

SIPMOS® Small-Signal-Transistor

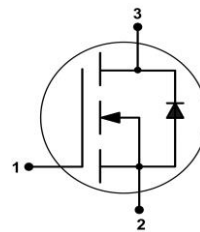
Features

- n-channel
- enhancement mode
- Logic level (4.5V rated)
- dv/dt rated
- 100%lead-free; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21

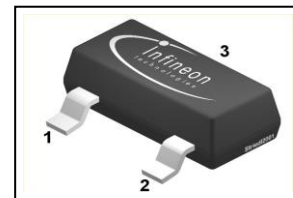


Product Summary

V_{DS}	600	V
$R_{DS(on),max}$	500	Ω
I_D	0.021	A



PG-SOT-23



Type	Package	Pb-free	Halogen-free	Tape and Reel Information	Marking
BSS127	PG-SOT-23	Yes	Yes	H6327: 3000PCS/reel	SlS

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_A=25\text{ °C}$	0.021	A
		$T_A=70\text{ °C}$	0.017	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	0.09	
Reverse diode dv/dt	dv/dt	$I_D=0.021\text{ A}$, $V_{DS}=480\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$	6	kV/ μs
Gate source voltage	V_{GS}		± 20	V
ESD class (JESD22-A114-HBM)			0 (<250)	
Power dissipation	P_{tot}	$T_A=25\text{ °C}$	0.50	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
IEC climatic category; DIN IEC 68-1			55/150/56	

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics

Thermal resistance, junction - minimal footprint	R_{thJA}		-	-	250	K/W
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Electrical characteristics, at $T_j=25\text{ }^{\circ}\text{C}$, unless otherwise specified
Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	600	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=8\text{ }\mu\text{A}$	1.4	2.0	2.6	
Drain-source leakage current	$I_{D(off)}$	$V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^{\circ}\text{C}$	-	-	0.1	μA
		$V_{DS}=600\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^{\circ}\text{C}$	-	-	10	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	10	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=4.5\text{ V}, I_D=0.016\text{ A}$	-	330	600	Ω
		$V_{GS}=10\text{ V}, I_D=0.016\text{ A}$	-	310	500	
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=0.01\text{ A}$	0.007	0.015	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	21	28	pF
Output capacitance	C_{oss}		-	2.4	3	
Reverse transfer capacitance	C_{rss}		-	1.0	1.5	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=300\text{ V},$ $V_{GS}=10\text{ V}, I_D=0.01\text{ A},$ $R_{G,ext}=6\ \Omega$	-	6.1	19.0	ns
Rise time	t_r		-	9.7	14.5	
Turn-off delay time	$t_{d(off)}$		-	14	21	
Fall time	t_f		-	115	170	

Gate Charge Characteristics

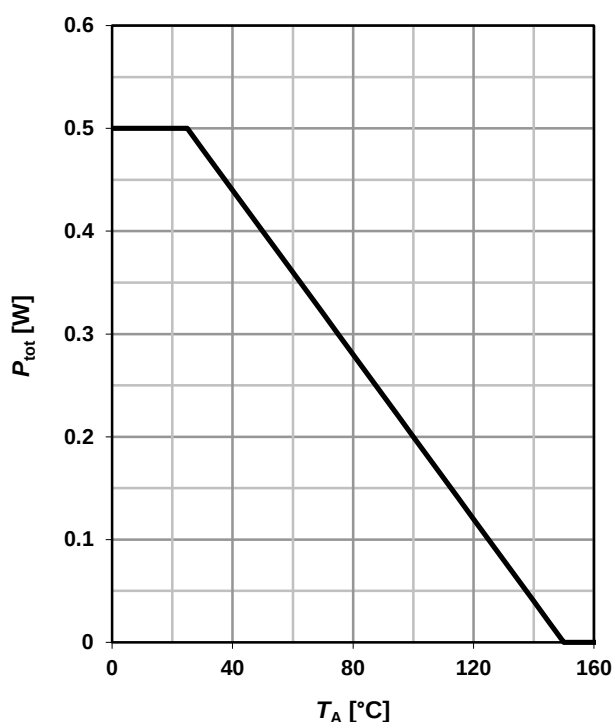
Gate to source charge	Q_{gs}	$V_{DD}=300\text{ V},$ $I_D=0.01\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	0.07	0.10	nC
Gate to drain charge	Q_{gd}		-	0.31	0.5	
Gate charge total	Q_g		-	0.65	1.0	
Gate plateau voltage	$V_{plateau}$		-	3.56	-	V

Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ °C}$	-	-	0.016	A
Diode pulse current	$I_{S,pulse}$		-	-	0.09	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=0.016\text{ A},$ $T_j=25\text{ °C}$	-	0.82	1.2	V
Reverse recovery time	t_{rr}	$V_R=300\text{ V},$ $I_F=0.016\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	160	240	ns
Reverse recovery charge	Q_{rr}		-	13.2	19.8	nC

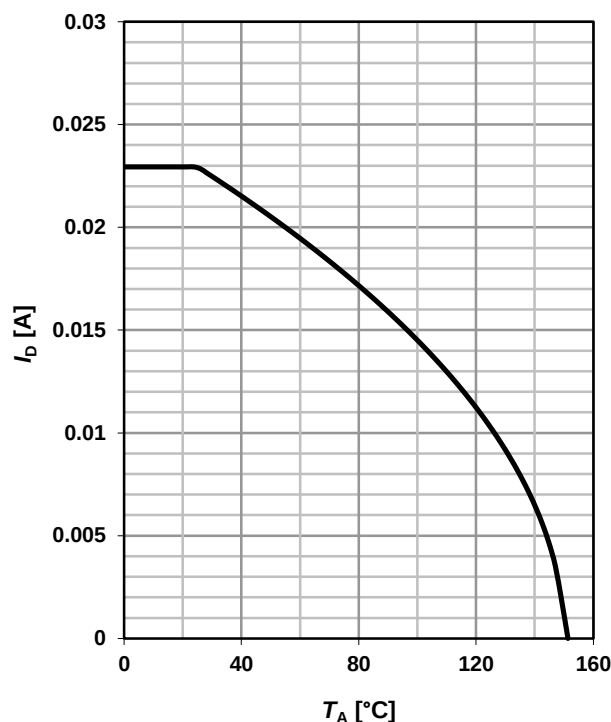
1 Power dissipation

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



2 Drain current

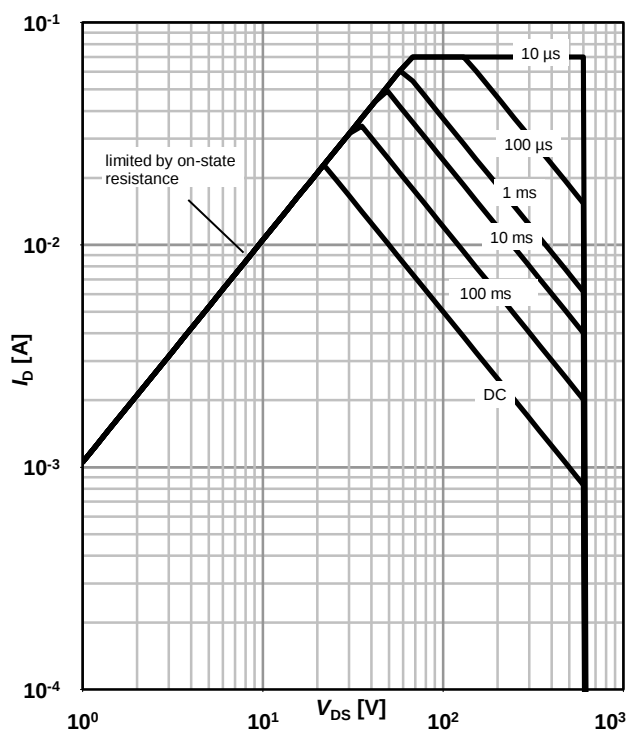
$$I_D = f(T_A); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

