OptiMOS™3 Power-Transistor

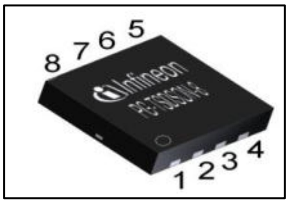
Product Summary

V_{DS}	250	V
$R_{DS(on),max}$	425	mΩ
I_D	5	A

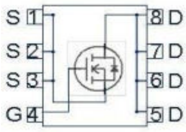
Features

- 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

PG-TSDSON-8



Type	Package	Marking
BSZ42DN25NS3 G	PG-TSDSON-8	42DN25N



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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_C=25 °C	5	A
		T_C=100 °C	3.5	
Pulsed drain current[2]	$I_{D,pulse}$	T_C=25 °C	20	
Avalanche energy, single pulse	E_{AS}	I_D=2.5 A, R_{GS}=25 Ω	40	mJ
Reverse diode dv/dt	dv/dt		10	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_C=25 °C	33.8	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}		-	-	3.7	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

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	250	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=13 µA	2	3	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=200 V, V_{GS}=0 V, T_j=25 °C	-	0.1	1	µA
		V_{DS}=200 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=2.5 A	-	371	425	mΩ
Gate resistance	R_G		-	1.7	-	Ω
Transconductance	g_{fs}	$\lvert V_{DS}\rvert>2\lvert I_D\rvert R_{DS(on)max}$, I_D=2.5 A	3	6	-	S

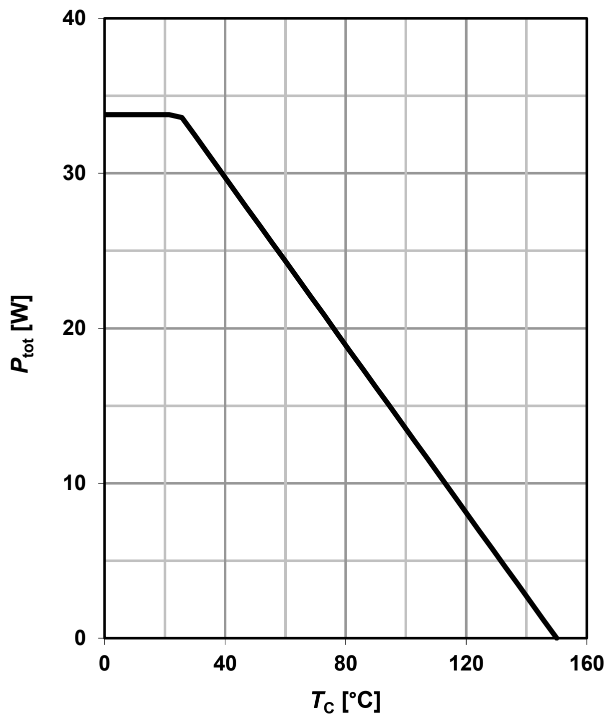
[3)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (one layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=100 V, f=1 MHz	-	320	430	pF
Output capacitance	C_{oss}		-	21	28	
Reverse transfer capacitance	C_{rss}		-	5.1	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=100 V, V_{GS}=10 V, I_D=2.5 A, $R_{G,ext}$=1.6 Ω	-	3	-	ns
Rise time	t_r		-	2	-	
Turn-off delay time	$t_{d(off)}$		-	8	-	
Fall time	t_f		-	5	-	
Gate Charge Characteristics[4)]						
Gate to source charge	Q_{gs}	V_{DD}=101 V, I_D=2.5 A, V_{GS}=0 to 10 V	-	1.4	-	nC
Gate to drain charge	Q_{gd}		-	0.8	-	
Switching charge	Q_{sw}		-	1.2	-	
Gate charge total	Q_g		-	4.2	5.5	
Gate plateau voltage	$V_{plateau}$		-	4.4	-	V
Output charge	Q_{oss}	V_{DD}=100 V, V_{GS}=0 V	-	7	9	nC
Reverse Diode						
Diode continous forward current	I_S	T_C=25 °C	-	-	5.0	A
Diode pulse current	$I_{S,pulse}$		-	-	20	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=5 A, T_j=25 °C	-	0.9	1.2	V
Reverse recovery time	t_{rr}	V_R=100 V, I_F=I_S, di_F/dt=100 A/µs	-	70	-	ns
Reverse recovery charge	Q_{rr}		-	159	-	nC

