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Predicția fiabilității bazată pe fizica defectării

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Abstract
First, some methodologies used for reliability predictions are shown, in order to highlight the advantages of using the physics-of-failure (PoF) and, as an example of such methodologies, the procedure called SYRP (Synergetic Reliability Prediction) is detailed. Then, in the largest part of the paper, as a first step in using SYRP for reliability predictions, the typical failure mechanisms of integrated circuits are presented.

Keywords: reliability prediction, failure mechanisms, physics of failure.

References:

[1] Băjenescu, T. şi M. Bâzu, Mecanisme de defectare ale componentelor electronice, Matrix Rom, ISBN 978-973-755-773-5.
[2] Bâzu, M., „A Combined Fuzzy Logic and Physics of Failure Approach to Reliability Prediction“, IEEE Trans. Reliability, Vol. 44, No. 2, pp. 237-242.
[3] Bazu, M., „Computational Intelligence Methods in Reliability Assessment for Electronic Components“, Quality Assurance, v.9, no.33, January-March 2003.
[4] Talmor, M., S. Arueti, „Reliability Prediction: The Turn-On Point“, Proc. Ann. Reliab. and Maintainability Symp., 1997, Philadelphia, Pennsylvania, USA, pp. 254-262.
[5] Shatzles, M., M. Av-Ron, R. A. Gdula, „Defect–Related Breakdown and Conduction“, IBM J. Research & Development, Vol. 24, pp. 469–479.
[6] McPherson, J. W., D. A. Baglee, „Acceleration Factors for This Gate Oxide Stressing“, Proc. 23nd Int'l Reliability Physics Symp., pp. 1–5.
[7] Elsayed, E. A., Chan, C. K., „Estimation of thin oxide reliability using proportional hazard models“, IEEE Trans. on Reliability, Vol. 39, pp. 329–335.
[8] Krumbein, K., „Tutorial: Electrolytic models for metallic electromigration failure mechanisms“, IEEE Trans. on Reliability, Vol. 44, No. 4, pp. 539–549.
[9] Ghate, P., „Electromigration Induced Failures in VLSI Interconnects“, Solid State Technology, Vol. 3, pp. 103–120.
[10] Fischer, F., F. Neppl, „Sputtered Ti-Dopped Al-Si for Enhanced Interconnect Reliability“, Proc. Int'l Reliability Physics Symp., pp. 190–193.
[11] Black, J. R., „Electromigration – a Brief Survey and Some Recent Results. IEEE Trans. on Electron Devices, Vol. ED-4, pp. 338–347.
[12] Learn, A. J., „Effect of Structure and Processing on Electromigration-Induced Failures in Anodized Aluminium“, J. Applied Physics, Vol. 12, pp. 518–522
[13] Gallace, L. J., „Reliability of TPA-Metallized Hermetic Chips in Plastic Packages – the Gold Chip System“, Note ST-6367 RCA, Sommerville, USA.

Asigurarea Calităţii – Quality Assurance, ISSN 1224–5410
Vol. XIX, Issue 73, January-March 2013
Pages 21 - 25

[14] Dasgupta, A., J. M. Hu, „Failure Mechanical Models for Brittle Fracture", IEEE Trans. Reliability, Vol. 41, No. 3, June, pp. 328–335.
[15] Chiang, S. S, R. K. Shukla, „Failure Mechanism of Die Cracking Due to Imperfect Die Attachement", Proc. Electronic Components Conf., 1984, pp. 195–202.
[16] Pecht, M., A. Dasgupta, John Evans, and Jillian Evans (Eds.), Quality Conformance and Qualification of MicroElectronic Package and Interconnects, Chichester: J. Wiley & Sons, Inc., 1994.
[17] Peck, D. S., „New Concerns About Integrated Circuit Reliability", Proc. of Int'l Reliablity Physics Symp., 1978, pp. 1–6.