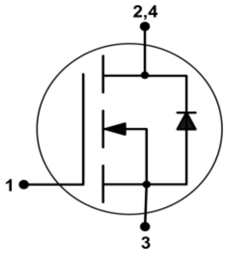
OptiMOS™-3 Small-Signal-Transistor

Features

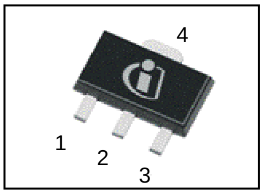
- N-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100%lead-free; Halogen-free; RoHS compliant

Product Summary

V_{DS}		60	V
$R_{DS(on),max}$	V_{GS}=10 V	60	mΩ
	V_{GS}=4.5 V	90	
I_D		3.2	A



PG-SOT-89



Type	Package	Tape and Reel Information	Marking	Halogen-free	Package
BSS606N	PG-SOT-89	H6327: 3000 pcs/ reel	KE	Yes	Non-dry

Maximum ratings, at T_j=25 °C, unless otherwise specified

Parameter	**Symbol**	**Conditions**	**Value**	**Unit**
Continuous drain current	I_D	T_A=25 °C	3.2	A
		T_A=70 °C	2.6	
Pulsed drain current	$I_{D,pulse}$	T_A=25 °C	12.8	
Avalanche energy, single pulse	E_{AS}	I_D=3.2 A, R_{GS}=25 Ω	14	mJ
Reverse diode dv/dt	dv/dt	I_D=3.2 A, V_{DS}=48 V, di/dt=100 A/µs, $T_{j,max}$=150 °C	6	kV/µs
Gate source voltage	V_{GS}		±20	V
Power dissipation [1]	P_{tot}	T_A=25 °C	1.0	W
Operating and storage temperature	T_j, T_{stg}		-55 ... 150	°C
ESD Class		JESD22-A114 -HBM	class 0 (< 250V)	
Soldering Temperature			260 °C	
IEC climatic category; DIN IEC 68-1			55/150/56	

[1] Value refers to minimum footprint

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Thermal characteristics						
Thermal resistance, junction - case	R_{thJC}		-	-	10	K/W
SMD version, device on PCB	R_{thJA}	minimal footprint	-	-	125	
		6 cm^2 cooling area[2)]	-	-	70	

Electrical characteristics, at T_j=25 °C, unless otherwise specified

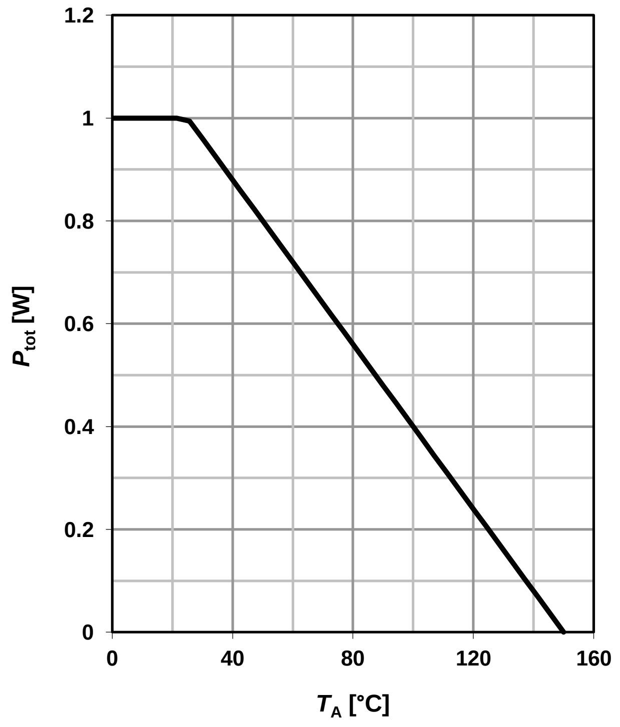
Parameter	Symbol	Conditions	min.	typ.	max.	Unit
Static characteristics						
Drain-source breakdown voltage	$V_{(BR)DSS}$	V_{GS}=0 V, I_D=250 µA	60	-	-	V
Gate threshold voltage	$V_{GS(th)}$	V_{DS}=0 V, I_D=15 µA	1.3	1.8	2.3	
Drain-source leakage current	I_{DSS}	V_{DS}=60 V, V_{GS}=0 V, T_j=25 °C	-	-	1	µA
		V_{DS}=60 V, V_{GS}=0 V, T_j=150 °C	-	-	100	
Gate-source leakage current	I_{GSS}	V_{GS}=20 V, V_{DS}=0 V	-	-	100	nA
Drain-source on-state resistance	$R_{DS(on)}$	V_{GS}=4.5 V, I_D=2.6 A	-	66	90	mΩ
		V_{GS}=10 V, I_D=3.2 A	-	47	60	
Transconductance	g_{fs}	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=2.6 A	-	6	-	S

