MOSFET

OptiMOS™2 Small-Signal-Transistor, 30 V

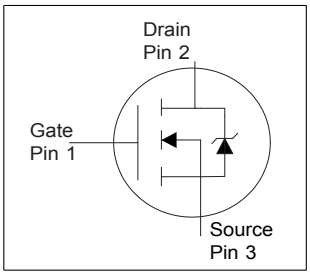
SOT-323-3

Features

- N-channel
- Enhancement mode
- Logic level (4.5V rated)
- Avalanche rated
- Qualified according to AEC Q101
- 100% lead-free; RoHS compliant
- Halogen-free according to IEC61249-2-21

Table 1 Key Performance Parameters

Parameter	Value	Unit
V_{DS}	30	V
$R_{DS(on),max}$, V_{GS}=4.5 V	600	mΩ
$R_{DS(on),max}$, V_{GS}=10V	400	mΩ
I_D	0.88	A



Type / Ordering Code	Package	Marking	Related Links
BSS340NW	PG-SOT323	XGs	-

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	- -	- -	0.88 0.71	A	T_A=25 °C T_A=70 °C
Pulsed drain current	$I_{D,pulse}$	-	-	3.5	A	T_A=25 °C
Avalanche energy, single pulse	E_{AS}	-	-	1.6	mJ	I_D=0.88 A, R_{GS}=16 Ω
Reverse diode dv/dt	dv/dt	-	-	6	kV/µs	I_D=0.88 A, V_{DS}=16 V, di/dt=200 A/µs, $T_{j,max}$=150 °C
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	0.5	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
ESD Class	-	-	-	0	-	JESD22-A114 -HBM, ESD Class 0 = < 250V
Soldering Temperature	-	-	-	260	°C	-

2 Thermal characteristics

Table 3 Thermal characteristics

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - ambient, minimal footprint[1)]	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	$V_{(BR)DSS}$	30	-	-	V	V_{GS}=0 V, I_D=250 µA
Gate threshold voltage	$V_{GS(th)}$	1.2	1.6	2.0	V	V_{DS}=V_{GS}, I_D=1.6 µA
Drain-source leakage current	I_{DSS}	- -	- -	0.01 5	µA	V_{DS}=30 V, V_{GS}=0 V, T_j=25 °C V_{DS}=30 V, V_{GS}=0 V, T_j=150 °C
Gate-source leakage current	I_{GSS}	-	-	10	nA	V_{GS}=20 V, V_{DS}=0 V
Drain-source on-state resistance	$R_{DS(on)}$	- -	447 286	600 400	mΩ	V_{GS}=4.5 V, I_D=0.29 A V_{GS}=10 V, I_D=0.88 A
Transconductance	g_{fs}	-	1.2	-	S	|V_{DS}|>2|I_D|$R_{DS(on)max}$, I_D=0.71 A

[1)] Performed on 40 mm x 40 mm FR4 PCB. The traces are 1mm wide, 70m thick and 20mm long; they are present on both sides of the PCB

Table 5 Dynamic characteristics[1)]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Input capacitance	C_{iss}	-	31	41	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Output capacitance	C_{oss}	-	12	16	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Reverse transfer capacitance	C_{rss}	-	2.4	3.6	pF	V_{GS}=0 V, V_{DS}=15 V, f=1 MHz
Turn-on delay time	$t_{d(on)}$	-	2.6	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=0.88 A, $R_{G,ext}$=6 Ω
Rise time	t_r	-	6.3	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=0.88 A, $R_{G,ext}$=6 Ω
Turn-off delay time	$t_{d(off)}$	-	4.6	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=0.88 A, $R_{G,ext}$=6 Ω
Fall time	t_f	-	2.5	-	ns	V_{DD}=15 V, V_{GS}=10 V, I_D=0.88 A, $R_{G,ext}$=6 Ω

Table 6 Gate charge characteristics[1)]

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Gate to source charge	Q_{gs}	-	0.11	0.15	nC	V_{DD}=15 V, I_D=0.88 A, V_{GS}=0 to 10 V
Gate to drain charge	Q_{gd}	-	0.08	0.1	nC	V_{DD}=15 V, I_D=0.88 A, V_{GS}=0 to 10 V
Gate charge total	Q_g	-	0.46	0.7	nC	V_{DD}=15 V, I_D=0.88 A, V_{GS}=0 to 10 V
Gate plateau voltage	$V_{plateau}$	-	3.6	-	V	V_{DD}=15 V, I_D=0.88 A, V_{GS}=0 to 10 V

