OptiMOS™3 Power-Transistor

Features

- Optimized for dc-dc conversion
- N-channel, normal level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[1] for target application
- Halogen-free according to IEC61249-2-21

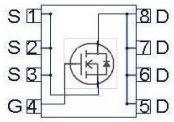
RoHS Halogen-Free

Product Summary

V_{DS}	150	V
$R_{DS(on),max}$	52	mΩ
I_D	21	A

PG-TSDSON-8

Type	Package	Marking
BSZ520N15NS3 G	PG-TSDSON-8	520N15N



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	21	A
		T_C=100 °C	14	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	84	
Avalanche energy, single pulse	E_{AS}	I_D=18 A, R_{GS}=25 Ω	60	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	57	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

[1] J-STD20 and JESD22

[2] see figure 3

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	2.2	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 cooling area[3)]	-	-	60	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	150	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=35 µA	2	3	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=120 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=120 V, V_{GS}=0 V, T_j=125 °C	-	10	100	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=18 A	-	42	52	mΩ
		V_{GS}=8 V, I_D=9 A	-	42	52	
Gate resistance	R_G		-	2.1	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=18 A	11	21	-	S

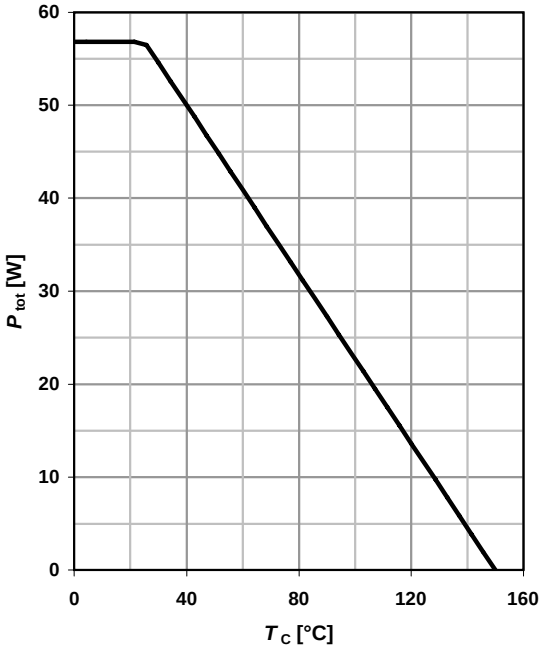
[3)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=75 V, f=1 MHz	-	670	890	pF
Output capacitance	C_{oss}		-	80	-	
Reverse transfer capacitance	C_{rss}		-	3.4	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=75 V, V_{GS}=10 V, I_D=9 A, R_G=1.6 Ω	-	7	-	ns
Rise time	t_r		-	5	-	
Turn-off delay time	$t_{d(off)}$		-	10	-	
Fall time	t_f		-	3	-	
Gate Charge Characteristics[4]						
Gate to source charge	Q_{gs}	V_{DD}=75 V, I_D=9 A, V_{GS}=0 to 10 V	-	3.5	-	nC
Gate to drain charge	Q_{gd}		-	1.5	-	
Switching charge	Q_{sw}		-	3	-	
Gate charge total	Q_g		-	8.7	12	
Gate plateau voltage	$V_{plateau}$		-	5.2	-	V
Output charge	Q_{oss}	V_{DD}=75 V, V_{GS}=0 V	-	22	29	nC
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	21	A
Diode pulse current	$I_{S,pulse}$		-	-	84	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=21 A, T_j=25 °C	-	0.9	1.2	V
Reverse recovery time	t_{rr}	V_R=75 V, I_F=9 A, di_F/dt=100 A/µs	-	66	-	ns
Reverse recovery charge	Q_{rr}		-	226	-	nC

