

IEEE802.3at Task Force

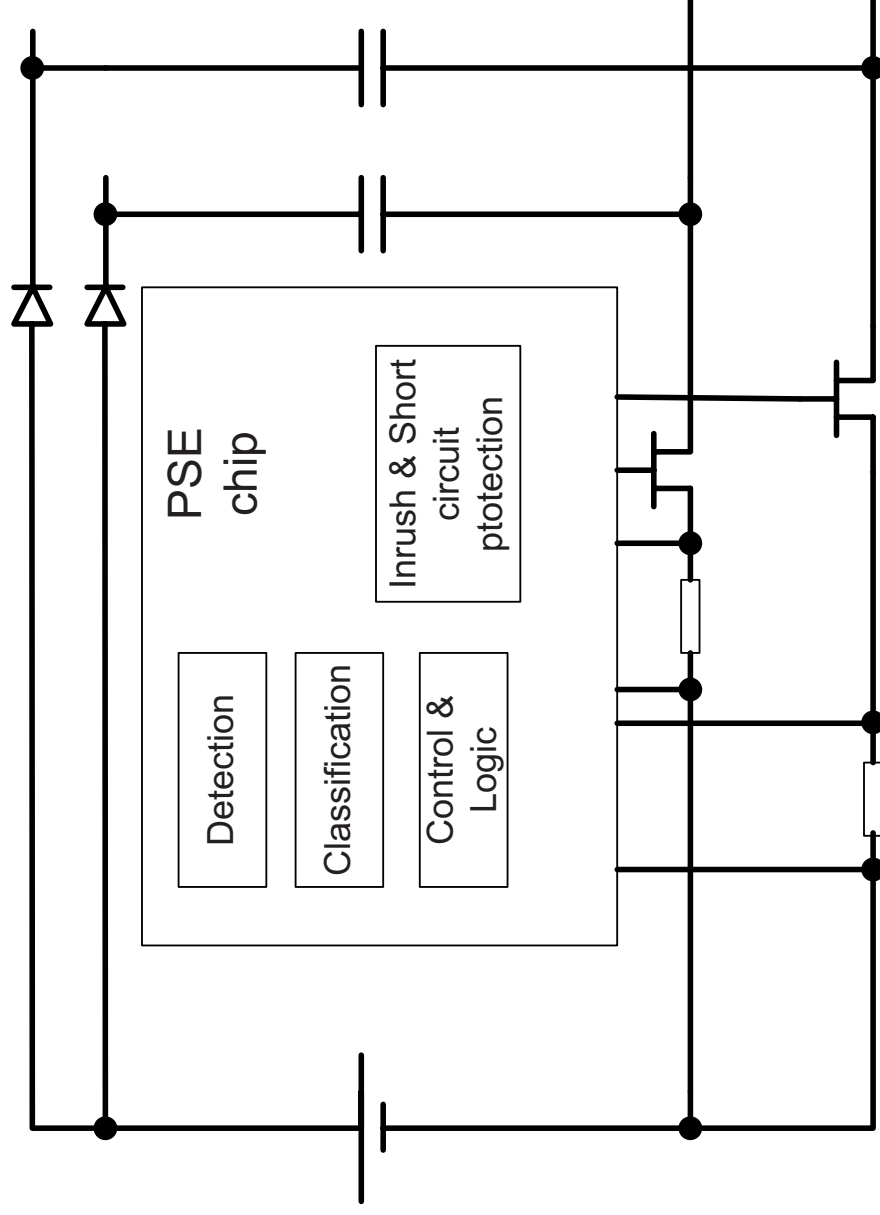
4P vs 2P Cost Analysis

Chandler AZ, Jan 2006
Yair Darshan

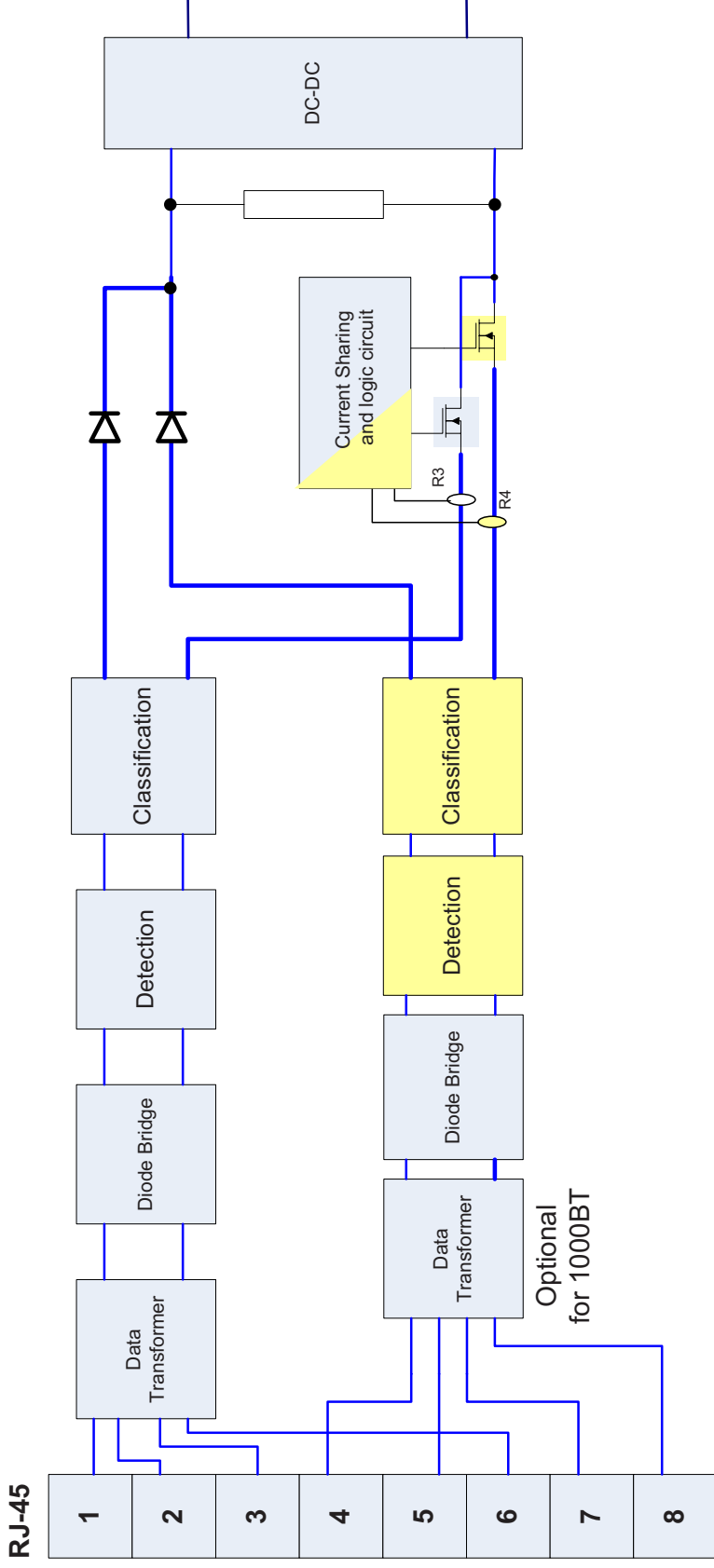
Principles

- Comparing 30W 2P to 30W 4P in a 1G solution to represent the worst case analysis
- Excel File with full numbers is available by email request
- Relative numbers to 802.3af

PSE: Chip Level: 4P Cost Model



PD: Cost Model for 2P / 4P implementations



Notes:

1. Upper two diodes may be replaced to control positive rails however it is not a must

Comparison Table – PSE Chip

	802.3af 15.4W 350mA/44V		30W 2P 712mA/51V		30W 4P 319mA/51V	
	QTY	Cost[\$]	QTY	Cost[\$]	QTY	Cost[\$]
PSE Chip						
PSE Controller	1		1		1	
PSE Switch	1		1		2	
CS Resistor	1		1		2	
Port Capacitor	1		1		2	
Fuse	1		1		2	
Parallel diode	1		1		2	
AC disconnect diode	1		1		2	
Total [\$]						
Relative Cost to 802.3af		1		1.11		1.40
4P/2P ratio						1.26

Comparison Table – PSE System

	802.3af 15.4W 350mA/44V	30W 2P 712mA/51V	30W 4P 319mA/51V
	QTY	QTY	QTY
	Cost[\$]	Cost[\$]	Cost[\$]
PSE System			
<i>PSE Chip</i>			
1G PoE Transformer	1	1	1
1G PoE Transformer Premium for the other pairs	2	2	2
	0	0	2
PSE Power supply	15.40	36.34	32.54
Total [\$]			
Relative Cost to 802.3af	1.00	1.62	1.62
4P/2P ratio			1.00

Comparison Table – PD Chip

	802.3af 15.4W 350mA/44V		30W 2P 712mA/51V		30W 4P 319mA/51V	
	QTY	Cost[\$]	QTY	Cost[\$]	QTY	Cost[\$]
PD Chip						
PD controler	1		1		1	
Current Sharing	0		0		1	
Sense Resistors	1		1		2	
Current Balancing	0		0		0	
Sig Resistor	1		1		2	
PD Switch	1		1		2	
Total [\$]						
Relative Cost to 802.3af		1		1.17		1.48
