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OptiMOS™ Power-MOSFET

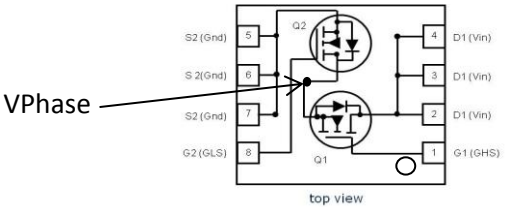
Features

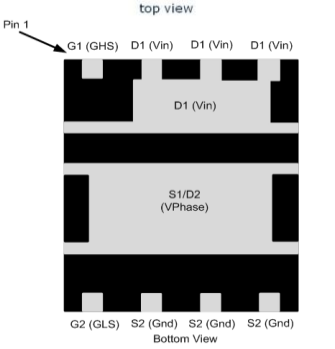
- Dual N-channel OptiMOS™ MOSFET
- Optimized for clean switching
- 100% avalanche tested
- Superior thermal resistance
- Optimized for high performance Buck converter
- Qualified according to JEDEC[1] for target applications
- Pb-free lead plating; RoHS compliant
- Halogen-free according to IEC61249-2-21

Pb-Free RoHS Halogen-Free

Product Summary

V_{DS}	30	V
$R_{DS(on),max}$	5	mΩ
I_D	40	A
Q_{OSS}	8.6	nC
Q_G(0V..10V)	13	nC





Type	Package	Marking
BSC0925ND	PG-TISON-8	0925ND

Maximum ratings, at T_j=25 °C, unless otherwise specified[2]

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	40	A
		V_{GS}=4.5 V, T_A=25 °C[3]	15	
		V_{GS}=4.5 V, T_A=70 °C[3]	12	
		V_{GS}=10 V, T_A=25 °C[4]	11	
Pulsed drain current[5]	$I_{D,pulse}$	T_C=25 °C	160	
Avalanche energy, single pulse	E_{AS}	I_D=20 A, R_{GS}=25 Ω	14	mJ
Gate source voltage	V_{GS}		±20	V

[1] J-STD20 and JESD22

[2] One transistor active

[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.

[4] Device mounted on a minimum pad (one layer, 70 µm thick). One transistor active

[5] See figure 3 for more detailed information.

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

Parameter	Symbol	Conditions	Value	Unit
Power dissipation	P_{tot}	T_C=25 °C	30	W
		T_A=25 °C, R_{thJA}=50 K/W[3)]	2.5	
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

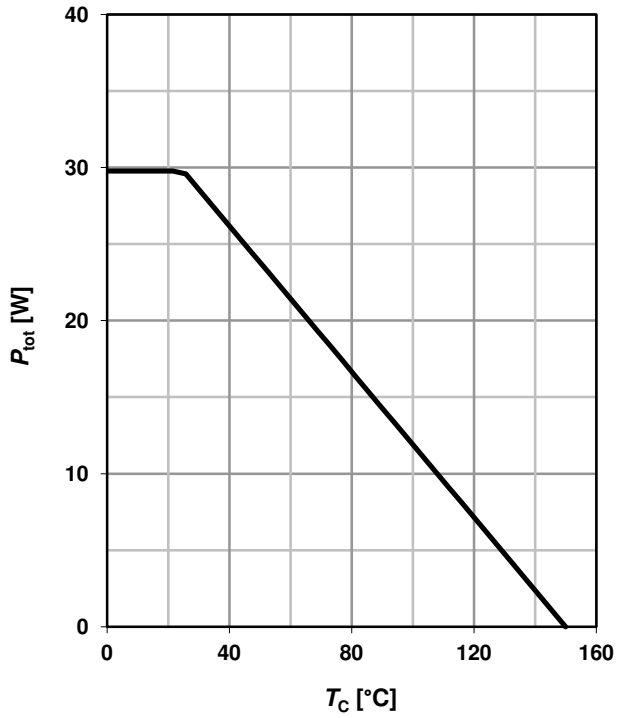
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	4.2	K/W
		top	-	-	20	
Device on PCB	R_{thJA}	6 cm^2 cooling area[3)]	-	-	50	
		minimum footprint[4)]	-	-	125	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=250 µA	1.2	-	2.0	
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}=20 V, V_{DS}=0 V	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=20 A	-	5.6	7	mΩ
		V_{GS}=10 V, I_D=20 A	-	4.2	5	
Gate resistance	R_G		1.3	2.6	5.2	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=30 A	38	77	-	S

