

Wind Turbine Solar Panel Impacts on Solar Panels

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Summary of Findings

- Bypass diodes can be triggered by turbine blades at certain irradiance conditions.
- Given module vendor diode ratings, premature failure of diodes can occur.

Unknowns

- At what distance does enough diffraction occur to stay below breakdown voltage?
- What is the actual durability of diodes? One unnamed vendor stated 15,000 “on/off’s”

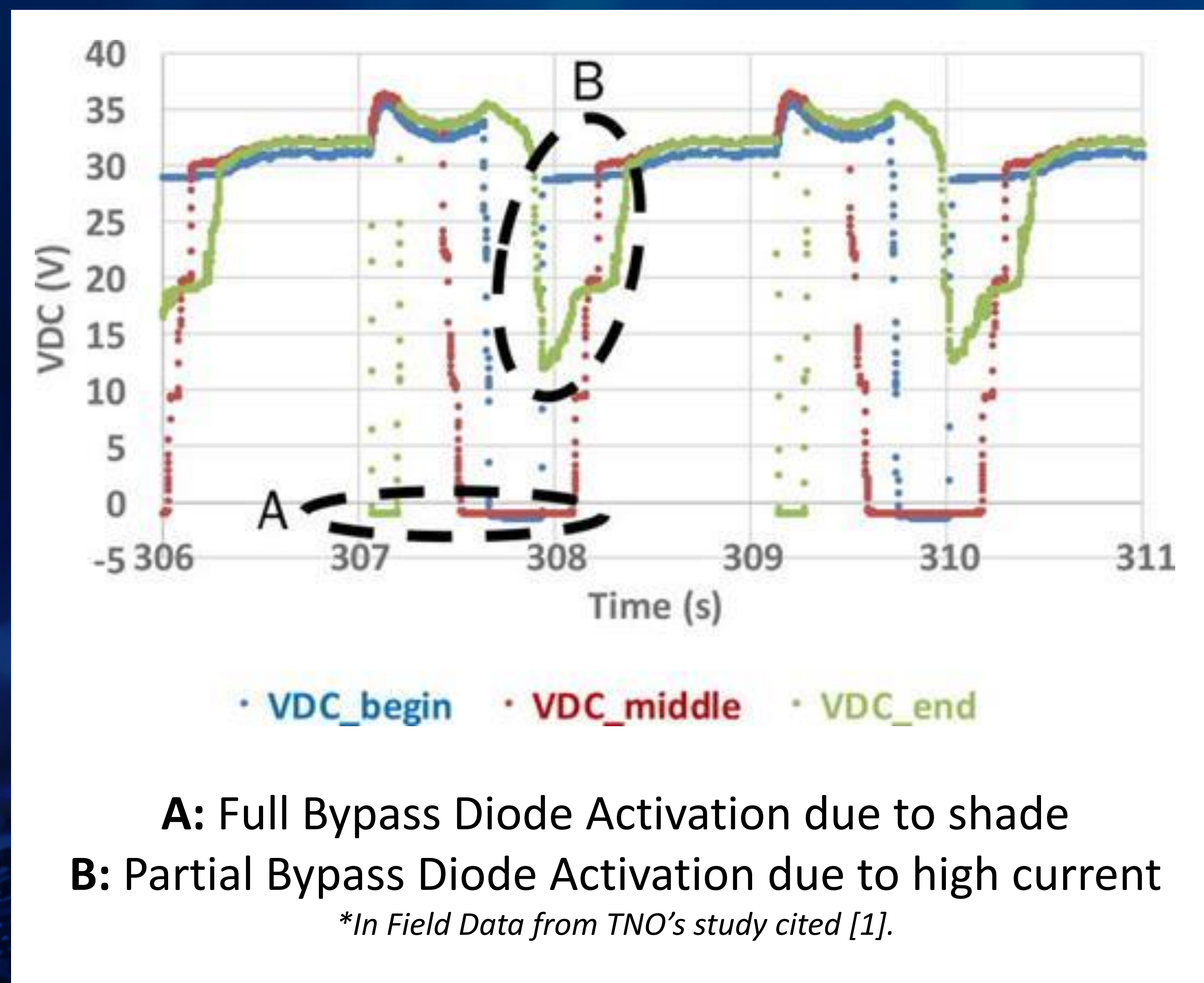
Potential Solutions

1. Setback properly from WTGs
2. Curtail solar in state of V_{oc}
3. Plan for replacement modules

Other Risks

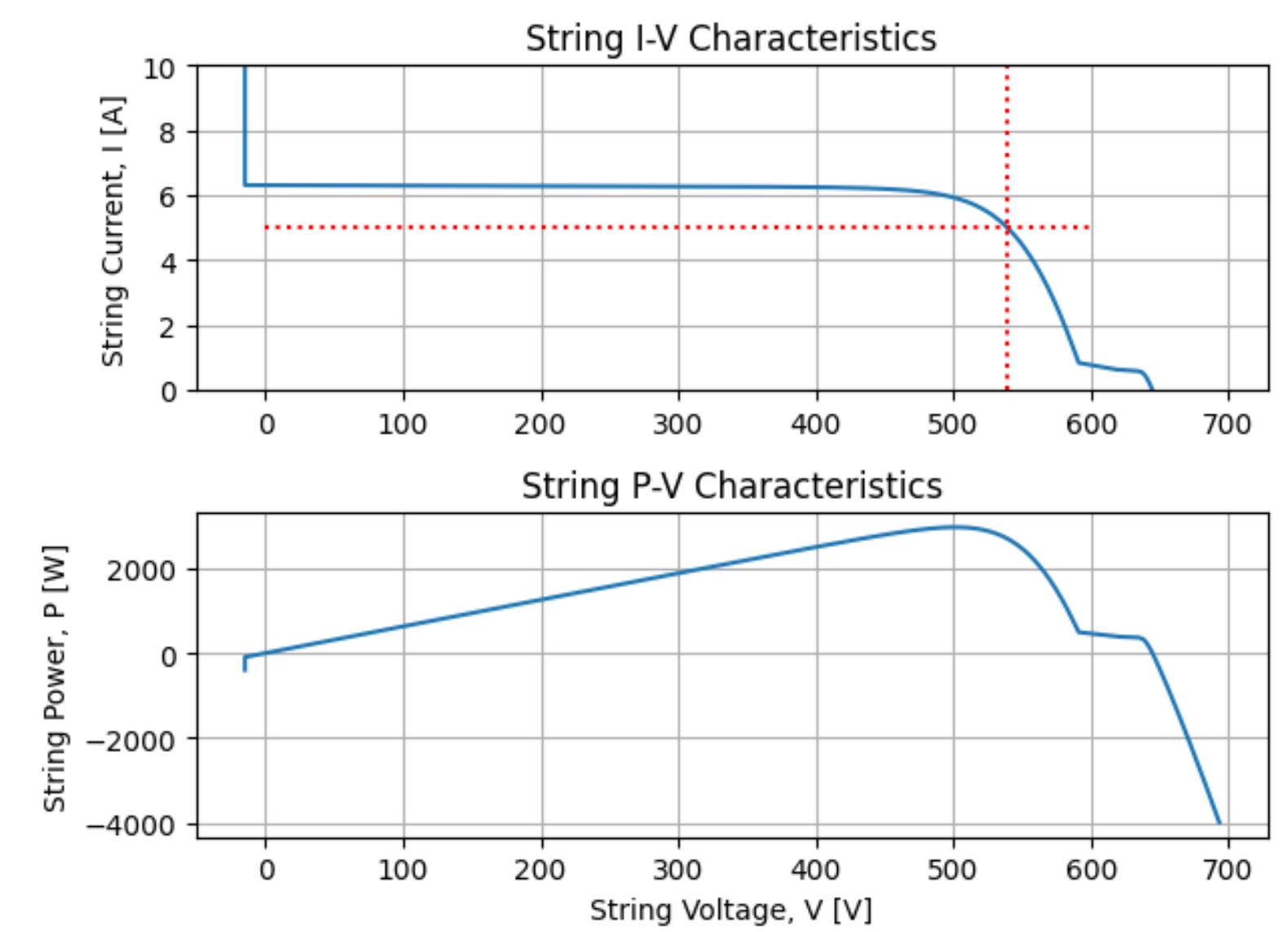
- Ice Shed from WTGs
- Tower Shading Hotspots

Risks of Shadow Flicker caused by bypass diode failure when siting WTGs near solar panels.

