

MOSFET

Metal Oxide Semiconductor Field Effect Transistor

OptiMOS™ Small-Signal-Transistor, 75V

BSL716SN

Data Sheet

Rev. 2.0
Final

Industrial & Multimarket

OptiMOS™ Small-Signal-Transistor

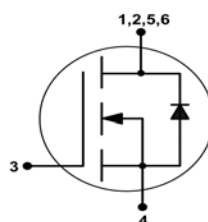
Features

- N-channel
- Enhancement mode
- Logic Level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- RoHS compliant
- Halogen-free according to IEC61249-2-21

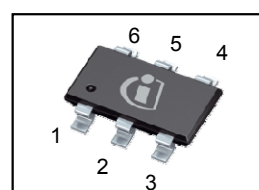


Product Summary

V_{DS}		75	V
$R_{DS(on),max}$	$V_{GS}=10\text{ V}$	0.15	Ω
	$V_{GS}=4.5\text{ V}$	0.18	
I_D		2.5	A



TSOP6



Type	Package	Tape and Reel Info	Marking	Halogen Free	Packing
BSL716SN	TSOP6	H6327: 3000 pcs/ reel	sPZ	Yes	Non dry

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

Parameter	Symbol	Conditions	Value	Unit
Continuous drain current	I_D	$T_A=25\text{ °C}$	2.5	A
		$T_A=70\text{ °C}$	2.0	
Pulsed drain current	$I_{D,pulse}$	$T_A=25\text{ °C}$	10.0	
Avalanche energy, single pulse	E_{AS}	$I_D=2.5\text{ A}$, $R_{GS}=25\text{ }\Omega$	33	mJ
Reverse diode dv/dt	dv/dt	$I_D=2.5\text{ A}$, $V_{DS}=50\text{ V}$, $di/dt=200\text{ A}/\mu\text{s}$, $T_{j,max}=150\text{ °C}$	6	kV/ μs
Gate source voltage	V_{GS}		± 20	V
Power dissipation ¹⁾	P_{tot}	$T_A=25\text{ °C}$	2.0	W
Operating and storage temperature	T_j , T_{stg}		-55 ... 150	$^{\circ}\text{C}$
ESD Class		JESD22-A114 -HBM	0 (<250V)	
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 - soldering point	R_{thJS}		-	-	50	K/W
Thermal resistance junction - ambient	R_{thJA}	minimal footprint	-	-	230	
		6 cm ² cooling area ¹⁾	-	-	62.5	

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

Static characteristics

Drain-source breakdown voltage	$V_{(BR)DSS}$	$V_{GS}=0\text{ V}, I_D=250\text{ }\mu\text{A}$	75	-	-	V
Gate threshold voltage	$V_{GS(th)}$	$V_{DS}=V_{GS}\text{ V}, I_D=218\text{ }\mu\text{A}$	0.8	1.4	1.80	
Drain-source leakage current	I_{DSS}	$V_{DS}=75\text{ V}, V_{GS}=0\text{ V}, T_j=25\text{ }^{\circ}\text{C}$	-	-	0.02	μA
		$V_{DS}=75\text{ V}, V_{GS}=0\text{ V}, T_j=150\text{ }^{\circ}\text{C}$	-	-	10	
Gate-source leakage current	I_{GSS}	$V_{GS}=20\text{ V}, V_{DS}=0\text{ V}$	-	-	10	nA
Drain-source on-state resistance	$R_{DS(on)}$	$V_{GS}=10\text{ V}, I_D=2.5\text{ A}$	-	120	150	m Ω
		$V_{GS}=4.5\text{ V}, I_D=2.3\text{ A}$	-	136	180	
Transconductance	g_{fs}	$ V_{DS} >2 I_D R_{DS(on)max}, I_D=2\text{ A}$		6.06	-	S

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

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	

Dynamic characteristics

Input capacitance	C_{iss}	$V_{GS}=0\text{ V}, V_{DS}=25\text{ V},$ $f=1\text{ MHz}$	-	237	315	pF
Output capacitance	C_{oss}		-	41	55	
Reverse transfer capacitance	C_{rss}		-	19	29	
Turn-on delay time	$t_{d(on)}$	$V_{DD}=37.5\text{ V},$ $V_{GS}=10\text{ V}, I_D=2.5\text{ A},$ $R_{G,ext}=6\ \Omega$	-	4.2	6.3	ns
Rise time	t_r		-	3.4	5.1	
Turn-off delay time	$t_{d(off)}$		-	50.3	75.5	
Fall time	t_f		-	14.3	21.5	