4P/2P ratio						1.27

Comparison Table – PD System

	802.3af 15.4W 350mA/44V		30W 2P 712mA/51V		30W 4P 319mA/51V	
	QTY	Cost[\$]	QTY	Cost[\$]	QTY	Cost[\$]
PD System						
PD Chip	1		1		1	
1G PoE Transformer	2		2		2	
1G PoE Transformer Premium for the other pairs	0		0		2	
PD Rectifier	2		2		2	
16W DC/DC Eff=80%	1		1		1	
Total [\$]						
Relative Cost to 802.3af		1		1.29		1.38
4P/2P ratio						1.07

Comparison Table – PoE System Solution

	802.3af 15.4W 350mA/44V	30W 2P 712mA/51V	30W 4P 319mA/51V	
	QTY	Cost[\$]	QTY	Cost[\$]
Total PoE system				
ABS Cost[\$]				
Relative Cost to 802.3af		1.00	1.44	1.49
4P/2P ratio				1.03

Note: In this comparison Current Sharing was placed at the PD side. It does not alter the results of the system comparison.

Summary

- PSE Silicon: $4P > 2P$ by ~25%.
- PSE System: $4P \approx 2P$!
- PD Silicon: $4P > 2P$ by ~27%.
- PD System: $4P > 2P$ by ~7%.
- Total PoE+ solution: $4P > 2P$ by 3% typical. 5% max.
- PoE+ total solution: $4P < 2P$ in \$/Watt
 - IF 2P can handle X watts, 4P can handle 2X watts for only added cost of ABS \$ OF 3-5%.

Conclusions

- Absolute cost *is not the key* parameter that will make a difference. Only 3-5% more overall.
- 4P vs 2P should be evaluated for:
 - Features
 - Reliability, Interoperability with all PD types
 - Risks
 - Overall system power efficiency (watts)
 - Sensitivity of RF performance to high currents/power dissipation/temperature variations (1G, 10G ?)
 - System design flexibility
 - Simple standard (4P) vs Complex one (2PMP vs 4P)
 - Custom (2P) vs Standard (4P) components
 - Future market needs
 - Etc.