

HC032N120G4T

1200V N-Channel SiC MOSFET

产品特点/Product features

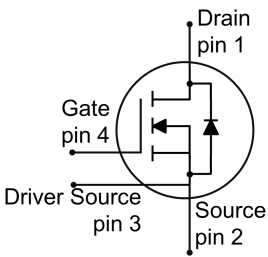
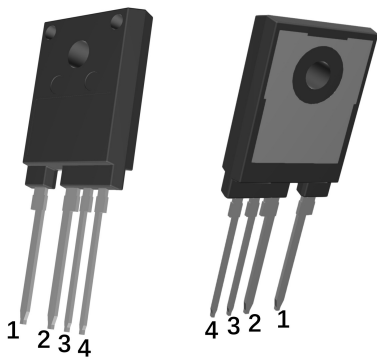
- High Efficiency & Low Loss Performance  
高效率与低损耗性能
- Optimized High-Frequency Switching  
优化的开关性能与高频率支持
- Minimized Cooling Requirements  
最小化的散热需求
- High Power Density  
高功率密度
- Enhanced Drive Stability (Kelvin Source)  
增强的驱动稳定性（开尔文源极）
- Simplification & Cost Reduction  
系统简化与成本降低
- The device is RoHS Compliant  
符合 RoHS 标准

应用领域/Applications

- High Voltage DC/DC Converters  
高压直流/直流 (DC/DC) 转换器
- Switch Mode Power Supplies (SMPS)  
开关模式电源
- Solar string inverter and solar optimizer  
太阳能电池组逆变器、太阳能优化器
- EV Charger  
电动汽车充电桩
- Solar Inverters  
太阳能逆变器

关键性能参数/Key Performance Parameters

| Parameter        | Value | Unit |
|------------------|-------|------|
| $V_{DS}$         | 1200  | V    |
| $R_{DS(on),typ}$ | 32    | mΩ   |
| $I_{DM}$         | 211   | A    |



| Type/型号      | Package/封装 | Marking/标识 | Packaging method/包装方式 |
|--------------|------------|------------|-----------------------|
| HC032N120G4T | TO247S-4L  | HC032N120T | Tube/管装               |

# 1200V N-Channel SiC MOSFET HC032N120G4T



## 1. Maximum ratings at $T_j = 25^\circ\text{C}$ , unless otherwise specified.

**最大额定值** 默认  $T_j = 25^\circ\text{C}$  除非另有说明

Table 1 Maximum ratings/最大额定值

| Parameter<br>参数                                  | Symbol<br>符号 | Test conditions<br>测试条件                                       | Value<br>值 | Unit<br>单位 |
|--------------------------------------------------|--------------|---------------------------------------------------------------|------------|------------|
| Drain-source voltage<br>漏极-源极电压                  | $V_{DS}$     | $T_j \geq 25^\circ\text{C}$                                   | 1200       | V          |
| Drain current <sup>1</sup><br>连续漏极电流             | $I_D$        | $T_C = 25^\circ\text{C}, V_{GS} = 18\text{V}$                 | 91         | A          |
|                                                  |              | $T_C = 100^\circ\text{C}, V_{GS} = 18\text{V}$                | 65         |            |
| Peak drain current <sup>2</sup><br>峰值漏极电流        | $I_{DM}$     | $T_j \leq 175^\circ\text{C}$                                  | 211        | A          |
| Continuous diode current <sup>1</sup><br>连续二极管电流 | $I_S$        | $T_C = 25^\circ\text{C}, V_{GS} = -4\text{V}$                 | 91         | A          |
| Peak diode current <sup>2</sup><br>峰值二极管电流       | $I_{SM}$     | $T_C = 25^\circ\text{C}, V_{GS} = -4\text{V}$                 | 211        | A          |
| Maximum gate source voltage<br>栅源最大电压            | $V_{GS,MAX}$ |                                                               | -10~22     | V          |
| Recommend gate source voltage<br>推荐的栅源电压         | $V_{GS,op}$  |                                                               | -4~18      | V          |
| Avalanche energy, single pulse<br>单脉冲雪崩能量        | $E_{AS}$     | $I_{AS} = 31\text{A}, V_{DD} = 100\text{V}, L = 1.0\text{mH}$ | 528        | mJ         |
| Power dissipation <sup>1</sup><br>总耗散功率          | $P_{tot}$    | $T_C = 25^\circ\text{C}$                                      | 454        | W          |
|                                                  |              | $T_C = 100^\circ\text{C}$                                     | 227        |            |
| Mounting torque<br>安装扭矩                          | $M_d$        | M3 and M3.5 screw<br>M3或者M3.5螺钉                               | 0.6        | Nm         |

1. Limited by  $T_j(\text{max})$ /受限于最大结温

2. Pulse width  $t_p$  limited by  $T_j(\text{max})$  /脉宽受限于最大结温



## 2. Thermal characteristics

### 热特性

Table 2 Thermal characteristics/热特性

| Parameter<br>参数                                | Symbol<br>符号  | Test conditions<br>测试条件 | Value/值 |      |      | Unit<br>单位 |
|------------------------------------------------|---------------|-------------------------|---------|------|------|------------|
|                                                |               |                         | Min.    | Typ. | Max. |            |
| Storage Temperature<br>存储温度                    | $T_{stg}$     |                         | -55     |      | 175  | °C         |
| Operating junction Temperature<br>工作结温         | $T_j$         |                         | -55     |      | 175  | °C         |
| Thermal resistance, junction-case<br>结-壳热阻     | $R_{th(j-c)}$ |                         |         | 0.33 |      | K/W        |
| Thermal resistance, junction-ambient<br>结-环境热阻 | $R_{th(j-a)}$ |                         |         | 40   |      | K/W        |
| Soldering temperature<br>焊接温度                  | $T_{sold}$    |                         |         |      | 260  | °C         |



