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CPU HASWELL SOCKET1 (5 OF 11)
CPU HASWELL SOCKET1 (10 OF 11)
CPU SIDEBAND: H/W STRAPS AND PECI

Table 5-34. Intel TXT Strap Signal Configuration

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**Notes:**
- A pull-up on board to VCCD via a 240 ohm resistor ±5% or a pull-down on board to VSS is via 240 ohm resistor ±5%.
CPU SIDEBAND: GTL TO LVTTL
PU IS 147 OHM IN CRB

NOTE:

CPU SIDEBAND: CATERR
PM_FAST_WAKE_N

CPU PWRGOOD

CPU RESET_N

FIVR

CPU EAR

CPU SIDEBAND: PUS AND PDS
DDR4 CHANNEL E DIMM2 (BLACK)
DDR4 CHANNEL F DIMM2 (BLACK)
NOT FILTERED: (P1V5_PCH)
STUFF: R1479, R1477, R1478, R1480, R1475
UNSTUFF: L15, L33, L14, R1156, L31

FILTERED: (P1V05)

P1V05_SATA3_PLL
P1V05_USB3_PLL
P1V05_DMI_PLL
P1V05_STBY_PCH
P1V5_PCH
P1V5_VCCSST_INT_CAP
TP_VCCUSB3SUS_1P05
P1V05_SUS_INT_CAP

P1V05_DSW_INT_CAP

P1V5_PCH
P1V05_XCK_VRM
P3V3
P1V05_STBY_PCH

P3V3_AUX
P3V3_BAT

P1V05_USB3_PLL
P1V05_DMI_PLL
P1V5_PCH
P1V05_STBY_PCH
P1V05_XCK_VRM
P3V3
P1V05_SATA3_PLL

OPTION TO POWER PCH FUSE WITH OTHER VOLTAGE.

DESIGN NOTE:

PCH_VCCPFUSE_3P3_R

IN
OUT
OUT
IN
IN
IN

PCH WELLSBURG 6 OF 7
P1V05_XCK_DCB

NOT FILTERED: (P1V5_PCH)
FILTERED: (P1V05)

R1479, R1477, R1478, R1480, R1475
L15, L33, L14, R1156, L31

R1479, R1477, R1478, R1480, R1475
L15, L33, L14, R1156, L31

STUFF: R1479, R1477, R1478, R1480, R1475
UNSTUFF: L15, L33, L14, R1156, L31

FILTERED: (P1V05)

P1V05_SATA3_PLL
P1V05_USB3_PLL
P1V05_DMI_PLL
P1V05_STBY_PCH
P1V5_PCH
P1V5_VCCSST_INT_CAP
TP_VCCUSB3SUS_1P05
P1V05_SUS_INT_CAP

P1V05_DSW_INT_CAP

P1V5_PCH
P1V05_XCK_VRM
P3V3
P1V05_STBY_PCH

P3V3_AUX
P3V3_BAT

P1V05_USB3_PLL
P1V05_DMI_PLL
P1V5_PCH
P1V05_STBY_PCH
P1V05_XCK_VRM
P3V3
P1V05_SATA3_PLL

OPTION TO POWER PCH FUSE WITH OTHER VOLTAGE.

DESIGN NOTE:

PCH_VCCPFUSE_3P3_R

IN
OUT
OUT
IN
IN
IN

PCH WELLSBURG 6 OF 7
P1V05_XCK_DCB
WELLSBURG PIN STRAP SETTINGS

PSV3

CS30310FB16

SPEAKER_PCH

REBOOT DISABLE WHEN HIGH

P/U: RING OSCILLATOR BYPASS IS DISABLED (DEFAULT)
P/D: RING OSCILLATOR BYPASS IS ENABLED.

P/U: JTAG CLK FILTER IS NOT BYPASSED
P/D: JTAG CLK FILTER IS BYPASSED

P/U : ADR TIMER HOLD OFF IS DISABLED WHEN PULLED HIGH (DEFAULT).
P/D : ADR TIMER HOLD OFF IS ENABLED WHEN PULLED LOW.

LT KEY DOWNGRADE
P/U : LT DEBUG MODE IS DISABLED WHEN PULLED HIGH (DEFAULT).
P/D : LT DEBUG MODE IS ENABLED WHEN PULLED LOW.
THIS PIN IS SHARED WITH MEXP_BMBDATA1. IF THIS FEATURE NEEDS TO BE ENABLED.

DSWODVREN: DEEP SLEEP WELL ON-DIE VOLTAGE REGULATOR ENABLE -
INTERNAL VRM ENABLE:

DISABLED WHEN SAMPLED LOW
ENABLED WHEN SAMPLED HIGH

INTERNAL PULL DOWN (15K - 40K)
INTERNAL PULL-UP (15K-40K).

CONNECT PWRGD_APWRDK TO PWRGD_P1V05_PCH_STBY_DLY
FOR NORMAL OPERATION.

DESIGN NOTE:
INTERNAL VRM ENABLE:
THIS SIGNAL IS USED TO ENABLE OR DISABLE THE INTEGRATED 1.05 VOLTAGE REGULATORS FOR THE SUSPEND WELL ON THE WELLSBURG.
P/U: ENABLED VR (DEFAULT)
P/D: DISABLES VR
P/D OPTION NOT BEING PROVIDED
Follow Intel TME direction for keep PU 3.3K for SLP_A# same as CRB

PCH WELLSBURG PU AND PD
RTC POWER-WELL ISOLATION

PCH WELLSBURG MISC/SGPIO
PCH REAR USB PORTS 2 OF 2
UN-STUFF FOR AST2400
STUFF FOR AST2300

190 OHM FOR AST2400
10K OHM FOR AST2300
BOM NOTES:
AST2400 (FLASH SIZE=32MBIT/32MBYTE)
SDC16
AKE3JZP0Z00 (MX25L25635EMI-12G) : SDC16 32MBIT
BMC_FLASH

BOM NOTE: PULL-UP (DEFAULT)
BOM NOTE: SOCKET IS D91187-001
THIS PART WILL BE IN SOCKET FOR FLASH PROTECTION

PULL-DOWN WRITE PROTECT

RESERVE SPI RESET# CIRCUIT FOR NEW SPI

BMC_FLASH
AST2400 (FLASH SIZE=256MBIT/32MBYTE)

USE ALT SYMBOL ASSOCIATED WITH PART FOOTPRINT
STUFF FOR QUAD BIT FLASH

PLACE RESISTOR NEAR FLASH
STUFF FOR QUAD BIT FLASH

BMC SPI FLASH
ROUTE ALL ADC NETS AT 6 MILS WIDE

CAD NOTE:
ROUTE ALL ADC NETS AT 6 MILS WIDE
MUX: COM-BMC_DEBUG / COM-SYSTEM
SIO 80 PORT
USE INTERNAL POR AS DEFAULT TO BE CONNECTED TO PULL UP.
1. LAN_PWR_GOOD SIGNAL FOR EXTERNAL POWER ON RESET USE:
2. BYPASS_POR SIGNAL TO BE CONNECTED TO PULL DOWN.

FOR EXTERNAL POWER ON RESET USE:
1. LAN_PWR_GOOD SIGNAL TO BE CONNECTED TO PULL UP
2. BYPASS_POR SIGNAL TO BE CONNECTED TO PULL UP