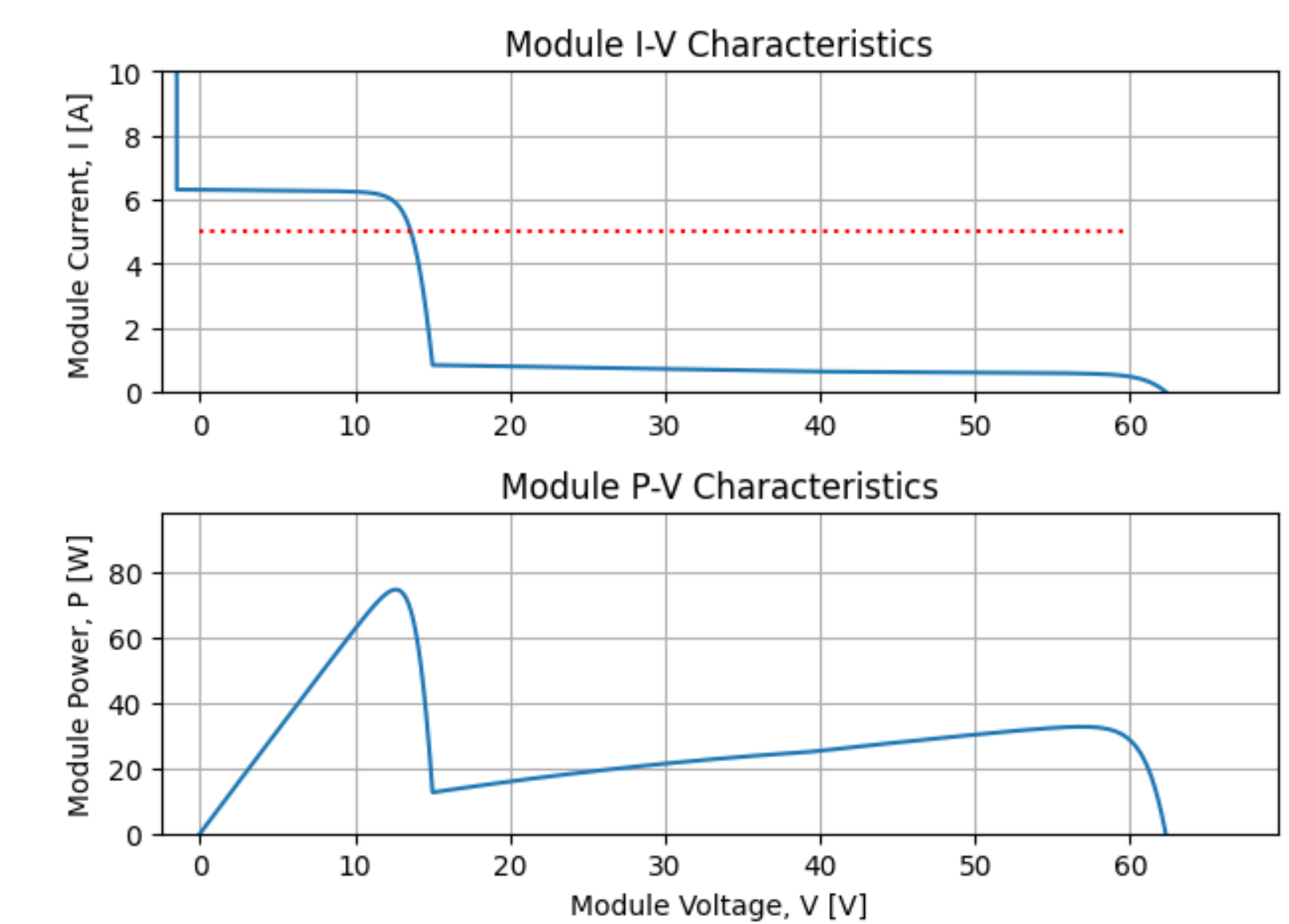


IV-PV Curve Simulations^[2]

