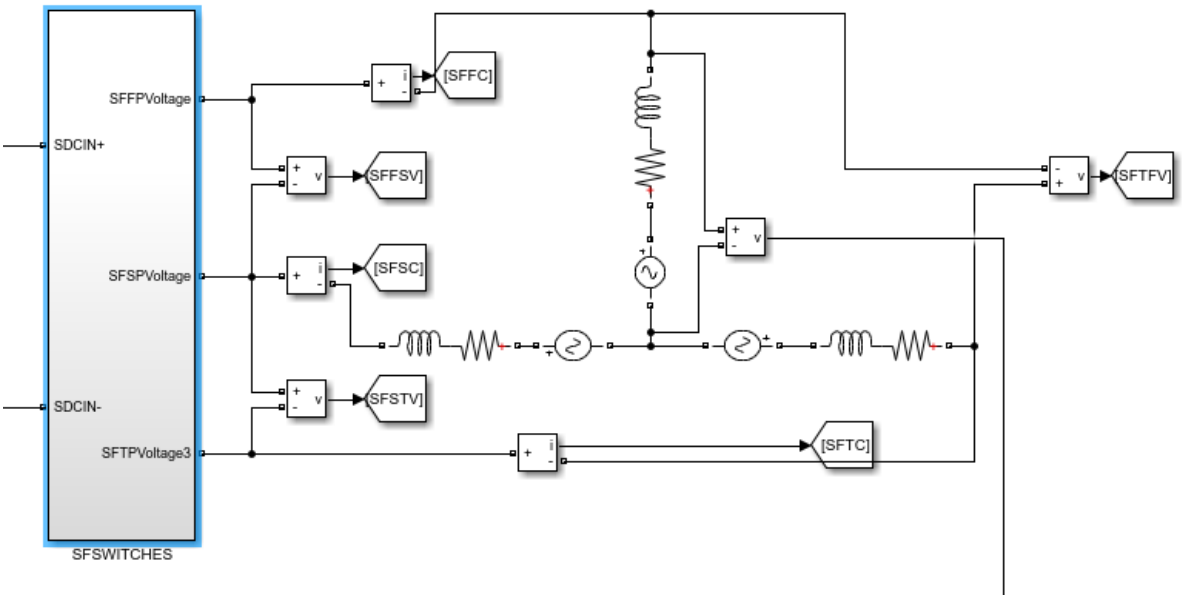
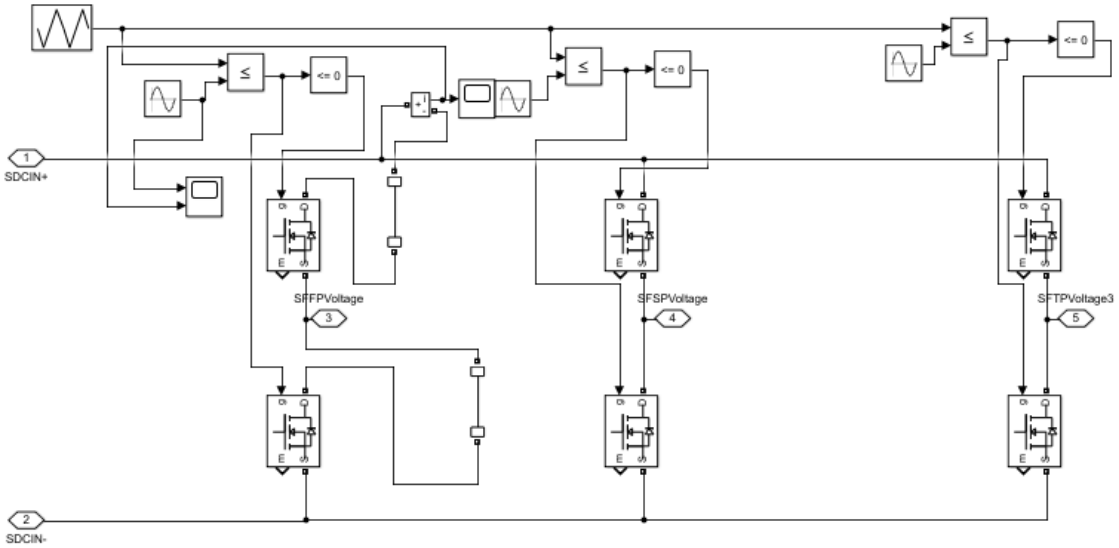
