THE DATASHEET OF

BSO604NS2XUMA1

BSO604NS2

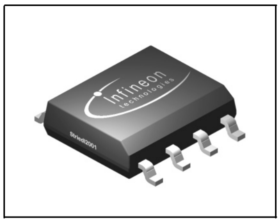
OptiMOS® Power-Transistor

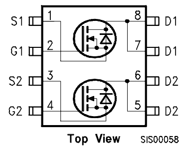
Feature

- Dual N-Channel
- Enhancement mode
- Logic Level
- 150 °C operating temperature
- Avalanche rated
- d*v*/d*t* rated
- Green Product (RoHS compliant)
- AEC Qualified

Product Summary

V_{DS}	55	V
$R_{DS(on)}$	35	mΩ
I_D	5	A





Type	Package	Ordering Code	Marking
BSO604NS2	PG-DSO-8 -25	On Request	2N604L

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

Parameter	Symbol	Value	Unit
Continuous drain current	I_D		A
T_A=25°C, *one channel active*		5	
T_A=70°C, *one channel active*		4	
Pulsed drain current, *one channel active* T_A=25°C	$I_{D\ puls}$	20	
Avalanche energy, single pulse I_D=5 A , V_{DD}=25V, R_{GS}=25Ω	E_{AS}	90	mJ
Reverse diode d*v*/d*t* I_S=5A, V_{DS}=44V, d*i*/d*t*=200A/µs, T_{jmax}=150°C	d*v*/d*t*	6	kV/µs
Gate source voltage	V_{GS}	±20	V
Power dissipation, *one channel active* T_A=25°C	P_{tot}	2	W
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	R_{thJS}	-	34	50	K/W
SMD version, device on PCB:	R_{thJA}				
@ min. footprint ; t ≤ 10 s		-	-	100	
@ 6 cm^2 cooling area [1)] ; t ≤10 s		-	-	62.5	

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}=0V, I_D=1mA	$V_{(BR)DSS}$	55	-	-	V
Gate threshold voltage, V_{GS} = V_{DS} I_D=30µA	$V_{GS(th)}$	1.2	1.6	2	
Zero gate voltage drain current	I_{DSS}				µA
V_{DS}=55V, V_{GS}=0V, T_j=25°C		-	0.01	1	
V_{DS}=55V, V_{GS}=0V, T_j=150°C		-	1	100	
Gate-source leakage current V_{GS}=20V, V_{DS}=0V	I_{GSS}	-	1	100	nA
Drain-source on-state resistance V_{GS}=4.5V, I_D=2.5A	$R_{DS(on)}$	-	38	44	mΩ
Drain-source on-state resistance V_{GS}=10V, I_D=2.5A	$R_{DS(on)}$	-	31	35	

[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.

