CCSiCUVAPD1p1

SiC Ultraviolet Avalanche Photodiodes

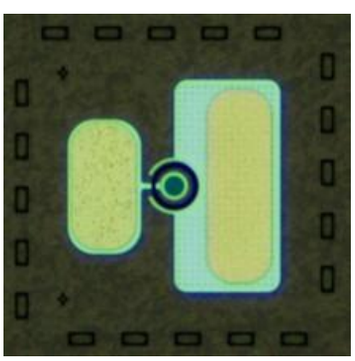
CoolCAD SiC Photodetectors have a unique set of advantages over Silicon Photodetectors, including, but not limited to, their significantly low dark current, inherent visible light blindness, wide temperature range with no degradation (up to 400C), and long-term UV exposure and radiation robustness. These factors greatly reduce system volume, as the need for cooling mechanisms and filters is eliminated. Fabricated on high-quality SiC epitaxial layers, our proprietary fabrication processes allow us to customize these devices to your exact specifications.

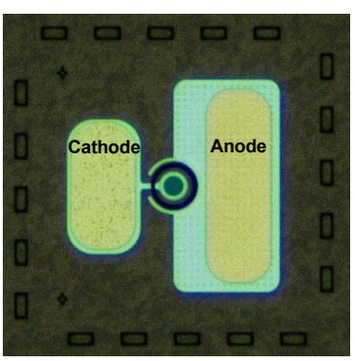
BENEFITS

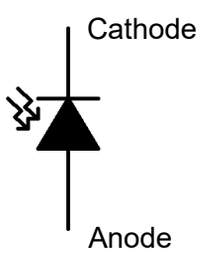
- Higher sensitivity
- Reduced cooling
- Lower dark current
- Visible-blind

APPLICATIONS INCLUDE

Ultraviolet signal detection, single photon detection, water filtration systems, pathogen detection, flame detection, and defect monitoring.







Part Number	Package	Marking
CCSiCUVAPD1p1	Bare Die	N/A

Electrical and Thermal Characteristics

*Characteristics	Symbol	Comments	Typ	Units
Peak Linear Responsivity	R_{max}	V_R<3V; λ=270nm; T_A=25°C; M=1	0.07	A/W
Peak Linear Quantum Efficiency	η	V_R<3V; λ=270nm; T_A=25°C; M=1	0.32	-
Spectral Range, 90% max QE	$\lambda_{min\_90\%}$ - $\lambda_{max\_90\%}$	V_R<3V; T_A=25°C; M=1	265-275	nm
Spectral Range, FWHM QE	λ_{min_FWHM} – λ_{max_FWHM}	V_R<3V; T_A=25°C; M=1	240-315	nm
Dark Current[1]	I_D	V_R<3V; T_A=25°C; M=1	<5	pA/mm^2
Visible Blindness	-	Peak responsivity/resp. @ 400nm, V_R=2V; M=1	>5000	-
Active Area	A_{pd}	-	0.019	mm^2
Avalanche Reverse Bias Voltage	$V_{bd,av}$	I_D=1uA; T_A=25°C	CCSiCUVAPD1p1A – 195-197 CCSiCUVAPD1p1B – 198-200 CCSiCUVAPD1p1C – 201-203	V
Gain	M	V_R=$V_{bd,av}$; λ=270nm	>1E5	-
Capacitance	C	V_R<3V; T_A=25°C; M=1	15	pF

1. Measurement system noise floor limited
2. Back side of die should always be left floating

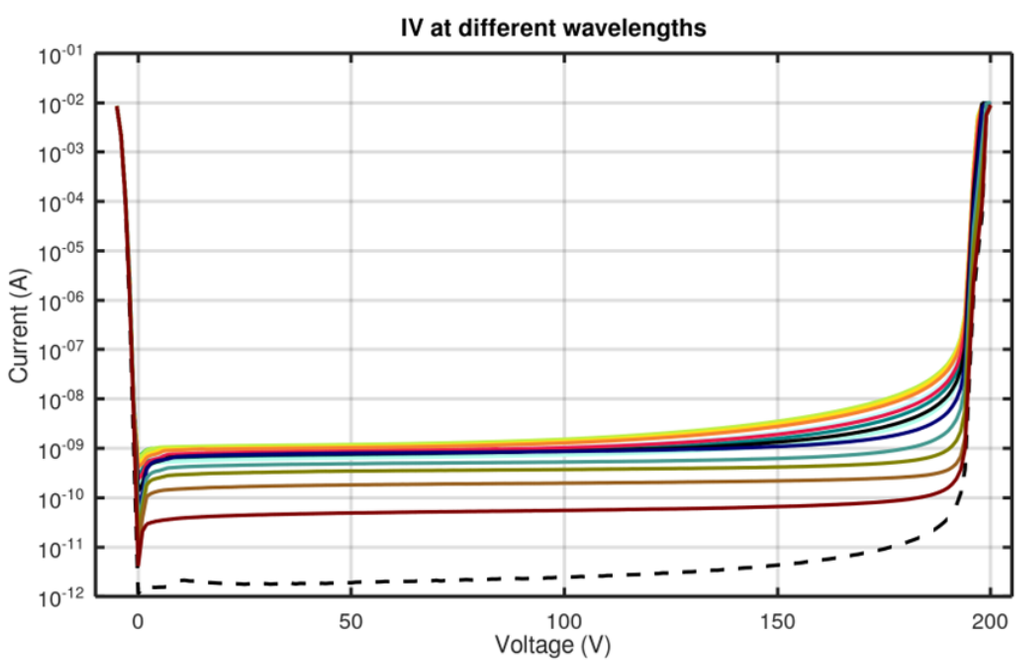


Figure 1: Sample Reverse I-V Characteristics. Black Dashed Line: Dark current. Solid Lines: Photo response between 200-350nm.

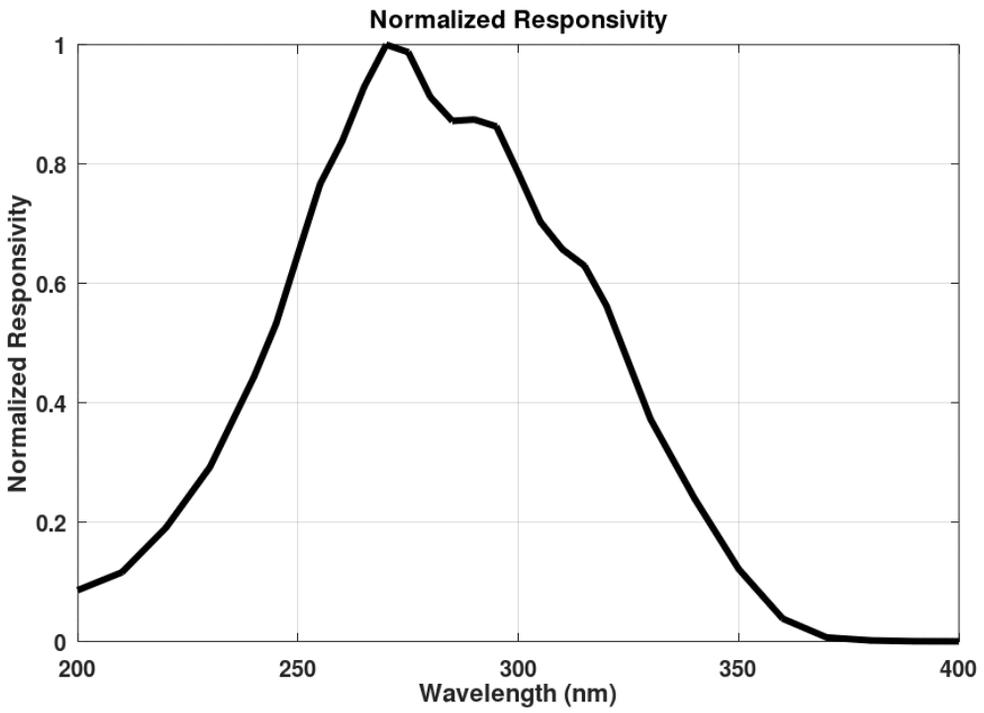


Figure 2: Normalized Linear Responsivity at V_R < 3V.

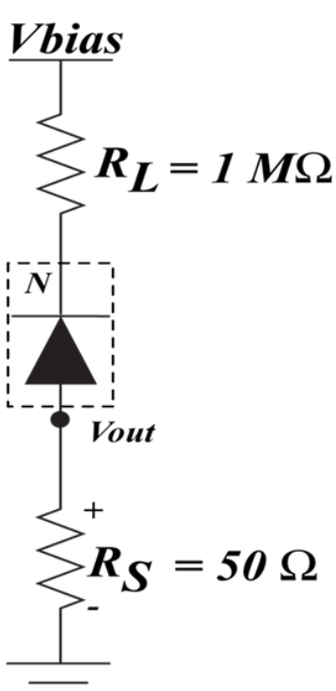


Figure 3: Passively-Quenched Geiger mode readout circuit configuration.

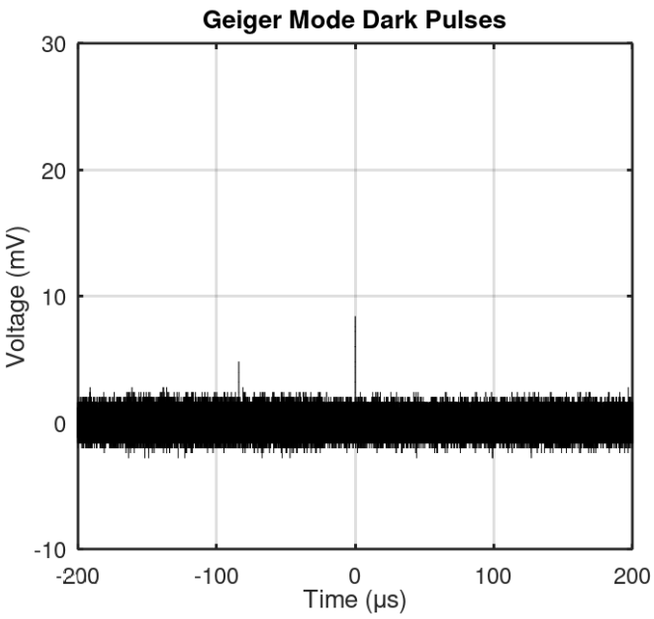


Figure 4: Sample Geiger mode response in the dark.

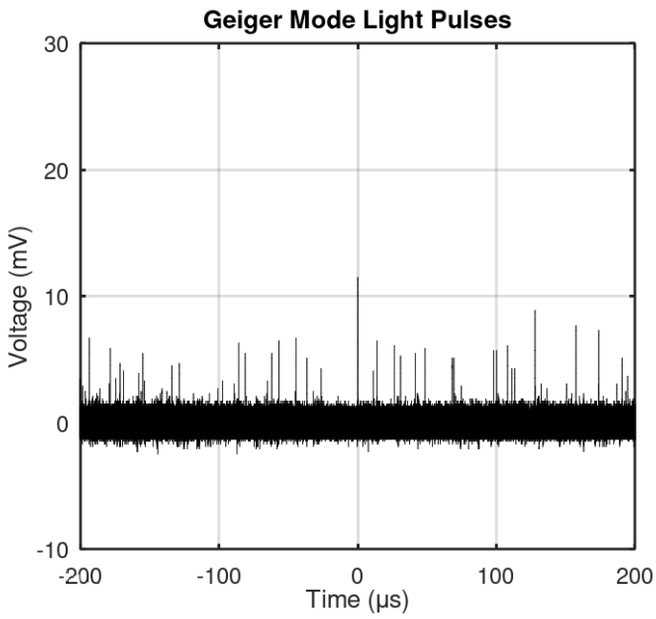


Figure 5: Sample Geiger mode response under 265nm illumination.

