HHW8GEMC-B1

8GB e·MMC

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Revision History

Version	Date	Description
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&DUG

1. Description

HHW¶V HÂ00& LV DQ HPEHGGHG IODVK PHPRU\ VWRUDJH VROXWLRQ
HHW¶V HÂ00& KL\EULG GHYLFH FRPELQLQJ DQ HPEHGGHG IODVK FRQ
-('(& 6WDQGDUG HÂ00& LQWHUIDFH
The HÂ00&RQWUROOHUZDVDQDJHPHQWODFRGHDQGHUURUFRUUHFWLRQ
DQG UHDG VHQVLQJ VLJQLILFDQWO\ UHGXFLQJ WKH VWRUDJH PDQ
HÂ00iVDQ LGHDO VROXWLRQ IRU PRQLWRULQJ HFWURQLF GHYLFHV
RI DSSOLFDWLRQ VXFK DV 3'$V +DQGKHOG
YLGHR FDPHUDV 0XOWLPHGLD HTXLSPHQW HWF 1RW RQO\ XVHG
DGRSWHGLQGHSHQGHQWO\EHGGHGDSSOLFDWLRQV

3. Features

- 6XSSRUW -('(& H&RHO&OLDQW
- 6XSSRUW 9 V9XSSRZHU
- 6XSSRUW ZLUH EXV &/. '&7> 'DXDG KDUGZDUH7BQVHW
- 8S WR 0+]VFSOHRFN
- 6XSSRUW 6LQJOH 'DWD 5DWH 5DWHDQG 'XDO 'DWD
- 6XSSRUW GLIIHUHQW %XVZLGWK ELW ELW
- 6XSSRUW 2ULJLQDO %RRWRGHV $OWHUQDWLYH %RRW
- 6XSSRUW 'DWD 5HPRYDEOH6DUGLQWHU]H
- 6XSSRUW 5HSOD\ 3URWHFWHG5HJLRQ\
- 6XSSRUW 0XOWLSOH 3DUWLWLRQV ZLWK HQKDQFHG DWWULEX
- 6XSSRUW 8QORFN3URGXFWLRQ
- 6XSSRUW 'DWD 3URWHFWLRQ 3RZHU
- 6XSSRUW 3RZHU 6DYLQJ 6OHHS
- 6XSSRUW +LJKVWUHUXSW +3,
- 6XSSRUW %DFNJURXQGRQ
- 6XSSRUW &RPPRQ&GV
- 6XSSRUW 6DPS6LQJX7XQH
- 6XSSRUW '\QDPLF3RZHU VWDQGDORQH VOHHS
- 6XSSRUW &RPPXQLQJ
- 6XSSRUW 6HFXUHWUHFWLRQ

