PG161-A01

TU116 6GB 12Gbps GDDR6
DVI-D/DP/DP + HDMI + DP

TABLE OF CONTENTS

Page	Description
1	Table of Contents
2	Block Diagram
3	PCI Express
4	MEMORY: GPU FB_AB
5	MEMORY: FBA[31:0]
6	MEMORY: FBA[63:32]
7	MEMORY: FBB[31:0]
8	MEMORY: FBB[63:32]
9	MEMORY: GPU FB_CD
10	MEMORY: FBC[31:0]
11	MEMORY: FBC[63:32]
12	MEMORY: FBD[31:0]
13	MEMORY: FBD[63:32]
14	GPU PWR & GND
15	GPU Decoupling
16	GPU Decoupling2
17	IO: IFPAB DVI-D-DL
18	IO: IFPA DP
19	IO: IFPB DP
20	IO: IFPE & IFPF USBC NC
21	IO: IFPC HDMI
22	IO: IFPD DP
23	IO: NVHS Interface and Frame Lock
24	MISC1: Thermal, JTAG, GPIO,STEREO
25	MISC2: ROM, XTAL,STRAPS
26	PS: 1V8_AON
27	PS: 5V
28	PS: PEXVDD
29	PS: FBVDDQ
30	PS: FBVDDQ PH2
31	PS: NVVDD Controller
32	PS: NVVDD Phase 6,4
33	PS: NVVDD Phase 3,5
34	PS: NVVDD Phase 2,1
35	PS: Input, Filtering, and Monitoring
36	PS: STEERING, UPB & HOT-UNPLUG
37	SEQ: 5V, 1V8, NV3V3 ENABLE
38	SEQ: NV, PEX, FB ENABLE
39	SEQ: MISC
40	FAN
41	PS: Pre-filter
42	MECH

Page	Description

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	Table of Contents

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	1 OF 42
BOM REV	A	DATE	27-NOV-2018

Page2: Block Diagram

DP

HDMI

DP

DP

DVI

CO-LAYOUT

POWER SUPPLY

MEM D LO

MEM D HI

GPU

MEM A HI

MEM A LO

MEM C LO

MEM C HI

MEM B LO

MEM B HI

Power Supply:

- Power Supply NVVDD-PH6
- Power Supply NVVDD-PH5
- Power Supply NVVDD-PH4
- Power Supply NVVDD-PH3
- Power Supply NVVDD-PH2
- Power Supply NVVDD-PH1
- Power Supply FBVDDQ-PH2
- Power Supply FBVDDQ-PH1
- Power Supply 5V
- PEX_VDD
- 1V8
- Fan
- DP_PWR

EXT_12V 2x4 PWR

PEX_12V Finger

3V3 Finger

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	Block Diagram

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	2 OF 42
BOM REV	A	DATE	27-NOV-2018

Page3: PCI Express

NET		VOLTAGE	MAX_CURRENT	MIN_WIDTH
12V	NV_SOURCE_POWER_NET	12V	5.5A	0.406
3V3	NV_SOURCE_POWER_NET	3.3V	3.0A	0.400
GND	NV_SOURCE_POWER_NET	0V	8.5A	0.300

CN1
CON_X16
COMMON
CON_PCIEXP_X16_EDGE

G1
TU116-400-A1
BGA2228
CHANGED
1/22 PCI_EXPRESS

Place under GPU

Place between GPU and PS

3x 10uF and 2x 22uF

END OF X1
END OF X4
END OF X8
END OF X16

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PCI Express

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	3 OF 42
BOM REV	A	DATE	27-NOV-2018

Page4: MEMORY: GPU Partition A/B

G1
TU116-400-A1
BGA2228
CHANGED

compatible

2/22 FBA

FB_DATA
FBA_D<63..0>

0	FBA_D<0>	U51	FBA_D0
1	FBA_D<1>	U48	FBA_D1
2	FBA_D<2>	U50	FBA_D2
3	FBA_D<3>	U49	FBA_D3
4	FBA_D<4>	R51	FBA_D4
5	FBA_D<5>	R50	FBA_D5
6	FBA_D<6>	R47	FBA_D6
7	FBA_D<7>	U46	FBA_D7
8	FBA_D<8>	V46	FBA_D8
9	FBA_D<9>	Y45	FBA_D9
10	FBA_D<10>	Y47	FBA_D10
11	FBA_D<11>	Y46	FBA_D11
12	FBA_D<12>	V50	FBA_D12
13	FBA_D<13>	V47	FBA_D13
14	FBA_D<14>	U52	FBA_D14
15	FBA_D<15>	V51	FBA_D15
16	FBA_D<16>	AJ44	FBA_D16
17	FBA_D<17>	AG48	FBA_D17
18	FBA_D<18>	AJ45	FBA_D18
19	FBA_D<19>	AG49	FBA_D19
20	FBA_D<20>	AF46	FBA_D20
21	FBA_D<21>	AF47	FBA_D21
22	FBA_D<22>	AF48	FBA_D22
23	FBA_D<23>	AD47	FBA_D23
24	FBA_D<24>	AD49	FBA_D24
25	FBA_D<25>	AD48	FBA_D25
26	FBA_D<26>	AC46	FBA_D26
27	FBA_D<27>	AC47	FBA_D27
28	FBA_D<28>	AA47	FBA_D28
29	FBA_D<29>	AA46	FBA_D29
30	FBA_D<30>	AA45	FBA_D30
31	FBA_D<31>	Y44	FBA_D31
32	FBA_D<32>	AW51	FBA_D32
33	FBA_D<33>	BA52	FBA_D33
34	FBA_D<34>	AW50	FBA_D34
35	FBA_D<35>	BA51	FBA_D35
36	FBA_D<36>	BA50	FBA_D36
37	FBA_D<37>	BB50	FBA_D37
38	FBA_D<38>	BA49	FBA_D38
39	FBA_D<39>	AW49	FBA_D39
40	FBA_D<40>	AV48	FBA_D40
41	FBA_D<41>	AT48	FBA_D41
42	FBA_D<42>	AT47	FBA_D42
43	FBA_D<43>	AT48	FBA_D43
44	FBA_D<44>	AT46	FBA_D44
45	FBA_D<45>	AV51	FBA_D45
46	FBA_D<46>	AV52	FBA_D46
47	FBA_D<47>	AV49	FBA_D47
48	FBA_D<48>	AJ48	FBA_D48
49	FBA_D<49>	AJ46	FBA_D49
50	FBA_D<50>	AJ47	FBA_D50
51	FBA_D<51>	AK49	FBA_D51
52	FBA_D<52>	AM47	FBA_D52
53	FBA_D<53>	AM46	FBA_D53
54	FBA_D<54>	AN48	FBA_D54
55	FBA_D<55>	AN49	FBA_D55
56	FBA_D<56>	AM44	FBA_D56
57	FBA_D<57>	AM45	FBA_D57
58	FBA_D<58>	AN45	FBA_D58
59	FBA_D<59>	AN46	FBA_D59
60	FBA_D<60>	AR48	FBA_D60
61	FBA_D<61>	AN47	FBA_D61
62	FBA_D<62>	AR47	FBA_D62
63	FBA_D<63>	AR46	FBA_D63

FB_DBI
FBA_DBI<7..0>

0	FBA_DBI<0>	U47	FBA_DQM0
1	FBA_DBI<1>	Y48	FBA_DQM1
2	FBA_DBI<2>	AG47	FBA_DQM2
3	FBA_DBI<3>	AC48	FBA_DQM3
4	FBA_DBI<4>	BB51	FBA_DQM4
5	FBA_DBI<5>	AV50	FBA_DQM5
6	FBA_DBI<6>	AM48	FBA_DQM6
7	FBA_DBI<7>	AR49	FBA_DQM7

FB_EDC
FBA_EDC<7..0>

0	FBA_EDC<0>	R48	FBA_DQS_WP0
1	FBA_EDC<1>	V48	FBA_DQS_WP1
2	FBA_EDC<2>	AF44	FBA_DQS_WP2
3	FBA_EDC<3>	AA48	FBA_DQS_WP3
4	FBA_EDC<4>	BB52	FBA_DQS_WP4
5	FBA_EDC<5>	AT50	FBA_DQS_WP5
6	FBA_EDC<6>	AK48	FBA_DQS_WP6
7	FBA_EDC<7>	AR51	FBA_DQS_WP7

W45	GND	
W47	GND	
W49	GND	
W51	GND	
W6	GND	
W8	GND	
Y14	GND	
Y15	GND	

GND

AF42 FB_REFPLL_AVDD0
L29 FB_REFPLL_AVDD1

1V8_FB_PLL → C923 1uF 6.3V 20% X5R 0201 COMMON; C788 1uF 6.3V 20% X5R 0201 COMMON → GND

1V8_AON → LB501 30ohm COMMON BEAD_0603 → 1V8_FB_PLL → C1001 4.7uF 6.3V 20% X6S 0603 COMMON; C1009 4.7uF 6.3V 20% X6S 0603 COMMON; C983 22uF 6.3V 20% X5R 0603W COMMON → GND

FB_CMD
FBA_CMD<33..0>

Y51	FBA_CMD<0>	0	FBA_CMD0
Y52	FBA_CMD<1>	1	FBA_CMD1
Y49	FBA_CMD<2>	2	FBA_CMD2
AA52	FBA_CMD<3>	3	FBA_CMD3
AA51	FBA_CMD<4>	4	FBA_CMD4
AA50	FBA_CMD<5>	5	FBA_CMD5
AC50	FBA_CMD<6>	6	FBA_CMD6
AC51	FBA_CMD<7>	7	FBA_CMD7
AC52	FBA_CMD<8>	8	FBA_CMD8
AC49	FBA_CMD<9>	9	FBA_CMD9
AD52	FBA_CMD<10>	10	FBA_CMD10
AD51	FBA_CMD<11>	11	FBA_CMD11
AD50	FBA_CMD<12>	12	FBA_CMD12
AF50	FBA_CMD<13>	13	FBA_CMD13
AF51	FBA_CMD<14>	14	FBA_CMD14
AF52	FBA_CMD<15>	15	FBA_CMD15
AN50	FBA_CMD<16>	16	FBA_CMD16
AN51	FBA_CMD<17>	17	FBA_CMD17
AN52	FBA_CMD<18>	18	FBA_CMD18
AM49	FBA_CMD<19>	19	FBA_CMD19
AM52	FBA_CMD<20>	20	FBA_CMD20
AM51	FBA_CMD<21>	21	FBA_CMD21
AM50	FBA_CMD<22>	22	FBA_CMD22
AK50	FBA_CMD<23>	23	FBA_CMD23
AK51	FBA_CMD<24>	24	FBA_CMD24
AK52	FBA_CMD<25>	25	FBA_CMD25
AJ49	FBA_CMD<26>	26	FBA_CMD26
AJ52	FBA_CMD<27>	27	FBA_CMD27
AJ51	FBA_CMD<28>	28	FBA_CMD28
AJ50	FBA_CMD<29>	29	FBA_CMD29
AG50	FBA_CMD<30>	30	FBA_CMD30
AG51	FBA_CMD<31>	31	FBA_CMD31
AF49	FBA_CMD<32>	32	FBA_CMD32
AG52	FBA_CMD<33>	33	FBA_CMD33
Y50	SNN_FBA_DEBUG0		
AR50	SNN_FBA_DEBUG1		

FBA_DBG_RFU1 ← AA44 SNN_FBA_DBG_RFU1
FBA_DBG_RFU2 ← AW44 SNN_FBA_DBG_RFU2

FBA_CLK0	AG45	FBA_CLK0	FB_CLK	OUT	5.3F<
FBA_CLK0	AG46	FBA_CLK0*	FB_CLK	OUT	5.3F<
FBA_CLK1	AK46	FBA_CLK1	FB_CLK	OUT	6.3F<
FBA_CLK1	AK45	FBA_CLK1*	FB_CLK	OUT	6.3F<

FBA_WCK01	U45	FBA_WCK01	FBA_WCK01	FB_WCK	OUT 5.2C<
FBA_WCK01	U44	FBA_WCK01*	FBA_WCK01	FB_WCK	OUT 5.2C<
FBA_WCKB01	V45	FBA_WCKB01	FBA_WCKB01	FB_WCK	OUT 5.3C<
FBA_WCKB01	V44	FBA_WCKB01*	FBA_WCKB01	FB_WCK	OUT 5.3C<
FBA_WCK23	AC45	FBA_WCK23	FBA_WCK23	FB_WCK	OUT 5.3D<
FBA_WCK23	AC44	FBA_WCK23*	FBA_WCK23	FB_WCK	OUT 5.3D<
FBA_WCKB23	AD45	FBA_WCKB23	FBA_WCKB23	FB_WCK	OUT 5.2D<
FBA_WCKB23	AD45	FBA_WCKB23*	FBA_WCKB23	FB_WCK	OUT 5.2D<
FBA_WCK45	AV47	FBA_WCK45	FBA_WCK45	FB_WCK	OUT 6.2C<
FBA_WCK45	AV46	FBA_WCK45*	FBA_WCK45	FB_WCK	OUT 6.2C<
FBA_WCKB45	AW48	FBA_WCKB45	FBA_WCKB45	FB_WCK	OUT 6.3C<
FBA_WCKB45	AW47	FBA_WCKB45*	FBA_WCKB45	FB_WCK	OUT 6.3C<
FBA_WCK67	AR45	FBA_WCK67	FBA_WCK67	FB_WCK	OUT 6.3D<
FBA_WCK67	AR44	FBA_WCK67*	FBA_WCK67	FB_WCK	OUT 6.3D<
FBA_WCKB67	AT45	FBA_WCKB67	FBA_WCKB67	FB_WCK	OUT 6.2D<
FBA_WCKB67	AT44	FBA_WCKB67*	FBA_WCKB67	FB_WCK	OUT 6.2D<

FBA_PLL_AVDD ← AN42 1V8_FB_PLL (IN 4.4A< 4.4H< 4.5C> 9.4D< 9.4H<)

C852 1uF 6.3V 20% X5R 0201 COMMON → GND

FBVDDQ → R518 10K 5% 0402 COMMON; R532 10K 5% 0402 COMMON → FBA_CMD<10> / FBA_CMD<26>
FBVDDQ → R293 10K 5% 0402 COMMON; R295 10K 5% 0402 COMMON → FBA_CMD<2> / FBA_CMD<18>
→ GND

GDDR6 CMD Mapping

	x16 Mode Lower 0..31 DRAM1 CHA-Byte 0,1	x16 Mode Upper 32..63 DRAM2 CHA-Byte 4,5
CA0_A	CMD0	CMD20
CA1_A	CMD9	CMD28
CA2_A	CMD8	CMD21
CA3_A	CMD32	CMD29
CA4_A	CMD7	CMD23
CA5_A	CMD11	CMD27
CA6_A	CMD15	CMD30
CA7_A	CMD14	CMD31
CA8_A	CMD3	CMD19
CA9_A	CMD1	CMD17
CABI_A	CMD6	CMD22
CKE_A	CMD10	CMD26
	CHB-Byte 2,3	CHB-Byte 6,7
CA0_B	CMD4	CMD16
CA1_B	CMD12	CMD25
CA2_B	CMD5	CMD24
CA3_B	CMD13	CMD33
CA4_B	CMD7	CMD23
CA5_B	CMD11	CMD27
CA6_B	CMD15	CMD30
CA7_B	CMD14	CMD31
CA8_B	CMD3	CMD19
CA9_B	CMD1	CMD17
CABI_B	CMD6	CMD22
CKE_B	CMD10	CMD26
RESET*	CMD2	CMD18

G1
TU116-400-A1
BGA2228
CHANGED

3/22 FBB

FB_DATA
FBB_D<63..0>

0	FBB_D<0>	H32	FBB_D0
1	FBB_D<1>	D32	FBB_D1
2	FBB_D<2>	A33	FBB_D2
3	FBB_D<3>	B32	FBB_D3
4	FBB_D<4>	E32	FBB_D4
5	FBB_D<5>	G32	FBB_D5
6	FBB_D<6>	J30	FBB_D6
7	FBB_D<7>	F32	FBB_D7
8	FBB_D<8>	H30	FBB_D8
9	FBB_D<9>	G35	FBB_D9
10	FBB_D<10>	J36	FBB_D10
11	FBB_D<11>	F36	FBB_D11
12	FBB_D<12>	F33	FBB_D12
13	FBB_D<13>	D33	FBB_D13
14	FBB_D<14>	J33	FBB_D14
15	FBB_D<15>	D33	FBB_D15
16	FBB_D<16>	E45	FBB_D16
17	FBB_D<17>	D45	FBB_D17
18	FBB_D<18>	F45	FBB_D18
19	FBB_D<19>	G45	FBB_D19
20	FBB_D<20>	D42	FBB_D20
21	FBB_D<21>	E42	FBB_D21
22	FBB_D<22>	F42	FBB_D22
23	FBB_D<23>	H41	FBB_D23
24	FBB_D<24>	E41	FBB_D24
25	FBB_D<25>	F38	FBB_D25
26	FBB_D<26>	E39	FBB_D26
27	FBB_D<27>	D39	FBB_D27
28	FBB_D<28>	F38	FBB_D28
29	FBB_D<29>	E38	FBB_D29
30	FBB_D<30>	D36	FBB_D30
31	FBB_D<31>	E36	FBB_D31
32	FBB_D<32>	M50	FBB_D32
33	FBB_D<33>	P46	FBB_D33
34	FBB_D<34>	M51	FBB_D34
35	FBB_D<35>	M49	FBB_D35
36	FBB_D<36>	P47	FBB_D36
37	FBB_D<37>	P52	FBB_D37
38	FBB_D<38>	R46	FBB_D38
39	FBB_D<39>	P46	FBB_D39
40	FBB_D<40>	L50	FBB_D40
41	FBB_D<41>	L51	FBB_D41
42	FBB_D<42>	L52	FBB_D42
43	FBB_D<43>	L49	FBB_D43
44	FBB_D<44>	M46	FBB_D44
45	FBB_D<45>	L47	FBB_D45
46	FBB_D<46>	M48	FBB_D46
47	FBB_D<47>	M47	FBB_D47
48	FBB_D<48>	D48	FBB_D48
49	FBB_D<49>	C50	FBB_D49
50	FBB_D<50>	C48	FBB_D50
51	FBB_D<51>	C46	FBB_D51
52	FBB_D<52>	E48	FBB_D52
53	FBB_D<53>	E50	FBB_D53
54	FBB_D<54>	F48	FBB_D54
55	FBB_D<55>	F46	FBB_D55
56	FBB_D<56>	F50	FBB_D56
57	FBB_D<57>	D52	FBB_D57
58	FBB_D<58>	J50	FBB_D58
59	FBB_D<59>	H48	FBB_D59
60	FBB_D<60>	H51	FBB_D60
61	FBB_D<61>	J51	FBB_D61
62	FBB_D<62>	H49	FBB_D62
63	FBB_D<63>	H52	FBB_D63

FB_DBI
FBB_DBI<7..0>

0	FBB_DBI<0>	C32	FBB_DQM0
1	FBB_DBI<1>	E33	FBB_DQM1
2	FBB_DBI<2>	E46	FBB_DQM2
3	FBB_DBI<3>	G39	FBB_DQM3
4	FBB_DBI<4>	P49	FBB_DQM4
5	FBB_DBI<5>	L48	FBB_DQM5
6	FBB_DBI<6>	D50	FBB_DQM6
7	FBB_DBI<7>	H50	FBB_DQM7

FB_EDC
FBB_EDC<7..0>

0	FBB_EDC<0>	B33	FBB_DQS_WP0
1	FBB_EDC<1>	E35	FBB_DQS_WP1
2	FBB_EDC<2>	G44	FBB_DQS_WP2
3	FBB_EDC<3>	H38	FBB_DQS_WP3
4	FBB_EDC<4>	P50	FBB_DQS_WP4
5	FBB_EDC<5>	J48	FBB_DQS_WP5
6	FBB_EDC<6>	D51	FBB_DQS_WP6
7	FBB_EDC<7>	P51	FBB_DQS_WP7

Y16	GND	
Y17	GND	
Y18	GND	
Y19	GND	
Y20	GND	
Y21	GND	
Y22	GND	
Y23	GND	

GND

FB_CMD
FBB_CMD<33..0>

B35	FBB_CMD<0>	0	FBB_CMD0
A35	FBB_CMD<1>	1	FBB_CMD1
D35	FBB_CMD<2>	2	FBB_CMD2
A36	FBB_CMD<3>	3	FBB_CMD3
B36	FBB_CMD<4>	4	FBB_CMD4
C36	FBB_CMD<5>	5	FBB_CMD5
C38	FBB_CMD<6>	6	FBB_CMD6
B38	FBB_CMD<7>	7	FBB_CMD7
A38	FBB_CMD<8>	8	FBB_CMD8
D38	FBB_CMD<9>	9	FBB_CMD9
A39	FBB_CMD<10>	10	FBB_CMD10
B39	FBB_CMD<11>	11	FBB_CMD11
C39	FBB_CMD<12>	12	FBB_CMD12
C41	FBB_CMD<13>	13	FBB_CMD13
B41	FBB_CMD<14>	14	FBB_CMD14
A41	FBB_CMD<15>	15	FBB_CMD15
B49	FBB_CMD<16>	16	FBB_CMD16
A49	FBB_CMD<17>	17	FBB_CMD17
A48	FBB_CMD<18>	18	FBB_CMD18
D47	FBB_CMD<19>	19	FBB_CMD19
A47	FBB_CMD<20>	20	FBB_CMD20
B47	FBB_CMD<21>	21	FBB_CMD21
C47	FBB_CMD<22>	22	FBB_CMD22
C45	FBB_CMD<23>	23	FBB_CMD23
B45	FBB_CMD<24>	24	FBB_CMD24
A45	FBB_CMD<25>	25	FBB_CMD25
D44	FBB_CMD<26>	26	FBB_CMD26
A44	FBB_CMD<27>	27	FBB_CMD27
B44	FBB_CMD<28>	28	FBB_CMD28
C44	FBB_CMD<29>	29	FBB_CMD29
C42	FBB_CMD<30>	30	FBB_CMD30
B42	FBB_CMD<31>	31	FBB_CMD31
D41	FBB_CMD<32>	32	FBB_CMD32
A42	FBB_CMD<33>	33	FBB_CMD33
C35	SNN_FBB_DEBUG0		
B50	SNN_FBB_DEBUG1		

FBB_DBG_RFU1 ← J35 SNN_FBB_DBG_RFU1
FBB_DBG_RFU2 ← J41 SNN_FBB_DBG_RFU2

FBB_CLK0	H42	FBB_CLK0	FB_CLK	OUT	7.3F<
FBB_CLK0	G42	FBB_CLK0*	FB_CLK	OUT	7.3F<
FBB_CLK1	F47	FBB_CLK1	FB_CLK	OUT	8.3F<
FBB_CLK1	E47	FBB_CLK1*	FB_CLK	OUT	8.3F<

