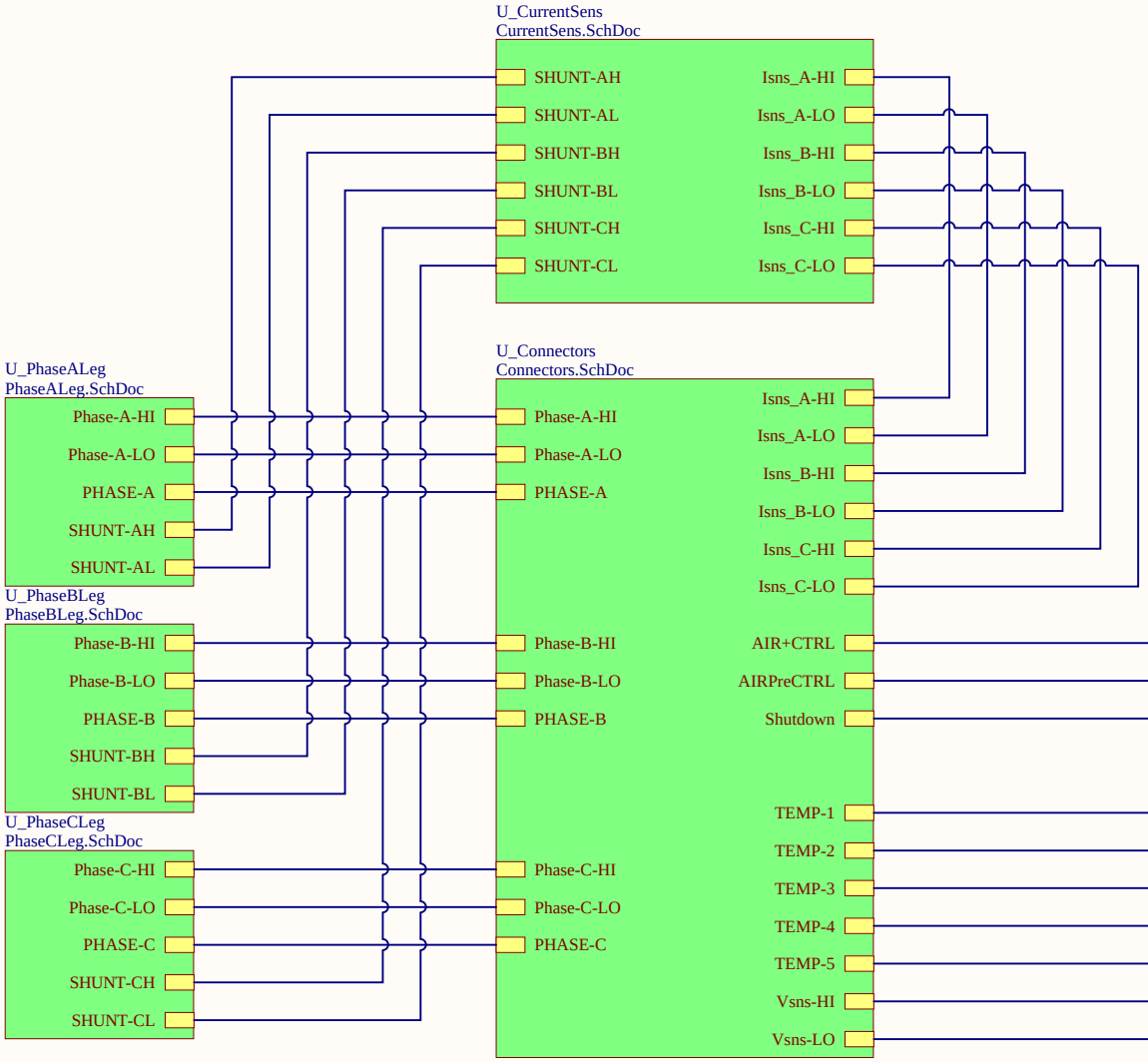
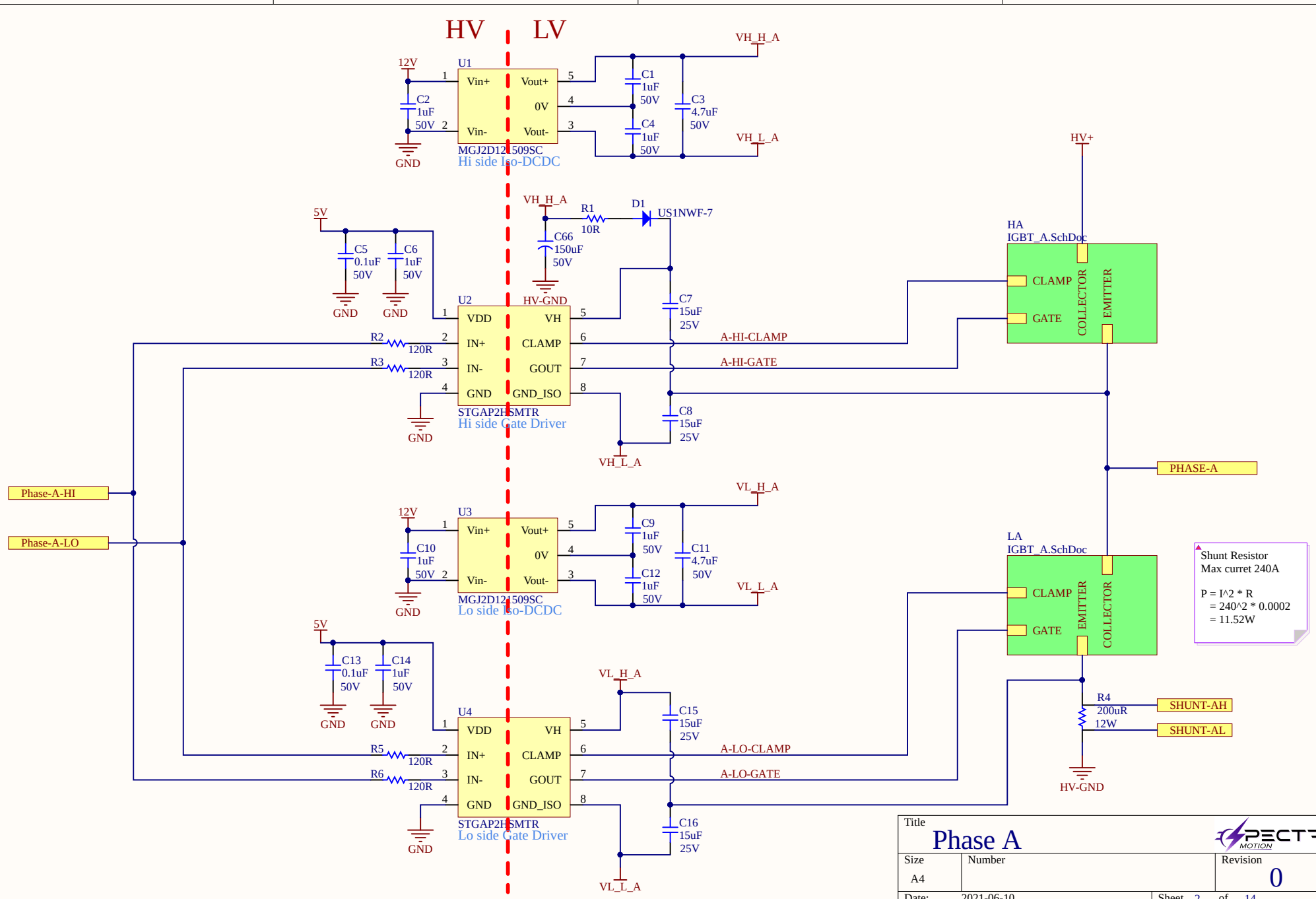