Gate Charge Characteristics

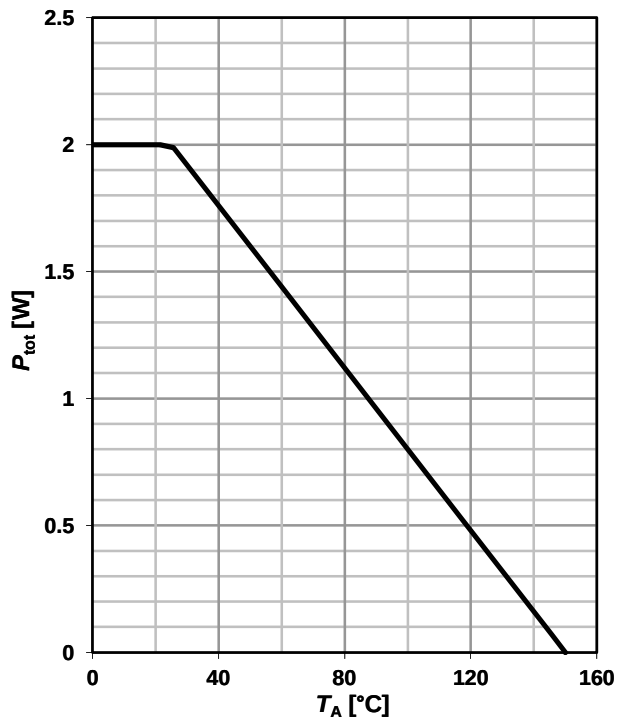
Gate to source charge	Q_{gs}	$V_{DD}=37.5\text{ V}, I_D=2.5\text{ A},$ $V_{GS}=0\text{ to }10\text{ V}$	-	0.6	0.8	nC
Gate to drain charge	Q_{gd}		-	2.5	3.7	
Gate charge total	Q_g		-	8.7	13.1	
Gate plateau voltage	$V_{plateau}$		-	2.4	-	V

Reverse Diode

Diode continuous forward current	I_S	$T_A=25\text{ °C}$	-	-	2.1	A
Diode pulse current	$I_{S,pulse}$		-	-	10.0	
Diode forward voltage	V_{SD}	$V_{GS}=0\text{ V}, I_F=2.5\text{ A},$ $T_J=25\text{ °C}$	-	0.8	1.1	V
Reverse recovery time	t_{rr}	$V_R=37.5\text{ V}, I_F=2.5\text{ A},$ $di_F/dt=200\text{ A}/\mu\text{s}$	-	29	36	ns
Reverse recovery charge	Q_{rr}		-	58	73	nC

