

HC032N120C4T

1200V N-Channel SiC MOSFET

产品特点/Product features

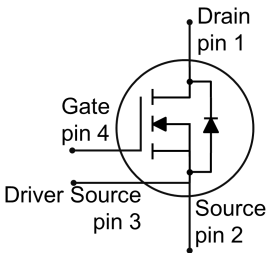
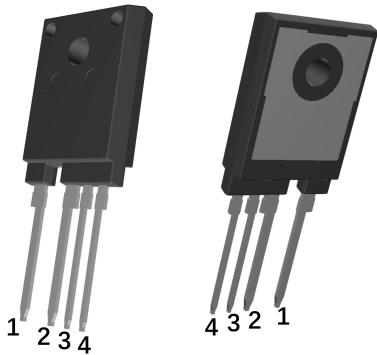
- High Efficiency & Low Loss Performance
高效率与低损耗性能
- Optimized High-Frequency Switching
优化的开关性能与高频率支持
- Minimized Cooling Requirements
最小化的散热需求
- High Power Density
高功率密度
- Enhanced Drive Stability (Kelvin Source)
增强的驱动稳定性（开尔文源极）
- Simplification & Cost Reduction
系统简化与成本降低
- The device is RoHS Compliant
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
HC032N120C4T	TO247-4L	HC032N120T	Tube/管装

1200V N-Channel SiC MOSFET

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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 参数	Symbol 符号	Test conditions 测试条件	Value 值	Unit 单位
Drain-source voltage 漏极-源极电压	V_{DS}	$T_j \geq 25^\circ\text{C}$	1200	V
Drain current ¹ 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 ² 峰值漏极电流	I_{DM}	$T_j \leq 175^\circ\text{C}$	211	A
Continuous diode current ¹ 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 ² 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 栅源最大电压	$V_{GS,MAX}$		-10~22	V
Recommend gate source voltage 推荐的栅源电压	$V_{GS,op}$		-4~18	V
Avalanche energy, single pulse 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 ¹ 总耗散功率	P_{tot}	$T_C = 25^\circ\text{C}$	454	W
		$T_C = 100^\circ\text{C}$	227	
Mounting torque 安装扭矩	M_d	M3 and M3.5 screw 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 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Storage Temperature 存储温度	T_{stg}		-55		175	°C
Operating junction Temperature 工作结温	T_j		-55		175	°C
Thermal resistance, junction-case 结-壳热阻	$R_{\text{th(j-c)}}$			0.33		K/W
Thermal resistance, junction-ambient 结-环境热阻	$R_{\text{th(j-a)}}$			40		K/W
Soldering temperature 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 参数	Symbol 符号	Test conditions 测试条件		Value/值			Unit 单位
				Min.	Typ.	Max.	
Drain-source breakdown voltage 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 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 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 Ω
			$T_j = 175^\circ\text{C}$		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 集电极-发射极漏电	I_{DSS}	$V_{DS} = 1200\text{V}, V_{GS} = 0\text{V}$			0.1	10	μA
Gate to source Leakage current 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 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 内部门极电阻	R_G	$f = 1\text{MHz}$			0.76		Ω

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Table 4 Dynamic characteristics/动态特性

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

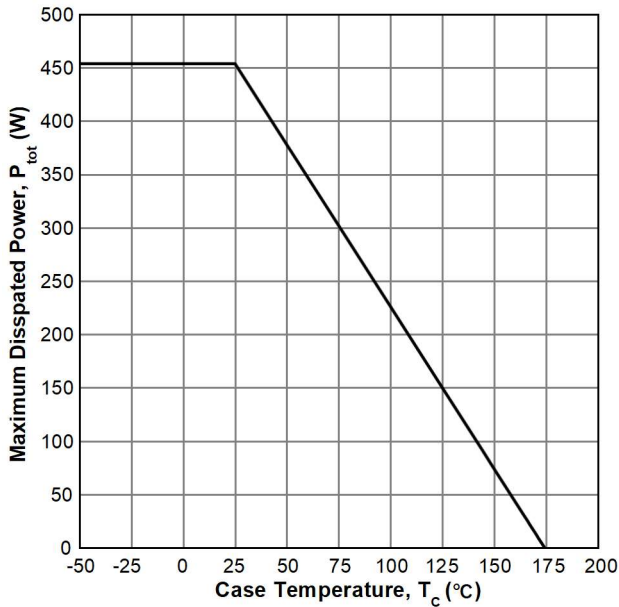
Table 5 Reverse diode characteristics/体二极管反向特性

