OptiMOS™3 Power-Transistor

Features

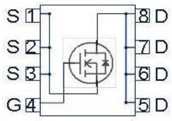
- Optimized for dc-dc conversion
- N-channel, normal level
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Low on-resistance $R_{DS(on)}$
- 150 °C operating temperature
- Pb-free lead plating; RoHS compliant
- Qualified according to JEDEC[1] for target application
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}	120	V
$R_{DS(on),max}$	24	mΩ
I_D	37	A

RoHS

Halogen-Free



PG-TSDSON-8

Type	Package	Marking
BSZ240N12NS3 G	PG-TSDSON-8	240N12N

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	37	A
		T_C=100 °C	24	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	148	
Avalanche energy, single pulse	E_{AS}	I_D=20 A, R_{GS}=25 Ω	80	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	66	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}		-	-	1.9	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm2 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	120	-	-	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}=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	-	1	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=20 A	-	21	24	mΩ
Gate resistance	R_G		-	1.4	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=20 A	15	29	-	S

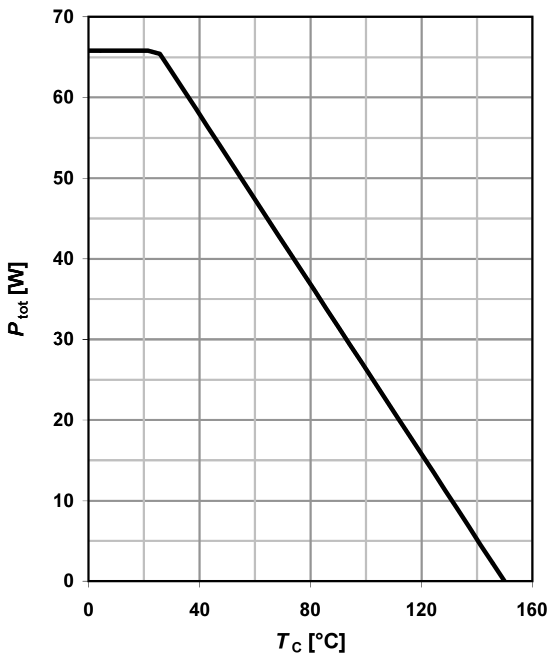
3) Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=60 V, f=1 MHz	-	1400	1900	pF
Output capacitance	C_{oss}		-	170	230	
Reverse transfer capacitance	C_{rss}		-	11	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=60 V, V_{GS}=10 V, I_D=19 A, R_G=1.6 Ω	-	9	-	ns
Rise time	t_r		-	4	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Fall time	t_f		-	4	-	
Gate Charge Characteristics[4)]						
Gate to source charge	Q_{gs}	V_{DD}=60 V, I_D=19 A, V_{GS}=0 to 10 V	-	7	-	nC
Gate to drain charge	Q_{gd}		-	5	-	
Switching charge	Q_{sw}		-	8	-	
Gate charge total	Q_g		-	20	27	
Gate plateau voltage	$V_{plateau}$		-	5.2	-	V
Output charge	Q_{oss}	V_{DD}=60 V, V_{GS}=0 V	-	23	31	nC
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	37	A
Diode pulse current	$I_{S,pulse}$		-	-	148	
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=60 V, I_F=19A, di_F/dt=100 A/µs	-	70	-	ns
Reverse recovery charge	Q_{rr}		-	208	-	nC

