Tips on attaching thermocouples

Malcom Co., Ltd.

The purpose of thermal profiling

- The difference of heat capacity of electronic components may cause the temperature variation of soldering joints in soldering process. As the lead-free solder paste tends to have higher soldering temperature, precise control of each solder joint is required.

- Monitoring the re-melting of reflowed solder joints on PCBs

In the case of Wave soldering process

Temperature difference between solder bath and solder melting point

（Set temperature ）　（Melting point ）

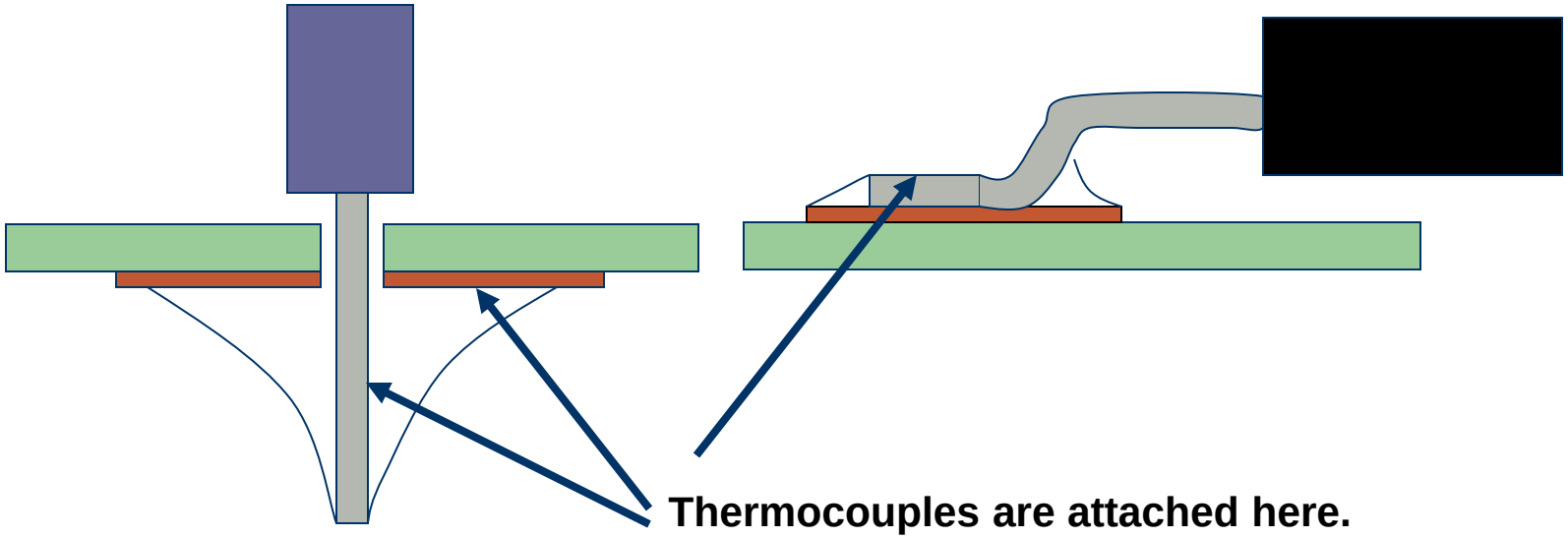
☆Eutectic solder　250℃～183℃＝67℃

☆Sn-Ag-Cu Solder　250℃～217℃＝33℃

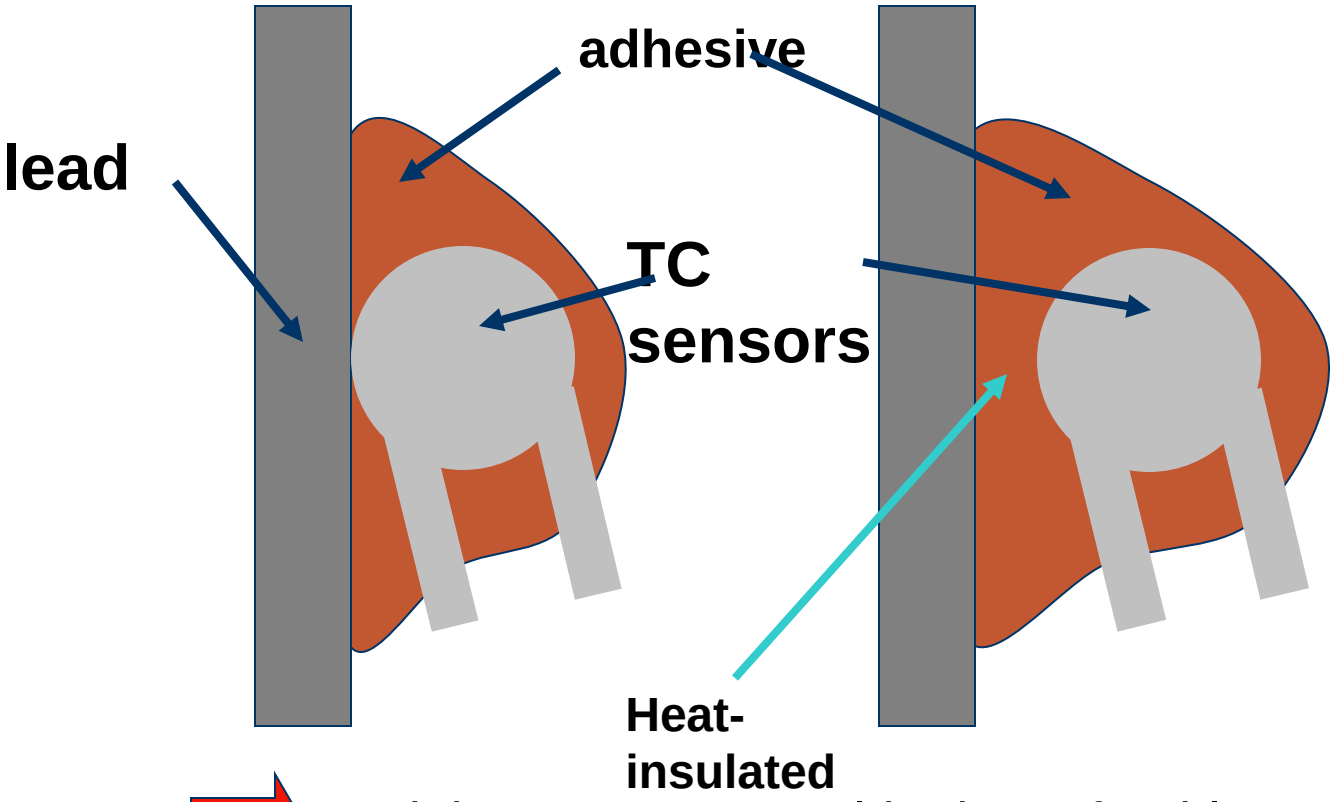
☆Sn-Cu Solder　250℃～227℃＝23℃

Narrower temperature window compared with eutectic solders.

How to attach thermocouples



Tips on attaching thermocouples with adhesive



High temperature solder is preferable to adhesive

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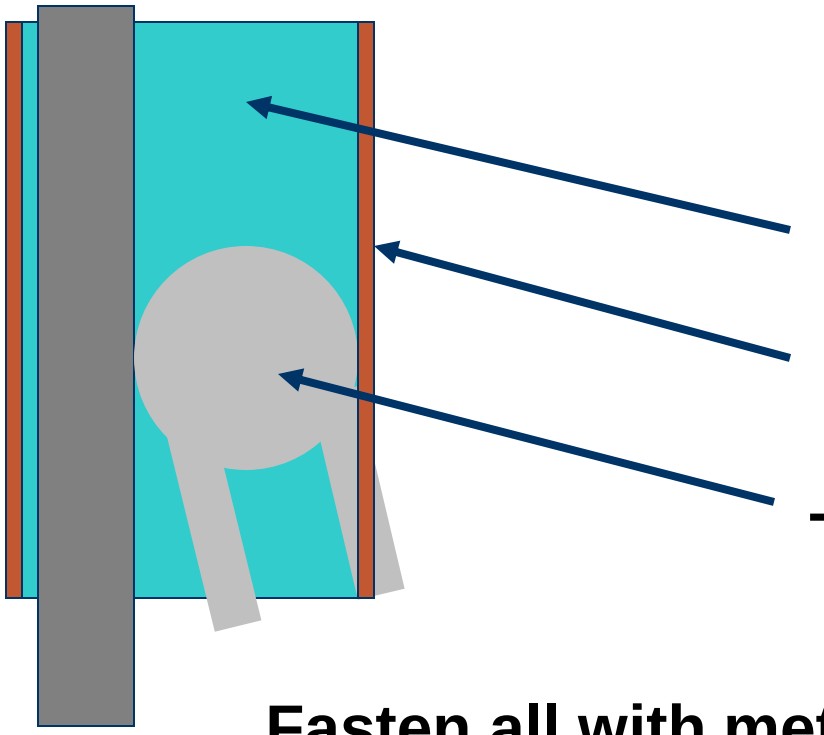