[2)] Performed on 40mmx40mmx1.5mm epoxy FR4 PCB with 6cm^2 (one layer, 70µm thick) copper area for drain connectio. PCB is vertical without blown air.

Parameter	Symbol	Conditions	Values			Unit
			min.	typ.	max.	
Dynamic characteristics						
Input capacitance	C_{iss}	V_{GS}=0 V, V_{DS}=25 V, f=1 MHz	-	494	657	pF
Output capacitance	C_{oss}		-	131	174	
Reverse transfer capacitance	C_{rss}		-	10.2	15.3	
Turn-on delay time	$t_{d(on)}$	V_{DD}=30 V, V_{GS}=10 V, I_D=3.2 A, $R_{G,ext}$=6 Ω	-	5.6	-	ns
Rise time	t_r		-	2.6	-	
Turn-off delay time	$t_{d(off)}$		-	13	-	
Fall time	t_f		-	2.1	-	
Gate Charge Characteristics						
Gate to source charge	Q_{gs}	V_{DD}=48 V, I_D=3.2 A, V_{GS}=0 to 5 V	-	1.6	2.1	nC
Gate to drain charge	Q_{gd}		-	1.0	1.4	
Gate charge total	Q_g		-	3.7	5.6	
Gate plateau voltage	$V_{plateau}$		-	3.2	-	V
Reverse Diode						
Diode continous forward current	I_S	T_A=25 °C	-	-	0.9	A
Diode pulse current	$I_{S,pulse}$		-	-	12.8	
Diode forward voltage	V_{SD}	V_{GS}=0 V, I_F=3.2 A, T_j=25 °C	-	0.8	1.1	V
Reverse recovery time	t_{rr}	V_R=30 V, I_F=3.2 A, di_F/dt=100 A/µs	-	22	-	ns
Reverse recovery charge	Q_{rr}		-	11	-	nC

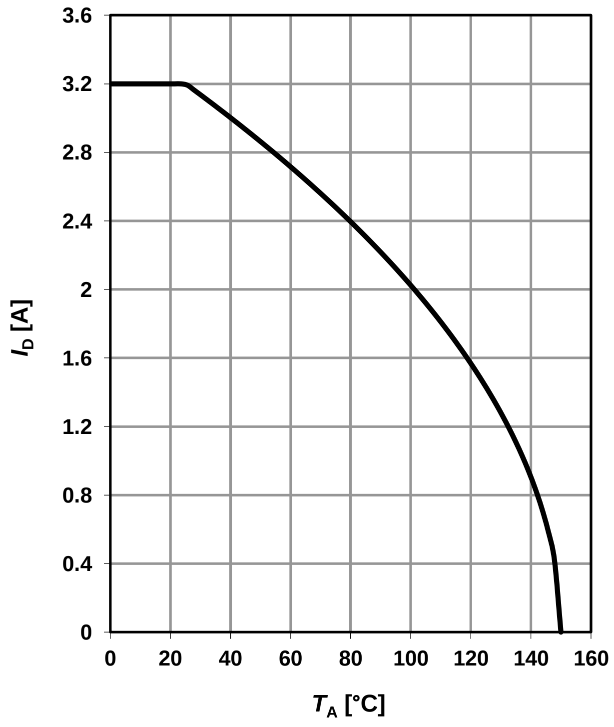
1 Power dissipation

P_{tot}=f(T_A)