- 3DFNDJH

-

4. Functional BlockDiagram

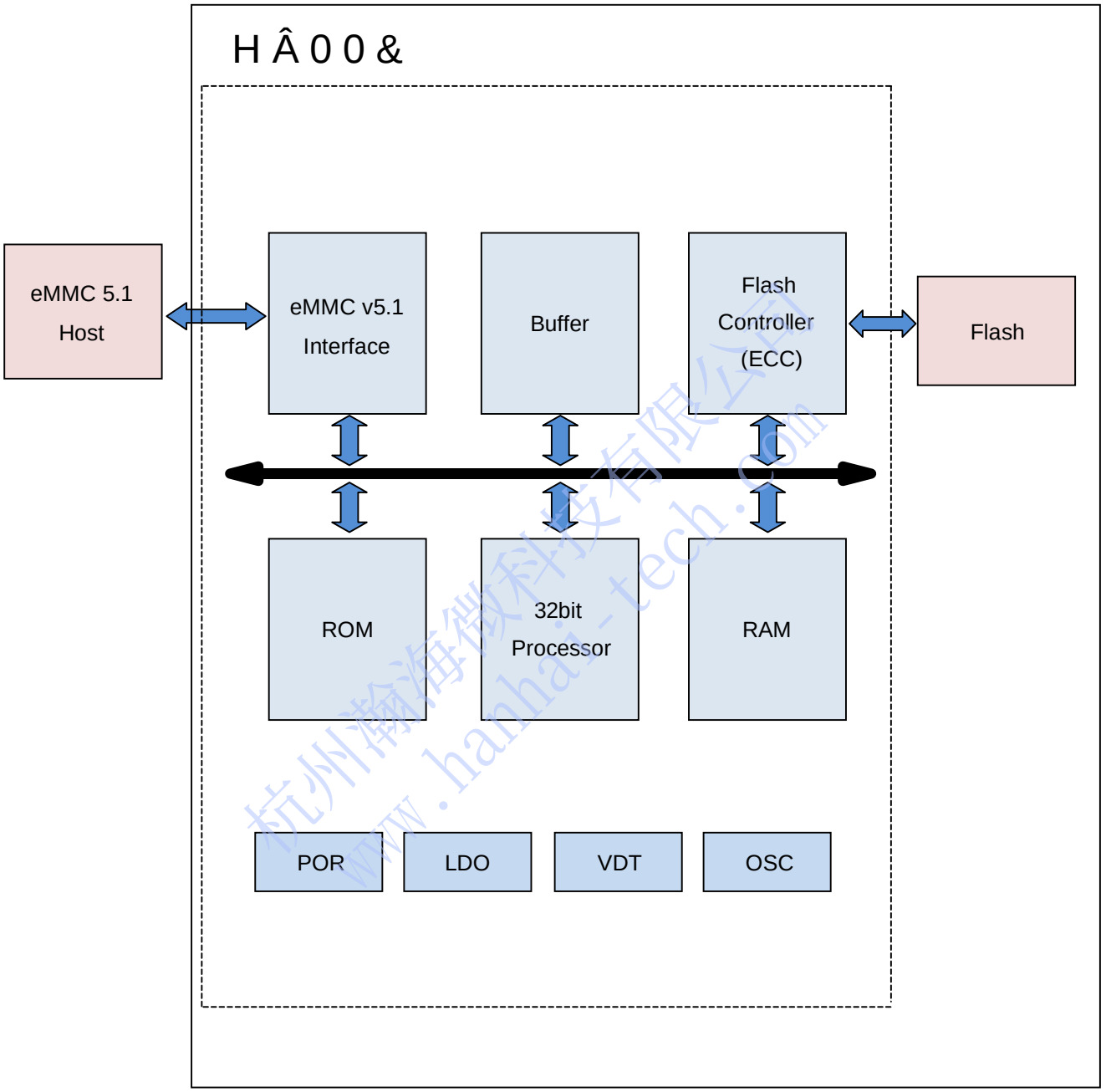


Figure 1 - G / / % $ N Q E M & K C I T C O

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5. HÂ00& 'HYLFH System

HÂ00& 6\VWHP

7KH HÂ00& VSHFLILFDWLRQ FRYHUV WKH EHKDYLRU RI WKH LQWH
VSHFLILFDWLRQ WKH H[LVWHQFH RI D KRVW FRQWUROOHU DQG D PH
RQ RI WKHVH SLHFHV LV QRW IXOO\ VSHFLILHG

