SELECTED TOPICS IN ADVANCED ELECTRONICS

Edited by

Khalid A. S. Al-Khateeb

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INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA

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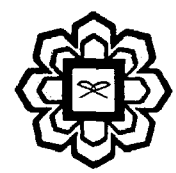

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CHAPTER 21

COOLING TECHNIQUES FOR SINGLE PHOTON AVALANCHE DIODE

By

Nurul Fadzlin Hasbullah,
Nurul Izzati Samsuddin and Salmiah Ahmad

Electrical and Computer Engineering Department
Kulliyyah of Engineering
International Islamic University Malaysia,
Gombak, Selangor, Malaysia

Synopsis

Current developments of optoelectronic device especially avalanche photodiodes have led to numerous important applications such as laser range finder, small-signal fluorescence, light detection and ranging (LIDAR) and precise photon counting. Silicon single photon avalanche diode (Si SPAD, C30902 series) from Perkin Elmer is a photodiode designed with a "reach through" structure that enables high responsitivity between 400 and 1000nm. It has fast rising and falling time response for all wavelengths. It has several favourable factors because it has small size, light weight, long lifetime, good responsitivity, wide spectral response range, high and low noise for many applications [1-3]. Also, compared to other avalanched photodiodes, C30902 has beneficial features of 77% quantum efficiency, can be operated in "Geiger" mode, low noise at room temperature, high responsitivity with internal gains up to 150 and wide operating temperature range of -40°C to +70°C.

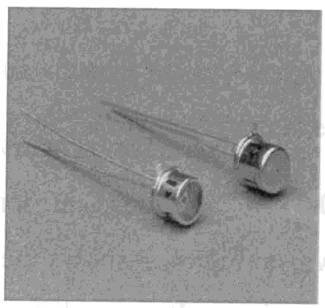

Figure 6.1: The Silicon Single Photon Avalanche Diodes (Si SPAD, C30902 series) from Perkin Elmer