OptiMOS™2 Small-Signal-Transistor

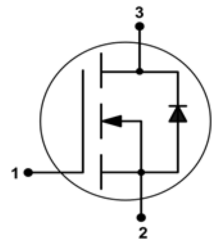
Features

- N-channel
- Enhancement mode
- Super Logic level (2.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21

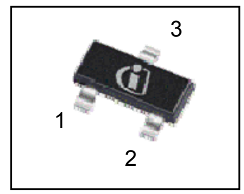
AEC Qualified | RoHS | Halogen-Free

Product Summary

V_{DS}		20	V
$R_{DS(on),max}$	V_{GS}=4.5 V	140	mΩ
	V_{GS}=2.5 V	250	
I_D		1.5	A



PG-SOT23



Type	Package	Tape and Reel Information	Marking	Lead Free	Packing
BSS214N	PG-SOT23	H6327: 3000 pcs/ reel	SVs	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	1.5	A
		T_A=70 °C	1.2	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	6	
Avalanche energy, single pulse	E_{AS}	I_D=1.5 A, R_{GS}=25 Ω	3.7	mJ
Reverse diode d*v*/d*t*	d*v*/d*t*	I_D=1.5 A, V_{DS}=16 V, d*i*/d*t*=200 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±12	V
Power dissipation	P_{tot}	T_A=25 °C	0.5	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	

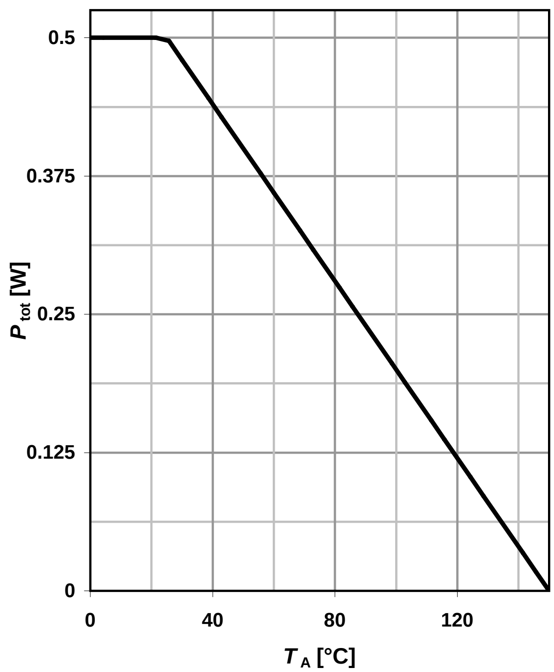
Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - ambient	R_{thJA}	minimal footprint [1]	-	-	250	K/W
Electrical characteristics, at T_j=25 °C, unless otherwise specified						
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}= 0 V, I_D= 250 µA	20	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=V_{GS}, I_D=3.7 µA	0.7	0.95	1.2	
Drain-source leakage current	I_{DSS}	V_{DS}=20 V, V_{GS}=0 V, T_j=25 °C	-	-	1	µA
		V_{DS}=20 V, V_{GS}=0 V, T_j=150 °C	-	-	100	
Gate-source leakage current	I_{GSS}	V_{GS}=12 V, V_{DS}=0 V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=2.5 V, I_D=0.7 A	-	175	250	mΩ
		V_{GS}=4.5 V, I_D=1.5 A	-	106	140	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=1.2 A	-	4	-	S

[1] Performed on 40mm^2 FR4 PCB. The traces are 1mm wide, 70µm thick and 20mm long; they are present on both sides of the PCB.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=10 V, f=1 MHz	-	107	143	pF
Output capacitance	C_{oss}		-	46	62	
Reverse transfer capacitance	C_{rss}		-	6	-	
Turn-on delay time	$t_{d(on)}$	V_{DD}=10 V, V_{GS}=4.5 V, I_D=1.5 A, R_G=6 Ω	-	4.1	-	ns
Rise time	t_r		-	7.8	-	
Turn-off delay time	$t_{d(off)}$		-	6.8	-	
Fall time	t_f		-	1.4	-	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=10 V, I_D=1.5 A, V_{GS}=0 to 5 V	-	0.24	-	nC
Gate to drain charge	Q_{gd}		-	0.2	-	
Gate charge total	Q_g		-	0.8	-	
Gate plateau voltage	$V_{plateau}$		-	2.2	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	0.5	A
Diode pulse current	$I_{S,pulse}$		-	-	6	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=1.5 A, T_j=25 °C	-	0.8	1.1	V
Reverse recovery time	t_{rr}	V_R=10 V, I_F=1.5 A, di_F/dt=100 A/µs	-	8.4	-	ns
Reverse recovery charge	Q_{rr}		-	1.7	-	nC