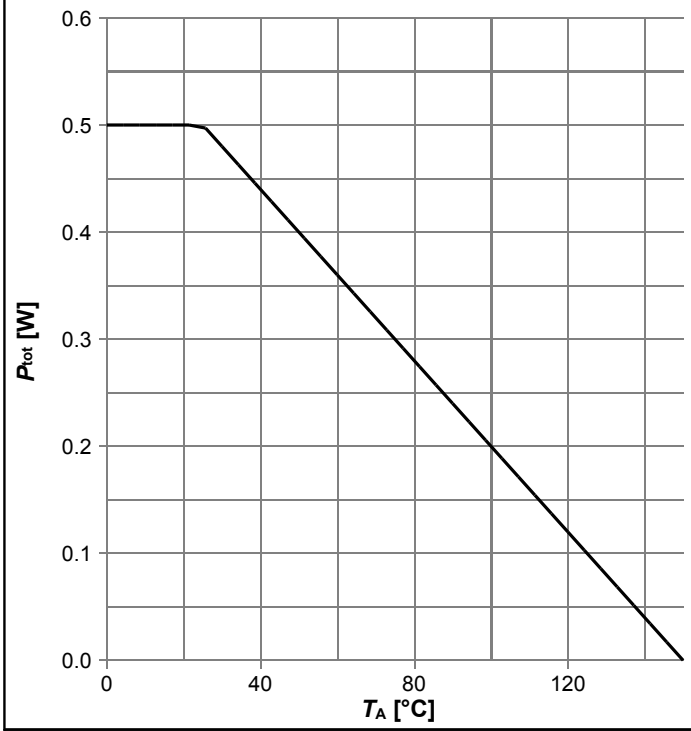
Table 7 Reverse diode

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Diode continous forward current	I_S	-	-	0.4	A	T_A=25 °C
Diode pulse current	$I_{S,pulse}$	-	-	3.5	A	T_A=25 °C
Diode forward voltage	V_{SD}	-	0.9	1.1	V	V_{GS}=0 V, I_F=0.88 A, T_j=25 °C
Reverse recovery time[1)]	t_{rr}	-	7.8	-	ns	V_R=15 V, I_F=0.88 A, di_F/dt=100 A/µs
Reverse recovery charge[1)]	Q_{rr}	-	1.9	-	nC	V_R=15 V, I_F=0.88 A, di_F/dt=100 A/µs

[1)] Defined by design. Not subjected to production test.