4) See figure 16 for gate charge parameter definition

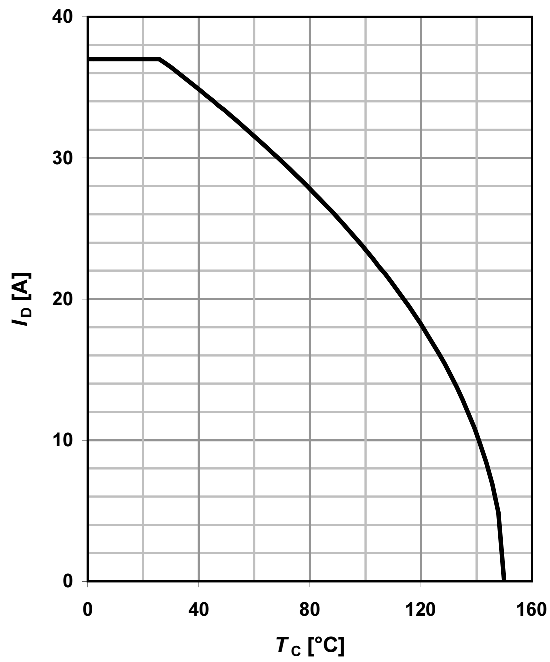
1 Power dissipation

P_{tot}=f(T_C)



2 Drain current

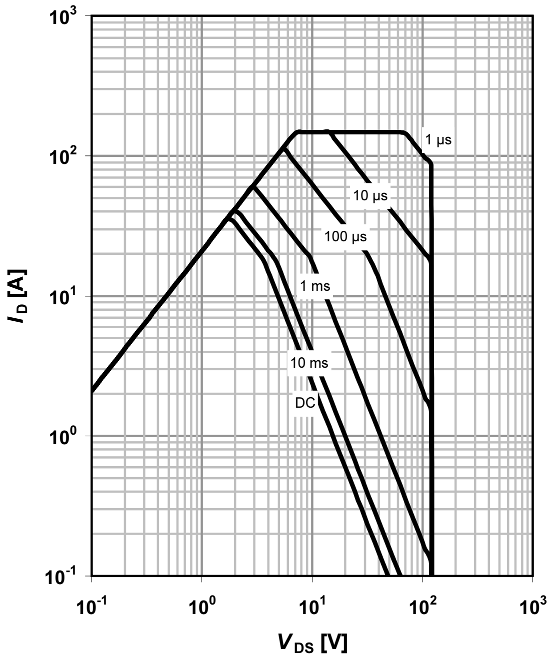
I_D=f(T_C); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

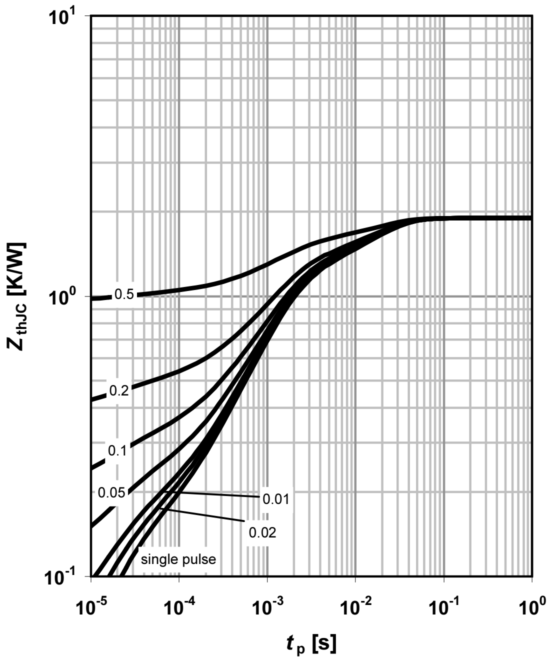
parameter: t_p



4 Max. transient thermal impedance

Z_{thJC}=f(t_p)

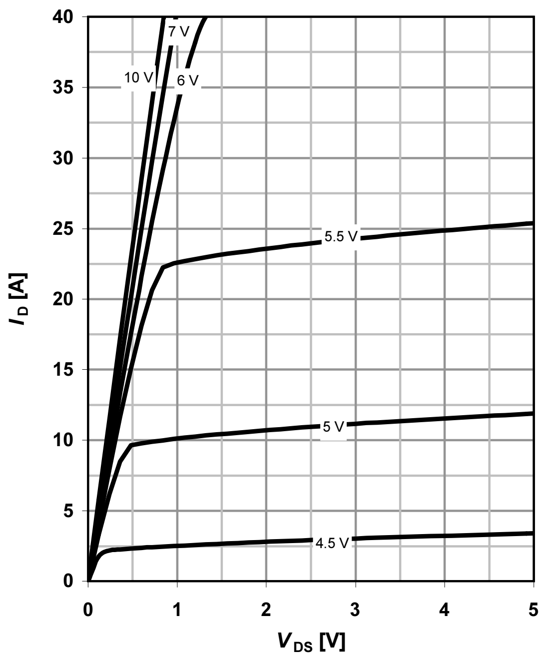
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

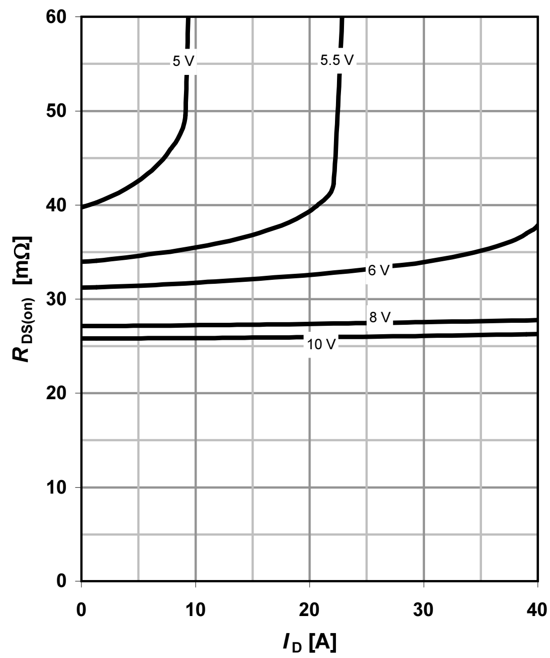
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

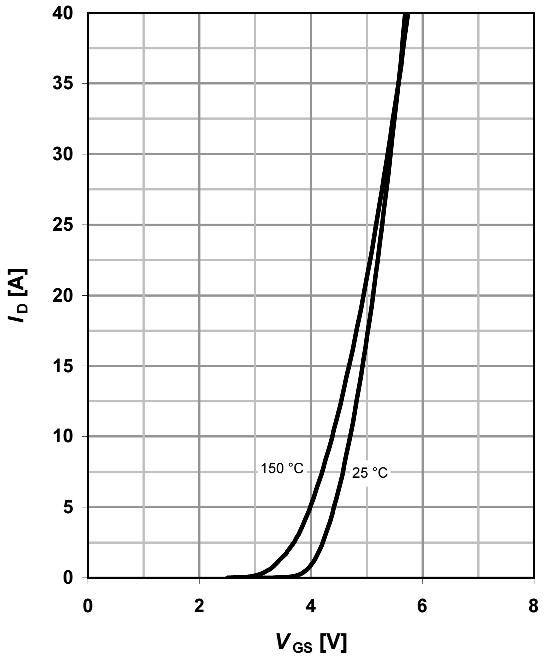
parameter: V_{GS}



7 Typ. transfer characteristics

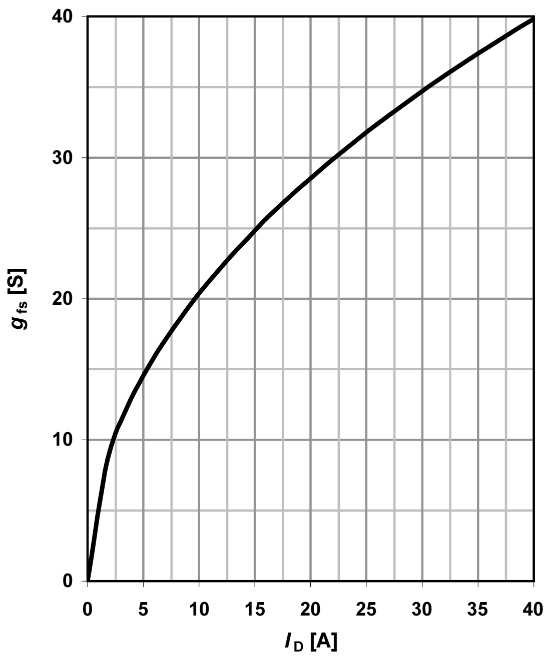
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

parameter: T_j



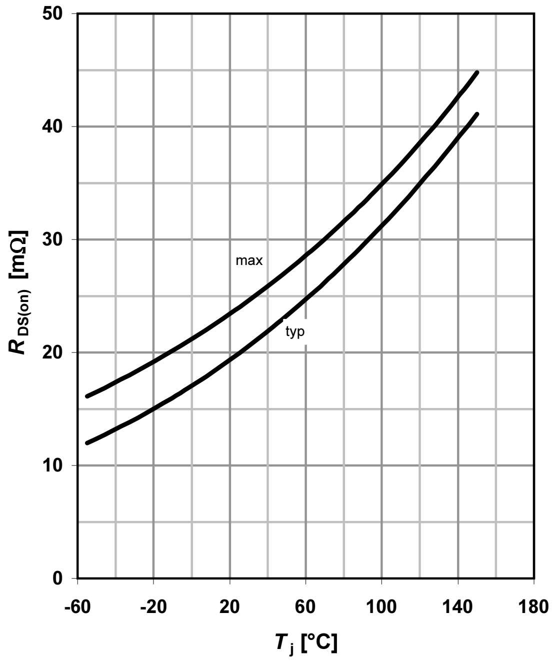
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

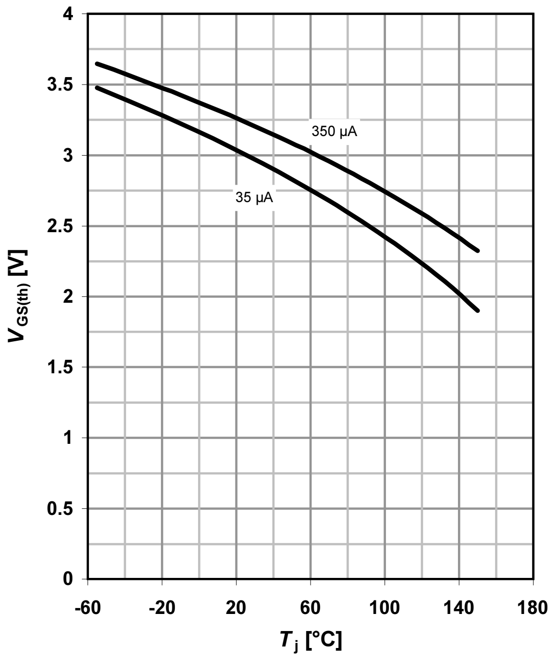
$R_{DS(on)}$=f(T_j); I_D=20A; V_{GS}=10 V



10 Typ. gate threshold voltage

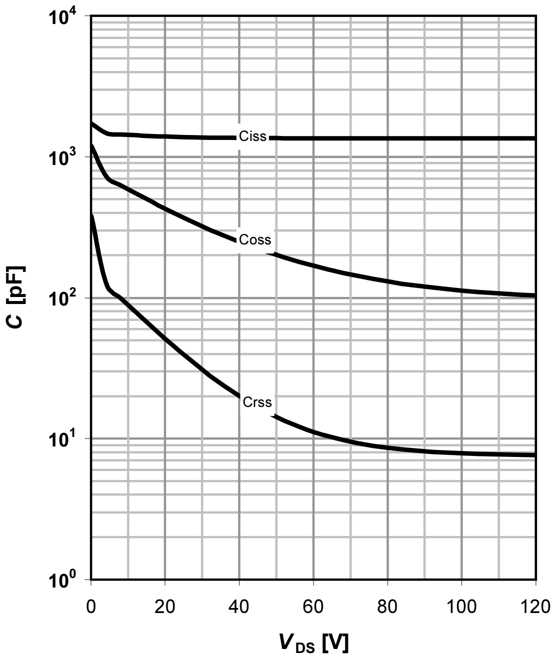
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

