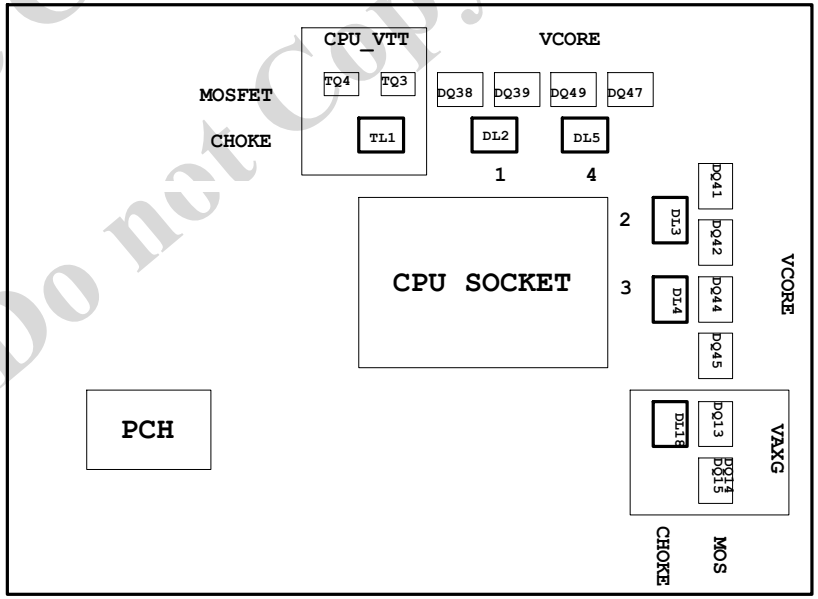
Model Name: GA-Z68AP-D3 2.0

SHEET	TITLE
01	COVER SHEET
02	BOM & PCB MODIFY HISTORY
03	BLOCK DIAGRAM
04	CPU_LGA1155-A
05	CPU_LGA1155-B
06	CPU_LGA1155-C
07	DDR III CHANNEL A
08	DDR III CHANNEL B
09	PCH_FDI,DMI,USB,PCIE
10	PCH_DP,CLK BUFFER
11	PCH_HOST,SATA,PCI
12	PCH_GPIO,CTRL,AUDIO
13	PCH_PWR,GND
14	PCI EXPRESS*16 SLOT
15	PCI EXPRESSX4 SLOT / PCIE X1 SLOT
16	IT8892
17	PCI SLOT 1&2
18	I/O ITE8728
19	COM, LPT, TPM
20	Dual BIOS
21	ALC889
22	REAR AUDIO JACK
23	VCORE PWM_ISL6364CRZ-1
24	VCORE PWM_ISL6364CRZ-2
25	DISCRETE POWER
26	DDR_15V & VCC1_05_PCH PWM_ISL6545CBZ
27	CPU_VTT PWM_ISL95870

SHEET	TITLE
28	VCCSA POWER
29	F_PANEL , F_USB
30	ATX POWER, CLOCK GEN
31	HWM,KB/MS , FAN CTRL
32	REALTEK RTL8111E
33	ETRON 168A
34	HDMI
35	VAXG POWER, mSATA
36	
37	
38	
39	
40	



Gigabyte Technology

Title: Cover Sheet

Size: Custom | Document Number: GA-Z68AP-D3 | Rev: 2.0

Date: Monday, September 19, 2011 | Sheet 1 of 35

GA-Z68AP-D3
Component value change history

Data	Change Item	Reason
2011/01/28 EBOM:02	e-bom for P67A-D3-0.2	
2011/02/10 EBOM:01	1.RENAME FOR P67A-D3-B3-0.1	
	2.CPU VCORE EC14,DEC4,DEC5,DEC6,TEC8電容移除	
	3.PCH VCC1_05 switch power------->linear power	
	4.PCH B2---->B3料號;R216 51 ---->1K	
2011/02/25 PBOM:10A	1.DR275 1K--->100K,R220 200 OHM---->1K 2.ADD TBC40,TBC41 FOR CPU VTT POWER RIPPLE	
2011/03/07 PBOM:10B	1.DEL R50 FOR 8278DX JP6 ISSUE	
	2.PCH HEATSINK換成有銘板消庫存	
2011/03/30 EBOM:10T	1.DEL EC30,EC31,TEC3,LEC1	
	2.F1,F4 1206 --->1812 SIZE; ADD R130 FOR ERP compability;add BC259,AD1,TBC42,TBC43,LBC26	
	3.ADD LAESD1 FOR LEN LED PROTECT	
	4.FOR PCH ERP	
2011/05/09 EBOM:01	1.DEL CLOCK GEN.	
	2.ADD HDMI, mSATA ,CPU VAXG POWER	
2011/05/16 PBOM:10A	1.DR309 499 --->1K	
	2.CPU VCORE/VAXG LOADLINE 阻值調整	
2011/07/20 EBOM:01	1.FOR GA-Z68AP-S3	
2011/08/08 EBOM:20T	1.ADD ITE8275 FOR DES,ALC889,全日固,MOS_HS	
2011/09/15 PBOM:20A	1.DEL CESD2	2.ADD CR24 FOR AUDIO SNR ISSUE
	3.TUNE CPU LOADLINE DR303-->1.91K	4.del DR355,DR360,DR364,DQ51,DQ54

Circuit or PCB layout change

DATE	Change Item	Reason
2010/07/05 PCB:0.1	1.NEW MODEL: P67A-D3-0.1	
2010/08/18 PCB:0.2	由GA-P67A-D3-0.1 rename GA-P67A-UD3-0.2	
	1.update MOS_HS footprint 2.2Oz copper pcb	
2010/10/05 PCB:0.1	由GA-P67A-UD3-0.2 修改	
2010/10/18 PCB:0.2	1.確認SATA 6GB PORT0 OR PORT1???	
	2.NO TURBO USB3.0 ,SUR1~SUR8 ------>SHORT WIRE	
2011/01/10 PCB:0.2	1.NEW MODEL: P67A-D3-0.2 由 P65A-D3-0.2修改	
	1.co-lay 電容移除	
	2.CPU VCORE 電容多留不用的MASK起來	
	3.0 OHM---->SHORT-WIRE	
2011/02/08 PCB:0.1	由0.2修改---->RENAME GA-P67A-D3-B3	
	1.co-lay 電容移除	
	2.CPU VCORE EC14,DEC4,DEC5,DEC6,TEC8電容移除;調整MOS_HS與CHOKE及電容的位置避免撞件	
	3.PCH VCC1_05 switch power------->linear power	
2011/02/24 PCB:1.0	1.CR49,CR50 short-wire ----->open,add LR15 FOR AUDIO line out SNR issue	
	2.DR290,DR293,DR312,DR333,DR351,R264,CR31 0 OHM---->SHORT-WIRE	
	3.背面電容mask	
	4.ADD TBC40,TBC41 to reduce CPU VTT power ripple	
2011/03/30 PCB:1.0T	1.ADD CLOCK BUFFER	
2011/05/04 PCB:0.1	1.由P67A-D3-B3-1.0T修改	
	2.DEL CLOCK GEN.	
	3.ADD HDMI, mSATA ,CPU VAXG POWER	
2011/05/15 PCB:1.0	1.Z68AP-D3-1.0 FOR MP	
2011/06/23 PCB:0.1	1.GA-Z68AP-S3由Z68AP-D3-1.0修改	
	2.CPU VCORE / VTT 上1下1,DDR TO-252 MOS,ALL IRON CHOKE.	
	3.NO 3X 力,單一POLY FUSE,NO SMART FAN; pure mSATA	
2011/08/04 PCB:2.0T	1.GA-Z68AP-S3-0.1 RENAME GA-Z68P-DS3-2.0T----->RENAME Z68AP-D3-2.0T	
	2.ADD ITE8275 FOR DES,ALC889,全日固	
2011/09/15 PCB:2.0	1.RENAME Z68AP-D3-2.0T -----> 2.0 for MP	

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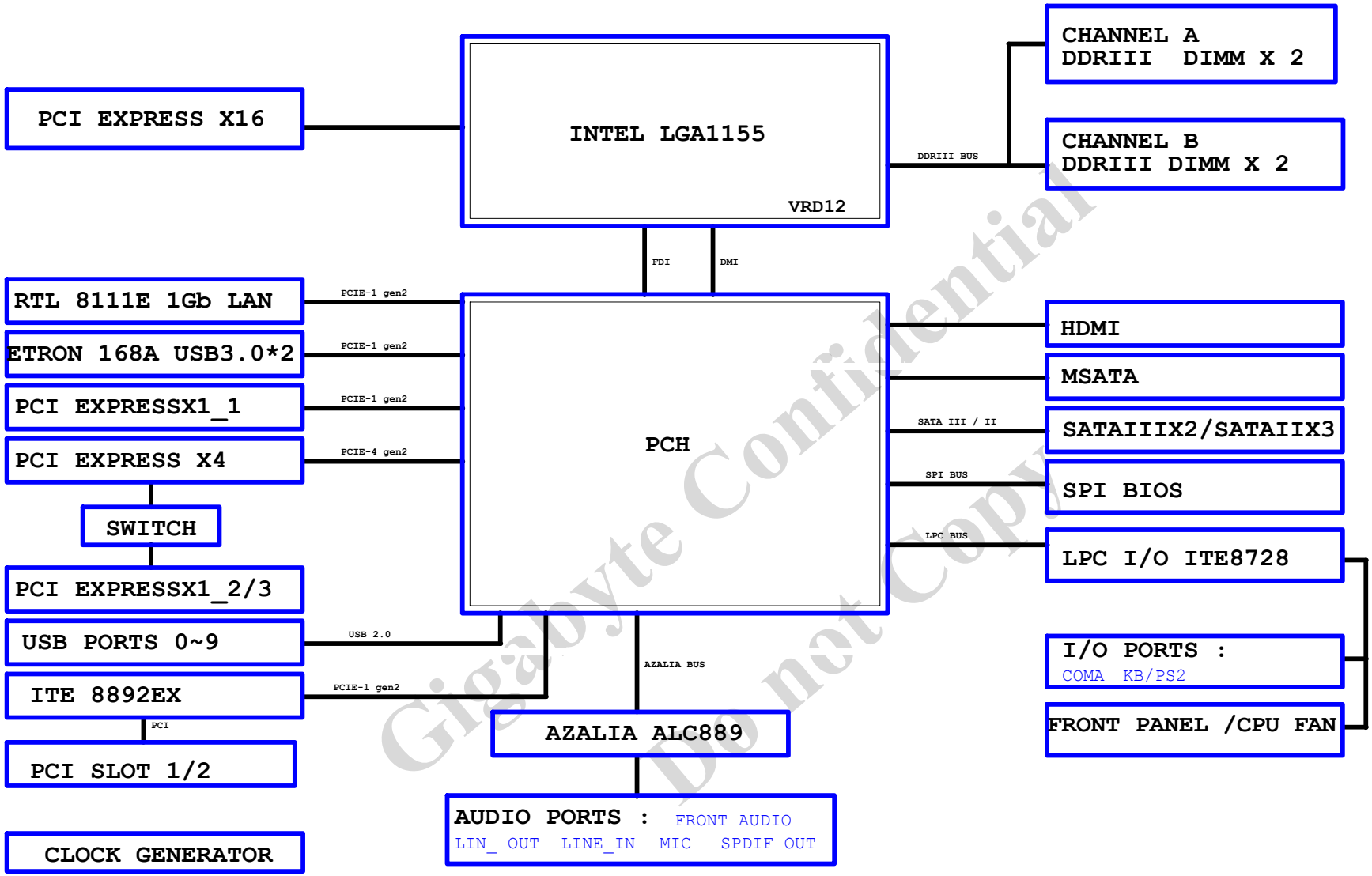
Title: BOM & PCB MODIFY HISTORY

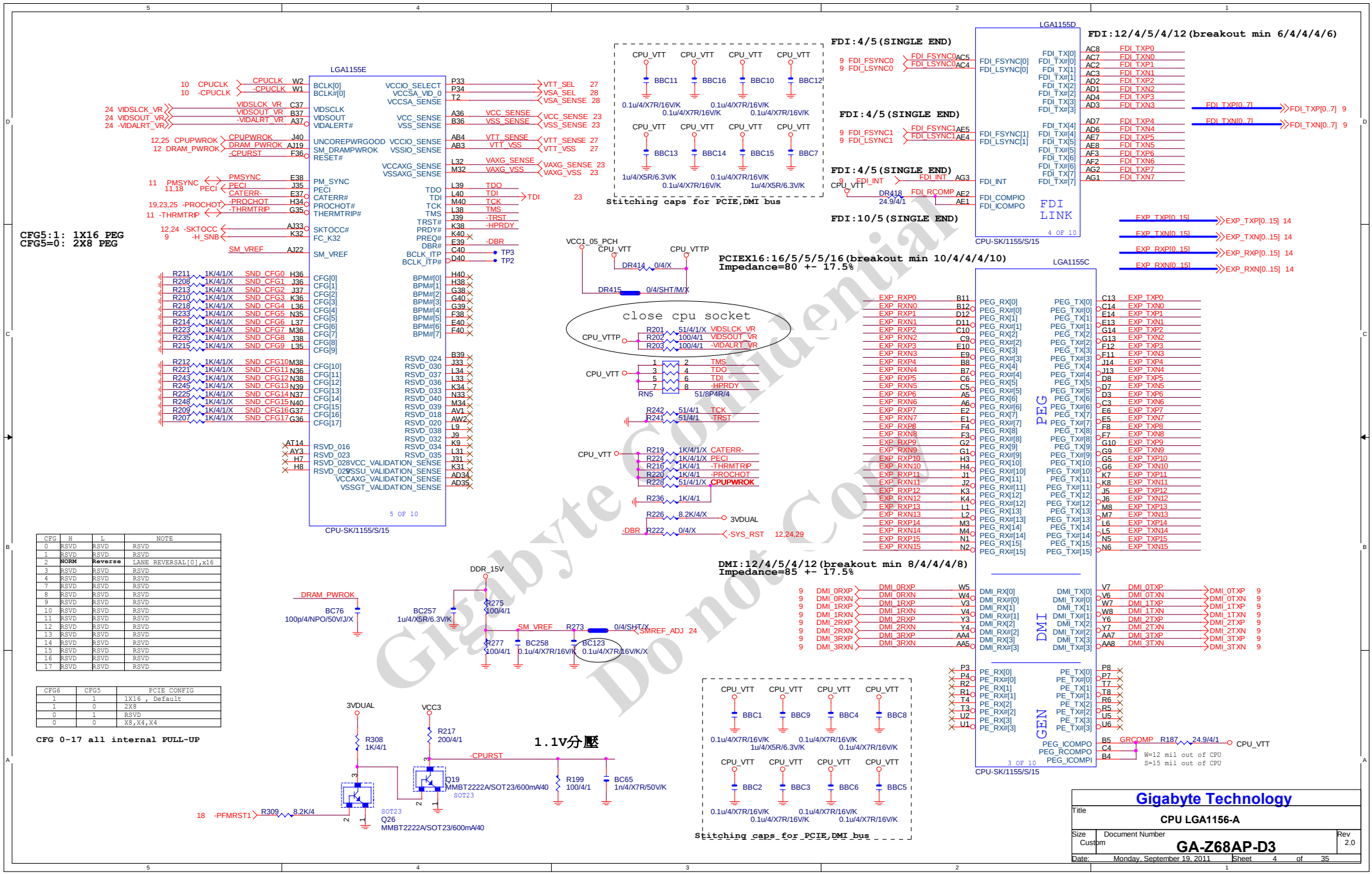
Size: Custom | Document Number: GA-Z68AP-D3 | Rev: 2.0

