SIPMOS® Small-Signal-Transistor

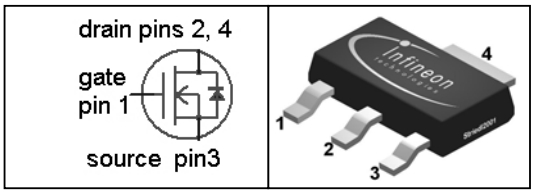
Features

- N-channel
- Depletion mode
- dv/dt rated
- Available with $V_{GS(th)}$ indicator on reel
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101

Product Summary

V_{DS}	240	V
$R_{DS(on),max}$	6	Ω
$I_{DSS,min}$	0.05	A

PG-SOT223



Type	Package	Tape and Reel Information	Marking	Packaging
BSP129	PG-SOT223	L6327: 1000 pcs/reel	BSP129	Non dry
BSP129	PG-SOT223	L6906: 1000 pcs/reel	BSP129	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	0.35	A
		T_A=70 °C	0.28	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	1.4	
Reverse diode dv/dt	dv/dt	I_D=0.36 A, V_{DS}=192 V, di/dt=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
ESD class (JESD22-A114-HBM)			1A (>250V, <500V)	
Power dissipation	P_{tot}	T_A=25 °C	1.8	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

[1] see table on next page and diagram 11

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - soldering point (pin 4)	R_{thJS}		-	-	25	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	115	
		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}=-3 V, I_D=250 µA	240	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=3 V, I_D=108 µA	-2.1	-1.4	-1	
Drain-source cutoff current	$I_{D(off)}$	V_{DS}=240 V, V_{GS}=-3 V, T_j=25 °C	-	-	0.1	µA
		V_{DS}=240 V, V_{GS}=-3 V, T_j=125 °C	-	-	10	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	-	10	nA
On-state drain current	I_{DSS}	V_{GS}=0 V, V_{DS}=10 V	50	-	-	mA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=0 V, I_D=25 mA	-	6.5	20	Ω
		V_{GS}=10 V, I_D=0.35 A	-	4.2	6.0	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=0.28 A	0.18	0.36	-	S
Threshold voltage $V_{GS(th)}$ sorted in bands[3)]						
J	$V_{GS(th)}$	V_{DS}=3 V, I_D=108 µA	-1.2	-	-1	V
K			-1.35	-	-1.15	
L			-1.5	-	-1.3	
M			-1.65	-	-1.45	
N			-1.8	-	-1.6	

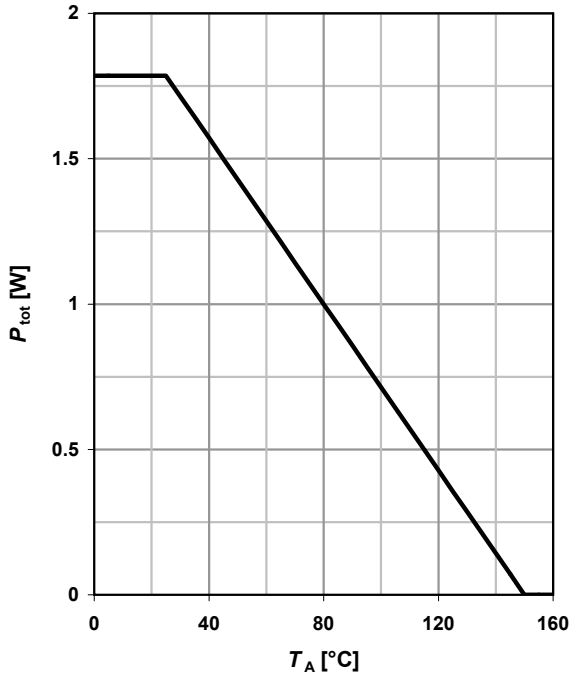
[2)] Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm^2 (single layer, 70 µm thick) copper area for drain connection. PCB is vertical in still air.

