Baseline for Figure 33-14 v320

Some formatting is for reviewing clarity and will be removed prior to baseline submission.

33.2.7 Power supply output

Info (not part of baseline!)

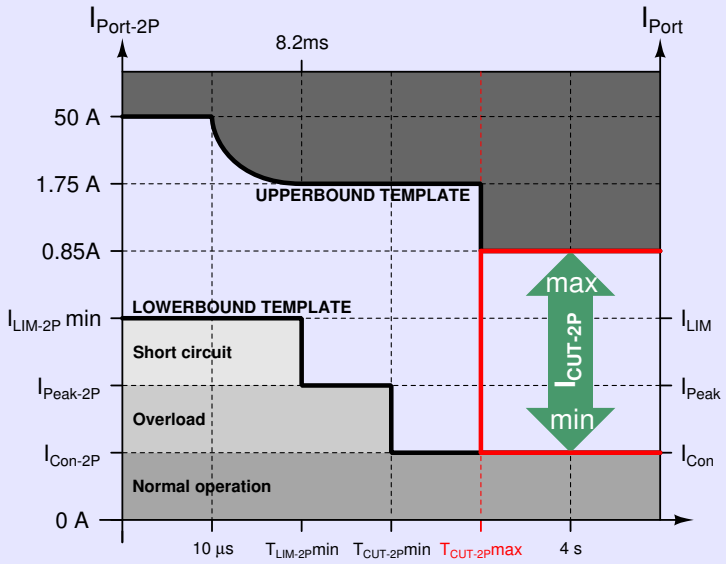
$I_{CUT\text{-}2P}$ is an optional limit a PSE can implement to perform power management. The minimum is defined by the lowerbound template at $t > T_{CUT\text{-}2P}$ max and the maximum is defined by the upperbound template also for $t > T_{CUT\text{-}2P}$ max.
This is the current D1.4 definition for $I_{CUT\text{-}2P}$:

7	Overload current per pairset, detection range	$I_{CUT\text{-}2P}$	A	P_{Class} / $V_{Port\_PSE\text{-}2P}$	$I_{LIM\text{-}2P}$	1,2	Optional limit; see 33.2.7.6, Table 33–7.
				$K\_I_{cut} \times P_{Class}$ / $V_{Port\_PSE\text{-}2P}$		3, 4	K_I_{cut} = 0.611 for Class 5 K_I_{cut} = 0.568 for Class 6 K_I_{cut} = 0.539 for Class 7 K_I_{cut} = 0.535 for Class 8

For every Type, the definition of $I_{CUT\text{-}2P}$ must match with Figure 33-14 and needs to have a range as follows:

$I_{CUT\text{-}2P}$min — The minimum current the PSE must be able to support, this matches with the lowerbound template and the value is $I_{Con\text{-}2P}$. $I_{Con\text{-}2P}$ already handles unbalance in its various definitions.

$I_{CUT\text{-}2P}$max — The maximum current a PSE may sustain, matching with the upperbound template.



Replace Table 33-11, Item 7 by:

Item	Parameter	Symbol	Unit	Min	Max	PSE Type	Add. Info
7	Overload current per pairset, detection range	$I_{CUT\text{-}2P}$	A	P_{Class}/ V_{PSE}	$I_{LIM\text{-}2P}$	1, 2	Optional limit; see 33.2.7.6, Table 33-7.
				$I_{Con\text{-}2P}$	0.85	3	
					I_{LPS}	4	

33.2.7.4 Continuous output current capability in the POWER_ON state

Info (not part of baseline!)

Per the current D1.4 text a PSE is required to support $I_{Peak\text{-}2P}$ on both pairsets simultaneously. $I_{Peak\text{-}2P}$includes the effect of unbalance, so the PSE is required to support the unbalance current twice. The goal of this modification is to employ the same mechanism as used fir I_{Con} where we define a total current (I_{Peak}), a maximum unbalance current ($I_{Peak\text{-}2P\_unb}$) and finally the per pairset requirement $I_{Peak\text{-}2P}$, which will be different depending on the sort of PD attached (2P, 4P with unbalance or 4P without unbalance).

Change 33.2.7.4 as follows:

In addition to I_{Con}, $I_{Con\text{-}2P}$ and $I_{Con\text{-}2P\_unb}$ as specified in Table 33-11, the PSE shall support the following AC current waveform parameters, while within the operating voltage range of $V_{Port\_PSE\text{-}2P}$:

$$I_{\text{Peak}} = \left\{ \frac{V_{\text{PSE}} - \sqrt{V_{\text{PSE}}^2 - 4 \cdot R_{\text{Chan}} \cdot P_{\text{Peak\_PD}}}}{2 \cdot R_{\text{Chan}}} \right\}_{\text{A}} \tag{33-4}$$

where

V_{PSE}	is the voltage at the PSE PI as defined in 1.4.426
R_{Chan}	is the channel loop resistance ~~as defined in 33.1.4~~; this parameter has a worst case value of R_{Ch}. R_{Ch} is defined in Table 33-1.
$P_{\text{Peak\_PD}}$	is the total peak power a PD may draw for its Class; see Table 33-18.

