比亚迪
半导体

BSPE80S120HN

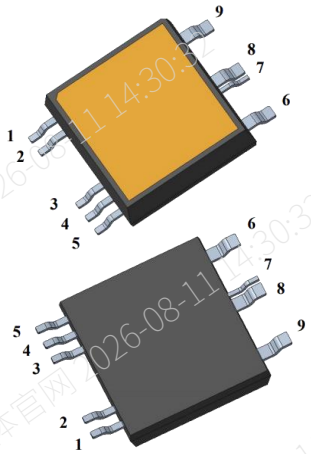
General Description
概述

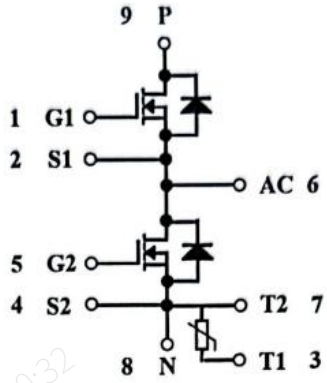
Specifically designed for Automotive applications, this SiC Power MOSFET utilizes the latest processing techniques to achieve extremely low on-resistance per unit area.

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

- Solar Inverters
  太阳能逆变器
- EV motor drive
  EV 电机驱动
- High Voltage DC/DC Converters
  高压 DC/DC 变压器
- Switched mode power supplies
  开关模式电源

Ordering Information
订货信息

Type 型号	BV_{DSS}[V] 漏极-源极电压	R_{DSon}[mΩ] 导通电阻	T_{jmax}[℃] 最高结温	Marking 标记	Packing 封装外形
BSPE80S120HN	1200	80	175	80S120HN	SOP9

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≥25℃ 漏-源电压, T_j≥25℃	V_{DSS}	1200	V
Drain Current(continuous)at T_C=25℃ 常温下漏极电流(持续)	I_D	34	A
Drain Current(continuous)at T_C=100℃ T_C=100℃下漏极电流(持续)		24	
Pulsed Drain current，tp limited by $T_{j\,max}$ 集电极脉冲电流，脉宽时间受 $T_{j\,max}$ 限制	I_{DM}	80	
Gate-Source Voltage 栅极-源极电压	V_{GSmax}	-10/+22	V
Gate-Source Voltage (Recommended operational values) 栅极-源极电压(推荐工作电压)	V_{GSop}	-5/+18	V
Power Dissipation T_C = 25℃ 常温耗散功率	P_D	176	W
Storage Temperature Range 储存温度范围	T_{stg}	-55 to +175	℃
Operating junction temperature Range 工作结温	T_J		
Solder Temperature, 1.6mm case from for10s 焊接温度	T_L	260	

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	$R_{\theta JC}$	0.85	℃/W
Thermal Resistance, Junction to Ambient, Max. 结-环境热阻	$R_{\theta JA}$	40	

Electrical Characteristic at T_j = 25°C （unless otherwise specified）
T_j=25°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-源极击穿电压	BV_{DSS}	V_{GS}=0V, I_D=100μA T_j=25°C	1200	-	-	V
Zero Gate Voltage Drain Current 栅源-漏极漏电流	I_{DSS}	V_{DS}=1200V, V_{GS}=0V T_j=25°C	-	-	100	μA
Gate to Body Leakage Current 栅极-源极漏电流	I_{GSS}	V_{GS}=22V, V_{DS}=0V	-	-	100	nA
Gate to Body Leakage Current 栅极-源极漏电流	I_{SGS}	V_{GS}=-10V, V_{DS}=0V	-	-	100	nA
Static Drain-source On Resistance 漏极-源极开通电阻	$R_{DS(on)}$	V_{GS}=18V, I_D=20A T_j=25°C	-	60	75	mΩ
		V_{GS}=18V, I_D=20A T_j=175°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°C	2.2	3.5	4.2	V
		V_{DS}=V_{GS}, I_{DS}=5mA T_j=175°C	-	2.3	-	
Gate Resistance 栅极电阻	R_G	f=1MHz	-	9.1	-	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	-	1250	-	pF
Output Capacitance 输出电容	C_{oss}		-	65	-	
Reverse Transfer Capacitance 反向传输电容	C_{rss}		-	7	-	
Total Gate Charge 栅极总电荷	$Q_{g(tot)}$	V_{DD}=800V, I_D=20A, V_{GS}=-5/18V	-	76	-	nC
Gate-source Charge 栅-源电荷	Q_{gs}		-	20	-	
Gate-Drain Charge 栅-漏电荷	Q_{gd}		-	15	-	