[4] See figure 16 for gate charge parameter definition

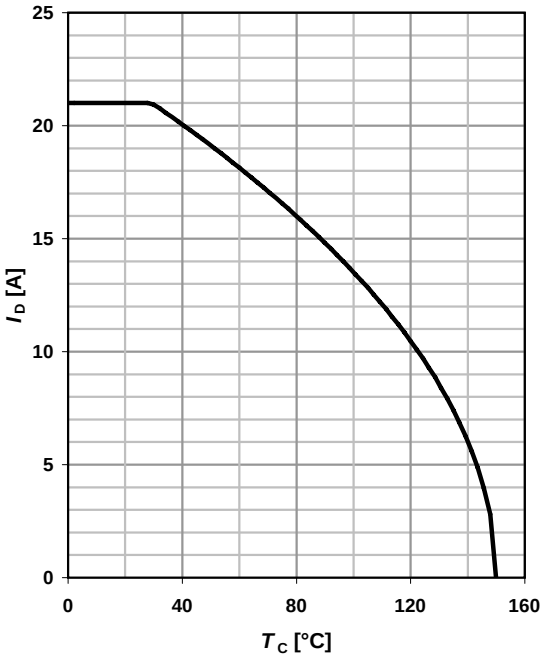
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

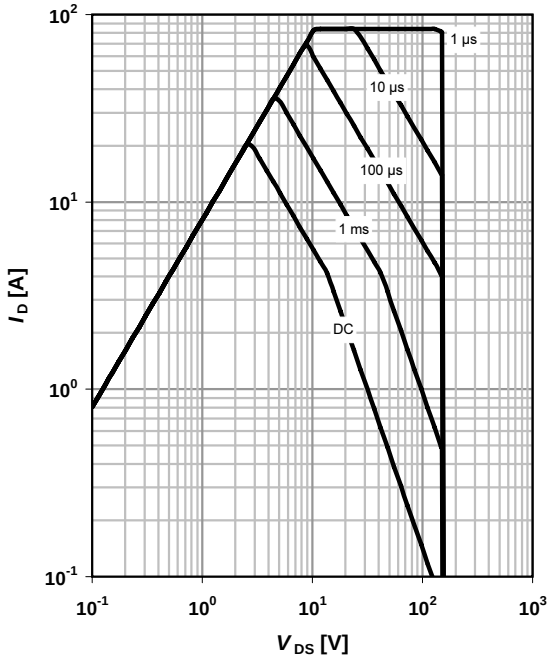
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

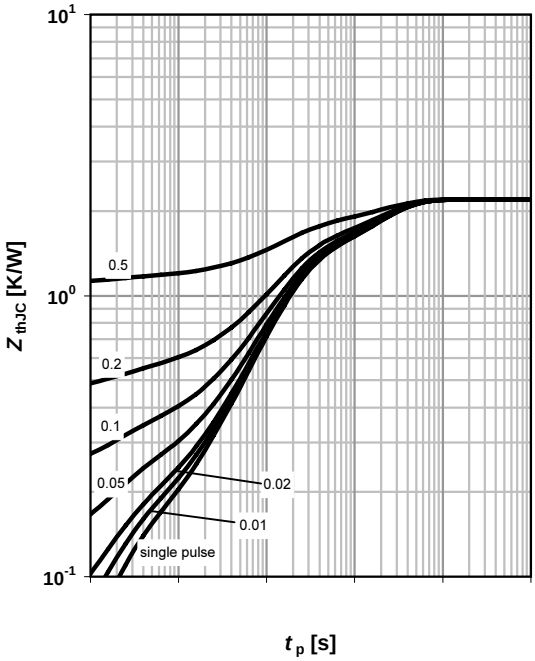
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

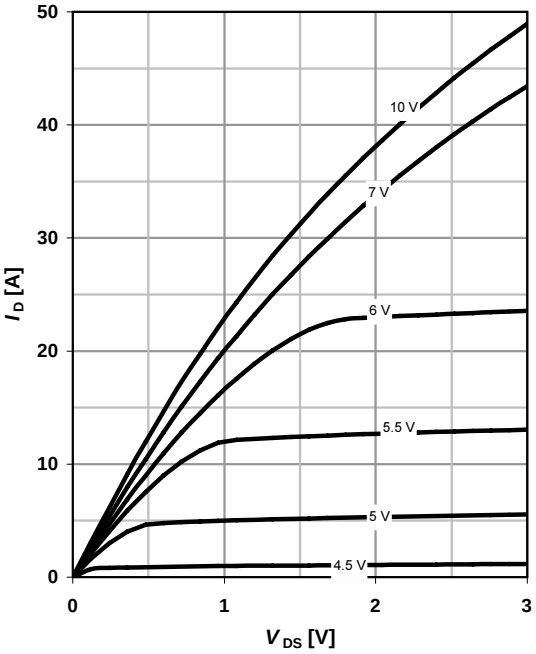
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; T_j=25 °C

