



>> DATA SHEET

(DOC No. HX8264-E-DS)

>> HX8264-E

1200CH TFT LCD Source Driver
with TCON

Version 01 August, 2010

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August, 2010

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>> HX8264-E

1200CH TFT LCD Source Driver with
TCON



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1. General Description

HX8264-E is a highly integrated 1200-channel outputs source driver with built-in Timing Controller for color TFT-LCD panels. HX8264-E is special designed for dual-gate architecture TFT-LCD panel with display resolutions of 800x480 and 800x600.

HX8264-E supports TTL digital 24-bit parallel RGB data input, and its source output generates 256 gray scales to perform 16M colors with dithering function enabled. The operating parameters could be set by input pin for all control features. In addition, special circuit architecture is designed for reducing power consumption.

HX8264-E could be configured as dual-gate operation mode for reducing FPC pin counts to save module cost. With wide range supply voltages and many control features make this chip more suitable for various applications.

HX8264-E supports content adaptive brightness control (CABC) function to reduce the power consumption of back light driver.

2. Features

- With built-in timing controller integrated 1200 channel source driver
- Support dual-gate operation mode
- Support display resolutions: 800(RGB)x600, 800(RGB)x480
- Support TTL 24-bit parallel (RGB) input timing
- Source output with 8-bit resolution 256 gray scale (16M colors, 2bit Dithering)
- Support content adaptive brightness control (CABC) function
- Support to configure CABC function via 3-wire SPI or hardware control pin
- Support stand-by mode for low power consumption
- Pin controlled UP/DOWN, LEFT/RIGHT, HV/DE mode select function
- Embedded Gamma Table
- Support external V1~V14 pad for Gamma adjusting
- Support 2 gamma curve for normally white or normally black LCD
- Output dynamic range: 0.1~AVDD-0.1V
- Power for source driver voltage AVDD: 6.5V~13.5V
- Power for digital interface circuit VDD: 2.7 ~ 3.6V
- Max. operating frequency: 50MHz
- COG package

3. Block Diagram

3.1 Function block diagram

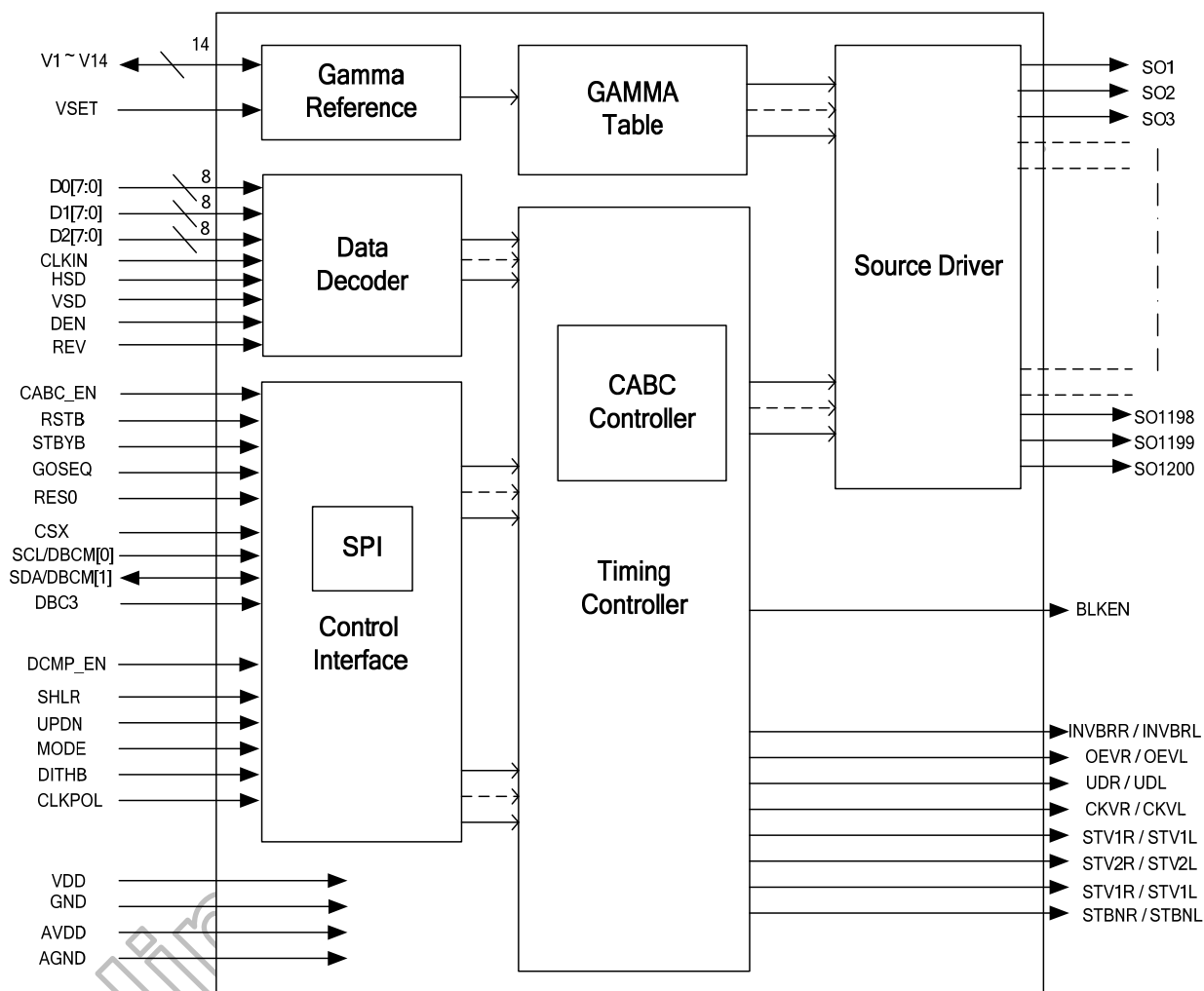


Figure 3.1: HX8264-E function block diagram

3.2 Application block diagram

3.2.1 800 x 480 dual gate mode (HX8264-E + HX8678)

Gate driver on left side

RES0 = 0

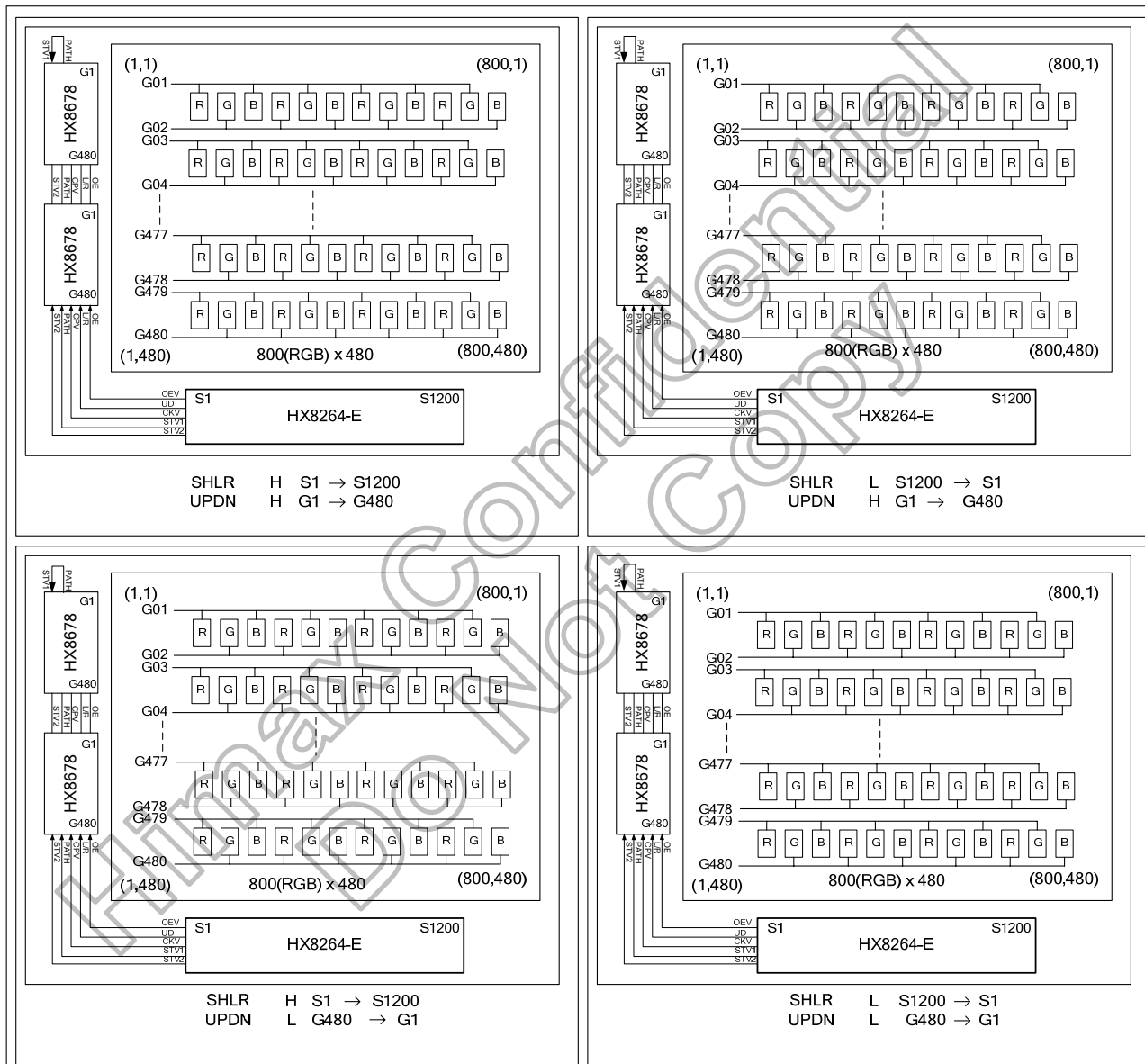


Figure 3.2: HX8264-E dual gate 800(RGB) x 480 application block diagram

Gate driver on right side

RES0 = 0

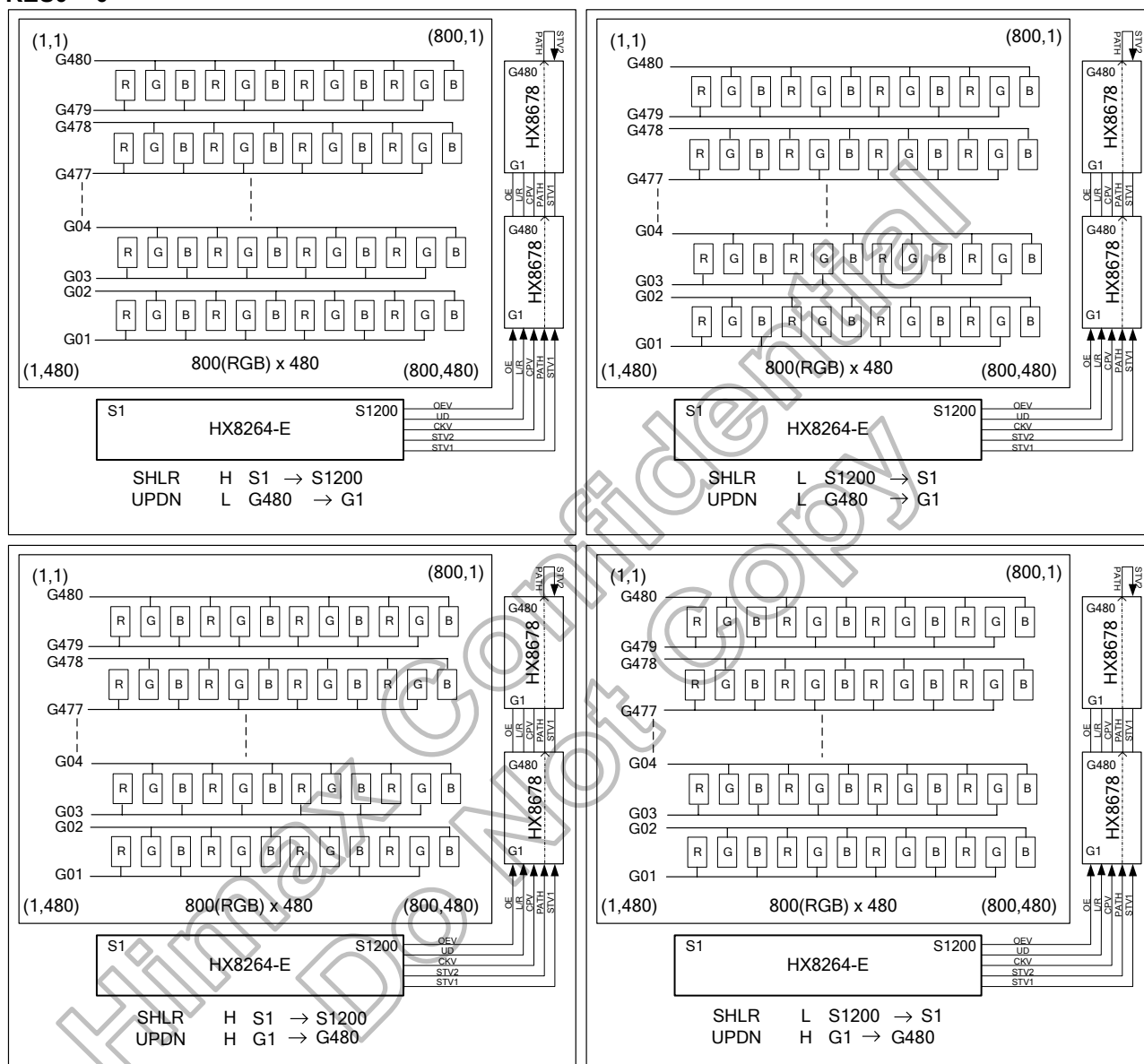


Figure 3.3: HX8264-E dual gate 800(RGB) x 480 application block diagram

3.2.2 800 x 600 dual gate mode (HX8264-E + HX8677)

