

## Comment:

Editor Note #2.

"2. The following case needs to be addressed: If PSE is using active or passive pair-to-pair current balancing circuitry,  $K_{Icut}$  may be lower (down to 0.5) per equation TBD."

The accuracy of this comment is addressed in the comment marked ED\_2 and the comment ED\_2 is updated in this comment as follows:

"2. The following case needs to be addressed: The PSE is allowed to use active or passive pair-to-pair current balancing circuitry and the current spec requirements allow it however we need to address the fact that we can't benefit from the advantages of using passive or active current balancing if we are not allowing PSE to use lower minimum values of  $I_{LIM-2P}$ ,  $I_{con-2P}$ ,  $I_{peak-2P\_unb}$  than specified in Table 33-11."

### Now the rest of this comment:

The following comment addresses the main issue of Editor Note #2.

- According to the current spec we can implement active or passive current balancing. This is not the issue.
- According to the current spec if we build active or passive current balancer and we use the limits of  $I_{con-2P\_unb}$ ,  $I_{peak-2P\_unb}$  and  $I_{LIM-2P}$  we will surely be fine. This is not the issue too.
- The issue is that if we leave that spec as it is, we can't benefit from using active or passive current balancer due to the fact that we are not allowed to use lower limits of  $I_{con-2P\_unb}$ ,  $I_{peak-2P\_unb}$  and  $I_{LIM-2P}$  (that was planned for the worst case unbalance) due to the improved unbalance now. As a result we can't optimize the PSE designs for lower cost as it the only reason for using current balancer.
- The fact that we can use  $I_{LIM}$ ,  $I_{con}$  etc. which doesn't include unbalance effect doesn't help to PSEs that wants to have independent  $I_{port-2P}$  measurements and protection over each pairset (this concept of XXX-2P is all over the spec now).

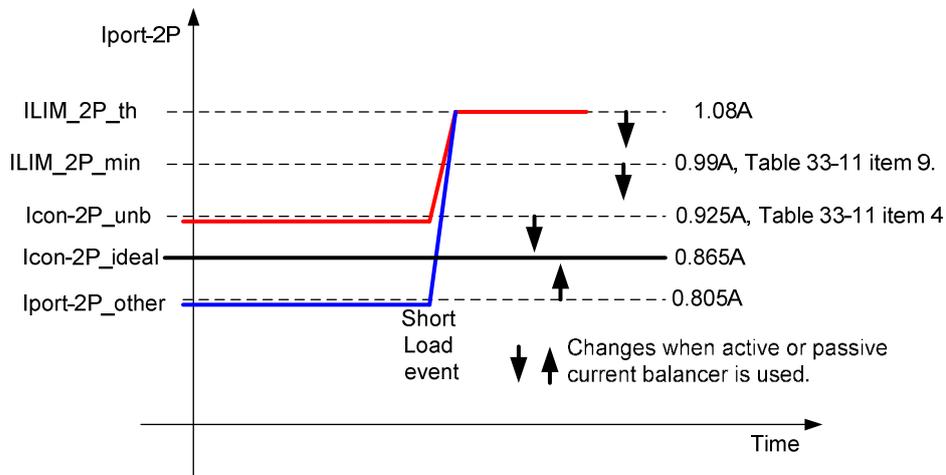
Example: In Type 4 class 8  $I_{LIM-2P}$  min is 0.99A which includes unbalance effect.

Normally PSEs set their  $I_{LIM-2P}$  protection to  $>0.99A$  per each pairset e.g. 1.08A.

It means that the 2nd pair with the lowest current will have much lower current during normal operation:  $I_{port-2P\_other} = (90W/52V/2 - (0.925A \cdot 90W/52V/2)) = 0.865A - 0.0596A = 0.805A$  :

So if there is a fault at the pair with the pair with the lowest current, the protection on this pairset will happen only when the pair with the lowest current will get to  $> 1.08A$  which is a current difference of  $1.08A - 0.805A = 0.275A$ . This means that the PSE have to be designed to such conditions, it is not a problem to design it as such however we can relax requirements to PSE if PSE is using active or passive current balancer.

The advantage of using lower  $I_{LIM-2P}$  etc. is e.g. reduction of magnetic size etc.



- The current spec allows implementations of active or passive current balancing.
- If we build active or passive current balancer and we use the existing limits of  $I_{con-2P\_unb}$ ,  $I_{peak-2P\_unb}$  and  $ILIM-2P$  we will surely be fine. This is not the issue too.
- With the current spec we can't benefit from using active or passive current balancer due to the fact that we are not allowed to use lower limits of  $I_{con-2P\_unb}$ ,  $I_{peak-2P\_unb}$  and  $ILIM-2P$  (that was planned for the worst case unbalance).
- Using active and passive current balancer allow us to use lower settings of  $I_{con-2P\_unb}$ ,  $I_{peak-2P\_unb}$  and  $ILIM-2P$  and as result we can optimize the PSE designs for lower cost as it is the only reason for using current balancer.
- The fact that we can use  $ILIM$ ,  $I_{con}$  etc. which doesn't include unbalance effect doesn't help to PSEs that wants to have independent  $I_{port-2P}$  measurements and protection over each pairset (this concept of  $XXX-2P$  is all over the spec now).

**Proposed Remedy: See next page.**

**Proposed Remedy:**

**1. Update the editor note to:**

"2. The following case needs to be addressed: The PSE is allowed to use active or passive pair-to-pair current balancing circuitry and the current spec requirements allow it however we need to address the fact that we can't benefit from the advantages of using passive or active current balancing if we are not allowing PSE to use lower minimum values of  $I_{LIM-2P}$ ,  $I_{con-2P}$ ,  $I_{peak-2P\_unb}$  than specified in Table 33-11."