

英飞凌MOSFET小信号晶体管

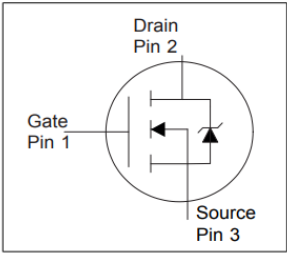
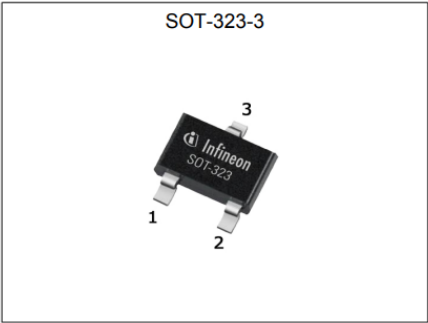
英飞凌BSS340NW OptiMOS™ 2 30 V N沟道小信号晶体管

特性

- N沟道
- 增强模式
- 逻辑电平（额定4.5V）
- 雪崩额定
- 符合 AEC-Q101 标准
- 100% 无铅；符合 RoHS 标准
- 符合 IEC61249-2-21 标准的无卤素

表 1 主要性能参数

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



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

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1 最大额定值

除非另有规定, $T_A = 25^\circ\text{C}$

表 2 最大额定值

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Continuous drain current	I_D	-	-	0.88 0.71	A	$T_A = 25^\circ\text{C}$ $T_A = 70^\circ\text{C}$
Pulsed drain current	$I_{D,pulse}$	-	-	3.5	A	$T_A = 25^\circ\text{C}$
Avalanche energy, single pulse	E_{AS}	-	-	1.6	mJ	$I_D = 0.88\text{ A}$, $R_{GS} = 16\ \Omega$
Reverse diode dv/dt	dv/dt	-	-	6	kV/ μs	$I_D = 0.88\text{ A}$, $V_{DS} = 16\text{ V}$, $di/dt = 200\text{ A}/\mu\text{s}$, $T_{j,max} = 150^\circ\text{C}$
Gate source voltage	V_{GS}	-20	-	20	V	-
Power dissipation	P_{tot}	-	-	0.5	W	$T_A = 25^\circ\text{C}$
Operating and storage temperature	T_j , T_{stg}	-55	-	150	$^\circ\text{C}$	IEC climatic category; DIN IEC 68-1: 55/150/56
ESD Class	-	-	-	0	-	JESD22-A114 -HBM, ESD Class 0 = < 250V
Soldering Temperature	-	-	-	260	$^\circ\text{C}$	-

2 热特性

表 3 热特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Thermal resistance, junction - ambient, minimal footprint ¹⁾	R_{thJA}	-	-	250	K/W	-

3 电气特性

除非另有规定, $T_j = 25^\circ\text{C}$

表 4 静态特性

Parameter	Symbol	Values			Unit	Note / Test Condition
		Min.	Typ.	Max.		
Drain-source breakdown voltage	$V_{(BR)DSS}$	30	-	-	V	$V_{GS} = 0\text{ V}$, $I_D = 250\ \mu\text{A}$
Gate threshold voltage	$V_{GS(th)}$	1.2	1.6	2.0	V	$V_{DS} = V_{GS}$, $I_D = 1.6\ \mu\text{A}$
Drain-source leakage current	I_{DSS}	-	-	0.01 5	μA	$V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 25^\circ\text{C}$ $V_{DS} = 30\text{ V}$, $V_{GS} = 0\text{ V}$, $T_j = 150^\circ\text{C}$
Gate-source leakage current	I_{GSS}	-	-	10	nA	$V_{GS} = 20\text{ V}$, $V_{DS} = 0\text{ V}$
Drain-source on-state resistance	$R_{DS(on)}$	-	447 286	600 400	m Ω	$V_{GS} = 4.5\text{ V}$, $I_D = 0.29\text{ A}$ $V_{GS} = 10\text{ V}$, $I_D = 0.88\text{ A}$
Transconductance	g_{fs}	-	1.2	-	S	$ V_{DS} > 2 I_D R_{DS(on)max}$, $I_D = 0.71\text{ A}$