[3)] Each reel contains transistors out of one band whose identifying letter is printed on the reel label. A specific band cannot be ordered separately.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=-3 V, V_{DS}=25 V, f=1 MHz	-	82	108	pF
Output capacitance	C_{oss}		-	12	16	
Reverse transfer capacitance	C_{rss}		-	6	10	
Turn-on delay time	$t_{d(on)}$	V_{DD}=120 V, V_{GS}=-2...5 V, I_D=0.2 A, R_G=7.6 Ω	-	4.4	6.6	ns
Rise time	t_r		-	4.1	6.2	
Turn-off delay time	$t_{d(off)}$		-	22	33	
Fall time	t_f		-	35	53	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=192 V, I_D=0.2 A, V_{GS}=-3 to 5 V	-	0.24	0.36	nC
Gate to drain charge	Q_{gd}		-	1.7	2.6	
Gate charge total	Q_g		-	3.8	5.7	
Gate plateau voltage	$V_{plateau}$		-	0.37	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	0.35	A
Diode pulse current	$I_{S,pulse}$		-	-	1.4	
Diode forward voltage	V_{SD}	V_{GS}=-3 V, I_F=0.35 A, T_j=25 °C	-	0.79	1.2	V
Reverse recovery time	t_{rr}	V_R=120 V, I_F=0.2 A, di_F/dt=100 A/µs	-	53	80	ns
Reverse recovery charge	Q_{rr}		-	65	97	nC

