4 wire method and Blow up Experiment

Res		13mil Vias	100mil	20mil	10mil	8mil	6mil
2-wire	ohm	0.95	0.98	1.07	1.11	0.82	0.86
4-wire	mohm	7.73	4.55	21.81	44.66	56.25	79.26
estimated	mohm		4.4	22	44	55	73.3

BlowUp	6mil	20mil
warm	2A	4A
hot	3A	6A
smoking	4A	9A

1. Estimate resistance: The trace is about L = 880mil, the Rsquare = 0.5mohm/square,

   R is estimated as (L/width)*Rsquare as in spread sheet.

2. So What Question: The spread sheet tells that when measuring small resistance, using 4-wire method is a necessary. If 2-wire method used directly, the resistance is largely obfuscated by the connect resistance. Using 4-wire method can measure the resistance.

3. The maximum IPC current for 20mil under 20 Fahrenheit is 3A, the maximum IPC current for 6mil under 20 Fahrenheit is 1A. The observation is shown in spreadsheet.

4. Recommendation I feel safe for using 6mil maximumly is 1A, for 20mil is 3A.

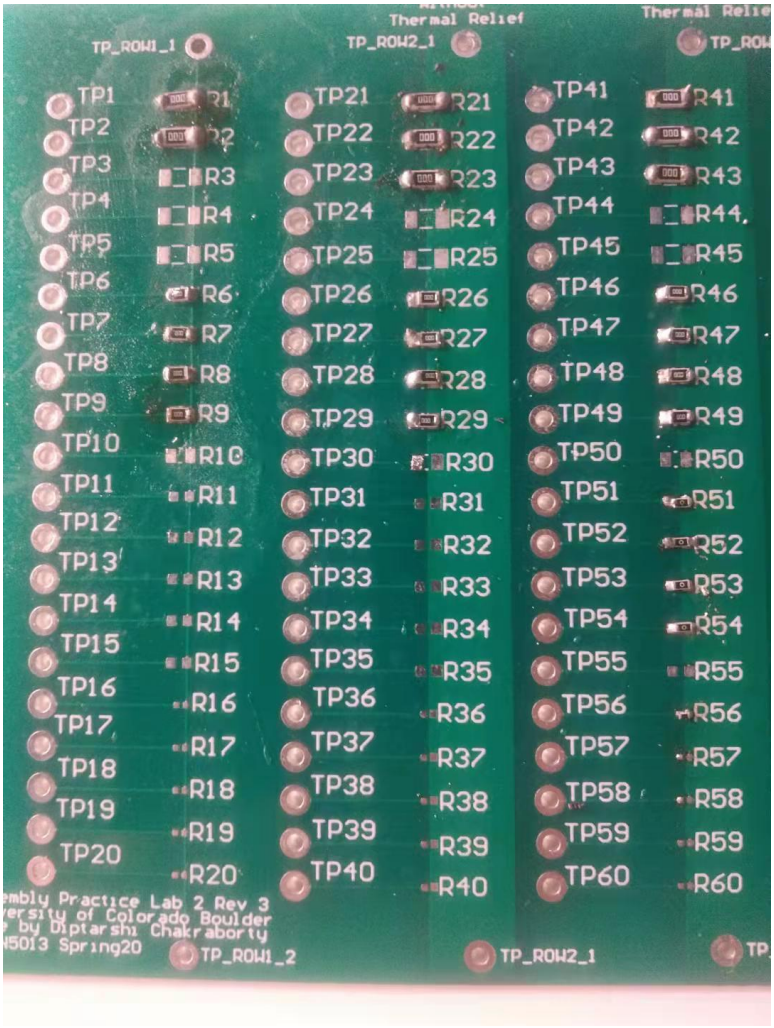
Solder Practice:

5. A picture of board is added at next page. (The 0402 part is soldered at R56)

6. The easiest to solder is the column with thermal relief. The middle part which have right pads embedded in part of a plane is most difficult to solder. The left column is relatively easy to solder as well. The trick I use is shown in the video, first put a little solder on the pad and use solder flux. Then place the part and melt the solder to fix the part.

7. Using solder flux is very important, it gives the purity and remove any oxides. It prevents the oxides are formed when the metal is exposed to air.

8. When removing the parts, it is needed to raise the temperature. After removing the part, using the copper wire and solder flux to clean the pad at high temperature.


Thermal Relief
TP_ROW1_1
TP_ROW2_1
TP1 TP2 TP3 TP4 TP5 TP6 TP7 TP8 TP9 TP10 TP11 TP12 TP13 TP14 TP15 TP16 TP17 TP18 TP19 TP20
R3 R4 R5 R6 R7 R8 R9 R10 R11 R12 R13 R14 R15 R16 R17 R18 R19 R20
TP21 TP22 TP23 TP24 TP25 TP26 TP27 TP28 TP29 TP30 TP31 TP32 TP33 TP34 TP35 TP36 TP37 TP38 TP39 TP40
R21 R22 R23 R24 R25 R26 R27 R28 R29 R30 R31 R32 R33 R34 R35 R36 R37 R38 R39 R40
TP41 TP42 TP43 TP44 TP45 TP46 TP47 TP48 TP49 TP50 TP51 TP52 TP53 TP54 TP55 TP56 TP57 TP58 TP59 TP60
R41 R42 R43 R44 R45 R46 R47 R48 R49 R50 R51 R52 R53 R54 R55 R56 R57 R58 R59 R60
TP_ROW1_2
TP_ROW2_1