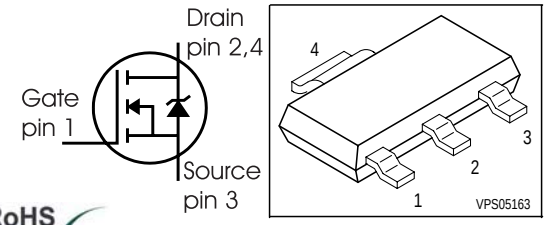
Feature

- N-Channel
- Enhancement mode
- Logic Level
- d*v*/d*t* rated
- Pb-free lead plating; RoHS compliant
- 2.8V rated
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	240	V
$R_{DS(on)}$	6	Ω
I_D	0.35	A

PG-SOT223



Halogen-Free AEC Qualified RoHS

Type	Package	Tape and Reel Information	Marking	Packaging
BSP88	PG-SOT223	H6327: 1000 pcs/reel	BSP88	Non dry

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

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_A=25°C		0.35	
T_A=70°C		0.28	
Pulsed drain current	$I_{D\ puls}$	1.4	
T_A=25°C			
Reverse diode d*v*/d*t*	d*v*/d*t*	6	kV/µs
I_S=0.35A, V_{DS}=192V, d*i*/d*t*=200A/µs, T_{jmax}=150°C			
Gate source voltage	V_{GS}	±20	V
ESD class (JESD22-A114-HBM)		1A (>250V, <500V)	
Power dissipation	P_{tot}	1.8	W
T_A=25°C			
Operating and storage temperature	T_j , T_{stg}	-55... +150	°C
IEC climatic category; DIN IEC 68-1		55/150/56	

Thermal Characteristics

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Characteristics					
Thermal resistance, junction - soldering point (Pin 4)	R_{thJS}	-	-	25	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint		-	-	115	
@ 6 cm^2 cooling area [1)]		-	-	70	

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

Parameter	Symbol	Values			Unit
		min.	typ.	max.	
Static Characteristics					
Drain-source breakdown voltage V_{GS}=0, I_D=250µA	$V_{(BR)DSS}$	240	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=108µA	$V_{GS(th)}$	0.6	1	1.4	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=240V, V_{GS}=0, T_j=25°C		-	-	0.1	
V_{DS}=240V, V_{GS}=0, T_j=150°C		-	-	10	
Gate-source leakage current V_{GS}=20V, V_{DS}=0	I_{GSS}	-	1	10	nA
Drain-source on-state resistance V_{GS}=2.8V, I_D=0.014A	$R_{DS(on)}$	-	4.9	15	Ω
Drain-source on-state resistance V_{GS}=4.5V, I_D=0.32A	$R_{DS(on)}$	-	4.6	7.5	
Drain-source on-state resistance V_{GS}=10V, I_D=0.35A	$R_{DS(on)}$	-	4	6	

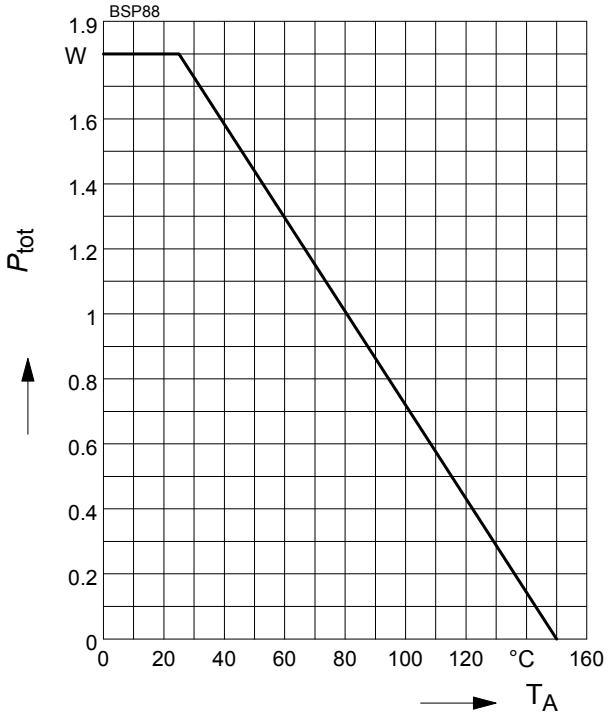
[1]Device on 40mm*40mm*1.5mm epoxy PCB FR4 with 6cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical without blown air.