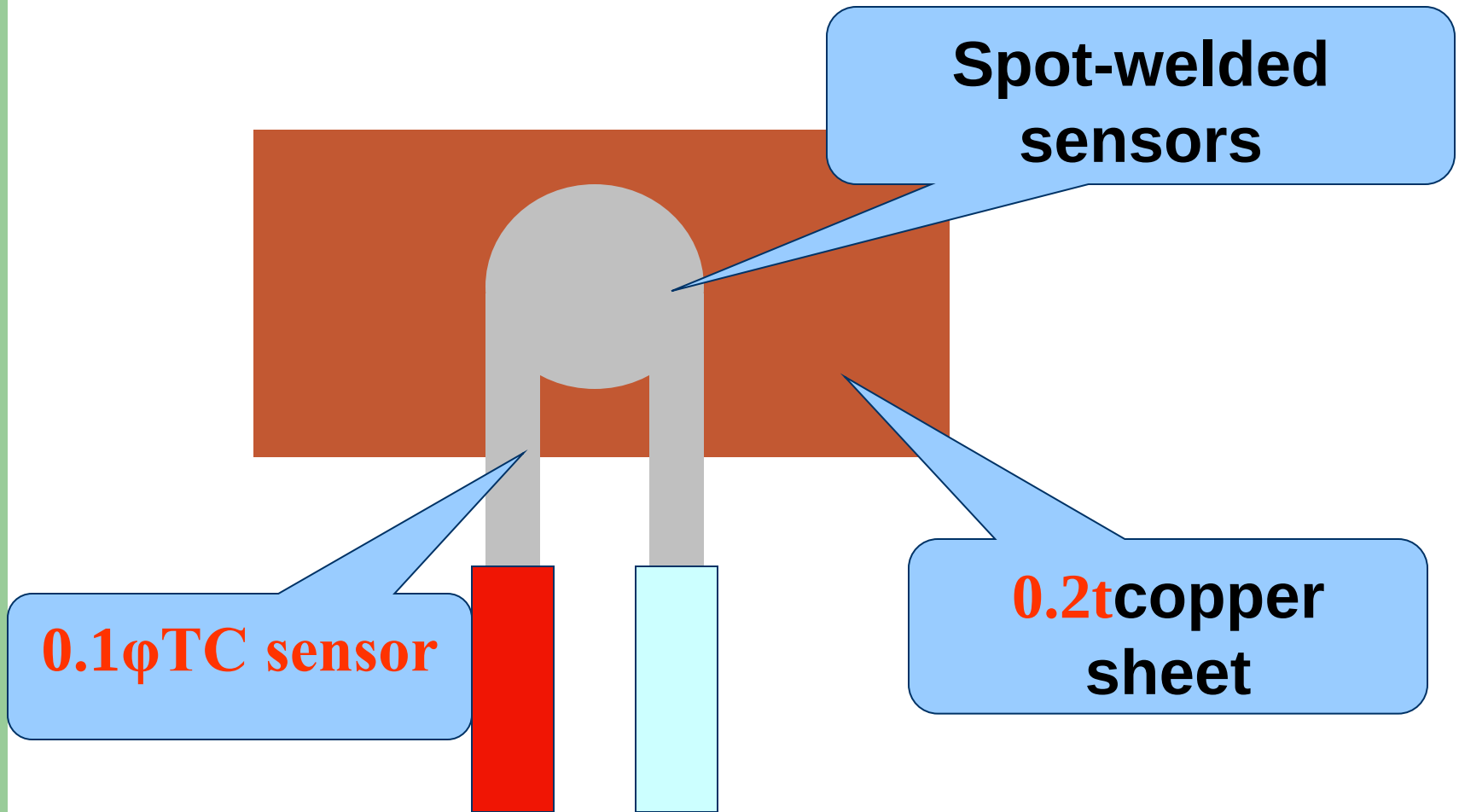
Solder

Cupper sheet (to fasten)

TC sensors

Fasten all with metallic material

Ideal thermocouples



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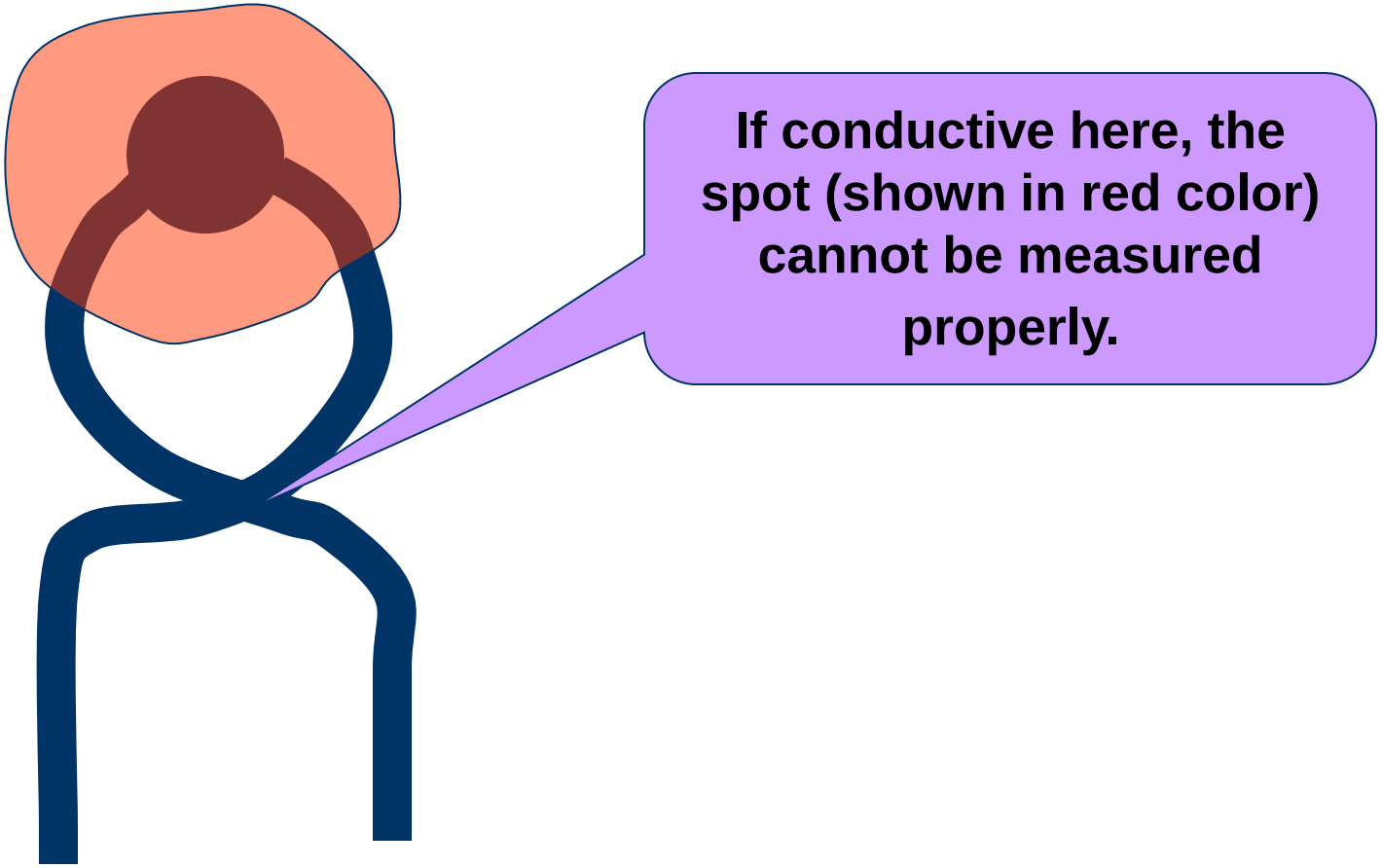
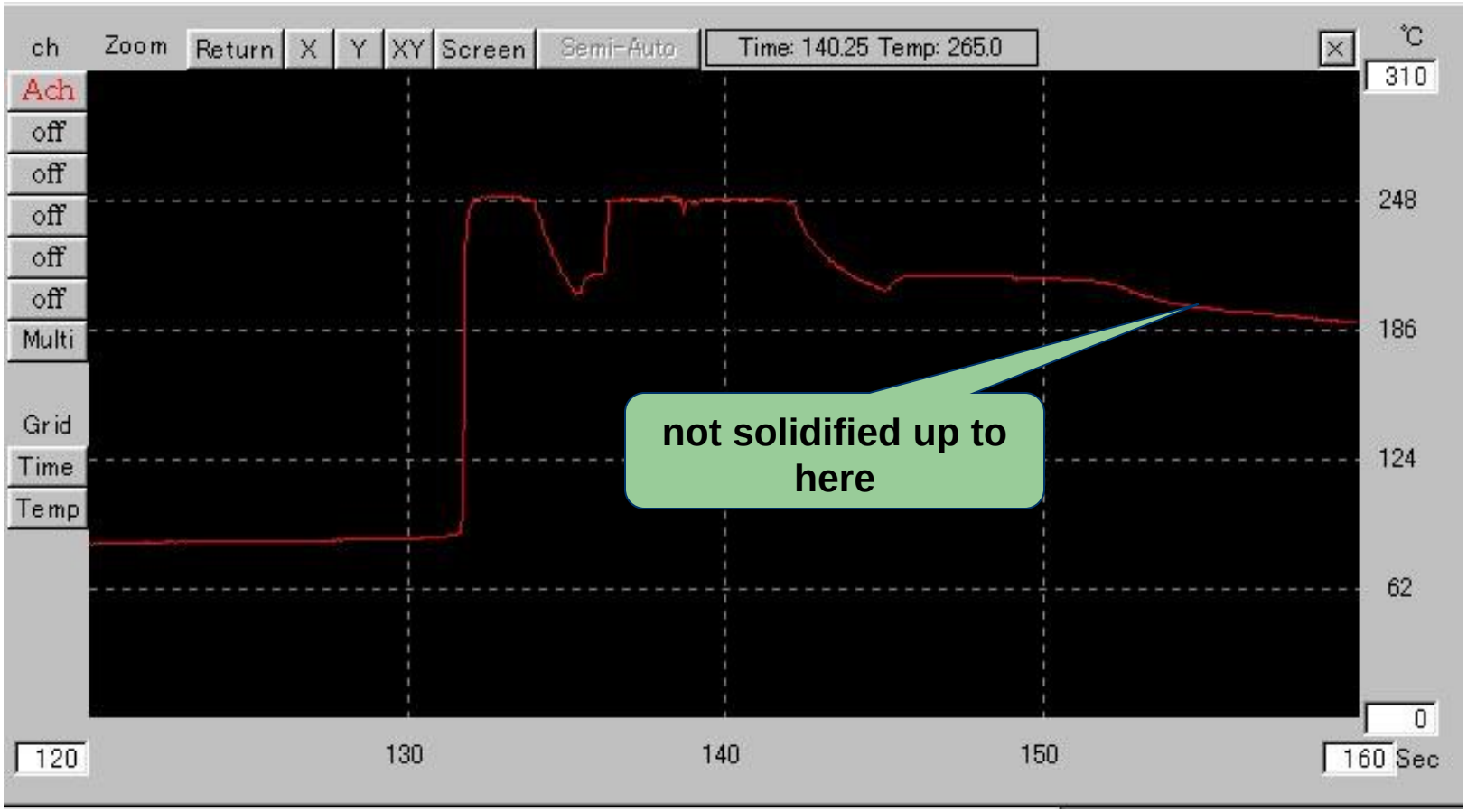
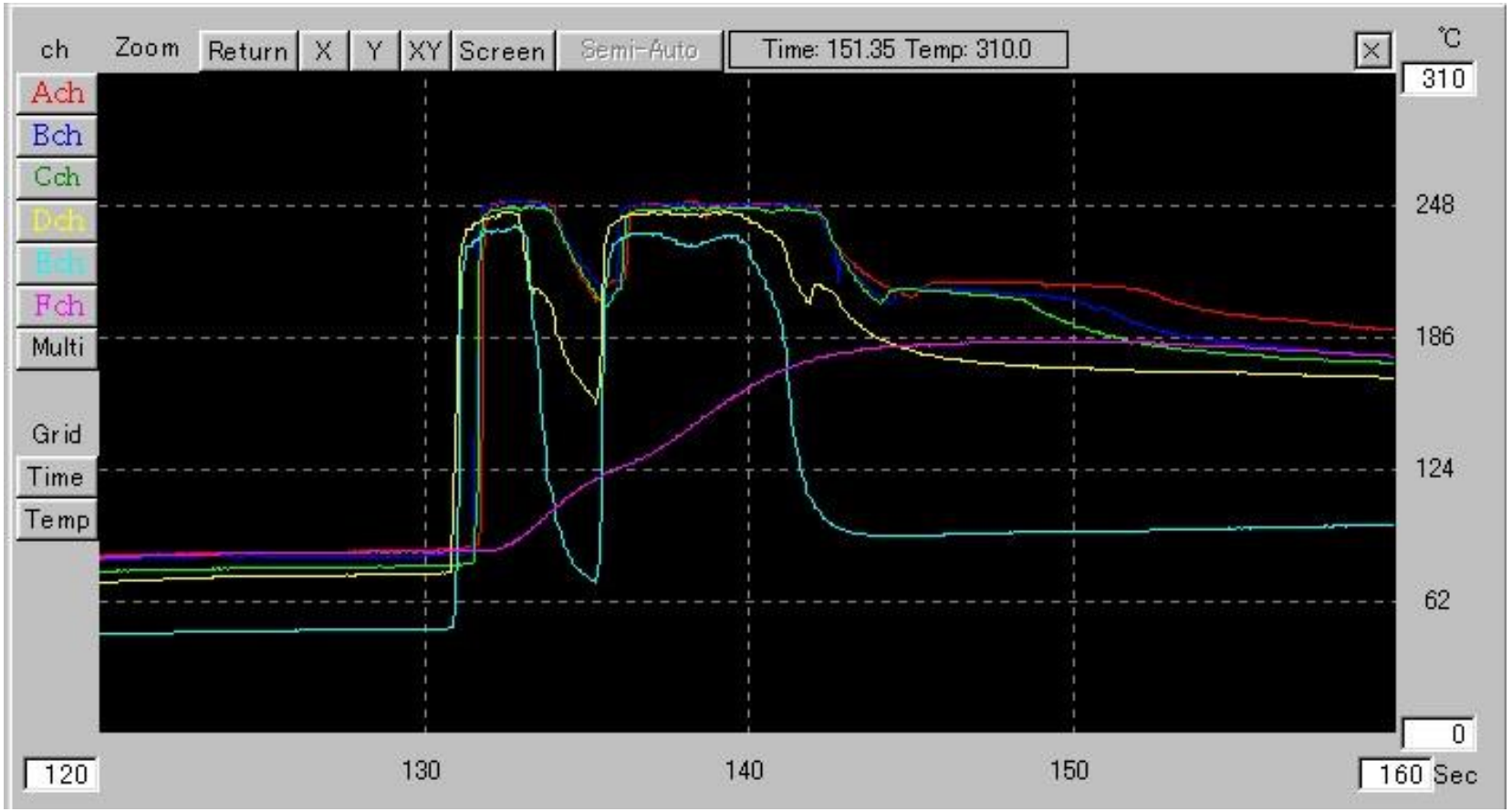


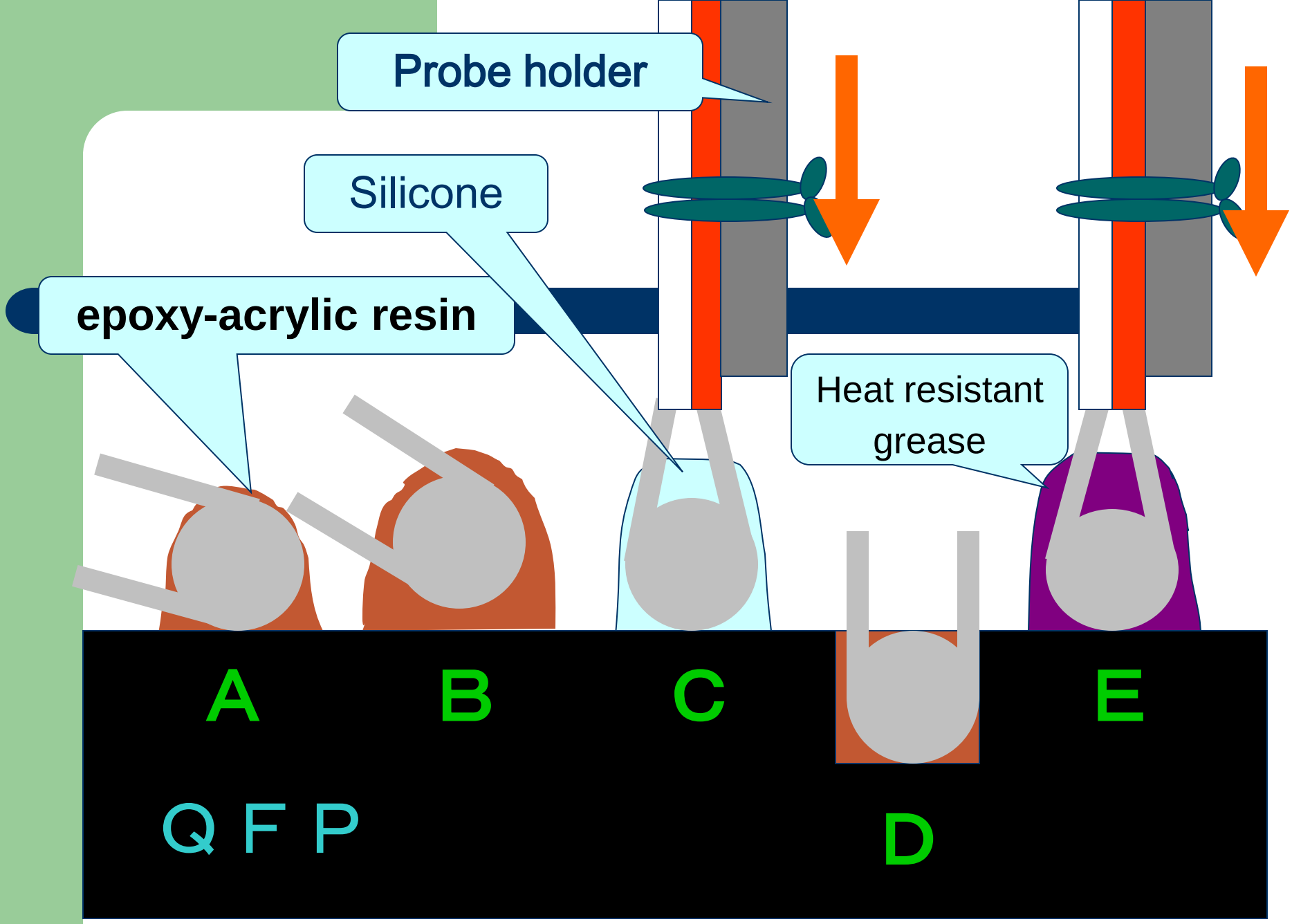
An output of thermal profiling with the RC-50 －1

