

# NOPOWER, $V_{On\_PD}$ , and $V_{Off\_PD}$ v111

## Info (not part of baseline)

This comment addresses r01-450, 449, 347, 451, 348, 349, 452, 227, 314, 353, and 238.

There is a discrepancy between the text in 145.3.8.1, dealing with PD turn-on and turn-off behavior and the behavior of the state diagram. The specification  $V_{Off\_PD}$  and  $V_{On\_PD}$  is intended for steady state condition, excluding peak power draw and transient events. After all, a PD that is drawing peak power may have a  $V_{PD}$  that is outside of the  $V_{Port\_PD-2P}$  range, and as such the PD would be permitted to turn off.

The state diagram implements this turning off of the PD with the NOPOWER state. Because the state diagram reacts instantaneously, depending on the value of  $V_{Off\_PD}$ , it can happen that peak power draw, or a transient event causes the PD to transition to NOPOWER. Because NOPOWER is also used to specify behavior for PDs that are intentionally drawn back into mark/class/ $V_{Off\_PD}$  range, a conflict arises, because a pass through the NOPOWER state allows the PD to change it class event counter.

Another way to make an unwarranted pass through NOPOWER is for the PD the intentionally transition from INRUSH to POWER\_DELAY before  $V_{PD}$  is in the  $V_{Port\_PD-2P}$  range. This must also be prevented.

To solve this:

- the PD state diagram is forced to spend precisely 50 msin INRUSH (the state, not the condition).
- the entry logic into NOPOWER is changed to be  $V_{PD} < V_{Off\_PD}$  min.
- Add requirement that states a PD can't turn off due to compliant peak power draw or transients.

### 145.3.3.4 Single-signature PD variables

#### Change variable *nopower* as follows:

*nopower*

A variable that indicates the PD has been in NOPOWER, which indicates  $V_{PD}$  was below  $V_{Off\_PD}$  min while being powered, since the last time  $V_{PD}$  was below  $V_{Reset}$  for at least  $T_{Reset}$ .

Values:

- FALSE: The PD has not been in NOPOWER.
- ~~FALSE~~ TRUE: The PD has been in NOPOWER.

### 145.3.3.5 Single-signature PD timers

*tinrushpdmax\_timer*

A timer used to determine when the PD exits INRUSH and meets the requirements of POWER\_DELAY; see  $T_{Inrush\_PD}$  max in Table 145–29.

### 145.3.3.9 Dual-signature PD variables

#### Add variable *nopower\_mode(X)* as follows:

A variable that indicates the PD has been in NOPOWER for Mode X, which indicates  $V_{PD}$  was below  $V_{Off\_PD}$  min while being powered, since the last time  $V_{PD}$  was below  $V_{Reset}$  for at least  $T_{Reset}$  on that Mode.

Values:

- FALSE: The PD has not been in NOPOWER.
- TRUE: The PD has been in NOPOWER.

### 145.3.3.10 Dual-signature PD timers

*tinrushpdmax\_timer\_mode(X)*

A timer used to determine when the PD exits INRUSH over Mode X and meets the requirements of POWER\_DELAY; see  $T_{Inrush\_PD}$  max in Table 145–29.

### 145.3.3.7 Single-signature PD state diagrams

Change Figure 145–26 as follows:

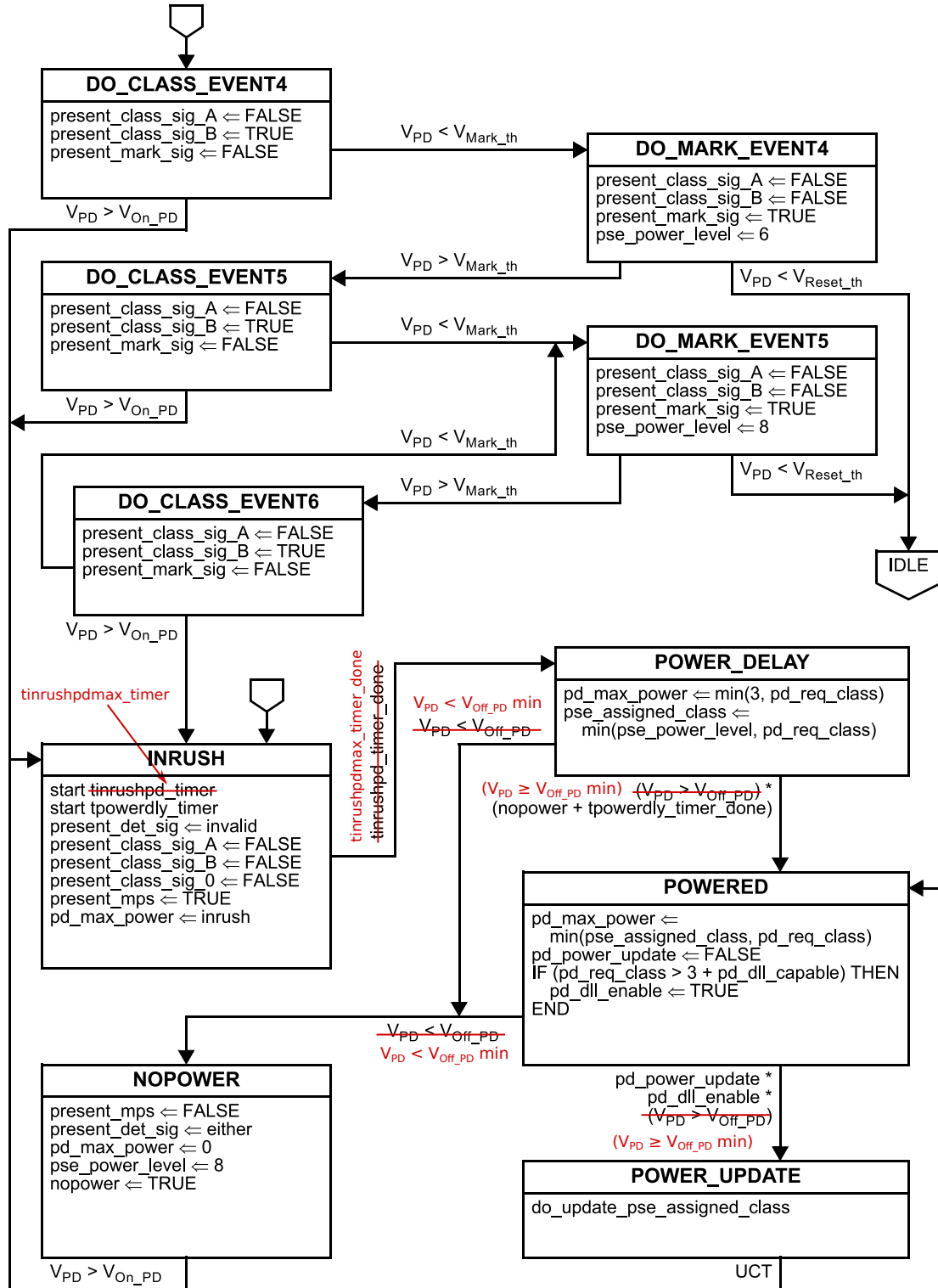


Figure 145–26—Single-signature PD state diagram (continued)

### 145.3.3.12 Dual-signature PD state diagrams

Change Figure 145–26 as follows:

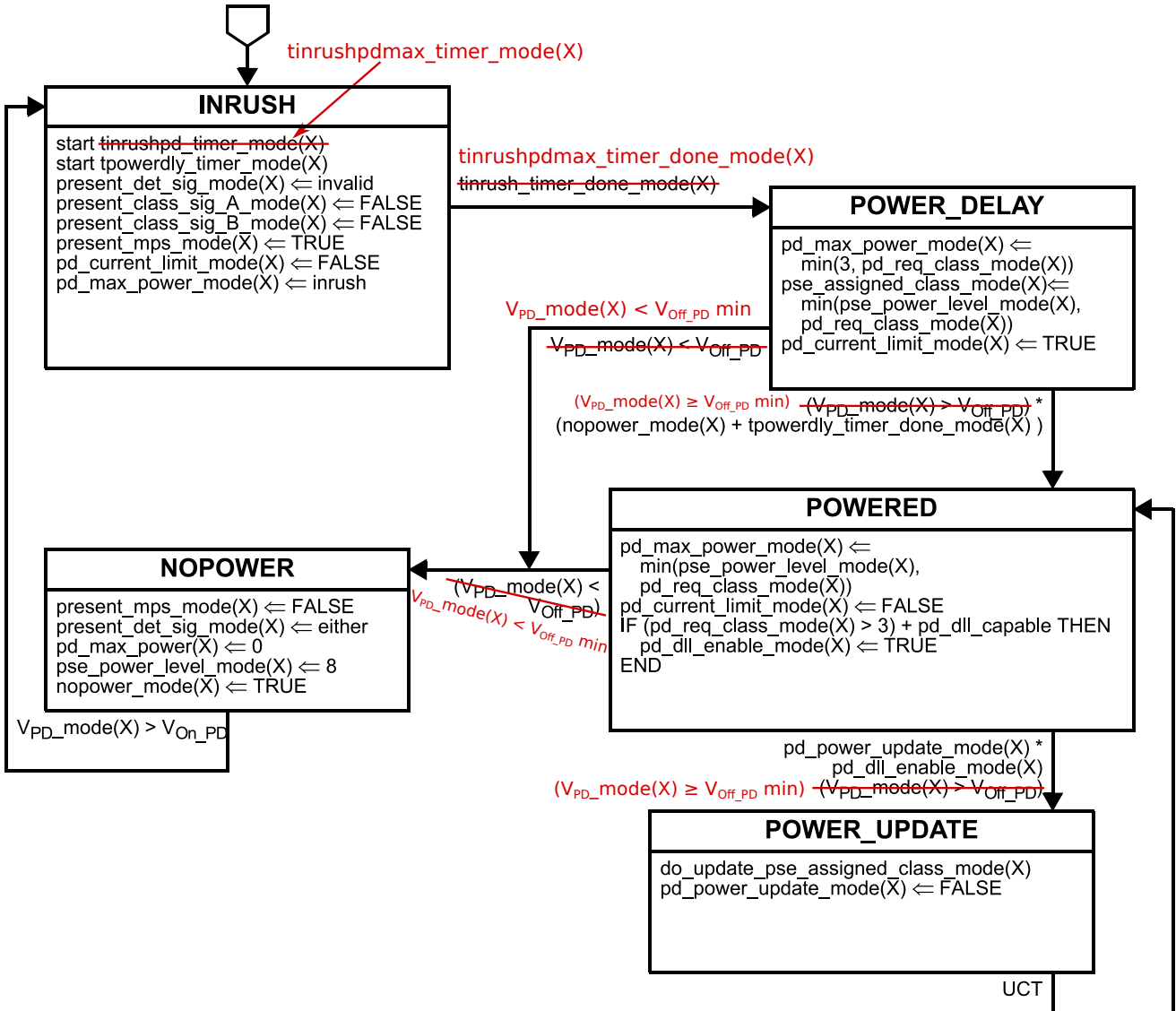


Figure 145–28—Dual-signature PD state diagram (continued)

### 145.3.8.1 Input voltage

Change 145.3.8.1 as follows:

The specification for  $V_{Port\_PD-2P}$  in Table 145–29 is for the input voltage range after startup (see 145.3.8.3), and accounts for loss in the cabling plant.

The PD shall turn on at a voltage in the range of  $V_{On\_PD}$ . After the PD turns on, the PD shall stay on over the entire  $V_{Port\_PD-2P}$  range. The PD shall turn off at a voltage in the range of  $V_{Off\_PD}$ . For dual-signature PDs the requirements for  $V_{On\_PD}$  and  $V_{Off\_PD}$  apply to each pairset individually. A PD shall not turn off due to peak power draw, causing  $V_{PD}$  to go as low as  $V_{Overload-2P}$ , as specified in 145.3.8.4, or due to a voltage transient as defined in 145.3.8.6.

...

When the PD is in POWER\_DELAY or POWERED and  $V_{PD}$  falls below  $V_{Off\_PD}$ , the PD transitions to NOPOWER and may show a valid or invalid detection signature, and may or may not draw mark current, draw any class current, and show MPS. When nopower is TRUE interoperability between PSE and PD is no longer guaranteed.