Parameter 参数	Symbol 符号	Test conditions 测试条件	Value/值			Unit 单位
			Min.	Typ.	Max.	
Drain-source reverse voltage 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		

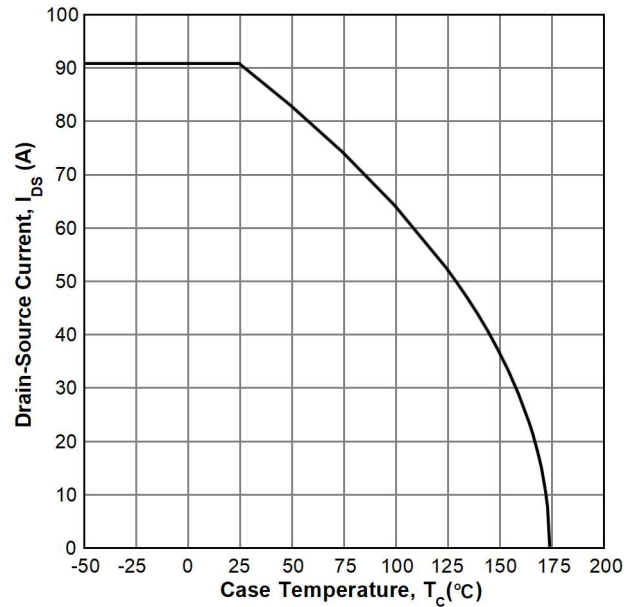
4. Electrical characteristics diagrams

电气特性图表

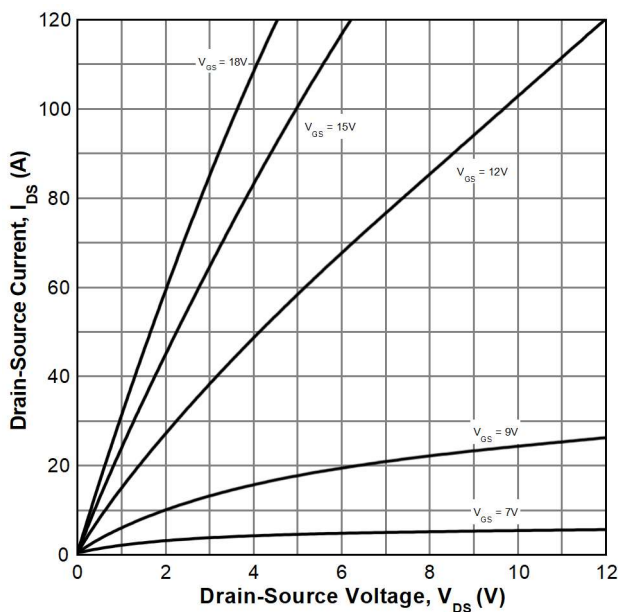
Power dissipation/耗散功率
 $P_{\text{tot}}=f(T_c)$; $T_J \leq 175^\circ\text{C}$



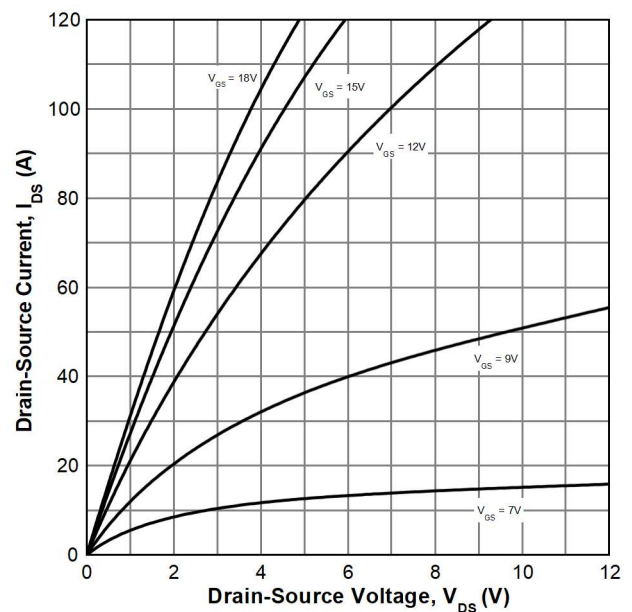
Continuous Drain Current/连续漏电流与壳温
 $I_{\text{DS}}=f(T_c)$; $T_J \leq 175^\circ\text{C}$



