

General Description

概述

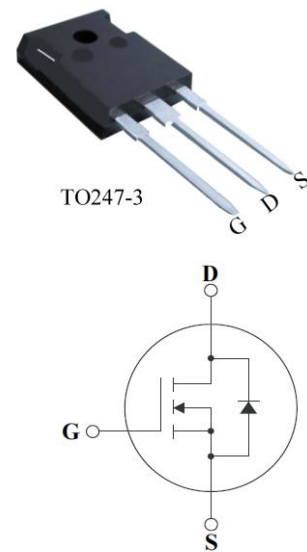
Specifically designed for Automotive applications, this SiC Power MOSFET utilizes the latest processing techniques to achieve extremely low on-resistance per unit area.

本产品是一款专为汽车应用设计的碳化硅功率MOSFET产品，采用了先进的工艺技术，产品的单位面积导通电阻非常低。

Features

特点

- High Speed Switching with Low Capacitances
开关速度快，寄生电容小
- High Blocking Voltage with Low $R_{DS(on)}$
阻断电压高，开通电阻低
- 100% avalanche tested
100%通过雪崩测试
- Halogen Free and RoHS Compliant
无卤元素，符合 RoHS



Typical Applications

典型应用

- EV Charging
EV 充电
- DC-AC Inverters
DC-AC 转换器
- High Voltage DC/DC Converters
高压 DC/DC 变压器
- Power Factor Correction Modules
功率因子校正模块

Ordering Information

订货信息

Type 型号	$BV_{DSS}[V]$ 漏极-源极电压	$R_{DS(on)}[m\Omega]$ 导通电阻	$T_{jmax}[^{\circ}C]$ 最高结温	Marking 标记	Packing 封装外形
BSN080S120	1200	80	175	BSN080S120	TO-247



Maximum Rated Values

最大额定参数

Parameter 参数	Symbol 符号	Value 数值	Unit 单位
Drain-Source Voltage, $T_j \geq 25^\circ\text{C}$ 漏-源电压, $T_j \geq 25^\circ\text{C}$	V_{DS}	1200	V
Drain Current(continuous)at $T_C=25^\circ\text{C}$ 常温下漏极电流(持续)	I_D	36	A
Drain Current(continuous)at $T_C=100^\circ\text{C}$ $T_C=100^\circ\text{C}$ 下漏极电流(持续)		25	
Pulsed Drain current, t_p limited by T_j max 集电极脉冲电流, 脉宽时间受 T_j max 限制	I_{DM}	60A	
Gate-Source Voltage(dynamic: $AC > 1\text{Hz}$) 栅极-源极电压(瞬态: $AC > 1\text{Hz}$)	V_{GS}	-15/+25	V
Gate-Source Voltage 栅极-源极电压	V_{GS}	-10/+25	
Gate-Source Voltage (Recommended operational values) 栅极-源极电压(推荐工作电压)	V_{GSop}	-5/+20	
Power Dissipation $T_C = 25^\circ\text{C}$ 常温耗散功率	P_D	238	W
Storage Temperature Range 储存温度范围	$T_{J.Tstg}$	-55 to +175	$^\circ\text{C}$
Solder Temperature (1.6mm from case for 10s) 焊接温度	T_L	260	
Operating junction temperature Range 工作结温	T_J	-55 to +175	
Mounting Torque 安装力矩	M_d	1 8.8	Nm lbf-in

Caution: These values must not be exceeded under any conditions.