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	-	870	1157	pF
Output capacitance	C_{oss}		-	330	439	
Reverse transfer capacitance	C_{rss}		-	49	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=15 V, V_{GS}=10 V, I_D=20 A, $R_{G,ext}$=1.6 Ω	-	4.7	-	ns
Rise time	t_r		-	3.8	-	
Turn-off delay time	$t_{d(off)}$		-	17	-	
Fall time	t_f		-	3.0	-	
Gate Charge Characteristics[6)]						
Gate to source charge	Q_{gs}	V_{DD}=15 V, I_D=30 A, V_{GS}=0 to 4.5 V	-	2.4	3.2	nC
Gate charge at threshold	$Q_{g(th)}$		-	1.4	-	
Gate to drain charge	Q_{gd}		-	2.2	2.9	
Switching charge	Q_{sw}		-	3.2	-	
Gate charge total	Q_g		-	6.7	8.9	
Gate plateau voltage	$V_{plateau}$		-	2.8	-	V
Gate charge total	Q_g	V_{DD}=15 V, I_D=30 A, V_{GS}=0 to 10 V	-	13	17	nC
Gate charge total, sync. FET	$Q_{g(sync)}$	V_{DS}=0.1 V, V_{GS}=0 to 4.5 V	-	5.4	-	
Output charge	Q_{oss}	V_{DD}=15 V, V_{GS}=0 V	-	8.6	11	
Reverse Diode						
Diode continuous forward current	I_S	T_C=25 °C	-	-	30	A
Diode pulse current	$I_{S,pulse}$		-	-	120	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=20 A, T_j=25 °C	-	0.87	1	V
Reverse recovery charge	Q_{rr}	V_R=15 V, I_F=I_S, di_F/dt=400 A/µs	-	5	-	nC

[6)] See figure 16 for gate charge parameter definition

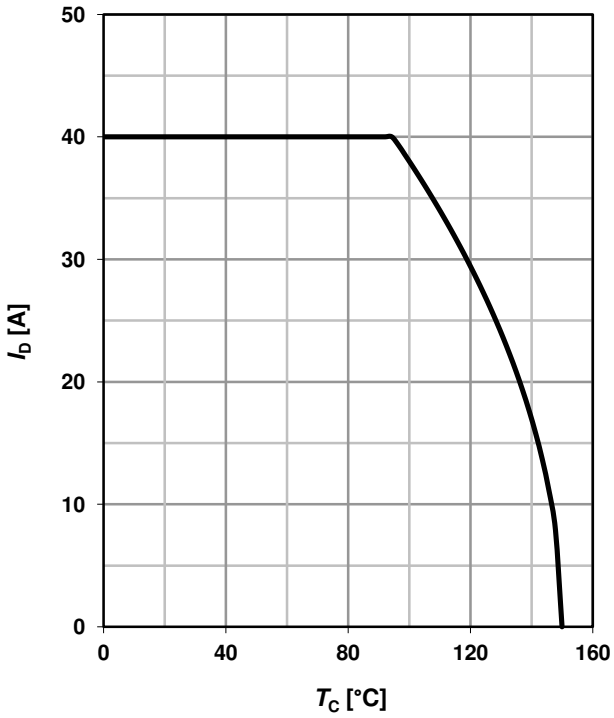
1 Power dissipation

$P_{tot}=f(T_C)$



2 Drain current

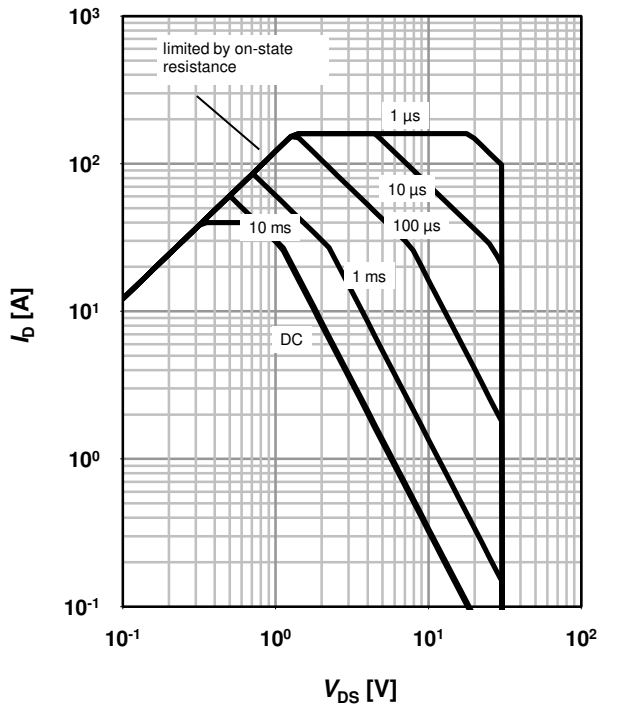
$I_D=f(T_C)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_C=25$ °C; $D=0$

