

Mosfet

Metal Oxide Semiconductor Field Effect Transistor

OptiMOS™ Power-Transistor, -30V

BSL305SPE

Data Sheet

Rev. 2.0
Final

Industrial & Multimarket

OptiMOS™-P 3 Small-Signal-Transistor

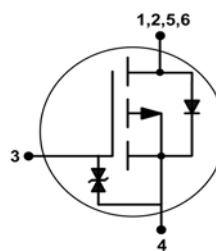
Features

- P-channel
- Enhancement mode
- Logic level (4.5V rated)
- ESD protected
- Avalanche rated
- Qualified according to AEC Q101
- 100% Lead-free; RoHS compliant, Halogen-free

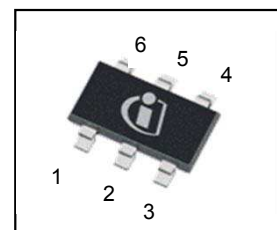


Product Summary

V_{DS}		-30	V
$R_{DS(on),max}$	$V_{GS}=-10\text{ V}$	45	mΩ
	$V_{GS}=-4.5\text{ V}$	80	
I_D		-5.3	A



PG-TSOP-6



Type	Package	Tape and Reel Information	Marking	Halogen Free	Packing
BSL305SPE	PG-TSOP-6	H6327: 3000 pcs/ reel	sPU	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_A=25\text{ °C}$	-5.3	A
		$T_A=70\text{ °C}$	-4.2	
		$T_A=25\text{ °C}$	-21.2	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	-21.2	
Avalanche energy, single pulse	E_{AS}	$I_D=-5.3\text{ A}$, $R_{GS}=25\text{ Ω}$	20	mJ
Reverse diode dv/dt	dv/dt	$I_D=-5.3\text{ A}$, $V_{DS}=-15\text{ V}$, $di/dt=100\text{ A/μs}$, $T_{j,max}=150\text{ °C}$	6	kV/μs
Gate source voltage	V_{GS}		±20	V
Power dissipation	P_{tot}	$T_A=25\text{ °C}$	2.0	W
Operating and storage temperature	T_j , T_{stg}		-55 ... 150	°C
ESD Class		JESD22-A114 -HBM	1C (1kV to 2kV)	V
Soldering Temperature			260 °C	°C
IEC climatic category; DIN IEC 68-1			55/150/56	°C

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Thermal characteristics

Thermal resistance, junction - minimal footprint	R_{thJS}		-	-	50	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	230	
		6 cm ² cooling area ¹⁾	-	-	62.5	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0V, I_D=-250\mu A$	-30	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=0V, I_D=-20\mu A$	-2	-1.50	-1	
Drain-source leakage current	I_{DSS}	$V_{DS}=-30V, V_{GS}=0V, T_j=25\text{ °C}$	-	-	-0.1	μA
		$V_{DS}=-30V, V_{GS}=0V, T_j=150\text{ °C}$	-	-	-20	
Gate-source leakage current	I_{GSS}	$V_{GS}=-20V, V_{DS}=0V$	-	-	-5	μA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=-4.5V, I_D=-4.3A$	-	49	80	$m\Omega$
		$V_{GS}=-10V, I_D=-5.3A$	-	34	45	
Transconductance	g_{fs}	$ V_{DS} > 2 I_D R_{DS(on)max}, I_D=-4.2A$		10.0	-	S

¹⁾ Device on 40 mm x 40 mm x 1.5 mm epoxy PCB FR4 with 6 cm² (single layer, 70 μm thick) copper area for drain connection. PCB is vertical in still air. (t < 5 sec.)