Gate driver on left side

RES0 =1

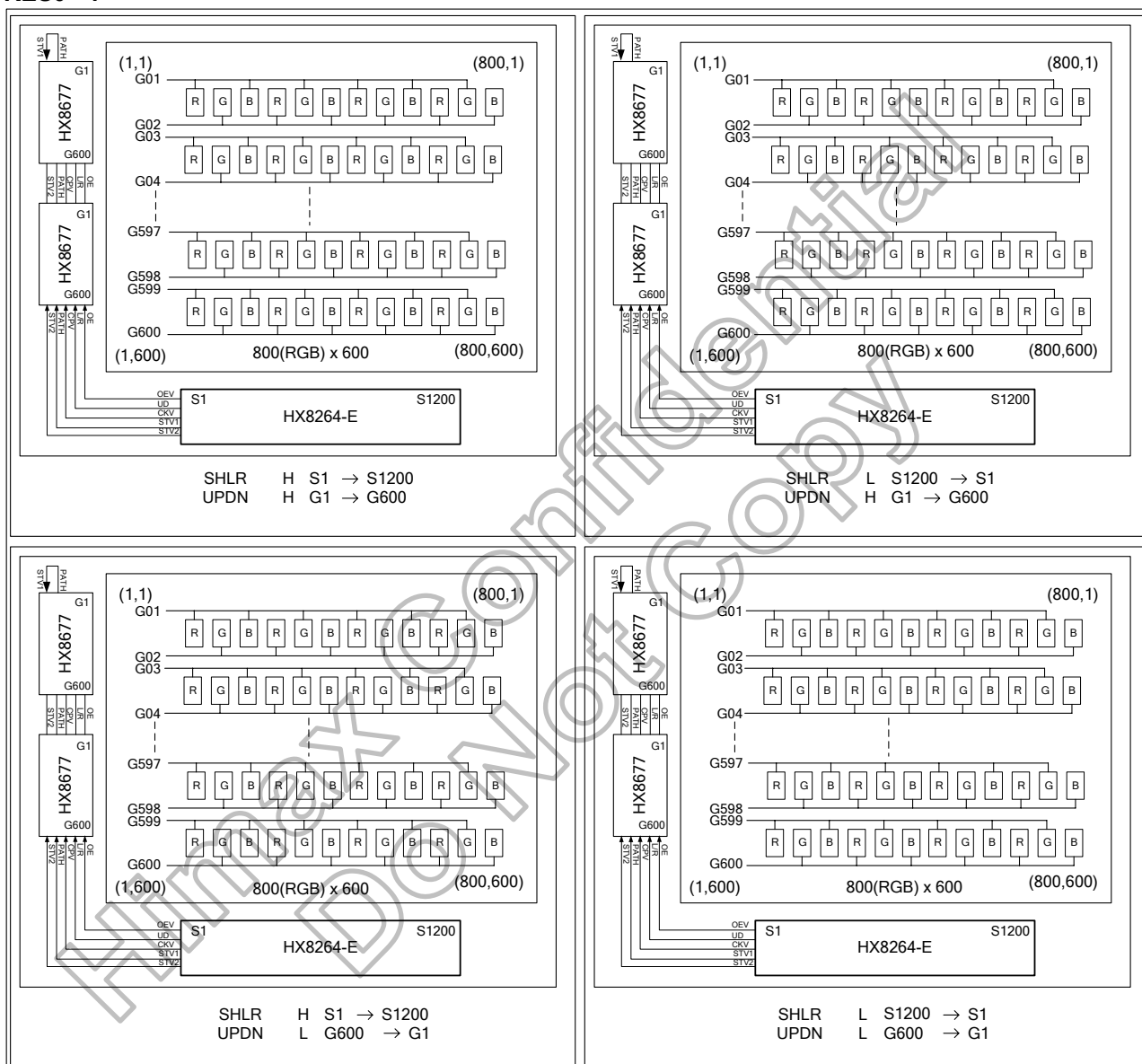


Figure 3.4: HX8264-E dual gate 800(RGB) x 600 application block diagram

Gate driver on right side

RES0 =1

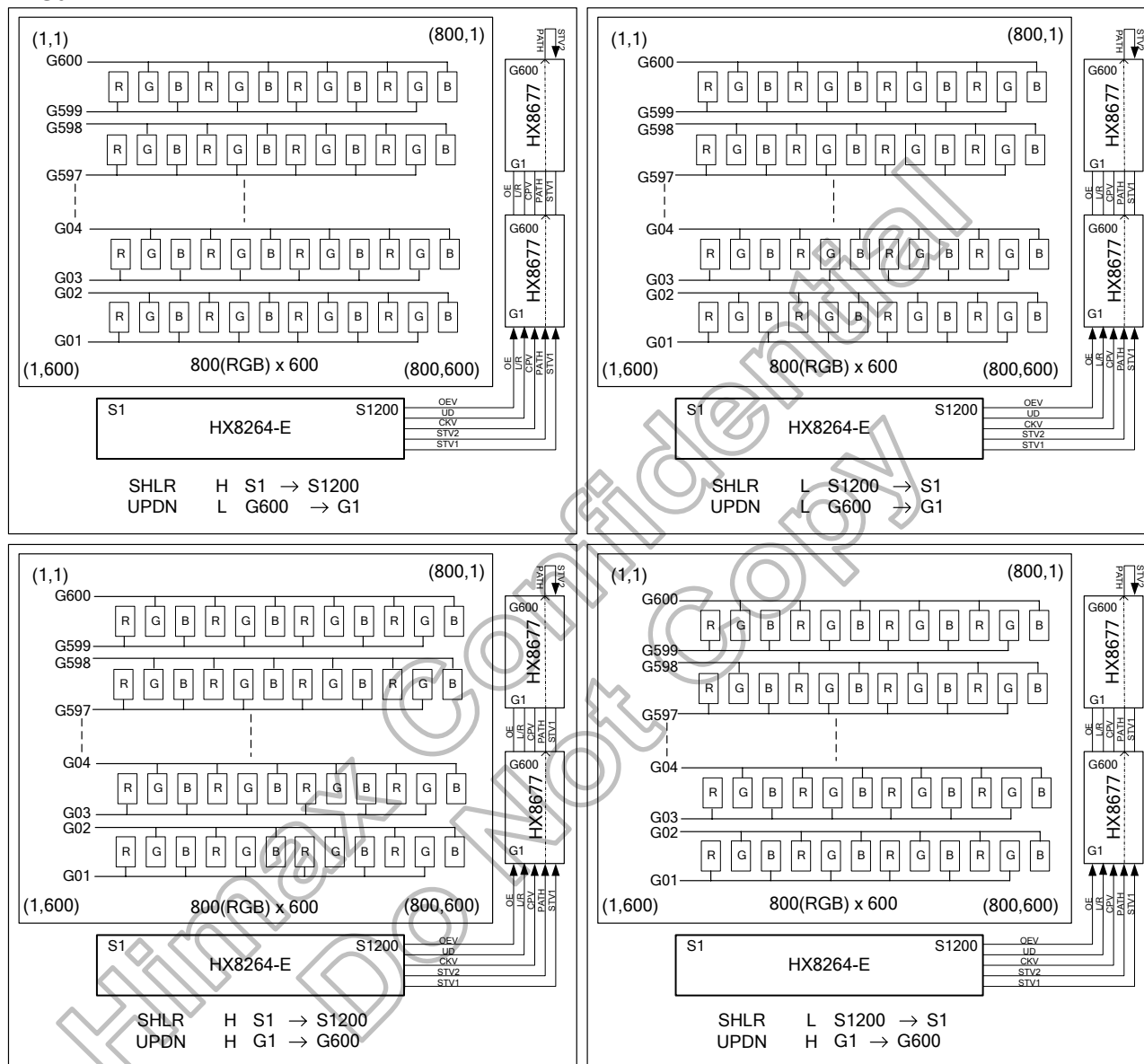


Figure 3.5: HX8264-E dual gate 800(RGB) x 600 application block diagram

4. Pin Description

HX8264-E Pin Description

Pin name	I/O	Description
D07~D00 D17~D10 D27~D20	I	Parallel Data input. For TTL 24-bit parallel RGB image data input. D[07:00] = R[7:0] data; D[17:10] = G[7:0] data ; D[27:20] = B[7:0] data. For 18-bit RGB interface ,connect two LSB bits of all the R/G/B data buses to GND.
CLKIN	I	Clock for Input Data. Data latched at rising/falling edge of this signal. Default falling edge.
HSD	I	Horizontal Sync Input. Negative polarity.
VSD	I	Vertical Sync Input. Negative polarity.
DEN	I	Data Input Enable. Active High to enable the data input bus under "DE Mode". Normally pull low.
MODE	I	DE / SYNC mode select. Normally pull high. H: DE mode. (Default) L: HSD/VSD mode.
REV	I	Data inverted control. Normally pull low REV="1": Data inverted for normally black LCD REV="0": Data not inverted for normally white LCD. (Default)
RES0	I	Display resolution selection. Normally pull low RES0="0", for 800(RGB)*480 display resolution. (Default) RES0="1", for 800(RGB)*600 display resolution
DITHB	I	Dithering function enable control. Normally pull high DITHB="1", Disable internal dithering function. (Default) DITHB="0", Enable internal dithering function.
CLKPOL	I	Input clock edge selection. Normally pull low CLKPOL="1", Latch data at CLKIN rising edge. CLKPOL="0", Latch data at CLKIN falling edge. (Default)
CSX	I	Serial Interface chip enable signal. Normally pull high CSX="0": The chip is selected (accessible) CSX="1": The chip is not selected (inaccessible) (Default) Note: Fix to the VDD level if no used
SCL/DBCM[0]	I	Multi function I/O pin. Normally pull high When DBC3="1", this pin is SCL function (Default) When DBC3="0", this pin is DBCM[0]function Note: Fix to the VDD level if no used
SDA/DBCM[1]	I/O	Multi function I/O pin. Normally pull high When DBC3="1", this pin is SDA function (Default) When DBC3="0", this pin is DBCM[1] function Note: Fix to the VDD level if no used
DBC3	I	CABC control by hardware or SPI selection. Normally pull high DBC3="0": CABC control by hardware DBC3="1": CABC control by SPI software (Default)
CABC_EN	I	CABC Function Enable Control. Normally pull low CABC_EN="0": BLKEN pin is used to be backlight control signal for external backlight controller. (Default) CABC_EN="1": BLKEN pin will refer the gray scale content of display image to output a PWM pulse to backlight driver
BLKEN	O	Backlight enable control signal for external controller. BLKEN="1", Logical control signal to turn on external backlight controller BLKEN="0", Turn off external backlight controller Note: Refer to the Power On/Off Sequence for the detail information.

Pin name	I/O	Description
V1 ~ V14	I	When VSET = "0", Internal Gamma Table is used. V1~V14 pad are un-used. When VSET = "1". V1~V14 are external gamma correction points. The voltage of these pins must be : $AGND < V14 < V13 < V12 < V11 < V10 < V9 < V8 ; V7 < V6 < V5 < V4 < V3 < V2 < V1 < AVDD$
VSET	I	Gamma correction source select. Normally pull low. VSET = "0", use internal Gamma Reference voltage (AVDD). (Default) VSET = "1", use external Gamma Correction input (V1~V14).
RSTB	I	Global reset pin. Active Low to enter Reset State. Suggest to connecting with an RC reset circuit for stability. Normally pull high.
STBYB	I	Standby mode. Normally pulled high. STBYB = "1", normal operation. (Default) STBYB = "0", timing controller, source driver will turn off, all output are High-Z
SHLR	I	Source Right or Left sequence control. Normally pull high SHLR = "L", shift left: last data = $S1 \leftarrow S2 \leftarrow S3 \dots \leftarrow S1200$ = first data. SHLR = "H", shift right: first data = $S1 \rightarrow S2 \rightarrow S3 \dots \rightarrow S1200$ = last data. (Default)
UPDN	I	Gate Up or Down scan control. Normally pull low UPDN = "L", STV2 output vertical start pulse and UD pin output logical "0" to Gate driver. (Default) UPDN = "H", STV1 output vertical start pulse and UD pin output logical "1" to Gate driver.
BIST	I	Normal Operation /BIST pattern select. Normally pull low BIST = H: BIST (DCLK input is not needed) BIST = L: Normal Operation. (Default)
GOSEQ	I	Gate on sequence. Normally pull low. Please refer to Note. GOSEQ = H: INVBRR/INVBRL = L Gate on $G1 \rightarrow G2 \rightarrow G4 \rightarrow G3 \rightarrow G5 \rightarrow G6 \rightarrow G8 \rightarrow G7 \dots$ GOSEQ = L: INVBRR/INVBRL = H Gate on $G1 \rightarrow G2 \rightarrow G3 \rightarrow G4 \rightarrow G5 \rightarrow G6 \rightarrow G7 \rightarrow G8 \dots$ (Default)
OEVR/OEVL	O	Gate driver control signal.
UDR/UDL	O	Gate driver control signal.
CKVR/CKVL	O	Gate driver control signal.
STV1R/STV1L	O	Gate driver control signal.
STV2R/STV2L	O	Gate driver control signal.
STBNR/STBNL	O	Gate driver control signal.
INVBRR/INVBRL	O	Gate driver control signal.
DCMPR/DCMPL	O	Data line compensation. When source output in positive polarity, DCMP output half voltage level of negative polarity. When source output in negative polarity, DCMP output half voltage level of positive polarity.
AVDD	PI	Power supply for analog circuits
AGND	PI	Ground pins for analog circuits
VDD	PI	Power supply for digital circuits
GND	PI	Ground pins for digital circuits
SO1~SO1200	O	Source Driver Output Signals. All outputs will be of unknown values under stand-by mode.
ALIGN	M	For assembly alignment.
COM1_B COM2_B	S	Internal link together between input side and output side.

Pin name	I/O	Description
COM1_T COM2_T	S	Internal link together between input side and output side.
TP0~9 TB0~4	T	Test pin for Himax only. Float these pins for normal operation.
SHIELDING	SH	IC shielding pads. Those pins are internally connected to the AGND. DO NOT connect to any WOA on the panel.
DASHD	SH	Data Bus Shielding Pad. Those pins are internally connected to the GND. Recommend to add shielding lines on the FPC to reduce EMI.
DUM	D	Dummy Pads. Those pins are floating pads.
DCMP_EN	I	DCMP enable control signal. Normally pull high DCMP_EN="H", The DCMP signal is enable. (Default) DCMP_EN="L", The DCMP signal is disable.

Note: I: Input, O: Output, P: Power, D: Dummy, S: Shorted line, M: Mark, PI: Power input, PO: Power output, T: Testing, SH: Shielding, I/O: Input / Output, PS: Power Setting, C: Capacitor Pin.

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HX8264-E Pass Line Description

Pass Line No.	Pin Name	
1	COM1_B	COM1_T
2	COM2_B	COM2_T

Table 4.1: HX8264-E Pass Line Description

Value of wiring resistance to each pin

The input wiring resistance values affect power or signal integrity and the display quality. Must be sure to design using values that do not exceed those recommended as below.

Pin Name	Wiring resistance value(Ω)
AVDD	< 5
AGND	< 5
VDD	< 10
GND	< 10
V1~V14	< 10
D00~D07	< 50
D10~D17	< 50
D20~D27	< 50
CLKIN	< 50
VSD	< 50
HSD	< 50
DEN	< 50
CSX	< 200
SCL/DBCM[0]	< 200
SDA/DBCM[1]	< 200
BLKEN	< 200
CABC_EN	< 500
RSTB	< 500
STBYB	< 500
DITHB	< 500
SHLR	< 500
UPDN	< 500
BIST	< 500
MODE	< 500
RES0	< 500
CLKPOL	< 500
VSET	< 500
OEVx	< 500
UDx	< 500
CKVx	< 500
STV1x	< 500
STV2x	< 500
STBNx	< 500

Table 4.2: The Recommended Wiring Resistance Values

5. Operation Description

5.1 Relationship between input data and output channels

(1) SHLR = "1", right shift

Output	Out1	Out2	Out3	...	...	...	Out1198	Out1199	Out1200
Order	First Data			→	→	→	Last Data		
Odd Line /Gn	D07~D00	D27~D20	D17~D10	...	...	...	D07~D00	D27~D20	D17~D10
Odd Line /Gn+1	D17~D10	D07~D00	D27~D20	...	...	...	D17~D10	D07~D00	D27~D20
Even Line /Gn	D07~D00	D27~D20	D17~D10	...	...	...	D07~D00	D27~D20	D17~D10
Even Line /Gn+1	D17~D10	D07~D00	D27~D20	...	...	...	D17~D10	D07~D00	D27~D20

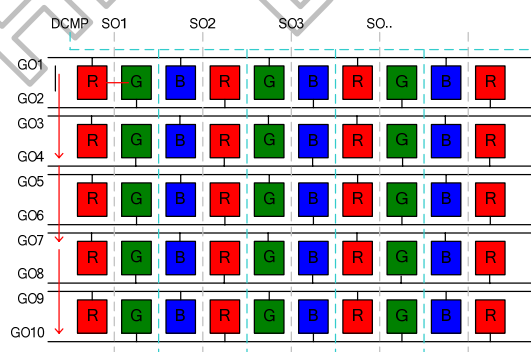
(2) SHLR = "0", left shift

Output	Out1	Out2	Out3	...	...	...	Out1198	Out1199	Out1200
Order	Last Data			←	←	←	First Data		
Odd Line /Gn	D07~D00	D27~D20	D17~D10	...	...	...	D07~D00	D27~D20	D17~D10
Odd Line /Gn+1	D17~D10	D07~D00	D27~D20	...	...	...	D17~D10	D07~D00	D27~D20
Even Line /Gn	D07~D00	D27~D20	D17~D10	...	...	...	D07~D00	D27~D20	D17~D10
Even Line /Gn+1	D17~D10	D07~D00	D27~D20	...	...	...	D17~D10	D07~D00	D27~D20

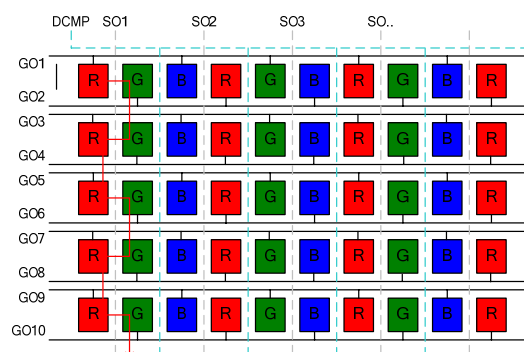
5.2 Gate Scan Sequence

HX8264-E supports two types of gate scan sequences and illustrated as below:

GOSEQ=L, INVBRRINVBRL=H
(With traditional gate driver)



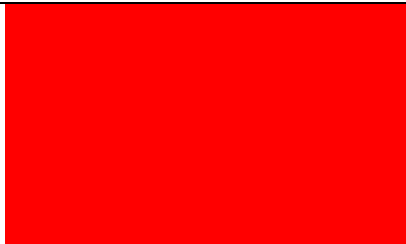
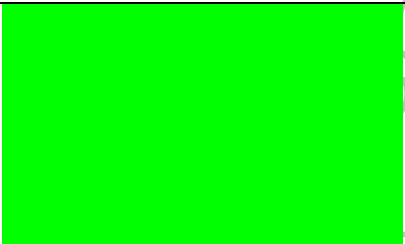
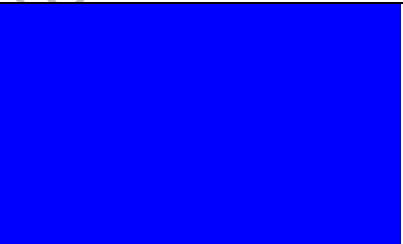
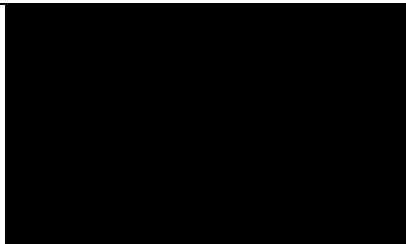
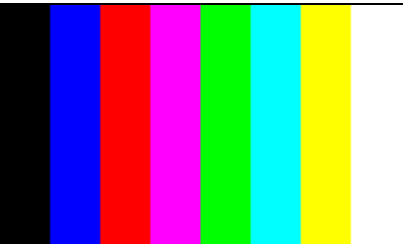
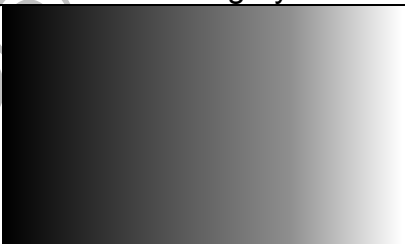
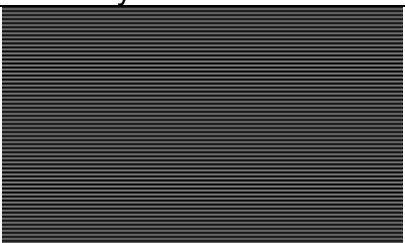
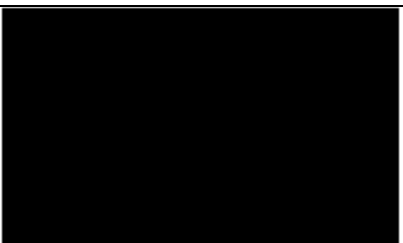
GOSEQ=H, INVBRRINVBRL=L
(With special design gate driver)



5.3 The BIST Pattern for Aging Mode Test

HX8264-E supports BIST pattern for aging mode test automatically. When external BIST pin set to “H” level, then HX8264-E will leave normal operation mode and starts to generate the BIST pattern to LCD panel without external clock signal. The CABC function will turn off and BLKEN output keep high level when BIST mode enable.

The BIST pattern is illustrated as below:

1	2	3
Red	Green	Blue
		
4	5	6
Black	White	Color Bar
		
7	8	9
Vertical 64 gray scale	Horizontal 64 gray scale	Gray with black block
		
10	11	12
Gray with black dot	Gray with black line	Black with white frame
		

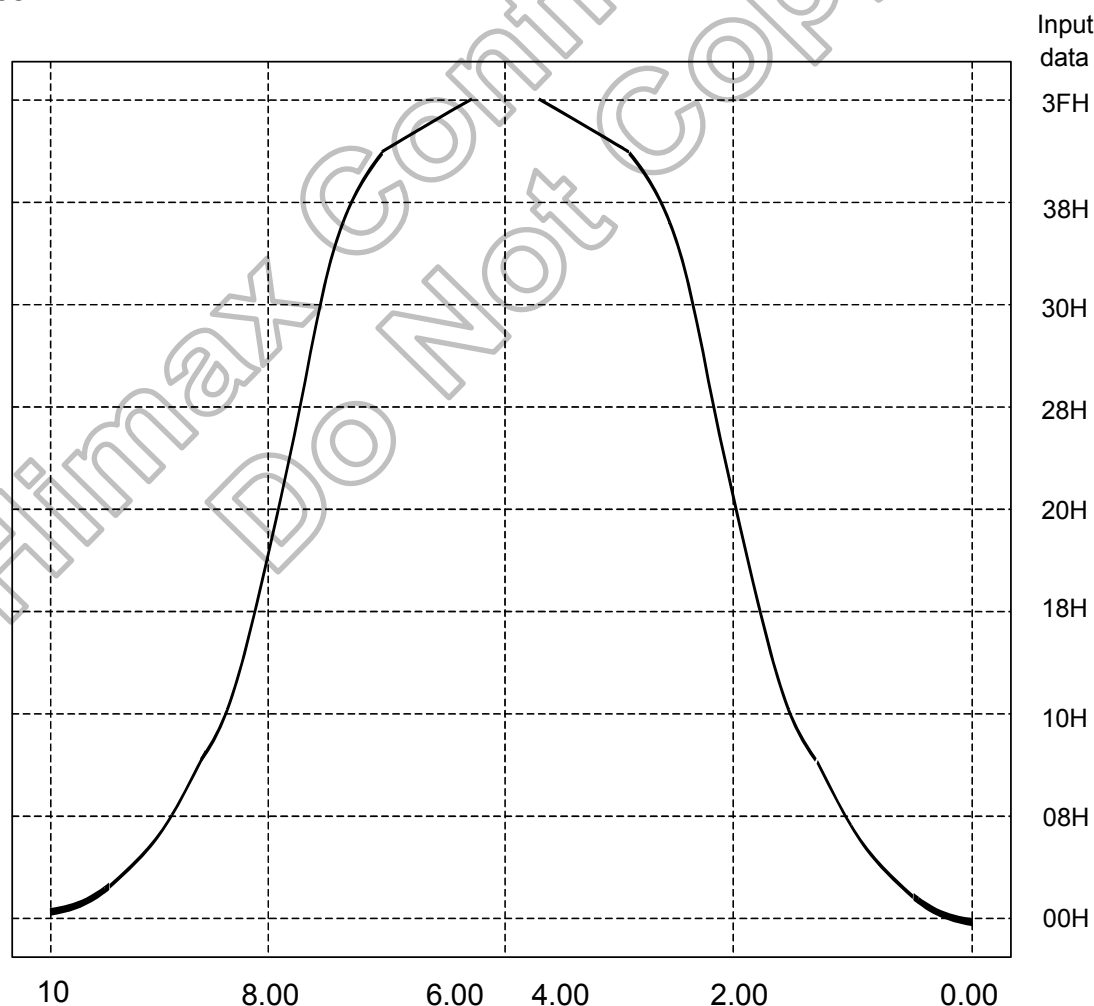
6. Gamma Adjustment Function

6.1 Relationship between gamma correction and output voltage

HX8264-E supports 2 gamma curve for normally white or normally black LCD depend on REV function pin. The output voltage is determined by the 6-bit DAC input data, and the V1 ~ V14 gamma correction reference voltage inputs.

Input code	Normally white LCD REV = L	Normally black LCD REV = H
00H	00H	3FH
0AH	0AH	35H
35H	35H	0AH
3FH	3FH	00H

The figure below shows the relationship between the input data and the output voltage. Please refer to the following pages for the relative resistor values and voltage values.



