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Comment: (Clause 33.2.8, Page 105 line 35, Editor Note #2)

Addressing Editor's Note #2. Its content from D1.7 is shown below. The text marked blue was modified to make the subject more clear.

2. E2EP2P_Iunb is the highest (~30%) on the pairs were we don't sense the current and lower on the pair we sense current (~15%). While specifying the PSE port current capacity per the highest P2P_Iunb is the correct approach (which we already did), it is worth to consider if ILIM and ICUT need to be calculated per the pairs with highest unbalance or per the pairs with lower unbalance. The reason for this question is: Icut and Ilim values are set to much higher values than the actual current measure due to much higher P2P_UNB. As a result the actual Ilim protection will be activated ~11.1% above Type 4 maximum power. The solution is: Ipeak-2P_unb and Ilim-2P_unb will be allowed to be decreased if Rpse_max and Rpse_min will increase compare the values defined in equation 33-13 and will generate lower PSE PI pair to pair unbalance. This is actually what happened in the negative pairs.

The issue to be addressed

Figure 1:

The positive pairs have the worst case unbalance. ILIM-2P_min is located near the pair with the maximum current marked in RED.

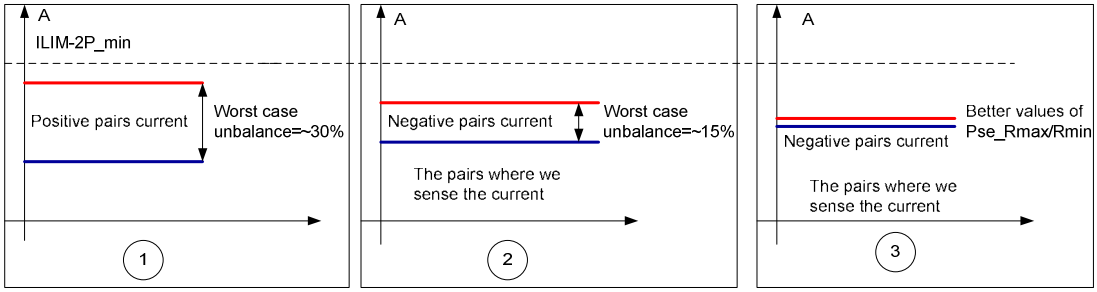


Figure 2:

The negative pairs have the lowest unbalance due to the fact that the sense resistors improve unbalance. ILIM-2P_min is located at the same place in the current spec, pair with the maximum current marked in RED.

The actual ILIM-2P_min need to be lower than the one needed for the positive pairs in order to protect both the negative and positive pairs in efficient way because increase in the current at the positive pair due to a fault will be translated to lower increase in the negative pair so the actual protection will happen at ~11% above what we expecting.

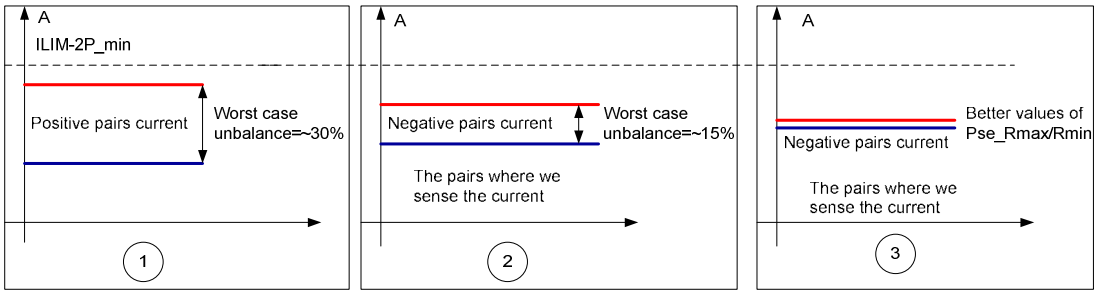
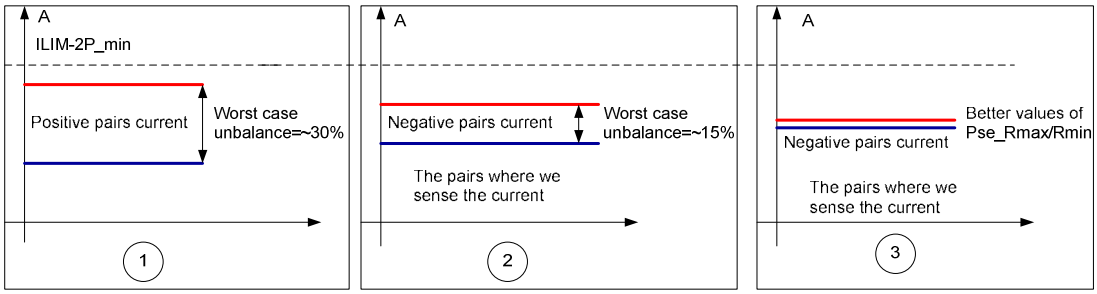


Figure 3:

The same case of Figure 2 but with better match of Rpse_max/min that reduces unbalance. But here, now the ILIM-2P_min is now further away from the actual current value of the pair with maximum current. This result with the need of big increase in the positive pair current to be sensed at the negative pairs where we do the sensing and control of the current.

The solution is to allow using lower ILIM-2P than specified in Table 33-17 for the pairs we sense the current if we use better values of Rpse_min/max specified in equation 33-13 that actually reduces unbalance.



Proposed Remedy:
Add the following text in 33.2.8.7 on page 116 after line 23.

Proposed Remedy:
Type 3 and Type 4 PSEs that operate over 4-pairs and control the PSE PI pair to pair unbalance with higher values of Rpse_max and Rpse_min than those defined by equation 33-13 and have a lower resistance difference (Rpse_max-Rpse_min) may use lower values of ILIM-2P_min and Ipeak-2P, as defined in TBD1 and TBD2.

ILIM-2P_min_new= min{ ILIM-2P_min, ILIM-2P_min*f(Rpse_max, Rpse_min, alfa, beta)} (TBD1)

Ipeak-2P_unb_new= ILIM-2P_min_new – 2mA (TBD2)

Editor Note: The equation f(Rpse_max, Rpse_min, alfa, beta) and the values of alfa and beta will be determined in next meeting based on curve fit similar to the techniques used for equation 33-10.

Where:

ILIM-2P_min_new is the new minimum value of ILIM-2P_min which is specified in table 33-17 when alfa>0 and beta>0 are used.
ILIM-2P_min is specified in Table 33-17
Rpse_max is the value specified in Equation 33-13.
Rpse_min is the value specified in Equation 33-13.
Alfa is the addition in the value of Rpse_max.
Beta is the addition in the value of Rpse_min that maintain the following requirement:
[(Rpse_max+a)-(Rpse_min+b)]/ (Rpse_max+a+Rpse_min+b)< (Rpse_max -Rpse_min)/ (Rpse_max+Rpse_min)
Ipeak-2P_unb_new is the new minimum value of Ipeak-2P_unb which is specified in equation 33-9.