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics²⁾

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=-15\text{ V},$ $f=1\text{ MHz}$	-	706	939	pF
Output capacitance	C_{oss}		-	338	449	
Reverse transfer capacitance	C_{rss}		-	22	34	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=-15\text{ V},$ $V_{GS}=-10\text{ V},$ $I_D=-5.3\text{ A}, R_{G,ext}=6\ \Omega$	-	6.4	9.6	ns
Rise time	t_r		-	8.0	12.0	
Turn-off delay time	$t_{d(off)}$		-	20.5	30.8	
Fall time	t_f		-	5.1	7.7	

Gate Charge Characteristics²⁾

Gate to source charge	Q_{gs}	$V_{DD}=-15\text{ V}, I_D=-5.3\text{ A},$ $V_{GS}=0\text{ to }-10\text{ V}$	-	2.3	3.0	nC
Gate to drain charge	Q_{gd}		-	1.1	1.6	
Gate charge total	Q_g		-	9.4	14.0	
Gate plateau voltage	$V_{plateau}$		-	3.2	-	V

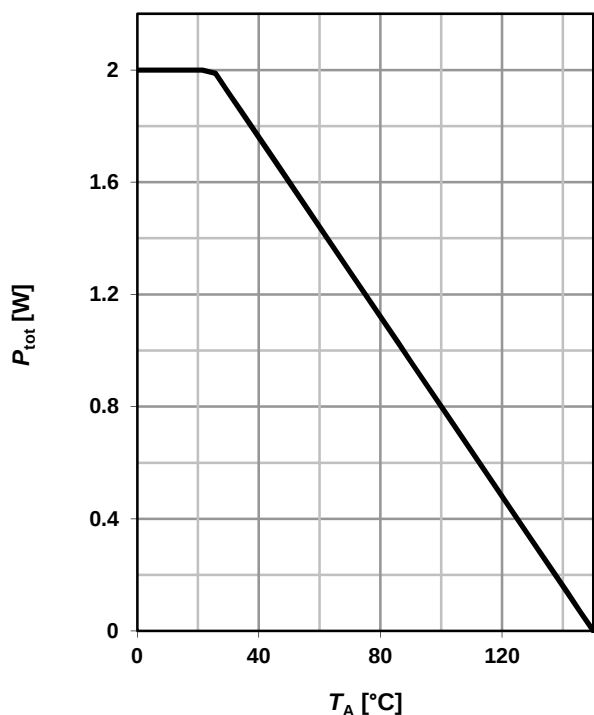
Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ °C}$	-	-	-5.3	A
Diode pulse current	$I_{S,pulse}$		-	-	-21.2	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=-5.3\text{ A},$ $T_j=25\text{ °C}$	-	-0.9	-1.1	V
Reverse recovery time ²⁾	t_{rr}	$V_R=-15\text{ V}, I_F=-5.3\text{ A},$ $di_F/dt=100\text{ A}/\mu\text{s}$	-	23	-	ns
Reverse recovery charge ²⁾	Q_{rr}		-	17	-	nC

²⁾ Defined by design. Not subjected to production test

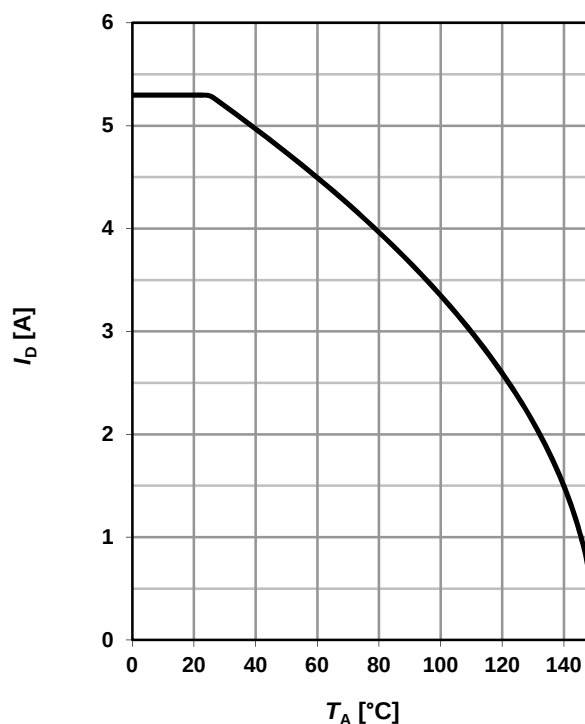
1 Power dissipation

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



2 Drain current

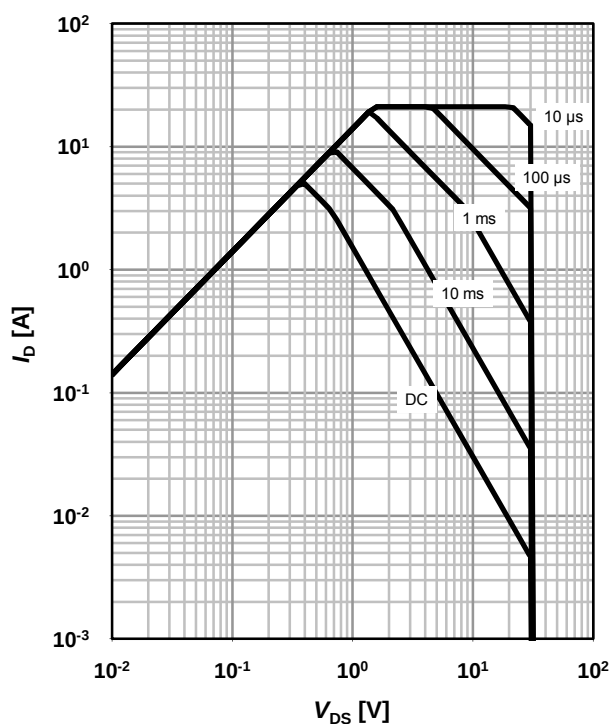
$$I_D = f(T_A); V_{GS} \geq -10 \text{ V}$$



3 Safe operating area

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

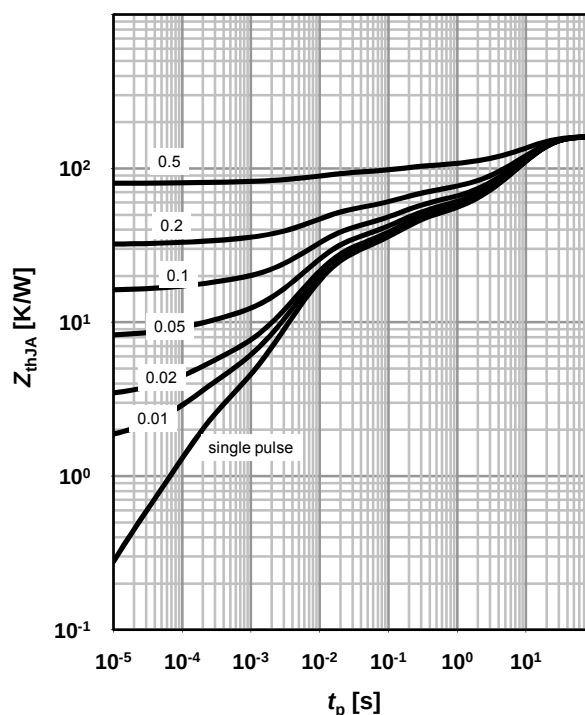
parameter: t_p



4 Max. transient thermal impedance

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

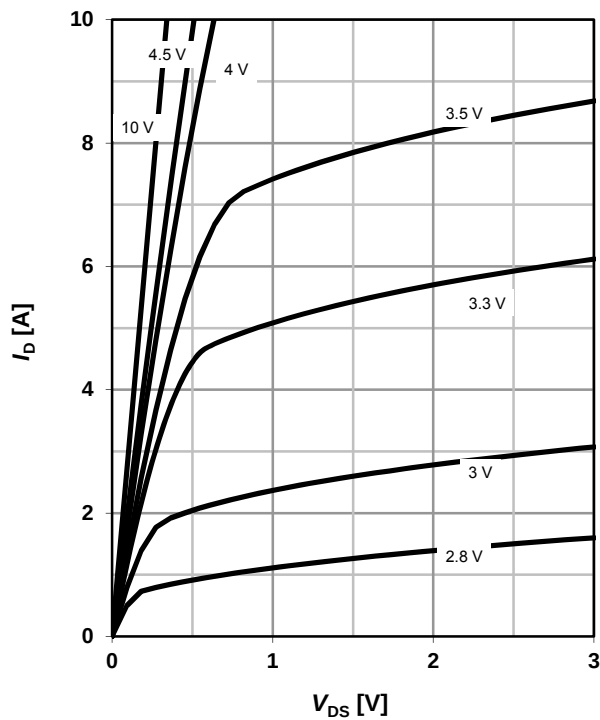
parameter: $D = t_p/T$



5 Typ. output characteristics

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

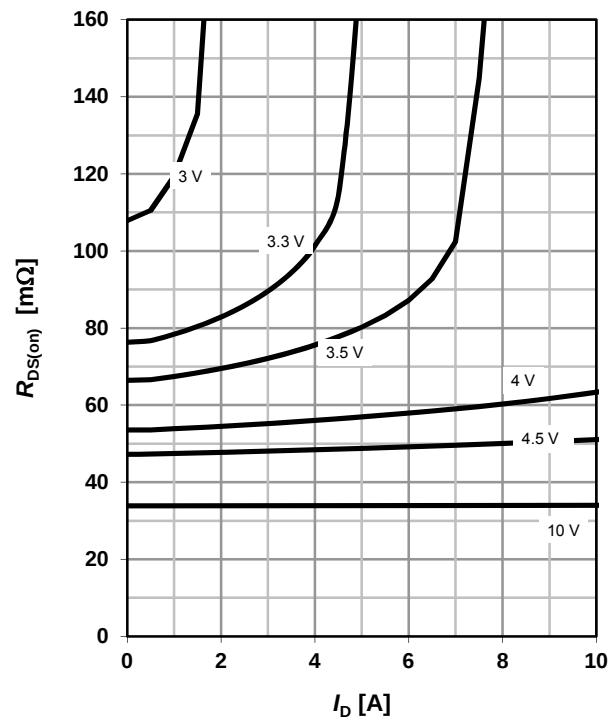
parameter: V_{GS}



6 Typ. drain-source on resistance

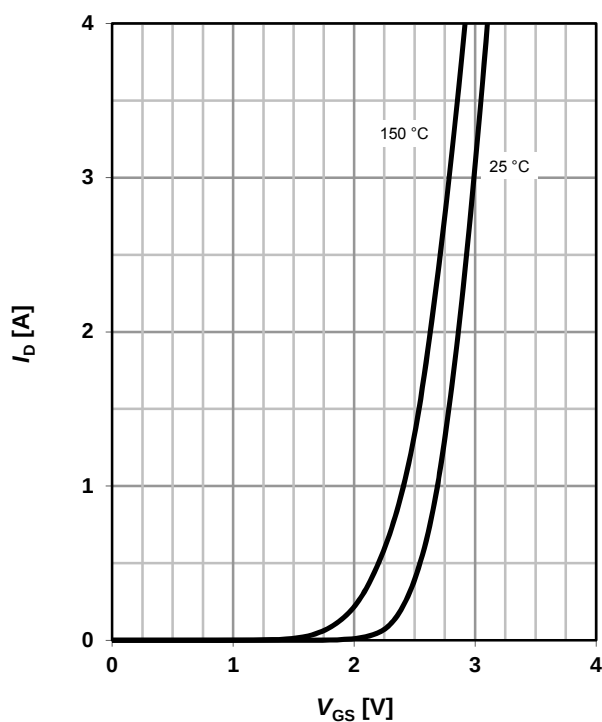
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter: V_{GS}