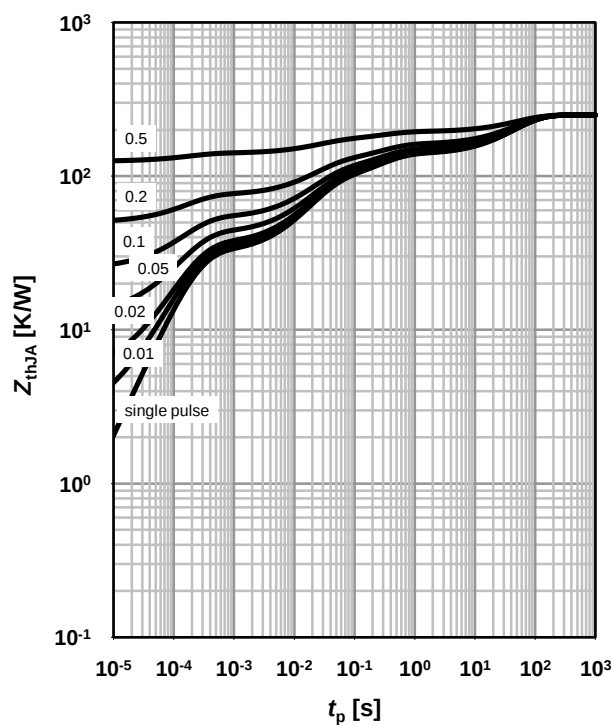
parameter: t_p



4 Max. transient thermal impedance

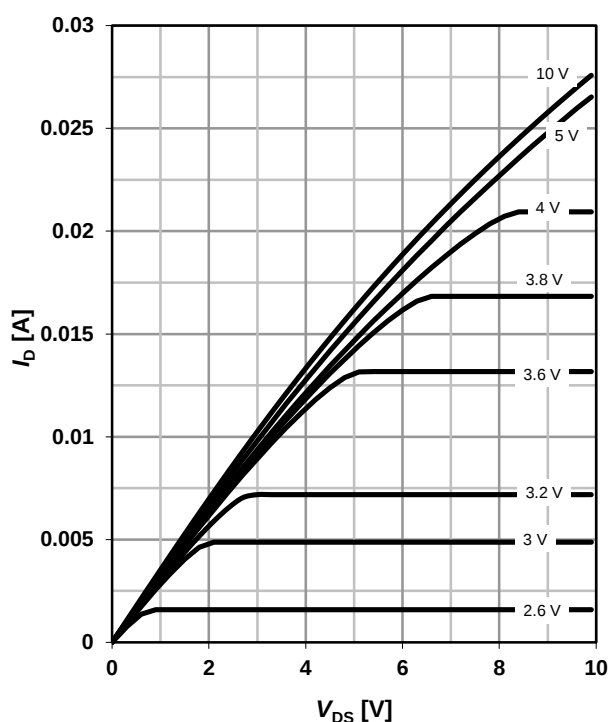
$$Z_{\text{thJA}} = f(t_p)$$

parameter: $D = t_p/T$



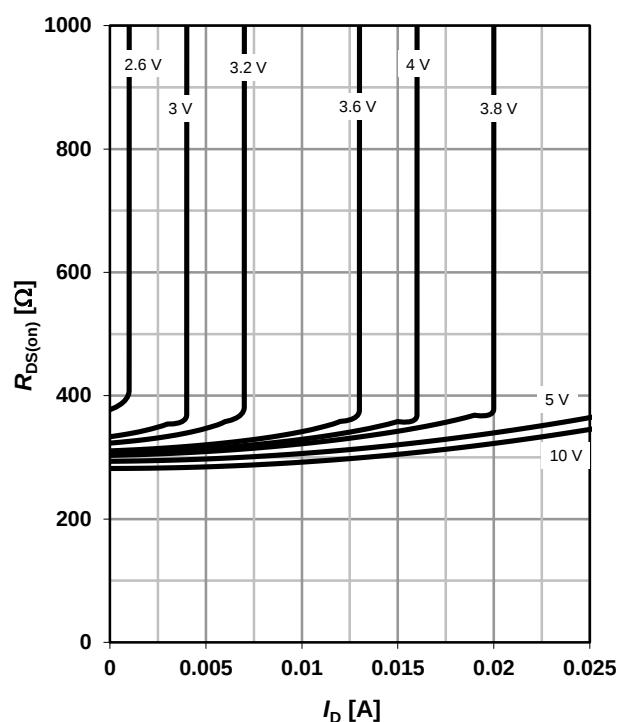
5 Typ. output characteristics

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

