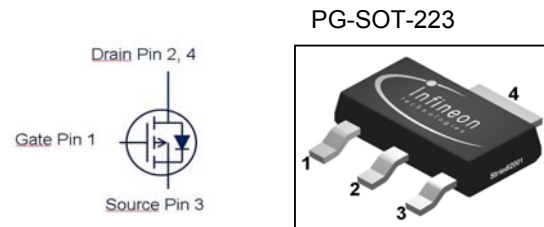


SIPMOS® Small-Signal-Transistor
Features

- P-Channel
- Enhancement mode
- Avalanche rated
- dv/dt rated
- Pb-free lead finishing; RoHS compliant

Product Summary

V_{DS}	-60	V
$R_{DS(on),max}$	0.3	Ω
I_D	-1.9	A



Type	Package	Tape and reel information	Marking	Lead free	Packing
BSP 170 P	PG-SOT-223	L6327: 1000pcs/reel	BSP170	Yes	Non Dry

Maximum ratings, at $T_j=25\text{ °C}$, unless otherwise specified

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	I_D	$T_A=25\text{ °C}$	-1.9	A
		$T_A=70\text{ °C}$	-1.5	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-7.6	
Avalanche energy, single pulse	E_{AS}	$I_D=1.9\text{ A}$, $R_{GS}=25\ \Omega$	70	mJ
Avalanche energy, periodic limited by T_{jmax}	E_{AR}		0.18	
Reverse diode dv/dt	dv/dt	$I_D=1.9\text{ A}$, $V_{DS}=48\text{ V}$, $di/dt=-200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$	-6	kV/ μs
Gate source voltage	V_{GS}		± 20	V
Power dissipation	P_{tot}	$T_A=25\text{ °C}$	1.8	W
Operating and storage temperature	T_j , T_{stg}		-55 ... 150	$^{\circ}\text{C}$
ESD class		JESD22-A114 (HBM)	1A (250V to 500V)	
Soldering temperature			260 $^{\circ}\text{C}$	
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}		-	-	20	K/W
SMD version, device on PCB:	R_{thJA}	minimal footprint	-	-	110	K/W
		6 cm ² cooling area ¹⁾	-	-	70	

Electrical characteristics, at $T_j=25\text{ °C}$, unless otherwise specified

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-250\text{ }\mu\text{A}$	-2.1	-3	-4	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ °C}$	-	-0.1	-1	μA
		$V_{DS}=-60\text{ V}, V_{GS}=0\text{ V}, T_j=125\text{ °C}$	-	-10	-100	
Gate-source leakage current	I_{GSS}	$V_{GS}=-20\text{ V}, V_{DS}=0\text{ V}$	-	-10	-100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-10\text{ V}, I_D=-1.9\text{ A}$	-	239	300	m Ω
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=-1.9\text{ A}$	1.3	2.6	-	S

¹⁾ Device on 40mm*40mm*1.5 epoxy PCB FR4 with 6cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical without blown air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	328	410	pF
Output capacitance	C_{oss}		-	105	135	
Reverse transfer capacitance	C_{rss}		-	38	48	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-30\text{ V}, V_{GS}=-$ $10\text{ V}, I_D=-1.9\text{ A},$ $R_G=6\ \Omega$	-	14	21	ns
Rise time	t_r		-	28	42	
Turn-off delay time	$t_{d(off)}$		-	92	138	
Fall time	t_f		-	60	90	