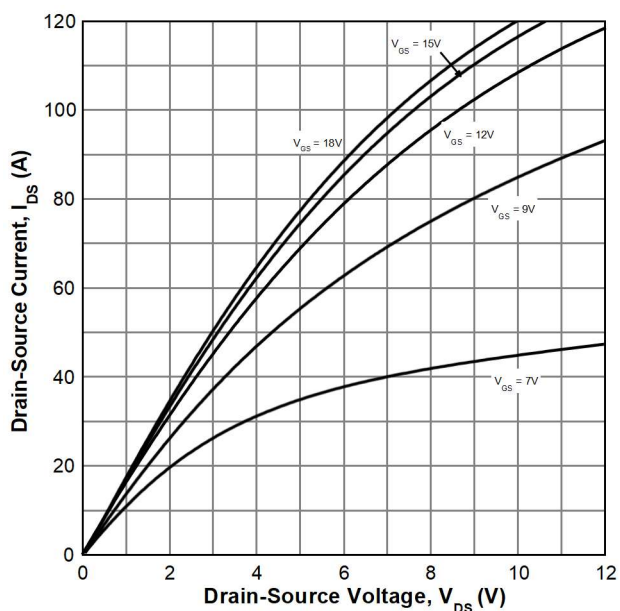
Typ. Output Characteristic/典型输出特性
 $I_{\text{DS}}=f(V_{\text{DS}})$; $T_J = -55^\circ\text{C}$



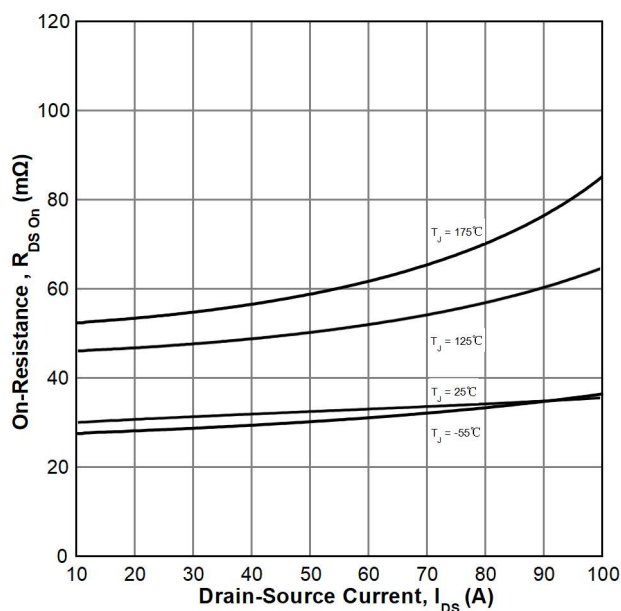
Typ. Output Characteristic/典型输出特性
 $I_{\text{DS}}=f(V_{\text{DS}})$; $T_J = 25^\circ\text{C}$



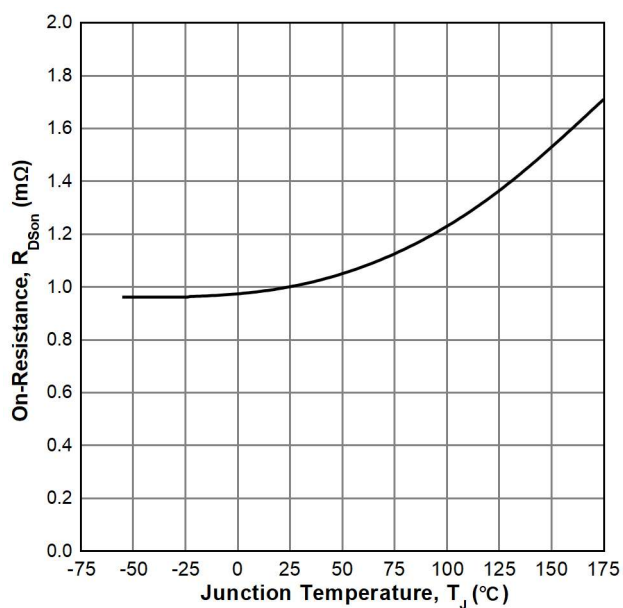
Typ. Output characteristic/典型输出特性
 $I_{DS}=f(V_{DS})$; $T_J=175^{\circ}\text{C}$



