

SIPMOS® Small-Signal-Transistor

Features

- P-Channel
- Enhancement mode
- Logic level
- Avalanche rated
- Pb-free lead plating; RoHS compliant
- Qualified according to AEC Q101
- Halogen-free according to IEC61249-2-21



Halogen-Free

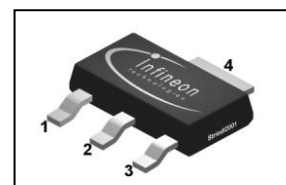


Product Summary

V_{DS}	-100	V
$R_{DS(on),max}$	800	mΩ
I_D	-1	A



PG-SOT-223



Type	Package	Tape and Reel Information	Marking	Lead free	Packing
BSP322P	PG-SOT-223	H6327: 1000 pcs/reel	BSP322P	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_C=25\text{ °C}$	1	A
		$T_C=70\text{ °C}$	0.8	
Pulsed drain current	$I_{D,pulse}$	$T_C=25\text{ °C}$	4	
Avalanche energy, single pulse	E_{AS}	$I_D=-1\text{ A}$, $R_{GS}=25\text{ Ω}$	57	mJ
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	$T_C=25\text{ °C}$	1.8	W
Operating and storage temperature	T_J , T_{stg}		-55 ... 150	°C
ESD Class		JESD22-A114-HBM	1A (250V to 500V)	
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, steady state	-	-	115	K/W
		6 cm ² cooling area ¹⁾ , steady state	-	-	70	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}$, $I_D=-250\text{ }\mu\text{A}$	-100	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$, $I_D=-380\text{ }\mu\text{A}$	-2.0	-1.5	-1.0	
Zero gate voltage drain current	I_{DSS}	$V_{DS}=-100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=25\text{ °C}$	-	-0.1	-1	μA
		$V_{DS}=-100\text{ V}$, $V_{GS}=0\text{ V}$, $T_j=150\text{ °C}$	-	-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	$R_{DS(on)}$	$V_{GS}=-10\text{ V}$, $I_D=-1\text{ A}$	-	600	800	m Ω
		$V_{GS}=-4.5\text{ V}$, $I_D=-0.93\text{ A}$	-	808	1000	
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}$, $I_D=-0.8\text{ A}$	0.7	1.4	-	S

¹⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (one layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	280	372	pF
Output capacitance	C_{oss}		-	70	94	
Reverse transfer capacitance	C_{rss}		-	34	51	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-50\text{ V}, V_{GS}=-10\text{ V}, I_D=-1\text{ A},$ $R_G=6\ \Omega$	-	4.6	6.9	ns
Rise time	t_r		-	4.3	6.5	
Turn-off delay time	$t_{d(off)}$		-	21.2	31.8	
Fall time	t_f		-	8.3	12.5	

Gate Charge Characteristics²⁾

Gate to source charge	Q_{gs}	$V_{DD}=-80\text{ V}, I_D=-1\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$	-	0.8	1.0	nC
Gate to drain charge	Q_{gd}		-	4.3	6.4	
Gate charge total	Q_g		-	12.4	16.5	
Gate plateau voltage	$V_{plateau}$		-	2.9	-	V