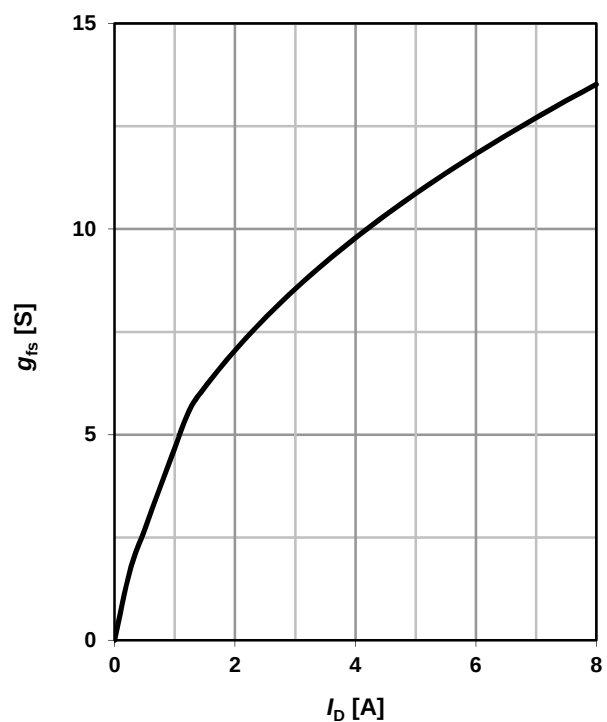
7 Typ. transfer characteristics

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



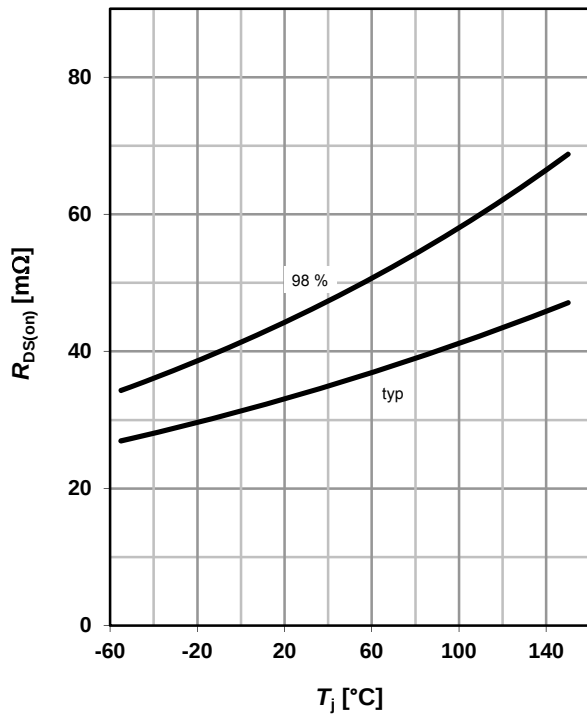
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

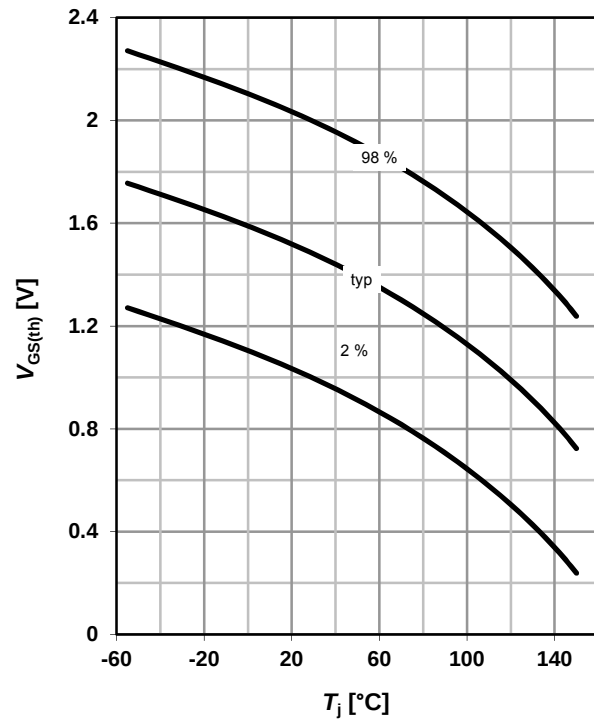
$$R_{DS(on)} = f(T_j); I_D = -5.3 \text{ A}; V_{GS} = -10 \text{ V}$$



