ANALOG DEVICES

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PD Signature Configuration

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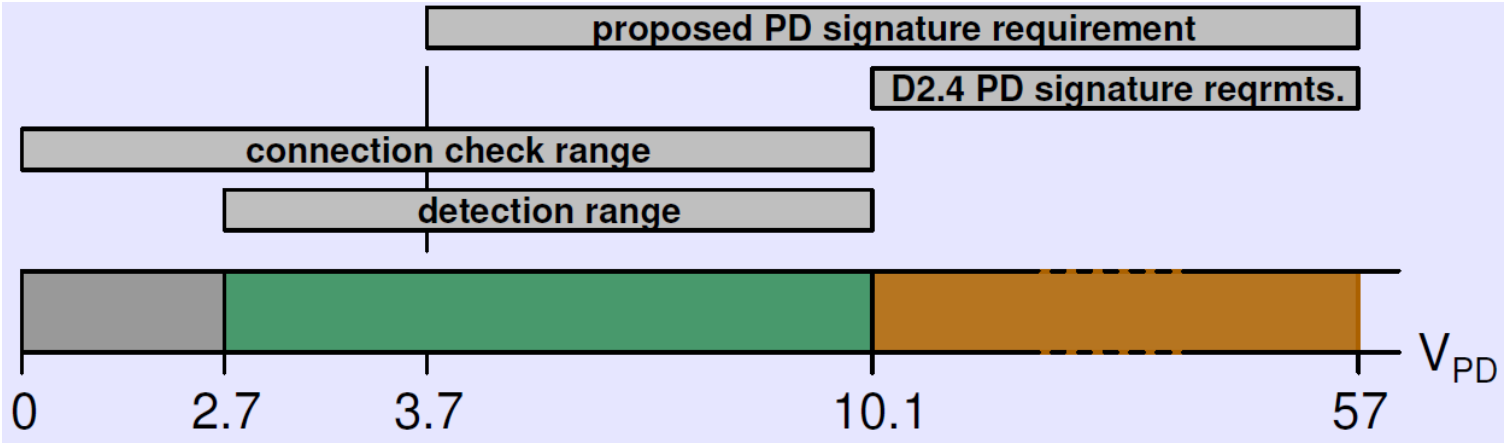
Problem Statement

- PD Signature Configuration, single-signature PD
  - Behavior is undefined for V_{PD} < 10.1V
  - Connection Check and Detection are performed by PSE in this voltage range
- PD designer needs clear guidance on how to behave below 10.1V
  - Ensures that PD properly identified by PSE as “single-signature”



Source: yseboodt_09_0517

Single-signature PD Considerations

- Single-signature PDs present the same detection resistor to both Modes
- A given Mode may be measured for a valid PD detection signature
- Certain effects on the other Mode will be apparent on the given Mode
  - Any current sourced on the other Mode
  - Specific application of voltage on the other Mode ($V_{PD\_Other} > V_{PD\_Given}$)
- **At some threshold of disturbance, the detection signature on a given Mode will no longer meet the "valid PD detection signature" requirements in Table 145–21**

Single-signature PD Considerations
Cont'd.

Table 145–21—Valid PD detection signature characteristics, measured at the PD PI

Parameter	Conditions	Min	Max	Unit	Additional information
R_{detect} (at any 1 V or greater chord within the voltage range conditions)	2.7 V to 10.1 V	23.7	26.3	kΩ	—
V_{offset}	—	0	1.9	V	See Figure 145–29
Voltage at the PI	$I_{Port-2P}$ = 124 µA	2.7		V	—
Input capacitance	2.7 V to 10.1 V	0.05	0.12	µF	—
Series input inductance	2.7 V to 10.1 V		100	µH	—

- 124uA is the minimum amount of current required to generate 2.7V (minimum detection voltage) at the PD PI
  - Applies to both common detection methods, Forced Voltage and Forced Current
- For a single-signature PD, applying 124uA to the "other" PD Mode guarantees that detection on the "given" PD Mode will not meet the requirements of 145–21
  - The PD will "not present a valid detection signature"

Voltage Disturbance

- Voltage disturbance is only working when current is flowing
- A system that uses voltage to disturb the other Mode sees less than 124uA on the detecting Mode when pollution is active
- The parameter “Voltage at the PI” (2.7V, 124uA) is violated

Current Disturbance

- Current disturbance causes an offset on the given Mode
- A system that uses a current disturbance > 124uA on the other mode can expect Vos > 2.7V on the given Mode
- The parameter Voffset (1.9V,max) is violated

Proposed Solution

1) Define single-signature PD behavior for V_{PD} < 10.1V

- Modify 145.3.5, paragraph #1 as follows:
  - Alternative #1: Current Only
    - "A single-signature PD shall present a valid detection signature, as defined in Table 145-21, on a given Mode when no voltage or current is applied on the other Mode, and shall ~~present an invalid~~ not present a valid detection signature on ~~that~~ the given Mode when any ~~voltage between 10.1V and 57V~~ current greater than 124µA is applied to the other Mode. These requirements apply to both Mode A and Mode B."
  - Alternative #2: Voltage and Current
    - "A single-signature PD shall present a valid detection signature, as defined in Table 145-21, on a given Mode when no voltage or current is applied on the other Mode, and shall ~~present an invalid~~ not present a valid detection signature on ~~that~~ the given Mode when ~~any voltage between 10.1V and 57V~~ any voltage in the range of 3.7V to 57V is applied to the other Mode or any current greater than 124µA is applied to the other Mode. These requirements apply to both Mode A and Mode B."

Proposed Solution
cont'd.

2) Add a note to define "not a valid signature"

- 145.3.5, add the following after paragraph beginning with "A dual-signature PD shall present…"
  - A valid detection signature meets every requirement in Table 145-21 across all specified conditions. A failure under any allowed condition is considered "not a valid signature."