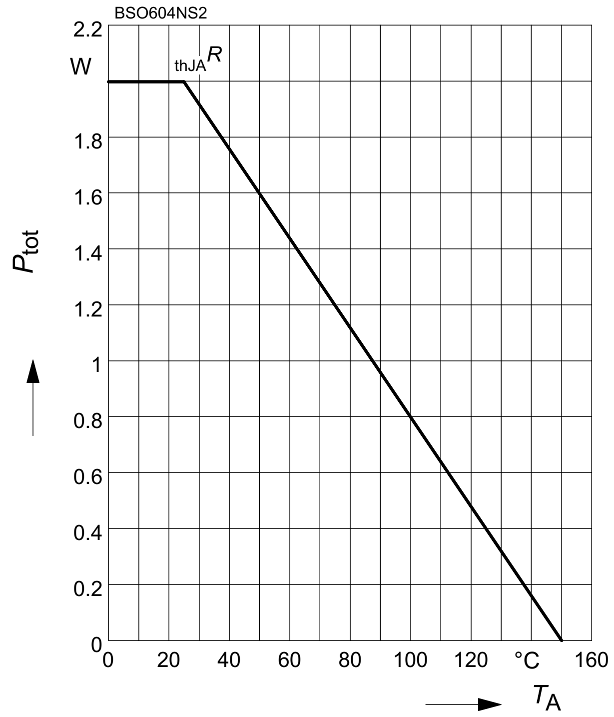
Electrical Characteristics

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic Characteristics						
Transconductance	g_{fs}	$V_{DS} \geq 2 * I_D * R_{DS(on)max}$=0.4V, I_D=5A	6.7	13.4	-	S
Input capacitance	C_{iss}	V_{GS}=0V, V_{DS}=25V, f=1MHz	-	656	870	pF
Output capacitance	C_{oss}		-	154	205	
Reverse transfer capacitance	C_{rss}		-	49	75	
Turn-on delay time	$t_{d(on)}$	V_{DD}=27.5V, V_{GS}=4.5V, I_D=5A, R_G=75Ω	-	9	14	ns
Rise time	t_r		-	8	13	
Turn-off delay time	$t_{d(off)}$		-	52	78	
Fall time	t_f		-	8	12	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=44V, I_D=5A	-	2	3	nC
Gate to drain charge	Q_{gd}		-	6.6	10	
Gate charge total	Q_g	V_{DD}=44V, I_D=5A, V_{GS}=0 to 10V	-	19.7	26	
Gate plateau voltage	$V_{(plateau)}$	V_{DD}=44V, I_D=5A	-	2.9	-	V
Reverse Diode						
Inverse diode continuous forward current	I_S	T_A=25°C	-	-	5	A
Inv. diode direct current, pulsed	I_{SM}		-	-	20	
Inverse diode forward voltage	V_{SD}	V_{GS}=0V, I_F=5A	-	0.9	1.3	V
Reverse recovery time	t_{rr}	V_R=27.5V, I_F=I_S, di_F/dt=100A/µs	-	32	40	ns
Reverse recovery charge	Q_{rr}		-	34	43	nC

