MPS Proposal for PoDL

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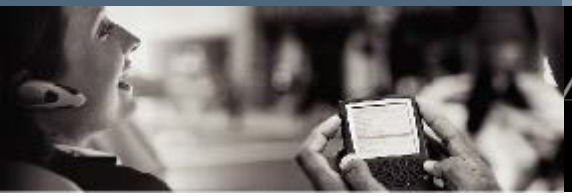


Presentation Objectives

- Review the requirements for PoDL MPS
- Propose a MPS scheme that relies upon comparing PD current averaged over a sliding window of time against a threshold current
- Propose a circuit architecture for reliably detecting low level, average PD current

PoDL MPS Requirements

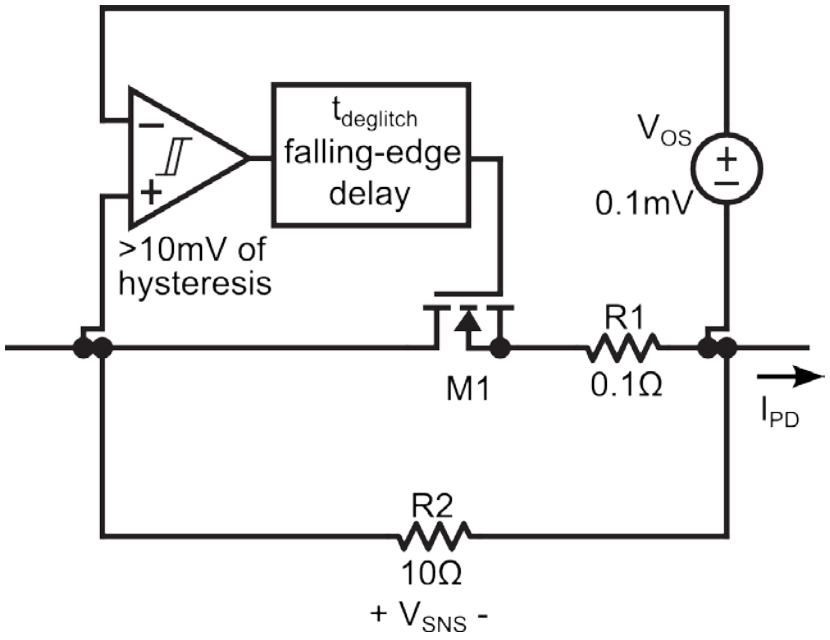
- Power consumption
  - The average PD current requirement for a MPS scheme should be minimal (on the order of 10µA?)
- Acceptable latency
  - The delay from absence of a MPS to removal of power at the PSE PI should be minimal, e.g. T_{MPDO} for PoE is guaranteed to be less than 400ms.