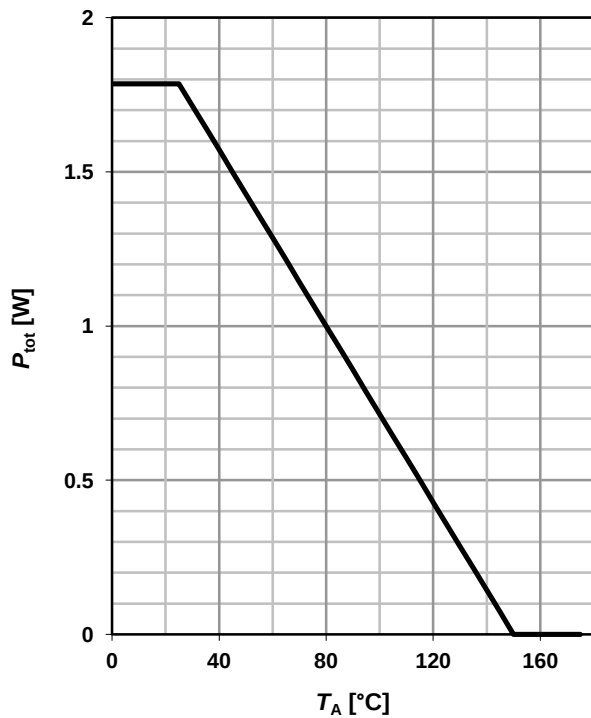
Reverse Diode

Diode continuous forward current	I_S	$T_C=25\text{ °C}$	-	-	-1.0	A
Diode pulse current	$I_{S,pulse}$		-	-	-4.0	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-1\text{ A},$ $T_J=25\text{ °C}$	-	0.84	1.2	V
Reverse recovery time	t_{rr}	$V_R=50\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	47	-	ns
Reverse recovery charge	Q_{rr}		-	84	-	nC

²⁾ See figure 16 for gate charge parameter definition

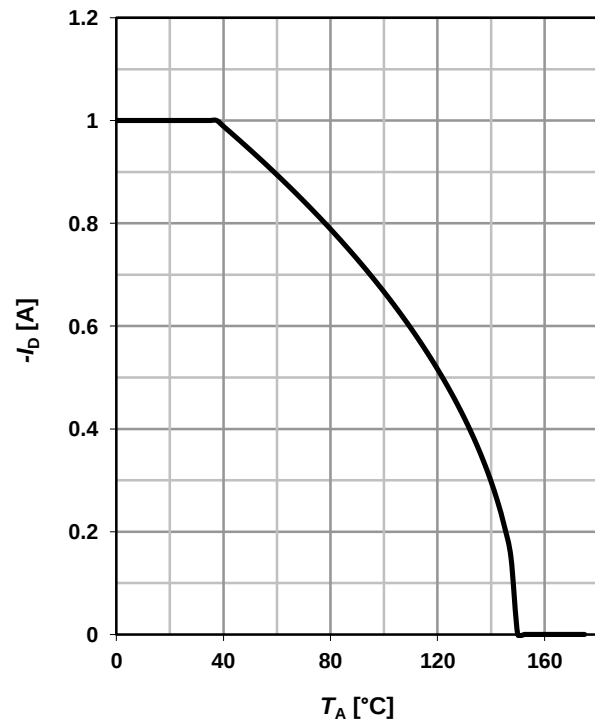
1 Power dissipation

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



2 Drain current

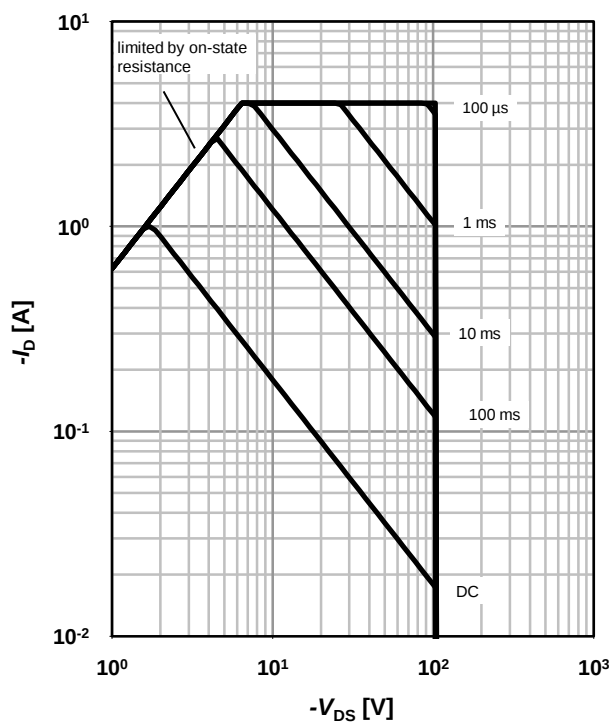
$$I_D = f(T_C); |V_{GS}| \geq 10 \text{ V}$$



3 Safe operating area

$$I_D = f(V_{DS}); T_C = 25^\circ\text{C}; D = 0$$

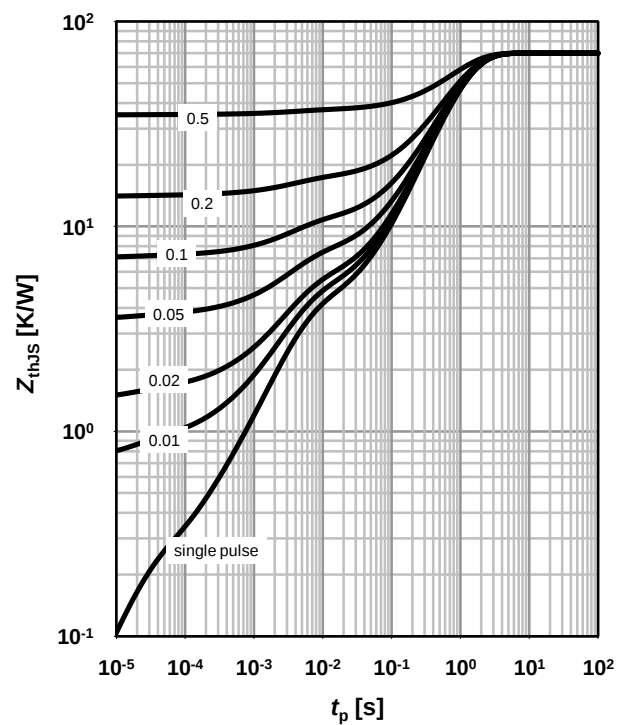
parameter: t_p



4 Max. transient thermal impedance

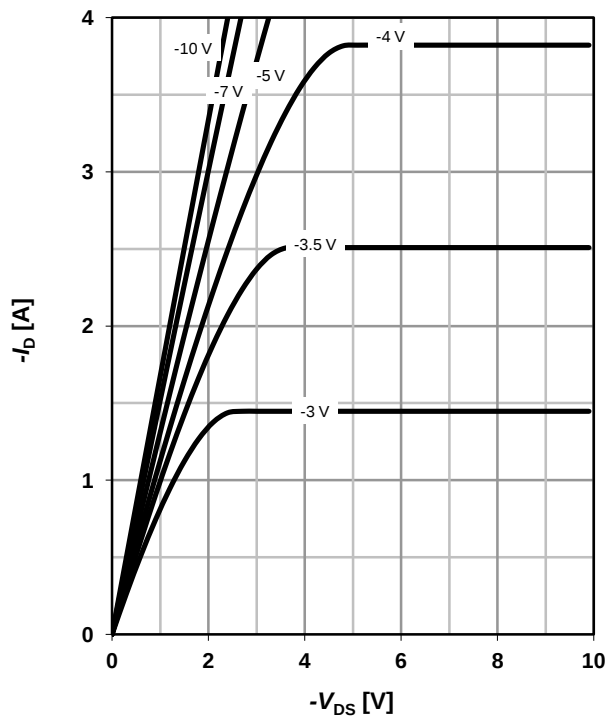
$$Z_{\text{thJC}} = f(t_p)$$

parameter: $D = t_p/T$



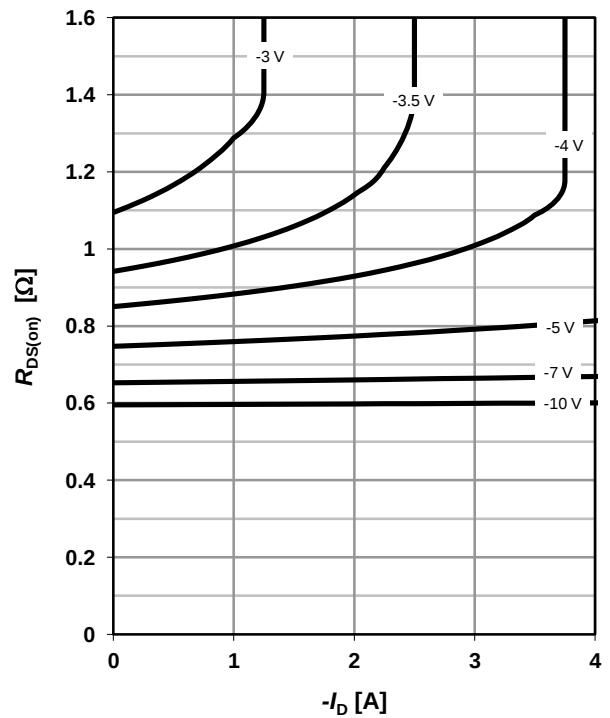