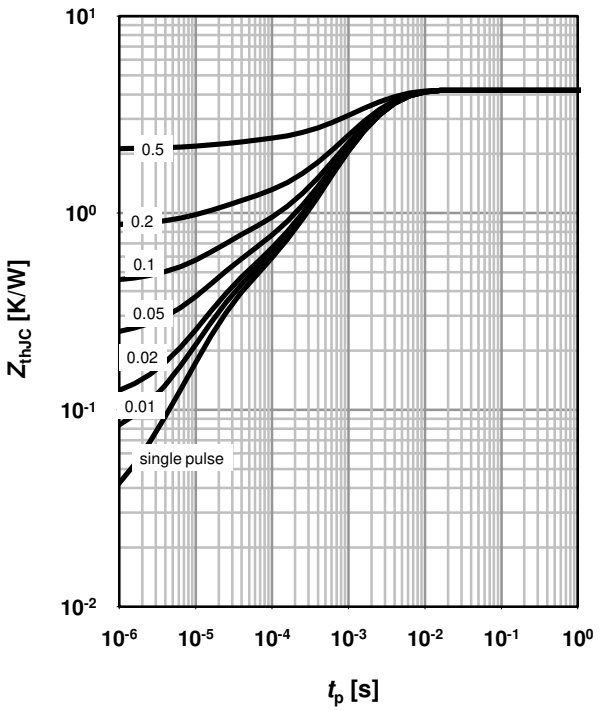
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJC}=f(t_p)$

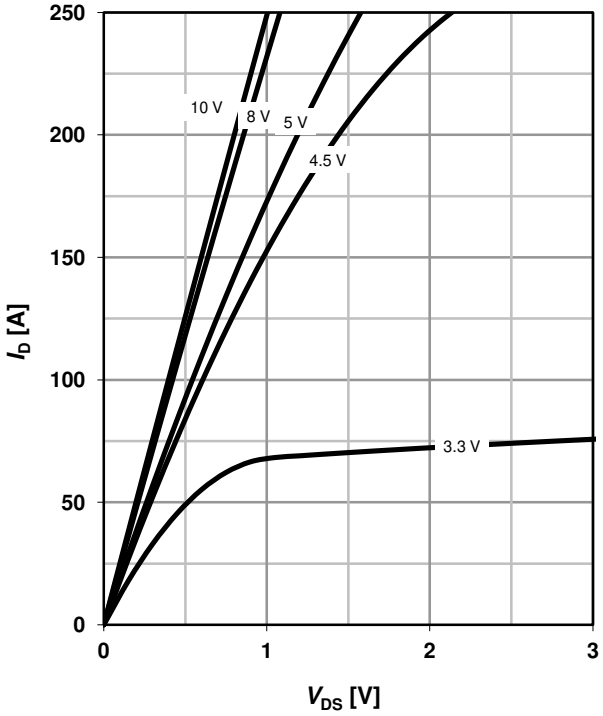
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

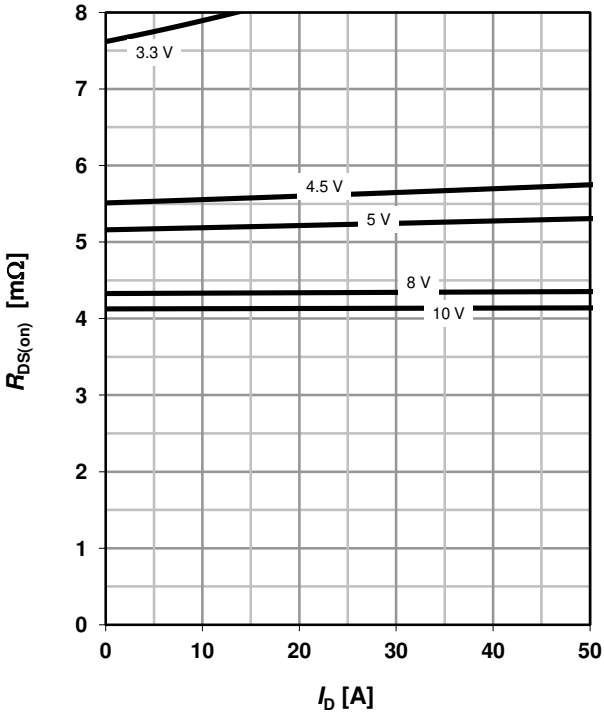
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