Note: $AVDD-0.1 \geq V1 \geq V2 \geq V3 \geq V4 \geq V5 \geq V6 \geq V7 \geq V8 \geq V9 \geq V10 \geq V11 \geq V12 \geq V13 \geq V14 \geq AGND+0.1V$

Figure 6.1: Gamma correction characteristic curve

6.2 HX8264-E internal gamma table (VSET= " L")

REV=0 data not inverted, for normally white panel

AVDD=10.4V		
Internal gamma	Input Code	Voltage
V1	00h	10.00
V2	01h	9.76
V3	10h	8.15
V4	20h	7.78
V5	30h	7.51
V6	3Eh	7.16
V7	3Fh	6.54
V8	3Fh	5.35
V9	3Eh	4.65
V10	30h	3.66
V11	20h	3.11
V12	10h	2.45
V13	01h	0.48
V14	00h	0.20

Data (Hex)	Negative Polarity	Positive Polarity
00H	AVDD X 0.019598	AVDD X 0.962
01H	AVDD X 0.046119	AVDD X 0.938
02H	AVDD X 0.083529	AVDD X 0.905
03H	AVDD X 0.109285	AVDD X 0.883
04H	AVDD X 0.129960	AVDD X 0.865
05H	AVDD X 0.146395	AVDD X 0.851
06H	AVDD X 0.159756	AVDD X 0.840
07H	AVDD X 0.171244	AVDD X 0.831
08H	AVDD X 0.181228	AVDD X 0.823
09H	AVDD X 0.190248	AVDD X 0.816
0AH	AVDD X 0.198556	AVDD X 0.810
0BH	AVDD X 0.205538	AVDD X 0.805
0CH	AVDD X 0.212346	AVDD X 0.800
0DH	AVDD X 0.218658	AVDD X 0.795
0EH	AVDD X 0.224393	AVDD X 0.791
0FH	AVDD X 0.230035	AVDD X 0.787
10H	AVDD X 0.235175	AVDD X 0.784
11H	AVDD X 0.240120	AVDD X 0.781
12H	AVDD X 0.245052	AVDD X 0.777
13H	AVDD X 0.249372	AVDD X 0.775
14H	AVDD X 0.253994	AVDD X 0.772
15H	AVDD X 0.258138	AVDD X 0.769
16H	AVDD X 0.262134	AVDD X 0.767
17H	AVDD X 0.266387	AVDD X 0.764
18H	AVDD X 0.270174	AVDD X 0.762
19H	AVDD X 0.273886	AVDD X 0.760
1AH	AVDD X 0.277749	AVDD X 0.758
1BH	AVDD X 0.281507	AVDD X 0.756
1CH	AVDD X 0.284932	AVDD X 0.754
1DH	AVDD X 0.288506	AVDD X 0.753
1EH	AVDD X 0.292393	AVDD X 0.751
1FH	AVDD X 0.295628	AVDD X 0.749
20H	AVDD X 0.298992	AVDD X 0.748
21H	AVDD X 0.302483	AVDD X 0.746
22H	AVDD X 0.305900	AVDD X 0.744

23H	AVDD X 0.308842	AVDD X 0.742
24H	AVDD X 0.311887	AVDD X 0.741
25H	AVDD X 0.315036	AVDD X 0.739
26H	AVDD X 0.318369	AVDD X 0.737
27H	AVDD X 0.321407	AVDD X 0.736
28H	AVDD X 0.324539	AVDD X 0.734
29H	AVDD X 0.327767	AVDD X 0.733
2AH	AVDD X 0.331173	AVDD X 0.731
2BH	AVDD X 0.334383	AVDD X 0.730
2CH	AVDD X 0.337684	AVDD X 0.728
2DH	AVDD X 0.341076	AVDD X 0.727
2EH	AVDD X 0.344652	AVDD X 0.725
2FH	AVDD X 0.348236	AVDD X 0.724
30H	AVDD X 0.351912	AVDD X 0.722
31H	AVDD X 0.355689	AVDD X 0.721
32H	AVDD X 0.359704	AVDD X 0.719
33H	AVDD X 0.363864	AVDD X 0.718
34H	AVDD X 0.368123	AVDD X 0.716
35H	AVDD X 0.372563	AVDD X 0.715
36H	AVDD X 0.377600	AVDD X 0.713
37H	AVDD X 0.382750	AVDD X 0.712
38H	AVDD X 0.388237	AVDD X 0.710
39H	AVDD X 0.394664	AVDD X 0.708
3AH	AVDD X 0.401224	AVDD X 0.706
3BH	AVDD X 0.409440	AVDD X 0.704
3CH	AVDD X 0.418345	AVDD X 0.701
3DH	AVDD X 0.429970	AVDD X 0.697
3EH	AVDD X 0.446886	AVDD X 0.688
3FH	AVDD X 0.514095	AVDD X 0.629

Table 6. 1 Gamma table for normally white panel

REV=1 data inverted, for normally black panel

AVDD=10.4V		
Internal gamma	Input Code	Voltage
V1	3Fh	10.09
V2	3Eh	9.83
V3	30h	8.51
V4	20h	7.98
V5	10h	7.61
V6	01h	6.55
V7	00h	6.37
V8	00h	4.78
V9	01h	4.59
V10	10h	3.43
V11	20h	3.02
V12	30h	2.53
V13	3Eh	0.96
V14	3Fh	0.61

6.3 HX8264-E external gamma voltage input (VSET = "H")

REV=0 data not inverted, for normally white panel (Default)
Gamma correction resistor ratio: (1 unit = 125ohm)

Positive gamma

V1	Name	Resistor	Name	Resistor	V4
V2	R0	7.6	R32	0.6	
	R1	10.6	R33	0.6	
	R2	7	R34	0.6	
	R3	5.8	R35	0.6	
	R4	4.4	R36	0.6	
	R5	3.6	R37	0.6	
	R6	2.8	R38	0.5	
	R7	2.6	R39	0.4	
	R8	2.2	R40	0.4	
	R9	2	R41	0.4	
	R10	1.6	R42	0.4	
	R11	1.6	R43	0.4	
	R12	1.6	R44	0.4	
	R13	1.2	R45	0.4	
	R14	1.2	R46	0.4	
V3	R15	1	R47	0.4	V5
	R16	1	R48	0.5	
	R17	1	R49	0.6	
	R18	1	R50	0.6	
	R19	1	R51	0.6	
	R20	0.8	R52	0.6	
	R21	0.8	R53	0.6	
	R22	0.8	R54	0.6	
	R23	0.8	R55	0.6	
	R24	0.6	R56	0.6	
	R25	0.6	R57	0.6	
	R26	0.6	R58	0.6	
	R27	0.6	R59	1	
	R28	0.6	R60	1.2	
	R29	0.6	R61	2.8	V6
	R30	0.6	R62	18.8	V7
V4	R31	0.6			

REV=0 data not inverted, for normally white panel (Default)

Gamma correction resistor ratio: (1 unit = 125ohm)

Negative gamma

Name	Resistor	Name	Resistor
R0	8.4	R32	1
R1	12	R33	1
R2	8.2	R34	1
R3	6.6	R35	1
R4	5.2	R36	1
R5	4.2	R37	1
R6	3.6	R38	1
R7	3.2	R39	1
R8	2.8	R40	1
R9	2.6	R41	1
R10	2.2	R42	1
R11	2.2	R43	1
R12	2	R44	1
R13	1.8	R45	1.2
R14	1.8	R46	1.2
R15	1.6	R47	1.2
R16	1.6	R48	1.2
R17	1.6	R49	1.2
R18	1.4	R50	1.4
R19	1.4	R51	1.4
R20	1.4	R52	1.4
R21	1.2	R53	1.6
R22	1.2	R54	1.6
R23	1.2	R55	1.8
R24	1.2	R56	2
R25	1.2	R57	2
R26	1.2	R58	2.6
R27	1.2	R59	2.8
R28	1.2	R60	3.6
R29	1.2	R61	5.4
R30	1	R62	21.4
R31	1		

REV=1 data inverted, for normally black panel
Gamma correction resistor ratio: (1 unit = 125ohm)

Positive gamma

V1	Name	Resistor	Name	Resistor	V4
V2	R0	8.7	R32	0.9	
	R1	7.2	R33	0.8	
	R2	5.3	R34	0.8	
	R3	4.5	R35	0.8	
	R4	3.7	R36	0.8	
	R5	3.5	R37	0.8	
	R6	2.7	R38	0.8	
	R7	2.5	R39	0.8	
	R8	2.4	R40	0.8	
	R9	2.3	R41	0.8	
	R10	1.9	R42	0.8	
	R11	1.9	R43	0.8	
	R12	1.9	R44	0.8	
	R13	1.5	R45	0.9	
	R14	1.5	R46	0.9	
V3	R15	1.6	R47	0.9	V5
	R16	1.6	R48	0.9	
	R17	1.3	R49	0.9	
	R18	1.2	R50	1	
	R19	1.2	R51	1.1	
	R20	1.2	R52	1.2	
	R21	1.2	R53	1.3	
	R22	1.2	R54	1.6	
	R23	1.2	R55	1.9	
	R24	1.2	R56	2.1	
	R25	1.2	R57	2.5	
	R26	1.1	R58	3	
	R27	1	R59	3.1	
	R28	1	R60	5.2	
	R29	1	R61	13	V6
	R30	1	R62	6.3	V7
V4	R31	1			

REV = 1 data inverted, for normally black panel
Gamma correction resistor ratio: (1 unit = 125ohm)

Negative gamma

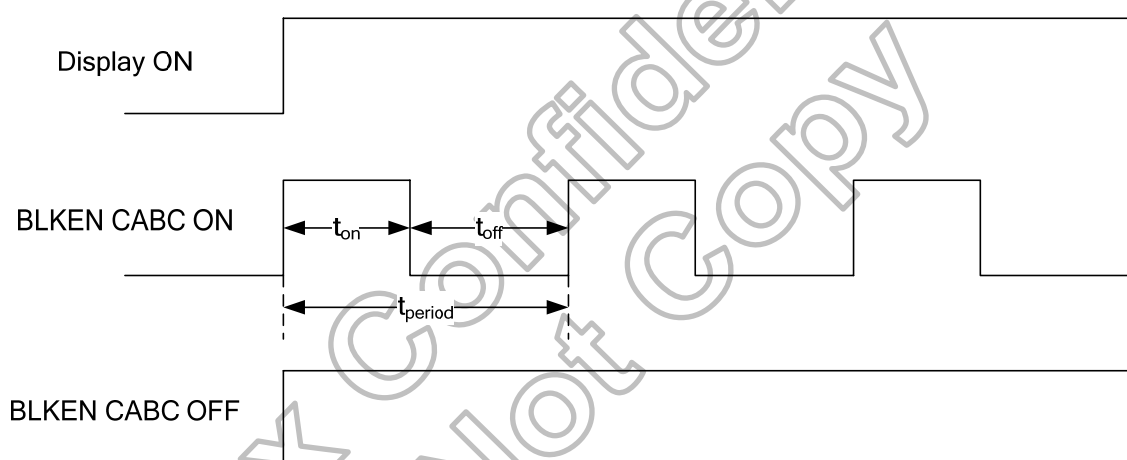
Name	Resistor	Name	Resistor
R0	10.5	R32	0.8
R1	9.3	R33	0.8
R2	6.9	R34	0.8
R3	5.2	R35	0.8
R4	4.2	R36	0.8
R5	3.2	R37	0.8
R6	3.2	R38	0.7
R7	2.7	R39	0.7
R8	2.1	R40	0.7
R9	1.7	R41	0.8
R10	1.6	R42	0.8
R11	1.6	R43	0.8
R12	1.6	R44	0.8
R13	1.6	R45	0.7
R14	1.5	R46	0.7
R15	1.3	R47	0.7
R16	1.1	R48	0.9
R17	1.1	R49	1
R18	1.3	R50	1
R19	1.3	R51	1.2
R20	1.1	R52	1.4
R21	1.1	R53	1.6
R22	1	R54	1.9
R23	0.8	R55	2.1
R24	0.8	R56	2.6
R25	0.8	R57	3.1
R26	0.9	R58	3.8
R27	0.9	R59	4.7
R28	0.9	R60	5.4
R29	0.8	R61	9.8
R30	0.7	R62	5.8
R31	0.7		

7. CABC (Content Adaptive Brightness Control)

HX8264-E supports content adaptive brightness control (CABC) function to reduce the power consumption of back light driver, depend on the image data output PWM pulse to back light driver for brightness control. It control backlight brightness intelligently by analyzing the display content which saves power, enhances contrast while maintaining vivid display quality.

The dimming algorithm enables a smooth backlight adjustment even when the content and brightness are swiftly changing.

CABC function can be configured by hardware control pin or software commands via SPI mode.



7.1 CABC Hardware Control

CABC_EN	DBC3	SDA/DBCM[1]	SCL/DBCM[0]	Function
0	X	X	X	CABC Disable
1	0	0	1	CABC Disable
1	0	0	0	UI mode (User Interface Image)
1	0	1	0	Moving mode (Moving Picture Image)
1	0	1	1	Still mode (Still Picture Image) (Default)
1	1	X	X	CABC software SPI control

7.2 CABC Software SPI Control

CABC Register Table

Register	Name	Default	Description	Note
R82h	CABC_CTL	0x20	[7:6]: Reserved [5:4]: CABC mode selection 00: Bypass mode 01: UI mode 10: Still mode (Default) 11: Moving mode [3:0]: Reserved	
R51h	BYPASS_DUTY	0xFF	[7:0]: CABC bypass mode duty cycle When 0x82=00h, CABC duty cycle is fixed by R51h	
R53h	CABC_FUN1	0x0C	[7:4]: Reserved [3]: ENDIM, Dimming function enable and disable 0: Disable 1: Enable (Default) [2]: BL, Back light is controlled by CABC function 0: Back light OFF 1: Back light ON (Default) [1:0]: Reserved	
R59h	DRV_FRE_A	0x00	[7:3]: Reserved [2:0]: DRV_FRE_A, parameter A of adjusting PWM period	
R5Eh	CABC_MB	0x80	[7:0]: CABC_MB, Minimum duty constraint (minimum brightness)	
R60h	DRV_FRE_B	0x04	[7:0]: DRV_FRE_B, parameter B of adjusting PWM period	
R65h	DIMT	0x21	[7:6]: Reserved [5:4]: DIM_A, total dimming time parameter A [1:0]: DIM_B, total dimming time parameter B Total dimming time = DIM_A x DIM_B (unit: frame)	
R70h	DBG_0	0x70	CABC curve user define gray level 0	
R71h	DBG_1	0xAC	CABC curve user define gray level 32	
R72h	DBG_2	0xC0	CABC curve user define gray level 64	
R73h	DBG_3	0xCD	CABC curve user define gray level 96	
R74h	DBG_4	0xD6	CABC curve user define gray level 128	
R75h	DBG_5	0xE0	CABC curve user define gray level 160	
R76h	DBG_6	0xEC	CABC curve user define gray level 192	
R77h	DBG_7	0xF8	CABC curve user define gray level 224	
R78h	DBG_8	0xFF	CABC curve user define gray level 255	

Note: (1) The un-addressed registers and reserved bit can't be written any data; otherwise the fault function is possible.

(2) All CABC parameter registers (R59h, R5Eh, R60h, R65h and R70h~R78h) access must before end of the power on sequence or enter standby mode or CABC_EN="0".

(3) R70h~R78h default value depend on R82h [5:4] CABC mode selection

7.3 Commend Description

R82h:

No.	R/W	Address								Default setting value							
R82	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	1	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0

R82h [5:4]: CABC_CTL, content adaptive brightness control mode

R82h[5:4]	Function	Note
0	0	Off (Bypass CABC)
0	1	UI mode (user interface image)
1	0	Still mode (still picture image)
1	1	Moving mode (Moving picture image)

Note: When R82h [5:4] =00, CABC function is bypassed and PWM duty is fixed by R51h.

R51h:

No.	R/W	Address								Default setting value							
R51	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	0	1	0	1	0	0	0	1	1	1	1	1	1	1	1	1

R51h [7:0]: Set PWM duty level when CABC Off (Bypass CABC mode)

R51h[7:0]								Function	Note
								PWM duty	
0	0	0	0	0	0	0	0	0%	-
0	0	0	0	0	0	0	1	0.3906%	-
0	0	0	0	0	0	1	0	0.7813%	-
:	:	:	:	:	:	:	:	:	-
1	1	1	1	1	1	0	1	98.8281%	-
1	1	1	1	1	1	1	0	99.2188%	-
1	1	1	1	1	1	1	1	100%	Default

R53h:

No.	R/W	Address								Default setting value							
R53	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	0	1	0	1	0	0	1	1	0	0	0	0	1	1	0	0

R53h [2]: BL, Back light is controlled by CABC function

R53h[2]	Function	Note
0	Off	-
1	On	Default

R53h [3]: ENDIM, Enable/Disable Dimming

R53h[3]	Function	Note
0	Disable	-
1	Enable	Default

R59h:

No.	R/W	Address								Default setting value							
R59	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0

R59h [2:0]: DRV_FRE_A, parameter A of adjusting PWM period

R59h[2:0]			Function	Note
0	0	0	1	Default
0	0	1	2	-
0	1	0	4	-
0	1	1	8	-
1	0	0	16	-
1	0	1	32	-
1	1	0	64	-
1	1	1	128	-

R5Eh:

No.	R/W	Address								Default setting value							
R5E	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	0	1	0	1	1	1	1	0	1	0	0	0	0	0	0	0

R5Eh [7:0]: CABC_MB, Minimum duty constraint (minimum brightness)

R5eh[7:0]								Function	Note
								PWM duty	
0	0	0	0	0	0	0	0	0%	-
0	0	0	0	0	0	0	1	0.3906%	-
0	0	0	0	0	0	1	0	0.7813%	-
:	:	:	:	:	:	:	:	:	-
1	0	0	0	0	0	0	0	50%	Default
:	:	:	:	:	:	:	:	:	-
1	1	1	1	1	1	0	1	98.8281%	-
1	1	1	1	1	1	1	0	99.2188%	-
1	1	1	1	1	1	1	1	100%	-

R60h:

No.	R/W	Address								Default setting value							
R60	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	0	1	1	0	0	0	0	0	0	0	0	0	0	1	0	0

R60h [7:0]: DRV_FRE_B, parameter B of adjusting PWM period

R60h[7:0]								Function	Note
								DRV_FRE_B	
0	0	0	0	0	0	0	0	0	-
0	0	0	0	0	0	0	1	1	-
0	0	0	0	0	0	1	0	2	-
0	0	0	0	0	0	1	1	3	-
0	0	0	0	0	1	0	0	4	Default
:	:	:	:	:	:	:	:	:	-
1	0	0	0	0	0	0	0	128	-
:	:	:	:	:	:	:	:	:	-
1	1	1	1	1	1	1	1	255	-

Backlight PWM output period = DCLK period x (DRV_FRE_A[2:0]) x 256 x (DRV_FRE_B[7:0]+1)

R65h:

No.	R/W	Address								Default setting value							
R65	R/W	A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0
	1/0	1	1	0	0	0	0	0	0	0	0	1	0	0	0	0	1

Total dimming time = DIMIT_A x DIMIT_B frame

R65h [5:4]: DIMIT_A, total dimming time parameter A

R65h[5:4]	Function	Note
0	0	2
0	1	4
1	0	8
1	1	16
		-
		-
		Default
		-

R65h [1:0]: DIMIT_B, total dimming time parameter B

R65h[1:0]	Function	Note
0	0	1
0	1	2
1	0	3
1	1	4
		-
		Default
		-
		-

R70h [7:0] ~ R78h [7:0]: DBG_0~DBG_8

No.	R/W	Address								Default setting value								Type
		A7	A6	A5	A4	A3	A2	A1	A0	D7	D6	D5	D4	D3	D2	D1	D0	
R70	1/0	0	1	1	1	0	0	0	0	1	1	0	0	1	0	0	0	UI
										0	0	0	1	0	0	0	0	Move
										0	1	1	1	0	0	0	0	Still
R71	1/0	0	1	1	1	0	0	0	1	1	1	0	1	0	1	1	0	UI
										0	1	1	0	0	0	0	0	Move
										1	0	1	0	1	1	0	0	Still
R72	1/0	0	1	1	1	0	0	1	0	1	1	1	0	0	0	0	0	UI
										1	0	0	1	0	0	0	0	Move
										1	1	0	0	0	0	0	0	Still
R73	1/0	0	1	1	1	0	0	1	1	1	1	1	0	1	0	0	0	UI
										1	0	1	1	1	0	1	0	Move
										1	1	0	0	1	1	0	1	Still
R74	1/0	0	1	1	1	1	0	0	0	1	1	1	1	0	0	0	0	UI
										1	1	0	0	1	1	0	1	Move
										1	1	0	1	0	1	1	0	Still
R75	1/0	0	1	1	1	1	0	0	1	1	1	1	1	0	1	0	0	UI
										1	1	0	1	1	1	0	0	Move
										1	1	1	0	0	0	0	0	Still
R76	1/0	0	1	1	1	0	1	1	0	1	1	1	1	1	0	0	0	UI
										1	1	1	0	0	1	1	0	Move
										1	1	1	0	1	1	0	0	Still
R77	1/0	0	1	1	1	0	1	1	1	1	1	1	1	1	1	0	0	UI
										1	1	1	1	0	0	1	0	Move
										1	1	1	1	1	0	0	0	Still
R78	1/0	0	1	1	1	1	0	0	0	1	1	1	1	1	1	1	1	UI
										1	1	1	1	1	1	1	1	Move
										1	1	1	1	1	1	1	1	Still

Duty cycle = (Register value / 255) x 100%

Register value = 255 x duty cycle

For example UI mode DBG0 duty cycle = 200/255 x100% = 78.43 %

If DBG0 duty cycle need 51% the register value = 255 x 0.51 = 130 = 0x82

R70h~R78h will return default value when register R82h [5:4] CABC mode selection is written.