¹⁾在 40 mm x 40 mm FR4 PCB 上进行。走线宽度为 1mm, 厚度为 70mm, 长度为 20mm; 它们位于 PCB 的两侧。

表5 动态特性¹⁾

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

表6 栅极电荷特性¹⁾

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

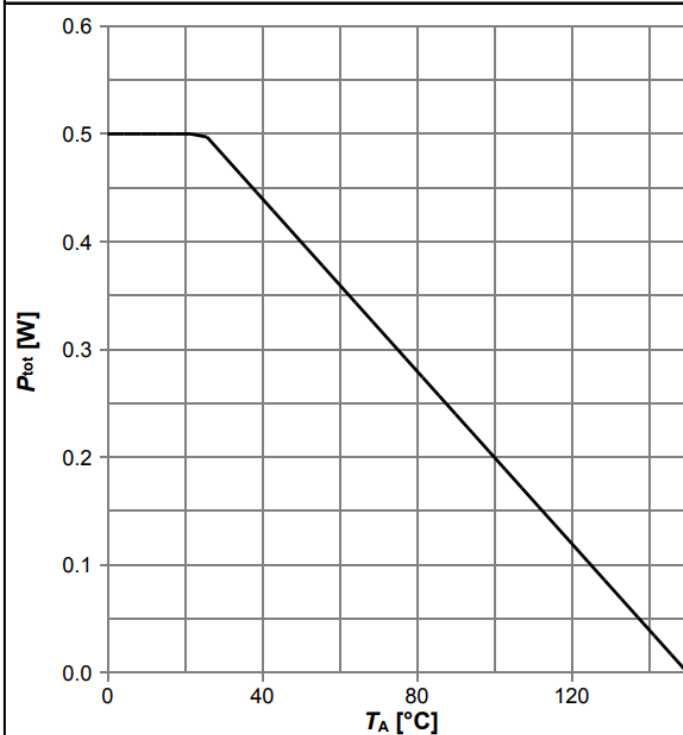
表7 反向二极管

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

¹⁾由设计标定, 不受制于生产测试。

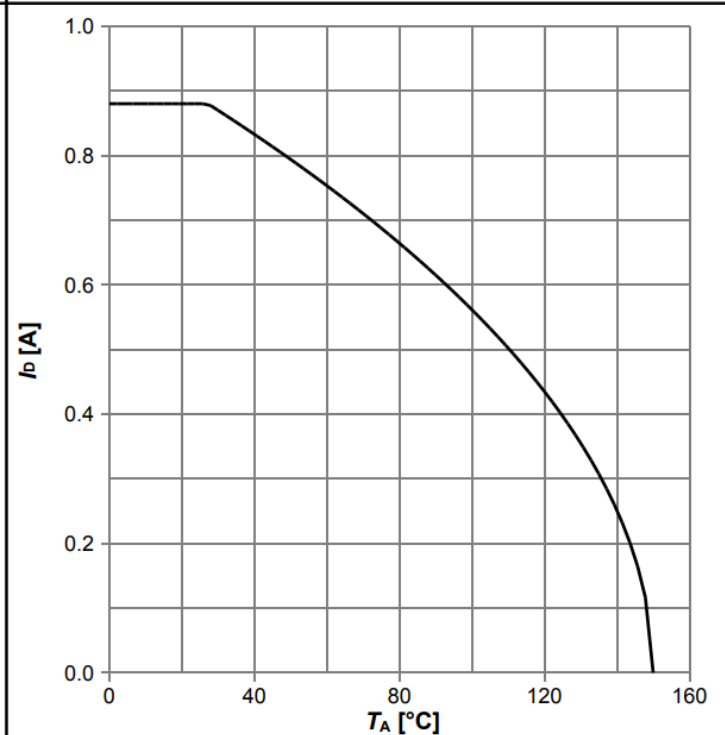
4 电气特性图

Diagram 1: Power dissipation