Gate Charge Characteristics

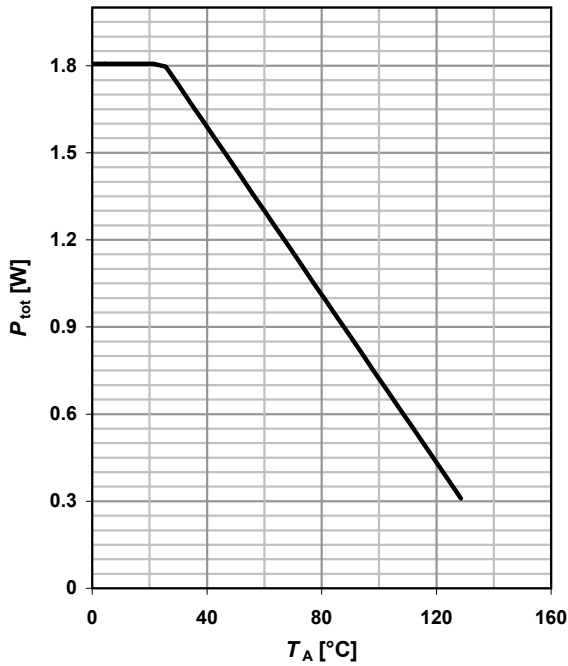
Gate to source charge	Q_{gs}	$V_{DD}=-48\text{ V}, I_D=-1.9\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$	-	-1.4	-1.9	nC
Gate to drain charge	Q_{gd}		-	-4.9	-7.4	
Gate charge total	Q_g		-	-10	-14	
Gate plateau voltage	$V_{plateau}$		-	-4.34	-	V

Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ }^\circ\text{C}$	-	-	-1.98	A
Diode pulse current	$I_{S,pulse}$		-	-	-7.6	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-1.9\text{ A},$ $T_j=25\text{ }^\circ\text{C}$	-	-0.83	-1.1	V
Reverse recovery time	t_{rr}	$V_R=30\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	36	54	ns
Reverse recovery charge	Q_{rr}		-	41	62	

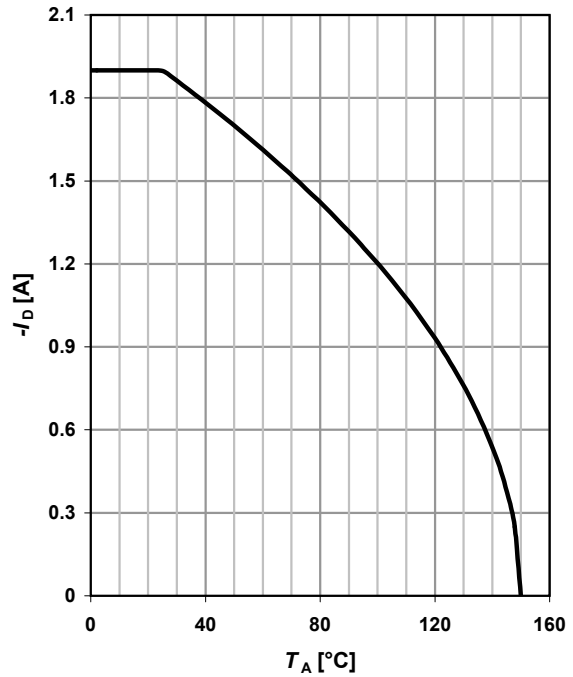
1 Power dissipation

$$P_{\text{tot}} = f(T_A)$$



2 Drain current

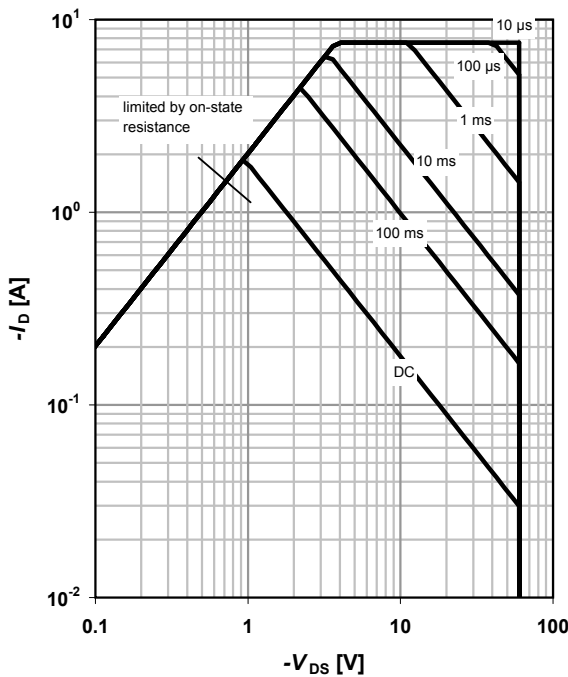
$$I_D = f(T_A); |V_{GS}| \geq 10 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{DS}); T_A = 25 \text{ °C}^1; D = 0$$