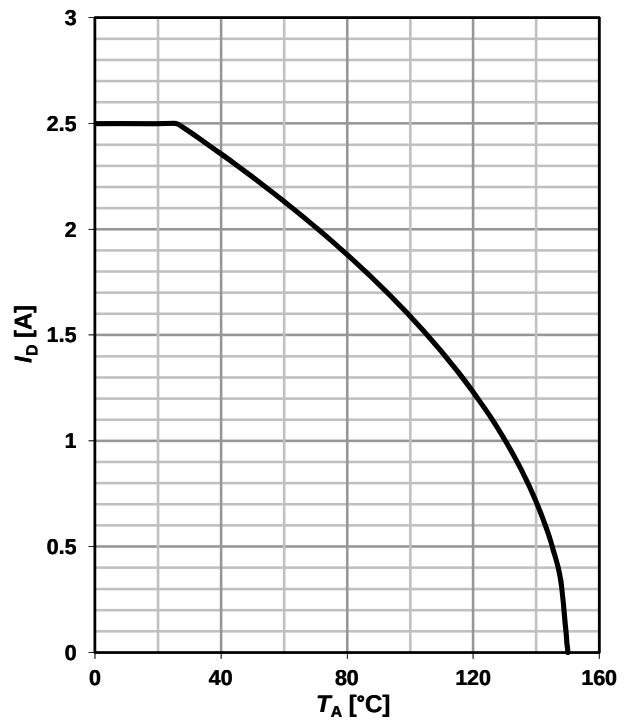
1 Power dissipation

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



2 Drain current

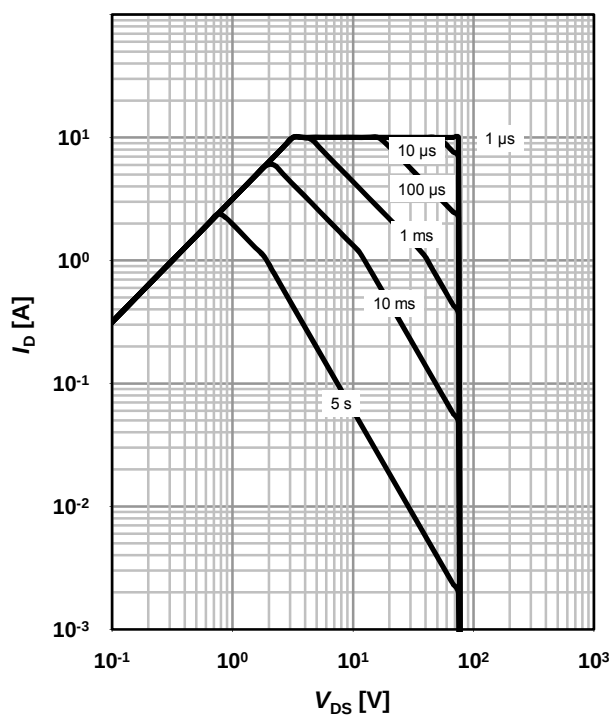
$$I_D = f(T_A); V_{GS} \geq 10 \text{ V}$$