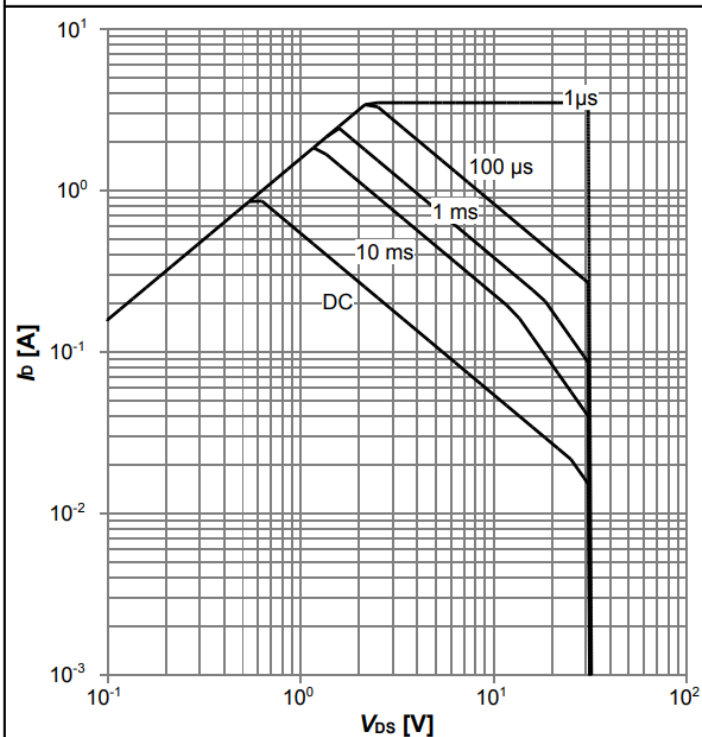
$$P_{tot}=f(T_A)$$

Diagram 2: Drain current



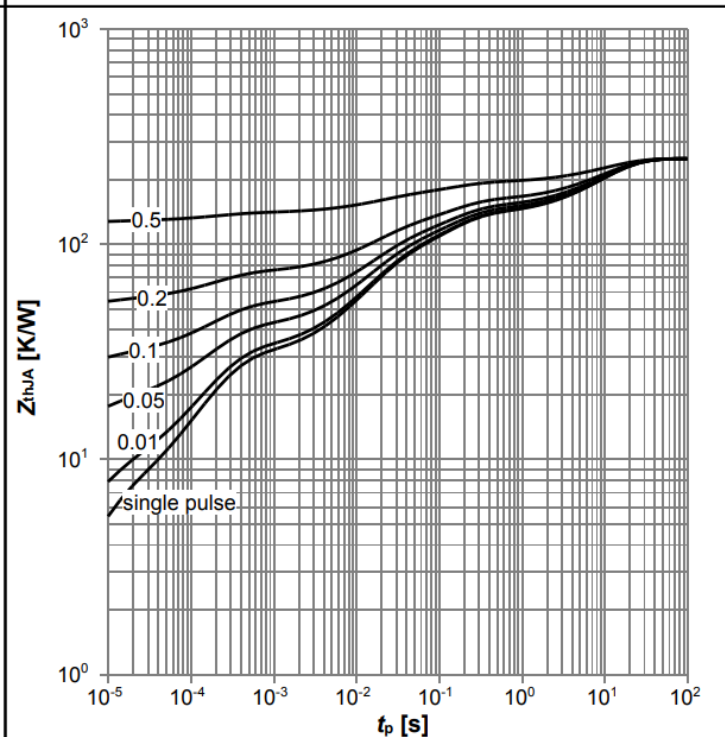
$$I_D=f(T_A); V_{GS}\geq 10\text{ V}$$

Diagram 3: Safe operating area



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

Diagram 4: Max. transient thermal impedance



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

Diagram 5: Typ. output characteristics

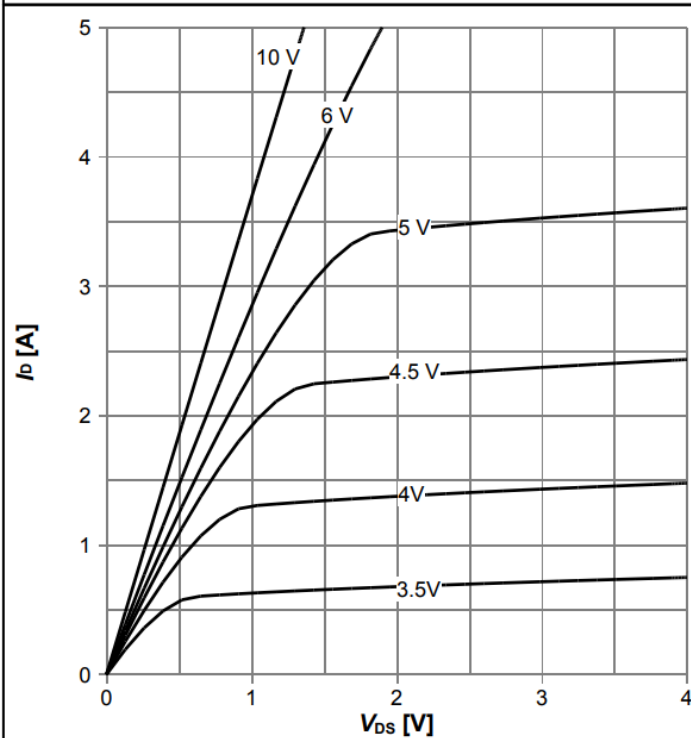

