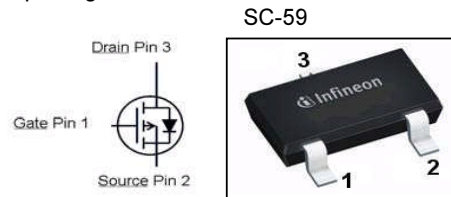


**SIPMOS<sup>®</sup> Small-Signal-Transistor**
**Features**

- P-Channel
- Enhancement mode
- Logic level
- Footprint and pinning compatible with SOT-23 / SuperSOT-23 packages
- Avalanche rated
- Pb-free lead finishing; RoHS compliant

**Product Summary**

$V_{DS}$	-60	V
$R_{DS(on),max}$	0.8	$\Omega$
$I_D$	-0.62	A



Type	Package	Tape and reel information	Marking	Lead free	Packing
BSR315P	PG-SC59	L6327 = 3000 pcs. / reel	LB	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
			steady state	
Continuous drain current	$I_D$	$T_A=25\text{ °C}$	-0.62	A
		$T_A=70\text{ °C}$	-0.49	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-2.48	
Avalanche energy, single pulse	$E_{AS}$	$I_D=0.62\text{ A}, R_{GS}=25\ \Omega$	24	mJ
Gate source voltage	$V_{GS}$		$\pm 20$	V
Power dissipation	$P_{tot}$	$T_A=25\text{ °C}$	0.5	W
Operating and storage temperature	$T_j, T_{stg}$		-55 ... 150	$^{\circ}\text{C}$
ESD class		JESD22-C101	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	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}$ , $I_D=-250\text{ }\mu\text{A}$	-60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}$ , $I_D=-160\text{ }\mu\text{A}$	-1	-1.5	-2	
Zero gate voltage drain current	$I_{DSS}$	$V_{DS}=-60\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=25\text{ }^\circ\text{C}$	-	-0.1	-1	$\mu\text{A}$
		$V_{DS}=-60\text{ V}$ , $V_{GS}=0\text{ V}$ , $T_j=150\text{ }^\circ\text{C}$	-	-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	$R_{DS(on)}$	$V_{GS}=-4.5\text{ V}$ , $I_D=-0.49\text{ A}$	-	870	1300	m $\Omega$
		$V_{GS}=-10\text{ V}$ , $I_D=-0.62\text{ A}$	-	620	800	
Transconductance	$g_{fs}$	$ V_{DS} >2 I_D R_{DS(on)max}$ , $I_D=-0.49\text{ A}$	0.5	0.9	-	S

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

**Dynamic characteristics**

Input capacitance	$C_{iss}$	$V_{GS}=0\text{ V}, V_{DS}=-25\text{ V},$ $f=1\text{ MHz}$	-	132	176	pF
Output capacitance	$C_{oss}$		-	42	56	
Reverse transfer capacitance	$C_{rss}$		-	20	30	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-30\text{ V},$ $V_{GS}=-10\text{ V},$ $I_D=-0.62\text{ A}, R_G=6\ \Omega$	-	8	13	ns
Rise time	$t_r$		-	28	46	
Turn-off delay time	$t_{d(off)}$		-	21	32	
Fall time	$t_f$		-	20	30	

**Gate Charge Characteristics<sup>1)</sup>**

Gate to source charge	$Q_{gs}$	$V_{DD}=-48\text{ V},$ $I_D=-0.62\text{ A}, V_{GS}=0\text{ to }-10\text{ V}$	-	0.4	0.5	nC
Gate to drain charge	$Q_{gd}$		-	2	3	
Gate charge total	$Q_g$		-	4	6	
Gate plateau voltage	$V_{plateau}$		-	-3	-	V