10 Typ. gate threshold voltage

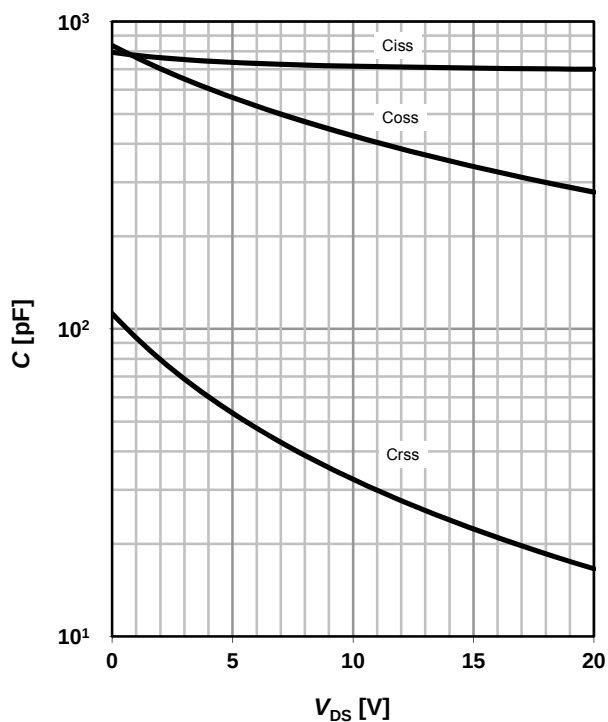
$$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = -20 \text{ μA}$$

parameter: I_D



11 Typ. capacitances

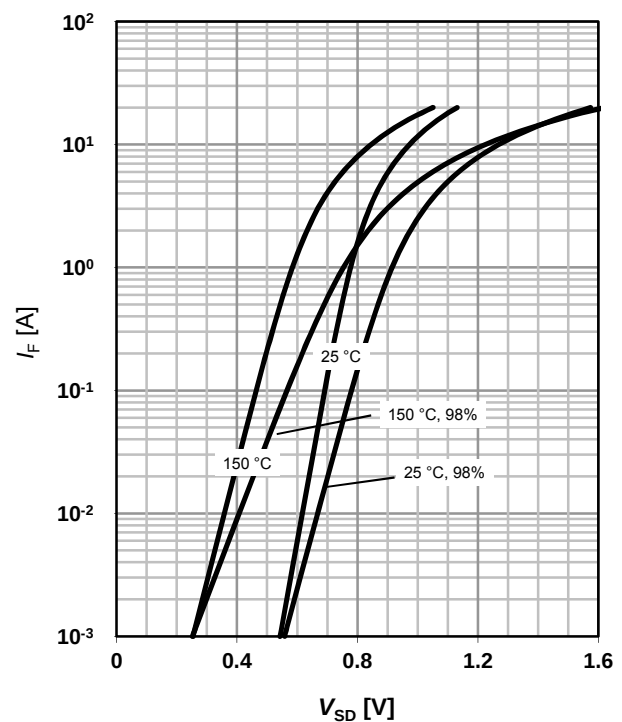
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$$



12 Forward characteristics of reverse diode

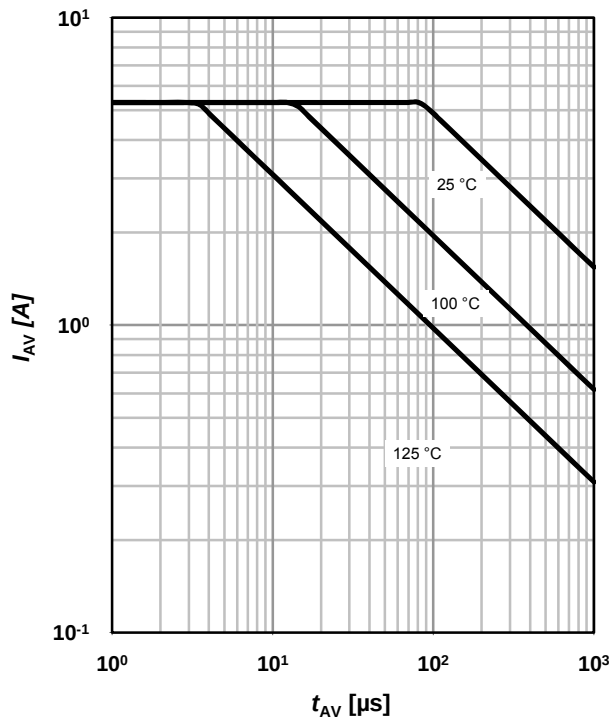
$$I_F = f(V_{SD})$$

parameter: T_j



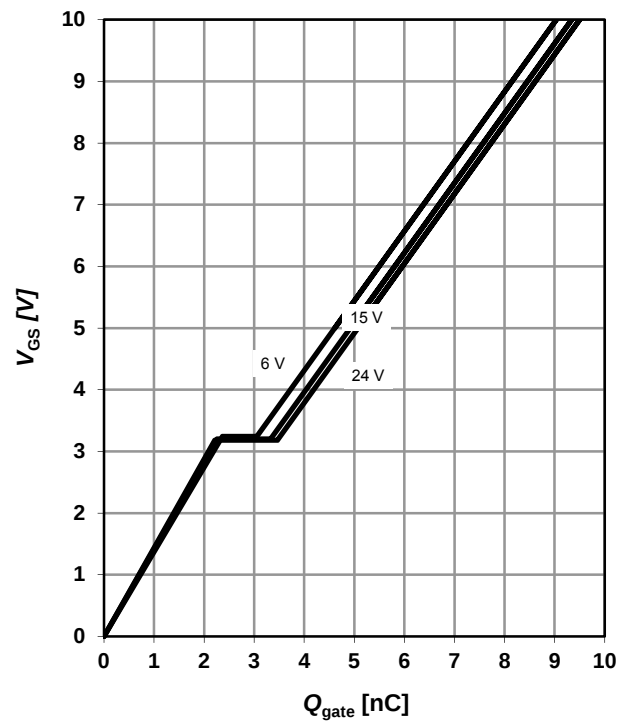
13 Avalanche characteristics

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

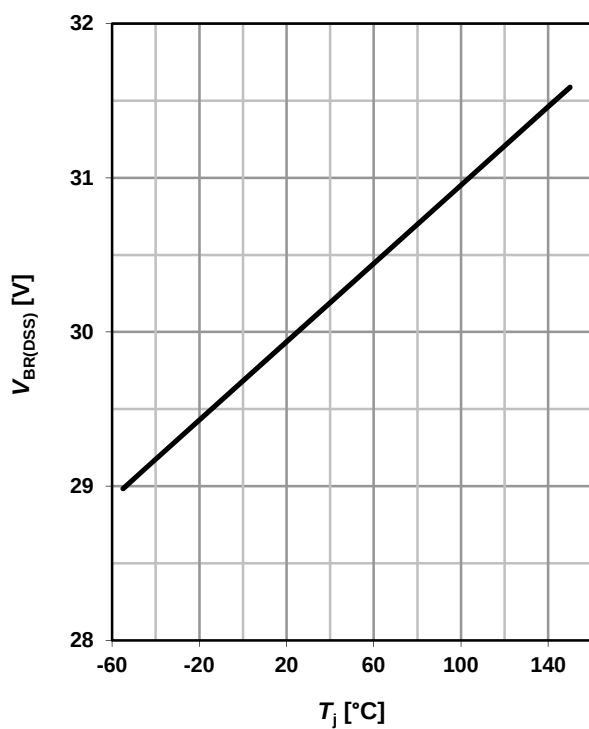
parameter: $T_{j(\text{start})}$


14 Typ. gate charge

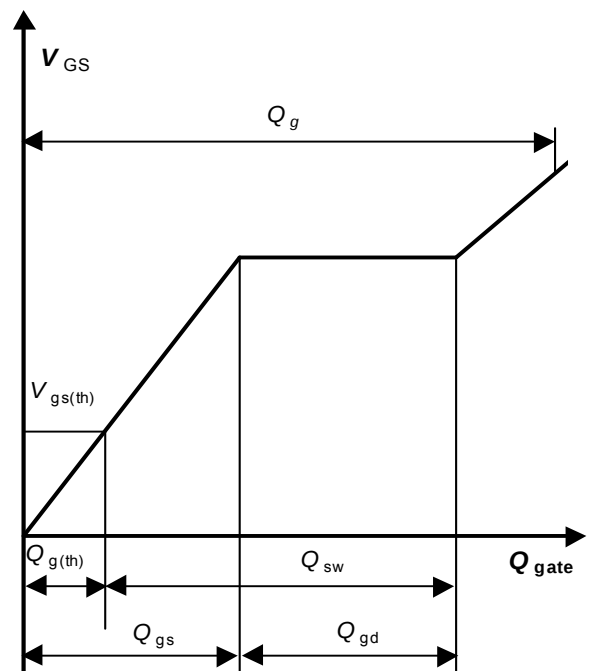
 $V_{GS}=f(Q_{\text{gate}}); I_D=-5.3\ \text{A pulsed}$