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=0.28A	0.19	0.38	-	S
Input capacitance	C_{iss}	V_{GS}=0, V_{DS}=25V, f=1MHz	-	76	95	pF
Output capacitance	C_{oss}		-	12	15	
Reverse transfer capacitance	C_{rss}		-	6	9	
Turn-on delay time	$t_{d(on)}$	V_{DD}=120V, V_{GS}=4.5V, I_D=0.35A, R_G=15Ω	-	3.6	5.4	ns
Rise time	t_r		-	3.5	5.2	
Turn-off delay time	$t_{d(off)}$		-	17.9	26.8	
Fall time	t_f		-	18.9	28.3	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=192V, I_D=0.35A	-	0.2	0.3	nC
Gate to drain charge	Q_{gd}		-	2	3	
Gate charge total	Q_g	V_{DD}=192V, I_D=0.35A, V_{GS}=0 to 10V	-	4.5	6.8	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=192V, I_D = 0.35 A	-	2.7	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	0.35	A
Inv. diode direct current, pulsed	I_{SM}		-	-	1.4	
Inverse diode forward voltage	V_{SD}	V_{GS}=0, I_F = I_S	-	0.86	1.2	V
Reverse recovery time	t_{rr}	V_R=120V, I_F=I_S, di_F/dt=100A/µs	-	66	82	ns
Reverse recovery charge	Q_{rr}		-	119	149	nC