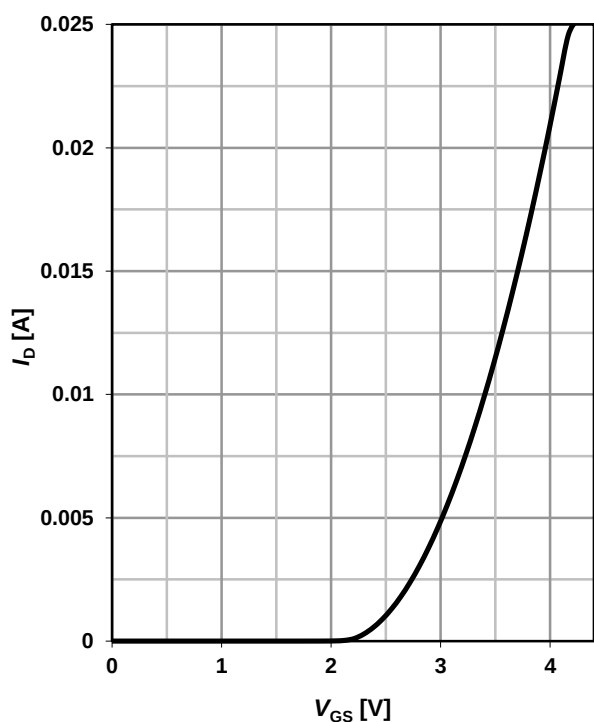
parameter: V_{GS}


6 Typ. drain-source on resistance

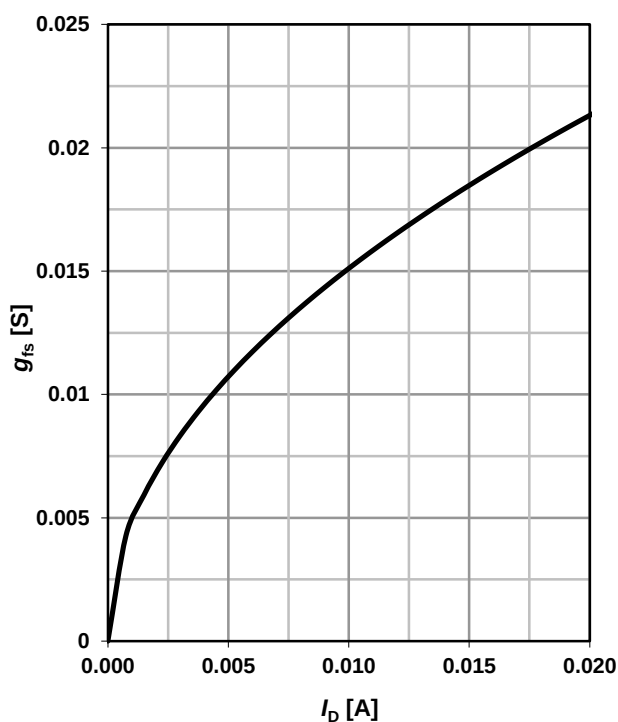
 $R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$

parameter: V_{GS}


7 Typ. transfer characteristics

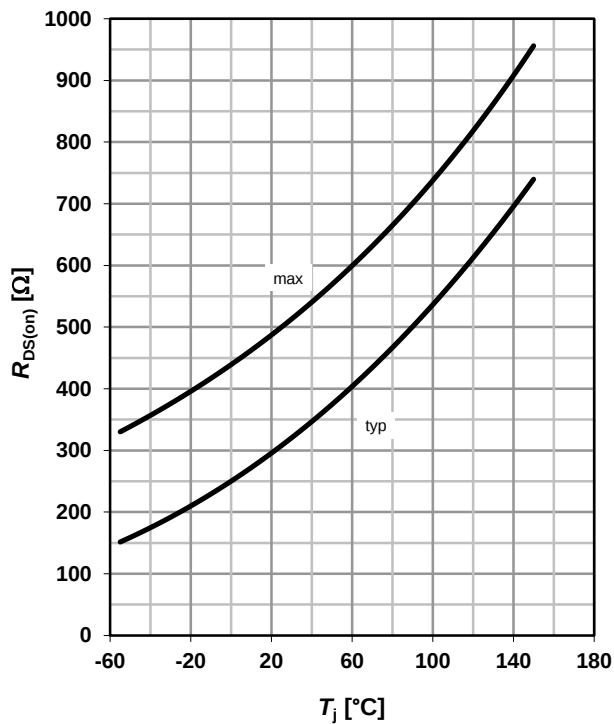
 $I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$


8 Typ. forward transconductance

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


9 Drain-source on-state resistance

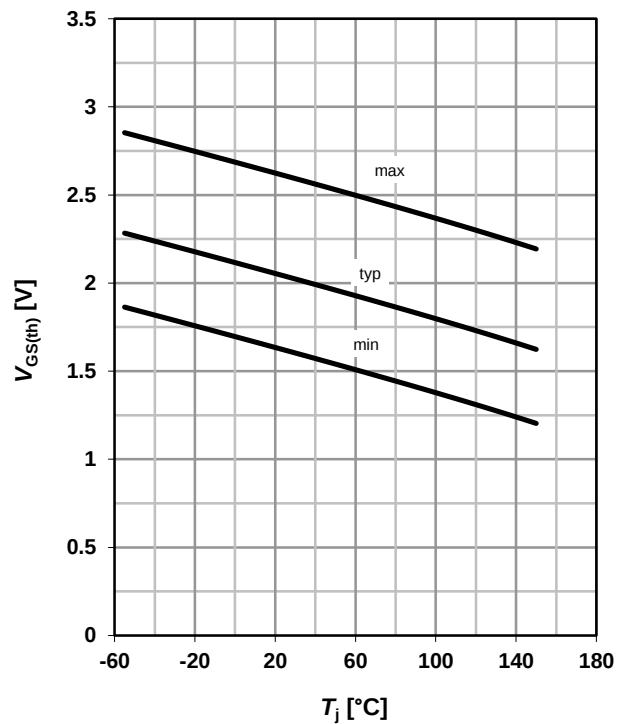
$R_{DS(on)} = f(T_j)$; $I_D = 0.016 \text{ A}$; $V_{GS} = 10 \text{ V}$



10 Typ. gate threshold voltage

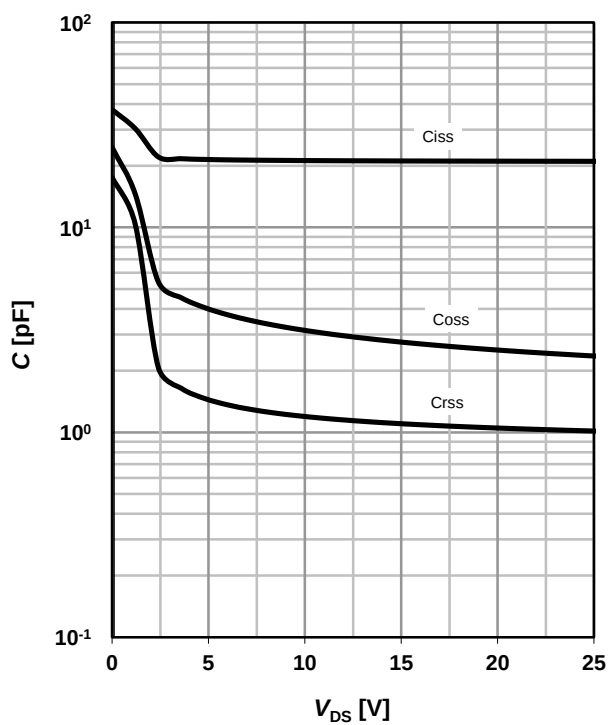
$V_{GS(th)} = f(T_j)$; $V_{DS} = V_{GS}$; $I_D = 8 \text{ μA}$