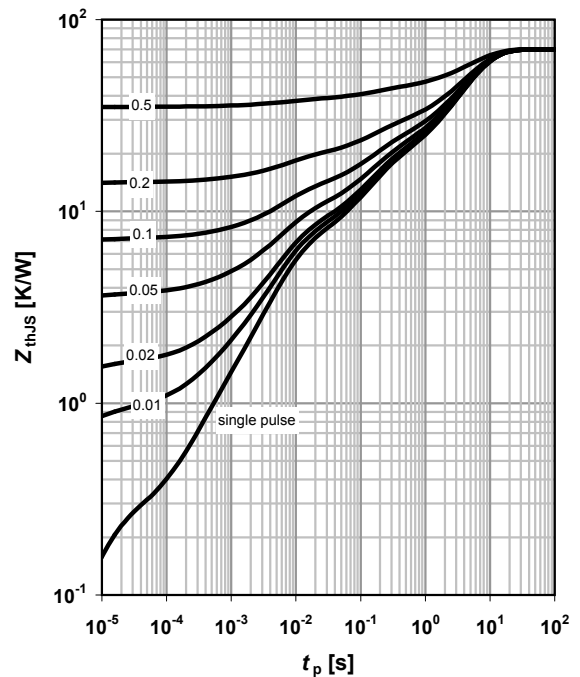
parameter: t_p



4 Max. transient thermal impedance

$$Z_{\text{thJA}} = f(t_p)$$

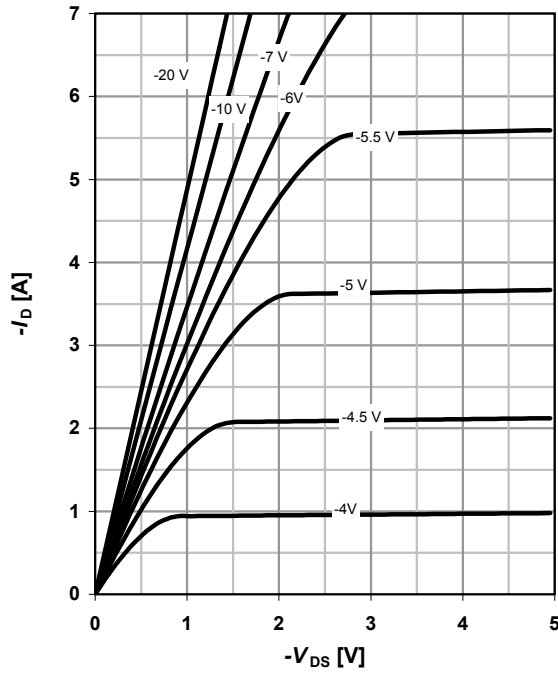
parameter: $D = t_p/T$



5 Typ. output characteristics

$$I_D = f(V_{DS}); T_j = 25\text{ }^\circ\text{C}$$

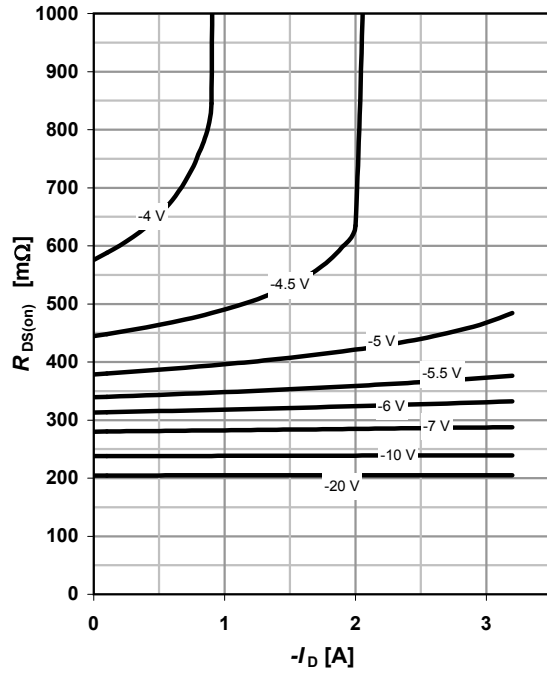