1 Power dissipation

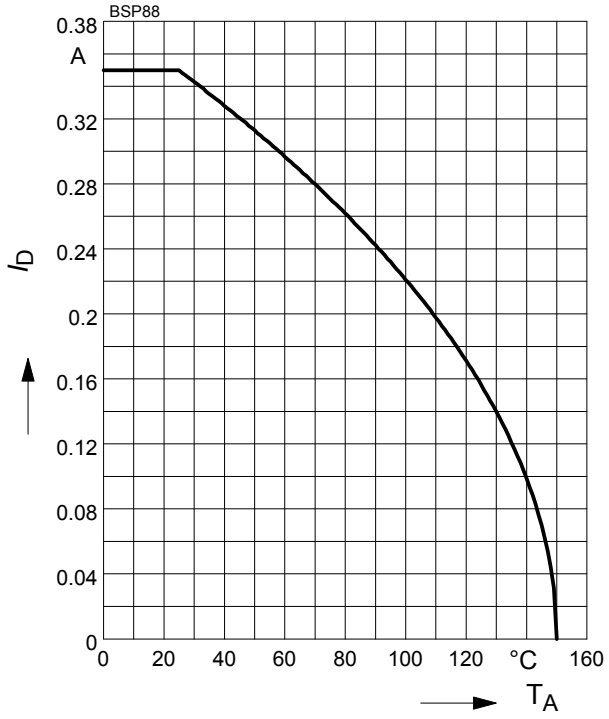
$P_{tot} = f(T_A)$



2 Drain current

$I_D = f(T_A)$

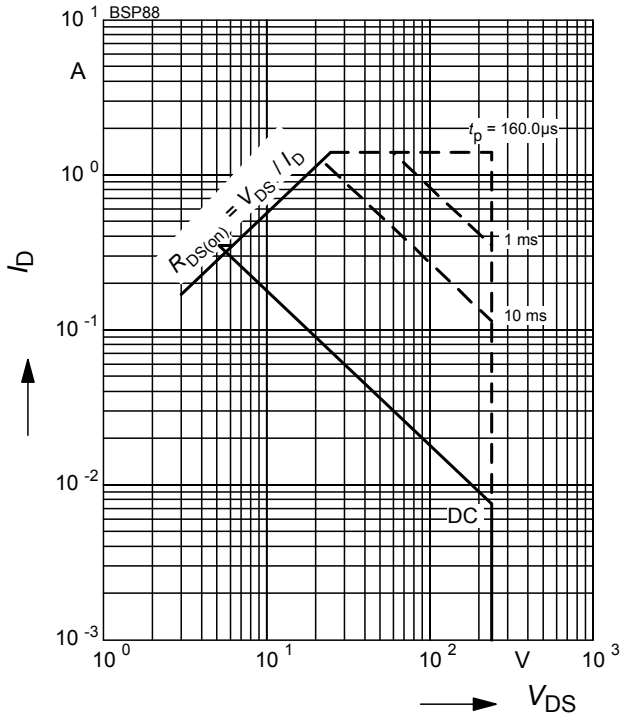
parameter: $V_{GS} \geq 10$ V



3 Safe operating area

$I_D = f(V_{DS})$

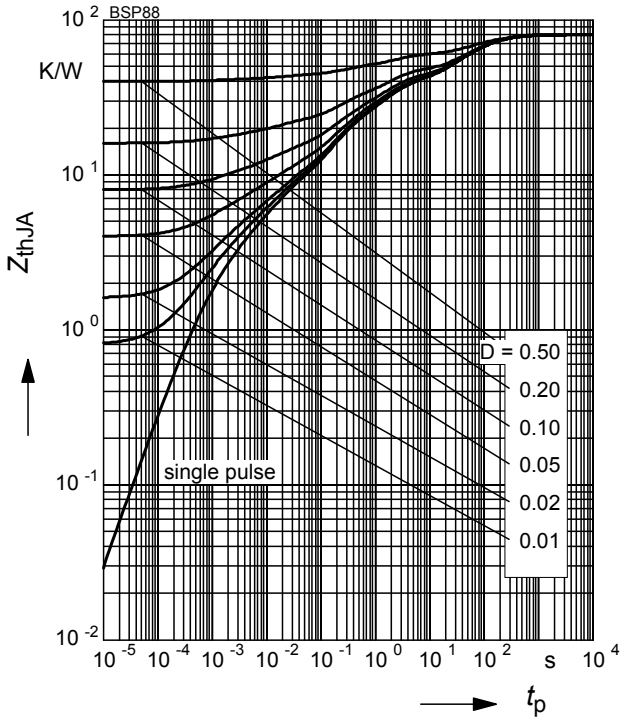
parameter : $D = 0$, $T_A = 25$ °C



4 Transient thermal impedance

$Z_{thJA} = f(t_p)$

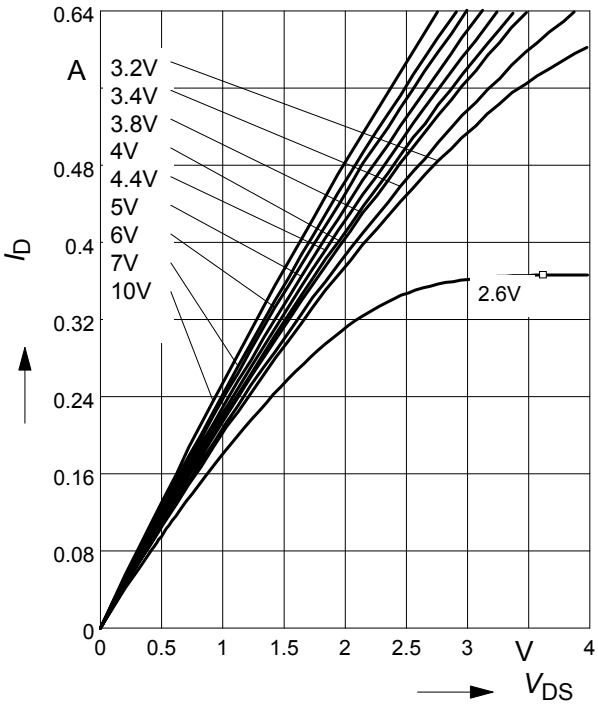
parameter : $D = t_p/T$



5 Typ. output characteristic

$I_D = f(V_{DS})$

