

Acoustic microscopy applied for SiP Physical analysis

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EUFANET WORKSHOP

OUTLINE

PURPOSE

Resolution

OPERATING MODE

Signal processing

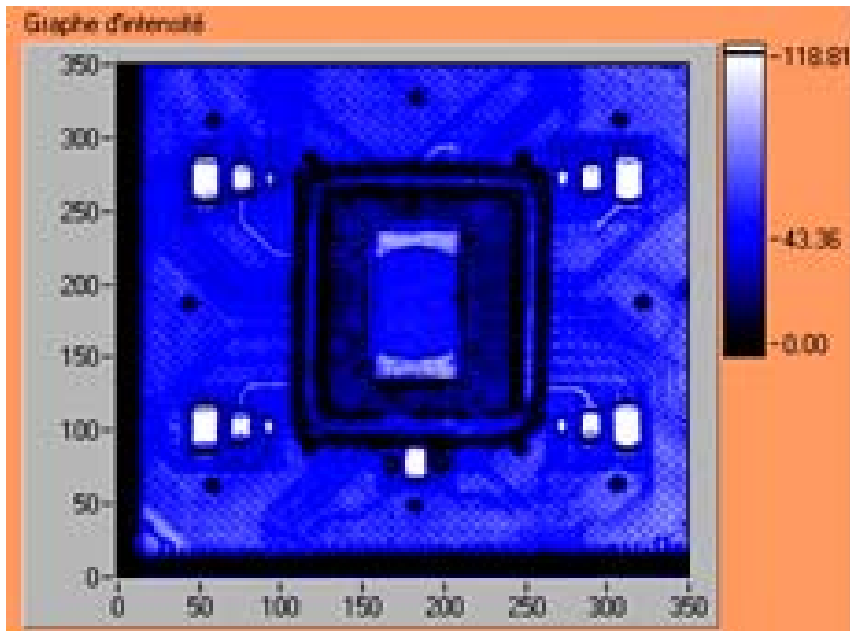
EXAMPLE

3D component (VIGOR)

CONCLUSION

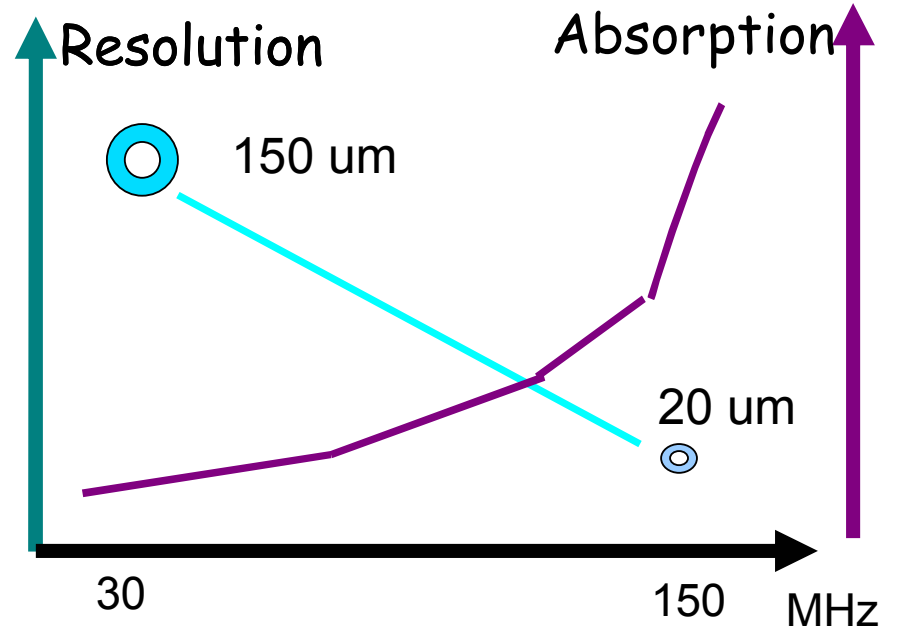


PURPOSE (1)