parameter: V_{GS}



6 Typ. drain-source on resistance

$$R_{DS(on)} = f(I_D); T_j = 25\text{ }^\circ\text{C}$$

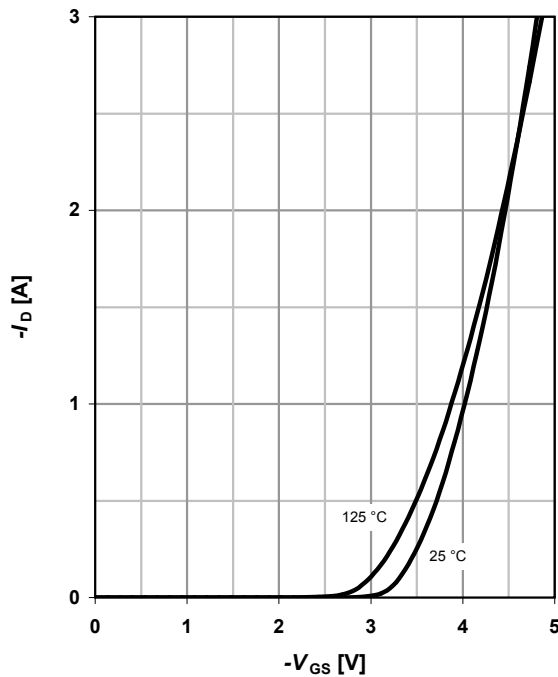
parameter: V_{GS}



7 Typ. transfer characteristics

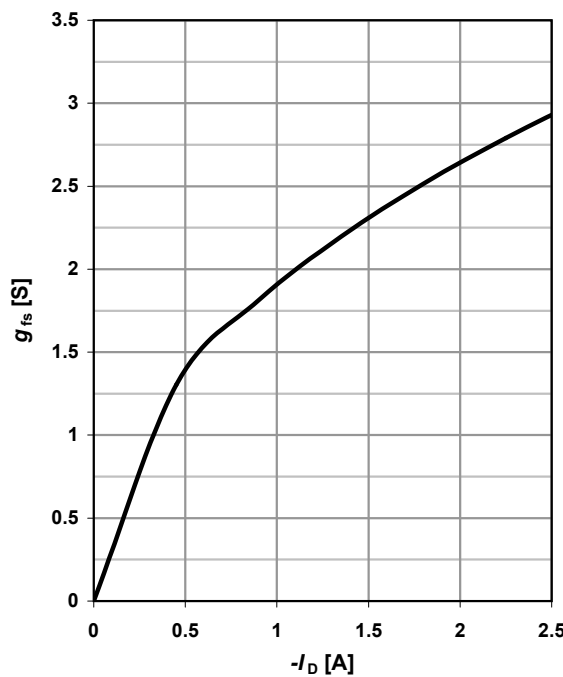
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$