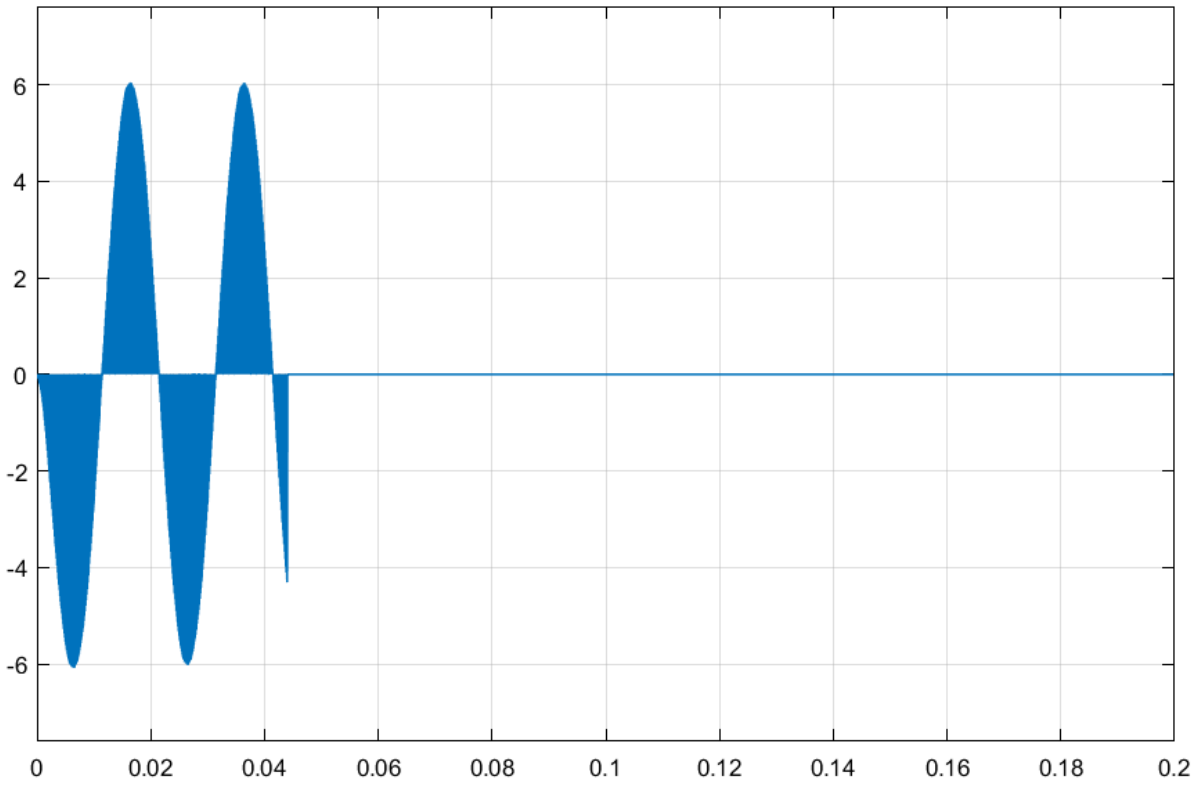
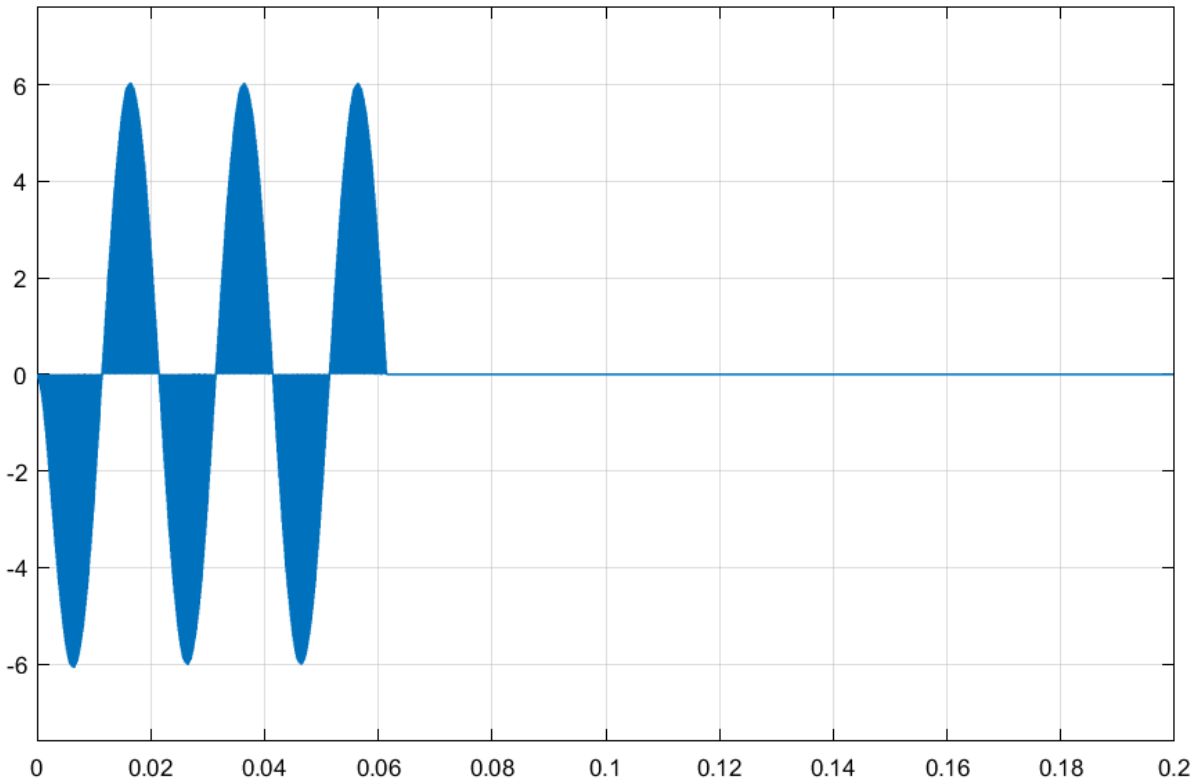

