

Re-Defining Reliability Assessment Per New Intra-Via Cu Leakage Degradation

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By stressing via-incorporated interconnect structures, we demonstrate for the first time the accelerated deterioration of leakage reliability relative to conventional biased-thermal-stressing (BTS) of Cu line/space modules. Electric field analyses confirm said finding, invoking the need to correspondingly adjust the reliability testing criteria to ensure the most conservative lifetime projection. Two important collateral consequences include leakage aggravation with Ar plasma treatment prior to barrier metal deposition and bias direction dependence of intra-via or line-via reliability.