1 Power dissipation

$P_{tot} = f(T_A)$

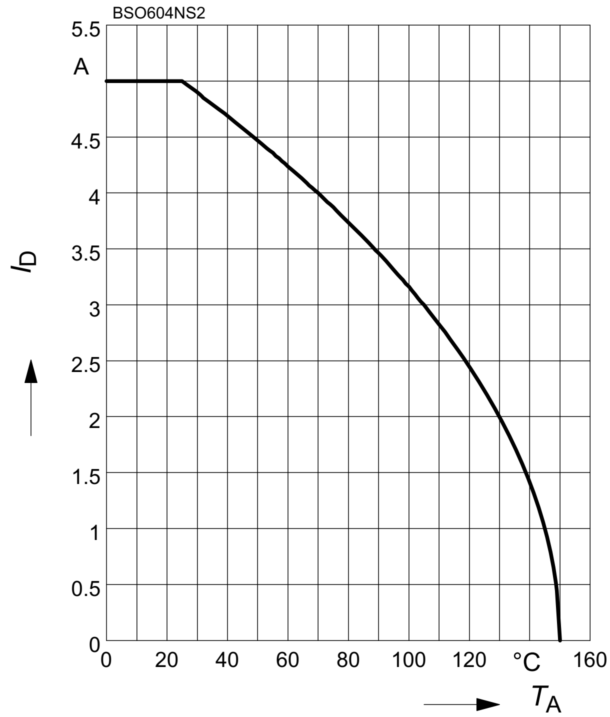
parameter: $V_{GS} \geq 6$ V



2 Drain current

$I_D = f(T_A)$

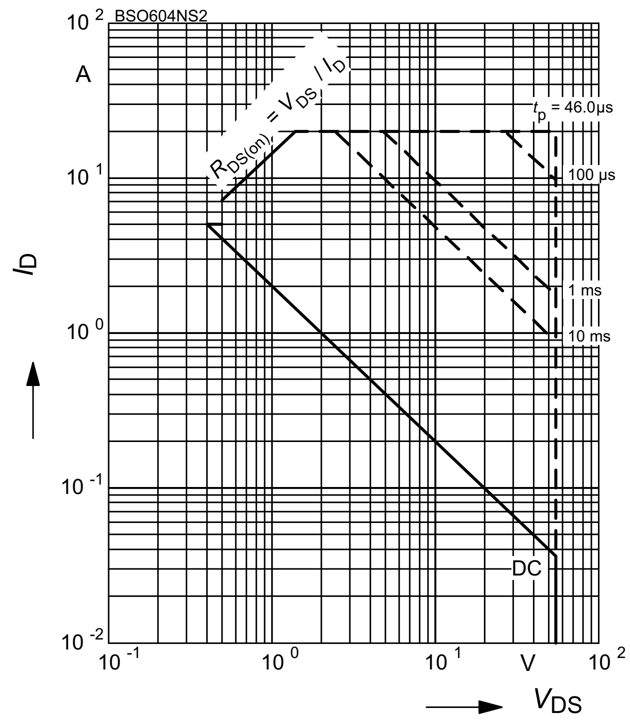
parameter: $V_{GS} \geq 10$ V



3 Safe operating area

$I_D = f(V_{DS})$

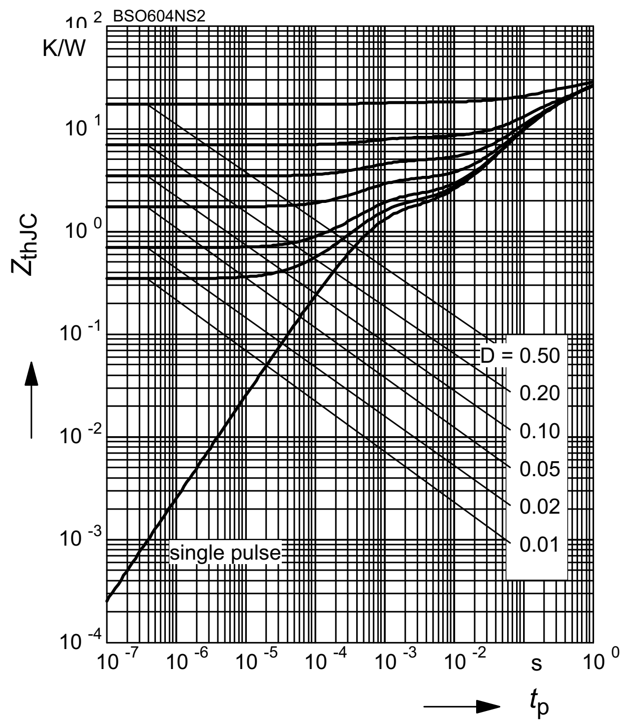
parameter : $D = 0$, $T_A = 25$ °C