2 Drain current

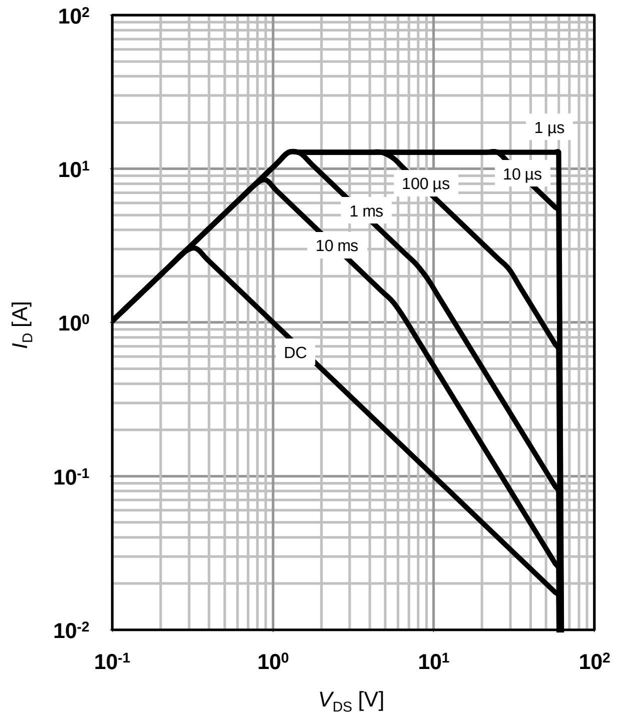
I_D=f(T_A); V_{GS}≥10 V



3 Safe operating area

I_D=f(V_{DS}); T_A=25 °C; D=0

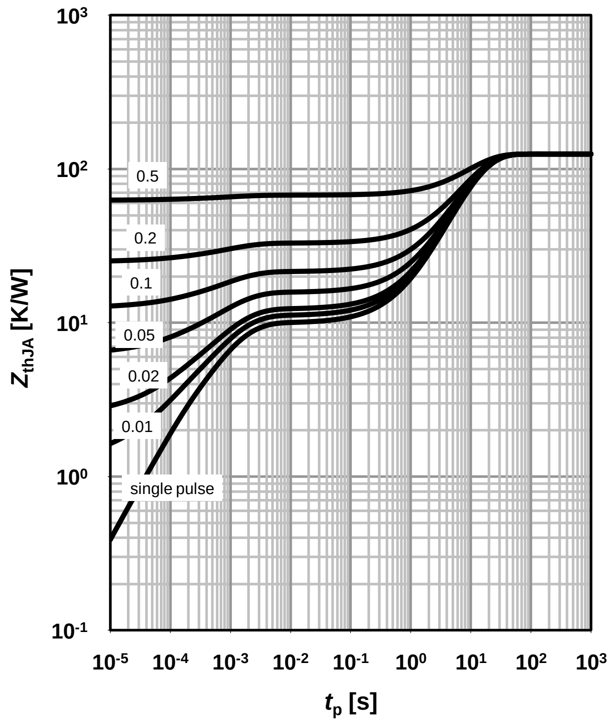
parameter: t_p



4 Max. transient thermal impedance

Z_{thJA}=f(t_p)