Normal picture

Extract information
Signal processing



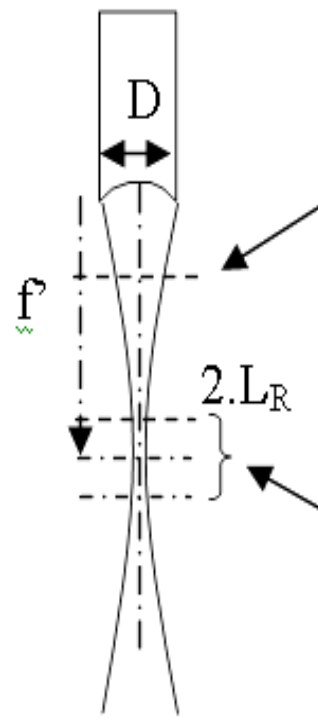
PURPOSE (2)

Acoustic propagation in the liquid coupling

For practical implementation with a discrete signal $s(nT_s)$, a discrete version of the original CWT

$$CWT [a, iT_s] \equiv T_s \sum_{n=1}^N h \left[\frac{[n - iT_s]}{a} \right] s [nT_s]$$

$$a = 2^{j+\frac{m}{M}}$$

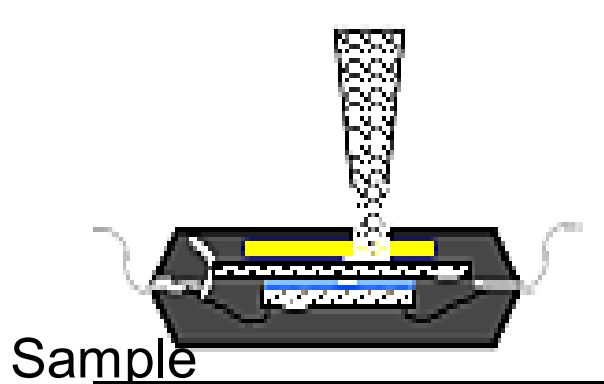


Upper plan over the focal plan and whose distance in focal plan Z is higher than the distance from Rayleigh L_R . The wave is propagated on a larger section. The precision is done by $\varepsilon = \frac{z D}{f'}$

Space included in both sides of the focal plan of the probe, length = $2 L_R$; The precision is done by $\varepsilon_0 = \frac{1,22 \lambda f'}{D}$



OPERATING MODE



Stock the
points in an
hard disk



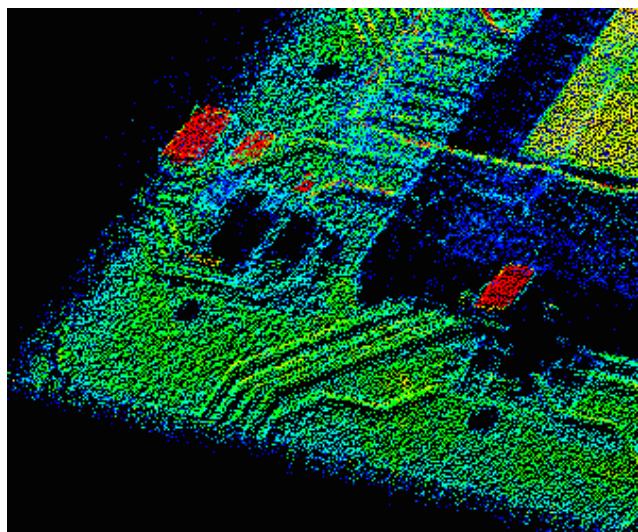
Programme
CWT



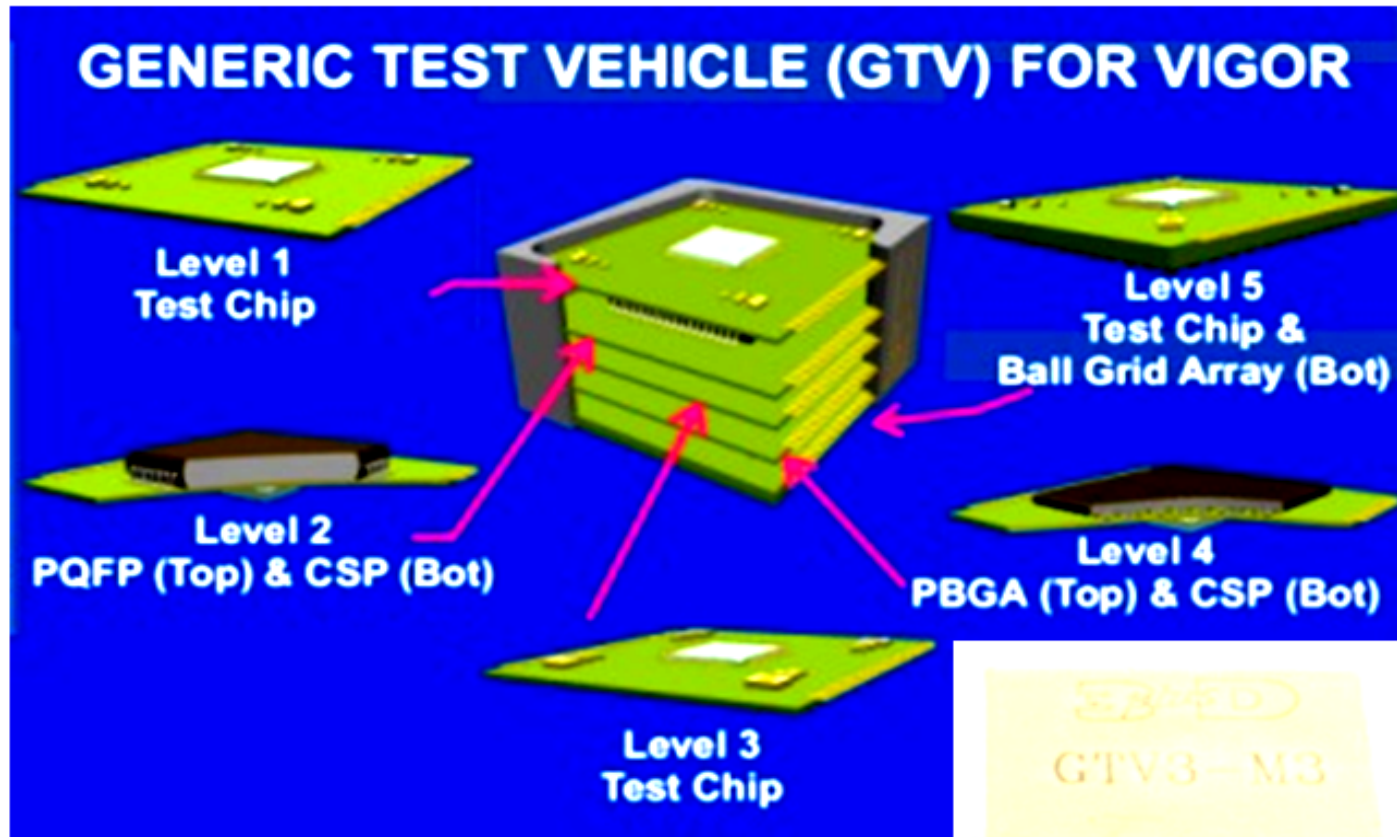