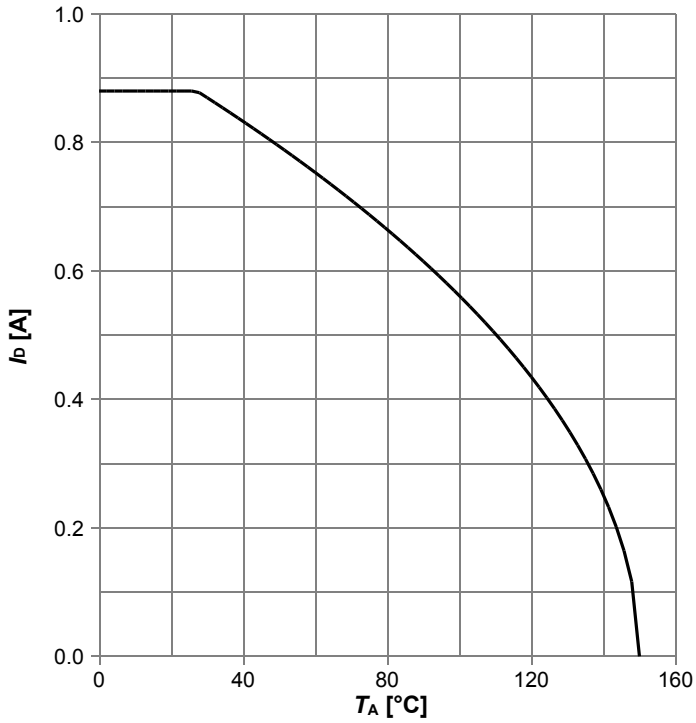
4 Electrical characteristics diagrams

Diagram 1: Power dissipation



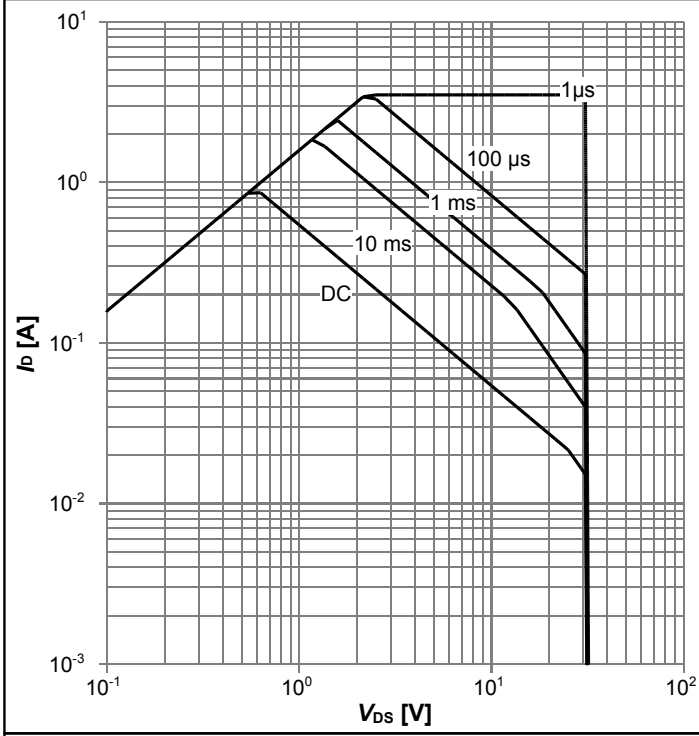
$P_{tot}=f(T_A)$

Diagram 2: Drain current



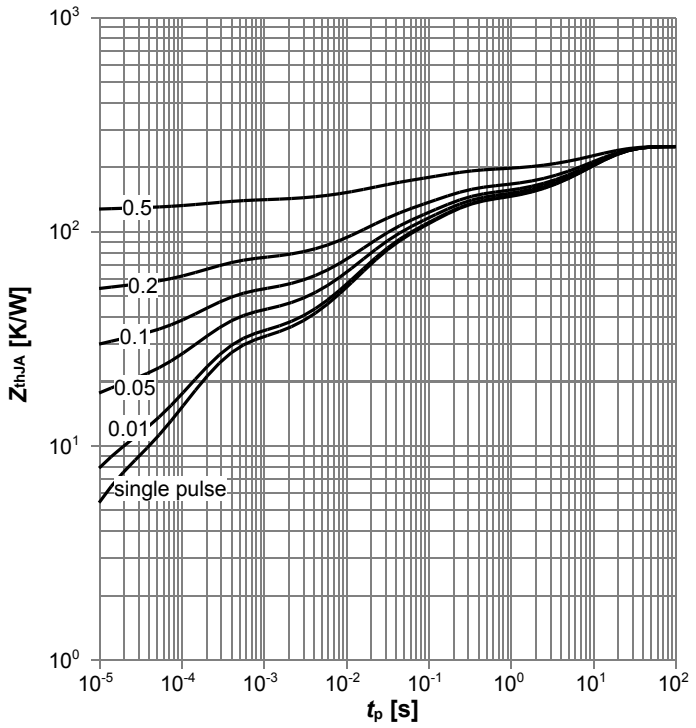
$I_D=f(T_A)$; $V_{GS}\geq 10$ V

Diagram 3: Safe operating area



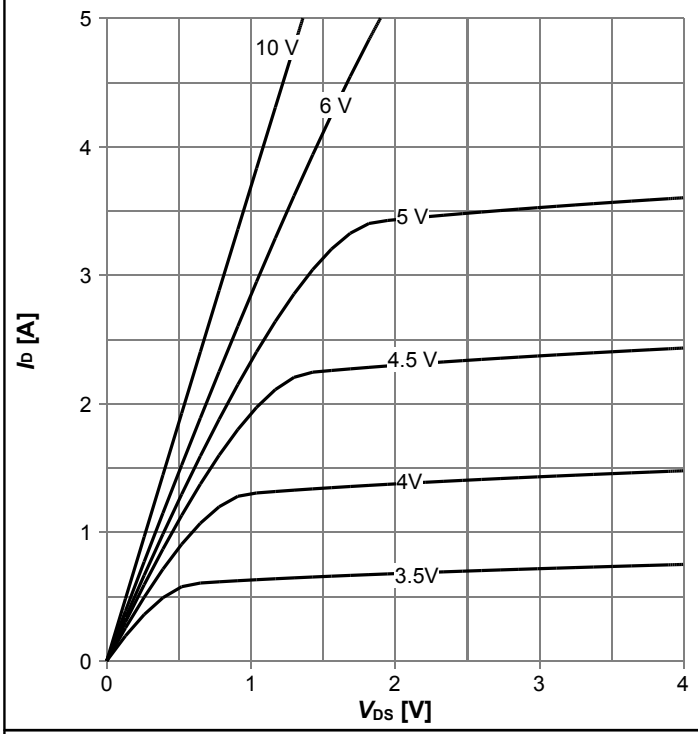
$I_D=f(V_{DS})$; T_A=25 °C; D=0; parameter: t_p

Diagram 4: Max. transient thermal impedance



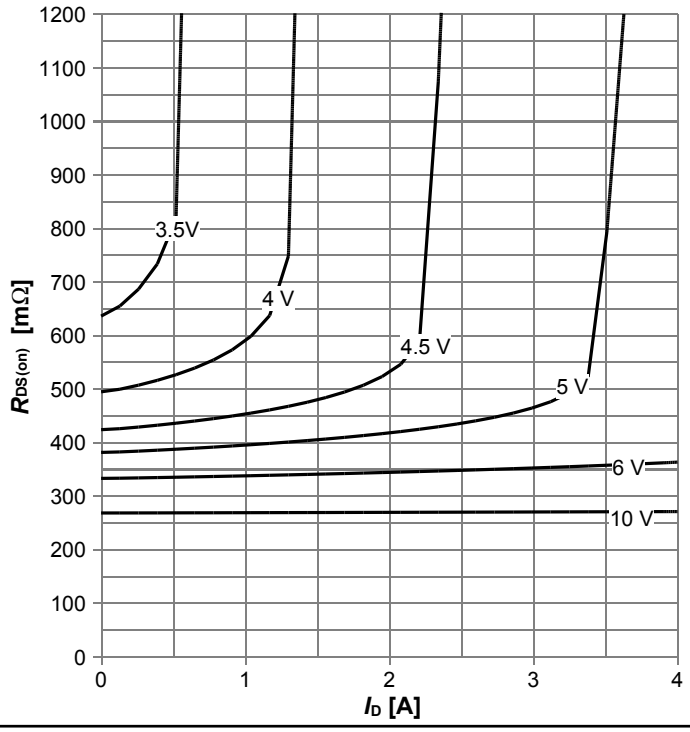
$Z_{thJA}=f(t_p)$; parameter: $D=t_p/T$

Diagram 5: Typ. output characteristics



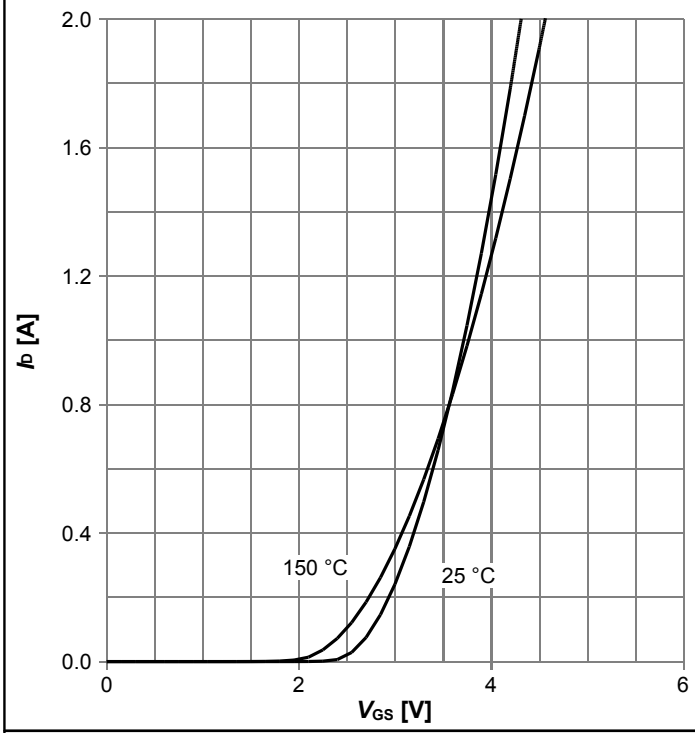
$I_D=f(V_{DS})$; $T_j=25$ °C; parameter: V_{GS}