4) See figure 16 for gate charge parameter definition

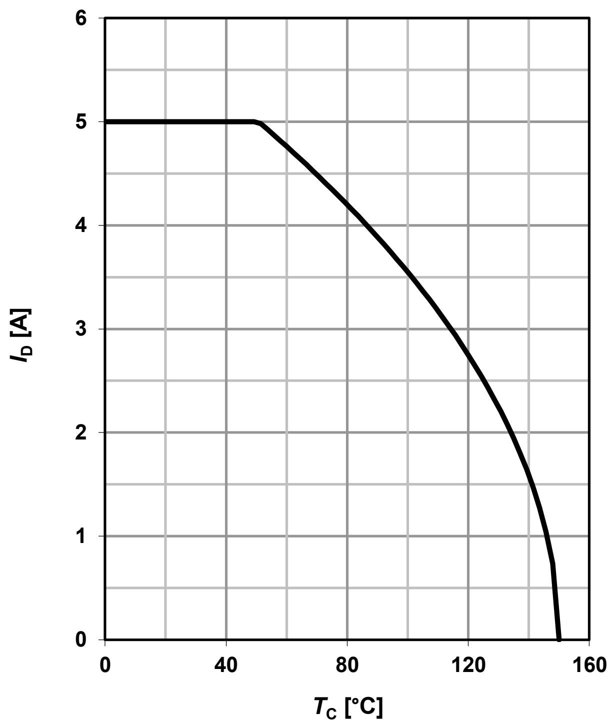
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

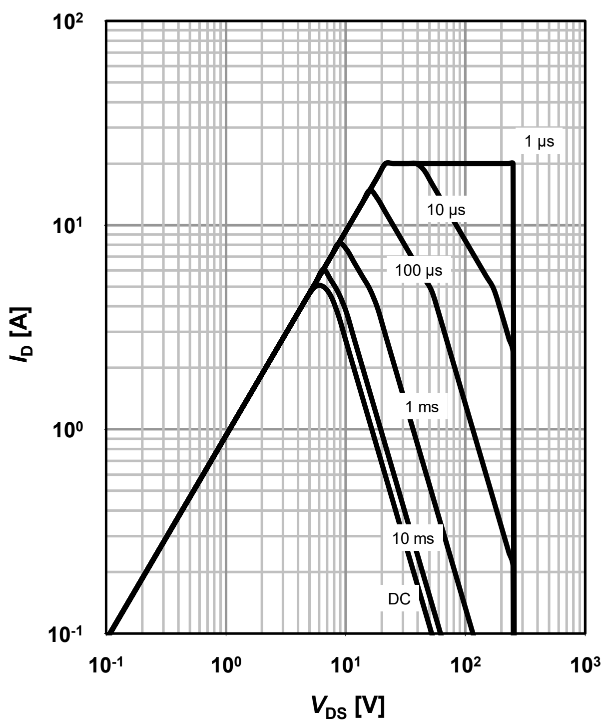
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

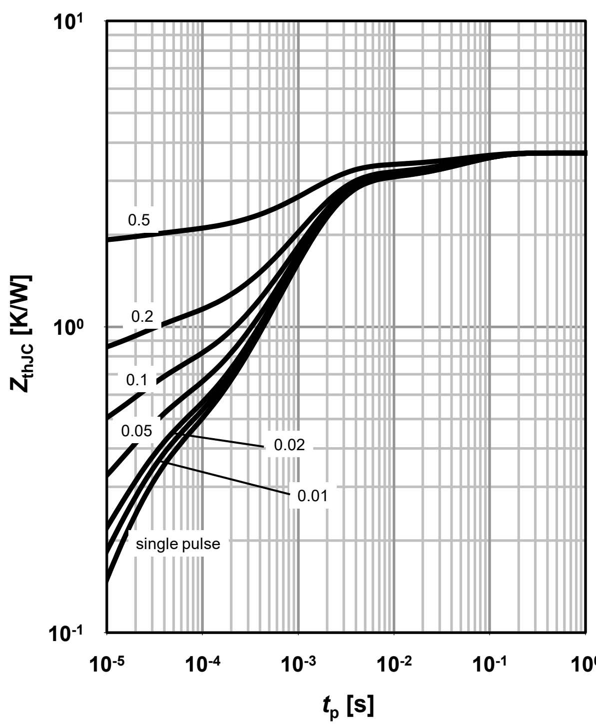
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

