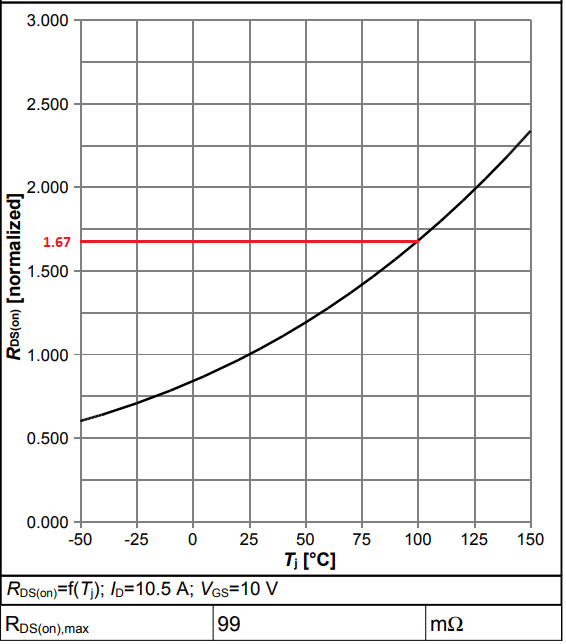
**Thermal Analysis**

1. **MOSFET1**

For MOSFET IPP60R099P7, the RDS value for maximum desired temperature of can be found from datasheet:

:

Thermal resistance, junction – case:

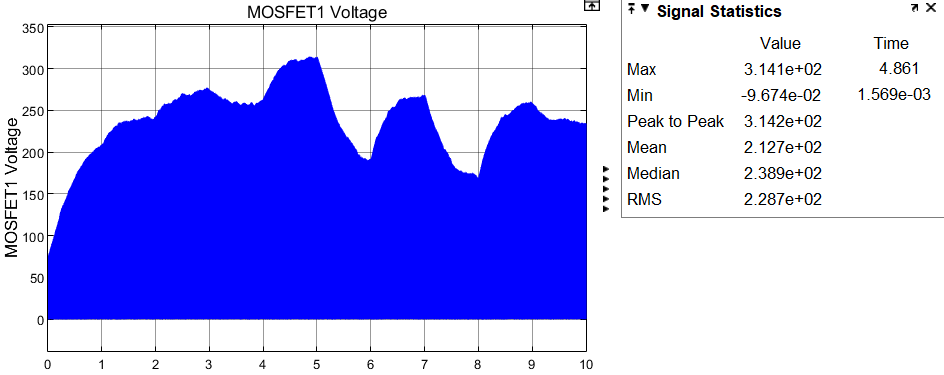
Thermal resistance, junction – ambient (leaded):

Typical thermal resistance of case – heat sink (flat, greased surface, approximately):

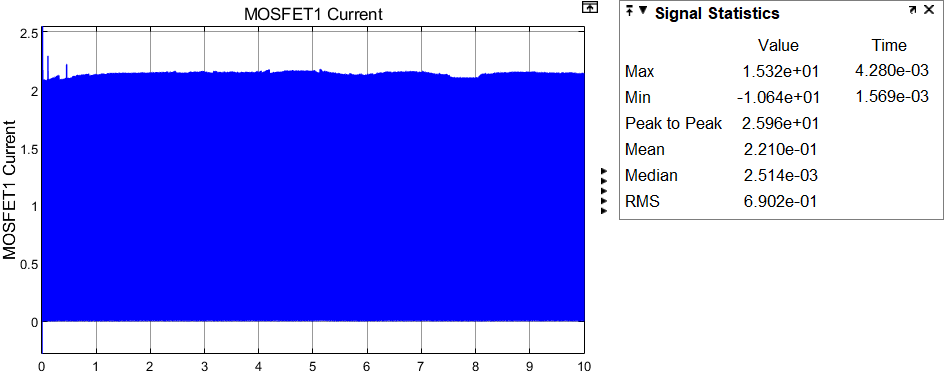
The sum of rise and fall times is:

In our application, switching frequency of the MOSFET is:

We should also find the rms output current and mean input voltage of the MOSFET. For this reason, simulation results are added:



The mean value of the MOSFET input voltage is:



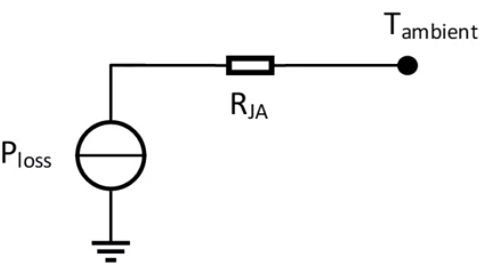
The rms value of the MOSFET current is:

The peak current in steady state (initial peak is omitted):

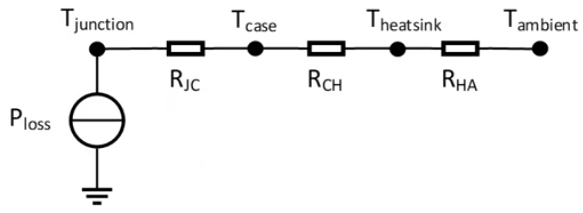
The total power loss of MOSFET should be calculated:

For normal conditions, let choose ambient temperature as.

If no heatsink applied, the junction temperature is:

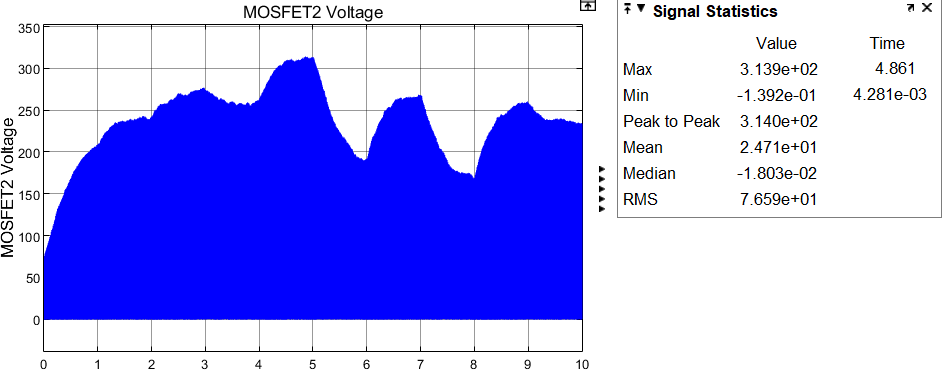


If there is a heatsink, maximum sink – ambient thermal resistance for maximum desired junction temperature of is:

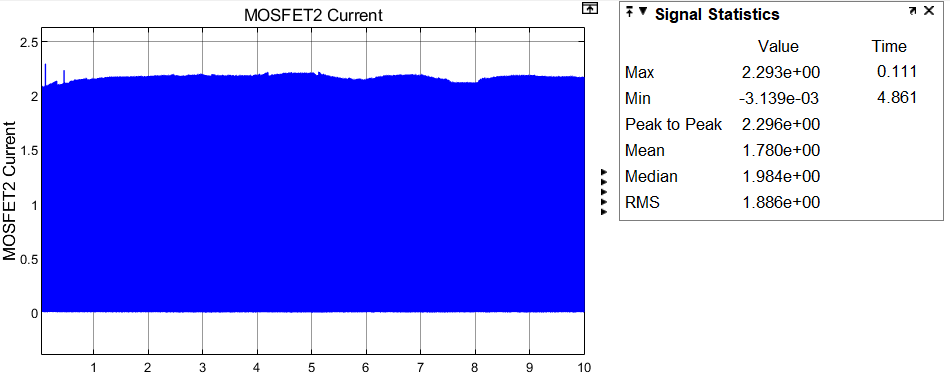


1. **MOSFET2 (Replacement with diode)**

We should find the rms output current and mean input voltage of the second MOSFET. For this reason, simulation results are added:



The mean value of the MOSFET input voltage is:



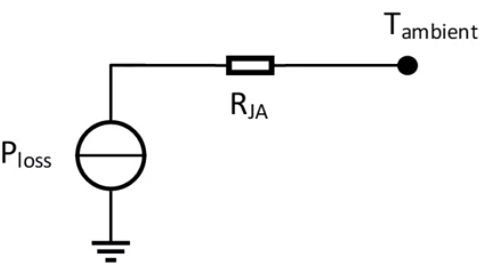
The rms value of the MOSFET current is:

The peak current in steady state:

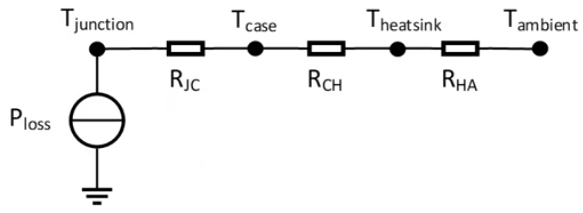
The total power loss of MOSFET should be calculated:

For normal conditions, let choose ambient temperature as.

