

East Tester  
ET5411A+

directly  
→ to battery

output  
↙

Any difference from Fluke and Rigol would be  
very small

DMM

DMM

Both are reading same amount

38.1 mm trace width (double sided)

↘ 76.4 mm

Distance between connectors - 28 mm  
trace would be any bottleneck

Temperature - FLIR C3-X Thermal Camera

Test 1) 15 A

room Ambient 21°C

Fluke - input - 16.12 V

Rigol - output - 15.952 V

P Input - 241.8 W

P Output - 239.77 W

no change in trace  
temperature

$$16.12 - 15.952 = 0.168 \text{ V}$$

Test 2) 10 A

Fluke - input - 15.59 V

Rigol - output - 15.479 V

Test 3) 5 A

Fluke - input - 15.44 V

Rigol - output - 15.382 V

Test 4) 1A

Fluke - input - 15.50 V

Rigid - output - 15.49 V

$$V = IR$$

$$\frac{V}{I} = R \rightarrow$$

Battery 2

Loss of Wires

$$\begin{array}{r} \text{Input } 16.41 \text{ V} \\ \text{Output } 16.228 \end{array} = 0.182$$

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Test 2: with PCB

$$\text{Input: } 16.40 \quad 16.40 - 16.185 = 0.215$$

$$\text{Output: } 16.185$$

We tested the wires separately to account for wire loss

$$0.215 - 0.182 = 0.033 \text{ , only PCB}$$

$$0.033 \text{ V} \cdot 15 \text{ A} = 0.495 \text{ W}$$

Test 3) 5A

wire losses

$$\text{Input} - 16.58 \text{ V}$$

$$\text{Output} - 16.514 \text{ V} \quad \left. \vphantom{\begin{array}{l} \text{Input} - 16.58 \text{ V} \\ \text{Output} - 16.514 \text{ V} \end{array}} \right\} 0.066 \text{ V} \rightarrow 0.33 \text{ W}$$

With PCB

Input - 16.58V  
Output - 16.503V } 0.077V  $\rightarrow$  0.385W