8. 3-wire Serial Peripheral Interface (SPI)

The HX8264-E supports the 3-pin serial peripheral interface (SPI) to set internal register. The data is written to the register of assigned address when “End of transfer” is detected after the 17th SCL rising cycles.

Data is not accepted if there are less or more than 17 cycles for one transaction. Only when SCL is input 17 times and SCX is in the "Low" period simultaneously, SDA is accepted.

The first bit means Read/Write command. “0” is WRITE. “1” is READ. And the next 8 bits (A7 ~ A0) specify the address of the register. And the last 8 bits are for Data setting (D7 ~ D0). The address and data are transferred from the MSB to LSB sequentially. And next cycle is turn-round cycle.

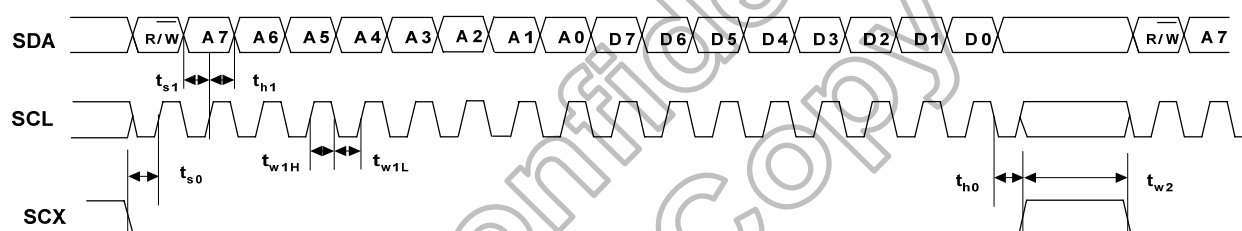


Figure 8.1: Serial Interface Signal Timing Chart

Item	Symbol	Conditions	Spec.			Unit
			Min.	Typ.	Max.	
SDA Setup Time	t_{s0}	SCX to SCL	12	-	-	ns
	t_{s1}	SDA to SCL	12	-	-	ns
SDA Hold Time	t_{h0}	SCX to SCL	12	-	-	ns
	t_{h1}	SDA to SCL	12	-	-	ns
Pulse Width	t_{w1L}	SCL low pulse width	50	-	-	ns
	t_{w1H}	SCL high pulse width	50	-	-	ns
	t_{w2}	SCX high pulse width	50	-	-	ns
Clock duty	-	-	40	50	60	%

Table 8.1: Serial Interface timing parameter

9. Power on/off sequence

To prevent the device damage from latch up, the power on/off sequence shown below must be followed.

Power ON: VDD, GND → AVDD, AVSS → V1 to V14

Power OFF: V1 to V14 → AVDD, AVSS → VDD, GND

9.1 Power on/off control

HX8264-E has a power ON/OFF sequence control function. In order to prevent IC from power on reset fail, the rising time(T_{POR}) of the digital power supply VDD should be maintained within the given specifications. Please refer to “AC characteristics” for more detail on timing.

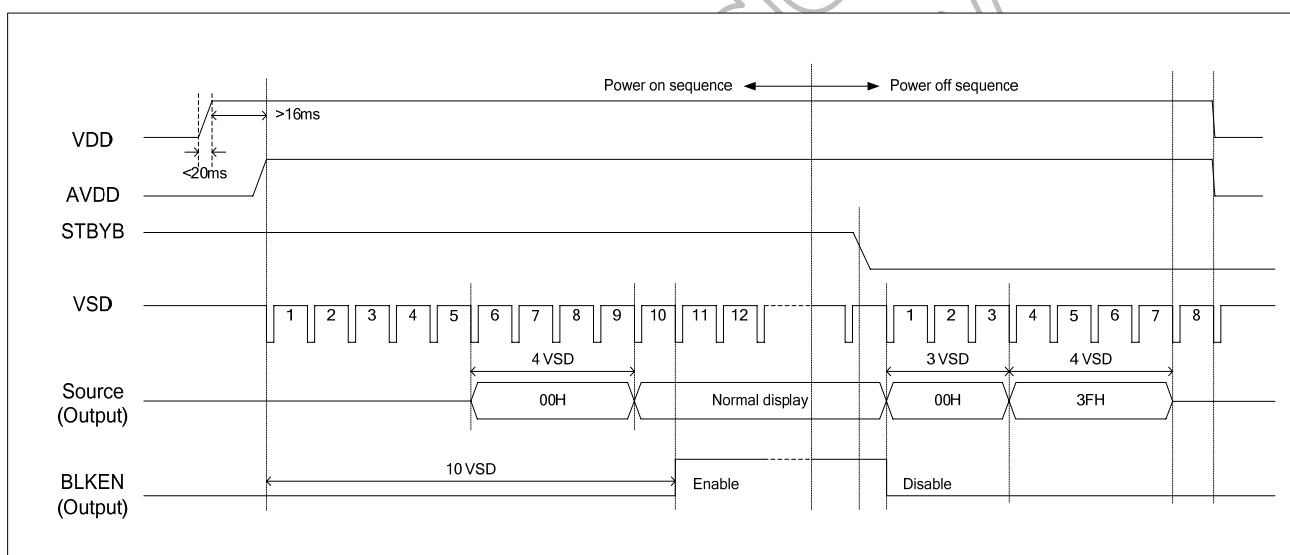


Figure 9.1: Power on/off timing sequence

9.2 Enter and exit standby mode sequence

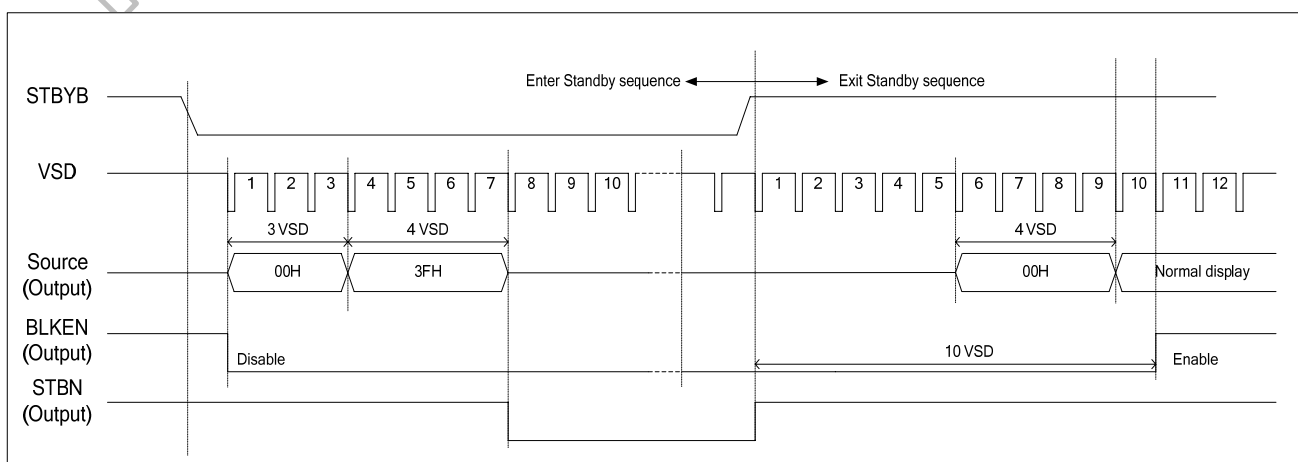


Figure 9.2: Enter and exit standby mode sequence

10. DC Characteristics

10.1 Absolute maximum rating (GND=VSS=0V, T_A = 25°C)

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Digital Supply Voltage	VDD	-0.5	-	+5	V
Analog Supply Voltage	AVDD, V1~V14	-0.5	-	+15	V
Operation temperature	T _{OPR}	-30	-	+85	°C
Storage temperature	T _{STG}	-55	-	+125	°C

Note: Stresses above those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only. Functional operation of this device at these or any conditions above those indicated in the operational sections of this specification is not implied and exposed to absolute maximum rating conditions for extended periods may affect device reliability.

10.2 DC electrical characteristics (GND=VSS=0V, T_A=25°C)

Parameter	Symbol	Spec.			Unit	Condition
		Min.	Typ.	Max.		
Power supply voltage	VDD	2.7	3.3	3.6	V	-
Power supply voltage	AVDD	6.5	-	13.5	V	AVDD-V1 ≥ 0.5V
Low level input voltage	V _{IL}	0	-	0.3VDD	V	For Digital Circuit
High level input voltage	V _{IH}	0.7VDD	-	VDD	V	For Digital Circuit
Output low voltage	V _{OL}	-	-	GND+0.4	V	I _{OL} =400μA
Output high voltage	V _{OH}	VDD-0.4	-	-	V	I _{OH} =-400μA
Pull low/high resistance	R _i	200K	250K	300K	Ohm	For the digital input pin @VDD=3.3V
Input leakage current	I _{li}	-	-	+/- 1	μA	For Digital Circuit
Digital Operation current	I _{dd}	-	5	10	mA	Fclk=50MHz, FLD=48KHz, VDD=3.3V CABC function disable, No load
Digital stand-by current	I _{st1}	-	10	50	μA	Clock & all functions are stopped
Analog Operating current	I _{dda}	-	5	10	mA	No load, Fclk=50MHz, FLD = 48KHz @ AVDD = 10V, V1=8V, V14 = 0.4V
Analog Stand-by current	I _{st2}	-	10	50	μA	No load, Clock & all functions are stopped
Input level of V1 ~ V7	V _{ref1}	0.4*AVDD	-	AVDD-1	V	Gamma correction voltage input
Input level of V8 ~ V14	V _{ref2}	0.1	-	0.6*AVDD	V	Gamma correction voltage input
Output Voltage deviation	V _{od1}	-	+/-20	+/-35	mV	V _o =AGND+0.1V ~ AGND+0.5V & V _o =AVDD-0.5V ~ AVDD-0.1V
Output Voltage deviation	V _{od2}	-	+/-15	+/-20	mV	V _o =AGND+0.5V ~ AVDD-0.5V
Output Voltage Offset between Chips	V _{oc}	-	-	+/- 20	mV	V _o =AGND+0.5V ~ AVDD-0.5V
Dynamic Range of Output	V _{dr}	0.1	-	AVDD-0.1	V	SO1 ~ SO1200
Sinking Current of Outputs	I _{OLy}	80	-	-	μA	SO1~SO1200; V _o = 0.1V vs. 1.0V, AVDD=13.5V
Driving Current of Outputs	I _{OHy}	80	-	-	μA	SO1 ~ SO1200 ; V _o = 0.1V vs. 12.5V , AVDD=13.5V
Resistance of Gamma Table	R _g	0.7*R _n	1.0*R _n	1.3*R _n	ohm	R _n :Internal gamma resistor
Dcmp Buffer Output Voltage variation	VDvar	-	-	-180	mV	AVDD=13.5V, C=1μF AVDD-0.5 ≤ GMI 1/2 ≤ AVDD-0.1 I _{sink} = -3.5mA
		-	-	180	mV	AVDD=13.5V, C=1μF 0.1 ≤ GMI 1/2 ≤ 0.5 I _{source} = 3.5mA , I _{sink} = -3.5mA
		-	-	+/-90	mV	AVDD=13.5V, C=1μF 0.5 ≤ GMI 1/2 ≤ AVDD-0.5 I _{source} = 3.5mA , I _{sink} = -3.5mA

11. AC Characteristics

11.1 AC electrical characteristics

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
HS setup time	Thst	8	-	-	ns
HS hold time	Thhd	8	-	-	ns
VS setup time	Tvst	8	-	-	ns
VS hold time	Tvhd	8	-	-	ns
Data setup time	Tdsu	8	-	-	ns
Data hold time	Tdhd	8	-	-	ns
DE setup time	Tesu	8	-	-	ns
DE hold time	Tehd	8	-	-	ns
VDD Power On Slew rate	TPOR	-	-	20	ms
RSTB pulse width	TRst	10	-	-	μs
CLKIN cycle time	Tcph	20	-	-	ns
CLKIN pulse duty	Tcwh	40	50	60	%
Output stable time	Tsst	-	-	6	μs

11.2 Data input format

- **Horizontal timing**

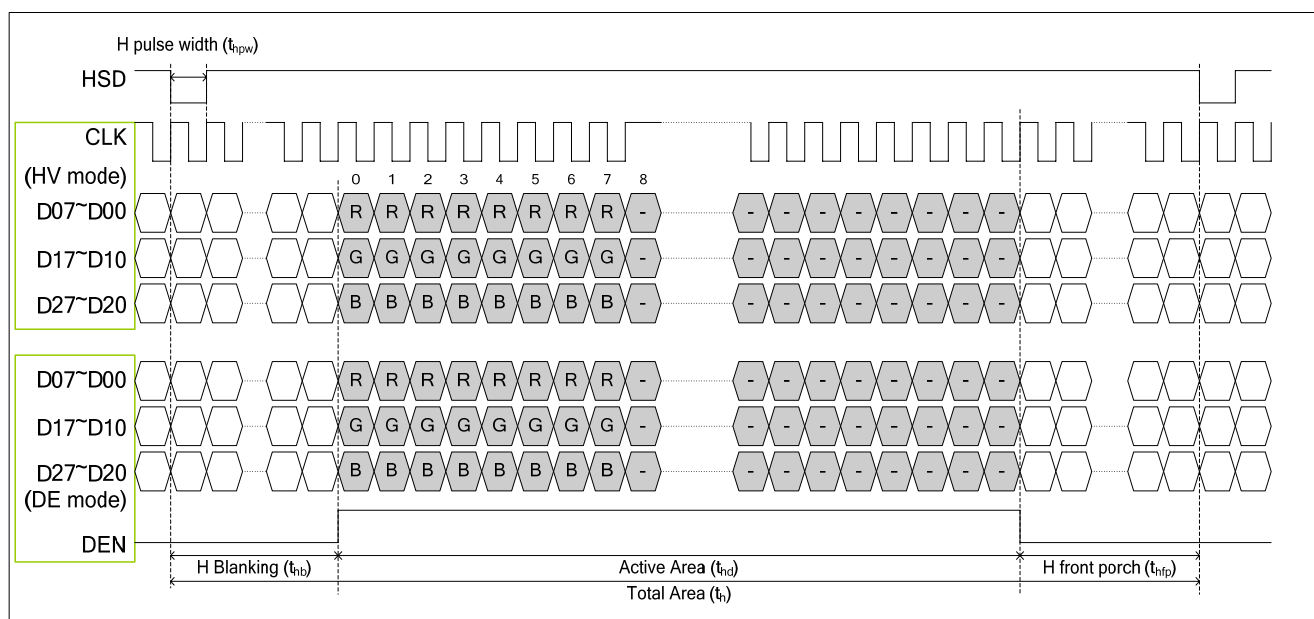


Figure 11.1 Horizontal input timing diagram

- **Vertical Timing**

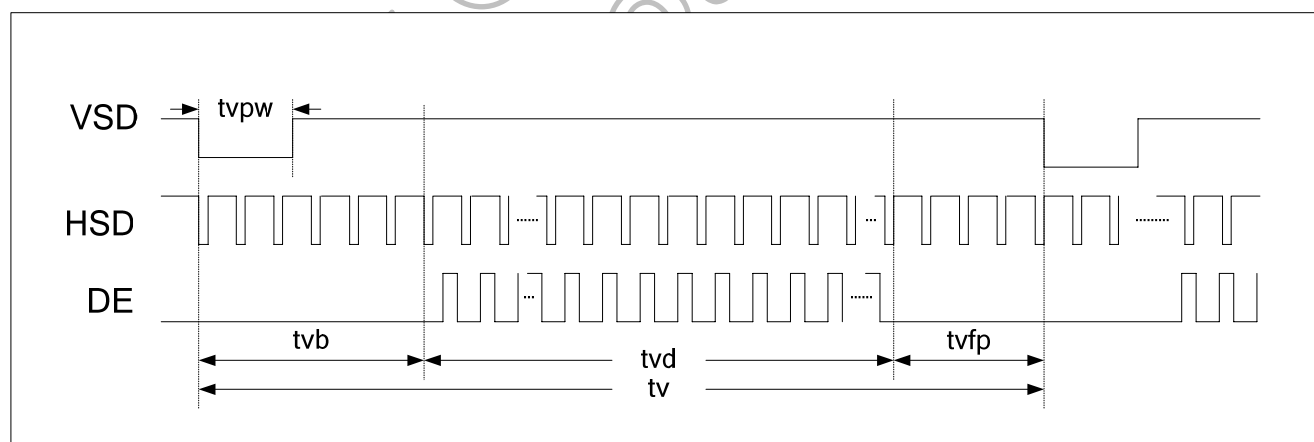


Figure 11.2: Vertical input timing diagram

11.2.1 Resolution : 800x480

● Horizontal Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd	-	800		DCLK
DCLK frequency	fclk	-	33.3	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width (Min.)	thpw		1		DCLK
HS pulse width (Typical.)	thpw		-		DCLK
HS pulse width (Max.)	thpw		40		DCLK
HS Back Porch (Blanking)	thb	46	46	46	DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	45	256	400	DCLK

● Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		480		TH
VS period time	tv	510	525	650	TH
VS pulse width	tvpw	1	-	20	TH
VS Back Porch (Blanking)	tvb	23	23	23	TH
VS Front Porch	tvfp	7	22	147	TH
DE mode Blanking	tv-tvd	4	45	170	TH

11.2.2 Resolution : 800x600

● Horizontal Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Horizontal Display Area	thd		800		DCLK
DCLK frequency	fclk	-	40	50	MHz
One Horizontal Line	th	862	1056	1200	DCLK
HS pulse width (Min.)	thpw		1		DCLK
HS pulse width (Typical.)	thpw		-		DCLK
HS pulse width (Max.)	thpw		40		DCLK
HS Back Porch (Blanking)	thb	46	46	46	DCLK
HS Front Porch	thfp	16	210	354	DCLK
DE mode Blanking	th-thd	45	256	400	DCLK

● Vertical Timing

Parameter	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Vertical Display Area	tvd		600		TH
VS period time	tv	624	635	700	TH
VS pulse width	tvpw	1	-	20	TH
VS Back Porch (Blanking)	tvb	23	23	23	TH
VS Front Porch	tvfp	1	12	77	TH
DE mode Blanking	tv-tvd	4	35	100	TH

12. Waveform

12.1 Parallel 24-bit RGB mode

Parameter	Symbol	Spec.			Unit	Conditions
		Min.	Typ.	Max.		
CLKIN Frequency	Fclk	-	40	50	MHz	VDD = 3.0V ~ 3.6V
CLKIN Cycle Time	Tclk	20	25	-	ns	-
CLKIN Pulse Duty	Tcwh	40	50	60	%	Tclk
Time from HSD to Source Output	Thso	-	20	-	CLKIN	-
Time from HSD to LD	Thld	-	20	-	CLKIN	-
Time from HSD to STV	Thstv	-	2	-	CLKIN	-
Time from HSD to CKV	Thckv	-	20	-	CLKIN	-
Time from HSD to OEV	Thoev	-	4	-	CLKIN	-
LD Pulse Width	Twld	-	10	-	CLKIN	-
CKV Pulse Width	Twckv	-	66	-	CLKIN	-
OEV Pulse Width	Twoev	-	74	-	CLKIN	-

