MOSFET

Small-Signal Transistor

PG-SOT23-3

Features

- N-channel
- Depletion mode
- d*v*/d*t* rated
- Pb-free lead-plating; RoHS compliant
- Halogen-free according to AEC61249-2-21

Product validation

Fully qualified according to JEDEC for Industrial Applications

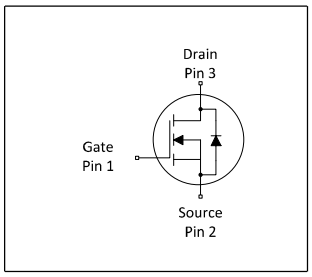


Table 1 Key Performance Parameters

Parameter	Value	Unit
V_{DS}	100	V
$R_{DS(on),max}$	12	Ω
$I_{DSS,min}$	0.09	A
ESD Sensitivity, JESD22-A114 (HBM)	Class 0 (<250V)	

Type / Ordering Code	Package	Marking	Related Links
BSS169I	PG-SOT23	FIs	-

Table of Contents

1 Maximum ratings

at T_A=25 °C, unless otherwise specified

Table 2 Maximum ratings

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	- -	- -	0.19 0.15	A	T_A=25 °C T_A=70 °C
Pulsed drain current	$I_{D,pulse}$	-	-	0.76	A	T_A=25 °C
Reverse diode dv/dt	dv/dt	-	-	6	kV/µs	I_D=0.19 A, V_{DS}=20 V, di/dt=200 A/µs, $T_{j,max}$=150 °C
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	0.36	W	T_A=25 °C
Operating and storage temperature	T_j, T_{stg}	-55	-	150	°C	IEC climatic category; DIN IEC 68-1: 55/150/56

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - ambient, minimal footprint	R_{thJA}	-	-	250	K/W	-

3 Electrical characteristics

at T_j=25 °C, unless otherwise specified

Table 4 Static characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	100	-	-	V	V_{GS}=-10 V, I_D=250 µA
Gate threshold voltage	$V_{GS(th)}$	-2.9	-2.2	-1.8	V	V_{DS}=3 V, I_D=50 µA
Drain-source cutoff current	$I_{D(off)}$	- -	- -	0.1 10	µA	V_{DS}=100 V, V_{GS}=-10 V, T_j=25 °C V_{DS}=100 V, V_{GS}=-10 V, T_j=125 °C
Gate-source leakage current	I_{GSS}	-	-	10	nA	V_{GS}=20 V, V_{DS}=0 V
On-state drain current	I_{DSS}	90	-	-	mA	V_{GS}=0 V, V_{DS}=10 V
Drain-source on-state resistance	$R_{DS(on)}$	- -	5.3 2.9	12 -	Ω	V_{GS}=0 V, I_D=0.05 A V_{GS}=10 V, I_D=0.19 A
Transconductance	g_{fs}	-	0.20	-	S	$\|V_{DS}\|>2\|I_D\|R_{DS(on)max}$, I_D=0.15 A

Table 5 Dynamic characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	51	-	pF	V_{GS}=-10 V, V_{DS}=25 V, f=1 MHz
Output capacitance	C_{oss}	-	9	-	pF	V_{GS}=-10 V, V_{DS}=25 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	4	-	pF	V_{GS}=-10 V, V_{DS}=25 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	2.9	-	ns	V_{DD}=50 V, V_{GS}=-3 to 7 V, I_D=0.12 A, R_G=6 Ω
Rise time	t_r	-	2.7	-	ns	V_{DD}=50 V, V_{GS}=-3 to 7 V, I_D=0.12 A, R_G=6 Ω
Turn-off delay time	$t_{d(off)}$	-	11	-	ns	V_{DD}=50 V, V_{GS}=-3 to 7 V, I_D=0.12 A, R_G=6 Ω
Fall time	t_f	-	27	-	ns	V_{DD}=50 V, V_{GS}=-3 to 7 V, I_D=0.12 A, R_G=6 Ω

