OptiMOS™3 Power-MOSFET

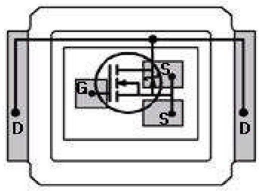
Features

- Optimized technology for DC/DC converters
- Excellent gate charge x $R_{DS(on)}$ product (FOM)
- Superior thermal resistance
- Dual sided cooling
- Low parasitic inductance
- Low profile (<0.7mm)
- N-channel, normal level
- 100% avalanche tested
- Pb-free plating; RoHS compliant
- Qualified according to JEDEC[1)] for target applications
- Compatible with DirectFET® package ST footprint and outline[2)]

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	11	mΩ
I_D	47	A

CanPAK™ S
MG-WDSON-2



Type	Package	Outline	Marking
BSF110N06NT3 G	MG-WDSON-2	ST	0306

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

Parameter	**Symbol**	**Conditions**	**Value**	**Unit**
Continuous drain current	I_D	V_{GS}=10 V, T_C=25 °C	47	A
		V_{GS}=10 V, T_C=100 °C	30	
		V_{GS}=10 V, T_A=25 °C, R_{thJA}=58 K/W[3)]	11	
Pulsed drain current[4)]	$I_{D,pulse}$	T_C=25 °C	188	
Avalanche energy, single pulse[5)]	E_{AS}	I_D=30 A, R_{GS}=25 Ω	100	mJ
Gate source voltage	V_{GS}		±20	V

[1)] J-STD20 and JESD22

[2)] DirectFET® is a trademark of International Rectifier Corporation

BSF110N06NT3 G uses DirectFET® technology licensed from International Rectifier Corporation

[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.

[4)] See figure 3 for more detailed information

[5)] See figure 13 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	38	W
		T_A=25 °C, R_{thJA}=58 K/W[3)]	2.2	
Operating and storage temperature	T_j, T_{stg}		-40 ... 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}	bottom	-	1.0	-	K/W
		top	-	-	3.3	
Device on PCB	R_{thJA}	6 cm^2 cooling area[3)]	-	-	58	

Electrical characteristics, at T_j=25 °C, unless otherwise specified

Static characteristics

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=1 mA	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=33 µA	2	3	4	
Zero gate voltage drain current	I_{DSS}	V_{DS}=30 V, V_{GS}=0 V, T_j=25 °C	-	0.1	10	µA
		V_{DS}=60 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}=10 V, I_D=30 A	-	8.6	11	mΩ
Gate resistance	R_G		-	0.5	-	Ω
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=30 A	23	46	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=30 V, f=1 MHz	-	2800	3700	pF
Output capacitance	C_{oss}		-	800	1060	
Reverse transfer capacitance	C_{rss}		-	22	33	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30 V, V_{GS}=10 V, I_D=30 A, R_G=1.6 Ω	-	11	-	ns
Rise time	t_r		-	2	-	
Turn-off delay time	$t_{d(off)}$		-	17	-	
Fall time	t_f		-	2	-	

Gate Charge Characteristics[6)]

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Gate to source charge	Q_{gs}	V_{DD}=30 V, I_D=30 A, V_{GS}=0 to 10 V	-	15	-	nC
Gate to drain charge	Q_{gd}		-	3	-	
Switching charge	Q_{sw}		-	9	-	
Gate charge total	Q_g		-	34	46	
Gate plateau voltage	$V_{plateau}$		-	5.2	-	V
Output charge	Q_{oss}	V_{DD}=30 V, V_{GS}=0 V	-	28	37	nC

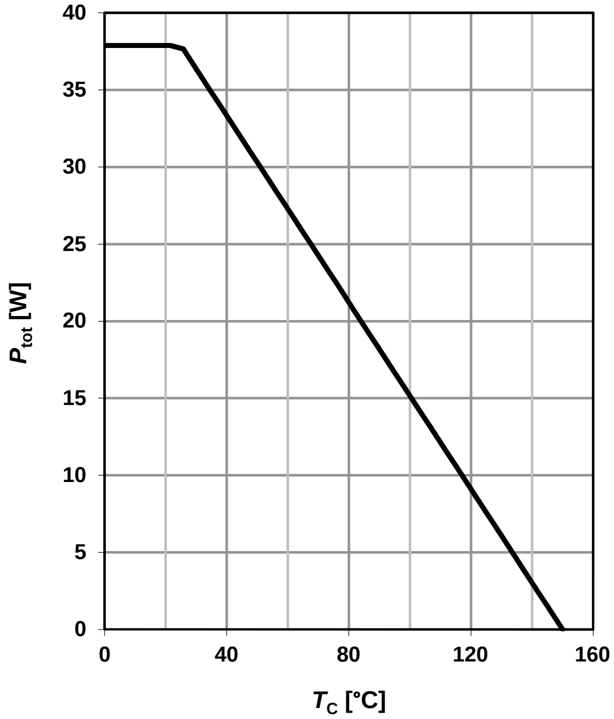
Reverse Diode

Parameter	Symbol	Conditions	min.	typ.	max.	Unit
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=30 A, T_j=25 °C	-	0.9	1.2	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=I_S, di_F/dt=400 A/µs	-	41	-	ns
Reverse recovery charge	Q_{rr}		-	56	-	nC