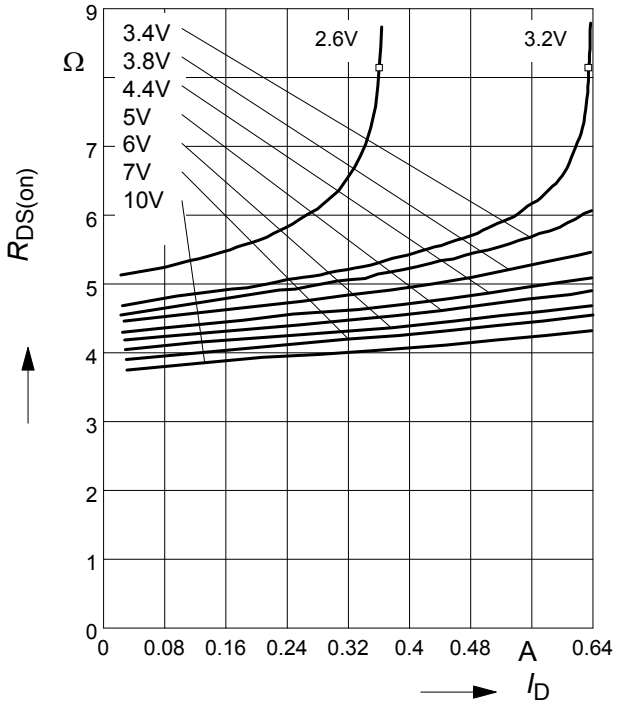
parameter: T_j = 25 °C, V_{GS}



6 Typ. drain-source on resistance

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

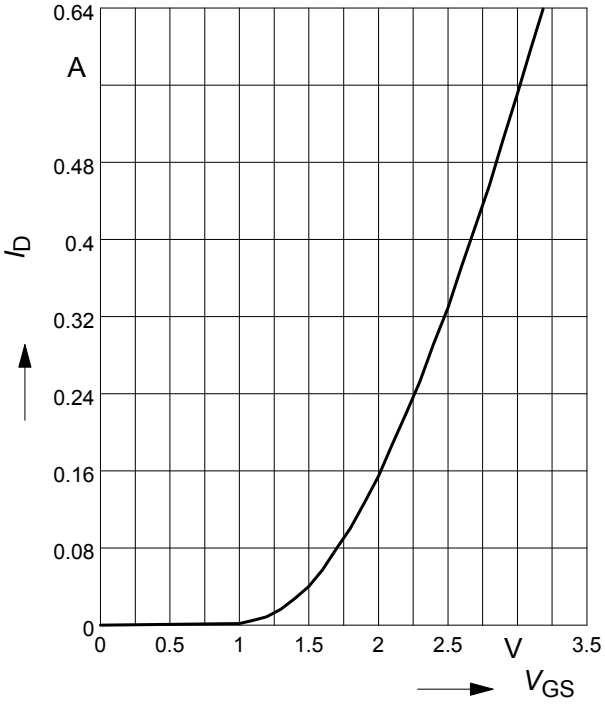
parameter: T_j = 25 °C, V_{GS}



7 Typ. transfer characteristics

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

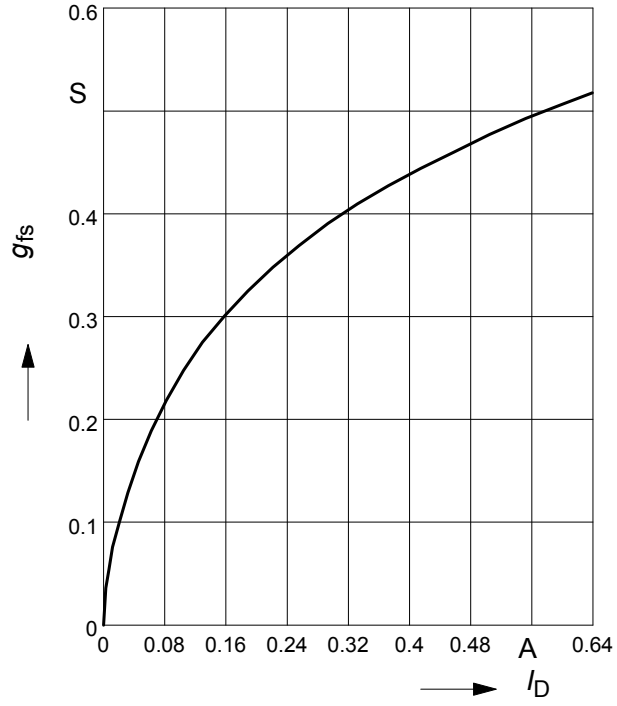
parameter: T_j = 25 °C



8 Typ. forward transconductance

$g_{fs} = f(I_D)$

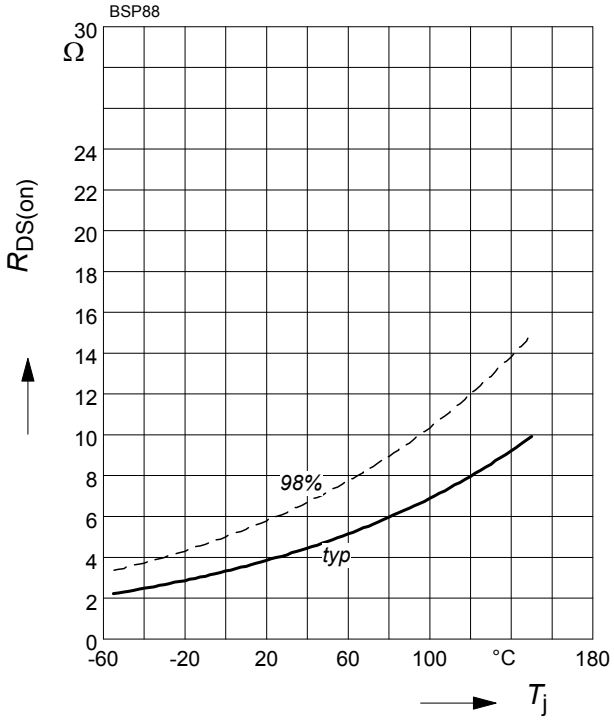