12.2 Timing diagram

12.2.1 Input clock and data timing waveform

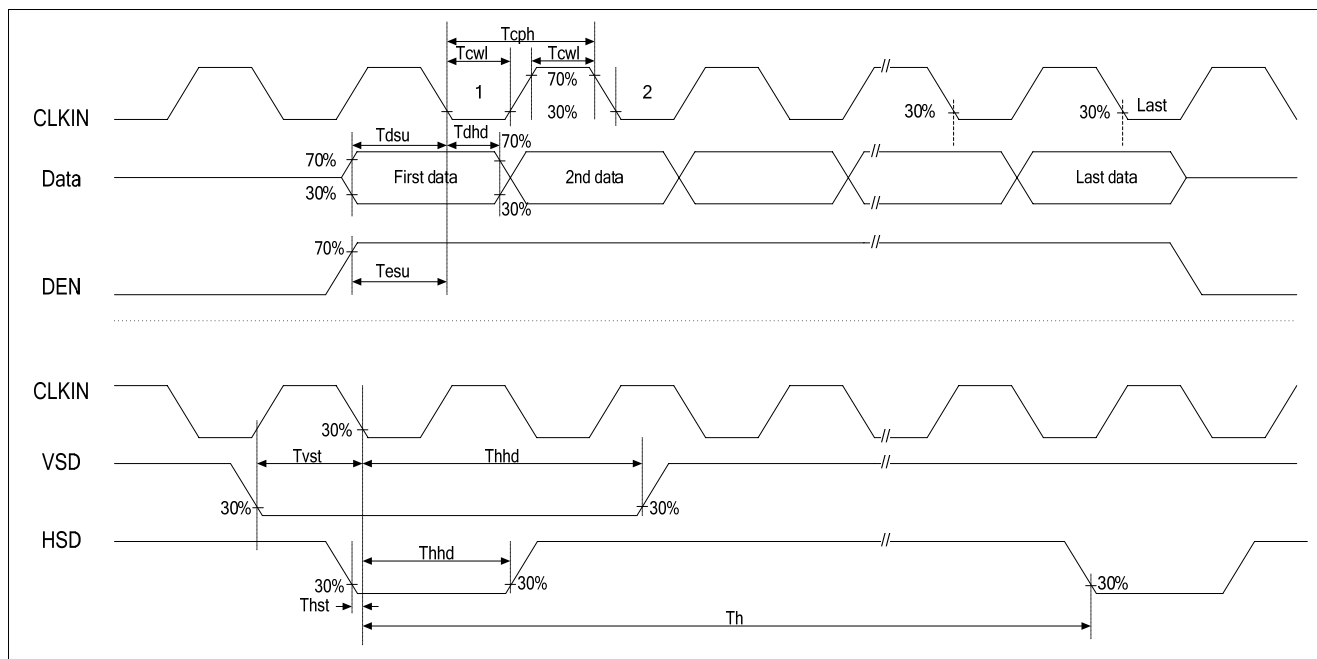


Figure 12.1: Input clock and data timing diagram

12.2.2 Source output timing waveform

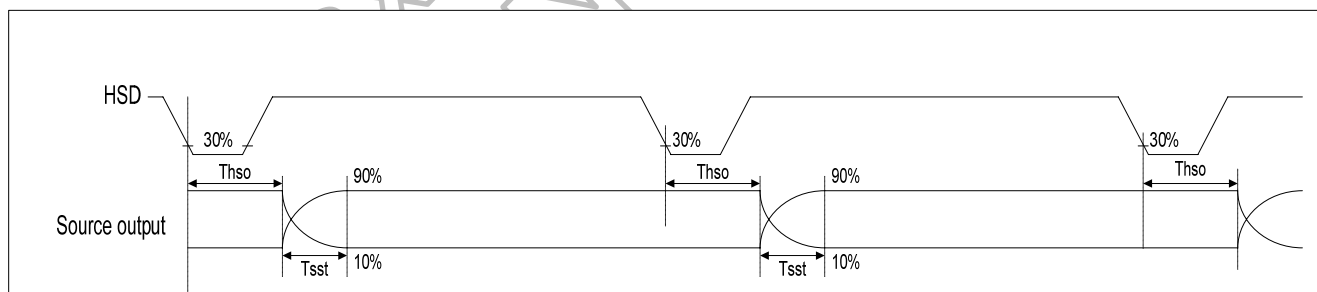
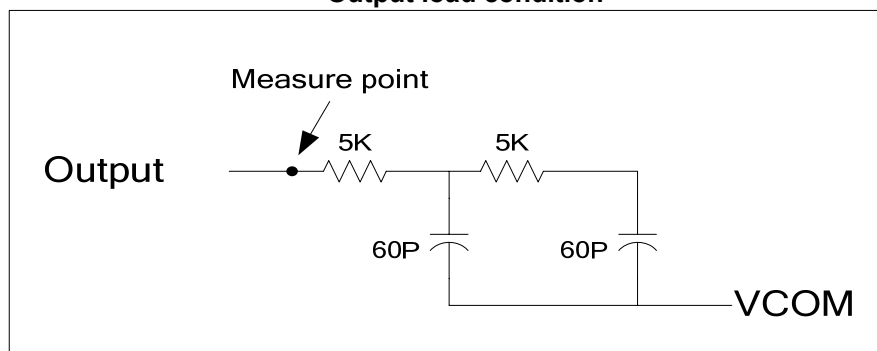


Figure 12.2: Source output timing diagram

Output load condition



12.2.3 Vertical timing diagram HV (dual gate)

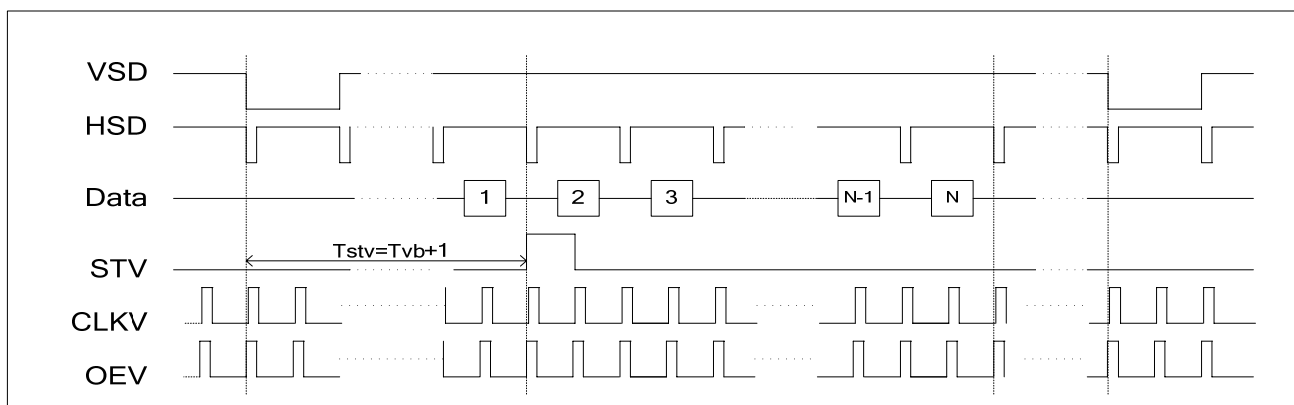


Figure 12.3: Vertical timing diagram HV (dual gate)

12.2.4 Vertical timing diagram DE (dual gate)

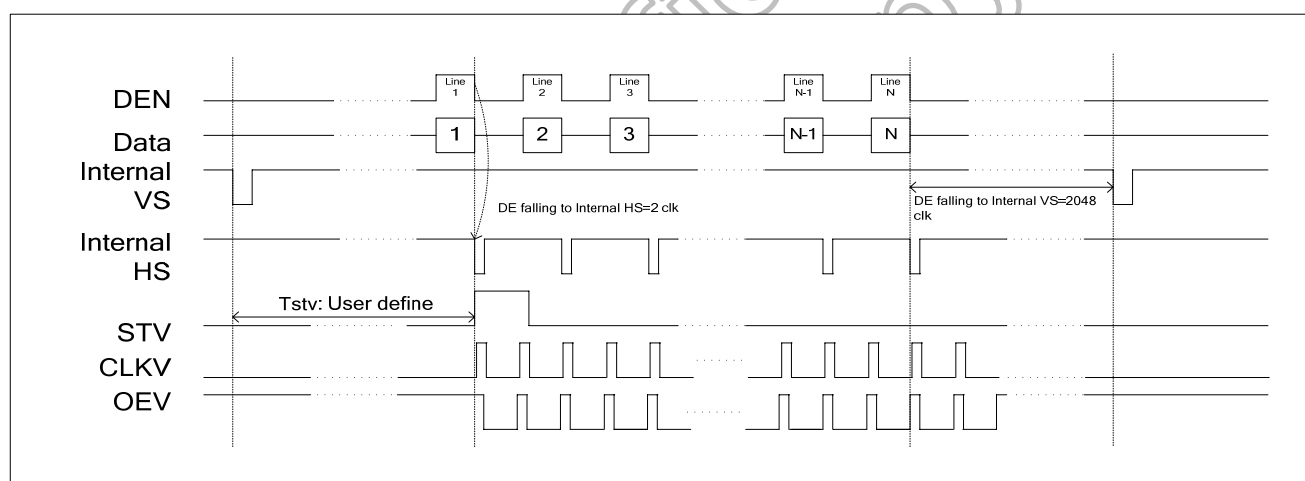


Figure 12.4: Vertical timing diagram DE (dual gate)

12.2.5 Gate output timing diagram (Dual Gate)

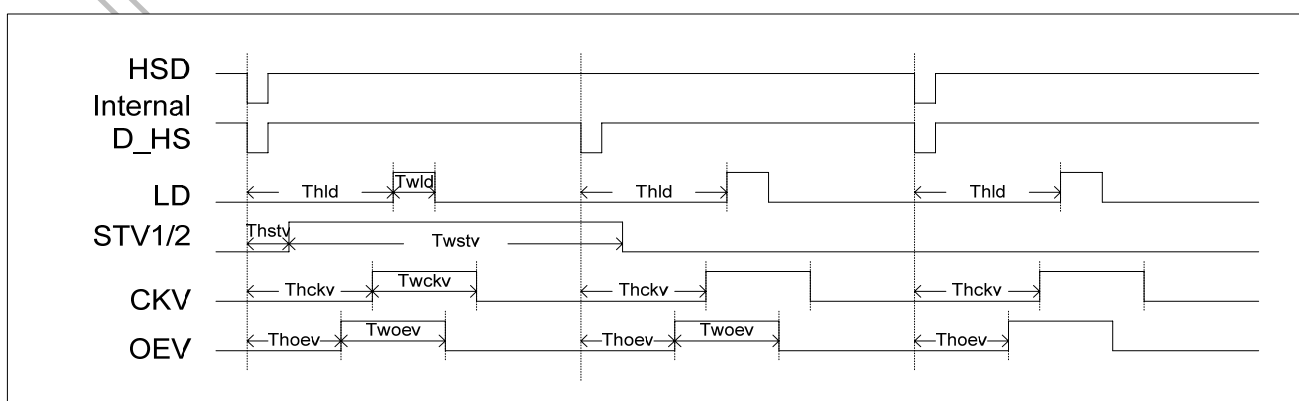
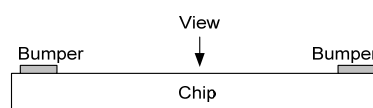


Figure 12.5: Gate output timing diagram (dual gate)



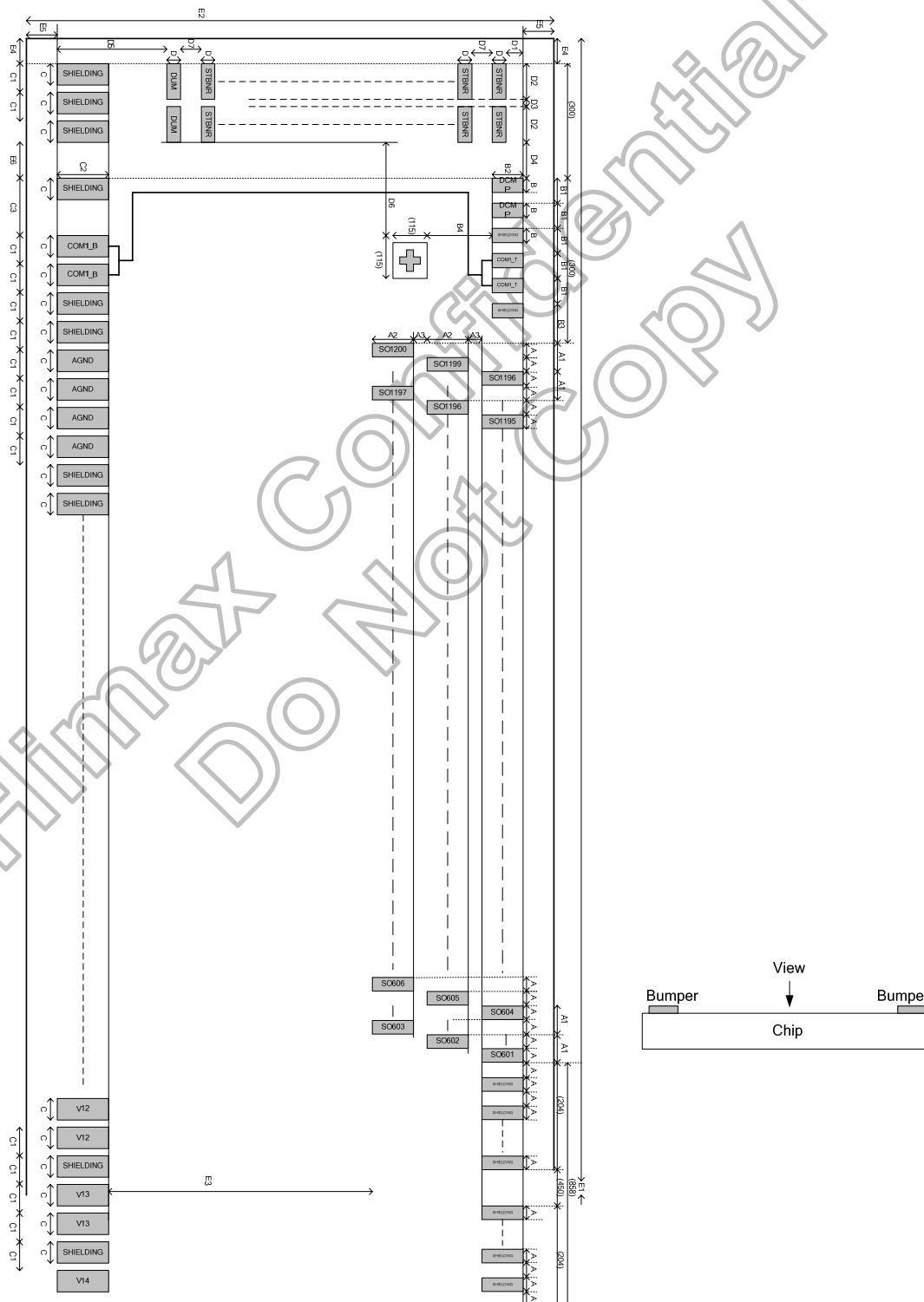
14. Pad Outline

Chip size: 22576 μ m x 1044 μ m (including seal ring and scribe line)

Bump height: 12 μ m $\pm$ 3 μ m

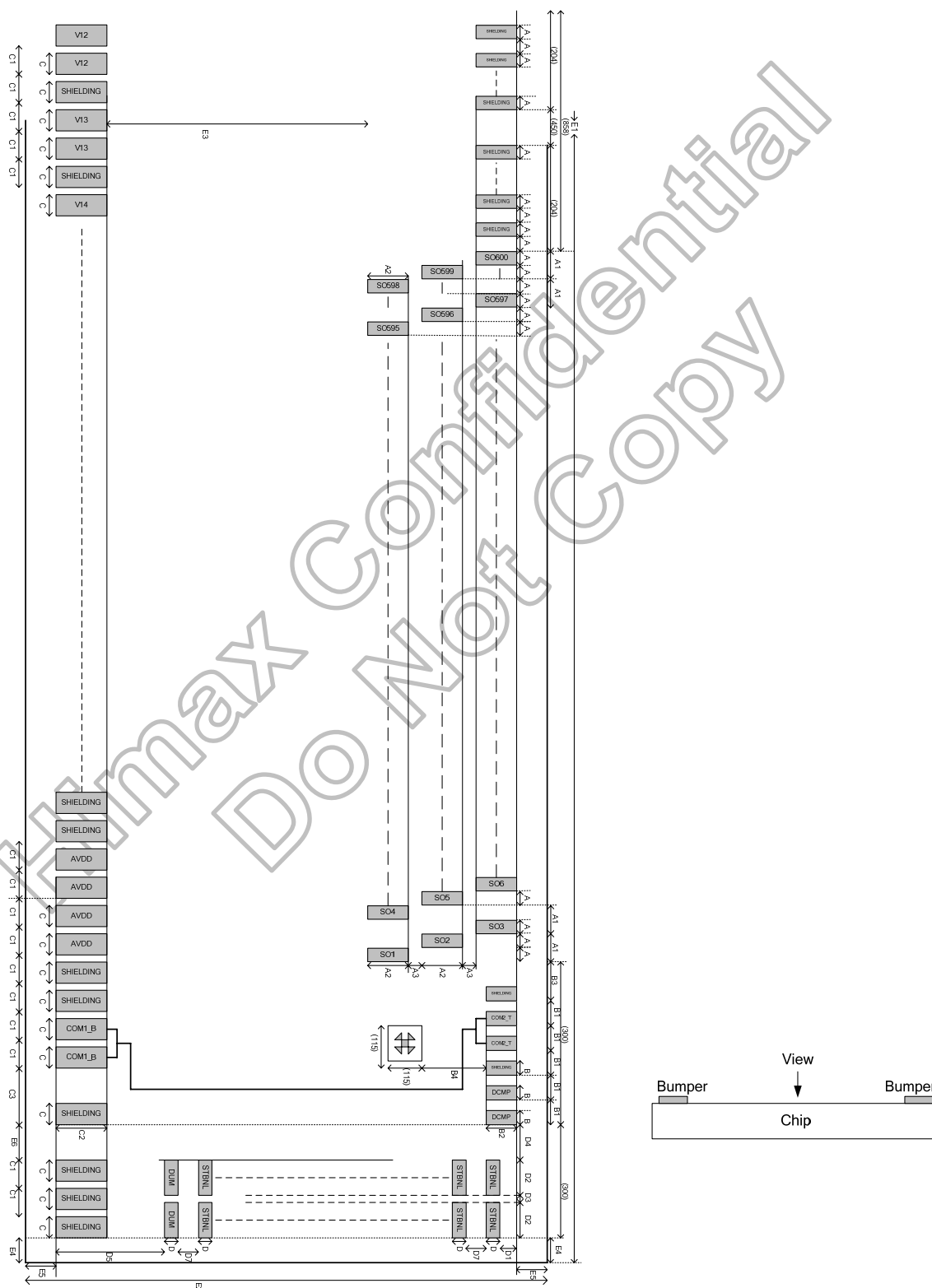
Bump hardness: 60 H_V $\pm$ 15 H_V

Dimension 1 (bump side)



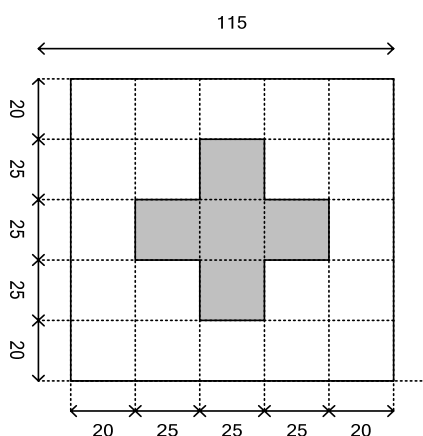
Dimension 2 (bump side)

400%

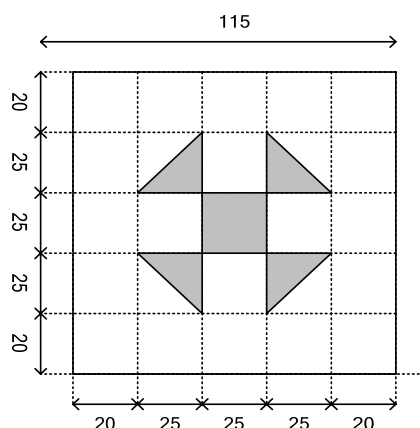


Alignment mark dimension (unit:um)

Left side



Right side



Symbol	Dimension (μm)
A	17
A1	34
A2	110
A3	30
B	30
B1	50
B2	70
B3	50
B4	191.5
C	65
C1	85
C2	110
C3	115
D	30

Symbol	Dimension (μm)
D1	40
D2	100
D3	30
D4	70
D5	266
D6	168.5
D7	50
E1	22578
E2	1044
E3	426
E4	60
E5	60
E6	136.5

Note: Chip dimension include scribe line.

