

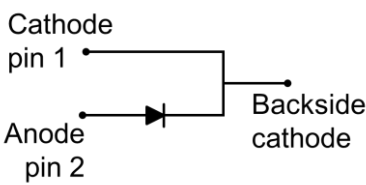
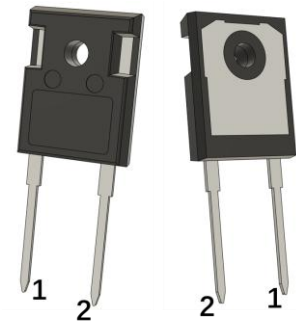


HD040N140A4R

1400V-40A Silicon Carbide Schottky Diode

Product features/产品特点

- Highly stable switching performance
高度稳定的开关性能
- Extremely fast reverse recovery time
极快的反向恢复时间
- High forward surge capability I_{FSM}
高正向浪涌电流耐受能力 I_{FSM}
- Superior in efficiency to Silicon Diode alternatives
效率优于硅基二极管替代方案
- Reduced losses in associated MOSFET
降低关联 MOSFET 的损耗
- Reduced EMI
电磁干扰 EMI 降低
- Reduced cooling requirements
减少散热需求
- High junction operating temperature capability $T_{vj(max)}=175^{\circ}C$
高结温工作能力，最高结温 $T_{vj(max)}=175^{\circ}C$



Applications/应用领域

- Switching mode power supplies
开关模式电源
- UPS & energy storage systems
不间断电源 (UPS) 与储能系统
- PV inverter and MPPT circuit
光伏逆变器和 MPPT (最大功率点追踪) 电路
- Battery formation systems
电池化成系统
- EV chargers
电动汽车充电桩/充电器
- Motor Drives
电机驱动器



Key performance and package parameters/关键性能和封装信息

Type	V_{DC}	I_F	$Q_{r,typ}$	$T_{vj,max}$	Marking	Package
HD040N140A4R	1400V	40A	99nC	175°C	HD040N140R	TO247-2L

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

最大额定值 默认 $T_{vj}=25^{\circ}\text{C}$ 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
Repetitive peak reverse voltage 重复峰值反向电压	V_{RRM}	$T_{vj}\geq 25^{\circ}\text{C}$	1400	V
Crest working reverse voltage 最高工作反向电压	V_{RWM}	$T_{vj}\geq 25^{\circ}\text{C}$	1400	V
Continuous forward current 连续正向电流	I_F	$T_C\leq 130^{\circ}\text{C}, D=1$	43	A
		$T_C\leq 125^{\circ}\text{C}, D=1$	46	
		$T_C\leq 25^{\circ}\text{C}, D=1$	91	
Surge repetitive forward current, sine halfwave 浪涌重复正向电流, 正弦半波	$I_{F, RM}$	$D=0.5; t_p=25\mu\text{s}; T_C\leq 125^{\circ}\text{C}; \text{square-wave pulse}$	55	A
Surge non-repetitive forward current, sine halfwave 浪涌非重复峰值正向电流, 正弦半波	$I_{F, SM}$	$t_p=10\text{ms}; T_{vj(\text{init})}=25^{\circ}\text{C}; \text{sine-wave pulse}$	360	A
		$t_p=10\mu\text{s}; T_{vj(\text{init})}=25^{\circ}\text{C}; \text{square-wave pulse}$	2000	
I ² t for fusing 熔断I ² t特性	i^2dt	$t_p=10\text{ms}; T_{vj(\text{init})}=25^{\circ}\text{C}; \text{sine-wave pulse}$	372	A ² S
Power dissipation 总耗散功率	P_{tot}	$T_C=25^{\circ}\text{C} @ R_{\text{th(j-c).typ}}$	417	W
		$T_C=25^{\circ}\text{C} @ R_{\text{th(j-c).MAX}}$	333	
Mounting torque 安装扭矩	M_d	M3 and M3.5 screw M3或者M3.5螺钉	0.6	Nm



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 _{vj}		-55		175	°C
Thermal resistance, junction-case 结-壳热阻	R _{th(j-c)}			0.36	0.45	K/W
Thermal resistance, junction-ambient 结-环境热阻	R _{th(j-a)}			40		K/W
Soldering temperature 焊接温度	T _{sold}				260	°C

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

电气特性 默认 $T_{vj}=25^{\circ}\text{C}$ 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.	
DC blocking voltage 直流阻断电压	V_{DC}	$I_R=20\mu\text{A}$		1400			V
Forward current 正向压降	V_F	$I_F=40\text{A}$	$T_{vj}=25^{\circ}\text{C}$		1.56	1.70	V
			$T_{vj}=175^{\circ}\text{C}$		2.39		
Reverse current 反向漏电流	I_R	$V_R=1400\text{V}$				40	μA