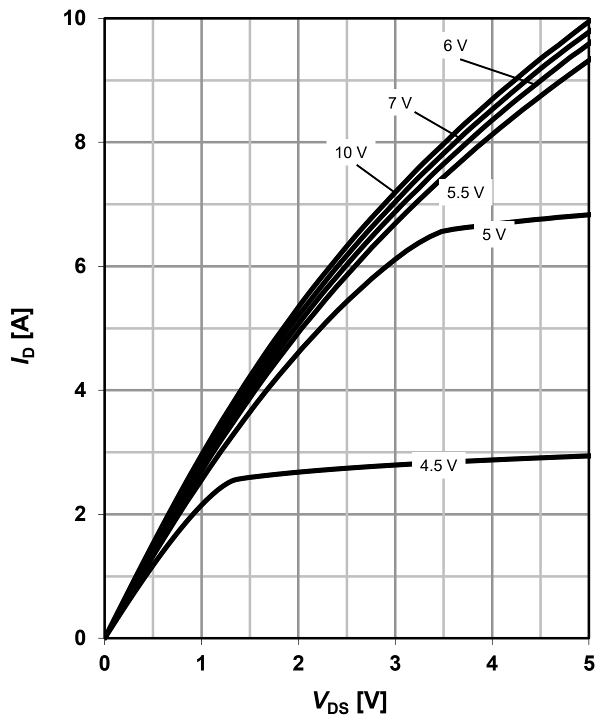
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

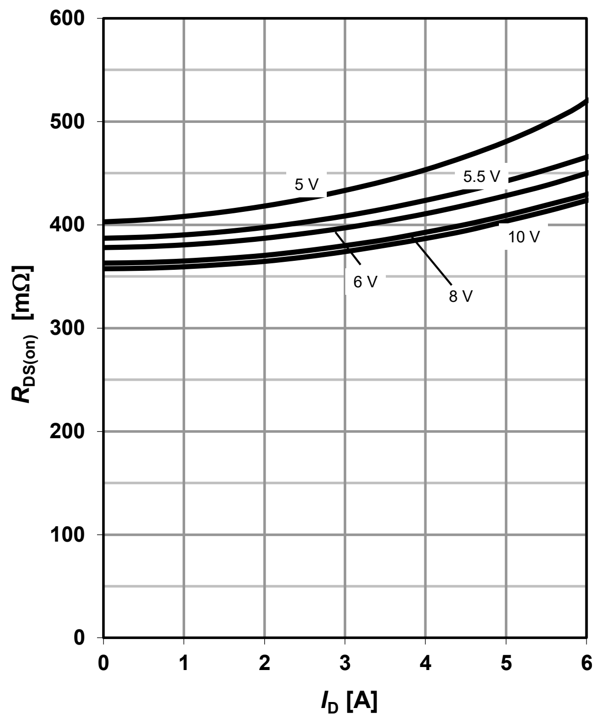
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