parameter: T_j = 25 °C



9 Drain-source on-state resistance

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

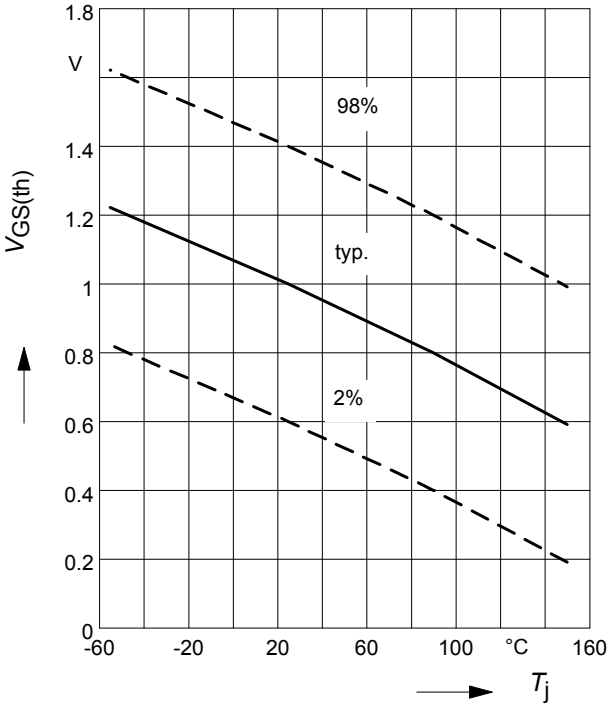
parameter : I_D = 0.35 A, V_{GS} = 10 V



10 Typ. gate threshold voltage

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

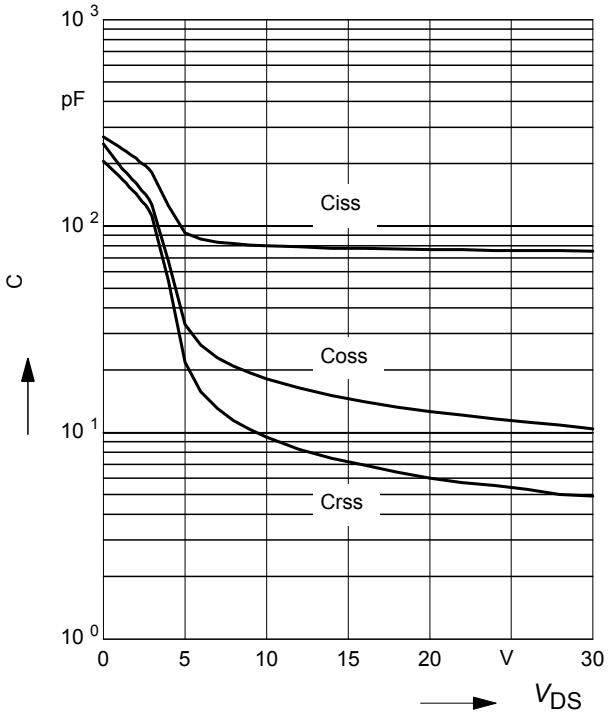
parameter: $V_{GS} = V_{DS}$; I_D = 108 µA



11 Typ. capacitances

$C = f(V_{DS})$

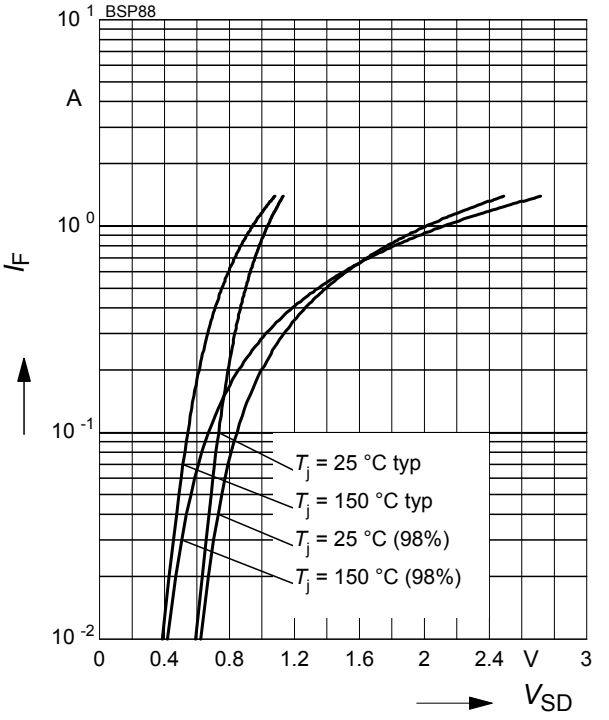
parameter: V_{GS}=0, f=1 MHz, T_j = 25 °C



