

Note: PSE Vdiff and PD Vdiff was combined for simplicity i.e. PD Vdiff can be considered as PSE Vdiff+PD Vdiff. Results are depened only by Total Vdiff.

Parameter	PSE	PD	PD	Channel	Cable					Components								
	Vpse_diff	Vdiff_diode	Ppd	Length	PAIR Runb	P2PRunb	Cordage Resistivity	Cable Resistivity	# OF Connectors	Rt_max	Rt_min	Rconn max	Rcon nmin	Rsense_max	Rsense_min	Rdson_max	Rdson_min	Rd
Value	0	0.1	51	100	0.02	0.05	0.125	0.125	4	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

Forming 12.5 ohms at 100m

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	642.322	105.05	1179.594	8.9%
B+ I(R42)	537.272			
A- I(R20)	626.123	72.652	1179.594	6.2%
B- I(R19)	553.471			

At 100m we get 1179mA instead of 1200mA which is 21mA less.

This is due to how the PD Model calculate the average voltage at its input due to unbalance at high currents.

Current unbalance wil not be changed due to this error since diodes VF doesn't changed significantly for DI=20mA

At currents of 500mA range.

Parameter	PSE	PD	PD	Channel	Cable					Components								
	Vpse_diff	Vdiff_diode	Ppd	Length	PAIR Runb	P2PRunb	Cordage Resistivity	Cable Resistivity	# OF Connectors	Rt_max	Rt_min	Rconn max	Rcon nmin	Rsense_max	Rsense_min	Rdson_max	Rdson_min	Rd
Value	0	0.1	51	100	0.02	0.05	0.0926	0.074	4	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	604.271	105.499	1103.043	9.6%
B+ I(R42)	498.772			
A- I(R20)	589.564	76.085	1103.043	6.9%
B- I(R19)	513.479			

WHY I GET 1100Ma AT 100M ? Answer: Channel at worst case unbalance calculations is much less that 12.5 ohms. See adhoc report.

Parameter	PSE	PD	PD	Channel	Cable					Components								
	Vpse_diff	Vdiff_diode	Ppd	Length	PAIR Runb	P2PRunb	Cordage Resistivity	Cable Resistivity	# OF Connectors	Rt_max	Rt_min	Rconn max	Rcon nmin	Rsense_max	Rsense_min	Rdson_max	Rdson_min	Rd
Value	0	0.1	51	5	0.02	0.05	0.0926	0.074	4	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	597.69	175.109	1020.271	17.2%
B+ I(R42)	422.581			
A- I(R20)	582.247	144.224	1020.27	14.1%
B- I(R19)	438.023			

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Value	0	0.1	51	5	0.02	0.05	0.0926	0.074	1	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	593.815	168.563	1019.067	16.5%
B+ I(R42)	425.252			
A- I(R20)	578.061	137.056	1019.066	13.4%
B- I(R19)	441.005			

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Value	0	0.1	51	5	0.02	0.05	0.0926	0.074	0	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	592.408	166.15	1018.666	16.3%
B+ I(R42)	426.258			
A- I(R20)	576.567	134.467	1018.667	13.2%
B- I(R19)	442.1			

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Value	0	0.1	51	0.5	0.02	0.05	0.0926	0.074	0	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	602.677	189.986	1015.368	18.7%
B+ I(R42)	412.691			
A- I(R20)	583.874	152.38	1015.368	15.0%
B- I(R19)	431.494			

424.212m If Vmax and Vmin of the diode in the models are reversed we will get the following:
591.249m The maximum current locations are changed and became a bit lower since
450.914m Now Vmax is in series to Rmax which helps to balance the current but still Vdiff is the dominant one
564.548m

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	602.822	190.152	1015.492	18.7%
B+ I(R42)	412.67			
A- I(R20)	568.883	122.273	1015.493	12.0%
B- I(R19)	446.61			

602.822m If RDSON Rmax-Rmin is changed from 100% to 30% the negative pairs are improved as
412.670m Expected by 3%. No changes in the positive pairs as expected.
568.883m
446.610m

	Ipair[mA]	Idiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	602.374	190.113	1014.635	18.7%
B+ I(R42)	412.261			
A- I(R20)	595.158	175.681	1014.635	17.3%
B- I(R19)	419.477			

For the same Rdson differences of 30%
602.374m If RDSON is outside the unbalance circuitry I.E. RDSON=0
412.261m The unbalance on the negative pairs where RDSON was removed will be increased as expected!
595.158m It means 1P Channel will have more unbalance at short channels.
419.477m

	PSE	PD	PD	Channel	Cable		Components											
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Value	0	0.1	51	0.15	0.02	0.05	0.0926	0.074	0	0.13	0.12	0.05	0.03	0.1	0.098	0.1	0.05	0.25
Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	ldiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	603.766	192.418	1015.114	19.0%
B+ I(R42)	411.348			
A- I(R20)	584.61	154.106	1015.114	15.2%
B- I(R19)	430.504			

	PSE	PD	PD	Channel	Cable		Components											
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Units	V	V	W	m	-	-	ohm	ohm	-	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm	ohm

	Ipair[mA]	ldiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	690.851	366.381	1015.321	36.1%
B+ I(R42)	324.47			
A- I(R20)	650.056	284.79	1015.322	28.0%
B- I(R19)	365.266			

Unbalance was increased due to Vdiff increase

	Ipair[mA]	ldiff[mA]	Itotal	Iunb=Runb
A+ I(R41)	690.927	366.394	1015.46	36.1%
B+ I(R42)	324.533			
A- I(R20)	633.424	251.388	1015.46	24.8%
B- I(R19)	382.036			

690.927m No changes on positive pairs as expected.

324.533m

633.424m 17mA reduction (3.9% less in Runbalance) if RDSON differences is 30% instead of 100%.

382.036m