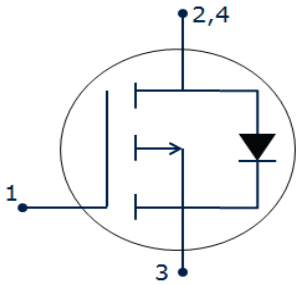
OptiMOS™-P Small-Signal-Transistor

Features

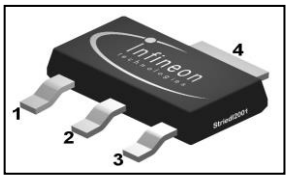
- P-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to AEC61249-2-21

Product Summary

V_{DS}		-60	V
$R_{DS(on),max}$	V_{GS}=10 V	120	mΩ
	V_{GS}=4.5 V	170	
I_D		-3	A



PG-SOT-223



Type	Package	Tape and Reel Information	Marking	Halogen Free	Packing
BSS612P	SOT223	H6327: 1000 pcs/ reel	BSP612P	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	-3.0	A
		T_A=70 °C	-2.44	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	-12	
Avalanche energy, single pulse	E_{AS}	I_D=-3 A, V_{DD}=-25V, R_{GS} = 25Ω	150	mJ
Reverse diode dv/dt	dv/dt	I_D=-3 A, V_{DS}=-48 V, di/dt=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation[1)]	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	1C	V
Soldering Temperature			260 °C	°C
IEC climatic category; DIN IEC 68-1			55/150/56	°C

OptiMOS™-P Small-Signal-Transis	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - soldering point (Pin 4)	R_{thJS}				25	K/W
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint			100	
Thermal resistance, junction - ambient	R_{thJA}	6 cm^2 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	-	-	-60	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=0 V, I_D=-1 mA	-2.0	-1.5	-1.0	
Drain-source leakage current	I_{DSS}	V_{DS}=-60V, V_{GS}=0 V, T_j=25 °C	-	-	-40	nA
		V_{DS}=-60V, V_{GS}=0V, T_j=150 °C	-	-	-20	µA
Gate-source leakage current	I_{GSS}	V_{GS}=-20V, V_{DS}=0V	-	-	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=-4.5 V, I_D=-2.3 A	-	140	170	mΩ
		V_{GS}=-10 V, I_D=-3 A	-	101	120	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=2.44 A		4.6	-	S

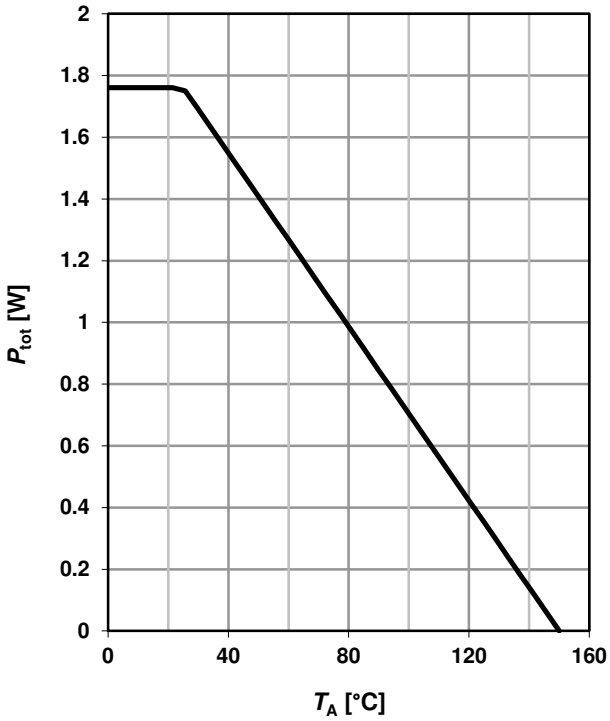
[1)] Device on 40mm x 40mm x 1.5mm epoxy PCB FR4 with 6cm² (one layer, 70µm thick) copper area for drain connection. PCB is vertical in still air.

OptiMOS™-P Small-Signal-Transis	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics[2]						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=-25 V, f=1 MHz	-	814	1083	pF
Output capacitance	C_{oss}		-	248	330	
Reverse transfer capacitance	C_{rss}		-	109	163	
Turn-on delay time	$t_{d(on)}$	V_{DD}=-30 V, V_{GS}=-10 V, I_D=-3 A, $R_{G,ext}$=2.7 Ω	-	8.3	12.5	ns
Rise time	t_r		-	10.4	15.6	
Turn-off delay time	$t_{d(off)}$		-	43.2	64.8	
Fall time	t_f		-	11.3	17.0	
Gate Charge Characteristics[2]						
Gate to source charge	Q_{gs}	V_{DD}=-48 V, I_D=-3 A, V_{GS}=0 to -10 V	-	-2.42	-3.2	nC
Gate to drain charge	Q_{gd}		-	-10.1	-15.2	
Gate charge total	Q_g		-	-26.3	-39.4	
Gate plateau voltage	$V_{plateau}$		-	-3.1	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	-3.0	A
Diode pulse current	$I_{S,pulse}$		-	-	-12	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=-3 A,	-	0.80	1.1	V
Reverse recovery time[2]	t_{rr}	V_R=-30 V, I_F=-3 A, di_F/dt=100 A/µs	-	44.8	67.2	ns
Reverse recovery charge[2]	Q_{rr}		-	62.9	94.4	nC

[2] Defined by design. Not subjected to production test

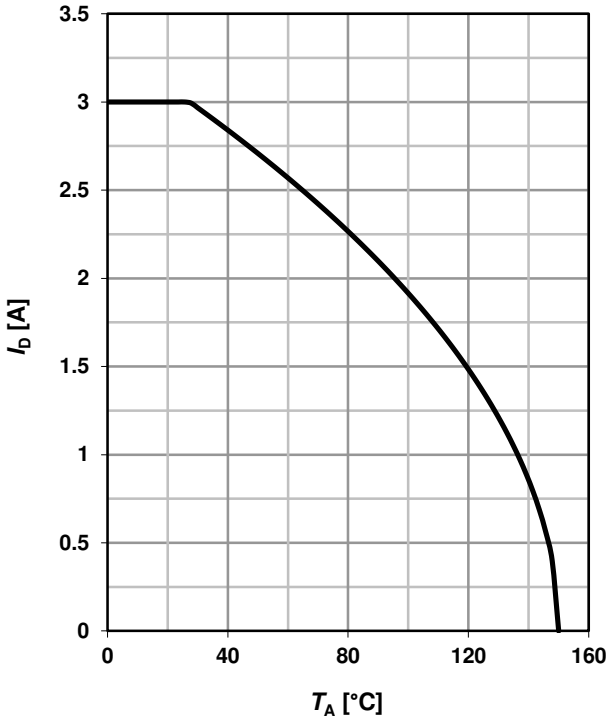
1 Power dissipation

$P_{tot}=f(T_A)$



2 Drain current

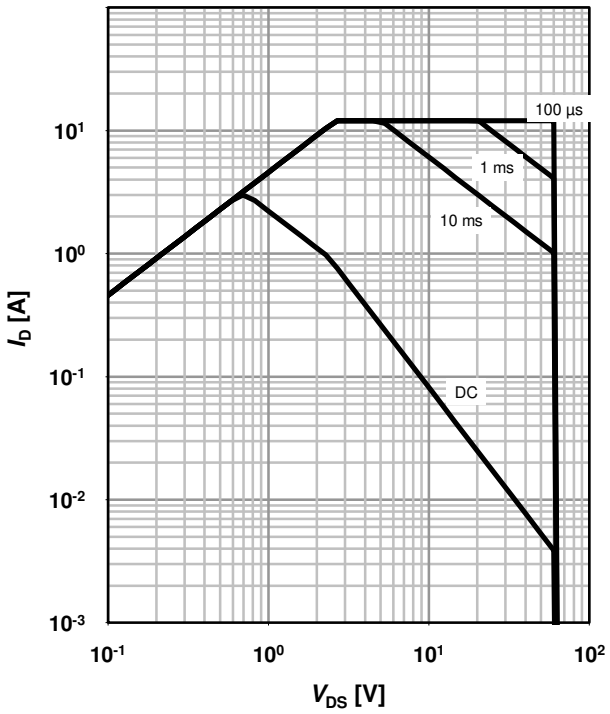
$I_D=f(T_A)$; $V_{GS}\leq$-10 V



3 Safe operating area

$I_D=f(V_{DS})$; T_A=25 °C; D=0

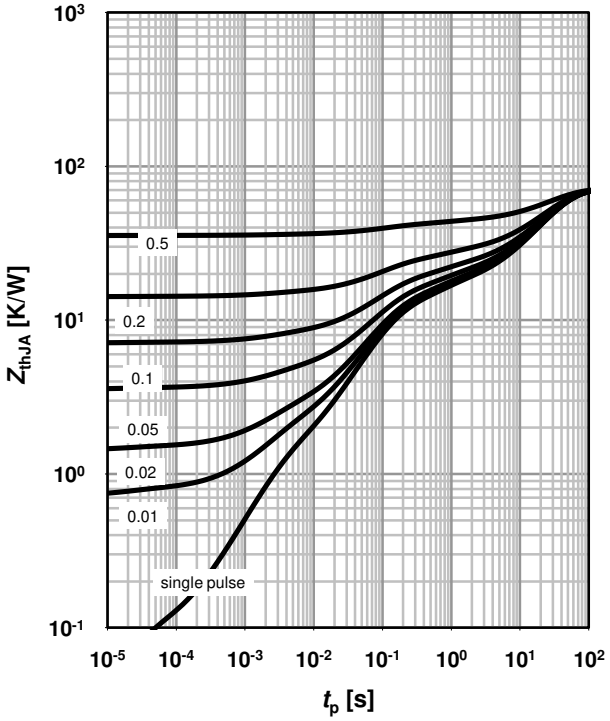
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

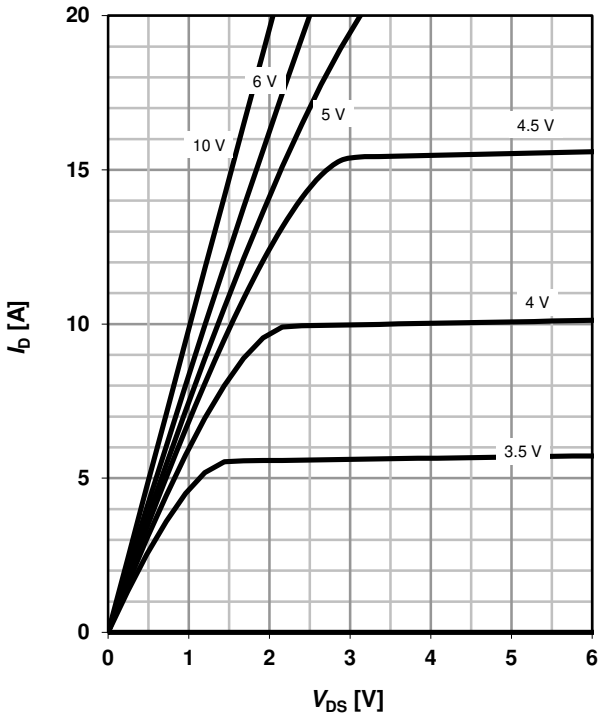
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

