OptiMOS™-P Power-Transistor

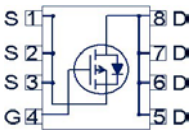
Features

- P-Channel
- Enhancement mode
- Logic level
- 150°C operating temperature
- Avalanche rated
- Vgs=25V, specially suited for notebook applications

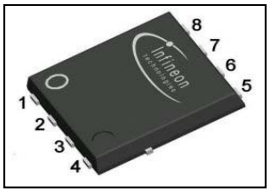
RoHS

Product Summary

V_{DS}	-30	V
$R_{DS(on),max}$	13	mΩ
I_D	-22.5	A



PG-TDSON-8



Type	Package	Marking	Lead free	Packing
BSC130P03LS G	PG-TDSON-8	130P03LS	Yes	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	-22.5	A
		T_C=70 °C	-22.5	
		T_A=25 °C[1)]	-12	
Pulsed drain current	$I_{D,pulse}$	T_C=25 °C[2)]	-90	
Avalanche energy, single pulse	E_{AS}	I_D=-22.5 A, R_{GS}=25 Ω	148	mJ
Gate source voltage	V_{GS}		±25	V
Power dissipation	P_{tot}	T_C=25 °C	69	W
		T_A=25 °C[1)]	2.8	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
ESD class		JESD22-C101-HBM	1C (1kV-2kV)	
Soldering temperature			260 °C	
IEC climatic category; DIN IEC 68-1			55/150/56	

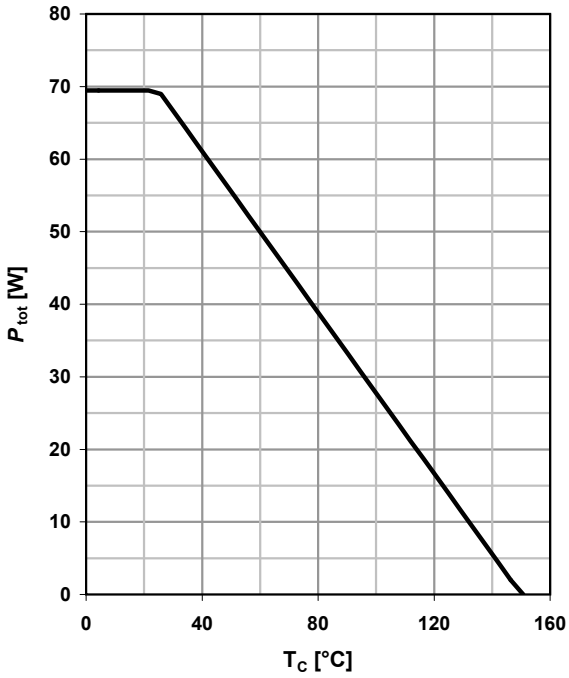
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	1.8	K/W
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 cooling area[1)]	-	-	50	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
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=-150 µA	-2.2	-1.5	-1	
Zero gate voltage drain current	I_{DSS}	V_{DS}=-30 V, V_{GS}=0 V, T_j=25 °C	-	-0.1	-1	µA
		V_{DS}=-30 V, V_{GS}=0 V, T_j=125 °C	-	-10	-100	
Gate-source leakage current	I_{GSS}	V_{GS}=-25 V, V_{DS}=0 V	-	-10	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-10 V, I_D=-22.5 A	-	9.4	13.0	mΩ
Gate resistance	R_G		-	3.8	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=-22.5 A	20	39	-	S

[1)] 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	-	2760	3670	pF
Output capacitance	C_{oss}		-	857	1140	
Reverse transfer capacitance	C_{rss}		-	690	1000	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-15 V, V_{GS}=-10 V, I_D=22.5 A, R_G=6 Ω	-	11.4	17.1	ns
Rise time	t_r		-	65.6	98.4	
Turn-off delay time	$t_{d(off)}$		-	43.5	65.3	
Fall time	t_f		-	35.1	52.7	
Gate Charge Characteristics[3)]						
Gate to source charge	Q_{gs}	V_{DD}=-24 V, I_D=22.5 A, V_{GS}=0 to -10 V	-	-7.7	-10.3	nC
Gate charge at threshold	$Q_{g(th)}$		-	-4.3	-5.7	
Gate to drain charge	Q_{gd}		-	-20.5	-30.8	
Switching charge	Q_{sw}		-	-24.0	-35.4	
Gate charge total	Q_g		-	-54.9	-73.1	
Gate plateau voltage	$V_{plateau}$		-	-2.9	-	V
Output charge	Q_{oss}	V_{DD}=-15 V, V_{GS}=0 V	-	-14.8	-	
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	22.5	A
Diode pulse current	$I_{S,pulse}$		-	-	-90	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=-22.5 A, T_j=25 °C	-	-0.9	-1.2	V
Reverse recovery time	t_{rr}	V_R=15 V, I_F=$\|I_S\|$, di_F/dt=100 A/µs	-	33	-	ns
Reverse recovery charge	Q_{rr}		-	24	-	nC

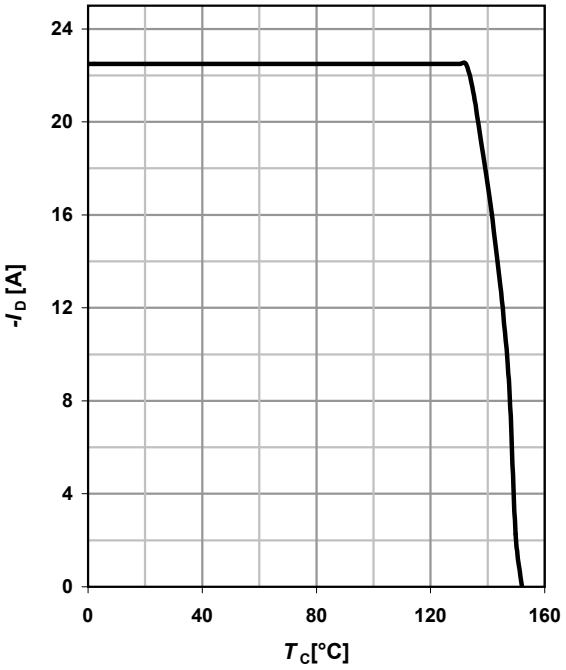
1 Power dissipation

$P_{tot}=f(T_C)$; $t_p \leq 10$ s



2 Drain current

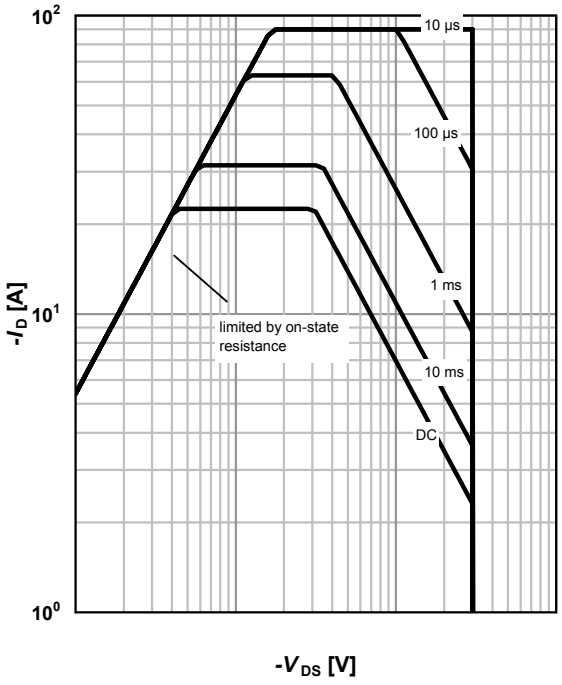
$I_D=f(T_C)$; $|V_{GS}| \geq 10$ V; $t_p \leq 10$ s



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C[1)]; $D=0$

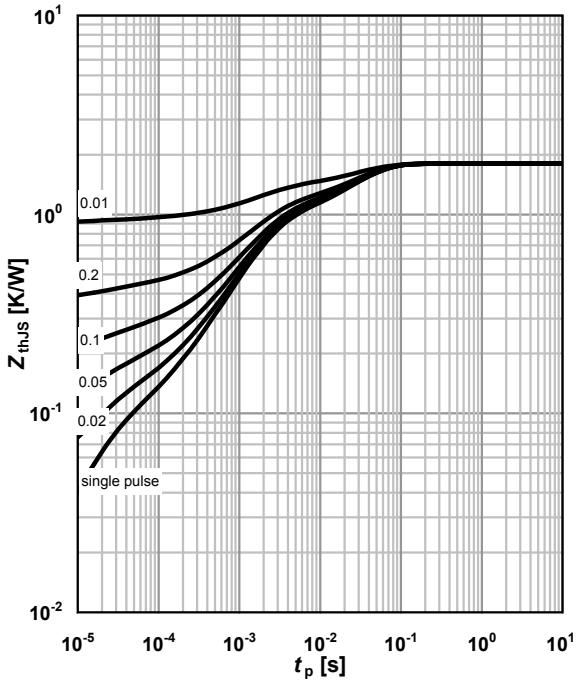
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJS}=f(t_p)$

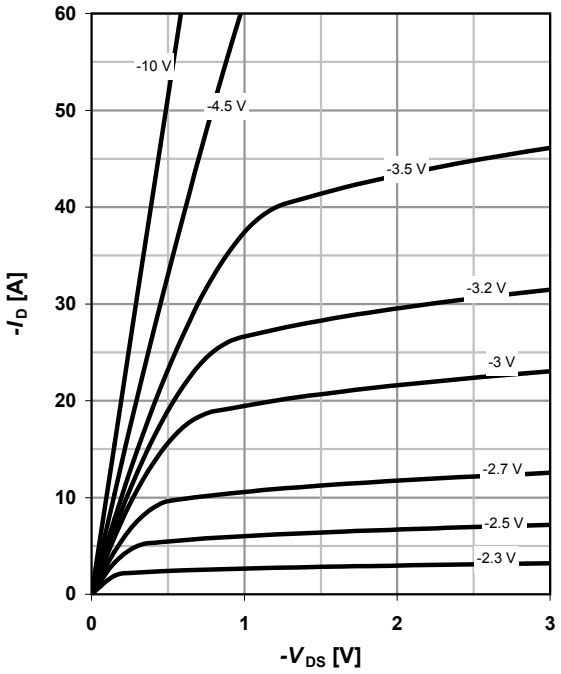
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

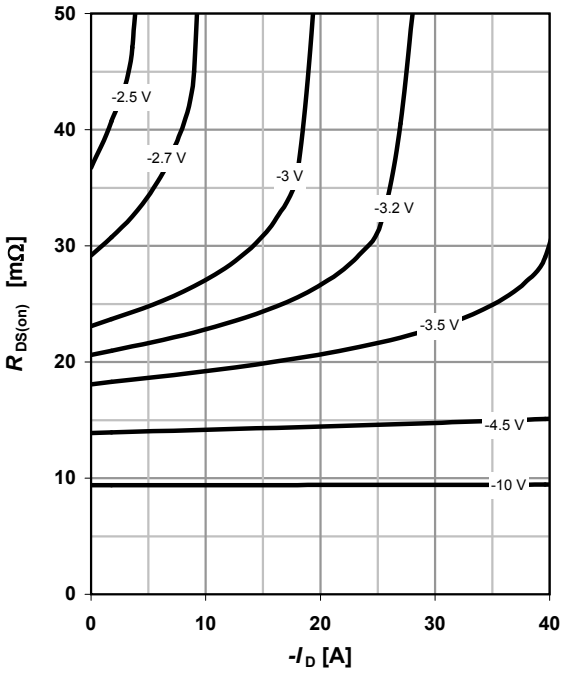
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

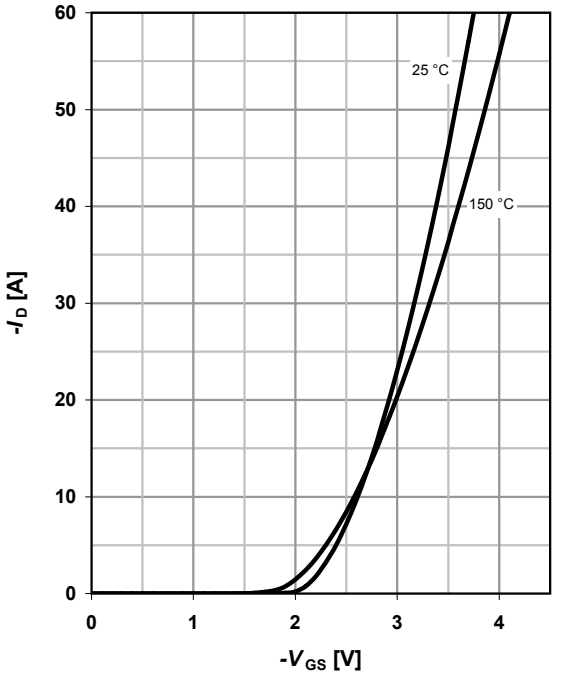
parameter: V_{GS}



7 Typ. transfer characteristics

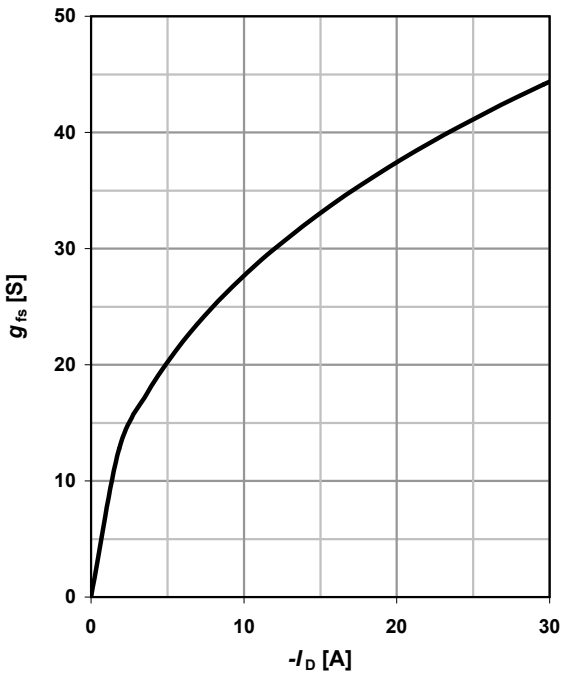
I_D=f(V_{GS}); $|V_{DS}|>2|I_D|R_{DS(on)max}$

parameter: T_j



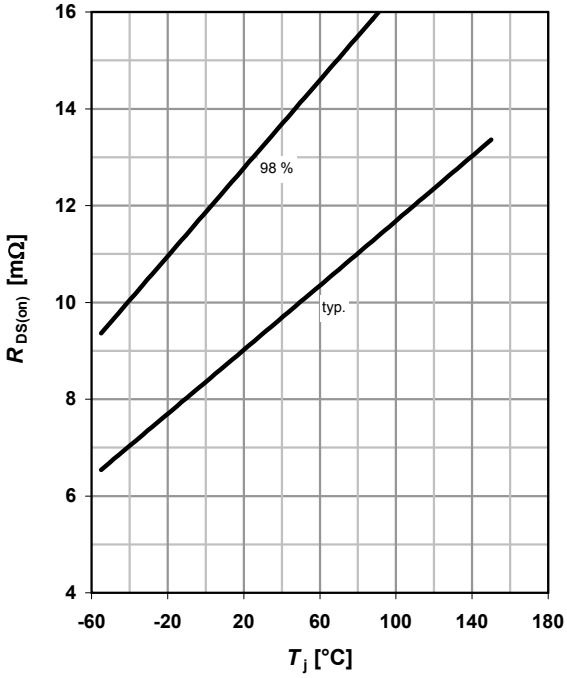
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



