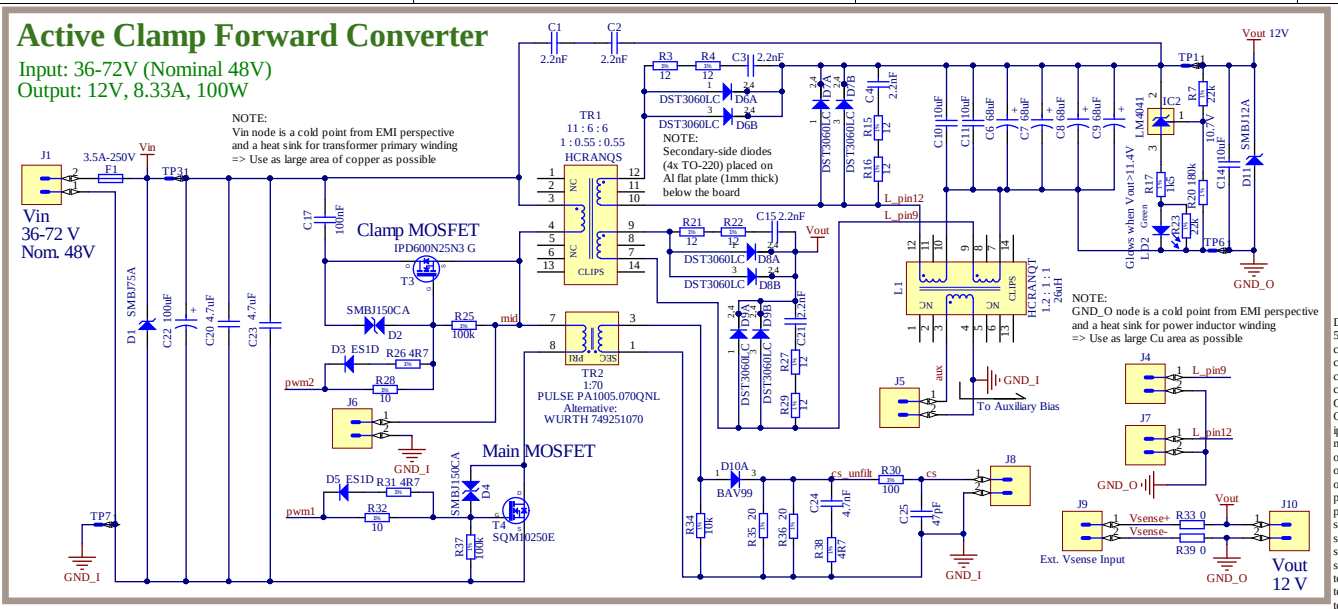
Active Clamp Forward Converter

Input: 36-72V (Nominal 48V)
Output: 12V, 8.33A, 100W

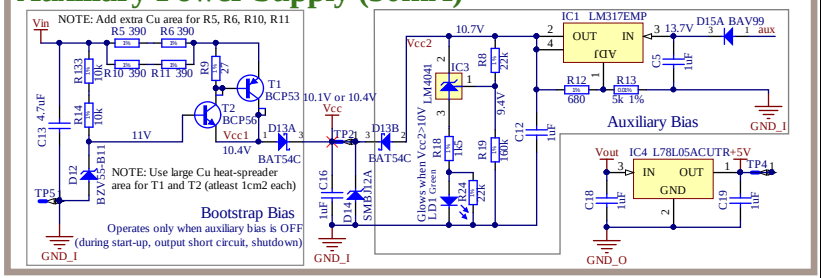


NOTE:
Vin node is a cold point from EMI perspective and a heat sink for transformer primary winding => Use as large area of copper as possible

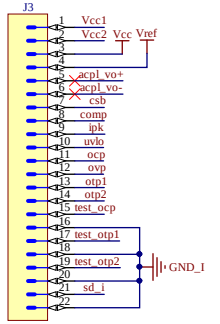
NOTE:
Secondary-side diodes (4x TO-220) placed on Al flat plate (1mm thick) below the board