 $I_D = f(V_{DS}); T_J = 25^\circ\text{C}; \text{parameter: } V_{GS}$

Diagram 6: Typ. drain-source on resistance

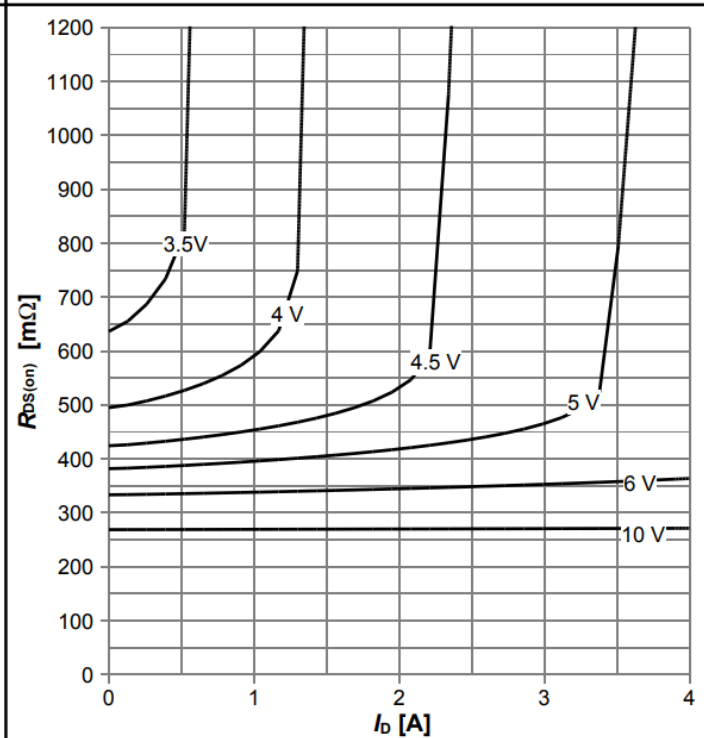

 $R_{DS(on)} = f(I_D); T_J = 25^\circ\text{C}; \text{parameter: } V_{GS}$

Diagram 7: Typ. transfer characteristics

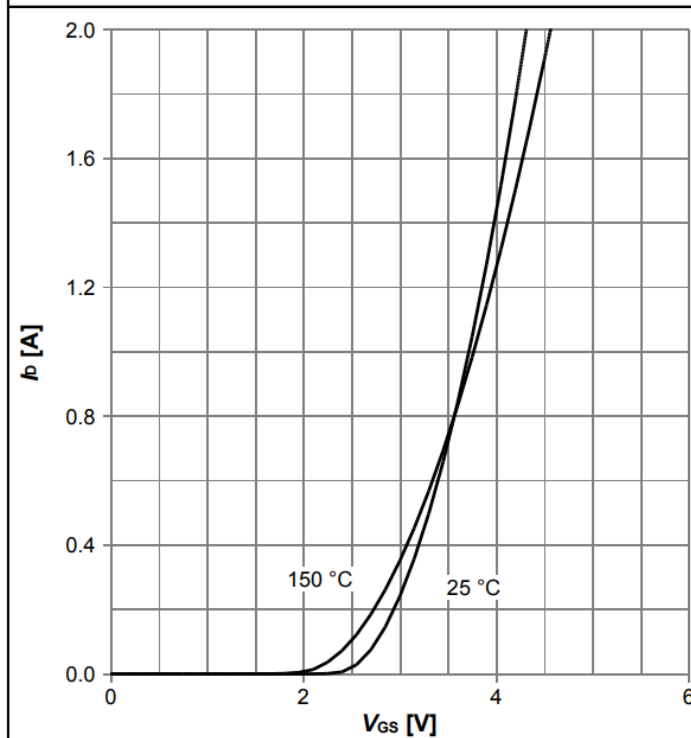

 $I_D = f(V_{GS}); |V_{DS}| > 2|I_D|R_{DS(on)max}$

Diagram 8: Typ. forward transconductance