Table 4 Dynamic characteristics/动态特性

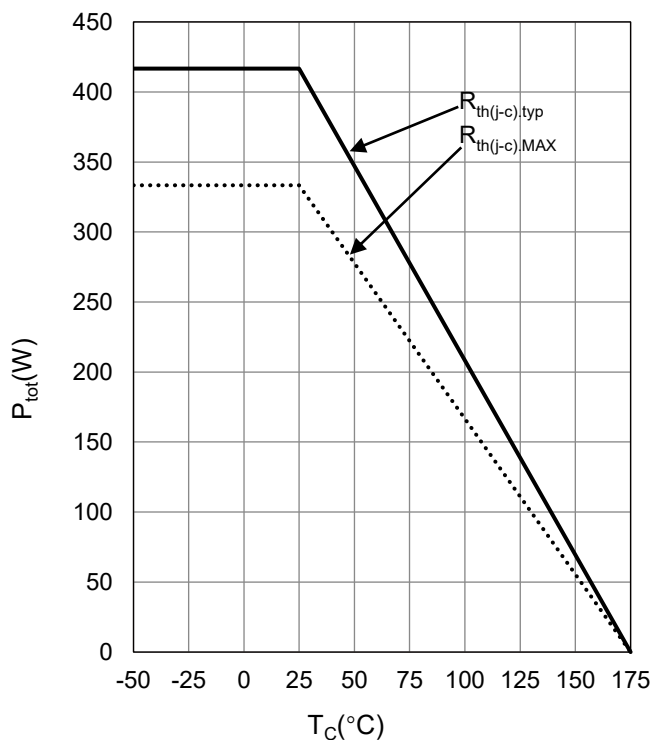
Parameter 参数	Symbol 符号	Test conditions 测试条件		Value/值			Unit 单位
				Min.	Typ.	Max.	
Recovered charge 反向恢复电荷	Q_r	$V_R=400\text{V}, I_F=40\text{A}, di_F/dt=500\text{A}/\mu\text{s}$			99		nC
Diode capacitance 二极管电容	C_d	$f=1\text{MHz}, V_R=1\text{V}$			1607		pF
		$f=1\text{MHz}, V_R=400\text{V}$			158		
		$f=1\text{MHz}, V_R=800\text{V}$			119		
Non-repetitive avalanche energy 非重复雪崩能量	E_{AS}	$V_{DD}=100\text{V}, I_R=10\text{A}, L=10\text{mH}$			465		mJ