NOTE:
GND_O node is a cold point from EMI perspective and a heat sink for power inductor winding => Use as large Cu area as possible

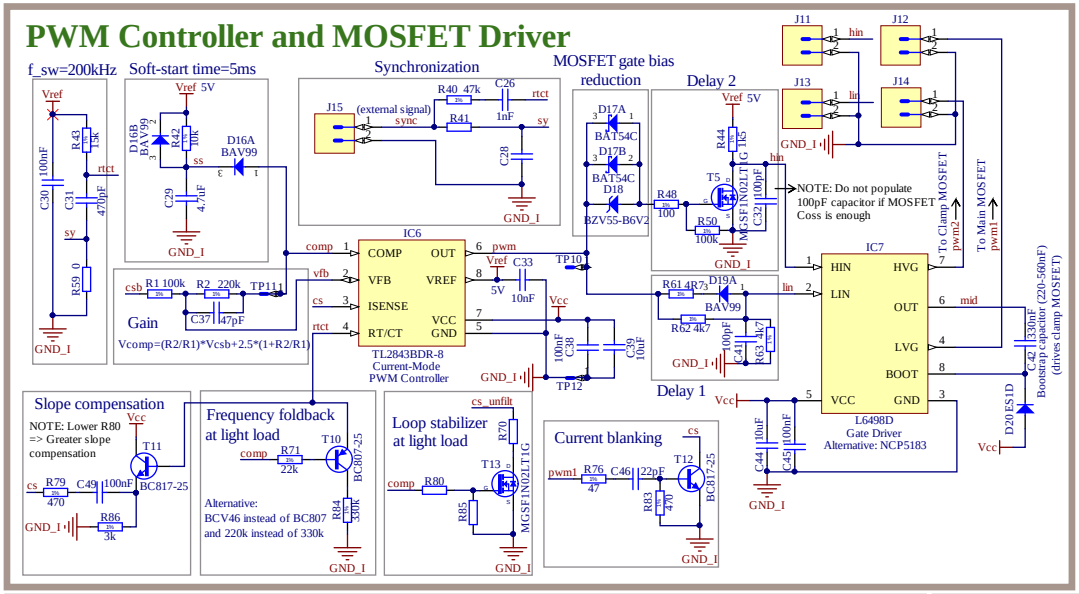
Auxiliary Power Supply (50mA)



DESCRIPTION OF NODE NAMES:
5V_sb = 5V standby (external input) required for external shutdown
comp = comp pin of PWM controller chip (IC6: TL2843)
cs = Current sense
cs_unfilt = Current sense (unfiltered)
csb = Current-share bus (connect to csb of other DC/DC)
GND_I = Input-side (primary-side) ground
GND_I = Output-side (secondary-side) ground
ipk = Peak current value (used for ocp)
mid = Node between main and clamp MOSFETs
ocp = Over-current protection
ovp = Over-voltage protection (power off when Vout>14.4V)
otp = Over-temperature protection
pwm1 = PWM pulses for main MOSFET
pwm2 = PWM pulses for clamp MOSFET
sd_o = Shutdown referenced to o/p side gnd (external signal, 5V active high)
sd_i = Shutdown referenced to i/p side gnd (external signal, 5V active high)
ss = Soft-start capacitor node
sync = Synchronisation (external signal)
test_ocp = Test node for OCP (short to gnd_i to simulate over-current)
test_otp1 = Test node for OTP #1 (short to gnd_i to simulate over-temperature)
test_otp2 = Test node for OTP #2 (short to gnd_i to simulate over-temperature)
test_ovp = Test node for OVP (short to gnd_o to simulate over-voltage)
uvlo = Under-voltage lockout (power off when Vin<36V)
va = Input voltage to isolation amplifier (IC14: ACPL-C87B)
vref_o = Ref. voltage of sec-side controller (IC12/IC13: LM4041 on GND_O)