Date: Monday, September 19, 2011 | Sheet 2 of 35

BLOCK DIAGRAM



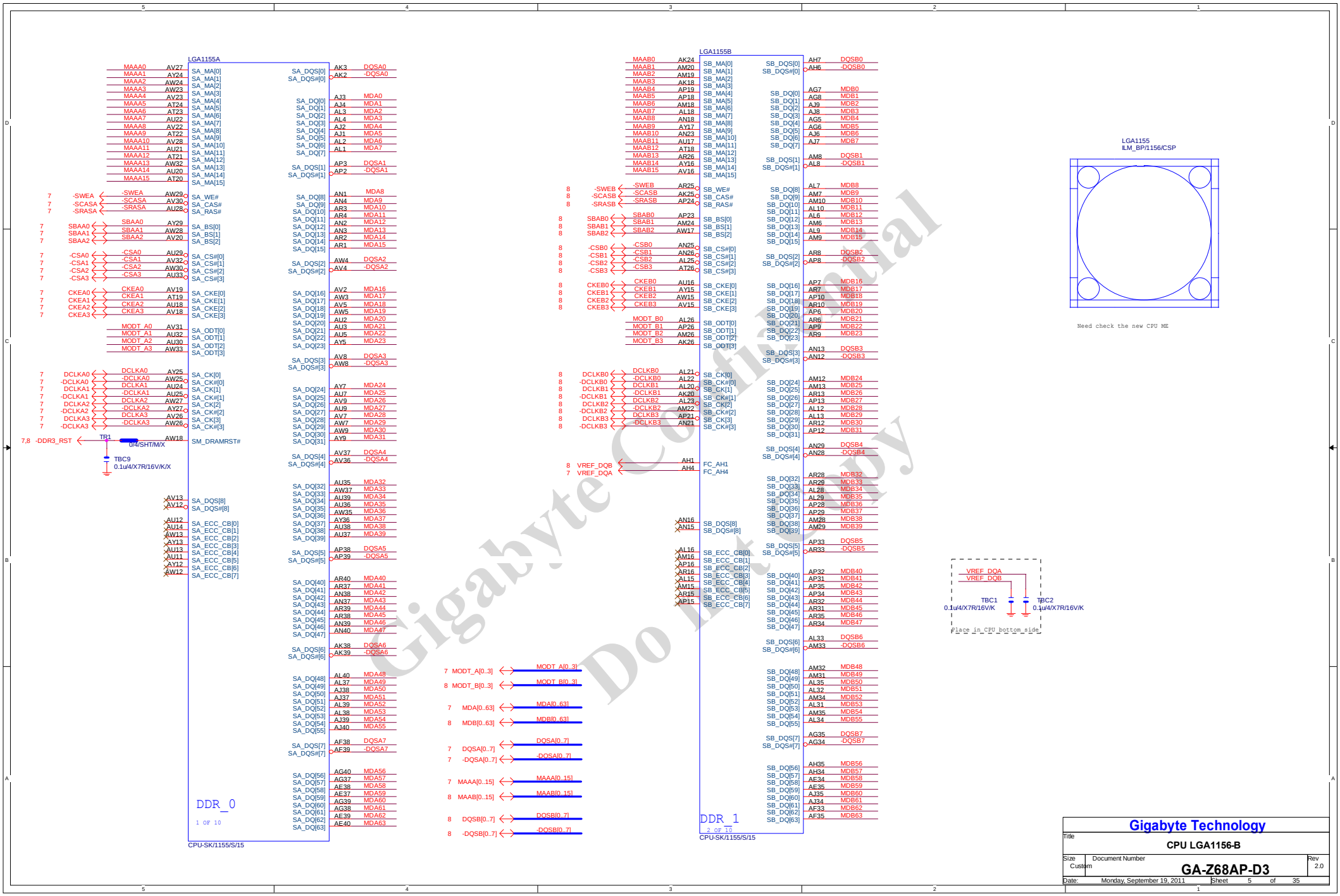
Gigabyte Technology		
Title: BLOCK DIAGRAM		
Size: C	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 3 of 35	

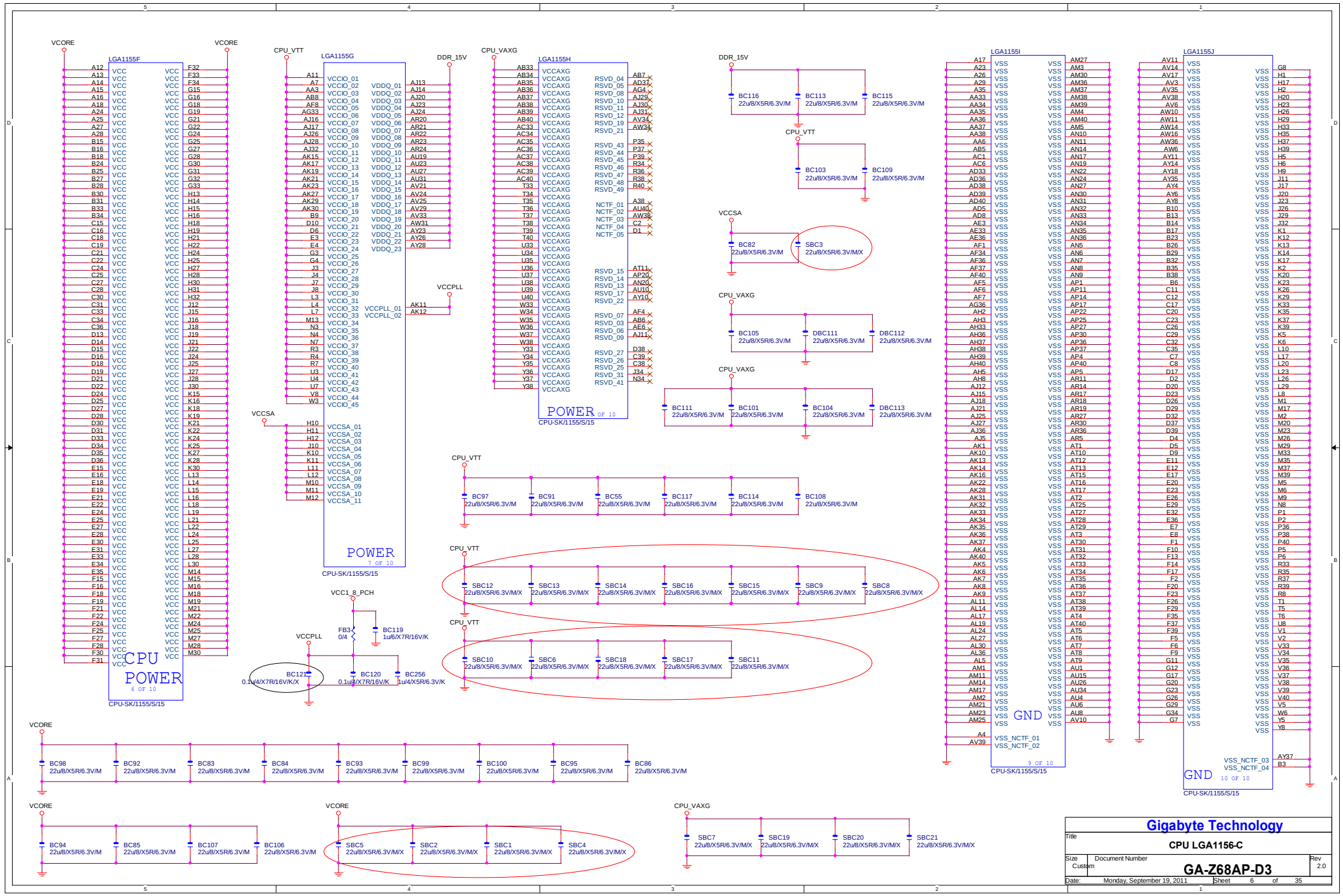


CFG	H	L	NOTE
0	RSVD	RSVD	RSVD
1	RSVD	RSVD	RSVD
2	**NORM**	**Reverse**	LANE REVERSAL[0],x16
3	RSVD	RSVD	RSVD
4	RSVD	RSVD	RSVD
7	RSVD	RSVD	RSVD
8	RSVD	RSVD	RSVD
9	RSVD	RSVD	RSVD
10	RSVD	RSVD	RSVD
11	RSVD	RSVD	RSVD
12	RSVD	RSVD	RSVD
13	RSVD	RSVD	RSVD
14	RSVD	RSVD	RSVD
15	RSVD	RSVD	RSVD
16	RSVD	RSVD	RSVD
17	RSVD	RSVD	RSVD

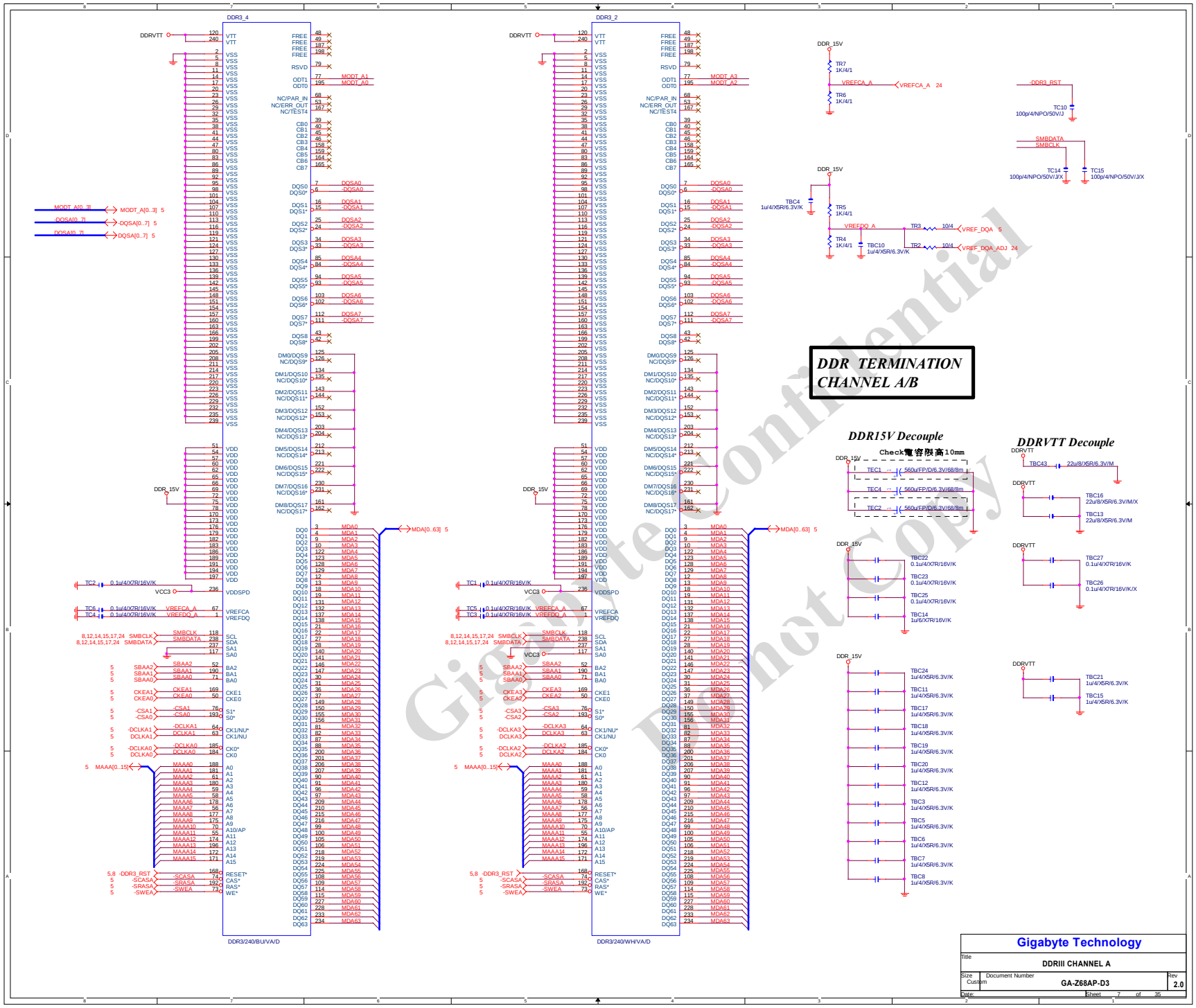
CFG6	CFG5	PCIE CONFIG
1	1	1X16 , Default
1	0	2X8
0	1	RSVD
0	0	X8,X4,X4

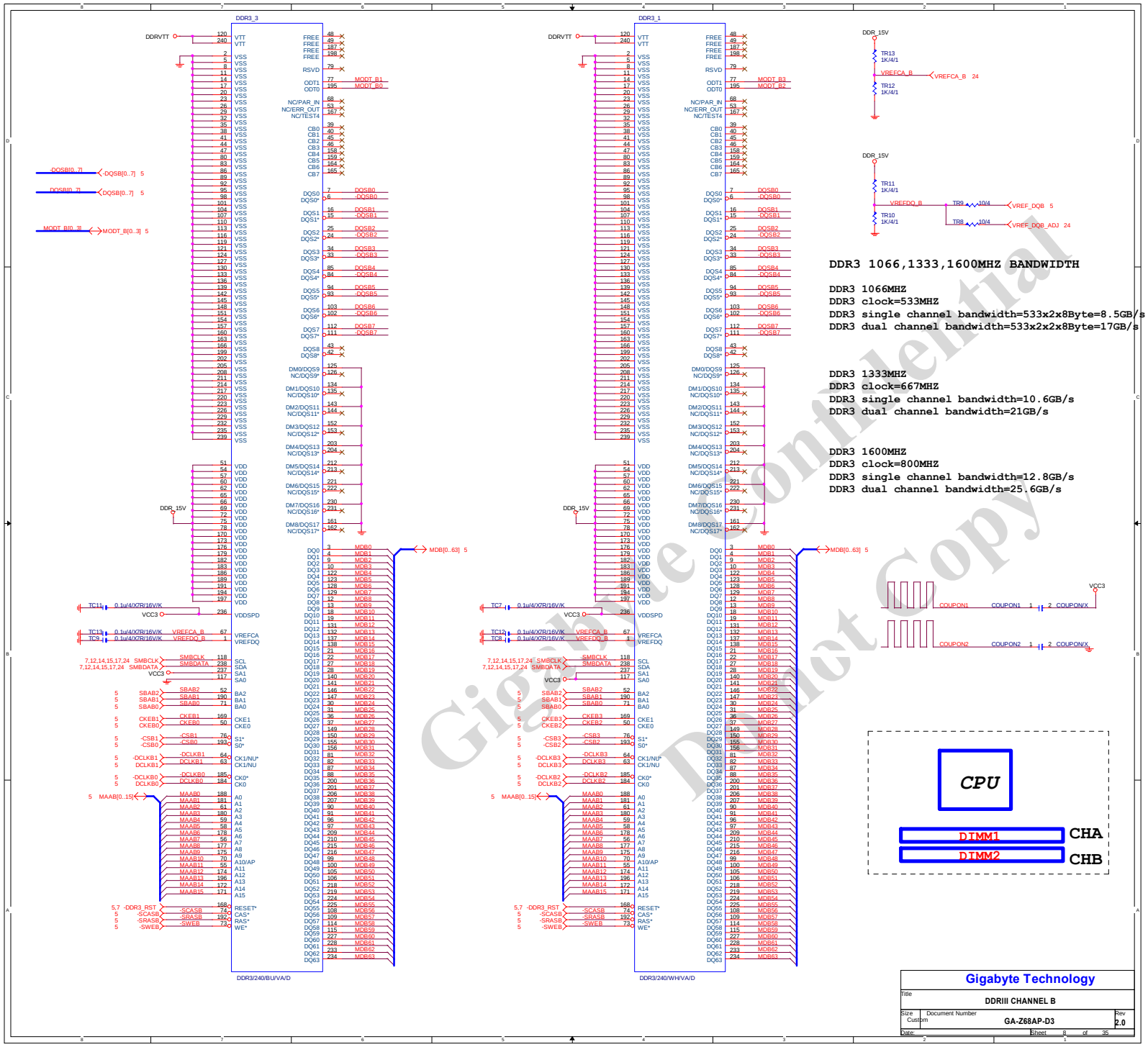
CFG 0-17 all internal PULL-UP





Gigabyte Technology		
Title: CPU LGA1156-C		
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 6 of 35	





USB:12/7.5/4.5/7.5/12 (breakout min 8/4/4/4/8)
Impedance=90 +- 17.5%

PCHB

H61 CHIP USB PORT 6/7 are Disable

OC[3:0]# for Device 29 (ports 0-7)

OC[7:4]# for Device 26 (ports 8-13)

USB OC#	Configure
OC0#	USB0,1
OC1#	USB2,3
OC2#	USB4,5
OC3#	USB6,7
OC4#	USB8,9
OC5#	USB10,11
OC6#	USB12,13
OC7#	Not Use

CHIP BD82268/B3 SLJ4F INTEL/[10HB1-030268-21R]