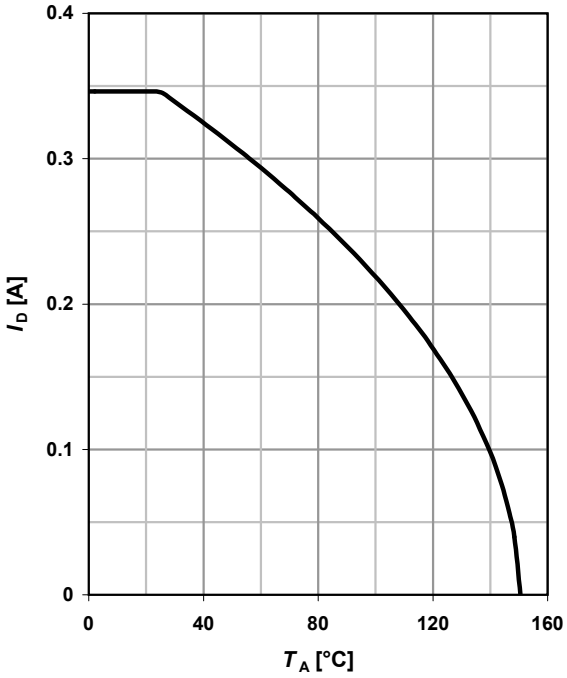
1 Power dissipation

$P_{tot}=f(T_A)$



2 Drain current

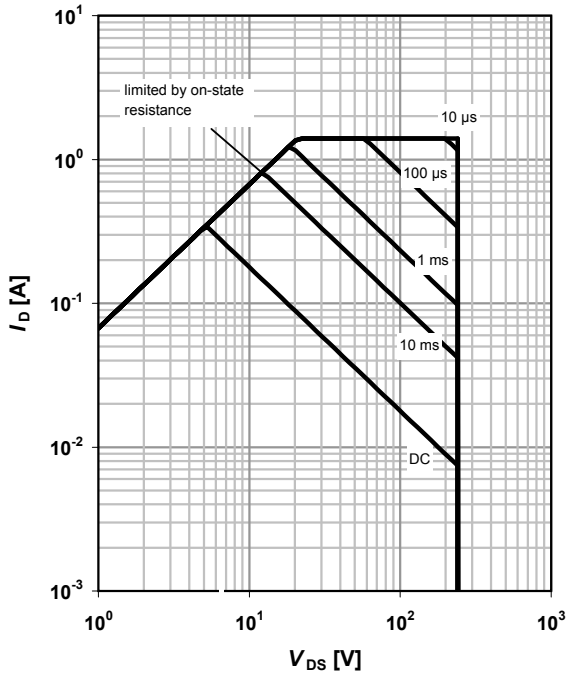
$I_D=f(T_A)$; $V_{GS}\geq 10$ V



3 Safe operating area

$I_D=f(V_{DS})$; $T_A=25$ °C; $D=0$

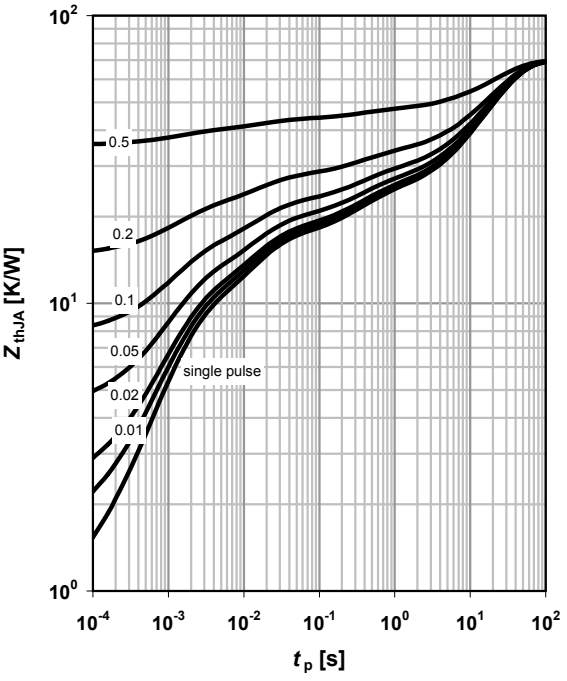
parameter: t_p



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

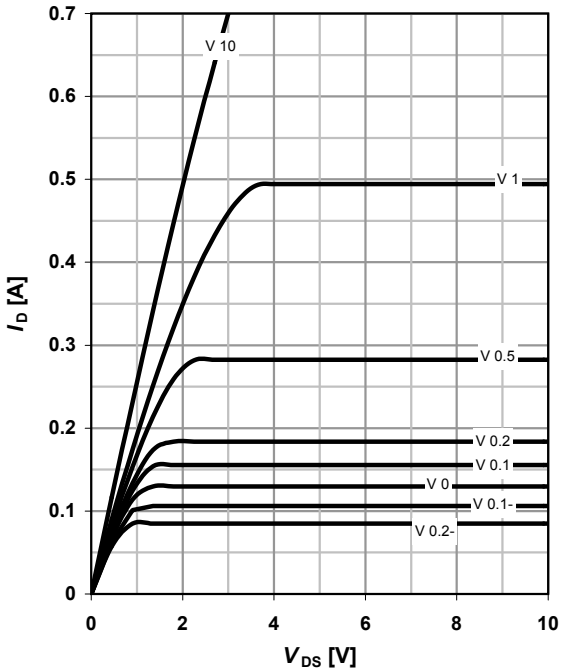
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

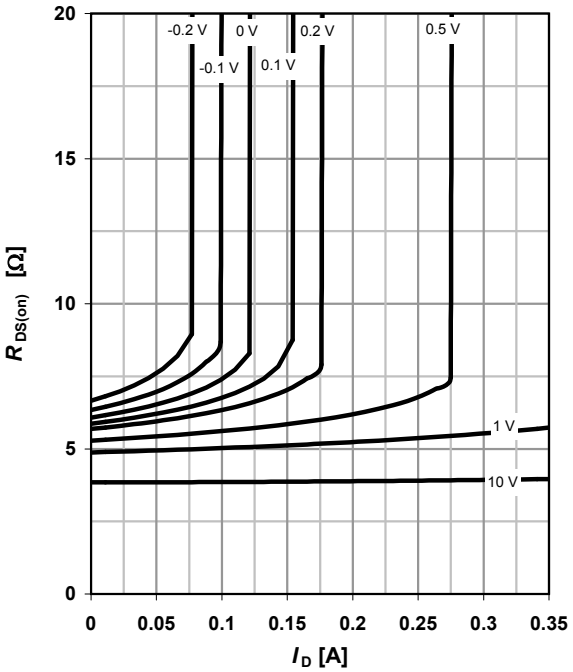
parameter: V_{GS}



6 Typ. drain-source on resistance

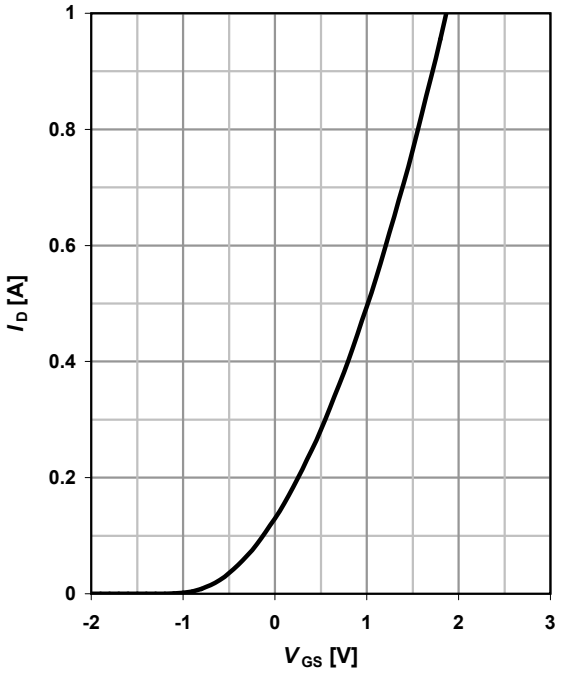
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



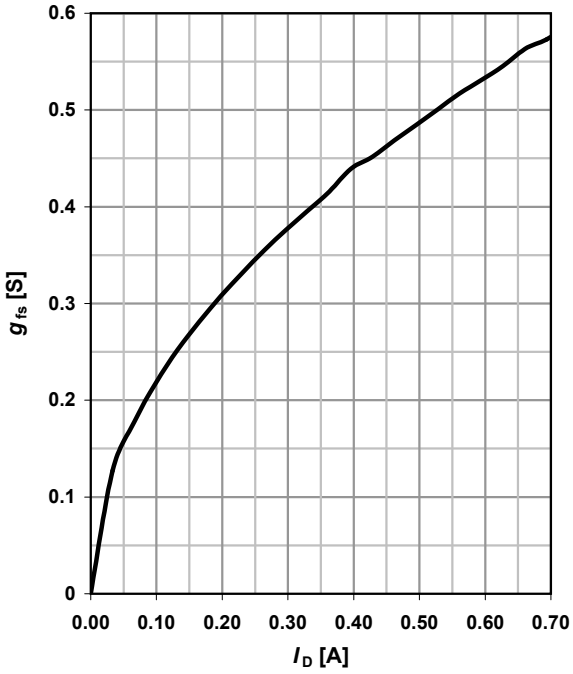
7 Typ. transfer characteristics

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



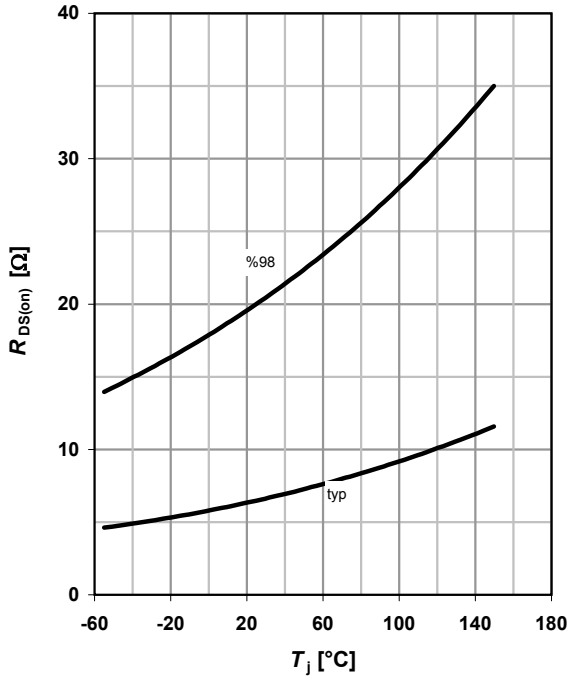
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

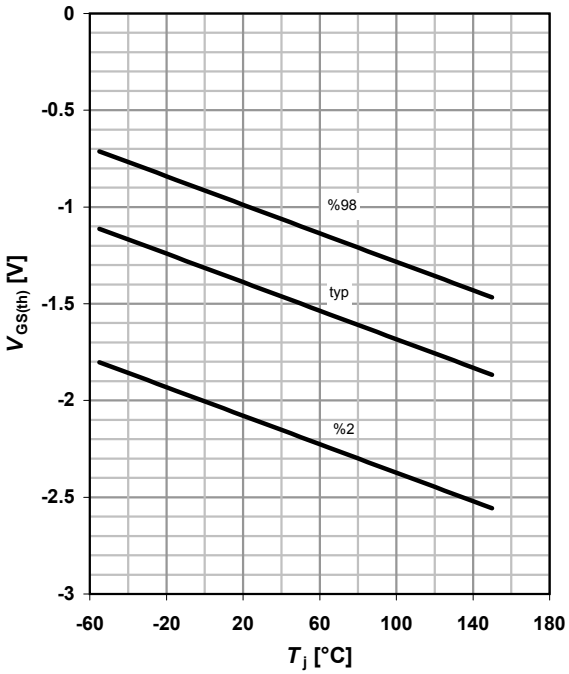
$R_{DS(on)}$=f(T_j); I_D=0.025 A; V_{GS}=0 V



10 Typ. gate threshold voltage

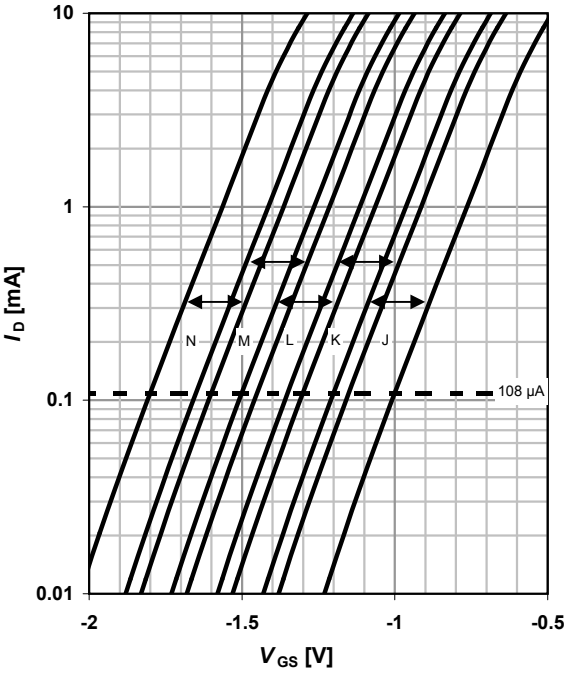
$V_{GS(th)}$=f(T_j); V_{DS}=3 V; I_D=108 µA