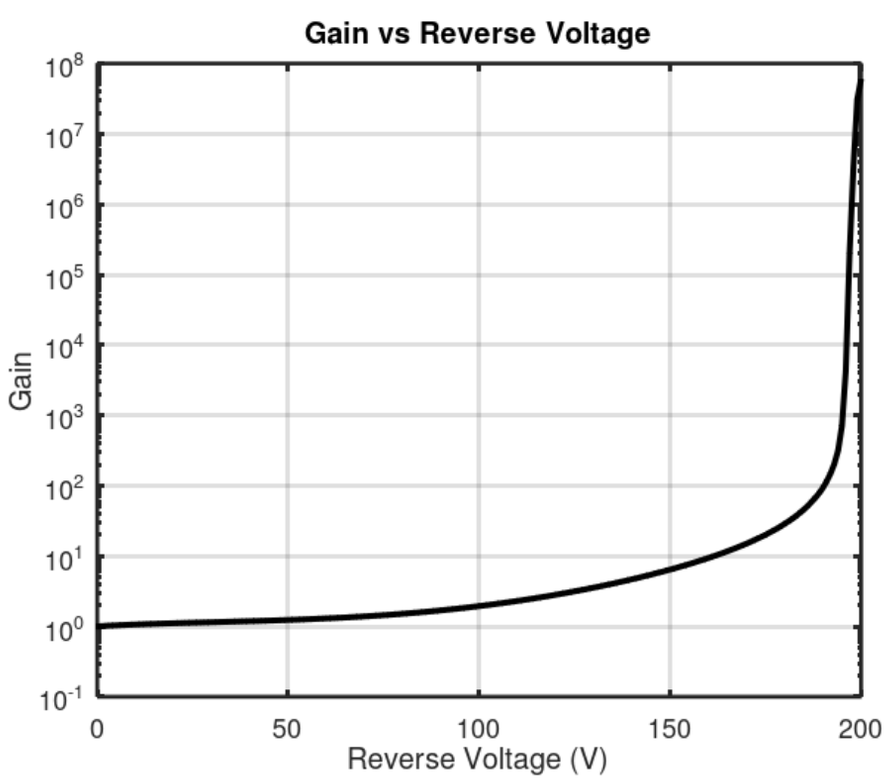
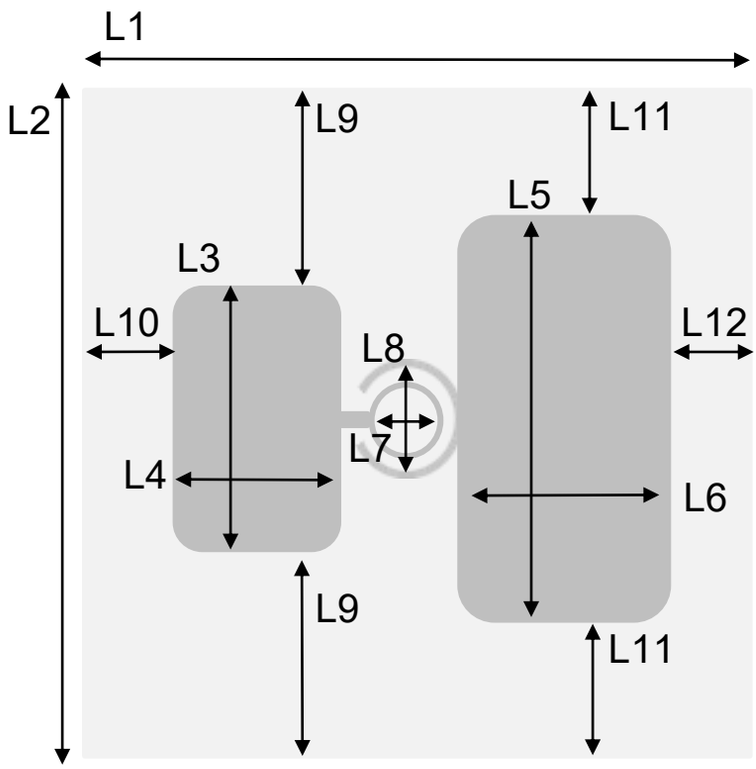


Figure 6: Sample gain versus reverse voltage under 270nm illumination.



Die dimensions

Parameter	Dimensions	Units
Die size (including dicing streets)	L1×L2 ~ 1.3×1.3	mm
Cathode pad*	L3×L4 ~ 0.48×0.245	mm
Anode pad*	L5×L6 ~ 0.73×0.245	mm
Central Active Area Diameter	L7 ~ 75	µm
Full Active Area Diameter	L8 ~ 175	µm
Cathode Pad to Top Die Edge	L9 ~ 410	µm
Cathode Pad to Side Die Edge	L10 ~ 262.5	µm
Anode Pad to Top Die Edge	L11 ~ 285	µm
Anode Pad to Side Die Edge	L12 ~ 282.5	µm
Chip thickness	355±10	µm

* Pads made of gold

CAUTION: These devices are ESD sensitive. Use proper handling procedures.

Disclaimer: These specifications may not be considered as a guarantee of components characteristics. Components have to be tested depending on intended application as adjustments may be necessary. The use of CoolCAD Electronics components in life support appliances and systems are subject to written approval of CoolCAD Electronics.

CoolCAD Electronics reserves the right to change without notice the specifications and information contained within.

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