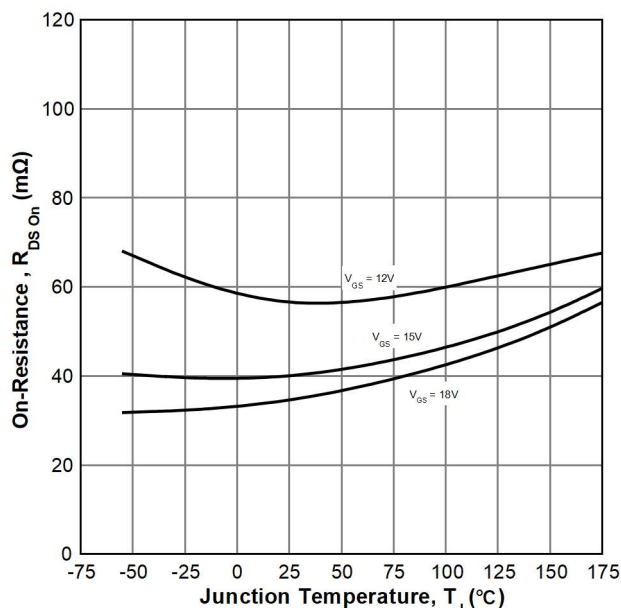
Typ. Drain-source on-state resistance/典型漏源导通电阻
 $R_{DS(on)}=f(I_{DS})$; $V_{GS}=18\text{V}$, $I_{DS}=40\text{A}$



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

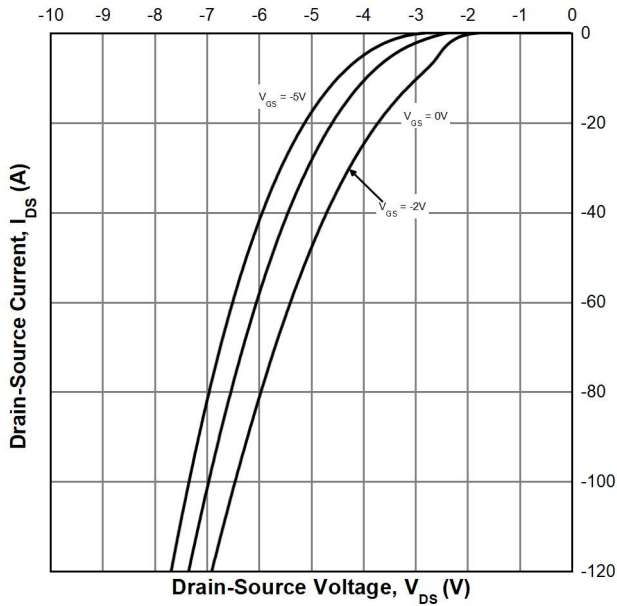


Typ. Drain-source on-state resistance/漏源导通电阻
 $R_{DS(on)}=f(T_J)$; $I_{DS}=40\text{A}$