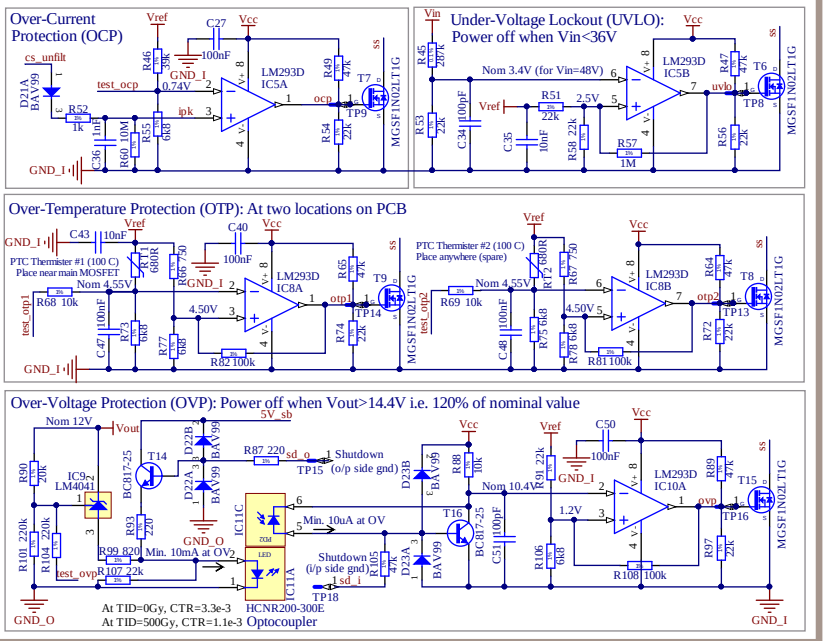


PWM Controller and MOSFET Driver

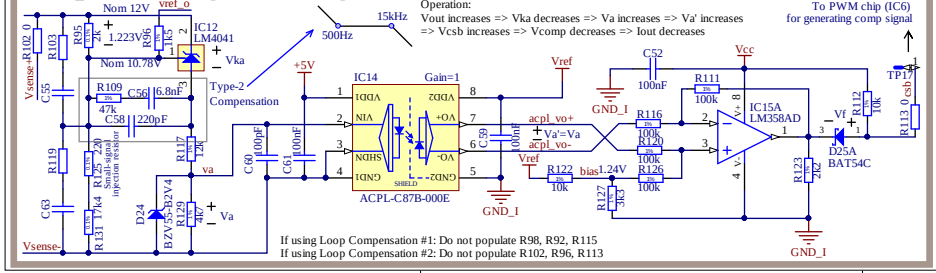


LIST OF TEST POINTS:
TP1: Vout
TP2: Vcc
TP3: Vin
TP4: +5V
TP5: GND_I
TP6: GND_O
TP7: GND_I
TP8: uvlo
TP9: ocp
TP10: pwm
TP11: comp
TP12: GND_I
TP13: otp2
TP14: otp1
TP15: sd_o
TP16: ovp
TP17: csb
TP18: sd_i
J4 (pin-1): L_pin9
J5 (pin-1): aux
J6 (pin-1): mid
J7 (pin-1): L_pin12
J8 (pin-1): cs
J11 (pin-1): hin
J12 (pin-1): pwm1
J13 (pin-1): lin
J14 (pin-1): pwm2