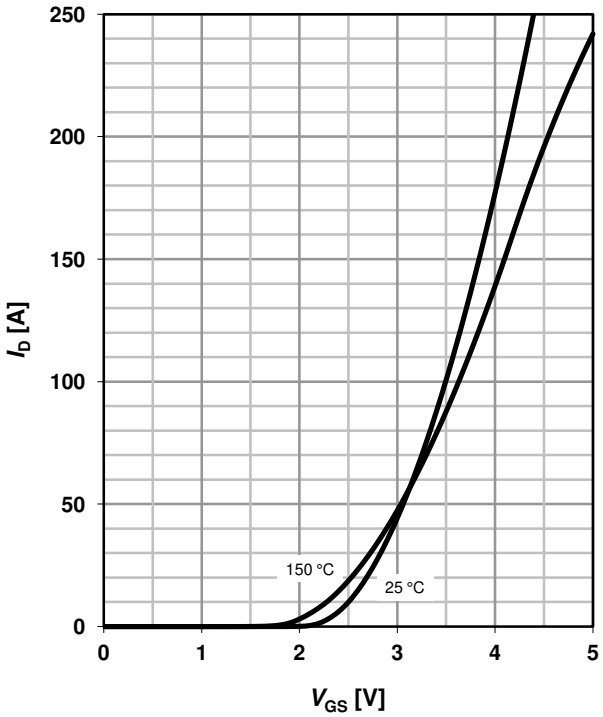
parameter: V_{GS}



7 Typ. transfer characteristics

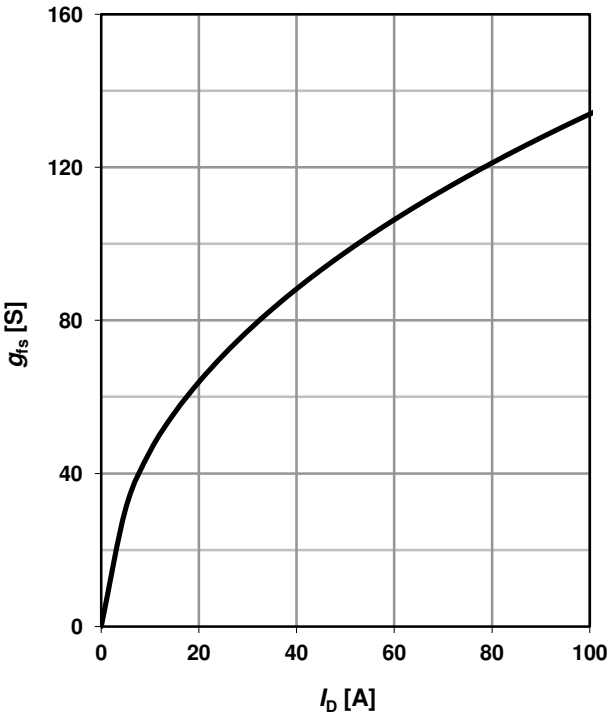
I_D=f(V_{GS}); |V_{DS}|>2|I_D|$R_{DS(on)max}$

parameter: T_j



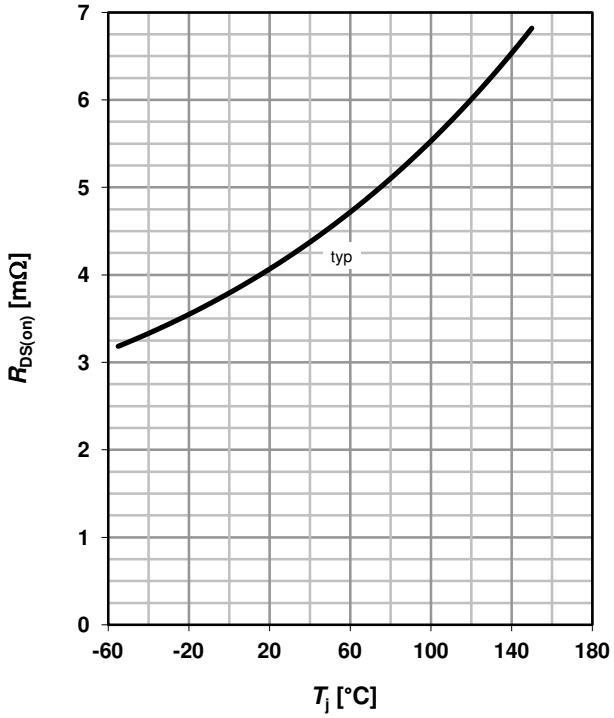
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