Voltage Levels

HV+	500V max
VH_H_x	15V supply rail for highside gate drivers
VH_L_x	-8V supply rail for highside gate drivers
VL_H_x	15V supply rail for lowside gate drivers
VL_L_x	-8V supply rail for lowside gate drivers
12V	12V
5V	5V supply rail for LV components
5V_iso	Isolated 5V rail for the HV side of opamps
3V3	3.3V rail for the LV side of opamps

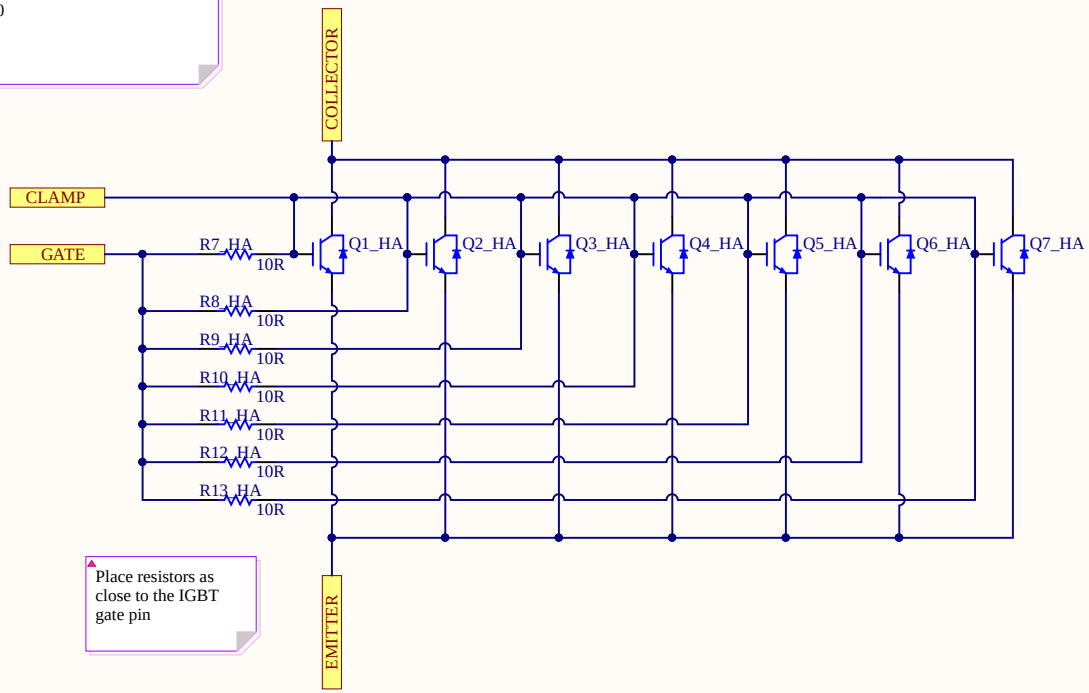
Can still add detail to the voltage chart

Title	Power Board Top		
Size: A4	Number:	Revision: 0	
Date: 2021-06-10		Sheet 1 of 14	
File: C:\Users\..\PowerBoard.SchDoc		Drawn By: Jarod Krane	


HV
LV
12V
U1
Vin+
Vout+
0V
Vin-
Vout-
MGJ2D121509SC
Hi side Iso-DCDC
C1 1uF 50V
C2 1uF 50V
C3 4.7uF 50V
C4 1uF 50V
GND
VH_H_A
VH_L_A
5V
C5 0.1uF 50V
C6 1uF 50V
C66 150uF 50V
R1 10R
D1 US1NWF-7
HV-GND
U2
VDD
VH
IN+
CLAMP
IN-
GOUT
GND
GND_ISO
STGAP2HSMTR
Hi side Gate Driver
C7 15uF 25V
C8 15uF 25V
R2 120R
R3 120R
A-HI-CLAMP
A-HI-GATE
HA
IGBT_A.SchDoc
CLAMP
GATE
COLLECTOR
EMITTER
HV+
PHASE-A
Phase-A-HI
Phase-A-LO
VL_H_A
VL_L_A
U3
MGJ2D121509SC
Lo side Iso-DCDC
C9 1uF 50V
C10 1uF 50V
C11 4.7uF 50V
C12 1uF 50V
LA
IGBT_A.SchDoc
U4
STGAP2HSMTR
Lo side Gate Driver
C13 0.1uF 50V
C14 1uF 50V
C15 15uF 25V
C16 15uF 25V
R5 120R
R6 120R
A-LO-CLAMP
A-LO-GATE
R4 200uR 12W
SHUNT-AH
SHUNT-AL
Shunt Resistor
Max curret 240A
P = I^2 * R
= 240^2 * 0.0002
= 11.52W
Title
Phase A
SPECTRE MOTION
Size
A4
Number
Revision
0
Date: 2021-06-10
Sheet 2 of 14
File: C:\Users\..\PhaseALeg.SchDoc
Drawn By: Jarod Krane