5 Typ. output characteristics

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

parameter: V_{GS}


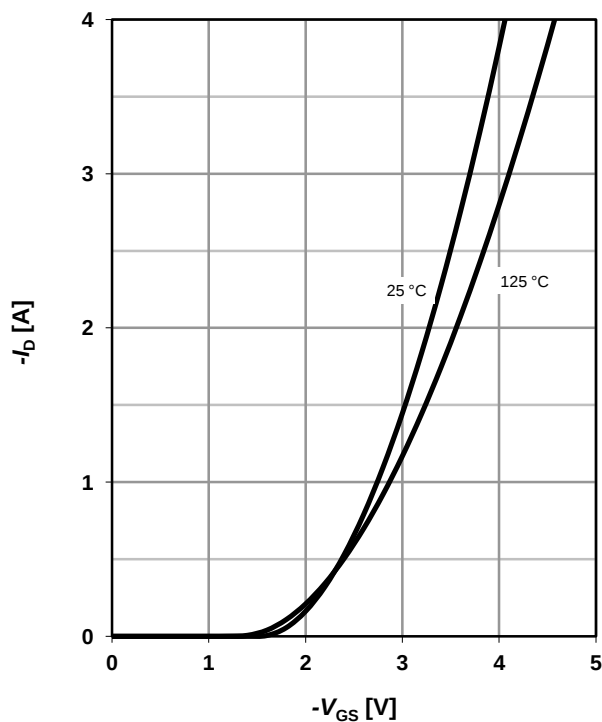
6 Typ. drain-source on resistance

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

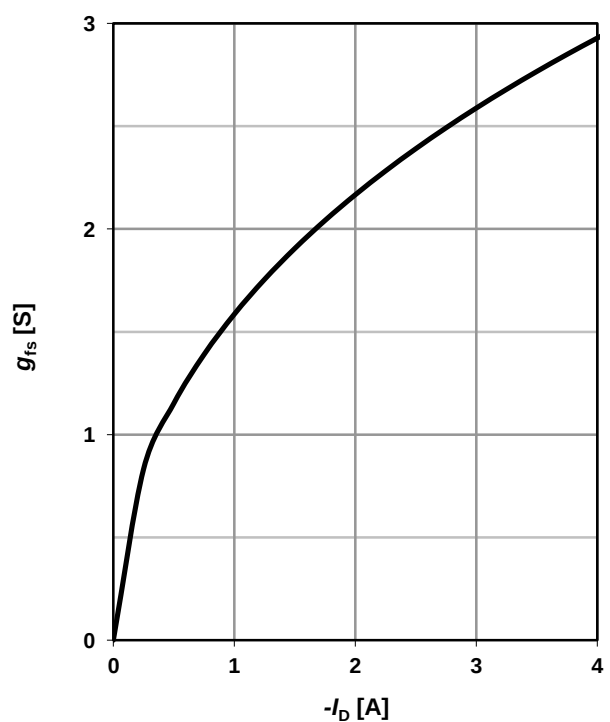
parameter: V_{GS}


7 Typ. transfer characteristics