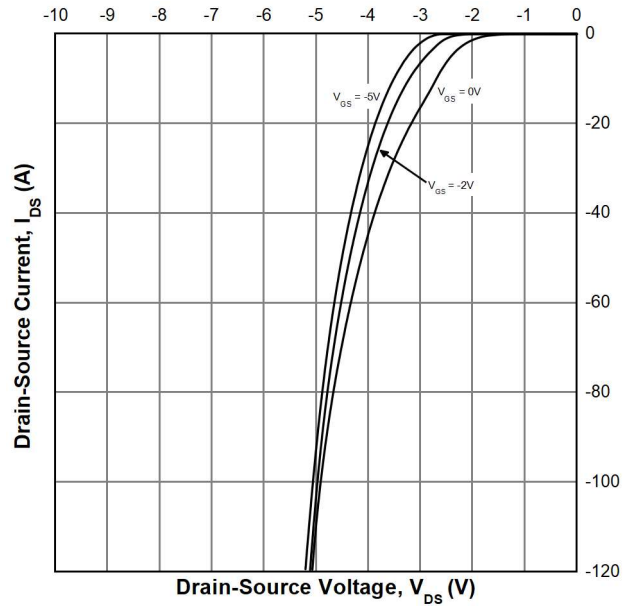




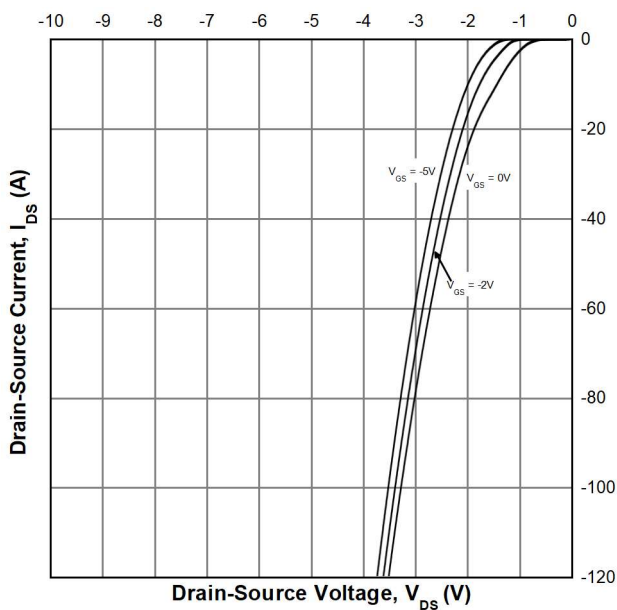
Typ.Reverse drain current characteristics/典型体二极管特性
 $I_{SD}=f(V_{SD})$; $T_J=-55^{\circ}\text{C}$



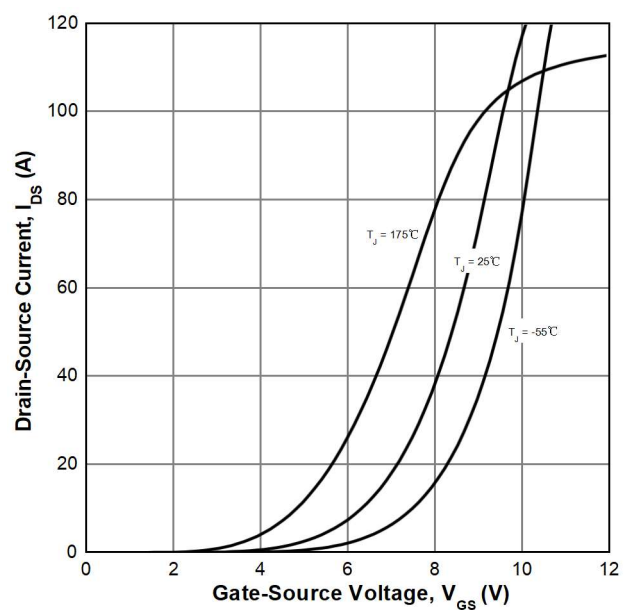
Typ.Reverse drain current characteristics/典型体二极管特性
 $I_{SD}=f(V_{SD})$; $T_J=25^{\circ}\text{C}$



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



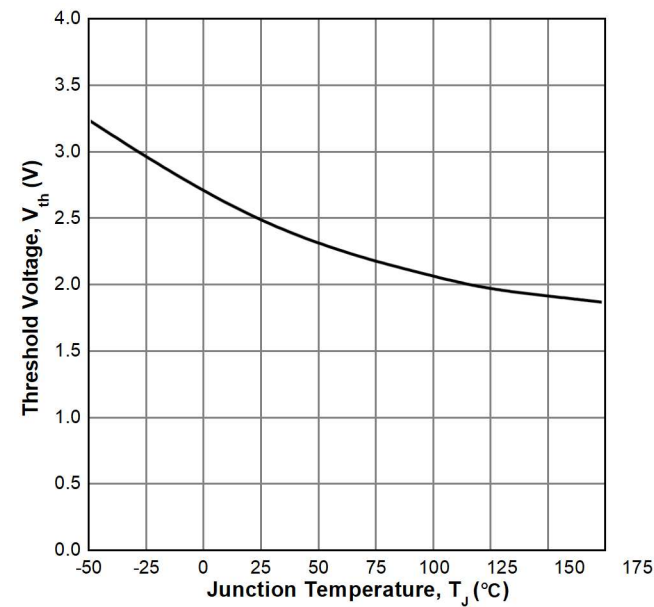
Typ.Transfer characteristics/传输特性
 $I_{DS}=f(V_{GS})$; $V_{DS}=20\text{V}$