3 Safe operating area

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

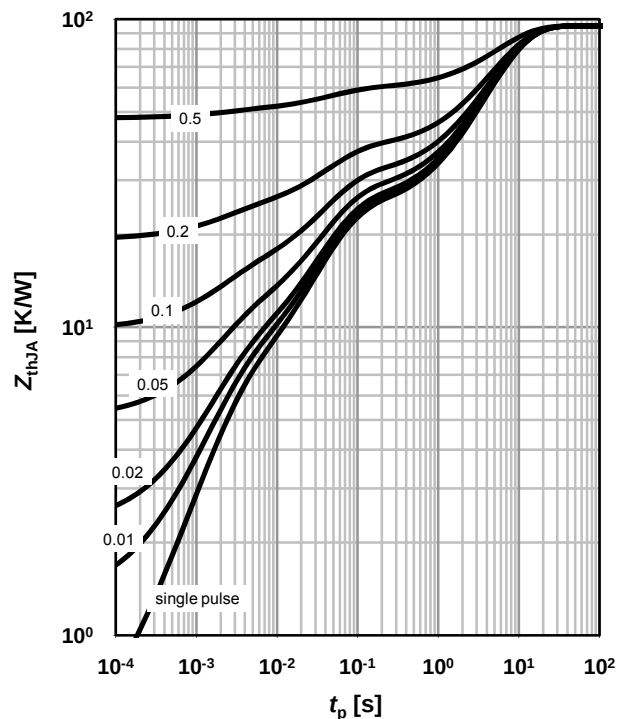
parameter: t_p



4 Max. transient thermal impedance

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

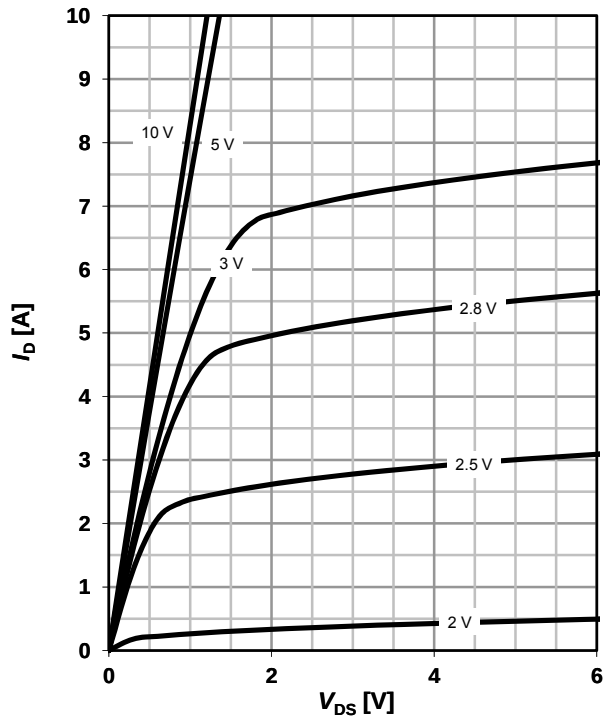
parameter: $D = t_p/T$



5 Typ. output characteristics

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

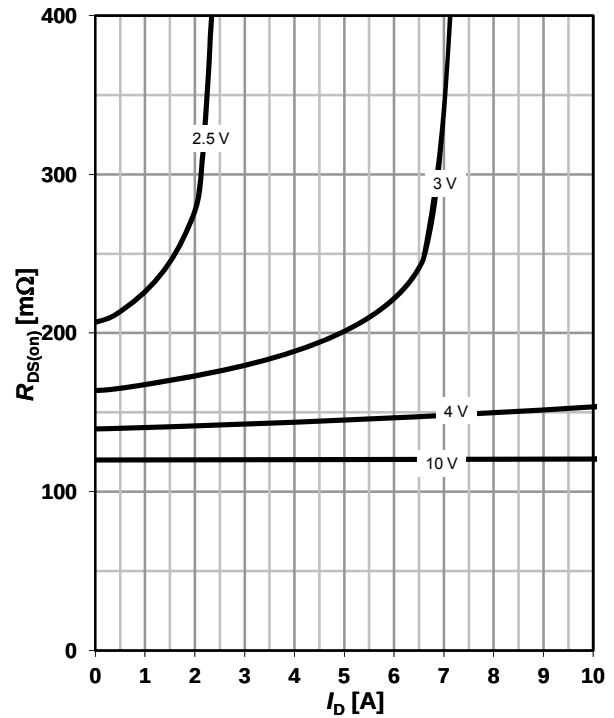
parameter: V_{GS}



6 Typ. drain-source on resistance

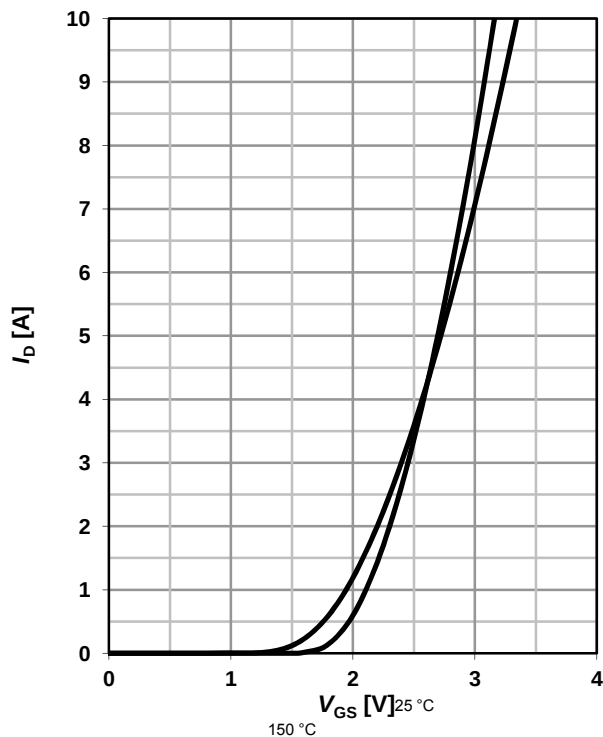
$$R_{DS(on)} = f(I_D); T_j = 25^\circ\text{C}$$

parameter: V_{GS}



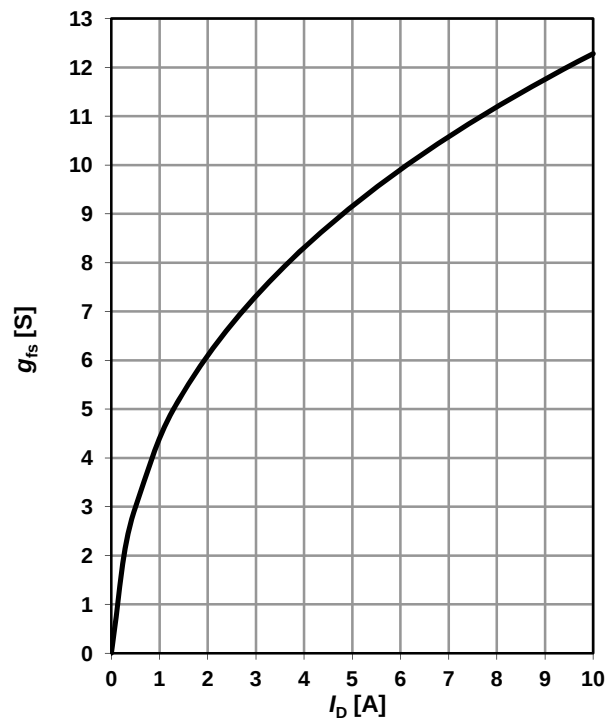
7 Typ. transfer characteristics

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



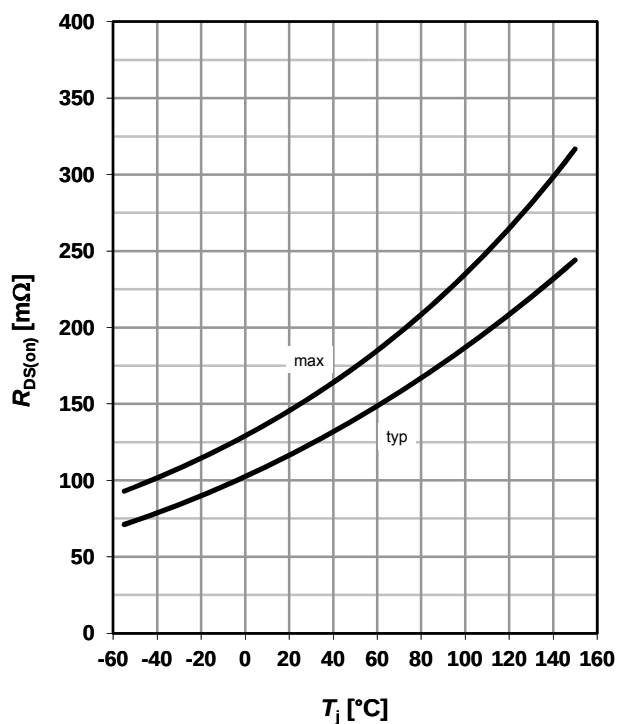
8 Typ. forward transconductance

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



9 Drain-source on-state resistance

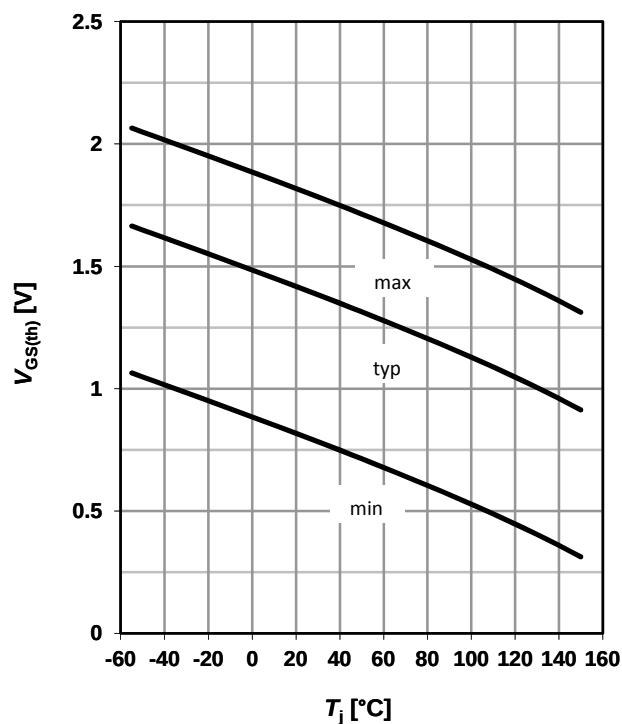
$$R_{DS(on)} = f(T_j); I_D = 2.5 \text{ A}; V_{GS} = 10 \text{ V}$$



10 Typ. gate threshold voltage

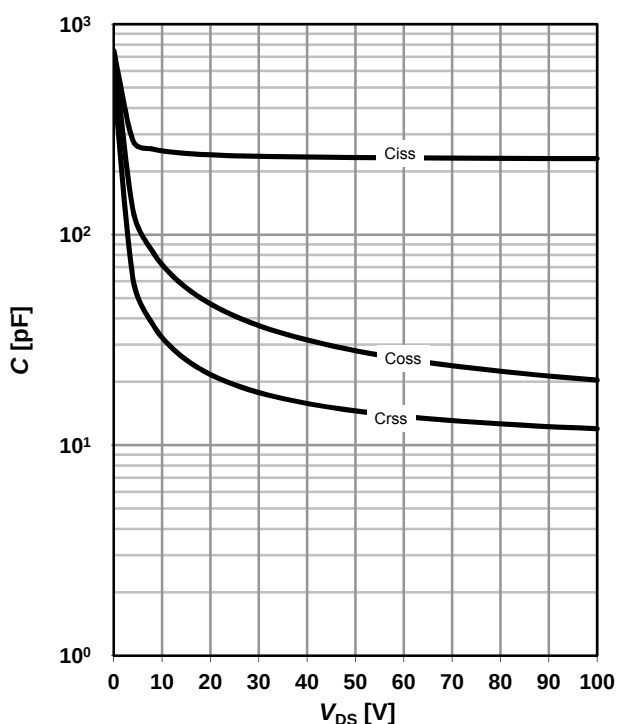
$$V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 218 \text{ μA}$$

parameter: I_D



11 Typ. capacitances

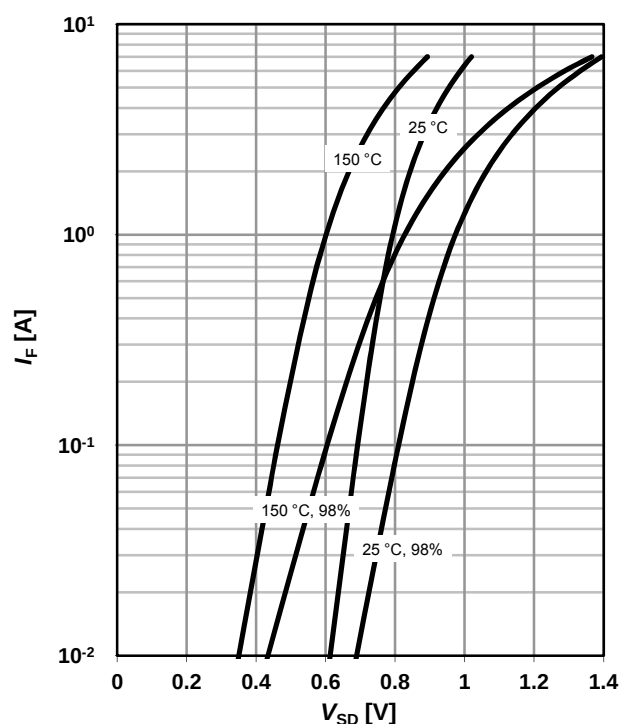
$$C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$$



12 Forward characteristics of reverse diode

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

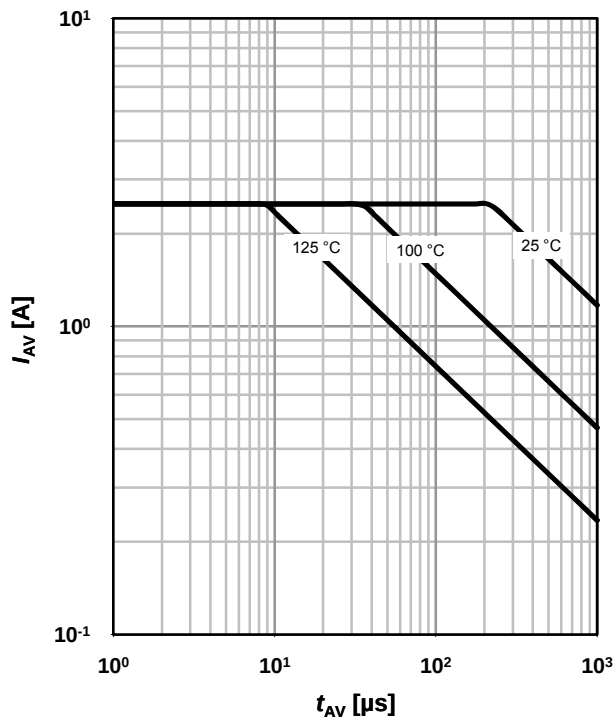
parameter: T_j



13 Avalanche characteristics

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

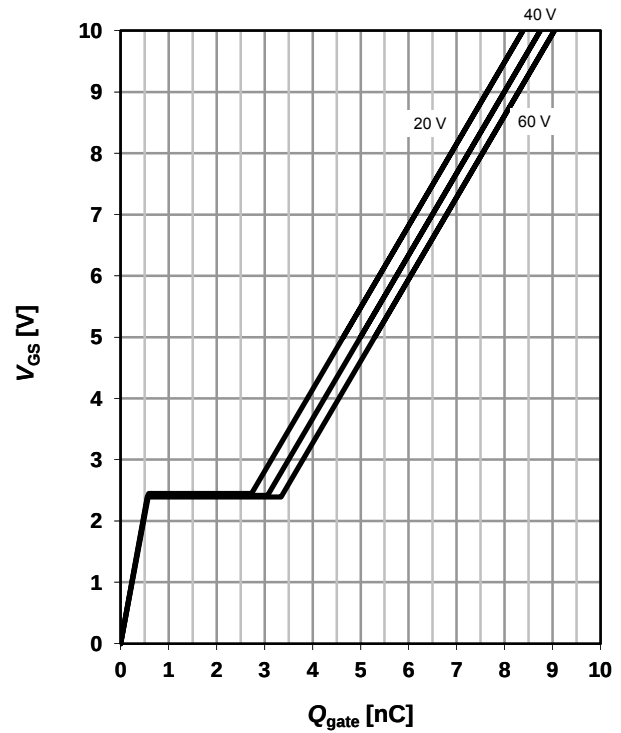
parameter: $T_{j(\text{start})}$



14 Typ. gate charge

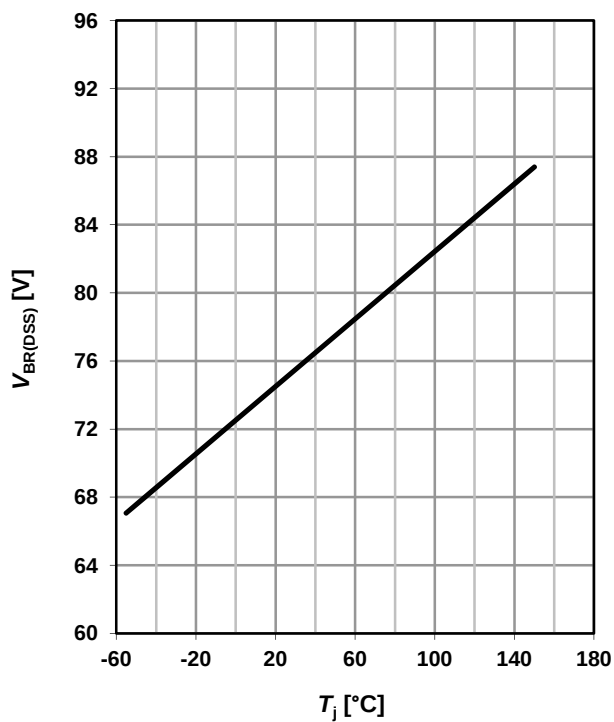
$$V_{GS}=f(Q_{\text{gate}}); I_D=2.5\ \text{A pulsed}$$