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

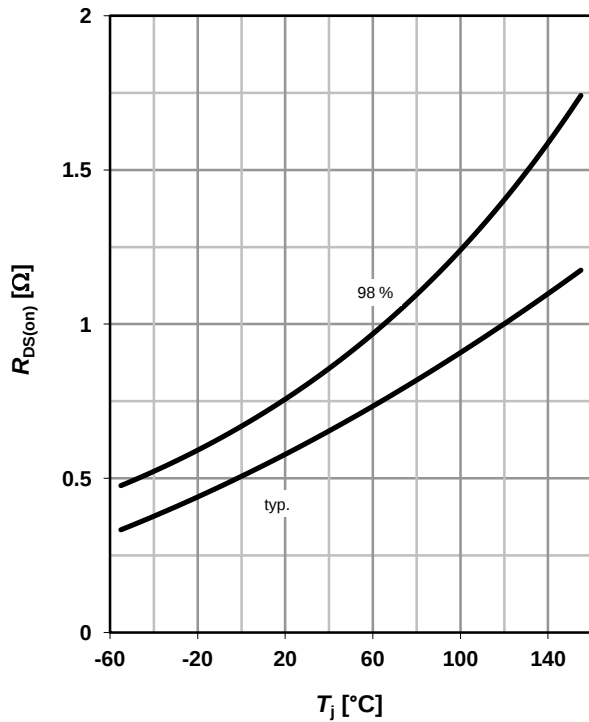
parameter: T_j


8 Typ. forward transconductance

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


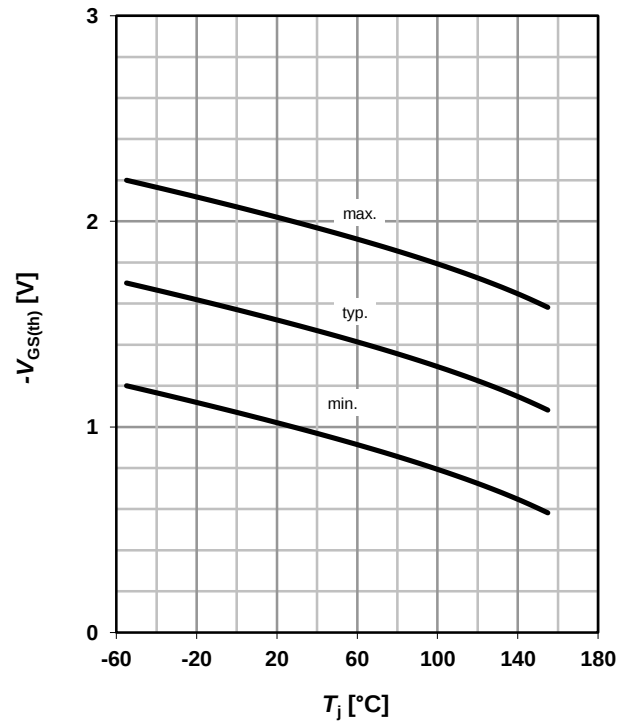
9 Drain-source on-state resistance