Diagram 6: Typ. drain-source on resistance



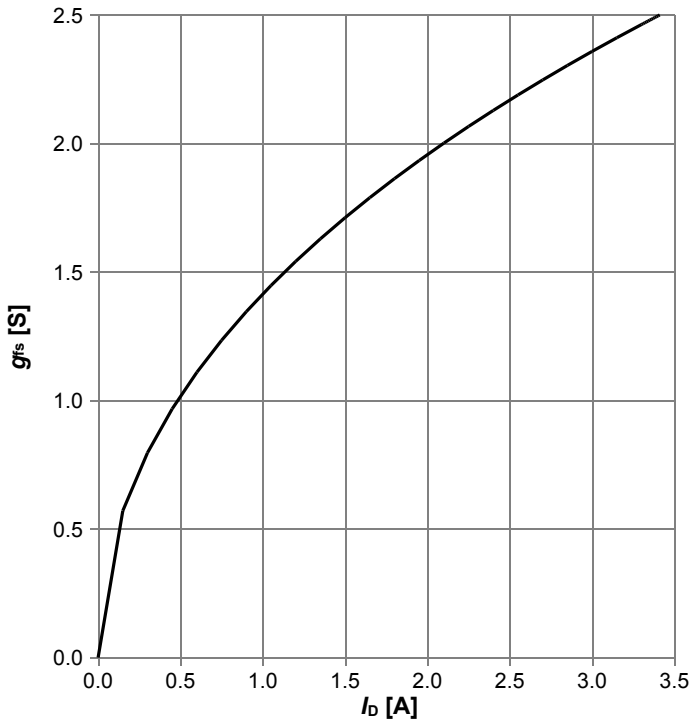
$R_{DS(on)}=f(I_D)$; $T_j=25$ °C; parameter: V_{GS}

Diagram 7: Typ. transfer characteristics



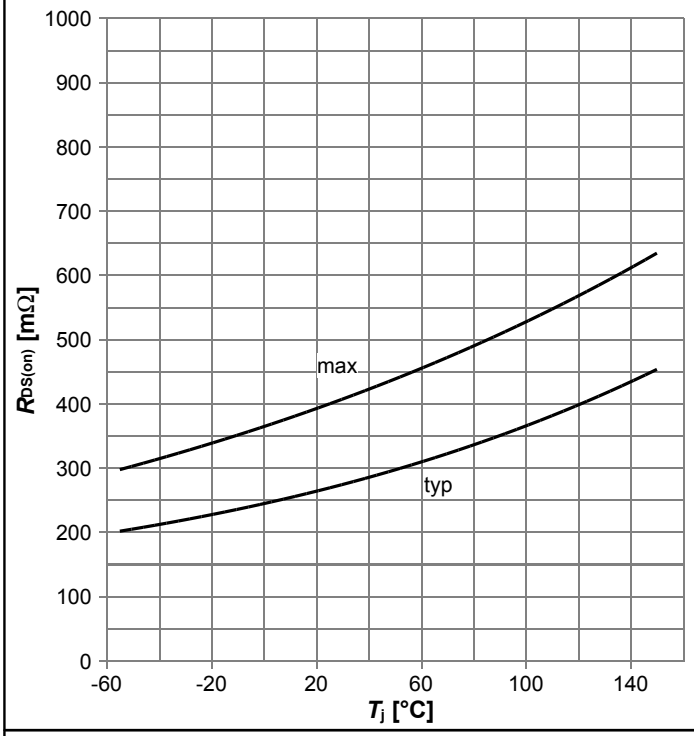
$I_D=f(V_{GS})$; $|V_{DS}|>2|I_D|R_{DS(on)max}$