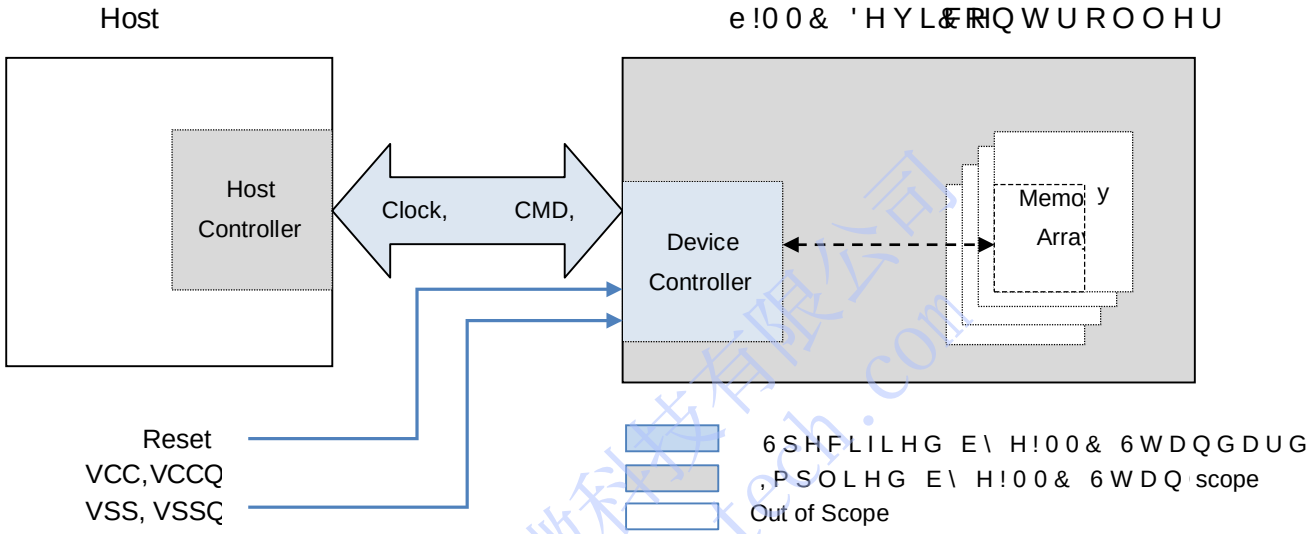


Figure 2 - G //% 5[UVGO 1XGTXKGY

HÂ00& 'HYLFH

7KH HÂ00& EXV KDV WKRHPRQOLRZLQJ DQG SRZHU OLQHV

- &/. &O,RQSXW
- '6 'DWD VWUREH XVHG IRU GRXWSXW LQ +6
- CMD &RPPDQG&ELGLUHFWLRQDOLQHGDWDIRUGRXWSXW DQGÂ00&RSHUDWLRGHQGUDLQ DQGSXVKXOO
- '$7 a'$7 'DWD OLQHV DUH ELGLUHFWLRQDO VLJQDOVRXWSXW DQG H
- 567BQ +DUGZDUHSXWVHW
- 9&& 9&& LV WKH SRZHU VXSO\ IRU FRUH DQG IODVK
- 9&&4 9&&4 LV WKH SRZHU VXSSO\ IRU KRVW
- 966 9664 *URXQGV

Name	Type	Description
&/.	I	&ORFN
DS	2 33	'DWD 6WUREH
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
'$7	, 2 33	Data
CMD	, 2 33 2'	&RPPDQG 5HVSRQVH
567BQ	I	+DUGZDUH UHVHW
9&&	S	6XSSO\ YROWDJH IRU
9&&4	S	6XSSO\ YROWDJH IRU , 2
966	S	6XSSO\ YROWDJH JURXQG IRU &RUH
9664	S	6XSSO\ YROWDJH JURXQG IRU ,
I: input, O: output, PP: push-pull, OD: open- GUDLQ 1& 1RW FRQQHFWHG 6 SRZ		

Table 1 - G / / %Interface

,QDFWLYH 6WDWH	,QDFWLYH PRGH	Open-GUDLQ
3UHGOH 6WDWH	%RRW PRGH	
3UHBoot State		
,GOH 6WDWH	6WDWLF LGHQWLILFDWLRQ PRGH	
,GHQWLILFDWLRQ 6WDWH		
6WDQGE\ 6WDWH		
6OHHS 6WDWH		
7UDQVIHU 6WDWH		

'DWD WUDQVIHU PRGH

3XOOXS

,Q DGGLWLRQ WR WKH VWDQGDUG (UDVH &RPPDQG WKH (UDVH &RPPDQG
FRPPDQG
7KH 6HFXUH (UDVH FRPPDQG GLIIHUV IURP WKH EDVLF (UDVH FR
KRVW WR ZDLW XQWLO WKH RSHUDWLRQ LV FRPSOHWH EHIRUH P

For additional information please refer JESD84 -B51A.