Create a
Matrix



Picture in
X, Y and ToF



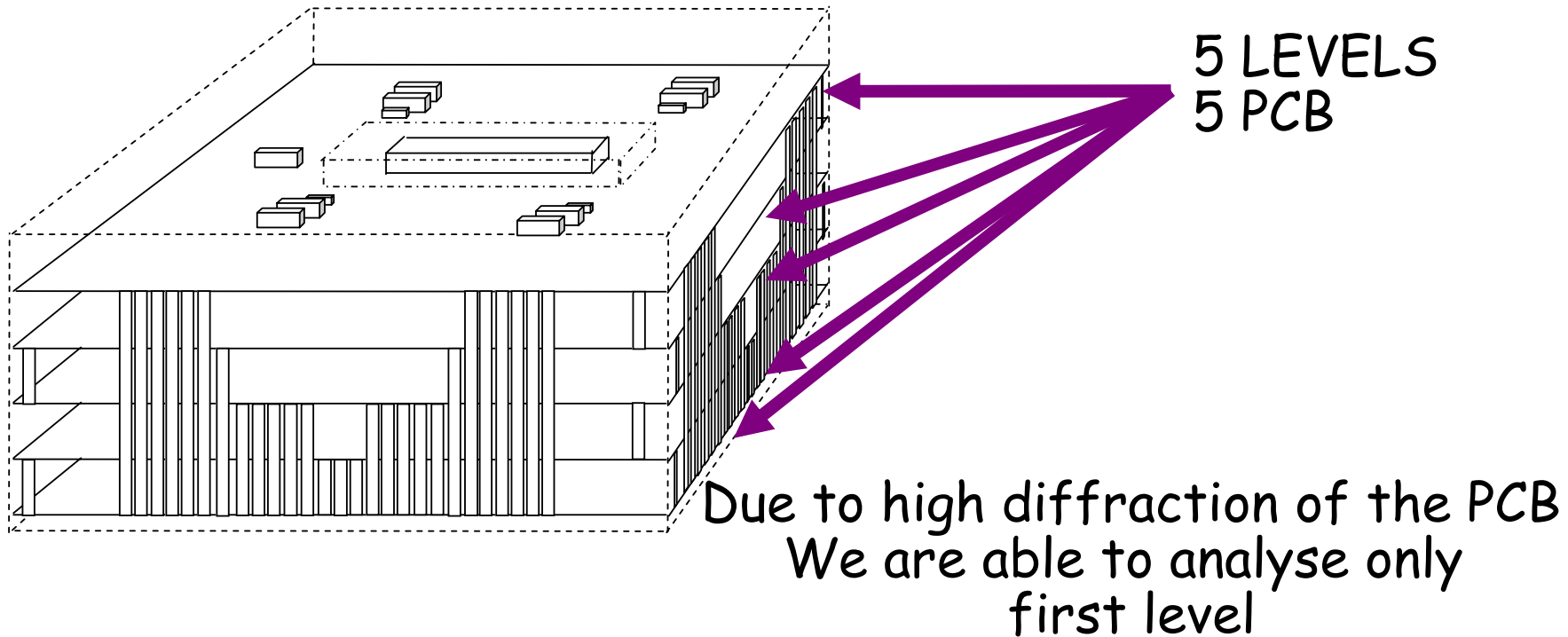
EXAMPLE (1)



CP



EXEMPLE (2)