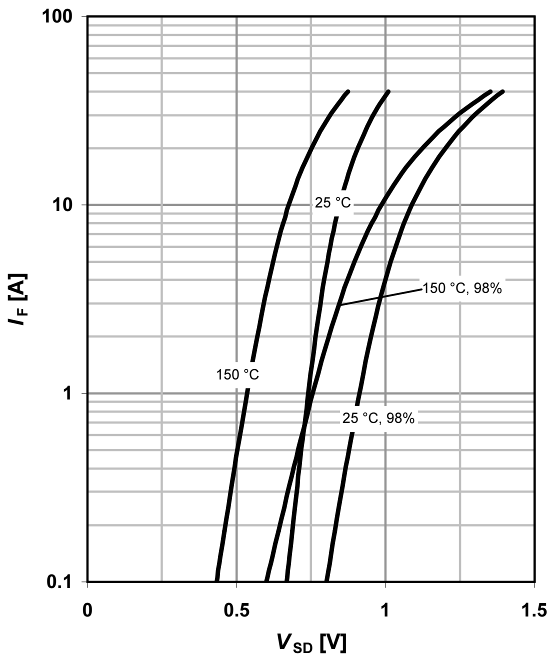
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

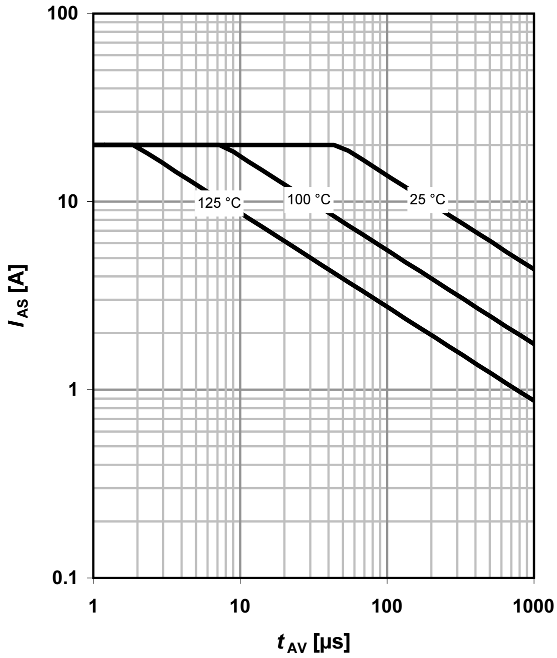
parameter: T_j



13 Avalanche characteristics

$I_{AS}=f(t_{AV})$; $R_{GS}=25\ \Omega$

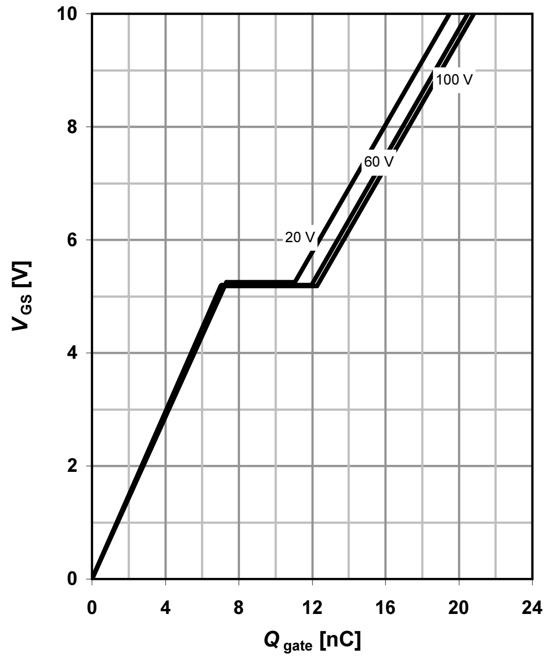
parameter: $T_{j(start)}$



14 Typ. gate charge

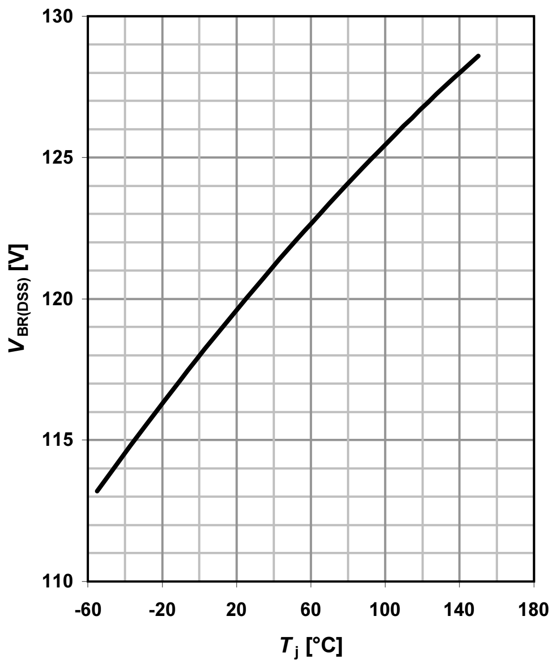
$V_{GS}=f(Q_{gate})$; $I_D=19$ A pulsed

parameter: V_{DD}

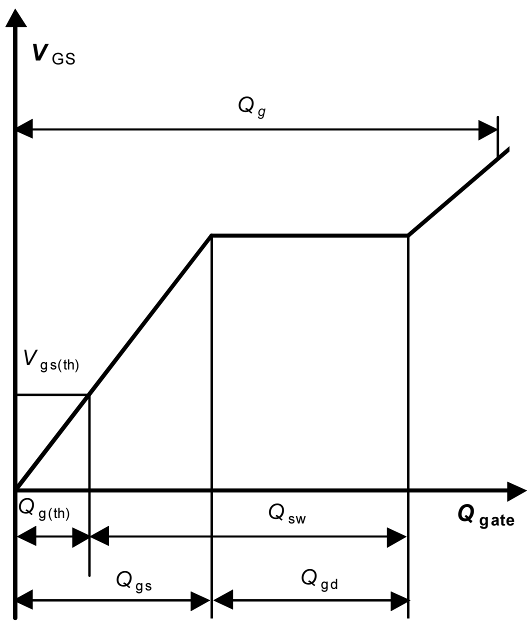