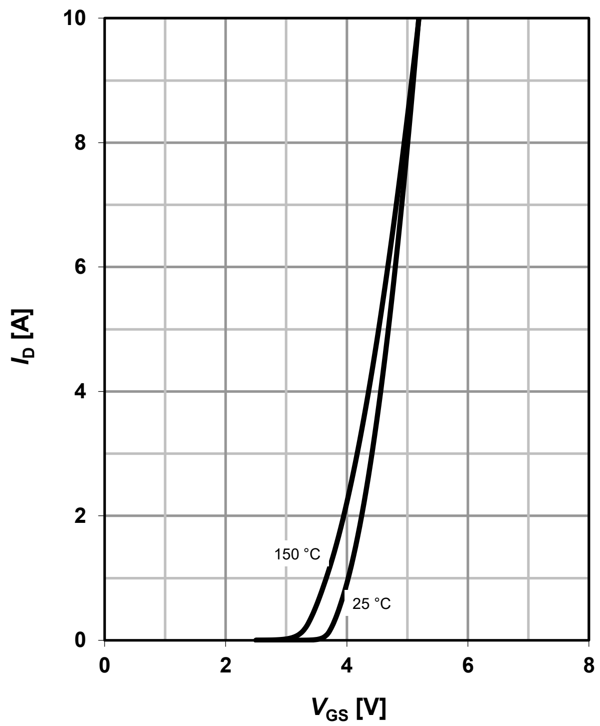
parameter: V_{GS}



7 Typ. transfer characteristics

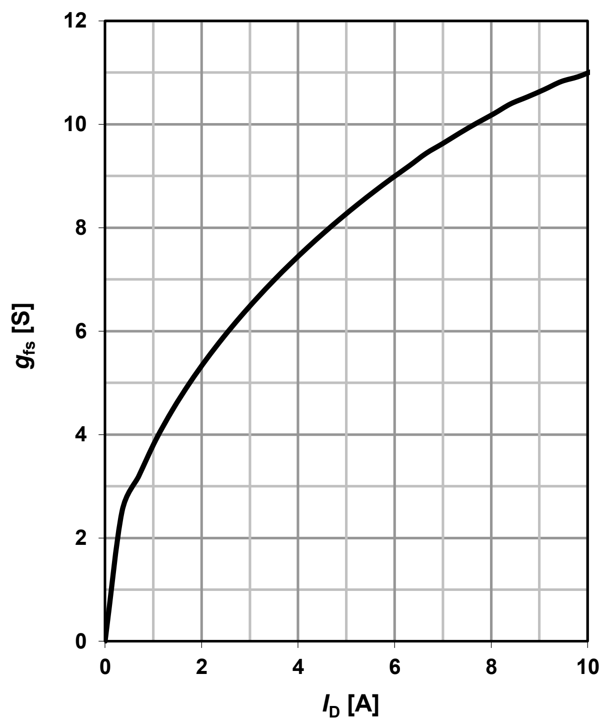
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

parameter: T_j



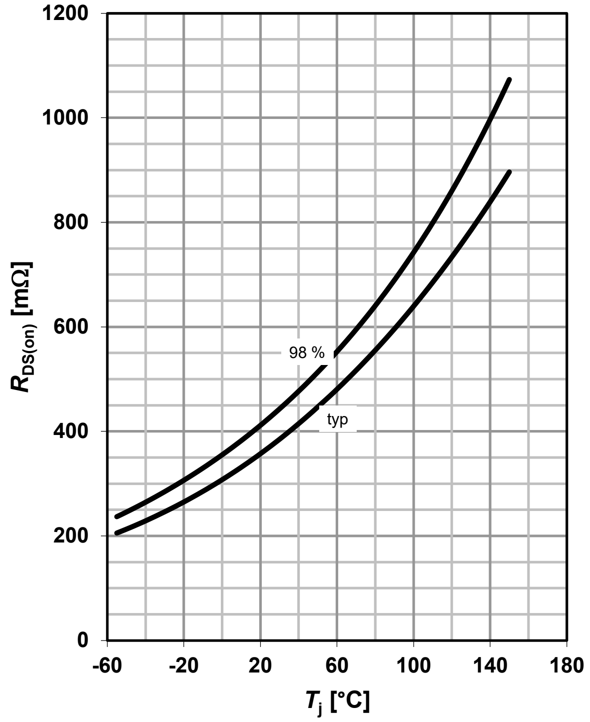
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