**3. Electrical characteristics** at  $T_j = 25^\circ\text{C}$ , unless otherwise specified.

电气特性 默认  $T_j = 25^\circ\text{C}$  除非另有说明

**Table 3 Static characteristics/静态特性**

| Parameter<br>参数                               | Symbol<br>符号  | Test conditions<br>测试条件                     |                           | Value/值 |      |      | Unit<br>单位    |
|-----------------------------------------------|---------------|---------------------------------------------|---------------------------|---------|------|------|---------------|
|                                               |               |                                             |                           | Min.    | Typ. | Max. |               |
| Drain-source breakdown voltage<br>漏源击穿电压      | $V_{(BR)DSS}$ | $I_D = 100\mu\text{A}, V_{GS} = 0\text{V}$  |                           | 1200    |      |      | V             |
| Gate threshold voltage<br>门极开启阈值电压            | $V_{GS(th)}$  | $I_D = 10\text{mA}, V_{DS} = V_{GS}$        | $T_j = 25^\circ\text{C}$  | 1.8     | 2.5  | 3.8  | V             |
|                                               |               |                                             | $T_j = 175^\circ\text{C}$ |         | 1.8  |      |               |
| Drain-source on-state resistance<br>漏极-源极导通电阻 | $R_{DS(on)}$  | $I_D = 40\text{A}, V_{GS(on)} = 15\text{V}$ | $T_j = 25^\circ\text{C}$  |         | 40   |      | m $\Omega$    |
|                                               |               |                                             | $T_j = 175^\circ\text{C}$ |         | 60   |      |               |
|                                               |               | $I_D = 40\text{A}, V_{GS(on)} = 18\text{V}$ | $T_j = 25^\circ\text{C}$  |         | 32   |      |               |
|                                               |               |                                             | $T_j = 175^\circ\text{C}$ |         | 57   |      |               |
| Zero gate voltage drain current<br>集电极-发射极漏电  | $I_{DSS}$     | $V_{DS} = 1200\text{V}, V_{GS} = 0\text{V}$ |                           |         | 0.1  | 10   | $\mu\text{A}$ |
| Gate to source Leakage current<br>门极-源极漏电流    | $I_{GSS}$     | $V_{DS} = 0\text{V}, V_{GS} = 18\text{V}$   |                           |         |      | 100  | nA            |
|                                               |               | $V_{DS} = 0\text{V}, V_{GS} = -4\text{V}$   |                           |         |      | 100  |               |
| Forward transconductance<br>正向跨导              | $g_{fs}$      | $I_D = 40\text{A}, V_{DS} = 20\text{V}$     | $T_j = 25^\circ\text{C}$  |         | 25   |      | S             |
|                                               |               |                                             | $T_j = 175^\circ\text{C}$ |         | 27   |      |               |
| Integrated gate resistor<br>内部门极电阻            | $R_G$         | $f = 1\text{MHz}$                           |                           |         | 0.76 |      | $\Omega$      |

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**Table 4 Dynamic characteristics/动态特性**

| Parameter<br>参数                        | Symbol<br>符号 | Test conditions<br>测试条件                           | Value/值 |      |      | Unit<br>单位 |
|----------------------------------------|--------------|---------------------------------------------------|---------|------|------|------------|
|                                        |              |                                                   | Min.    | Typ. | Max. |            |
| Total gate charge<br>总栅极电荷             | $Q_{G(tot)}$ | $V_{DD}=800V$ ,<br>$I_D=40A$ ,<br>$V_{GS}=-4/18V$ |         | 88   |      | nC         |
| Gate source charge<br>栅-源极电荷           | $Q_{GS}$     |                                                   |         | 22   |      |            |
| Gate-drain charge<br>栅-漏极电荷            | $Q_{GD}$     |                                                   |         | 35   |      |            |
| Input capacitance<br>输入电容              | $C_{iss}$    | $V_{DS}=1000V$ ,<br>$V_{GS}=0V$ ,<br>$f=100KHz$   |         | 1855 |      | pF         |
| Output capacitance<br>输出电容             | $C_{oss}$    |                                                   |         | 91   |      |            |
| Reverse transfer capacitance<br>反向传输电容 | $C_{rss}$    |                                                   |         | 6.6  |      |            |
| Coss stored energy<br>输出电容存储能量         | $E_{oss}$    | Calculated based on $C_{oss}$                     |         | 36   |      | $\mu J$    |

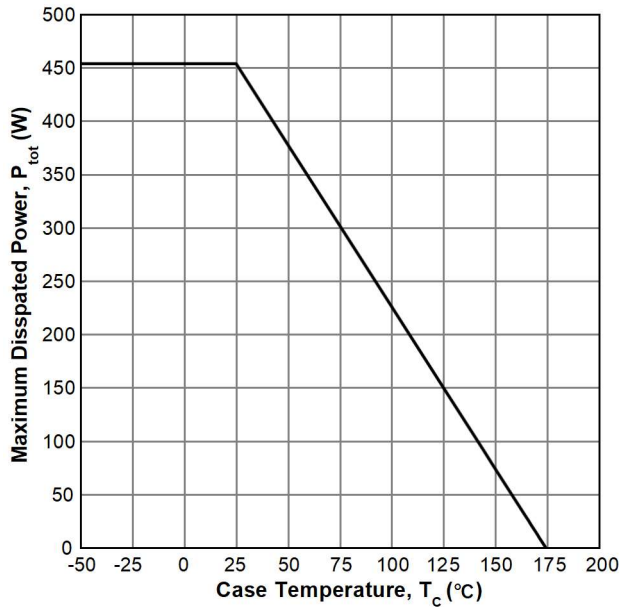
**Table 5 Reverse diode characteristics/体二极管反向特性**

| Parameter<br>参数                          | Symbol<br>符号 | Test conditions<br>测试条件 | Value/值 |      |      | Unit<br>单位 |
|------------------------------------------|--------------|-------------------------|---------|------|------|------------|
|                                          |              |                         | Min.    | Typ. | Max. |            |
| Drain-source reverse voltage<br>体二极管正向压降 | $V_{SD}$     | $I_S=20A, V_{GS}=0V$    |         | 3.1  |      | V          |
|                                          |              | $I_S=20A, V_{GS}=-2V$   |         | 3.6  |      |            |
|                                          |              | $I_S=20A, V_{GS}=-5V$   |         | 3.8  |      |            |