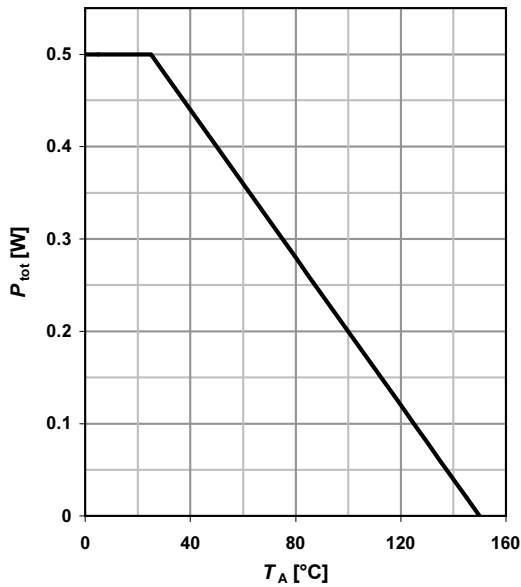
**Reverse Diode**

Diode continuous forward current	$I_S$	$T_A=25\text{ °C}$	-	-	-0.56	A
Diode pulse current	$I_{S,pulse}$		-	-	-2.5	
Diode forward voltage	$V_{SD}$	$V_{GS}=0\text{ V}, I_F=-0.62\text{ A},$ $T_j=25\text{ °C}$	-	-0.82	-1.2	V
Reverse recovery time	$t_{rr}$	$V_R=-30\text{ V}, I_F= I_S ,$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	32	48	ns
Reverse recovery charge	$Q_{rr}$		-	29	43	nC

<sup>1)</sup> See figure 16 for gate charge parameter definition

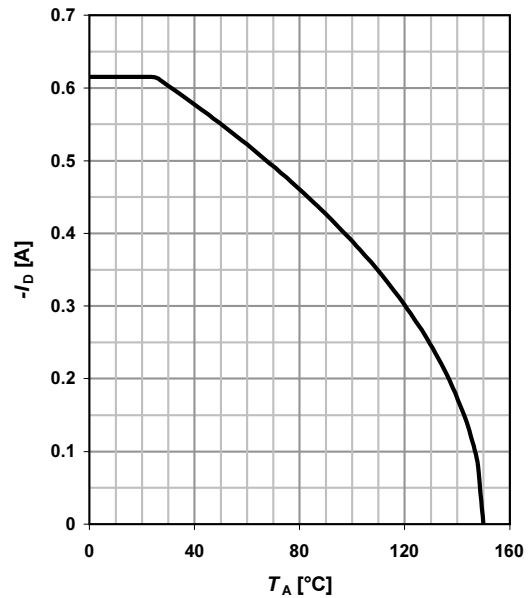
**1 Power dissipation**

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



**2 Drain current**

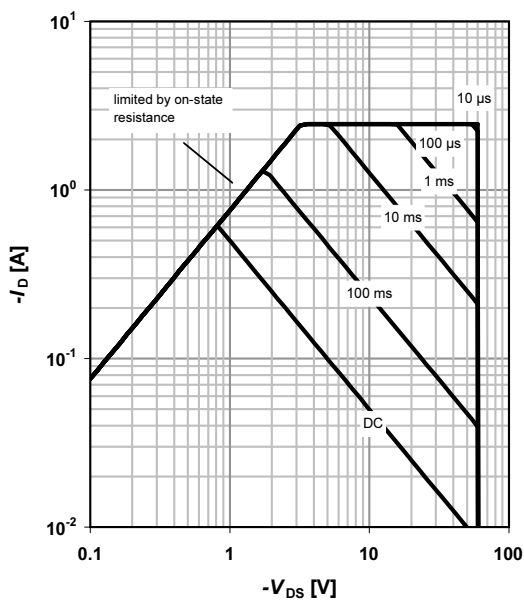
$$I_D = f(T_A); |V_{GS}| \geq 10 \text{ V}$$