放靠近 Device & PCI-E Slot

PCIEX1:16/5/5/5/16 (breakout min 8/4/4/4/8)
Impedance=80 +- 17.5%

PCHG

CHIP BD82268/B3 SLJ4F INTEL/[10HB1-030268-21R]

PCHE

NVRAM

CHIP BD82268/B3 SLJ4F INTEL/[10HB1-030268-21R]

R102 short to GND in non graphic SKU

DMI /FDI termination voltage

P67/ H67 MODEL上有銘版的HS

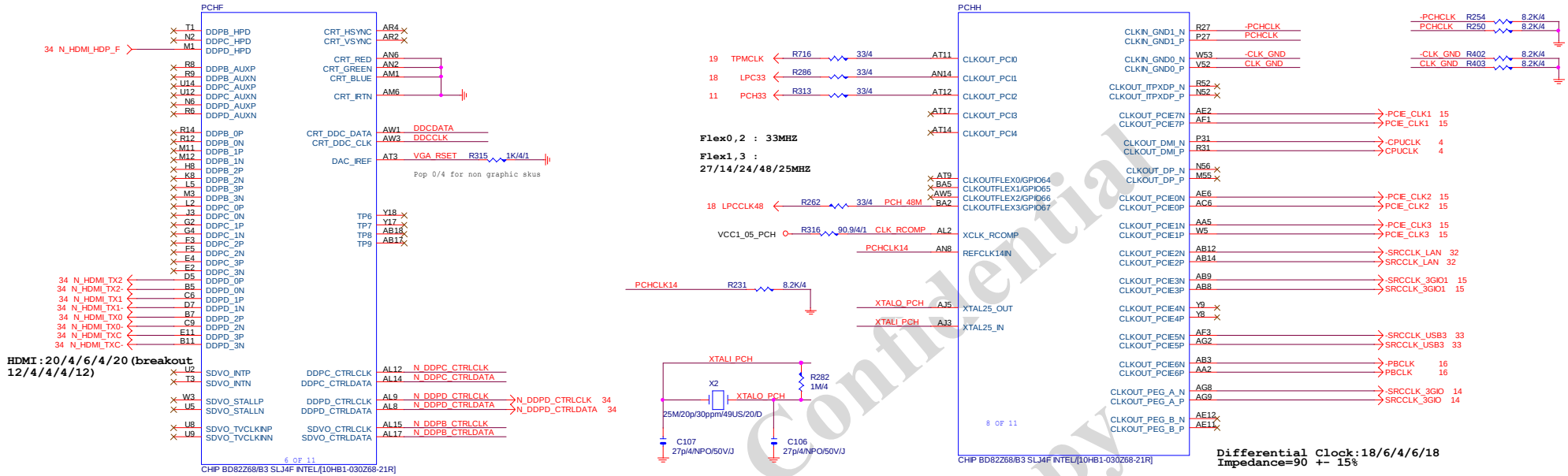
1.舊料號(PCH HS 貼銘板)
(1) 12SP2-050072-01R---國格
(2) 12SP2-050072-02R---志航
(3) 12SP2-050072-03R---信緯
2.新料號(PCH HS 無銘板)
(1) 12SP2-050072-11R---國格
(2) 12SP2-050072-12R---志航
(3) 12SP2-050072-13R---信緯

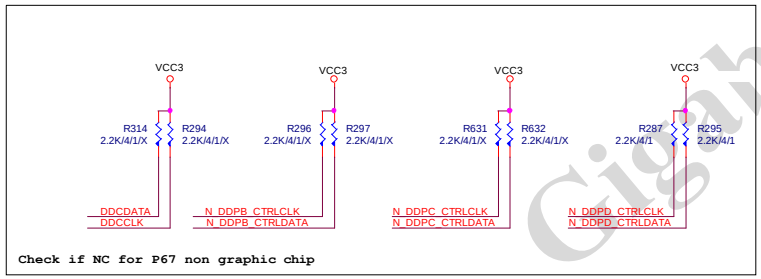
HEAT SINK/H67MA-D2H/PCH/KWOGER/[12SP2-050072-01R_12SP2-050072-03R_12SP2-050072-02R]/X

Z68 MODEL

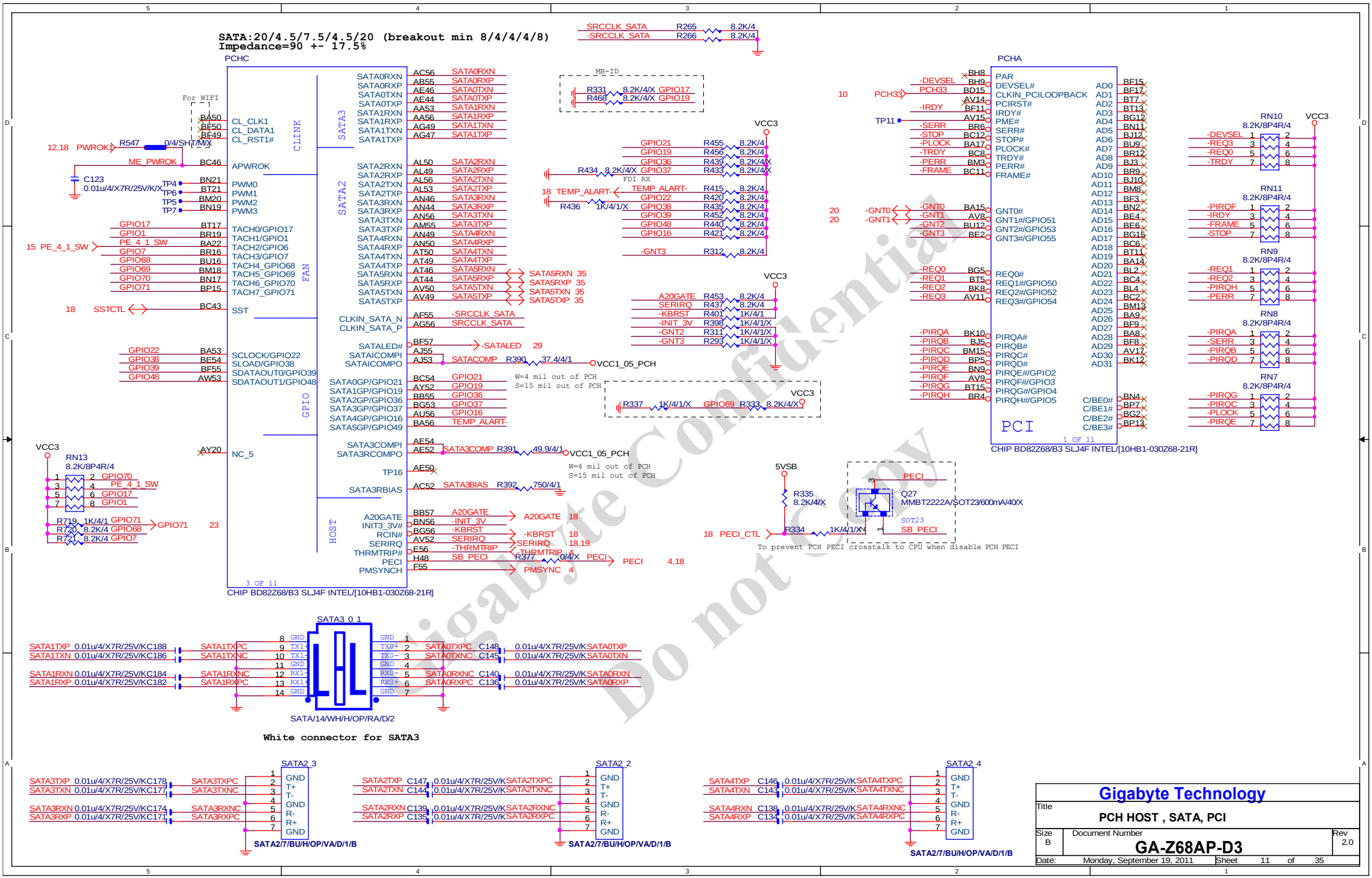
PCH_HS/[12SP2-S04311-01R_12SP2-S04311-02R_12SP2-S04311-03R]

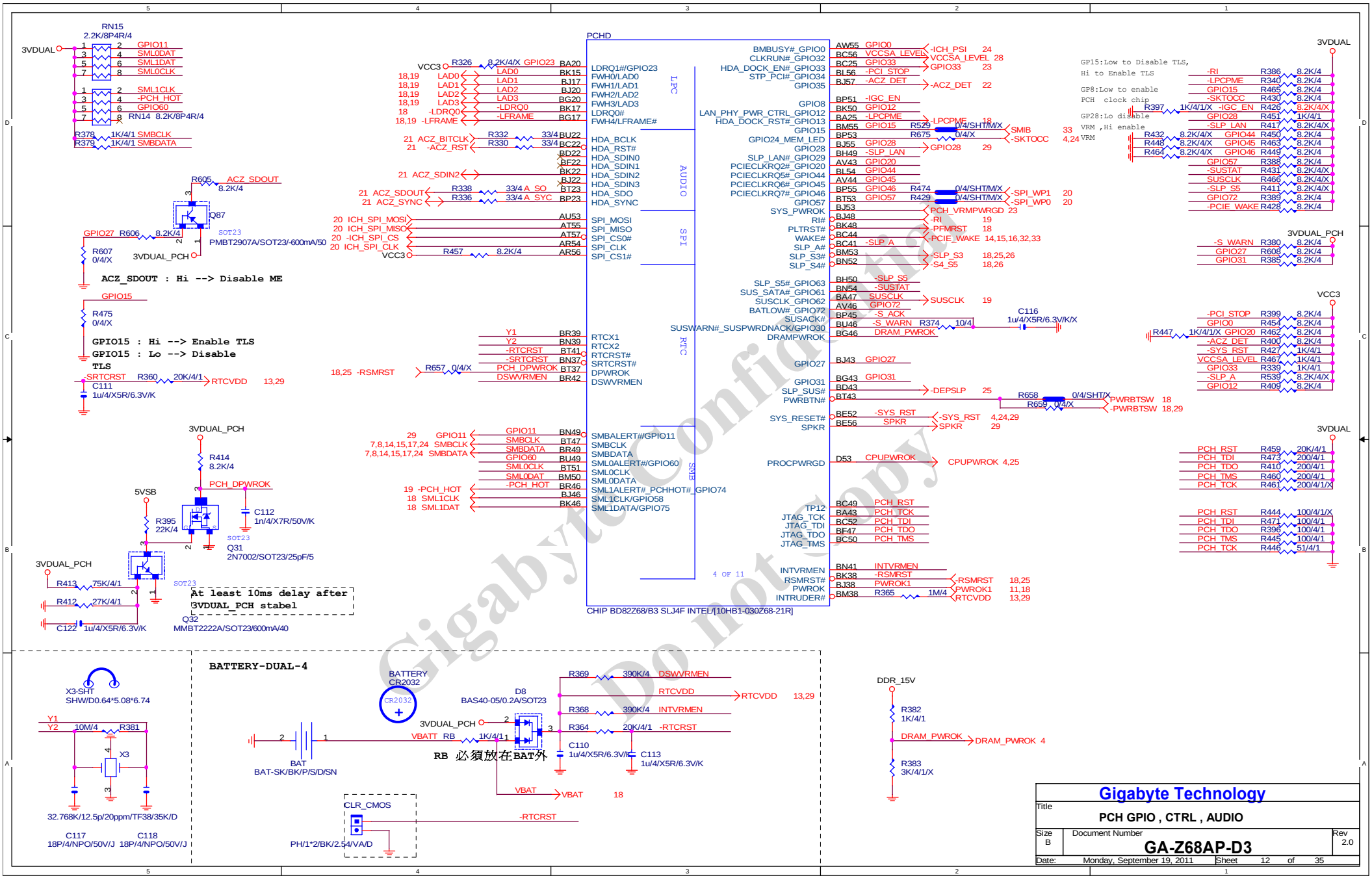
Gigabyte Technology	
Title	PCH FDI,DMI,USB ,PCIE
Size	Custom
Document Number	GA-Z68AP-D3
Rev	2.0
Date:	Monday, September 19, 2011
Sheet	9 of 35

