IEEE802.3at Task Force

Vport ad hoc

Constant Power Model = Worst Case

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Objectives of this presentation

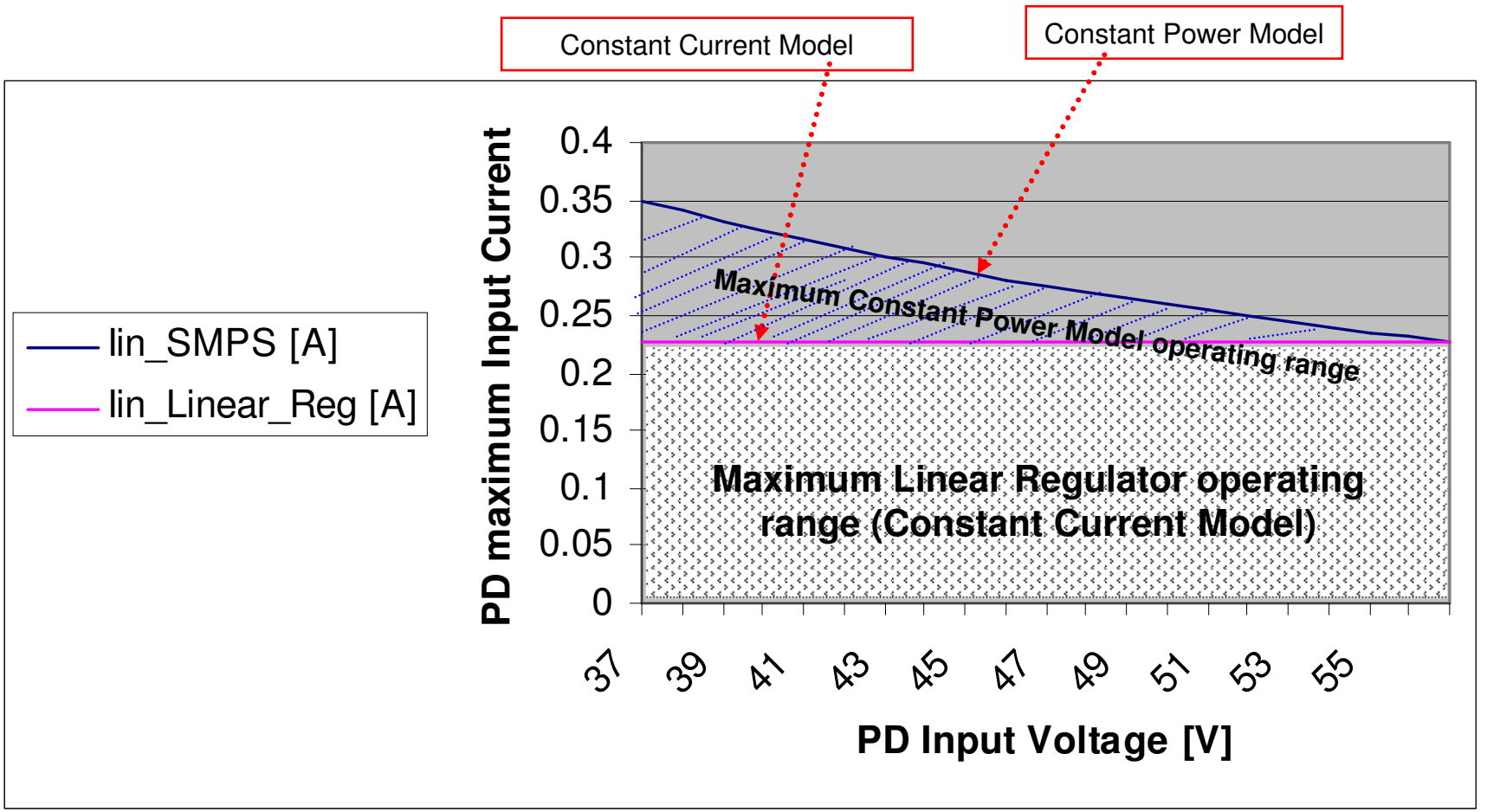
- Showing that using the PD as a constant power model covers all cases of PD power supply implementations
  - Linear regulators
  - Switching Power Supplies
  - Any other combination

List of facts 1 of 2

- **Linear Regulator**
- Vout and Pout determine Pout=constant. ➔ Iout = Iin = constant
- Pin=Vout*Iin+(Vin-Vout)*Iin = Vin*Constant. ➔
- Pin_max=min {Vin*Constant , 12.95W} ➔ Pin_max = 12.95W
- Efficiency=Pout/Pin=Vout*Iin/Vin*Iin= Vout/Vin !!
- **Switching Regulator**
- Vout and Pout determine Pout=constant. ➔ Pin=Pout/Efficiency =~ constant (at >80% efficiency)
- Pin=Pout/Efficiency =~ constant.
- Pin_max = 12.95W

- In all cases:
  - Pin_max=12.95W. ➔ Pport_max.
  - Iport_max=0.35A. ➔ Icable_max.
  - Iport=Pport/Vport must be maintained to meet the 12.95W and 0.35A limitations
- The differences between the models are: In switching regulator the output power is much higher then in linear regulator due to better efficiency!

Constant Power Model allows max power utilization



802.3af Example

List of facts 2 of 2

- 802.3af uses PD constant power model assumption in various locations
  - Table 33-12 item 5: Input Current DC or RMS.
    - Iport=0.35A for Vport=37V ➔ 12.95W/37V=0.35A, Pport=constant, Vport=Variable
    - Iport=0.23A for Vport=57V ➔ 12.95W/57V=0.23A , Pport=constant, Vport=Variable
    - ➔ Constant power model.
  - 33.3.5.4: Iport_max=Pport_max/Vport
  - PSE section: similar representations as in PD section

Summary and conclusions

- 802.3af is our baseline
- 802.3af is using constant power model load for average/rms power/current.
- Constant power model load allows optimal utilization of PD power supply.
- 802.3at is should continue using the same concept.
- Constant Power Model Definition: Iport=Pport/Vport=Pclass_max/Vport
- Pclass may be received from Physical Layer or Data Link Layer classification.

Discussion