Vmark vs Imark at Typical Conditions
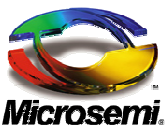
IEEE802.3at

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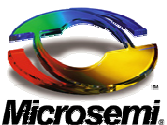
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PSE Worst case Parameters

- PSE: C_{pse}=0.52uF max., TCLE1/2_min=6msec, Vclass is 20.5V

- Cable: C_{cable}=10nF max/100m

- PD: 0.12uF max. PD capacitance during classification is undefined (Worth se a separate comment..), Vmark_th=10.2V

- Hence total capacitance is 0.65uF at least for the worst case.

- During Mark Event PD current can be as low as 0.25mA.

- (During Vmark_th range the current can be any number between 0.25mA to 44mA or to Iclass. Assuming PD vendor use 0.25mA all the way for Vmark_th range)

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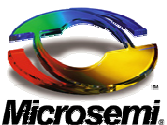
The Problem

- The voltage at the port during Mark event will be: Vclass-0.25mA*6msec/0.65uF= 20.5V-2.304V=18.2V > Vmark_th

- Problems:

- Vport > Vmark_th ➔ PD can not detect 2nd classification attempt

- PSE can not support its maximum capacitance spec and TCLE1/2 min with PD worse case values Vmark_th=10.1V ,Cpd=0.12uF, Imark=0.25mA for the entire Vmark_th range.

PSE with Typical Parameters

- PSE: Cpse=0.2uF, TCLE1/2=9msec, Vclass is 18V

- Cable: Ccable=10nF max/100m

- PD: 0.1uF. PD capacitance during classification is undefined (Worth se a separate comment..), Vmark_th=10.2V

- Hence total capacitance is 0.31uF at least for the typical case.

- During Mark Event PD current can be as low as 0.25mA.

- (During Vmark_th range the current can be any number between 0.25mA to 44mA or to Iclass. Assuming PD vendor use 0.25mA all the way for Vmark_th range)

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We still have problem

- The voltage at the port during Mark event will be: Vclass-0.25mA*9msec/0.31uF=10.5V > Vmark_th

- Conclussions:

- We dont want to change legacy parameters but we can do simple change that will fix the issue: To require PD to consume Iclass as long as Vport>Vmark_th.

- Under the current specification If PD Vmark_th is close to 10.1V and its Imark=0.25mA for the entire Vclass Vmark ranges and PSE port voltage is not discharged below Vmark_th then PD can not detect the 2nd Classification attempt.

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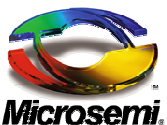
Simulation Results with Typical PSE numbers

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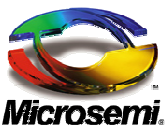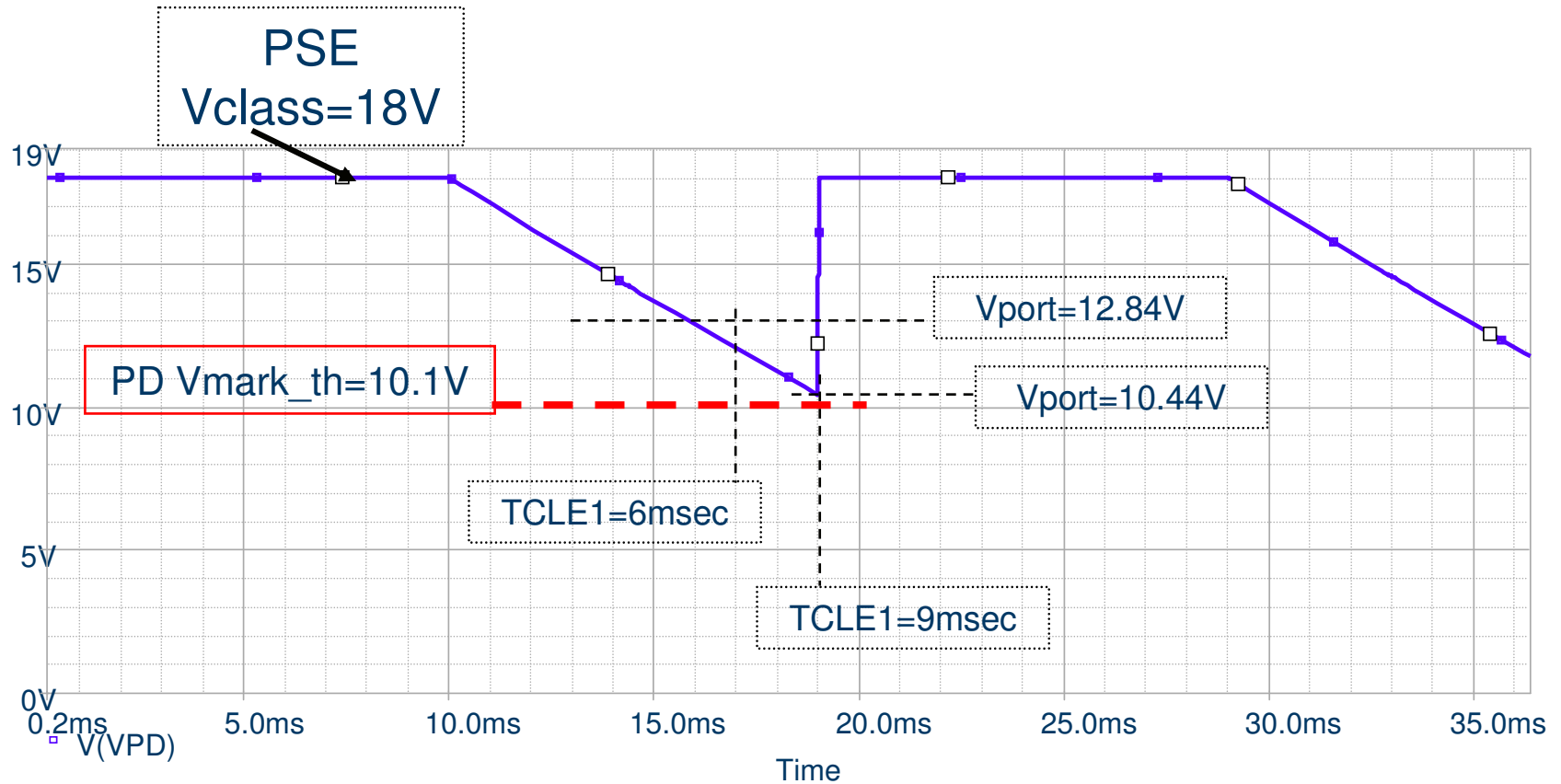
Suggested Remedy

- (To require PD to consume Iclass as long as Vport>Vmark_th.)

- Add the following item after item 4 in Table 33-17:
  Item: 4.1, Parameter: Mark_event threshold current,
  Symbol:Imark_th, Units:mA, Min:Iclass, Max:Iclass_max,
  Additional Information: For Vclass >=Vport_PD >=Vmark_th