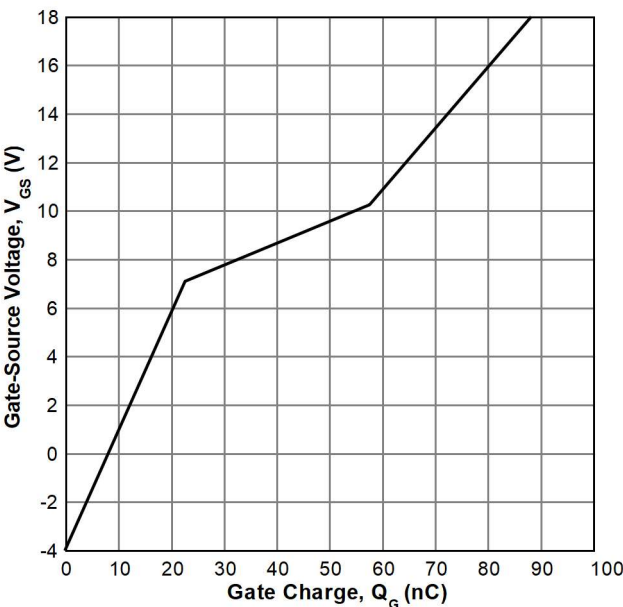
1200V N-Channel SiC MOSFET
HC032N120C4T



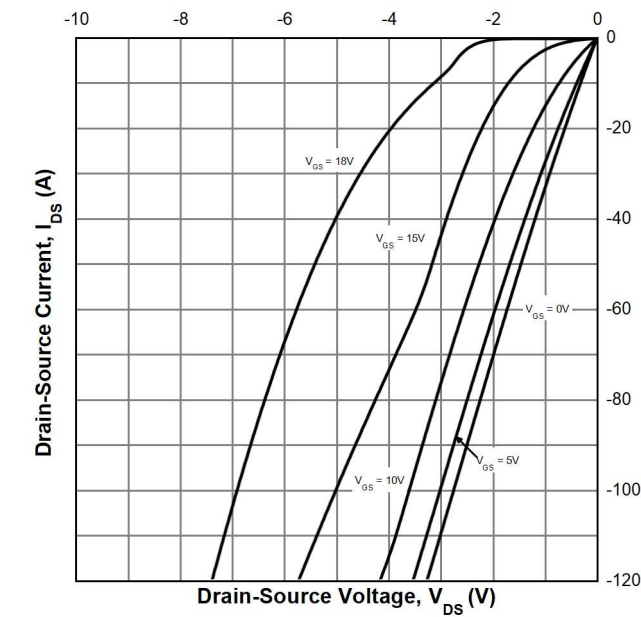
Typ. Gate threshold voltage/门级阈值电压结温特性
 $V_{GS}=f(T_J)$; $I_D=10mA$, $V_{DS}=V_{GS}$



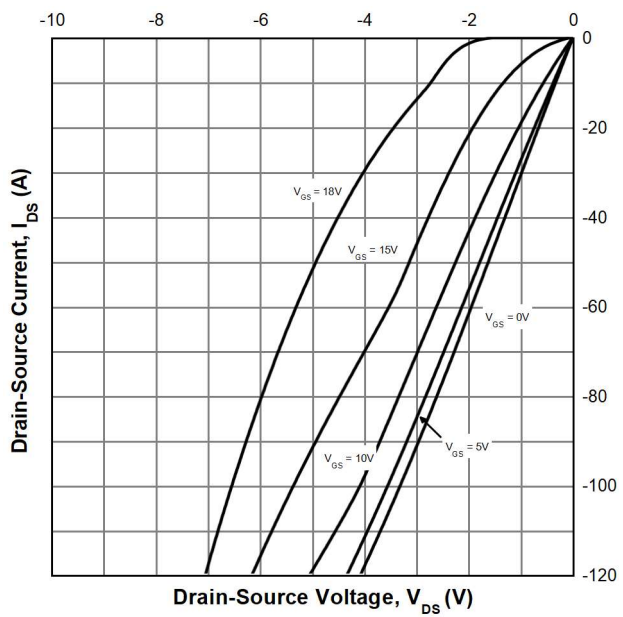
Typ. Gate charge/典型门级电荷
 $V_{GS}=f(Q_G)$; $I_{DS}=40A$, $I_{GS}=50mA$, $V_{DS}=800V$, $T_J=25^\circ C$