Table 6 Gate charge characteristics

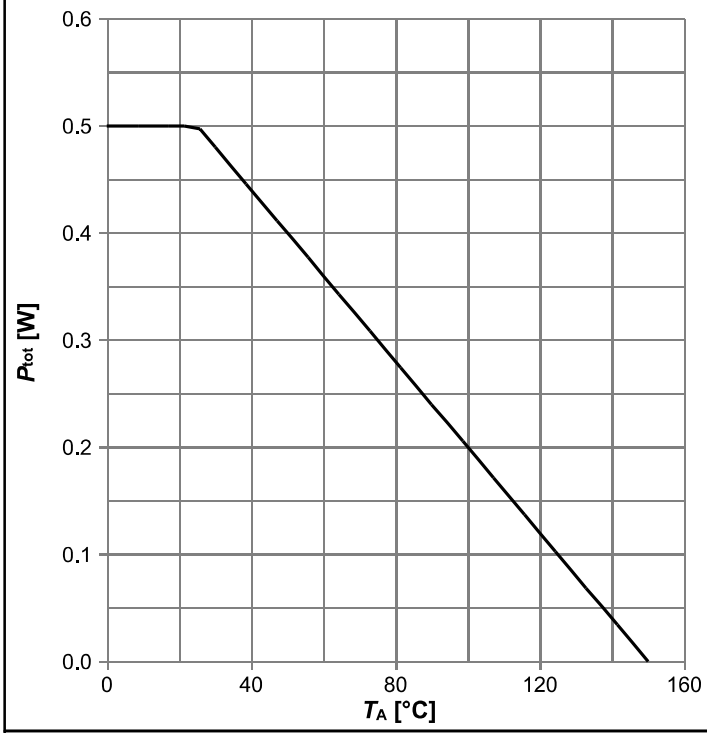
Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	0.12	-	nC	V_{DD}=80 V, I_D=0.12 A, V_{GS}=-3 to 7 V
Gate to drain charge	Q_{gd}	-	0.9	-	nC	V_{DD}=80 V, I_D=0.12 A, V_{GS}=-3 to 7 V
Gate charge total	Q_g	-	2.1	-	nC	V_{DD}=80 V, I_D=0.12 A, V_{GS}=-3 to 7 V
Gate plateau voltage	$V_{plateau}$	-	-0.43	-	V	V_{DD}=80 V, I_D=0.12 A, V_{GS}=-3 to 7 V

Table 7 Reverse diode

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continous forward current	I_S	-	-	0.19	A	T_A=25 °C
Diode pulse current	$I_{S,pulse}$	-	-	0.76	A	T_A=25 °C
Diode forward voltage	V_{SD}	-	0.82	1.2	V	V_{GS}=-10 V, I_F=0.19 A, T_j=25 °C
Reverse recovery time	t_{rr}	-	20.5	25.6	ns	V_R=50 V, I_F=0.12 A, di_F/dt=100 A/µs
Reverse recovery charge	Q_{rr}	-	9.7	12.1	nC	V_R=50 V, I_F=0.12 A, di_F/dt=100 A/µs