7KH VHFXUH HUDVH FRPPDQG UHTXLUHV GHYLFH WR SHUIRUP D VHFX
DQG FRS\ LWHPV LGHQWLILHG IRU HUDVH LQ WKRVH HUDVH JURXSV
$ SXUJH RSHUDWLRQ LV GHILQHG

0 D Q D J H P H Q W

7 K H G H I D X O W D U H D R I W K H P H P R U \ G H Y L F H F R Q V L V W V R I D 8 V H U ' D
D U H D S D U W L W L R Q H G L Q W R 5 H S O D \ R W H F K Q R O R J \ F O D U L I \ W K H
D X W K H Q W L F D W H G D Q G P D Q D J H P H Q W D \ 7 K H R W K H U F R Q I L J X U D W L R Q L Q L W L
S D U W L W L R Q D Q G R U H V H U Data $ U H D Q 5 3 0 % $ U H 3 D U W L W L R Q E R U $ U H 3 D U W L W L R Q V

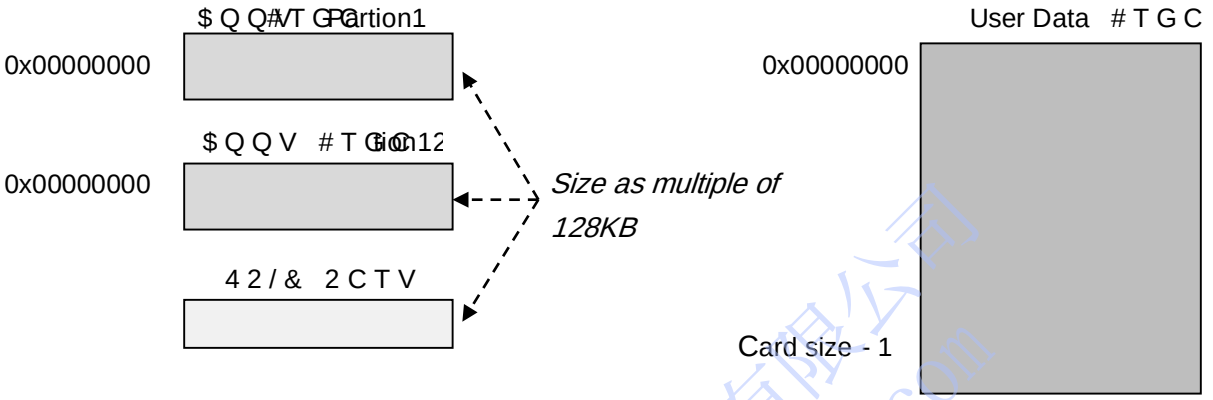


Figure 3 - G / / % O G O Q T [Q T I C P K \ C V K Q P C V V K O G \ G T Q

For additional information please refer JESD84 -B51A.

+ L J K S U L R U L W \ + 8 Q W H U U X S W

0 D Q \ R S H U D W L Q J V \ V W H P S D J H V Q H W R D Q F K D S U F H V V U H T X H V W H
Q H H G V W R I H W F K W K H D Q J H V Z K L O H R I D Z L U H R S H U D W L R Q W K H U H T X
F R P S O H W L R Q R I W K H Z U L W H F R P P D Q G Z K L F K L Q W K H Z R U V W F D
7 K H K L J K S U L R U L W \ L Q W H U U X S W % + 3 , H D V E H L Q H G Z L Q H (G ' O D W H Q
V X S S H Q G L Q J D O R Z H U S U L R U L W \ R S H U D W L R Q 7 K L V P H F K D Q L V P F W
O D W H Q F \ L Q W \ S L F D O F R Q G L W L R Q W R P V H F

For additional information please refer JESD84 -B51A.

%DFNJURXQG

'HYLFHV KDYH YDULRXV PDLQWHQDQFH RSHUDWLRQV WR EH SHUIRUPHG GXULQJ GDWD
FROOHFWLRQ WR PDLQWDLQ RU LPSURYH GDWD TXDOLW\ RU WR UHFRYHU GDWD
WR H[HFXWH PDLQWHQDQFH RSHUDWLRQV ZKHQ WKH GHYLFH LV QRW

Operations are then separated into two types: foreground operations – such as reareaoperation(or

The 'LVFDUG SRSHUDWLRQ GHYLFH GHVFULSWRU 7LRQ The 'LVFDUG FWDRQ ZRUG to LGHQWLI\ that is no ORQJHU UHTXLUHG VR WKDW WKH GHYLFH FDQ HUDVH DQG UHFODLP WKH XQGHUO\LQJ 7KH FRQWHQWV RI D ZULWH EORFN ZKHUH WKH GLVFDUG IXQFWLRQ GLVFDUGHG GDWD LQ WKH ORFDWLRQ RQ GHYLFH SRUWLRQ RI WKH GDWD LQ WKH ORFDWLRQ MXVW DV LQ WKH FDVH RI 75,0 7KH GHYLFH ZLOO ORG FLGH WKH F

For additional information please refer JESD84 -B51A.