Diagram 8: Typ. forward transconductance



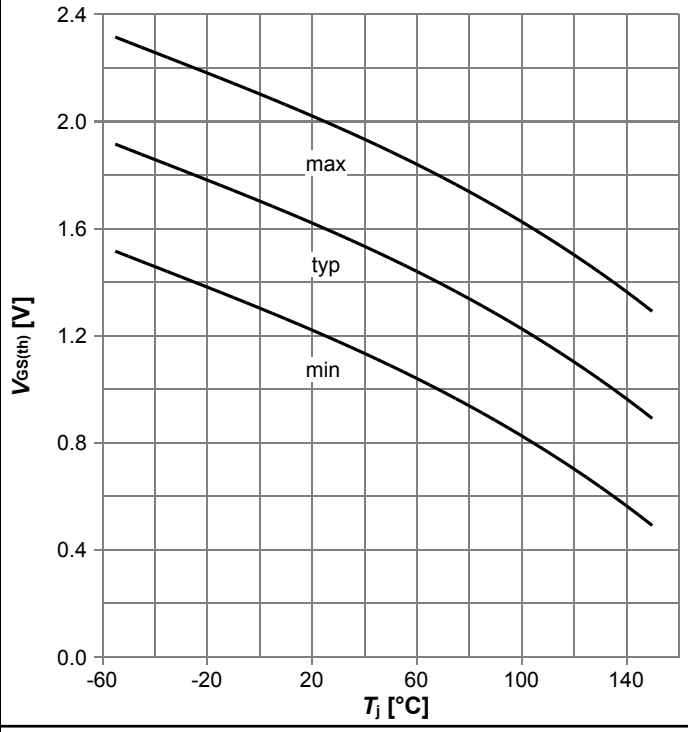
$g_{fs}=f(I_D)$; $T_j=25$ °C

Diagram 9: Drain-source on-state resistance



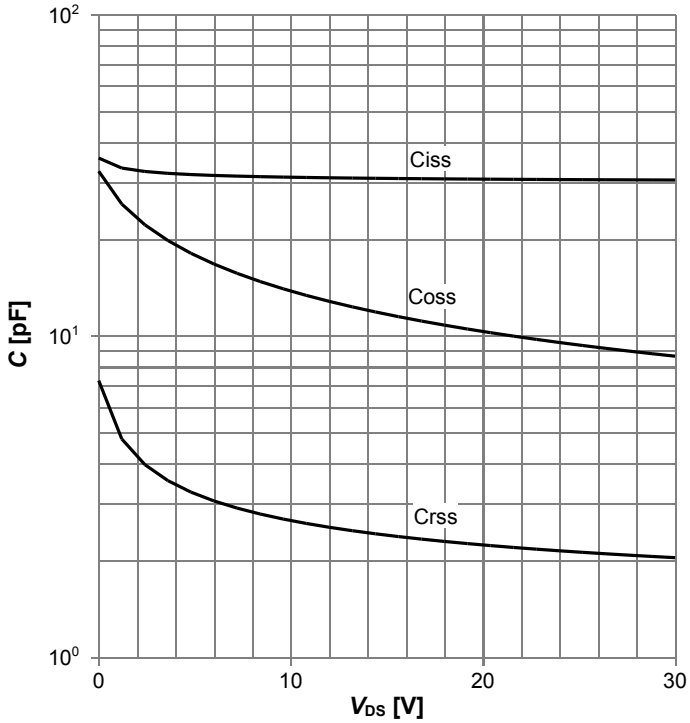
$R_{DS(on)}$=f(T_j); I_D=0.88 A; V_{GS}=10 V

Diagram 10: Typ. gate threshold voltage



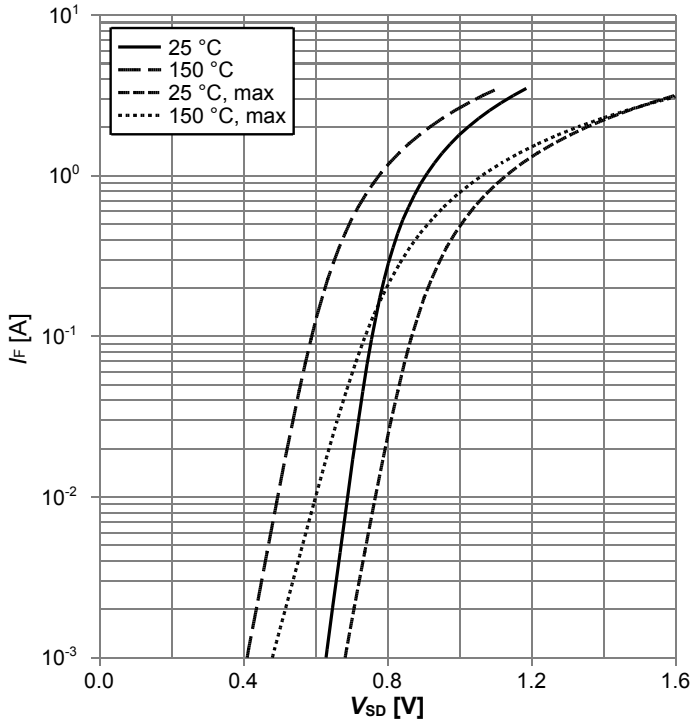
$V_{GS(th)}$=f(T_j); V_{DS}=V_{GS}; I_D=1.6 µA; parameter: I_D