Switching Characteristic at T_j=25°C（Inductive Load）
T_j=25°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 特性						
Turn-on delay time 开通延迟时间	$t_{d(on)}$	V_{DS}=800V, V_{GS}=-5/18V, I_D=20A, $R_{G(ext)}$=5Ω, L=300μH	-	16	-	ns
Rise time 上升时间	t_r		-	28	-	
Turn-off delay time 关断延迟时间	$t_{d(off)}$		-	54	-	
Fall time 下降时间	t_f		-	34	-	
Turn-on Switching Energy 开通损耗	Eon		-	890	-	uJ
Turn-off Switching Energy 关断损耗	Eoff		-	140	-	
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}	V_{GS}=-5V, I_{SD}=10A, T_j=25°C	-	3.3	-	V
		V_{GS}=-5V, I_{SD}=10A, T_j=175°C	-	3.0	-	
Continuous Diode Forward Current 正向电流	I_S	T_C=25°C	-	30	-	A
Reverse recovery time 反向恢复时间	t_{rr}	T_j=25°C, V_{GS} =-5V/18V, V_R=800V, I_{SD}=20A diF/dt=400A/μs	-	15	-	ns
Recovered charge 恢复电荷	Q_{rr}		-	30	-	nC
Peak reverse recovery current 反向峰值电流	I_{rrm}		-	3.5	-	A

Notes:

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

b: Essentially independent of operating temperature

注：

a：重复范围：脉冲宽度受限于最大结温

b：本质上与工作温度无关

Electrical characteristics diagram
特性曲线

Figure 1. Output Characteristics T_J = -55℃

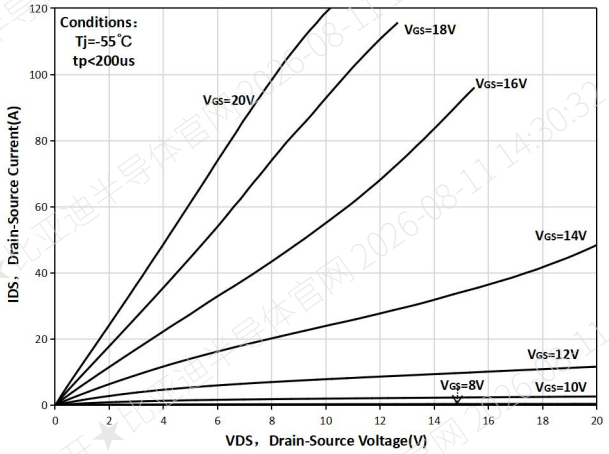


Figure 2. Output Characteristics T_J = 25℃

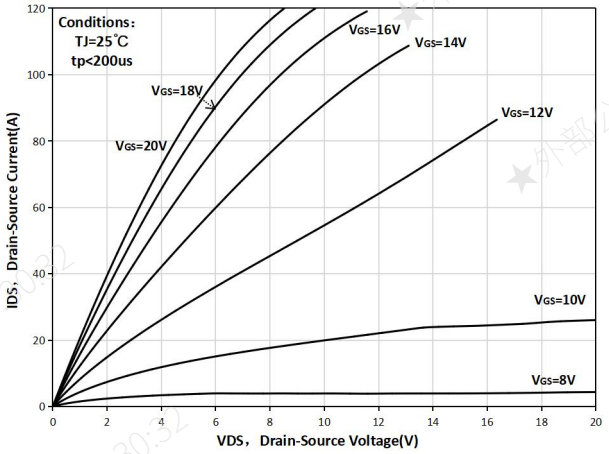


Figure 3. Output Characteristics T_J =175°C

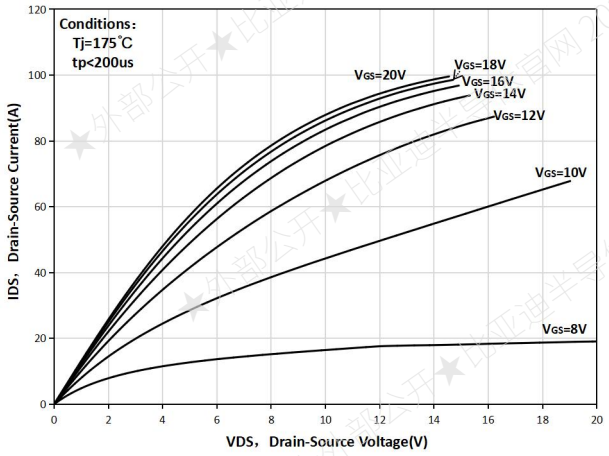


Figure 4. On-Resistance For Various Gate Voltage

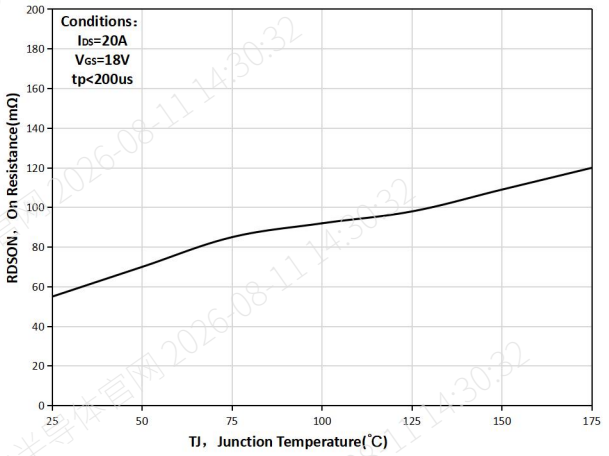


