Power Transistor Light Emission For Gate Control And Reliability Monitoring

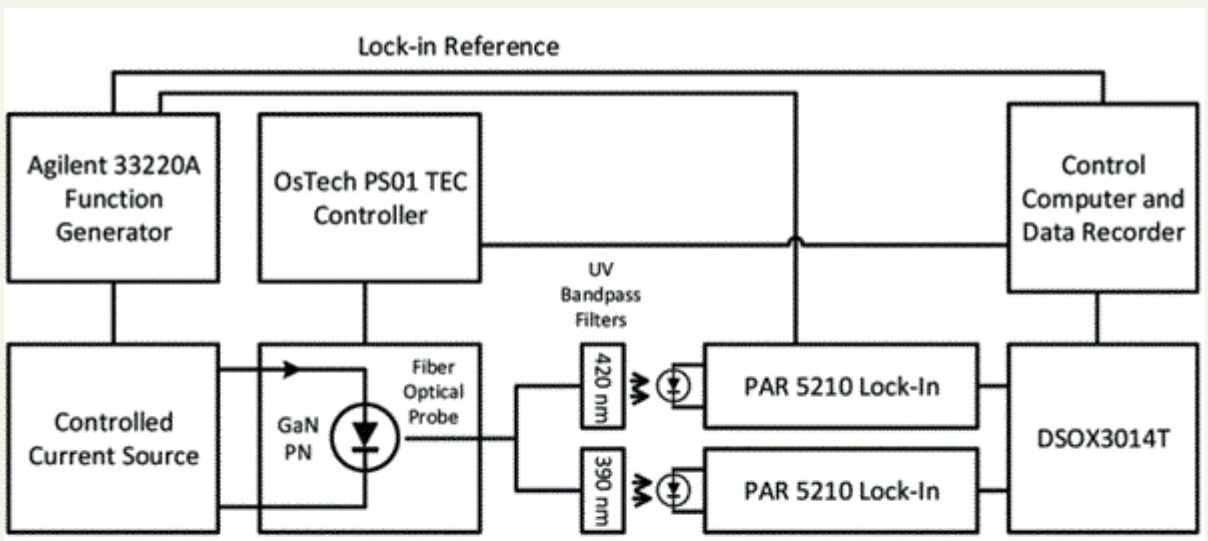
Tech ID: 32774 / UC Case 2018-905-0

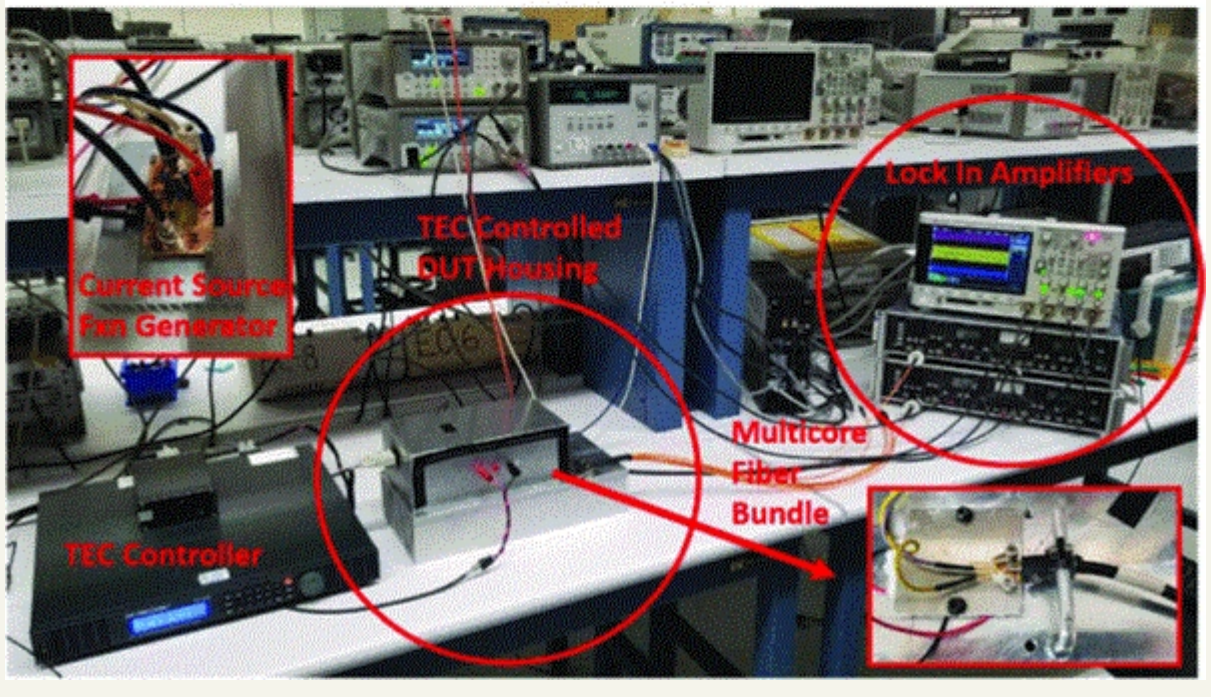
BACKGROUND

Methods for monitoring device operating conditions and current are shifting towards the use of optical measurements, which are are less susceptible to electromagnetic noise. Existing light emission techniques utilize complex components, like laser diodes and photodiodes, to measure device current, rendering such techniques expensive to implement.

TECHNOLOGY DESCRIPTION

A UC Santa Cruz researcher and collaborators at the Naval Postgraduate School have developed a new way to integrate the functionality of light measurements from power transistors to determine device current, reliability, and temperature without the need for additional components. This resulted in a new integrated power transistor that measures light emission to determine the operating condition of the device. An optical detector is used to sense light emitted by a transistor during operation, and the optical information is transferred to a signal processor that provides information about device operation and condition. This method can be used to determine device degradation, temperature, and reliability.





CONTACT

Marc Oettinger
marc.oettinger@ucsc.edu
tel: 831-502-0253.

INVENTORS

- Corzine, Keith

OTHER INFORMATION

KEYWORDS

Optical Sensor, Current sensor, Temperature sensor, Transistor reliability, Light measurement

CATEGORIZED AS

- **Optics and Photonics**
  - All Optics and Photonics
- **Engineering**
  - Engineering

RELATED CASES

2018-905-0

APPLICATIONS

Electronics andelectrical circuits

Reliability monitoring of circuits

Circuit gate control

ADVANTAGES

Use of light results in systems that can be used in electromagnetically noisy conditions.

INTELLECTUAL PROPERTY INFORMATION

Country	Type	Number	Dated	Case
United States Of America	Issued Patent	11,621,774	04/04/2023	2018-905

RELATED MATERIALS

- Current and Temperature Measurement via Spectral Decomposition of Light Emission from a GaN Power Diode - 03/15/2020

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

- DC Circuit Breaker for Emerging Power Systems

University of California, Santa Cruz
Industry Alliances & Technology Commercialization
Kerr 413 / IATC,
Santa Cruz,CA 95064

Tel: 831.459.5415
innovation@ucsc.edu
https://officeofresearch.ucsc.edu/
Fax: 831.459.1658