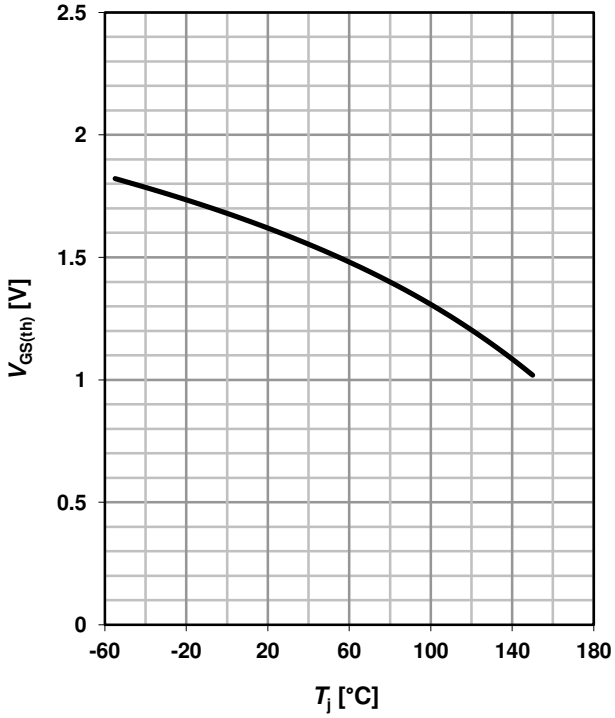
9 Drain-source on-state resistance

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



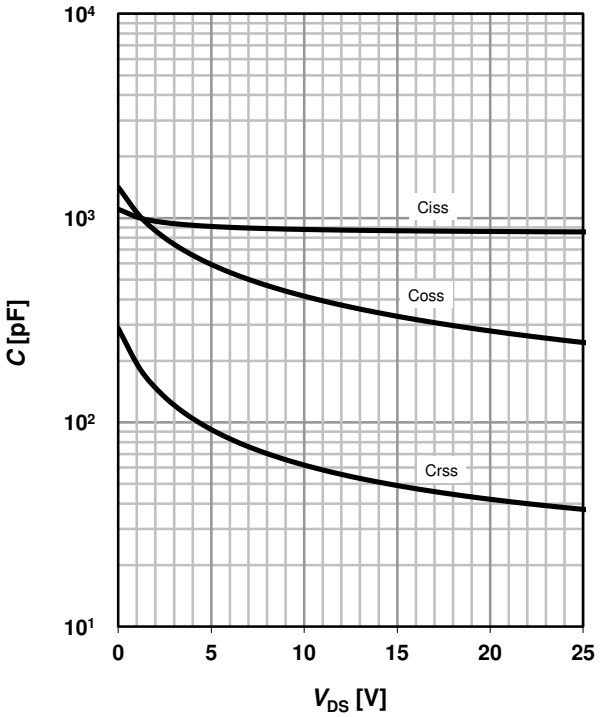
10 Typ. gate threshold voltage

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



11 Typ. capacitances

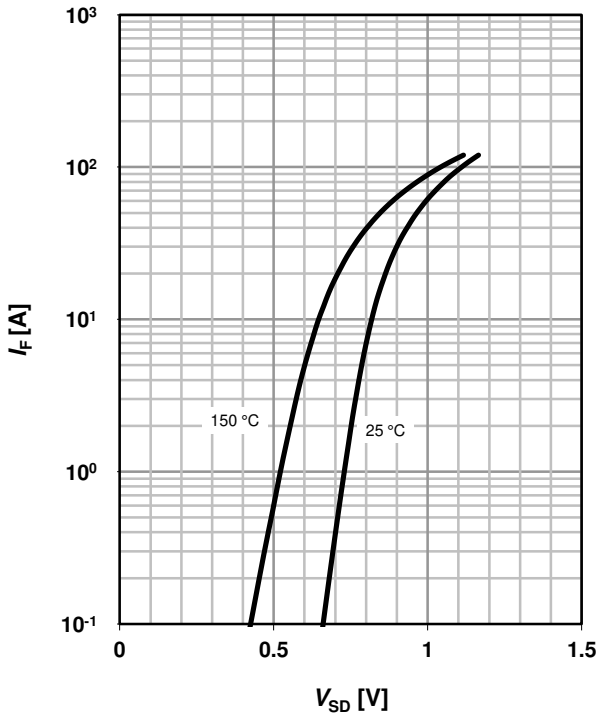
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