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



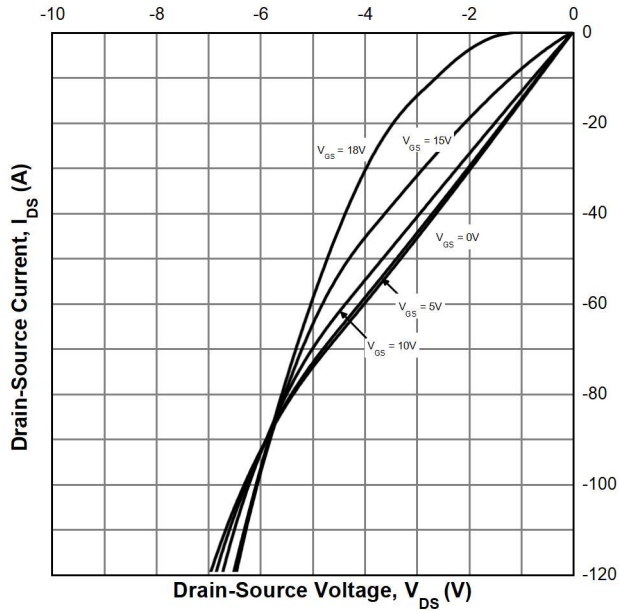
Typ. 3rd Quadrant Characteristics/典型第三象限特性
 $I_{DS}=f(V_{DS})$; $T_J=25^\circ C$



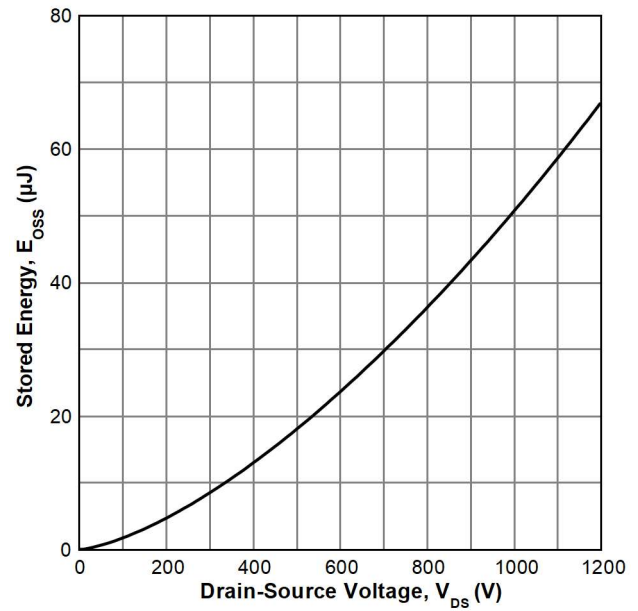
1200V N-Channel SiC MOSFET HC032N120C4T



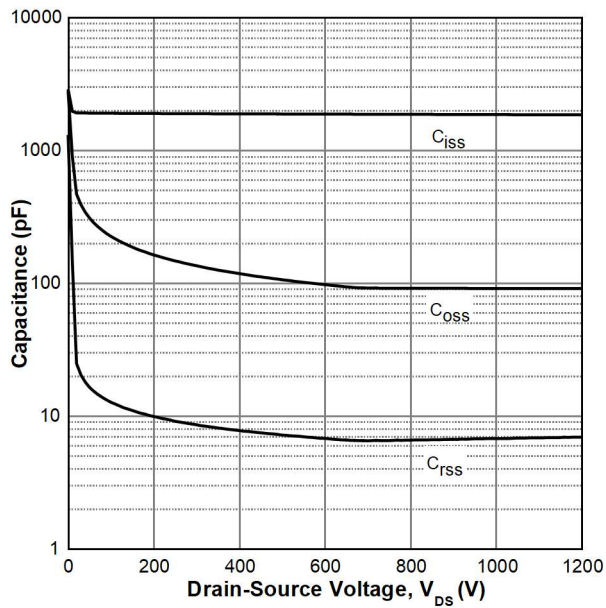
Typ.3rd Quadrant Characteristics/典型第三象限特性
 $I_{DS}=f(V_{DS})$; $T_J=25^\circ\text{C}$



