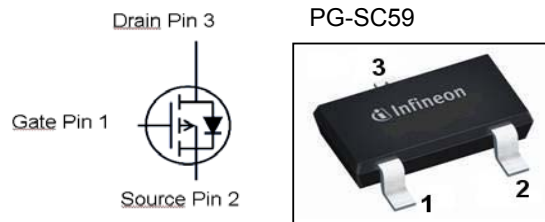


**SIPMOS<sup>®</sup> Small-Signal-Transistor**
**Features**

- P-Channel
- Enhancement mode / Logic level
- Avalanche rated
- Pb-free lead plating; RoHS compliant
- Footprint compatible to SOT23

**Product Summary**

$V_{DS}$	-100	V
$R_{DS(on),max}$	1.8	$\Omega$
$I_D$	-0.36	A



Type	Package	Tape and Reel Information	Marking	Lead free	Packing
BSR316P	PG-SC59	L6327 = 3000 pcs. / reel	LC	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	$I_D$	$T_A=25\text{ }^\circ\text{C}$	-0.36	A
		$T_A=70\text{ }^\circ\text{C}$	-0.29	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ }^\circ\text{C}$	-1.44	
Avalanche energy, single pulse	$E_{AS}$	$I_D=-0.36\text{ A}, R_{GS}=25\text{ }\Omega$	25	mJ
Gate source voltage	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_C=25\text{ }^\circ\text{C}$	0.5	W
Operating and storage temperature	$T_j, T_{stg}$		-55 ... 150	$^\circ\text{C}$
ESD class		JESD22-A114-HBM	1A (250V to 500V)	
Soldering temperature			260 $^\circ\text{C}$	
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	-	-	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	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=-250\text{ }\mu\text{A}$	-	-	-100	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_D=-170\text{ }\mu\text{A}$	-2	-1.5	-1	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-100\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^\circ\text{C}$	-	-0.1	-1	$\mu\text{A}$
		$V_{DS}=-100\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^\circ\text{C}$	-	-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	$R_{DS(on)}$	$V_{GS}=-4.5\text{ V}, I_D=-0.33\text{ A}$	-	1.8	2.2	$\Omega$
		$V_{GS}=-10\text{ V}, I_D=-0.36\text{ A}$	-	1.3	1.8	
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=-0.29\text{ A}$	0.3	0.5	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	124	165	pF
Output capacitance	$C_{oss}$		-	25	33	
Reverse transfer capacitance	$C_{rss}$		-	13	20	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-50\text{ V},$ $V_{GS}=-10\text{ V},$ $I_D=-0.36\text{ A}, R_G=6\ \Omega$	-	5	8	ns
Rise time	$t_r$		-	6	9	
Turn-off delay time	$t_{d(off)}$		-	71	106	
Fall time	$t_f$		-	26	39	

**Gate Charge Characteristics<sup>2)</sup>**

Gate to source charge	$Q_{gs}$	$V_{DD}=-80\text{ V},$ $I_D=-0.36\text{ A}, V_{GS}=0\text{ to }-10\text{ V}$	-	0.3	0.4	nC
Gate to drain charge	$Q_{gd}$		-	1.6	2.4	
Gate charge total	$Q_g$		-	5.3	7.0	
Gate plateau voltage	$V_{plateau}$		-	-2.7	-	V

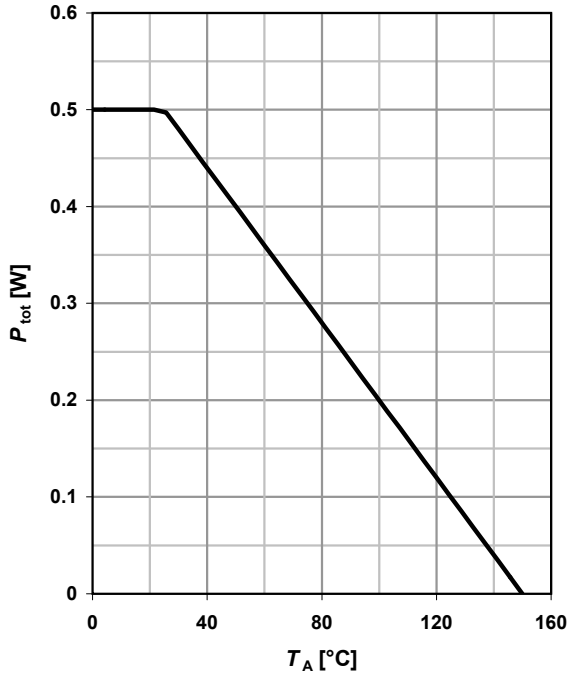
**Reverse Diode**

Diode continuous forward current	$I_S$	$T_C=25\text{ °C}$	-	-	-0.36	A
Diode pulse current	$I_{S,pulse}$		-	-	-1.44	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=0.36\text{ A},$ $T_j=25\text{ °C}$	-	-0.8	-1.1	V
Reverse recovery time	$t_{rr}$	$V_R=-50\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	40.6	-	ns
Reverse recovery charge	$Q_{rr}$		-	46.4	-	nC

<sup>2)</sup> See figure 16 for gate charge parameter definition

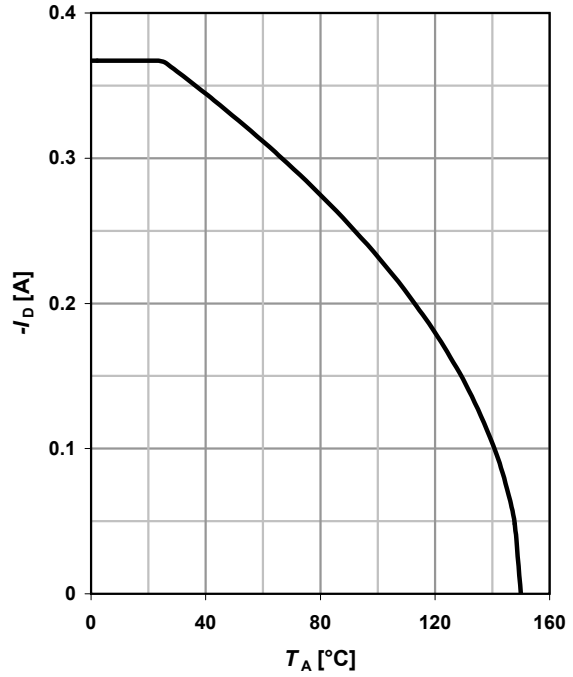
**1 Power dissipation**

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



**2 Drain current**

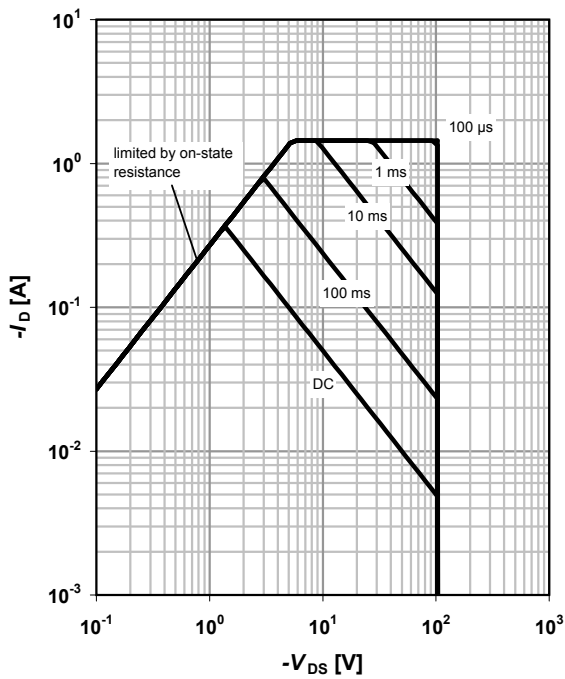
$$I_D = f(T_C); |V_{GS}| \geq 10 \text{ V}$$



**3 Safe operating area**

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

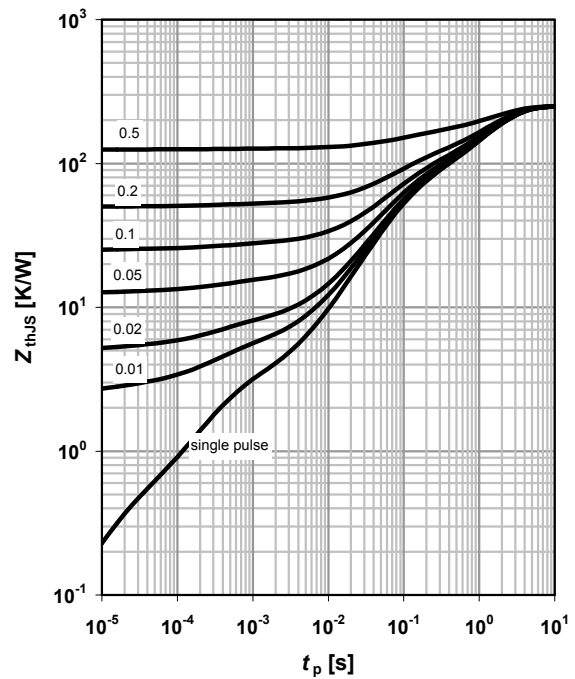
parameter:  $t_p$



**4 Max. transient thermal impedance**

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

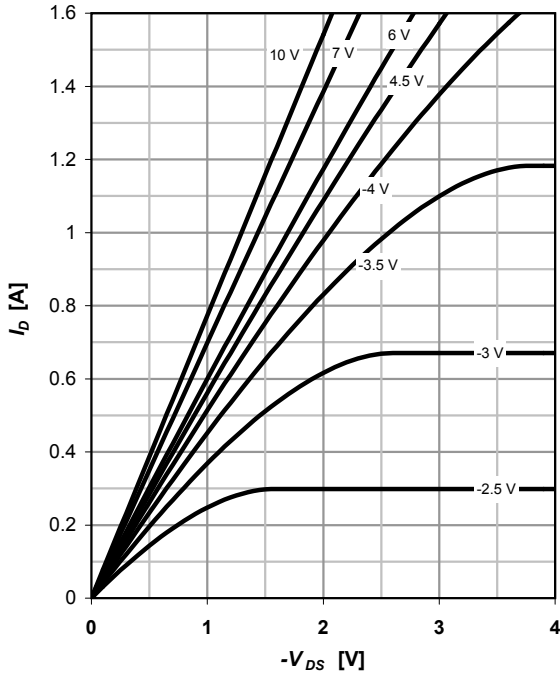
parameter:  $D = t_p / T$



**5 Typ. output characteristics**

$I_D = f(V_{DS}); T_j = 25\text{ °C}$

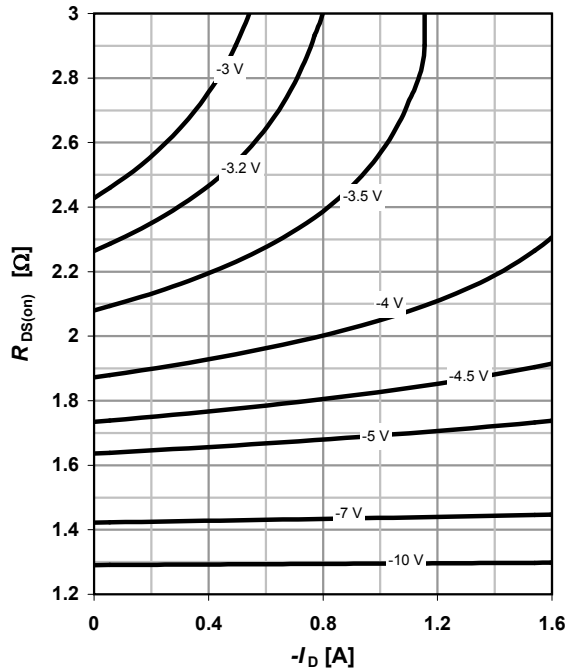
parameter:  $V_{GS}$



**6 Typ. drain-source on resistance**

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

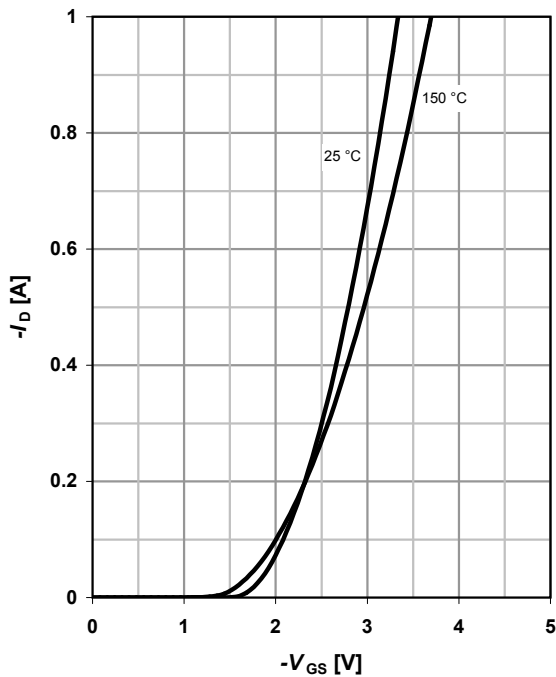
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

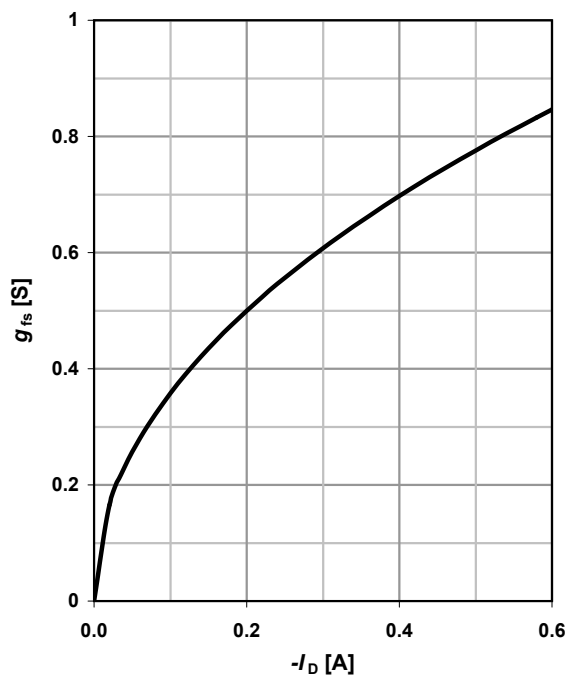
$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

parameter:  $T_j$



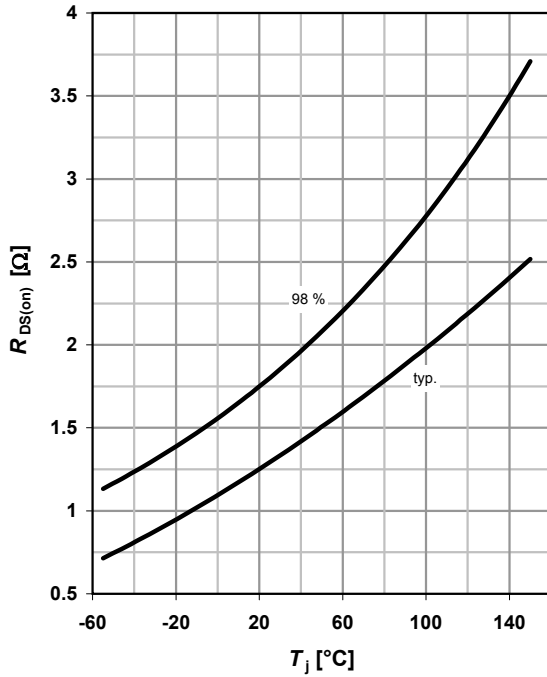
**8 Typ. forward transconductance**

$g_{fs} = f(I_D); T_j = 25\text{ °C}$



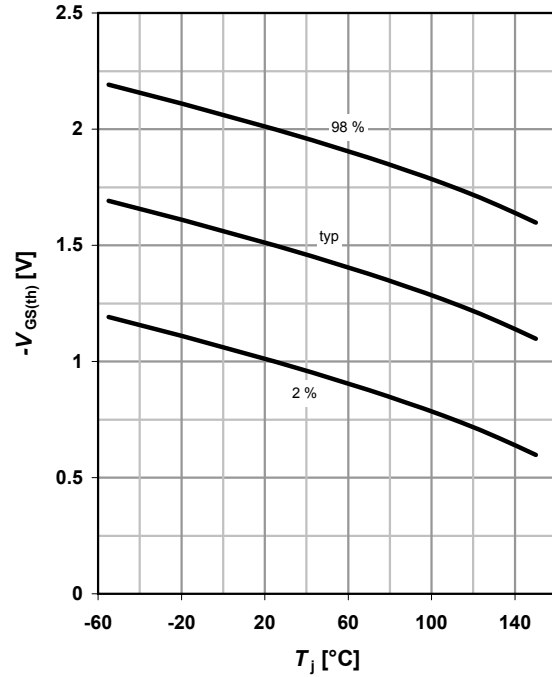
**9 Drain-source on-state resistance**

$R_{DS(on)} = f(T_j); I_D = -0.36 \text{ A}; V_{GS} = -10 \text{ V}$



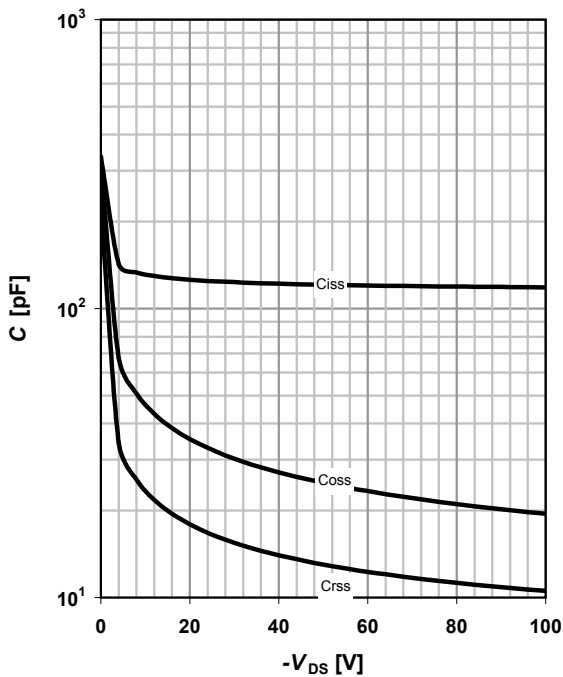
**10 Typ. gate threshold voltage**

$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -170 \mu\text{A}$



**11 Typ. capacitances**

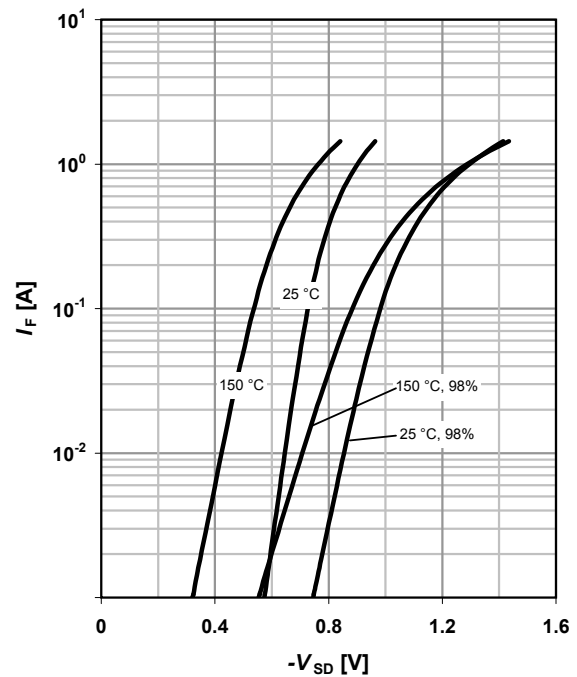
$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$