4 Max. transient thermal impedance

$Z_{thJC} = f(t_p)$

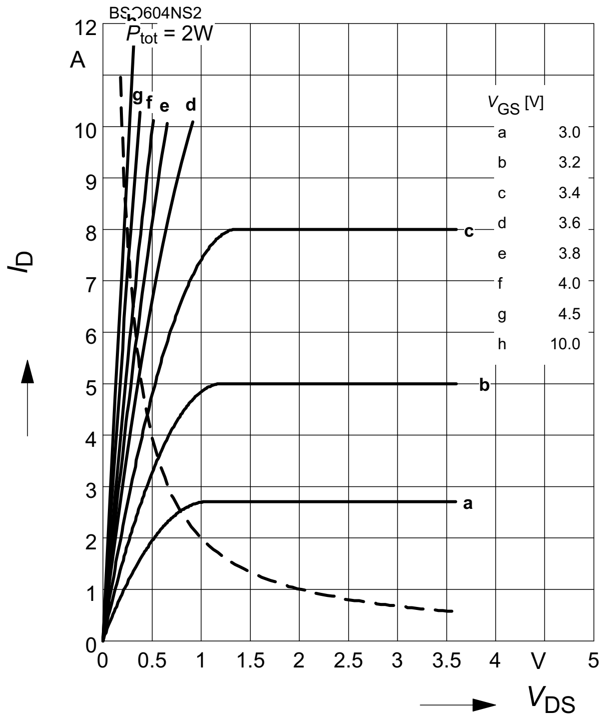
parameter : $D = t_p/T$



5 Typ. output characteristic

$I_D = f(V_{DS})$; T_j=25°C

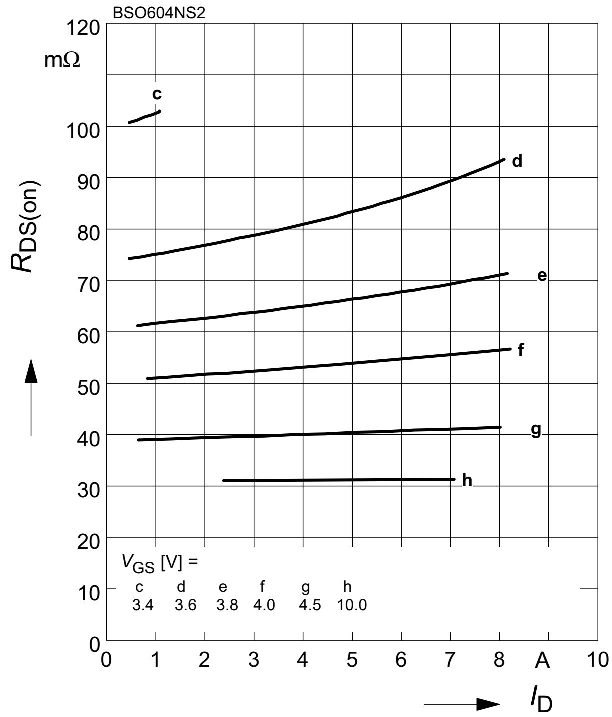
parameter: t_p = 80 µs



6 Typ. drain-source on resistance

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

