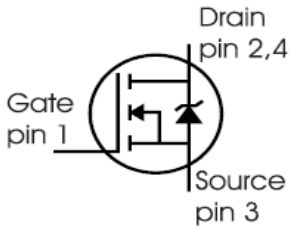
OptiMOS™ Small-Signal-Transistor

Features

- N-channel
- Enhancement mode
- Logic Level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21

Product Summary

V_{DS}		75	V
$R_{DS(on),max}$	V_{GS}=10 V	0.16	Ω
	V_{GS}=4.5 V	0.18	
I_D		2.3	A



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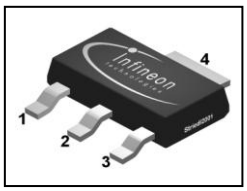


Type	Package	Tape and Reel	Marking	Halogen-Free	Packing
BSP716N	SOT223	H6327: 1000 pcs/ reel	BSP716N	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_A=25 °C	2.3	A
		T_A=70 °C	1.8	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	9.2	
Avalanche energy, single pulse	E_{AS}	I_D=2.3 A, R_{GS}=25 Ω	33	mJ
Reverse diode dv/dt	dv/dt	I_D=2.3 A, V_{DS}=80 V, di/dt=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	T_A=25 °C	1.8	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
ESD Class		JESD22-A114 -HBM	0 (<250V)	
Soldering Temperature			260 °C	
IEC climatic category; DIN IEC 68-1			55/150/56	

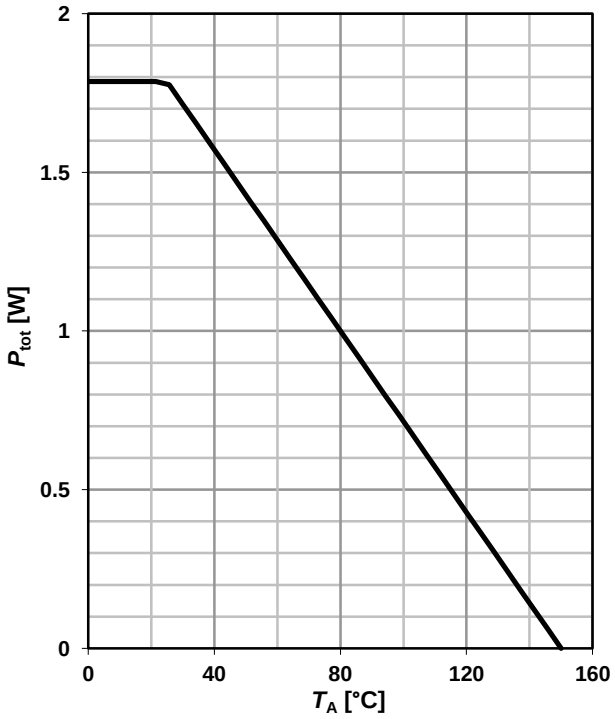
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance junction - soldering point	R_{thJS}		-	-	25	K/W
Thermal resistance junction - ambient	R_{thJA}	minimal footprint	-	-	110	
		6 cm² cooling area[1)]	-	-	70	
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=250 µA	75	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=Vgs V, I_D=218 µA	0.8	1.4	1.80	
Drain-source leakage current	I_{DSS}	V_{DS}=75 V, V_{GS}=0 V, T_j=25 °C	-	-	0.1	µA
		V_{DS}=75 V, V_{GS}=0 V, T_j=150 °C	-	-	10	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	-	10	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=10 V, I_D=2.3 A	-	122	160	mΩ
		V_{GS}=4.5 V, I_D=2.2 A	-	138	180	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=1.8 A		5.71	-	S