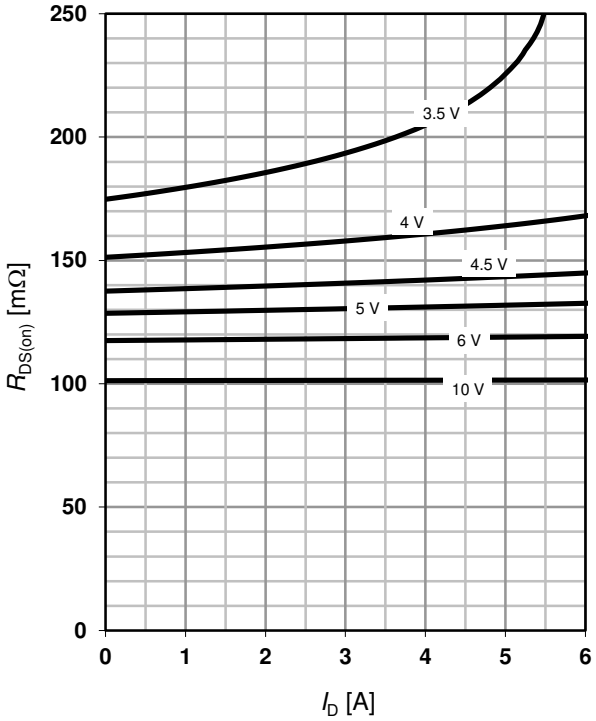
parameter: V_{GS}



6 Typ. drain-source on resistance

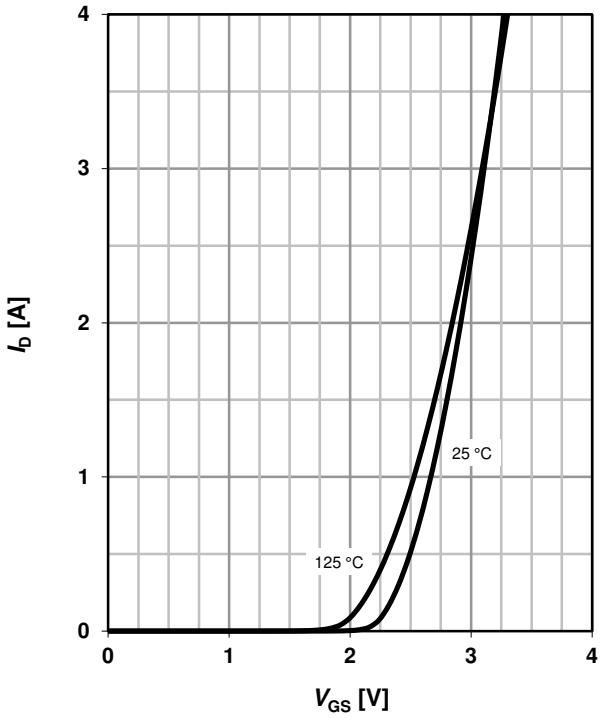
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



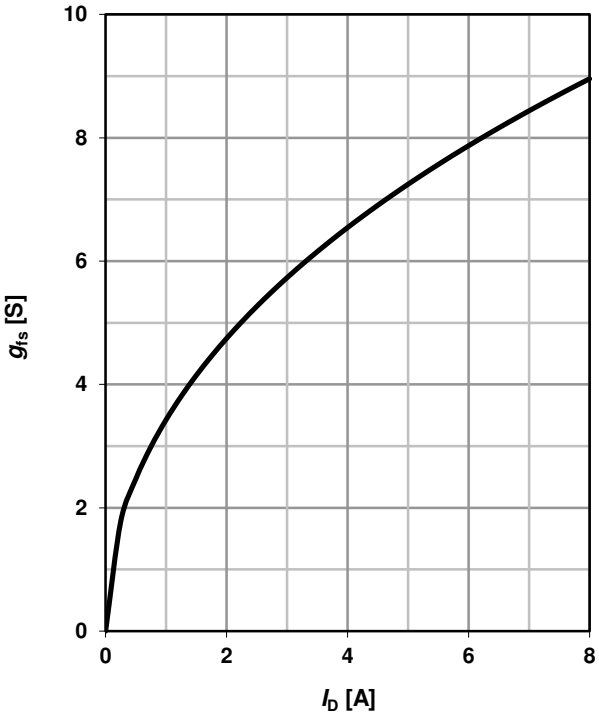
7 Typ. transfer characteristics

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



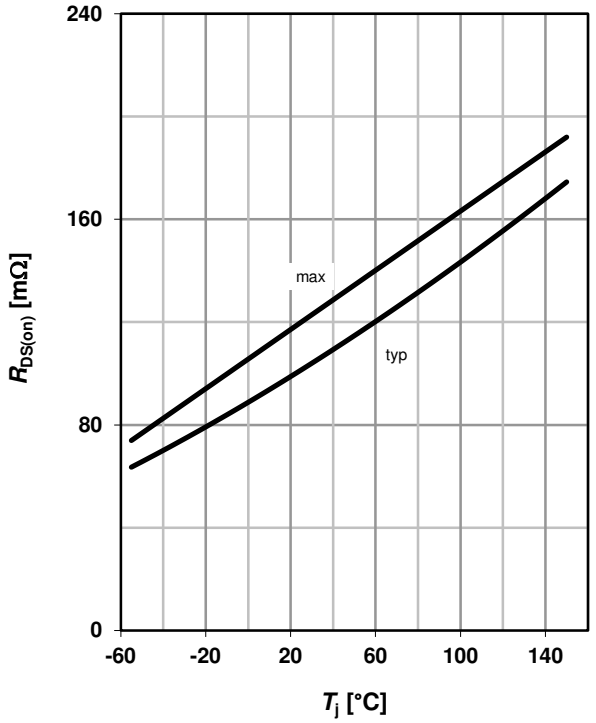
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

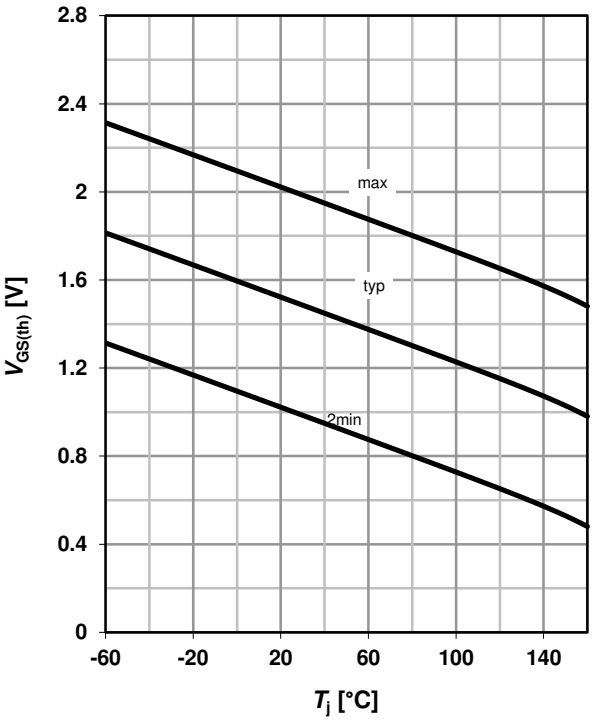
$R_{DS(on)}$=f(T_j); I_D=-3 A; V_{GS}=-10 V



10 Typ. gate threshold voltage

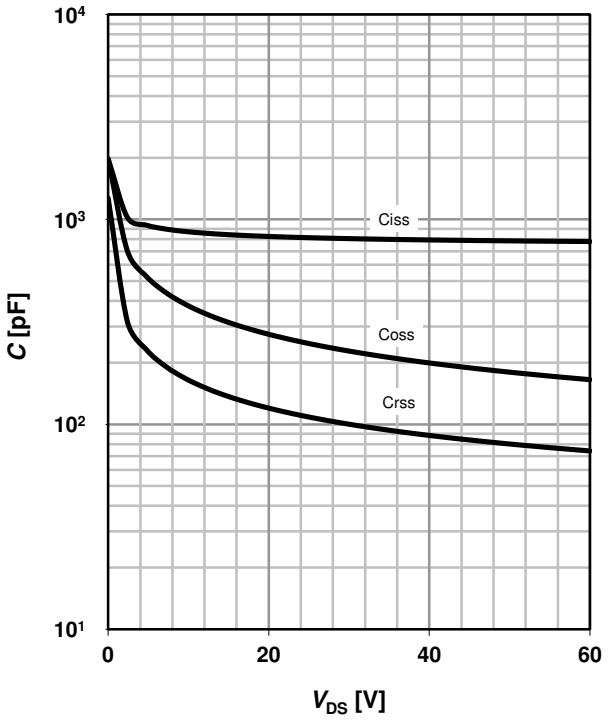
$V_{GS(th)}$=f(T_j); V_{DS}=V_{GS}; I_D=-1 mA

parameter: I_D



11 Typ. capacitances

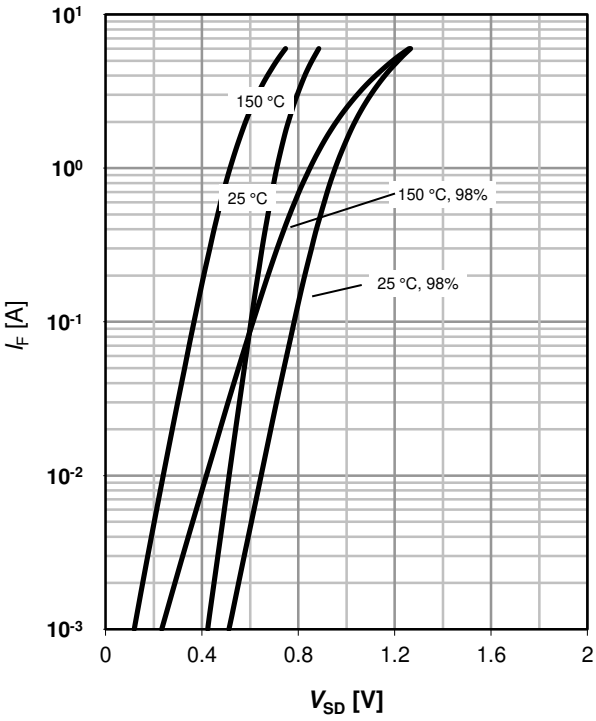
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz; T_j=25°C



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

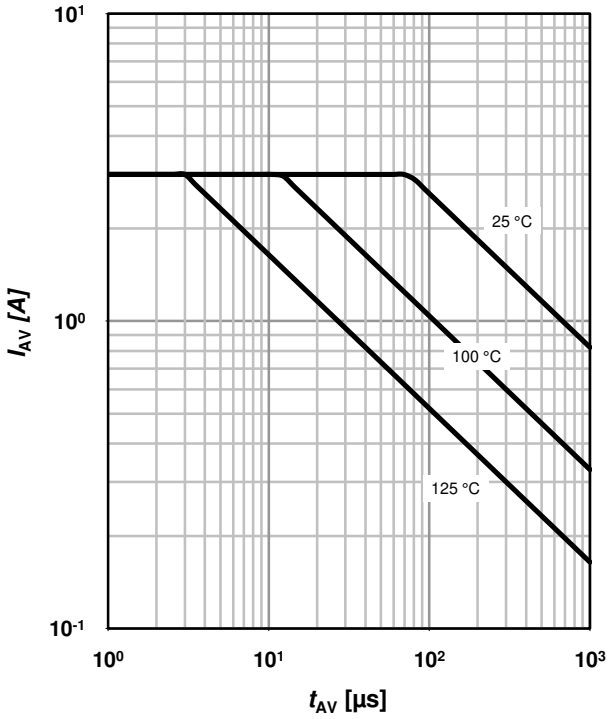
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

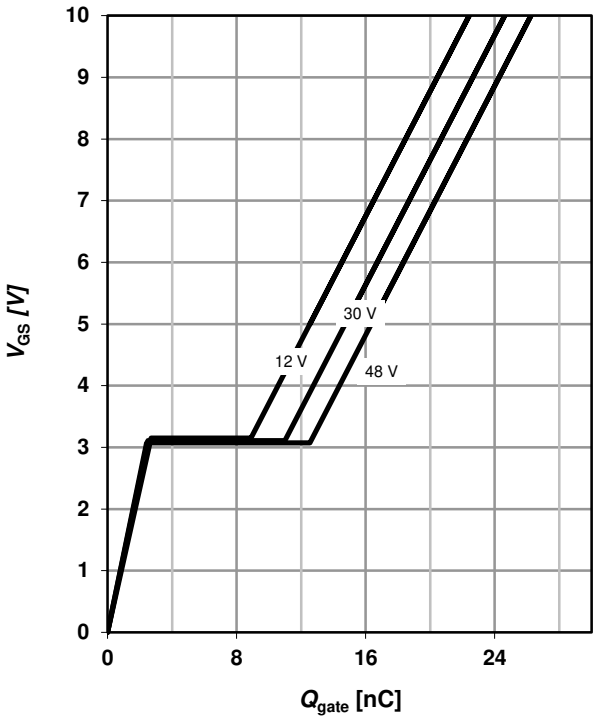
parameter: $T_{j(start)}$



14 Typ. gate charge

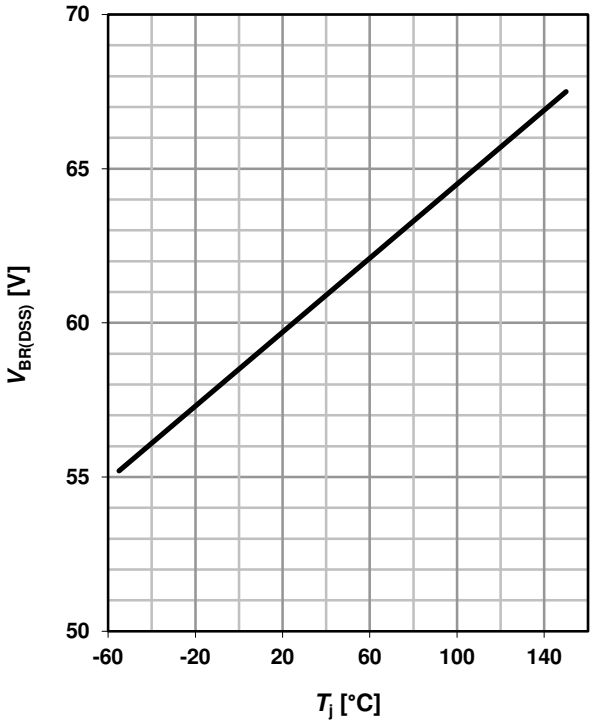
V_{GS}=f(Q_{gate}); I_D=-3 A pulsed

parameter: V_{DD}

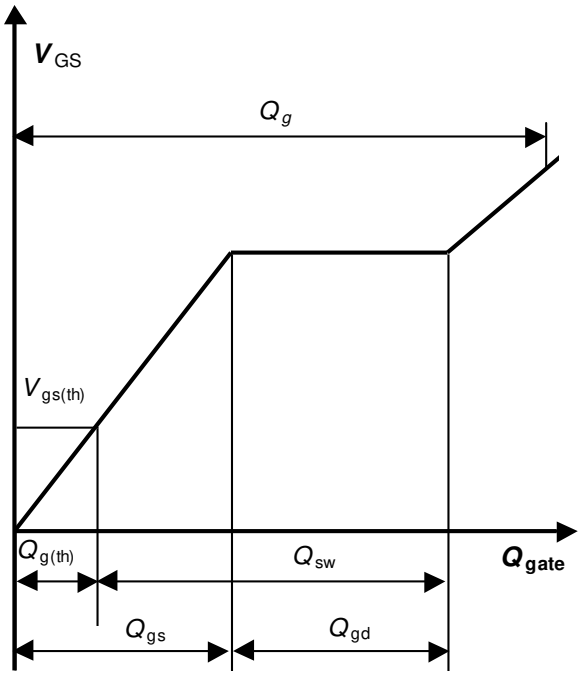


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA

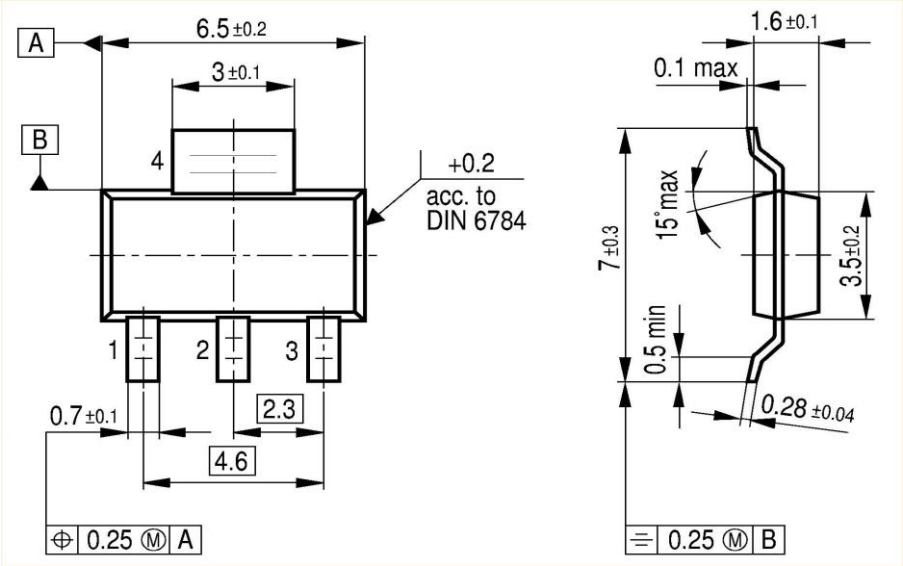


16 Gate charge waveforms



SOT223

Package Outline:



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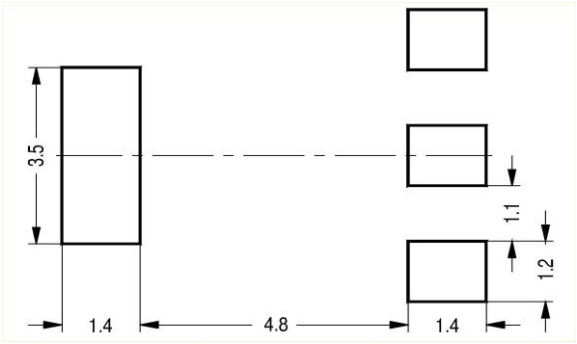
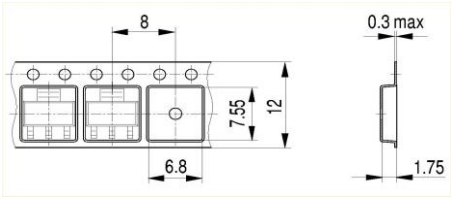
Footprint:



Packaging:



Published by
Infineon Technologies AG
81726 Munich, Germany

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