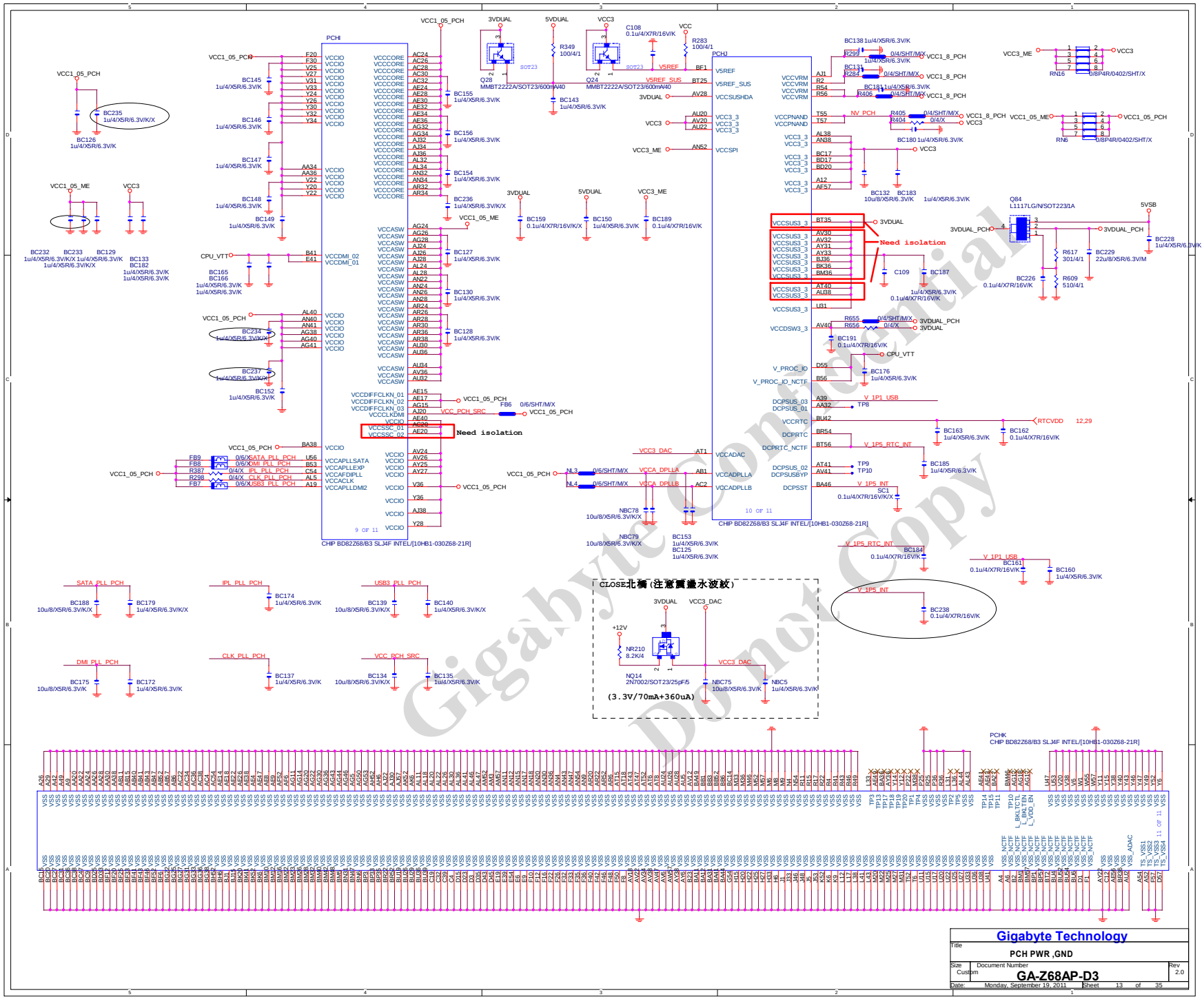


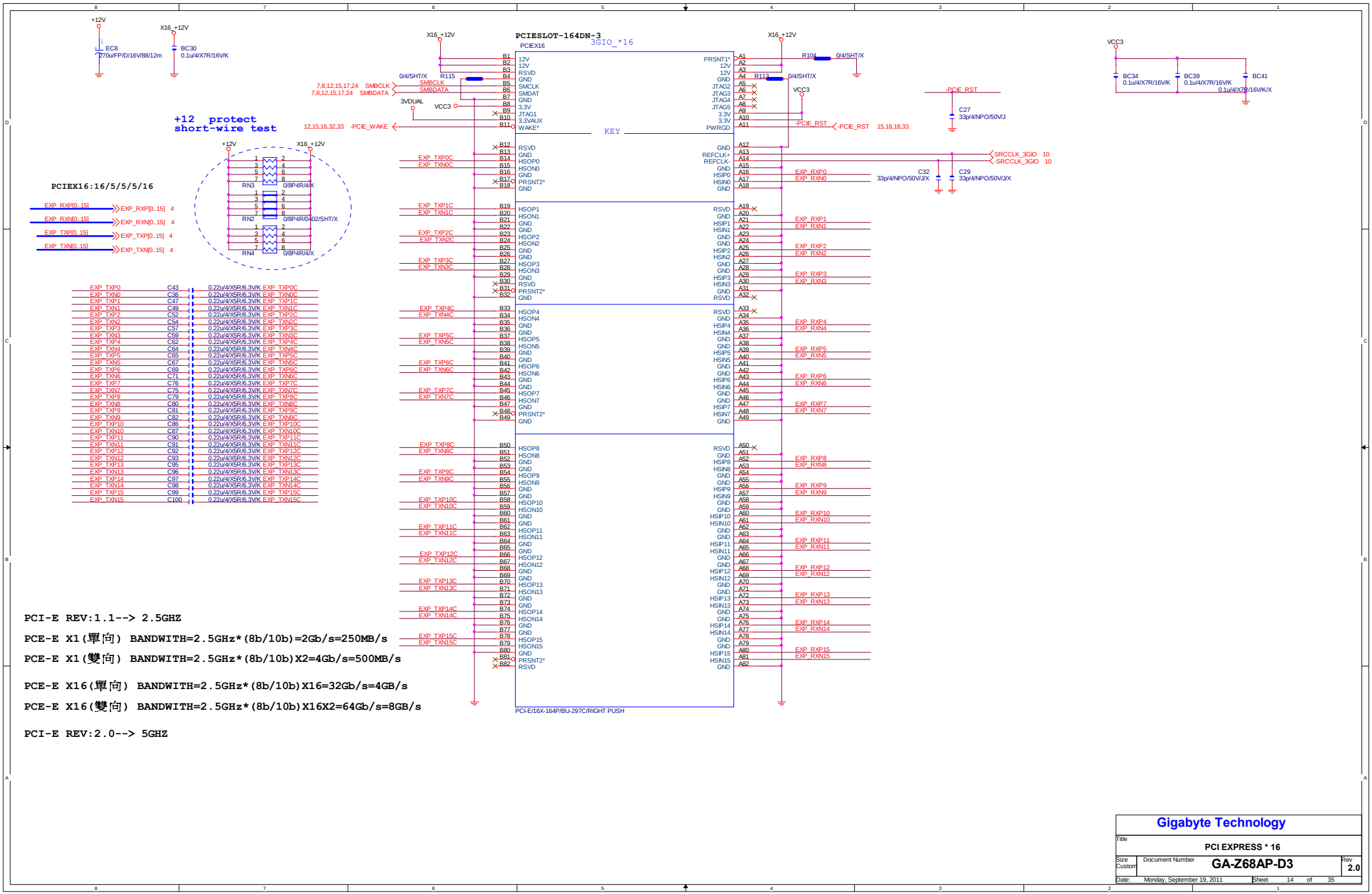


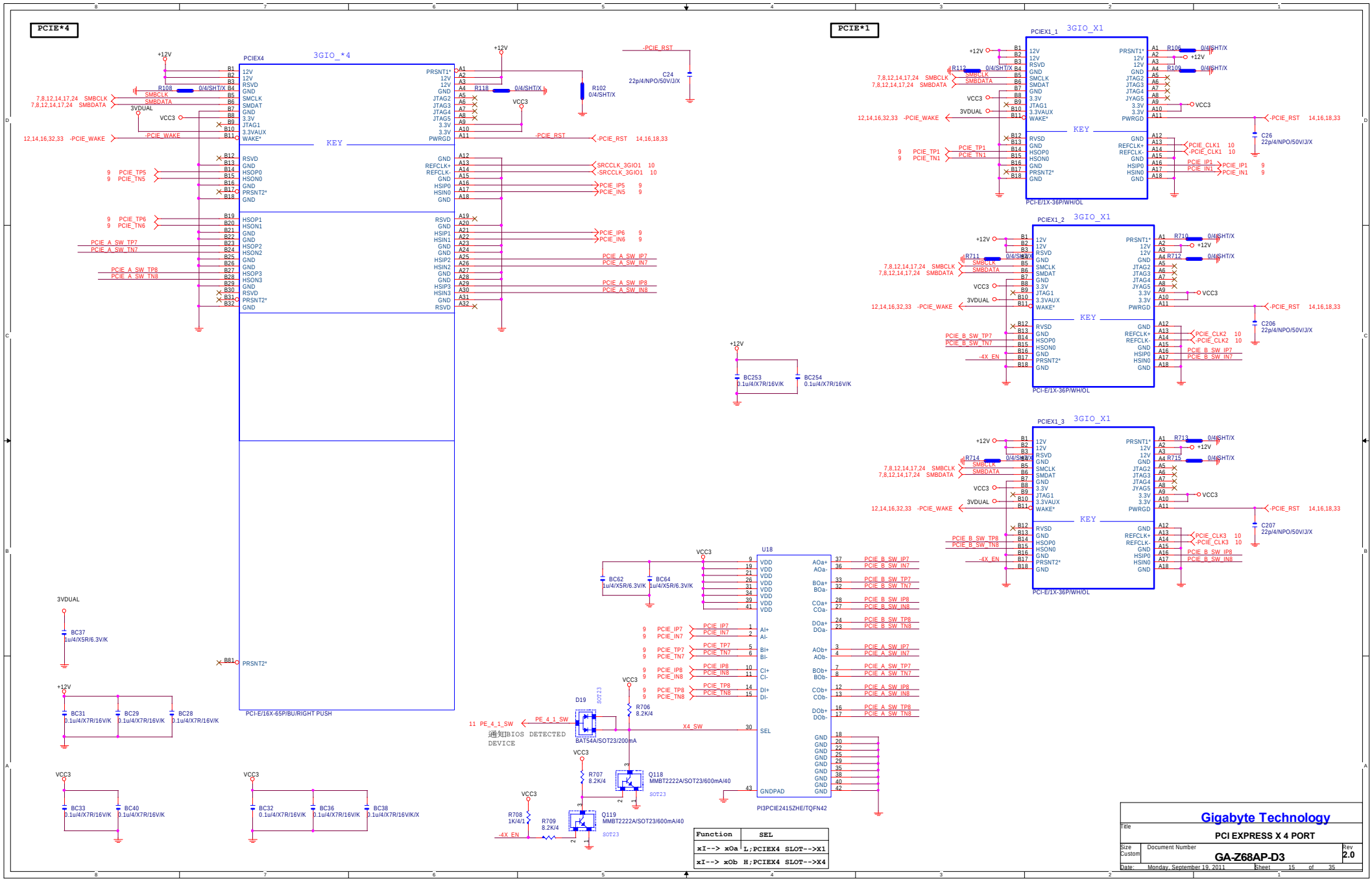
Gigabyte Technology		
Title: PCH DISPLAY ,CLK BUFFER		
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 10 of 35	

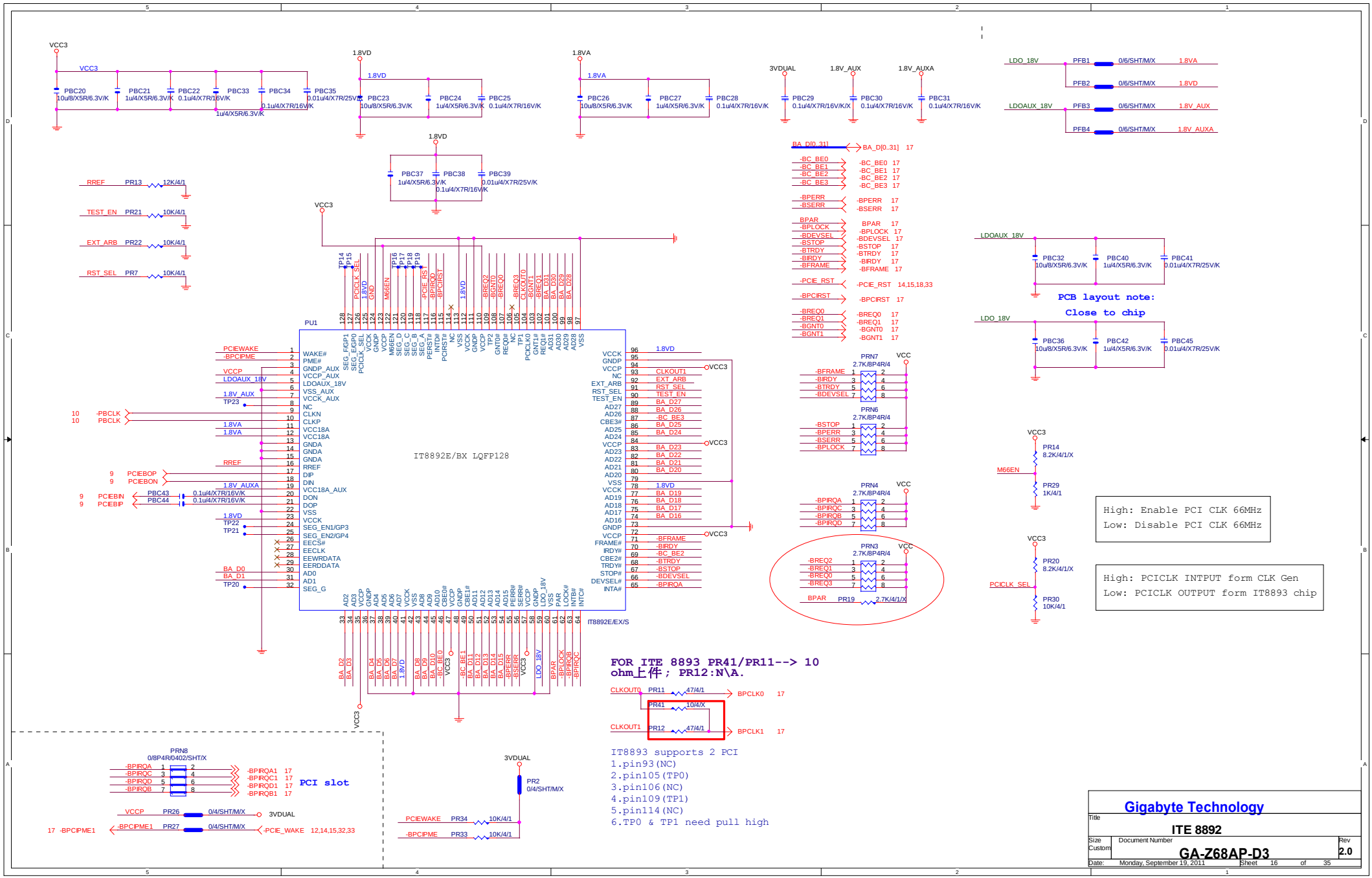


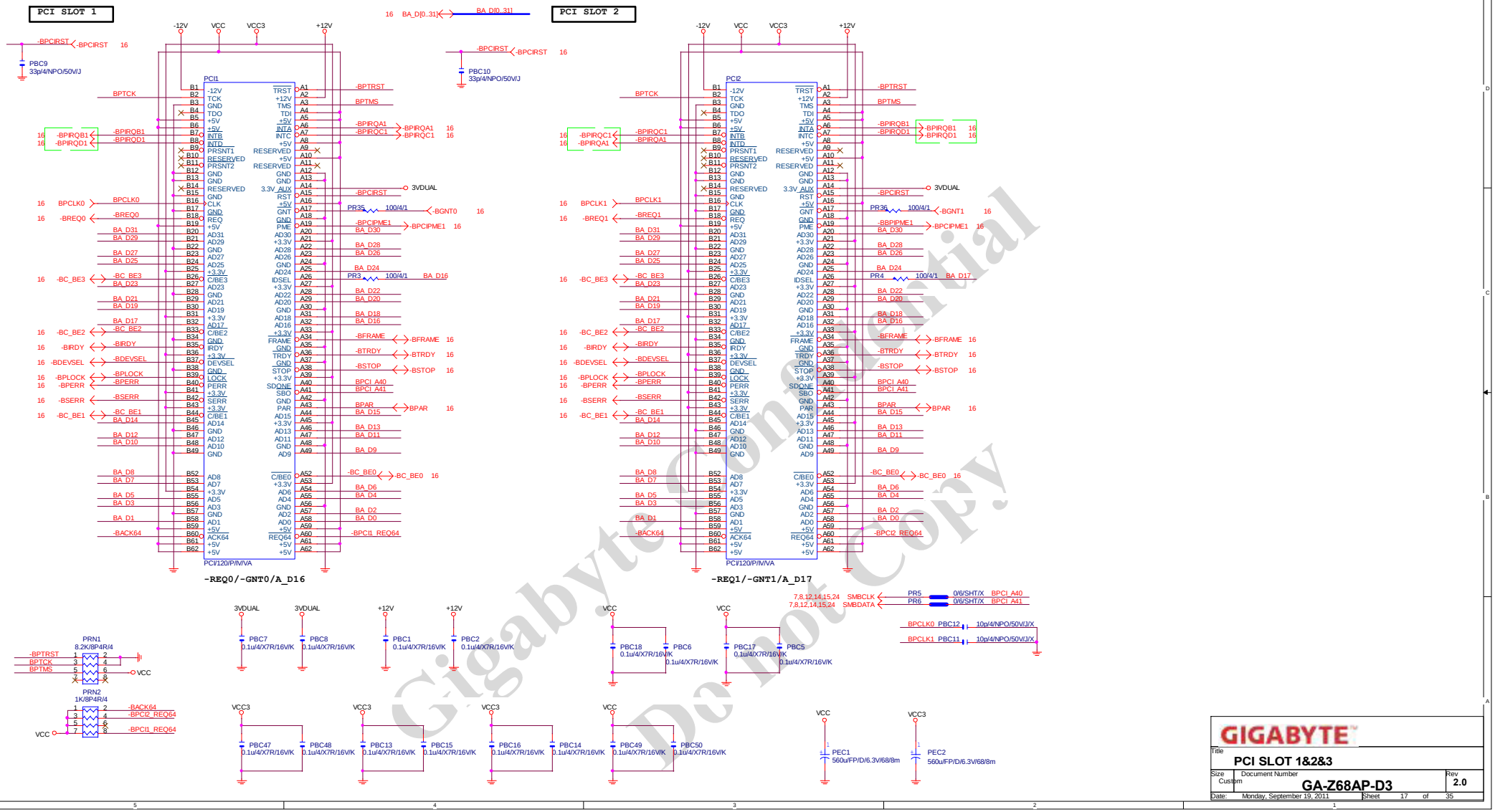


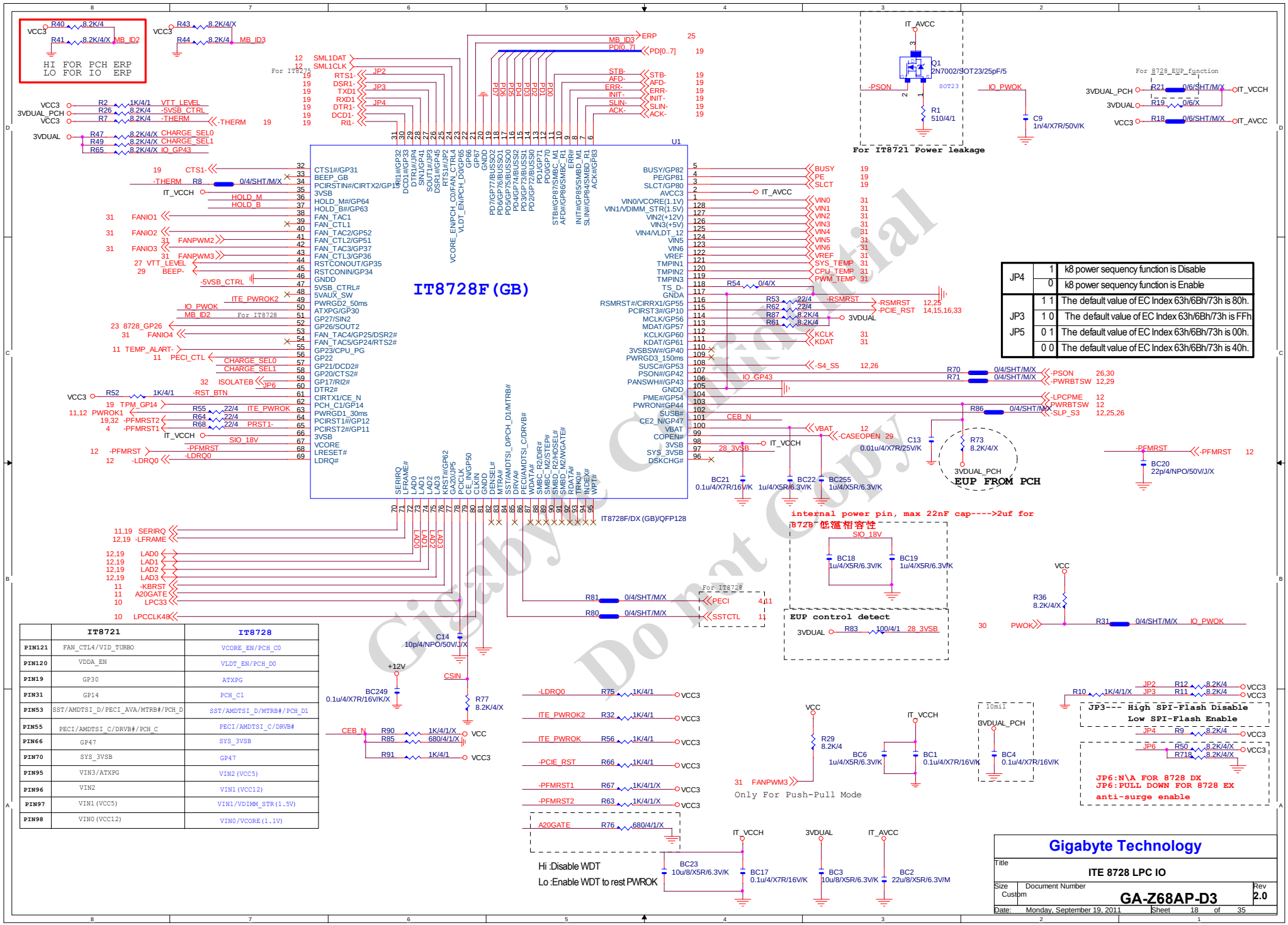






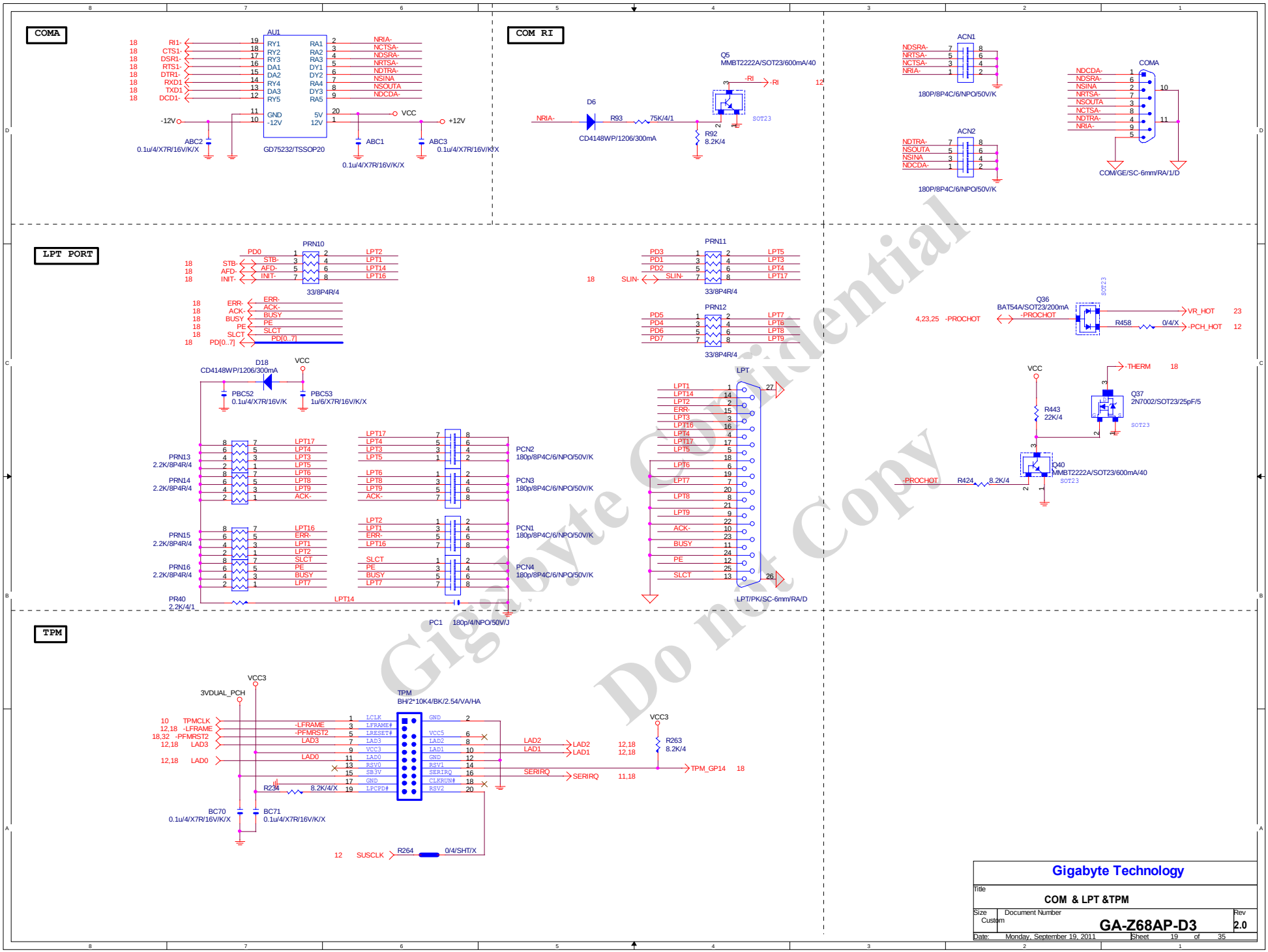


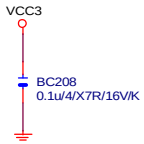




JP4	1	k8 power sequency function is Disable
	0	k8 power sequency function is Enable
JP3 JP5	1 1	The default value of EC Index 63h/6Bh/73h is 80h.
	1 0	The default value of EC Index 63h/6Bh/73h is FFh
	0 1	The default value of EC Index 63h/6Bh/73h is 00h.
	0 0	The default value of EC Index 63h/6Bh/73h is 40h.

	IT8721	IT8728
PIN121	FAN_CTL4/VID_TURBO	VCORE_EN/PCH_C0
PIN120	VDDA_EN	VLDT_EN/PCH_D0
PIN19	GP30	ATXPG
PIN31	GP14	PCH_C1
PIN53	SST/AMDTSI_D/PECI_AVA/MTRB#/PCH_D	SST/AMDTSI_D/MTRB#/PCH_D1
PIN55	PECI/AMDTSI_C/DRVB#/PCH_C	PECI/AMDTSI_C/DRVB#
PIN66	GP47	SYS_3VSB
PIN70	SYS_3VSB	GP47
PIN95	VIN3/ATXPG	VIN2(VCC5)
PIN96	VIN2	VIN1(VCC12)
PIN97	VIN1(VCC5)	VIN1/VDIMM_STR(1.5V)
PIN98	VIN0(VCC12)	VIN0/VCORE(1.1V)



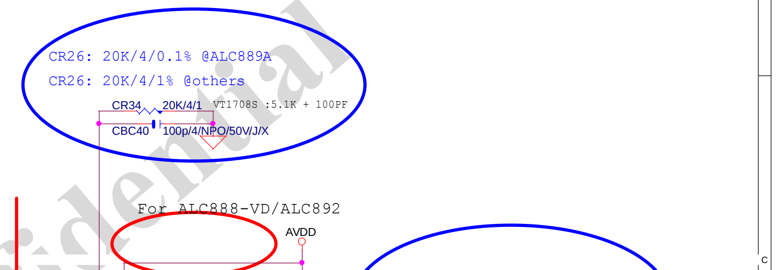


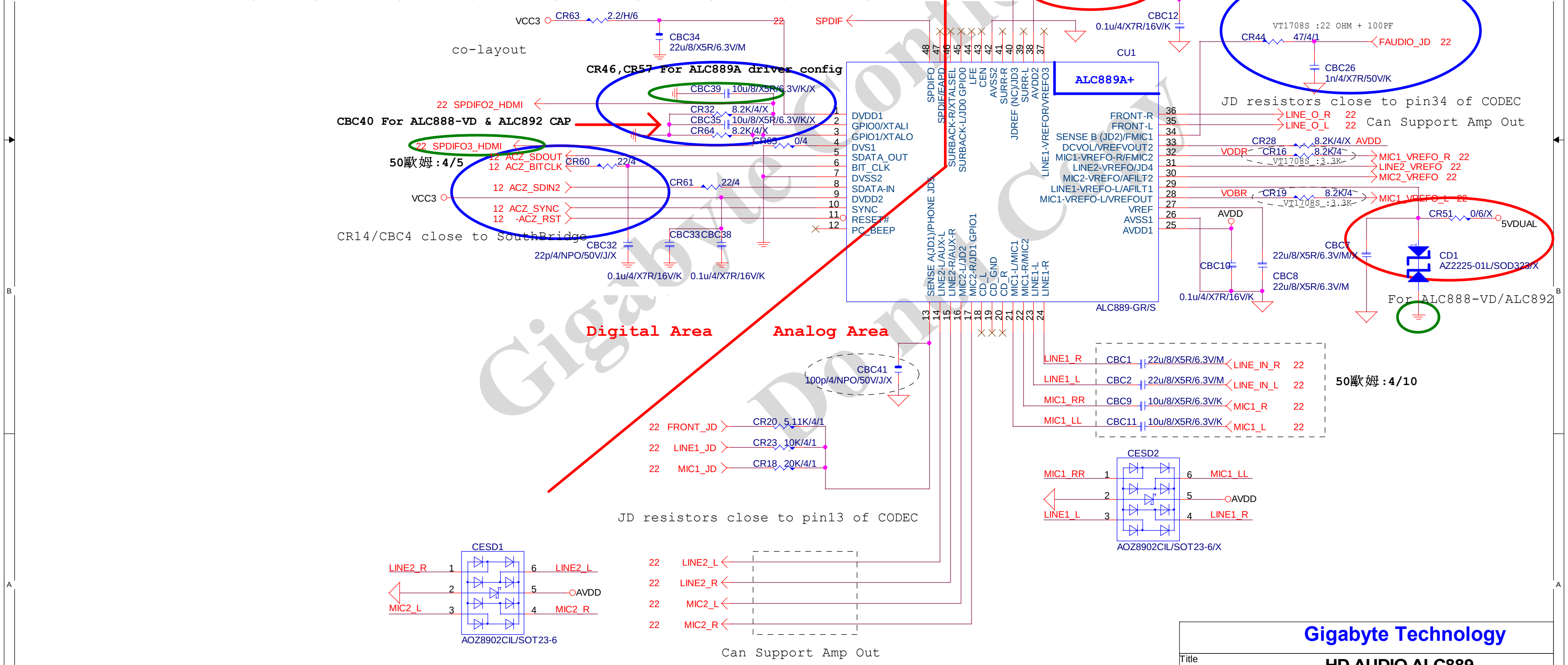
	Gigabyte Technology	
Title	BIOS	
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 20 of 35	

AZALIA CODEC

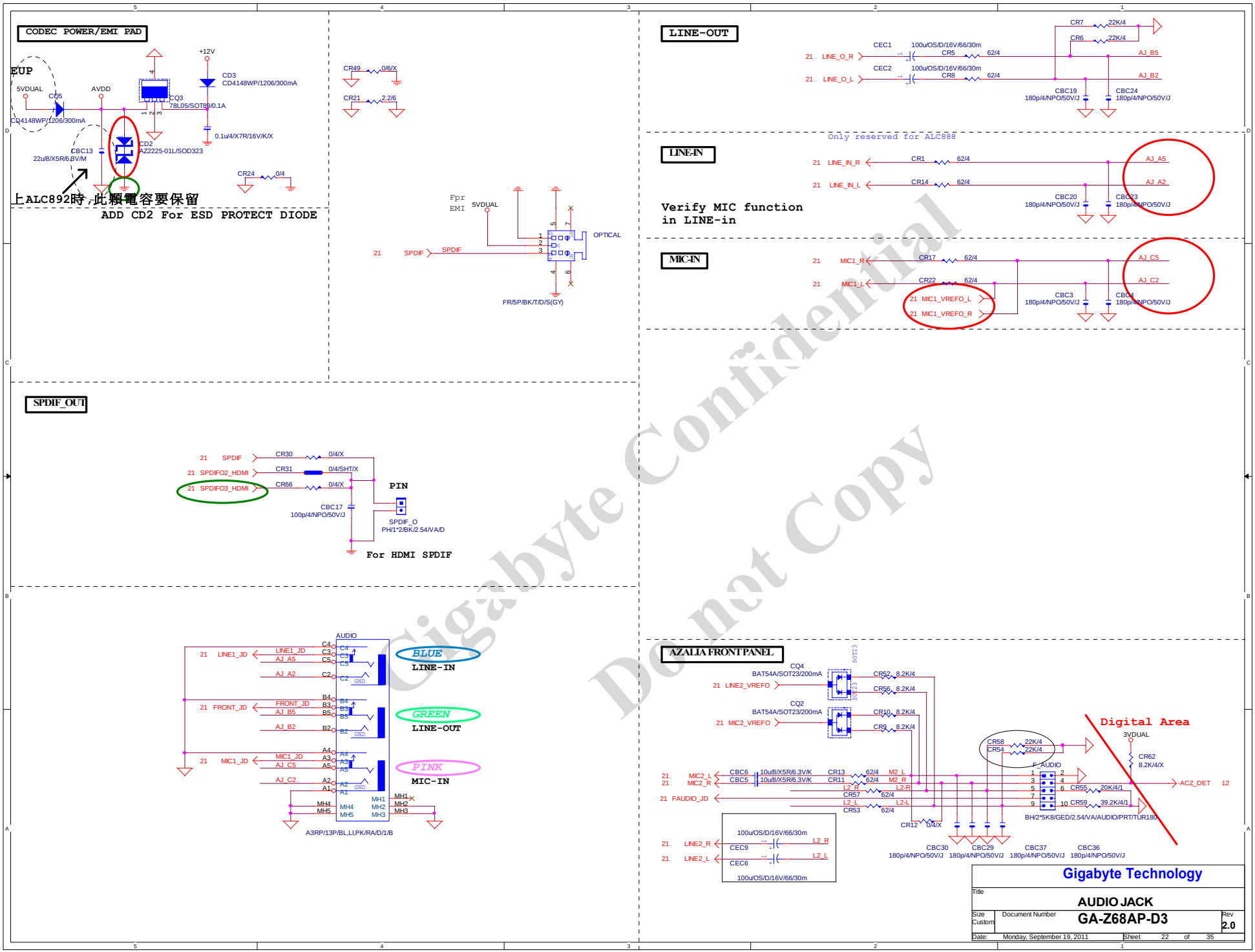
ALC883/ALC888-A/ALC888B/ALC888-VD/ALC892R/ALC889/ALC889A Colay

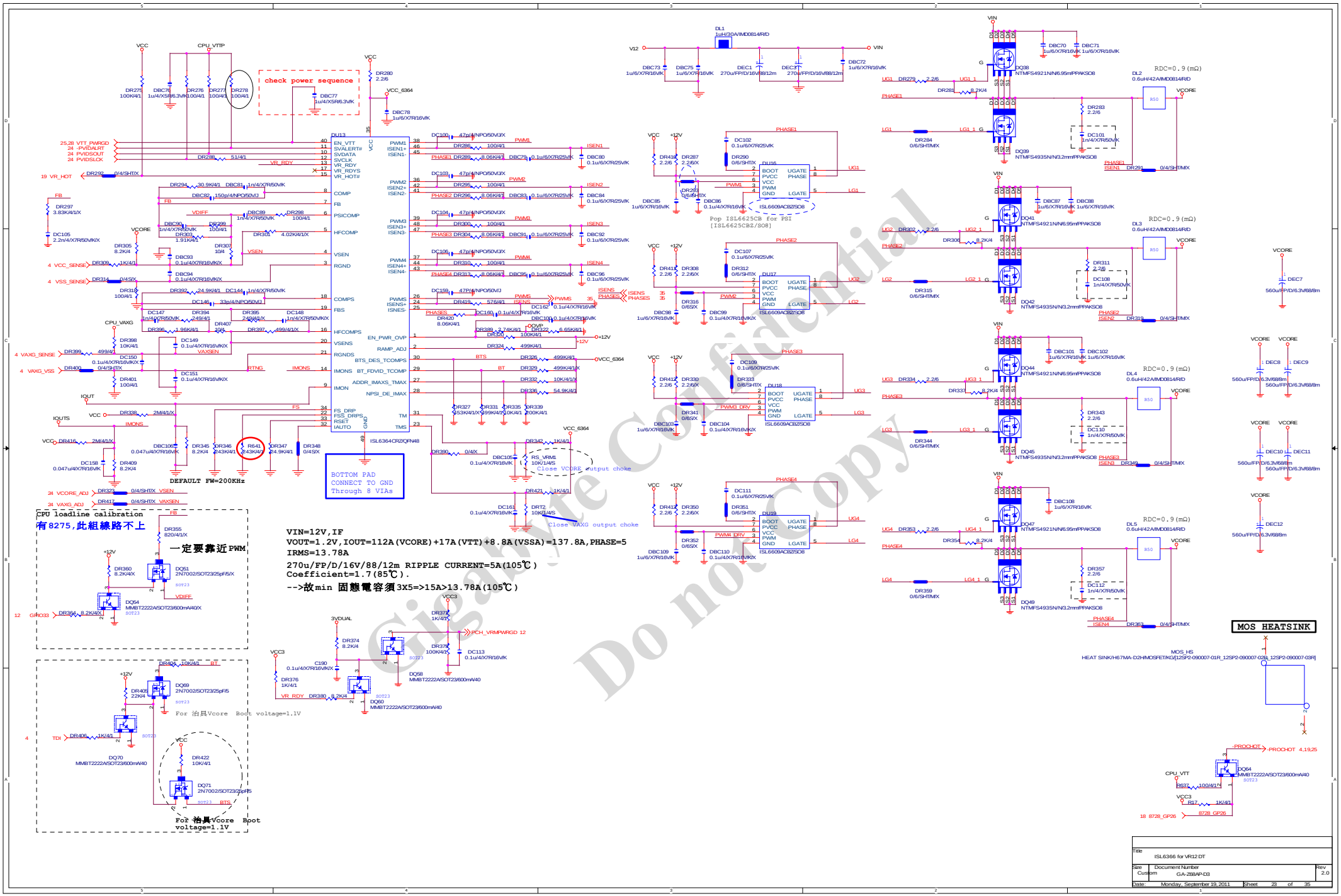
	ALC883	ALC888-VA	ALC888B	ALC888-VD	ALC892R	ALC889	ALC889A	ALC889 New Bonding	ALC898 ALC892
CR32	X	X	X	X	X	X	O	X	X
CR64	X	X	X	X	X	X	O	X	X
CR65	O	O	X	X	X	O	O	O	X
CBC35	X	X	X	10uF/X5R	10uF/X5R	X	X	X	10uF/X5R
CR28	O	X	X	X	X	X	X	X	X
CR34	20K/1%	20K/1%	20K/1%	20K/1%	20K/1%	20K/1%	20K/0.1%	20K/1%	20K/1%
CR31	X	X	O	X	O	O	X	X	O
CR30	O	O	X	O	X	X	O	X	X
CBC1/CBC2/CBC5/ CBC6/CBC9/CBC11	4.7uF /X5R	4.7uF /X5R	4.7uF /X5R	4.7uF /X5R	4.7uF /X5R	10uF /X5R	4.7uF /X5R	10uF /X5R	4.7uF /X5R
CR5/CR8/CR11/CR4/ CR17/CR22/CR45/CR33/ CR47/CR40/CR26/CR37/ CR13/CR11/CR57/CR53	75 ohm	75 ohm	75 ohm	75 ohm	75 ohm	62 ohm	75 ohm	62 ohm	75 ohm
CR51/CD1/CBC7	X	X	X	O	X	X	X	X	O
CD2/CD3/CQ3/CQ5	O	O	O	X	O	O	O	O	X
CBC1/CBC2	10uF	10uF	10uF	10uF	10uF	22uF	10uF	22uF	10uF
CR66	X	X	X	X	X	X	X	O	X
CBC39	X	X	X	X	X	X	X	10uF	X

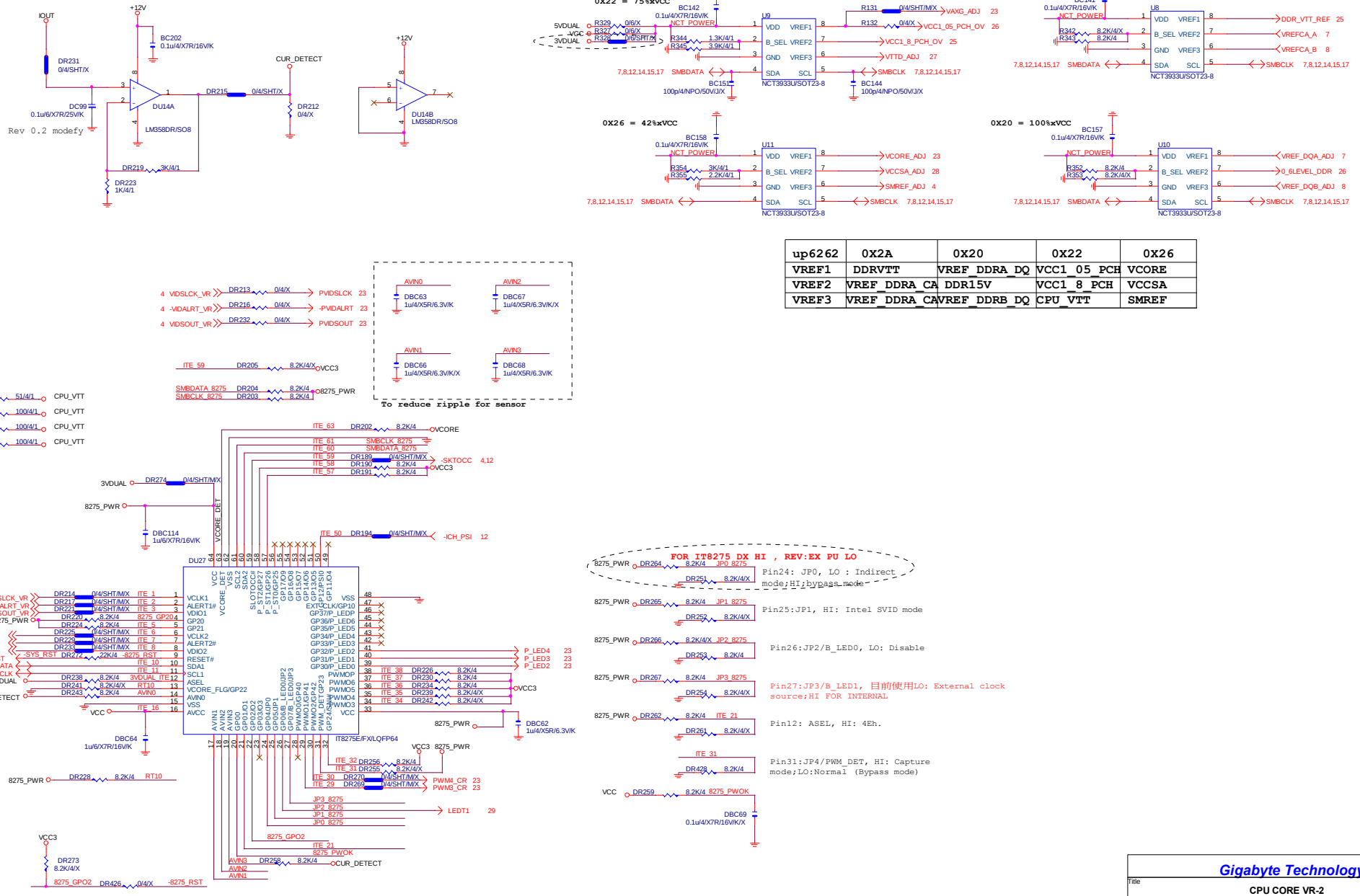




Gigabyte Technology	
Title	HD AUDIO ALC889
Size: Custom	Document Number: GA-Z68AP-D3 — Rev 2.0
Date: Monday, September 19, 2011	Sheet 21 of 35



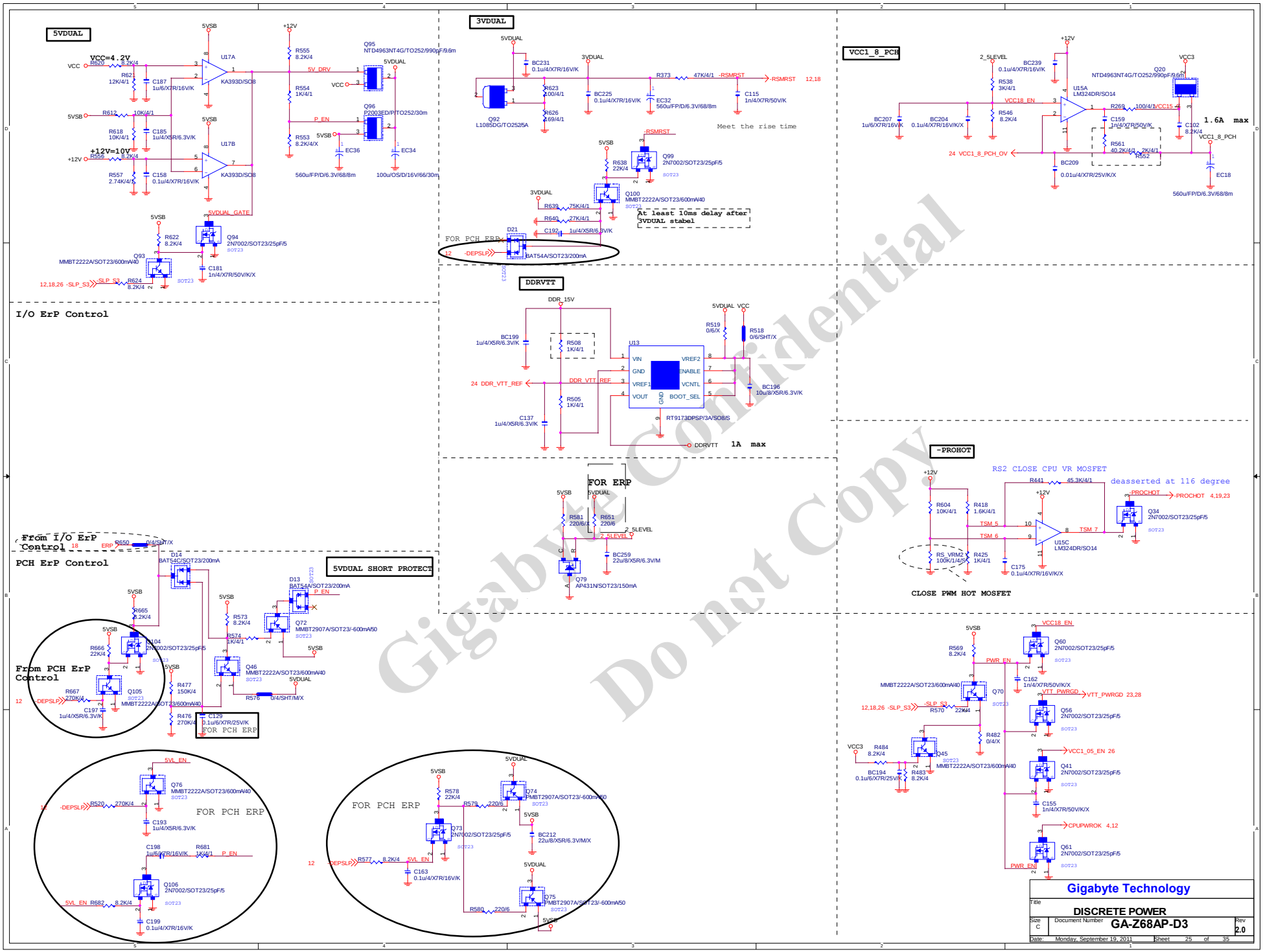




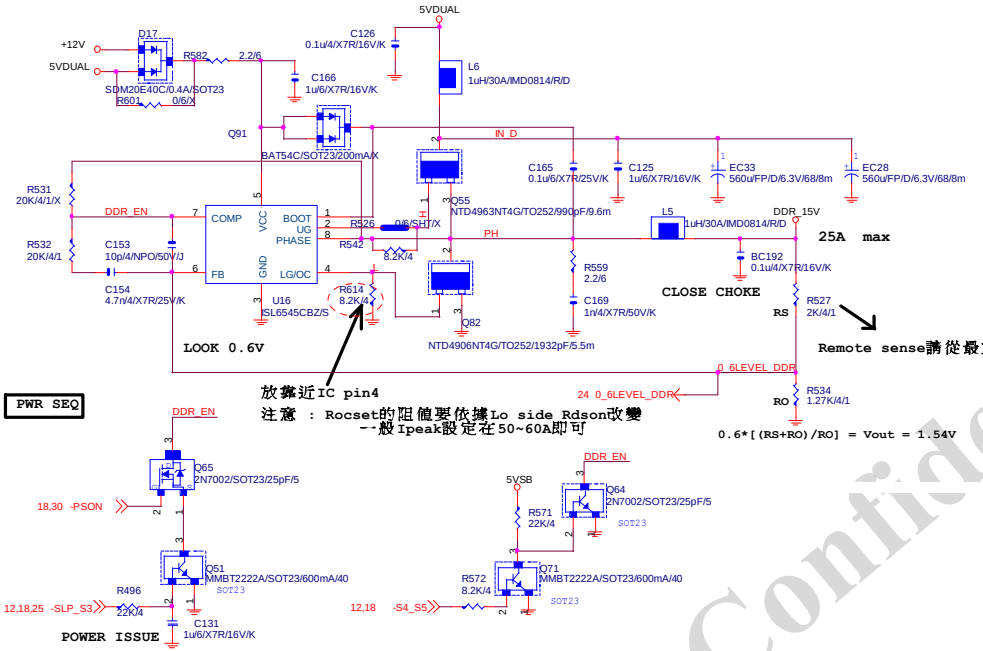
up6262	0X2A	0X20	0X22	0X26
VREF1	DDRVTT	VREF_DDRA_DQ	VCC1_05_PCH	VCORE
VREF2	VREF_DDRA_CA	DDR15V	VCC1_8_PCH	VCCSA
VREF3	VREF_DDRA_CA	VREF_DDRB_DQ	CPU_VTT	SMREF

Gigabyte Technology

Title	CPU CORE VR-2	
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 24 of 35	



DDR18V



VIN=5V,VOUT=1.5V,IOUT=25A,PHASE=1
IRMS=11.45A

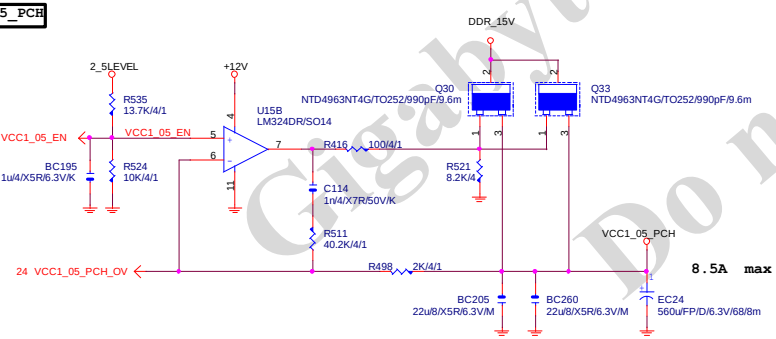
560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85℃),1(105℃)

