OptiMOS™ P3 Power-Transistor

Features

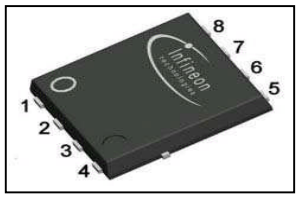
- single P-Channel in SuperSO8
- Qualified according JEDEC[1] for target applications
- 150 °C operating temperature
- 100% Avalanche tested
- V_{GS}=25 V, specially suited for notebook applications
- ESD protected
- Pb-free; RoHS compliant
- applications: battery management, load switching
- Halogen-free according to IEC61249-2-21

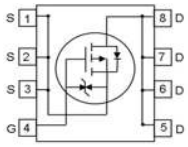
RoHS Halogen-Free

Product Summary

V_{DS}	-30	V
$R_{DS(on),max}$	8.4	mΩ
I_D	-78.6	A

PG-TDSON-8





Type	Package	Marking	Lead free	Halogen free	Packing
BSC084P03NS3E G	PG-TDSON-8	084P3NSE	Yes	Yes	non dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	-78.6	A
		T_C=70 °C	-62.9	
		T_A=25 °C	-14.9	
Pulsed drain current	$I_{D,pulse}$	T_C=25 °C[2]	-200	
Avalanche energy, single pulse	E_{AS}	I_D=-50 A, R_{GS}=25 Ω	105	mJ
Gate source voltage	V_{GS}		±25	V
Power dissipation	P_{tot}	T_C=25 °C	69	W
		T_A=25 °C[1]	2.5	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
ESD class		JESD22-A114 HBM	3 (>= 4 kV)	
Soldering temperature			260	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

[1] J-STD20 and JESD22

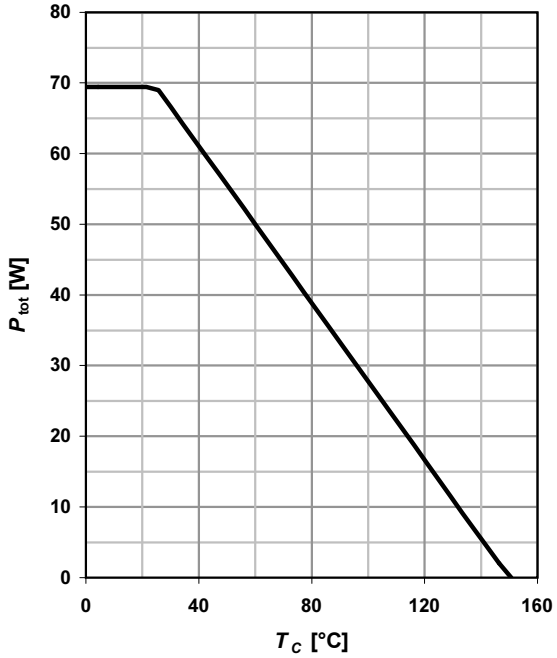
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.8	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 cooling area[2)]	-	-	50	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=-250µA	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=-110 µA	-3.0	-2.5	-2.0	
Zero gate voltage drain current	I_{DSS}	V_{DS}=-30 V, V_{GS}=0 V, T_j=25 °C	-	-	-1	µA
		V_{DS}=-30 V, V_{GS}=0 V, T_j=125 °C	-	-	-100	
Gate-source leakage current	I_{GSS}	V_{GS}=-25 V, V_{DS}=0 V	-	-	-10	µA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-6 V, I_D=-30 A	-	8.4	14.0	mΩ
		V_{GS}=-10 V, I_D=-50 A	-	6.1	8.4	
Gate resistance	R_G		-	2.2	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-50 A	33	66	-	S

[2)] 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}=-15 V, f=1 MHz	-	3190	4240	pF
Output capacitance	C_{oss}		-	1520	2020	
Reverse transfer capacitance	C_{rss}		-	110	160	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-15 V, V_{GS}=-10 V, I_D=-50 A, R_G=6 Ω	-	16.4	24.6	ns
Rise time	t_r		-	133.5	200.3	
Turn-off delay time	$t_{d(off)}$		-	33.3	50.0	
Fall time	t_f		-	8.1	12.2	
Gate Charge Characteristics[3)]						
Gate to source charge	Q_{gs}	V_{DD}=-24 V, I_D=-50 A, V_{GS}=0 to -10 V	-	14.8	19.7	nC
Gate charge at threshold	$Q_{g(th)}$		-	5.0	6.7	
Gate to drain charge	Q_{gd}		-	7.2	10.8	
Switching charge	Q_{sw}		-	16.9	23.7	
Gate charge total	Q_g		-	43.4	57.7	
Gate plateau voltage	$V_{plateau}$		-	4.7	-	V
Output charge	Q_{oss}	V_{DD}=-15 V, V_{GS}=0 V	-	34.9	46.4	nC
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	78	A
Diode pulse current	$I_{S,pulse}$		-	-	200	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=-50 A, T_j=25 °C	-	-	-1.1	V
Reverse recovery time	t_{rr}	V_R=15 V, I_F=$\|I_S\|$, di_F/dt=100 A/µs	-	45.4	-	ns
Reverse recovery charge	Q_{rr}		-	49.7	-	nC

