SIPMOS® Small-Signal-Transistor

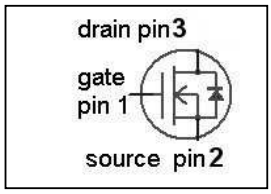
Features

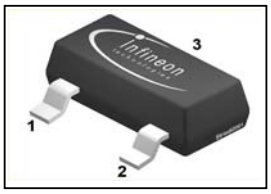
- N-channel
- Depletion mode
- dv/dt rated
- Available with $V_{GS(th)}$ indicator on reel
- Pb-free lead-plating; RoHS compliant

Product Summary

V_{DS}	60	V
$R_{DS(on),max}$	8	Ω
$I_{DSS,min}$	0.13	A

SOT-23





Type	Package	Pb-free	Tape and Reel Information	Marking
BSS159	PG-SOT-23	Yes	L6327: 3000 pcs/reel	SGs
BSS159	PG-SOT-23	Yes	L6906: 3000 pcs/reel sorted in $V_{GS(th)}$ bands[1)]	SGs

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	T_A=25 °C	0.23	A
		T_A=70 °C	0.18	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	0.92	
Reverse diode dv/dt	dv/dt	I_D=0.23 A, V_{DS}=60 V, di/dt=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
ESD sensitivity (HBM) as per MIL-STD 883			Class 0	
Power dissipation	P_{tot}	T_A=25 °C	0.36	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

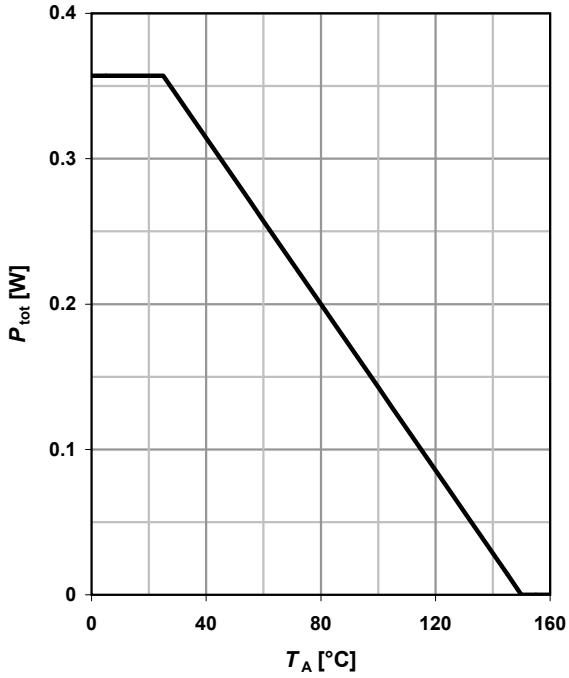
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal characteristics	R_{thJA}	minimal footprint	-	-	350	K/W
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=-10 V, I_D=250 µA	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=3 V, I_D=26 µA	-3.5	-2.8	-2.4	
Drain-source cutoff current	$I_{D(off)}$	V_{DS}=60 V, V_{GS}=-10 V, T_j=25 °C	-	-	0.1	µA
		V_{DS}=60 V, V_{GS}=-10 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	130	-	-	mA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=0 V, I_D=0.07 A	-	3.9	8	Ω
		V_{GS}=10 V, I_D=0.16 A	-	1.7	3.5	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=0.16 A	0.1	0.19	-	S
Threshold voltage $V_{GS(th)}$ sorted in bands[2)]						
J	$V_{GS(th)}$	V_{DS}=3 V, I_D=26 µA	-2.6	-	-2.4	V
K			-2.75	-	-2.55	
L			-2.9	-	-2.7	
M			-3.05	-	-2.85	
N			-3.2	-	-3	

[2)] 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}=-10 V, V_{DS}=25 V, f=1 MHz	-	33	44	pF
Dynamic characteristics	C_{oss}		-	8.3	11	
Reverse transfer capacitance	C_{rss}		-	3.9	5.9	
Turn-on delay time	$t_{d(on)}$	V_{DD}=25 V, V_{GS}=-3…7 V, I_D=0.16 A, R_G=6 Ω	-	3.1	4.7	ns
Rise time	t_r		-	2.9	4.4	
Turn-off delay time	$t_{d(off)}$		-	9	13	
Fall time	t_f		-	9	13	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=40 V, I_D=0.16 A, V_{GS}=-3 to 5 V	-	0.14	0.21	nC
Gate to drain charge	Q_{gd}		-	0.7	1.1	
Gate charge total	Q_g		-	2.2	2.9	
Gate plateau voltage	$V_{plateau}$		-	-0.14	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	0.20	A
Diode pulse current	$I_{S,pulse}$		-	-	0.81	
Diode forward voltage	V_{SD}	V_{GS}=-3 V, I_F=0.16 A, T_j=25 °C	-	0.79	1.2	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=0.16 A, di_F/dt=100 A/µs	-	10.4	13	ns
Reverse recovery charge	Q_{rr}		-	3.3	4.1	nC