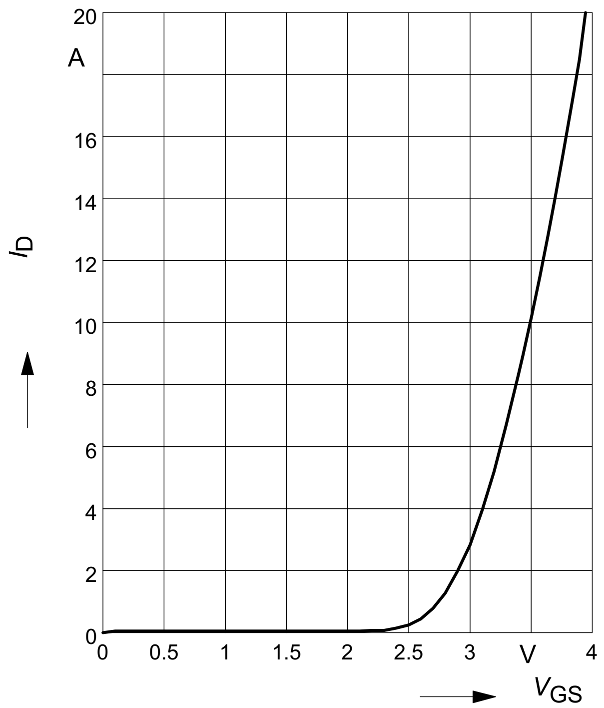
parameter: V_{GS}



7 Typ. transfer characteristics

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

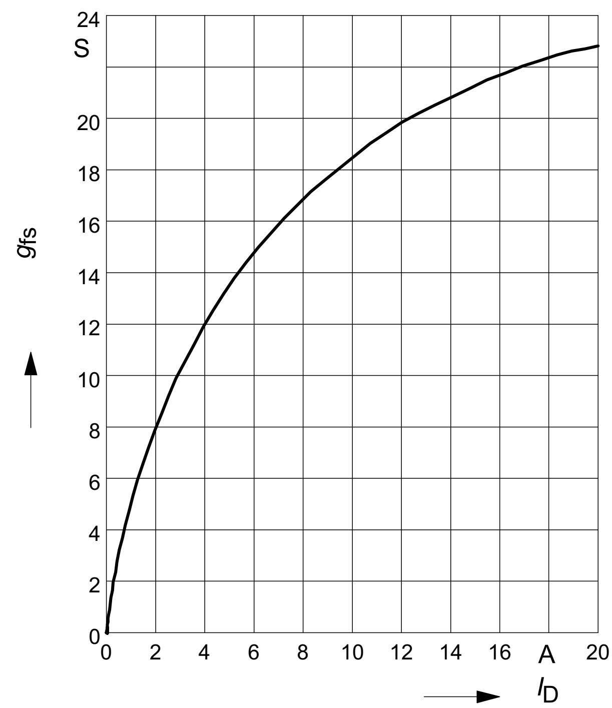
parameter: t_p = 80 µs



8 Typ. forward transconductance

$g_{fs} = f(I_D)$; T_j=25°C

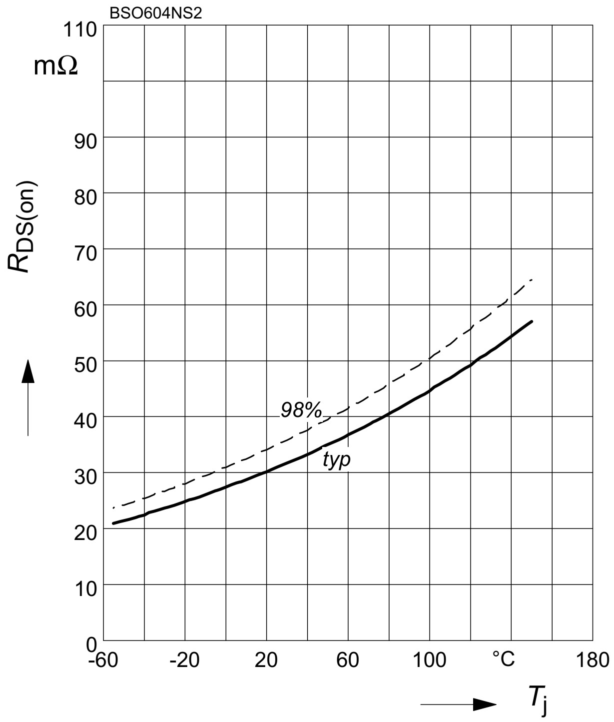
parameter: g_{fs}



9 Drain-source on-state resistance