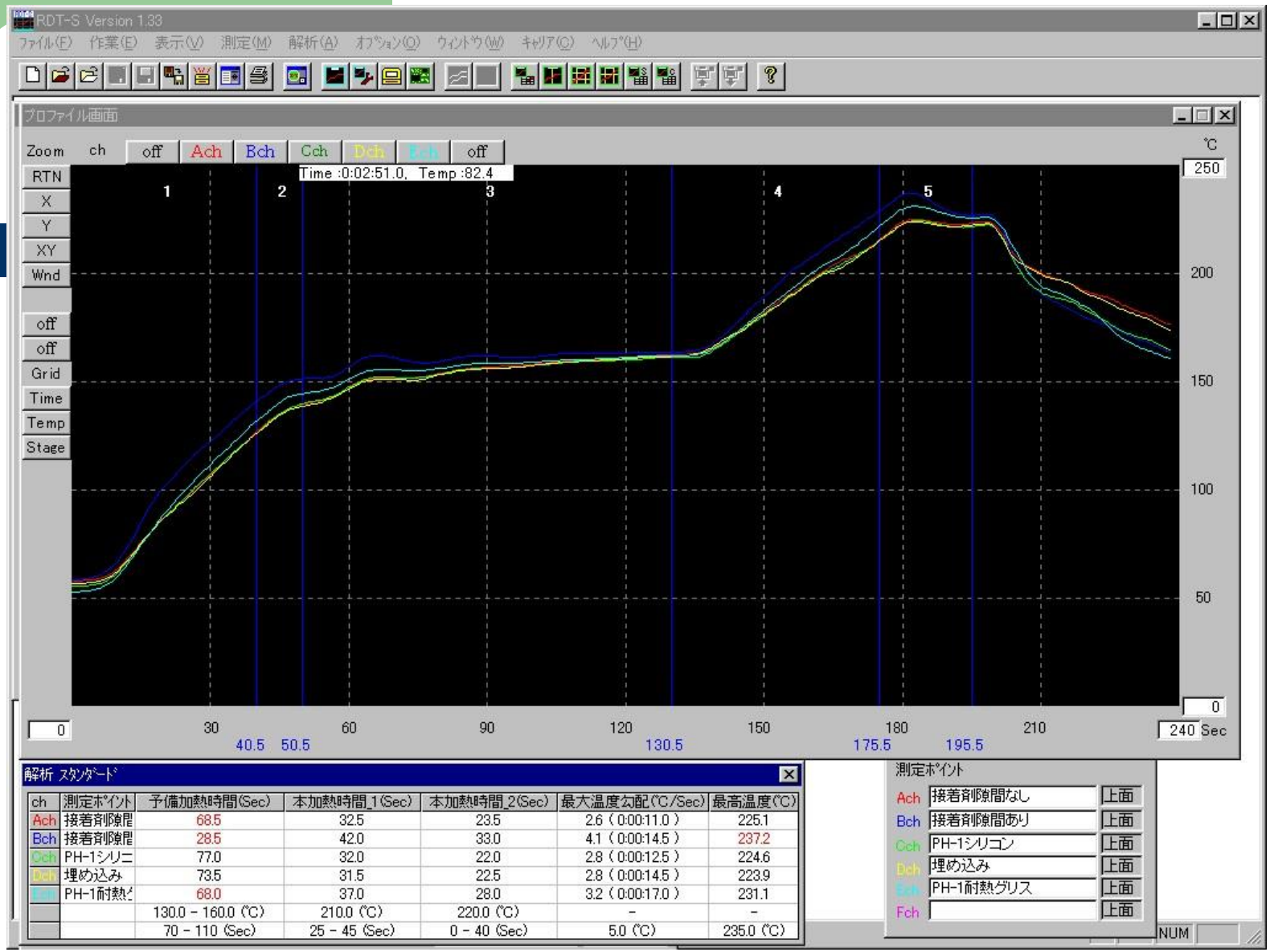


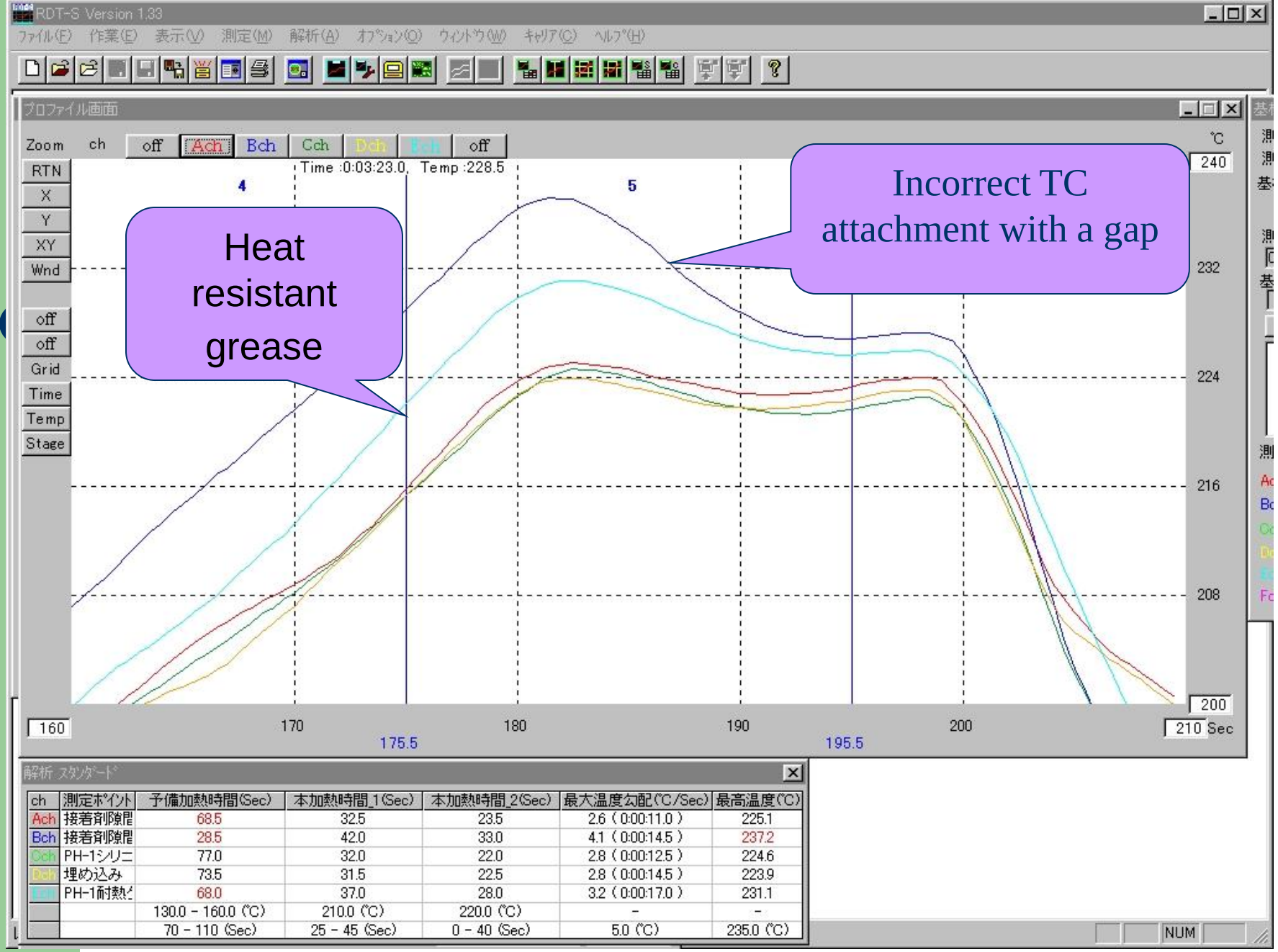
An output of thermal profiling with the RC-50 －2



In the case of Reflow soldering process


Probe holder
Silicone
epoxy-acrylic resin
Heat resistant grease
A
B
C
D
E
Q F P


RDT-S Version 1.33
ファイル(F) 作業(E) 表示(V) 測定(M) 解析(A) オプション(O) ウィンドウ(W) キャリア(C) ヘルプ(H)
プロファイル画面
Zoom ch off Ach Bch Cch Dch Ech off
Time :0:02:51.0, Temp :82.4
RTN X Y XY Wnd off off Grid Time Temp Stage
℃
250 200 150 100 50 0
1 2 3 4 5
0 30 60 90 120 150 180 210 240 Sec
40.5 50.5 130.5 175.5 195.5
解析 スタンダード
ch 測定ポイント 予備加熱時間(Sec) 本加熱時間_1(Sec) 本加熱時間_2(Sec) 最大温度勾配(℃/Sec) 最高温度(℃)
Ach 接着剤隙間 68.5 32.5 23.5 2.6 (0:00:11.0) 225.1
Bch 接着剤隙間 28.5 42.0 33.0 4.1 (0:00:14.5) 237.2