parameter: T_j



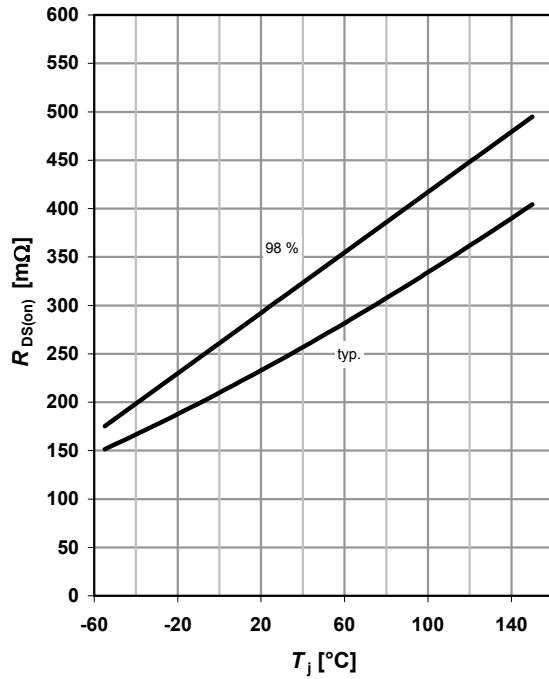
8 Typ. forward transconductance

$$g_{fs} = f(I_D); T_j = 25\text{ }^\circ\text{C}$$



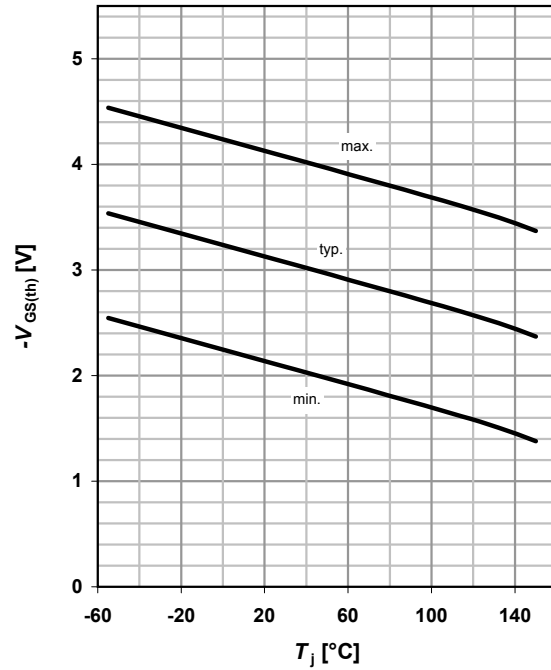
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -1.9 \text{ A}; V_{GS} = -10 \text{ V}$$



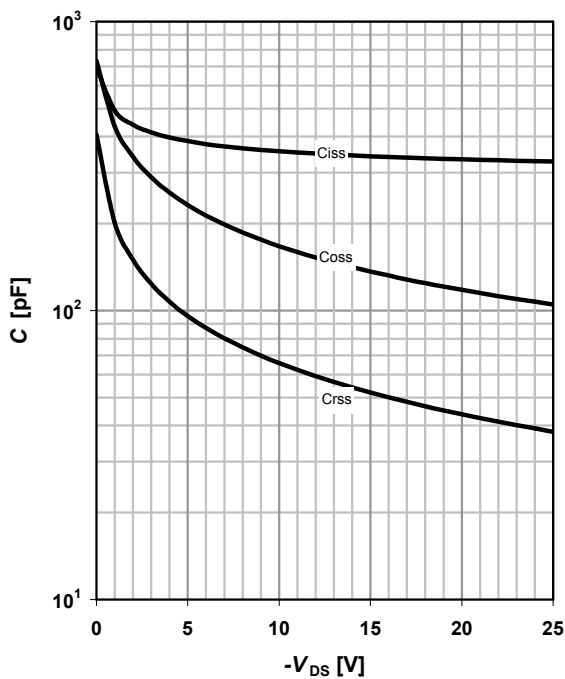
10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -250 \mu\text{A}$$



11 Typ. capacitances

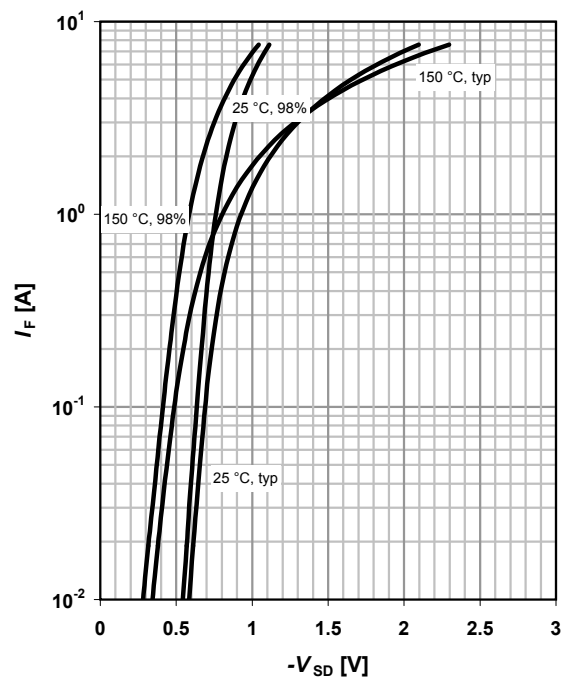
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