4. Electrical characteristics diagrams

电气特性图表

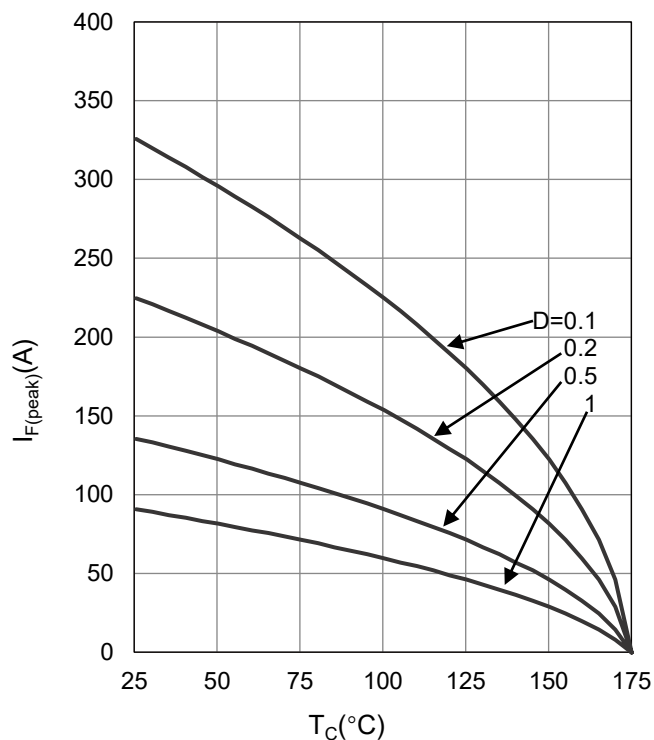
Power dissipation/耗散功率

$$P_{\text{tot}}=f(T_c);$$



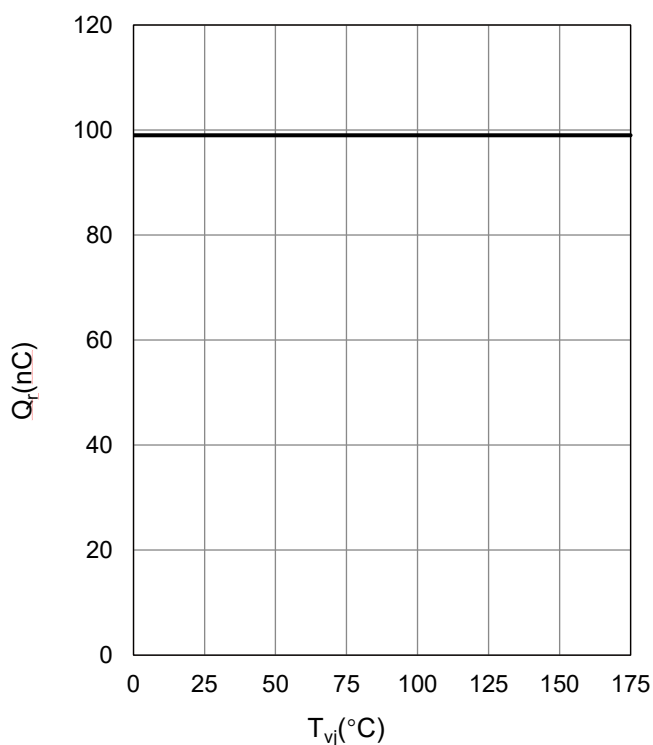
Current Derating vs. Temperature/峰值电流限值与壳温函数

$$I_{\text{Fpeak}}=f(T_c);$$



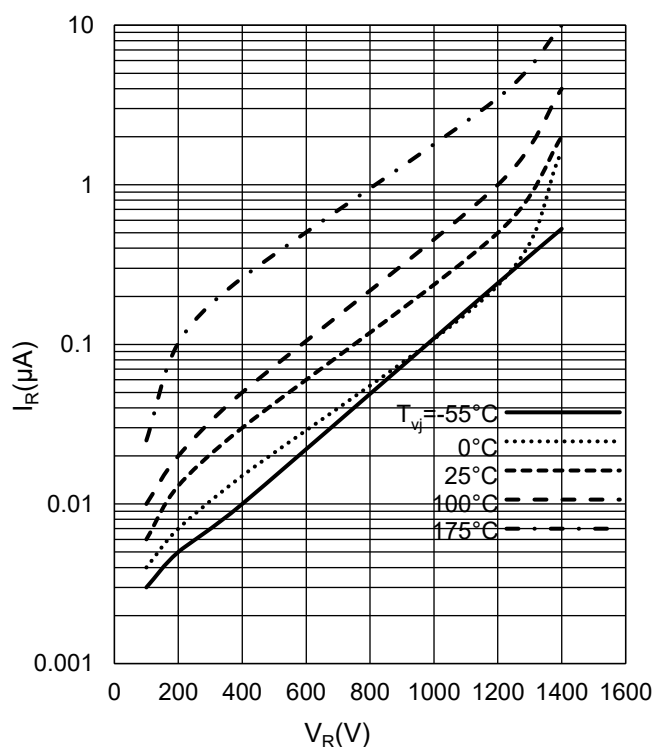
Recovered Charge vs. T_{vj} /反向恢复电荷与结温函数