15 Drain-source breakdown voltage

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

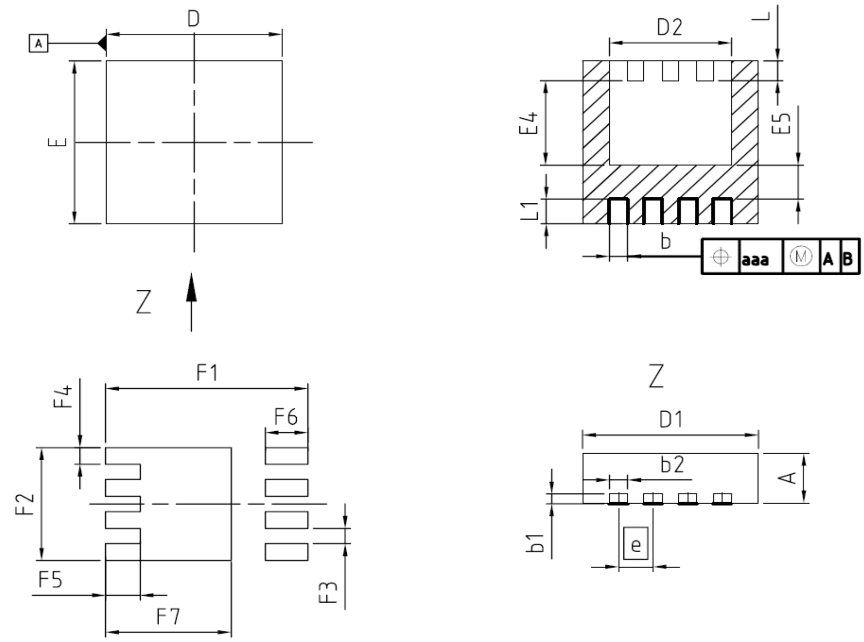


16 Gate charge waveforms



Package Outline:PG-TSDSON-8

TSDSON-8-1/-2/-21/22



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	

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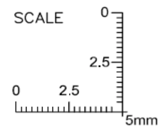
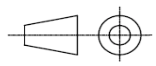
SCALE



EUROPEAN PROJECTION



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