Gate Driver Max current output 4A

Gate current = dV/R
= 23V / 10
2.3A max

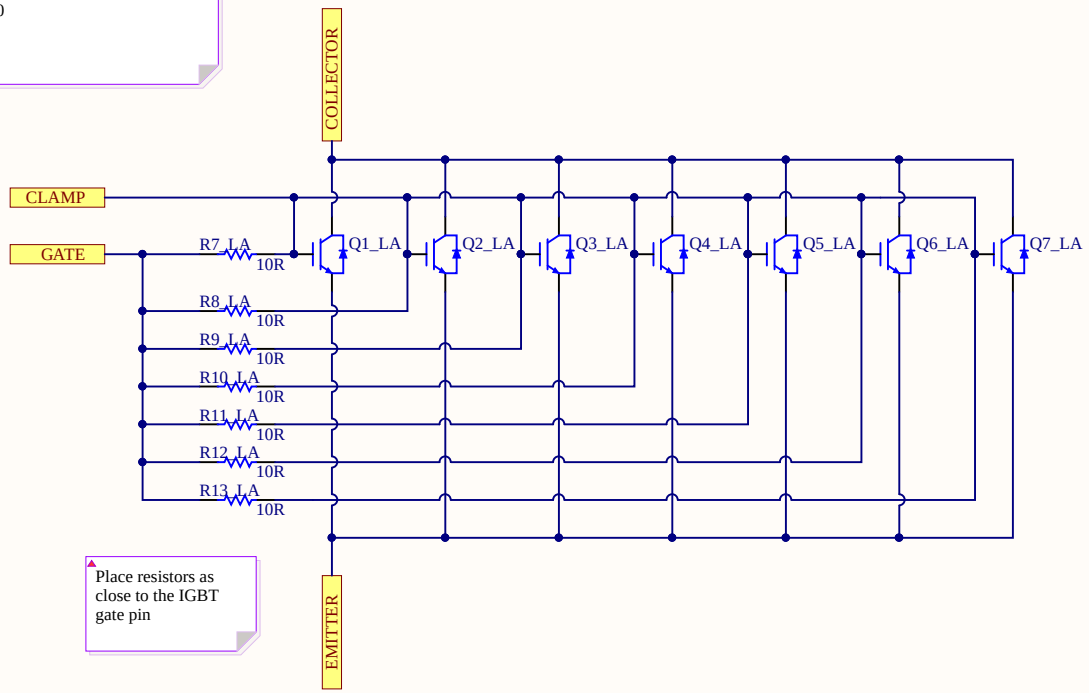


Place resistors as close to the IGBT gate pin

Title: IGBT A		SPECTRE MOTION
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 3.1 of 14
File: C:\Users\..\IGBT_A.SchDoc		Drawn By: Jarod Krane

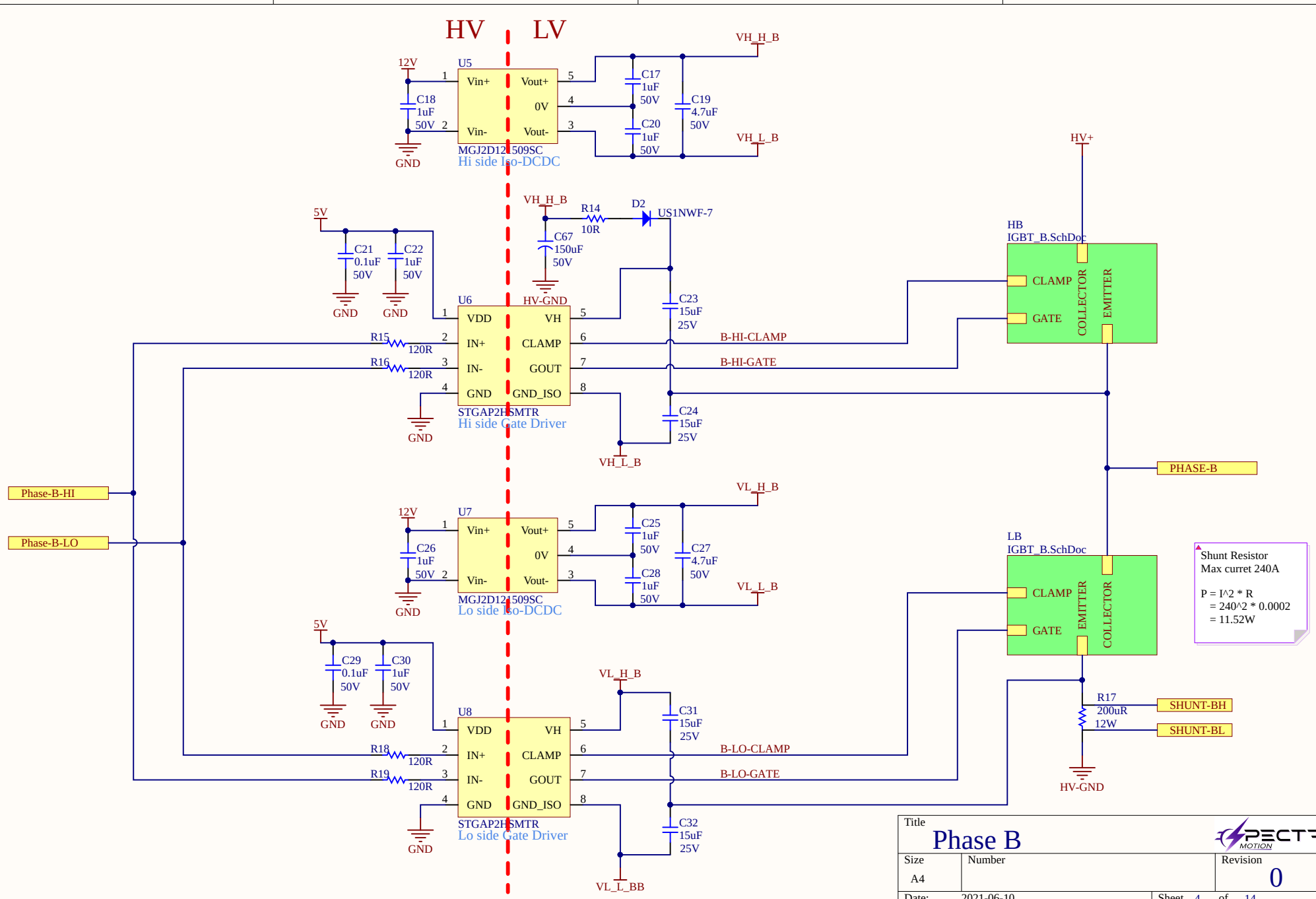
Gate Driver Max current output 4A

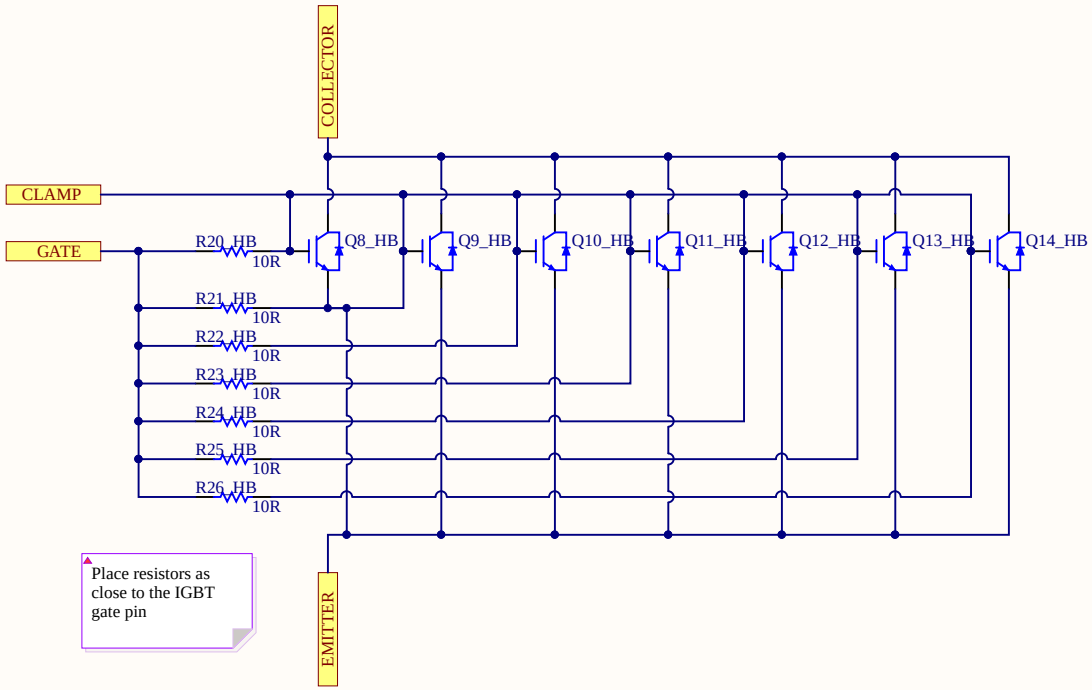
Gate current = dV/R
= 23V / 10
2.3A max



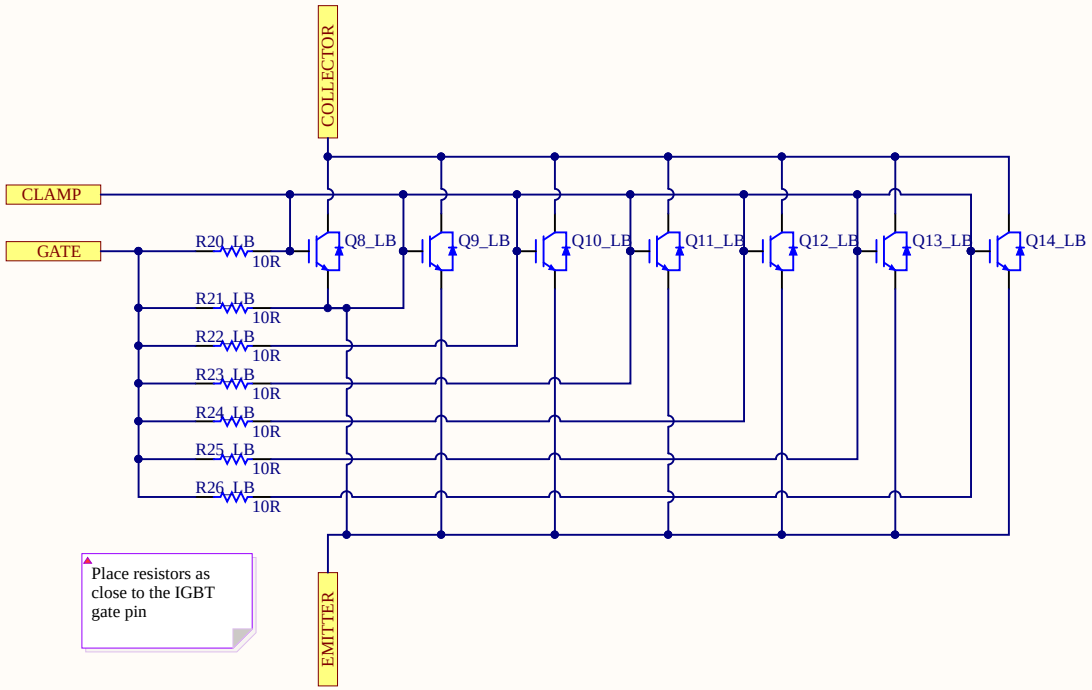
Place resistors as close to the IGBT gate pin

Title	IGBT A		
Size	A4	Number	Revision 0
Date:	2021-06-10	Sheet 3.2 of 14	
File:	C:\Users\..\IGBT_A.SchDoc	Drawn By:	Jarod Krane