Figure 5. Transfer Characteristic
for Various Junction Temperatures

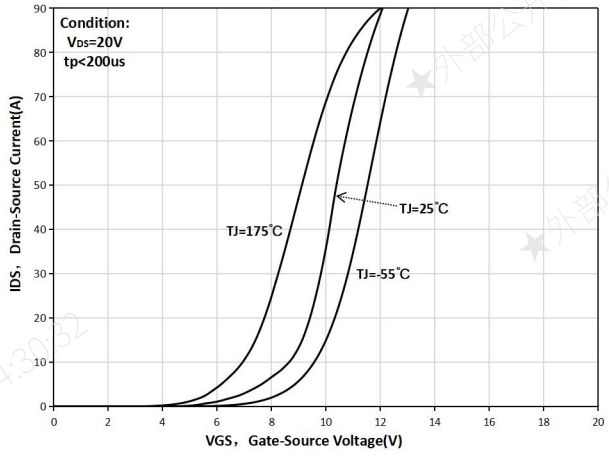


Figure 6. Threshold Voltage vs. Temperature

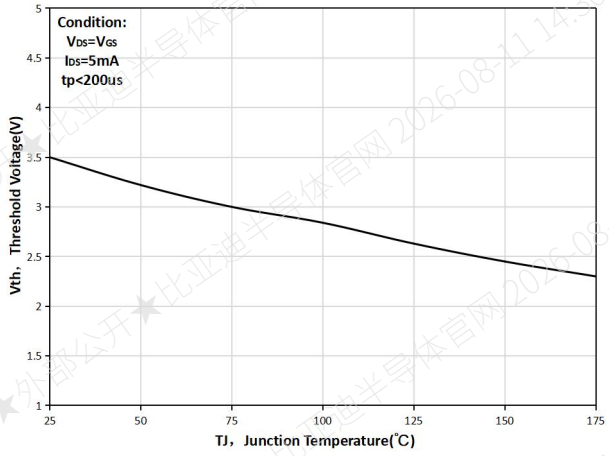


Figure 7. Body Diode Characteristics at -55℃

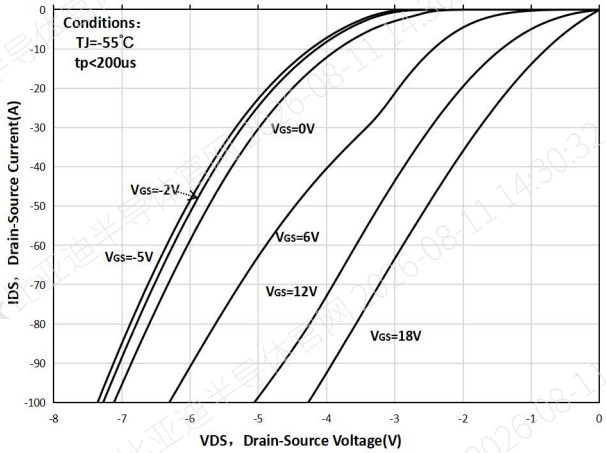


Figure 8. Body Diode Characteristics at 25℃

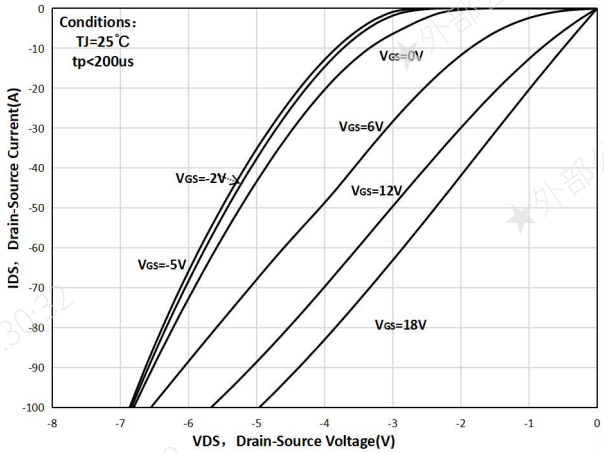


Figure 9. Body Diode Characteristics at 175℃

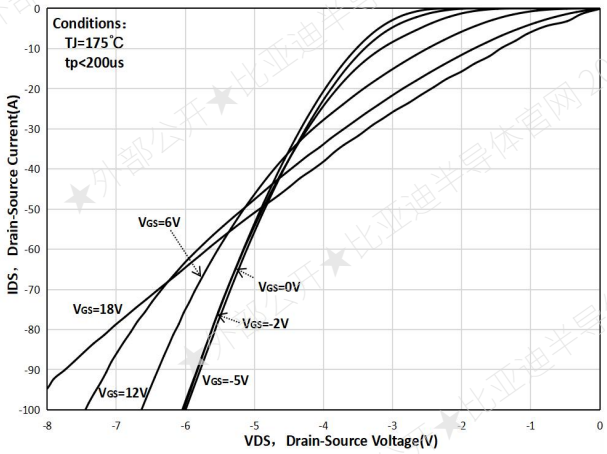


Figure 10. Capacitances vs. Drain-Source Voltage