12 Forward character. of reverse diode

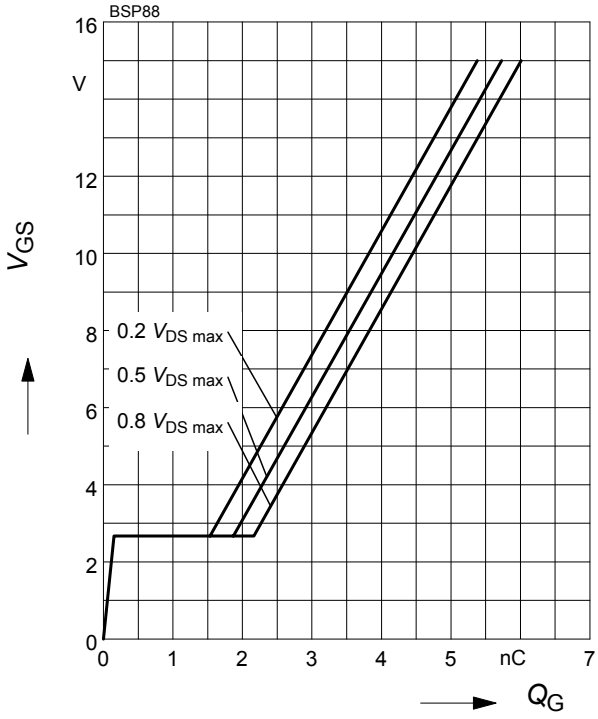
$I_F = f(V_{SD})$

parameter: T_j



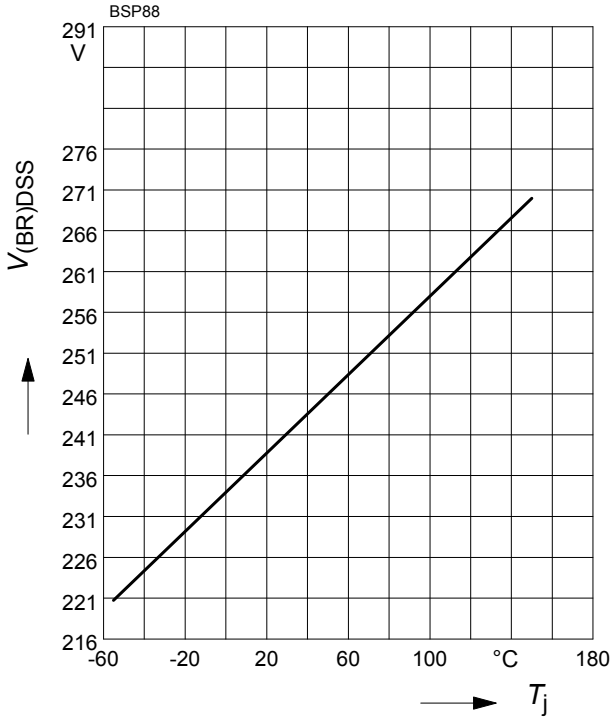
13 Typ. gate charge

$V_{GS} = f\ (Q_G)$; parameter: V_{DS} ,
$I_D = 0.35$ A pulsed, $T_j = 25$ °C



14 Drain-source breakdown voltage

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



Published by
Infineon Technologies AG
81726 Munich, Germany
© 2008 Infineon Technologies AG
All Rights Reserved.

Legal Disclaimer
The information given in this document shall in no event be regarded as a guarantee of conditions or characteristics. With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation, warranties of non-infringement of intellectual property rights of any third party.

Information
For further information on technology, delivery terms and conditions and prices, please contact the nearest Infineon Technologies Office (www.infineon.com).

Warnings
Due to technical requirements, components may contain dangerous substances. For information on the types in question, please contact the nearest Infineon Technologies Office.
Infineon Technologies components may be used in life-support devices or systems only 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.