$$Q_r=f(T_{vj}); V_R=400V, I_F=40A$$



Typ.Reverse current of voltage /典型漏电与电压函数

$$I_R=f(V_R);$$



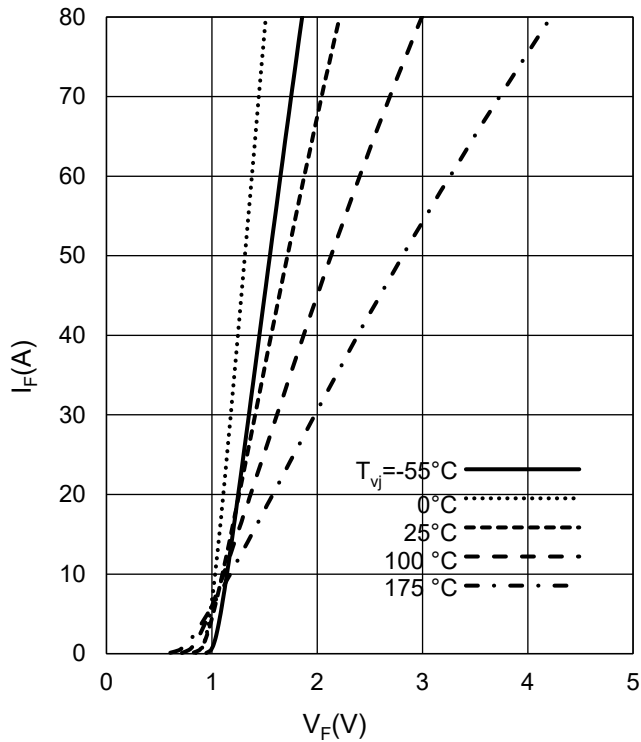
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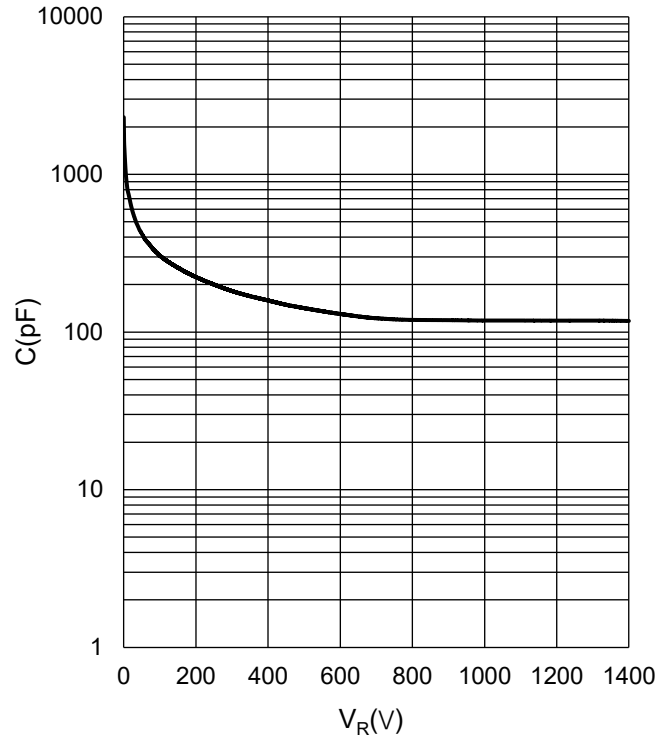
Typ.Forward characteristics/典型正向特性

$I_F=f(V_F)$;