**12 Forward characteristics of reverse diode**

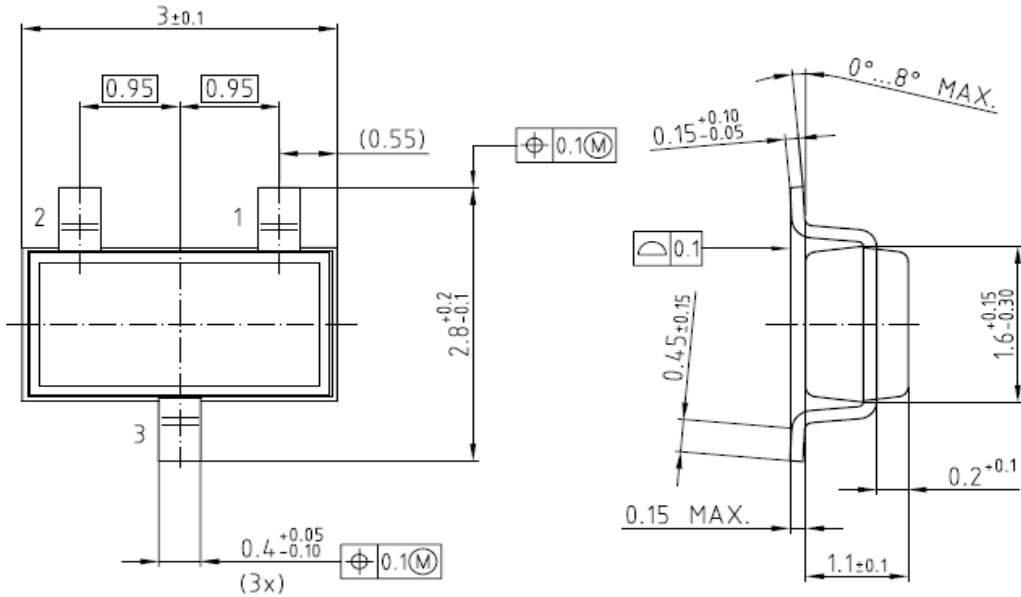
$I_F = f(V_{SD})$

parameter:  $T_j$

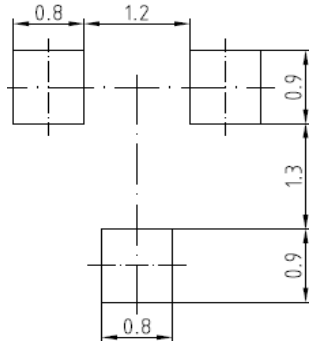


Package Outline

SC-59: Outline

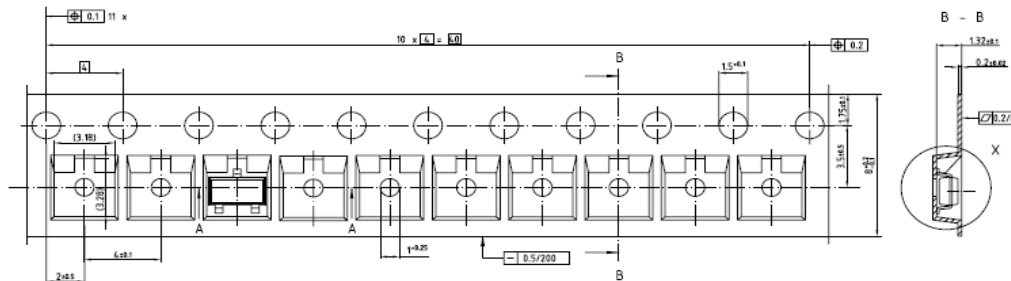


Footprint



Packaging

Tape

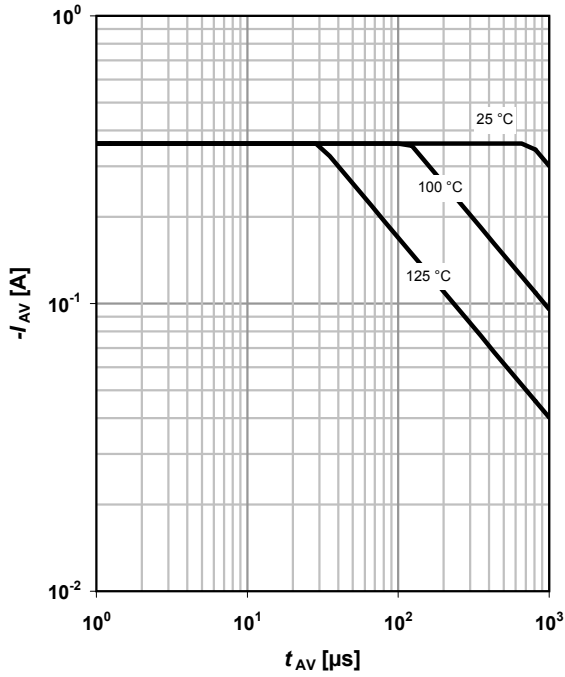


Dimensions in mm

**13 Avalanche characteristics**

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