parameter: I_D



11 Typ. capacitances

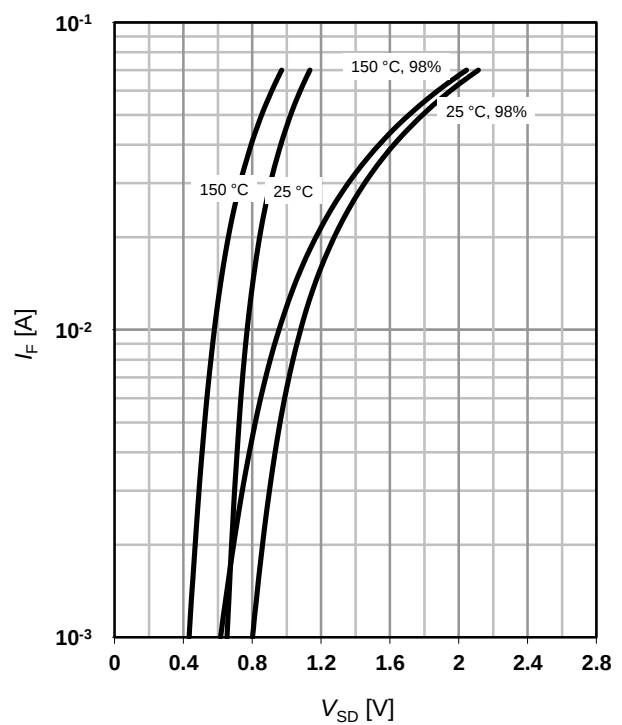
$C = f(V_{DS})$; $V_{GS} = 0 \text{ V}$; $f = 1 \text{ MHz}$; $T_j = 25 \text{ °C}$



12 Forward characteristics of reverse diode

$I_F = f(V_{SD})$

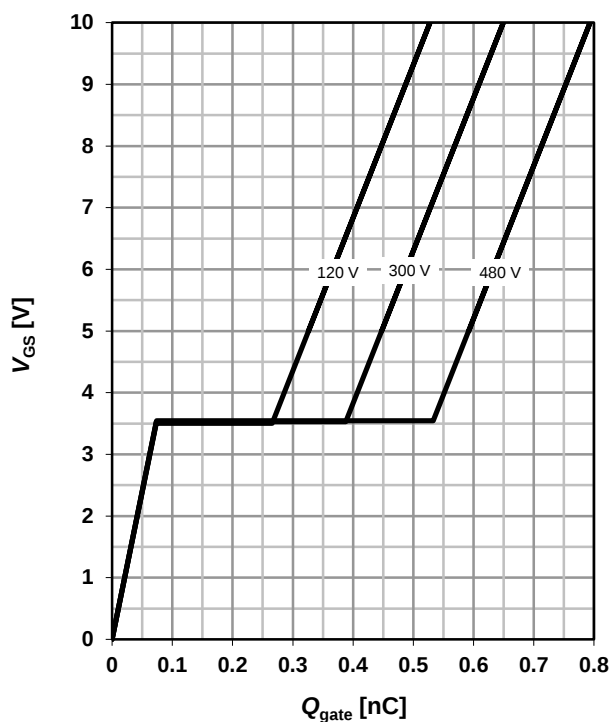
parameter: T_j



13 Typ. gate charge

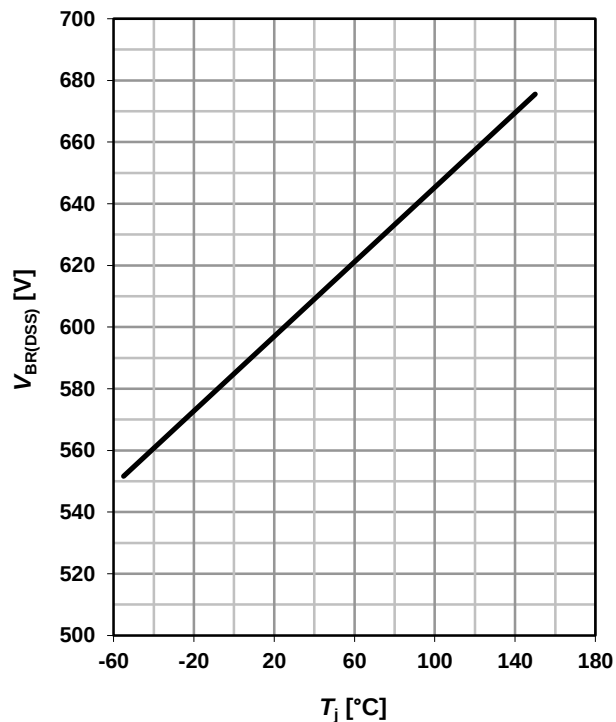
$V_{GS}=f(Q_{gate}); I_D=0.01\text{ A}$ pulsed