[1)] Device on 40mm x 40mm x 1.5mm epoxy PCB FR4 with 6cm² (one layer, 70µm 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}=25 V, f=1 MHz	-	237	315	pF
Output capacitance	C_{oss}		-	41	55	
Reverse transfer capacitance	C_{rss}		-	19	29	
Turn-on delay time	$t_{d(on)}$	V_{DD}=37.5 V, V_{GS}=10 V, I_D=2.3 A, $R_{G,ext}$=6 Ω	-	4.6	6.9	ns
Rise time	t_r		-	5.5	8.3	
Turn-off delay time	$t_{d(off)}$		-	50.1	75.2	
Fall time	t_f		-	16.7	25.1	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=37.5 V, I_D=2.3 A, V_{GS}=0 to 10 V	-	0.6	0.9	nC
Gate to drain charge	Q_{gd}		-	2.5	3.8	
Gate charge total	Q_g		-	8.7	13.1	
Gate plateau voltage	$V_{plateau}$		-	2.4	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	2.3	A
Diode pulse current	$I_{S,pulse}$		-	-	9.2	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=2.3 A, T_j=25 °C	-	0.86	1.1	V
Reverse recovery time	t_{rr}	V_R=37.5 V, I_F=2.3 A, di_F/dt=100 A/µs	-	31	46.5	ns
Reverse recovery charge	Q_{rr}		-	28	42	nC

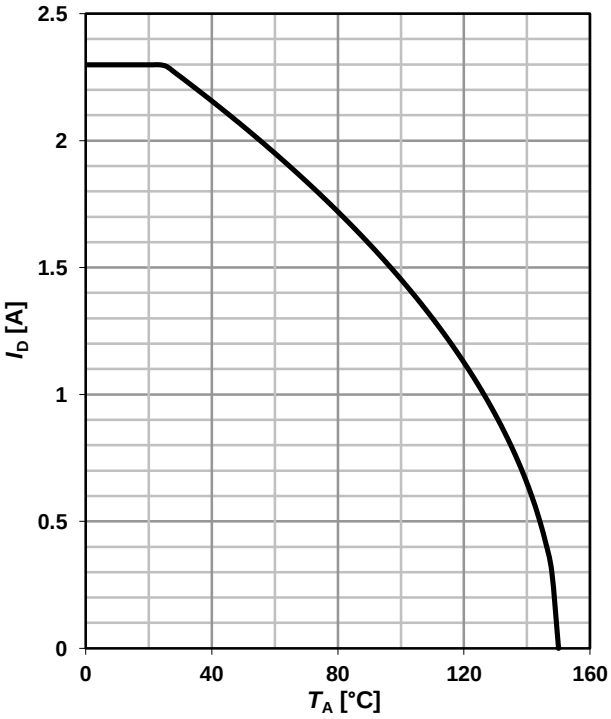
1 Power dissipation

$P_{tot}=f(T_A)$



2 Drain current

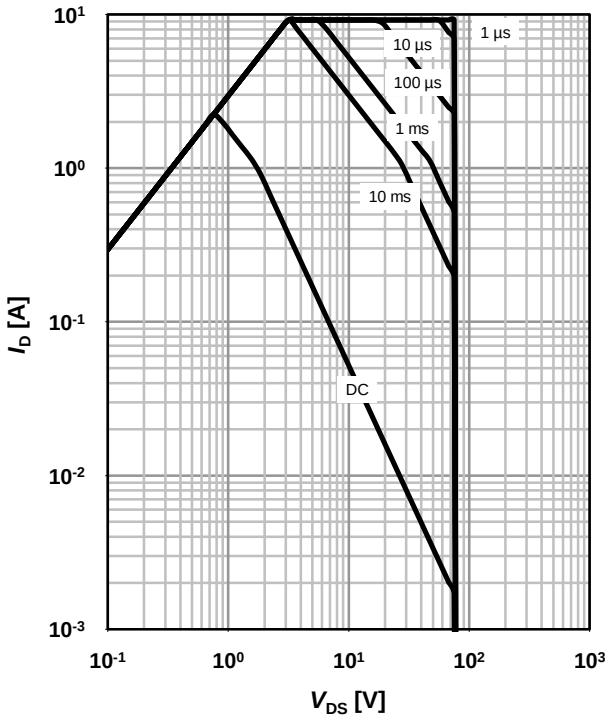
$I_D=f(T_A)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_A=25$ °C; $D=0$

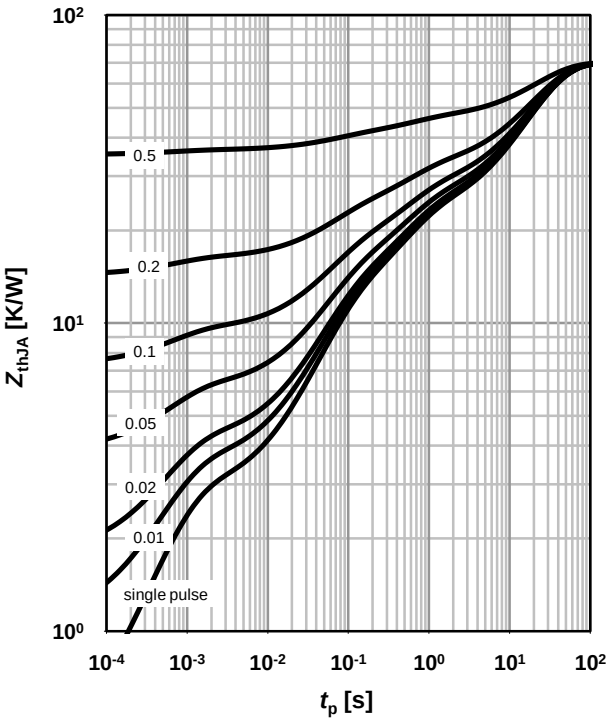
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

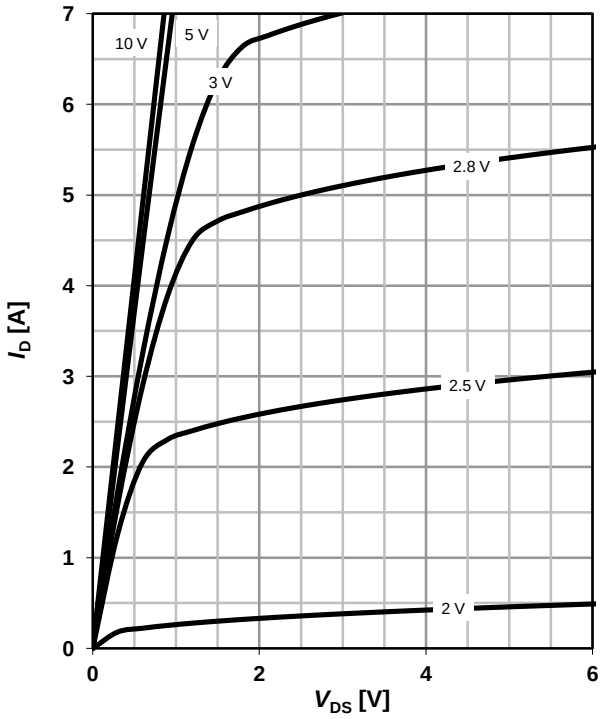
parameter: $D=t_p/T$



5 Typ. output characteristics

$I_D=f(V_{DS})$; $T_j=25$ °C

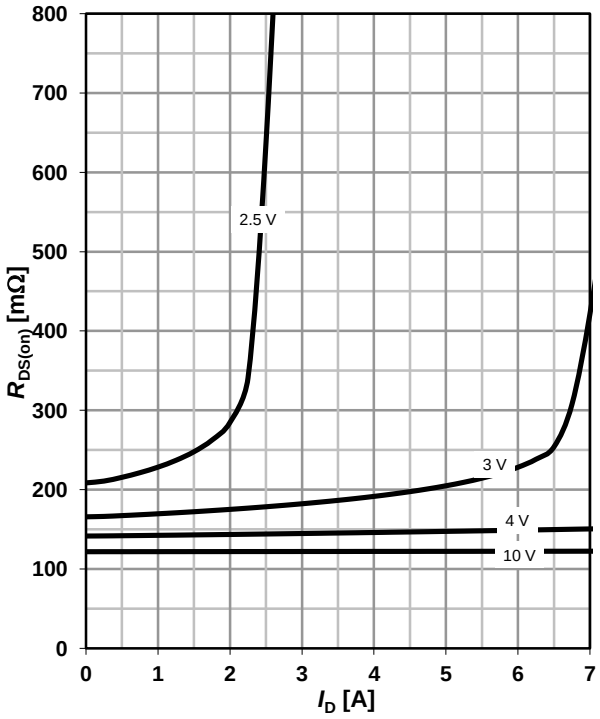
parameter: V_{GS}



6 Typ. drain-source on resistance

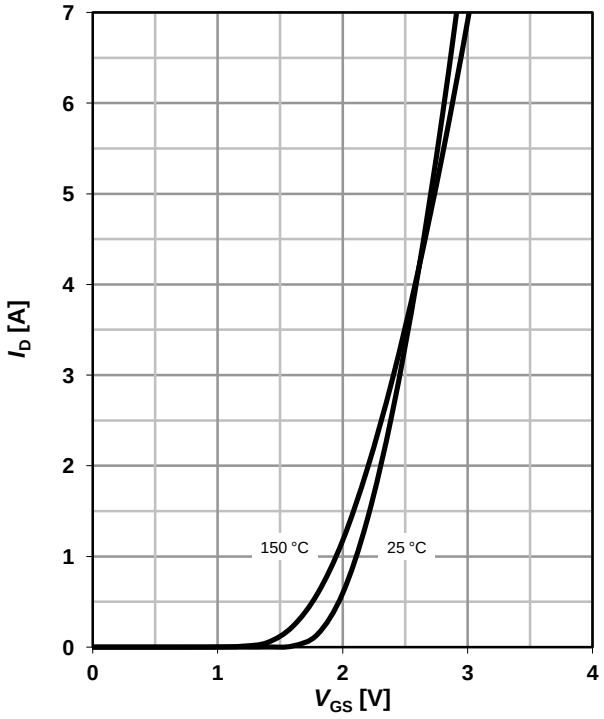
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C

parameter: V_{GS}



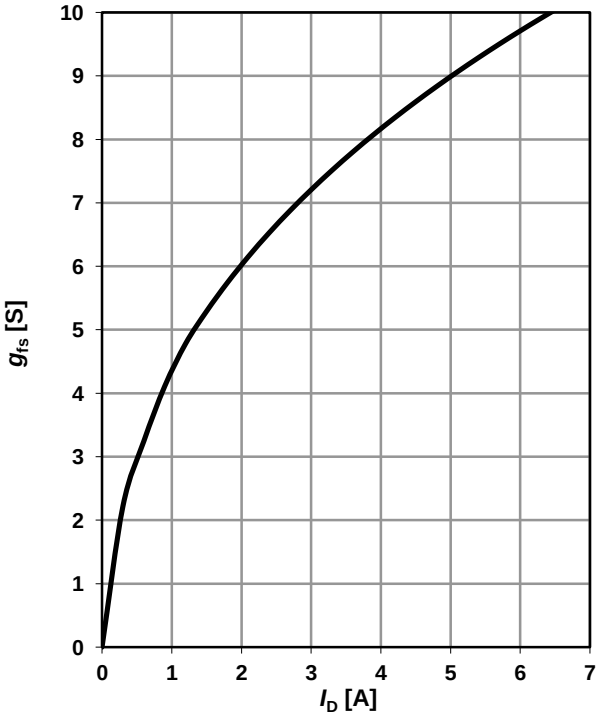
7 Typ. transfer characteristics

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



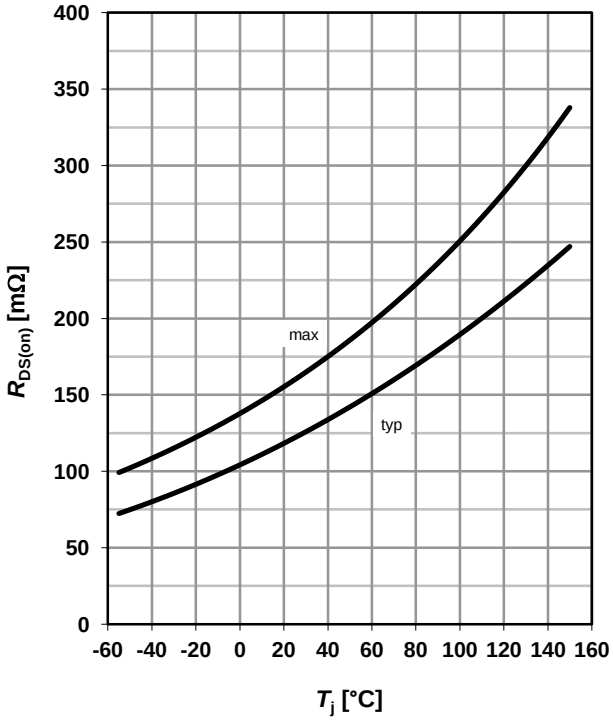
8 Typ. forward transconductance

$g_{fs}=f(I_D)$; $T_j=25$ °C



9 Drain-source on-state resistance

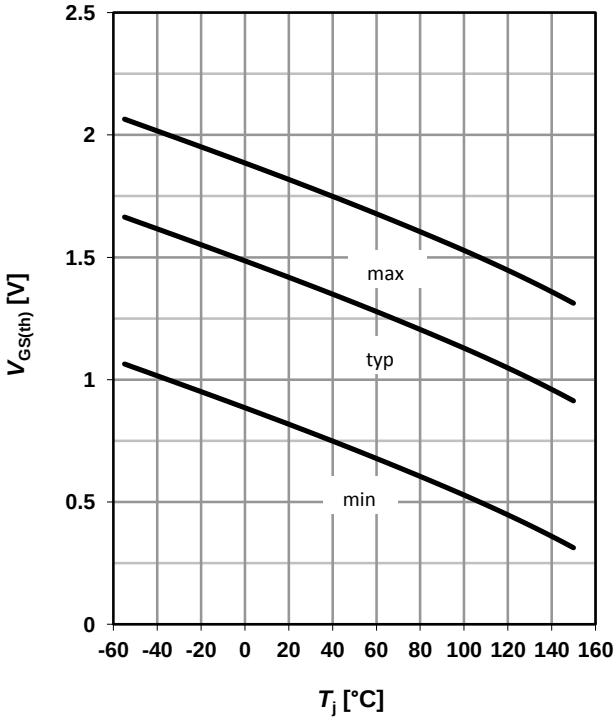
$R_{DS(on)}$=f(T_j); I_D=2.3 A; V_{GS}=10 V



10 Typ. gate threshold voltage

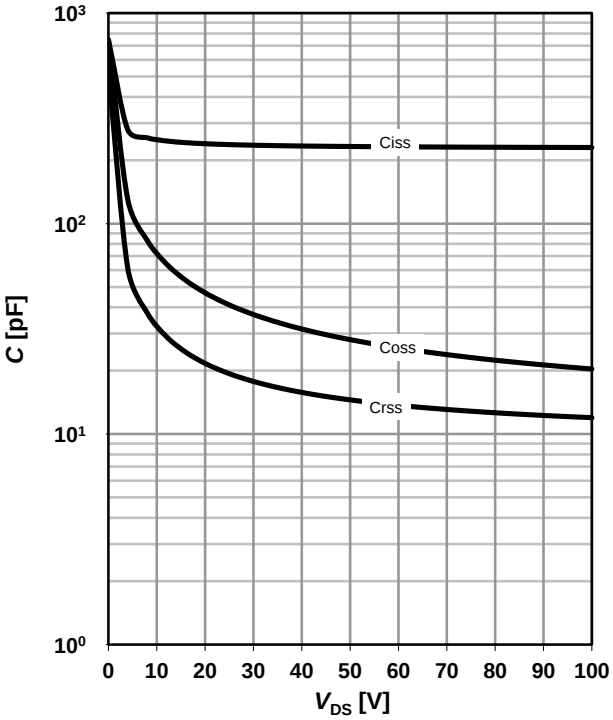
$V_{GS(th)}$=f(T_j); V_{DS}=V_{GS}; I_D=218 µA

parameter: I_D



11 Typ. capacitances

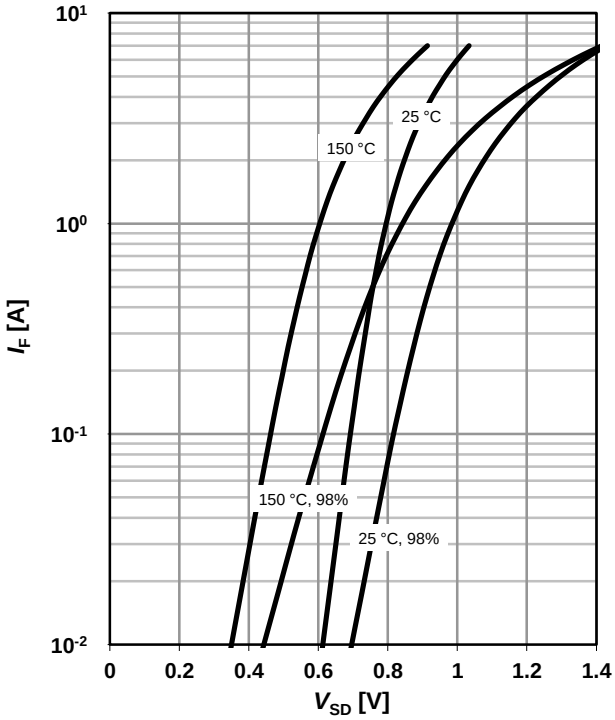
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz; T_j=25°C



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

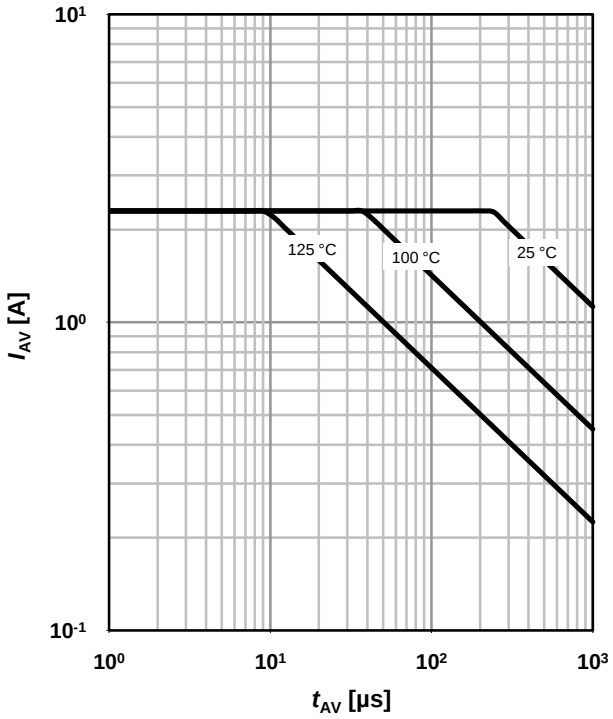
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

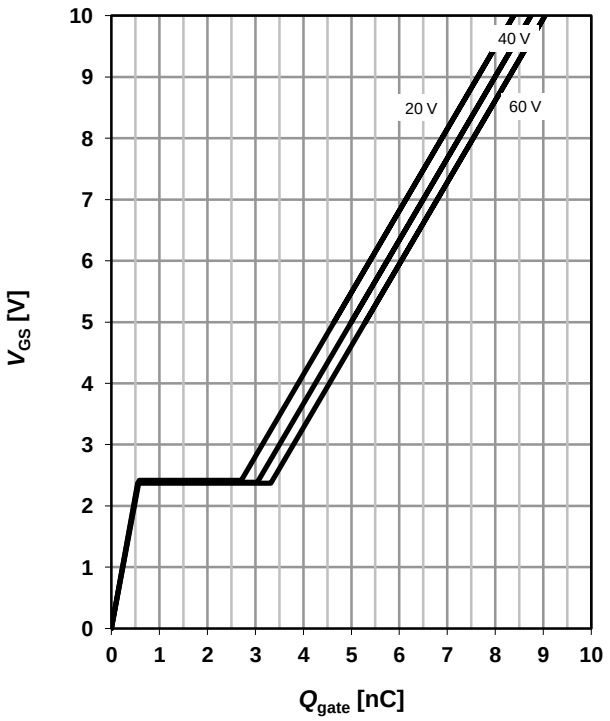
parameter: $T_{j(start)}$



14 Typ. gate charge

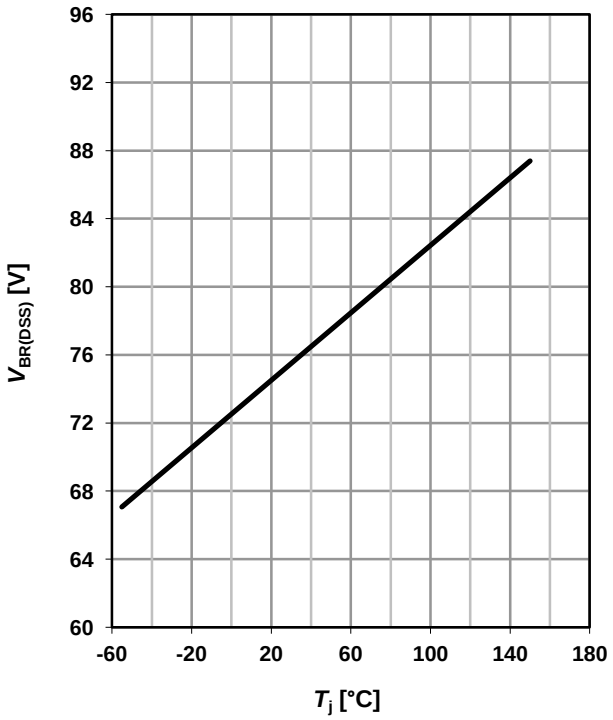
V_{GS}=f(Q_{gate}); I_D=2.3 A pulsed

parameter: V_{DD}

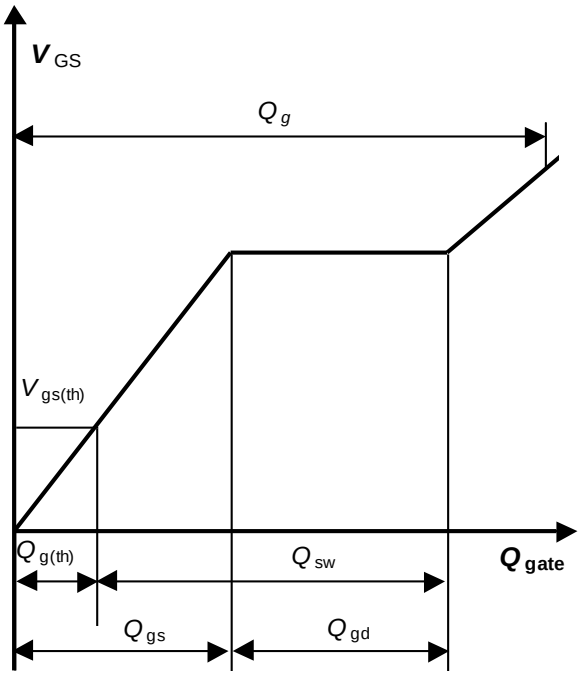


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA



16 Gate charge waveforms



SOT223

Package Outline:

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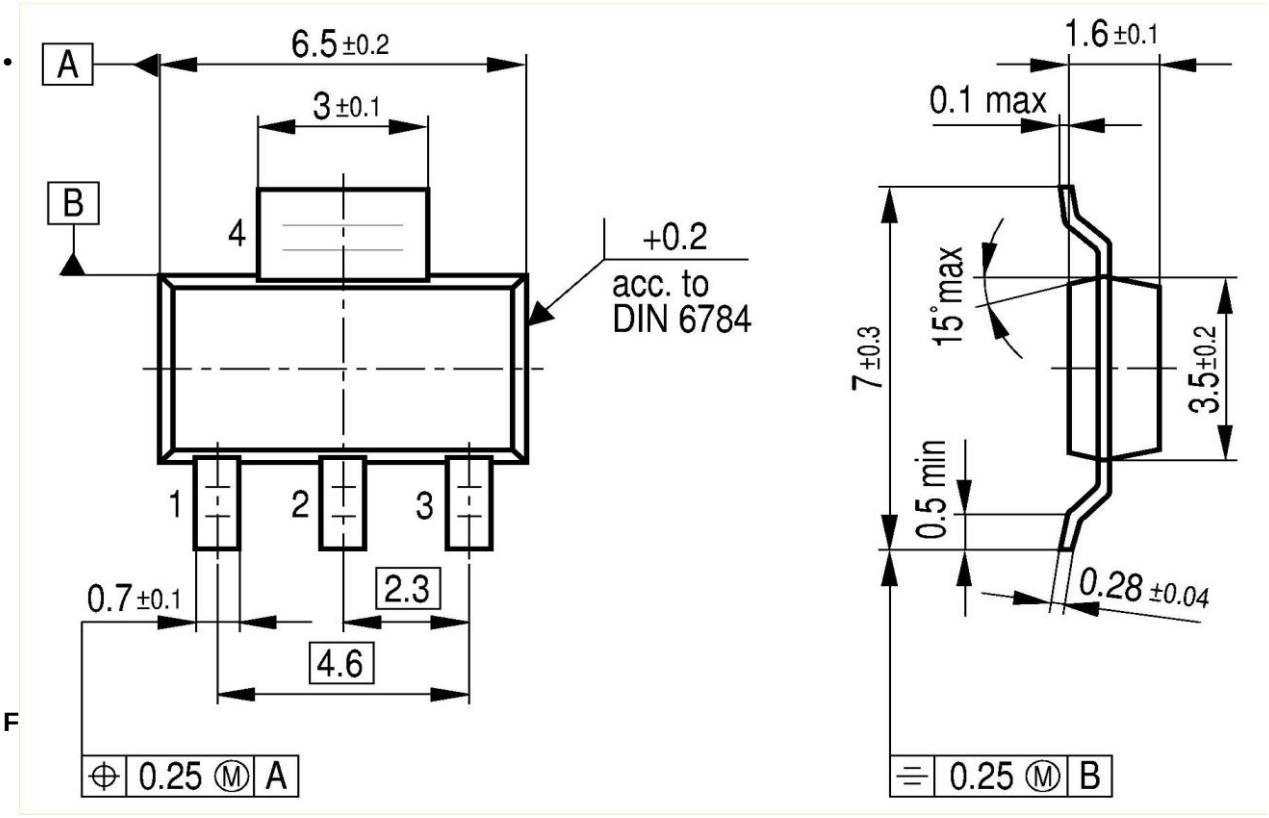

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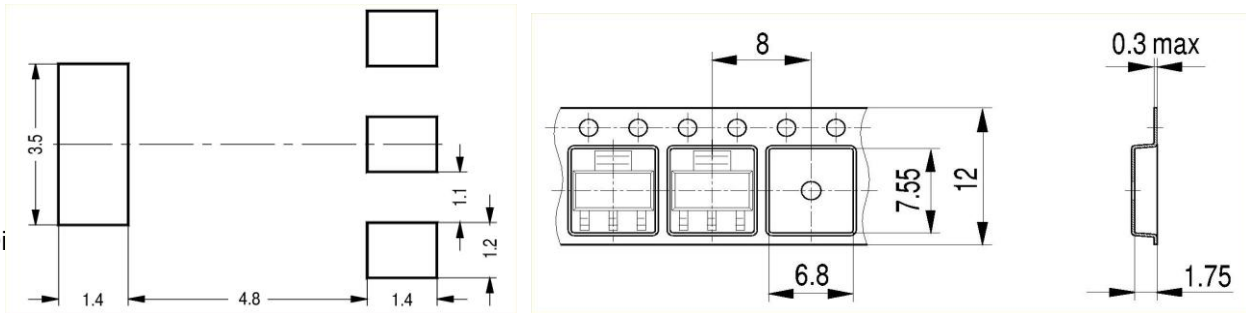

Published by
Infineon Technologies AG
81726 Munich, Germany
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● 100% lead-free;Halogen-free; RoHS compliant

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