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

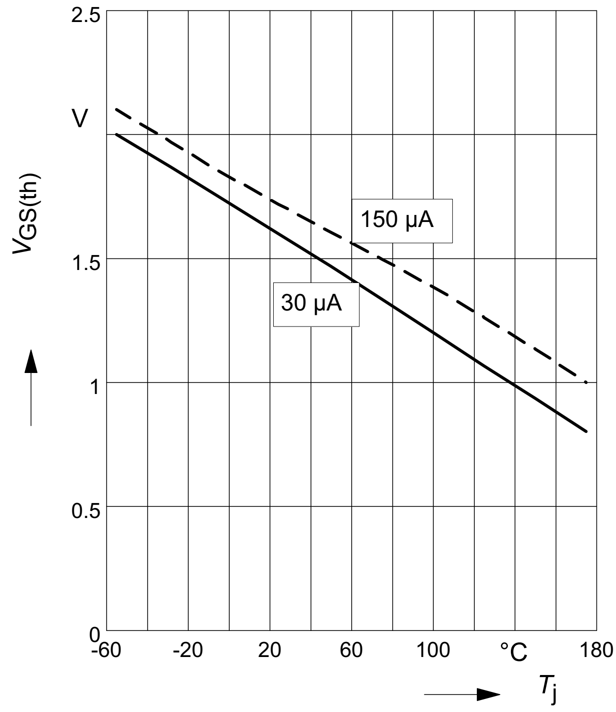
parameter : I_D = 2.5 A, V_{GS} = 10 V



10 Typ. gate threshold voltage

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

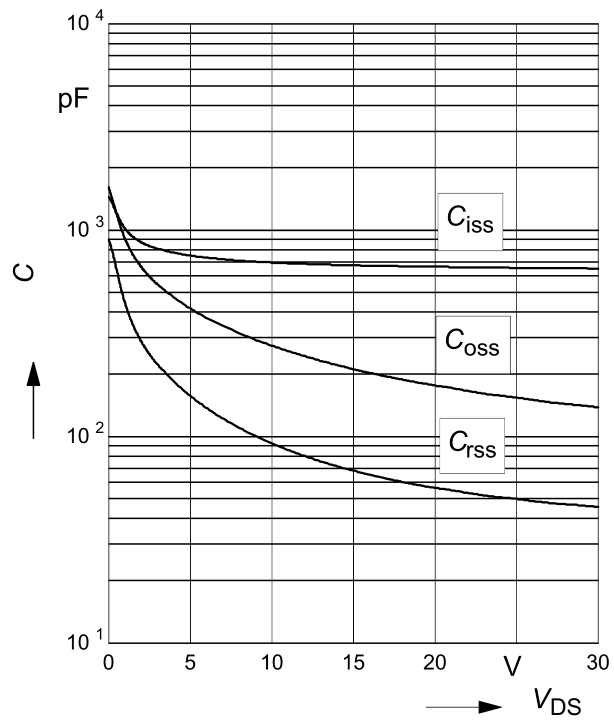
parameter: $V_{GS} = V_{DS}$



11 Typ. capacitances

$C = f(V_{DS})$