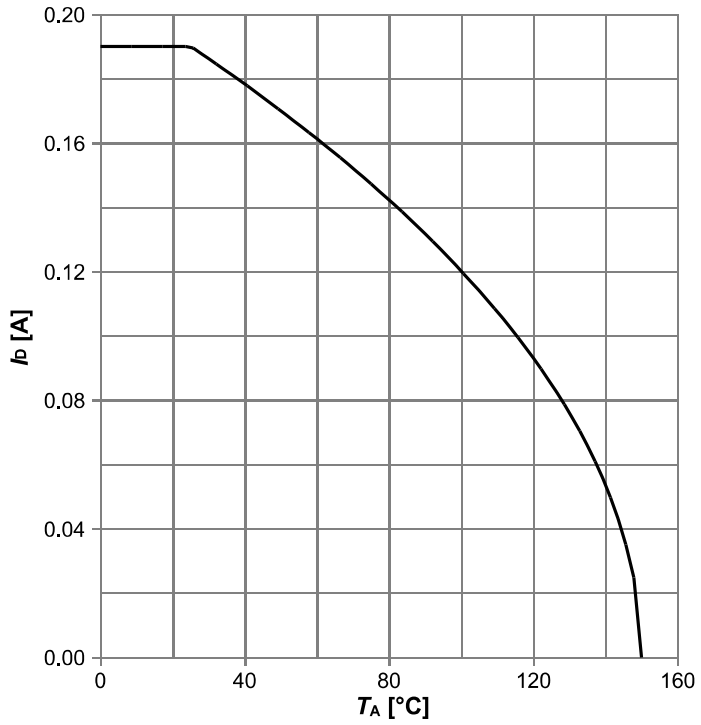
4 Electrical characteristics diagrams

Diagram 1: Power dissipation



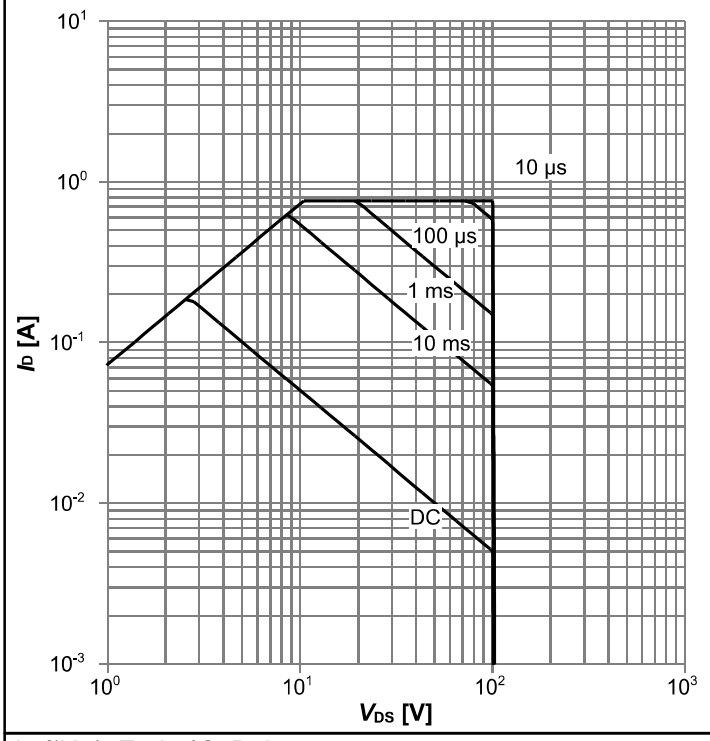
$P_{tot}=f(T_A)$

Diagram 2: Drain current



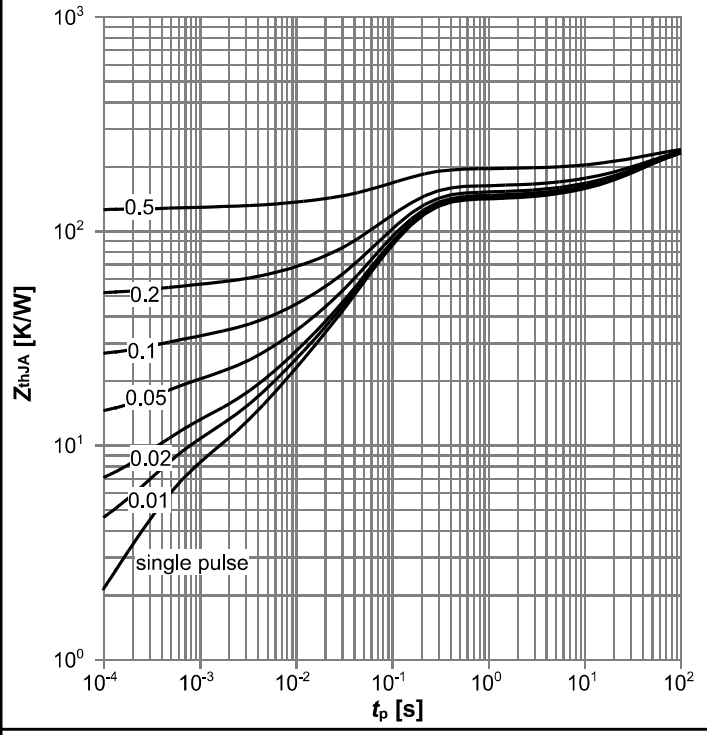
$I_D=f(T_A)$; $|V_{GS}|\geq 10$ V

Diagram 3: Safe operating area



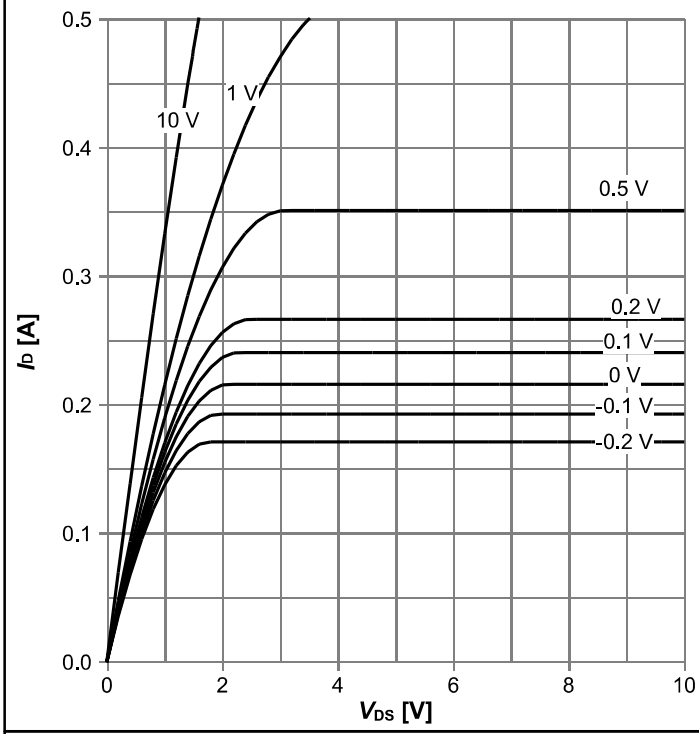
$I_D=f(V_{DS})$, $T_A=25$ °C, $D=0$; parameter: t_p