14.1 Pad Coordinate

No.	Name	X	Y	Bump size
1	SHIELDING	-11196.5	-408	65X110
2	SHIELDING	-11111.5	-408	65X110
3	SHIELDING	-11026.5	-408	65X110
4	SHIELDING	-10825	-408	65X110
5	COM1_B	-10710	-408	65X110
6	COM1_B	-10625	-408	65X110
7	SHIELDING	-10540	-408	65X110
8	SHIELDING	-10455	-408	65X110
9	AGND	-10370	-408	65X110
10	AGND	-10285	-408	65X110
11	AGND	-10200	-408	65X110
12	AGND	-10115	-408	65X110
13	SHIELDING	-10030	-408	65X110
14	SHIELDING	-9945	-408	65X110
15	SHIELDING	-9860	-408	65X110
16	SHIELDING	-9775	-408	65X110
17	SHIELDING	-9690	-408	65X110
18	SHIELDING	-9605	-408	65X110
19	TP0	-9520	-408	65X110
20	TB0	-9435	-408	65X110
21	TP1	-9350	-408	65X110
22	TB1	-9265	-408	65X110
23	TP2	-9180	-408	65X110
24	TB2	-9095	-408	65X110
25	TP3	-9010	-408	65X110
26	TP3	-8925	-408	65X110
27	TP4	-8840	-408	65X110
28	TP4	-8755	-408	65X110
29	TP5	-8670	-408	65X110
30	REV	-8585	-408	65X110
31	SHIELDING	-8500	-408	65X110
32	TB3	-8415	-408	65X110
33	TB4	-8330	-408	65X110
34	SHIELDING	-8245	-408	65X110
35	CABC_EN	-8160	-408	65X110
36	CABC_EN	-8075	-408	65X110
37	SHIELDING	-7990	-408	65X110
38	SHIELDING	-7905	-408	65X110
39	SHIELDING	-7820	-408	65X110
40	SHIELDING	-7735	-408	65X110
41	CSX	-7650	-408	65X110
42	CSX	-7565	-408	65X110
43	SHIELDING	-7480	-408	65X110
44	SCL/DBCM[0]	-7395	-408	65X110
45	SCL/DBCM[0]	-7310	-408	65X110
46	SHIELDING	-7225	-408	65X110
47	SDA/DBCM[1]	-7140	-408	65X110
48	SDA/DBCM[1]	-7055	-408	65X110
49	SHIELDING	-6970	-408	65X110
50	SHIELDING	-6885	-408	65X110

No.	Name	X	Y	Bump size
51	GOSEQ	-6800	-408	65X110
52	GOSEQ	-6715	-408	65X110
53	SHIELDING	-6630	-408	65X110
54	BIST	-6545	-408	65X110
55	BIST	-6460	-408	65X110
56	SHIELDING	-6375	-408	65X110
57	RES0	-6290	-408	65X110
58	RES0	-6205	-408	65X110
59	SHIELDING	-6120	-408	65X110
60	DBC3	-6035	-408	65X110
61	DBC3	-5950	-408	65X110
62	SHIELDING	-5865	-408	65X110
63	CLKPOL	-5780	-408	65X110
64	CLKPOL	-5695	-408	65X110
65	SHIELDING	-5610	-408	65X110
66	DITHB	-5525	-408	65X110
67	DITHB	-5440	-408	65X110
68	SHIELDING	-5355	-408	65X110
69	MODE	-5270	-408	65X110
70	MODE	-5185	-408	65X110
71	SHIELDING	-5100	-408	65X110
72	SHLR	-5015	-408	65X110
73	SHLR	-4930	-408	65X110
74	SHIELDING	-4845	-408	65X110
75	UPDN	-4760	-408	65X110
76	UPDN	-4675	-408	65X110
77	SHIELDING	-4590	-408	65X110
78	STBYB	-4505	-408	65X110
79	STBYB	-4420	-408	65X110
80	SHIELDING	-4335	-408	65X110
81	RSTB	-4250	-408	65X110
82	RSTB	-4165	-408	65X110
83	SHIELDING	-4080	-408	65X110
84	BLKEN	-3995	-408	65X110
85	BLKEN	-3910	-408	65X110
86	SHIELDING	-3825	-408	65X110
87	VSET	-3740	-408	65X110
88	VSET	-3655	-408	65X110
89	TP6	-3570	-408	65X110
90	TP6	-3485	-408	65X110
91	TP7	-3400	-408	65X110
92	TP7	-3315	-408	65X110
93	TP8	-3230	-408	65X110
94	TP8	-3145	-408	65X110
95	TP9	-3060	-408	65X110
96	TP9	-2975	-408	65X110
97	TP9	-2890	-408	65X110
98	GND	-2805	-408	65X110
99	DCMP_EN	-2720	-408	65X110
100	VDD	-2635	-408	65X110

No.	Name	X	Y	Bump size
101	SHIELDING	-2550	-408	65X110
102	AVDD	-2465	-408	65X110
103	AVDD	-2380	-408	65X110
104	AVDD	-2295	-408	65X110
105	AVDD	-2210	-408	65X110
106	AVDD	-2125	-408	65X110
107	AVDD	-2040	-408	65X110
108	AVDD	-1955	-408	65X110
109	AVDD	-1870	-408	65X110
110	SHIELDING	-1785	-408	65X110
111	V1	-1700	-408	65X110
112	V1	-1615	-408	65X110
113	SHIELDING	-1530	-408	65X110
114	V2	-1445	-408	65X110
115	V2	-1360	-408	65X110
116	SHIELDING	-1275	-408	65X110
117	V3	-1190	-408	65X110
118	V3	-1105	-408	65X110
119	SHIELDING	-1020	-408	65X110
120	V4	-935	-408	65X110
121	V4	-850	-408	65X110
122	SHIELDING	-765	-408	65X110
123	V5	-680	-408	65X110
124	V5	-595	-408	65X110
125	SHIELDING	-510	-408	65X110
126	V6	-425	-408	65X110
127	V6	-340	-408	65X110
128	SHIELDING	-255	-408	65X110
129	V7	-170	-408	65X110
130	V7	-85	-408	65X110
131	SHIELDING	0	-408	65X110
132	V8	85	-408	65X110
133	V8	170	-408	65X110
134	SHIELDING	255	-408	65X110
135	V9	340	-408	65X110
136	V9	425	-408	65X110
137	SHIELDING	510	-408	65X110
138	V10	595	-408	65X110
139	V10	680	-408	65X110
140	SHIELDING	765	-408	65X110
141	V11	850	-408	65X110
142	V11	935	-408	65X110
143	SHIELDING	1020	-408	65X110
144	V12	1105	-408	65X110
145	V12	1190	-408	65X110
146	SHIELDING	1275	-408	65X110
147	V13	1360	-408	65X110
148	V13	1445	-408	65X110
149	SHIELDING	1530	-408	65X110
150	V14	1615	-408	65X110

No.	Name	X	Y	Bump size
151	V14	1700	-408	65X110
152	SHIELDING	1785	-408	65X110
153	AGND	1870	-408	65X110
154	AGND	1955	-408	65X110
155	AGND	2040	-408	65X110
156	AGND	2125	-408	65X110
157	AGND	2210	-408	65X110
158	AGND	2295	-408	65X110
159	AGND	2380	-408	65X110
160	AGND	2465	-408	65X110
161	SHIELDING	2550	-408	65X110
162	SHIELDING	2635	-408	65X110
163	GND	2720	-408	65X110
164	GND	2805	-408	65X110
165	GND	2890	-408	65X110
166	GND	2975	-408	65X110
167	SHIELDING	3060	-408	65X110
168	SHIELDING	3145	-408	65X110
169	VDD	3230	-408	65X110
170	VDD	3315	-408	65X110
171	VDD	3400	-408	65X110
172	VDD	3485	-408	65X110
173	DASHD	3570	-408	65X110
174	VSD	3655	-408	65X110
175	VSD	3740	-408	65X110
176	DASHD	3825	-408	65X110
177	HSD	3910	-408	65X110
178	HSD	3995	-408	65X110
179	DASHD	4080	-408	65X110
180	DEN	4165	-408	65X110
181	DEN	4250	-408	65X110
182	DASHD	4335	-408	65X110
183	CLKIN	4420	-408	65X110
184	CLKIN	4505	-408	65X110
185	DASHD	4590	-408	65X110
186	D27	4675	-408	65X110
187	D27	4760	-408	65X110
188	D26	4845	-408	65X110
189	D26	4930	-408	65X110
190	DASHD	5015	-408	65X110
191	D25	5100	-408	65X110
192	D25	5185	-408	65X110
193	D24	5270	-408	65X110
194	D24	5355	-408	65X110
195	DASHD	5440	-408	65X110
196	D23	5525	-408	65X110
197	D23	5610	-408	65X110
198	D22	5695	-408	65X110
199	D22	5780	-408	65X110
200	DASHD	5865	-408	65X110

No.	Name	X	Y	Bump size
201	D21	5950	-408	65X110
202	D21	6035	-408	65X110
203	D20	6120	-408	65X110
204	D20	6205	-408	65X110
205	DASHD	6290	-408	65X110
206	D17	6375	-408	65X110
207	D17	6460	-408	65X110
208	D16	6545	-408	65X110
209	D16	6630	-408	65X110
210	DASHD	6715	-408	65X110
211	D15	6800	-408	65X110
212	D15	6885	-408	65X110
213	D14	6970	-408	65X110
214	D14	7055	-408	65X110
215	DASHD	7140	-408	65X110
216	D13	7225	-408	65X110
217	D13	7310	-408	65X110
218	D12	7395	-408	65X110
219	D12	7480	-408	65X110
220	DASHD	7565	-408	65X110
221	D11	7650	-408	65X110
222	D11	7735	-408	65X110
223	D10	7820	-408	65X110
224	D10	7905	-408	65X110
225	DASHD	7990	-408	65X110
226	D07	8075	-408	65X110
227	D07	8160	-408	65X110
228	D06	8245	-408	65X110
229	D06	8330	-408	65X110
230	DASHD	8415	-408	65X110
231	D05	8500	-408	65X110
232	D05	8585	-408	65X110
233	D04	8670	-408	65X110
234	D04	8755	-408	65X110
235	DASHD	8840	-408	65X110
236	D03	8925	-408	65X110
237	D03	9010	-408	65X110
238	D02	9095	-408	65X110
239	D02	9180	-408	65X110
240	DASHD	9265	-408	65X110
241	D01	9350	-408	65X110
242	D01	9435	-408	65X110
243	D00	9520	-408	65X110
244	D00	9605	-408	65X110
245	DASHD	9690	-408	65X110
246	SHIELDING	9775	-408	65X110
247	SHIELDING	9860	-408	65X110
248	SHIELDING	9945	-408	65X110
249	SHIELDING	10030	-408	65X110
250	AVDD	10115	-408	65X110

No.	Name	X	Y	Bump size
251	AVDD	10200	-408	65X110
252	AVDD	10285	-408	65X110
253	AVDD	10370	-408	65X110
254	SHIELDING	10455	-408	65X110
255	SHIELDING	10540	-408	65X110
256	COM2_B	10625	-408	65X110
257	COM2_B	10710	-408	65X110
258	SHIELDING	10825	-408	65X110
259	SHIELDING	11026.5	-408	65X110
260	SHIELDING	11111.5	-408	65X110
261	SHIELDING	11196.5	-408	65X110
262	DUM	11049	-232	100X30
263	DUM	11179	-232	100X30
264	STBNL	11049	-152	100X30
265	STBNL	11179	-152	100X30
266	STV1L	11049	-72	100X30
267	STV1L	11179	-72	100X30
268	STV2L	11049	8	100X30
269	STV2L	11179	8	100X30
270	STV1L	11049	88	100X30
271	STV1L	11179	88	100X30
272	CKVL	11049	168	100X30
273	CKVL	11179	168	100X30
274	UDL	11049	248	100X30
275	UDL	11179	248	100X30
276	OEVL	11179	328	100X30
277	INBVRL	11179	408	100X30
278	OEVL	11049	328	100X30
279	INBVRL	11049	408	100X30
280	DCMPL	10914	428	30X70
281	DCMPL	10864	428	30X70
282	SHIELDING	10814	428	30X70
283	COM2_T	10764	428	30X70
284	COM2_T	10714	428	30X70
285	SHIELDING	10664	428	30X70
286	SO1	10620.5	128	17X110
287	SO2	10603.5	268	17X110
288	SO3	10586.5	408	17X110
289	SO4	10569.5	128	17X110
290	SO5	10552.5	268	17X110
291	SO6	10535.5	408	17X110
292	SO7	10518.5	128	17X110
293	SO8	10501.5	268	17X110
294	SO9	10484.5	408	17X110
295	SO10	10467.5	128	17X110
296	SO11	10450.5	268	17X110
297	SO12	10433.5	408	17X110
298	SO13	10416.5	128	17X110
299	SO14	10399.5	268	17X110
300	SO15	10382.5	408	17X110

No.	Name	X	Y	Bump size
301	SO16	10365.5	128	17X110
302	SO17	10348.5	268	17X110
303	SO18	10331.5	408	17X110
304	SO19	10314.5	128	17X110
305	SO20	10297.5	268	17X110
306	SO21	10280.5	408	17X110
307	SO22	10263.5	128	17X110
308	SO23	10246.5	268	17X110
309	SO24	10229.5	408	17X110
310	SO25	10212.5	128	17X110
311	SO26	10195.5	268	17X110
312	SO27	10178.5	408	17X110
313	SO28	10161.5	128	17X110
314	SO29	10144.5	268	17X110
315	SO30	10127.5	408	17X110
316	SO31	10110.5	128	17X110
317	SO32	10093.5	268	17X110
318	SO33	10076.5	408	17X110
319	SO34	10059.5	128	17X110
320	SO35	10042.5	268	17X110
321	SO36	10025.5	408	17X110
322	SO37	10008.5	128	17X110
323	SO38	9991.5	268	17X110
324	SO39	9974.5	408	17X110
325	SO40	9957.5	128	17X110
326	SO41	9940.5	268	17X110
327	SO42	9923.5	408	17X110
328	SO43	9906.5	128	17X110
329	SO44	9889.5	268	17X110
330	SO45	9872.5	408	17X110
331	SO46	9855.5	128	17X110
332	SO47	9838.5	268	17X110
333	SO48	9821.5	408	17X110
334	SO49	9804.5	128	17X110
335	SO50	9787.5	268	17X110
336	SO51	9770.5	408	17X110
337	SO52	9753.5	128	17X110
338	SO53	9736.5	268	17X110
339	SO54	9719.5	408	17X110
340	SO55	9702.5	128	17X110
341	SO56	9685.5	268	17X110
342	SO57	9668.5	408	17X110
343	SO58	9651.5	128	17X110
344	SO59	9634.5	268	17X110
345	SO60	9617.5	408	17X110
346	SO61	9600.5	128	17X110
347	SO62	9583.5	268	17X110
348	SO63	9566.5	408	17X110
349	SO64	9549.5	128	17X110
350	SO65	9532.5	268	17X110

No.	Name	X	Y	Bump size
351	SO66	9515.5	408	17X110
352	SO67	9498.5	128	17X110
353	SO68	9481.5	268	17X110
354	SO69	9464.5	408	17X110
355	SO70	9447.5	128	17X110
356	SO71	9430.5	268	17X110
357	SO72	9413.5	408	17X110
358	SO73	9396.5	128	17X110
359	SO74	9379.5	268	17X110
360	SO75	9362.5	408	17X110
361	SO76	9345.5	128	17X110
362	SO77	9328.5	268	17X110
363	SO78	9311.5	408	17X110
364	SO79	9294.5	128	17X110
365	SO80	9277.5	268	17X110
366	SO81	9260.5	408	17X110
367	SO82	9243.5	128	17X110
368	SO83	9226.5	268	17X110
369	SO84	9209.5	408	17X110
370	SO85	9192.5	128	17X110
371	SO86	9175.5	268	17X110
372	SO87	9158.5	408	17X110
373	SO88	9141.5	128	17X110
374	SO89	9124.5	268	17X110
375	SO90	9107.5	408	17X110
376	SO91	9090.5	128	17X110
377	SO92	9073.5	268	17X110
378	SO93	9056.5	408	17X110
379	SO94	9039.5	128	17X110
380	SO95	9022.5	268	17X110
381	SO96	9005.5	408	17X110
382	SO97	8988.5	128	17X110
383	SO98	8971.5	268	17X110
384	SO99	8954.5	408	17X110
385	SO100	8937.5	128	17X110
386	SO101	8920.5	268	17X110
387	SO102	8903.5	408	17X110
388	SO103	8886.5	128	17X110
389	SO104	8869.5	268	17X110
390	SO105	8852.5	408	17X110
391	SO106	8835.5	128	17X110
392	SO107	8818.5	268	17X110
393	SO108	8801.5	408	17X110
394	SO109	8784.5	128	17X110
395	SO110	8767.5	268	17X110
396	SO111	8750.5	408	17X110
397	SO112	8733.5	128	17X110
398	SO113	8716.5	268	17X110
399	SO114	8699.5	408	17X110
400	SO115	8682.5	128	17X110

No.	Name	X	Y	Bump size
401	SO116	8665.5	268	17X110
402	SO117	8648.5	408	17X110
403	SO118	8631.5	128	17X110
404	SO119	8614.5	268	17X110
405	SO120	8597.5	408	17X110
406	SO121	8580.5	128	17X110
407	SO122	8563.5	268	17X110
408	SO123	8546.5	408	17X110
409	SO124	8529.5	128	17X110
410	SO125	8512.5	268	17X110
411	SO126	8495.5	408	17X110
412	SO127	8478.5	128	17X110
413	SO128	8461.5	268	17X110
414	SO129	8444.5	408	17X110
415	SO130	8427.5	128	17X110
416	SO131	8410.5	268	17X110
417	SO132	8393.5	408	17X110
418	SO133	8376.5	128	17X110
419	SO134	8359.5	268	17X110
420	SO135	8342.5	408	17X110
421	SO136	8325.5	128	17X110
422	SO137	8308.5	268	17X110
423	SO138	8291.5	408	17X110
424	SO139	8274.5	128	17X110
425	SO140	8257.5	268	17X110
426	SO141	8240.5	408	17X110
427	SO142	8223.5	128	17X110
428	SO143	8206.5	268	17X110
429	SO144	8189.5	408	17X110
430	SO145	8172.5	128	17X110
431	SO146	8155.5	268	17X110
432	SO147	8138.5	408	17X110
433	SO148	8121.5	128	17X110
434	SO149	8104.5	268	17X110
435	SO150	8087.5	408	17X110
436	SO151	8070.5	128	17X110
437	SO152	8053.5	268	17X110
438	SO153	8036.5	408	17X110
439	SO154	8019.5	128	17X110
440	SO155	8002.5	268	17X110
441	SO156	7985.5	408	17X110
442	SO157	7968.5	128	17X110
443	SO158	7951.5	268	17X110
444	SO159	7934.5	408	17X110
445	SO160	7917.5	128	17X110
446	SO161	7900.5	268	17X110
447	SO162	7883.5	408	17X110
448	SO163	7866.5	128	17X110
449	SO164	7849.5	268	17X110
450	SO165	7832.5	408	17X110