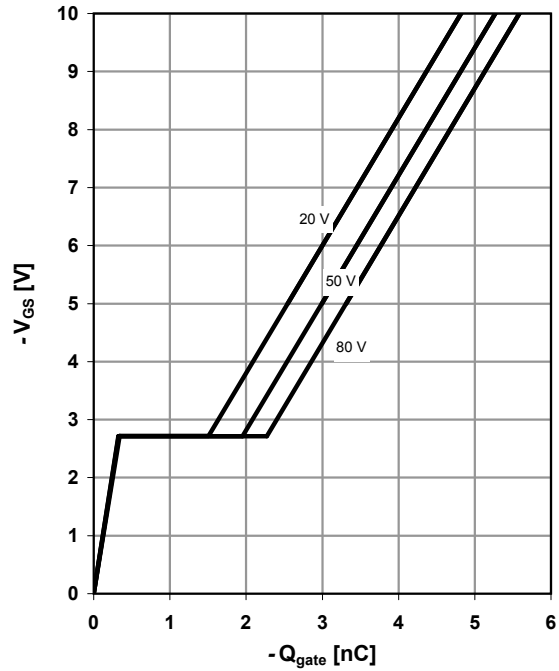
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

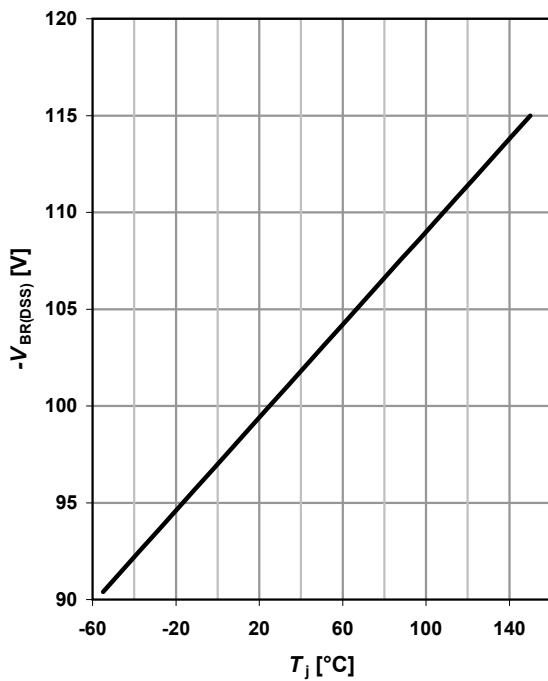
$V_{GS}=f(Q_{gate}); I_D=-0.36$  A pulsed

parameter:  $V_{DD}$

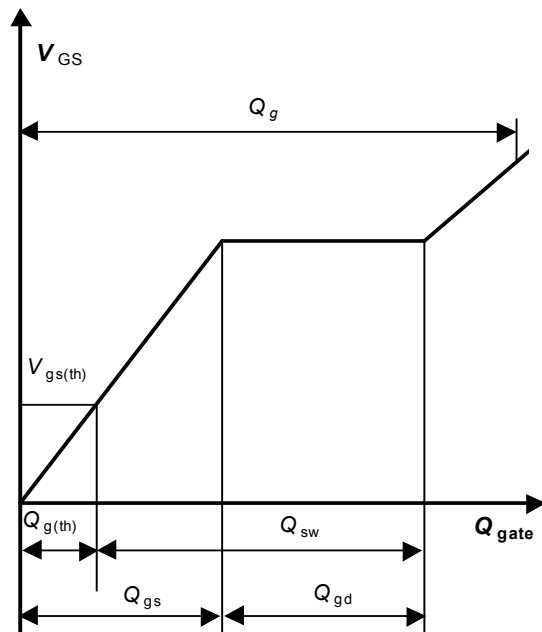


**15 Drain-source breakdown voltage**

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



**16 Gate charge waveforms**





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