parameter: V_{DD}

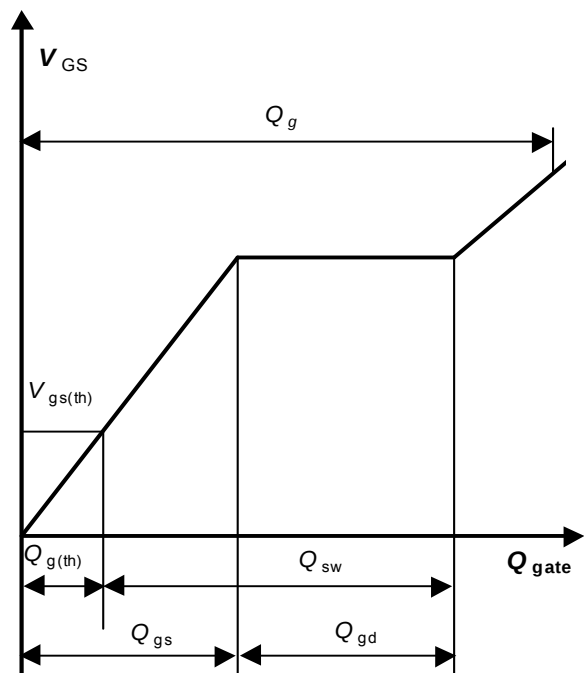


15 Drain-source breakdown voltage

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

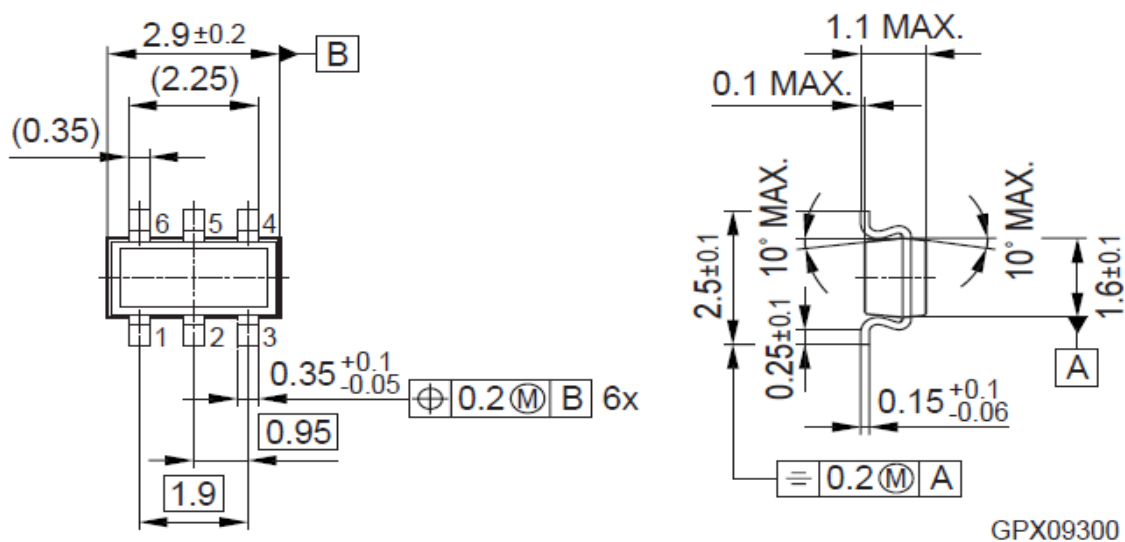


16 Gate charge waveforms

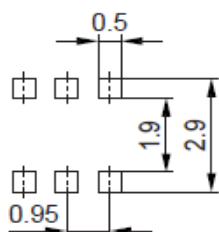


TSOP6

Package Outline:

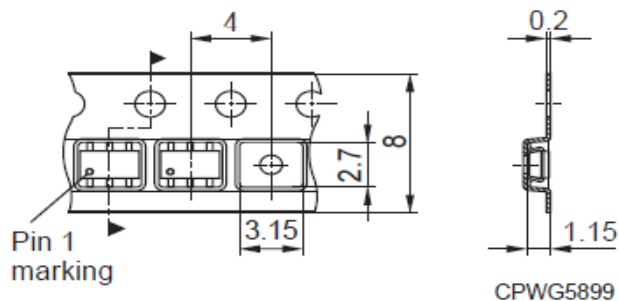


Footprint:



Remark: Wave soldering possible dep.
on customers process conditions
HLG09283

Packaging:



Dimensions in mm

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

Revision History

BSL716SN

Revision: 2014-10-03, Rev. 2.0

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.0	2014-10-03	Release of final version

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