If no heatsink applied, the junction temperature is:

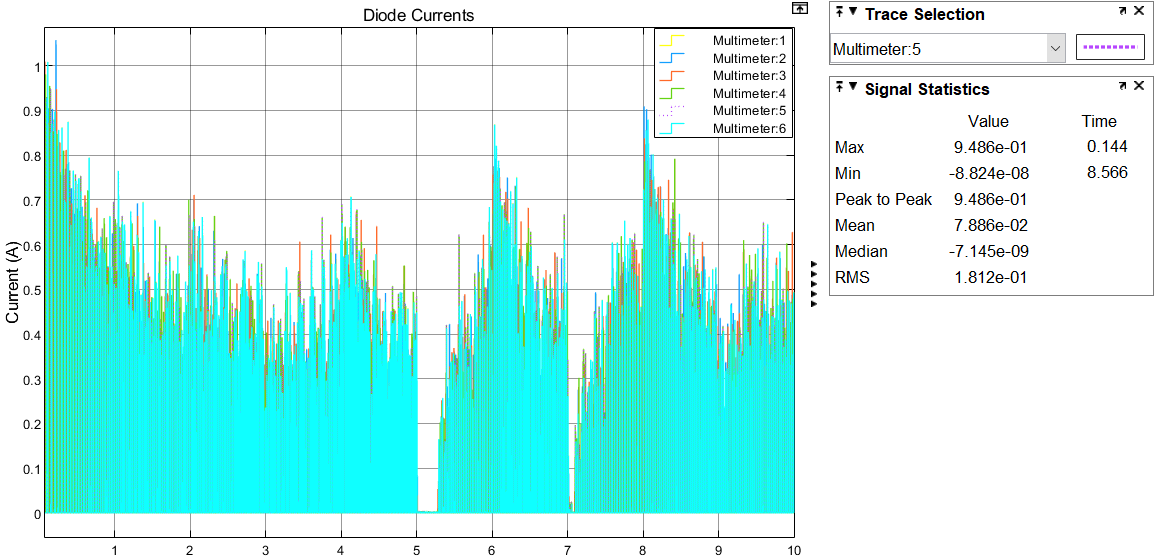


If there is a heatsink, maximum sink – ambient thermal resistance for maximum desired junction temperature of is:

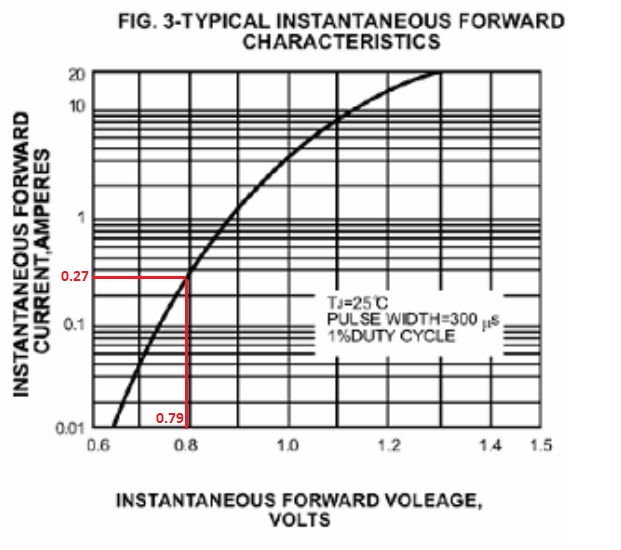


1. **Diode**

For Diode SD560B,



The mean value of the diode current, which has its maximum among 6 diodes in the bridge, is:

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For normal conditions, let choose ambient temperature as.

Thermal resistance, junction – ambient (leaded) of this diode is:

If no heatsink applied, the junction temperature is:

