

TECHNICAL
NOTES

ESD Precautions

Thermal
Management

DFB Laser Concept

Tunable Diode
Laser Absorption
Spectroscopy

Reliability

ESD Precautions

Semiconductor Lasers

This note addresses the problem of electrostatic discharge (**ESD**), which is responsible for more than 30% of electronic failures. It is intended to help prevent damage to your nanoplus laser, as even an invisible 15 V ESD can destroy your device.

In the following, you will be made aware of the causes of electrostatic discharges and suitable protective measures.

Key recommendations:

- WRIST STRAPS
- FOOT STRAPS
- ESD-SAFE FLOORS
- NON-INSULATING SHOES



Use a wrist strap



Be aware of electrostatic discharge (ESD)

Electrostatic charging mainly occurs when **materials with different surface charges** are brought together or separated. **External electric fields** are another reason. For example, it is easy to generate voltages > 100 V simply by walking across a carpet.

Electrostatic discharging arise when the **charged object** is **connected to the ground or an object with a different potential**, resulting in the transfer of electrons. In principle, all objects

have a **different potential unless** they are on the **same ground**. The visible sparks reach 10,000 V, but even an invisible electrostatic discharge of 15 V is sufficient to destroy your device.

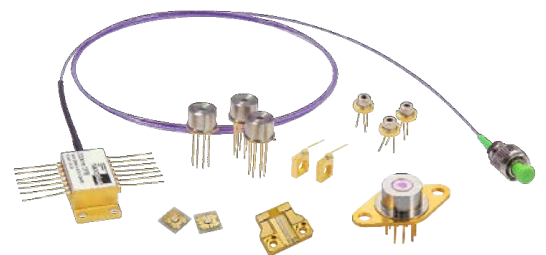
People are the **primary source of ESD**. Therefore, the only way to avoid ESD is to **put all parts of your setup**, including the operator, on the **same ground**.

This is as simple as wearing a **wrist strap** when working with a laser diode. The wrist strap must be connected to the same ground as the other items you use (tools, instruments, other materials).

In addition, you can use **ESD-safe floors, shoes, and foot straps**. Shoes that are not ESD-safe should have a strap connecting the inside of the operator's socks to the outside of the shoes, as these shoes are usually insulating. Creating an **ESD-safe area** is the best way to protect your equipment.

nanoplus accepts **no liability for ESD damage**. All devices leave nanoplus in tested condition and are properly packed to avoid ESD damage during transport. **ESD precautions** must be taken **before unpacking** the laser. For example, if you use a voltmeter for testing, this will immediately destroy the laser. Only use suitable instruments and tools to ensure a long service life for your laser.

"Protect your laser from ESD damage by creating an ESD-safe workspace."



nanoplus lasers are susceptible to ESD damage



[1] <http://www.esda.org/aboutesd.html>, [2] Semiconductor laser damage due to human-body-model electrostatic discharge, Twu, Y. et al, J. Appl. Phys. 74 (3), 1510-1520, 1993. [3] Human-body-model electrostatic-discharge and electrical-overstress studies of buried-heterostructure semiconductor lasers, Huang, J. et al, IEEE Transaction on Devices and Materials Reliability, 7 (3), 453-461, 2007.