THAN 1 INCH AWAY PORTS 0 AND 1 RBIAS RESISTORS FOR BOTH
10K 10K
FOR SAGEVILLE/X540 
FOR I350 UNSTUFF

CAPS:
X540 & SAGEVILLE = C87=22PF & C96 =27PF
USE 0 OHM RES
X540 & SAGEVILLE = C87=22PF & C96 =27PF

USE 0.75 IN TRACE LENGTHS SHOULD BE LESS THAN 0.75 IN
10.0 PF 5% 0402LF
FOR X540 & SAGEVILLE = 50MHZ

FOR X540 & SAGEVILLE = C87=22PF & C96 =27PF
CAPS:
X540 & SAGEVILLE = 50MHZ
SAGEVILLE = 27PF
50V 5% 0402

CAD NOTE: TRACE LENGTHS SHOULD BE LESS THAN 0.75 IN
XTAL_O_50M_R_NIC
X540 & SAGEVILLE = 50MHZ

CAD NOTE: TRACE LENGTHS SHOULD BE LESS THAN 0.75 IN
XTAL_O_50M_R_NIC
X540 & SAGEVILLE = 50MHZ

THAN 0.75 IN TRACE LENGTHS SHOULD BE LESS
PLACE AC CAP CLOSE TO LAN CHIP

PCIE CPU-NIC AC CAPS
STUFF FOR X540

FOR X540: THIS FILTER IS A PLACEHOLDER QPN: CV+03G04N00
------- 33NH ------- 33NH ----

FOR SAGEVILLE:
STUFF 0 OHM RESISTORS INSTEAD OF 33NH INDUCTORS
UN-STUFF CAPS

THE FILTER SHOULD BE PLACED/ROUTED AS BALANCED DIFFERENTIALLY AS POSSIBLE AND SHOULD BE LOCATED CLOSE TO THE X540 PACKAGE

FOR I350 CHANNEL TERMINATION

THE FILTER SHOULD BE PLACED/ROUTED AS BALANCED DIFFERENTIALLY AS POSSIBLE AND SHOULD BE LOCATED CLOSE TO THE X540 PACKAGE

POWervILLE PORT 0
THE FILTER SHOULD BE PLACED/ROUTED AS BALANCED DIFFERENTIALLY AND SHOULD BE LOCATED CLOSE TO THE X540 PACKAGE.

FOR SAGEVILLE:
STUFF 0 OHM RESISTORS INSTEAD OF 33NH INDUCTORS UNSTUFF CAPS
FOR X540: THIS FILTER IS A PLACE HOLDER QPN: CV+03G04N00
FOR I550: THIS FILTER SHOULD BE MODIFIED TO 0 OHM RESISTOR

0 OHM RESISTORS INSTEAD OF 33NH FOR I350
CPLD NOTE
CURRENTLY, CPLD DON'T SUPPORT ADR FUNCTION

ROUTE ALL THE SIGNALS WITH NETNAMES THAT STARTS WITH RST, OR RST сигнальнав. SPORT AWAY FROM THE CRB EDGE OF THE BOARD.

ROUTE ALL THE SIGNALS WITH NETNAMES IN 500MIL AWAY FROM THE CRB EDGE OF THE BOARD.

CPLD 1 OF 2
LATTICE IN SYSTEM PROGRAMMING HEADER.

PLACE DECOUPLING CAPACITORS NEAR POWER PIN ON PLD PROGRAMMING HEADER.
CAD NOTE: PLACE RS/RP RESISTOR CLOSE TO CLK SOURCE WITHIN 0.5 INCHES
RMII  50MHZ  CLOCK
**SMBUS FRU AND TEMP SENSOR**

**CAD NOTE:**

- THIS SENSOR NEED TO BE PLACED IN MILLDE OF THE BOARD.
- THIS SENSOR NEED TO BE PLACED IN THE NORTHWEST SIDE.
- THIS SENSOR NEED TO BE PLACED CLOSE TO OCP MEZZ.
- PLACE REGS CLOSE TO TMP75.
- PLACE REGS CLOSE TO USA1.
- PLACE REGS CLOSE TO TMP75.

**BASEBOARD FRU EEPROM**

**SMBUS ADDRESS:** 0XA8

**SMBUS ADDRESS:** 0X9E

**SMBUS ADDRESS:** 0X9C

**SMBUS ADDRESS:** 0X90

**CAD:**

- CAD NOTE: THIS SENSOR NEED TO BE PLACED IN MILLDE OF THE BOARD.
- CAD NOTE: THIS SENSOR NEED TO BE PLACED IN THE NORTHWEST SIDE.
- CAD NOTE: THIS SENSOR NEED TO BE PLACED CLOSE TO OCP MEZZ.

**DEPARTMENT:**

- DEPARTMENT: CCBU

**DESIGNER:**

- DESIGNER: Nick

**PROJECT:**

- PROJECT: S2B

**DOCUMENT NUMBER:**

- DOCUMENT NUMBER: DA052MB6A0

**REVIEWER:**

- REVIEWER: Peter, Yulin, Matt

**DATE SHEET:**

- DATE SHEET: Mon Nov 16 11:55:15 2015 149 OF 188
DESIGN SPECIFICATION

OUTPUT VOLTAGE = 5.0V +/- 5%
OUTPUT RIPPLE & NOISE = 50mV
TRANSIENT TOLERANCE = 500mA
TDC = 10A
MAX CURRENT = 20A
OVER-CURRENT PROTECTION (MAX RATING * 1.2) = 24A
CURRENT STEP = 5A
SLEW RATE = 2.5A/US
WORK FREQUENCY = 300KHz
EFFICIENCY > 90% @TDC

DESIGNER

P5V_AUX & P3V3_AUX
DESIGN SPECIFICATION

OUTPUT VOLTAGE = 1.05 +/-5%
OUTPUT RIPPLE & NOISE < 21mV
TRANSIENT TOLERANCE = 105mV
TDC = 6.8A
MAX CURRENT = 8A
OVER-CURRENT PROTECTION (MAX RATING * 1.2) = 10.4A
CURRENT STEP = 5A
WORK FREQUENCY = 400KH
EFFICIENCY > 90% @TDC

DIFF-PAIR
ISAT = 33A
DCR = 3.8M
SMD 10*10*4
SMD 4*4*6
5*5.8
ESR = 10M
RDS-ON = 2.5MOHM/4.5V MAX

P1V05_STBY_PCH
**DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE**: 1.8±5%
- **OUTPUT RIPPLE & NOISE**: 36mV
- **TRANSIENT TOLERANCE**: 180mV
- **TDC**: 1A
- **MAX CURRENT**: 2A
- **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
- **CURRENT STEP**: 0.2A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS
- **OVER-CURRENT PROTECTION**: (MAX RATING * 1.4) = 2.8A
- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS
  - **OVER-CURRENT PROTECTION**: (MAX RATING * 1.4) = 2.8A
  - **MAX CURRENT**: 2A
  - **CURRENT STEP**: 0.2A

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS

**OTHER SPECIFICATIONS**

- **MAX CURRENT**: 2A
- **CURRENT STEP**: 0.2A
- **DESIGN SPECIFICATION**
  - **OUTPUT RIPPLE & NOISE**: < 36mV
  - **OUTPUT VOLTAGE**: 1.8±5%
  - **TRANSIENT TOLERANCE**: 180mV
  - **TDC**: 1A
  - **MAX CURRENT**: 2A
  - **OVER-CURRENT PROTECTION (MAX RATING * 1.4)**: 2.8A
  - **CURRENT STEP**: 0.2A
  - **EFFICIENCY**: > 90% @TDC
  - **WORK FREQUENCY**: 300KHz
  - **SLEW RATE**: 1A/µS

**MONITORING AND PROTECTION**

- **VOLTAGE MONITOR**: 0.6(1 + RA/RB) = 1.8V
- **RESISTANCE**: RA = 10M, RB = 5.8
- **ISAT**: 18A
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHz
- **SLEW RATE**: 1A/µS
OUTPUT VOLTAGE = 1.538V +/- 5%
OUTPUT RIPPLE & NOISE < 30MV
TRANSIENT TOLERANCE = 153.8MV
MAX CURRENT = 1.9A
PD = (1.8V - 1.538V) * 1.9A = 0.4978W
OUTPUT VOLTAGE = 1.26V+/−5%
OUTPUT RIPPLE & NOISE < 30MV
TRANSIENT TOLERANCE = 126MV
MAX CURRENT = 1.1A
PD = (1.538V - 1.26V) * 1.1A = 0.3058W

VNOM = 0.8(1 + RA/RB) = 1.26
**X540 DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE:** 1.2V±2%  DC  +3% AC
- **OUTPUT RIPPLE & NOISE:** <24mV
- **TRANSIENT TOLERANCE:** 180mV
- **TDC:** 1.5A
- **MAX CURRENT:** 2A
- **OVER-CURRENT PROTECTION:** MAX RATING * 1.3) = 2.6A
- **CURRENT STEP:** 0.9A
- **SLEW RATE:** 1A/μS
- **WORK FREQUENCY:** 300KHZ
- **EFFICIENCY:** > 90%  @TDC

**i350 DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE:** 1.2V±2%  DC  +3% AC
- **OUTPUT RIPPLE & NOISE:** <36mV
- **TRANSIENT TOLERANCE:** 180mV
- **TDC:** 1.5A
- **MAX CURRENT:** 2A
- **OVER-CURRENT PROTECTION:** MAX RATING * 1.3) = 2.6A
- **CURRENT STEP:** 0.9A
- **SLEW RATE:** 1A/μS
- **WORK FREQUENCY:** 300KHZ
- **EFFICIENCY:** > 90%  @TDC

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**P1V2的设计规范**

- **输出电压:** 1.2V±2%  DC  +3% AC
- **输出纹波和噪声:** <24mV
- **瞬态容限:** 180mV
- **最大电流:** 2A
- **超电流保护:** MAX RATING * 1.3) = 2.6A
- **电流步进:** 0.9A
- **斜率:** 1A/μS
- **工作频率:** 300KHZ
- **效率:** > 90%  @TDC

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**i350的设计规范**

- **输出电压:** 1.2V±2%  DC  +3% AC
- **输出纹波和噪声:** <36mV
- **瞬态容限:** 180mV
- **最大电流:** 2A
- **超电流保护:** MAX RATING * 1.3) = 2.6A
- **电流步进:** 0.9A
- **斜率:** 1A/μS
- **工作频率:** 300KHZ
- **效率:** > 90%  @TDC
**X540 DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE** = 0.8V/±2% DC ±3% AC
- **OUTPUT RIPPLE & NOISE** < 20mV
- **TRANSIENT TOLERANCE** = 80mV
- **TDC** = 4.5A
- **MAX CURRENT** = 10A
- **OVER-CURRENT PROTECTION (MAX RATING * 1.3)** = 12A
- **CURRENT STEP** = 4A
- **SLEW RATE** = 1A/µS
- **WORK FREQUENCY** = 300KHz
- **EFFICIENCY > 90% @TDC

**I350 DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE** = 1V/±2% DC ±3% AC
- **OUTPUT RIPPLE & NOISE** < 20mV
- **TRANSIENT TOLERANCE** = 100mV
- **TDC** = 4.5A
- **MAX CURRENT** = 8A
- **OVER-CURRENT PROTECTION (MAX RATING * 1.3)** = 12A
- **CURRENT STEP** = 4A
- **SLEW RATE** = 1A/µS
- **WORK FREQUENCY** = 300KHz
- **EFFICIENCY > 90% @TDC

**SAGEVILLE**

- **VO** = 0.6(1+RA/RB) = 0.804V
- **I350**
  - **VOUT**
    - **RA** = 3.4K
    - **VO** = 0.804V
    - **I350**
      - **VOUT**
        - **RA** = 6.65K
        - **VO** = 0.999V
    - **SAGEVILLE**
      - **VOUT**
        - **RA** = 4.22K
        - **VO** = 0.853V
X540 DESIGN SPECIFICATION

OUTPUT VOLTAGE = 0.67 +/- 2% DC + 3% AC
OUTPUT RIPPLE & NOISE = 13.4MV
TRANSIENT TOLERANCE = 67MV
TDC = 4A
MAX CURRENT = 10A
OVER-CURRENT PROTECTION (MAX RATING * 1.3) = 12A
CURRENT STEP = 2.4A
SLEW RATE = 1A/US
WORK FREQUENCY = 300KHZ
EFFICIENCY > 90% @TDC

I350 DESIGN SPECIFICATION

OUTPUT VOLTAGE = 1 +/- 2% DC + 3% AC
OUTPUT RIPPLE & NOISE = 20MV
TRANSIENT TOLERANCE = 100MV
TDC = 4A
MAX CURRENT = 8A
OVER-CURRENT PROTECTION (MAX RATING * 1.3) = 10.4A
CURRENT STEP = 2.4A
SLEW RATE = 1A/US
WORK FREQUENCY = 300KHZ
EFFICIENCY > 90% @TDC
DESIGN SPECIFICATION

OUTPUT VOLTAGE = 2.5±2% DC +3% AC
OUTPUT RIPPLE & NOISE < 50mV
TRANSIENT TOLERANCE = 250mV
TDC = 1.2A
MAX CURRENT = 2A
OVERCURRENT PROTECTION (MAX RATING * 1.3) = 2.6A
CURRENT STEP = 0.75A
SLEW RATE = 1A/US
WORK FREQUENCY = 300KHZ
EFFICIENCY > 90% @TDC