The sanitize RSHUDWLRQ LV D IHDWXUH LQ DGGLWLRQ WR 75,0 DQG (GHYLFH 7KH XVH RI WKH 6DQLWL]H RSHUDWLRQ UHTXLUHV WKH G XQPDSSHG XVHU DGGUHVV VSDFH $ 6DQLWL]H RSHUDWLRQ LV LQLWLDWHG &6'> @ 6$1,7,=(B67$57

For additional information please refer JESD84 -B51A.

'\QDPLF &DSDFLW\ 0DQDJHPHQW

([WHQVLYH PHPRU\ XVDJH DQG DJLQJ RI)ODVK FRXOG UHVXOW LQ '\QDPLF &DSDFLW\ 0DQDJHPHQW SURYLGHV WKH PHFKDQLVP WR UHG FDSDFLW\ DQG H[WHQG WKH GHYLFH OLIH WLPH

The mechanism to manipulate dynamic capacity is based on: memory array partitioning and the granularity of WP groups. Reducing the capacity is done by releasing of WP-groups anywhere within the address space of the user area. A released WP-Group will behave as a permanently write protected group and it shall not be read from: Writing to an address within a released WP -Group returns a WP error; Reading form an address tithing a released WP-Group is forbidden and may return an error; &KHFNLQJ ZULWH SURWHFWLRQ XVLQJ &0' DQG ZULWH SURV groups and permanent write protection accordingly.

For additional information please refe r JESD84-B51A.

7. Product Specifications

& R Q V X P S W L R Q

Power Consumption	8GB	Units
Standby(VCCQ & VCC on)	80	uA
Sleep (VCCQ on, VCC off)	70	uA
HS400 Read VCC	70	mA
HS400 Read VCCQ	200	mA
HS400 Write VCC	45	mA
HS400 WriteVCCQ	125	mA

Table 4 - 2 Q Y G T % Q P U W O R V K Q P 6 C " 8 % % 8 8 % % 3 8

HS400 Performance	8GB	Units
Sequential Read	250	MB/s
Sequential Write	115	MB/s
Random Read	3900	IOPS
Random Write	4400	IOPS

6 C D N-GPerformance

2 S H U D W L Q J & R Q G L W L R Q V

	-25 / a	
	- / a /	

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3K\VLFDO

(\$67,&¶!V0Ø LV D SLQ-SWWLFKHGQEHDOO JULG DUUD\ %*\$

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Figure 4 – 11.5 x 13.0 x 1.2mm Top View