**3 Safe operating area**

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

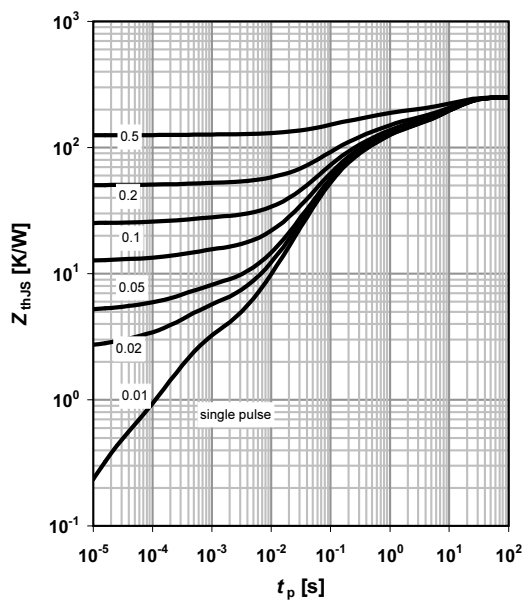
parameter:  $t_p$



**4 Max. transient thermal impedance**

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

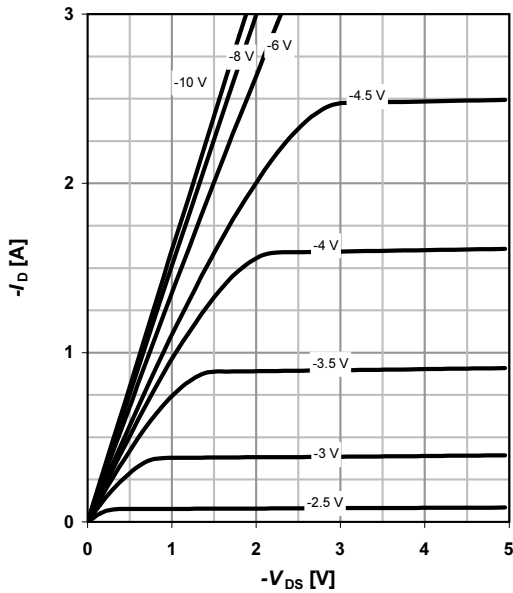
parameter:  $D = t_p/T$



**5 Typ. output characteristics**

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

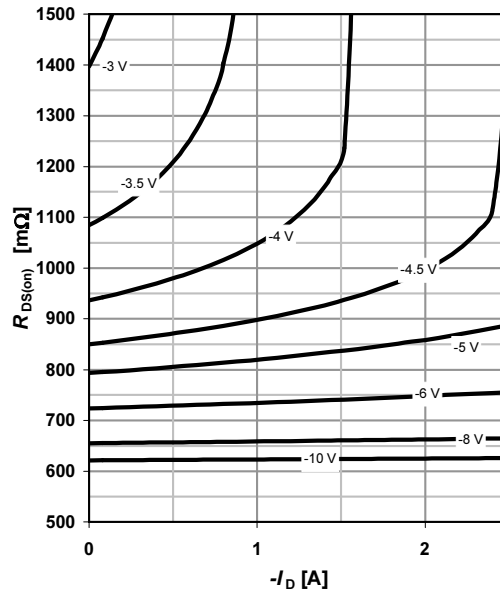
parameter:  $V_{GS}$



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

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

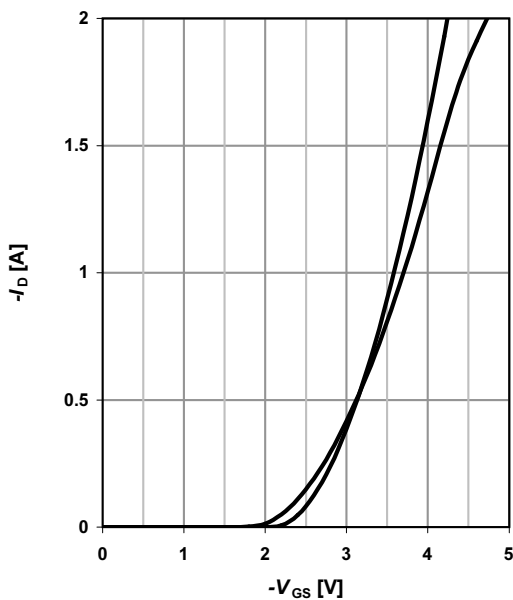
parameter:  $V_{GS}$



**7 Typ. transfer characteristics**

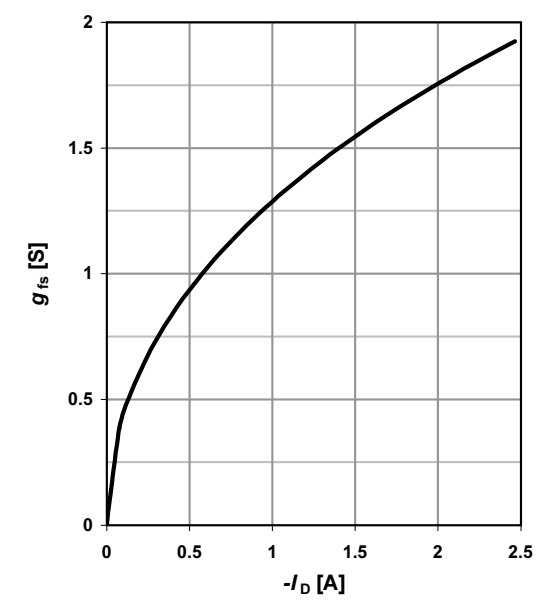
$$I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$$

parameter:  $T_j$



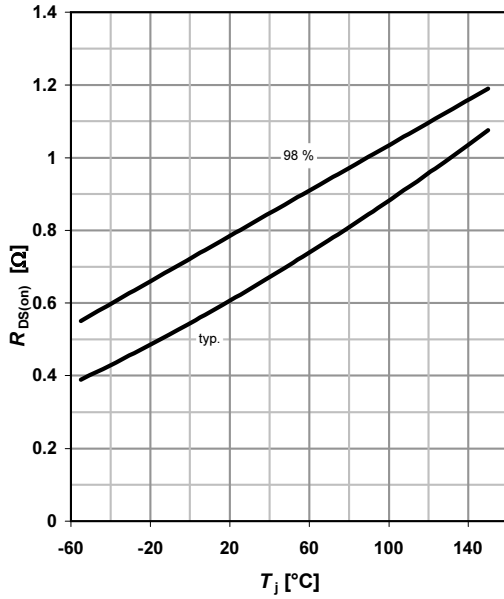
**8 Typ. forward transconductance**

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



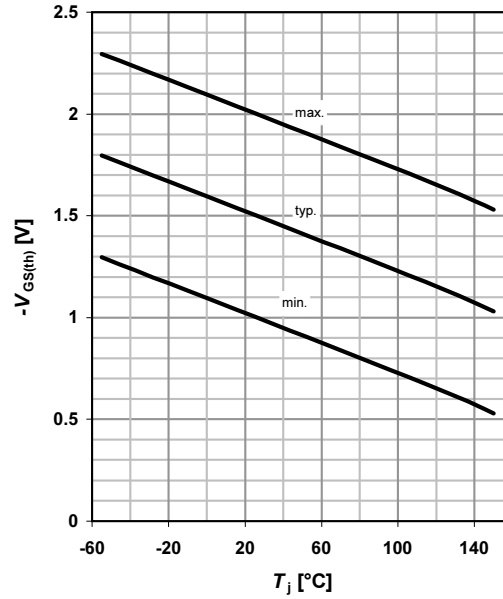
**9 Drain-source on-state resistance**

$$R_{DS(on)} = f(T_j); I_D = -0.62 \text{ A}; V_{GS} = -10 \text{ V}$$



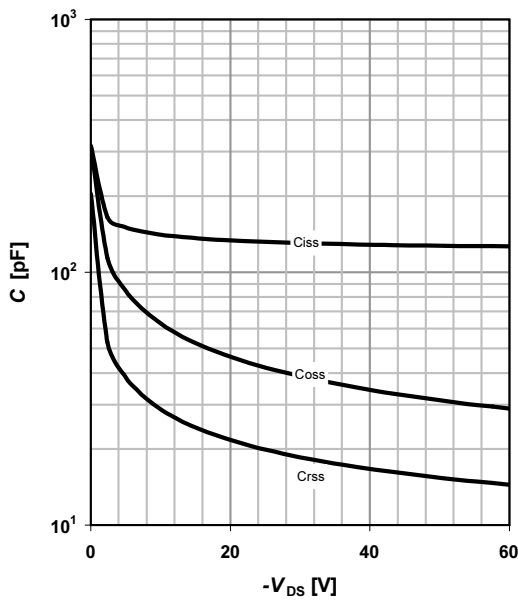
**10 Typ. gate threshold voltage**

$$V_{GS(th)} = f(T_j); V_{GS} = V_{DS}; I_D = -160 \mu\text{A}$$



**11 Typ. capacitances**

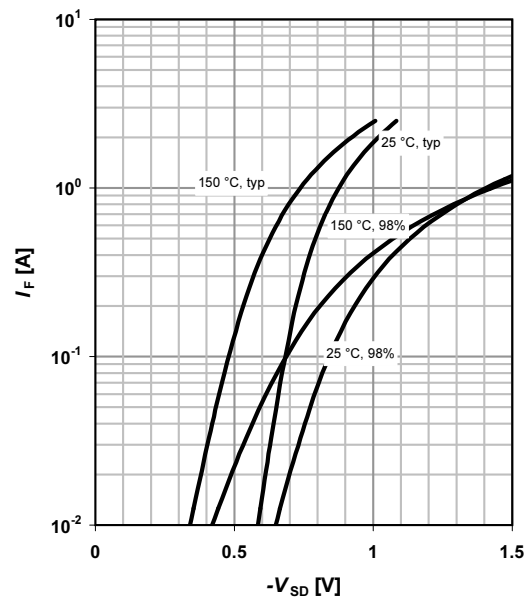
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}$$