VO = 0.6(1+RA/RB) = 2.496V

X540 31.6K 2.496V
I350 45.3K 3.318V
SAGEVILLE 24.9K 2.098V
MAX CURRENT = +/-3.6A (FOR LRDIMM)
OCP (MAX CURRENT * 130%) = +/-4.68A
CURRENT STEP = 0.25A
TDC = +/-3.3A (FOR LRDIMM) SLEW RATE = 3A/US
AC_LL = 1/2VDDQ +/- 57mV
RIPPLE & NOISE = +/-1%
VOUT = 1/2 VDDQ +/- 1.5%

DDR0_VTT SPECIFICATION
- VOUT = 1/2 VDDQ +/- 1.5%
- RIPPLE & NOISE = +/- 1%
- VOUT = 1/2 VDDQ +/- 1.5%
- RIPPLE & NOISE = +/- 1%

ESR = 7M
THETA_J = 15M
IDC = 9A

Q2VGS = 10V (7M/9M)
Q1VGS = 4.5V (21M/32M/15A)
Q2VGS = 4.5V (10M/13M/30A)
Q1VGS = 10V (15M/19M)

DDR0_VTT ISEN_N
DDR0_VTT ISEN_P

SW_DDR_VTT_FLT
SW_DDR_VTT_LG
SW_DDR_VTT_PH
SW_DDR_VTT_UG

IND
X5R
CH4103K9B09
16V
0.1UF 0402

OSCON
2.5V
820UF

MMF
IC
10UF
X6S
1206

SMLF
IC
BSZ0908ND
0603
1UF 16V
X7R
DDR1 VTT SPECIFICATION

- VOUT=1.2 VDDQ+/-1.5%
- RIPPLE & NOISE=+/-1%
- AC LL=1/2 VDDQ+/-57MV

MAX CURRENT=+/-3.6A (FOR LRDIMM)
TDC=+/-3.3A (FOR LRDIMM)
CURRENT STEP=0.25A
SLEW RATE=3A/US

AC_LL=1/2 VDDQ+/-57MV
RIPPLE & NOISE=+/-1%
VOUT=1/2 VDDQ+/-1.5%

6*8
ESR=7M
3*3
DCR=15M
IDC=9A

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NICK, PETER, MATT, KUOCHAN
KENT CHOU

Quanta
DDR3 VTT SPECIFICATION

VOUT=1/2 VDDQ +/-1.5%
RIPPLE & NOISE=+/-1%
AC LL=1/2VDDQ +/-57MV
TDC=+/-3.3A (FOR LRDIMM)
MAX CURRENT=+/-3.6A (FOR LRDIMM)
OCP MAX CURRENT*130%=+/-4.68A
CURRENT STEP=0.25A
SLEW RATE=+/-3AUS

Q2VGS=4.5V (10M/13M/30A)
Q2VGS=10V (7M/9M)
BSZ0908ND

Q1VGS=4.5V (21M/32M/15A)

BSZ09080000

ESR=7M
DCR=15M
IDC=9A

DCBU

PVTT_DDR_GH
SLEW RATE = 25.4A/µS
CURRENT STEP = 3.1A
OVER-CURRENT PROTECTION (MAX RATING * 1.3) = 4.94A
MAX CURRENT = 3.8A
TRANSIENT TOLERANCE = +130MV/-233MV
OUTPUT VOLTAGE = 2.5±1%
OUTPUT RIPPLE & NOISE < 23MV
WORK FREQUENCY = 300KHZ
EFFICIENCY > 90% @TDC

DESIGN SPECIFICATION
OUTPUT VOLTAGE = 2.5±1% DC
OUTPUT RIPPLE & NOISE < 23MV
TRANSIENT TOLERANCE = +130MV/-233MV
TDC = 2.1A
MAX CURRENT = 3.8A
SLEW RATE = 25.4A/µS
WORK FREQUENCY = 300KHZ
EFFICIENCY > 90% @TDC

VO=0.6(1+RA/RB) = 2.496V

DESIGNER: BEN CHIANG
REVIEWER: PETER,MATT,KUOCHAN
DATE: Nov 16 11:56:04 2015
SHEET: 179 OF 188
DEPARTMENT: CCBU
PROJECT: S2B
DOCUMENT NUMBER: DA052MBB8A0
**DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE** = 2.5±1% DC
- **OUTPUT RIPPLE & NOISE** = 23mV
- **TRANSIENT TOLERANCE** = ±130mV/-233mV
- **TDC** = 2.1A
- **MAX CURRENT** = 3.8A
- **OVER-CURRENT PROTECTION/MAX RATING * 1.3** = 4.94A
- **CURRENT STEP** = 3.1A
- **SLEW RATE** = 25.4A/US
- **WORK FREQUENCY** = 300KHZ
- **EFFICIENCY** = 90% @TDC

**VO = 0.6(1+RA/RB)** = 2.496V

**OUTPUT RIPPLE & NOISE** = 23mV

**TRANSIENT TOLERANCE** = ±130mV/-233mV

**MAX CURRENT** = 3.8A

**OVER-CURRENT PROTECTION/MAX RATING * 1.3** = 4.94A

**CURRENT STEP** = 3.1A

**SLEW RATE** = 25.4A/US

**WORK FREQUENCY** = 300KHZ

**EFFICIENCY** = 90% @TDC
**ESR** = 7M

**SMD** 10*10*4

**RA**

**RB**

**DCR** = 11M

6.3*9

VO = 0.6(1 + RA/RB) = 2.496V

**TDC** = 2.1A

**DESIGN SPECIFICATION**

**EFFICIENCY** > 90% @ TDC

**WORK FREQUENCY** = 300KHz

**TRANSIENT TOLERANCE** = +130MV/-233MV

**OUTPUT RIPPLE & NOISE** < 23MV

**OUTPUT VOLTAGE** = 2.5 +/– 1%

**MAX CURRENT** = 3.8A

OVER-CURRENT PROTECTION (MAX RATING * 1.3) = 4.94A

**CURRENT STEP** = 3.1A

**SLEW RATE** = 25.4A/US

ISAT = 14.5A

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**1S2B DA0S2BMB8A0**

**3**

**1**

**2**

D32

**21PR97**

**2**

**1**

PR105

**21**

**PR101**

**20 24**

**18 17 16 15 19**

4

**25**

**2**

**5**

**11 10 12 13 14 15 16 17 18 19**

26

**21 28**

27 TH

**3**

**22 PU29**

**21**

**PL57**

**2**

**1 PC180**

**2**

**1 PC170**

**21PC474**

**2**

**1 PR232**

**2**

**1 PC320**

**2**

**1 PC316**

**21**

**PR240**

**2**

**1 PR236**

**2**

**1 PR93**

**2**

**1 PC489**

**2**

**1 PC317**

**2**

**1 PC327**

**2**

**1 PC326**

**X5R**

**CH4103K9B09**

0.1UF 16V 0402

**PVPP_DDR_EF**

**0.1UF 10%**

**0402**
**DESIGN SPECIFICATION**

- **OUTPUT VOLTAGE**: 2.5 ± 1% DC
- **TRANSIENT TOLERANCE**: ±130mV/233mV
- **TDC**: 2.1A
- **MAX CURRENT**: 3.8A
- **OVER-CURRENT PROTECTION (MAX RATING * 1.3)**: 4.94A
- **CURRENT STEP**: 3.1A
- **SLEW RATE**: 25.4A/μS
- **EFFICIENCY**: > 90% @TDC
- **WORK FREQUENCY**: 300KHZ
- **EFFICIENCY**: > 90% @TDC

**D I A G R A M**

- **PVPP_DDR_GH**: Various components and connections including capacitors, resistors, and other electronic parts.

**E Q U A T I O N**

- \[ VO = 0.6(1 + RA/RB) = 2.496V \]
OUTPUT VOLTAGE = 1.5V±5%
OUTPUT RIPPLE & NOISE < 30MV
TRANSIENT TOLERANCE = 150MV
MAX CURRENT = 0.2A
PD = (1.8V - 1.5V) * 0.2A = 0.06W

RT9059-15GQW FIXED VOLTAGE 1.5V
ADJUSTABLE VOLTAGE : VOUT=0.8*(1+RA/RB)