parameter: I_D



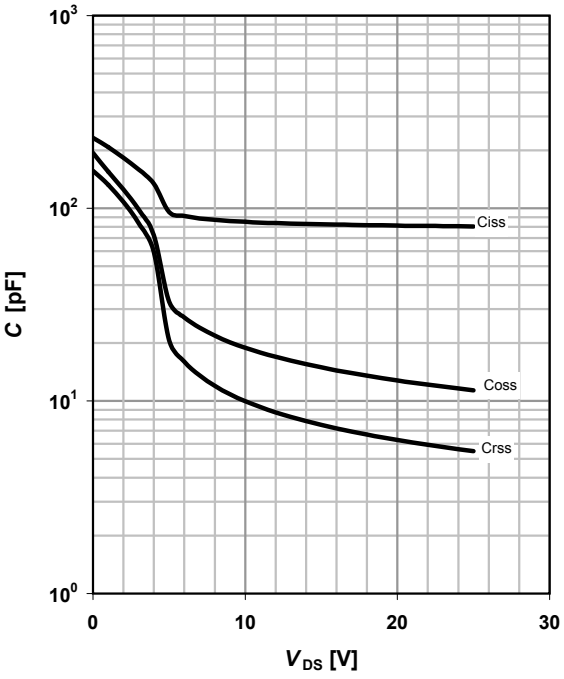
11 Threshold voltage bands

I_D=f(V_{GS}); V_{DS}=3 V; T_j=25 °C



12 Typ. capacitances

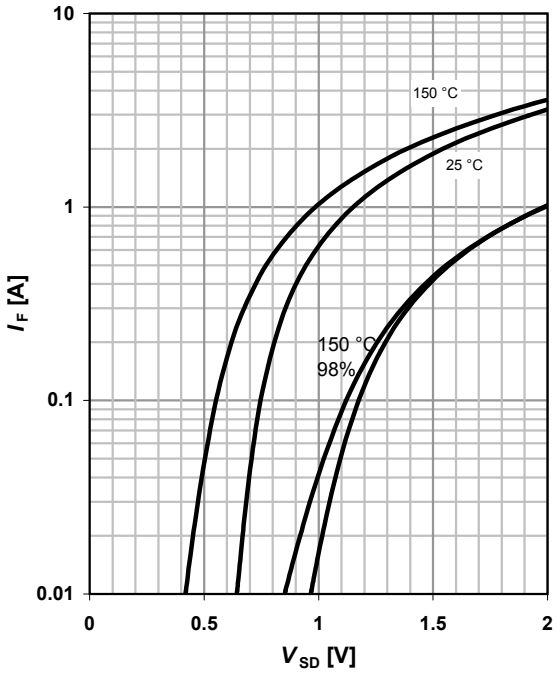
C=f(V_{DS}); V_{GS}=-3 V; f=1 MHz



13 Forward characteristics of reverse diode

I_F=f(V_{SD})