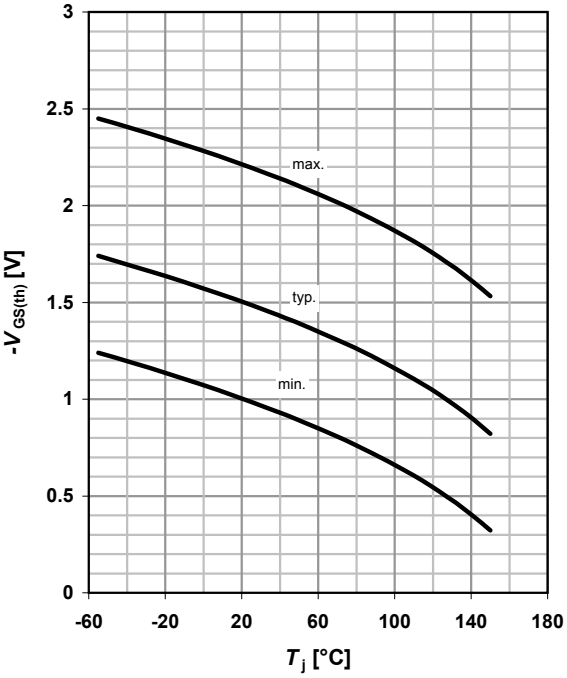
9 Drain-source on-state resistance

$R_{DS(on)}$=f(T_j); I_D=-22.5 A; V_{GS}=-10 V



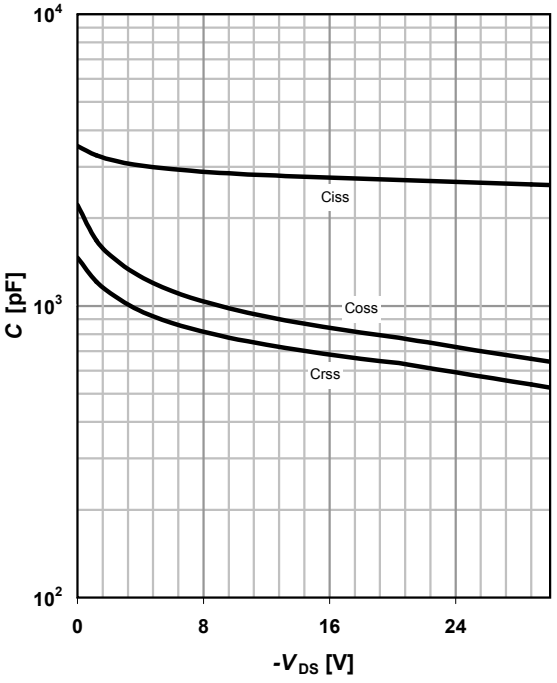
10 Typ. gate threshold voltage

$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}; I_D=-150 µA



11 Typ. capacitances

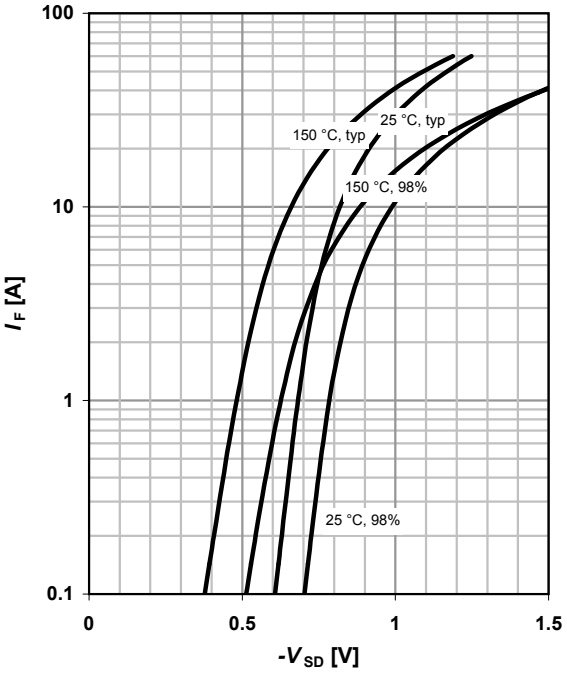
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

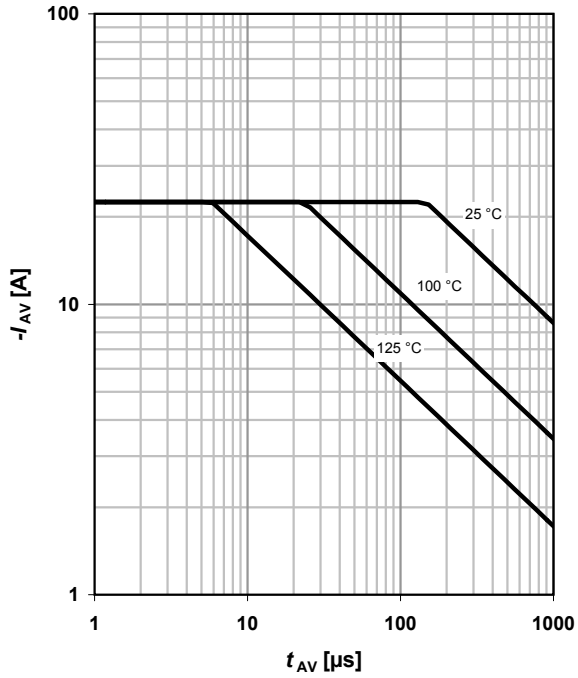
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

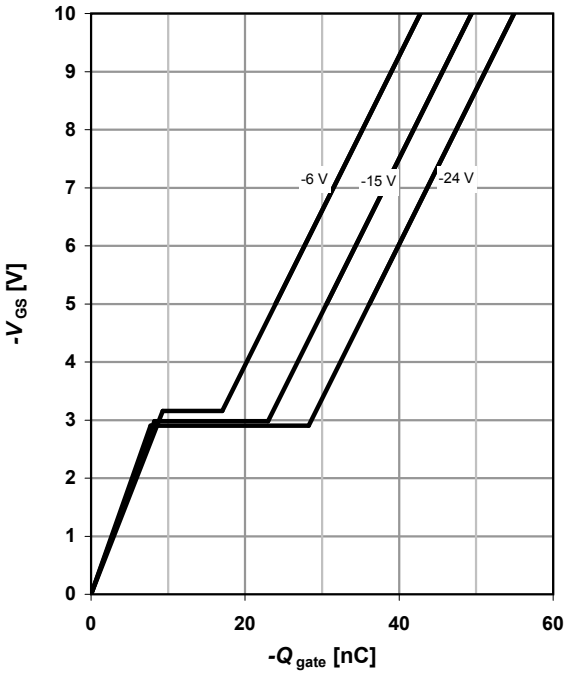
parameter: $T_{j(start)}$



14 Typ. gate charge

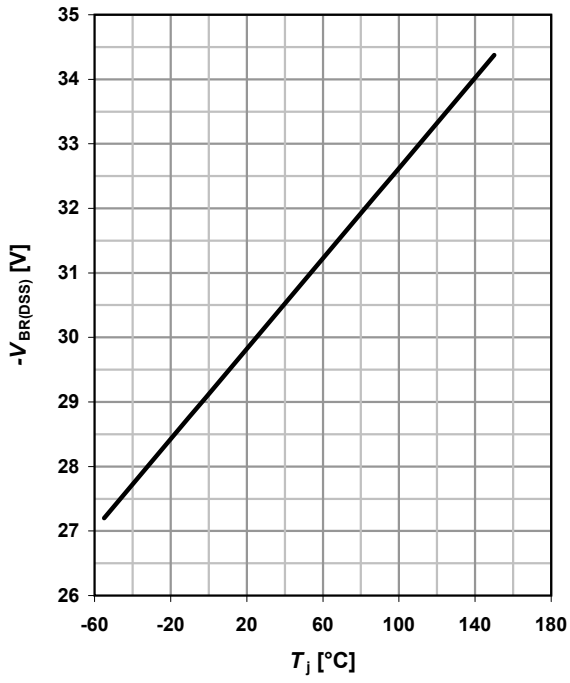
V_{GS}=f(Q_{gate}); I_D=-22.5 A pulsed

parameter: V_{DD}

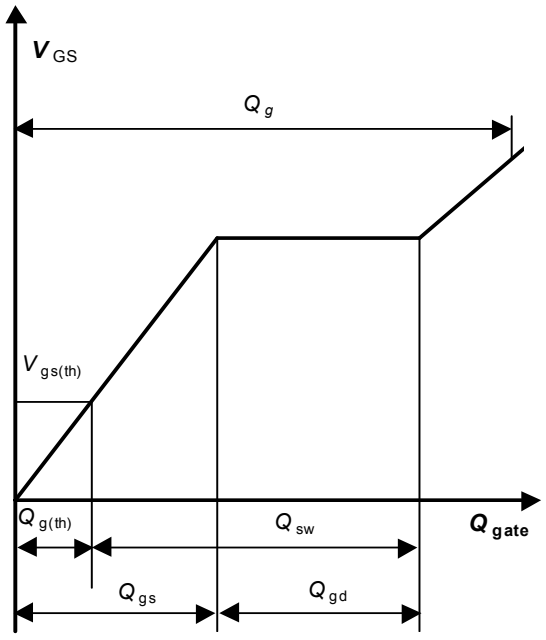


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=-250 µA

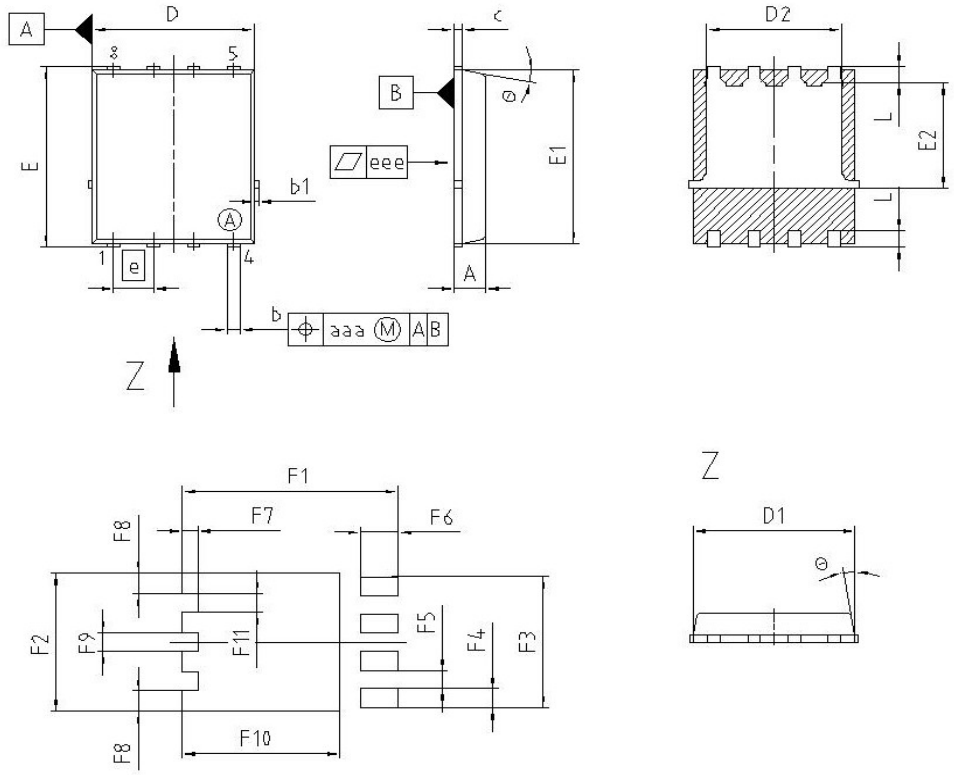


16 Gate charge waveforms



Package Outline

PG-TDSON-8: Outline



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.900	1.100	0.035	0.043
b	0.340	0.540	0.013	0.021
b1	0.000	0.120	0.000	0.005
c	0.150	0.350	0.006	0.014
D=D1	4.950	5.350	0.195	0.211
D2	4.200	4.400	0.165	0.173
E	5.950	6.350	0.234	0.250
E1	5.700	6.100	0.224	0.240
E2	3.400	3.800	0.134	0.150
e	1.270		0.050	
N	8		8	
L	0.450	0.650	0.018	0.026
Θ	9°	11°	9°	11°
aaa	0.250		0.010	
eee	0.050		0.002	
F1	6.750	6.950	0.266	0.274
F2	4.600	4.800	0.181	0.189
F3	4.360	4.560	0.172	0.180
F4	0.550	0.750	0.022	0.030
F5	0.520	0.720	0.020	0.028
F6	1.100	1.300	0.043	0.051
F7	0.400	0.600	0.016	0.024
F8	0.600	0.800	0.024	0.031
F9	0.530	0.730	0.021	0.029
F10	4.900	5.100	0.193	0.201
F11	0.535	0.735	0.021	0.029

REFERENCE	JEDEC / MO-240
SCALE	0, 2.5, 0, 2.5, 5mm
EUROPEAN PROJECTION	
ISSUE DATE	23-08-2006
FILE	TDSON_1

Dimensions in mm

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