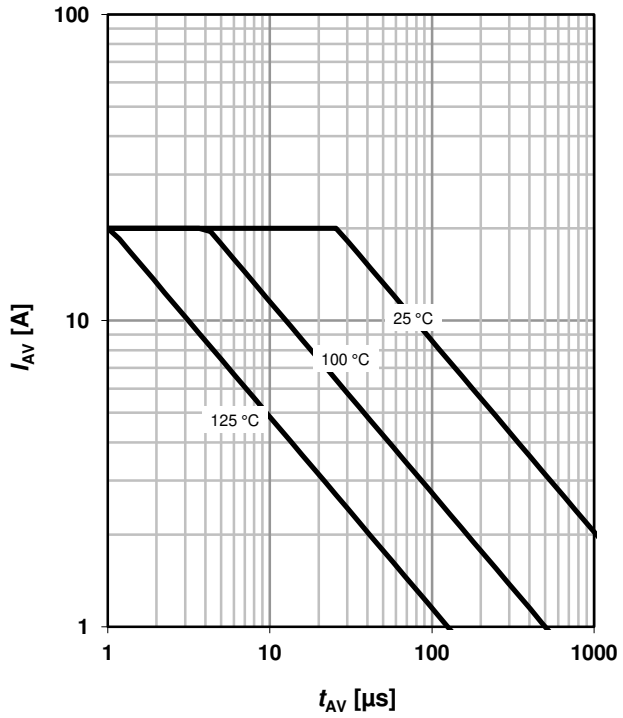
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