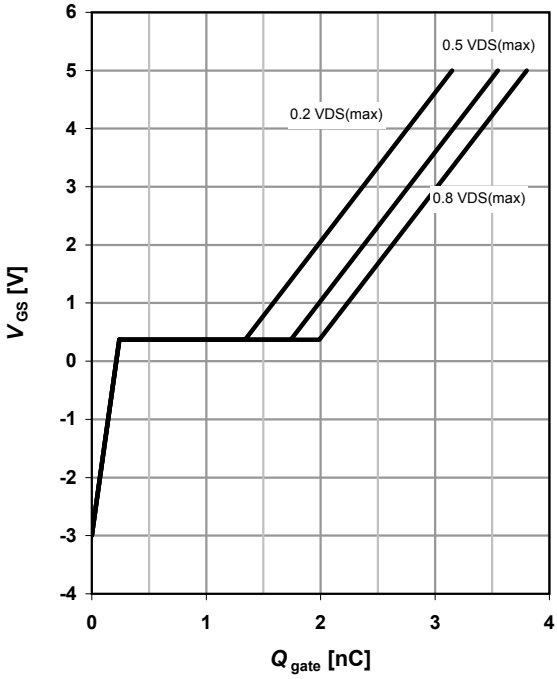
parameter: T_j



15 Typ. gate charge

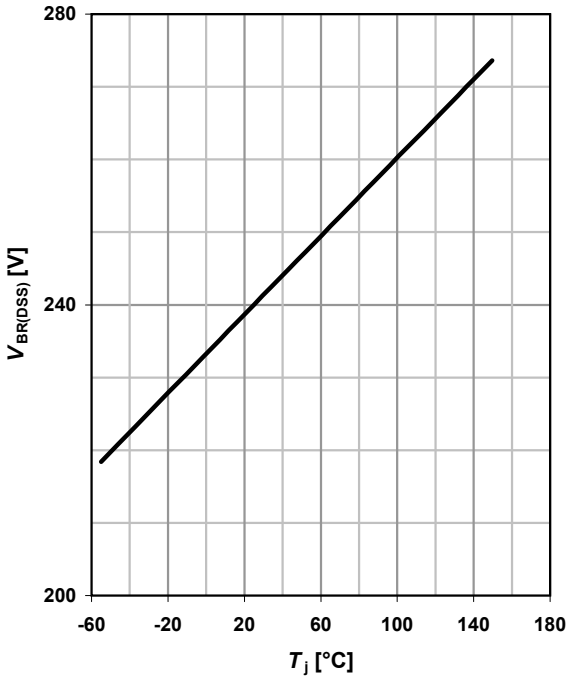
V_{GS}=f(Q_{gate}); I_D=0.2 A pulsed

parameter: V_{DD}

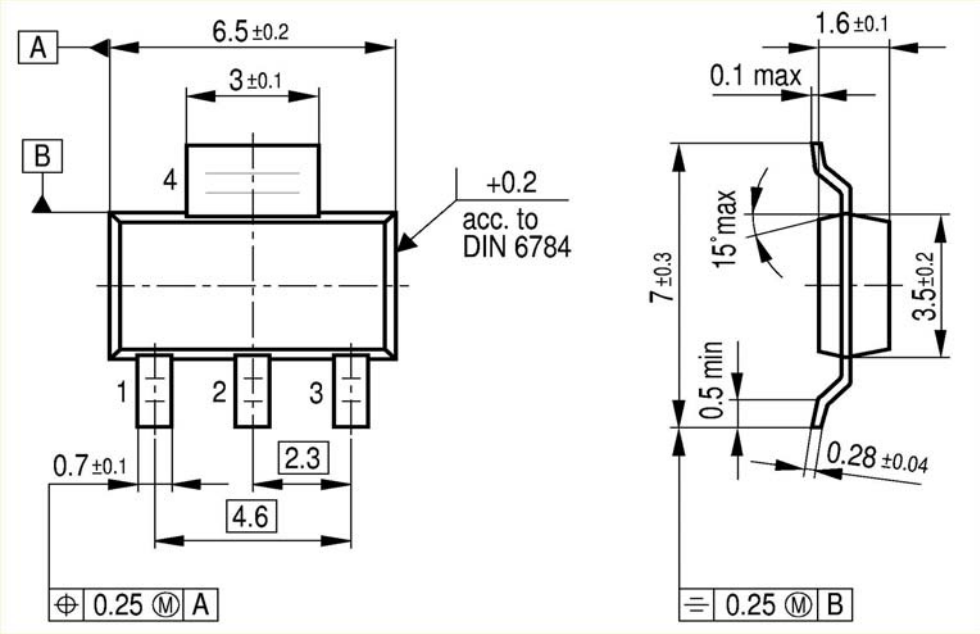


16 Drain-source breakdown voltage

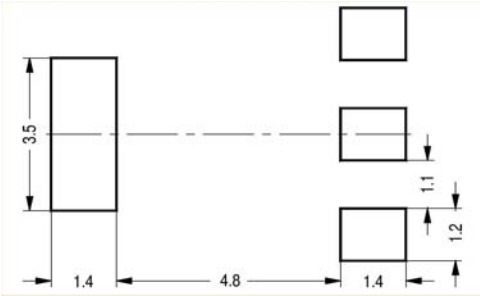
$V_{BR(DSS)}$=f(T_j); I_D=250 µA



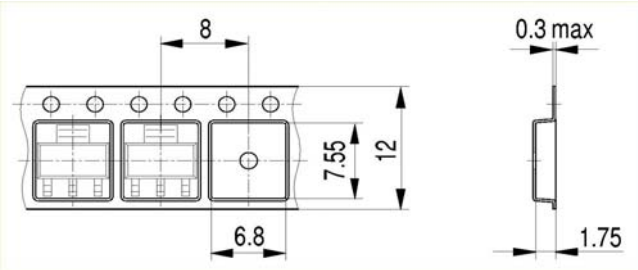
Package Outline:



Footprint:



Packaging:



Dimensions in mm

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Infineon Technologies AG
81726 Munich, Germany
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