注意：任何条件下都不能超出上述值。

Thermal Resistance

热阻

Parameter 参数	Symbol 符号	Value 值	Unit 单位
Thermal Resistance, Junction to Case, Max. 结-管壳热阻	$R_{\theta JC}$	0.63	$^\circ\text{C}/\text{W}$
Thermal Resistance, Junction to Ambient, Max. 结-环境热阻	$R_{\theta JA}$	40	



Electrical Characteristic at $T_j = 25^\circ\text{C}$ (unless otherwise specified)

$T_j=25^\circ\text{C}$ 时电学特性（除非特别声明）

Parameter 参数	Symbol 符号	Conditions 条件	Value 值			Unit 单位
			Min. 最小值	Typ. 典型值	Max. 最大值	
Static Characteristic 静态特性						
Drain to Source Breakdown Voltage 漏极-源极电压击穿电压	BV_{DS}	$V_{GS}=0V, I_D=100\mu A$ $T_j=25^\circ\text{C}$	1200	-	-	V
Zero Gate Voltage Drain Current 栅源短路的漏极电流	I_{DSS}	$V_{DS}=1200V, V_{GS}=0V,$ $T_j=25^\circ\text{C}$	-	1	100	μA
Gate to Body Leakage Current 栅极-源极漏泄电流	I_{GSS}	$V_{GS}=20V, V_{DS}=0V$	-	20	100	nA
Static Drain-source On Resistance ^(Fig.4) 漏极-源极通态电阻	$R_{DS(on)}$	$V_{GS}=20V, I_D=20A,$ $T_j=25^\circ\text{C}$	-	80	100	m Ω
		$V_{GS}=20V, I_D=20A,$ $T_j=175^\circ\text{C}$	-	120	-	
Gate Threshold Voltage 栅极-源极阈值电压	$V_{GS(th)}$	$V_{DS}=V_{GS}, I_{DS}=5mA$ $T_j=25^\circ\text{C}$	2	-	4	V
Gate Resistance 栅极电阻	R_G	$f=1MHz, V_{AC}=25mV$	-	5	-	Ω
Dynamic Characteristic 动态特性						
Input Capacitance 输入电容	C_{iss}	$V_{DS}=1000V,$ $f=1MHz, V_{GS}=0V,$ $V_{AC}=25mV$	-	2080	-	pF
Output Capacitance 输出电容	C_{oss}		-	97	-	
Reverse Transfer Capacitance 反向传输电容	C_{rss}		-	22	-	
Total Gate Charge 栅极总电荷	$Q_{g(tot)}$	$V_{DS}=800V$ $I_D=20A, V_{GS}=-5/20V$	-	85	-	nC
Gate-source Charge 栅-源电荷	Q_{gs}		-	23	-	
Gate-Drain Charge 栅-漏电荷	Q_{gd}		-	26	-	



Switching Characteristic at $T_j=25^\circ\text{C}$ (Inductive Load)

$T_j=25^\circ\text{C}$ 时开关特性（电感负载）

Parameter 参数	Symbol 符号	Conditions 条件	Value 值			Unit 单位
			Min. 最小 值	Typ. 典型 值	Max. 最大 值	
MOSFET Characteristic						
MOSFET 特性						
Turn-on delay time 开通延迟时间	$t_{d(on)}$	$V_{DS}=800\text{V},$ $V_{GS}=-5/20\text{V},$ $I_D=20\text{A},$ $R_{G(ext)}=5\Omega,$ $R_L=40\Omega,$ $T_j=25^\circ\text{C};$	-	23	-	ns
Rise time 上升时间	t_r		-	60	-	
Turn-off delay time 关断延迟时间	$t_{d(off)}$		-	17	-	
Fall time 下降时间	t_f		-	12	-	
Turn-on Switching Energy 开通损耗	E_{on}	$V_{DS}=800\text{V},$ $V_{GS}=-5/20\text{V},$ $I_D=20\text{A},$ $R_{G(ext)}=5\Omega,$ $T_j=25^\circ\text{C},$ $L=142\mu\text{H};$	-	180	-	μJ
Turn-off Switching Energy 关断损耗	E_{off}		-	70	-	