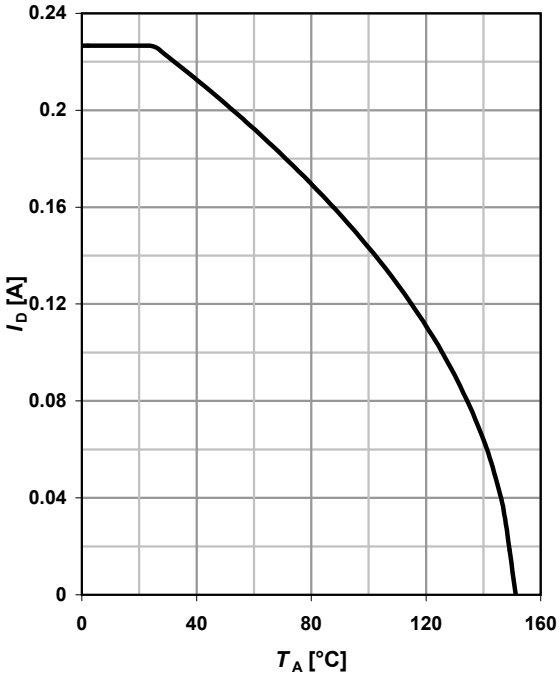
1 Power dissipation

$P_{tot}=f(T_A)$



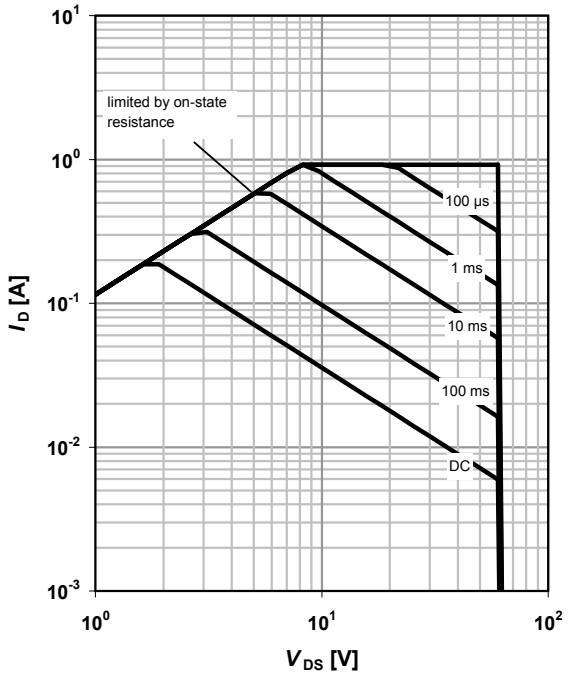
2 Drain current

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



3 Safe operating area

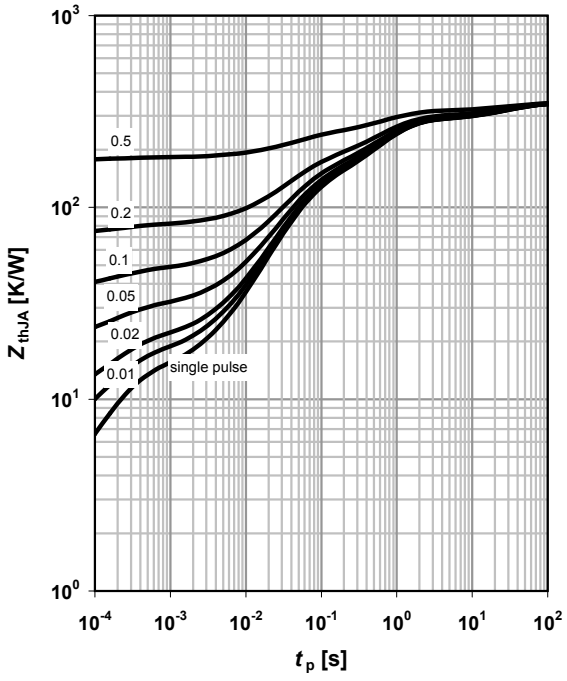
$I_D=f(V_{DS})$; $T_A=25$ °C; $D=0$



4 Max. transient thermal impedance

$Z_{thJA}=f(t_p)$

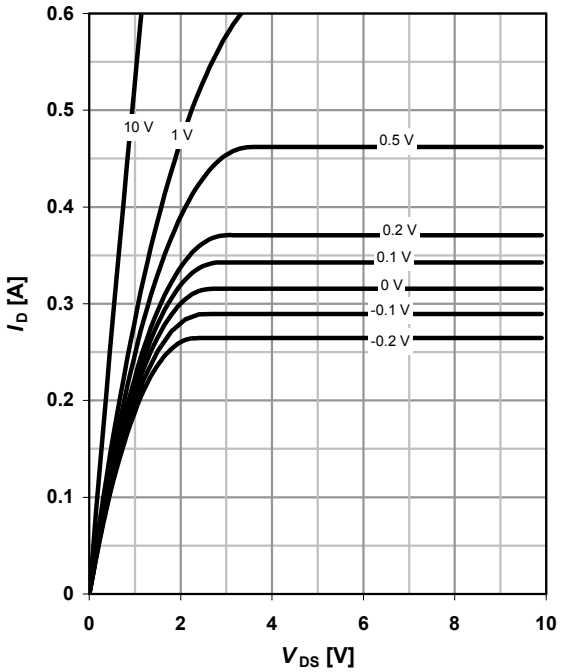
parameter: $D=t_p/T$



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