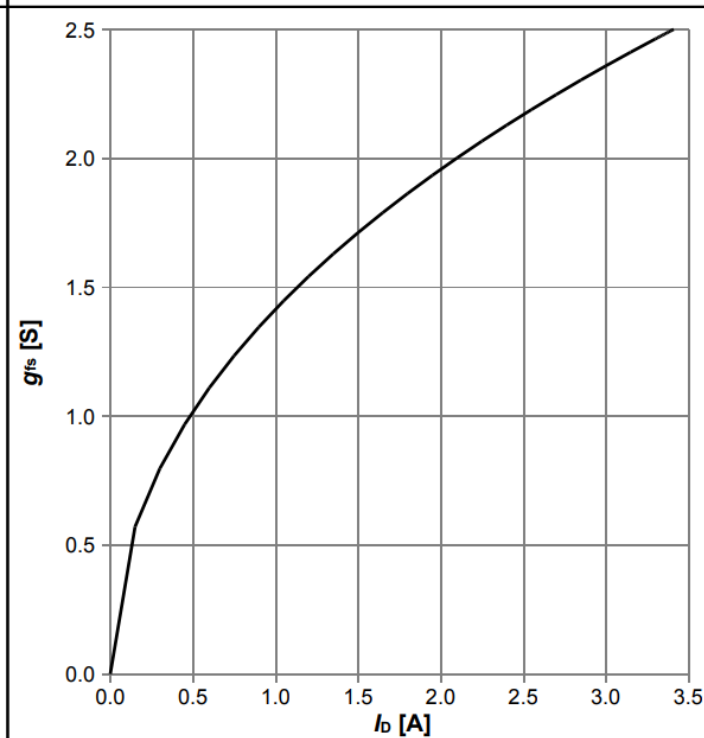

 $g_{fs} = f(I_D); T_J = 25^\circ\text{C}$

Diagram 9: Drain-source on-state resistance

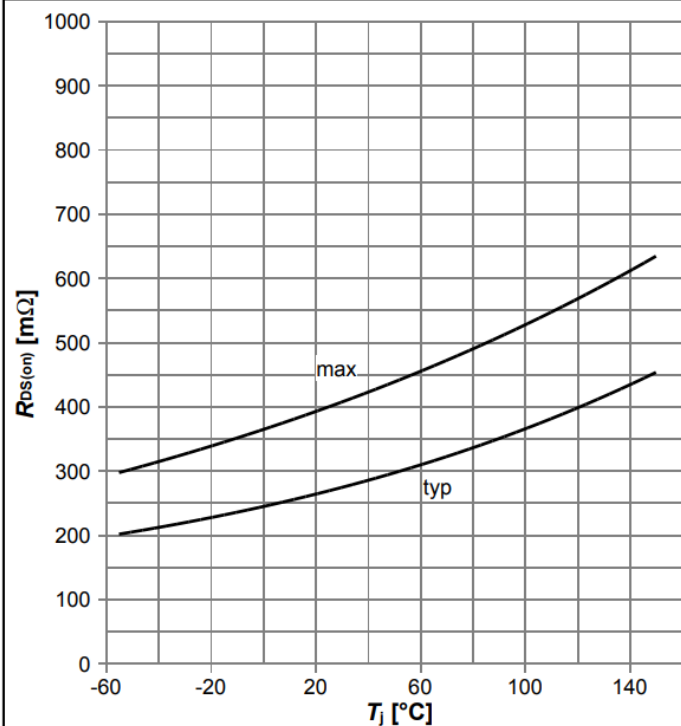

 $R_{DS(on)} = f(T_j); I_D = 0.88 \text{ A}; V_{GS} = 10 \text{ V}$

Diagram 10: Typ. gate threshold voltage

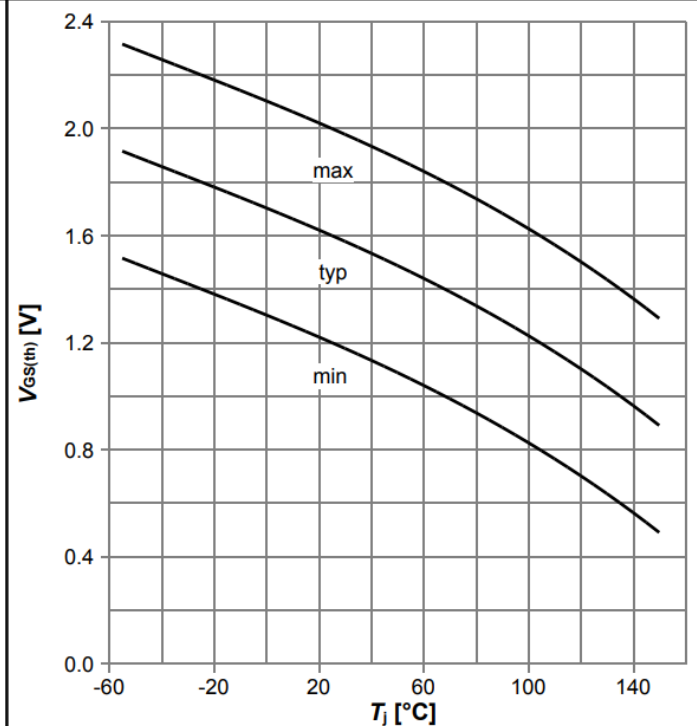

 $V_{GS(th)} = f(T_j); V_{DS} = V_{GS}; I_D = 1.6 \mu\text{A}; \text{parameter: } I_D$