SFFPVoltage
SDCIN+
SFSPVoltage
SDCIN-
SFTPVoltage3
SFSWITCHES
[SFFC]
[SFFSV]
[SFSC]
[SFSTV]
[SFTC]
[SFTFV]

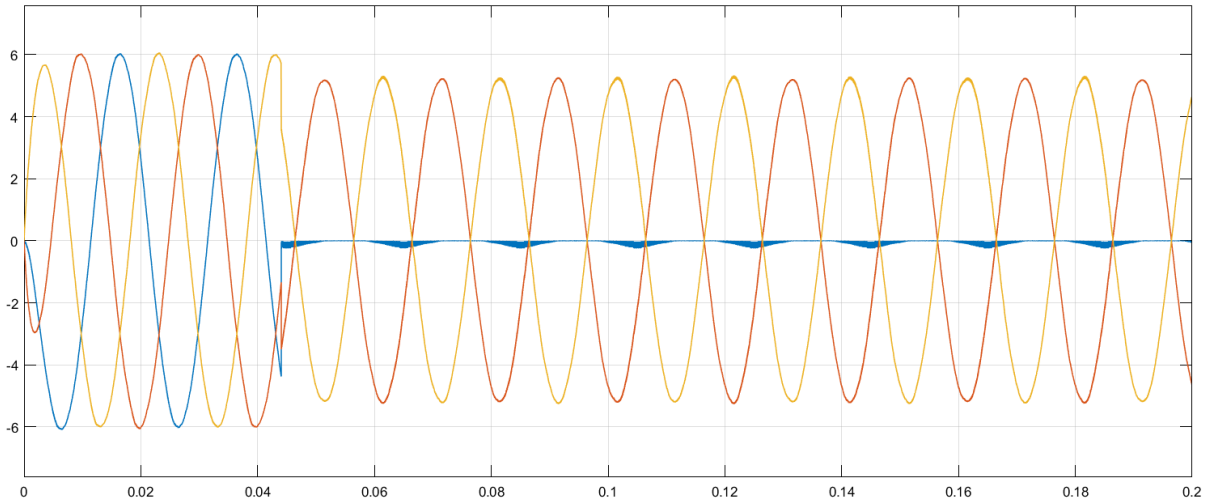

1
SDCIN+
2
SDCIN-
SFFPVoltage
3
SFSPVoltage
4
SFTPVoltage3
5
<= 0

Fail at upper transistor while its conducting

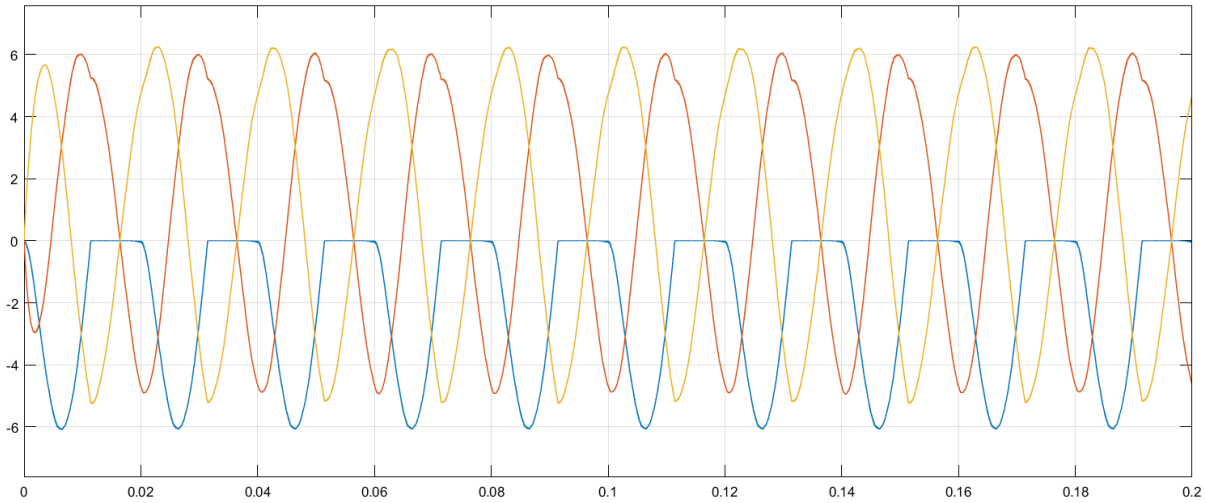


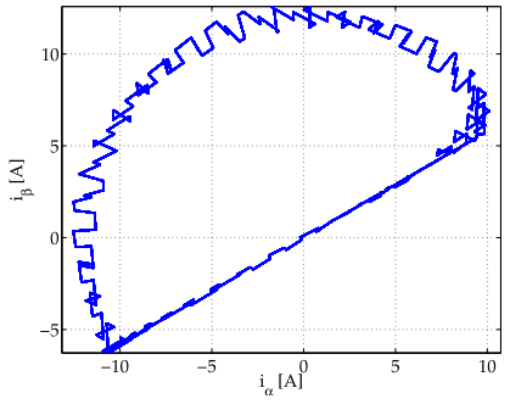
While its not conducting



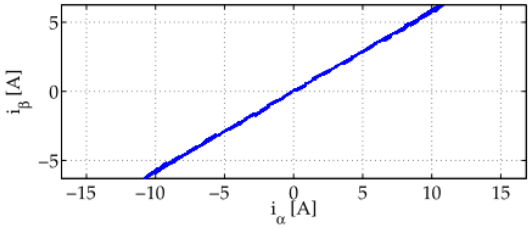


When only mosfet part fails but diode conducts





(a) IGBT fault



(b) Simultaneous IGBT-diode or entire leg fault

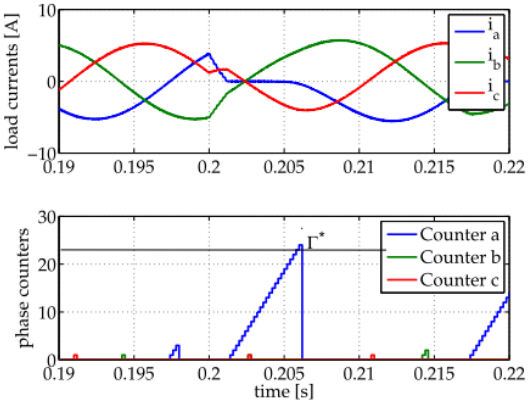


Fig. 4: Fault detection operating principle based on current samples counting.

relationship in (11) is satisfied within $\frac{2N}{\pi}\varepsilon$ samples at most. Therefore, the diagnosis process can use a pulse counter operating with the same clock frequency used for current sampling. Such a counter is reset every time (11) are no longer verified. A fault index Γ much higher than $\frac{2N}{\pi}\varepsilon$ is introduced.

Figure 4 shows the simulation of the diagnosis based on the sample counting principle. When (11) become true for each