$$R_{DS(on)} = f(T_j); I_D = -1 \text{ A}; V_{GS} = -10 \text{ V}$$



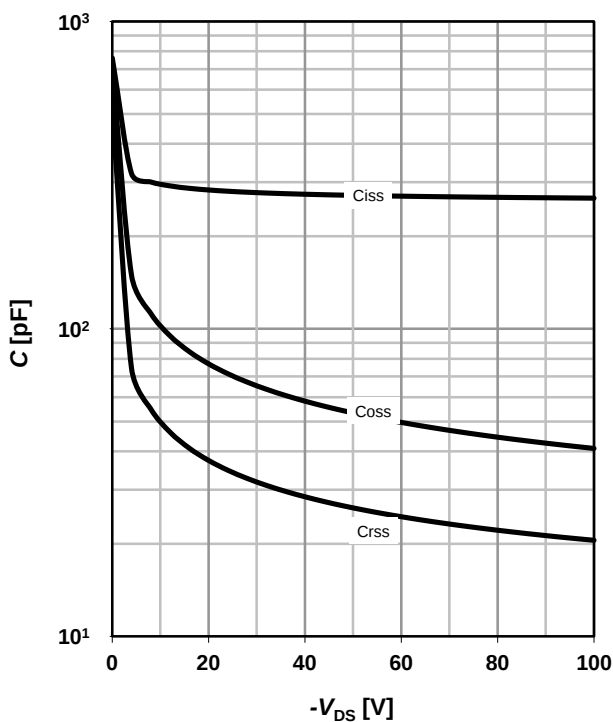
10 Typ. gate threshold voltage

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -380 \text{ μA}$$



11 Typ. capacitances

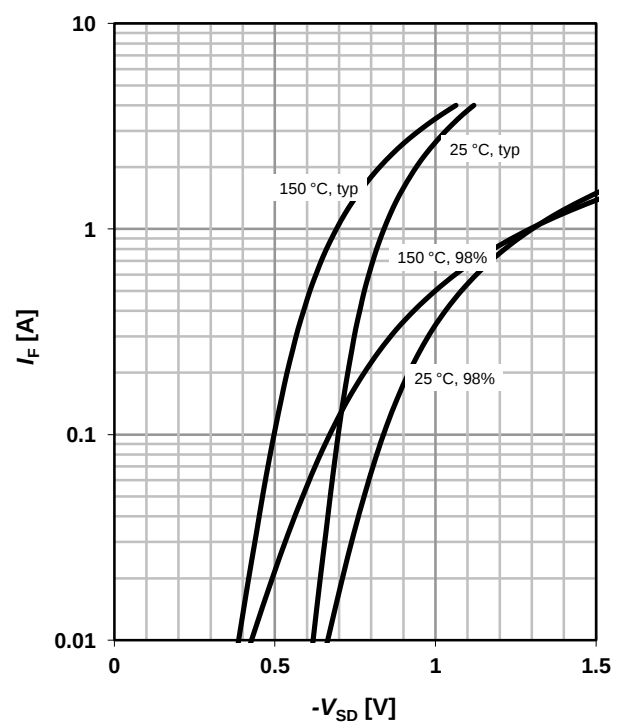
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



12 Forward characteristics of reverse diode

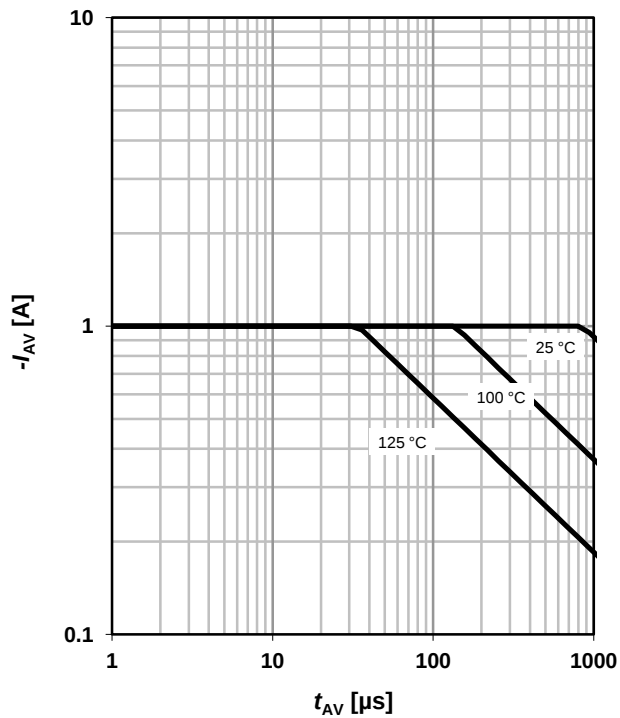
$$I_F = f(V_{SD})$$

parameter: T_j



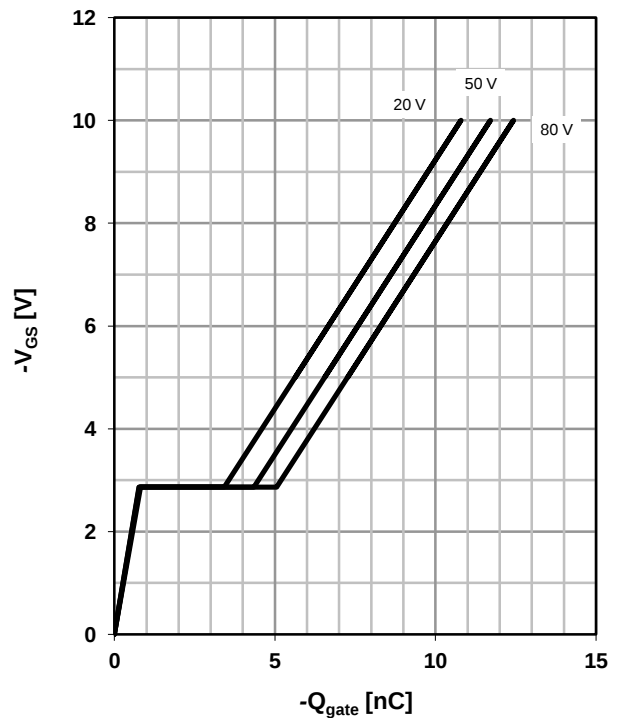
13 Avalanche characteristics

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

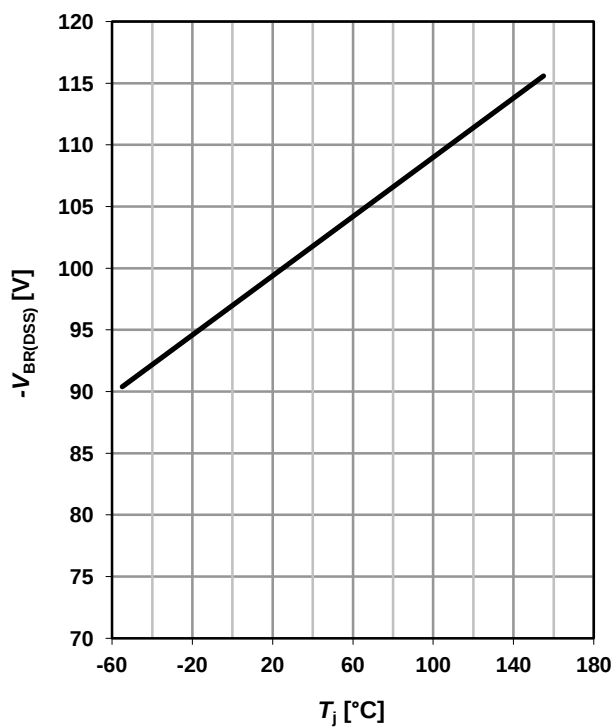
parameter: $T_{j(\text{start})}$


14 Typ. gate charge

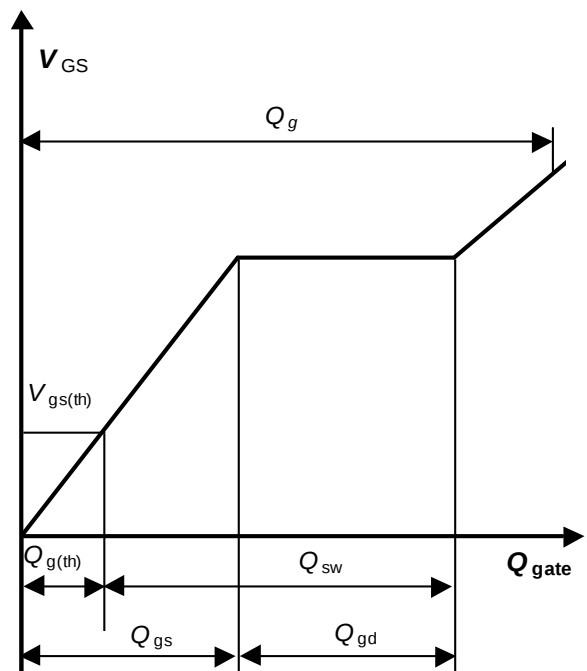
 $V_{GS}=f(Q_{gate}); I_D=-1\ \text{A pulsed}$

parameter: V_{DD}


15 Drain-source breakdown voltage

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


16 Gate charge waveforms



Technical drawing of a mechanical part, showing front and side views with dimensions and tolerances.

Front View Dimensions:

- Overall width: 6.5 ± 0.2
- Top flange width: 3 ± 0.1
- Top flange height: 4
- Bottom flange width: 4.6
- Bottom flange height: 0.7 ± 0.1
- Bottom flange thickness: 2.3
- Bottom flange width (inner): 2.3
- Bottom flange width (outer): 4.6