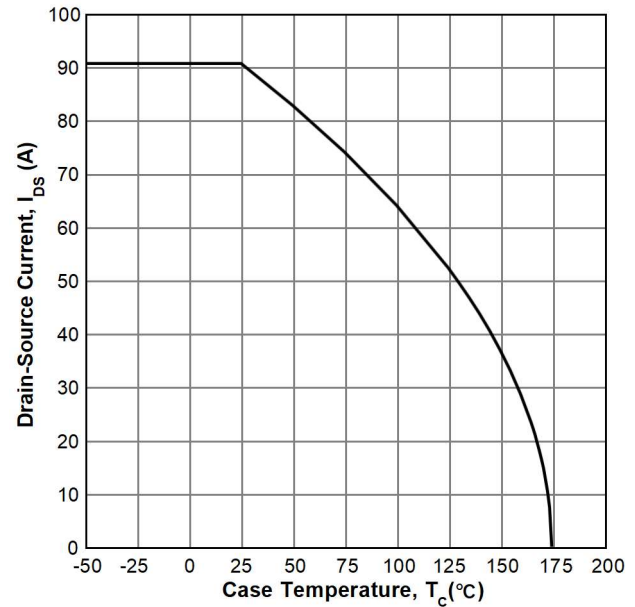
## 4. Electrical characteristics diagrams

### 电气特性图表

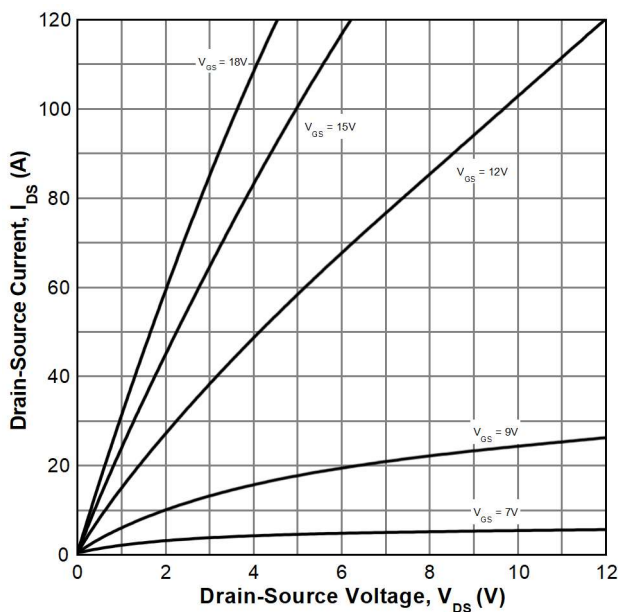
Power dissipation/耗散功率  
 $P_{tot}=f(T_c)$ ;  $T_J \leq 175^\circ\text{C}$



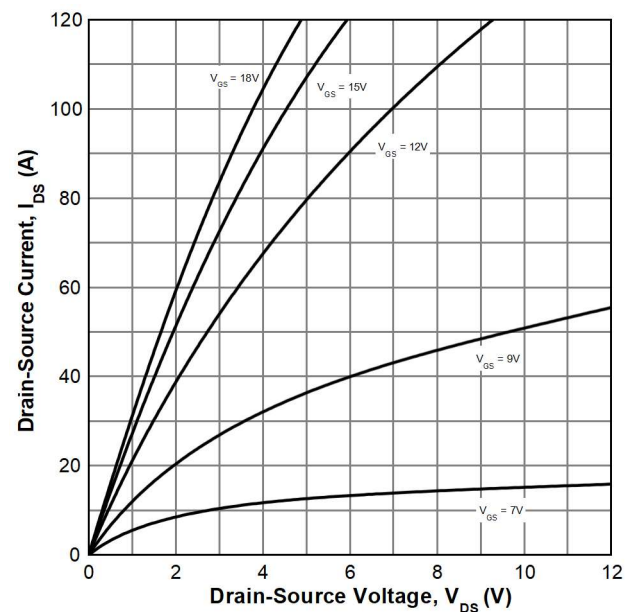
Continuous Drain Current/连续漏电流与壳温  
 $I_{DS}=f(T_c)$ ;  $T_J \leq 175^\circ\text{C}$



Typ. Output Characteristic/典型输出特性  
 $I_{DS}=f(V_{DS})$ ;  $T_J = -55^\circ\text{C}$

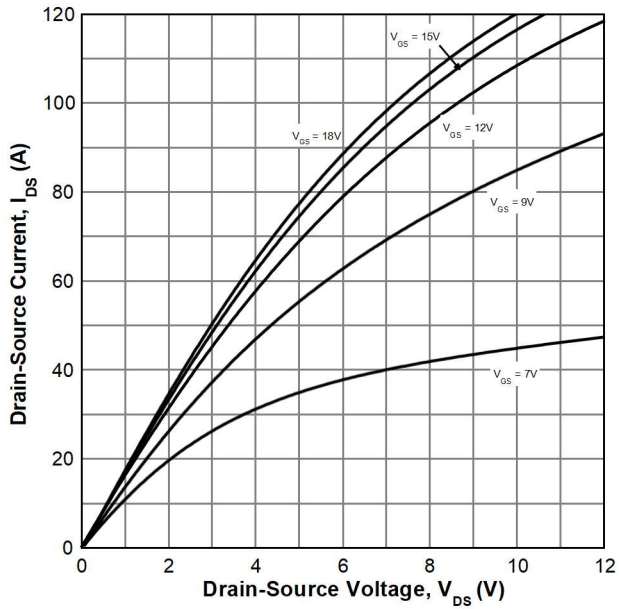


Typ. Output Characteristic/典型输出特性  
 $I_{DS}=f(V_{DS})$ ;  $T_J = 25^\circ\text{C}$