$I_{\text{Peak}}$is the total current of both pairs with the same polarity that a PSE supports.

$$I_{\text{Peak-2P\_unb}} = \left\{ (1 + K_{\text{IPeak}}) \cdot \frac{I_{\text{Peak}}}{2} \right\}_{\text{A}} \tag{33-4a}$$

where

K_{IPeak}	The value of K_{IPeak}, defined in Equation 33-4b, is based on a curve fit and is dimensionless.
I_{Peak}	is the total peak current a PSE supports per Equation 33-4

$$K_{\text{IPeak}} = \begin{cases} \min(0.214 \times R_{\text{Chan}}^{-0.363},\ 0.330) & \text{for Class 5} \\ \min(0.199 \times R_{\text{Chan}}^{-0.350},\ 0.300) & \text{for Class 6} \\ \min(0.180 \times R_{\text{Chan}}^{-0.326},\ 0.270) & \text{for Class 7} \\ \min(0.176 \times R_{\text{Chan}}^{-0.325},\ 0.260) & \text{for Class 8} \end{cases} \tag{33-4b}$$

where R_{Chan} is the channel DC loop resistance.

Info (not part of baseline!)

The next part follows the same structure as the $I_{\text{Con-2P}}$ definition.

PSEs that operate in 2-pair mode shall be able to source $I_{\text{Peak-2P}}$ as specified in Equation 33-4c. $I_{\text{Peak-2P}}$ is the current the PSE supports on the powered pairset.

$$I_{\text{Peak-2P}} = I_{\text{Peak}} \tag{33-4c}$$

where

I_{Peak}	is the total peak current a PSE supports per Equation 33-4

Type 3 and Type 4 PSEs operating in 4-pair mode, connected to a single-signature PD, shall be able to source I_{Peak}, $I_{\text{Peak-2P}}$, and $I_{\text{Peak-2P\_unb}}$ as specified in Table 33-11 and Equation 33-4d. $I_{\text{Con-2P}}$ is the current the PSE supports on each pairset and is defined by Equation 33-4d. A PSE is not required to support $I_{\text{Peak-2P}}$ values greater than $I_{\text{Peak-2P\_unb}}$. I_{Peak} is the total current of both pairs with the same polarity that a PSE supports. $I_{\text{Peak-2P\_unb}}$ is the maximum current the PSE supports over one of the pairs of same polarity under maximum unbalance condition (see 33.2.7.4.1) in the POWER_ON state.

$$I_{\text{Peak-2P}} = \min\left(I_{\text{Peak}} - I_{\text{Port-2P-other}},\ I_{\text{Peak-2P\_unb}}\right) \tag{33-4d}$$

where

I_{Peak}	is the total peak current a PSE supports per Equation 33-4
$I_{\text{Port-2P-other}}$	is the output current on the other pairset (see 33.2.4.4)
$I_{\text{Peak-2P\_unb}}$	is the minimum current due to unbalance effects a PSE must support on a pairset as define in Table 33-11.

Type 3 and Type 4 PSEs operating in 4-pair mode, connected to a dual-signature PD, shall be able to source $I_{\text{Peak-2P}}$ on each pairset as specified in Equation 33-4e. Note that for these PDs $I_{\text{Peak-2P}}$ is calculated using Equation 33-4e for each pairset independently.

$$I_{\text{Peak-2P}} = \left\{ \frac{V_{\text{PSE}} - \sqrt{V_{\text{PSE}}^2 - 4 \cdot R_{\text{Chan}} \cdot P_{\text{Peak\_PD-2P}}}}{2 \cdot R_{\text{Chan}}} \right\}_{\text{A}} \tag{33-4e}$$

where

V_{PSE}	is the voltage at the PSE PI as defined in 1.4.426
R_{Chan}	is the channel loop resistance; this parameter has a worst case value of R_{Ch}. R_{Ch} is defined in Table 33-1.
$P_{Peak\_PD\text{-}2P}$	is the peak power a PD may draw on a pairset; see Table 33-18.

Info (not part of baseline!)

