MOSFET

Metal Oxide Semiconductor Field Effect Transistor

OptiMOS™ Power-Transistor, 100V

OptiMOS™ 3 Power Transistor
BSZ160N10NS3

Data Sheet

Rev. 2.1
Final

Power Management & Multimarket

OptiMOS™3 Power-Transistor

Product Summary

V_{DS}	100	V
$R_{DS(on),max}$	16	mΩ
I_D	40	A

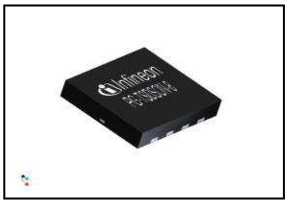
Features

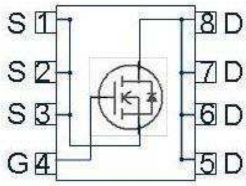
- Ideal for high frequency switching
- Optimized technology for DC/DC converters
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- N-channel, normal level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC[1] for target applications
- Halogen-free according to IEC61249-2-21

RoHS

Halogen-Free

PG-TSDSON-8





Type	Package	Marking
BSZ160N10NS3 G	PG-TSDSON-8	160N10N

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	40	A
		V_{GS}=10 V, T_C=100 °C	28	
		V_{GS}=10 V, T_A=25 °C, R_{thJA}=60 K/W[2]	8	
Pulsed drain current[3]	$I_{D,pulse}$	T_C=25 °C	160	
Avalanche energy, single pulse[4]	E_{AS}	I_D=20 A, R_{GS}=25 Ω	80	mJ
Gate source voltage	V_{GS}		±20	V

[1] J-STD20 and JESD22

[2] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

[3] See Diagram 3 for more detailed information

[4] See Diagram 13 for more detailed information

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

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	T_C=25 °C	63	W
		T_A=25 °C, R_{thJA}=60 K/W 2)	2.1	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

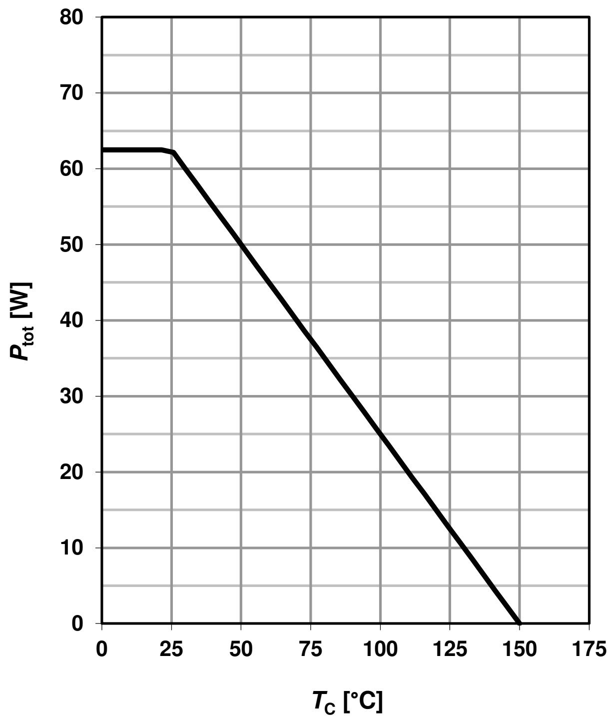
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	2.1	K/W
Device on PCB	R_{thJA}	minimal footprint	-	-	62	
		6 cm^2 cooling area 2)	-	-	60	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=33 µA	2	2.8	3.5	
Zero gate voltage drain current	I_{DSS}	V_{DS}=100 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=100 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	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=20 A	-	14	16	mΩ
		V_{GS}=6 V, I_D=10 A	-	18	33	
Gate resistance	R_G		-	1.4	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=20 A	16	33	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=50 V, f=1 MHz	-	1300	1700	pF
Output capacitance	C_{oss}		-	240	320	
Reverse transfer capacitance	C_{rss}		-	11	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=50 V, V_{GS}=10 V, I_D=10 A, $R_{G,ext}$=1.6 Ω	-	13.0	-	ns
Rise time	t_r		-	10.0	-	
Turn-off delay time	$t_{d(off)}$		-	22.0	-	
Fall time	t_f		-	5.0	-	
Gate Charge Characteristics[5)]						
Gate to source charge	Q_{gs}	V_{DD}=50 V, I_D=10 A, V_{GS}=0 to 10 V	-	5.7	-	nC
Gate charge at threshold	$Q_{g(th)}$		-	3.8	-	
Gate to drain charge	Q_{gd}		-	3.4	-	
Switching charge	Q_{sw}		-	5.3	-	
Gate charge total	Q_g		-	19	25	
Gate plateau voltage	$V_{plateau}$		-	4.2	-	V
Output charge	Q_{oss}	V_{DD}=40 V, V_{GS}=0 V	-	25	33	nC
Reverse Diode						
Diode continuous forward current	I_S	T_C=25 °C	-	-	40	A
Diode pulse current	$I_{S,pulse}$		-	-	160	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=20 A, T_j=25 °C	-	0.9	1.2	V
Reverse recovery time	t_{rr}	V_R=50 V, I_F=10A, di_F/dt=100 A/µs	-	73	-	ns
Reverse recovery charge	Q_{rr}		-	52	-	nC

5) See figure 16 for gate charge parameter definition

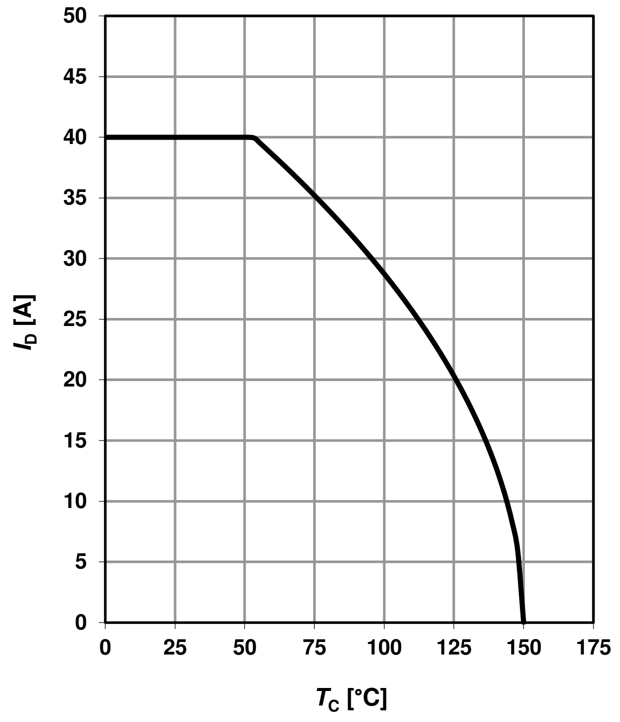
1 Power dissipation

P_{tot}=f(T_C)



2 Drain current

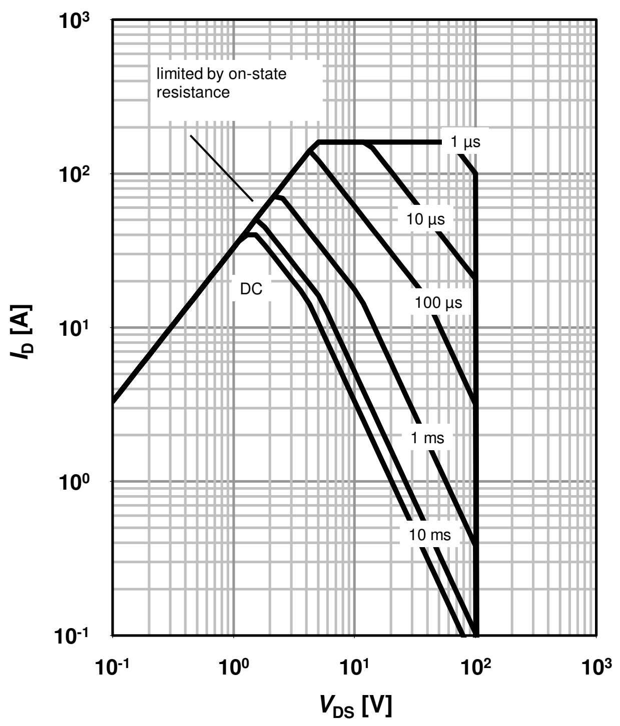
I_D=f(T_C); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

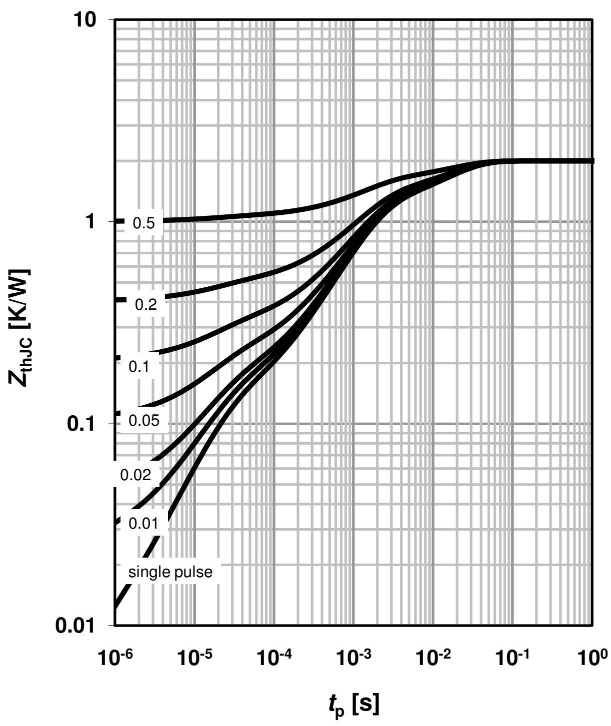
parameter: t_p



4 Max. transient thermal impedance

Z_{thJC}=f(t_p)

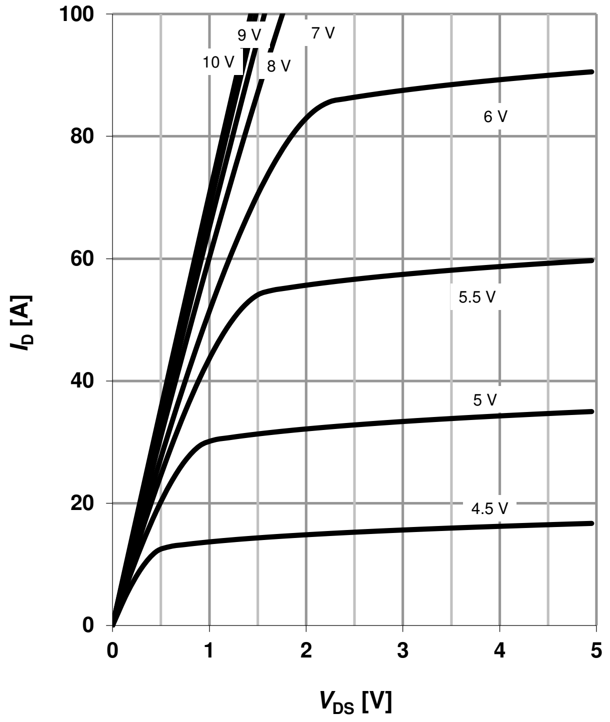
parameter: D=t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

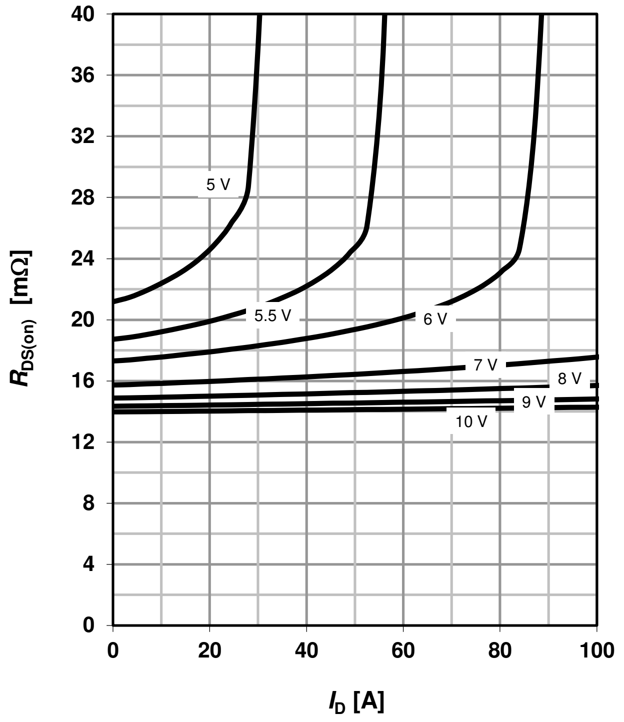
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

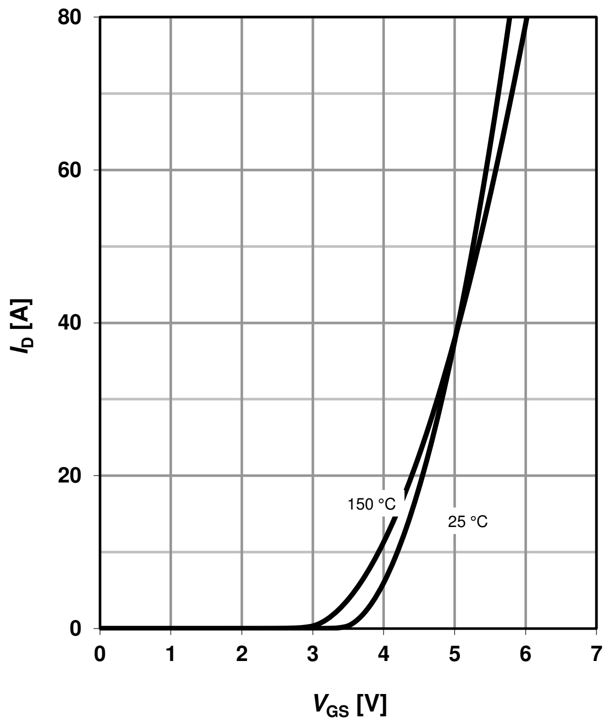
parameter: V_{GS}



7 Typ. transfer characteristics

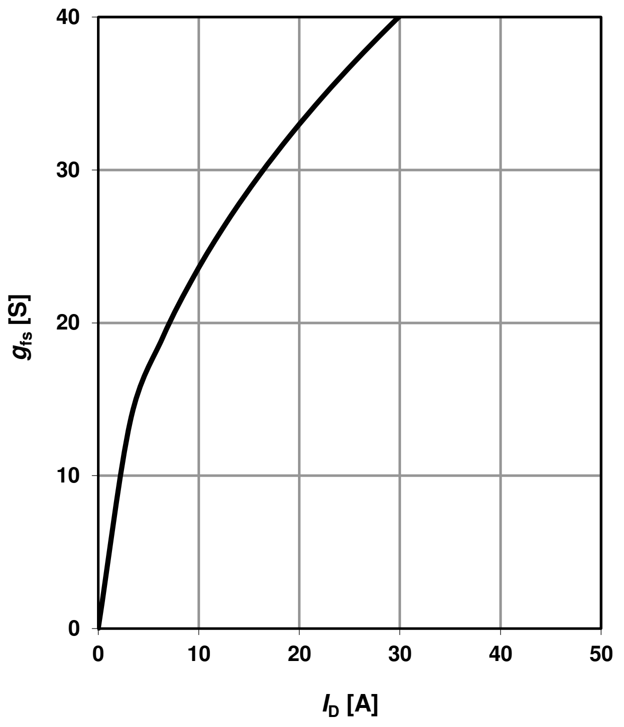
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

parameter: T_j



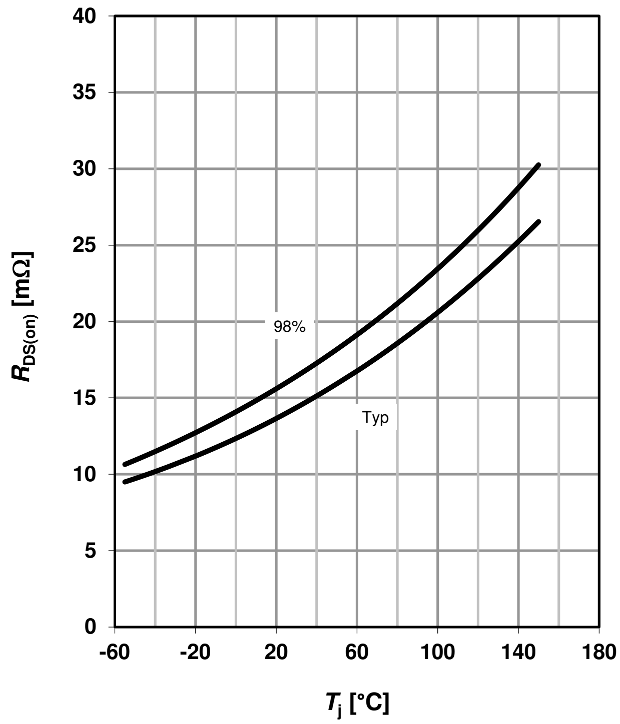
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



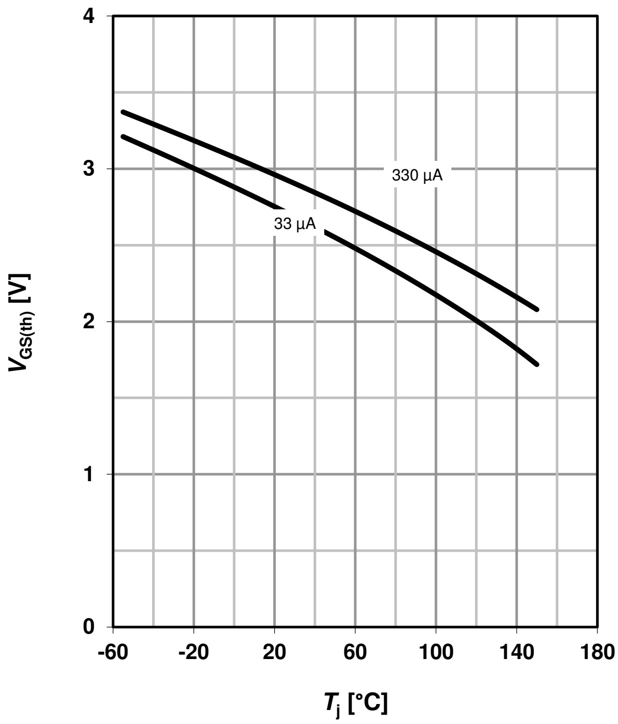
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=20 A; V_{GS}=10 V



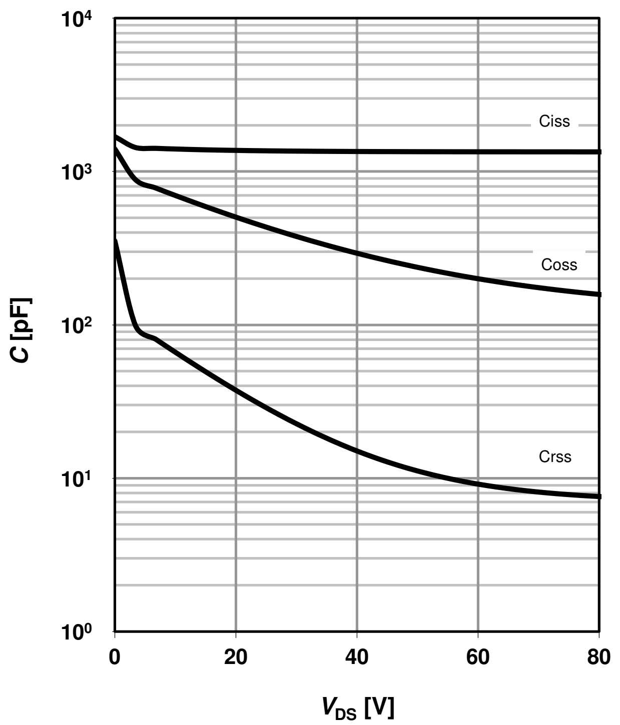
10 Typ. gate threshold voltage

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



11 Typ. capacitances

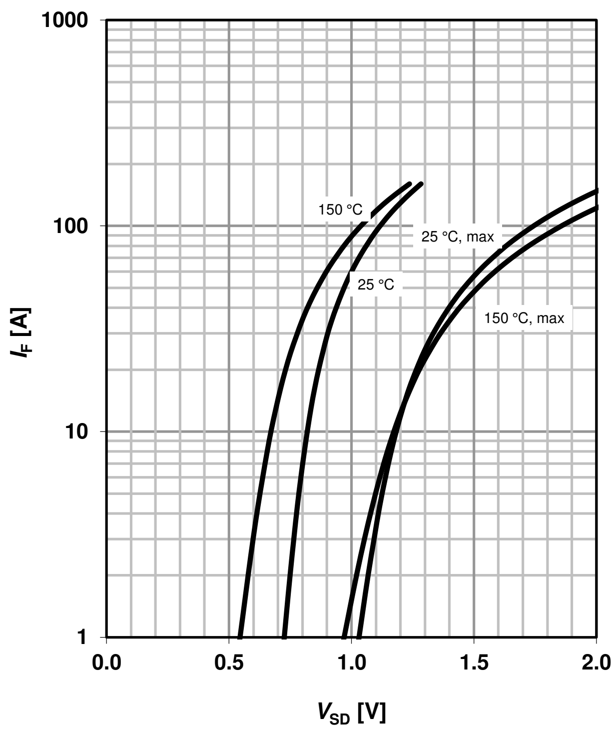
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

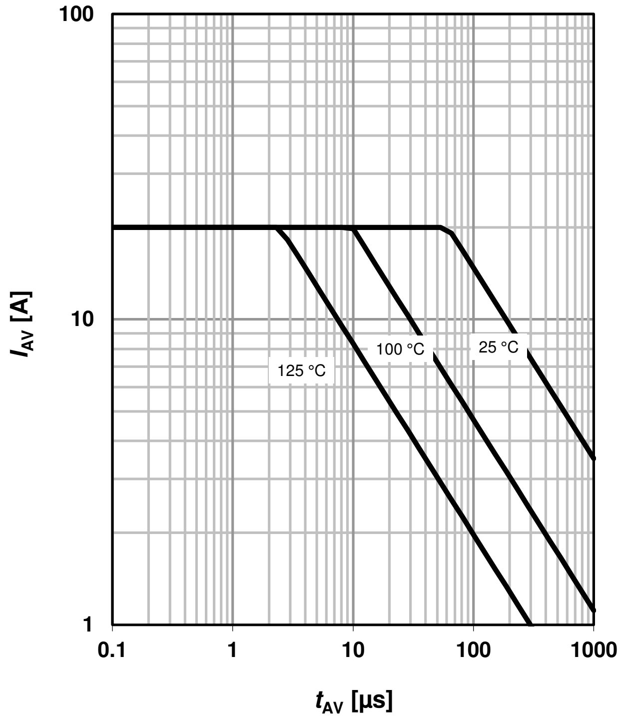
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

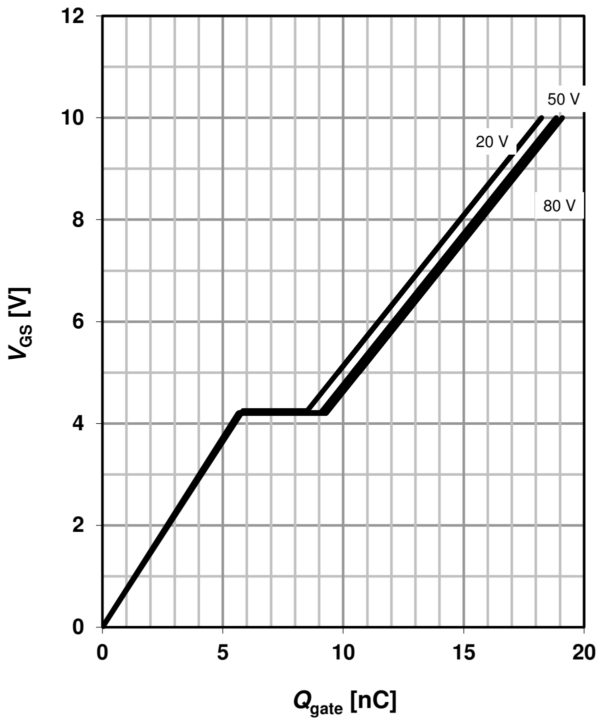
parameter: $T_{j(start)}$



14 Typ. gate charge

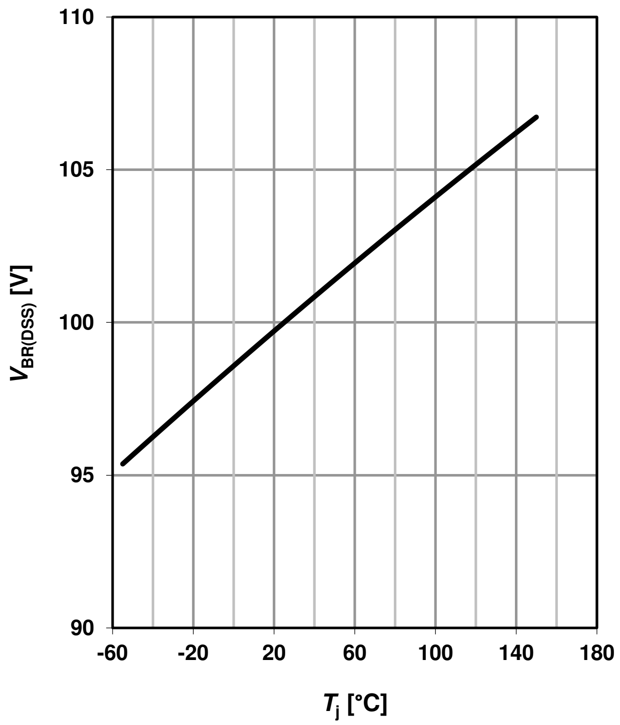
V_{GS}=f(Q_{gate}); I_D=10 A pulsed

parameter: V_{DD}

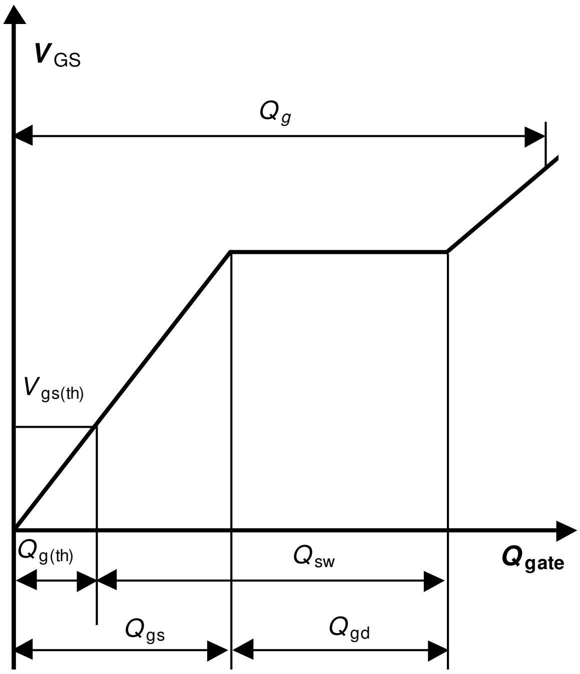


15 Drain-source breakdown voltage

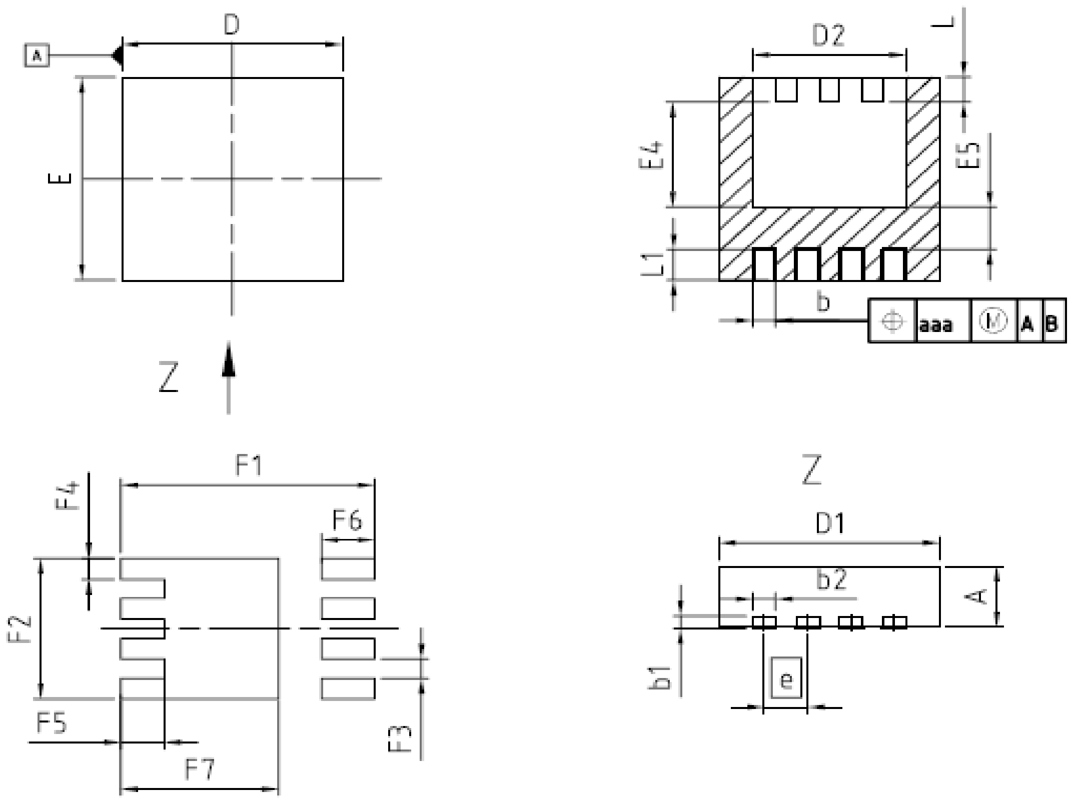
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



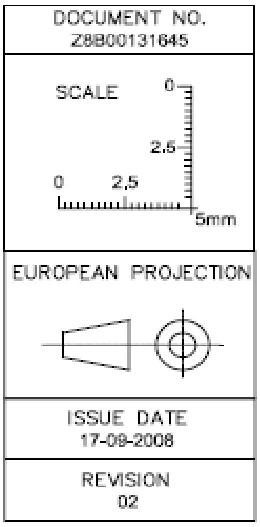
16 Gate charge waveforms



Package Outline: PG-TSDSON-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	



Footprint
Dimensions in mm

Revision History

BSZ160N10NS3

Revision: 2015-10-05, Rev. 2.1

Previous Revision		
Revision	Date	Subjects (major changes since last revision)
2.1	2015-10-05	Update Id condition for Vgs(th) and Tj to Ta condition for "Maximum ratings"

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