FBB_WCK01	J33	FBB_WCK01	FBB_WCK01	FB_WCK	OUT 7.2C<
FBB_WCK01	H33	FBB_WCK01*	FBB_WCK01	FB_WCK	OUT 7.2C<
FBB_WCKB01	G35	FBB_WCKB01	FBB_WCKB01	FB_WCK	OUT 7.3C<
FBB_WCKB01	H35	FBB_WCKB01*	FBB_WCKB01	FB_WCK	OUT 7.3C<
FBB_WCK23	J39	FBB_WCK23	FBB_WCK23	FB_WCK	OUT 7.3D<
FBB_WCK23	H39	FBB_WCK23*	FBB_WCK23	FB_WCK	OUT 7.3D<
FBB_WCKB23	F41	FBB_WCKB23	FBB_WCKB23	FB_WCK	OUT 7.2D<
FBB_WCKB23	G41	FBB_WCKB23*	FBB_WCKB23	FB_WCK	OUT 7.2D<
FBB_WCK45	L46	FBB_WCK45	FBB_WCK45	FB_WCK	OUT 8.2C<
FBB_WCK45	L45	FBB_WCK45*	FBB_WCK45	FB_WCK	OUT 8.2C<
FBB_WCKB45	M44	FBB_WCKB45	FBB_WCKB45	FB_WCK	OUT 8.3C<
FBB_WCKB45	M45	FBB_WCKB45*	FBB_WCKB45	FB_WCK	OUT 8.3C<
FBB_WCK67	H47	FBB_WCK67	FBB_WCK67	FB_WCK	OUT 8.3E<
FBB_WCK67	H46	FBB_WCK67*	FBB_WCK67	FB_WCK	OUT 8.3E<
FBB_WCKB67	J47	FBB_WCKB67	FBB_WCKB67	FB_WCK	OUT 8.3E<
FBB_WCKB67	J46	FBB_WCKB67*	FBB_WCKB67	FB_WCK	OUT 8.3E<

FBB_PLL_AVDD ← L38 1V8_FB_PLL (IN 4.4A< 4.4D< 4.5C> 9.4D< 9.4H<)

C779 1uF 6.3V 20% X5R 0201 COMMON → GND

FBVDDQ → R513 10K 5% 0402 COMMON; R502 10K 5% 0402 COMMON → FBB_CMD<10> / FBB_CMD<26>
FBVDDQ → R309 10K 5% 0402 COMMON; R310 10K 5% 0402 COMMON → FBB_CMD<2> / FBB_CMD<18>
→ GND

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: GPU FB_AB

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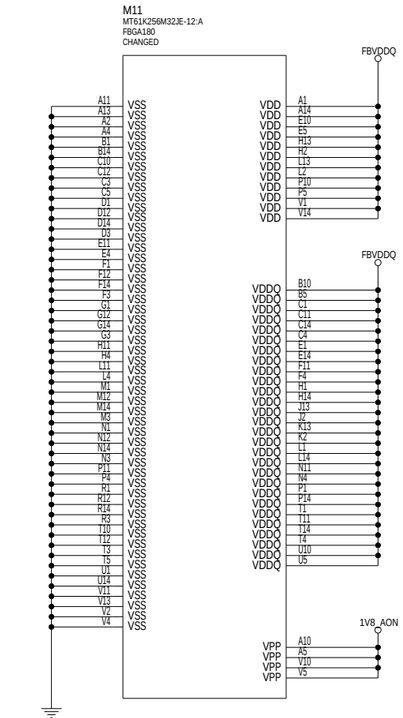
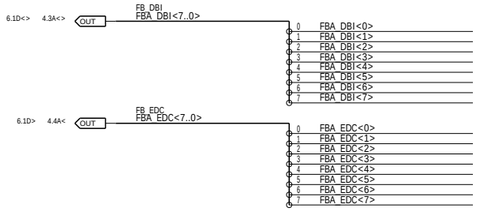
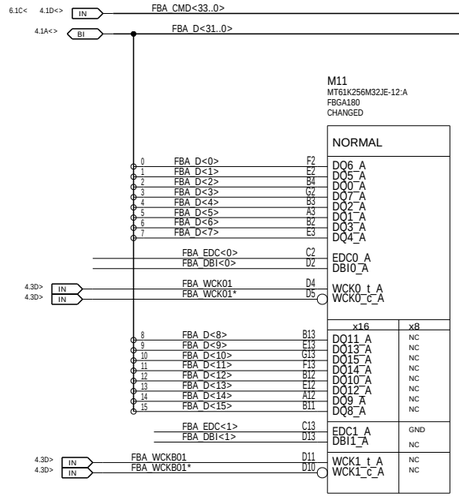
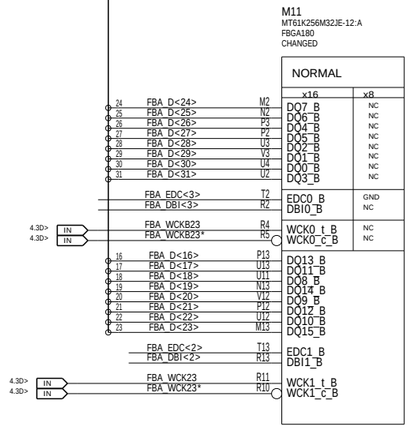
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	4 OF 42
BOM REV	A	DATE	27-NOV-2018

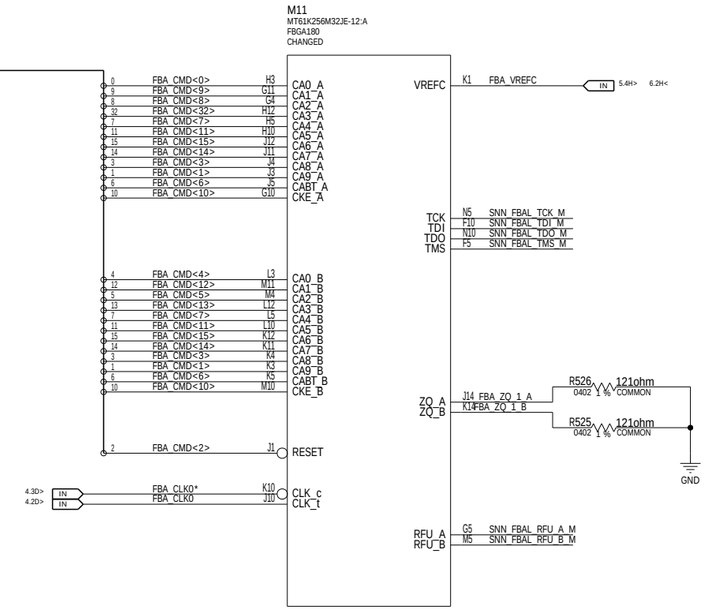
Page5: MEMORY: FBA Partition 31..0

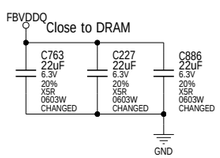


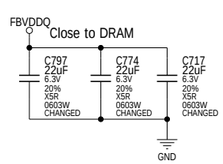


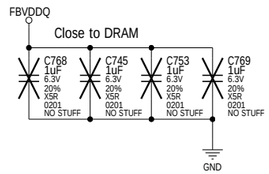


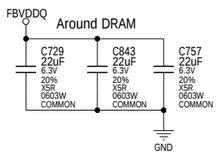


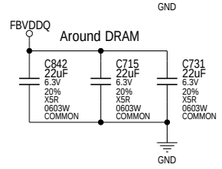


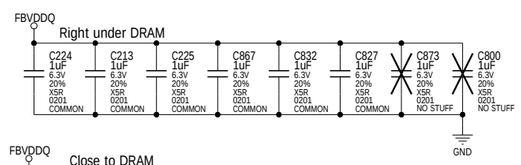


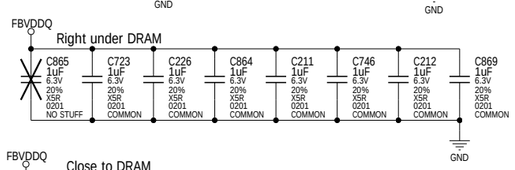


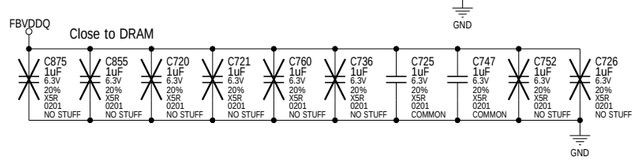


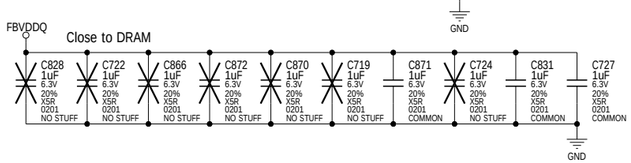




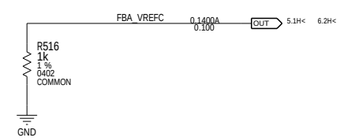


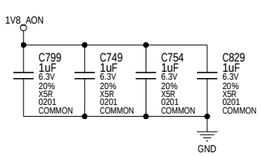






VREFC IS NOT USED IN x16 CONFIGURATION
1K OHM PULL-DOWN IS IN PLACE OF THE 1.33K FOR R106





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PAGE DETAIL	MEMORY: FBA[31:0]

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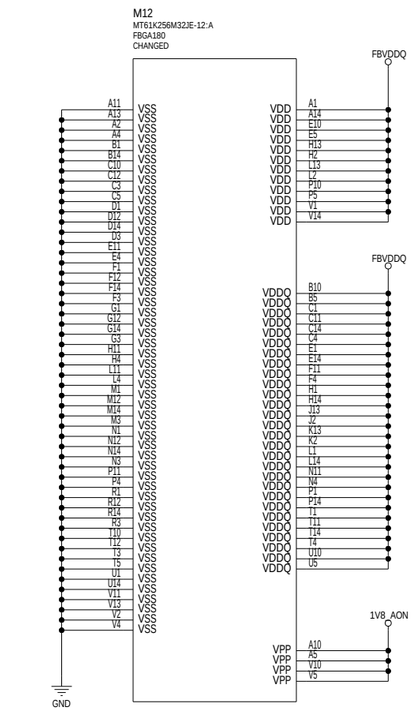
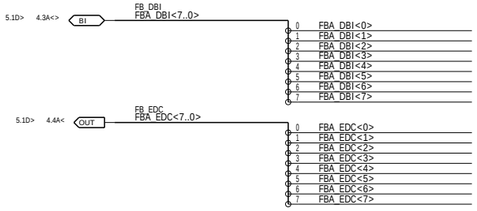
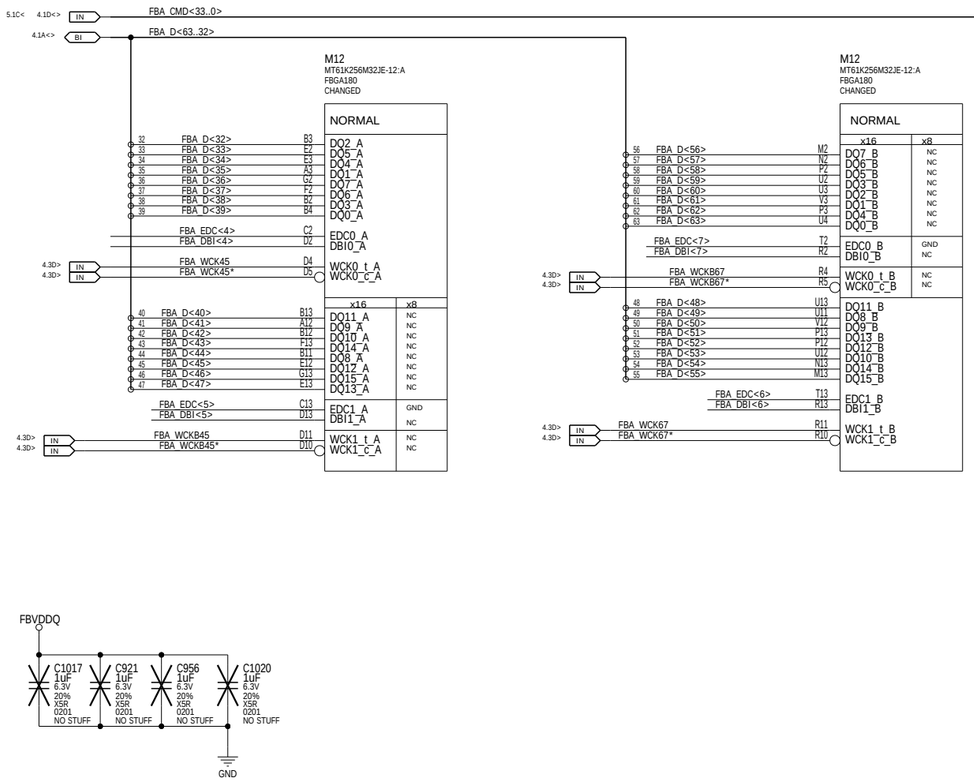
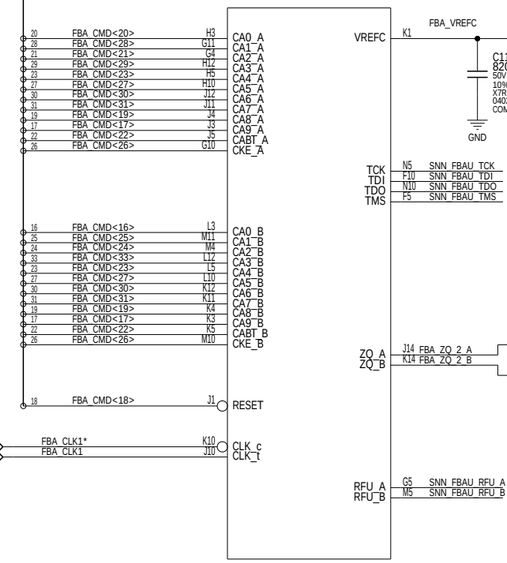
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	5 OF 42
BOM REV	A	DATE	27-NOV-2018

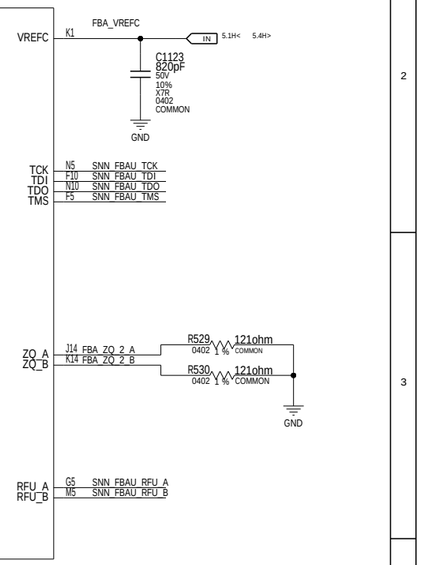
Page6: MEMORY: FBA Partition 63..32

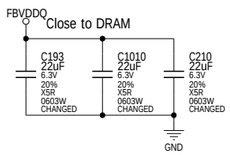


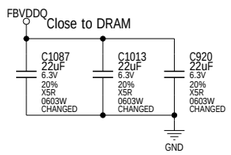


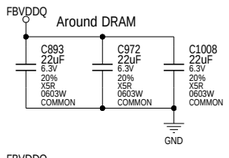


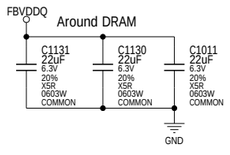


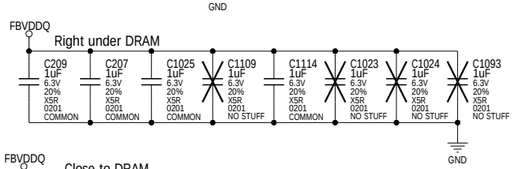


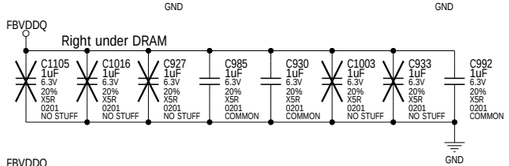


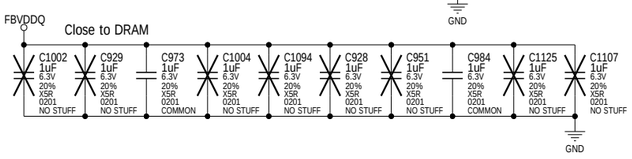


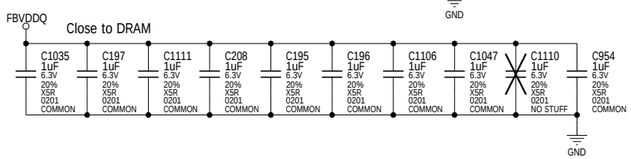


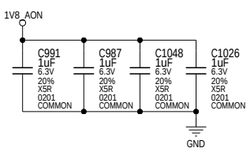












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PAGE DETAIL	MEMORY: FBA[63:32]

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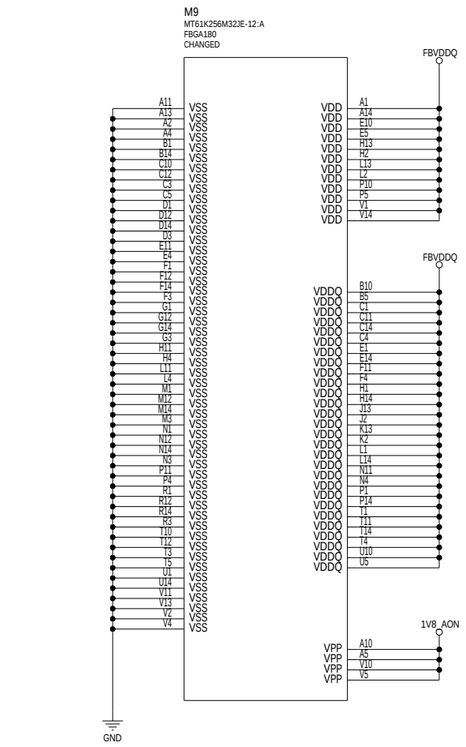
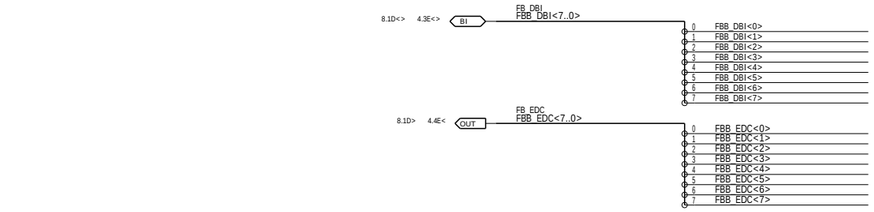
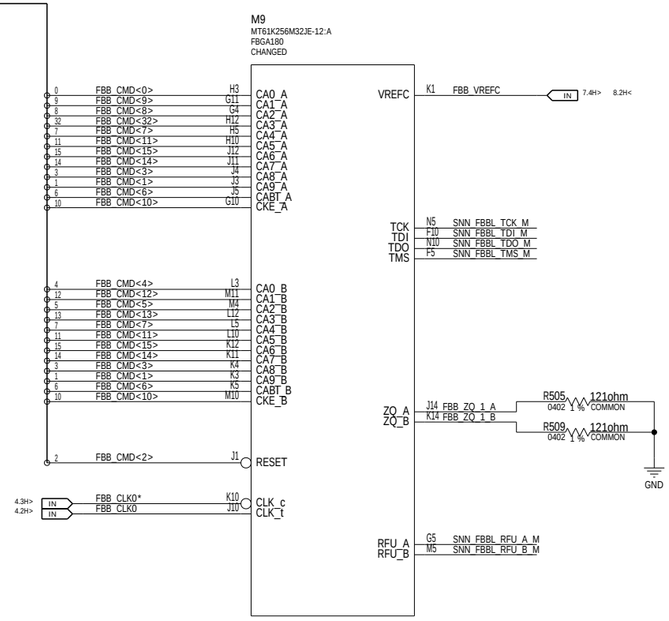
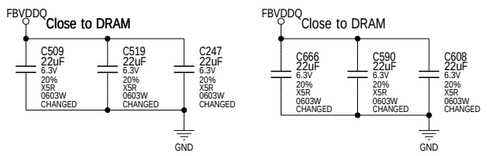
PCB REV	PG161-A01	PAGE	6 OF 42
BOM REV	A	DATE	27-NOV-2018

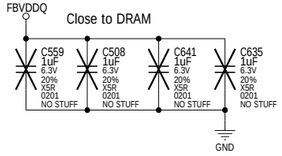
Page7: MEMORY: FBB Partition 31..0

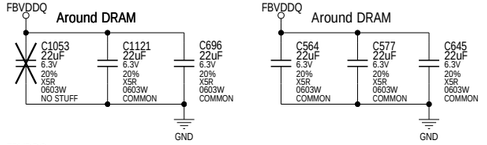


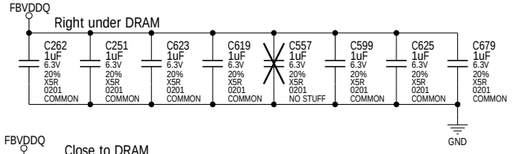


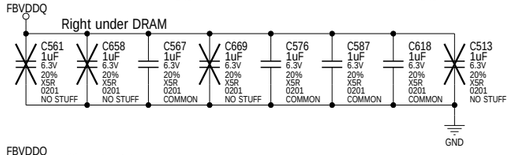


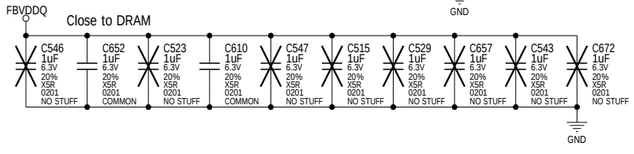


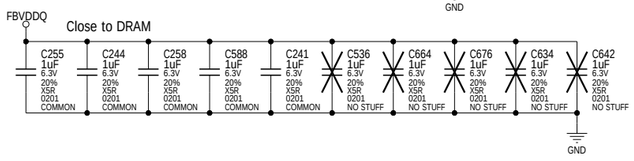




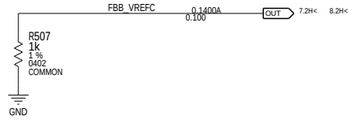


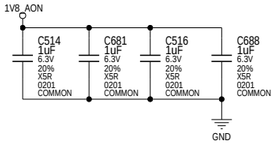






VREFC IS NOT USED IN x16 CONFIGURATION
1K OHM PULL-DOWN IS IN PLACE OF THE 1.33K FOR R104





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: FBB[31:0]

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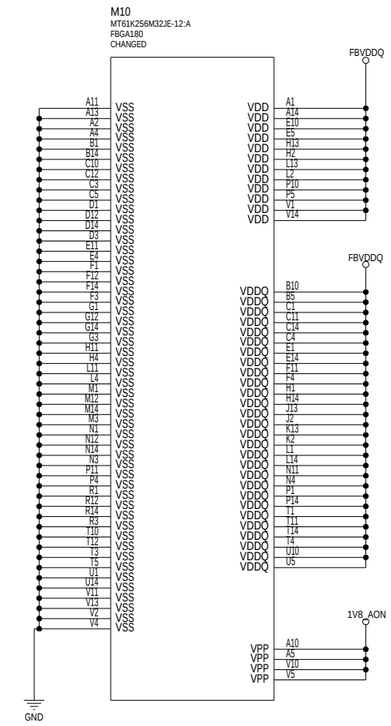
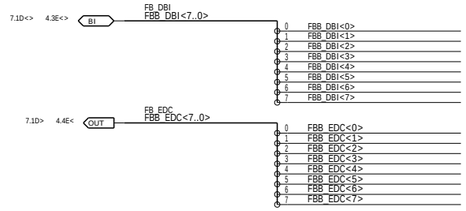
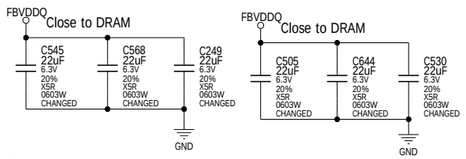
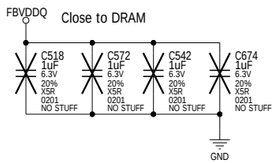
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	7 OF 42
BOM REV	A	DATE	27-NOV-2018

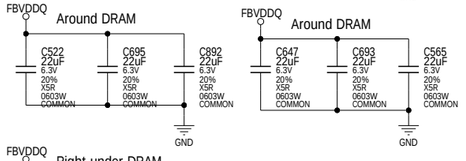
Page8: MEMORY: FBB Partition 63..32

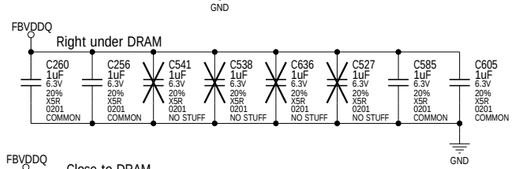


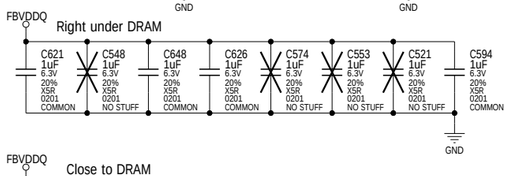


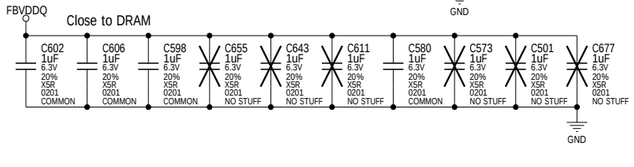


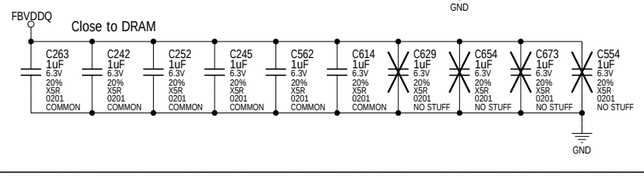


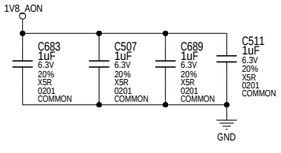












ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: FBB[63:32]

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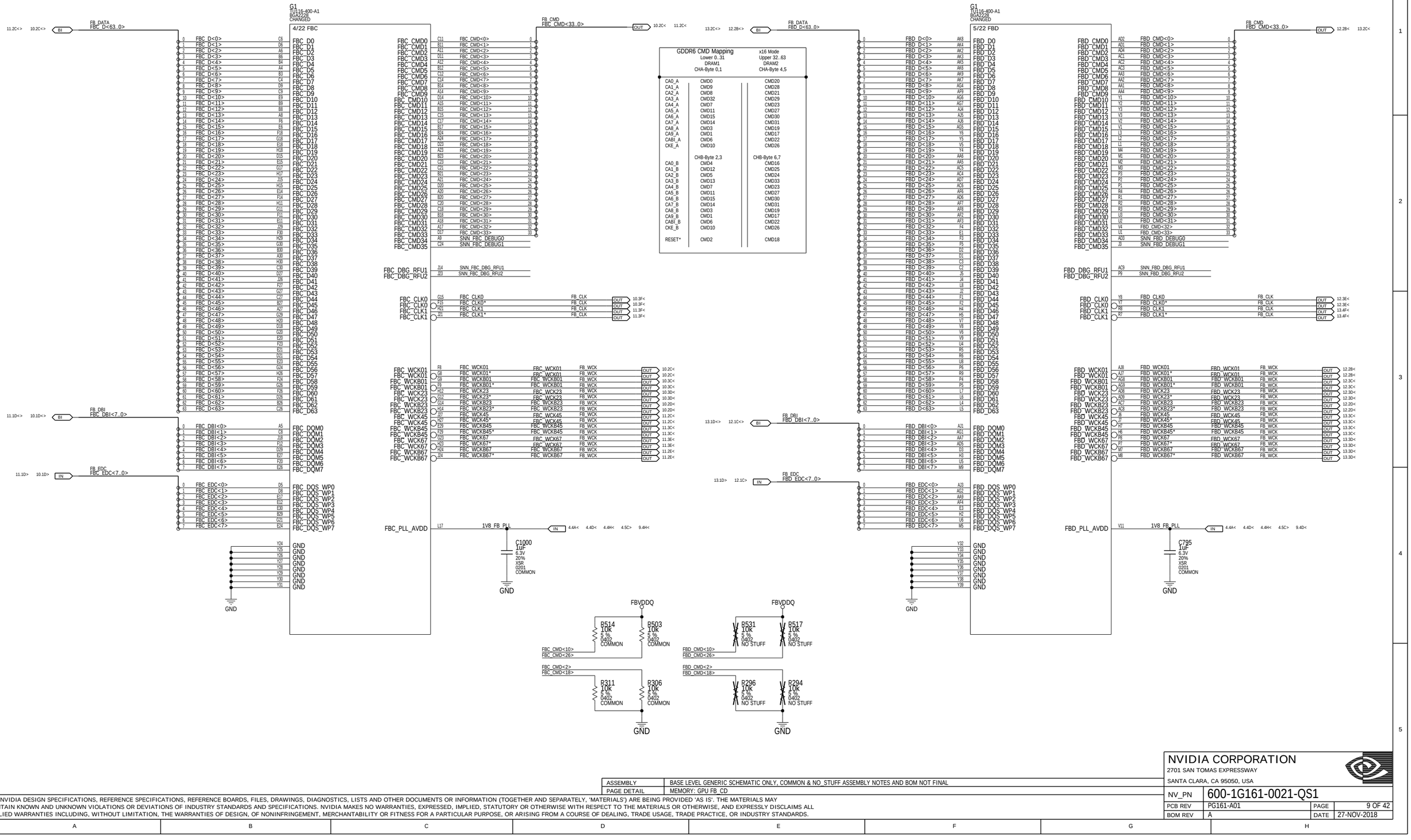
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	8 OF 42
BOM REV	A	DATE	27-NOV-2018

Page9: MEMORY: GPU Partition C/D



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: GPU FB_CD

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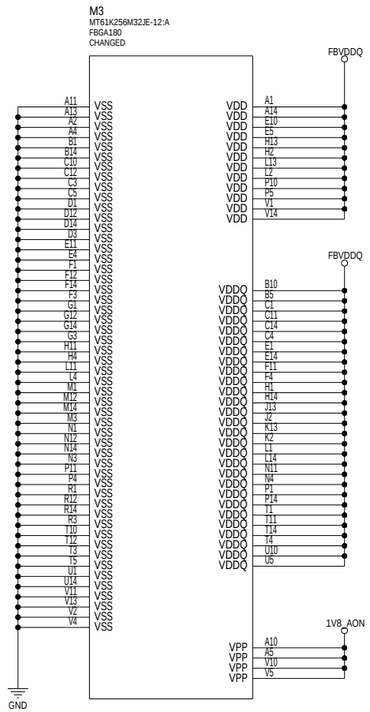
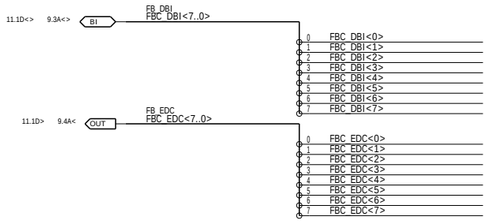
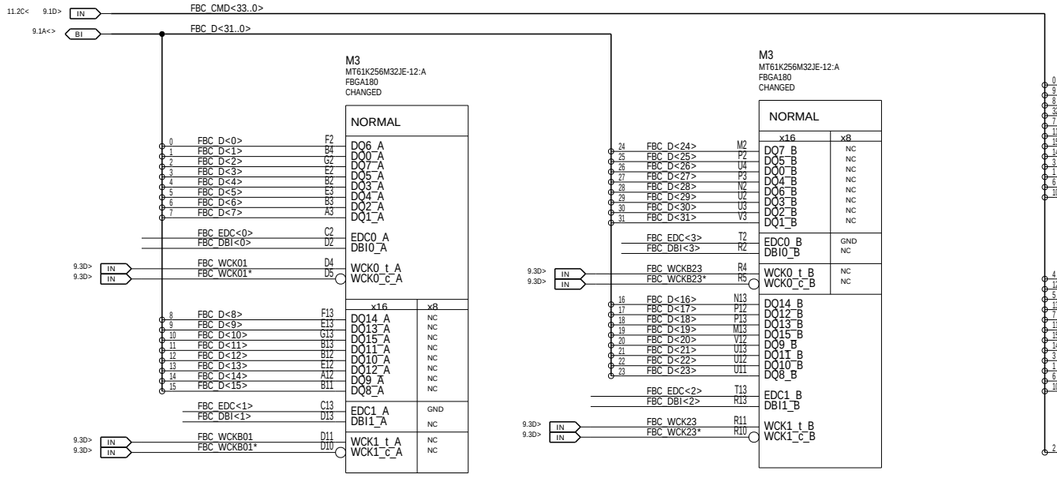
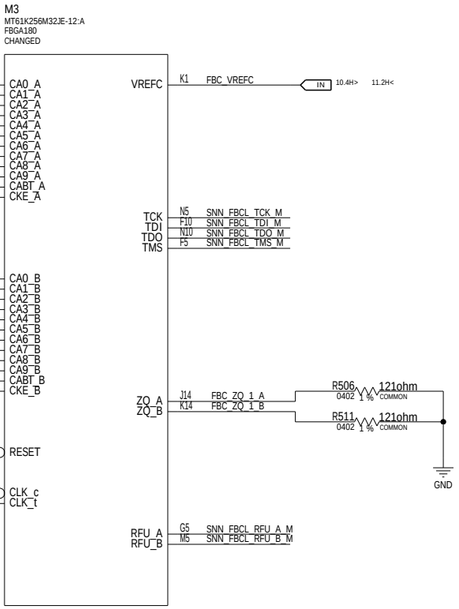
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	9 OF 42
BOM REV	A	DATE	27-NOV-2018

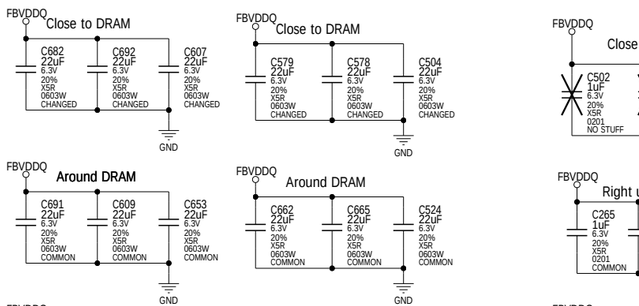
Page10: MEMORY: FBC Partition 31..0

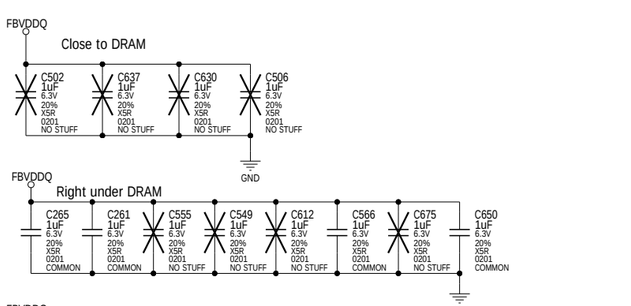


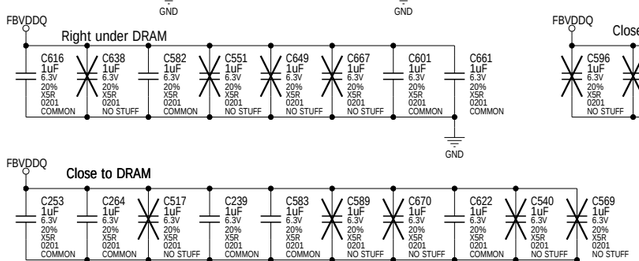


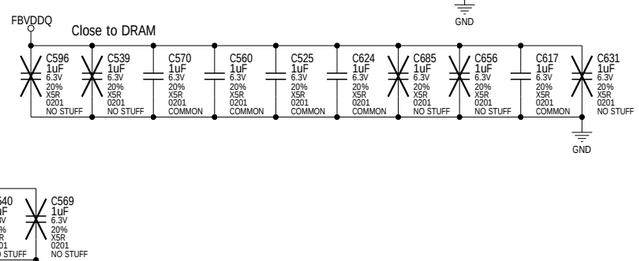




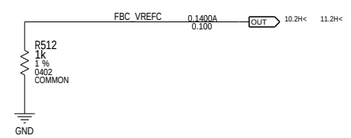


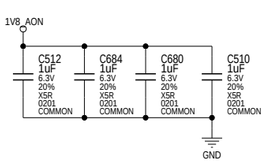






VREFC IS NOT USED IN x16 CONFIGURATION
1K OHM PULL-DOWN IS IN PLACE OF THE 1.33K FOR R75





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: FBC[31:0]

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	10 OF 42
BOM REV	A	DATE	27-NOV-2018

Page11: MEMORY: FBC Partition 63..32

M4
MT61K256M32JE-12:A
FBGA180
CHANGED

FBVDDQ

VSS: A11, A13, A2, A4, B1, B14, C10, C12, C3, C5, D1, D12, D14, D3, E11, E4, F1, F12, F14, F3, G1, G12, G14, G3, H11, H4, L11, L4, M1, M12, M14, M3, N1, N12, N14, N3, P11, P4, R1, R12, R14, R3, T10, T12, T3, T5, U1, U14, V11, V13, V2, V4

VDD: A1, A14, E10, E5, H13, H2, L13, L2, P10, P5, V1, V14

FBVDDQ

VDDQ: B10, B5, C1, C11, C14, C4, E1, E14, F11, F4, H1, H14, J13, J2, K13, K2, L1, L14, N11, N4, P1, P14, T1, T11, T14, T4, U10, U5

1V8_AON

VPP: A10, A5, V10, V5

GND

10.1D<> 9.3A<> BI FB_DBI
FBC_DBI<7..0>
0 FBC_DBI<0>
1 FBC_DBI<1>
2 FBC_DBI<2>
3 FBC_DBI<3>
4 FBC_DBI<4>
5 FBC_DBI<5>
6 FBC_DBI<6>
7 FBC_DBI<7>

10.1D> 9.4A< OUT FB_EDC
FBC_EDC<7..0>
0 FBC_EDC<0>
1 FBC_EDC<1>
2 FBC_EDC<2>
3 FBC_EDC<3>
4 FBC_EDC<4>
5 FBC_EDC<5>
6 FBC_EDC<6>
7 FBC_EDC<7>

10.2C< 9.1D> IN FBC_CMD<33..0>

9.1A<> BI FBC_D<63..32>

M4
MT61K256M32JE-12:A
FBGA180
CHANGED

NORMAL

32 FBC_D<32>	B4	DQ0_A
33 FBC_D<33>	B3	DQ7_A
34 FBC_D<34>	A3	DQ1_A
35 FBC_D<35>	F2	DQ6_A
36 FBC_D<36>	E3	DQ4_A
37 FBC_D<37>	B2	DQ3_A
38 FBC_D<38>	G2	DQ7_A
39 FBC_D<39>	E2	DQ5_A
FBC_EDC<4>	C2	EDC0_A
FBC_DBI<4>	D2	DBI0_A
9.3D> IN FBC_WCK45	D4	WCK0_t_A
9.3D> IN FBC_WCK45*	D5	WCK0_c_A

x16		x8
40 FBC_D<40>	B12	DQ10_A
41 FBC_D<41>	F13	DQ14_A
42 FBC_D<42>	E13	DQ13_A
43 FBC_D<43>	A12	DQ9_A
44 FBC_D<44>	E12	DQ12_A
45 FBC_D<45>	B13	DQ11_A
46 FBC_D<46>	B11	DQ8_A
47 FBC_D<47>	G13	DQ15_A
FBC_EDC<5>	C13	EDC1_A
FBC_DBI<5>	D13	DBI1_A
9.3D> IN FBC_WCKB45	D11	WCK1_t_A
9.3D> IN FBC_WCKB45*	D10	WCK1_c_A

M4
MT61K256M32JE-12:A
FBGA180
CHANGED

NORMAL

x16		x8
56 FBC_D<56>	U3	DQ2_B
57 FBC_D<57>	M2	DQ7_B
58 FBC_D<58>	U4	DQ0_B
59 FBC_D<59>	P3	DQ4_B
60 FBC_D<60>	P2	DQ5_B
61 FBC_D<61>	V3	DQ1_B
62 FBC_D<62>	N2	DQ6_B
63 FBC_D<63>	U2	DQ3_B
FBC_EDC<7>	T2	EDC0_B
FBC_DBI<7>	R2	DBI0_B
9.3D> IN FBC_WCKB67	R4	WCK0_t_B
9.3D> IN FBC_WCKB67*	R5	WCK0_c_B

x16		x8
48 FBC_D<48>	V12	DQ9_B
49 FBC_D<49>	U11	DQ8_B
50 FBC_D<50>	U13	DQ11_B
51 FBC_D<51>	U12	DQ10_B
52 FBC_D<52>	P13	DQ13_B
53 FBC_D<53>	P12	DQ12_B
54 FBC_D<54>	M13	DQ15_B
55 FBC_D<55>	N13	DQ14_B
FBC_EDC<6>	T13	EDC1_B
FBC_DBI<6>	R13	DBI1_B
9.3D> IN FBC_WCK67	R11	WCK1_t_B
9.3D> IN FBC_WCK67*	R10	WCK1_c_B

M4
MT61K256M32JE-12:A
FBGA180
CHANGED

20 FBC_CMD<20>	H3	CA0_A
28 FBC_CMD<28>	G11	CA1_A
21 FBC_CMD<21>	G4	CA2_A
29 FBC_CMD<29>	H12	CA3_A
23 FBC_CMD<23>	H5	CA4_A
27 FBC_CMD<27>	H10	CA5_A
30 FBC_CMD<30>	J12	CA6_A
31 FBC_CMD<31>	J11	CA7_A
19 FBC_CMD<19>	J4	CA8_A
17 FBC_CMD<17>	J3	CA9_A
22 FBC_CMD<22>	J5	CABT_A
26 FBC_CMD<26>	G10	CKE_A
16 FBC_CMD<16>	L3	CA0_B
25 FBC_CMD<25>	M11	CA1_B
24 FBC_CMD<24>	M4	CA2_B
33 FBC_CMD<33>	L12	CA3_B
23 FBC_CMD<23>	L5	CA4_B
27 FBC_CMD<27>	L10	CA5_B
30 FBC_CMD<30>	K12	CA6_B
31 FBC_CMD<31>	K11	CA7_B
19 FBC_CMD<19>	K4	CA8_B
17 FBC_CMD<17>	K3	CA9_B
22 FBC_CMD<22>	K5	CABT_B
26 FBC_CMD<26>	M10	CKE_B
18 FBC_CMD<18>	J1	RESET
9.3D> IN FBC_CLK1*	K10	CLK_c
9.3D> IN FBC_CLK1	J10	CLK_t

VREFC K1 FBC_VREFC IN 10.2H< 10.4H>

C600 820pF 50V 10% X7R 0402 COMMON

GND

TCK N5 SNN_FBCU_TCK
TDI P10 SNN_FBCU_TDI
TDO N10 SNN_FBCU_TDO
TMS F5 SNN_FBCU_TMS

ZQ_A J14 FBC_ZQ_2_A
ZQ_B K14 FBC_ZQ_2_B

R508 121ohm 0402 1% COMMON
R501 121ohm 0402 1% COMMON

GND

RFU_A G5 SNN_FBCU_RFU_A
RFU_B M5 SNN_FBCU_RFU_B

FBVDDQ Close to DRAM
C203 10uF 6.3V 20% X5R 0603 NO STUFF
C248 22uF 6.3V 20% X5R 0603W CHANGED
C246 22uF 6.3V 20% X5R 0603W CHANGED
GND

FBVDDQ Close to DRAM
C660 22uF 6.3V 20% X5R 0603W CHANGED
C563 22uF 6.3V 20% X5R 0603W CHANGED
C503 22uF 6.3V 20% X5R 0603W CHANGED
GND

FBVDDQ Close to DRAM
C632 1uF 6.3V 20% X5R 0201 NO STUFF
C640 1uF 6.3V 20% X5R 0201 NO STUFF
C533 1uF 6.3V 20% X5R 0201 NO STUFF
C532 1uF 6.3V 20% X5R 0201 NO STUFF
GND

FBVDDQ Around DRAM
C620 22uF 6.3V 20% X5R 0603W COMMON
C603 22uF 6.3V 20% X5R 0603W COMMON
C694 22uF 6.3V 20% X5R 0603W COMMON
GND

FBVDDQ Around DRAM
C646 22uF 6.3V 20% X5R 0603W COMMON
C528 22uF 6.3V 20% X5R 0603W COMMON
C544 22uF 6.3V 20% X5R 0603W COMMON
GND

FBVDDQ Right under DRAM
C537 1uF 6.3V 20% X5R 0201 NO STUFF
C250 1uF 6.3V 20% X5R 0201 COMMON
C257 1uF 6.3V 20% X5R 0201 COMMON
C663 1uF 6.3V 20% X5R 0201 COMMON
C628 1uF 6.3V 20% X5R 0201 COMMON
C613 1uF 6.3V 20% X5R 0201 COMMON
C678 1uF 6.3V 20% X5R 0201 NO STUFF
C520 1uF 6.3V 20% X5R 0201 NO STUFF
GND

FBVDDQ Right under DRAM
C575 1uF 6.3V 20% X5R 0201 NO STUFF
C615 1uF 6.3V 20% X5R 0201 NO STUFF
C556 1uF 6.3V 20% X5R 0201 NO STUFF
C595 1uF 6.3V 20% X5R 0201 NO STUFF
C668 1uF 6.3V 20% X5R 0201 NO STUFF
C659 1uF 6.3V 20% X5R 0201 NO STUFF
C591 1uF 6.3V 20% X5R 0201 NO STUFF
C671 1uF 6.3V 20% X5R 0201 NO STUFF
GND

FBVDDQ Close to DRAM
C687 1uF 6.3V 20% X5R 0201 NO STUFF
C571 1uF 6.3V 20% X5R 0201 NO STUFF
C584 1uF 6.3V 20% X5R 0201 COMMON
C627 1uF 6.3V 20% X5R 0201 COMMON
C633 1uF 6.3V 20% X5R 0201 COMMON
C639 1uF 6.3V 20% X5R 0201 NO STUFF
C586 1uF 6.3V 20% X5R 0201 NO STUFF
C581 1uF 6.3V 20% X5R 0201 COMMON
C535 1uF 6.3V 20% X5R 0201 NO STUFF
C604 1uF 6.3V 20% X5R 0201 COMMON
GND

FBVDDQ Close to DRAM
C550 1uF 6.3V 20% X5R 0201 COMMON
C526 1uF 6.3V 20% X5R 0201 NO STUFF
C240 1uF 6.3V 20% X5R 0201 COMMON
C243 1uF 6.3V 20% X5R 0201 COMMON
C254 1uF 6.3V 20% X5R 0201 COMMON
C259 1uF 6.3V 20% X5R 0201 COMMON
C592 1uF 6.3V 20% X5R 0201 COMMON
C558 1uF 6.3V 20% X5R 0201 COMMON
C552 1uF 6.3V 20% X5R 0201 NO STUFF
C593 1uF 6.3V 20% X5R 0201 COMMON
GND

1V8_AON
C690 1uF 6.3V 20% X5R 0201 COMMON
C534 1uF 6.3V 20% X5R 0201 COMMON
C686 1uF 6.3V 20% X5R 0201 COMMON
C531 1uF 6.3V 20% X5R 0201 COMMON
GND

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: FBC[63:32]

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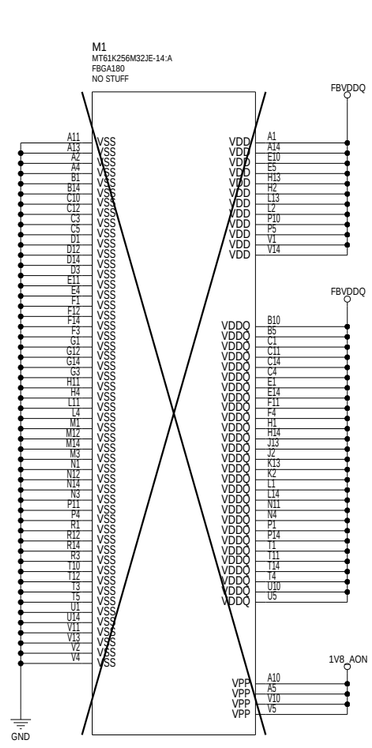
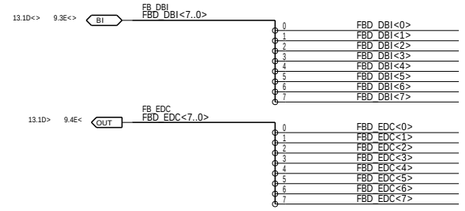
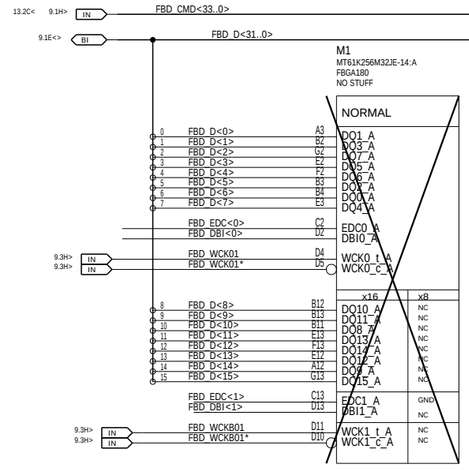
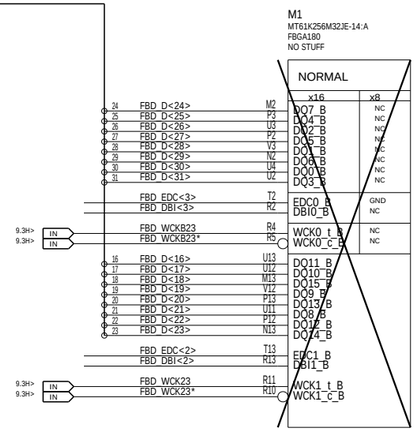
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	11 OF 42
BOM REV	A	DATE	27-NOV-2018

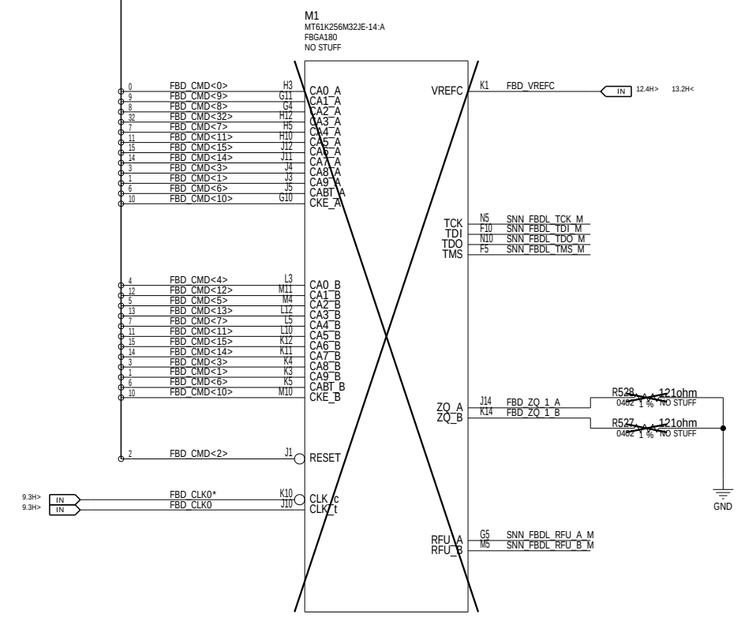
Page12: MEMORY: FBD Partition 31..0

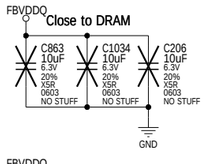


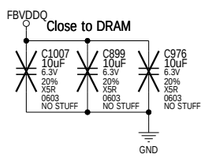


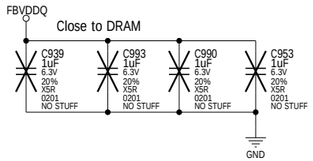


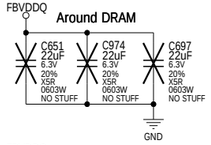


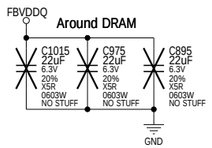


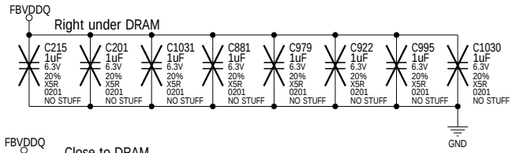


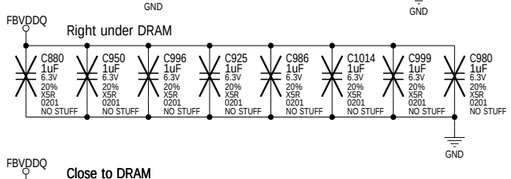


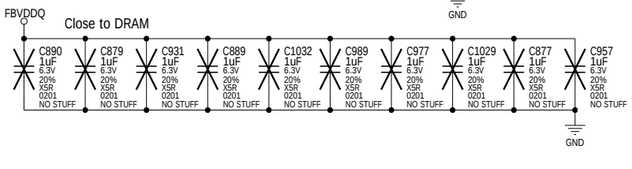


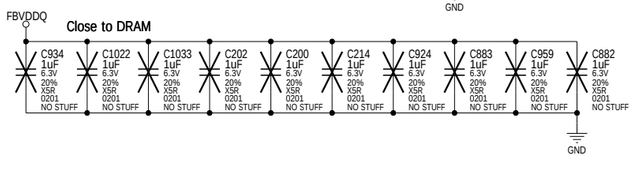




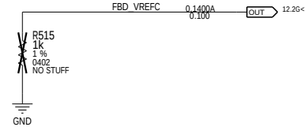


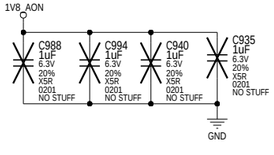






VREFC IS NOT USED IN x16 CONFIGURATION
1K OHM PULL-DOWN IS IN PLACE OF THE 1.33K FOR R62





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MEMORY: FBD[31:0]

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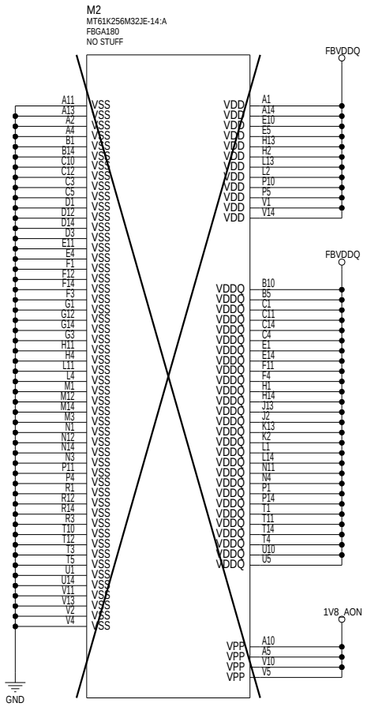
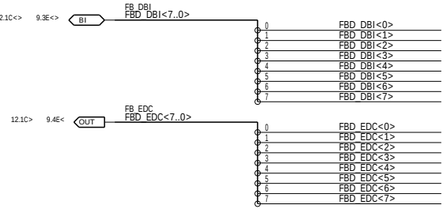
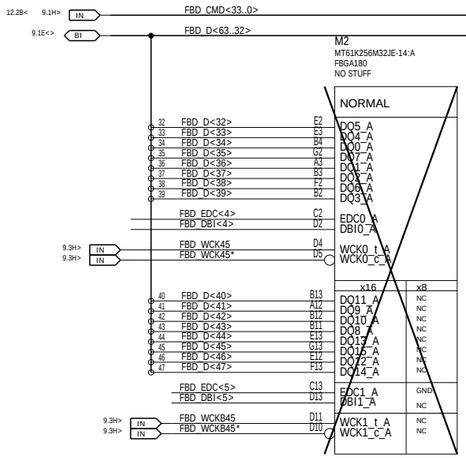
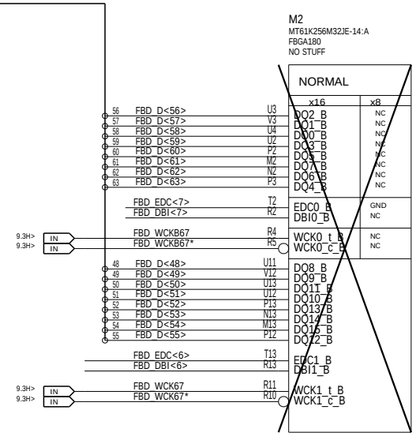
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	12 OF 42
BOM REV	A	DATE	27-NOV-2018

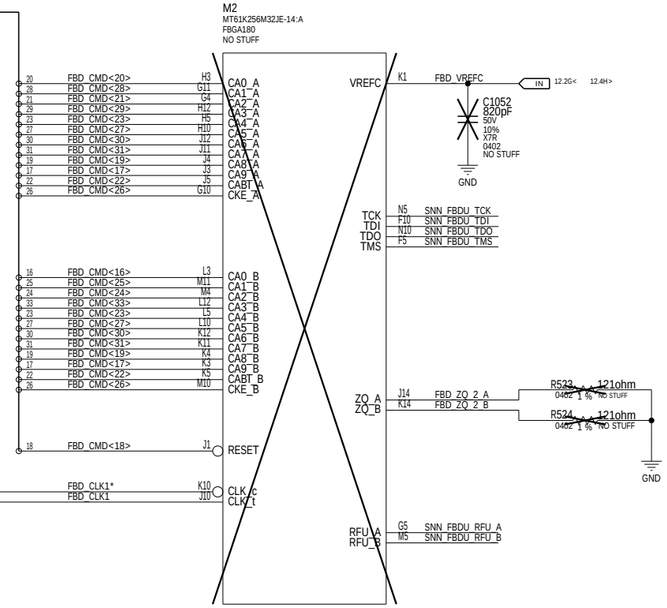
Page13: MEMORY: FBD Partition 63..32

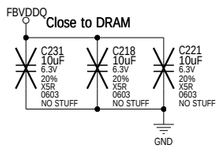


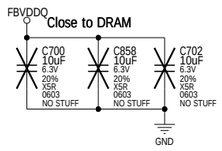


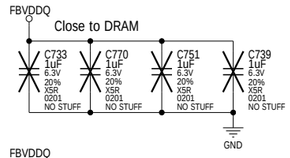


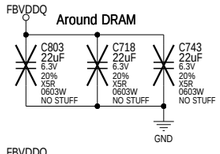


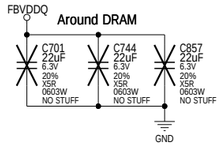


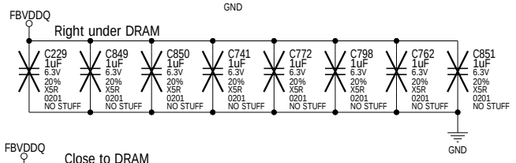


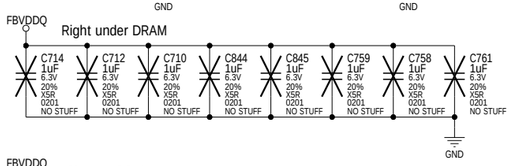


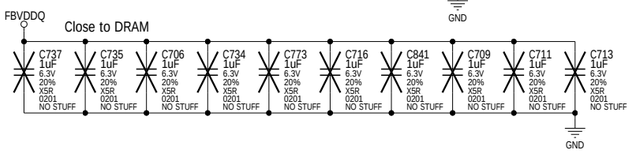


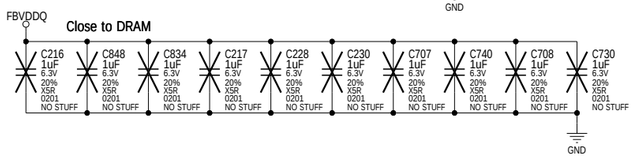


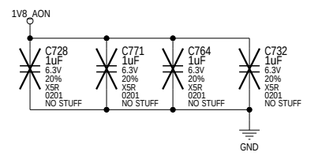












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PAGE DETAIL	MEMORY: FBD[63:32]

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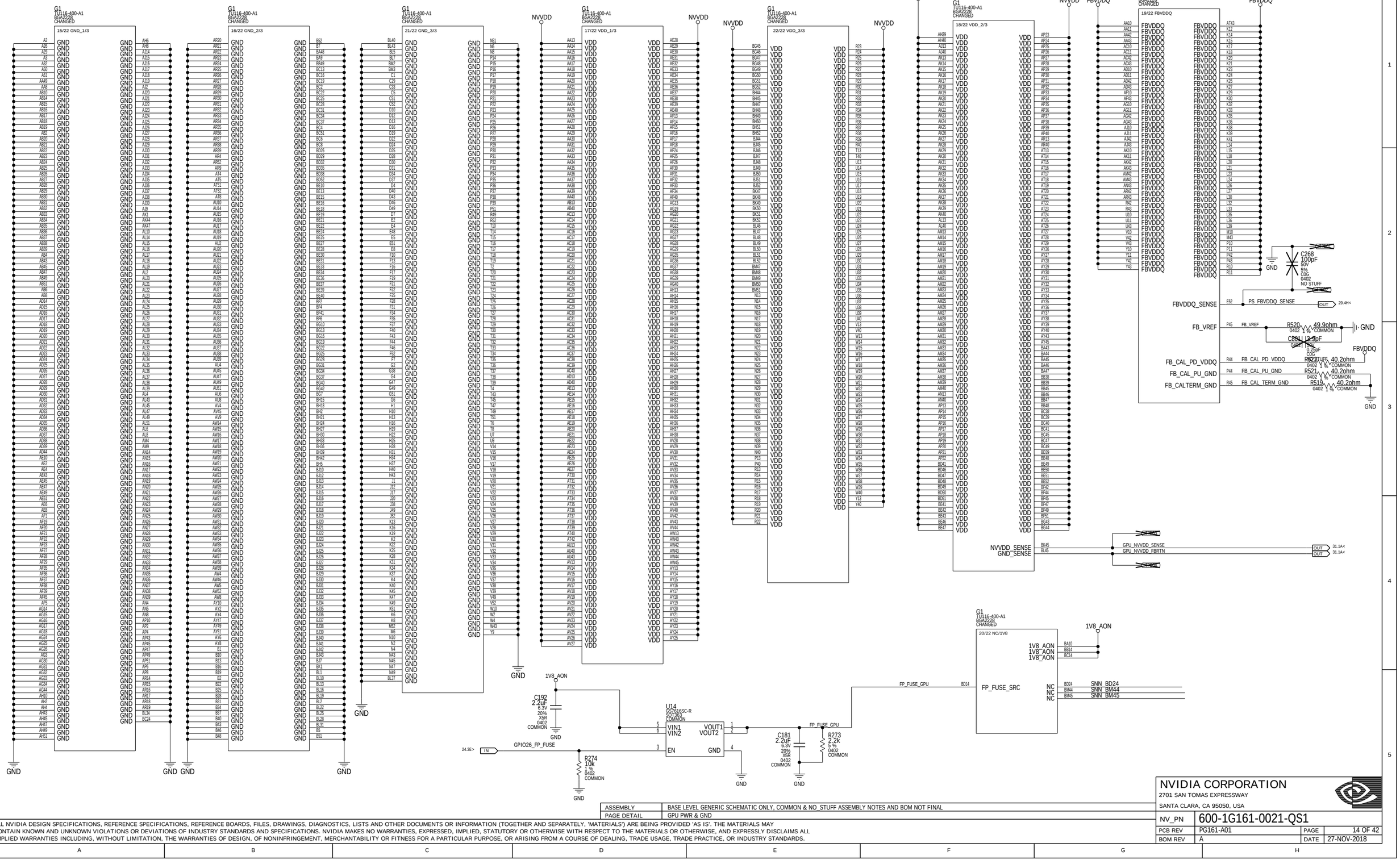
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	13 OF 42
BOM REV	A	DATE	27-NOV-2018

Page14: GPU PWR and GND



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PAGE DETAIL	GPU PWR & GND

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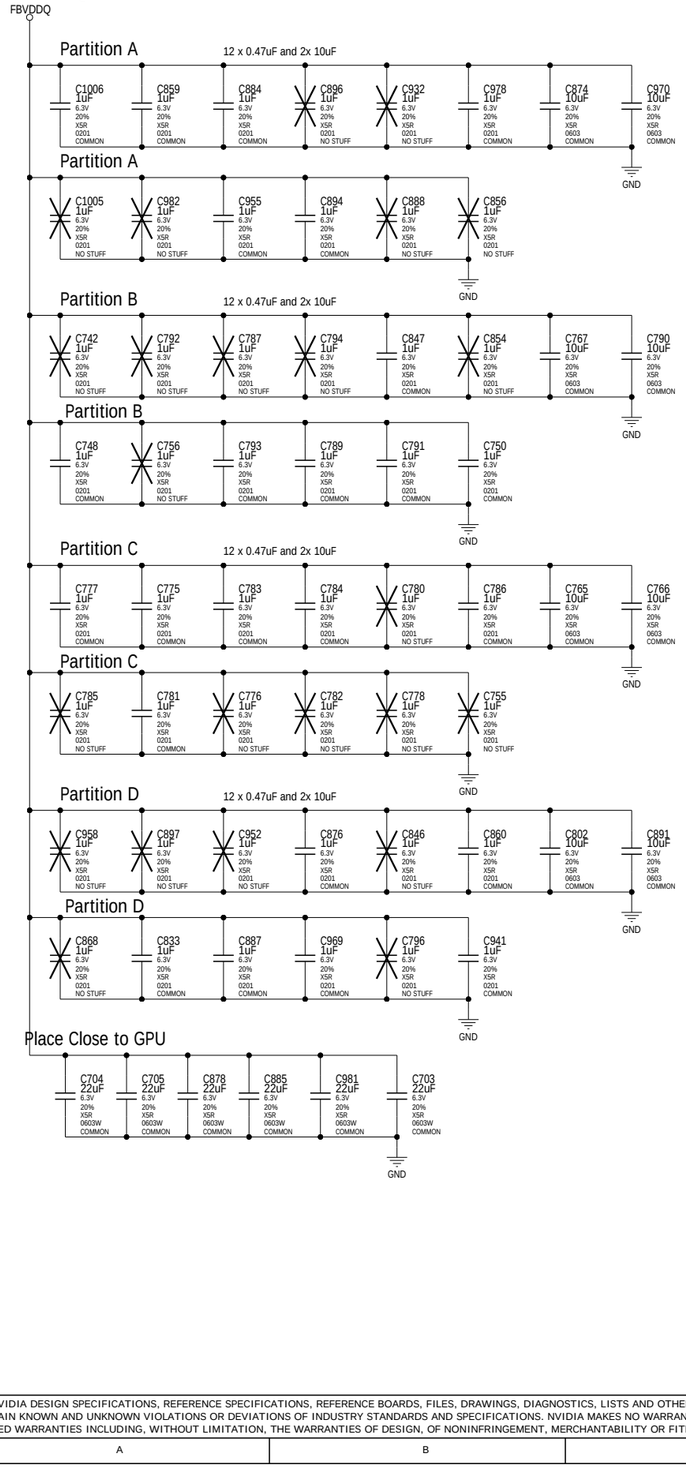
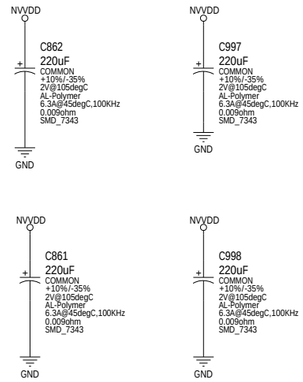
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	14 OF 42
BOM REV	A	DATE	27-NOV-2018

Page15: GPU Decoupling 1

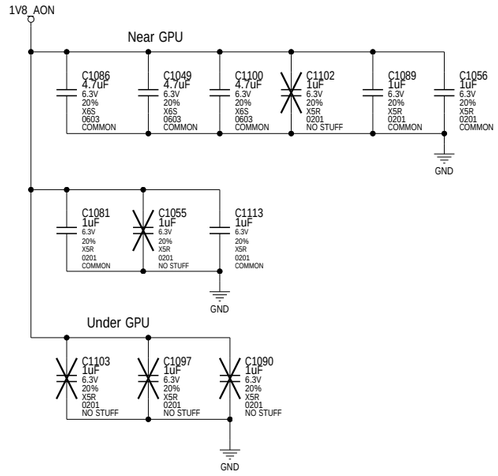
FBVDDQ



NVVDD



1V8_AON



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	GPU Decoupling

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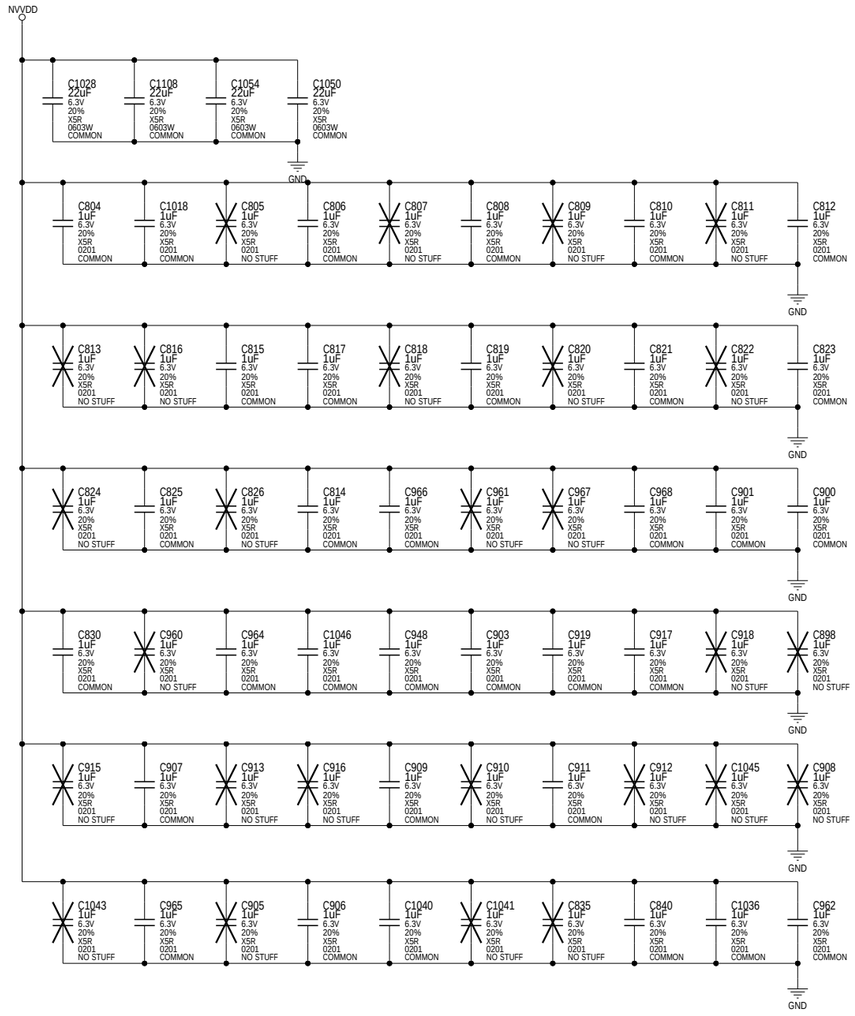
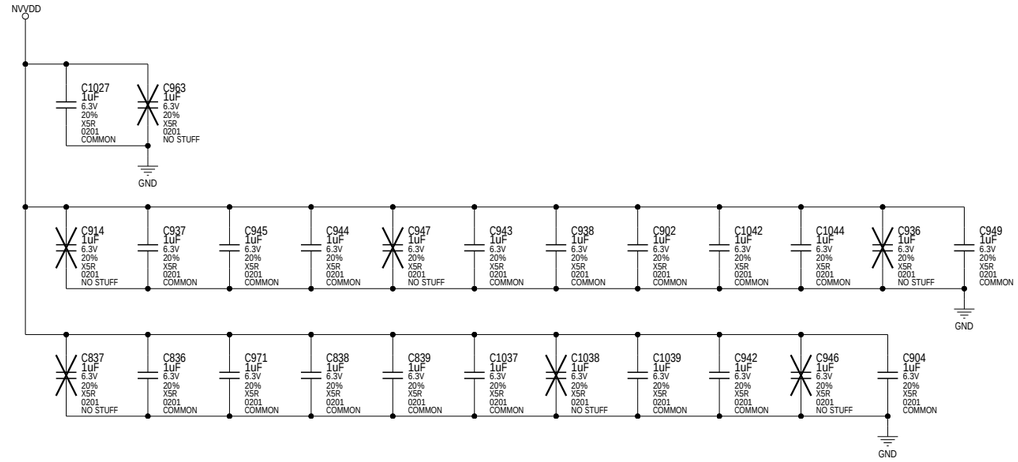
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	15 OF 42
BOM REV	A	DATE	27-NOV-2018