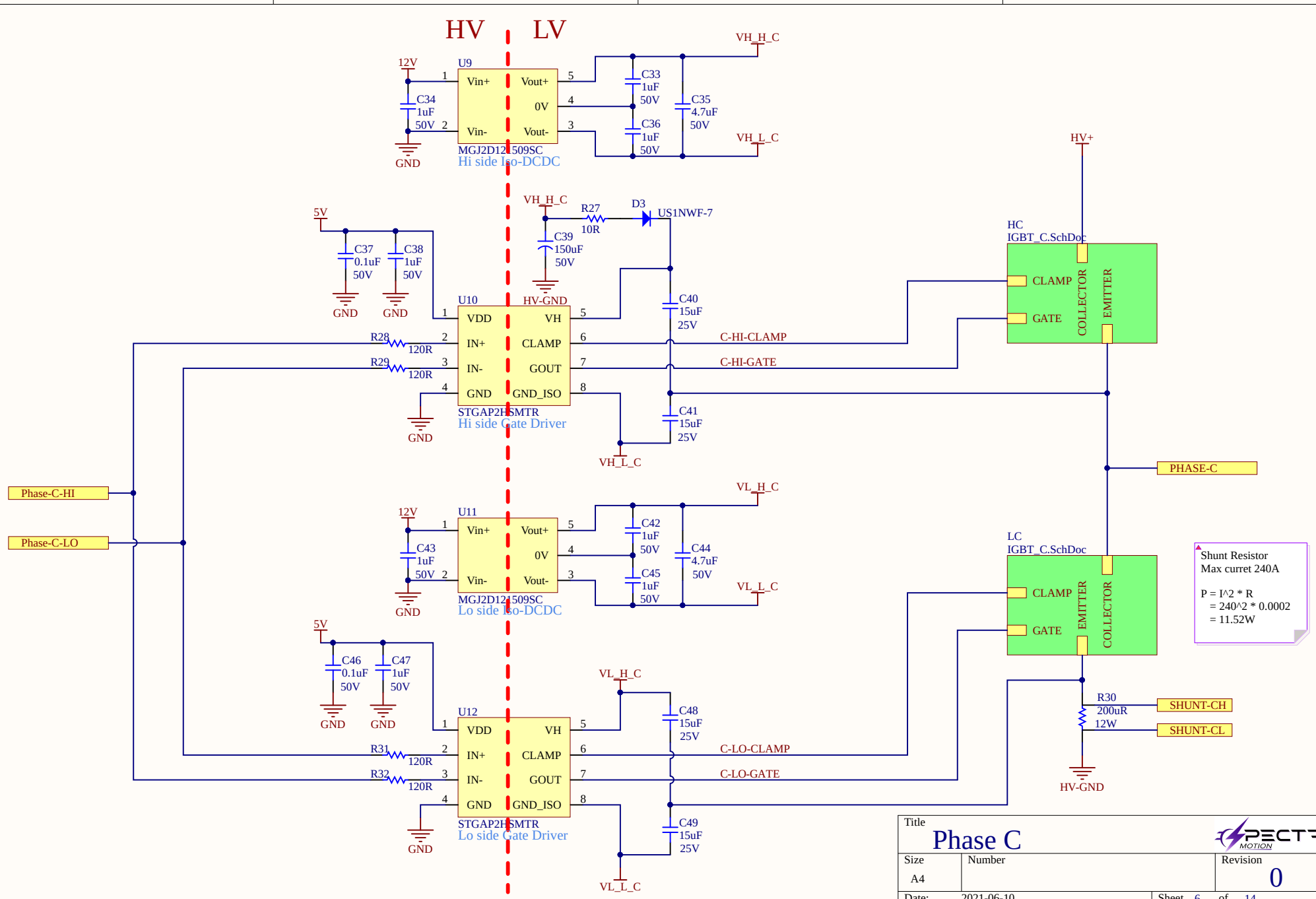

HV
LV
U5
MGJ2D121509SC
Hi side Iso-DCDC
12V
GND
VH_H_B
VH_L_B
C17 1uF 50V
C18 1uF 50V
C19 4.7uF 50V
C20 1uF 50V
U6
STGAP2HSMTR
Hi side Gate Driver
HV-GND
5V
C21 0.1uF 50V
C22 1uF 50V
C23 15uF 25V
C24 15uF 25V
C67 150uF 50V
R14 10R
D2 US1NWF-7
R15 120R
R16 120R
B-HI-CLAMP
B-HI-GATE
HB
IGBT_B.SchDoc
CLAMP
GATE
COLLECTOR
EMITTER
HV+
PHASE-B
Phase-B-HI
Phase-B-LO
U7
MGJ2D121509SC
Lo side Iso-DCDC
VL_H_B
VL_L_B
C25 1uF 50V
C26 1uF 50V
C27 4.7uF 50V
C28 1uF 50V
U8
STGAP2HSMTR
Lo side Gate Driver
C29 0.1uF 50V
C30 1uF 50V
C31 15uF 25V
C32 15uF 25V
R18 120R
R19 120R
B-LO-CLAMP
B-LO-GATE
LB
IGBT_B.SchDoc
R17 200uR 12W
SHUNT-BH
SHUNT-BL
VL_L_BB
Shunt Resistor
Max curret 240A
P = I^2 * R
= 240^2 * 0.0002
= 11.52W
Title
Phase B
Size
A4
Number
Revision
0
Date: 2021-06-10
Sheet 4 of 14
File: C:\Users\..\PhaseBLeg.SchDoc
Drawn By: Jarod Krane