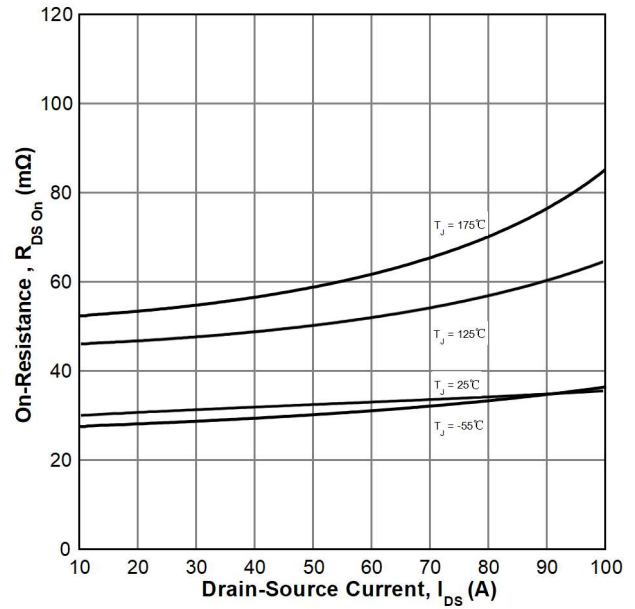




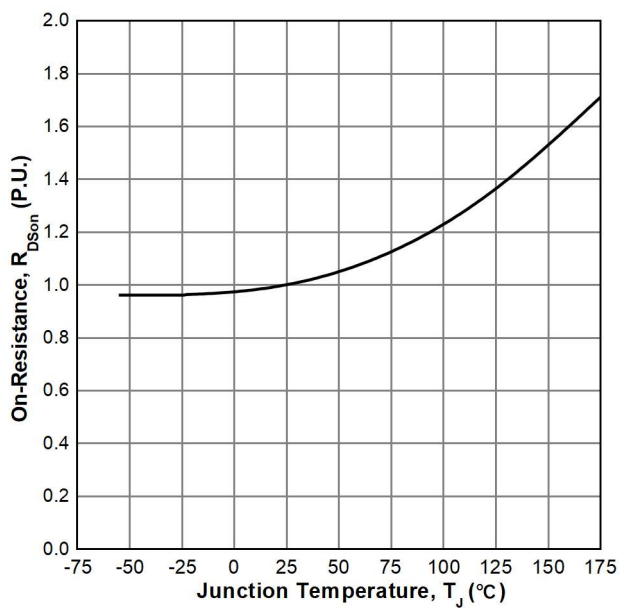
**Typ. Output characteristic/典型输出特性**  
 $I_{DS}=f(V_{DS})$ ;  $T_J=175^{\circ}\text{C}$



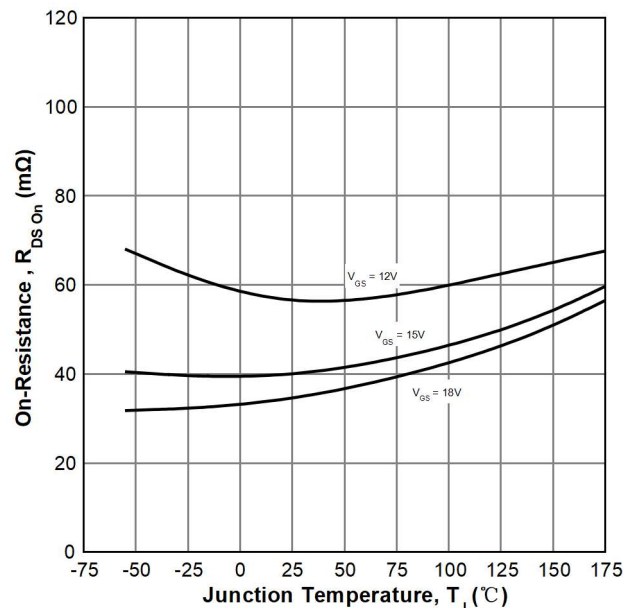
**Typ. Drain-source on-state resistance/典型漏源导通电阻**  
 $R_{DS(on)}=f(I_{DS})$ ;  $V_{GS}=18\text{V}$ ,  $I_{DS}=40\text{A}$



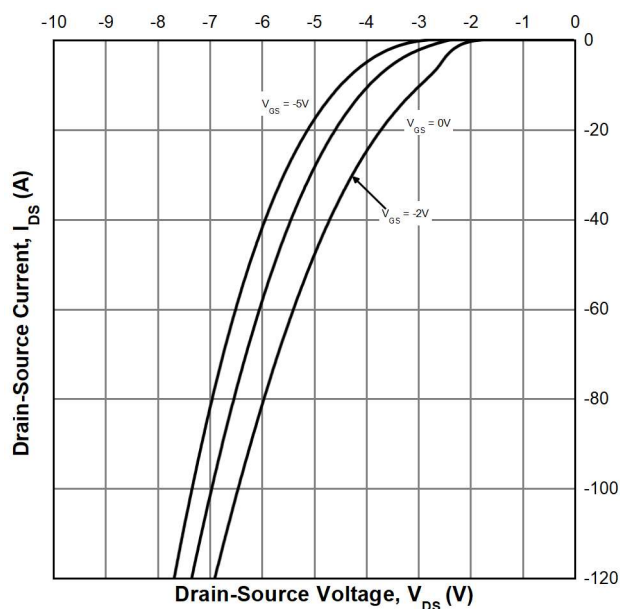
**Typ. Drain-source on-state resistance/漏源导通电阻**  
 $R_{DS(on)}=f(T_J)$ ;  $I_{DS}=40\text{A}$ ,  $V_{GS}=18\text{V}$



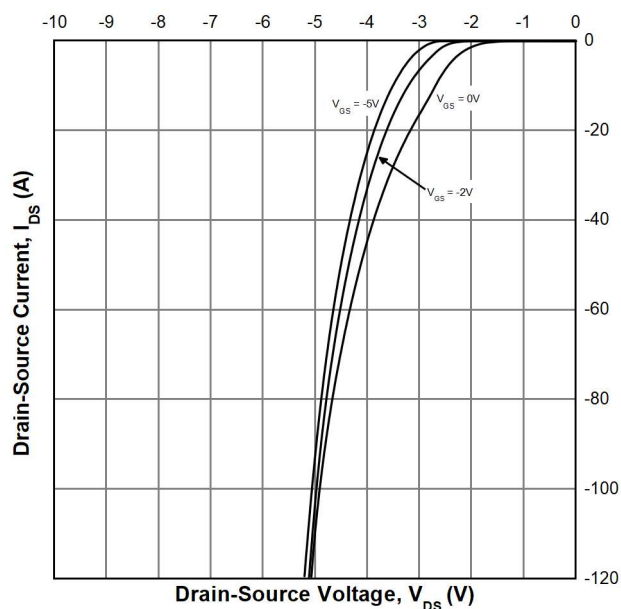
**Typ. Drain-source on-state resistance/漏源导通电阻**  
 $R_{DS(on)}=f(T_J)$ ;  $I_{DS}=40\text{A}$



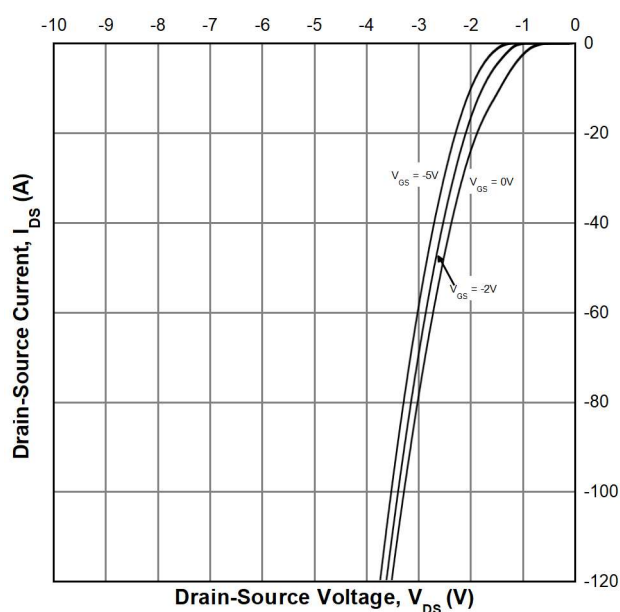
**Typ.Reverse drain current characteristics/典型体二极管特性**  
 $I_{SD}=f(V_{SD})$ ;  $T_J=-55^{\circ}\text{C}$



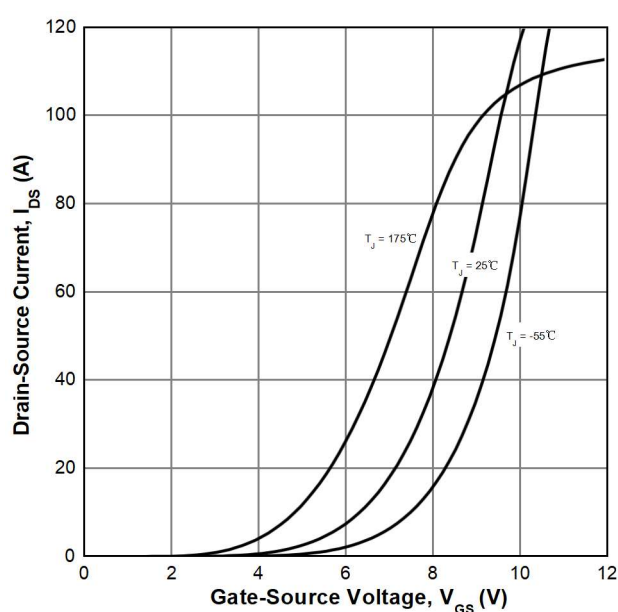
**Typ.Reverse drain current characteristics/典型体二极管特性**  
 $I_{SD}=f(V_{SD})$ ;  $T_J=25^{\circ}\text{C}$