Page16: GPU Decoupling 2

NVVDD





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PAGE DETAIL	GPU Decoupling2

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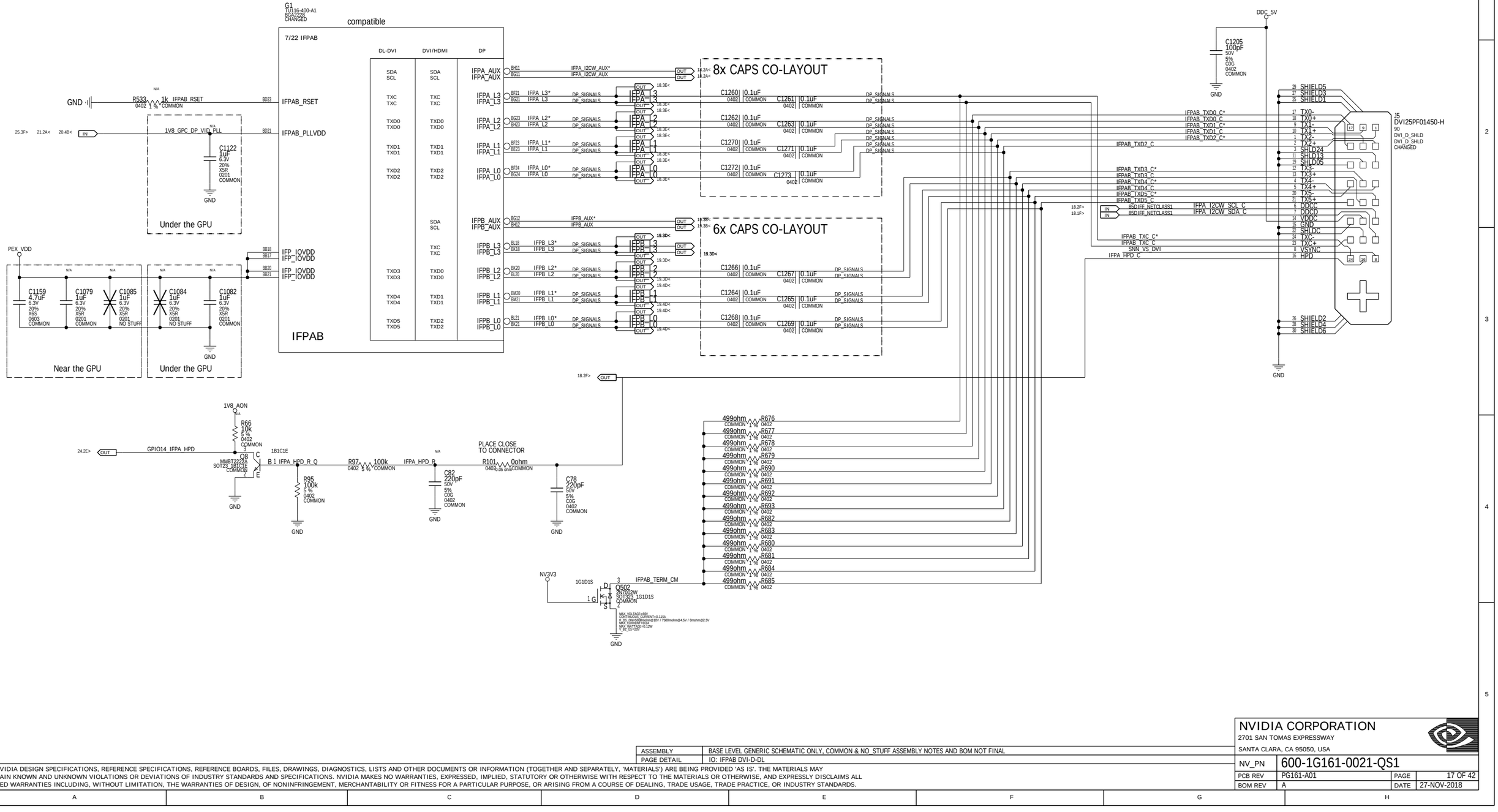
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	16 OF 42
BOM REV	A	DATE	27-NOV-2018

Page17: IFPAB DVI-D-DL

IFPAB DVI-D-DL CO-LAYOUT WITH 2x DP



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: IFPAB DVI-D-DL

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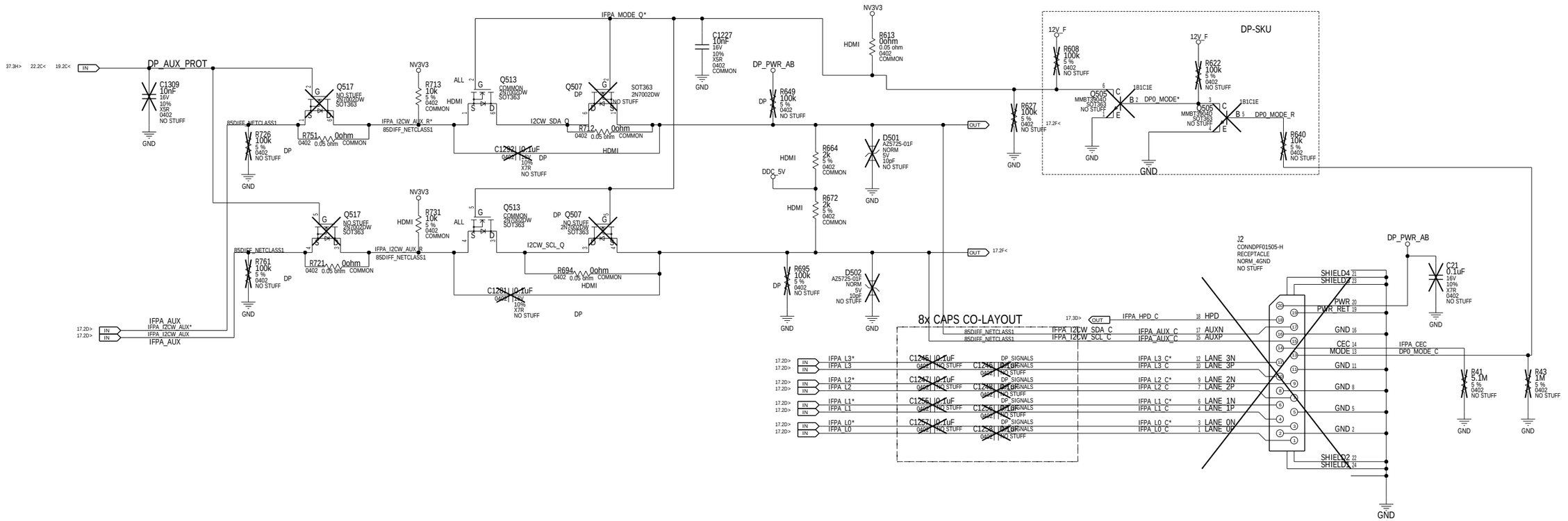
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	17 OF 42
BOM REV	A	DATE	27-NOV-2018

Page18: IFPA DP



IFPA DP CO-LAYOUT WITH IFPAB DVI-D-DL

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: IFPA DP

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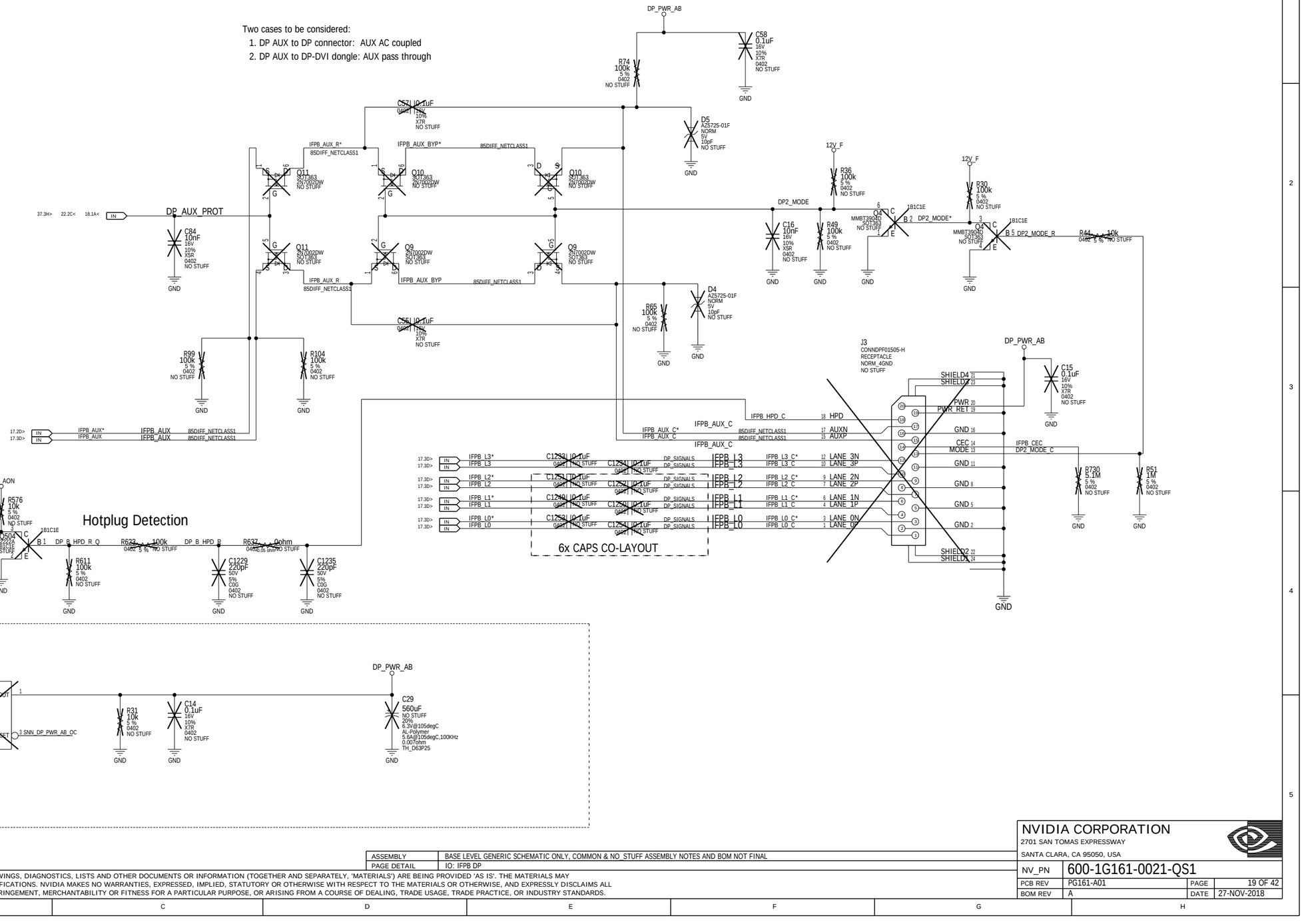
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	18 OF 42
BOM REV	A	DATE	27-NOV-2018

Page19: IFPB DP

IFPB DP CO-LAYOUT WITH IFPAB DVI-D-DL



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: IFPB DP

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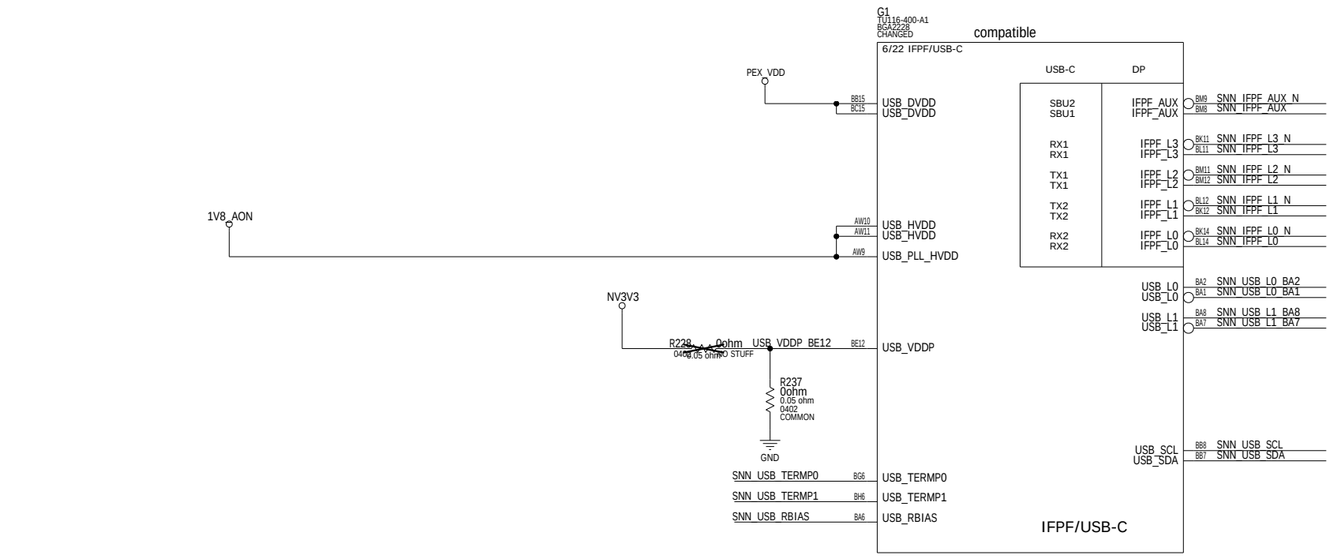
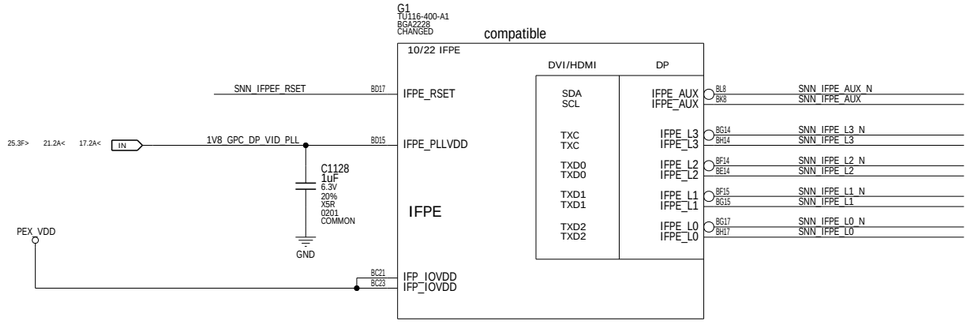
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	19 OF 42
BOM REV	A	DATE	27-NOV-2018

Page20: IFPE & IFPF USB-C NC



IFPF NC



IFPE NC

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	

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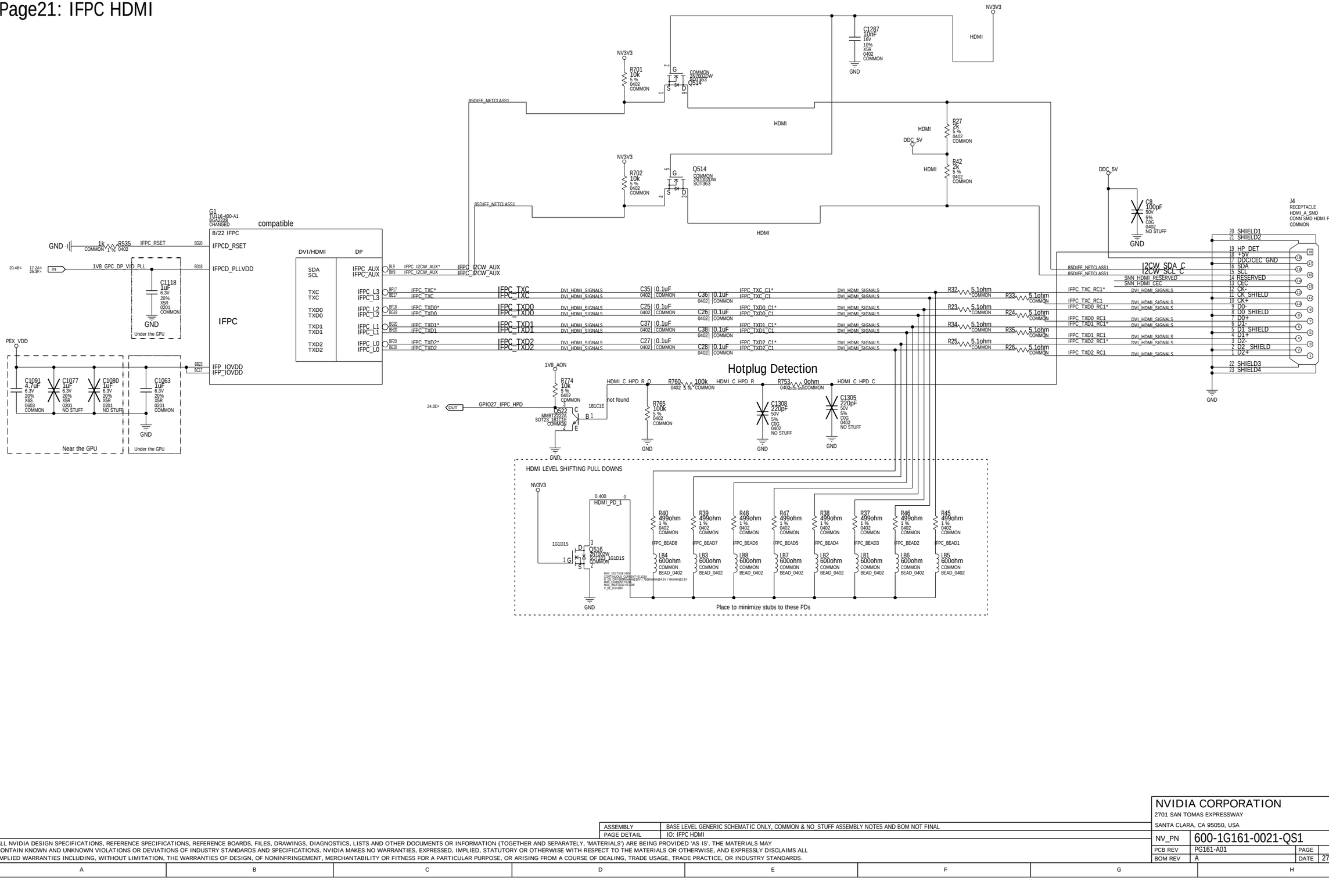
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	20 OF 42
BOM REV	A	DATE	27-NOV-2018

Page21: IFPC HDMI



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: IFPC HDMI

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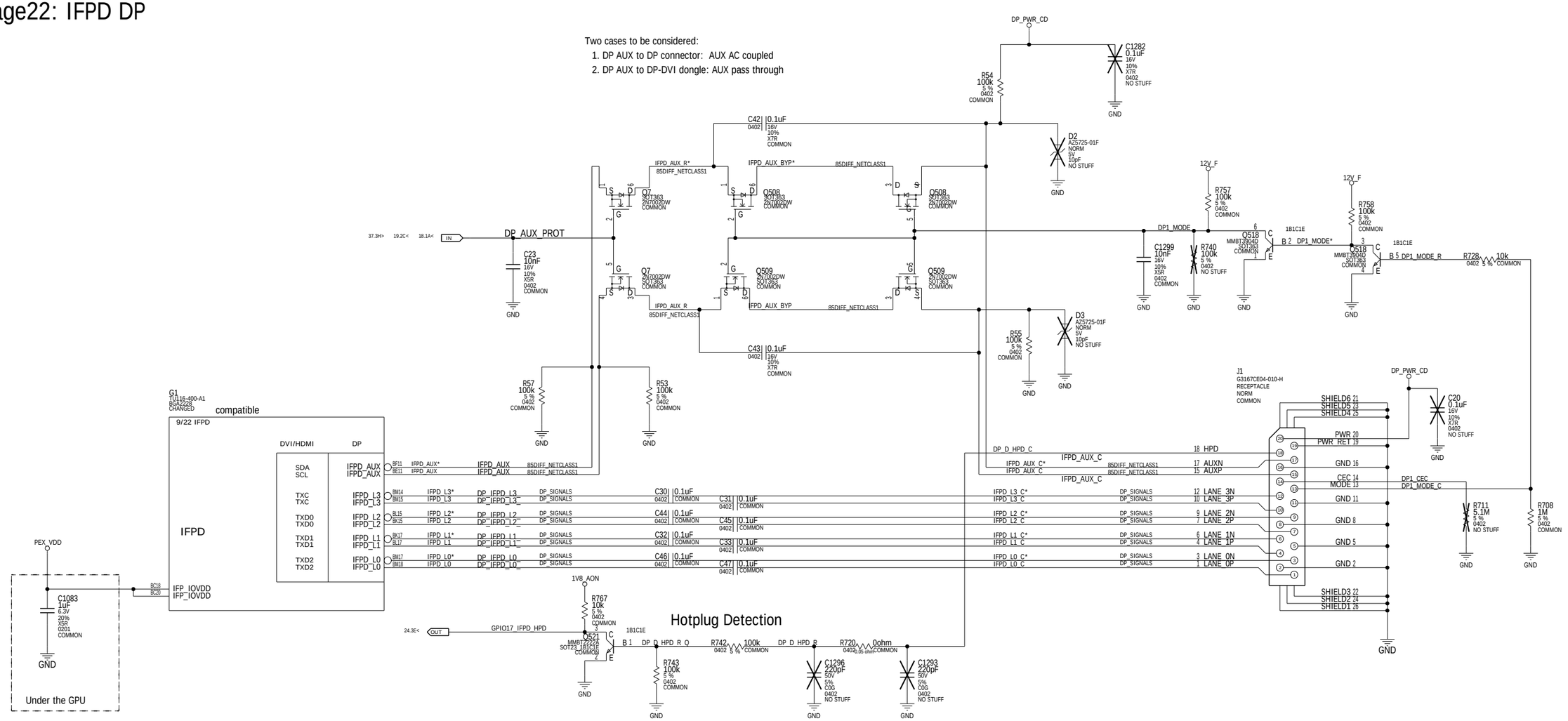
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	21 OF 42
BOM REV	A	DATE	27-NOV-2018

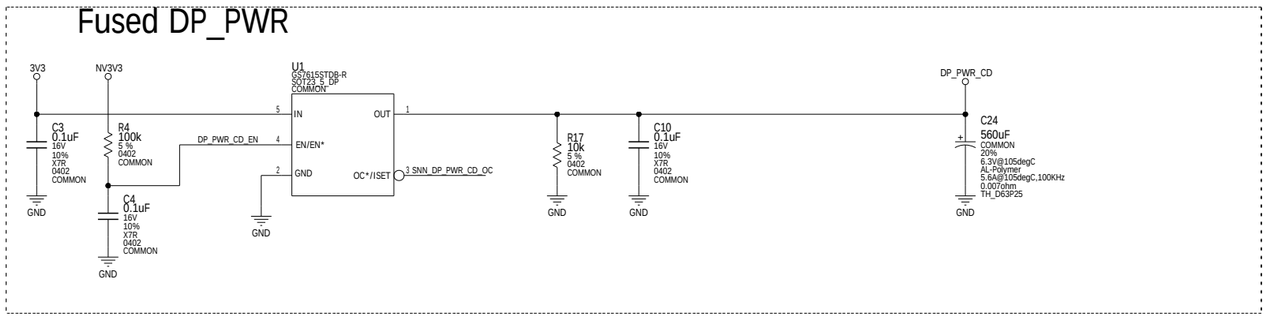
Page22: IFPD DP

Two cases to be considered:

1. DP AUX to DP connector: AUX AC coupled
2. DP AUX to DP-DVI dongle: AUX pass through



Fused DP_PWR



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: IFPD DP

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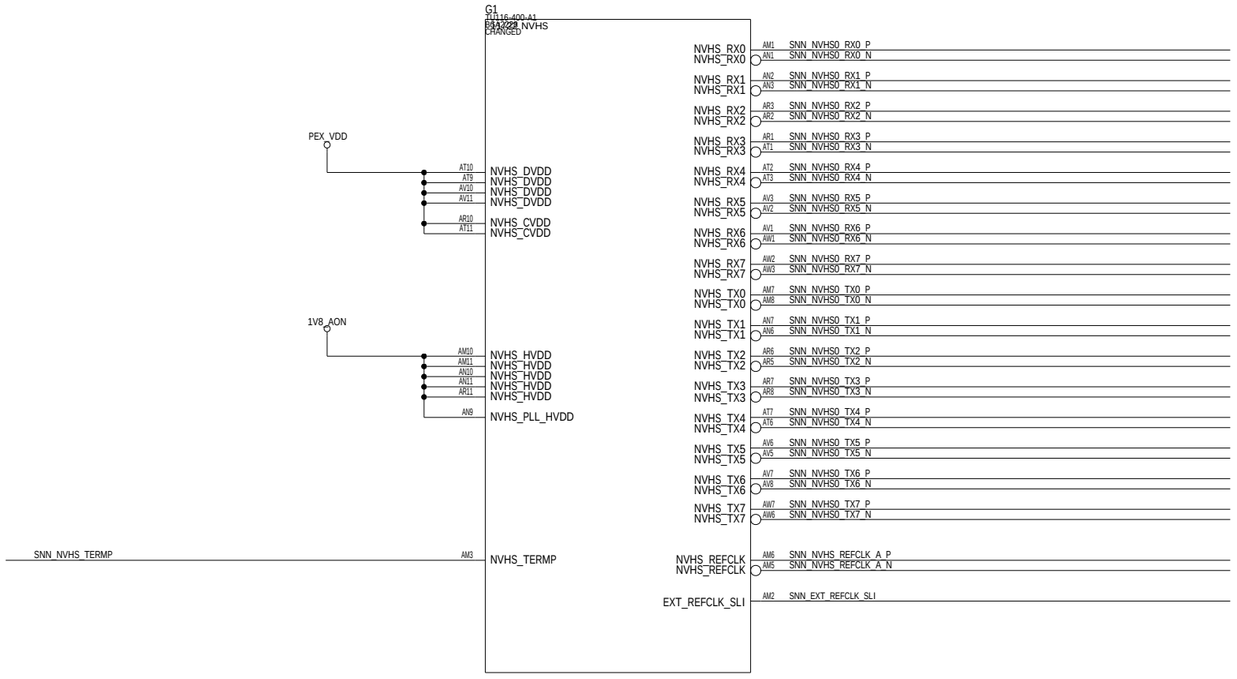
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	22 OF 42
BOM REV	A	DATE	27-NOV-2018

Page23: NVHS Interface and Frame Lock



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	IO: NVHS Interface and Frame Lock

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	23 OF 42
BOM REV	A	DATE	27-NOV-2018

Page24: MISC1: Fan, Thermal, JTAG, GPIO

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PAGE DETAIL	MISC1: Thermal, JTAG, GPIO,STEREO

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	24 OF 42
BOM REV	A	DATE	27-NOV-2018

Page25: MISC2: ROM, XTAL, Straps

STRAP2	STRAP1	STRAP0	RAMCFG[4:0]
L	L	L	00000
L	L	H	00001
L	H	L	00010
L	H	H	00011
H	H	L	00110
H	H	H	00111
L	L	M	01000

RAMCFG[4:0]	DENSITY	WIDTH	VENDOR	DIE
00000	8Gb	256-bit	Samsung	C
00001	8Gb	256-bit	Micron	A
00010	8Gb	256-bit	Hynix	M
00011	8Gb	256-bit	Samsung	C
00100	8Gb	256-bit	Micron	A
00101	8Gb	256-bit	Hynix	M
00110	16Gb	256-bit	Samsung	M
00111				

ROM_SO	ROM_SI	ROM_SCLK	DUMMY[2:0],FS_OVERT	1:ENABLE 0:DISABLE	
L	L	L	XXX1	FS_OVERT ENABLE	DEFAULT
L	L	M	XXX0	FS_OVERT DISABLE	

STRAP5	STRAP4	STRAP3	SMB_ALT_ADDR	DEVID_SEL	PCIE_CFG	VGA_DEVICE
M	H	H	1	1	1	1
M	H	L	1	1	1	0
M	L	H	1	1	0	1
M	L	L	1	1	0	0
L	H	M	1	0	1	1
L	M	H	1	0	1	0
L	M	L	1	0	0	1
L	L	M	1	0	0	0
H	H	H	0	1	1	1
H	H	L	0	1	1	0
H	L	H	0	1	0	1
H	L	L	0	1	0	0
L	H	H	0	0	1	1
L	H	L	0	0	1	0
L	L	H	0	0	0	1 DEFAULT
L	L	L	0	0	0	0

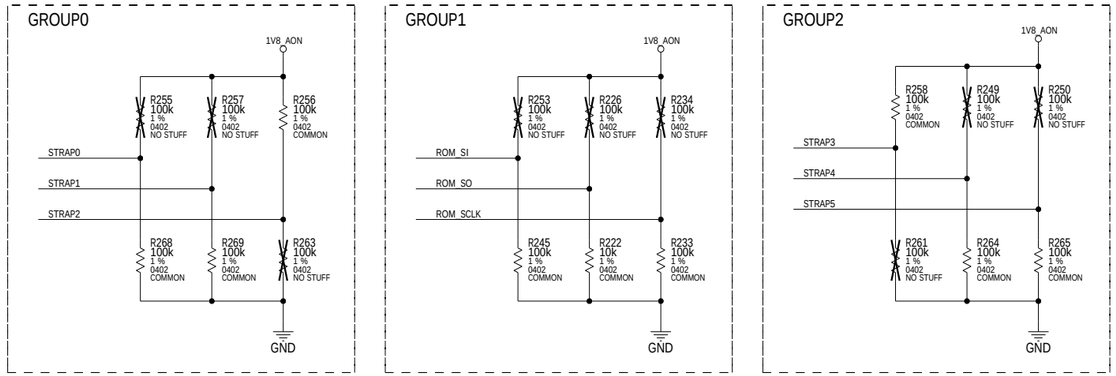
H=High :Tied to 1.8V
M=Middle:Tied to 0.9V
L=Low :Tied to 0V

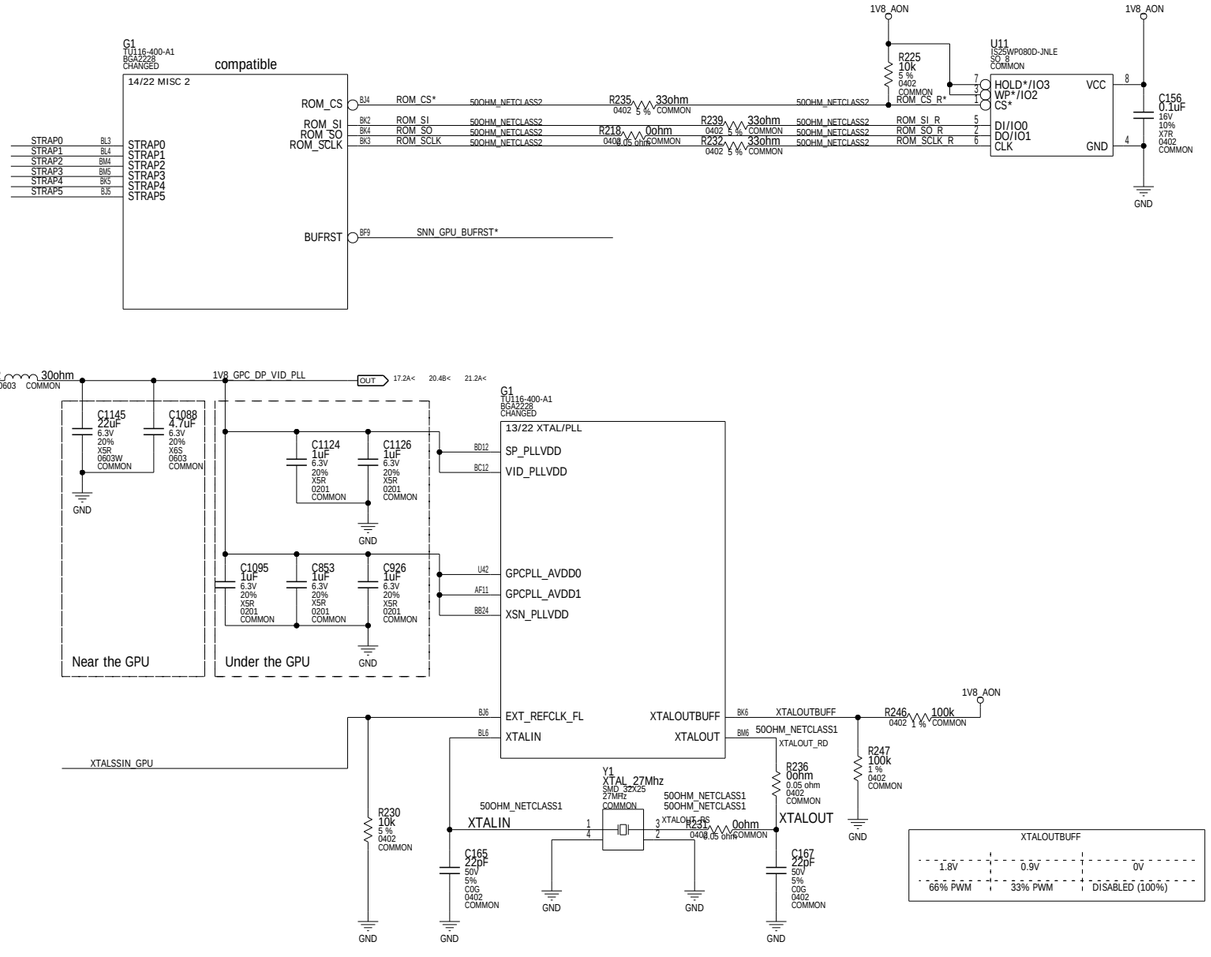
1:SMB_ALT_ADDR ENABLE
0:SMB_ALT_ADDR DISABLE

1:DEVID_SEL REBRAND
0:DEVID_SEL ORIGNAL

1:PCIE_CFG LOW POWER
0:PCIE_CFG HIGH POWER

1:VGA_DEVICE ENABLE
0:VGA_DEVICE DISABLE





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	MISC2: ROM, XTAL,STRAPS

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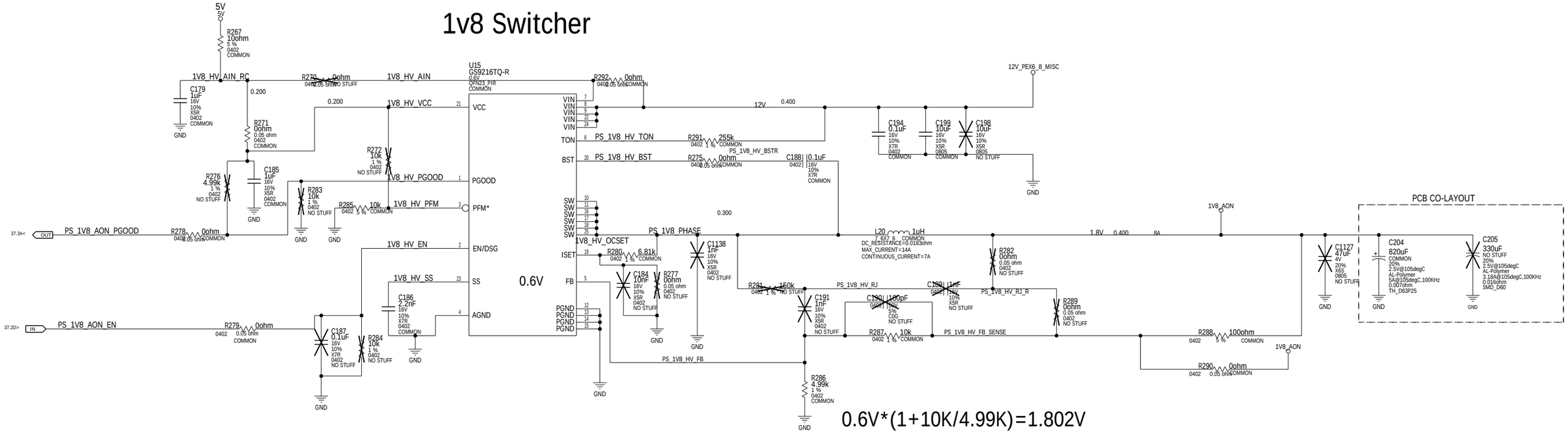
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	25 OF 42
BOM REV	A	DATE	27-NOV-2018

Page26: PS: 1V8_AON

1v8 Switcher



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: 1V8_AON

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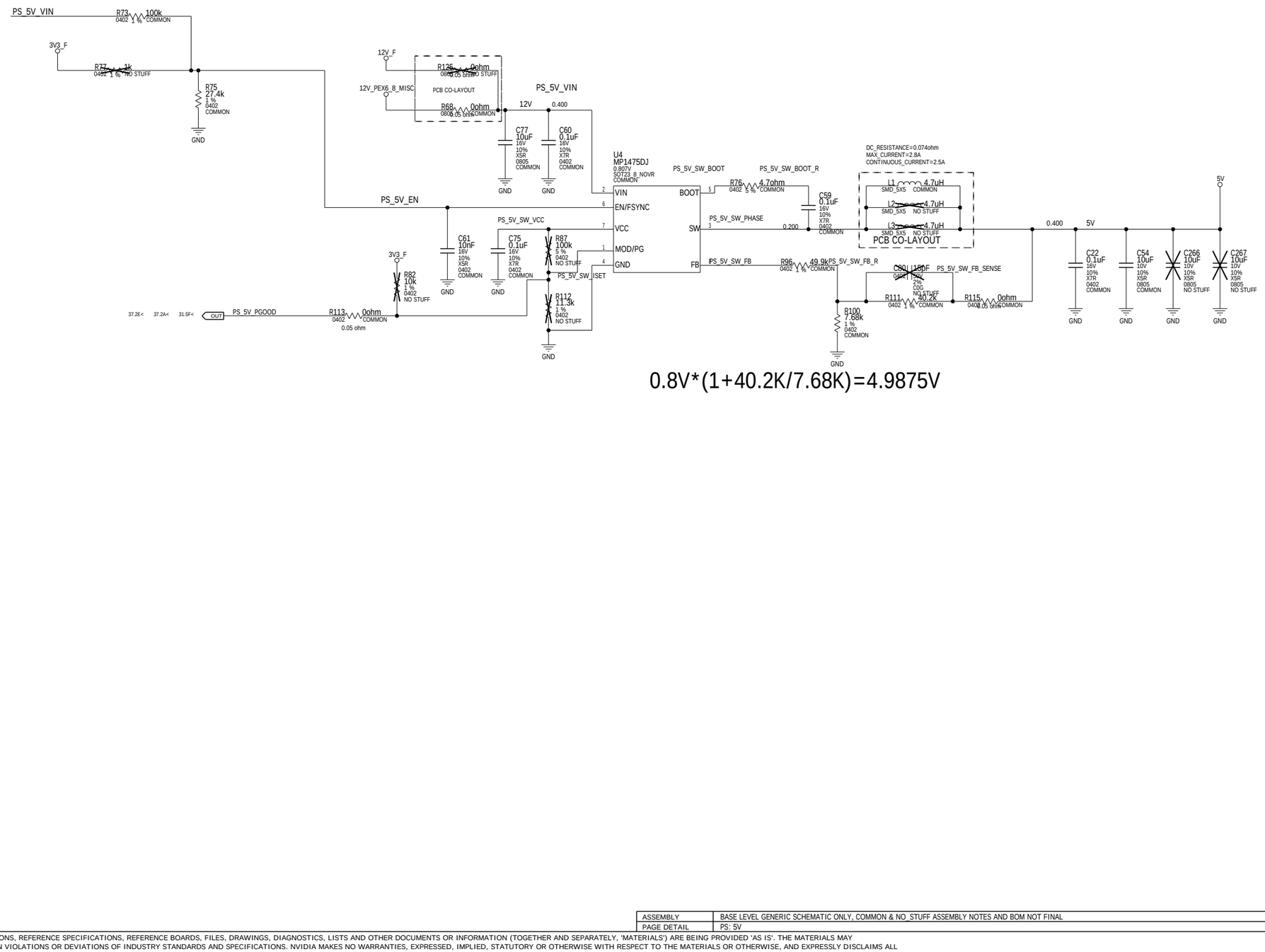
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	26 OF 42
BOM REV	A	DATE	27-NOV-2018

Page27: PS: 5V



0.8V*(1+40.2K/7.68K)=4.9875V

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: 5V

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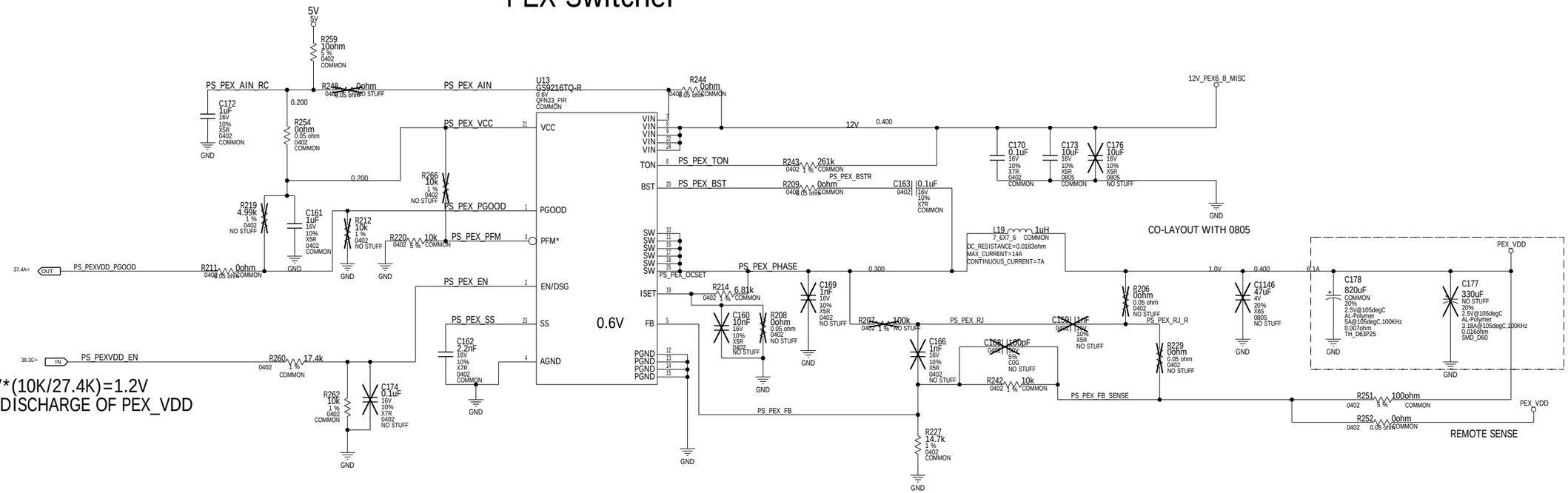
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	27 OF 42
BOM REV	A	DATE	27-NOV-2018

Page28: PS: PEXVDD

PEX Switcher



EN: 3.3V*(10K/27.4K)=1.2V
ENABLE DISCHARGE OF PEX_VDD

0.6V*(1+10K/14.7K)=1.008V

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: PEXVDD

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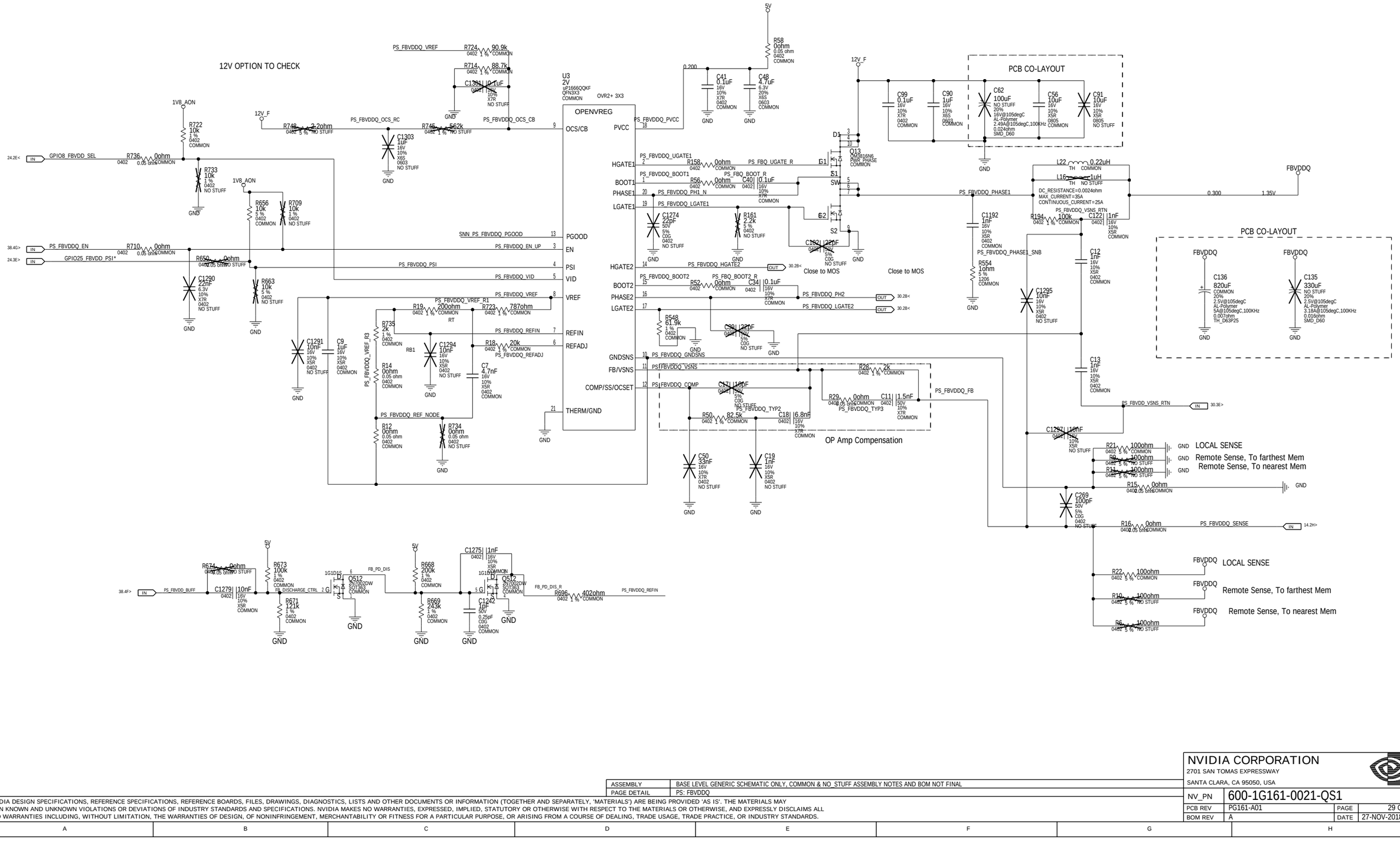
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	28 OF 42
BOM REV	A	DATE	27-NOV-2018

Page29: PS: FBVDDQ



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: FBVDDQ

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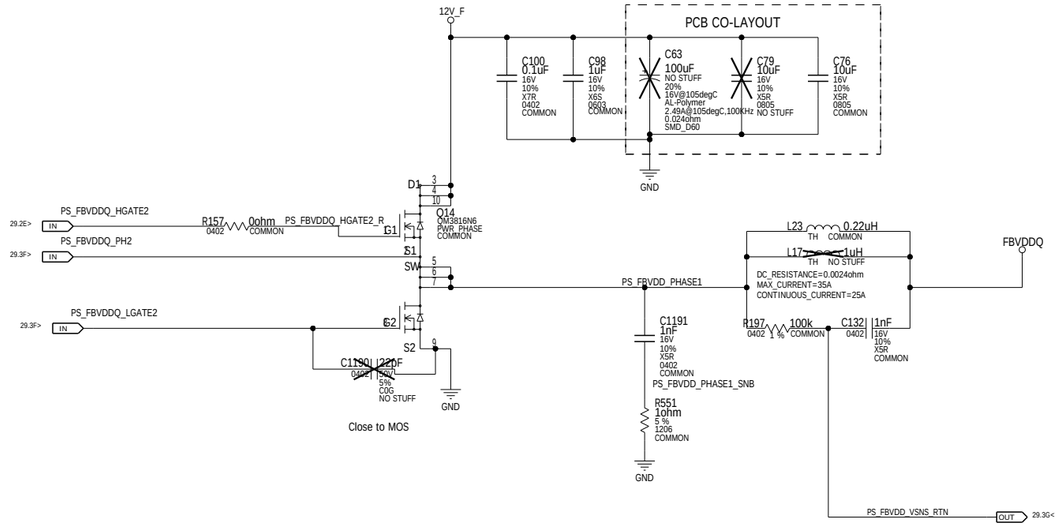
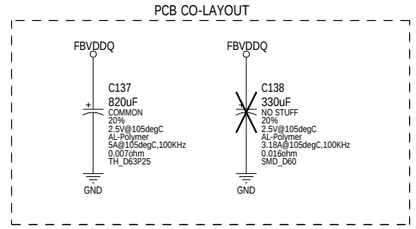
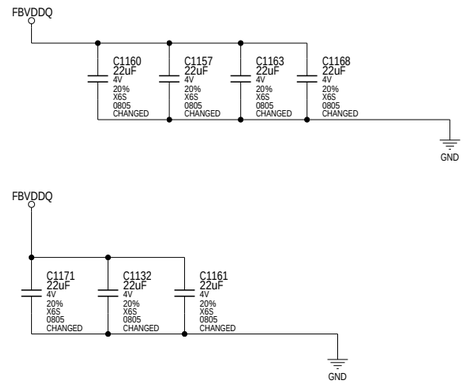
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	29 OF 42
BOM REV	A	DATE	27-NOV-2018

Page30: PS: FBVDDQ PH2







ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: FBVDDQ PH2

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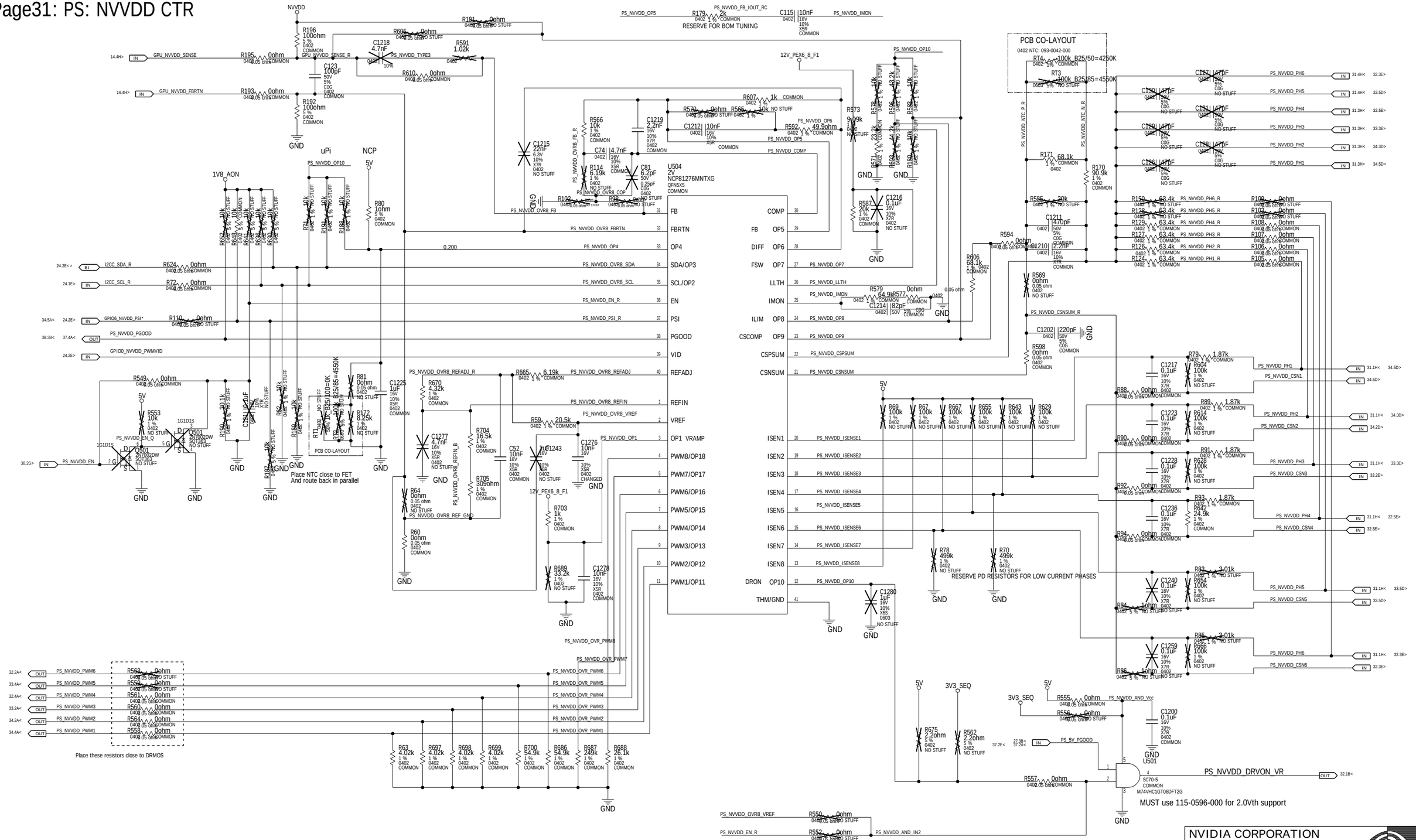
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	30 OF 42
BOM REV	A	DATE	27-NOV-2018

Page31: PS: NVVDD CTR



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: NVVDD Controller

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NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	31 OF 42
BOM REV	A	DATE	27-NOV-2018

Page32: PS: NVVDD PH6&4

ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: NVVDD Phase 6,4

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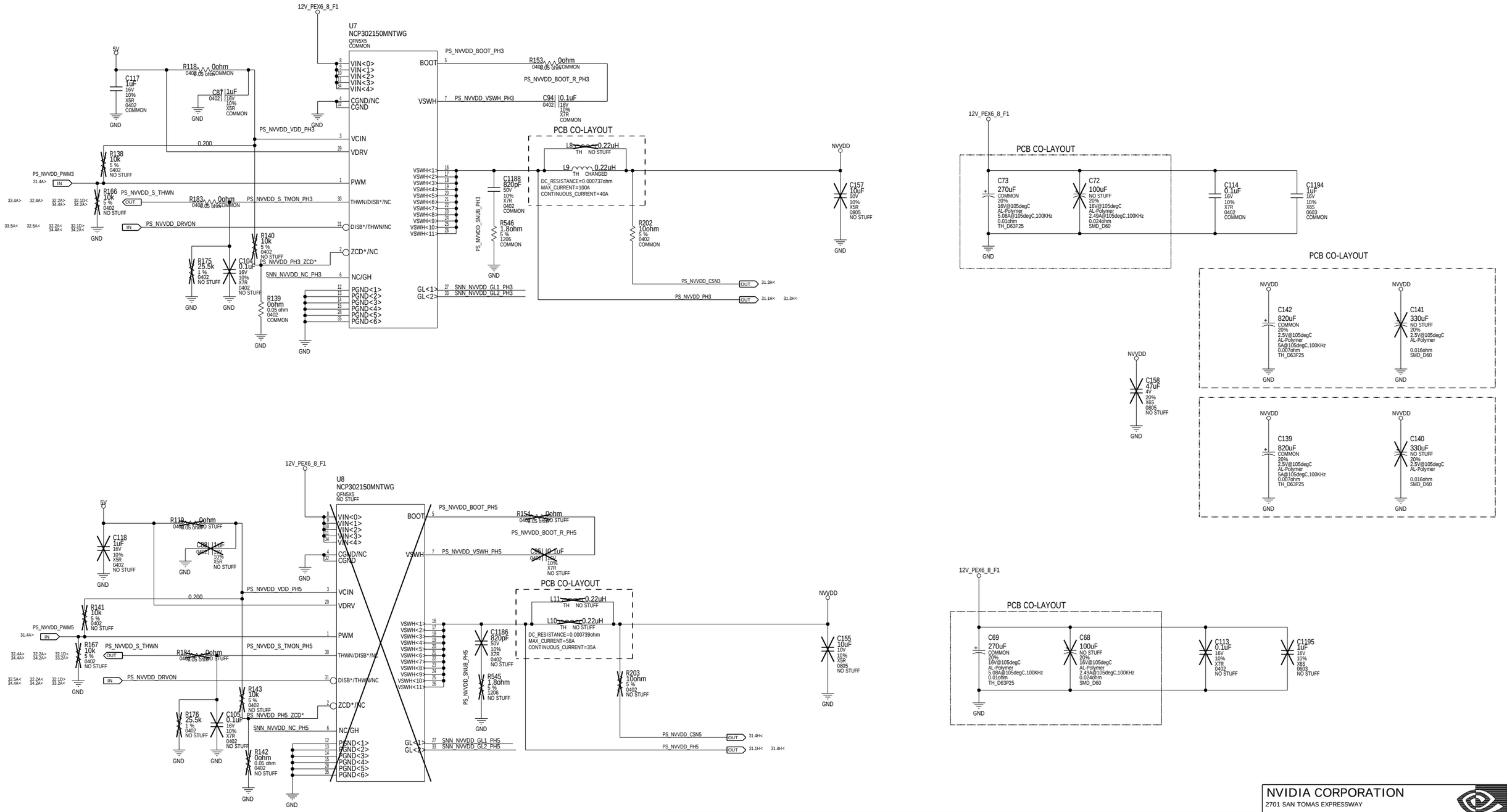
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	32 OF 42
BOM REV	A	DATE	27-NOV-2018

Page33: PS: NVVDD PH3&5



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: NVDD Phase 3.5

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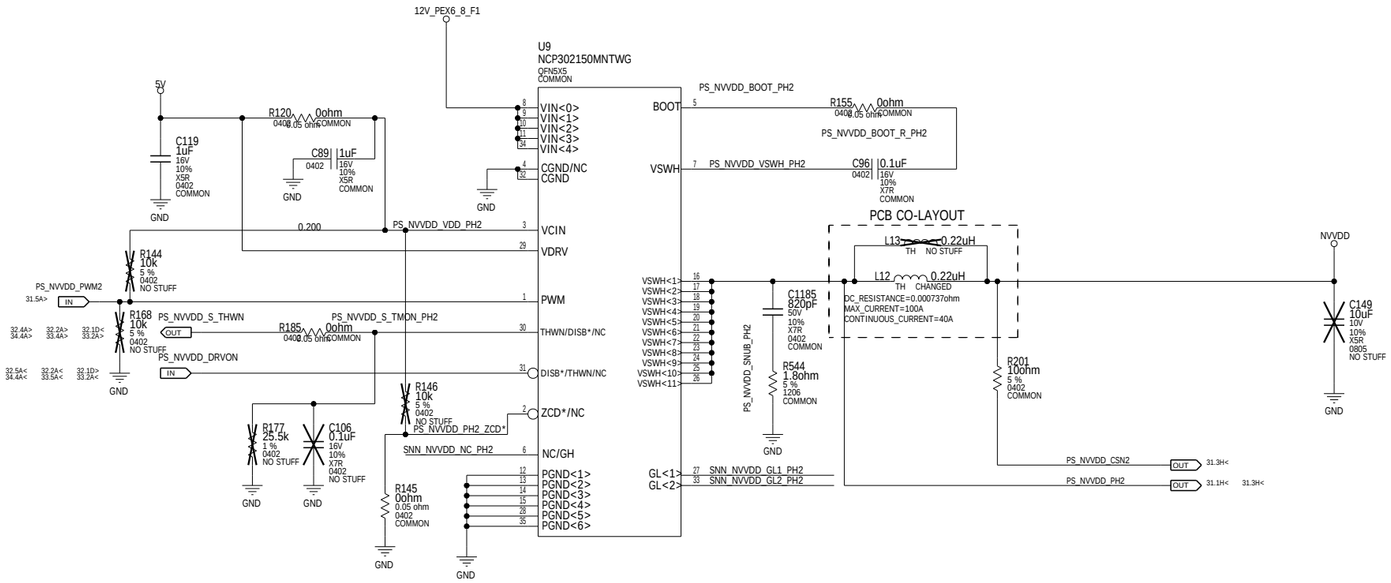
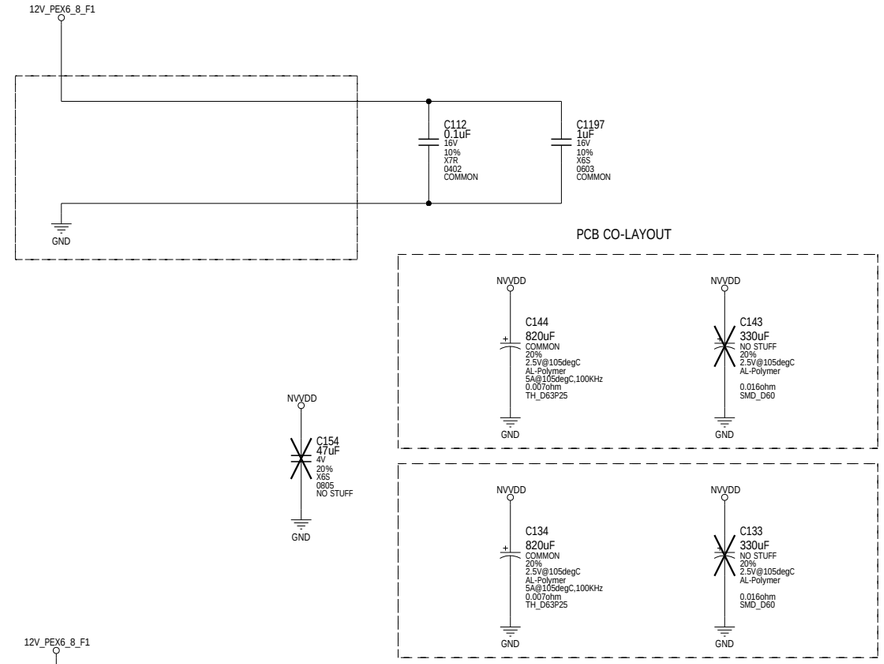
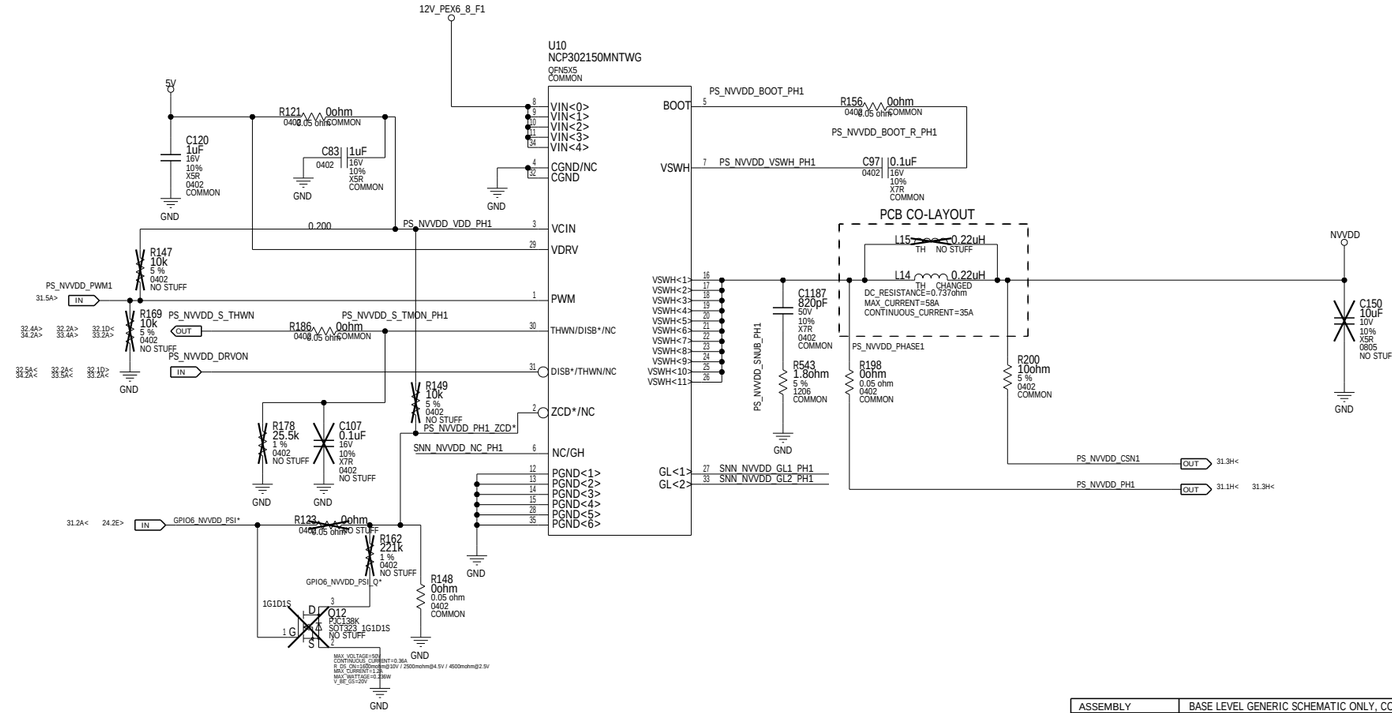
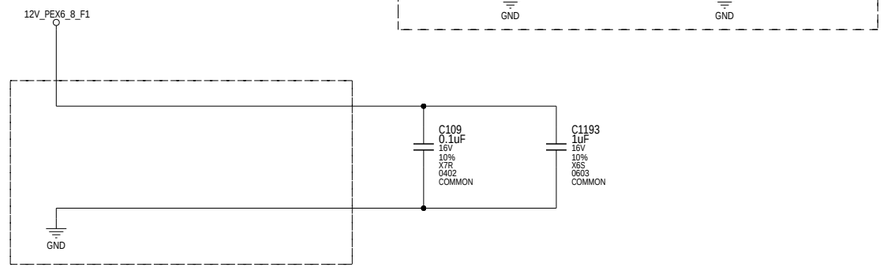
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	33 OF 42
BOM REV	A	DATE	27-NOV-2018

Page34: PS: NVVDD PH2&1









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PAGE DETAIL	PS: NVVDD Phase 2,1

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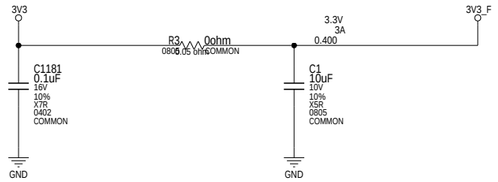
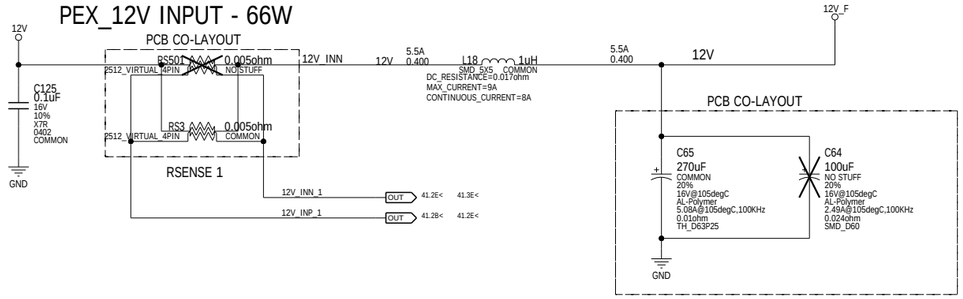
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	34 OF 42
BOM REV	A	DATE	27-NOV-2018

Page35: PS: Inputs, Filtering, and Monitoring

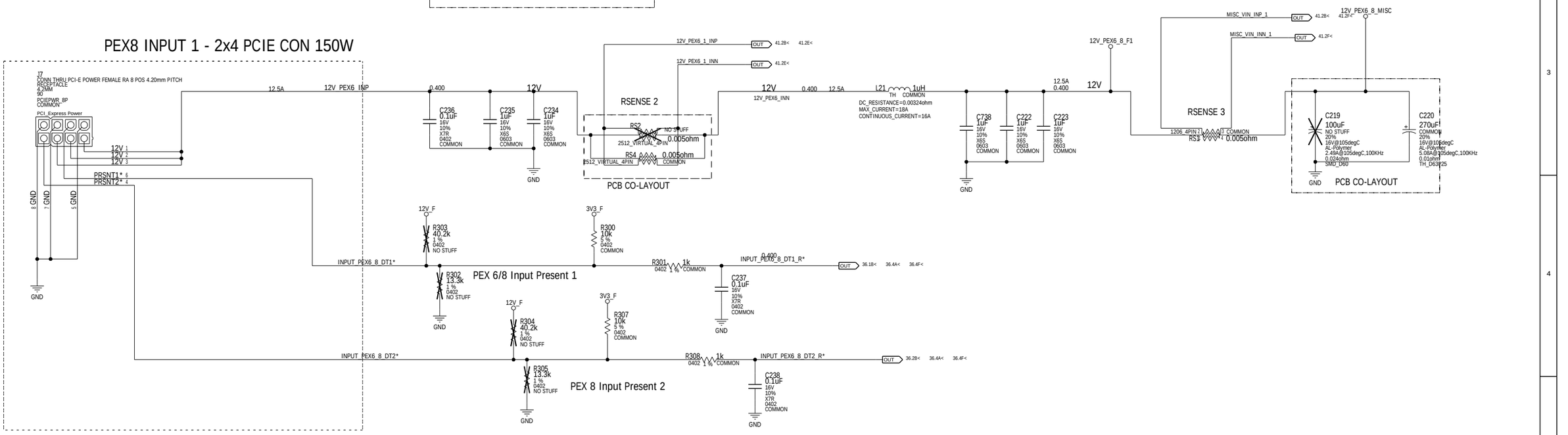
PEX 3V3 INPUT - 10W



PEX_12V INPUT - 66W



PEX8 INPUT 1 - 2x4 PCIE CON 150W



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	PS: Input, Filtering, and Monitoring

