IEEE 802.3af DTE Power via MDI

Disconnect Detection Alternative And More....

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Objectives

- Description of alternative disconnect detection concept.
- Presenting how the above concept can be simple and robust

Concept Description

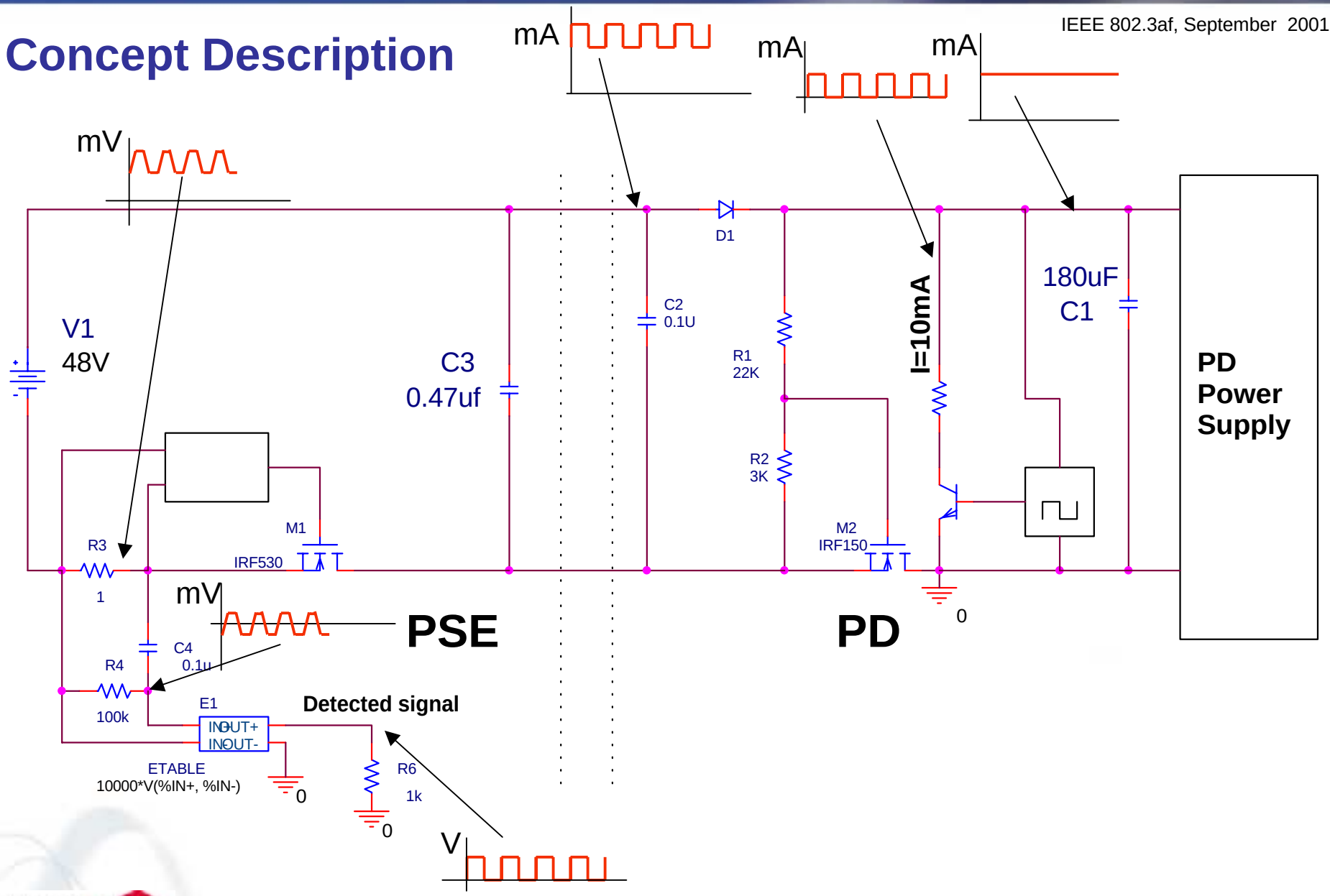


Figure -1

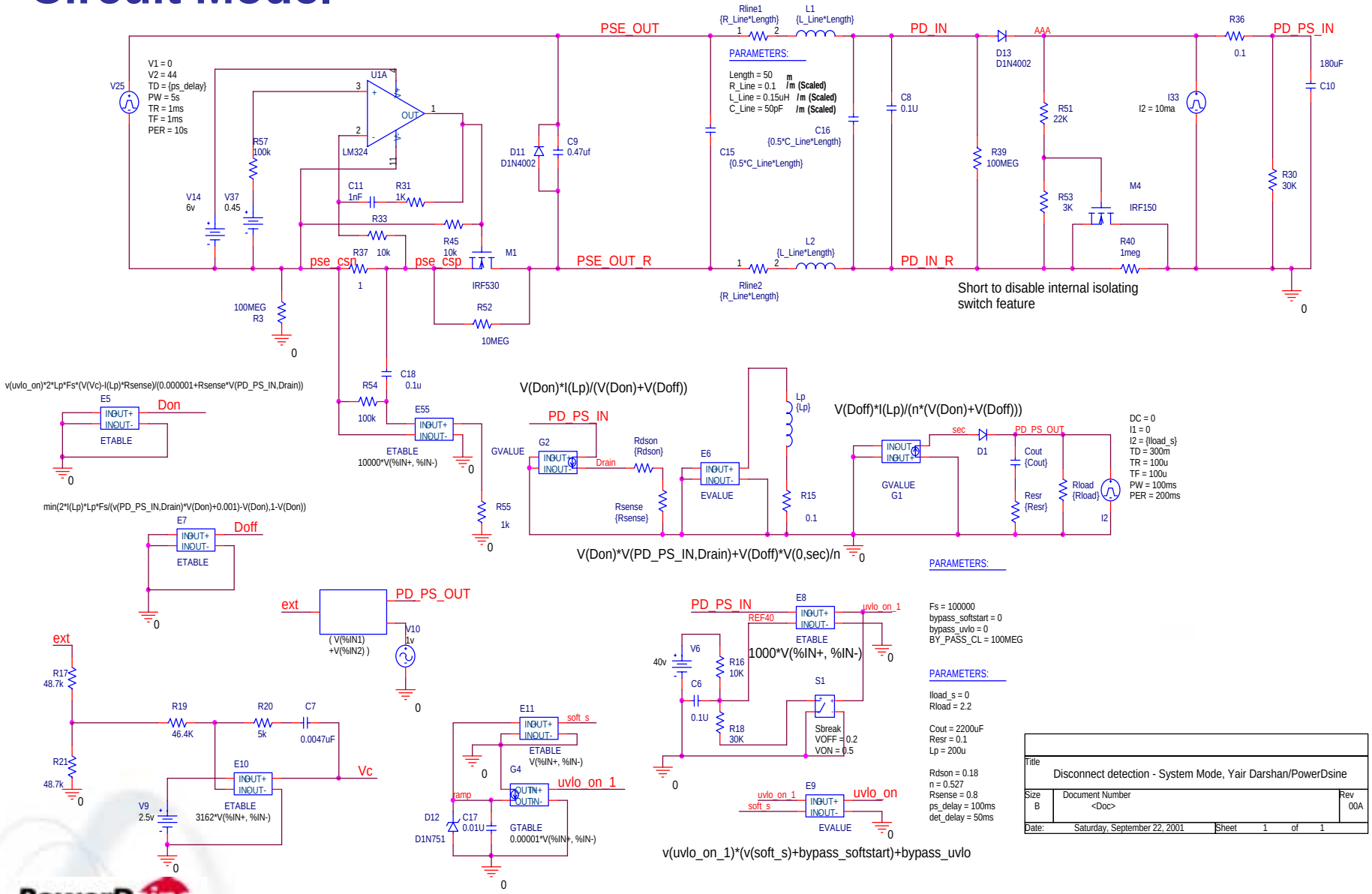
PD Requirements

- Adding at the PD power supply input a current modulator activated above UVLO threshold.
  - Implemented by switched current source or
  - Implemented by simple transistor and resistor
- The PD input current will be changed by 10mApp
- The frequency of the current will be at the range of 50Hz to 1KHz
- Current rise/fall time is inherently limited by the current passive elements in the system
- Duty cycle can be around 50% or less to keep low average current.