**Typ.Reverse drain current characteristics/典型体二极管特性**  
 $I_{SD}=f(V_{SD})$ ;  $T_J=175^{\circ}\text{C}$



**Typ.Transfer characteristics/传输特性**  
 $I_{DS}=f(V_{GS})$ ;  $V_{DS}=20V$

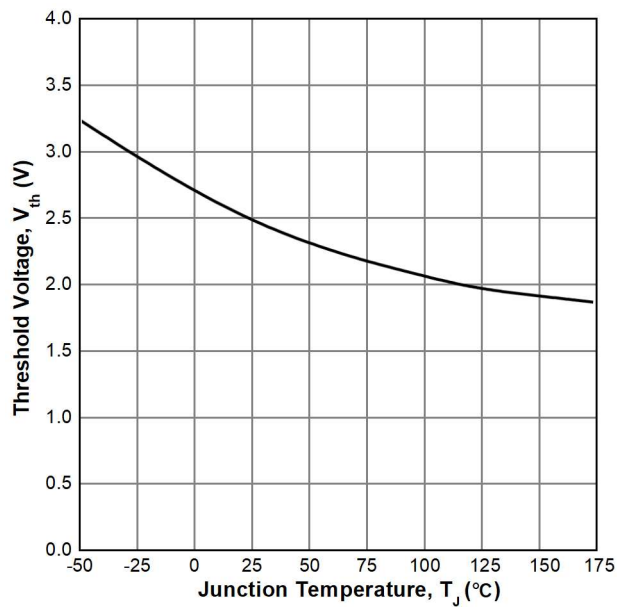




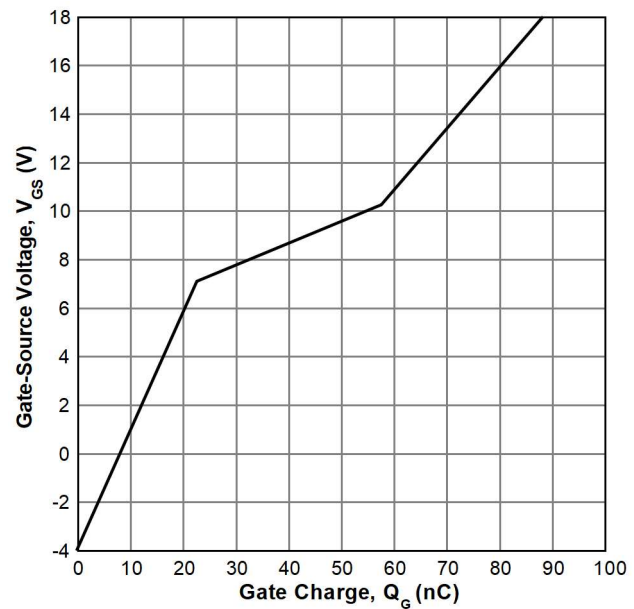
1200V N-Channel SiC MOSFET  
HC032N120G4T



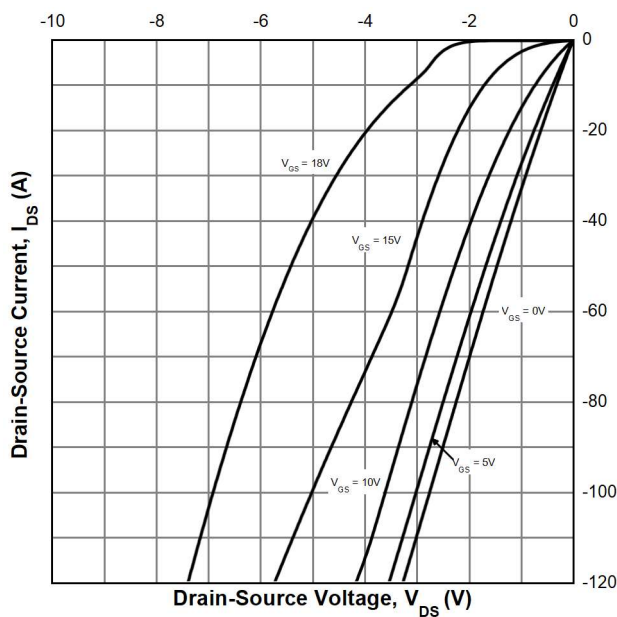
Typ. Gate threshold voltage/门级阈值电压结温特性  
 $V_{GS}=f(T_J)$ ;  $I_D=10mA$ ,  $V_{DS}=V_{GS}$



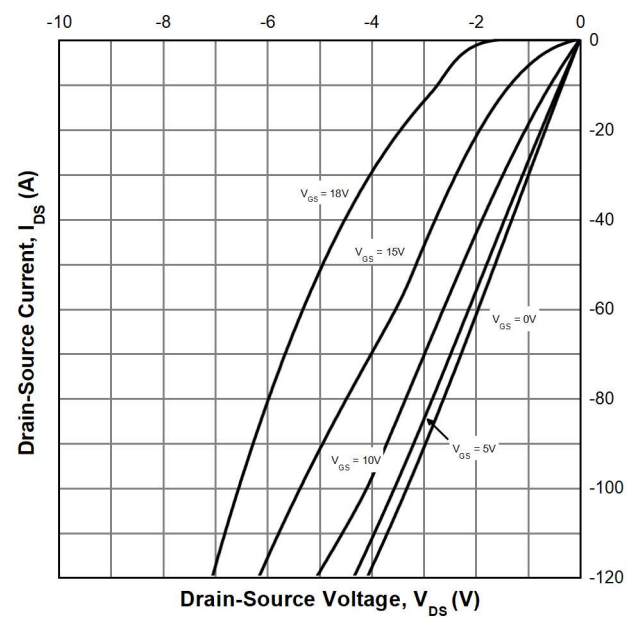
Typ. Gate charge/典型门级电荷  
 $V_{GS}=f(Q_G)$ ;  $I_{DS}=40A$ ,  $I_{GS}=50mA$ ,  $V_{DS}=800V$ ,  $T_J=25^\circ C$



Typ. 3rd Quadrant Characteristics/典型第三象限特性  
 $I_{DS}=f(V_{DS})$ ;  $T_J=-55^\circ C$



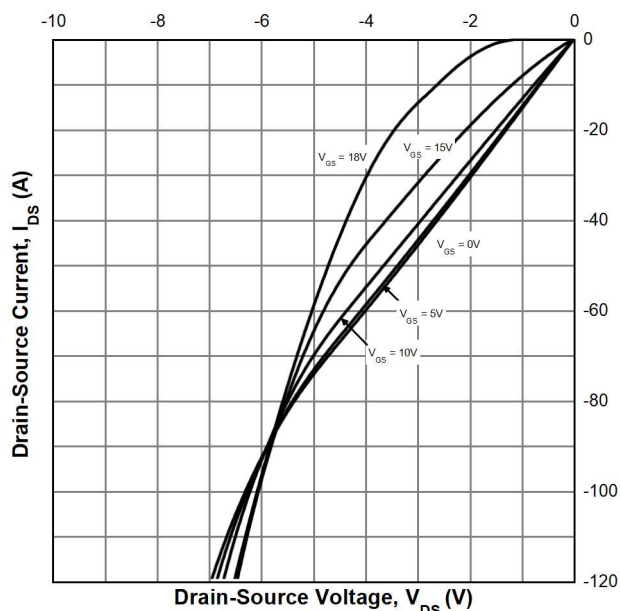
Typ. 3rd Quadrant Characteristics/典型第三象限特性  
 $I_{DS}=f(V_{DS})$ ;  $T_J=25^\circ C$