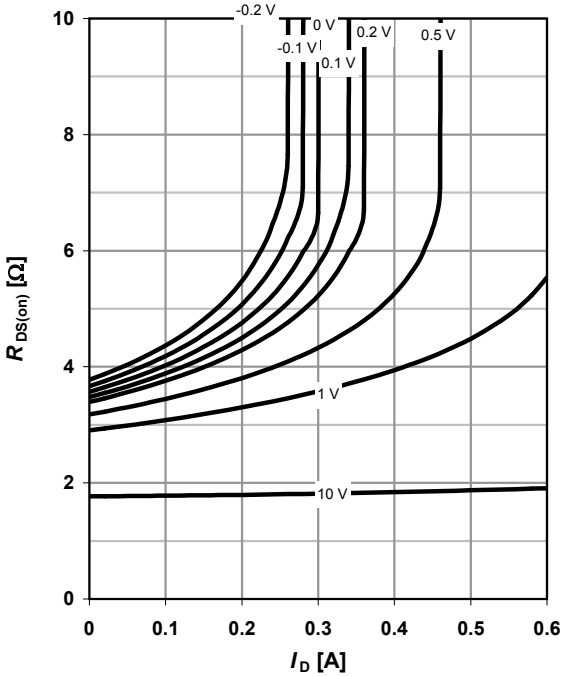
parameter: V_{GS}



6 Typ. drain-source on resistance

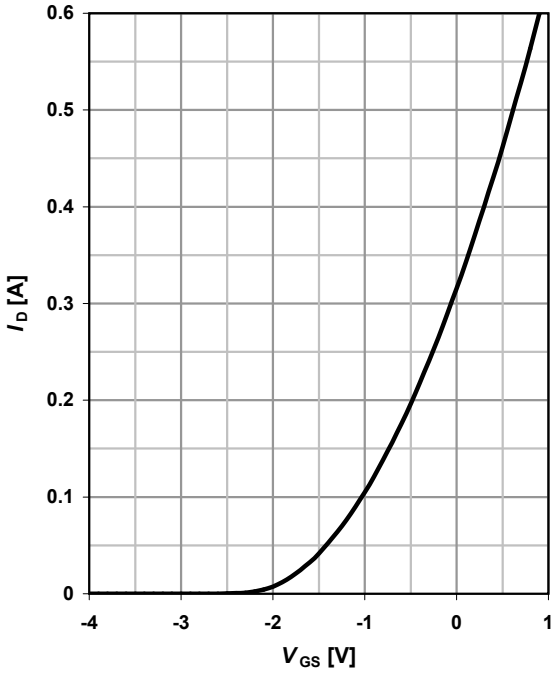
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



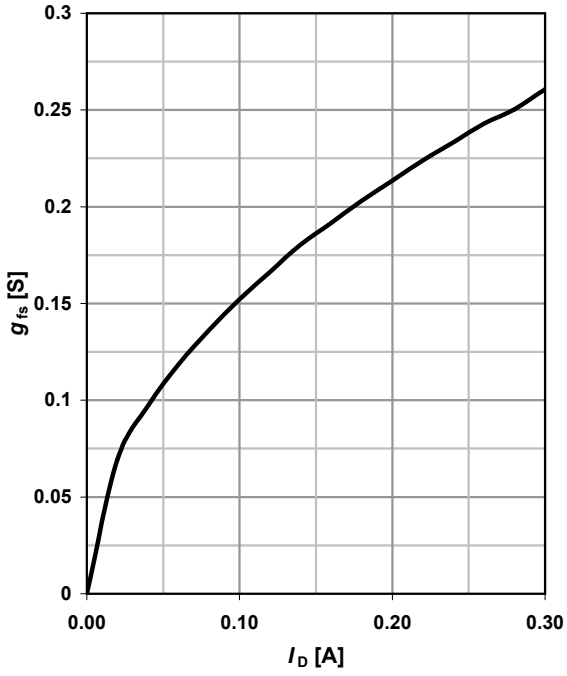
7 Typ. transfer characteristics

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



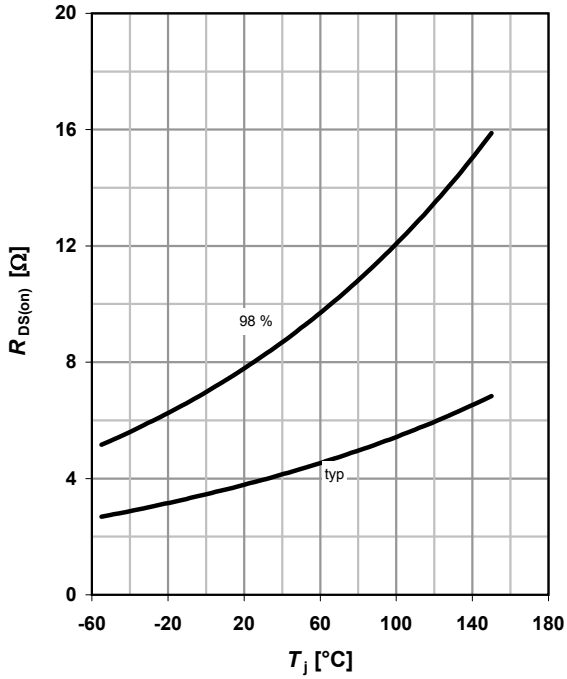
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

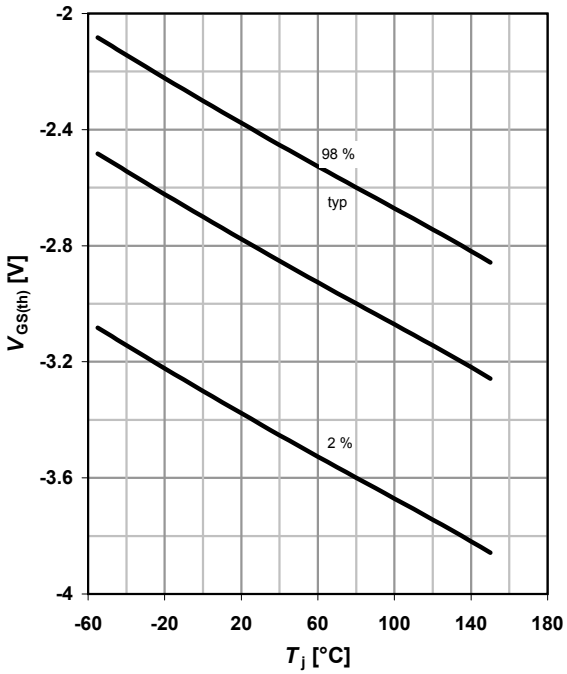
$R_{DS(on)}$=f(T_j); I_D=0.07 A; V_{GS}=0 V



10 Typ. gate threshold voltage

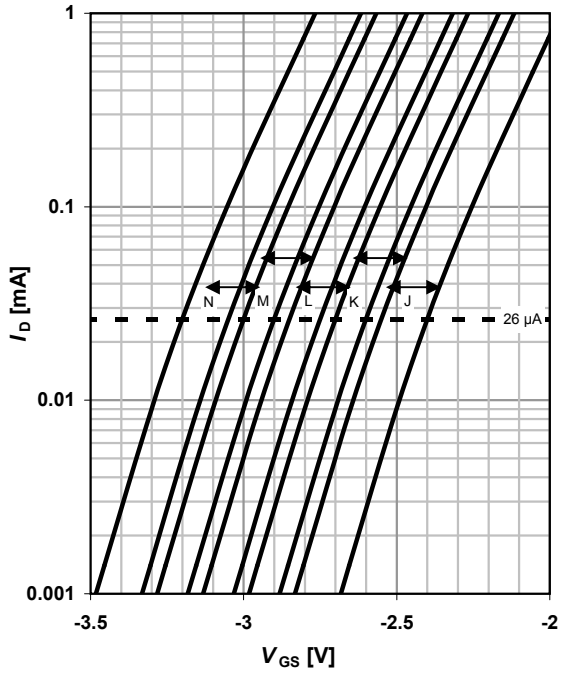
$V_{GS(th)}$=f(T_j); V_{DS}=3 V; I_D=26 µA