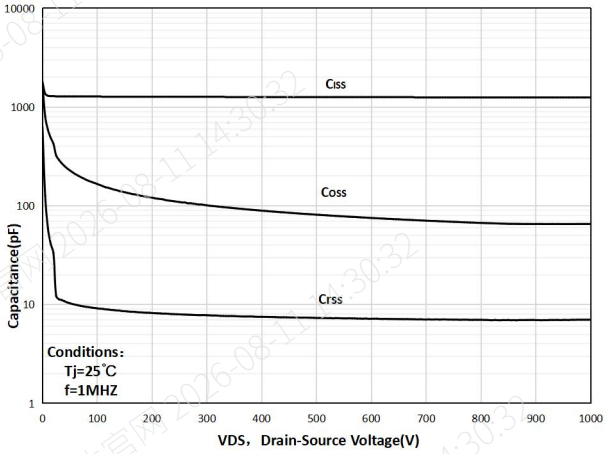


Figure 11. Gate Charge Characteristics

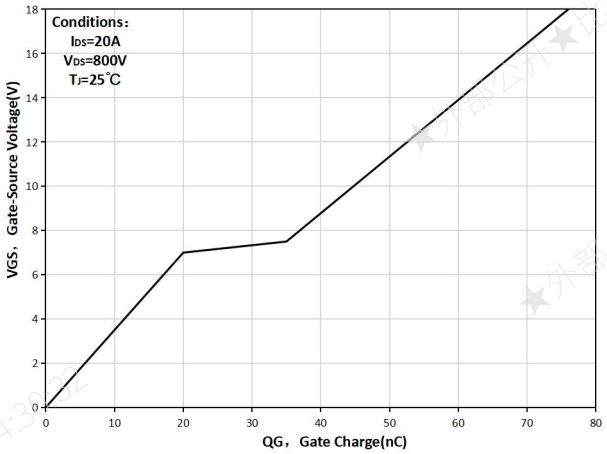


Figure 12. Forward Voltage vs.Junction Temperature

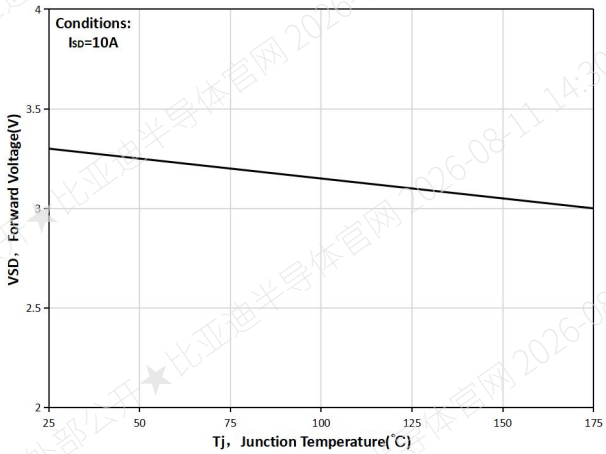


Figure 13. Body Diode Characteristics for Various Junction Temperatures

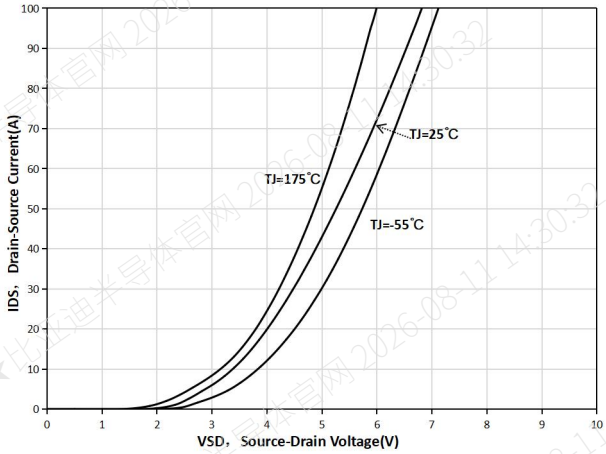


Figure 14. Clamped Inductive Switching Energy Vs.Temperature

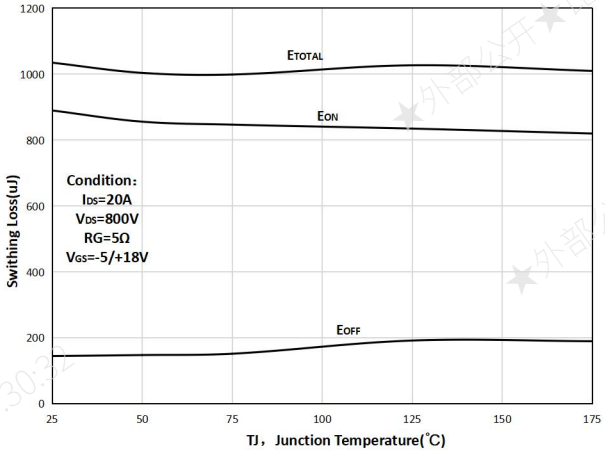


Figure 15. Switching Times vs.Junction Temperature

