

Accepted Manuscript

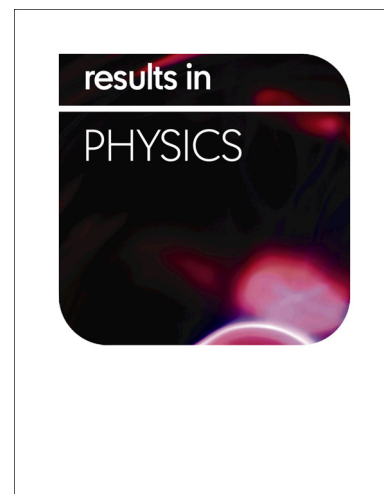
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PII: S2211-3797(18)30436-4
DOI: <https://doi.org/10.1016/j.rinp.2018.05.015>
Reference: RINP 1458

To appear in: *Results in Physics*

Received Date: 27 February 2018
Revised Date: 5 May 2018
Accepted Date: 6 May 2018



Please cite this article as: Li, Q., Wen, Y., Zhang, F., Li, H., Xiao, G., Chen, Y., Fu, T., A novel SOI LDMOS with substrate field plate and variable-k dielectric buried layer, *Results in Physics* (2018), doi: <https://doi.org/10.1016/j.rinp.2018.05.015>

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A novel SOI LDMOS with substrate field plate and variable-k dielectric buried layer

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Abstract: A novel silicon-on-insulator (SOI) lateral double-diffused metal-oxide-semiconductor (LDMOS) structure has been proposed. The new structure features a substrate field plate (SFP) and a variable-k dielectric buried layer (VKBL). The SFP and VKBL improve the breakdown voltage by introducing new electric field peaks in the surface electric field distribution. Moreover, the SFP reduces the specific ON-resistance through an enhanced auxiliary depletion effect on the drift region. The simulation results indicate that compared to the conventional SOI LDMOS structure, the breakdown voltage is improved from 118V to 221V, the specific ON-resistance is decreased from $7.15\text{m}\Omega\cdot\text{cm}^2$ to $3.81\text{m}\Omega\cdot\text{cm}^2$, the peak value of surface temperature is declined by 38K.

Keywords: SOI LDMOS, field plate, variable-k dielectric, breakdown voltage, specific ON-resistance

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