Cch PH-1シリコ 77.0 32.0 22.0 2.8 (0:00:12.5) 224.6
Dch 埋め込み 73.5 31.5 22.5 2.8 (0:00:14.5) 223.9
Ech PH-1耐熱グ 68.0 37.0 28.0 3.2 (0:00:17.0) 231.1
130.0 - 160.0 (℃) 210.0 (℃) 220.0 (℃) - -
70 - 110 (Sec) 25 - 45 (Sec) 0 - 40 (Sec) 5.0 (℃) 235.0 (℃)
測定ポイント
Ach 接着剤隙間なし 上面
Bch 接着剤隙間あり 上面
Cch PH-1シリコン 上面
Dch 埋め込み 上面
Ech PH-1耐熱グリス 上面
Fch 上面
NUM



ch	測定ﾎﾟｲﾝﾄ	予備加熱時間(Sec)	本加熱時間_1(Sec)	本加熱時間_2(Sec)	最大温度勾配(℃/Sec)	最高温度(℃)
Ach	接着剤隙間	68.5	32.5	23.5	2.6 (0:00:11.0)	225.1
Bch	接着剤隙間	28.5	42.0	33.0	4.1 (0:00:14.5)	237.2
Cch	PH-1ｼﾘｺﾝ	77.0	32.0	22.0	2.8 (0:00:12.5)	224.6
Dch	埋め込み	73.5	31.5	22.5	2.8 (0:00:14.5)	223.9
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		130.0 - 160.0 (℃)	210.0 (℃)	220.0 (℃)	-	-
		70 - 110 (Sec)	25 - 45 (Sec)	0 - 40 (Sec)	5.0 (℃)	235.0 (℃)