parameter: I_D



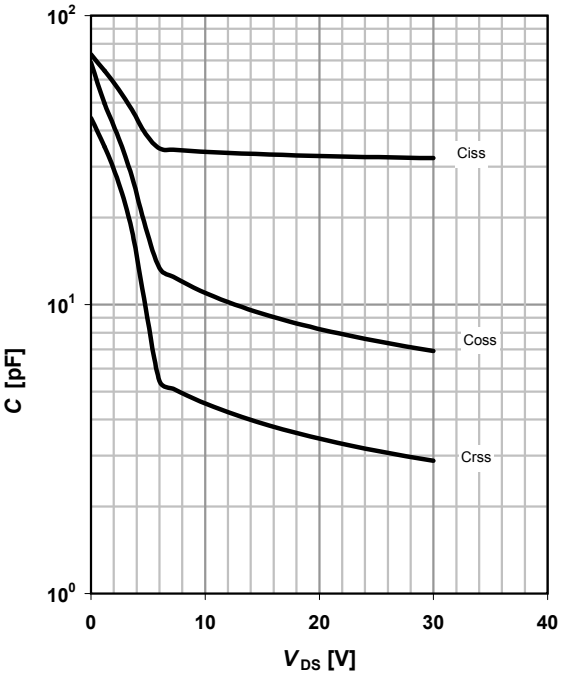
11 Threshold voltage bands

I_D=f(V_{GS}); V_{DS}=3 V; T_j=25 °C



12 Typ. capacitances

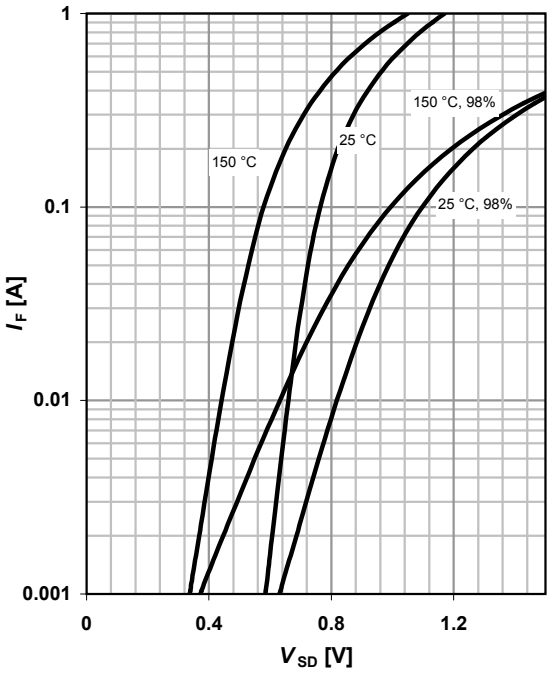
C=f(V_{DS}); V_{GS}=-10 V; f=1 MHz



13 Forward characteristics of reverse diode

I_F=f(V_{SD})