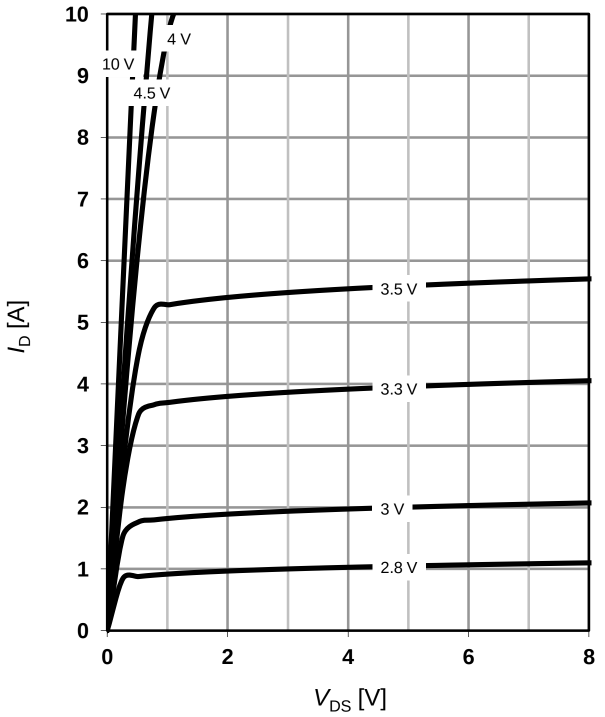
parameter: D=t_p/T



5 Typ. output characteristics

I_D=f(V_{DS}); T_j=25 °C

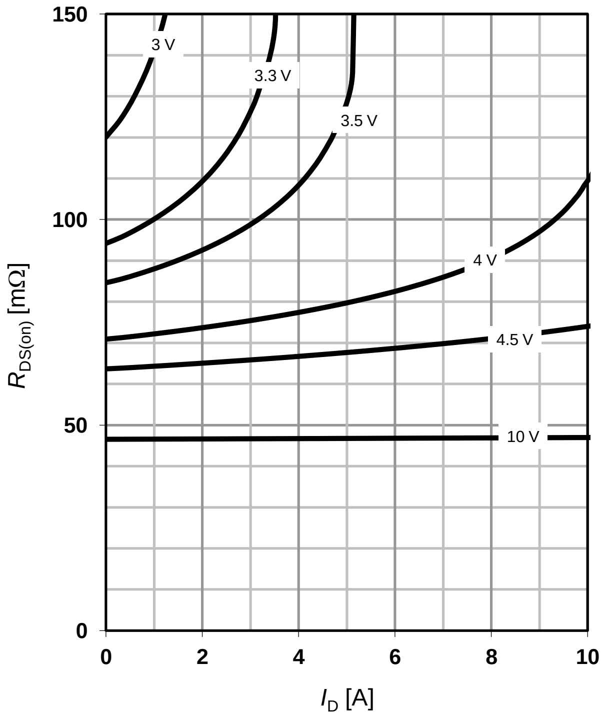
parameter: V_{GS}



6 Typ. drain-source on resistance

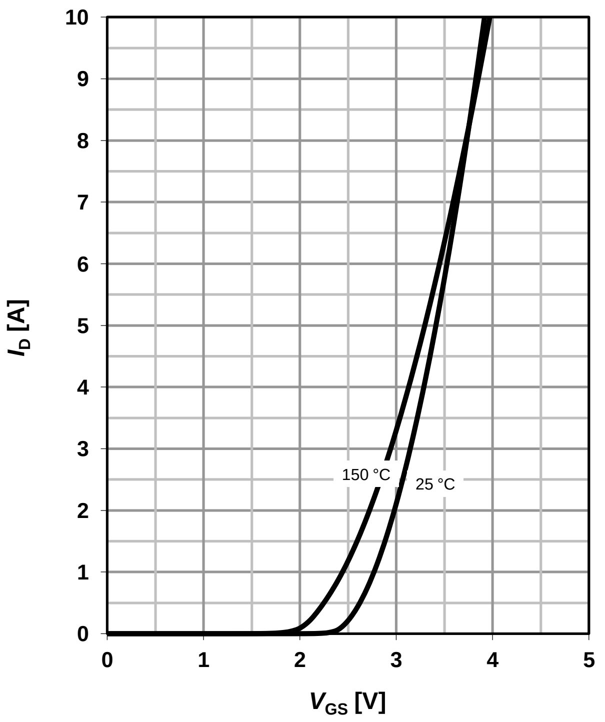
$R_{DS(on)}$=f(I_D); T_j=25 °C

parameter: V_{GS}



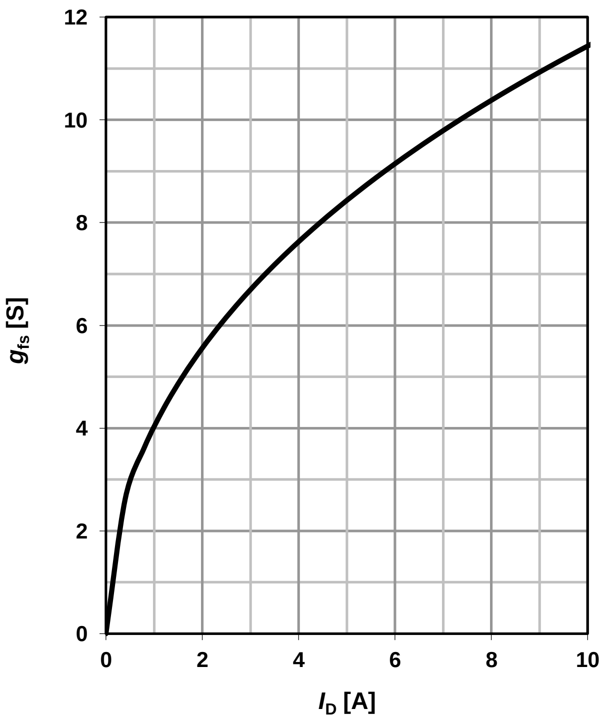
