MCPCB, preferably with direct attachment for thermals.

Greater than 10MHz −3dB current bandwidth
Fixed 10A / V gain
50A max set−current
10mA max leakage when off
20mA accuracy
5V−10V DC < 1A power supply

Isolated input preferred
Over−power protection preferred

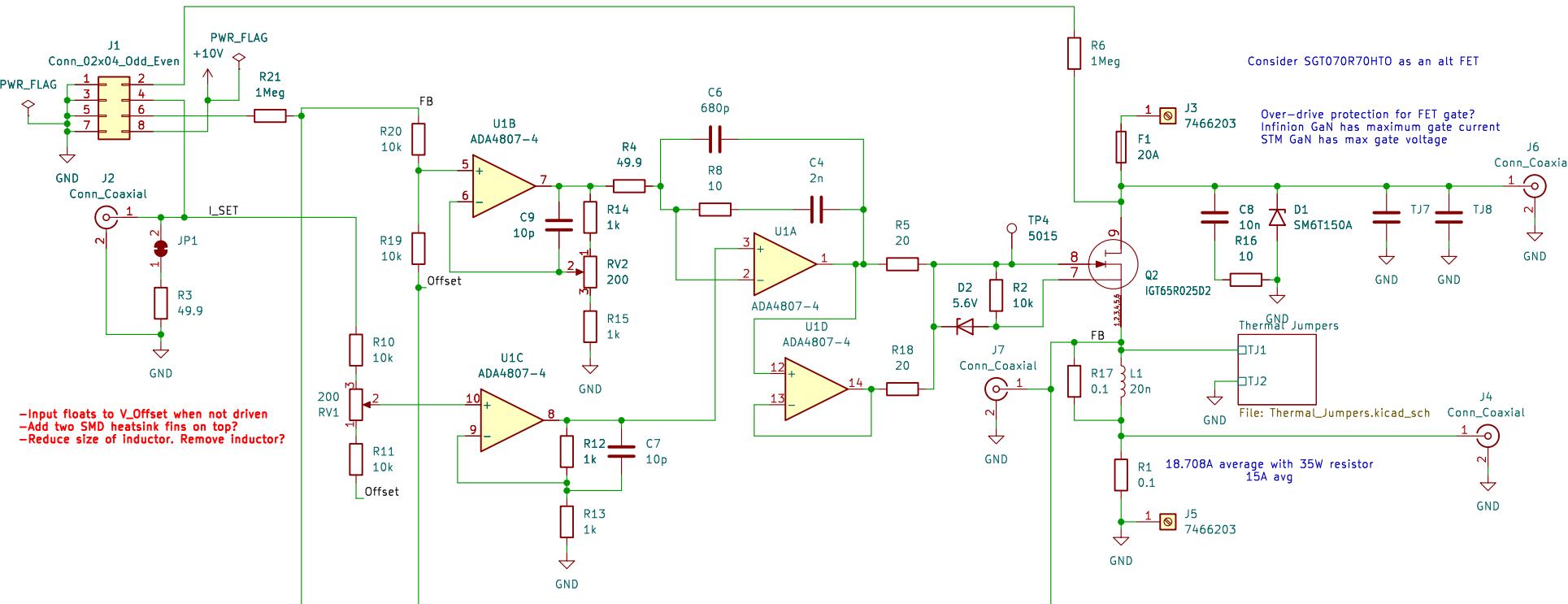Each module report:
−Temp
−Voltage
−Current

IO Considerations:
−Pwr
−GND
−Set current
−UNREG
−Temp
−Fault/Protect

Thermal design:
Tjc, ~0.51C/W
Solder, ~0.025 C/W
Copper coin under FET, ~.04 C/W
TIM: ??? Gel75, 0.2mm, ~0.14 C/W

Thermal jumpers??
TIM to heatsink, 1W/mk, 65x40mm 0.5mm, 0.19 C/W

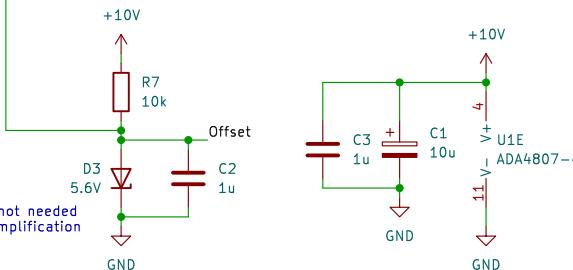230W abs max on FET @ 25C without external thermal impedances

BOM:https://www.digikey.com/en/mylists/list/430F3M7L10

Consider SGT070R70HTO as an alt FET

Over−drive protection for FET gate?
Infinion GaN has maximum gate current
STM GaN has max gate voltage

J1
Conn_02x04_Odd_Even
PWR_FLAG +10V
PWR_FLAG
GND
R21 1Meg
FB

R20 10k
R19 10k
U1B ADA4807−4
C9 10p
Offset
R14 1k
RV2 200
R15 1k

R4 49.9
C6 680p
R8 10
C4 2n
U1A ADA4807−4

R5 20
TP4 5015
D2 5.6V
R2 10k
U1D ADA4807−4
R18 20

Q2 IGT65R025D2

R6 1Meg
J3 7466203
F1 20A
C8 10n
R16 10
D1 SM6T150A
TJ7 TJ8
J6 Conn_Coaxial
GND GND GND

J2 Conn_Coaxial
GND
I_SET
JP1
R3 49.9
GND

R10 10k
RV1 200
R11 10k
Offset

U1C ADA4807−4
R12 1k
C7 10p
R13 1k
GND

GND

FB
R17 0.1
L1 20n
J7 Conn_Coaxial
GND

Thermal Jumpers
TJ1
TJ2
GND
File: Thermal_Jumpers.kicad_sch

J4 Conn_Coaxial
GND

R1 0.1
18.708A average with 35W resistor
15A avg
J5 7466203
GND

−Input floats to V_Offset when not driven
−Add two SMD heatsink fins on top?
−Reduce size of inductor. Remove inductor?

Controller board that provides:
−Isolated analog signal
−Isolated power supply

Xtra:
−Basic function generation
−Voltage control loop
−Current reporting(?) Sum of modules?
−Constant power control loop

TP6 5015   TP7 5015   TP9 5015   TP10 5015
GND

+10V
R7 10k
Offset
D3 5.6V
C2 1u
Zener not needed
BOM simplification
GND

+10V
C3 1u
C1 10u
U1E ADA4807−4
V+
V−
GND

UNREG LED if feedback loop differs by > 0.1V?

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Rev:
Id: 1/2