B O I N
scientific software

WAFERMAP for Windows

APPLICATION NOTE 5: Temperature Mapping Using Multiple Thermocouples

An easy way to monitor temperature distributions on semiconductor wafers is the use of a TC-wafer, instrumented with a number of embedded thermocouples (TC). Typical applications of TC-wafers are thermal analysis of processing steps carried out in a diffusion furnace or Rapid Thermal Processing chamber. The temperature readout of these TC's can be stored during processing for later use.

WAFERMAP can be used to visualize the measured temperature distributions for any TC configuration. The number and location of TCs is user-defined. The measured temperature values can either be entered manually in WAFERMAP, or, if the data can be accessed via files, the import function of WAFERMAP for Windows Professional may be used. In the following an example of a specific TC arrangement, the measured temperature values and the contour plot of the temperature distribution are shown.

Figures:

Tab. 1: Coordinates and measurement values of the TCs

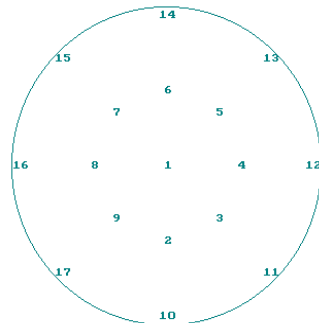| #	x coord	y coord	value
1	0	0	700
2	0	-47,5	702
3	33,58	-33,58	702,5
4	47,5	0	701,2998
5	33,58	33,58	702,1195
6	0	47,5	703,1593
7	-33,58	33,58	703,2002
8	-47,5	0	704,5498
9	-33,58	-33,58	704,4004
10	0	-95	700,8805
11	67,17	-67,17	700,2191
12	95	0	698,4004
13	67,17	67,17	699,2002
14	0	95	700,5907
15	-67,17	67,17	706,0996
16	-95	0	709,2002
17	-67,17	-67,17	702,4691

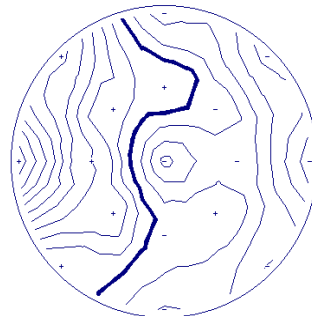Fig.1: Locations of the 17 TCs on the wafer

Fig.2: Contour plot of the temperature distribution (Mean: 702.37°C, Std.Dev.: 0.38%, Interval: 0.1%)