Diagram 11: Typ. capacitances

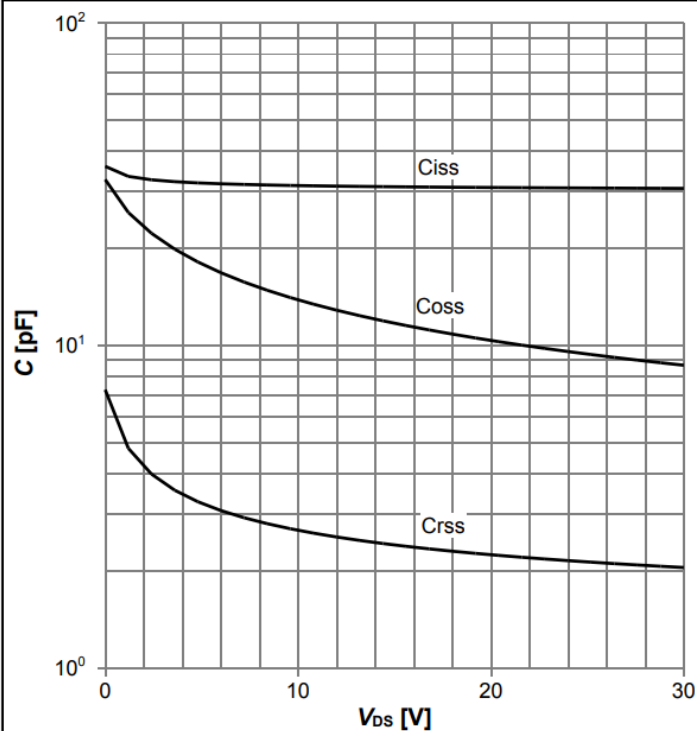

 $C = f(V_{DS}); V_{GS} = 0 \text{ V}; f = 1 \text{ MHz}; T_j = 25^\circ\text{C}$

Diagram 12: Forward characteristics of reverse diode

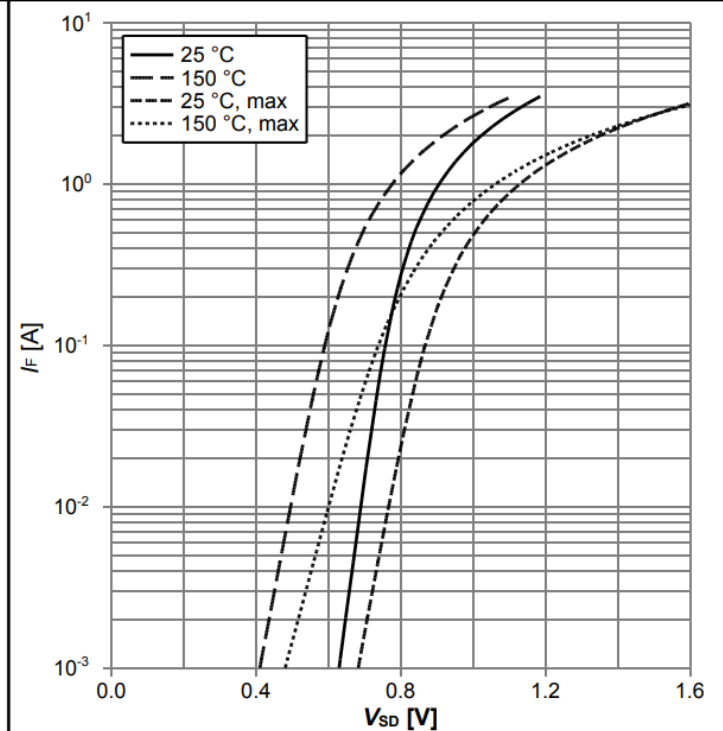

 $I_F = f(V_{SD}); \text{parameter: } T_j$

Diagram 13: Avalanche characteristics

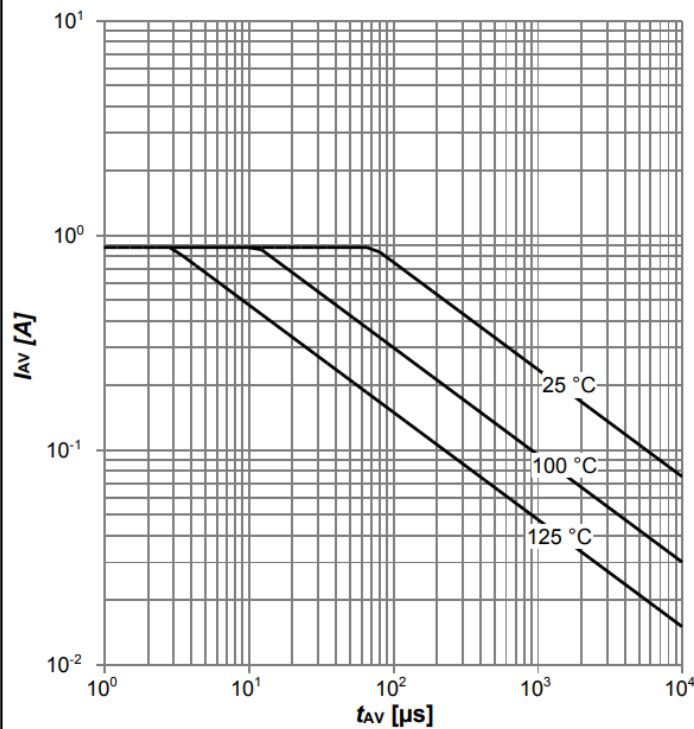