Diagram 11: Typ. capacitances



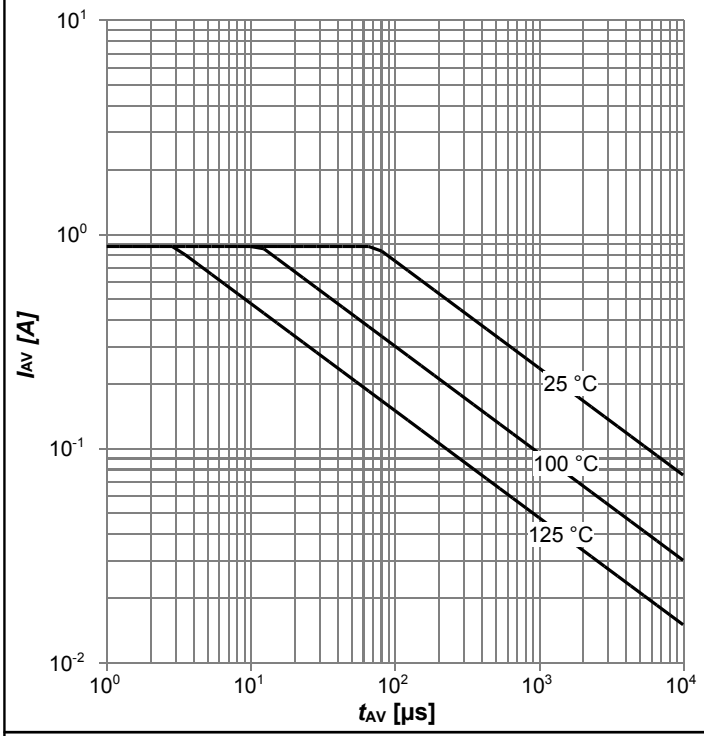
C=f(V_{DS}); V_{GS}=0 V; f=1 MHz; T_j=25°C

Diagram 12: Forward characteristics of reverse diode



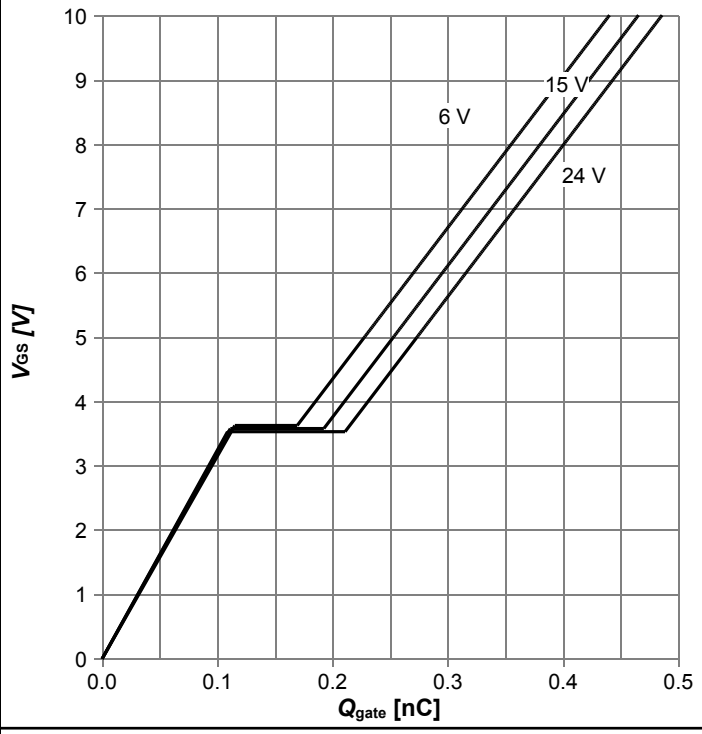
I_F=f(V_{SD}); parameter: T_j

Diagram 13: Avalanche characteristics



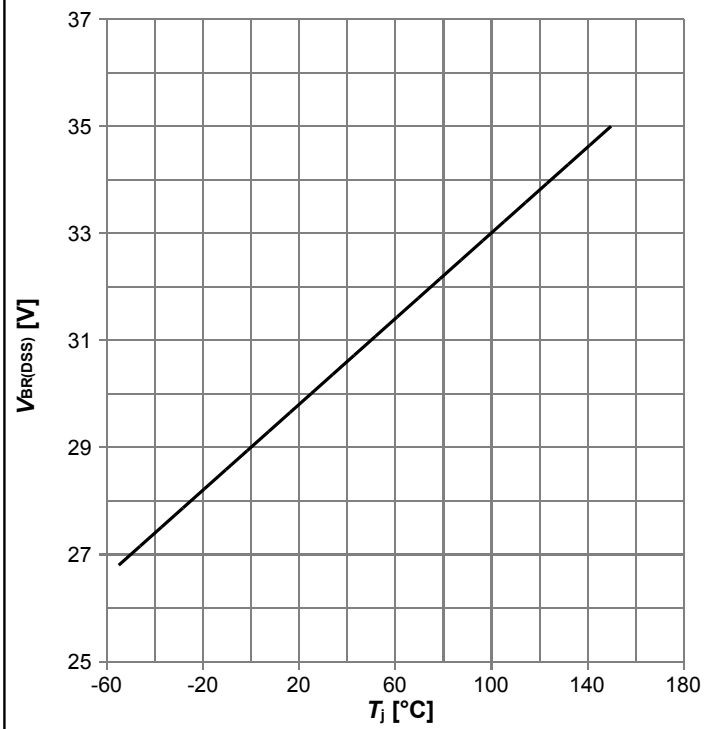
I_{AS}=f(t_{AV}); R_{GS}=16 Ω; parameter: $T_{j(start)}$