View 3D of the first level

Capacitors



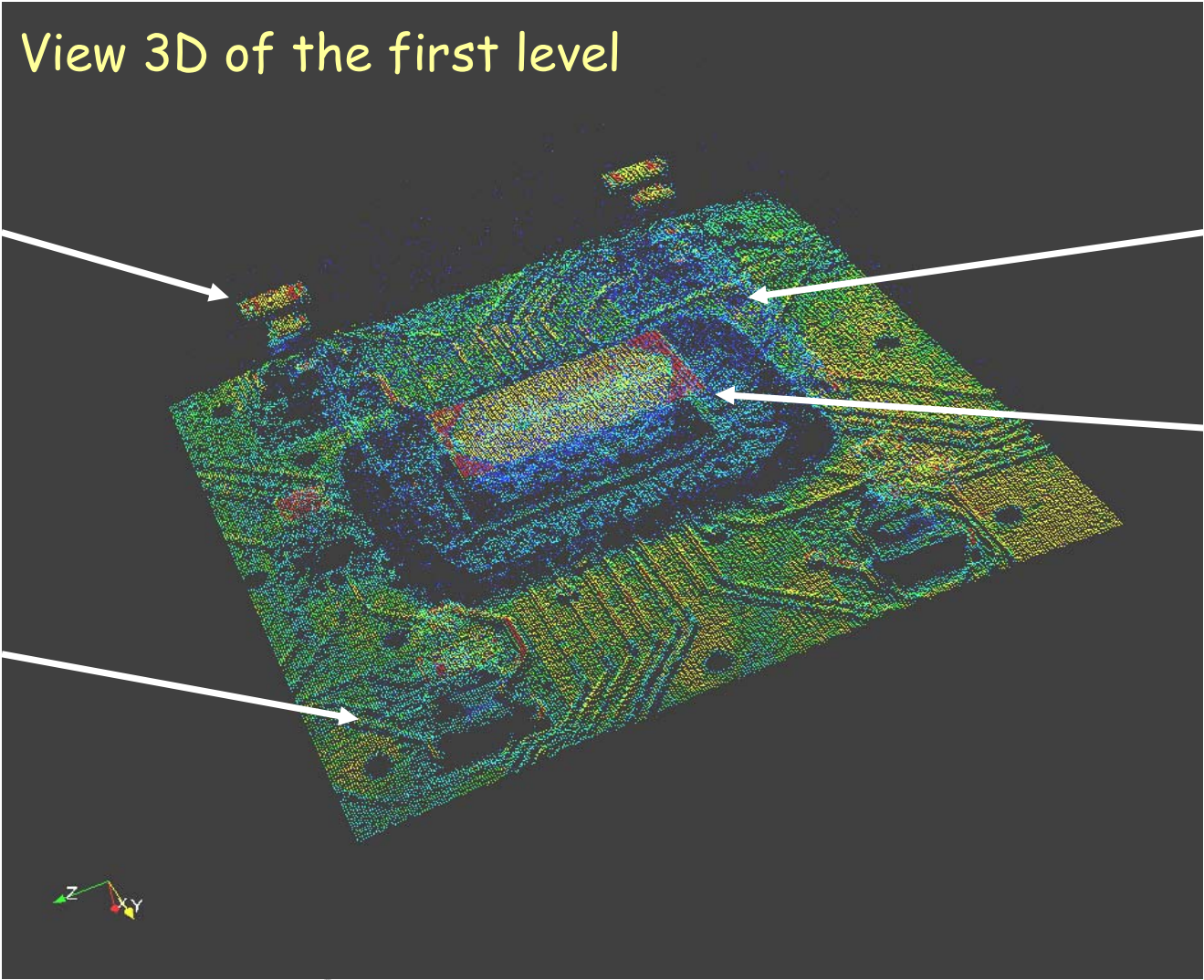
Glob top
on the
silicon
chip



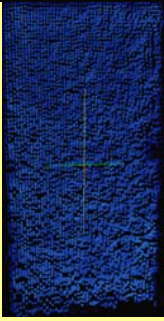

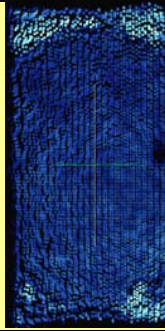
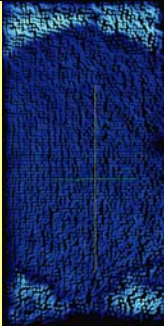