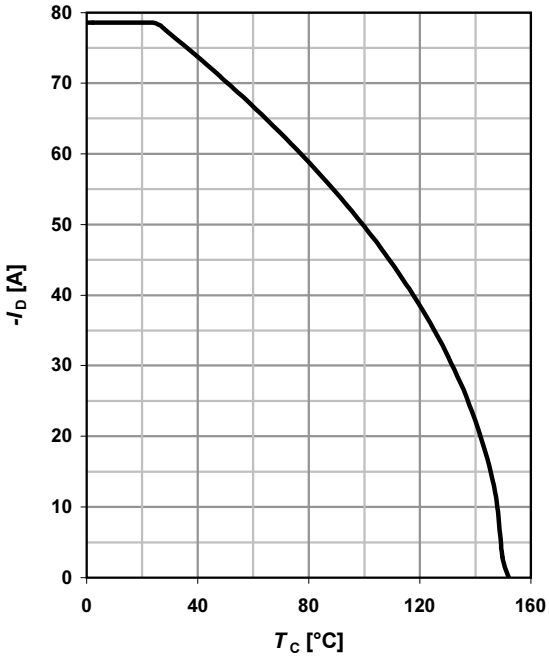
1 Power dissipation

P_{tot}=f(T_C); t_p≤10 s



2 Drain current

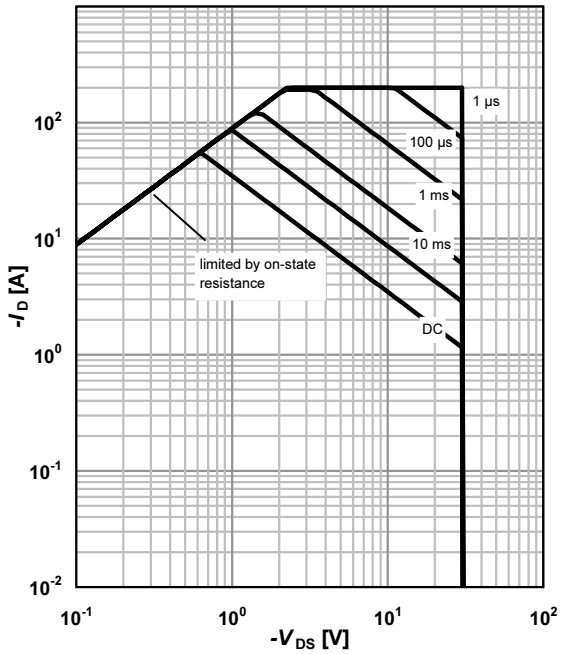
I_D=f(T_C); |V_{GS}|≥10 V; t_p≤10 s



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C[1]; D=0

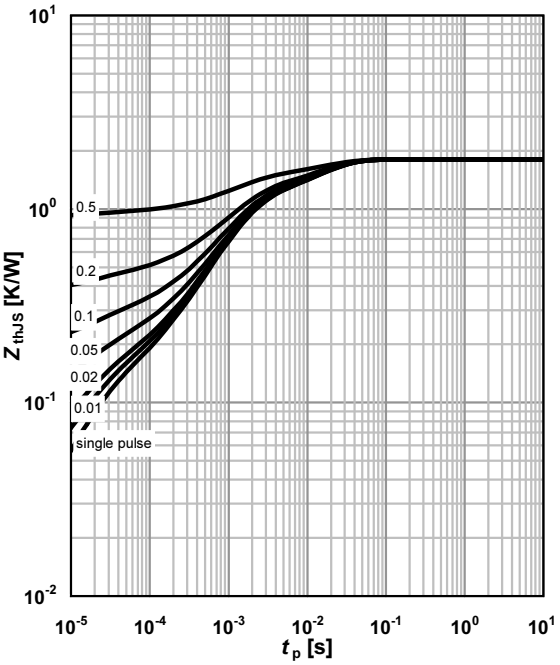
parameter: t_p



4 Max. transient thermal impedance

Z_{thJS}=f(t_p)

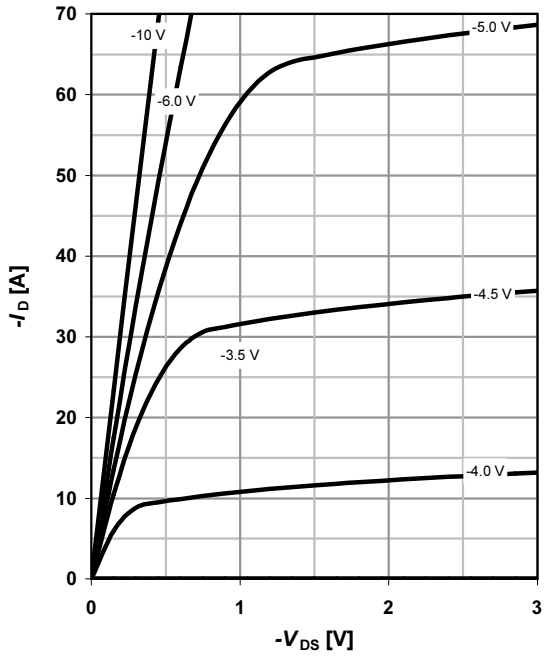
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

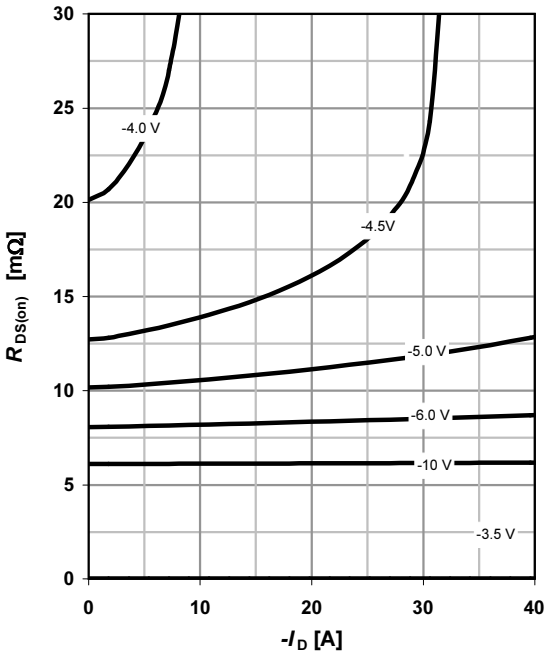
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