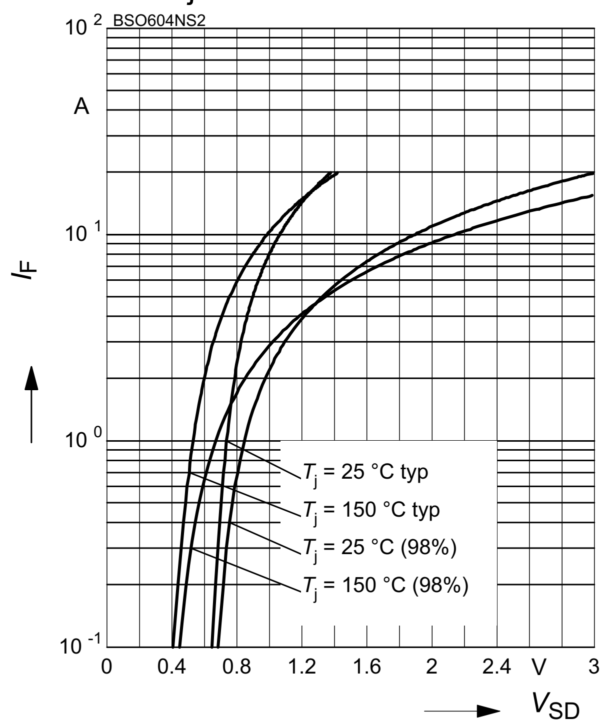
parameter: V_{GS}=0V, f=1 MHz



12 Forward character. of reverse diode

$I_F = f(V_{SD})$

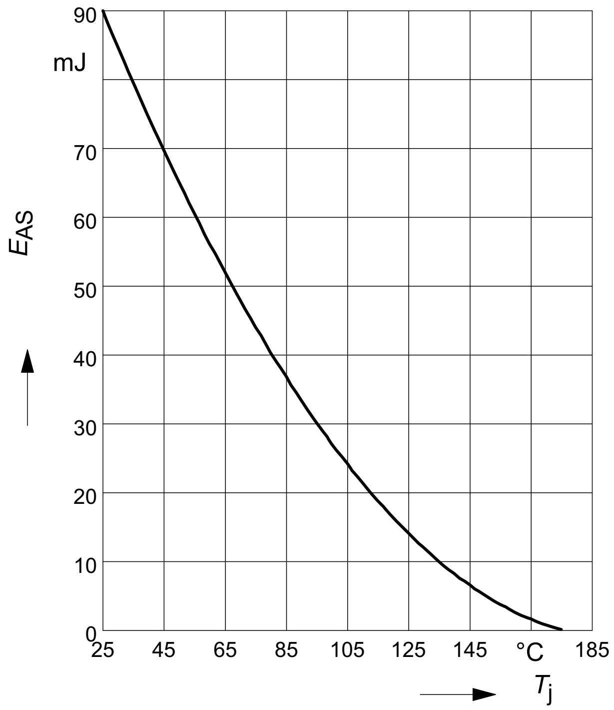
parameter: T_j , t_p = 80 µs



13 Typ. avalanche energy

$E_{AS} = f(T_j)$

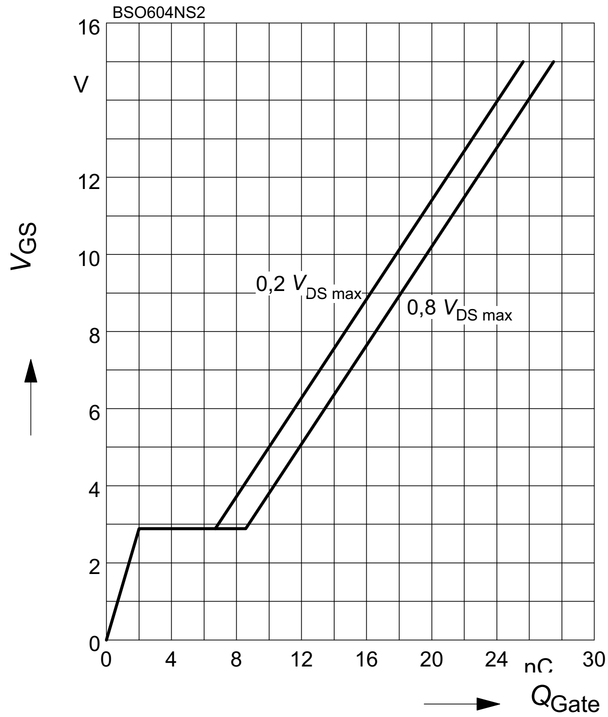
par.: I_D = 5 A , V_{DD} = 25 V, R_{GS} = 25 Ω