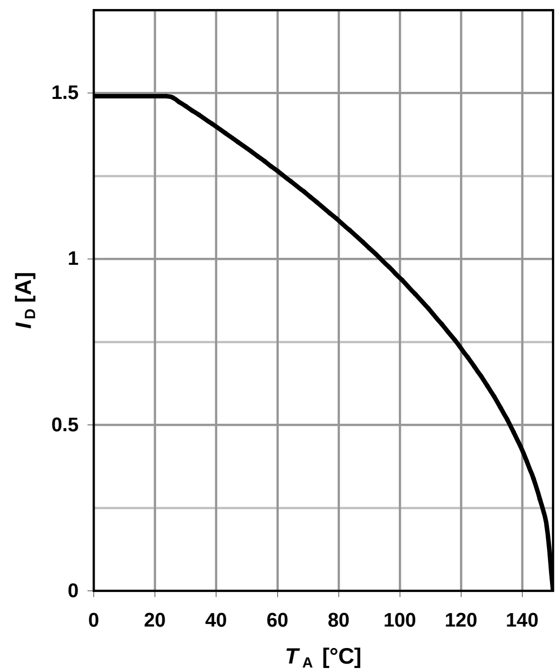
1 Power dissipation

P_{tot}=f(T_A)



2 Drain current

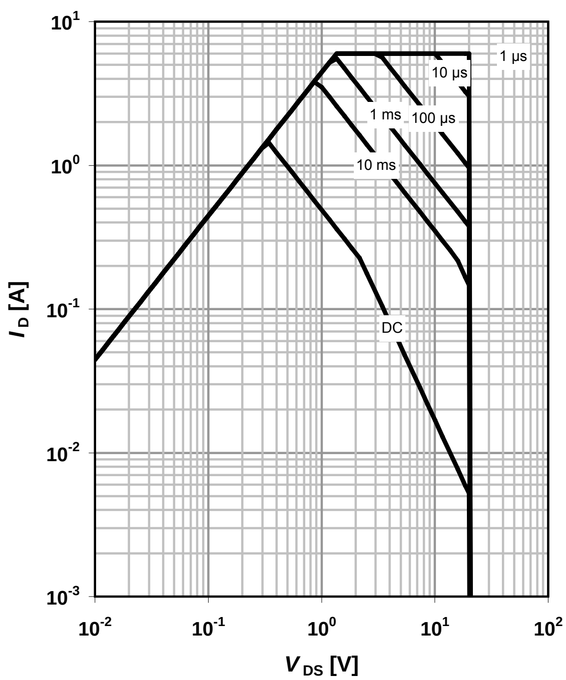
I_D=f(T_A); V_{GS}≥4.5 V



3 Safe operating area

I_D=f(V_{DS}); T_A=25 °C; D =0

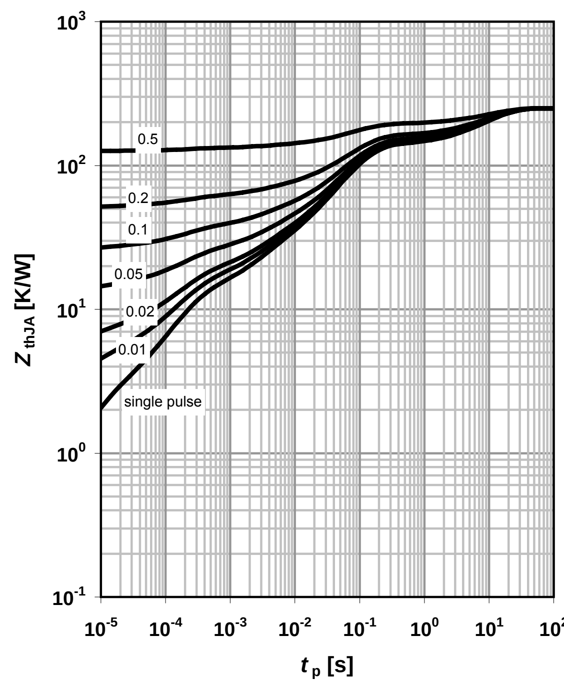
parameter: t_p



4 Max. transient thermal impedance

Z_{thJA}=f(t_p)