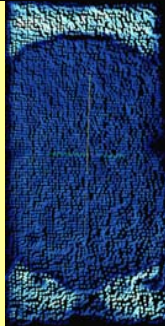
Silicon
chip
glued on
the PCB



Copper
in the PCB

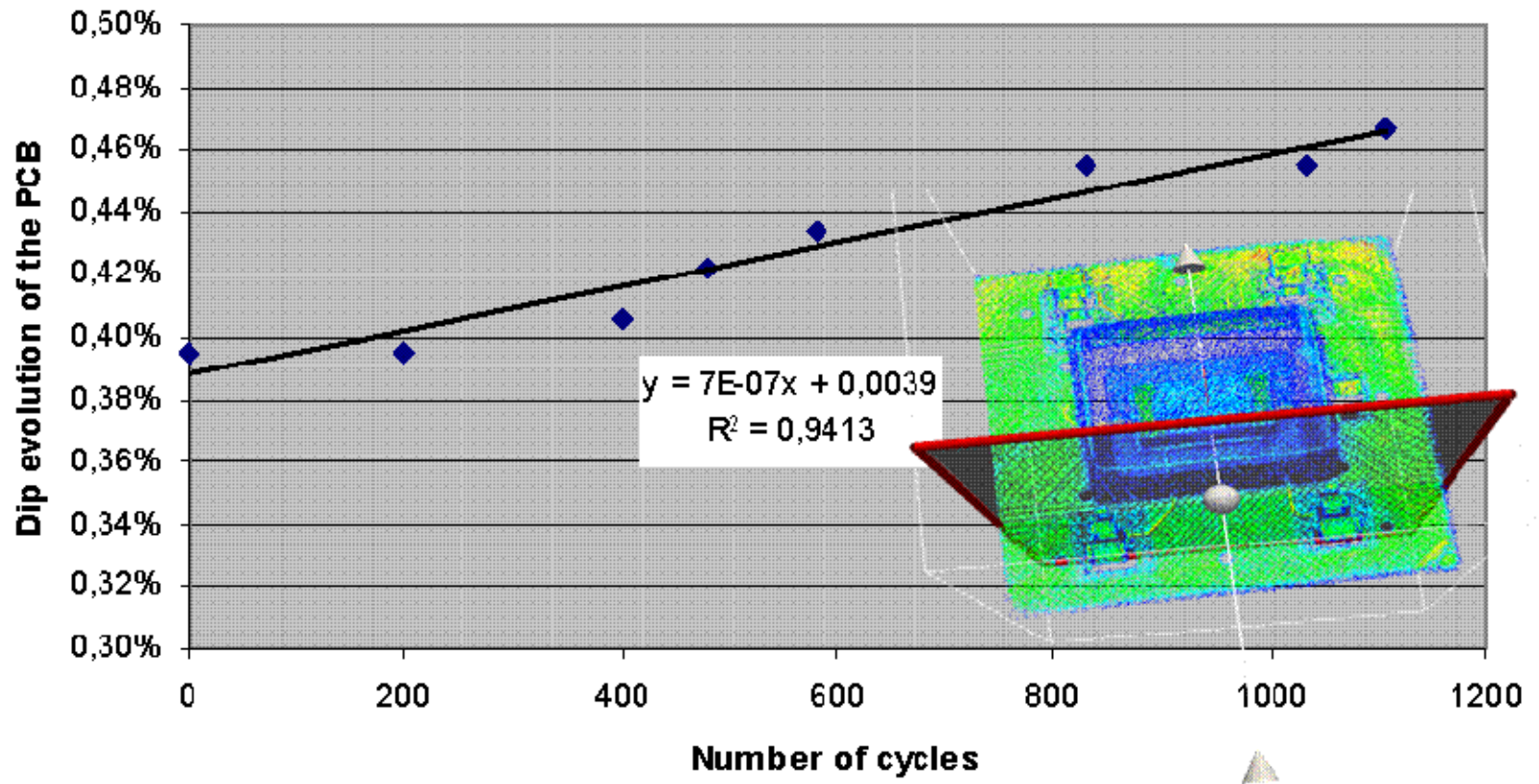


Variation
of the glue
under the
chip

Silicon chip 0 cycle	Silicon chip 200 cycles	Silicon chip 400 cycles
		
Delamination of the glue under the chip 0%	Delamination of the glue under the chip 6,25 %	Delamination of the glue under the chip 12,6 %
Silicon chip 480 cycles	Silicon chip 580 cycles	Silicon chip 830 cycles
		
Delamination of the glue under the chip 17,05 %	Delamination of the glue under the chip 20,13 %	Delamination of the glue under the chip 25,00 %



Dip evolution of the component versus ageing



CONCLUSION

IDENTIFICATION AND SPATIAL LOCALIZATION OF THE DEFECT
WHATEVER THE FREQUENCY DOMAIN AND BY AN AUTOMATIC WAY
(ECHO SHAPE INDEPENDENCE)

DIAGNOSIS IMPROVEMENT AND IDENTIFICATION OF FAILURE
(FEED BACK CONTROL OF TECHNOLOGY - QUALITY IMPROVEMENT)

RELIABILITY INDICATOR