$$I_F = f(V_{SD})$$

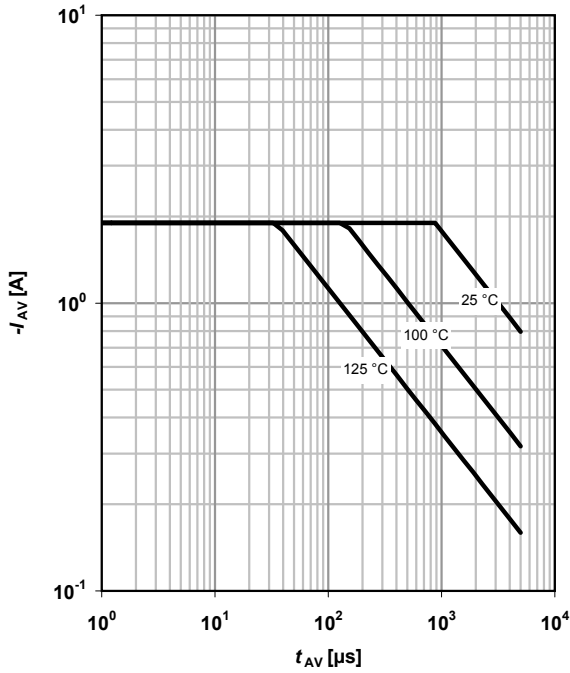
parameter: T_j



13 Avalanche characteristics

$I_{AS}=f(t_{AV}); R_{GS}=25 \Omega$

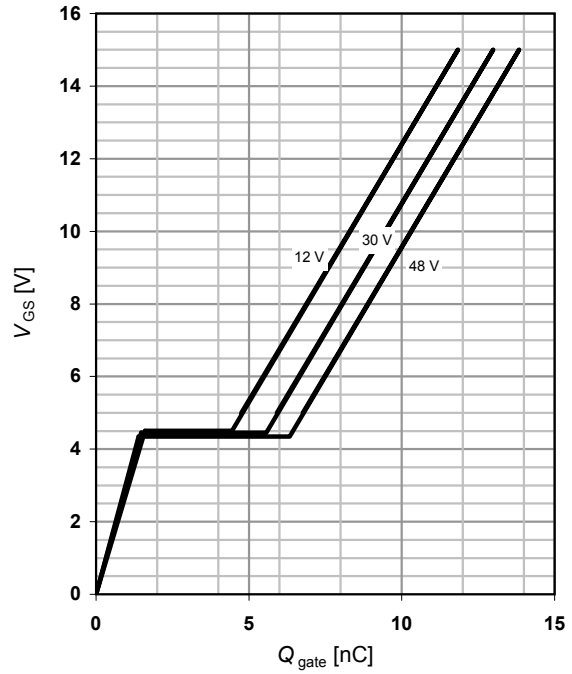
parameter: $T_{j(start)}$



14 Typ. gate charge

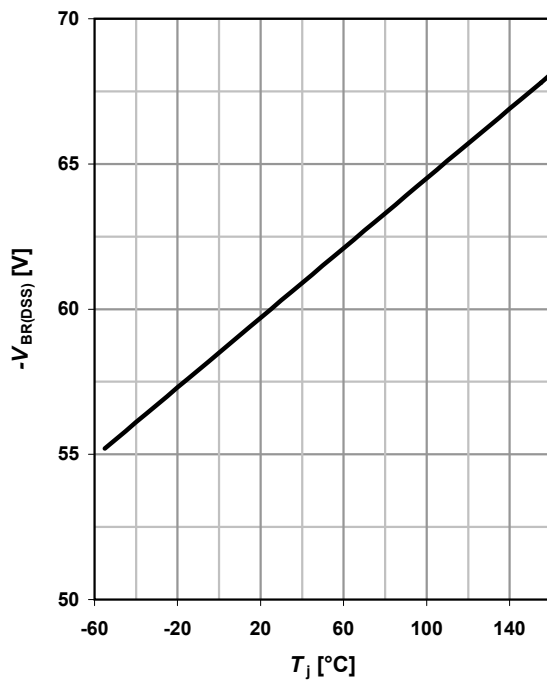
$V_{GS}=f(Q_{gate}); I_D=-1.9 \text{ A pulsed}$

parameter: V_{DD}



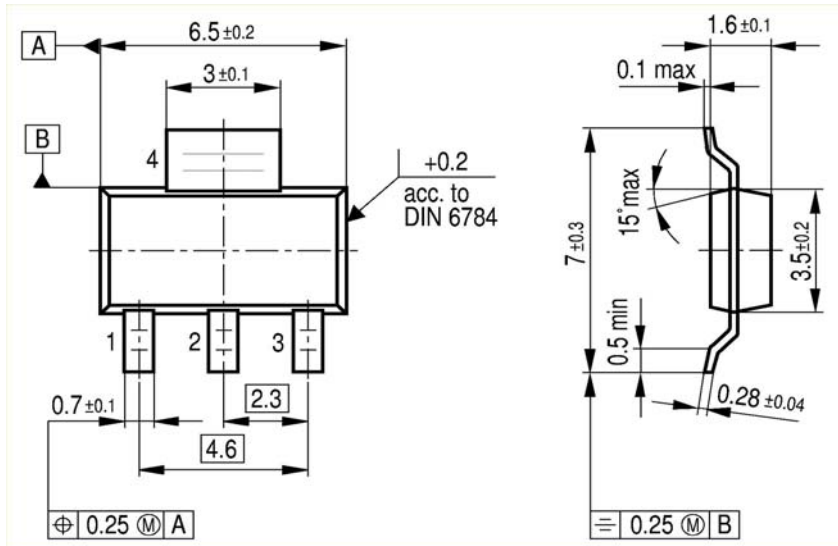
15 Drain-source breakdown voltage

$V_{BR(DSS)}=f(T_j); I_D=-250 \mu\text{A}$

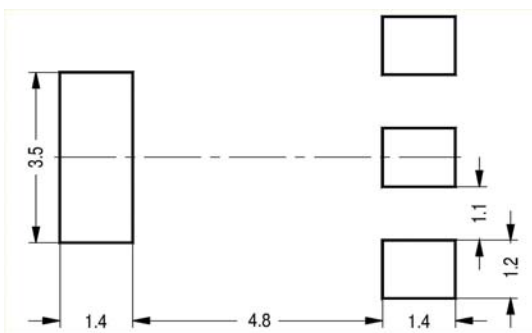


Package Outline

SOT-223: Outline

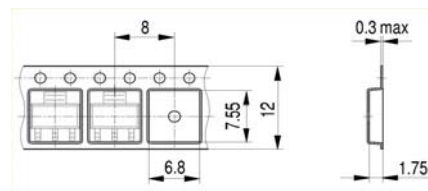


Footprint



Packaging

Tape



Dimensions in mm

Published by**Infineon Technologies AG****81726 München, Germany****© Infineon Technologies AG 2006.****All Rights Reserved.****Attention please!**

The information given in this data sheet shall in no event be regarded as a guarantee of conditions or characteristics ("Beschaffenheitsgarantie"). With respect to any examples or hints given herein, any typical values stated herein and/or any information regarding the application of the device, Infineon Technologies hereby disclaims any and all warranties and liabilities of any kind, including without limitation warranties of non-infringement of intellectual property rights of any third party.

Information

For further information on technology, delivery terms and conditions and prices please contact your nearest Infineon Technologies Office (www.infineon.com).

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your nearest Infineon Technologies Office.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.