Diagram 14: Typ. gate charge

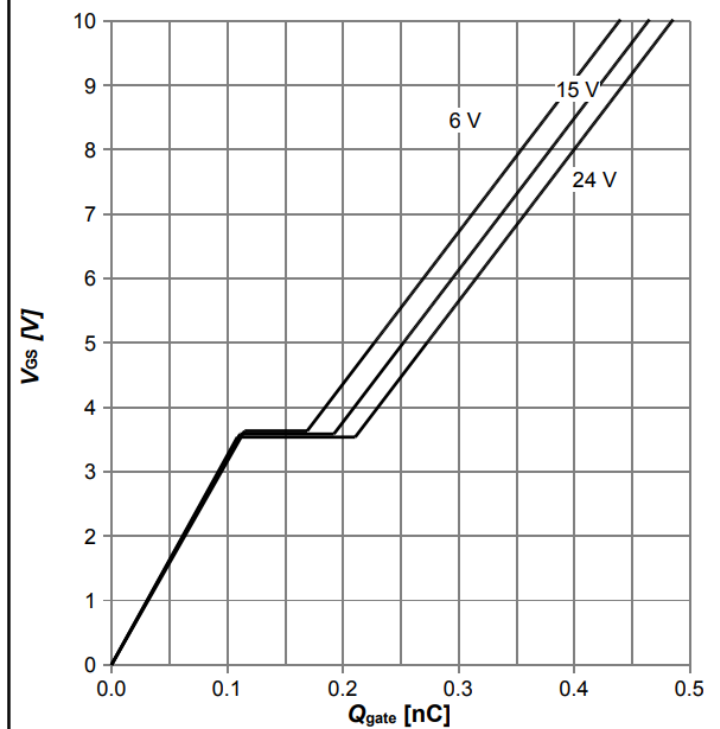


Diagram 15: Drain-source breakdown voltage

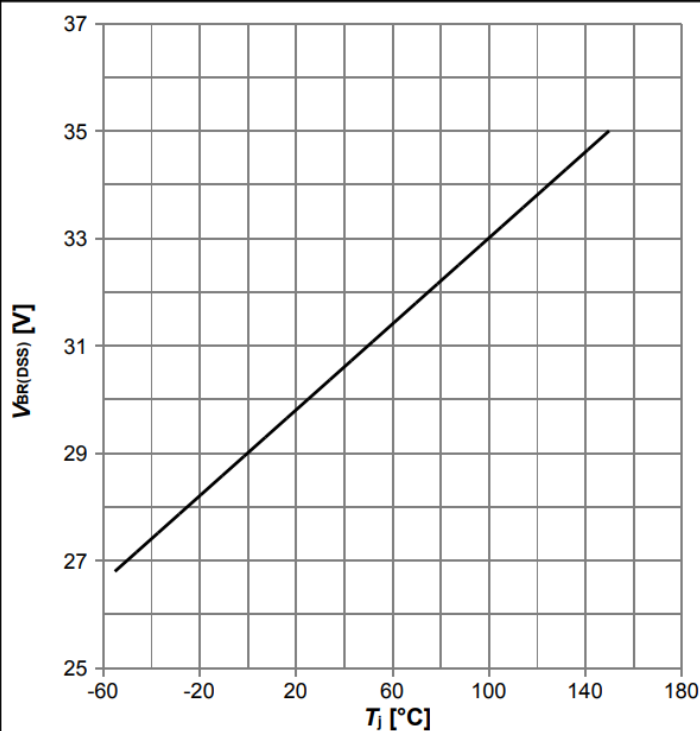
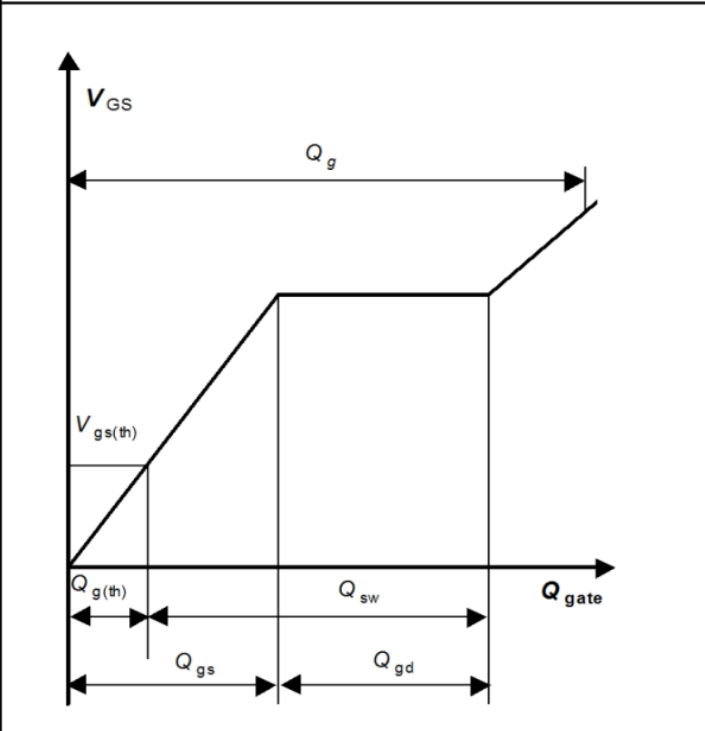
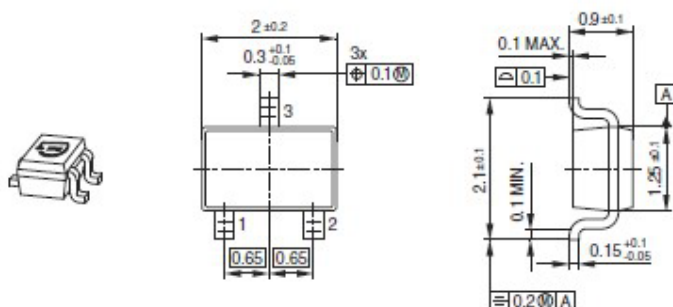


Diagram Gate charge waveforms



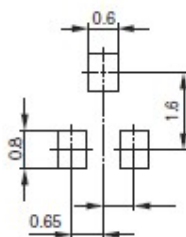
5 封装外形

Package Outline

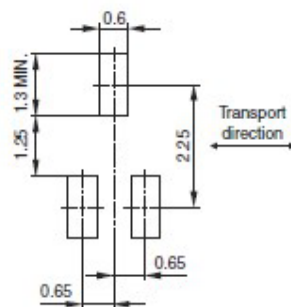


Foot Print

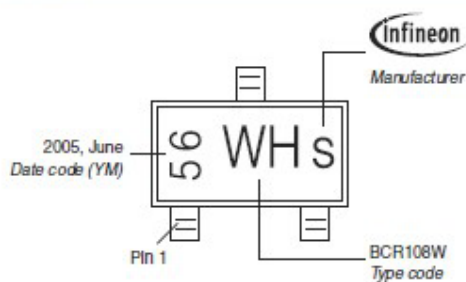
Soldering Type: Reflow Soldering



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

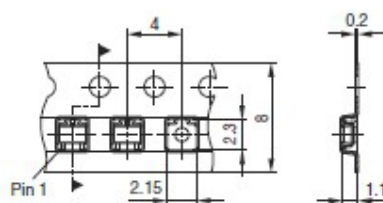


图 1 PG-SOT323 外形图，尺寸单位为毫米

修订记录

BSS340NW

Revision: 2020-06-02, Rev. 2.1

历史修订版本

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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