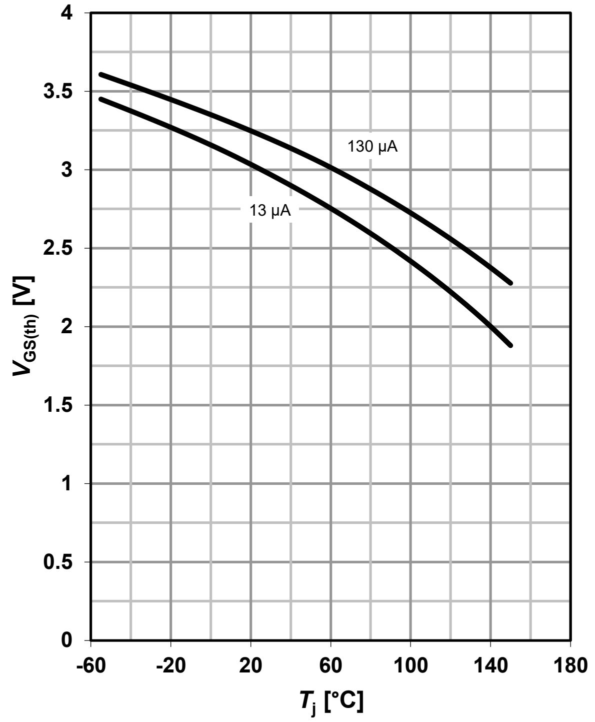
$R_{DS(on)}$=f(T_j); I_D=2.5 A; V_{GS}=10 V



10 Typ. gate threshold voltage

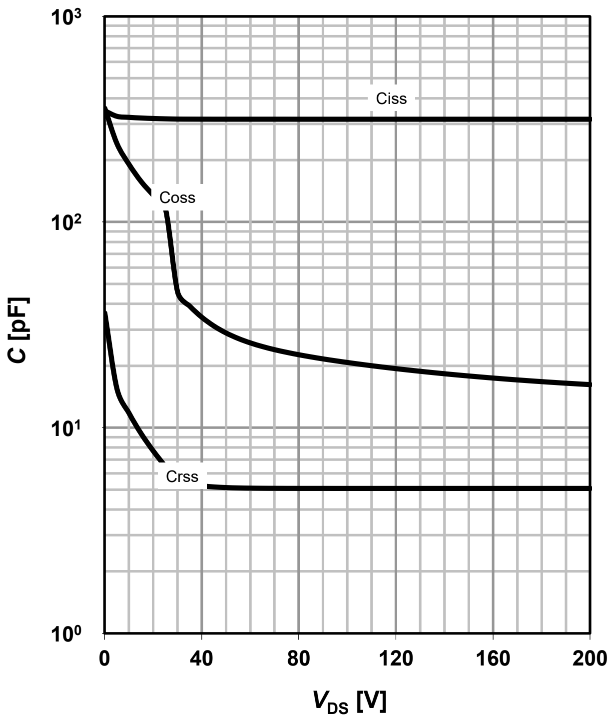
$V_{GS(th)}$=f(T_j); V_{GS}=V_{DS}

parameter: I_D



11 Typ. capacitances

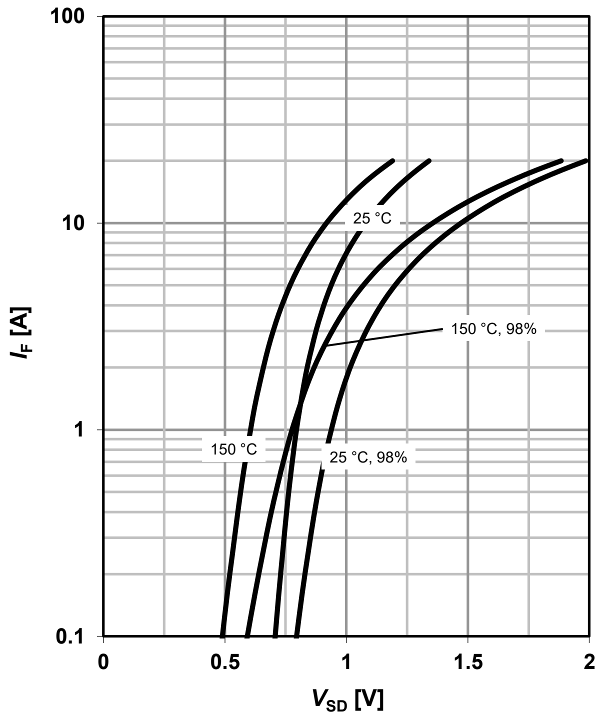
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