14 Typ. gate charge

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

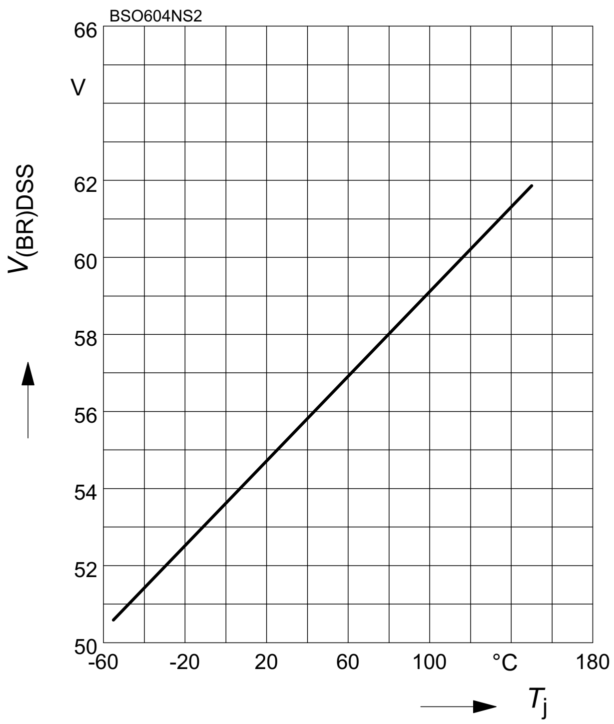
parameter: I_D = 5 A pulsed



15 Drain-source breakdown voltage

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

parameter: I_D=10 mA



1 Package Outlines

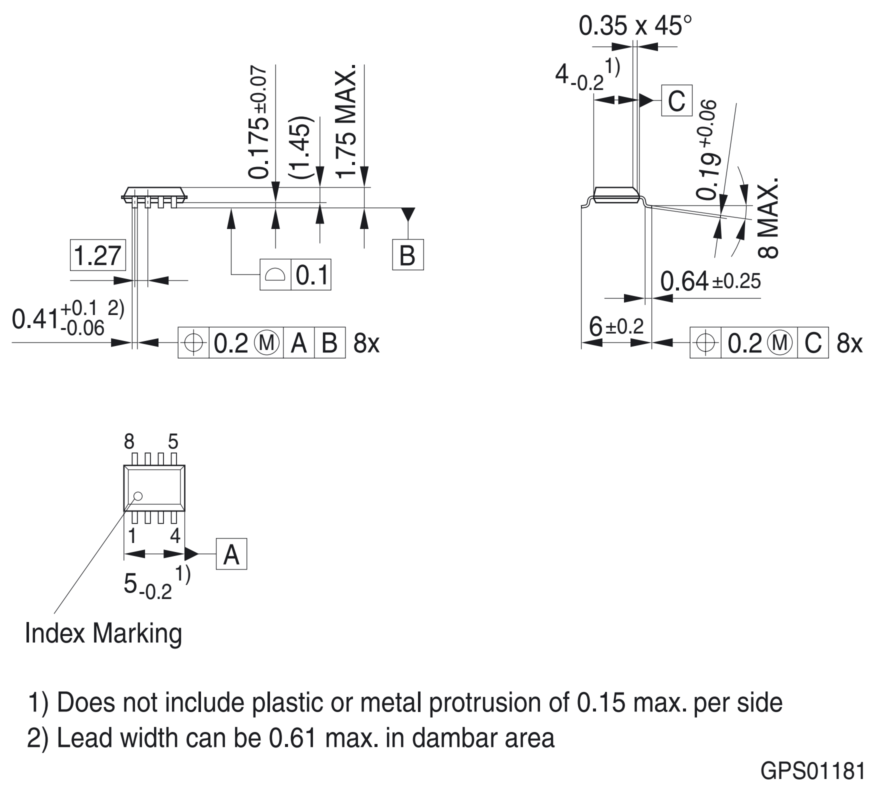


Figure 1 PG-DSO-8-25

Green Product (RoHS compliant)

To meet the world-wide customer requirements for environmentally friendly products and to be compliant with government regulations the device is available as a green product. Green products are RoHS-Compliant (i.e Pb-free finish on leads and suitable for Pb-free soldering according to IPC/JEDEC J-STD-020).

For further information on alternative packages, please visit our website:
http://www.infineon.com/packages.

Dimensions in mm

2 Revision History

Revision	Date	Changes
1.1	2008-03-20	Initial version of RoHS-compliant derivate of BSO604NS2 Page 1: AEC certified statement added Page 1 and 8: added RoHS compliance statement and Green product feature Page 1 and 8: Package changed to RoHS compliant version Page 9-10: added Revision History, updated Legal Disclaimer

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