6) See figure 16 for gate charge parameter definition

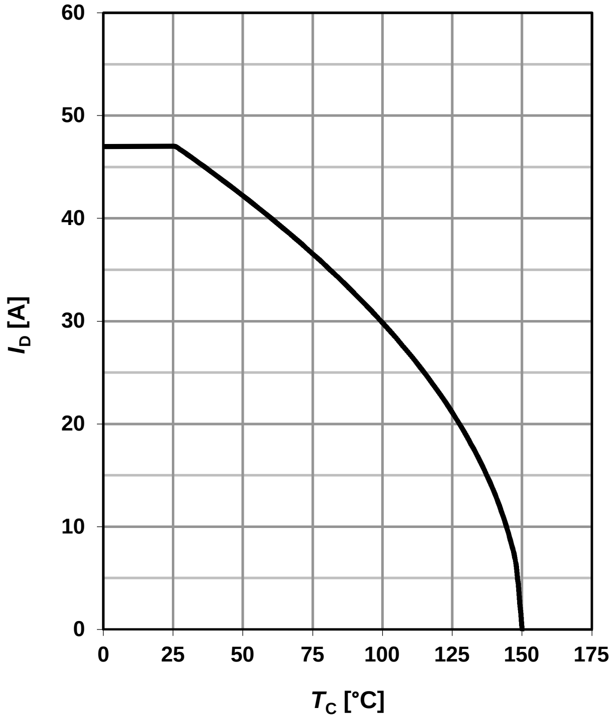
1 Power dissipation

P_{tot}=f(T_C)



2 Drain current

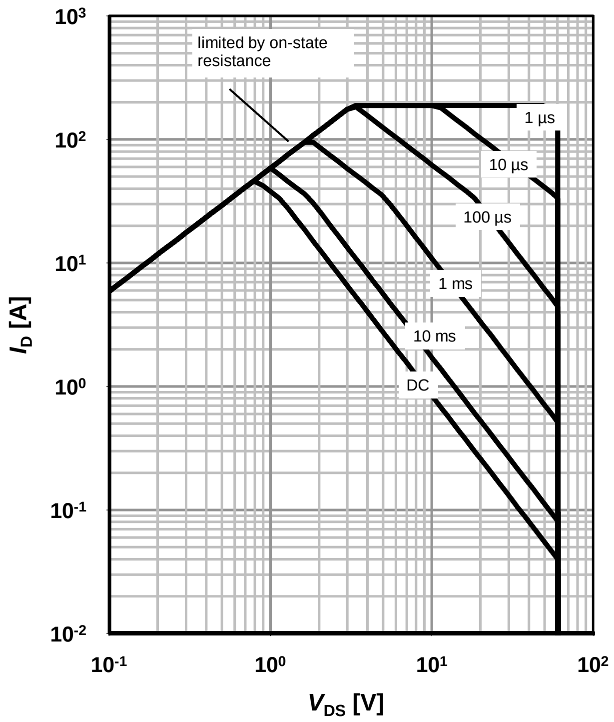
I_D=f(T_C); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_C=25 °C; D=0

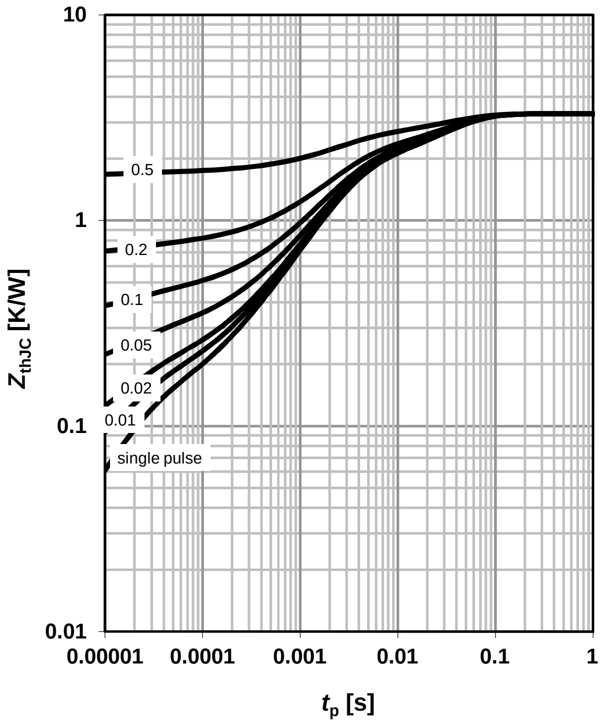
parameter: t_p



4 Max. transient thermal impedance

Z_{thJC}=f(t_p)