parameter: V_{DD}

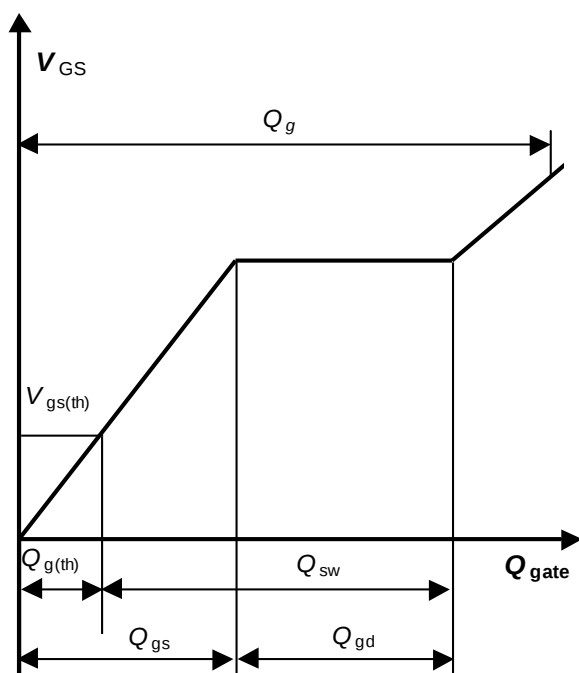


14 Drain-source breakdown voltage

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

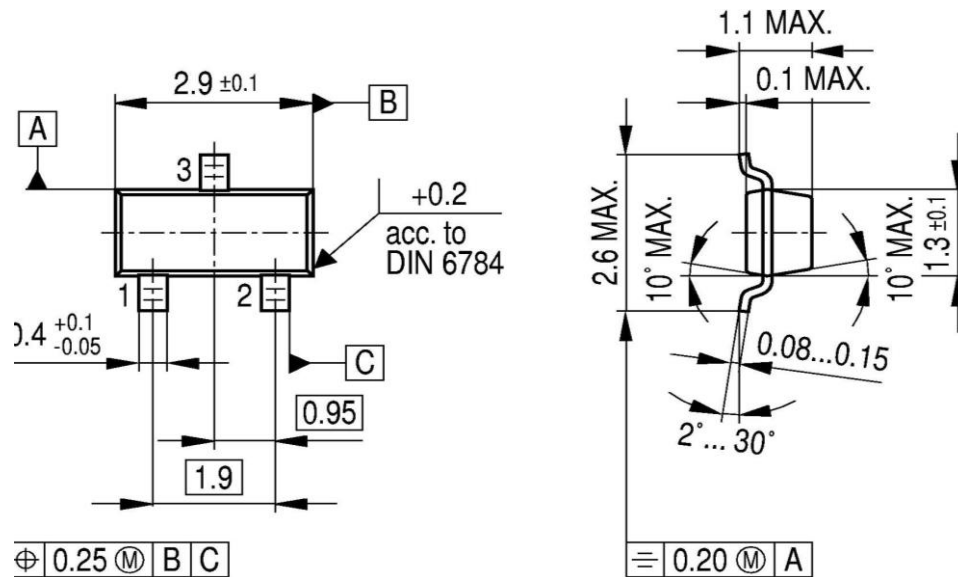


15 Gate charge waveforms

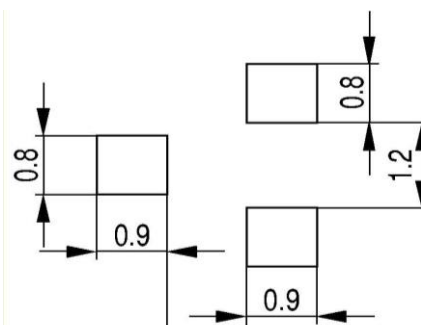


SOT-23

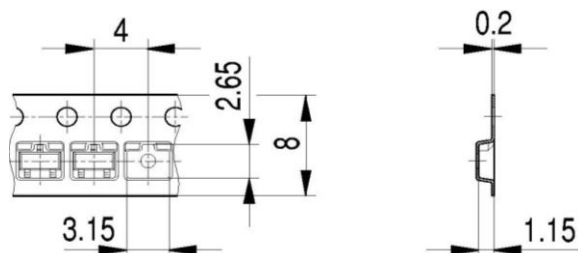
Package Outline:



Footprint:



Packaging:



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