Diagram 4: Max. transient thermal impedance



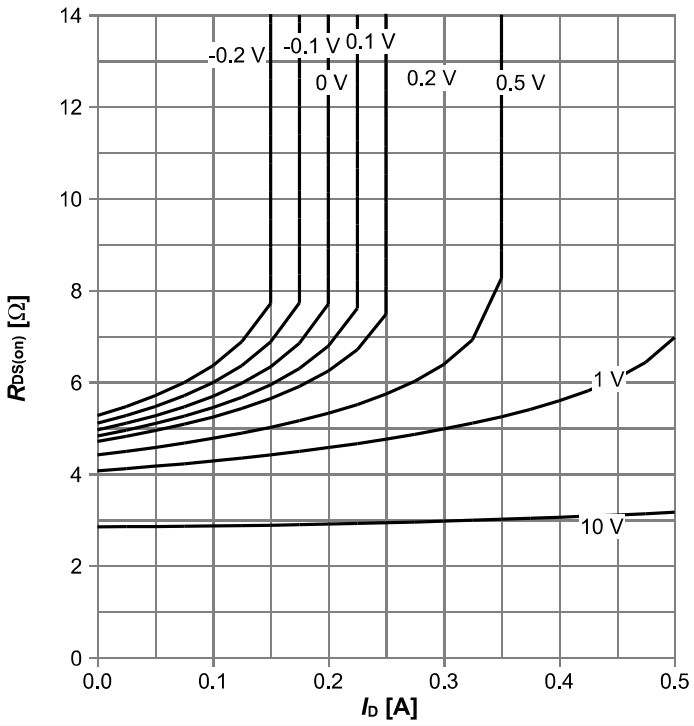
$Z_{thJA}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



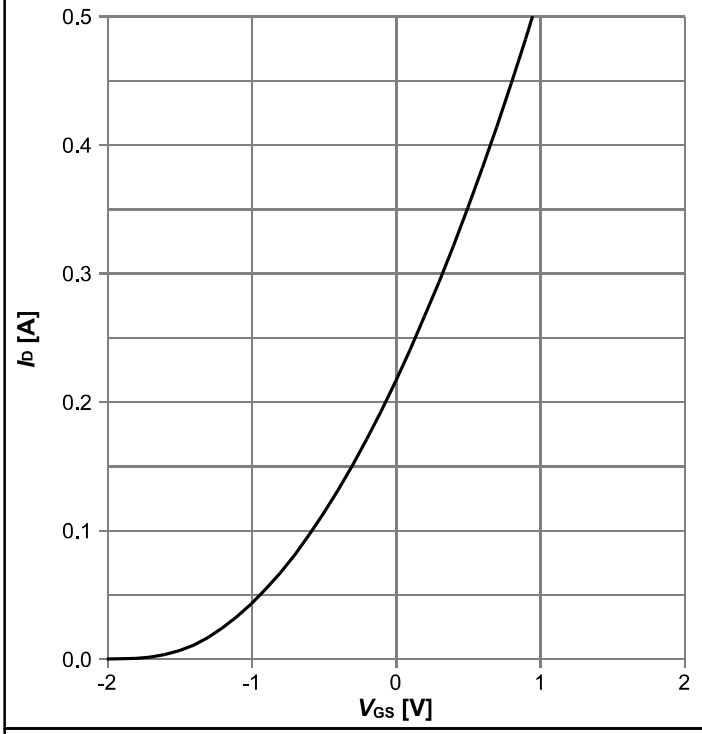
$I_D=f(V_{DS})$, $T_j=25$ °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