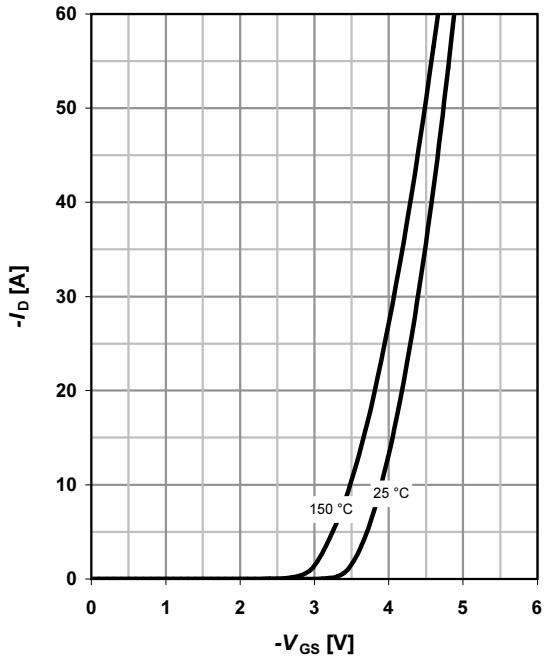
parameter: V_{GS}



7 Typ. transfer characteristics

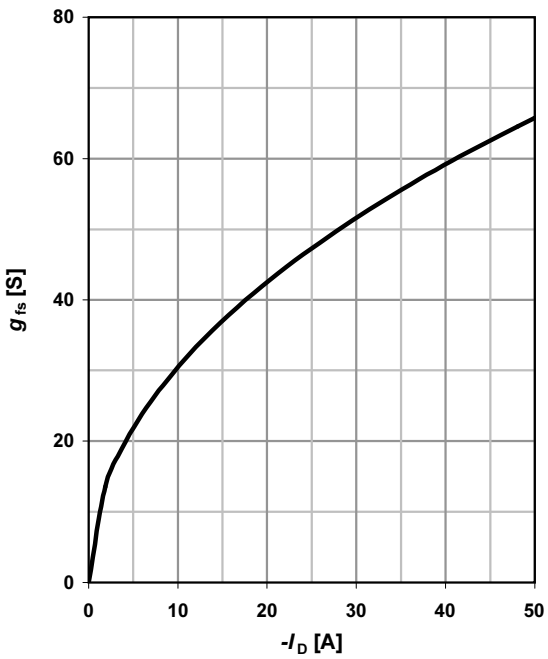
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



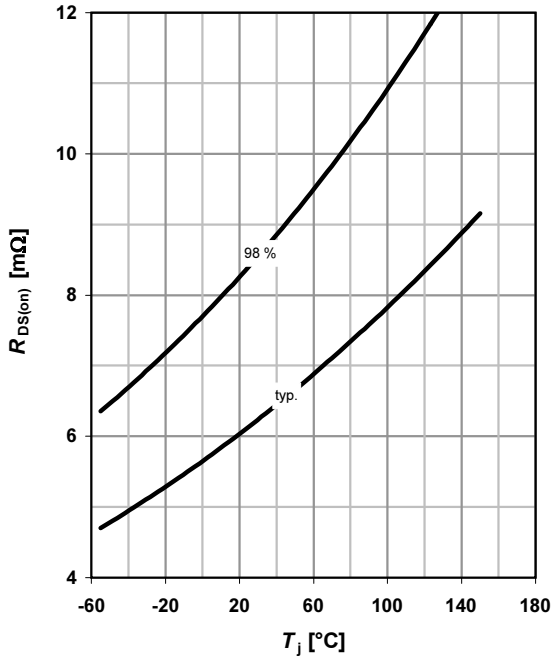
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



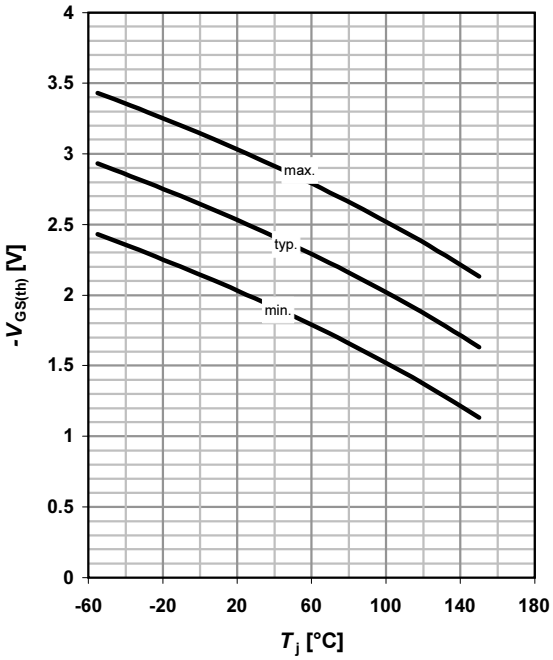
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=-30 A; V_{GS}=-10 V



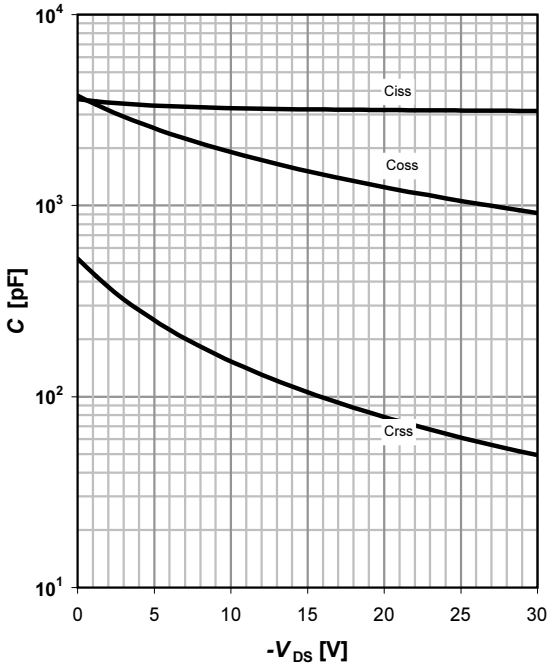
10 Typ. gate threshold voltage

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=-250 µA



11 Typ. capacitances

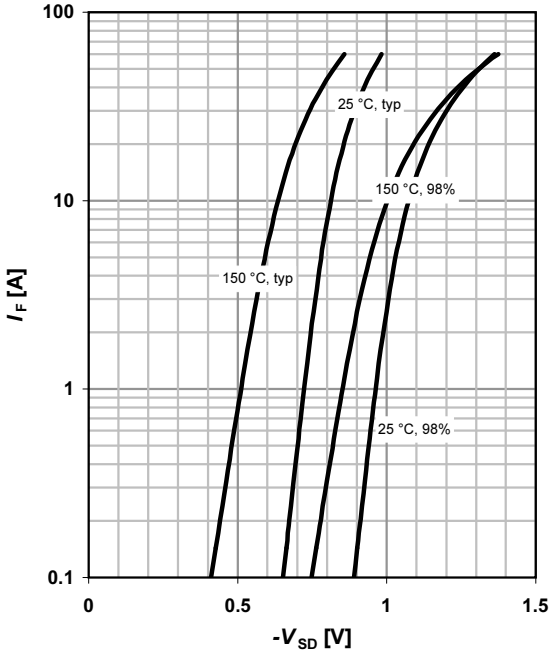
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

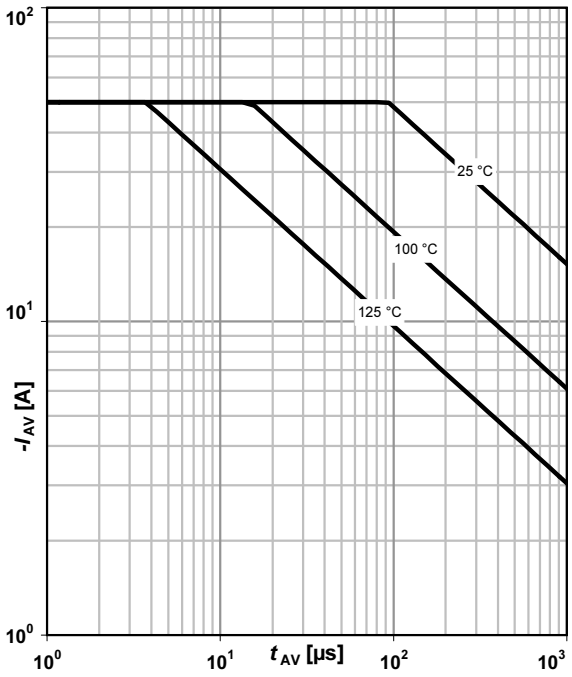
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