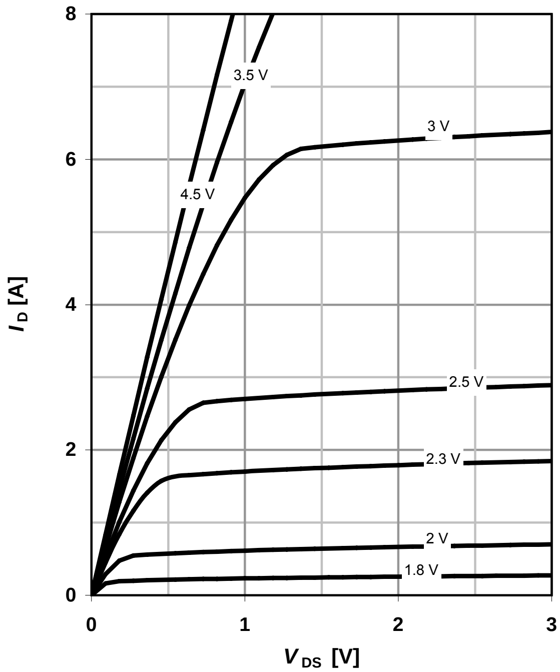
parameter: D =t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

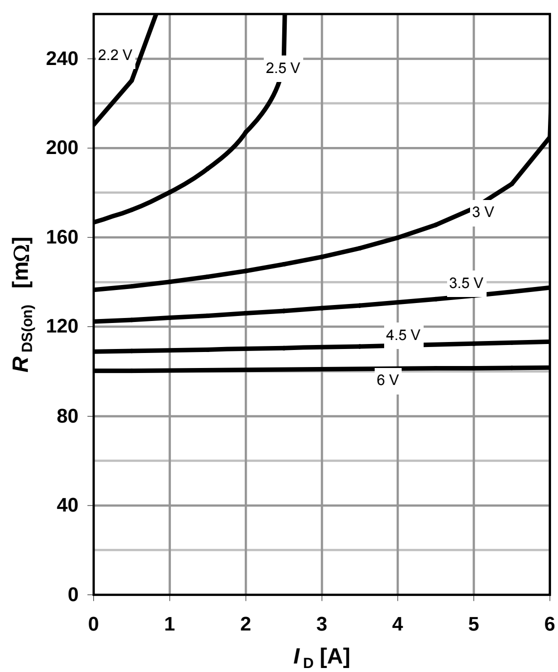
parameter: V_{GS}



6 Typ. drain-source on resistance

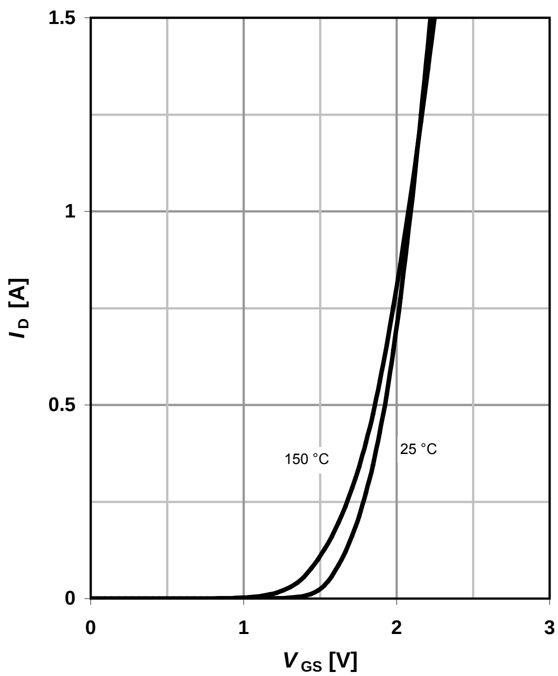
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



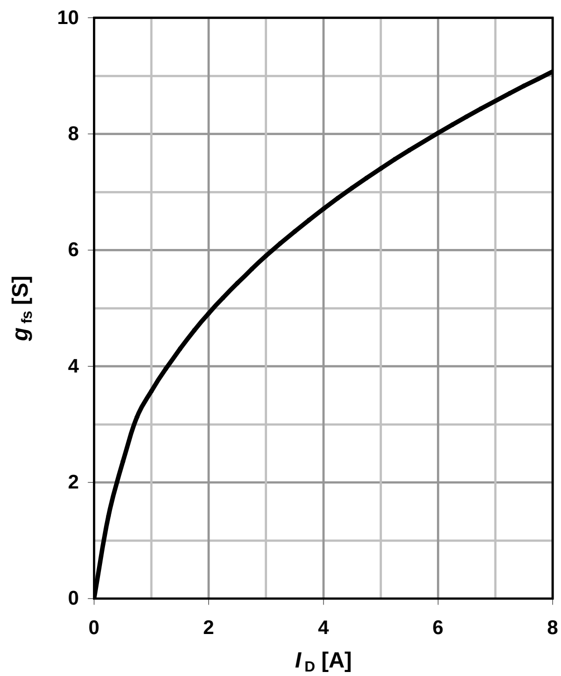
7 Typ. transfer characteristics

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



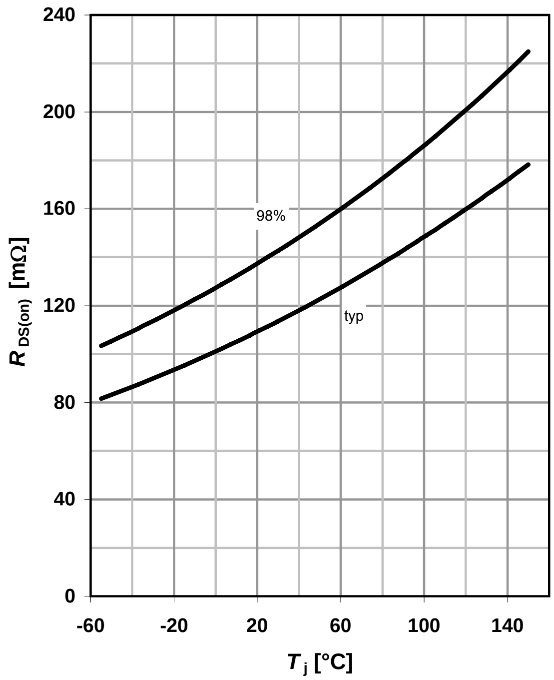
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

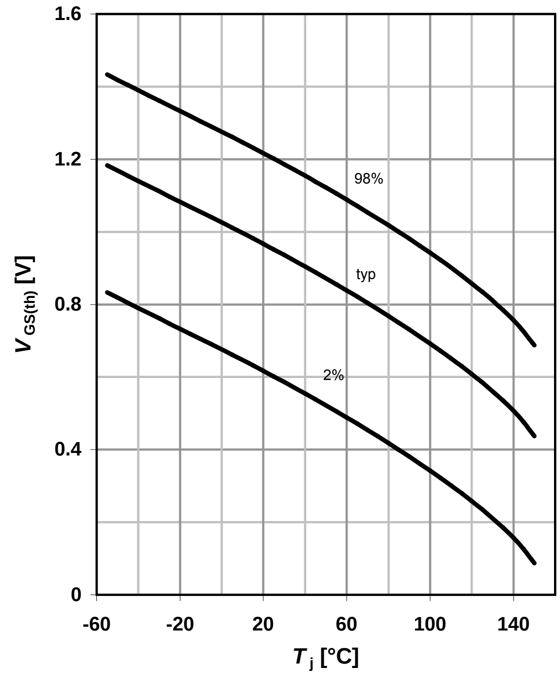
$R_{DS(on)}$=f(T_j); I_D=1.5 A; V_{GS}=4.5 V



10 Typ. gate threshold voltage

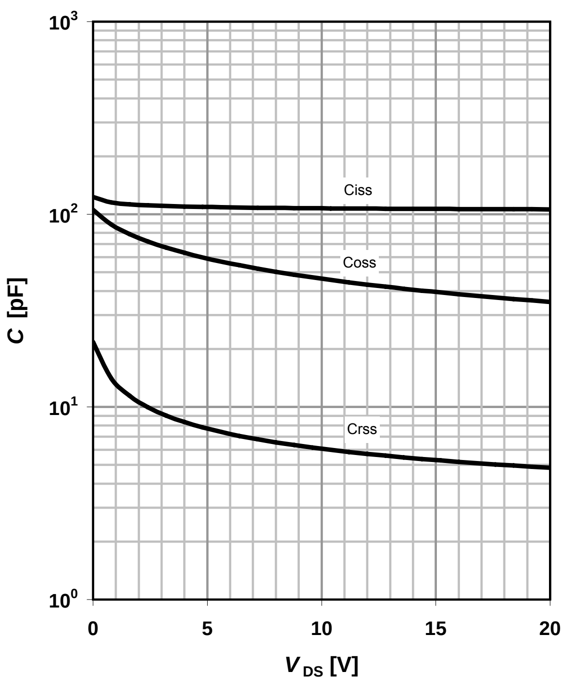
$V_{GS(th)}$=f(T_j); V_{DS}=V_{GS}; I_D=3.7 µA

parameter: I_D



11 Typ. capacitances

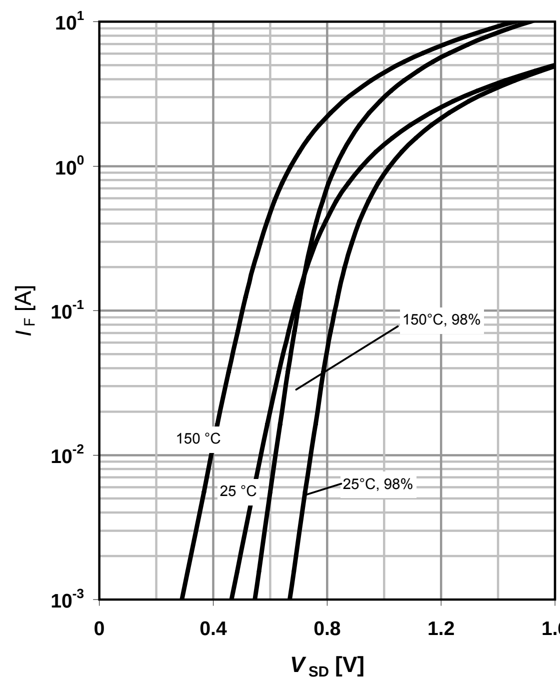
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz; T_j=25°C



12 Forward characteristics of reverse diode

I_F=f(V_{SD})

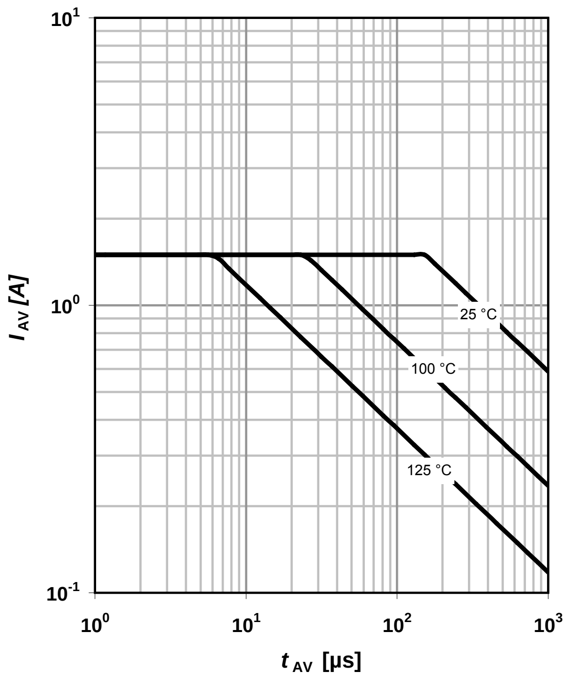
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 W