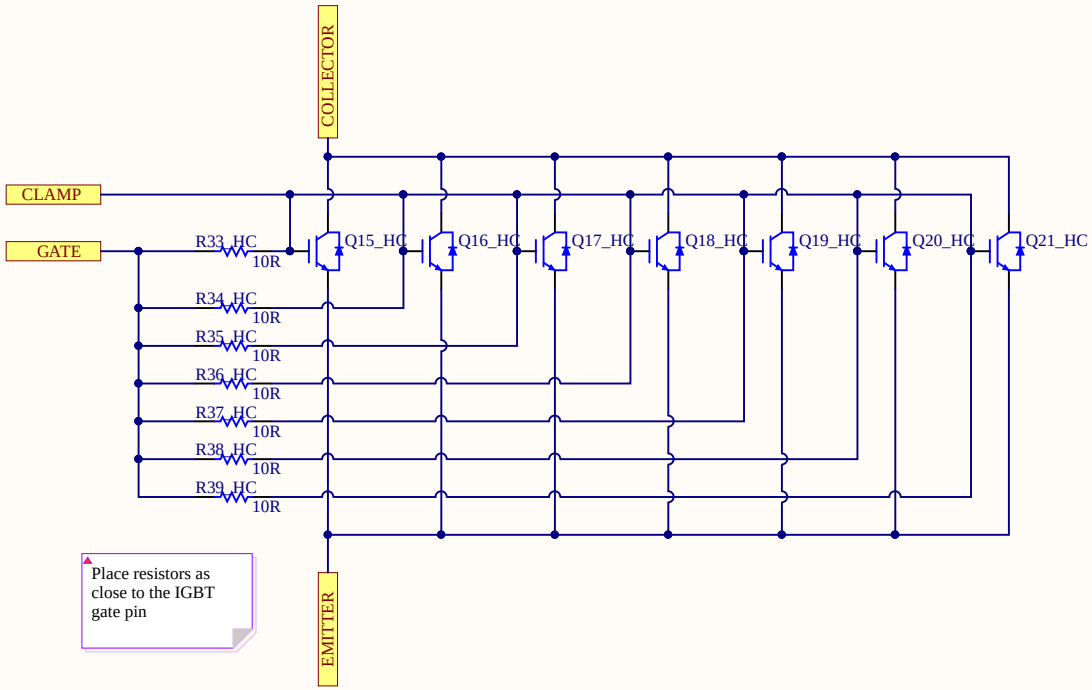
Title: IGBT B		
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 5.1 of 14
File: C:\Users\..\IGBT_B.SchDoc		Drawn By: Jarod Krane



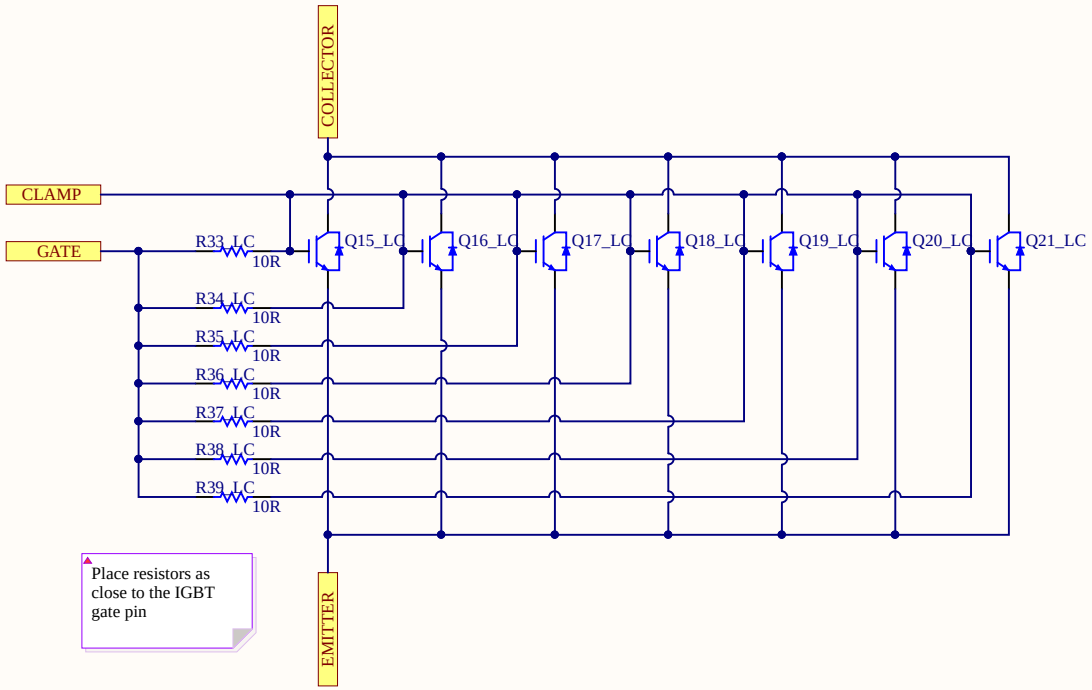
Title: IGBT B		SPECTRE MOTION
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 5.2 of 14
File: C:\Users\..\IGBT_B.SchDoc		Drawn By: Jarod Krane



Title: Phase C		
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 6 of 14
File: C:\Users\..\PhaseCLeg.SchDoc		Drawn By: Jarod Krane

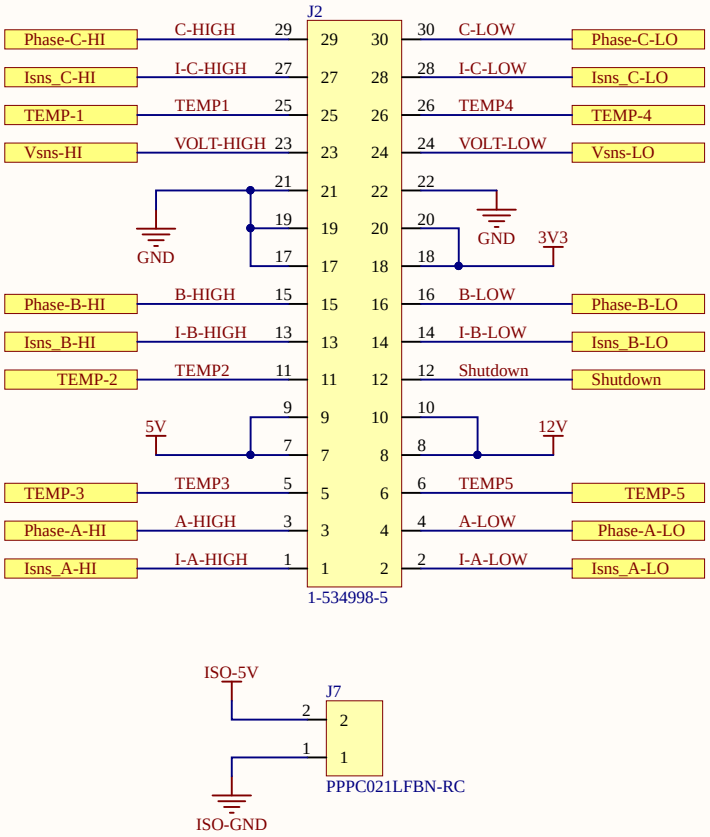


Title: IGBT C		SPECTRE MOTION
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 7.1 of 14
File: C:\Users\..\IGBT_C.SchDoc		Drawn By: Jarod Krane