SOURCE-DRAIN DIODE CHARACTERISTICS

源极-漏极二极管特性

Source to Drain Diode Forward Voltage 源极-漏极正向电压	V_{SD}	$I_{SD}=10\text{A},$ $V_{GS}=-5\text{V},$ $T_j=25^\circ\text{C};$	-	3.5	-	V
		$I_{SD}=10\text{A},$ $V_{GS}=-5\text{V},$ $T_j=175^\circ\text{C};$	-	3.0	-	
Reverse Recovery time 反向恢复时间	t_{rr}	$V_{GS}=-5\text{V},$ $I_{SD}=20\text{A},$ $V_R=800\text{V},$ $\text{dif}/\text{dt}=1000\text{A}/\mu\text{s};$	-	38	-	ns
Reverse Recovery Charge 反向恢复电荷	Q_{rr}		-	207	-	nC
Peak Reverse Recovery Current 峰值反向恢复电流	I_{rrm}		-	13	-	A

Notes

a: Repetitive Rating : Pulse width limited by maximum junction temperature

b: Pulse Test : Pulse width $\leq 380\mu\text{s}$

c: Essentially independent of operating temperature

注:

a: 重复范围: 脉冲宽度受限于最大结温

b: 脉冲测试: 脉冲宽度 $\leq 380\mu\text{s}$

c: 本质上与工作温度无关

Electrical characteristics diagram 特性曲线

Figure 1. Output Characteristics $T_J = -55^\circ\text{C}$

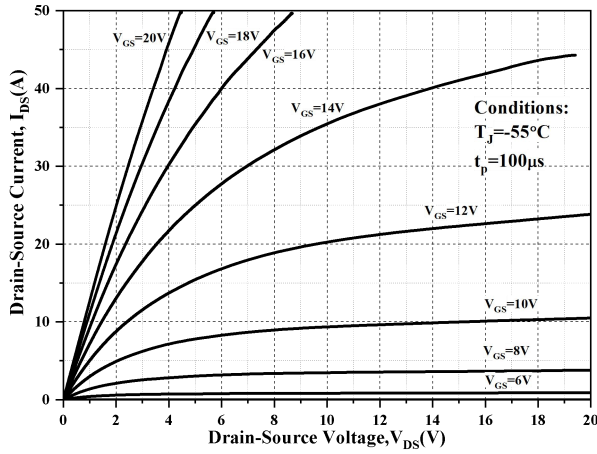


Figure 2. Output Characteristics $T_J = 25^\circ\text{C}$

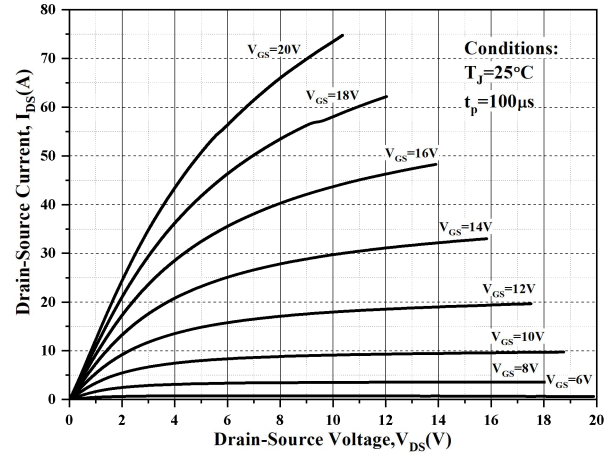


Figure 3. Output Characteristics $T_J = 175^\circ\text{C}$

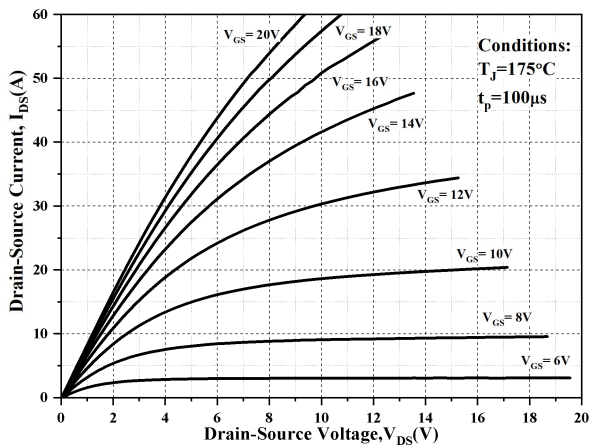


Figure 4. On-Resistance vs. Junction Temperature

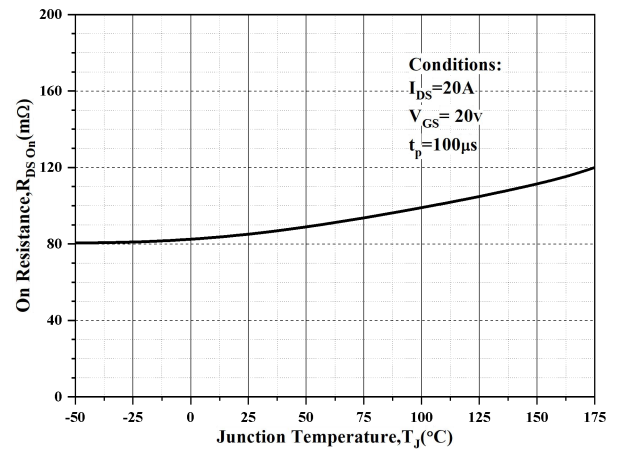