- Bottom flange width (inner): 2.3
- Bottom flange width (outer): 4.6

Side View Dimensions:

- Overall height: 7 ± 0.3
- Top flange width: 1.6 ± 0.1
- Top flange thickness: 0.1 max
- Top flange angle: 15° max
- Top flange height: 3.5 ± 0.2
- Top flange width (inner): 0.5 min
- Top flange width (outer): 0.28 ± 0.04

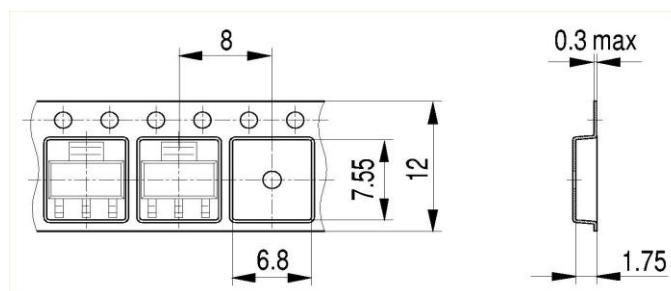
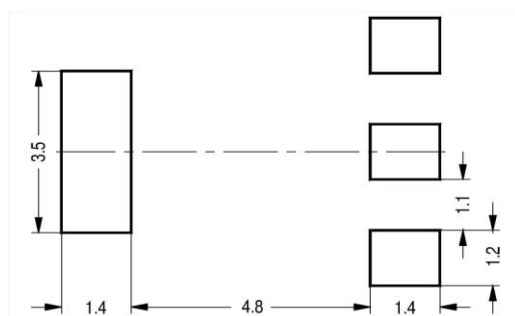
Surface Finish:

- Surface A: $\oplus 0.25 \text{ (M) A}$
- Surface B: $\equiv 0.25 \text{ (M) B}$

Reference:

- +0.2 acc. to DIN 6784

Packaging:



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Contact Us :

➤ Address :

401 Building No.5, JiuGe Business Center, Lane 2301, Yishan Rd
Minhang District, Shanghai , China

➤ Sales :

Direct +86 (21) 6401-6692

Email amall@ameya360.com

QQ 800077892

Skype ameyasales1 ameyasales2

➤ Customer Service :

Email service@ameya360.com

➤ Partnership :

Tel +86 (21) 64016692-8333

Email mkt@ameya360.com