Possible Approaches to MPS

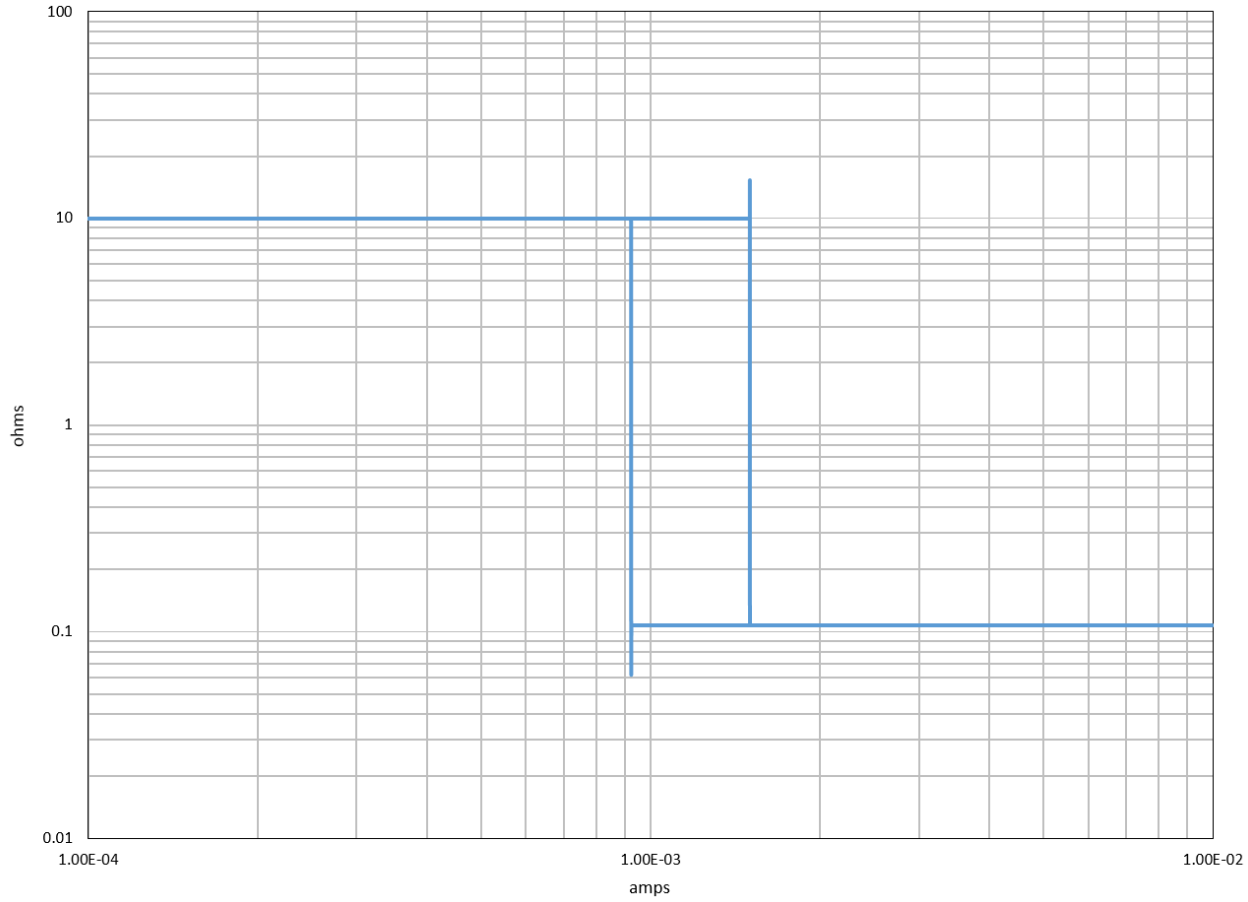
- Approach 1: PD generates an active current signature.
  - This is the approach used by PoE.
  - Meeting the desired average current consumption and latency requirements may be problematic using this approach.
- Approach 2: Compare PD current sensed over a sliding window against a threshold.
  - If PD current averaged over a sliding time window falls below the MPS threshold current, the PSE may remove power from the PI.
  - PD MPS implementation can be conceptually very simple, e.g. connecting a high value resistor in shunt with the PD may suffice.
  - How to accurately measure average PD current on the order of 10µA?

Technically Feasible Scheme for Accurately Sensing PD Current over a Wide Range

- Detect current with low value 0.1Ω R_{SNS} when I_{PD}>1mA+I_{Hyst}.
- Detect current with a 10Ω R_{SNS} when I_{PD}<1mA.
- M1 gate driver falling-edge delay limits motor-boating frequency.
- Sensitivity to PD current is increased by 10Ω/0.1Ω = 100x!

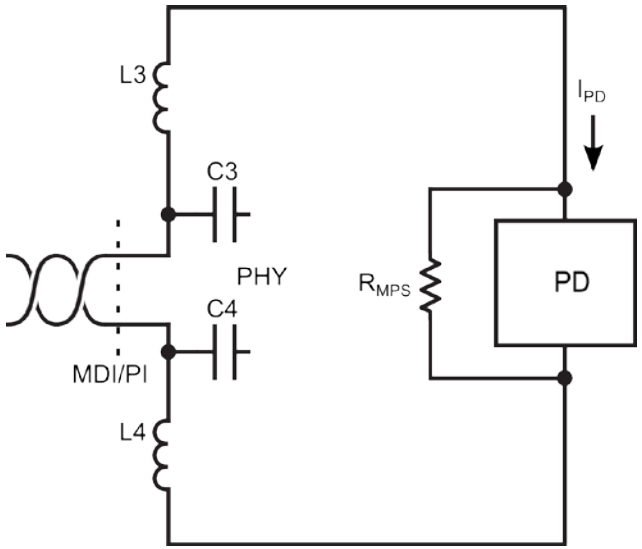


Simulated PSE Sense Resistance vs. PD Current for Proposed Circuit Architecture



Conclusions

- It is technically feasible to sense average PD current on the order of 10µA.
- Comparing averaged PD current against a threshold current may be a viable MPS scheme for PoDL.
  - The MPS signature device may be as simple as a high valued resistor in shunt with the PD.



Simple PoDL MPS Scheme

Questions?