Figure 5. Transfer Characteristic for Various Junction Temperatures

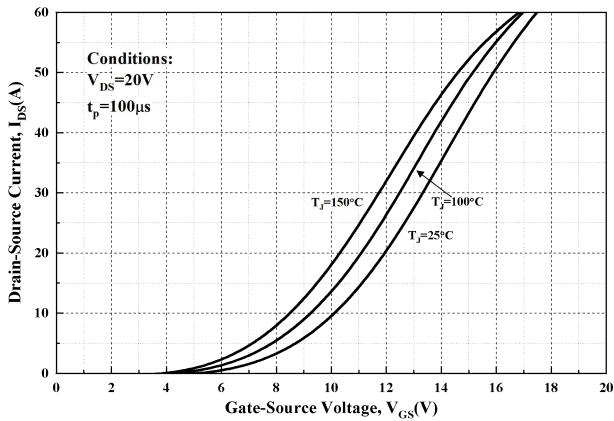


Figure 6. On-Resistance For Various Gate Voltage

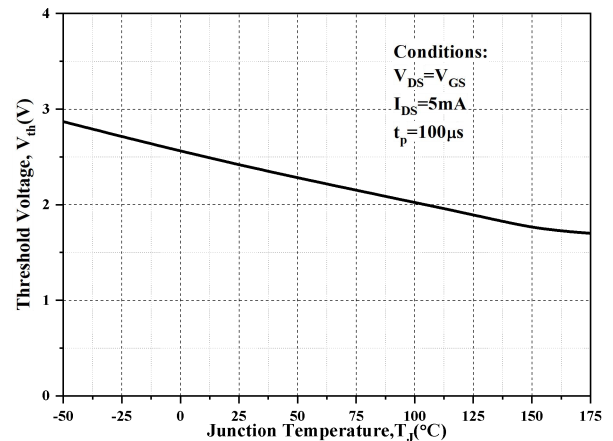


Figure 7. Body Diode Characteristics

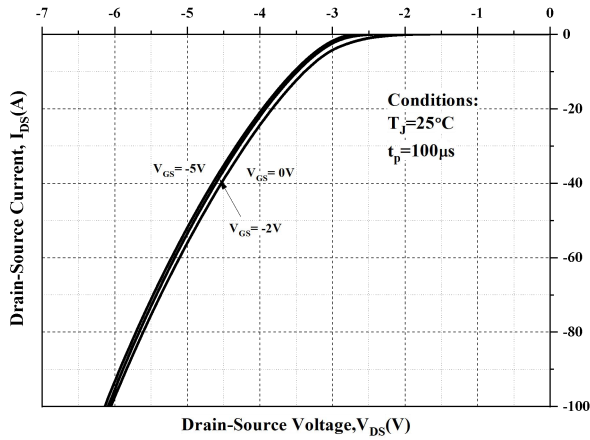


Figure 8. Capacitances vs. Drain-Source Voltage

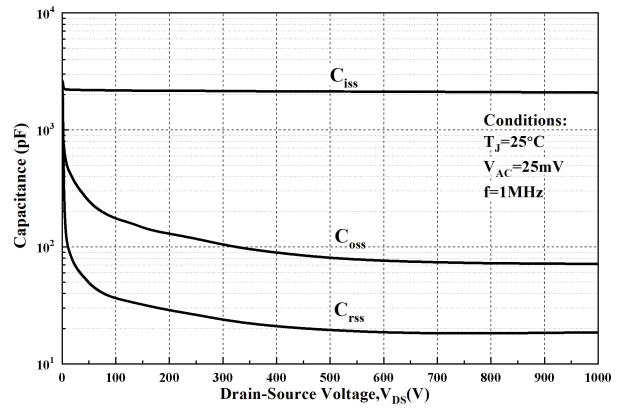


Figure 9. Gate Charge Characteristics

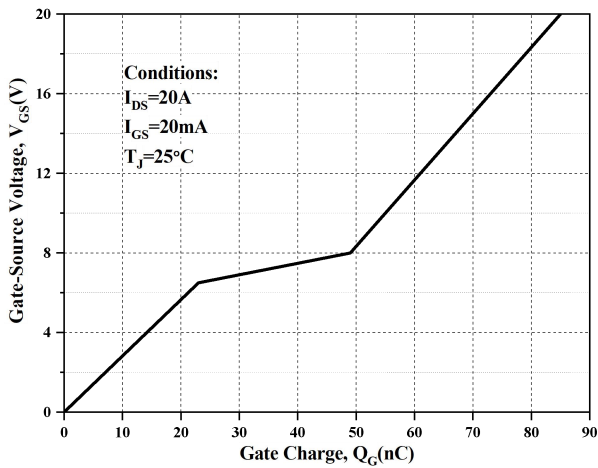


Figure 10. Maximum Power Dissipation Derating vs. Case Temperature

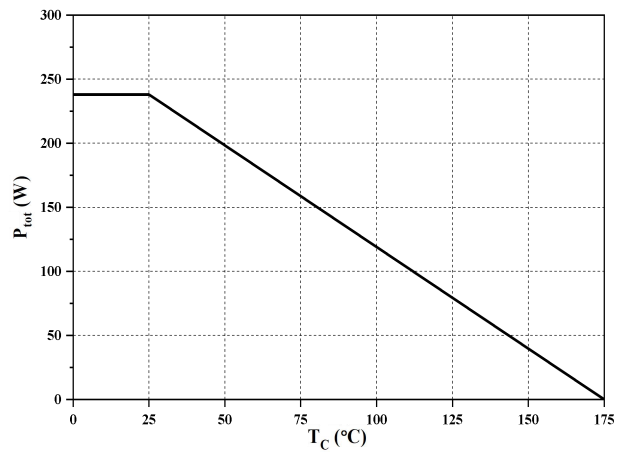
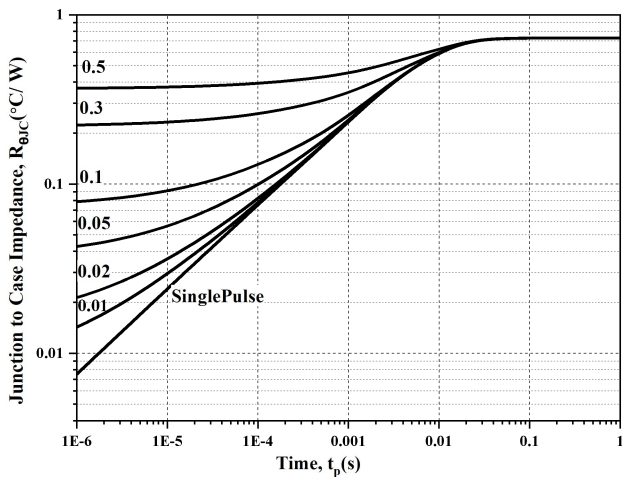
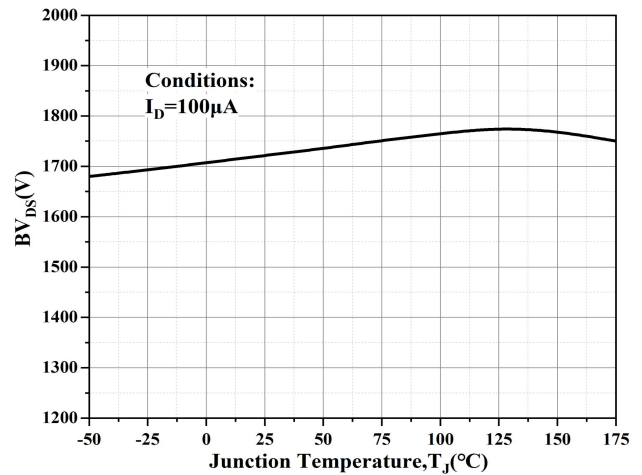