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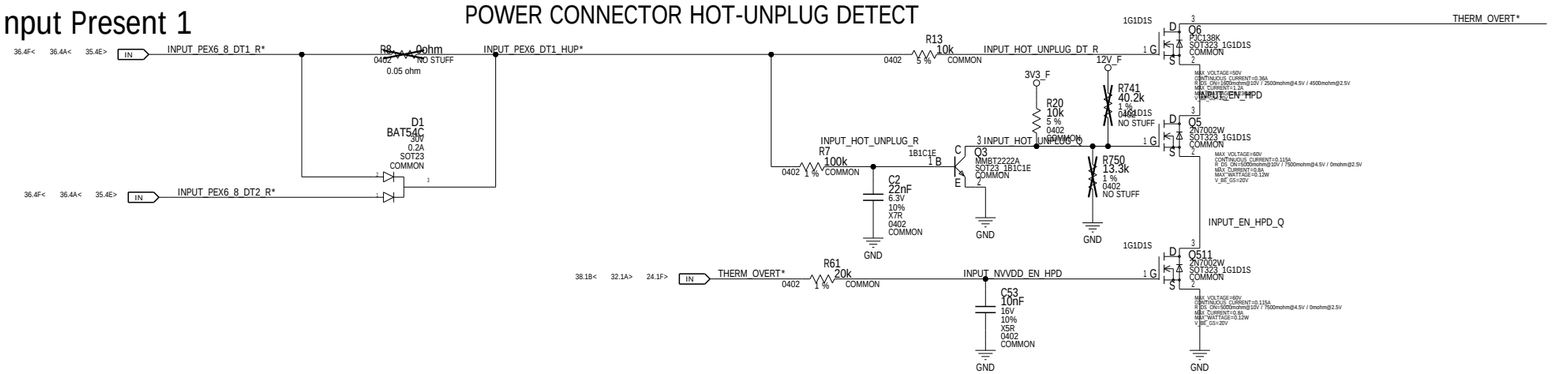
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	35 OF 42
BOM REV	A	DATE	27-NOV-2018

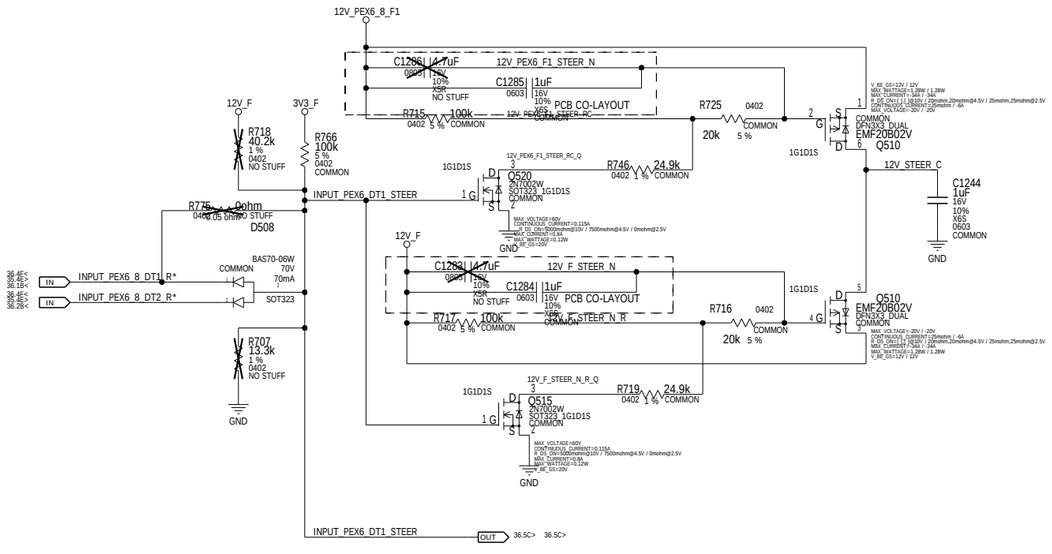
Page36: PS: HOT-UNPLUG, UNDER POWER BOOT, CURRENT STEERING

PEX Input Present 1

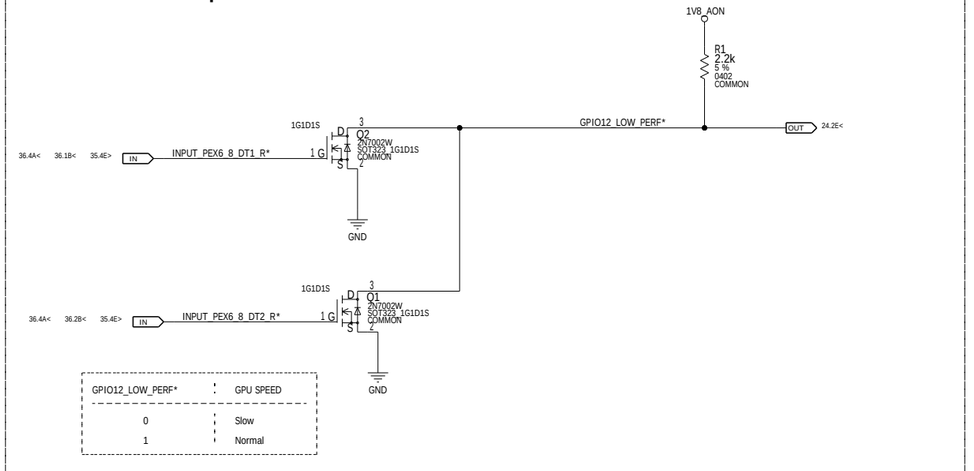


12V CURRENT STEERING (UNDER POWER BOOT):

GUIDES CURRENT FROM PEX EDGE TO PEX 6 PIN INPUT AREA



PEX Input - Power Level/PSI* Control



GPIO12_LOW_PERF*	GPU SPEED
0	Slow
1	Normal

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PAGE DETAIL	PS: STEERING, UPB & HOT-UNPLUG

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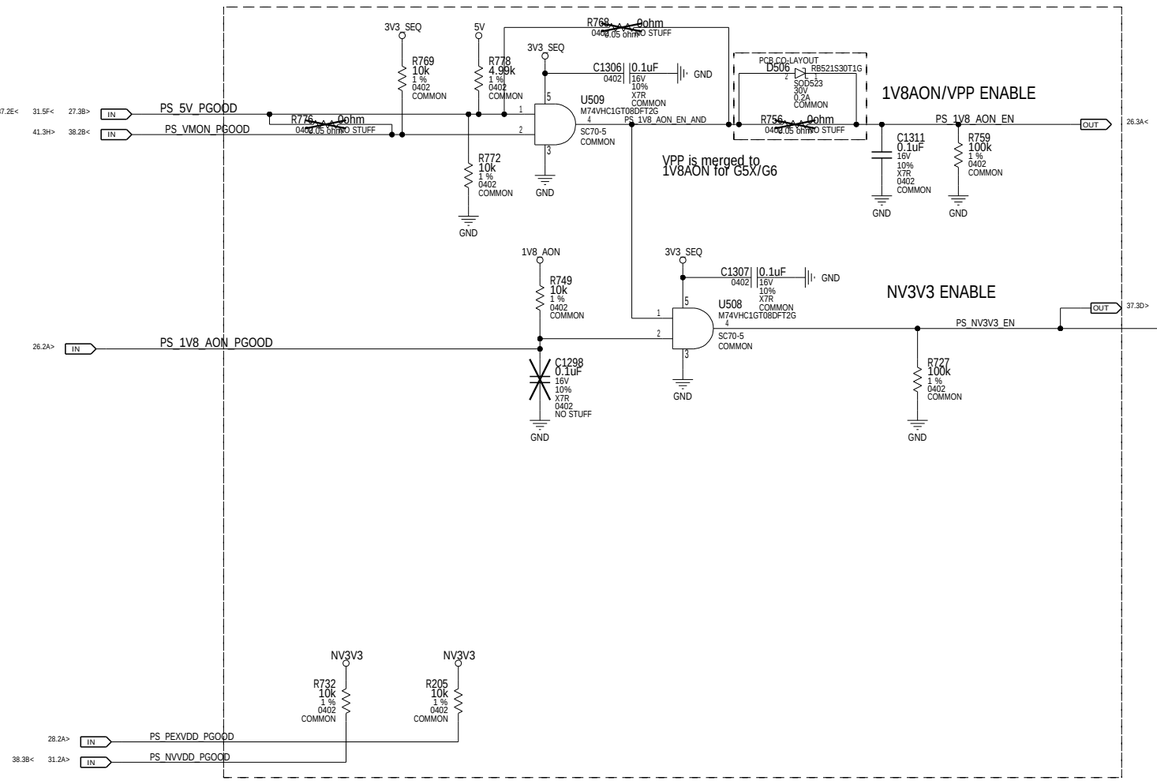
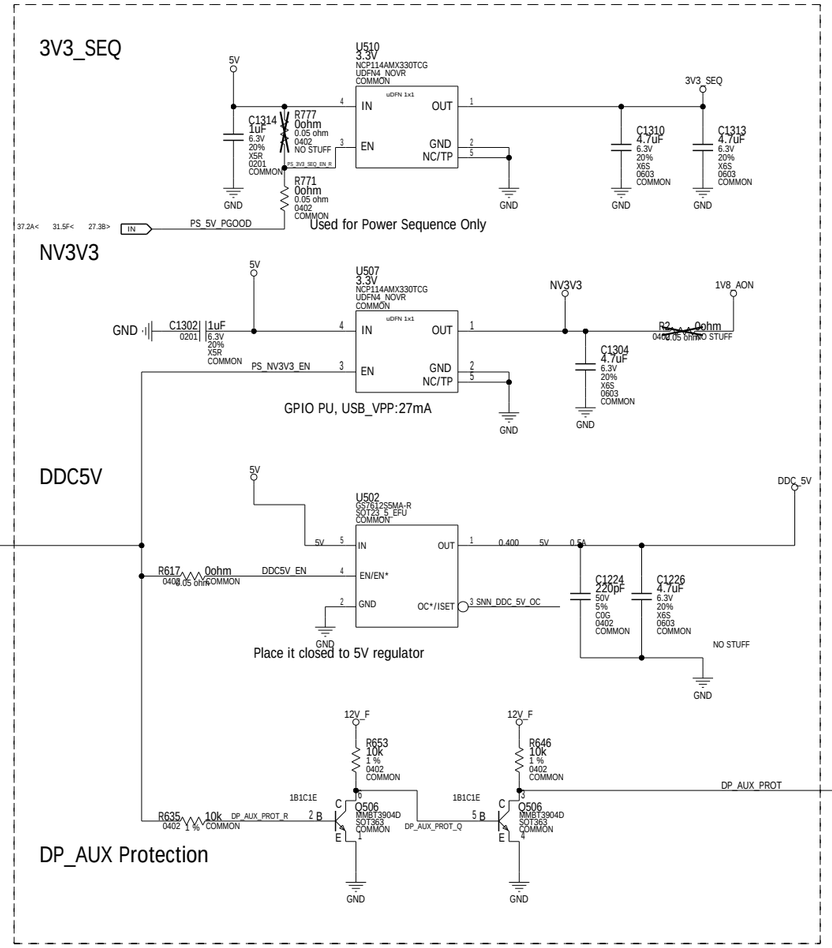
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	36 OF 42
BOM REV	A	DATE	27-NOV-2018

Page37: SEQ:5V,1V8,NV3V3 ENABLE





ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	SEQ: 5V, 1V8, NV3V3 ENABLE

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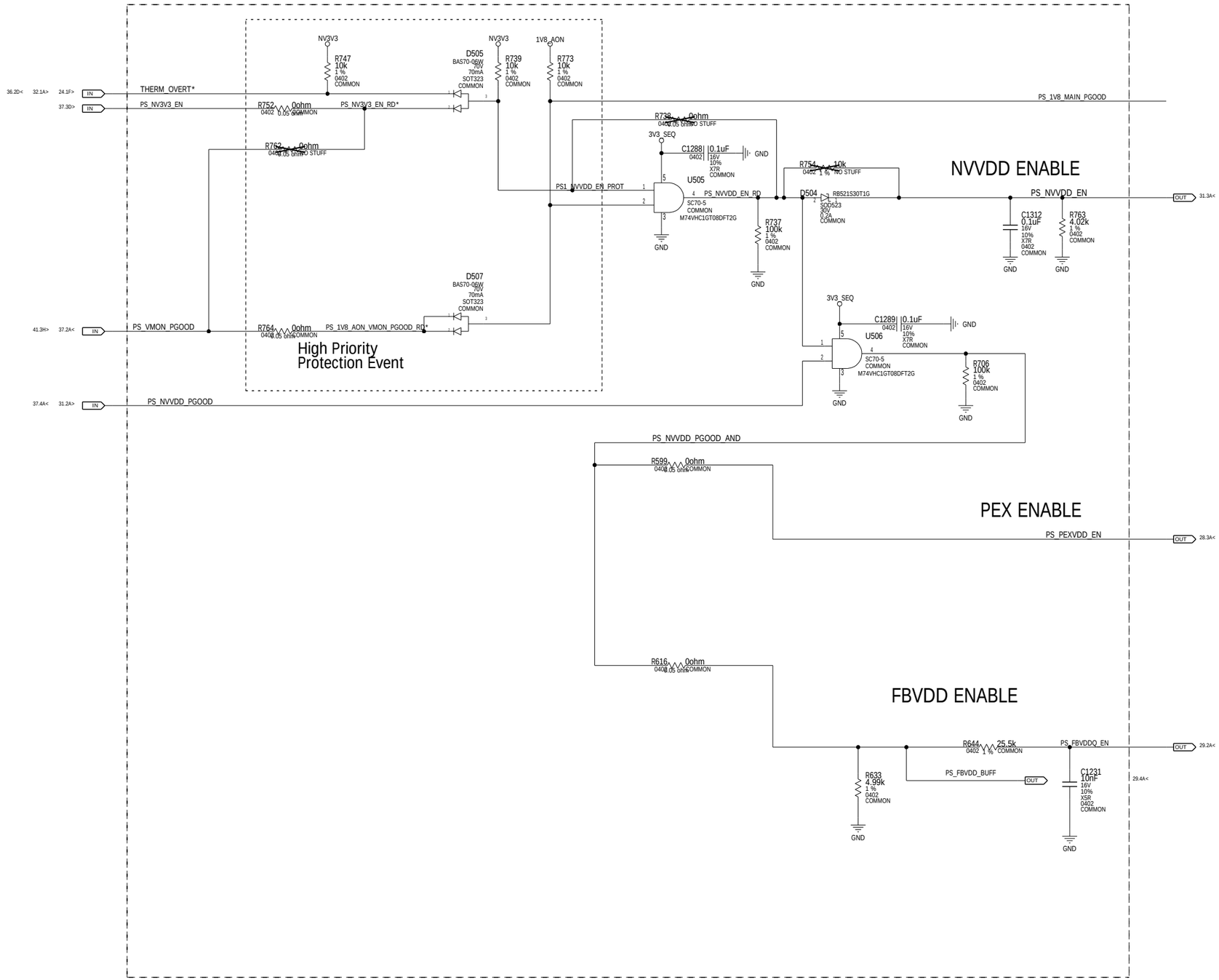
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	37 OF 42
BOM REV	A	DATE	27-NOV-2018

Page38: SEQ:NV,PEX,FB ENABLE



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	SEQ: NV, PEX, FB ENABLE

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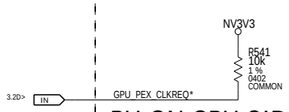
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	38 OF 42
BOM REV	A	DATE	27-NOV-2018

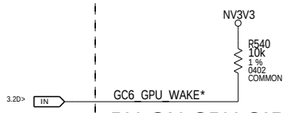
PEX_CLKREQ*



PU ON GPU SIDE

NC ON GOLD FINGER SIDE

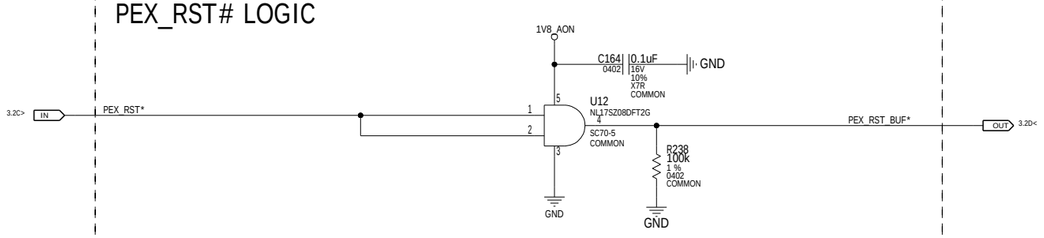
GPU_WAKE*



PU ON GPU SIDE

NC ON GOLD FINGER SIDE

PEX_RST# LOGIC



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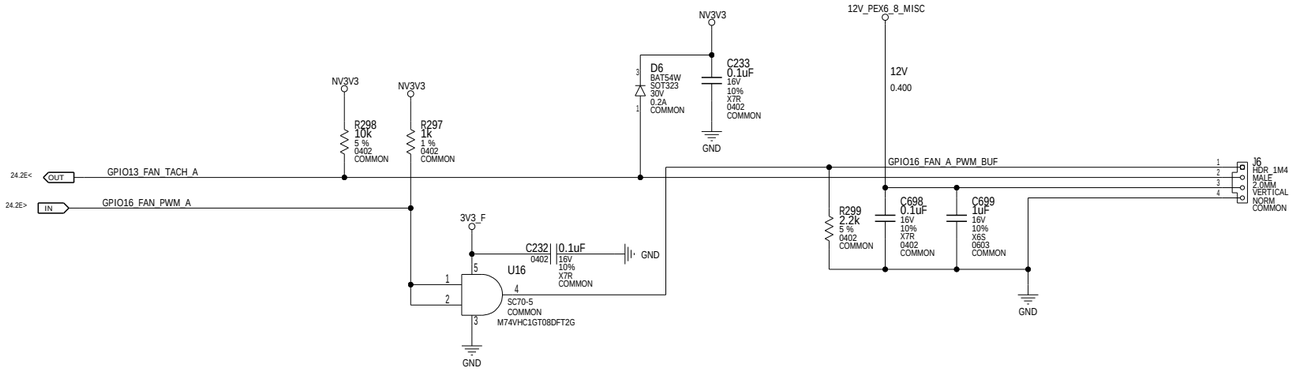
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	39 OF 42
BOM REV	A	DATE	27-NOV-2018

Page40: FAN



ASSEMBLY	BASE LEVEL GENERIC SCHEMATIC ONLY, COMMON & NO_STUFF ASSEMBLY NOTES AND BOM NOT FINAL
PAGE DETAIL	FAN

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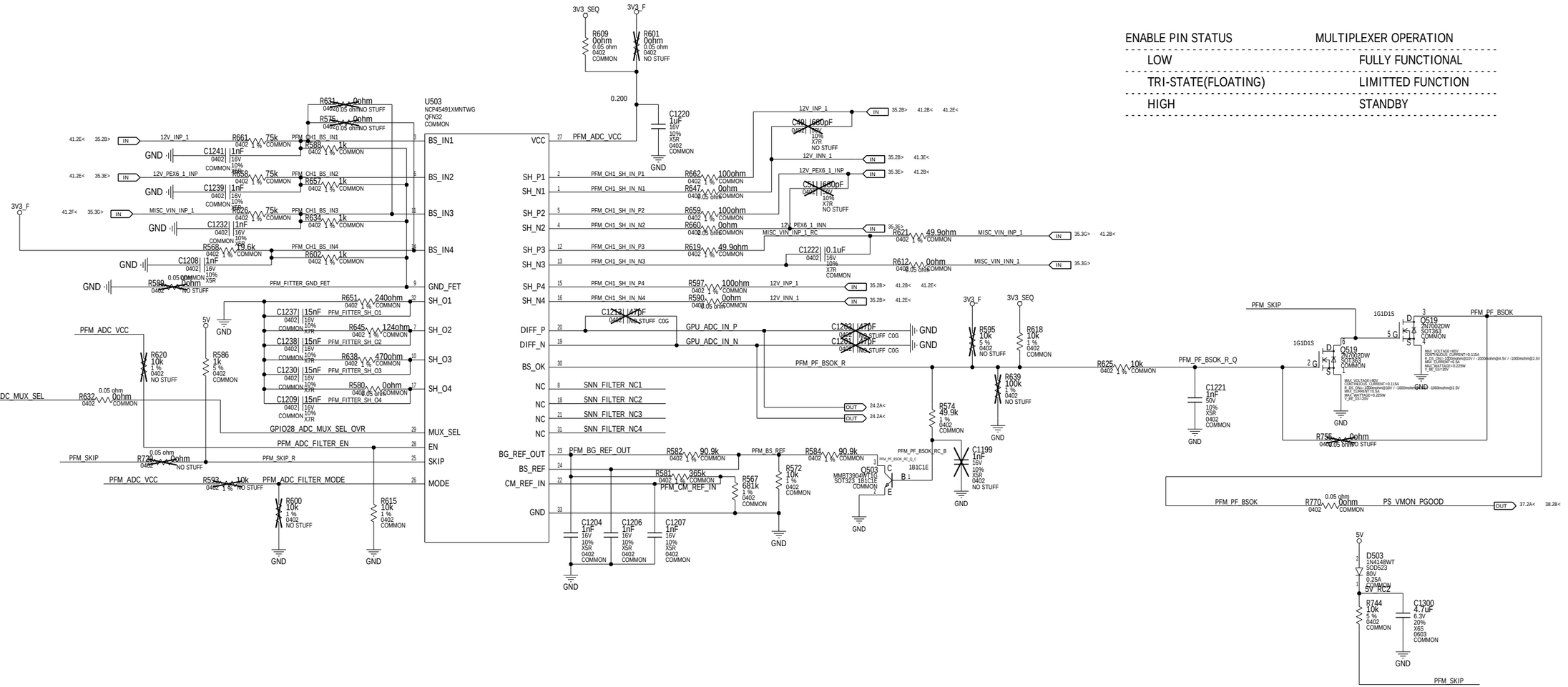
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	40 OF 42
BOM REV	A	DATE	27-NOV-2018

Page41: PWR SENSE

MODE PIN STATUS	MULTIPLEXER OPERATION
LOW	DEVICE A
TRI-STATE(FLOATING)	STAND-ALONE
HIGH	DEVICE B

ENABLE PIN STATUS	MULTIPLEXER OPERATION
LOW	FULLY FUNCTIONAL
TRI-STATE(FLOATING)	LIMITTED FUNCTION
HIGH	STANDBY



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PAGE DETAIL	PS: Pre-filter

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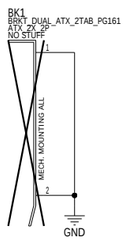
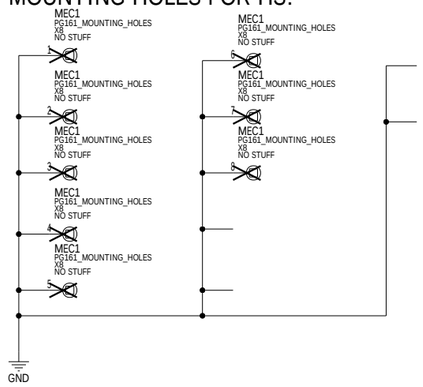
NV_PN	600-1G161-0021-QS1		
PCB REV	PG161-A01	PAGE	41 OF 42
BOM REV	A	DATE	27-NOV-2018

Page42: MECH

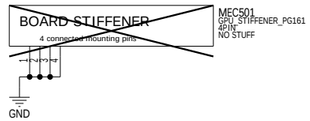
Bracket:



MOUNTING HOLES FOR HS:



BACK STIFFENER:



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PCB REV	PG161-A01	PAGE	42 OF 42
BOM REV	A	DATE	27-NOV-2018