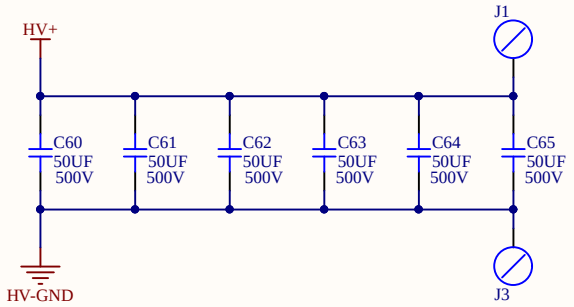


Title: IGBT C		
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 7.2 of 14
File: C:\Users\..\IGBT_C.SchDoc		Drawn By: Jarod Krane

Board to Board



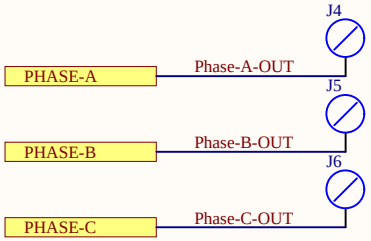
HV IN



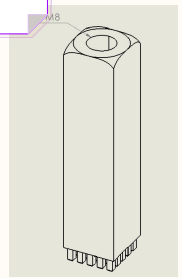
DC Link Capacitor

Capacitance	50uF +/- 10%
Voltage	500V
Surve Voltage	1.5*500V = 750V
Dielectric	Polypropylene (PP)
ESR	2.8mOhms
I peak	332A
Irms @ 70C	22.8Arms
Temp Rating	-55C 105C