**12 Forward characteristics of reverse diode**

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

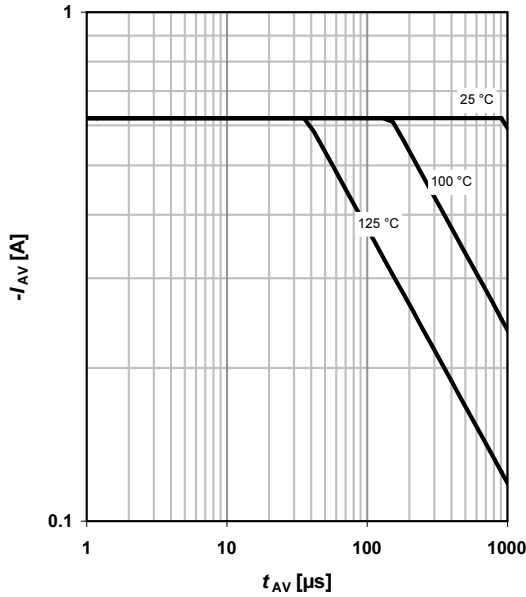
parameter:  $T_j$



**13 Avalanche characteristics**

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

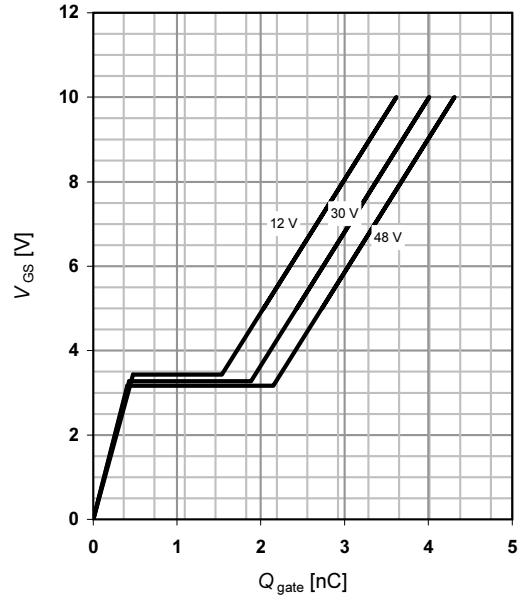
parameter:  $T_{j(start)}$



**14 Typ. gate charge**

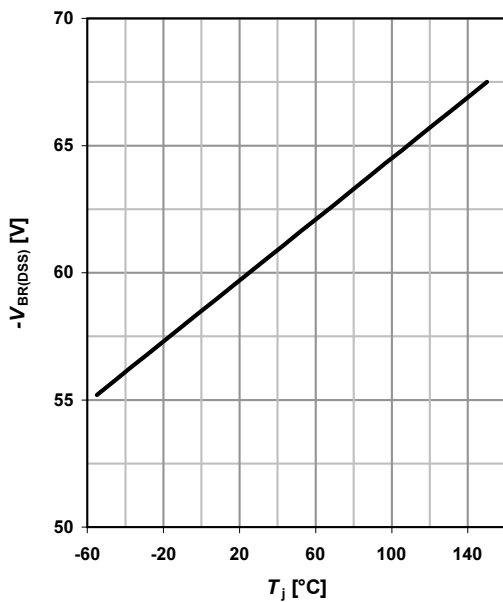
$V_{GS}=f(Q_{gate}); I_D=-0.62 \text{ A pulsed}$