VIN Ripple current=4.7X1.7=7.99A(85℃)
-->故固態電容須2X7.99=15.98>11.45A

OCP : Ipeak=(2xIocsetxRocset)/Rdson
typ Iocset=20uA , Rocset=4.7k
OCP :53.71A=(2x20uax4.7k)/(7m//7m)

PWR SEQ

VCC1_05_PCH



VIN=3.3V,VOUT=1.05V,IOUT=8.5A,PHASE=1
IRMS=3.959A

560u/FP/D/6.3V/68/8m RIPPLE CURRENT=4.7A
Coefficient=1.7(85℃),1(105℃)

VIN Ripple current=4.7X1.7=7.99A(85℃)
-->故固態電容須2X7.99=15.98>11.45A

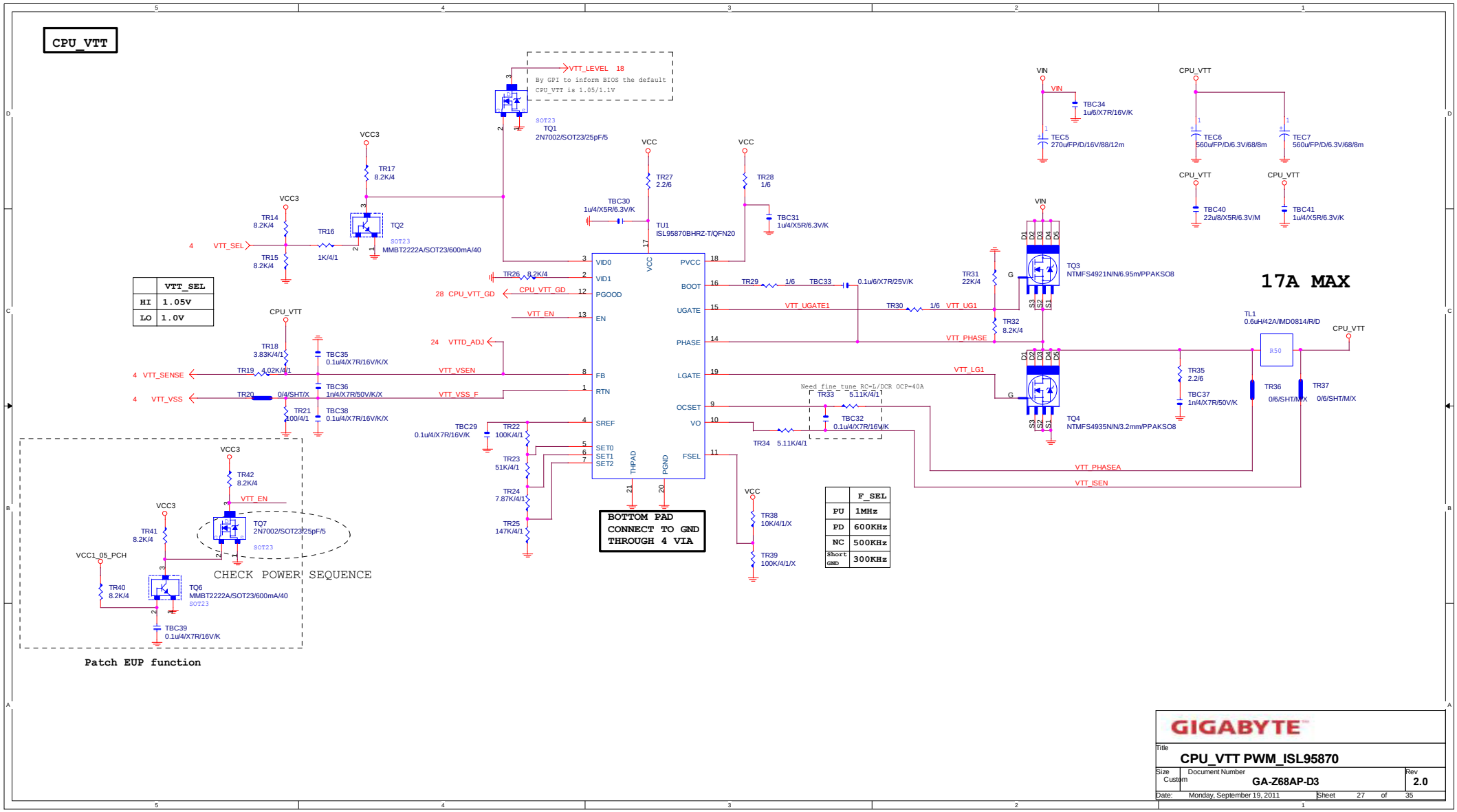
OCP : Ipeak=(2xIocsetxRocset)/Rdson
typ Iocset=20uA , Rocset=8.2k
OCP :46.86A=(2x20uax8.2k)/7m

Gigabyte Technology

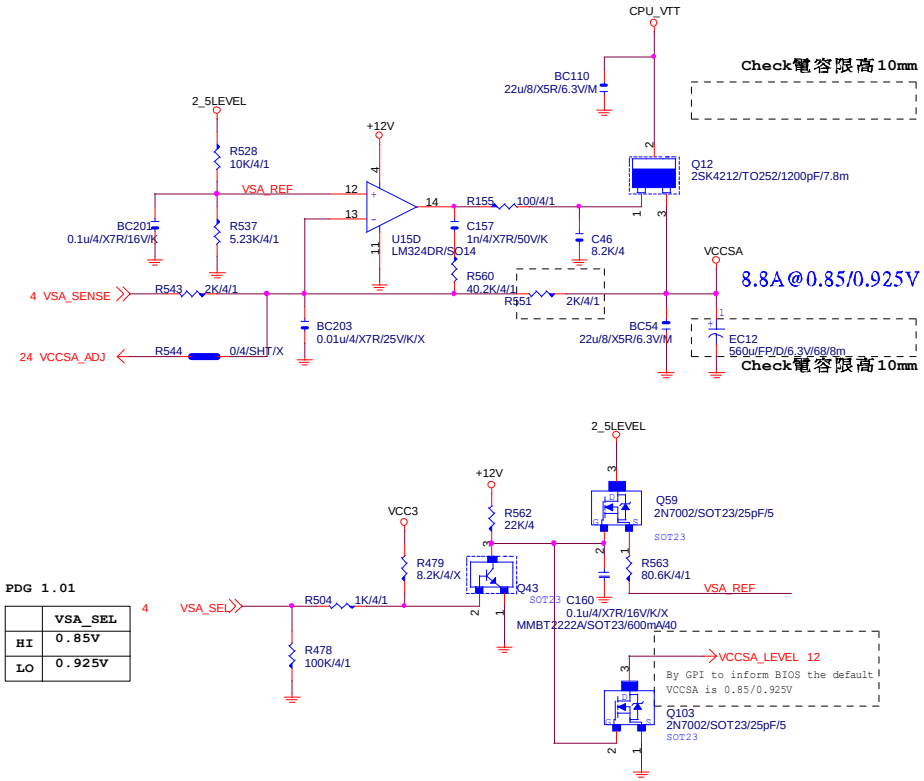
Title: DDR_15V

Size: Custom | Document Number: GA-Z68AP-D3 | Rev: 2.0

Date: Monday, September 19, 2011 | Sheet 26 of 35



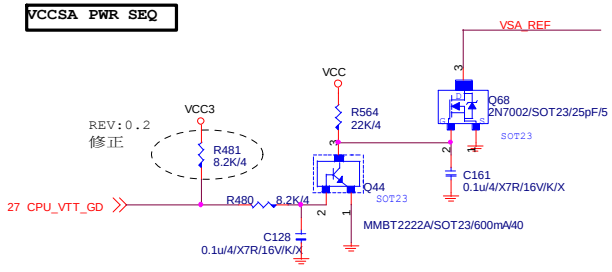
VCC_SA

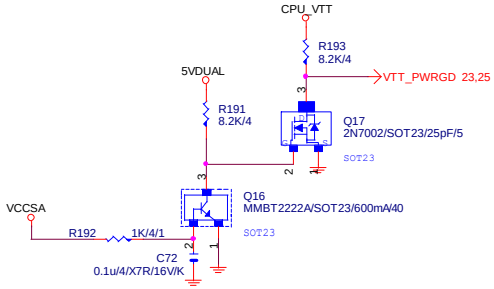


PDG 1.01

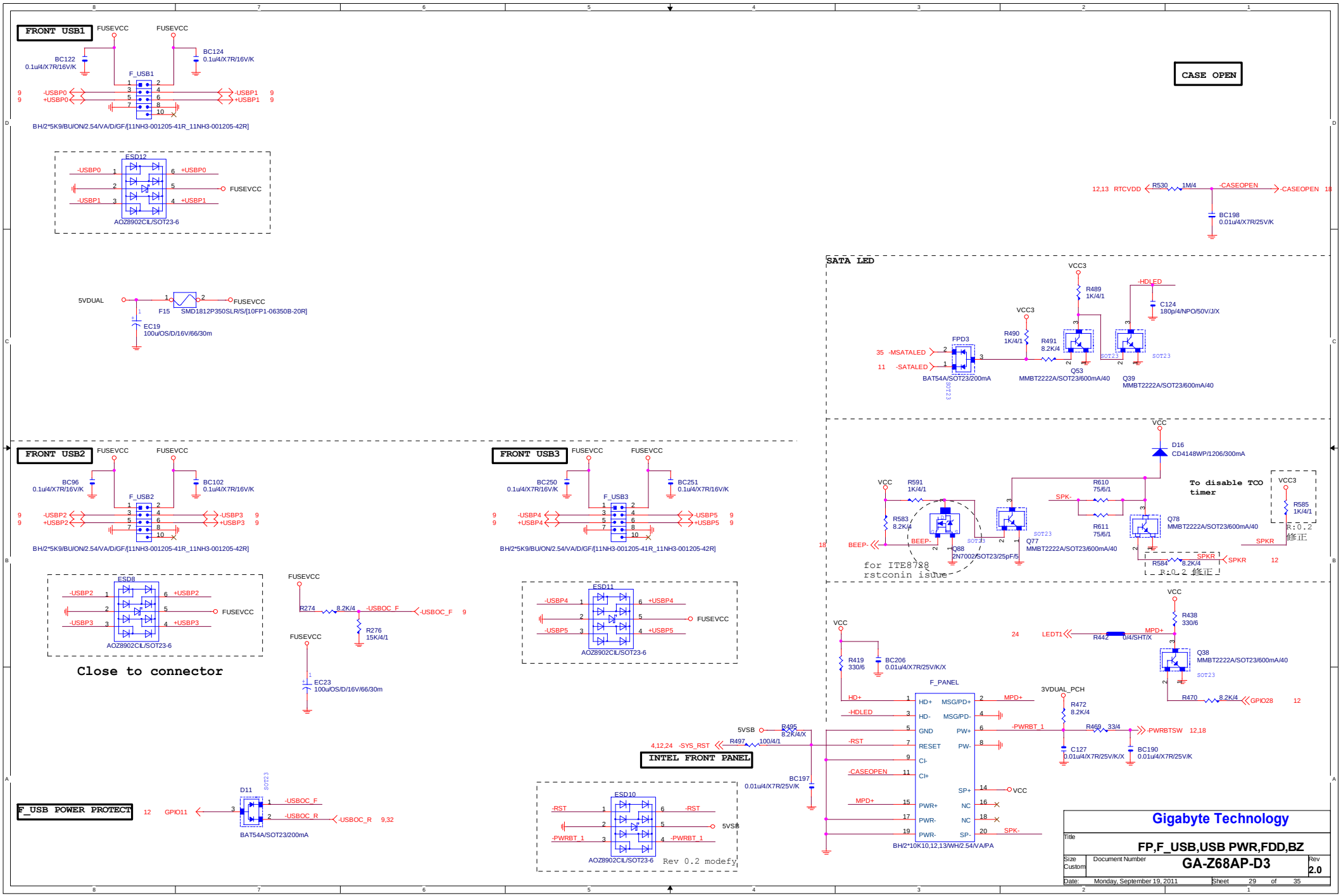
	VSA_SEL
HI	0.85V
LO	0.925V

VCCSA PWR SEQ

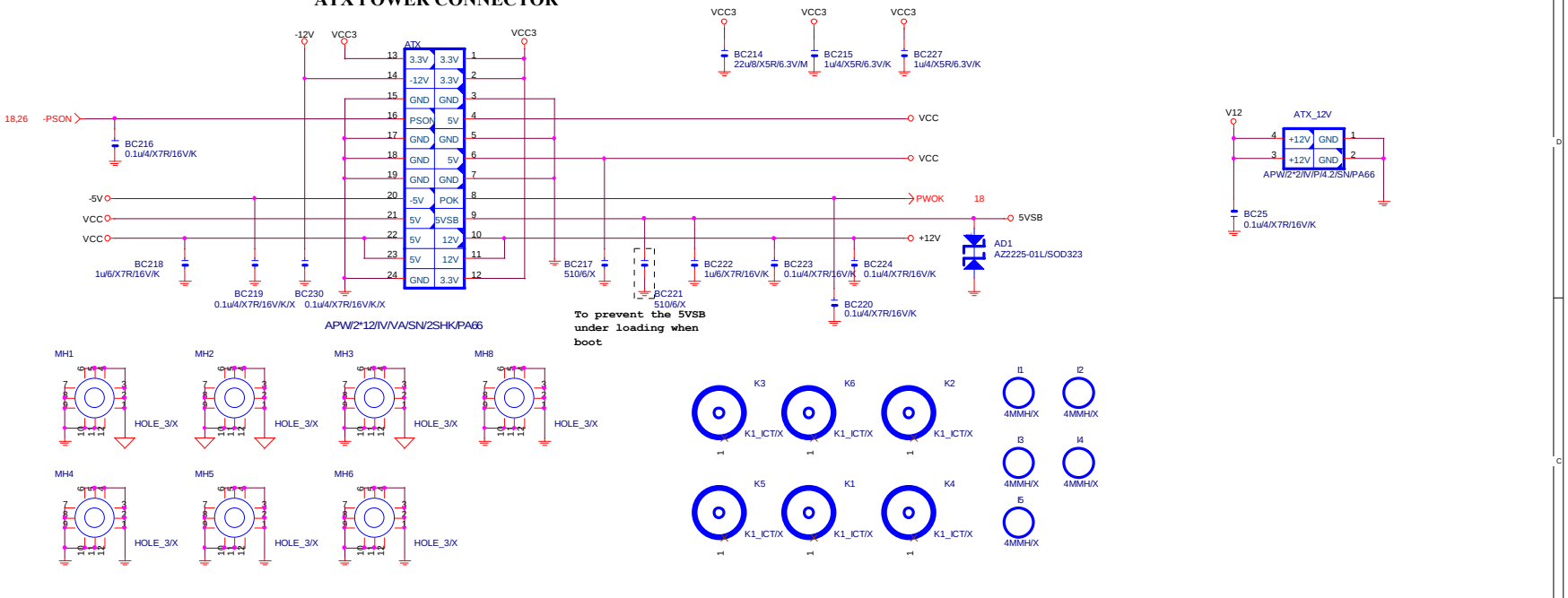




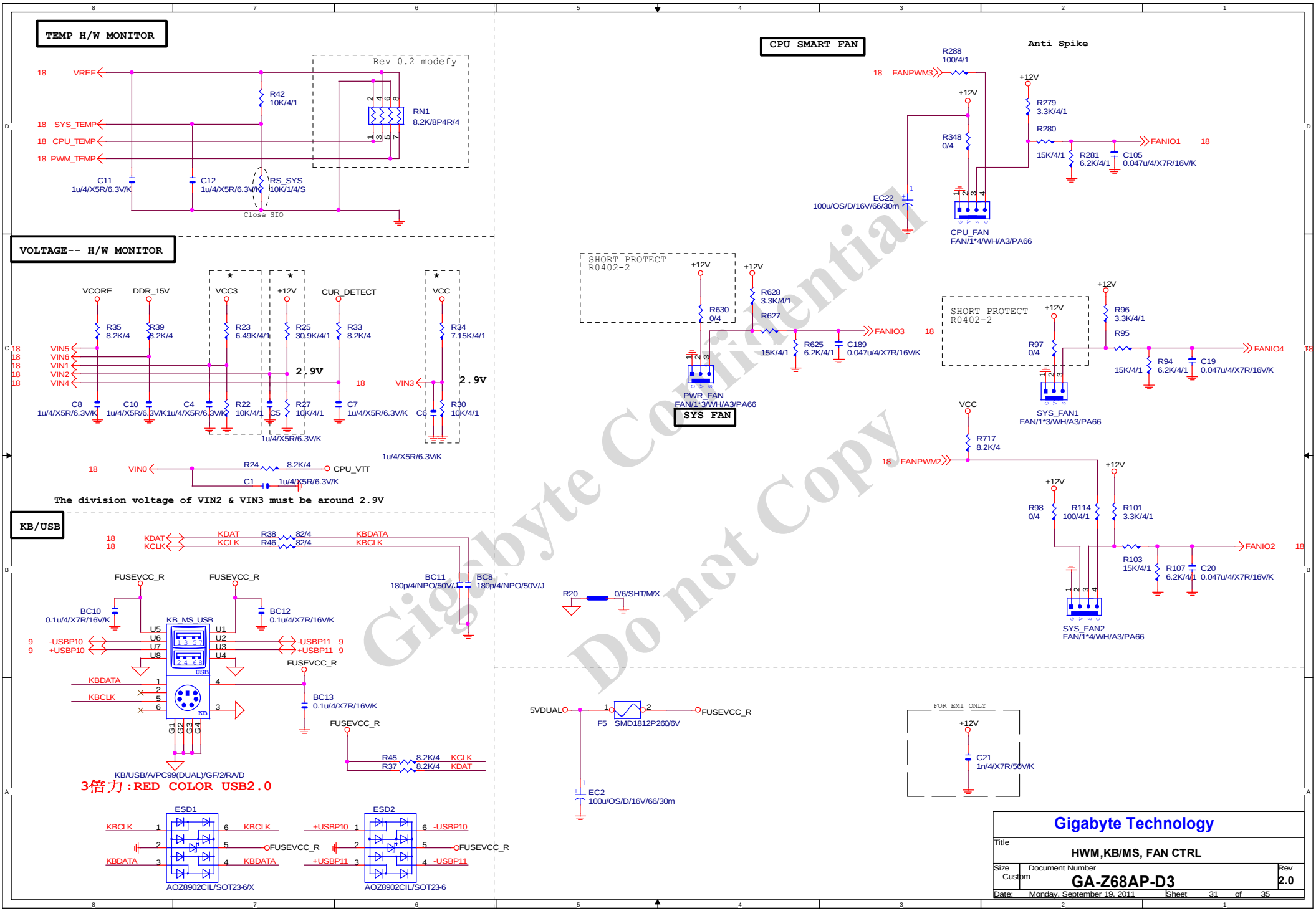
Gigabyte Technology	
Title	CPU VTT PWM_ISL6312
Size: Custom	Document Number: GA-Z68AP-D3
Rev	2.0
Date: Monday, September 19, 2011	Sheet 28 of 35



ATX POWER CONNECTOR



Gigabyte Technology		
Title: ATX POWER CONNECTOR		
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 30 of 35	



PCIE-1G LAN

Power domain chart

	RTL8111E
AVDD33	3.3V
DVDD33	3.3V
VDDREG	3.3V
DVDD10	1.05V

FOR DSM MODE
(DEEP SLUMBER MODE)

ENABLE SW

Dual Color LED

Single Color LED

RTL8111E-VL-CG/QFN48/S

P35-152-19W9

80歐姆：[15/5/5/5/5]

SRCCLK 50歐姆：[18/4/10/4/18]

離IC近越好

(CLOSE LU1)

(PIN3,6,9,13,29,41,45)

CLOSE LL2

(PIN21)

USB30_LAN CONNECTOR

100歐姆：[20/4/8/4/20]

3倍力：RED COLOR USB2.0

90歐姆：[15/4.5/7.5/4.5/15]

90歐姆：[20/4.5/7.5/4.5/20]

Close to R_USB30

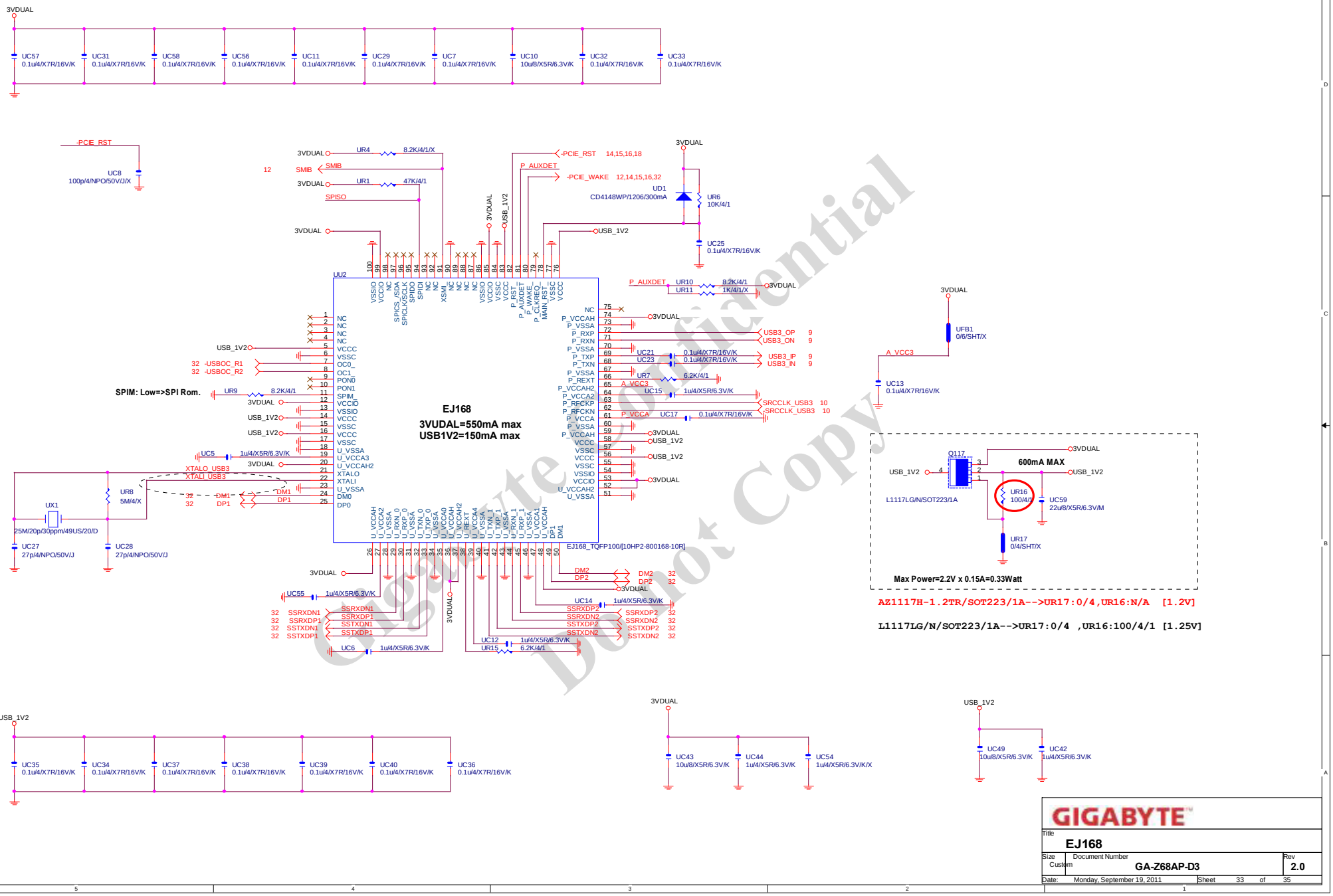
Close to connector

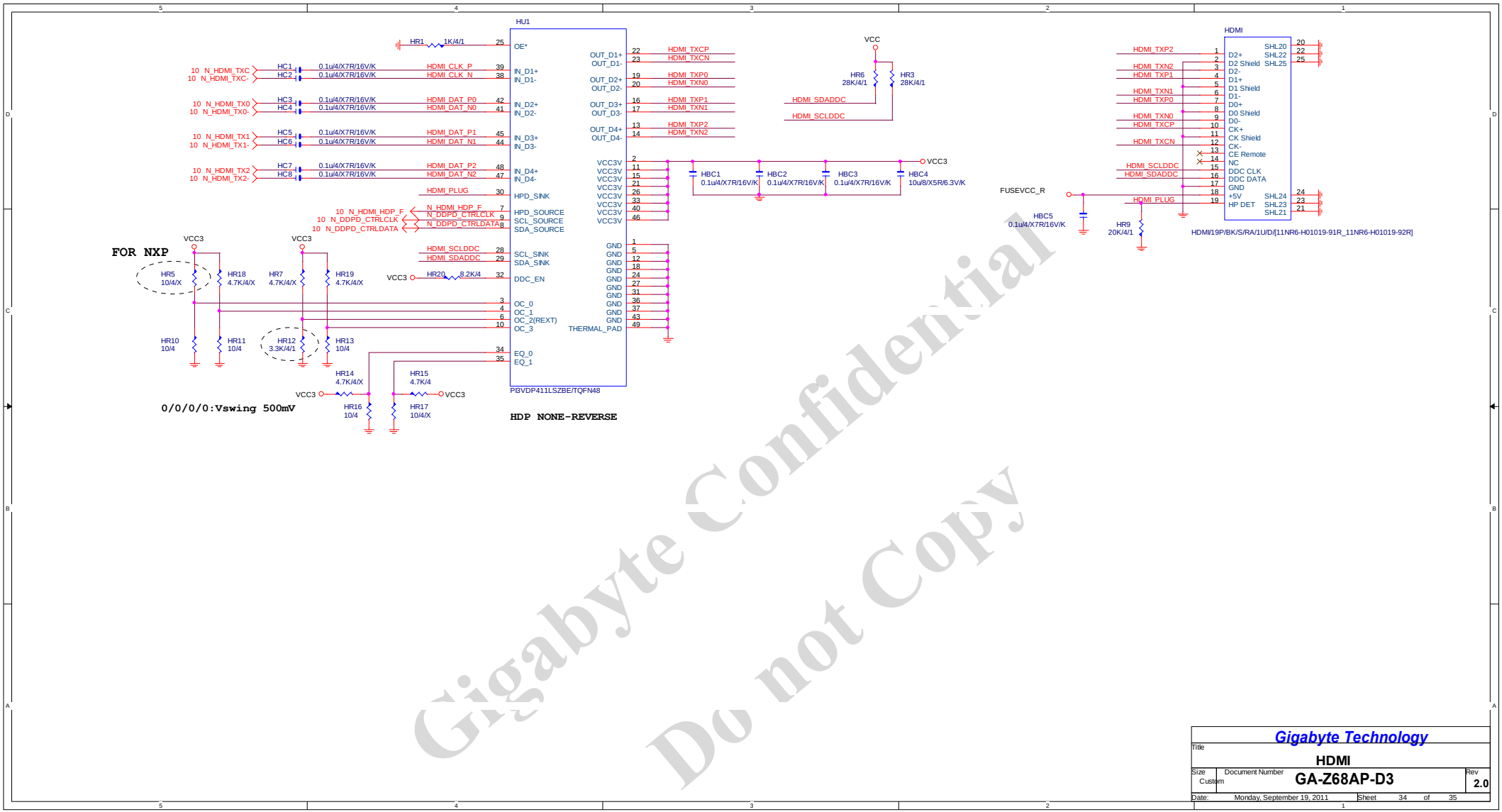
FROM NEC USB2.0

FROM PCH USB2.0

Close to connector

Gigabyte Technology	
Title	REALTEK RTL8111E
Size: Custom	Document Number: GA-Z68AP-D3
Rev	2.0
Date: Monday, September 19, 2011	Sheet 32 of 35

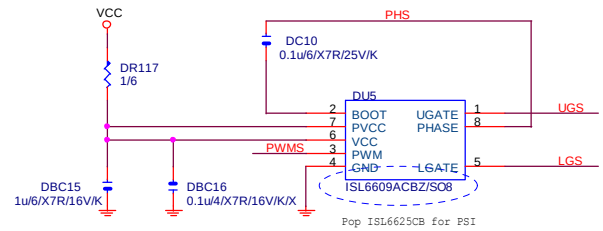


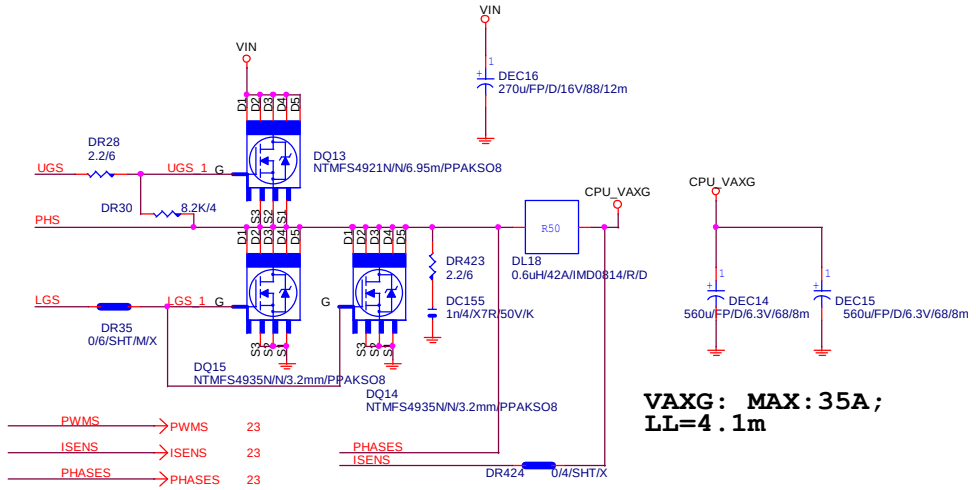


VAXG

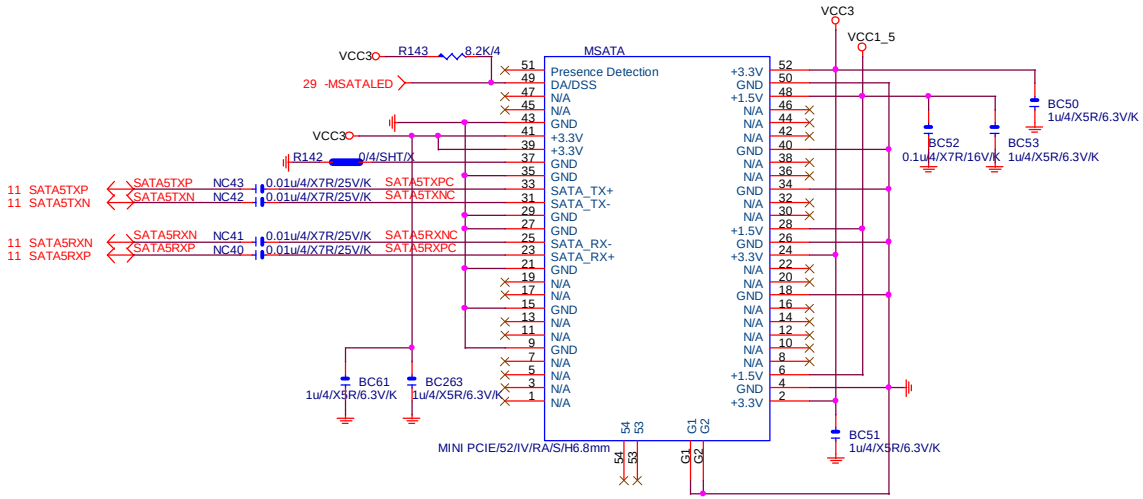
ISL6612 use +12V
ISL6609 use VCC

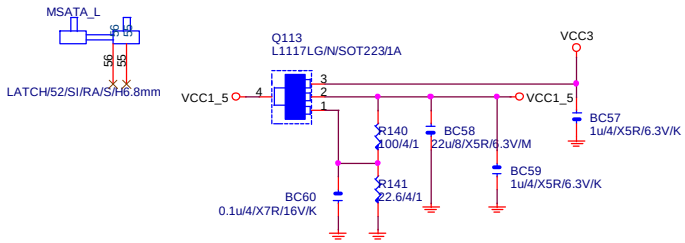
ISL6612 use 1 ohm
ISL6609 use 0 ohm





VAXG: MAX:35A;
LL=4.1m





GIGABYTE™

Title: VAXG PHASE		
Size: Custom	Document Number: GA-Z68AP-D3	Rev: 2.0
Date: Monday, September 19, 2011	Sheet 35 of 35	