No.	Name	X	Y	Bump size
451	SO166	7815.5	128	17X110
452	SO167	7798.5	268	17X110
453	SO168	7781.5	408	17X110
454	SO169	7764.5	128	17X110
455	SO170	7747.5	268	17X110
456	SO171	7730.5	408	17X110
457	SO172	7713.5	128	17X110
458	SO173	7696.5	268	17X110
459	SO174	7679.5	408	17X110
460	SO175	7662.5	128	17X110
461	SO176	7645.5	268	17X110
462	SO177	7628.5	408	17X110
463	SO178	7611.5	128	17X110
464	SO179	7594.5	268	17X110
465	SO180	7577.5	408	17X110
466	SO181	7560.5	128	17X110
467	SO182	7543.5	268	17X110
468	SO183	7526.5	408	17X110
469	SO184	7509.5	128	17X110
470	SO185	7492.5	268	17X110
471	SO186	7475.5	408	17X110
472	SO187	7458.5	128	17X110
473	SO188	7441.5	268	17X110
474	SO189	7424.5	408	17X110
475	SO190	7407.5	128	17X110
476	SO191	7390.5	268	17X110
477	SO192	7373.5	408	17X110
478	SO193	7356.5	128	17X110
479	SO194	7339.5	268	17X110
480	SO195	7322.5	408	17X110
481	SO196	7305.5	128	17X110
482	SO197	7288.5	268	17X110
483	SO198	7271.5	408	17X110
484	SO199	7254.5	128	17X110
485	SO200	7237.5	268	17X110
486	SO201	7220.5	408	17X110
487	SO202	7203.5	128	17X110
488	SO203	7186.5	268	17X110
489	SO204	7169.5	408	17X110
490	SO205	7152.5	128	17X110
491	SO206	7135.5	268	17X110
492	SO207	7118.5	408	17X110
493	SO208	7101.5	128	17X110
494	SO209	7084.5	268	17X110
495	SO210	7067.5	408	17X110
496	SO211	7050.5	128	17X110
497	SO212	7033.5	268	17X110
498	SO213	7016.5	408	17X110
499	SO214	6999.5	128	17X110
500	SO215	6982.5	268	17X110

No.	Name	X	Y	Bump size
501	SO216	6965.5	408	17X110
502	SO217	6948.5	128	17X110
503	SO218	6931.5	268	17X110
504	SO219	6914.5	408	17X110
505	SO220	6897.5	128	17X110
506	SO221	6880.5	268	17X110
507	SO222	6863.5	408	17X110
508	SO223	6846.5	128	17X110
509	SO224	6829.5	268	17X110
510	SO225	6812.5	408	17X110
511	SO226	6795.5	128	17X110
512	SO227	6778.5	268	17X110
513	SO228	6761.5	408	17X110
514	SO229	6744.5	128	17X110
515	SO230	6727.5	268	17X110
516	SO231	6710.5	408	17X110
517	SO232	6693.5	128	17X110
518	SO233	6676.5	268	17X110
519	SO234	6659.5	408	17X110
520	SO235	6642.5	128	17X110
521	SO236	6625.5	268	17X110
522	SO237	6608.5	408	17X110
523	SO238	6591.5	128	17X110
524	SO239	6574.5	268	17X110
525	SO240	6557.5	408	17X110
526	SO241	6540.5	128	17X110
527	SO242	6523.5	268	17X110
528	SO243	6506.5	408	17X110
529	SO244	6489.5	128	17X110
530	SO245	6472.5	268	17X110
531	SO246	6455.5	408	17X110
532	SO247	6438.5	128	17X110
533	SO248	6421.5	268	17X110
534	SO249	6404.5	408	17X110
535	SO250	6387.5	128	17X110
536	SO251	6370.5	268	17X110
537	SO252	6353.5	408	17X110
538	SO253	6336.5	128	17X110
539	SO254	6319.5	268	17X110
540	SO255	6302.5	408	17X110
541	SO256	6285.5	128	17X110
542	SO257	6268.5	268	17X110
543	SO258	6251.5	408	17X110
544	SO259	6234.5	128	17X110
545	SO260	6217.5	268	17X110
546	SO261	6200.5	408	17X110
547	SO262	6183.5	128	17X110
548	SO263	6166.5	268	17X110
549	SO264	6149.5	408	17X110
550	SO265	6132.5	128	17X110

No.	Name	X	Y	Bump size
551	SO266	6115.5	268	17X110
552	SO267	6098.5	408	17X110
553	SO268	6081.5	128	17X110
554	SO269	6064.5	268	17X110
555	SO270	6047.5	408	17X110
556	SO271	6030.5	128	17X110
557	SO272	6013.5	268	17X110
558	SO273	5996.5	408	17X110
559	SO274	5979.5	128	17X110
560	SO275	5962.5	268	17X110
561	SO276	5945.5	408	17X110
562	SO277	5928.5	128	17X110
563	SO278	5911.5	268	17X110
564	SO279	5894.5	408	17X110
565	SO280	5877.5	128	17X110
566	SO281	5860.5	268	17X110
567	SO282	5843.5	408	17X110
568	SO283	5826.5	128	17X110
569	SO284	5809.5	268	17X110
570	SO285	5792.5	408	17X110
571	SO286	5775.5	128	17X110
572	SO287	5758.5	268	17X110
573	SO288	5741.5	408	17X110
574	SO289	5724.5	128	17X110
575	SO290	5707.5	268	17X110
576	SO291	5690.5	408	17X110
577	SO292	5673.5	128	17X110
578	SO293	5656.5	268	17X110
579	SO294	5639.5	408	17X110
580	SO295	5622.5	128	17X110
581	SO296	5605.5	268	17X110
582	SO297	5588.5	408	17X110
583	SO298	5571.5	128	17X110
584	SO299	5554.5	268	17X110
585	SO300	5537.5	408	17X110
586	SO301	5520.5	128	17X110
587	SO302	5503.5	268	17X110
588	SO303	5486.5	408	17X110
589	SO304	5469.5	128	17X110
590	SO305	5452.5	268	17X110
591	SO306	5435.5	408	17X110
592	SO307	5418.5	128	17X110
593	SO308	5401.5	268	17X110
594	SO309	5384.5	408	17X110
595	SO310	5367.5	128	17X110
596	SO311	5350.5	268	17X110
597	SO312	5333.5	408	17X110
598	SO313	5316.5	128	17X110
599	SO314	5299.5	268	17X110
600	SO315	5282.5	408	17X110

No.	Name	X	Y	Bump size
601	SO316	5265.5	128	17X110
602	SO317	5248.5	268	17X110
603	SO318	5231.5	408	17X110
604	SO319	5214.5	128	17X110
605	SO320	5197.5	268	17X110
606	SO321	5180.5	408	17X110
607	SO322	5163.5	128	17X110
608	SO323	5146.5	268	17X110
609	SO324	5129.5	408	17X110
610	SO325	5112.5	128	17X110
611	SO326	5095.5	268	17X110
612	SO327	5078.5	408	17X110
613	SO328	5061.5	128	17X110
614	SO329	5044.5	268	17X110
615	SO330	5027.5	408	17X110
616	SO331	5010.5	128	17X110
617	SO332	4993.5	268	17X110
618	SO333	4976.5	408	17X110
619	SO334	4959.5	128	17X110
620	SO335	4942.5	268	17X110
621	SO336	4925.5	408	17X110
622	SO337	4908.5	128	17X110
623	SO338	4891.5	268	17X110
624	SO339	4874.5	408	17X110
625	SO340	4857.5	128	17X110
626	SO341	4840.5	268	17X110
627	SO342	4823.5	408	17X110
628	SO343	4806.5	128	17X110
629	SO344	4789.5	268	17X110
630	SO345	4772.5	408	17X110
631	SO346	4755.5	128	17X110
632	SO347	4738.5	268	17X110
633	SO348	4721.5	408	17X110
634	SO349	4704.5	128	17X110
635	SO350	4687.5	268	17X110
636	SO351	4670.5	408	17X110
637	SO352	4653.5	128	17X110
638	SO353	4636.5	268	17X110
639	SO354	4619.5	408	17X110
640	SO355	4602.5	128	17X110
641	SO356	4585.5	268	17X110
642	SO357	4568.5	408	17X110
643	SO358	4551.5	128	17X110
644	SO359	4534.5	268	17X110
645	SO360	4517.5	408	17X110
646	SO361	4500.5	128	17X110
647	SO362	4483.5	268	17X110
648	SO363	4466.5	408	17X110
649	SO364	4449.5	128	17X110
650	SO365	4432.5	268	17X110

No.	Name	X	Y	Bump size
651	SO366	4415.5	408	17X110
652	SO367	4398.5	128	17X110
653	SO368	4381.5	268	17X110
654	SO369	4364.5	408	17X110
655	SO370	4347.5	128	17X110
656	SO371	4330.5	268	17X110
657	SO372	4313.5	408	17X110
658	SO373	4296.5	128	17X110
659	SO374	4279.5	268	17X110
660	SO375	4262.5	408	17X110
661	SO376	4245.5	128	17X110
662	SO377	4228.5	268	17X110
663	SO378	4211.5	408	17X110
664	SO379	4194.5	128	17X110
665	SO380	4177.5	268	17X110
666	SO381	4160.5	408	17X110
667	SO382	4143.5	128	17X110
668	SO383	4126.5	268	17X110
669	SO384	4109.5	408	17X110
670	SO385	4092.5	128	17X110
671	SO386	4075.5	268	17X110
672	SO387	4058.5	408	17X110
673	SO388	4041.5	128	17X110
674	SO389	4024.5	268	17X110
675	SO390	4007.5	408	17X110
676	SO391	3990.5	128	17X110
677	SO392	3973.5	268	17X110
678	SO393	3956.5	408	17X110
679	SO394	3939.5	128	17X110
680	SO395	3922.5	268	17X110
681	SO396	3905.5	408	17X110
682	SO397	3888.5	128	17X110
683	SO398	3871.5	268	17X110
684	SO399	3854.5	408	17X110
685	SO400	3837.5	128	17X110
686	SO401	3820.5	268	17X110
687	SO402	3803.5	408	17X110
688	SO403	3786.5	128	17X110
689	SO404	3769.5	268	17X110
690	SO405	3752.5	408	17X110
691	SO406	3735.5	128	17X110
692	SO407	3718.5	268	17X110
693	SO408	3701.5	408	17X110
694	SO409	3684.5	128	17X110
695	SO410	3667.5	268	17X110
696	SO411	3650.5	408	17X110
697	SO412	3633.5	128	17X110
698	SO413	3616.5	268	17X110
699	SO414	3599.5	408	17X110
700	SO415	3582.5	128	17X110

No.	Name	X	Y	Bump size
701	SO416	3565.5	268	17X110
702	SO417	3548.5	408	17X110
703	SO418	3531.5	128	17X110
704	SO419	3514.5	268	17X110
705	SO420	3497.5	408	17X110
706	SO421	3480.5	128	17X110
707	SO422	3463.5	268	17X110
708	SO423	3446.5	408	17X110
709	SO424	3429.5	128	17X110
710	SO425	3412.5	268	17X110
711	SO426	3395.5	408	17X110
712	SO427	3378.5	128	17X110
713	SO428	3361.5	268	17X110
714	SO429	3344.5	408	17X110
715	SO430	3327.5	128	17X110
716	SO431	3310.5	268	17X110
717	SO432	3293.5	408	17X110
718	SO433	3276.5	128	17X110
719	SO434	3259.5	268	17X110
720	SO435	3242.5	408	17X110
721	SO436	3225.5	128	17X110
722	SO437	3208.5	268	17X110
723	SO438	3191.5	408	17X110
724	SO439	3174.5	128	17X110
725	SO440	3157.5	268	17X110
726	SO441	3140.5	408	17X110
727	SO442	3123.5	128	17X110
728	SO443	3106.5	268	17X110
729	SO444	3089.5	408	17X110
730	SO445	3072.5	128	17X110
731	SO446	3055.5	268	17X110
732	SO447	3038.5	408	17X110
733	SO448	3021.5	128	17X110
734	SO449	3004.5	268	17X110
735	SO450	2987.5	408	17X110
736	SO451	2970.5	128	17X110
737	SO452	2953.5	268	17X110
738	SO453	2936.5	408	17X110
739	SO454	2919.5	128	17X110
740	SO455	2902.5	268	17X110
741	SO456	2885.5	408	17X110
742	SO457	2868.5	128	17X110
743	SO458	2851.5	268	17X110
744	SO459	2834.5	408	17X110
745	SO460	2817.5	128	17X110
746	SO461	2800.5	268	17X110
747	SO462	2783.5	408	17X110
748	SO463	2766.5	128	17X110
749	SO464	2749.5	268	17X110
750	SO465	2732.5	408	17X110

No.	Name	X	Y	Bump size
751	SO466	2715.5	128	17X110
752	SO467	2698.5	268	17X110
753	SO468	2681.5	408	17X110
754	SO469	2664.5	128	17X110
755	SO470	2647.5	268	17X110
756	SO471	2630.5	408	17X110
757	SO472	2613.5	128	17X110
758	SO473	2596.5	268	17X110
759	SO474	2579.5	408	17X110
760	SO475	2562.5	128	17X110
761	SO476	2545.5	268	17X110
762	SO477	2528.5	408	17X110
763	SO478	2511.5	128	17X110
764	SO479	2494.5	268	17X110
765	SO480	2477.5	408	17X110
766	SO481	2460.5	128	17X110
767	SO482	2443.5	268	17X110
768	SO483	2426.5	408	17X110
769	SO484	2409.5	128	17X110
770	SO485	2392.5	268	17X110
771	SO486	2375.5	408	17X110
772	SO487	2358.5	128	17X110
773	SO488	2341.5	268	17X110
774	SO489	2324.5	408	17X110
775	SO490	2307.5	128	17X110
776	SO491	2290.5	268	17X110
777	SO492	2273.5	408	17X110
778	SO493	2256.5	128	17X110
779	SO494	2239.5	268	17X110
780	SO495	2222.5	408	17X110
781	SO496	2205.5	128	17X110
782	SO497	2188.5	268	17X110
783	SO498	2171.5	408	17X110
784	SO499	2154.5	128	17X110
785	SO500	2137.5	268	17X110
786	SO501	2120.5	408	17X110
787	SO502	2103.5	128	17X110
788	SO503	2086.5	268	17X110
789	SO504	2069.5	408	17X110
790	SO505	2052.5	128	17X110
791	SO506	2035.5	268	17X110
792	SO507	2018.5	408	17X110
793	SO508	2001.5	128	17X110
794	SO509	1984.5	268	17X110
795	SO510	1967.5	408	17X110
796	SO511	1950.5	128	17X110
797	SO512	1933.5	268	17X110
798	SO513	1916.5	408	17X110
799	SO514	1899.5	128	17X110
800	SO515	1882.5	268	17X110

No.	Name	X	Y	Bump size
801	SO516	1865.5	408	17X110
802	SO517	1848.5	128	17X110
803	SO518	1831.5	268	17X110
804	SO519	1814.5	408	17X110
805	SO520	1797.5	128	17X110
806	SO521	1780.5	268	17X110
807	SO522	1763.5	408	17X110
808	SO523	1746.5	128	17X110
809	SO524	1729.5	268	17X110
810	SO525	1712.5	408	17X110
811	SO526	1695.5	128	17X110
812	SO527	1678.5	268	17X110
813	SO528	1661.5	408	17X110
814	SO529	1644.5	128	17X110
815	SO530	1627.5	268	17X110
816	SO531	1610.5	408	17X110
817	SO532	1593.5	128	17X110
818	SO533	1576.5	268	17X110
819	SO534	1559.5	408	17X110
820	SO535	1542.5	128	17X110
821	SO536	1525.5	268	17X110
822	SO537	1508.5	408	17X110
823	SO538	1491.5	128	17X110
824	SO539	1474.5	268	17X110
825	SO540	1457.5	408	17X110
826	SO541	1440.5	128	17X110
827	SO542	1423.5	268	17X110
828	SO543	1406.5	408	17X110
829	SO544	1389.5	128	17X110
830	SO545	1372.5	268	17X110
831	SO546	1355.5	408	17X110
832	SO547	1338.5	128	17X110
833	SO548	1321.5	268	17X110
834	SO549	1304.5	408	17X110
835	SO550	1287.5	128	17X110
836	SO551	1270.5	268	17X110
837	SO552	1253.5	408	17X110
838	SO553	1236.5	128	17X110
839	SO554	1219.5	268	17X110
840	SO555	1202.5	408	17X110
841	SO556	1185.5	128	17X110
842	SO557	1168.5	268	17X110
843	SO558	1151.5	408	17X110
844	SO559	1134.5	128	17X110
845	SO560	1117.5	268	17X110
846	SO561	1100.5	408	17X110
847	SO562	1083.5	128	17X110
848	SO563	1066.5	268	17X110
849	SO564	1049.5	408	17X110
850	SO565	1032.5	128	17X110

No.	Name	X	Y	Bump size
851	SO566	1015.5	268	17X110
852	SO567	998.5	408	17X110
853	SO568	981.5	128	17X110
854	SO569	964.5	268	17X110
855	SO570	947.5	408	17X110
856	SO571	930.5	128	17X110
857	SO572	913.5	268	17X110
858	SO573	896.5	408	17X110
859	SO574	879.5	128	17X110
860	SO575	862.5	268	17X110
861	SO576	845.5	408	17X110
862	SO577	828.5	128	17X110
863	SO578	811.5	268	17X110
864	SO579	794.5	408	17X110
865	SO580	777.5	128	17X110
866	SO581	760.5	268	17X110
867	SO582	743.5	408	17X110
868	SO583	726.5	128	17X110
869	SO584	709.5	268	17X110
870	SO585	692.5	408	17X110
871	SO586	675.5	128	17X110
872	SO587	658.5	268	17X110
873	SO588	641.5	408	17X110
874	SO589	624.5	128	17X110
875	SO590	607.5	268	17X110
876	SO591	590.5	408	17X110
877	SO592	573.5	128	17X110
878	SO593	556.5	268	17X110
879	SO594	539.5	408	17X110
880	SO595	522.5	128	17X110
881	SO596	505.5	268	17X110
882	SO597	488.5	408	17X110
883	SO598	471.5	128	17X110
884	SO599	454.5	268	17X110
885	SO600	437.5	408	17X110
886	SHIELDING	403.5	408	17X110
887	SHIELDING	369.5	408	17X110
888	SHIELDING	335.5	408	17X110
889	SHIELDING	301.5	408	17X110
890	SHIELDING	267.5	408	17X110
891	SHIELDING	233.5	408	17X110
892	SHIELDING	-233.5	408	17X110
893	SHIELDING	-267.5	408	17X110
894	SHIELDING	-301.5	408	17X110
895	SHIELDING	-335.5	408	17X110
896	SHIELDING	-369.5	408	17X110
897	SHIELDING	-403.5	408	17X110
898	SO601	-437.5	408	17X110
899	SO602	-454.5	268	17X110
900	SO603	-471.5	128	17X110

No.	Name	X	Y	Bump size
901	SO604	-488.5	408	17X110
902	SO605	-505.5	268	17X110
903	SO606	-522.5	128	17X110
904	SO607	-539.5	408	17X110
905	SO608	-556.5	268	17X110
906	SO609	-573.5	128	17X110
907	SO610	-590.5	408	17X110
908	SO611	-607.5	268	17X110
909	SO612	-624.5	128	17X110
910	SO613	-641.5	408	17X110
911	SO614	-658.5	268	17X110
912	SO615	-675.5	128	17X110
913	SO616	-692.5	408	17X110
914	SO617	-709.5	268	17X110
915	SO618	-726.5	128	17X110
916	SO619	-743.5	408	17X110
917	SO620	-760.5	268	17X110
918	SO621	-777.5	128	17X110
919	SO622	-794.5	408	17X110
920	SO623	-811.5	268	17X110
921	SO624	-828.5	128	17X110
922	SO625	-845.5	408	17X110
923	SO626	-862.5	268	17X110
924	SO627	-879.5	128	17X110
925	SO628	-896.5	408	17X110
926	SO629	-913.5	268	17X110
927	SO630	-930.5	128	17X110
928	SO631	-947.5	408	17X110
929	SO632	-964.5	268	17X110
930	SO633	-981.5	128	17X110
931	SO634	-998.5	408	17X110
932	SO635	-1015.5	268	17X110
933	SO636	-1032.5	128	17X110
934	SO637	-1049.5	408	17X110
935	SO638	-1066.5	268	17X110
936	SO639	-1083.5	128	17X110
937	SO640	-1100.5	408	17X110
938	SO641	-1117.5	268	17X110
939	SO642	-1134.5	128	17X110
940	SO643	-1151.5	408	17X110
941	SO644	-1168.5	268	17X110
942	SO645	-1185.5	128	17X110
943	SO646	-1202.5	408	17X110
944	SO647	-1219.5	268	17X110
945	SO648	-1236.5	128	17X110
946	SO649	-1253.5	408	17X110
947	SO650	-1270.5	268	17X110
948	SO651	-1287.5	128	17X110
949	SO652	-1304.5	408	17X110
950	SO653	-1321.5	268	17X110