Figure 11. Transient Thermal Impedance



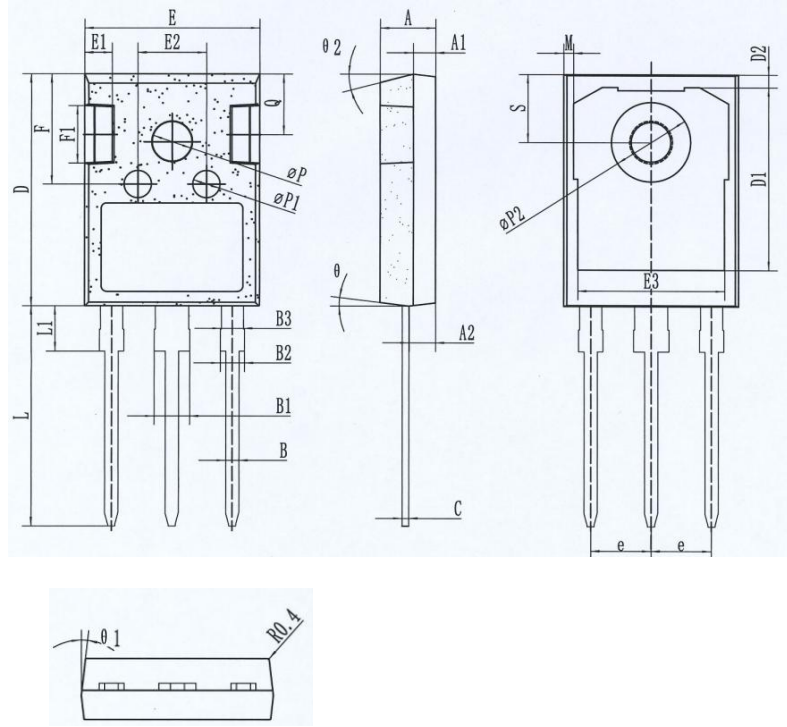
12. BVDSS vs. Junction Temperature





TO-247 Packing Outline Dimensions:
TO-247 封装外形尺寸

Dim	Mechanical Dimensions /mm		
	MIN	NOM	MAX
A	4.90	5.00	5.10
A1	1.90	2.00	2.10
A2	2.30	2.40	2.50
B	1.10	1.20	1.30
B1	3.05	3.15	3.25
B2	2.00	2.10	2.20
C	0.55	0.60	0.65
D	20.90	21.00	21.10
D1	16.35	16.55	16.75
E	15.70	15.80	15.90
E1	2.40	2.50	2.60
F	9.80	10.00	10.20
F1	5.10	5.20	5.30
e	5.44 BSC		
L	19.72	19.92	20.12
L1	3.90	4.10	4.30
ΦP	3.50	3.60	3.70
ΦP1	2.40	2.50	2.60
ΦP2	7.10	7.20	7.30
S	6.05	6.15	6.25
M	0.45	-	0.95
Q	5.40	5.50	5.60



Packing 包装

Package 包装	Pcs/tube 片/管	Tube/ inner box 管/内盒	Inner box/ carton 内盒/外箱	Pcs/carton 片/外箱
Tube 管	30	12	6	2160



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