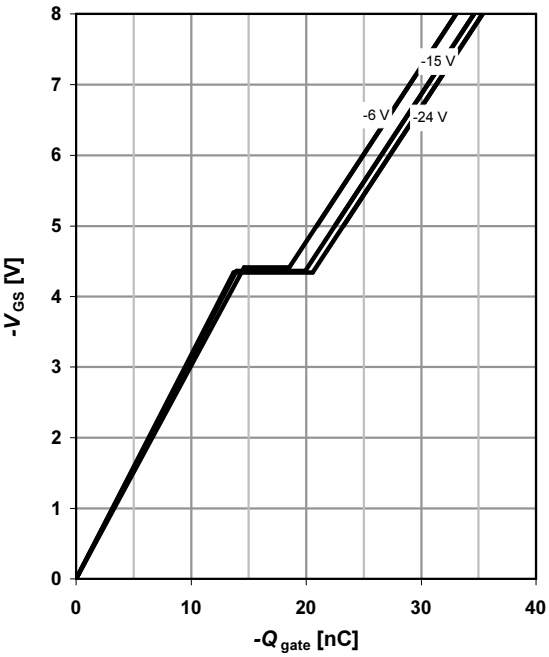
parameter: $T_{j(start)}$



14 Typ. gate charge

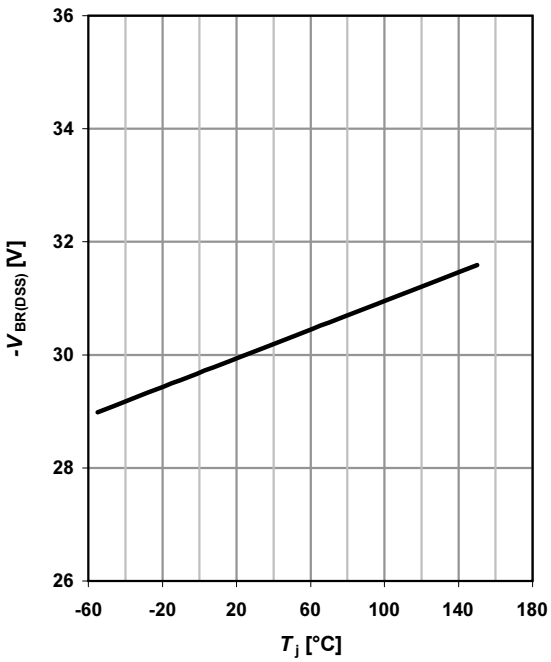
V_{GS}=f(Q_{gate}); I_D=-50 A pulsed

parameter: V_{DD}

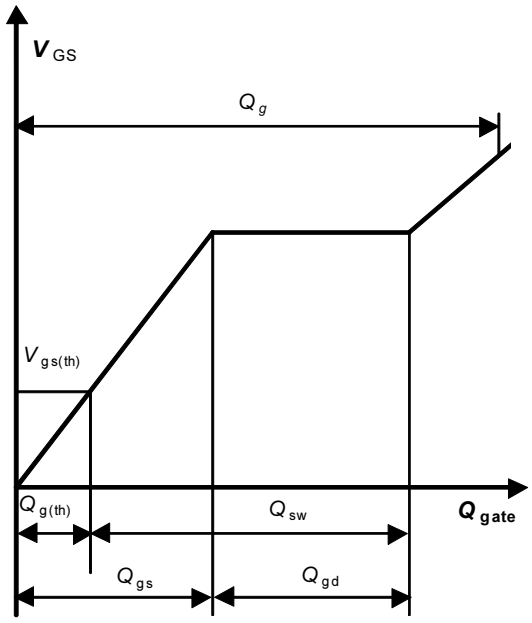


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=-250 µA

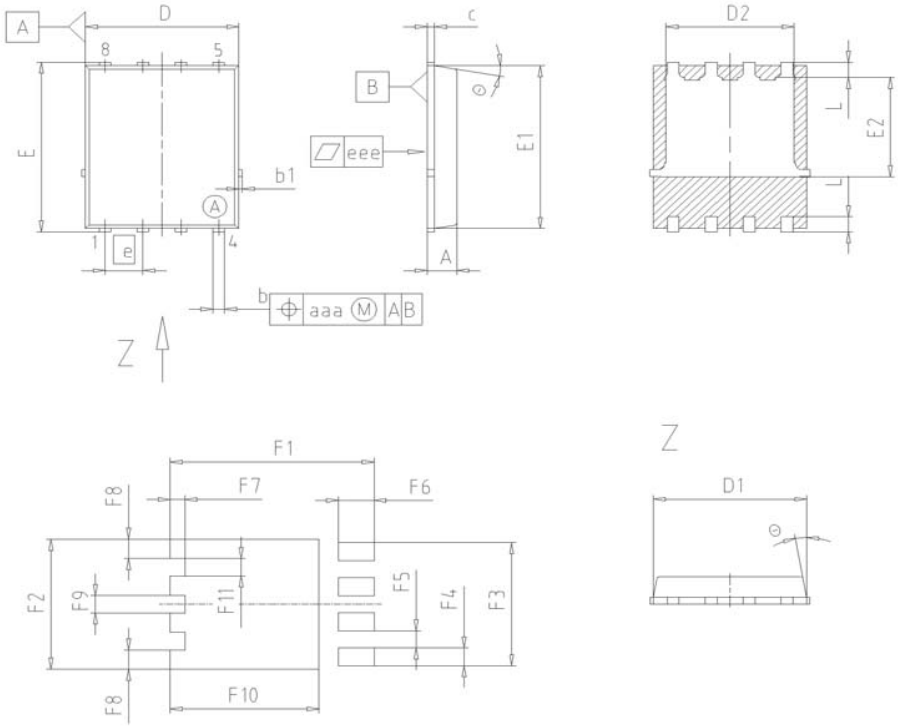


16 Gate charge waveforms

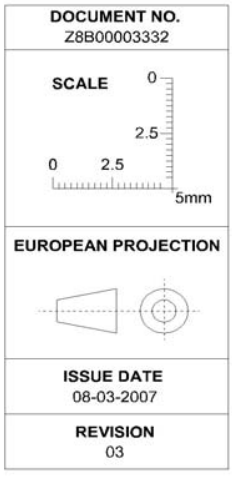


Package Outline

PG-TDSON-8



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.10	0.035	0.043
b	0.34	0.54	0.013	0.021
b1	0.02	0.22	0.001	0.008
c	0.15	0.35	0.006	0.014
D=D1	4.95	5.35	0.195	0.211
D2	4.20	4.40	0.165	0.173
E	5.95	6.35	0.234	0.250
E1	5.70	6.10	0.224	0.240
E2	3.40	3.80	0.134	0.150
e	1.27		0.050	
N	8		8	
L	0.45	0.65	0.018	0.026
□	8.5°	11.5°	8.5°	11.5°
aaa	0.25		0.010	
eee	0.05		0.002	
F1	6.75	6.95	0.266	0.274
F2	4.60	4.80	0.181	0.189
F3	4.36	4.56	0.172	0.180
F4	0.55	0.75	0.022	0.030
F5	0.52	0.72	0.020	0.028
F6	1.10	1.30	0.043	0.051
F7	0.40	0.60	0.016	0.024
F8	0.60	0.80	0.024	0.031
F9	0.53	0.73	0.021	0.029
F10	4.90	5.10	0.193	0.201
F11	0.53	0.73	0.021	0.029



Dimensions in mm

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