parameter:  $V_{DD}$

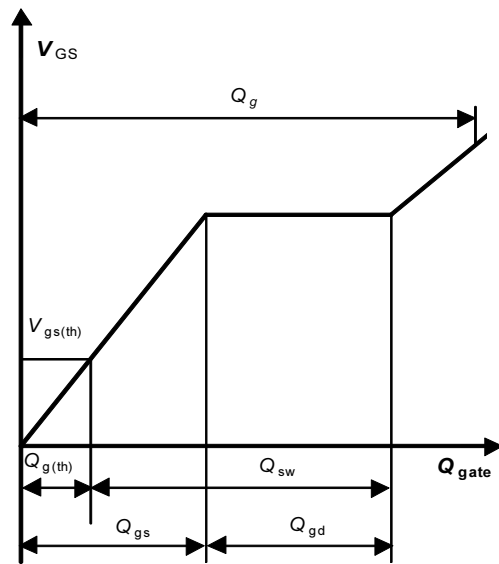


**15 Drain-source breakdown voltage**

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

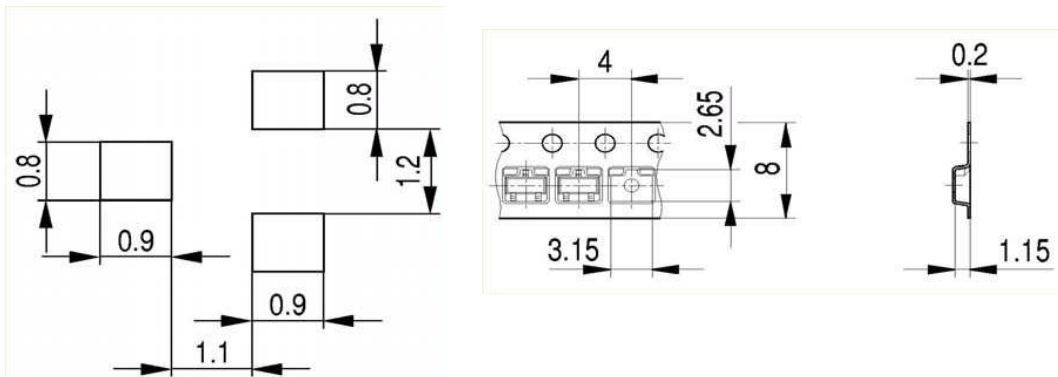
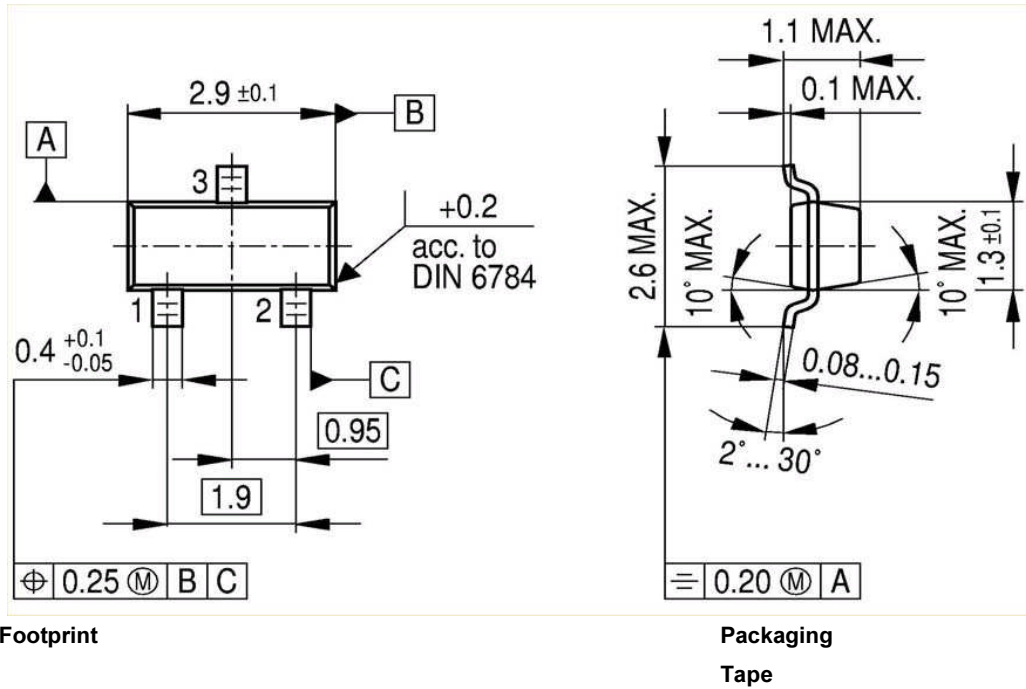


**16 Gate charge waveforms**



Package Outline

SC-59: Outline



Dimensions in mm



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