Diagram 14: Typ. gate charge



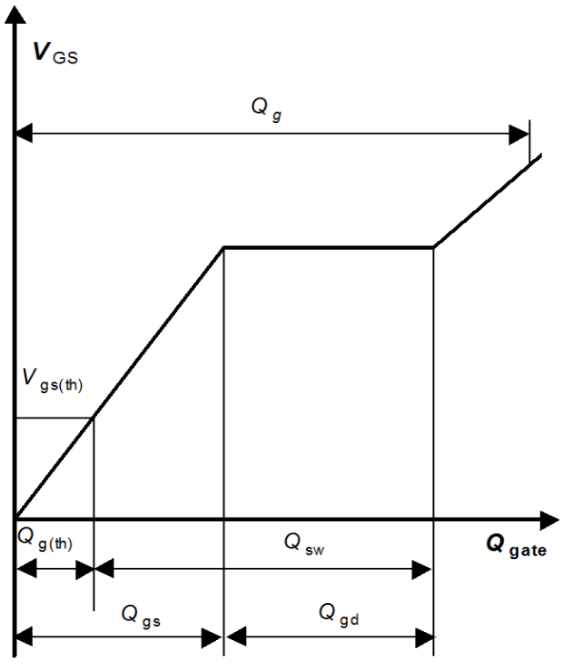
V_{GS}=f(Q_{gate}); I_D=0.88 A pulsed; parameter: V_{DD}

Diagram 15: Drain-source breakdown voltage



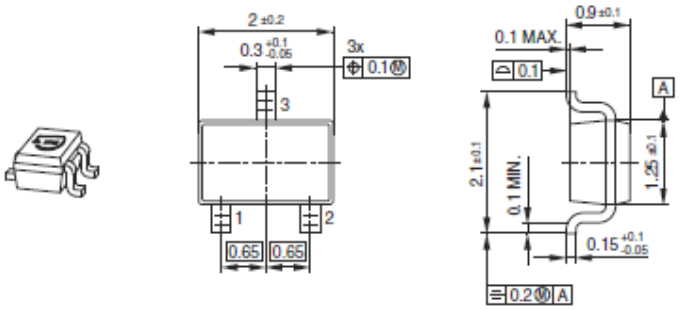
$V_{BR(DSS)}$=f(T_j); I_D=250 µA

Diagram Gate charge waveforms



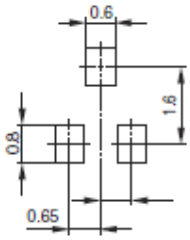
5 Package Outlines

Package Outline

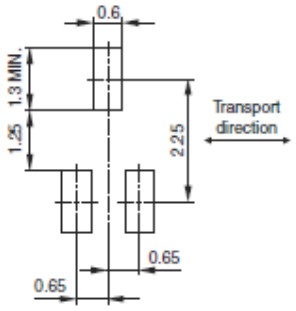


Foot Print

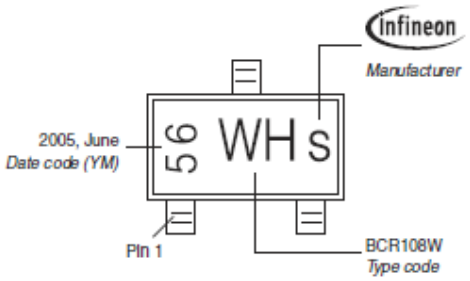
Soldering Type: Reflow Soldering



Soldering Type: Wave Soldering



Marking Layout (Example)



Tape and Reel

Reel ø180 mm: 3.000 Pieces/Reel
Reels/Box: 1 x 3.000 = 3.000
Reels/Box: 10 x 3.000 = 30.000

Reel ø330 mm: 10.000 Pieces/Reel
Reels/Box: 1 x 10.000 = 10.000

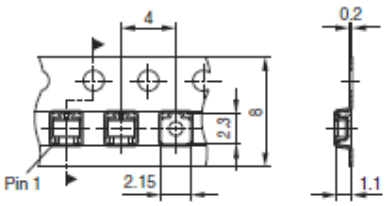


Figure 1 Outline PG-SOT323, dimensions in mm

Revision History

BSS340NW

Revision: 2020-06-02, Rev. 2.1

Previous Revision		
Revision	Date	Subjects (major changes since last revision)
2.0	2016-06-23	Release of final version
2.1	2020-06-02	Update unit Drain-source leakage current

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Published by
Infineon Technologies AG
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