CCSiCUVPL01

SiC Ultraviolet Photodiodes

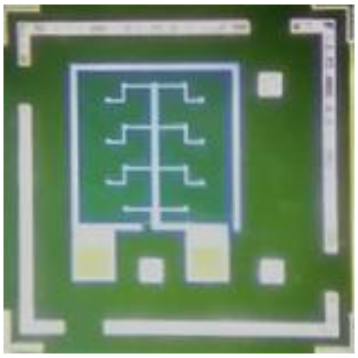
CoolCAD SiC Photodetectors have a unique set of advantages over Silicon Photodetectors, including, but not limited to, their incredibly low dark current, inherent visible light blindness, wide temperature range with no degradation (up to 400C), and long-term UV exposure and radiation robustness. These 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.

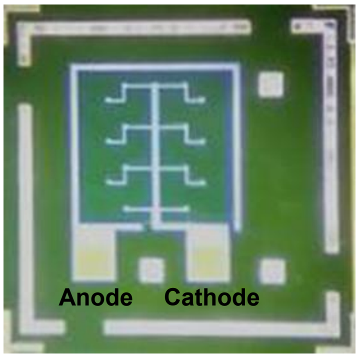
BENEFITS

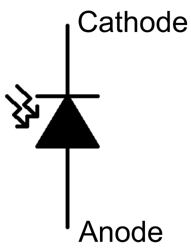
- Higher sensitivity
- Reduced cooling
- Low Dark-current
- Visible-Blind

APPLICATIONS INCLUDE

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







Part Number	Package	Marking
CCSiCUVPL01	Bare Die	N/A

Electrical and Thermal Characteristics

*Characteristics	Symbol	Comments	Typ	Units
Peak Responsivity	R_{max}	V_R<3V; λ=265nm; T_A=25°C	0.112	A/W
Peak Quantum Efficiency	η	V_R<3V; λ=245nm; T_A=25°C	0.54	-
Spectral Range, 90% max QE	$\lambda_{min\_90\%}$ - $\lambda_{max\_90\%}$	V_R<3V; T_A=25°C	235-270	nm
Spectral Range, FWHM QE	λ_{min_FWHM} – λ_{max_FWHM}	V_R<3V; T_A=25°C	225-315	nm
Dark Current[1]	I_D	V_R<3V; T_A=25°C	<500	fA/mm²
Visible Blindness	-	Peak responsivity/resp. @ 400nm, V_R=2V	>5000	-
Post-exposure Responsivity Drift	-	100J/cm2 total exposure @ 254 nm, VR=2V	Negligible	
Active Area	A_{pd}	-	CCSiCUVPL01A – 0.52 CCSiCUVPL01B – 0.38 CCSiCUVPL01C – 0.24	mm²
Capacitance	C	V_R<3V; T_A=25°C	CCSiCUVPL01A – 37 CCSiCUVPL01B – 27 CCSiCUVPL01C – 17	pF

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

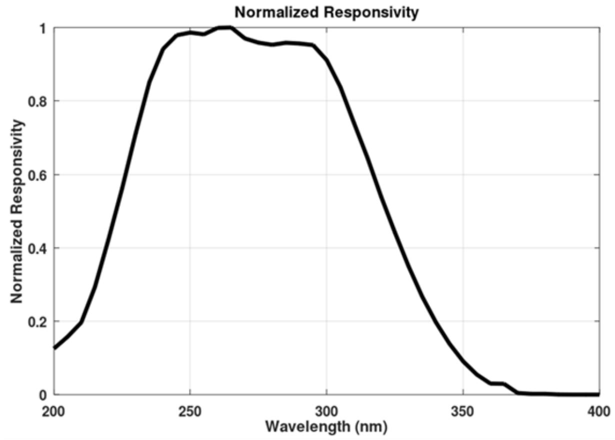


Figure 1: Normalized Responsivity of sample device.

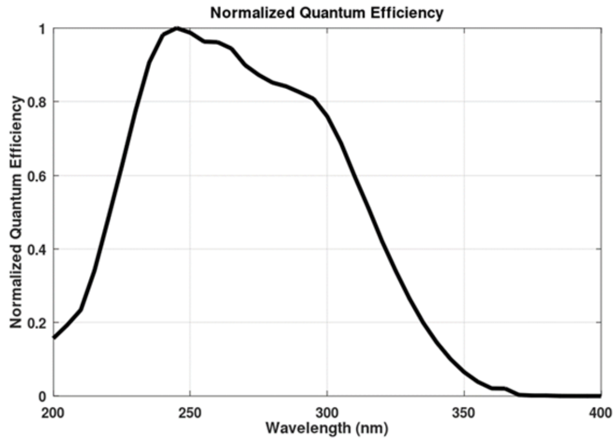


Figure 2: Normalized Quantum Efficiency of sample device.

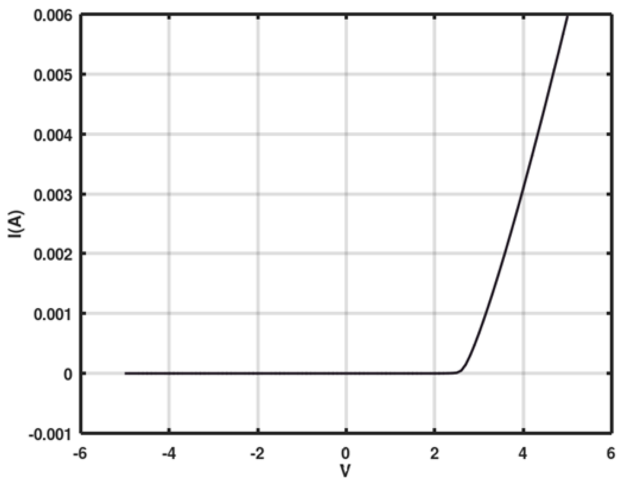


Figure 3: Sample device IV characteristics, linear scale

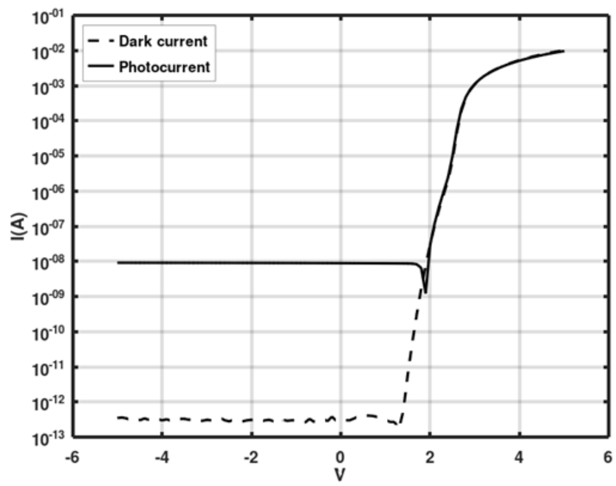


Figure 4: Sample device IV characteristics, logarithmic scale. Photocurrent under 255nm illumination

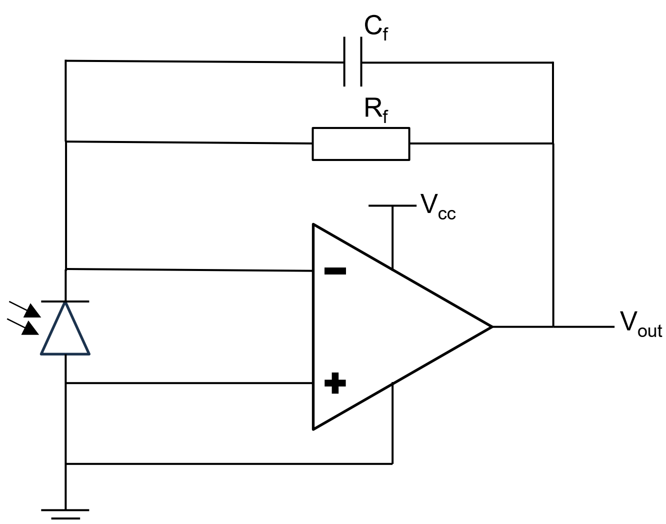
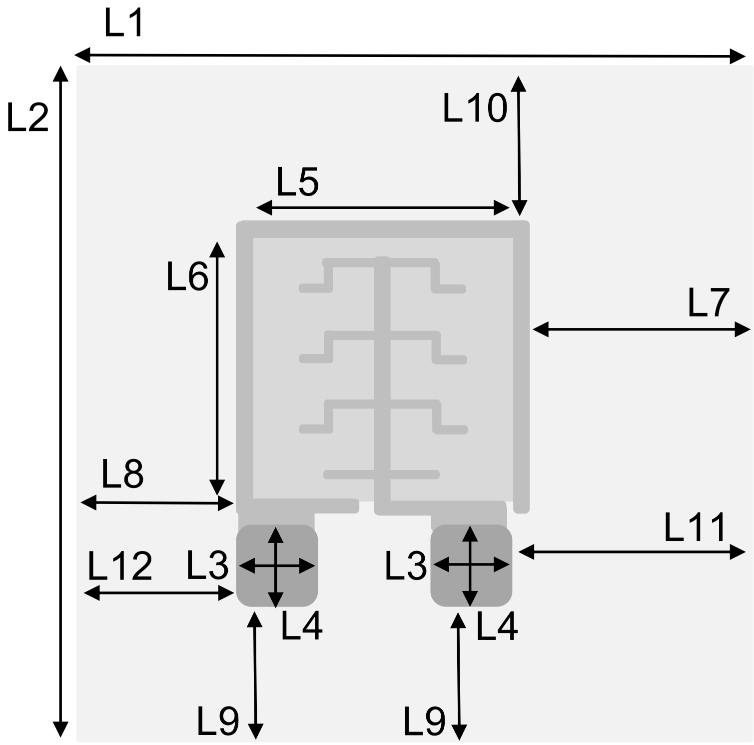


Figure 5: Sample readout circuit with integrated photodiode



Die dimensions

Parameter	Dimensions	Units
Die size (including dicing streets)	L1×L2 ~ 1.65×1.65	mm
Cathode pad*	L3×L4 ~ 0.19×0.19	mm
Anode pad*	L3×L4 ~ 0.19×0.19	mm
Lateral Active Area	L5 ~ 740	µm
Vertical Active Area	CCSiCUVPL01A - L6 ~ 740 CCSiCUVPL01B - L6 ~ 540 CCSiCUVPL01C - L6 ~ 340	µm
Device to Right Die Edge	L7 ~ 525	µm
Device to Left Die Edge	L8 ~ 325	µm
Pads to Bottom Die Edge	L9 ~ 330	µm
Device to Top Die Edge	CCSiCUVPL01A – L10 ~ 275 CCSiCUVPL01B – L10 ~ 475 CCSiCUVPL01C – L10 ~ 675	µm
Anode Pad to Left Die Edge	L11 ~ 330	µm
Cathode Pad to Right Die Edge	L12 ~ 585	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.

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