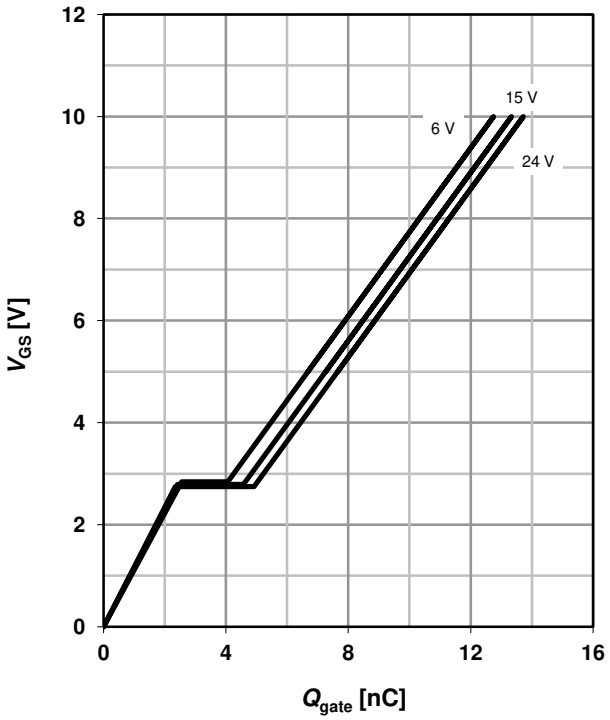
parameter: $T_{j(start)}$



14 Typ. gate charge

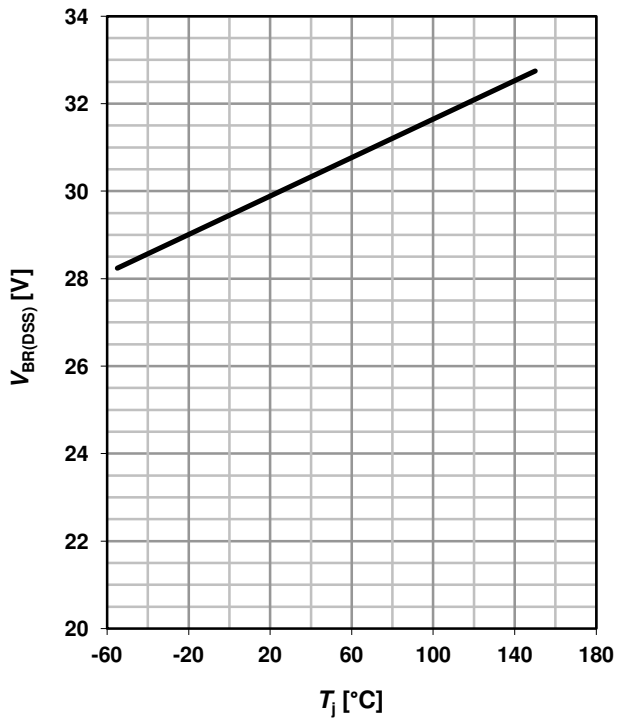
V_{GS}=f(Q_{gate}); I_D=30 A pulsed

parameter: V_{DD}

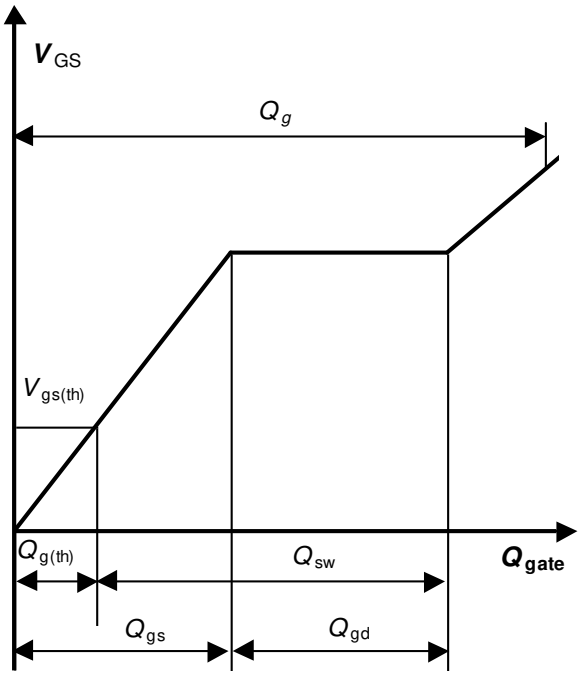


15 Drain-source breakdown voltage

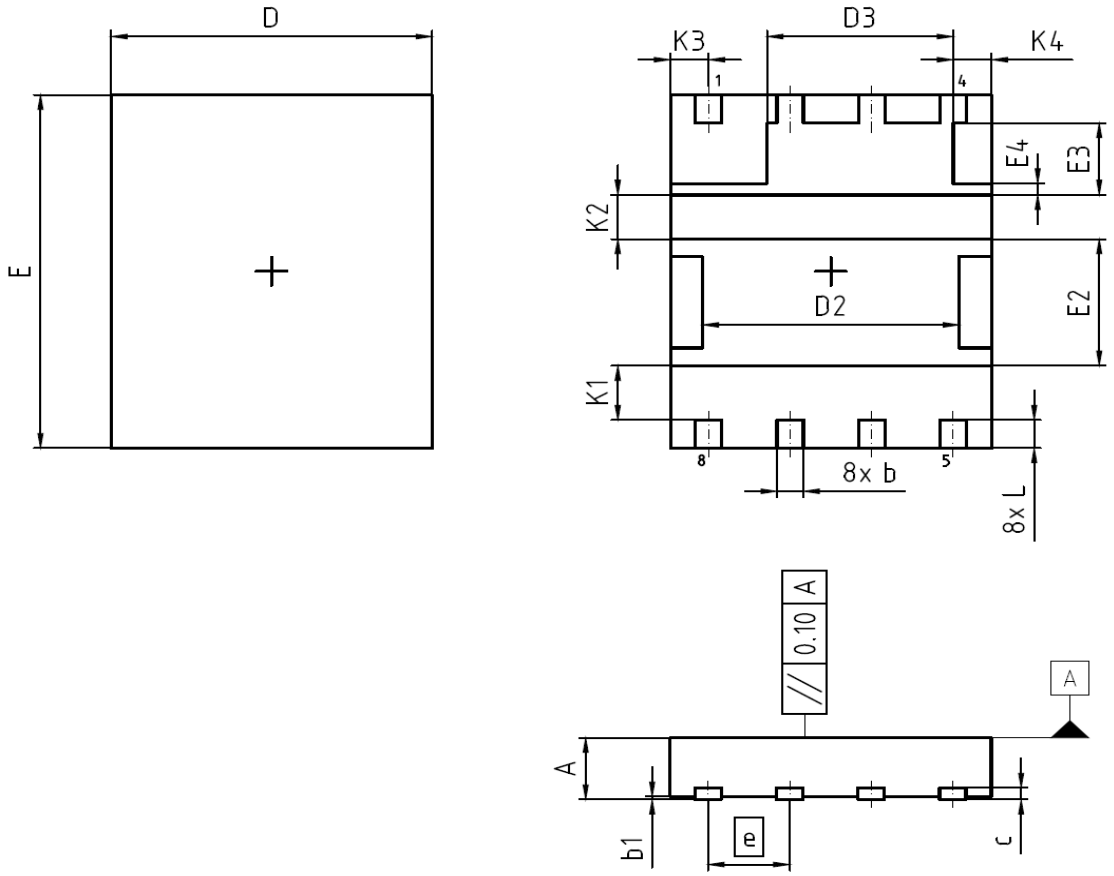
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



Package Outline **PG-TISON**



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.90	1.15	0.035	0.045
b	0.31	0.51	0.012	0.020
b1	0.00	0.05	0.000	0.002
c	0.10	0.30	0.004	0.012
D	4.90	5.10	0.193	0.201
D2	3.90	4.10	0.154	0.161
D3	2.80	3.00	0.110	0.118
E	5.90	6.10	0.232	0.240
E2	2.05	2.25	0.081	0.089
E3	1.12	1.32	0.044	0.052
E4	0.10	0.30	0.004	0.012
e	1.27 (BSC)		0.05 (BSC)	
N	8		8	
L	0.38	0.58	0.015	0.023
K1	0.82	1.02	0.032	0.040
K2	0.65	0.85	0.026	0.033
K3 = K4	0.50	0.70	0.019	0.027

DOCUMENT NO.
Z8B00162738

SCALE
0 2.5 5mm

EUROPEAN PROJECTION

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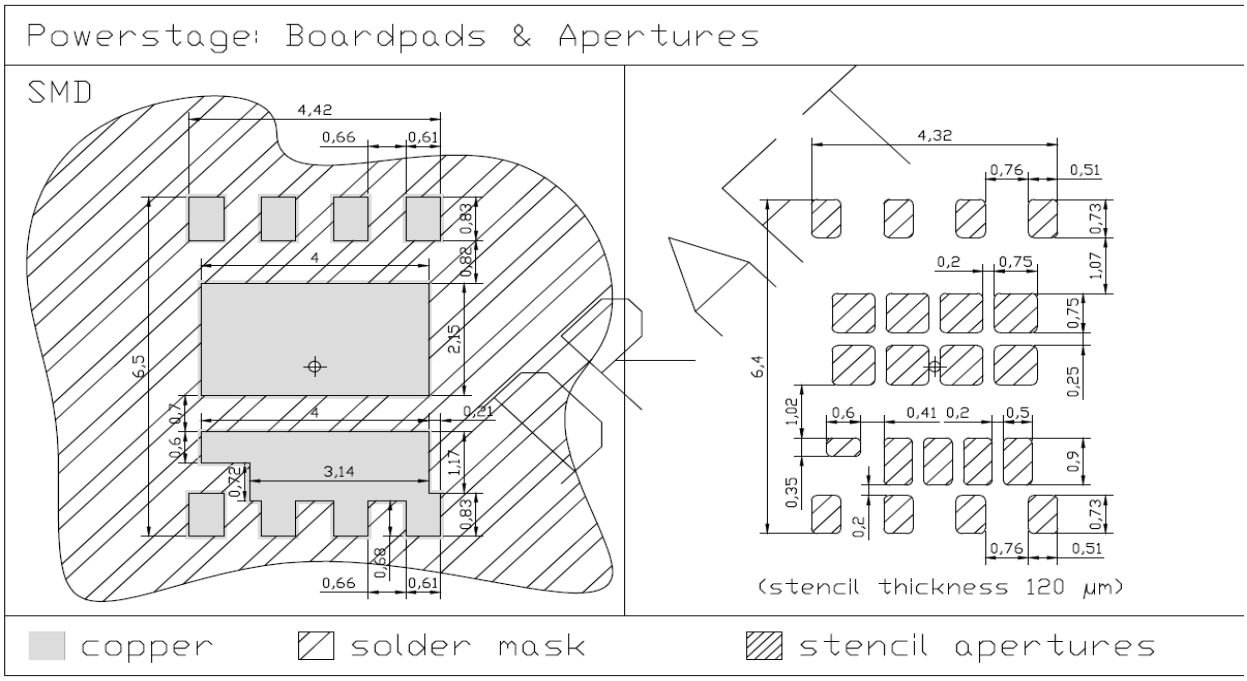
21-09-2011

REVISION
01

PG-TISON



Dimensions in mm

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