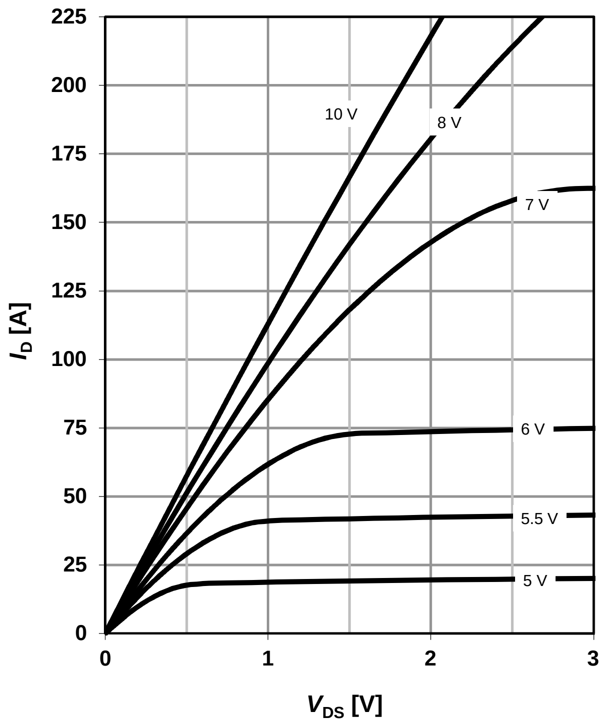
parameter: D=t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