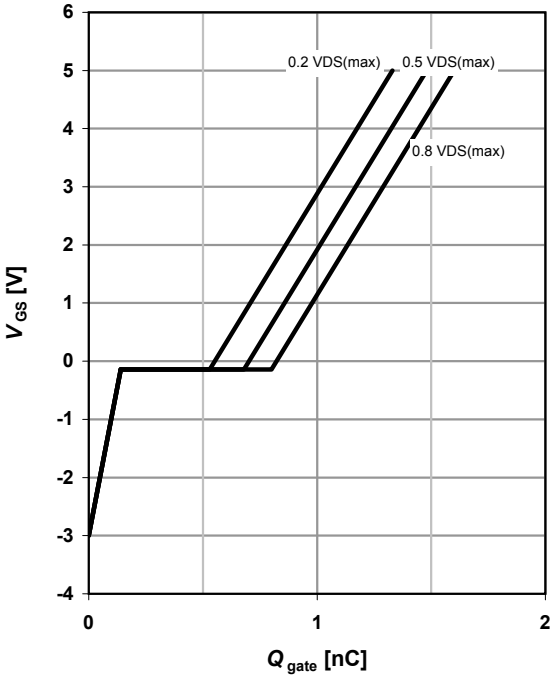
parameter: T_j



15 Typ. gate charge

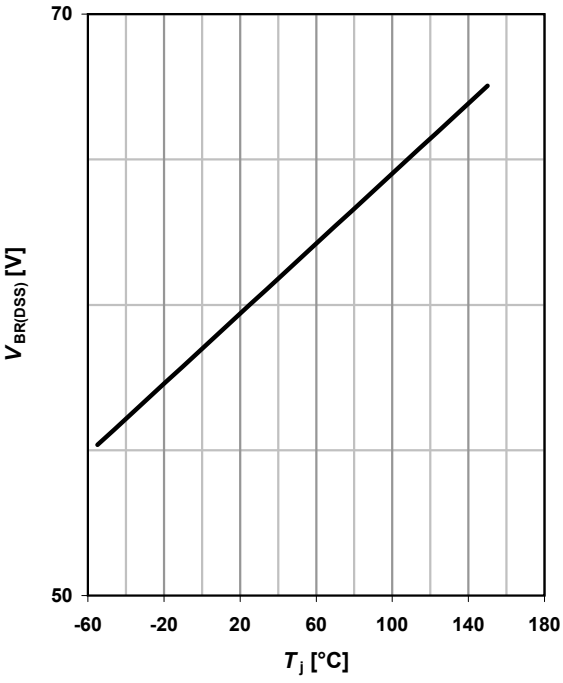
V_{GS}=f(Q_{gate}); I_D=0.16 A pulsed

parameter: V_{DD}

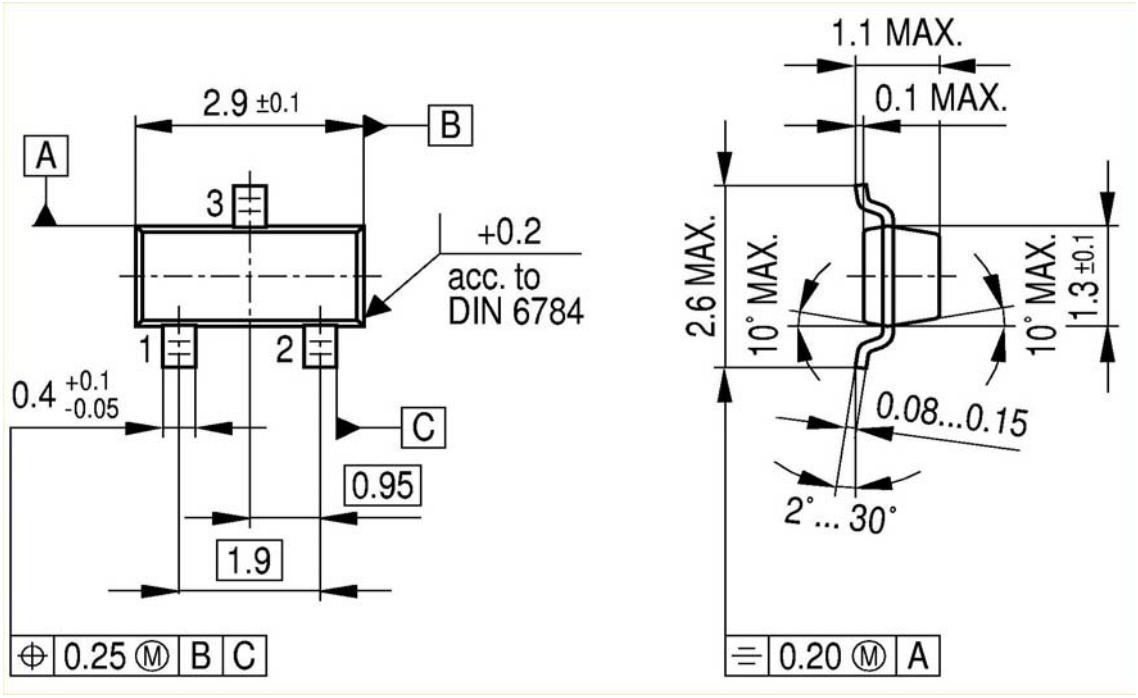


16 Drain-source breakdown voltage

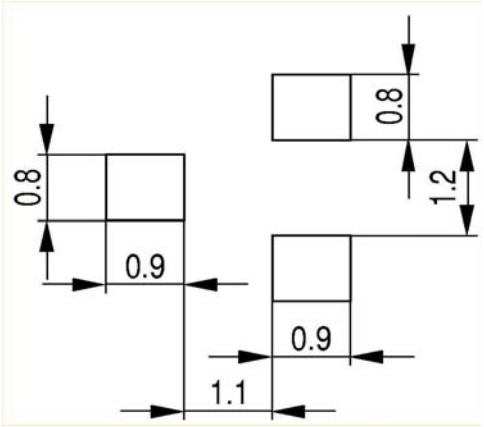
$V_{BR(DSS)}$=f(T_j); I_D=250 µA



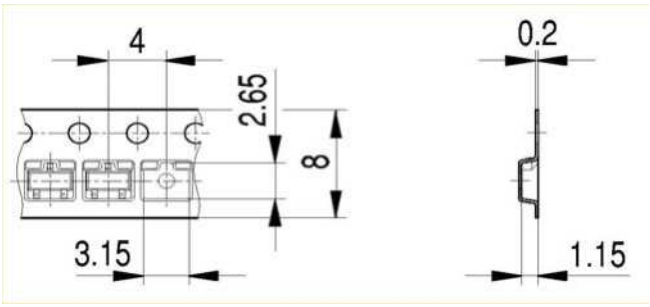
Package Outline:



Footprint:



Packaging:



Dimensions in mm

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