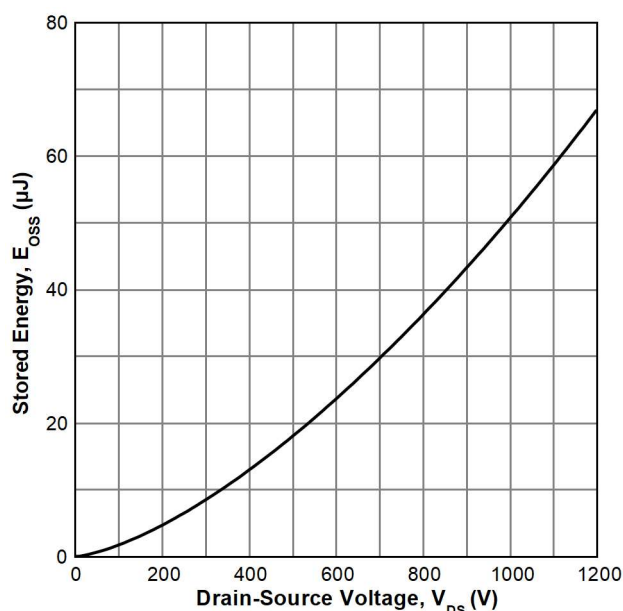
# 1200V N-Channel SiC MOSFET HC032N120G4T



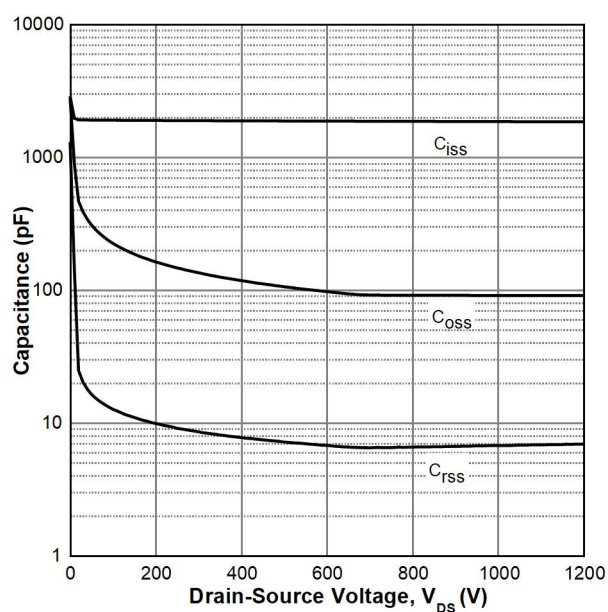
Typ.3rd Quadrant Characteristics/典型第三象限特性  
 $I_{DS}=f(V_{DS})$ ;  $T_J=25^\circ\text{C}$



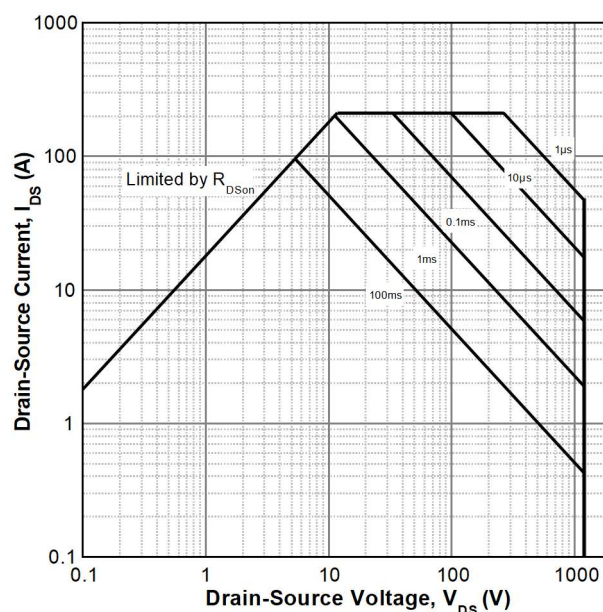
Typ.Coss stored energy/典型 $C_{OSS}$ 存储能量  
 $E_{OSS}=f(V_{DS})$ ;  $T_J=25^\circ\text{C}$



Typ.Capacitances/典型电容特性  
 $C=f(V_{DS})$ ;  $V_{GS}=0V$



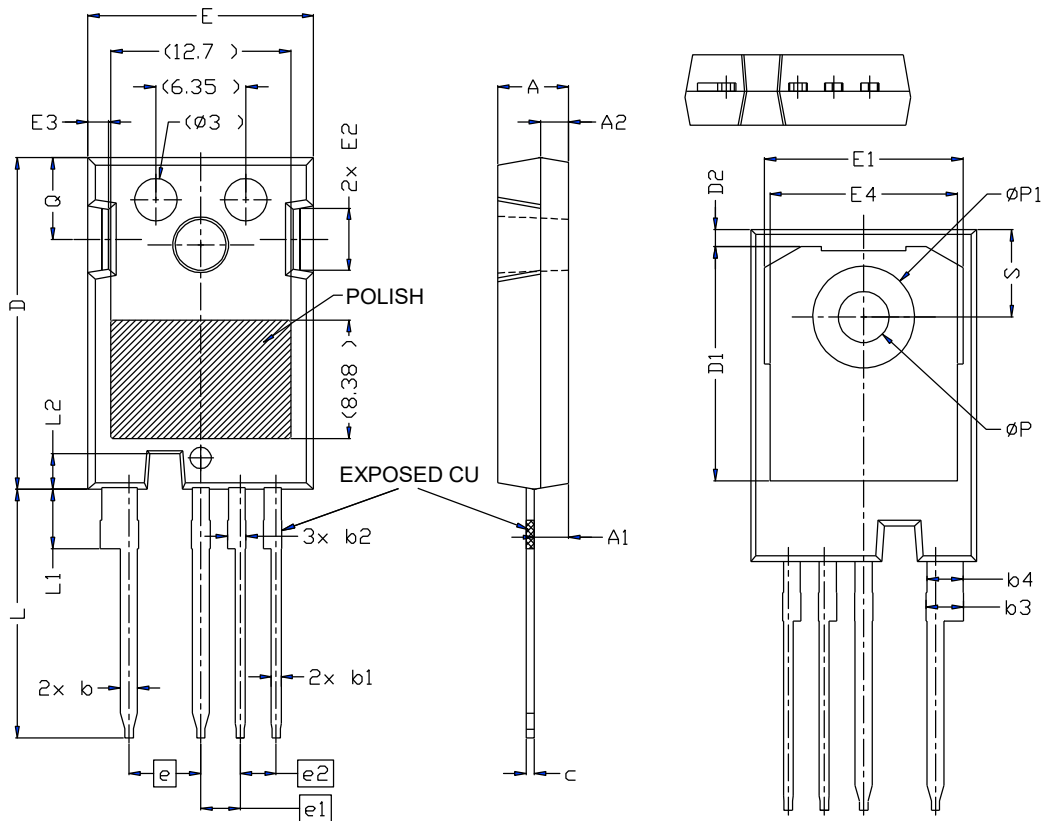
Forward bias safe operating area/安全工作区  
 $I_D=f(V_{DS})$ ;  $T_C=25^\circ\text{C}, D=0$





5. Package outline  
封装外形

Figure 1. Outline TO247S-4L, dimensions in mm/TO247S-4L外形尺寸（毫米）



| SYMBOL | DIMENSIONS |       |       | SYMBOL | DIMENSIONS |       |       |
|--------|------------|-------|-------|--------|------------|-------|-------|
|        | MIN.       | NOM.  | MAX.  |        | MIN.       | NOM.  | MAX.  |
| A      | 4.83       | 5.02  | 5.21  | E      | 15.75      | 15.94 | 16.13 |
| A1     | 2.29       | 2.41  | 2.54  | E1     | 13.10      | 14.02 | 14.15 |
| A2     | 1.91       | 2.00  | 2.16  | E2     | 3.68       | 4.40  | 5.10  |
| b      | 1.10       | 1.20  | 1.30  | E3     | 1.00       | 1.45  | 1.90  |
| b1     | 0.65       | 0.70  | 0.80  | E4     | 12.38      | 13.26 | 13.43 |
| b2     | 1.07       | 1.30  | 1.60  | e      | 5.08 BSC   |       |       |
| b3     | 2.39       | 2.67  | 2.94  | e1     | 2.79 BSC   |       |       |
| b4     | 2.39       | 2.53  | 2.69  | e2     | 2.54 BSC   |       |       |
| c      | 0.55       | 0.60  | 0.68  | L      | 17.31      | 17.57 | 17.82 |
| c1     | 0.55       | 0.60  | 0.65  | L1     | 3.97       | 4.19  | 4.37  |
| D      | 23.30      | 23.45 | 23.60 | L2     | 2.35       | 2.50  | 2.65  |
| D1     | 16.25      | 16.55 | 17.65 | ΦP     | 3.51       | 3.61  | 3.65  |
| D2     | 0.95       | 1.19  | 1.25  | ΦP1    | 7.19 REF.  |       |       |
|        |            |       |       | Q      | 5.49       | 5.79  | 6.00  |
|        |            |       |       | S      | 6.04       | 6.17  | 6.30  |

- NOTES\注:
- Slot required, notch may be rounded
  - 槽口是必需的，缺口（或凹槽）可以倒圆（或圆角化）
  - Dimension D & E do not include mold flash, Mold flash shall not exceed 0.127mm per side, These dimensions are measured at the outermost extreme of the plastic body
  - 尺寸 D 和 E 不包含溢边（模具飞边）。溢边每侧不得超过0.127mm。这些尺寸测量于塑料本体的最外极限。
  - Thermal pad contour optional within dimension D1 & E1.
  - 散热焊盘的轮廓在尺寸 D1 和 E1 定义的范围内可选。
  - Lead finish uncontrolled in L1
  - 引脚镀层在 L1 区域不作控制。
  - ΦP to have A draft angle of 1.5°(REF.) to the top of the part with hole diameter of 3.91mm(REF.)
  - ΦP孔具有一个1.5°（参考值）的拔模斜度（至器件顶部），孔径为 3.91 mm（参考值）



## 6. Revision history

Table 6 Date and version number/日期与版本号

| Date日期     | Revision版本 | Changes更改内容              |
|------------|------------|--------------------------|
| 2025-09-15 | Rev. G 1.0 | Target Datasheet (目标规格书) |

## 7. Matters needing attention

### Appendix 1. Important Technical Guidance, Application Policy, and Copyright Notice/重要技术指南、应用规范与版权声明

#### [Data and Design Guidance]

The information provided herein, including typical values and application examples, serves as technical guidance only and should not be construed as a formal guarantee of product characteristics. This documentation is intended for qualified engineering personnel, who bear the ultimate responsibility for evaluating the product's suitability for their specific application and compliance with all industry standards.

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