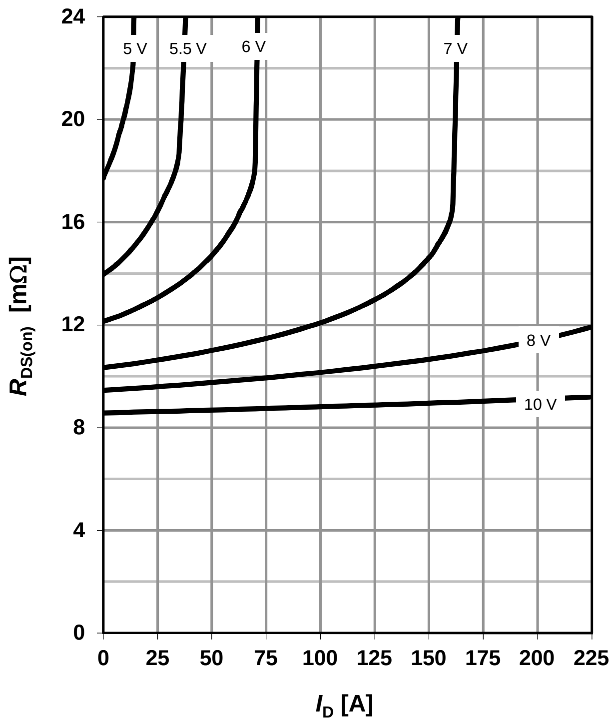
parameter: V_{GS}



6 Typ. drain-source on resistance

$R_{DS(on)}$=f(I_D); T_j=25 °C

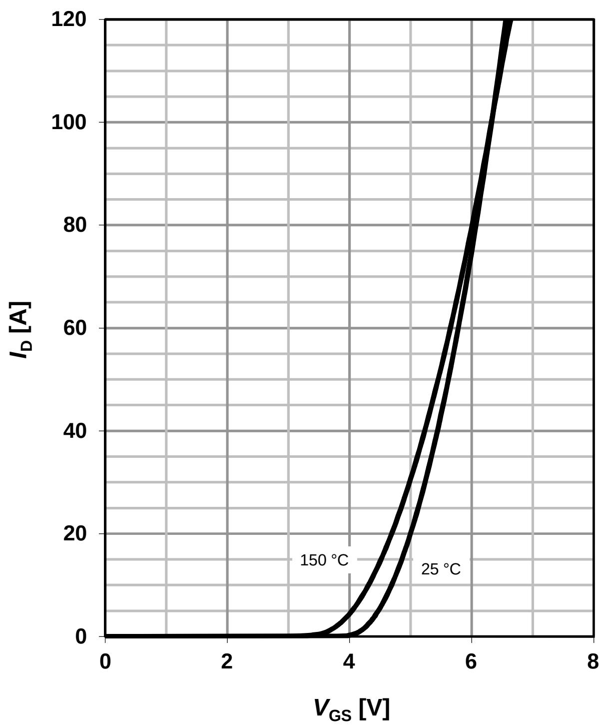
parameter: V_{GS}



7 Typ. transfer characteristics

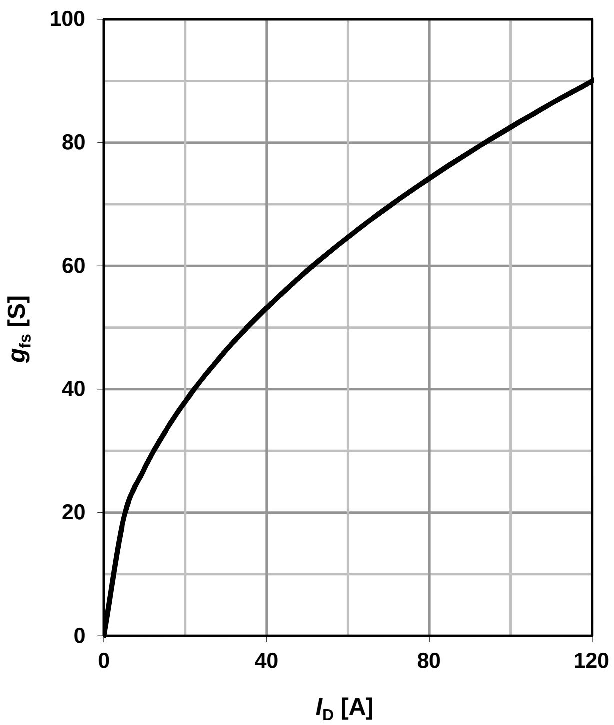
I_D=f(V_{GS}); $|V_{DS}|$>2$|I_D|R_{DS(on)max}$

parameter: T_j



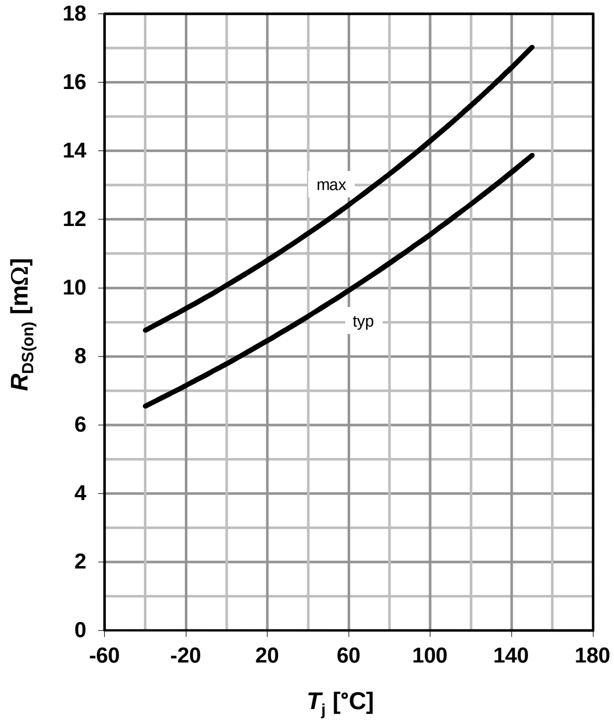
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



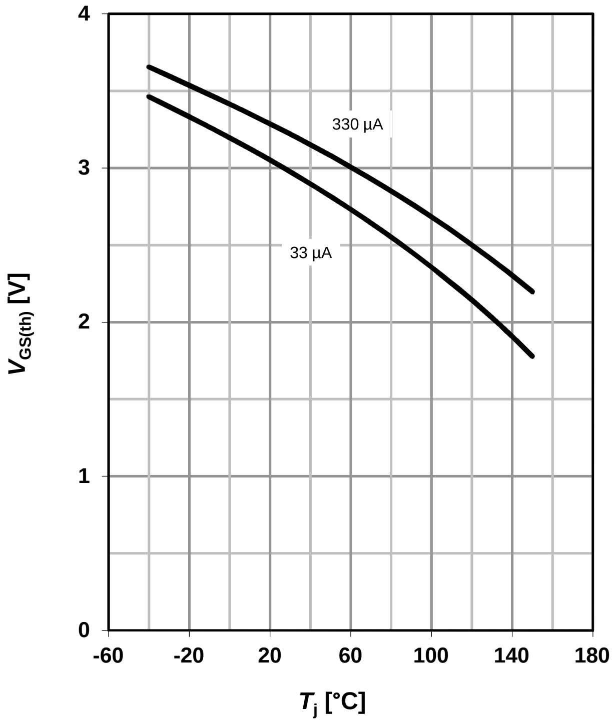
9 Drain-source on-state resistance

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



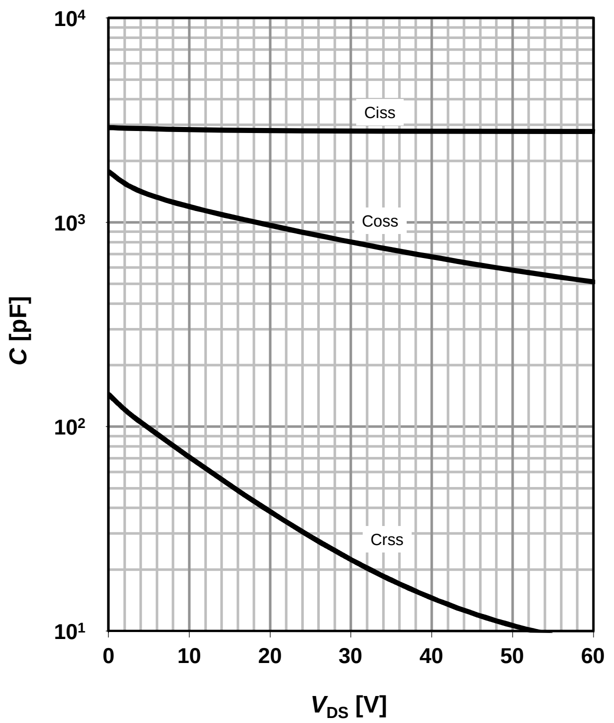
10 Typ. gate threshold voltage

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



11 Typ. capacitances

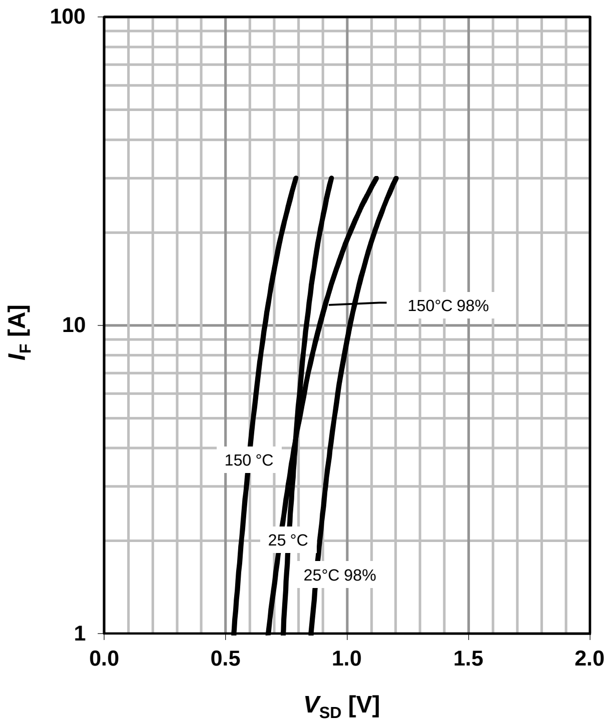
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

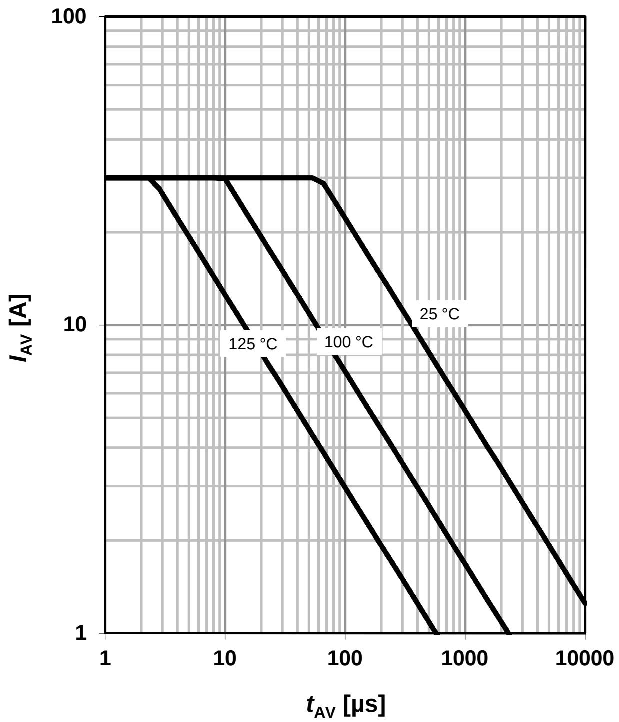
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

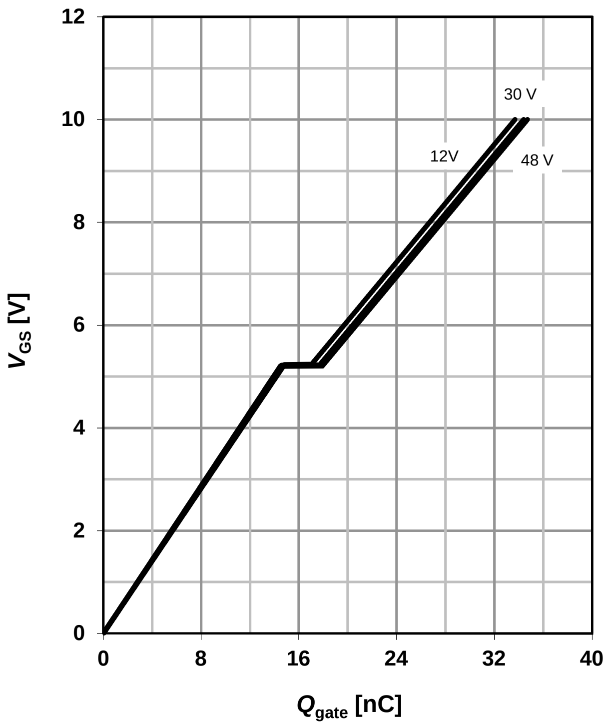
parameter: $T_{j(start)}$



14 Typ. gate charge

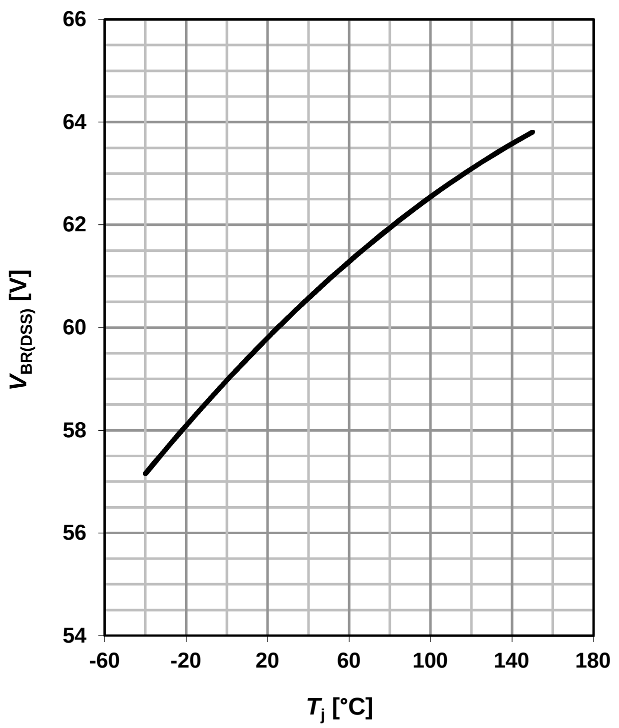
V_{GS}=f(Q_{gate}); I_D=30 A pulsed

parameter: V_{DD}

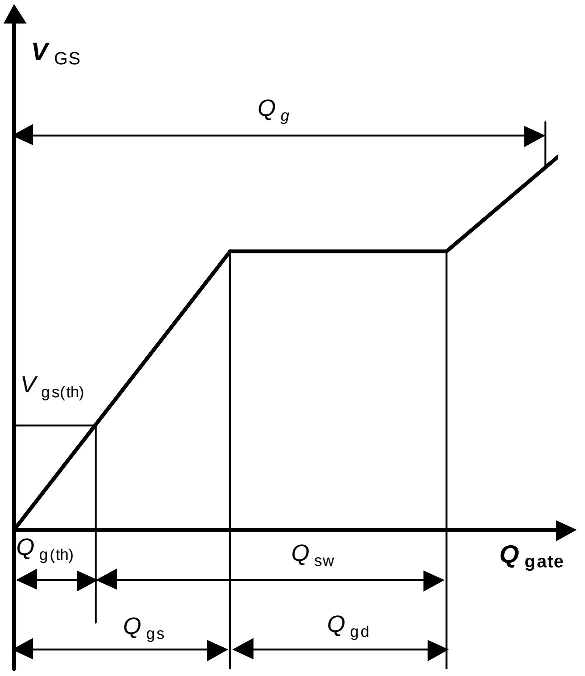


15 Drain-source breakdown voltage

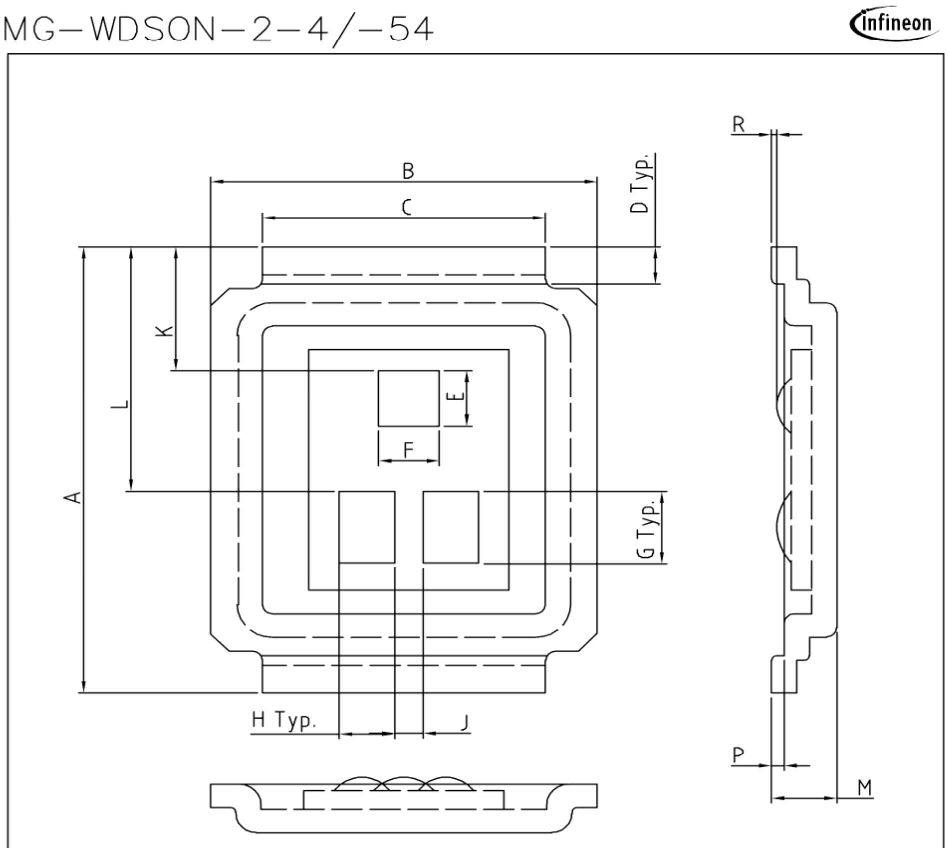
$V_{BR(DSS)}$=f(T_j); I_D=1 mA



16 Gate charge waveforms



Package Outline **CanPAK™ S**
MG-WDSON-2



DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	4.75	4.88	0.187	0.192
B	3.70	3.95	0.146	0.156
C	2.75	2.85	0.108	0.112
D	0.35	0.45	0.014	0.018
E	0.58	0.62	0.023	0.024
F	0.58	0.62	0.023	0.024
G	0.75	0.79	0.030	0.031
H	0.53	0.57	0.021	0.022
J	0.26	0.30	0.010	0.012
K	1.23	1.43	0.048	0.056
L	2.53	2.73	0.100	0.107
M	0.60	0.70	0.024	0.028
R	0.00	0.10	0.000	0.004
P	0.08	0.17	0.003	0.007

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SCALE 0 5 7.5mm

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REVISION
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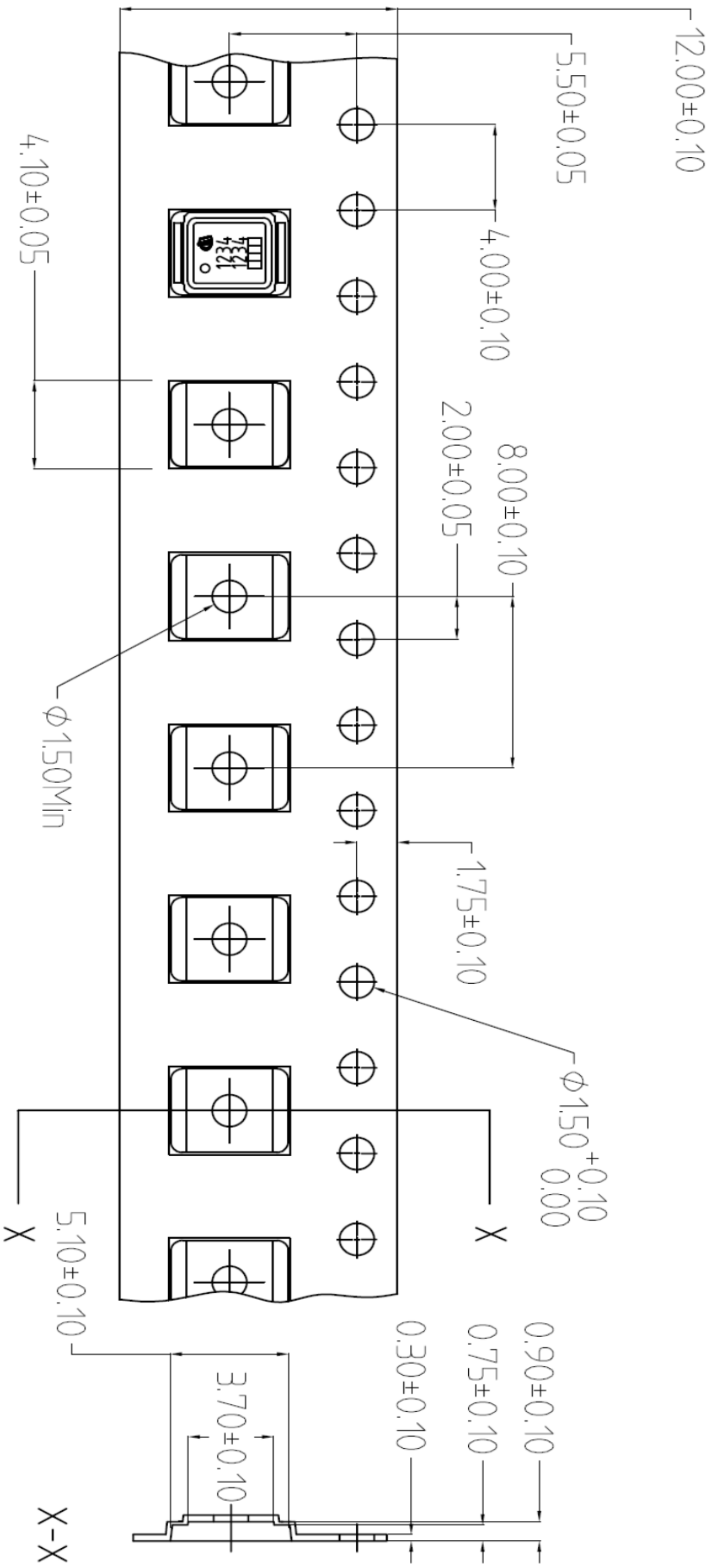
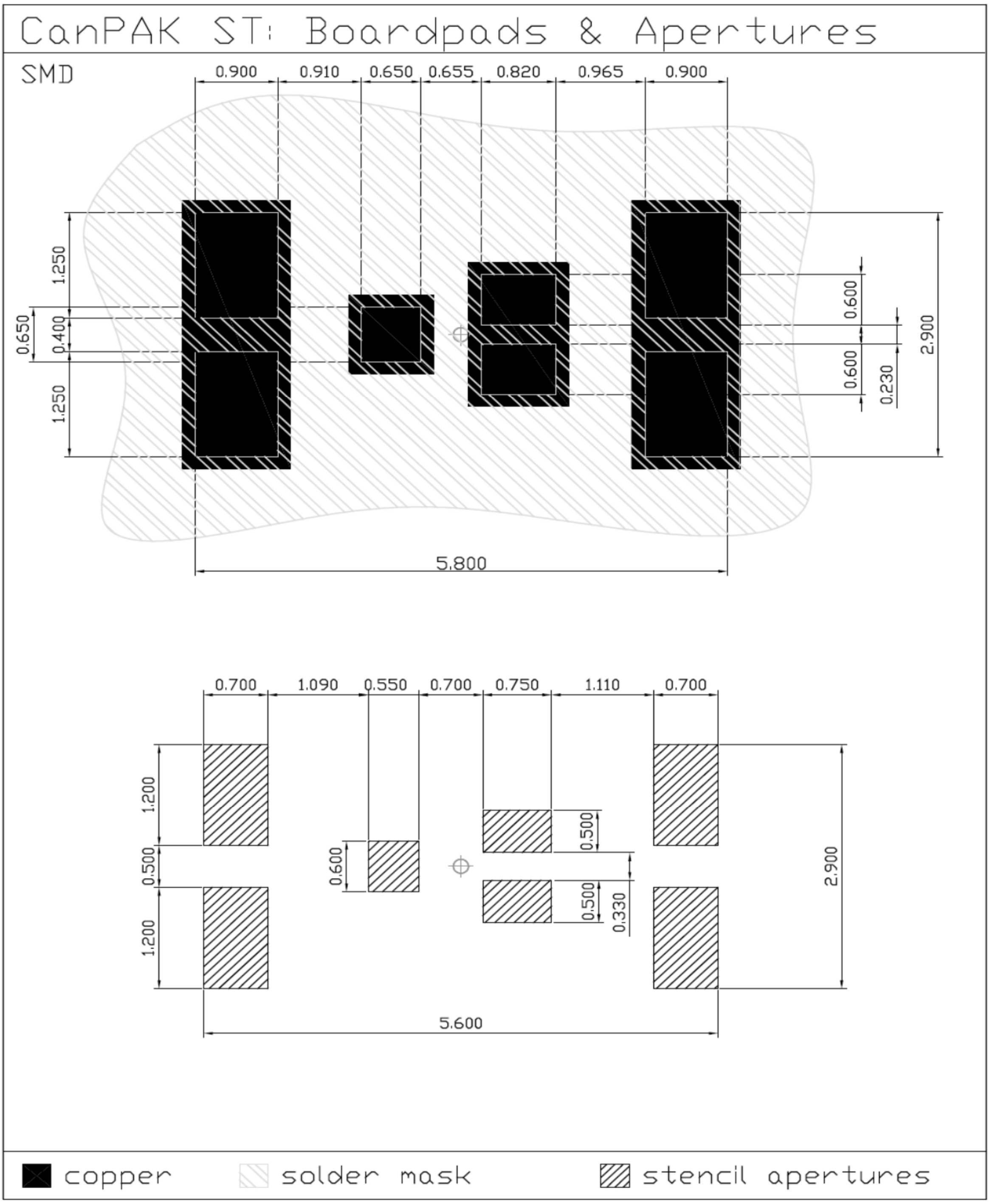
CanPAK™ S
MG-WDSON-2



Dimensions in mm

CanPAK™ S

MG-WDSON-2



Dimensions in mm

Recommended stencil thickness 150 µm

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