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# Multiphysics Modeling of Power Electronic Devices

This work will model the power electronic devices in two steps: loss modeling and thermal modeling for IGBTs, MOSFETs, and power diodes. There will be no specific devices used; just general device parameters found from a market survey at different voltage/current ratings. This section covers how these two modeling methods are designed for each respective device.

### MOSFET Loss Modeling

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Modeling of the MOSFETs will be done largely using the examples in the application note by Graovac et al., 2006. This method also considers the losses of the body diode, so for MOSFET applications, no extra parallel diode will be included.

#### *Table 1: Inputs and outputs used for device modeling.*

|  |  |
| --- | --- |
| **Input** | **Output** |
| Phase Current () | Sine Wave Pulsed Power Output () |
| Electrical Frequency () |
| Modulation Index () |
| Power Factor () |

### IGBT Loss Modeling

### Diode Loss Modeling