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SELECTION OF RESEARCH DIRECTIONS FOR INVERTERS WITH SiC MOSFET

The comparison of the properties of semiconductor materials shows that SiC is superior in almost all respects. And this is the reason for numerous studies of its application in power electronics. The aim of the work: analysis of publications and selection of research directions for inverters with SiC MOSFET. These works are aimed at:

- Improving the methods for identifying SiC power MOSFET models.
- Evaluating the degree of degradation of SiC power MOSFETs based on a neural network model.
- Increasing the accuracy of estimating the temperature of SiC power MOSFET junctions.

- Building hybrid indicators of SiC power MOSFET defects based on data-driven and knowledge-driven machine learning.
- Using machine learning methods to model the relationship between electrical and thermal processes in SiC power MOSFETs.
- Extending the service life of SiC power MOSFETs by minimizing MOSFET temperature fluctuations without affecting the vehicle dynamics.
- Building SiC power MOSFET failure models based on reflectometry data.
- Developing tools for online monitoring of SiC power MOSFET condition.

The following conclusions can be drawn from the analysis of publications:

- The problem of selection, determination of its technical condition and forecasting of the life cycle of SiC power MOSFET is relevant - a large number of publications are devoted to it
- The choice of the SiC power MOSFET model is of great importance - both models based on physical and geometric parameters and "black box" models are used. In this case, as a rule, models with concentrated quantitative parameters are used
- The non-stationary nature of the load significantly complicates forecasting the end of the service life of SiC power MOSFET
- The main factor accelerating aging is temperature, and methods slowing down aging are temperature reduction and stabilization, improved cooling

It is proposed to improve the quality of modeling inverters with SiC MOSFET by using higher forms of knowledge. To assess the residual life of inverters with SiC MOSFET, it is proposed to use the methodology of the IEC 60076-7 standard.