7 Typ. transfer characteristics

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



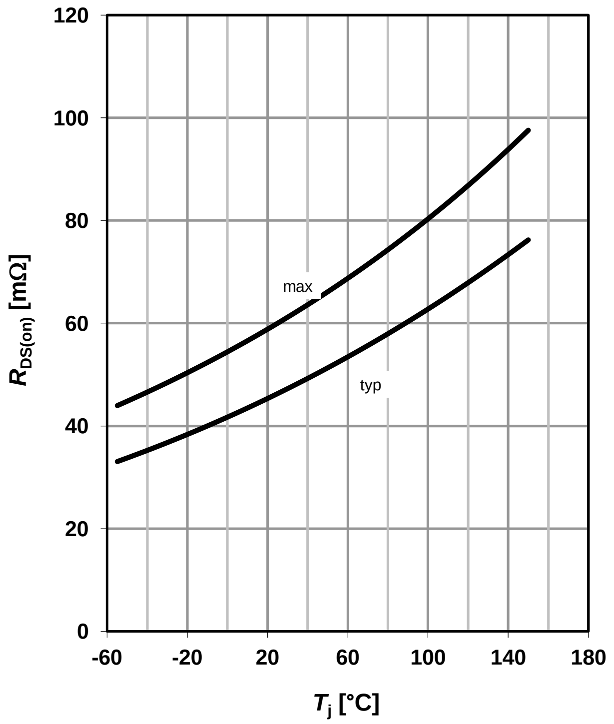
8 Typ. forward transconductance

g_{fs}=f(I_D); T_j=25 °C



9 Drain-source on-state resistance

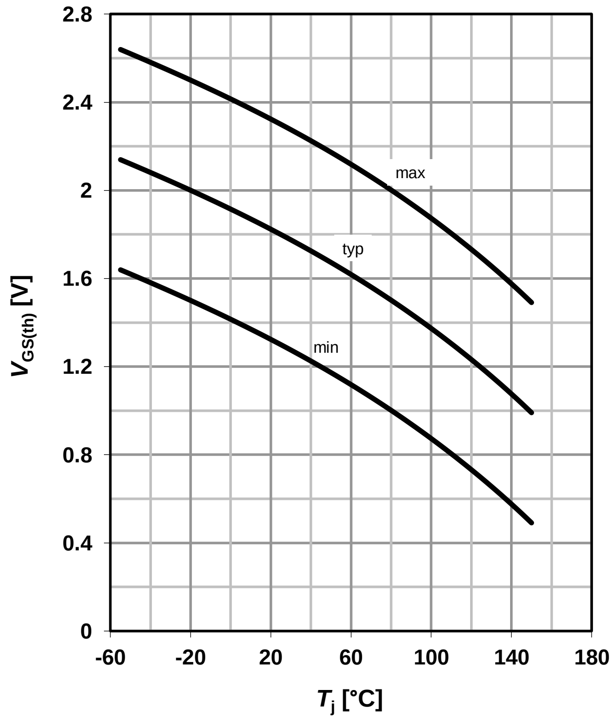
$R_{DS(on)}=f(T_j)$; $I_D=3.2$ A; $V_{GS}=10$ V



10 Typ. gate threshold voltage

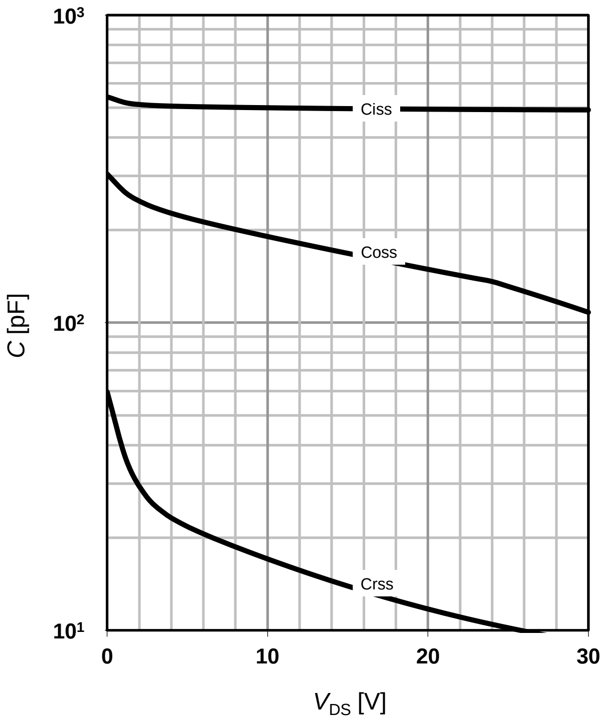
$V_{GS(th)}=f(T_j)$; $V_{DS}=V_{GS}$; $I_D=15$ µA

parameter: I_D



11 Typ. capacitances

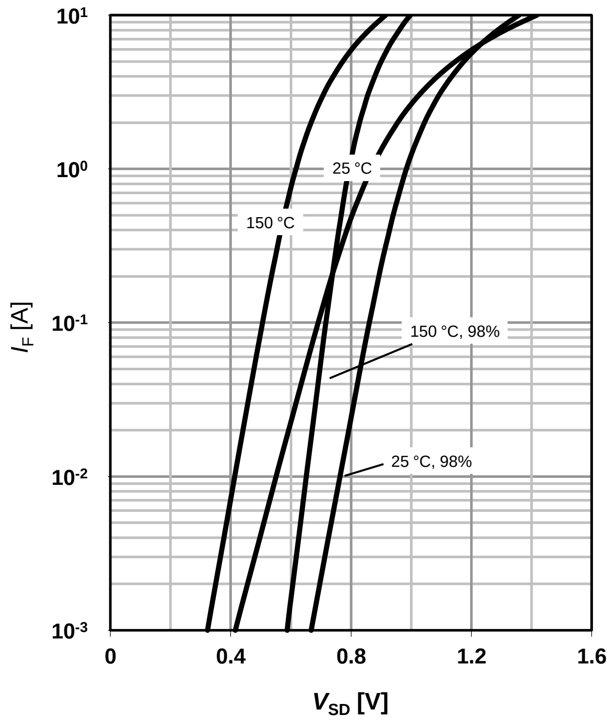
$C=f(V_{DS})$; $V_{GS}=0$ V; $f=1$ MHz; $T_j=25$°C



12 Forward characteristics of reverse diode

$I_F=f(V_{SD})$

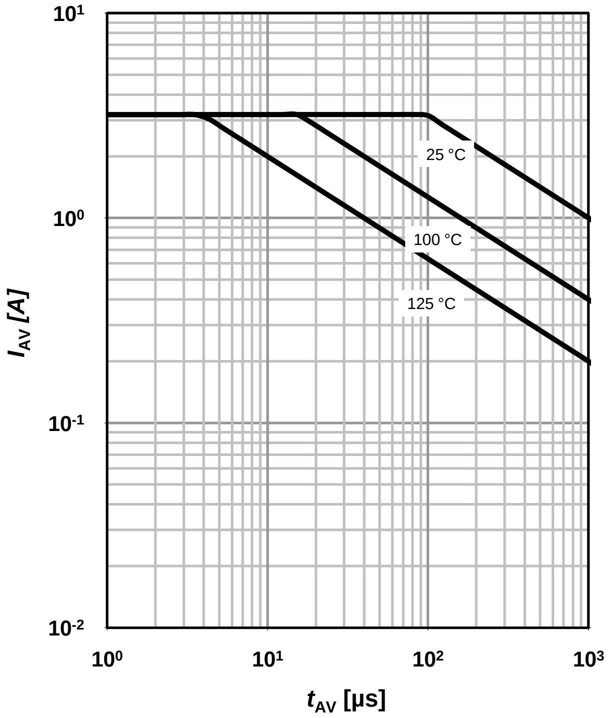
parameter: T_j



13 Avalanche characteristics

I_{AS}=f(t_{AV}); R_{GS}=25 Ω

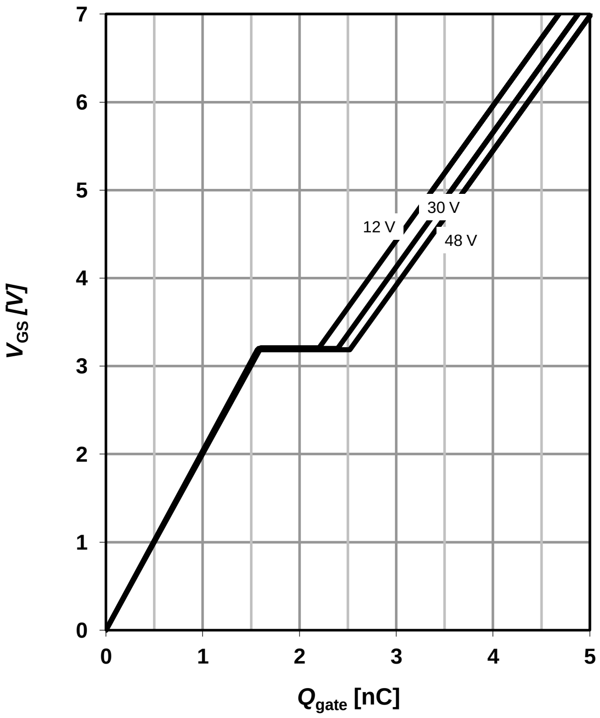
parameter: $T_{j(start)}$



14 Typ. gate charge

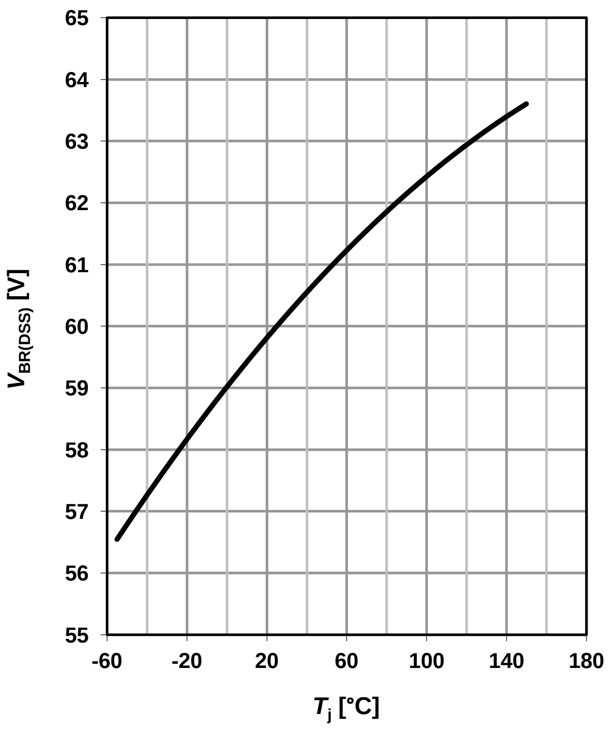
V_{GS}=f(Q_{gate}); I_D=3.2 A pulsed

parameter: V_{DD}

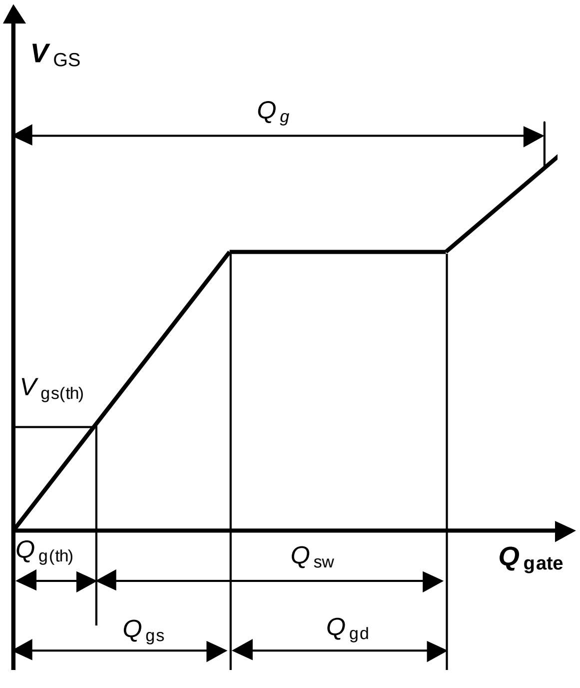


15 Drain-source breakdown voltage

$V_{BR(DSS)}$=f(T_j); I_D=250 µA

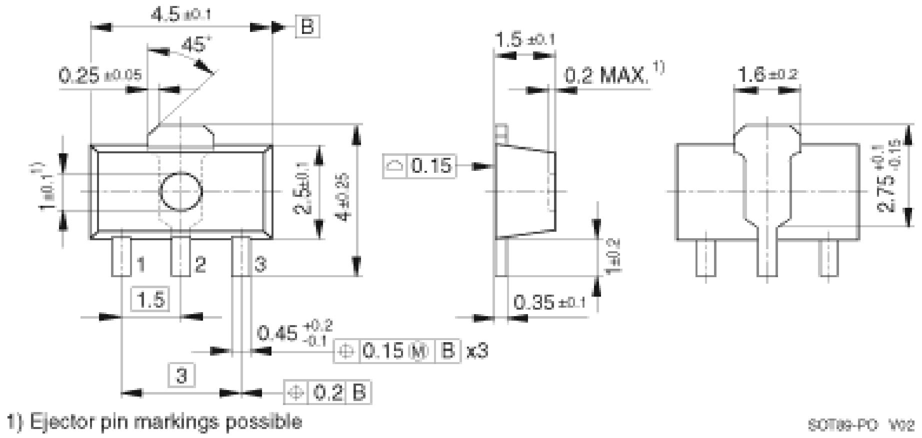


16 Gate charge waveforms

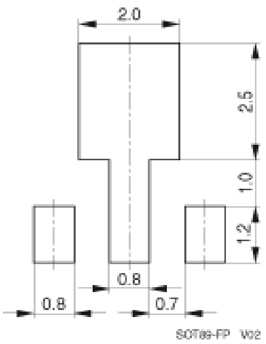


SOT-89

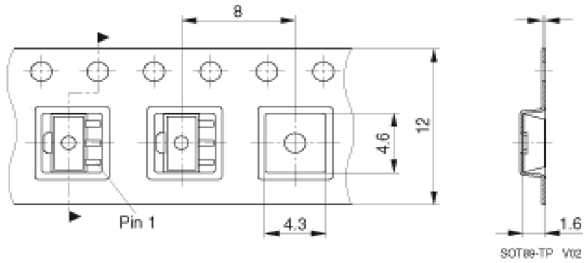
Package Outline:



Footprint:



Packaging:



Dimensions in mm

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