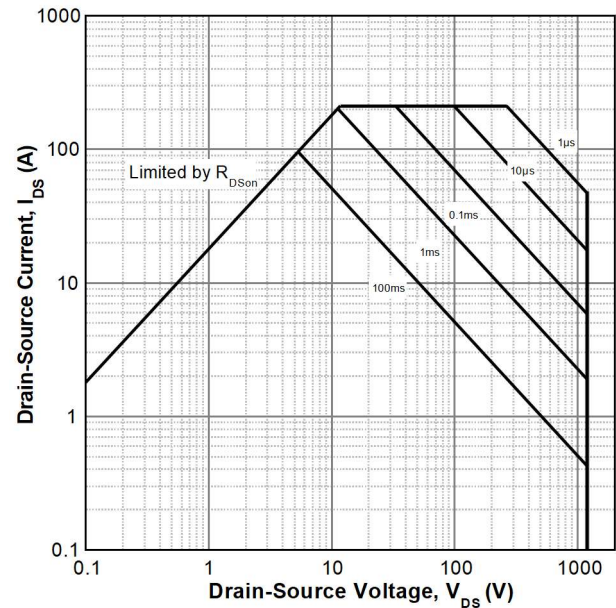
Typ.Coss stored energy/典型 C_{OSS} 存储能量
 $E_{OSS}=f(V_{DS})$; $T_J=25^\circ\text{C}$



Typ.Capacitances/典型电容特性
 $C=f(V_{DS})$; $V_{GS}=0\text{V}$, $T_J=25^\circ\text{C}$



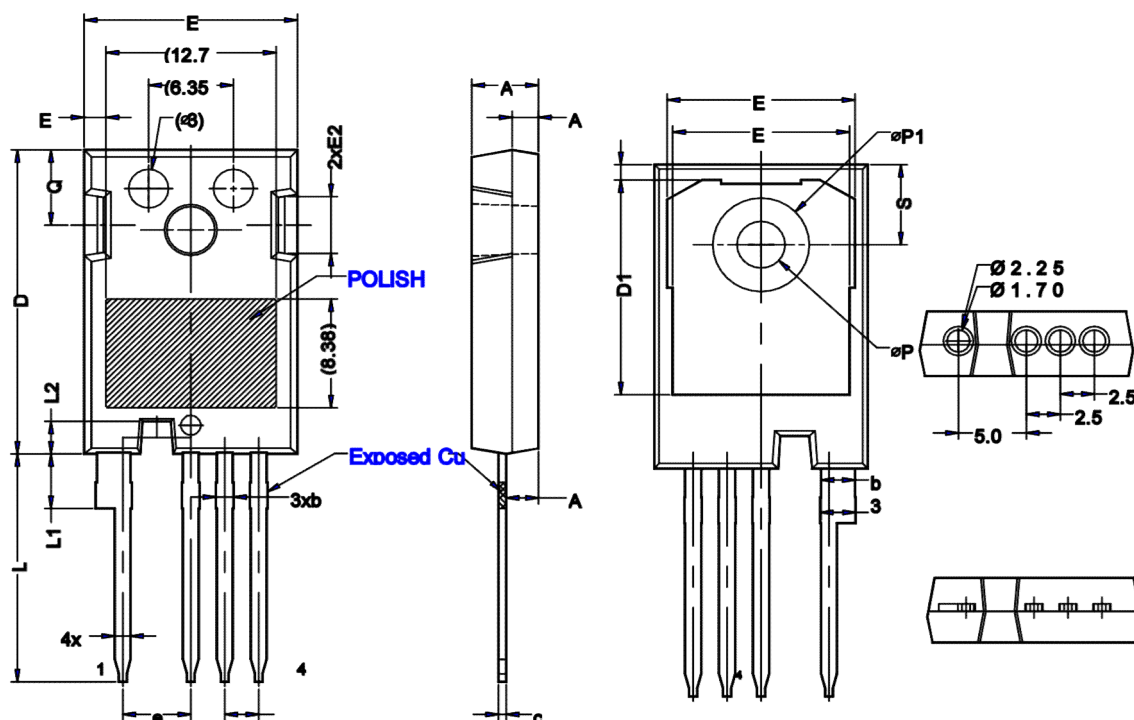
Forward bias safe operating area/安全工作区
 $I_D=f(V_{DS})$; $T_C=25^\circ\text{C}$, $D=0$



5. Package outline

封装外形

Figure 1. Outline TO247-4L, dimensions in mm/TO247-4L外形尺寸 (毫米)



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

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]

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