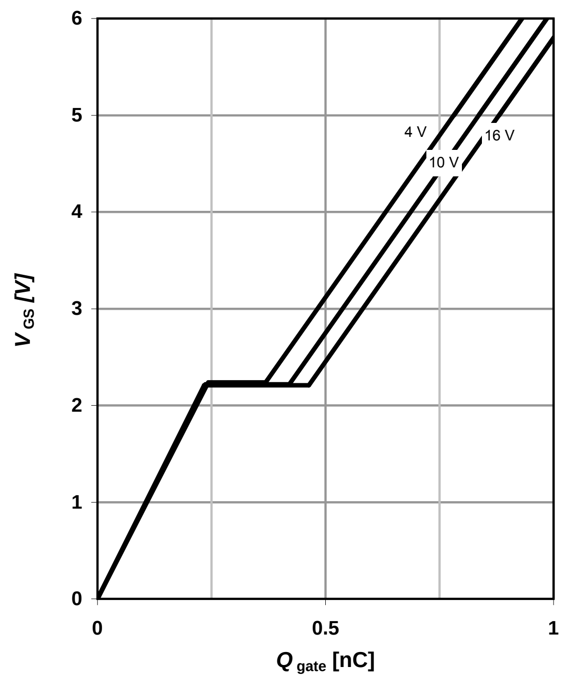
parameter: $T_{j(start)}$



14 Typ. gate charge

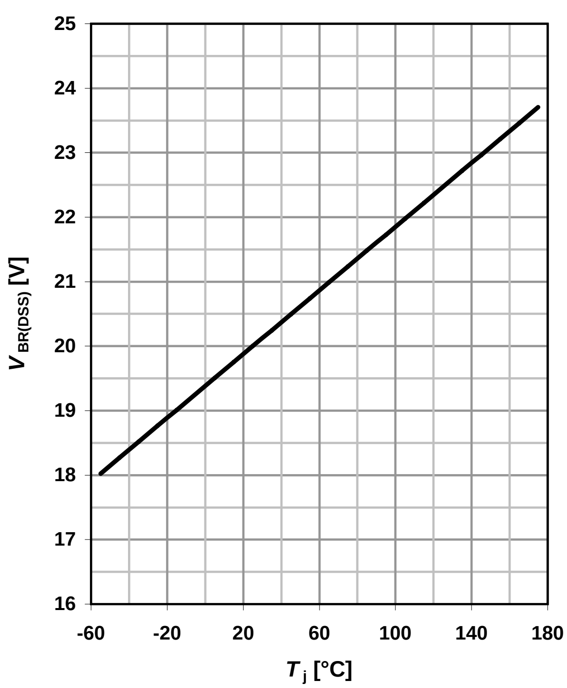
V_{GS} = f(Q_{gate}); I_D=6A pulsed

parameter: V_{DD}

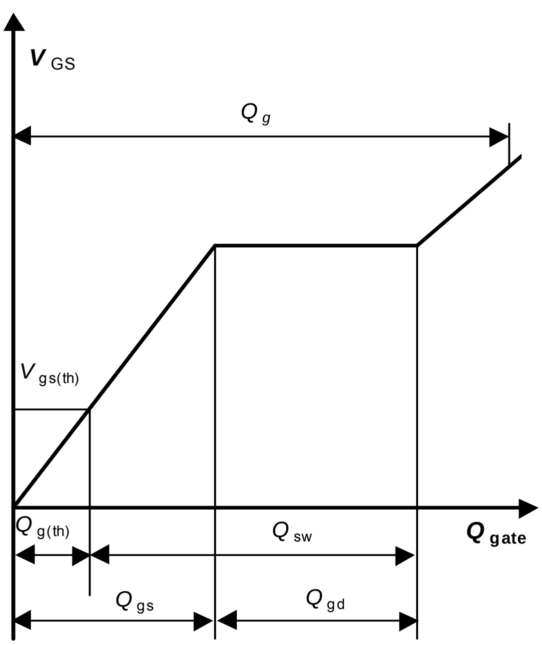


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA

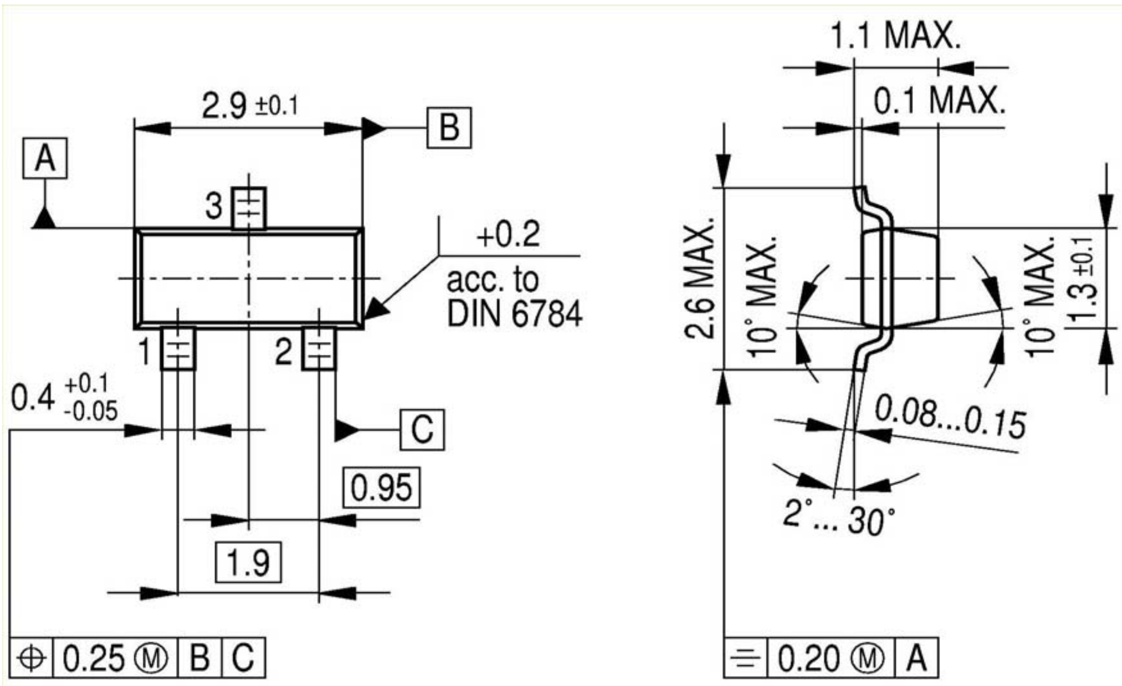


16 Gate charge waveforms

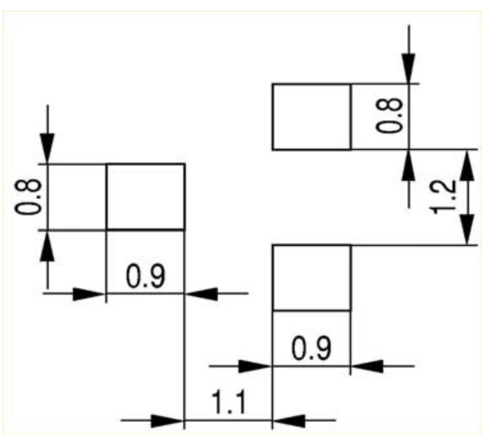


SOT23

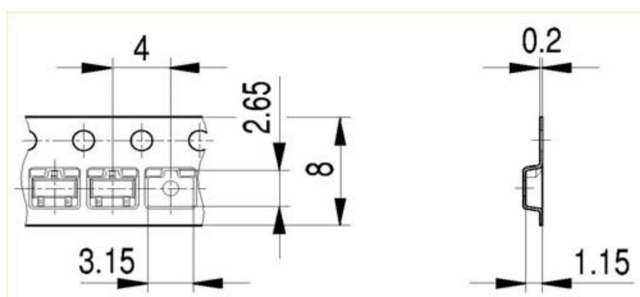
Package Outline:



Footprint:



Packaging:



Dimensions in mm

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