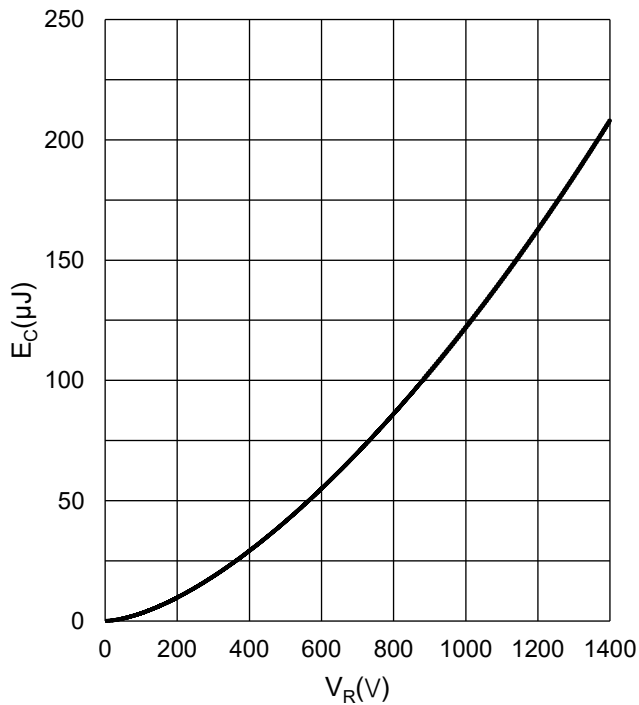
Typ.Capacitance characteristics/典型电容特性

$C=f(V_R)$; $T_{vj}=25^\circ\text{C}$, $f=1\text{MHz}$



Typ.Capacitively stored energy vs V_R /典型电容储能特性

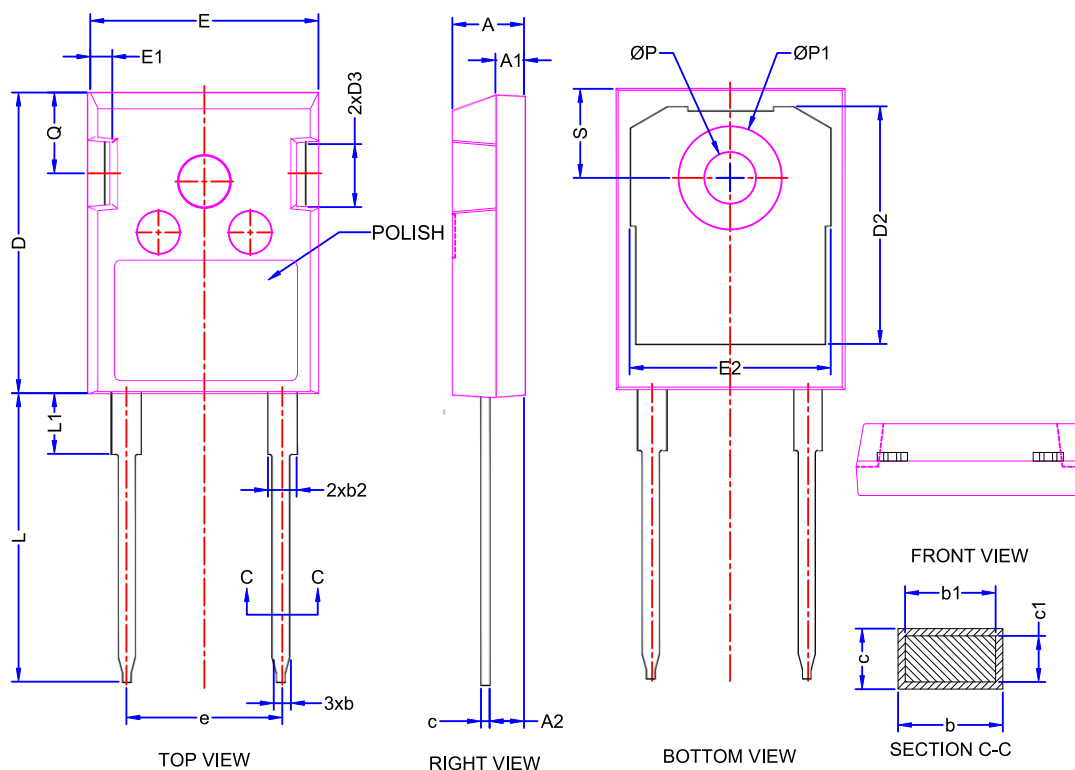
$C=f(V_R)$; $T_{vj}=25^\circ\text{C}$, $f=1\text{MHz}$



5. Package outline

封装外形

Figure 1. Outline TO247-2L, dimensions in mm/TO247-2L外形尺寸 (毫米)



SYMBOL	DIMENSIONS			SYMBOL	DIMENSIONS		
	MIN.	NOM.	MAX.		MIN.	NOM.	MAX.
A	4.90	5.00	5.10	E	15.80	15.90	16.00
A1	1.94	2.04	2.14	E1	1.43	1.53	1.63
A2	2.30	2.40	2.50	E2	13.82	14.02	14.22
b	1.14	1.24	1.34	e	10.871 BSC		
b1	1.10	1.20	1.30	L	19.90	20.10	20.30
b2	1.94	2.04	2.14	L1	4.02	4.22	4.42
c	0.55	0.65	0.75	ØP	3.50	3.60	3.70
c1	0.50	0.60	0.70	ØP1	7.19 REF		
D	20.85	20.95	21.05	Q	5.44	5.64	5.84
D1	1.02	1.22	1.40	S	6.04	6.20	6.30
D2	16.35	16.55	16.75				
D3	4.23	4.33	4.43				

Note:

- Slot required, notch may be rounded;
- 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;
- Thermal pad contour optional within dimension D2&E2.
- Lead finish uncontrolled in L1;
- ØP to have a draft angle of 1.5°(REF.) to the top of the part with hole diameter of 3.91mm(REF >)

注:

- 槽为强制结构, 缺口可做圆角处理;
- D 及 E 尺寸不含模塑溢料, 每侧模塑溢料最大不超过 0.127 毫米; 上述尺寸以塑料本体的最外边缘为测量基准;
- 散热焊盘的轮廓可在 D2 及 E2 尺寸范围内自由设计;
- L1 区域内的引线镀层不做管控;
- ØP 对应的孔相对器件顶部的拔模角度为 1.5° (参考值), 孔直径为 3.91 毫米 (参考值 >)



6. Revision history

Table 5 Date and version number/日期与版本号

Date日期	Revision版本	Changes更改内容
2025-11-26	Rev. G 1.0	Target Datasheet (目标规格书)

7. Matters needing attention

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