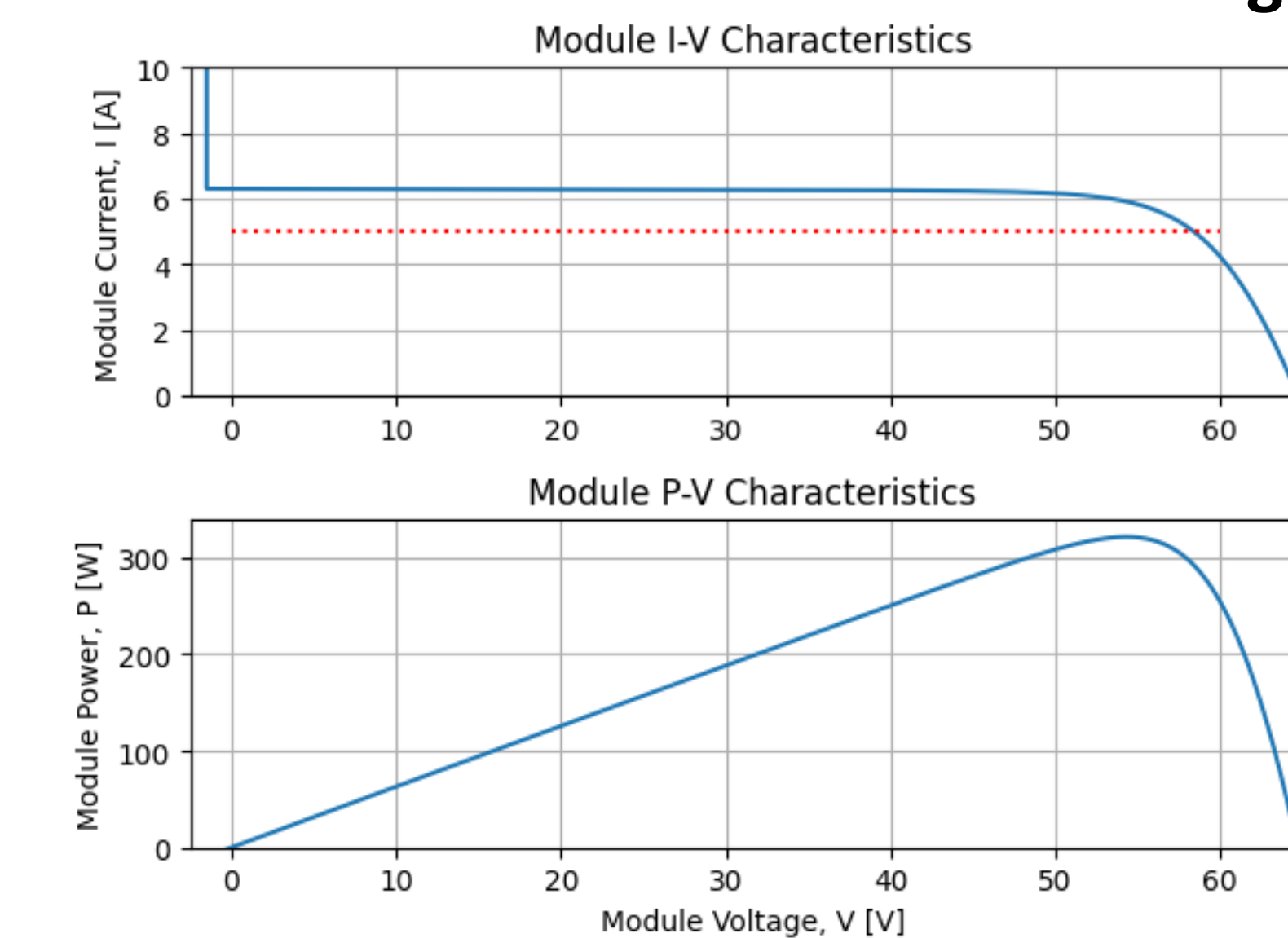
One String with a Shaded Module (System of 20 strings)



Shaded Module



Unshaded Modules on the String



References

- [1] Dekker, Nico J., et al. "Effects of Wind Turbine Dynamic Shading on Combined Solar and Wind Farms. TNO Solar Energy.
- [2] Mikofski, Mark. Weblog post. PV Electric Mismatch in Silicon-Cell PV - Part 2, 23 Aug. 2024, Accessed 25 Aug. 2024.

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