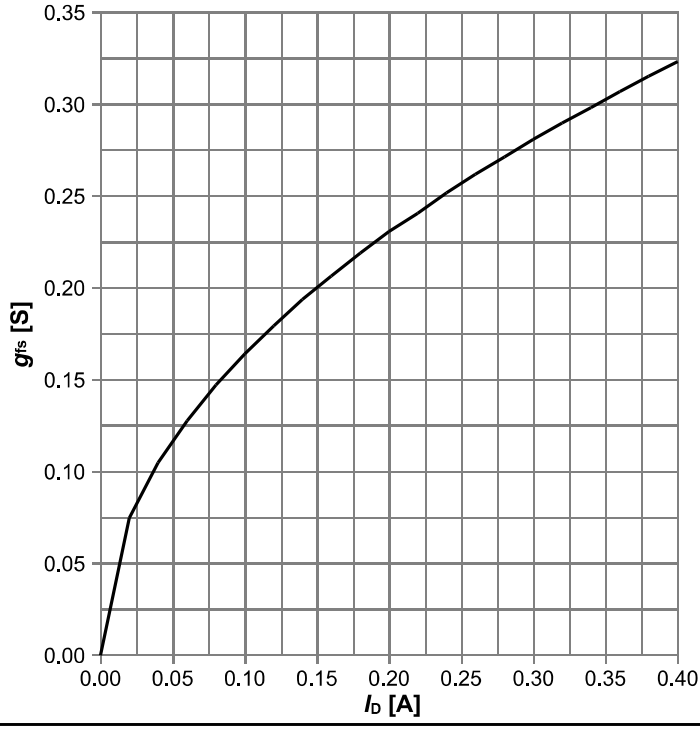
$R_{DS(on)}=f(I_D)$, $T_j=25$ °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



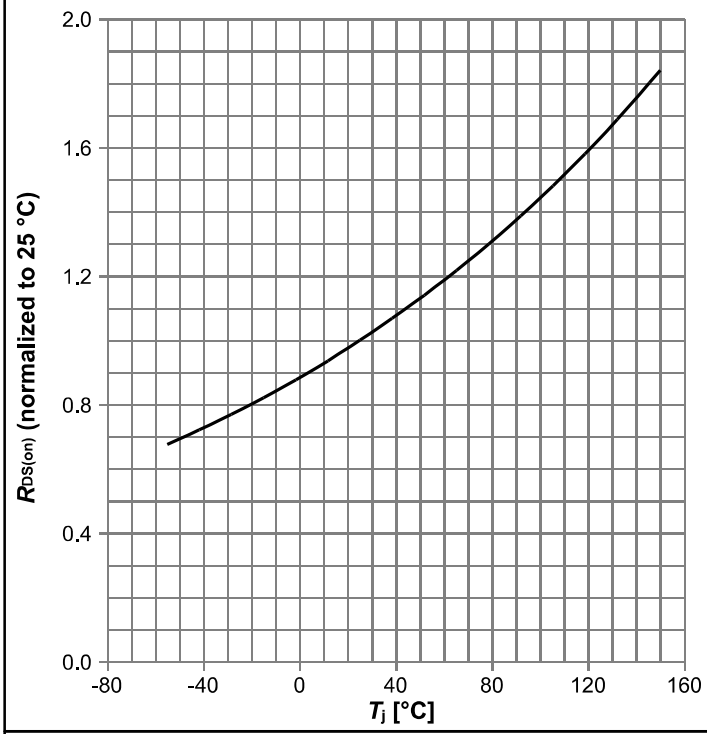
$I_D=f(V_{GS})$, $|V_{DS}|>2|I_D|R_{DS(on)max}$, $T_j=25$ °C

Diagram 8: Typ. transconductance



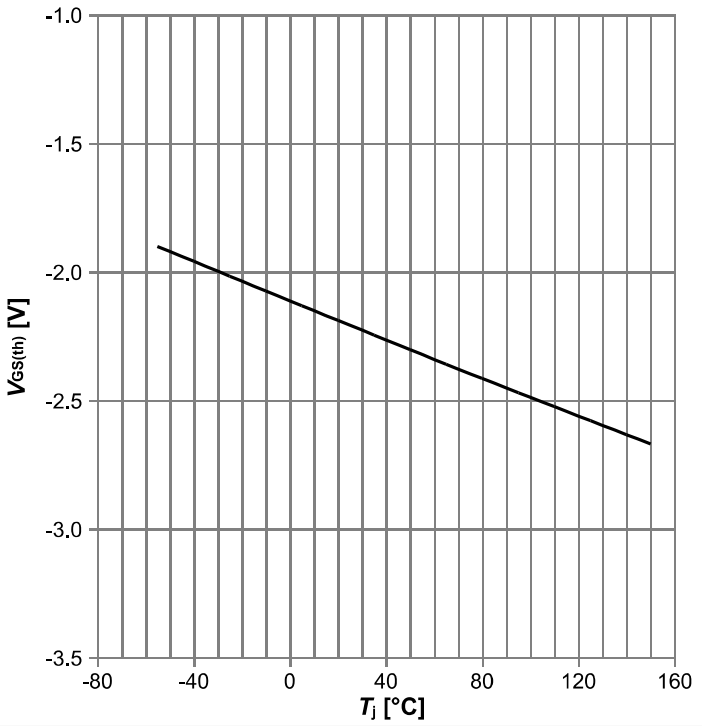
$g_{fs}=f(I_D)$, $V_{DS}=5$ V, $T_j=25$ °C

Diagram 9: Normalized drain-source on resistance



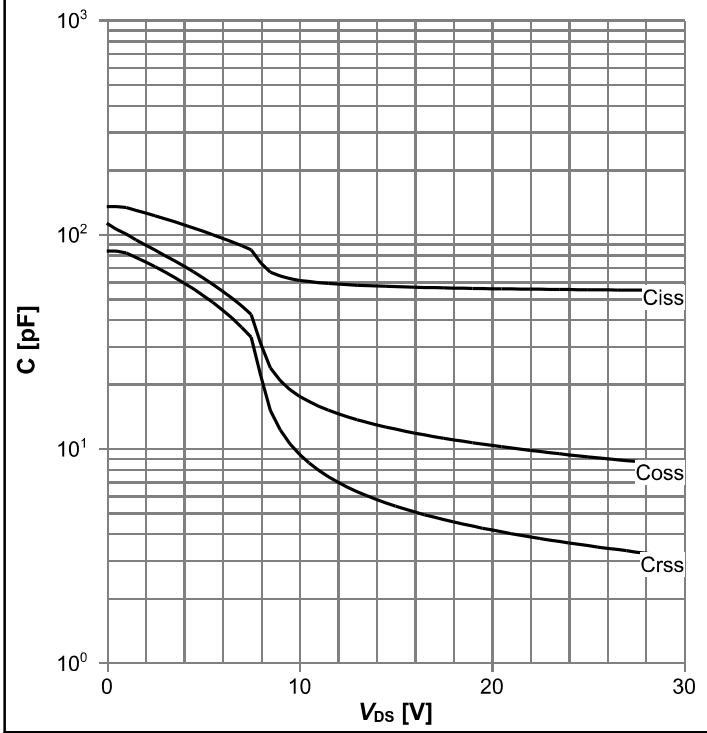
$R_{DS(on)}$=f(T_j), I_D=0.05 A, V_{GS}=0 V

Diagram 10: Typ. gate threshold voltage



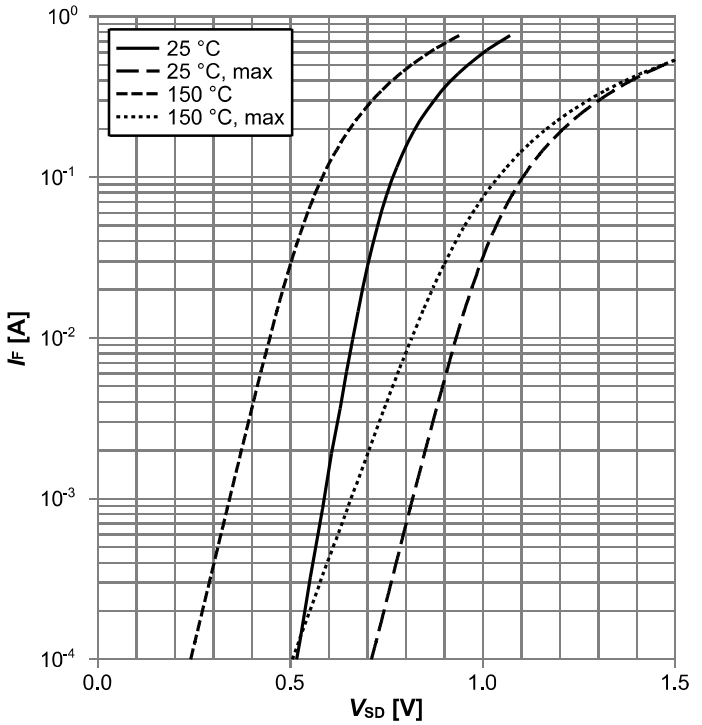
$V_{GS(th)}$=f(T_j), V_{DS}=3 V, I_D=50 µA

Diagram 11: Typ. capacitances



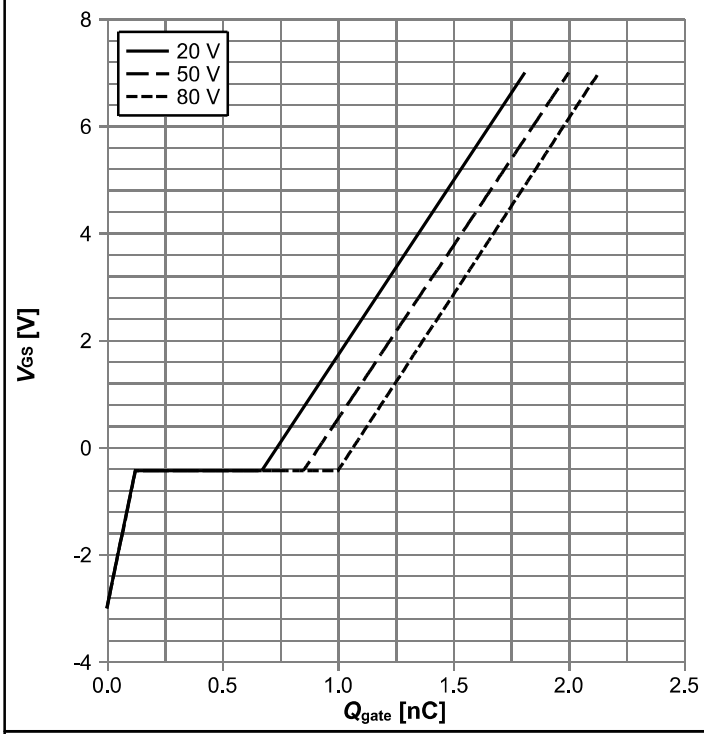
C=f(V_{DS}), V_{GS}=-3 V, f=1 MHz

Diagram 12: Forward characteristics of reverse diode



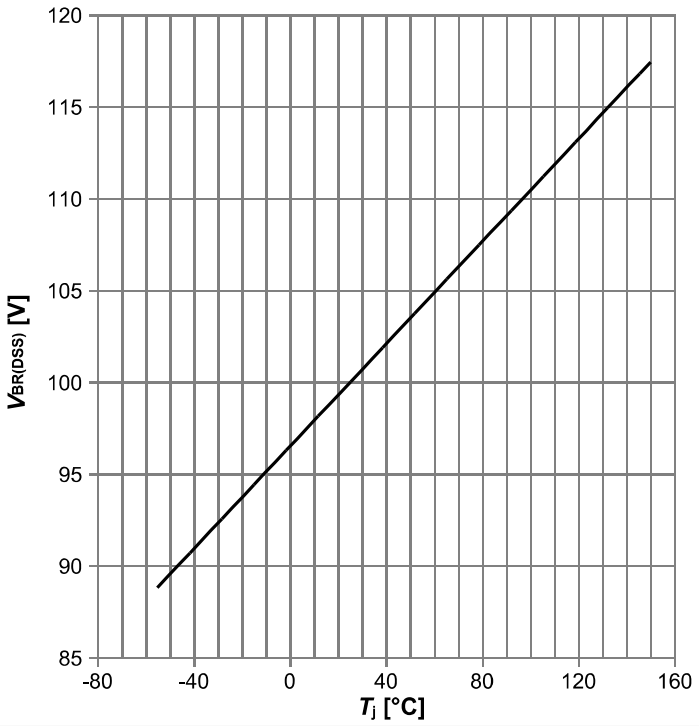
I_F=f(V_{SD}); parameter: T_j

Diagram 13: Typ. gate charge



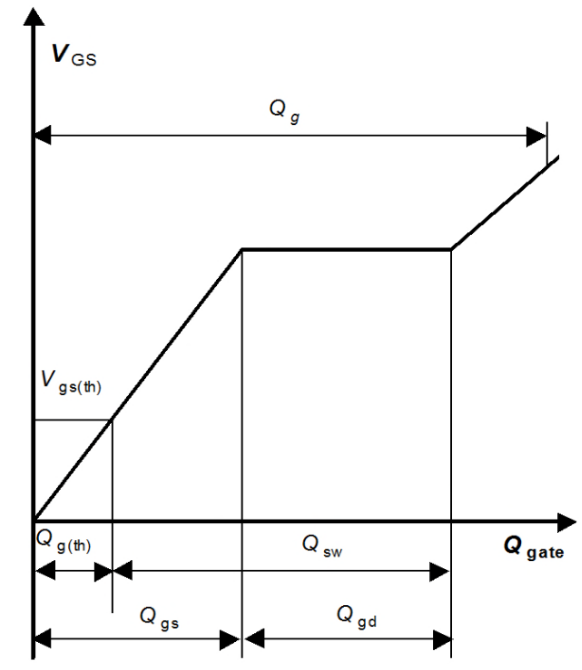
$V_{GS}=f(Q_{gate})$, I_D=0.12 A pulsed, T_j=25 °C

Diagram 14: Drain-source breakdown voltage

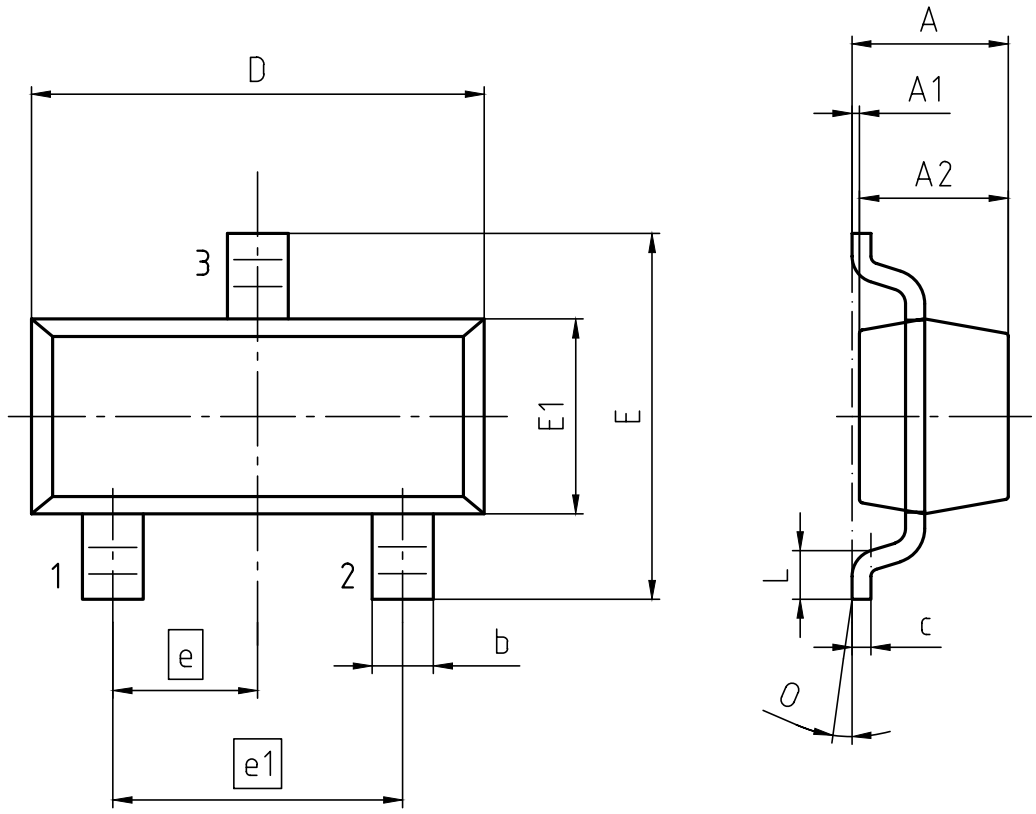


$V_{BR(DSS)}=f(T_j)$, I_D=250 µA

Diagram Gate charge waveforms



5 Package Outlines



PACKAGE - GROUP NUMBER:	PG-SOT23-3-U01	
REVISION: 01	DATE: 09.12.2020	
DIMENSIONS	**MILLIMETERS**	
	MIN.	MAX.
A	0.89	1.12
A1	0.01	0.10
A2	0.88	1.02
b	0.30	0.50
c	0.08	0.20
D	2.80	3.04
E	2.10	2.64
E1	1.20	1.40
e	0.95	
e1	1.90	
L	0.15	0.60
O	0°	8°

Figure 1 Outline PG-SOT23, dimensions in mm

Revision History

BSS169I

Revision: 2021-03-17, Rev. 2.1

Previous Revision

Revision	Date	Subjects (major changes since last revision)
2.0	2021-01-26	Release of final version
2.1	2021-03-17	Update technology naming

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