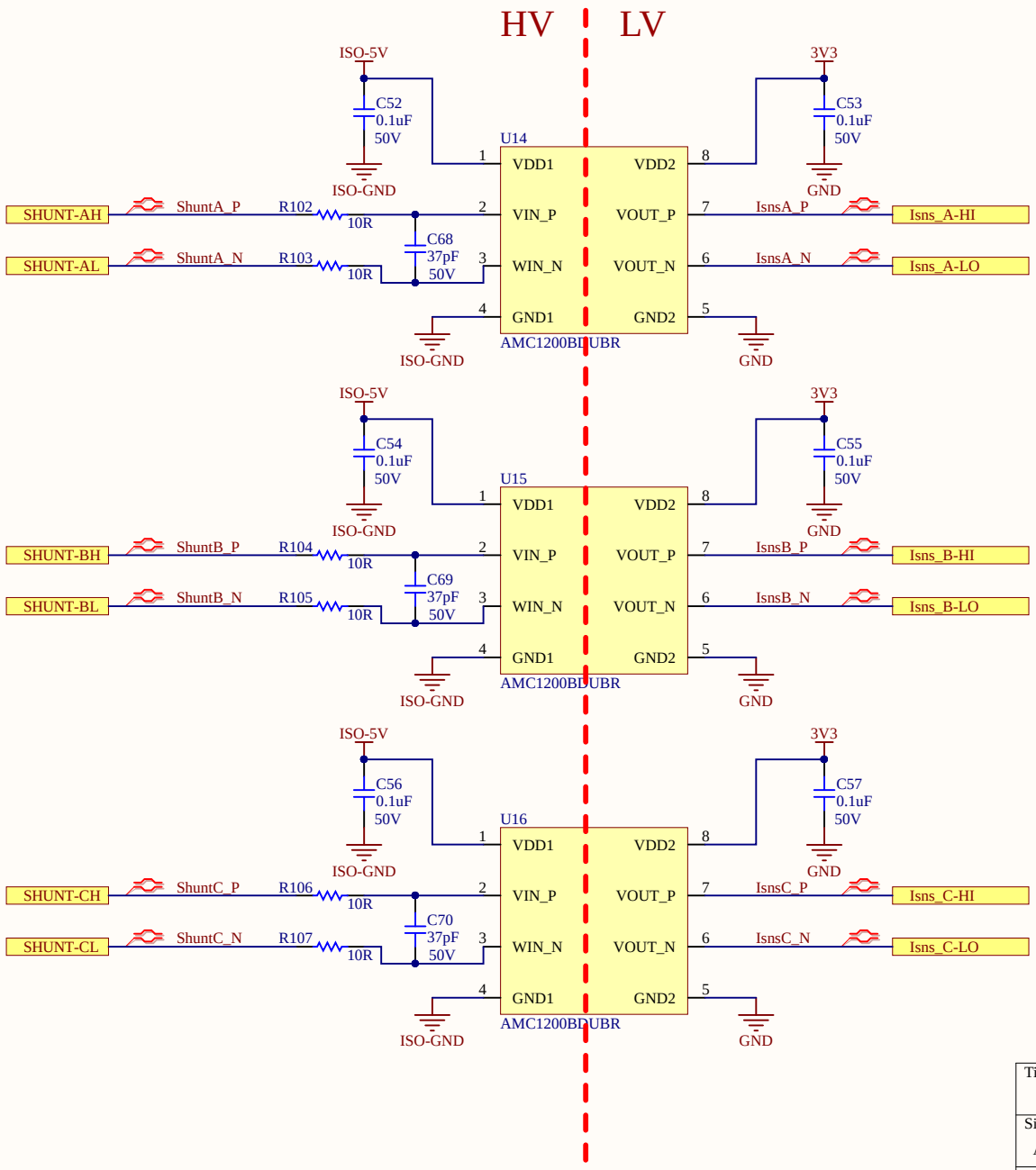
HV OUT



HV terminal connector

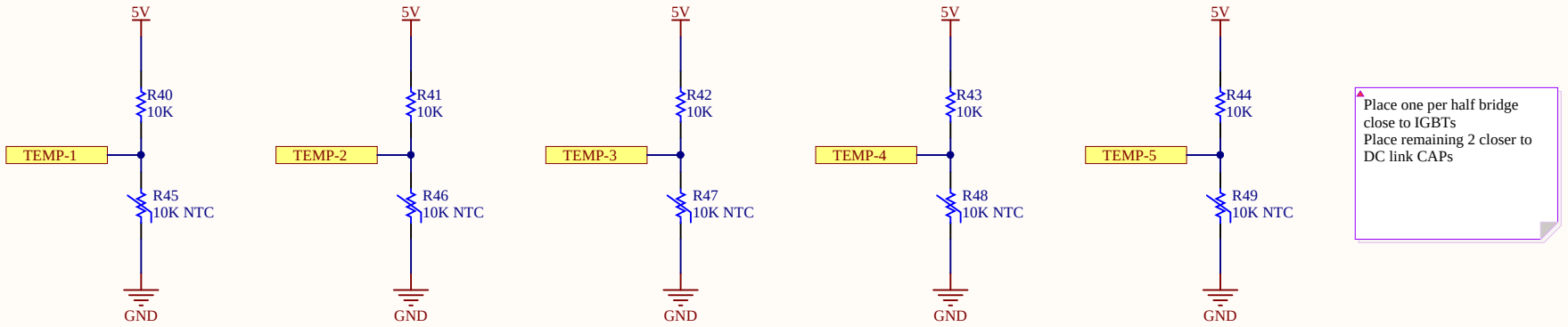


Title	Connectors		
Size	Number		Revision
A4			0
Date:	2021-06-10	Sheet 8	of 14
File:	C:\Users\..\Connectors.SchDoc	Drawn By:	Jarod Krane

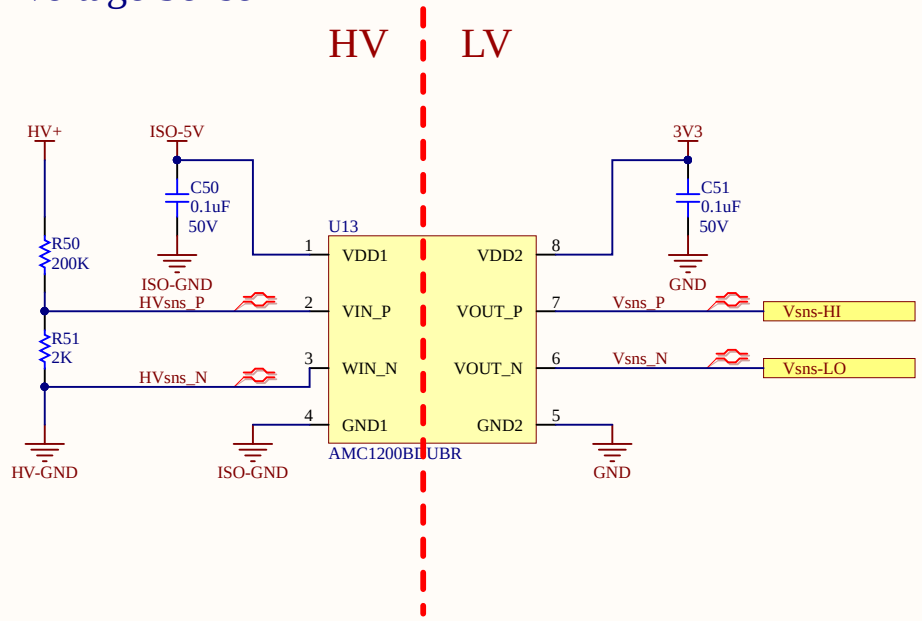


Title: Current Sensors		SPECTRE MOTION
Size: A4	Number:	Revision: 0
Date: 2021-06-10	Sheet 9 of 14	
File: C:\Users\..\CurrentSens.SchDoc	Drawn By: Jarod Krane	

Temperature Sensors



HV Voltage Sense

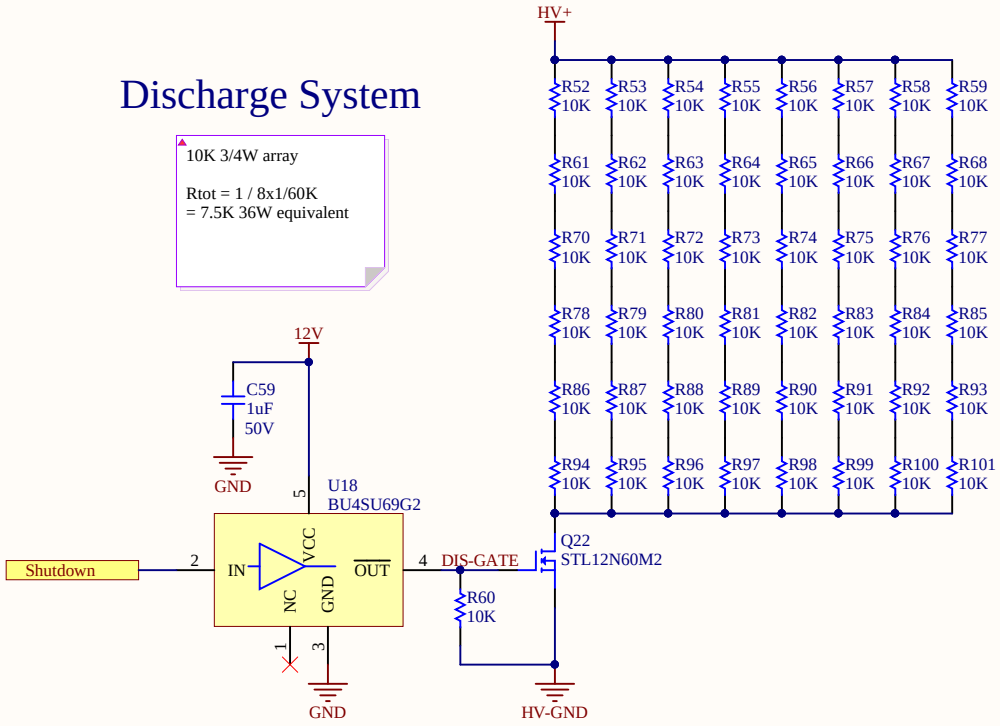


Title	Sensors		
Size	Number		Revision
A4			0
Date:	2021-06-10	Sheet 10 of 14	
File:	C:\Users\..\Sensors.SchDoc	Drawn By:	Jarod Krane

Discharge System

10K 3/4W array

Rtot = 1 / 8x1/60K
= 7.5K 36W equivalent



Title: AIR Control		
Size: A4	Number:	Revision: 0
Date: 2021-06-10		Sheet 11 of 14
File: C:\Users\..\AIRControl.SchDoc		Drawn By: Jarod Krane