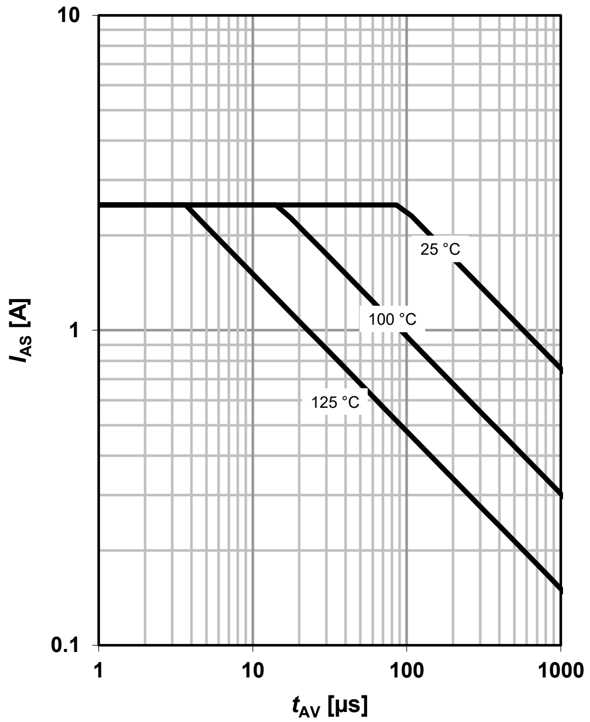
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

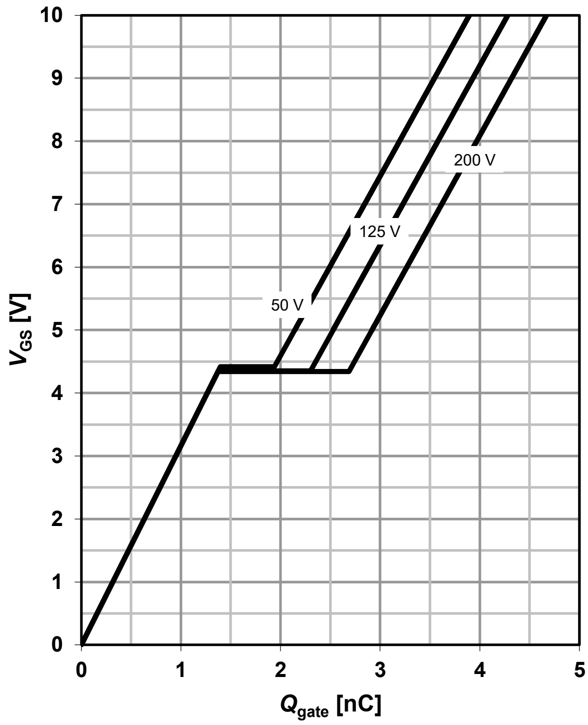
parameter: $T_{j(start)}$



14 Typ. gate charge

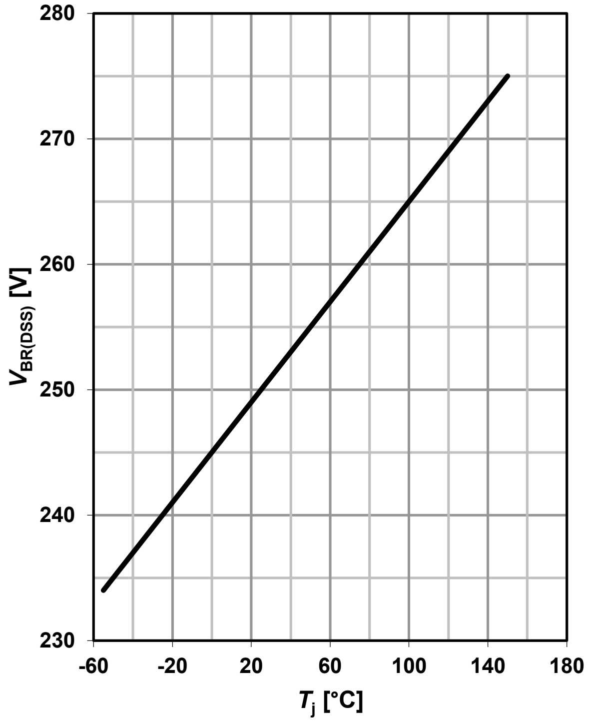
V_{GS}=f(Q_{gate}); I_D=2.5 A pulsed

parameter: V_{DD}

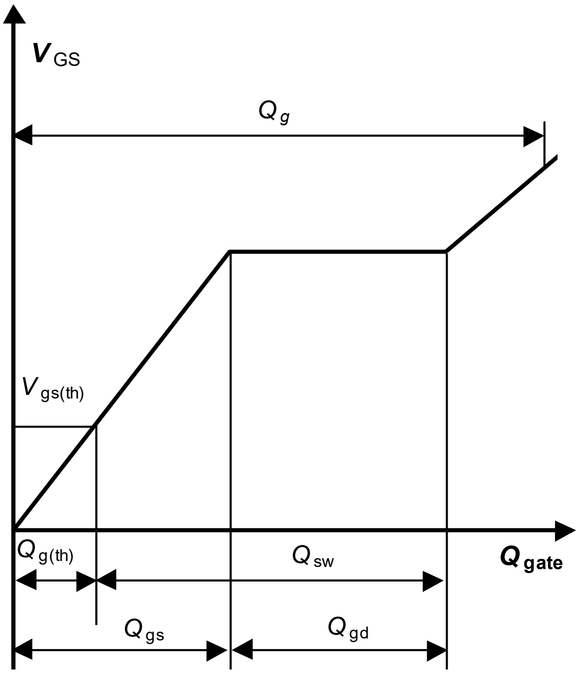


15 Drain-source breakdown voltage

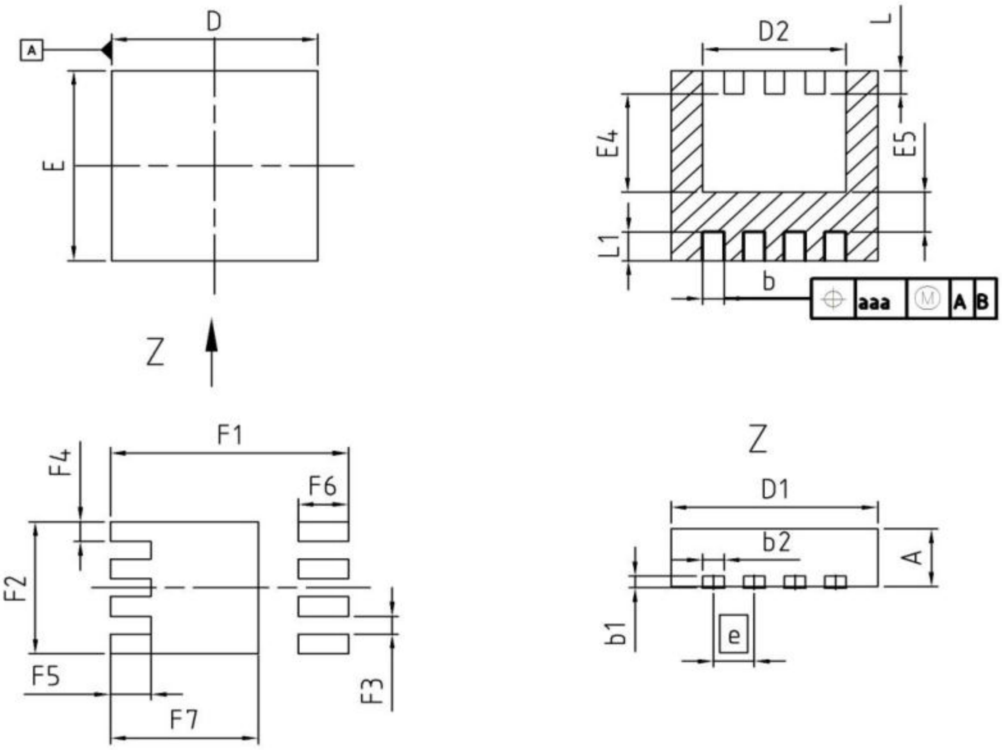
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



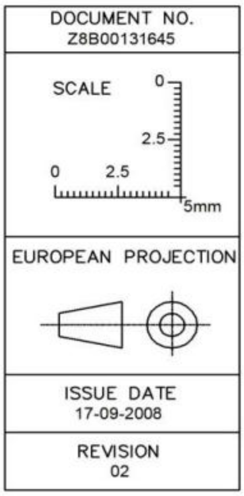
16 Gate charge waveforms



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	



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