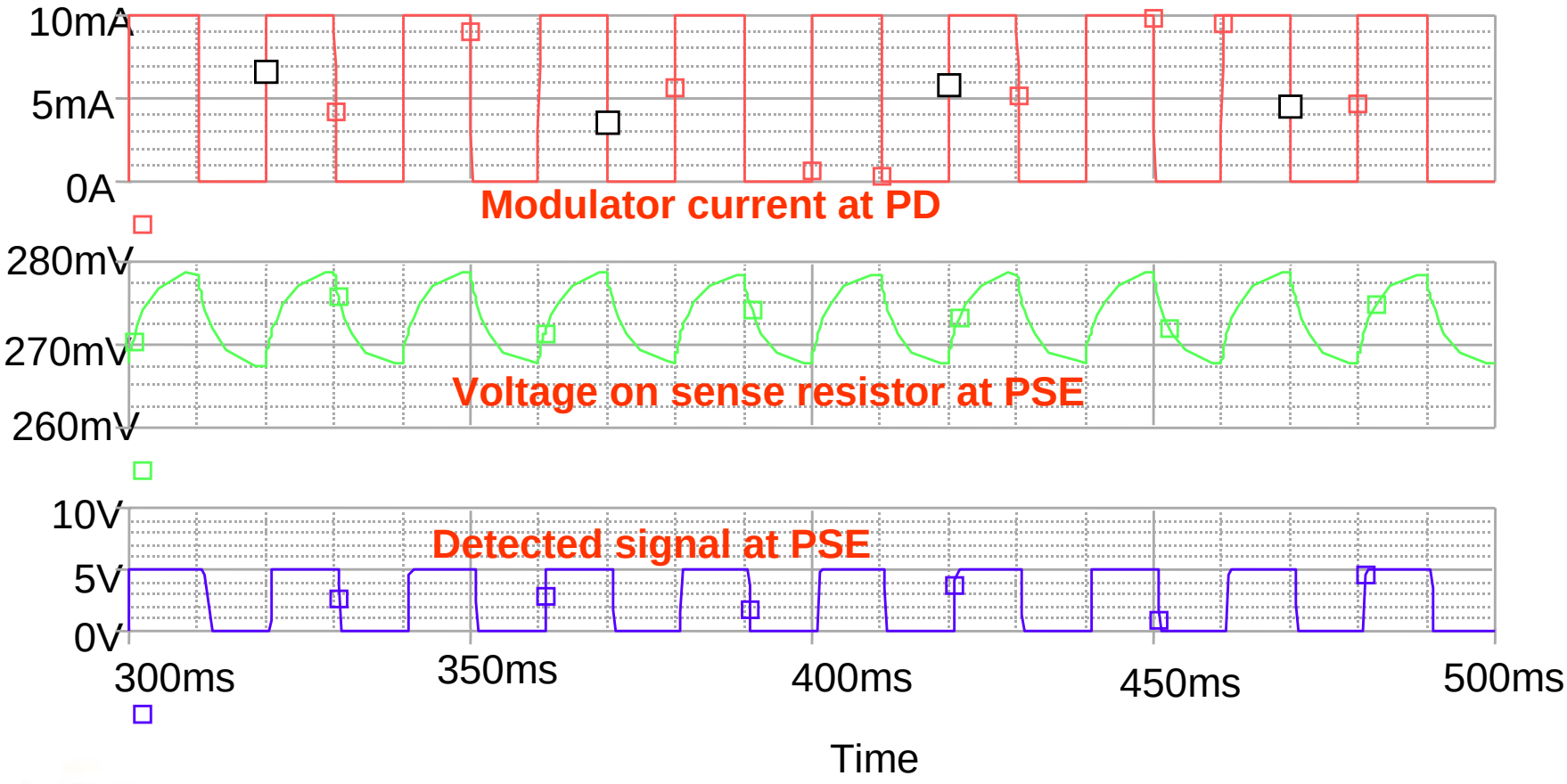
PSE Requirements

- Current through the port is sensed through the port current sense resistor and translated to ac voltage
- AC voltage will be extracted from the DC voltage by RC filter or other circuit
- AC voltage pulses converted to convenient logic levels and being used as “PD is Connected” indication
- If there are no N pulses for more than 300ms than power will be removed from the port. (or equivalent wording…)
  - N can be 1,2….. M

Circuit Model



Simulation Results



Summary

Pros

- Simple method
  - Increase PD cost by less than $0.1 with discrete components
    - << $0.1 if integrated in a chip.
  - Increase PSE port cost by less than $0.07 with discrete components
    - << $0.07 if integrated in a chip.
- Not sensitive to noise/voltage transient etc due to the fact that you have it only if PD is connected…..
- Pulses can be coded for more options or enhancing reliability.
- No EMI problems

Summary - Cont.

- Can be expanded as Detection and/or Classification method.
  - Example 1: Ac current at frequency of 100Hz is a piece of information that says:
  - PD requires power.
  - PD is connected
  - PD Needs max. 5W

  - Example 2: Ac current at frequency of 200Hz is a piece of information that says
  - PD requires power.
  - PD is connected
  - PD Needs max. 7W

  - The pulses can be coded to generate more options

Summary- Cont.

- **Cons**
- More work for some of us…
- May delay ending the standard

What next

- Specifying final frequency range
- How the detection is affected by ac ripple generated by load changes (*)
- How detection is affected by ac ripple generated by PSE output voltage variations or by port to port cross regulation effects(*)
- What happen if PSE voltage ripple is in 180 degree compared to ac current generated by the PD. The result can be zero pulses or narrow pulses. Probability is near to zero but not zero..(**)
- Implementing the hardware in a full system environment and get results
  - (*) Checked with simulations still good results. More tests are required.
  - (**) Can be solved by using two frequency coding or changing the frequecy of the modulator in the PD over time