parameter: V_{DD}


15 Drain-source breakdown voltage

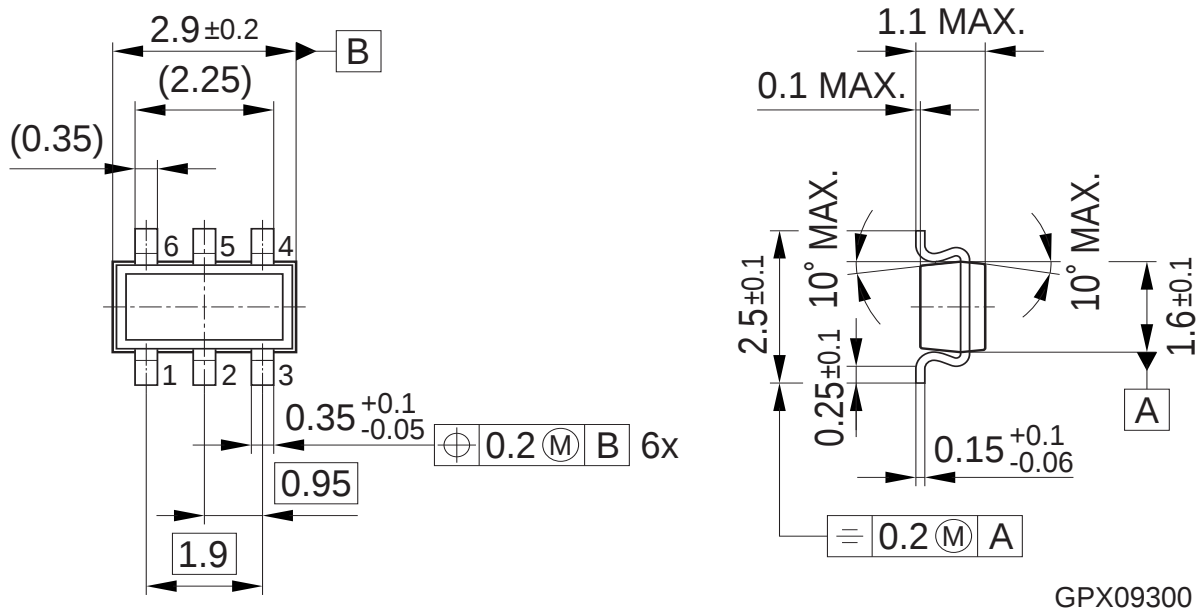
 $V_{BR(DSS)}=f(T_j); I_D=250\ \mu\text{A}$


16 Gate charge waveforms



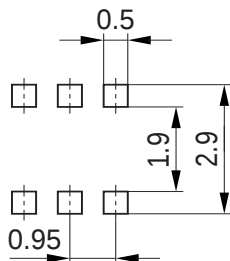
Package Outline:

TSOP-6



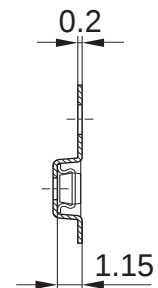
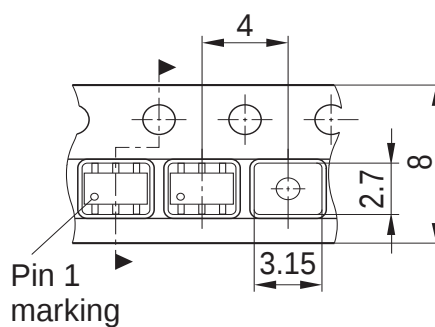
Footprint:

Packaging:



Remark: Wave soldering possible dep.
on customers process conditions

HLG09283



CPWG5899

Dimensions in mm

Note: For symmetric types there is no defined Pin 1 orientation in the reel.

Revision History

BSL305SPE

Revision: 2014-12-10, Rev. 2.0

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.0	2014-12-10	Release of final version

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