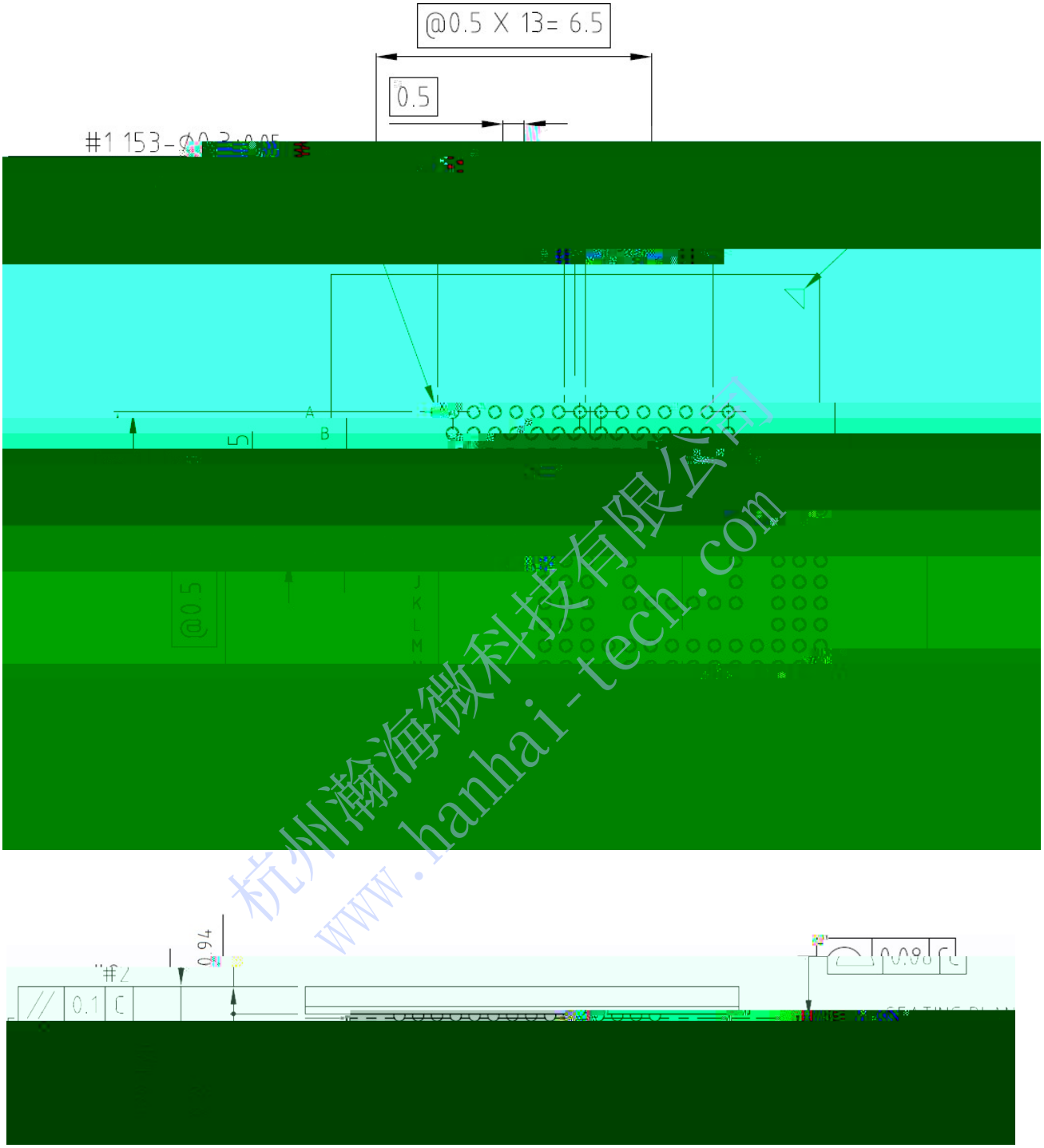


Figure 5 – 11.5 x 13.0 x 1.2mm Bottom & side View

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8. Interface Description

H Â 0 0 & ,Q W H U I D F H E D O O

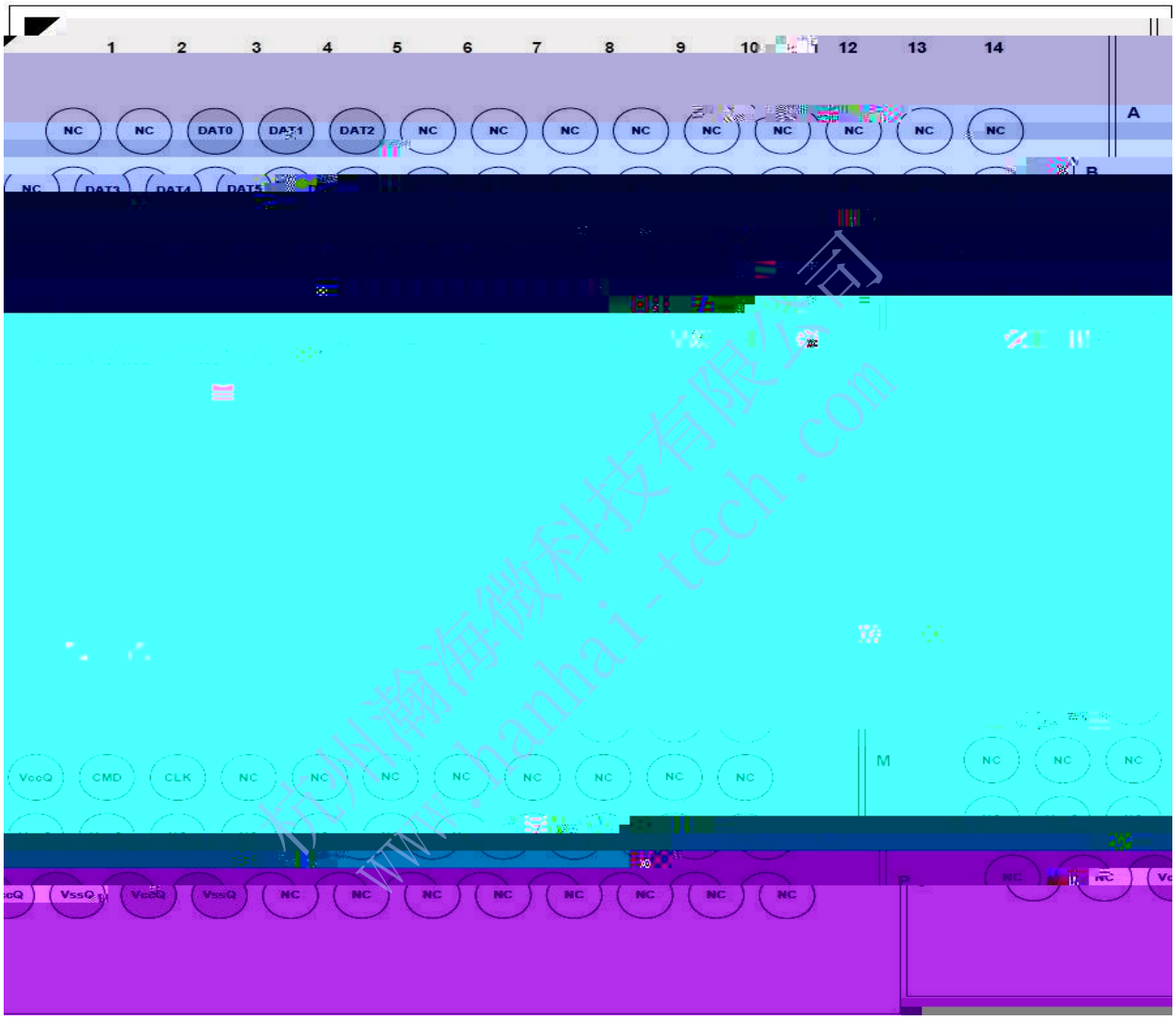


Figure 6 - FBGA153 Package Connection (top view through package)

3 L Q V D Q G 6 L J Q D O

153- Ball Device	Symbol	Type	Ball Function
			& O R F N
0	& / .	Input	

9. Device Resisters

2SHUDWLQJ &RQGLWLRQ 5HVLVWHU

The 32-EL WS HUDWLQJ FRQGLWLRQ UHJLVWHU VWRUHV WKH GDWD SDUDPHWHU ($67,&¶V DQG WKH DFFHVV PRGH LQGLFDWLRQ ,Q DGGLWLRQ WKLV UHJLVWHU VHW LI WKH &(SURJUDP& XSHUFHGXUH KDV EHHQ ILQLVKHG 7LPSOHPHQWHG EWMS67,&¶V

> @	5HVHUYHG	E	
> @	a 9	E	
> @	a 9	E	
> @	a 9	E	
> @	5HVHUYHG	E	
> @	$FFHVV PRGH	E	
> @	FDUG SRZHU XS VWDWXV ELW EXV\		

7KLV ELW LV VHW WR /2: LI WKH 'HYLFH KDV QRW ILQLVKHG WKH SRZHU XS U

6CDN-G1%4 TGIKUVGT FGHKPKVKQP

&DUG ,GHQWLILFDWLRQ &,' 5HVLVWHU

7KH &DUG ,'HQWLILFDWLRQ &,' UHJLVWHU LV ELWV ZLGH ,Q FI

XVHG GXULQJ HYLFH HQWLPHUDWLRQ SURFHVV DQG LV SURYLGHG 2HYLFH KDOO KDYH DQ XQLTXH LQLWLDOL]DWLRQ YDOXH 7KH VWUXFWXUH RI WKH &,' UHJLVWHU LV GHILQHG LQ WKH IROO

0DQXIDFWXUHU ,	MID	8	> @	FFh	
5HVHUYHG		6	> @		
&DUG %*$	CBX	2	> @		%*$

2(0 $SSOL0CU ~ò

- &J#§ Þ0 ° 9L€ œ (

'HYLFH VL]H	&B6,=(	12	5	>	@FFFh	
0D[UHDG FXUUHQW	9#'9B'5B&855B0,1	3	5	>	@6h	
0D[UHDG FXUUHQW	9#'9B'5B&855B0$;	3	5	>	@6h	
0D[ZULWH FXUUHQW	9#'9B':B&855B0,1	3	5	>	@6h	
0D[ZULWH FXUUHQW	9#'9B':B&855B0$;	3	5	>	@6h	



0LQLPXP :ULWH 3HUIRUPDQFH IRU 26MHz	0,1EBL3W(5DBW B B	5	> @	K	
0LQLPXP :ULWH 3HUIRUPDQFH IRU 26MHz	0,1EBL3W(5DBW5B	5	> @	K	
5HVHUYHG	5(6(59('	5	> @		
3RZHU FODVV IRU 9 5	0+]DW 3:5B&/B B	5	> @	K	0$; 506 &XUUHQW P$ 0$; 3HDN &XUUHQW P$
3RZHU FODVV IR 9 5	3:5B&/B B	5	> @	K	0$; 506 &XUUHQW P$ 0$; 3HDN &XUUHQW P$
3RZHU FODVV IRU 9 5	0+]DW 3:5B&/B B	5	> @	K	0$; 506 &XUUHQW P$ 0$; 3HDN &XUUHQW P$
3RZHU FODVV IR 9 5	3:5B&/B B	5	> @	K	0$; 506 &XUUHQW P$ 0$; 3HDN &XUUHQW P$
3DUWLDO=RQH.LQJ	3$57 7 21B6:, +B7,0(	5	> @	5h	3DUWLWLRQ VZLWFK WLPH PV
2X-WR-LQWHUUXSW WLPLQJ	\287B2)B,17(558 37B7,0(	5	> @	K	+3, WLPH RXW PV
, 2 'ULYHU 6WUHQJWK	'5 9(5B675(1* H	5	> @	1F	6XSSRUW GULYHU VWUHQJWK 7\
'HYLFH W\SH	'(9,&(B7<3(	5	> @	K	+6 # 9 2. +LJKSHHG 'DWD#5DWH 9 3. +LJKSHHG 'DWD 5DWH #UDWHG YROWDJH V 4. +LJKSHHG 'DWD 5DWH #UDWHG YROWDJH V
5HVHUYHG	5(6(59('	TBD	> @		
&6' VWUXFWXUH	&6'B6758&785(	5	> @	2h	&6' YHUVLRQ 1R
5HVHUYHG	5(6(59('	TBD	> @		
([WHQG &6' UHYLV	;7B&6'B5(9	5	> @	8h	5HYLVLRQ IRU 00& Y
0RGHV 6HJPHQW					
&RPPDQG VHW	&0'B6(7	5 :(B3	> @	K	
5HVHUYHG	5(6(59('	TBD	> @		
&RPPDQG VHW UH	&YO'B6(7B5(9	5	> @	K	9
5HVHUYHG	5(6(59('	TBD	> @		
3RZHU FODVV	32:(5B&/$66	5 :(B3	> @		

6WDUW 6DQLWL]H6 $S,H7 LHD W6 RQ	. (B3	>	@	K	
0DQXDOO\ VWDUW % 236B(1 EDFNJURXQG RSHUDWLRQV	: (B3	>	@	K	

(QDEOH EDFNJURXQG RSHUDWLRQV KDQGVKDNH

3URGXFW VWDWH DZDUHQHVV HQDEOHPHQW	352'8&7B67$7($:$55(1(66B(1$ %/(0(17	5 : (5	> @	3h	
6HFXUH 5HPRYDO 7\SH	6(&85(B5(029 /B7<3(	5 : (5	> @	K	
&RPPDQG 4XHXH QDEOH	&0'4B02'(B(1	5 : (B3	> @	K	
5HVHUYHG		TBD	> @		

127(5HVHUYHG ELWV VKRXOG UHDG DV ³ ´
127(