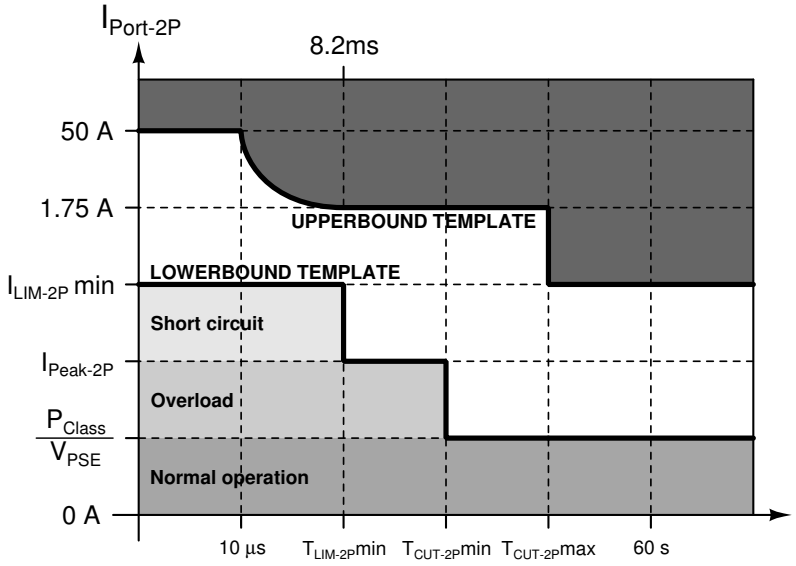
For dual-signature PDs we will need to define a $P_{Peak\_PD\text{-}2P}$ in the PD section.

33.2.7.7 Output current at short circuit condition

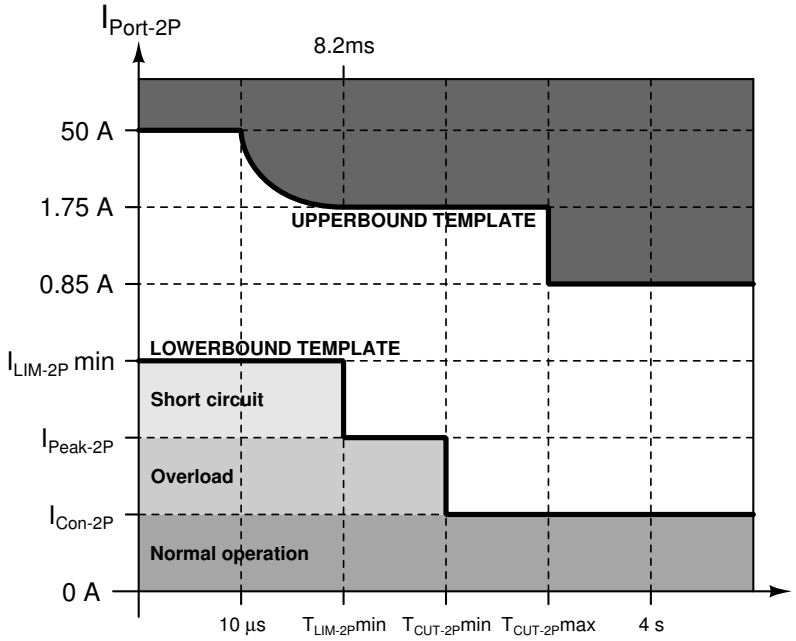
Info (not part of baseline!)

Apart from fixing minor inconsistencies, the only change is that I_{LIM} and I_{Peak} have been added to the I_{Port} axis in Figures 33-14b and 33-14c.

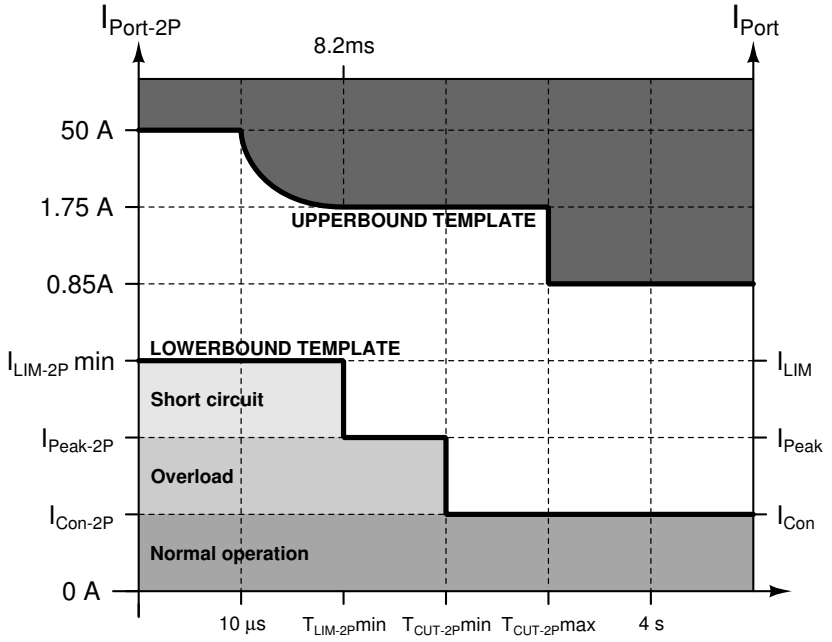
Replace Figures 33-14:



Replace Figures 33-14a:



Replace Figures 33-14b:



Replace Figures 33-14c: