

IMPROVED MECHANICAL CONTACT RELIABILITY AND ENERGY EFFICIENCY FOR CMOS APPLICATIONS

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BRIEF DESCRIPTION

In order to overcome fundamental energy efficiency limits of CMOS technology, micro-electro-mechanical (MEM) relay technologies are now being investigated for ultra-low-power digital integrated circuit (IC) applications. High relay endurance (exceeding 10^{14} ON/OFF switching cycles) is required for relay-based ICs to be viable, and has been a major challenge due to stiction and wear.

Researchers at UC Berkeley have developed an efficient way to reduce contacts aging, stiction, and oxidation. The researchers have shown that contacts can be made to be very reliable with very low resistance. To date, a contact resistance of 85.2 kohms has been measured at room temperature and suggests the possible use of these contacts for relay-based integrated circuits, which typically requires contact resistances less than 100 kohms. Further work will include coating optimization, surface roughness analysis, dynamic measurements for contact aging evaluation, thermal analysis, extraction of the effective contact area, and advanced current transport modeling.

SUGGESTED USES

- » CMOS
- » Ultra-low-power digital integrated circuit (IC)

ADVANTAGES

- » Increased power absorption and generation in individual or arrays of wave energy converters

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OTHER INFORMATION

KEYWORDS

CMOS, digital integrated circuit

CATEGORIZED AS

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