**MOSFET - NTB150N65S3HF**

**– N‐Channel, SUPERFET III, FRFET 650 V, 24 A, 150 mohms**

Features,

* 700 V @ TJ= 150°C
* Typ. RDS(on)= 121 mohms
* Ultra Low Gate Charge (Typ. Qg= 43 nC)
* Low Effective Output Capacitance (Typ. Coss(eff.)= 400 pF)
* 100% Avalanche Tested
* These Devices are Pb−Free and are RoHS Compliant

As it is written “Simulation Results” part, we need MOSFET which can work under 300-325 V (according to input voltage change this value can be 600 as it is indicated also in simulation results part), or for some other input voltage parameters 600V. Also, current will be mostly 20-22 A in safety margin. As we can see from the features and also from the name of the MOSFET, this component can work under 650 V and 24 A which are fit our requirements. This component offer low capacitance and low gate charge which lets us to on and off it fast. Turn-on rise time is 19ns, turn-off fall time is 14ns which is okey for our circuit. RDS(on) is 121 mohms and it tells us the conduction loss will be very low. We can calculate it like that: RDS(on)\*ton\*I\*fs = 0.121\*14.2us\*18A\*25kHz = 0.77 Watt/second.

**Current Sensor – ACS770LCB-050B-PFF-T**  
**– Hall-Effect-Based Linear Current Sensor IC, 50 A, Bidirectional**

Features:

* Current Range: ±50 A (Bidirectional)
* Sensitivity: 50 mV/A
* Accuracy: Typical output error ±1% at 25°C
* Bandwidth: 80 kHz
* Response Time: 6.5 µs
* Supply Voltage Range: 3 V to 5.5 V
* Isolation Voltage: 424 V RMS
* Temperature Range: -40°C to +125°C

As mentioned in the "Simulation Results" section, the current sensor must monitor currents in the range of 20–22 A under nominal operating conditions, with the potential to measure higher currents for peak or fault detection up to ±50 A. This sensor is ideal for our requirements, as it has a current sensing range of ±50 A, which covers our operational range with a safety margin.

The sensor's high sensitivity (50 mV/A) ensures precise and linear measurement of current. Its bandwidth of 80 kHz and fast response time of 6.5 µs are sufficient to detect rapid changes in current, ensuring accuracy in real-time applications. Additionally, the isolation voltage of 484 V RMS provides safe electrical isolation between the sensor and the circuit, a crucial feature for power electronics applications. The sensor’s integrated shielding minimizes the impact of external magnetic interference, enhancing measurement accuracy. Its low output error (±0.51% typically) further confirms its suitability for high-accuracy applications. This component’s robustness and precision make it an excellent fit for our design, ensuring reliable performance in demanding environments.