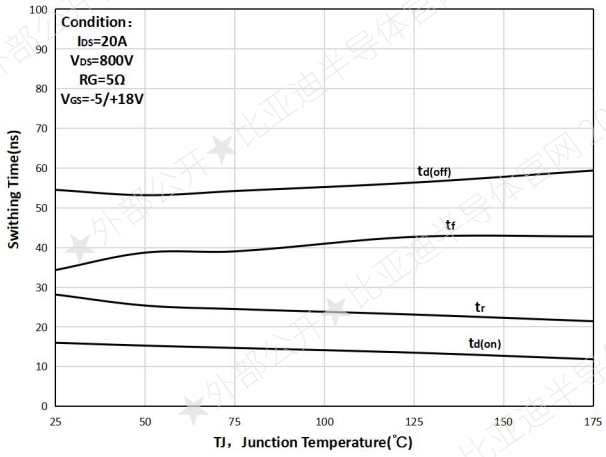


Figure 16. On-Resistance vs.Drain Current

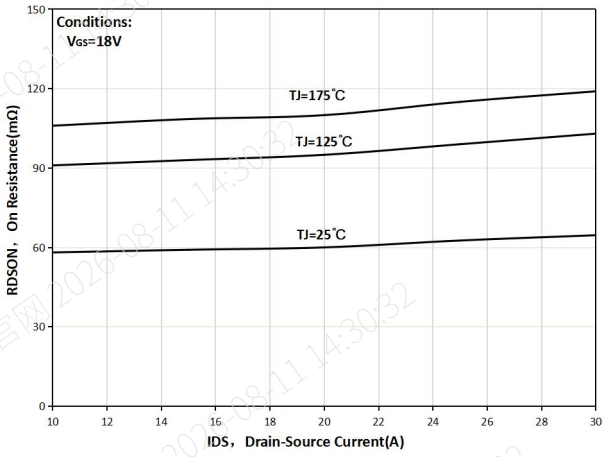


Figure17. Continuous Drain Current Derating vs. Case Temperature

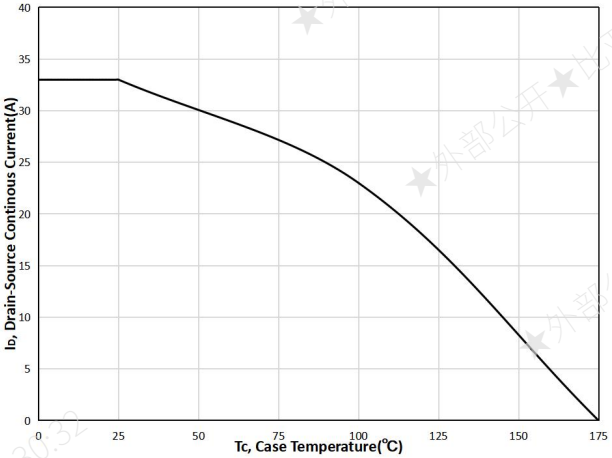
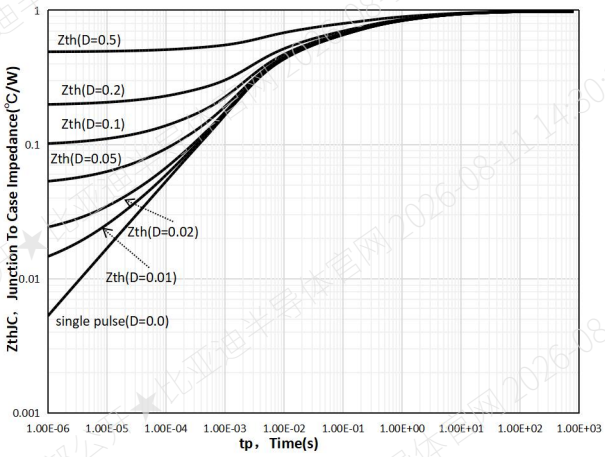
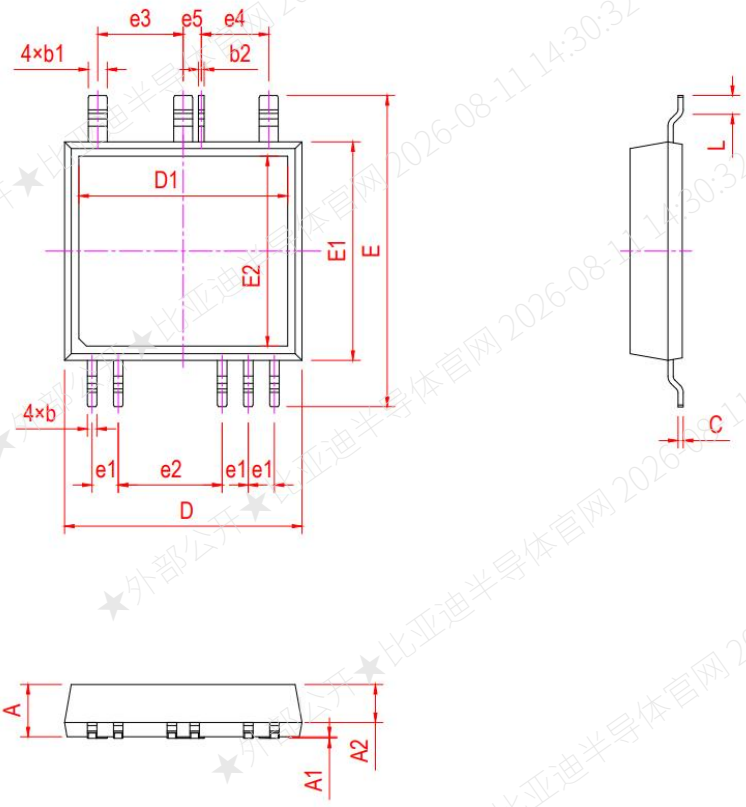


Figure 18 Transient Thermal Impendance



SOP Packing Outline Dimensions:
SOP 封装外形尺寸



Dim.	Mechanical Dimensions /mm	
	MIN	MAX
A	5.40	5.60
A1	0.05	0.25
A2	3.90	4.10
b	0.90	1.10
b1	1.90	2.10
b2	0.50	0.70
c	0.45	0.60
D	24.80	25.20
D1	21.00 TYP	
E	32.40	33.00
E1	22.80	23.20
E2	19.00 TYP	
e1	2.65	2.85
e2	10.65	10.85
e3	8.50	8.70
e4	7.00	7.20
e5	2.20	2.40
L	1.05	1.45

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  Special instructions： Storage Temperature: 20±5℃; Relative Humidity: 30%-60%; The product should be stored in a place away from direct light and vibration.

  质保期：除双方在合作协议或其他书面文件中另行约定外，产品妥当保存的情况下自购买之日起，本规格书所述产品质保期为期一年。

  特殊说明：储存温度：20±5℃；相对湿度：30%-60%；产品应放置于避光地方，避免震动。
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