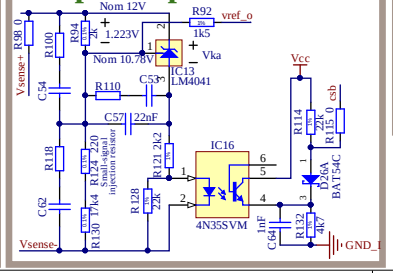
Protection Circuits



Output Voltage Sensing and Loop Compensation #1



Loop Compensation #2



MOUNTING HOLES:
B1 B2
B3 B4

FIDUCIALS:
FTG1 FTG2
FTG3

Project/Equipment	-
Document	R2E Active Clamp Forward DC/DC 12V, 8.33A, 100W
Designer	Yves Thurel, Lalit Patnaik
Drawn by	Lalit Patnaik
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Last Mod.	-
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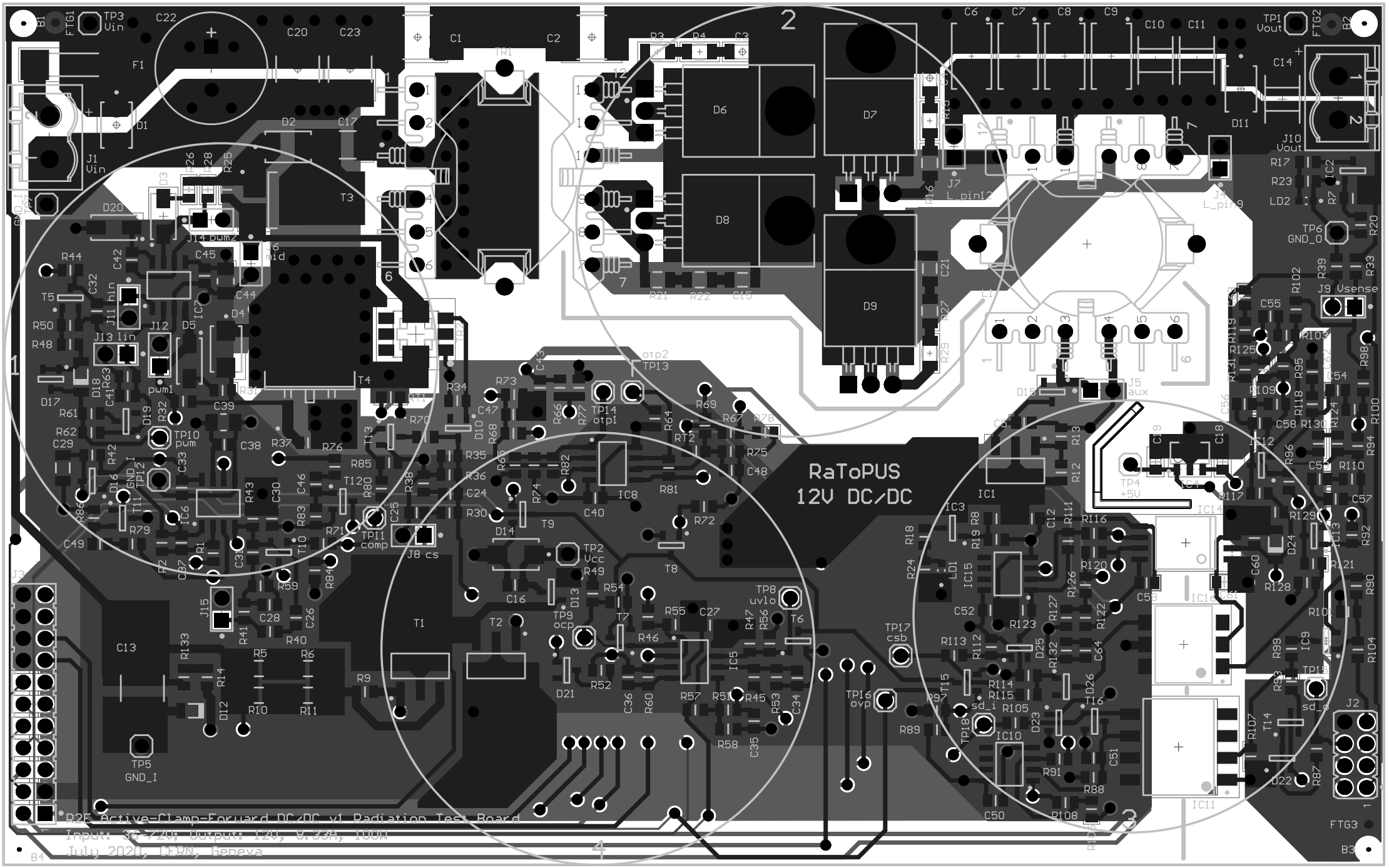
RaToPUS
12V DC/DC
R2F Active-Clamp-Forward DC/DC v1 Radiation Test Board
Input: 36-72V, Output: 12V, 8.33A, 100W
July 2020, CERN, Geneva