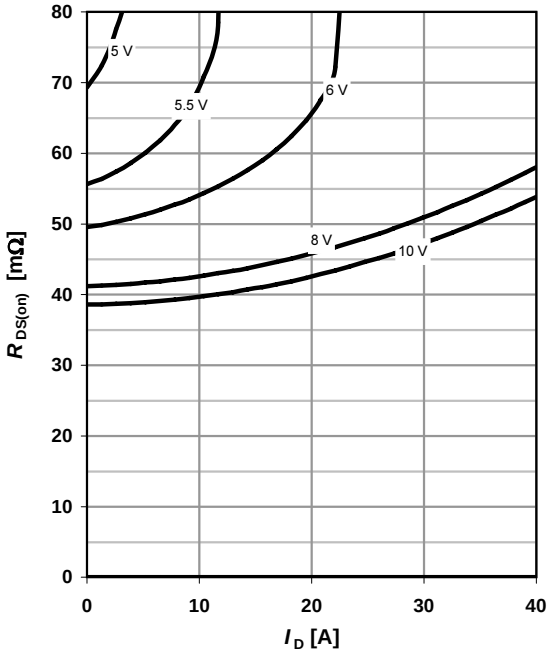
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; T_j=25 °C

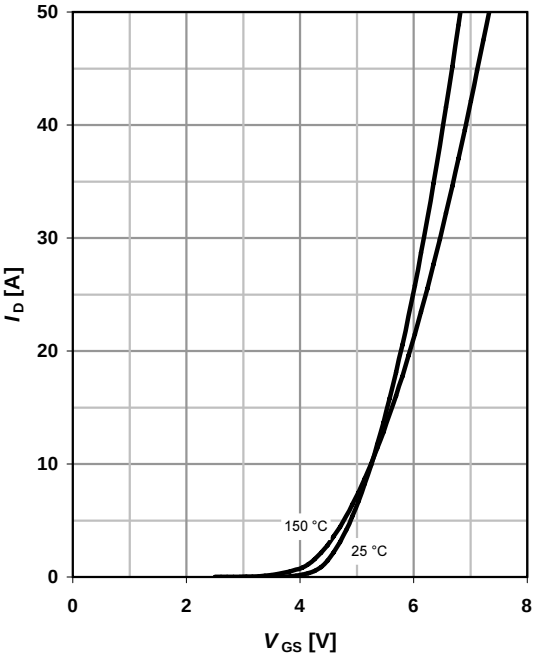
parameter: V_{GS}



7 Typ. transfer characteristics

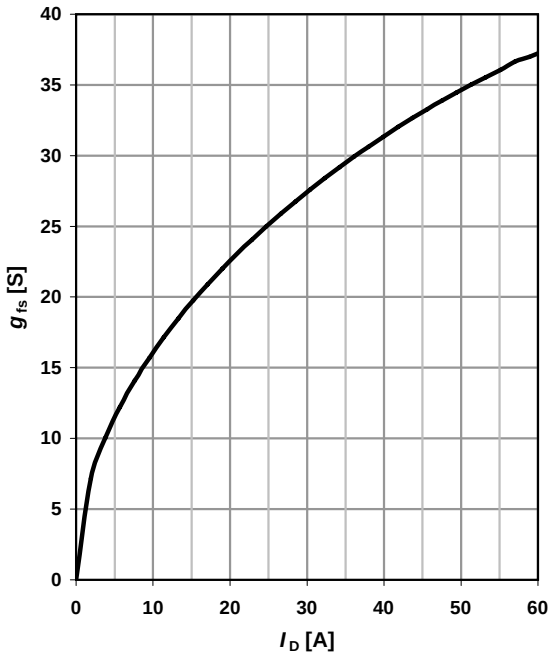
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



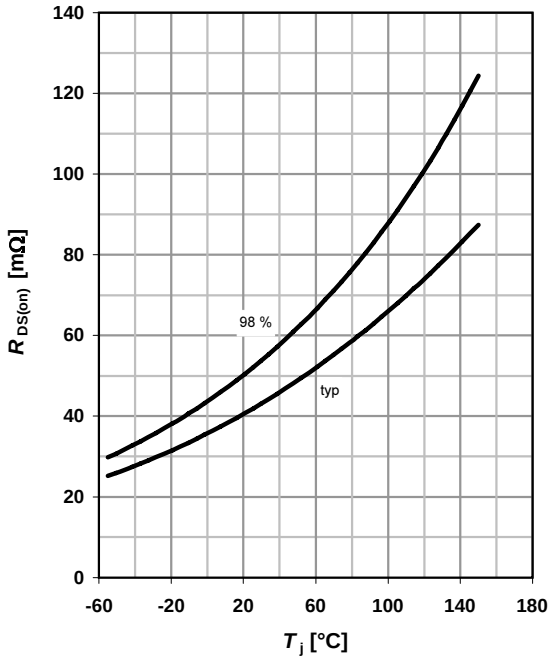
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; T_j=25 °C



9 Drain-source on-state resistance

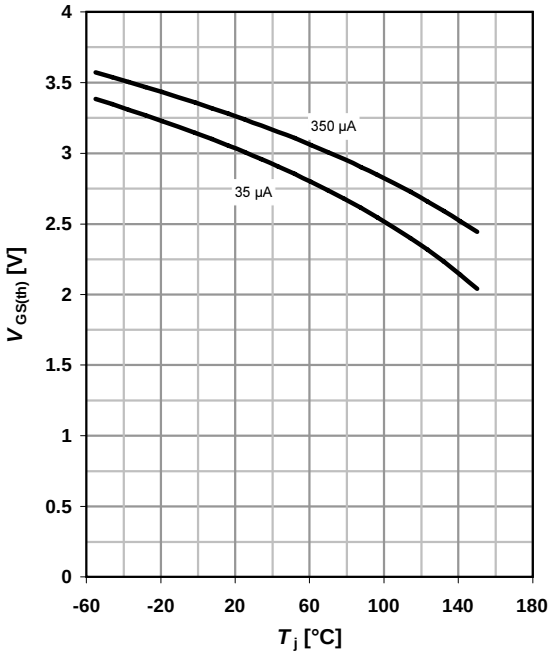
$R_{DS(on)}=f(T_j)$; $I_D=18$ A; $V_{GS}=10$ V



10 Typ. gate threshold voltage

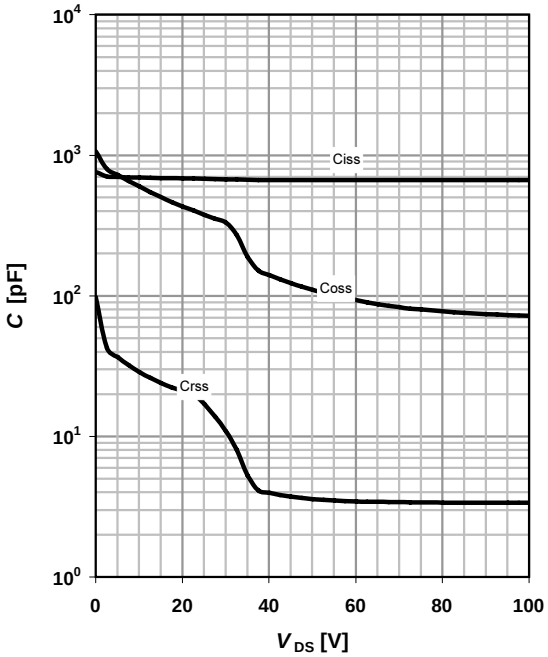
$V_{GS(th)}=f(T_j)$; $V_{GS}=V_{DS}$

parameter: I_D



11 Typ. capacitances

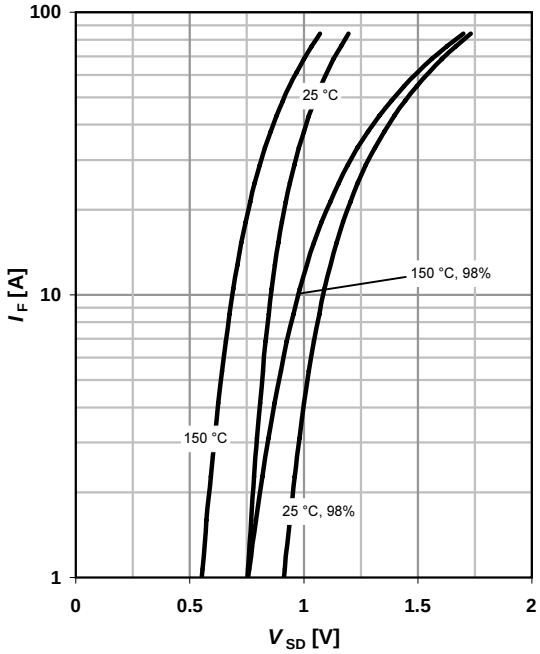
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

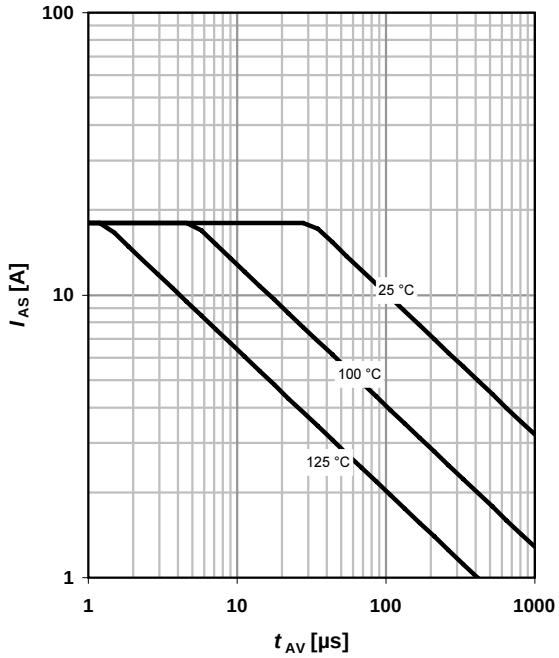
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

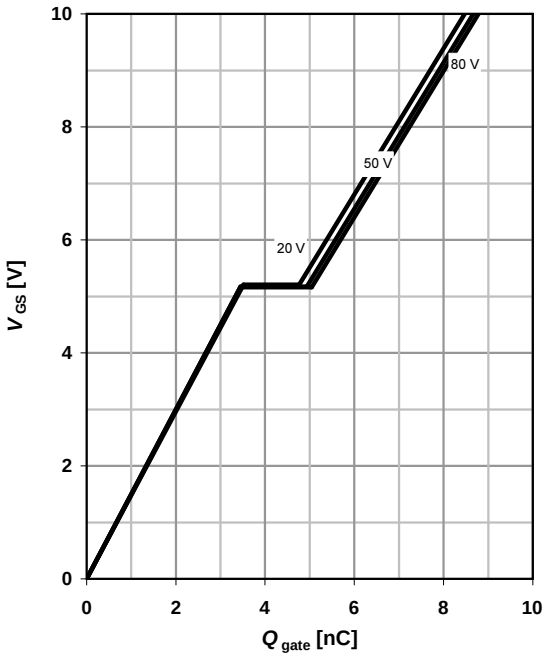
parameter: $T_{j(start)}$



14 Typ. gate charge

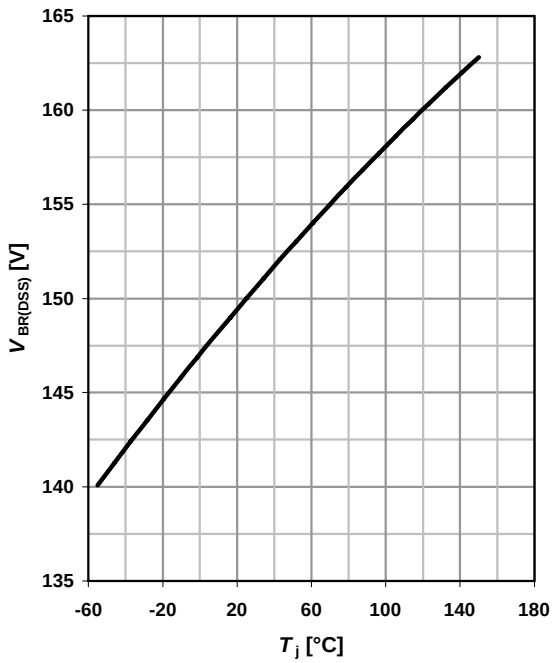
V_{GS}=f(Q_{gate}); I_D=9 A pulsed

parameter: V_{DD}

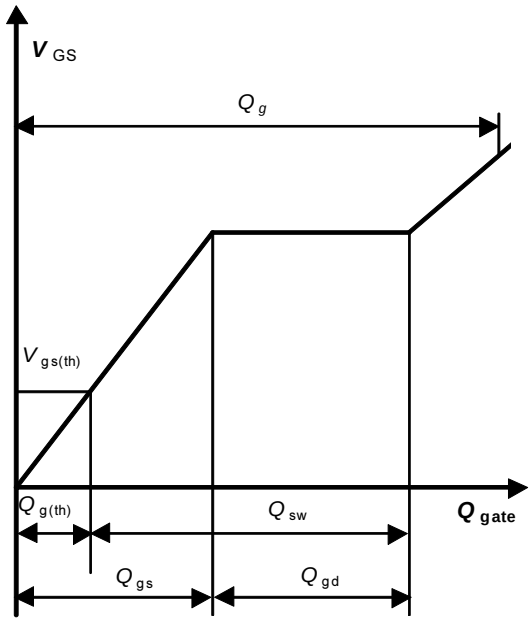


15 Drain-source breakdown voltage

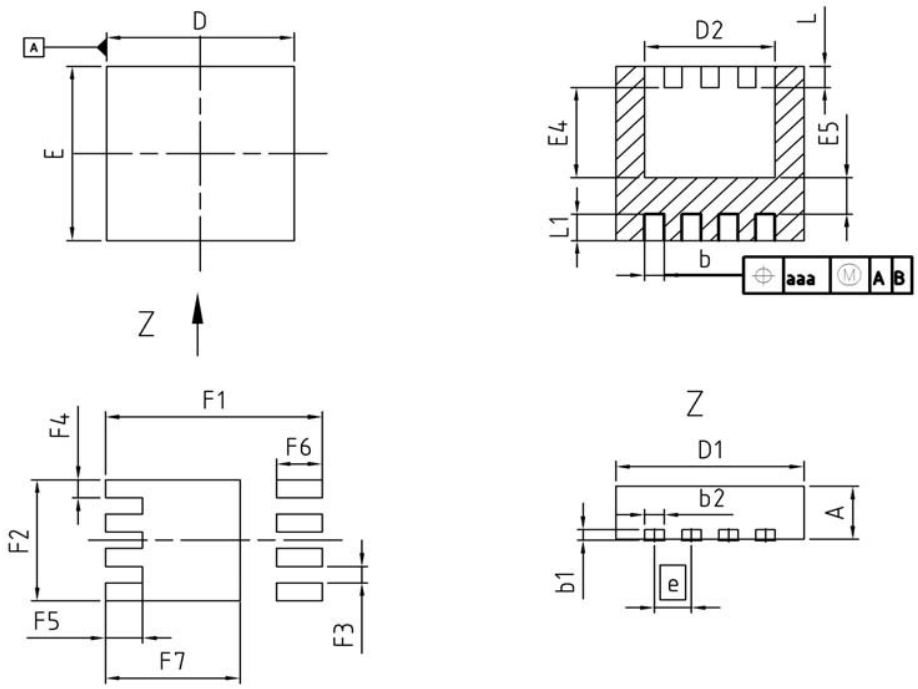
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



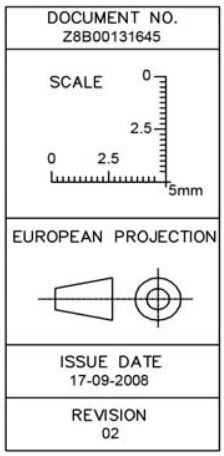
16 Gate charge waveforms



Package Outline: PG-TDSON-8



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
b	0.24	0.44	0.009	0.017
b1	0.10	0.30	0.004	0.012
b2	0.20	0.44	0.008	0.017
D=D1	3.20	3.40	0.126	0.134
D2	2.15	2.45	0.085	0.096
E	3.20	3.40	0.126	0.134
E4	1.60	1.81	0.063	0.071
E5	0.59	0.86	0.023	0.034
e	0.65		0.026	
N	8		8	
L	0.30	0.56	0.012	0.022
L1	0.33	0.60	0.013	0.024
aaa	0.25		0.010	
F1	3.80		0.150	
F2	2.29		0.090	
F3	0.31		0.012	
F4	0.34		0.013	
F5	0.65		0.026	
F6	0.80		0.031	
F7	2.36		0.093	



Published by
Infineon Technologies AG
81726 Munich, Germany

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. The Infineon Technologies component described in this Data Sheet may be used in life-support devices or systems and/or automotive, aviation and aerospace applications 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, automotive, aviation and aerospace 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.