No.	Name	X	Y	Bump size
951	SO654	-1338.5	128	17X110
952	SO655	-1355.5	408	17X110
953	SO656	-1372.5	268	17X110
954	SO657	-1389.5	128	17X110
955	SO658	-1406.5	408	17X110
956	SO659	-1423.5	268	17X110
957	SO660	-1440.5	128	17X110
958	SO661	-1457.5	408	17X110
959	SO662	-1474.5	268	17X110
960	SO663	-1491.5	128	17X110
961	SO664	-1508.5	408	17X110
962	SO665	-1525.5	268	17X110
963	SO666	-1542.5	128	17X110
964	SO667	-1559.5	408	17X110
965	SO668	-1576.5	268	17X110
966	SO669	-1593.5	128	17X110
967	SO670	-1610.5	408	17X110
968	SO671	-1627.5	268	17X110
969	SO672	-1644.5	128	17X110
970	SO673	-1661.5	408	17X110
971	SO674	-1678.5	268	17X110
972	SO675	-1695.5	128	17X110
973	SO676	-1712.5	408	17X110
974	SO677	-1729.5	268	17X110
975	SO678	-1746.5	128	17X110
976	SO679	-1763.5	408	17X110
977	SO680	-1780.5	268	17X110
978	SO681	-1797.5	128	17X110
979	SO682	-1814.5	408	17X110
980	SO683	-1831.5	268	17X110
981	SO684	-1848.5	128	17X110
982	SO685	-1865.5	408	17X110
983	SO686	-1882.5	268	17X110
984	SO687	-1899.5	128	17X110
985	SO688	-1916.5	408	17X110
986	SO689	-1933.5	268	17X110
987	SO690	-1950.5	128	17X110
988	SO691	-1967.5	408	17X110
989	SO692	-1984.5	268	17X110
990	SO693	-2001.5	128	17X110
991	SO694	-2018.5	408	17X110
992	SO695	-2035.5	268	17X110
993	SO696	-2052.5	128	17X110
994	SO697	-2069.5	408	17X110
995	SO698	-2086.5	268	17X110
996	SO699	-2103.5	128	17X110
997	SO700	-2120.5	408	17X110
998	SO701	-2137.5	268	17X110
999	SO702	-2154.5	128	17X110
1000	SO703	-2171.5	408	17X110

No.	Name	X	Y	Bump size
1001	SO704	-2188.5	268	17X110
1002	SO705	-2205.5	128	17X110
1003	SO706	-2222.5	408	17X110
1004	SO707	-2239.5	268	17X110
1005	SO708	-2256.5	128	17X110
1006	SO709	-2273.5	408	17X110
1007	SO710	-2290.5	268	17X110
1008	SO711	-2307.5	128	17X110
1009	SO712	-2324.5	408	17X110
1010	SO713	-2341.5	268	17X110
1011	SO714	-2358.5	128	17X110
1012	SO715	-2375.5	408	17X110
1013	SO716	-2392.5	268	17X110
1014	SO717	-2409.5	128	17X110
1015	SO718	-2426.5	408	17X110
1016	SO719	-2443.5	268	17X110
1017	SO720	-2460.5	128	17X110
1018	SO721	-2477.5	408	17X110
1019	SO722	-2494.5	268	17X110
1020	SO723	-2511.5	128	17X110
1021	SO724	-2528.5	408	17X110
1022	SO725	-2545.5	268	17X110
1023	SO726	-2562.5	128	17X110
1024	SO727	-2579.5	408	17X110
1025	SO728	-2596.5	268	17X110
1026	SO729	-2613.5	128	17X110
1027	SO730	-2630.5	408	17X110
1028	SO731	-2647.5	268	17X110
1029	SO732	-2664.5	128	17X110
1030	SO733	-2681.5	408	17X110
1031	SO734	-2698.5	268	17X110
1032	SO735	-2715.5	128	17X110
1033	SO736	-2732.5	408	17X110
1034	SO737	-2749.5	268	17X110
1035	SO738	-2766.5	128	17X110
1036	SO739	-2783.5	408	17X110
1037	SO740	-2800.5	268	17X110
1038	SO741	-2817.5	128	17X110
1039	SO742	-2834.5	408	17X110
1040	SO743	-2851.5	268	17X110
1041	SO744	-2868.5	128	17X110
1042	SO745	-2885.5	408	17X110
1043	SO746	-2902.5	268	17X110
1044	SO747	-2919.5	128	17X110
1045	SO748	-2936.5	408	17X110
1046	SO749	-2953.5	268	17X110
1047	SO750	-2970.5	128	17X110
1048	SO751	-2987.5	408	17X110
1049	SO752	-3004.5	268	17X110
1050	SO753	-3021.5	128	17X110

No.	Name	X	Y	Bump size
1051	SO754	-3038.5	408	17X110
1052	SO755	-3055.5	268	17X110
1053	SO756	-3072.5	128	17X110
1054	SO757	-3089.5	408	17X110
1055	SO758	-3106.5	268	17X110
1056	SO759	-3123.5	128	17X110
1057	SO760	-3140.5	408	17X110
1058	SO761	-3157.5	268	17X110
1059	SO762	-3174.5	128	17X110
1060	SO763	-3191.5	408	17X110
1061	SO764	-3208.5	268	17X110
1062	SO765	-3225.5	128	17X110
1063	SO766	-3242.5	408	17X110
1064	SO767	-3259.5	268	17X110
1065	SO768	-3276.5	128	17X110
1066	SO769	-3293.5	408	17X110
1067	SO770	-3310.5	268	17X110
1068	SO771	-3327.5	128	17X110
1069	SO772	-3344.5	408	17X110
1070	SO773	-3361.5	268	17X110
1071	SO774	-3378.5	128	17X110
1072	SO775	-3395.5	408	17X110
1073	SO776	-3412.5	268	17X110
1074	SO777	-3429.5	128	17X110
1075	SO778	-3446.5	408	17X110
1076	SO779	-3463.5	268	17X110
1077	SO780	-3480.5	128	17X110
1078	SO781	-3497.5	408	17X110
1079	SO782	-3514.5	268	17X110
1080	SO783	-3531.5	128	17X110
1081	SO784	-3548.5	408	17X110
1082	SO785	-3565.5	268	17X110
1083	SO786	-3582.5	128	17X110
1084	SO787	-3599.5	408	17X110
1085	SO788	-3616.5	268	17X110
1086	SO789	-3633.5	128	17X110
1087	SO790	-3650.5	408	17X110
1088	SO791	-3667.5	268	17X110
1089	SO792	-3684.5	128	17X110
1090	SO793	-3701.5	408	17X110
1091	SO794	-3718.5	268	17X110
1092	SO795	-3735.5	128	17X110
1093	SO796	-3752.5	408	17X110
1094	SO797	-3769.5	268	17X110
1095	SO798	-3786.5	128	17X110
1096	SO799	-3803.5	408	17X110
1097	SO800	-3820.5	268	17X110
1098	SO801	-3837.5	128	17X110
1099	SO802	-3854.5	408	17X110
1100	SO803	-3871.5	268	17X110

No.	Name	X	Y	Bump size
1101	SO804	-3888.5	128	17X110
1102	SO805	-3905.5	408	17X110
1103	SO806	-3922.5	268	17X110
1104	SO807	-3939.5	128	17X110
1105	SO808	-3956.5	408	17X110
1106	SO809	-3973.5	268	17X110
1107	SO810	-3990.5	128	17X110
1108	SO811	-4007.5	408	17X110
1109	SO812	-4024.5	268	17X110
1110	SO813	-4041.5	128	17X110
1111	SO814	-4058.5	408	17X110
1112	SO815	-4075.5	268	17X110
1113	SO816	-4092.5	128	17X110
1114	SO817	-4109.5	408	17X110
1115	SO818	-4126.5	268	17X110
1116	SO819	-4143.5	128	17X110
1117	SO820	-4160.5	408	17X110
1118	SO821	-4177.5	268	17X110
1119	SO822	-4194.5	128	17X110
1120	SO823	-4211.5	408	17X110
1121	SO824	-4228.5	268	17X110
1122	SO825	-4245.5	128	17X110
1123	SO826	-4262.5	408	17X110
1124	SO827	-4279.5	268	17X110
1125	SO828	-4296.5	128	17X110
1126	SO829	-4313.5	408	17X110
1127	SO830	-4330.5	268	17X110
1128	SO831	-4347.5	128	17X110
1129	SO832	-4364.5	408	17X110
1130	SO833	-4381.5	268	17X110
1131	SO834	-4398.5	128	17X110
1132	SO835	-4415.5	408	17X110
1133	SO836	-4432.5	268	17X110
1134	SO837	-4449.5	128	17X110
1135	SO838	-4466.5	408	17X110
1136	SO839	-4483.5	268	17X110
1137	SO840	-4500.5	128	17X110
1138	SO841	-4517.5	408	17X110
1139	SO842	-4534.5	268	17X110
1140	SO843	-4551.5	128	17X110
1141	SO844	-4568.5	408	17X110
1142	SO845	-4585.5	268	17X110
1143	SO846	-4602.5	128	17X110
1144	SO847	-4619.5	408	17X110
1145	SO848	-4636.5	268	17X110
1146	SO849	-4653.5	128	17X110
1147	SO850	-4670.5	408	17X110
1148	SO851	-4687.5	268	17X110
1149	SO852	-4704.5	128	17X110
1150	SO853	-4721.5	408	17X110

No.	Name	X	Y	Bump size
1151	SO854	-4738.5	268	17X110
1152	SO855	-4755.5	128	17X110
1153	SO856	-4772.5	408	17X110
1154	SO857	-4789.5	268	17X110
1155	SO858	-4806.5	128	17X110
1156	SO859	-4823.5	408	17X110
1157	SO860	-4840.5	268	17X110
1158	SO861	-4857.5	128	17X110
1159	SO862	-4874.5	408	17X110
1160	SO863	-4891.5	268	17X110
1161	SO864	-4908.5	128	17X110
1162	SO865	-4925.5	408	17X110
1163	SO866	-4942.5	268	17X110
1164	SO867	-4959.5	128	17X110
1165	SO868	-4976.5	408	17X110
1166	SO869	-4993.5	268	17X110
1167	SO870	-5010.5	128	17X110
1168	SO871	-5027.5	408	17X110
1169	SO872	-5044.5	268	17X110
1170	SO873	-5061.5	128	17X110
1171	SO874	-5078.5	408	17X110
1172	SO875	-5095.5	268	17X110
1173	SO876	-5112.5	128	17X110
1174	SO877	-5129.5	408	17X110
1175	SO878	-5146.5	268	17X110
1176	SO879	-5163.5	128	17X110
1177	SO880	-5180.5	408	17X110
1178	SO881	-5197.5	268	17X110
1179	SO882	-5214.5	128	17X110
1180	SO883	-5231.5	408	17X110
1181	SO884	-5248.5	268	17X110
1182	SO885	-5265.5	128	17X110
1183	SO886	-5282.5	408	17X110
1184	SO887	-5299.5	268	17X110
1185	SO888	-5316.5	128	17X110
1186	SO889	-5333.5	408	17X110
1187	SO890	-5350.5	268	17X110
1188	SO891	-5367.5	128	17X110
1189	SO892	-5384.5	408	17X110
1190	SO893	-5401.5	268	17X110
1191	SO894	-5418.5	128	17X110
1192	SO895	-5435.5	408	17X110
1193	SO896	-5452.5	268	17X110
1194	SO897	-5469.5	128	17X110
1195	SO898	-5486.5	408	17X110
1196	SO899	-5503.5	268	17X110
1197	SO900	-5520.5	128	17X110
1198	SO901	-5537.5	408	17X110
1199	SO902	-5554.5	268	17X110
1200	SO903	-5571.5	128	17X110

No.	Name	X	Y	Bump size
1201	SO904	-5588.5	408	17X110
1202	SO905	-5605.5	268	17X110
1203	SO906	-5622.5	128	17X110
1204	SO907	-5639.5	408	17X110
1205	SO908	-5656.5	268	17X110
1206	SO909	-5673.5	128	17X110
1207	SO910	-5690.5	408	17X110
1208	SO911	-5707.5	268	17X110
1209	SO912	-5724.5	128	17X110
1210	SO913	-5741.5	408	17X110
1211	SO914	-5758.5	268	17X110
1212	SO915	-5775.5	128	17X110
1213	SO916	-5792.5	408	17X110
1214	SO917	-5809.5	268	17X110
1215	SO918	-5826.5	128	17X110
1216	SO919	-5843.5	408	17X110
1217	SO920	-5860.5	268	17X110
1218	SO921	-5877.5	128	17X110
1219	SO922	-5894.5	408	17X110
1220	SO923	-5911.5	268	17X110
1221	SO924	-5928.5	128	17X110
1222	SO925	-5945.5	408	17X110
1223	SO926	-5962.5	268	17X110
1224	SO927	-5979.5	128	17X110
1225	SO928	-5996.5	408	17X110
1226	SO929	-6013.5	268	17X110
1227	SO930	-6030.5	128	17X110
1228	SO931	-6047.5	408	17X110
1229	SO932	-6064.5	268	17X110
1230	SO933	-6081.5	128	17X110
1231	SO934	-6098.5	408	17X110
1232	SO935	-6115.5	268	17X110
1233	SO936	-6132.5	128	17X110
1234	SO937	-6149.5	408	17X110
1235	SO938	-6166.5	268	17X110
1236	SO939	-6183.5	128	17X110
1237	SO940	-6200.5	408	17X110
1238	SO941	-6217.5	268	17X110
1239	SO942	-6234.5	128	17X110
1240	SO943	-6251.5	408	17X110
1241	SO944	-6268.5	268	17X110
1242	SO945	-6285.5	128	17X110
1243	SO946	-6302.5	408	17X110
1244	SO947	-6319.5	268	17X110
1245	SO948	-6336.5	128	17X110
1246	SO949	-6353.5	408	17X110
1247	SO950	-6370.5	268	17X110
1248	SO951	-6387.5	128	17X110
1249	SO952	-6404.5	408	17X110
1250	SO953	-6421.5	268	17X110

No.	Name	X	Y	Bump size
1251	SO954	-6438.5	128	17X110
1252	SO955	-6455.5	408	17X110
1253	SO956	-6472.5	268	17X110
1254	SO957	-6489.5	128	17X110
1255	SO958	-6506.5	408	17X110
1256	SO959	-6523.5	268	17X110
1257	SO960	-6540.5	128	17X110
1258	SO961	-6557.5	408	17X110
1259	SO962	-6574.5	268	17X110
1260	SO963	-6591.5	128	17X110
1261	SO964	-6608.5	408	17X110
1262	SO965	-6625.5	268	17X110
1263	SO966	-6642.5	128	17X110
1264	SO967	-6659.5	408	17X110
1265	SO968	-6676.5	268	17X110
1266	SO969	-6693.5	128	17X110
1267	SO970	-6710.5	408	17X110
1268	SO971	-6727.5	268	17X110
1269	SO972	-6744.5	128	17X110
1270	SO973	-6761.5	408	17X110
1271	SO974	-6778.5	268	17X110
1272	SO975	-6795.5	128	17X110
1273	SO976	-6812.5	408	17X110
1274	SO977	-6829.5	268	17X110
1275	SO978	-6846.5	128	17X110
1276	SO979	-6863.5	408	17X110
1277	SO980	-6880.5	268	17X110
1278	SO981	-6897.5	128	17X110
1279	SO982	-6914.5	408	17X110
1280	SO983	-6931.5	268	17X110
1281	SO984	-6948.5	128	17X110
1282	SO985	-6965.5	408	17X110
1283	SO986	-6982.5	268	17X110
1284	SO987	-6999.5	128	17X110
1285	SO988	-7016.5	408	17X110
1286	SO989	-7033.5	268	17X110
1287	SO990	-7050.5	128	17X110
1288	SO991	-7067.5	408	17X110
1289	SO992	-7084.5	268	17X110
1290	SO993	-7101.5	128	17X110
1291	SO994	-7118.5	408	17X110
1292	SO995	-7135.5	268	17X110
1293	SO996	-7152.5	128	17X110
1294	SO997	-7169.5	408	17X110
1295	SO998	-7186.5	268	17X110
1296	SO999	-7203.5	128	17X110
1297	SO1000	-7220.5	408	17X110
1298	SO1001	-7237.5	268	17X110
1299	SO1002	-7254.5	128	17X110
1300	SO1003	-7271.5	408	17X110

No.	Name	X	Y	Bump size
1301	SO1004	-7288.5	268	17X110
1302	SO1005	-7305.5	128	17X110
1303	SO1006	-7322.5	408	17X110
1304	SO1007	-7339.5	268	17X110
1305	SO1008	-7356.5	128	17X110
1306	SO1009	-7373.5	408	17X110
1307	SO1010	-7390.5	268	17X110
1308	SO1011	-7407.5	128	17X110
1309	SO1012	-7424.5	408	17X110
1310	SO1013	-7441.5	268	17X110
1311	SO1014	-7458.5	128	17X110
1312	SO1015	-7475.5	408	17X110
1313	SO1016	-7492.5	268	17X110
1314	SO1017	-7509.5	128	17X110
1315	SO1018	-7526.5	408	17X110
1316	SO1019	-7543.5	268	17X110
1317	SO1020	-7560.5	128	17X110
1318	SO1021	-7577.5	408	17X110
1319	SO1022	-7594.5	268	17X110
1320	SO1023	-7611.5	128	17X110
1321	SO1024	-7628.5	408	17X110
1322	SO1025	-7645.5	268	17X110
1323	SO1026	-7662.5	128	17X110
1324	SO1027	-7679.5	408	17X110
1325	SO1028	-7696.5	268	17X110
1326	SO1029	-7713.5	128	17X110
1327	SO1030	-7730.5	408	17X110
1328	SO1031	-7747.5	268	17X110
1329	SO1032	-7764.5	128	17X110
1330	SO1033	-7781.5	408	17X110
1331	SO1034	-7798.5	268	17X110
1332	SO1035	-7815.5	128	17X110
1333	SO1036	-7832.5	408	17X110
1334	SO1037	-7849.5	268	17X110
1335	SO1038	-7866.5	128	17X110
1336	SO1039	-7883.5	408	17X110
1337	SO1040	-7900.5	268	17X110
1338	SO1041	-7917.5	128	17X110
1339	SO1042	-7934.5	408	17X110
1340	SO1043	-7951.5	268	17X110
1341	SO1044	-7968.5	128	17X110
1342	SO1045	-7985.5	408	17X110
1343	SO1046	-8002.5	268	17X110
1344	SO1047	-8019.5	128	17X110
1345	SO1048	-8036.5	408	17X110
1346	SO1049	-8053.5	268	17X110
1347	SO1050	-8070.5	128	17X110
1348	SO1051	-8087.5	408	17X110
1349	SO1052	-8104.5	268	17X110
1350	SO1053	-8121.5	128	17X110

No.	Name	X	Y	Bump size
1351	SO1054	-8138.5	408	17X110
1352	SO1055	-8155.5	268	17X110
1353	SO1056	-8172.5	128	17X110
1354	SO1057	-8189.5	408	17X110
1355	SO1058	-8206.5	268	17X110
1356	SO1059	-8223.5	128	17X110
1357	SO1060	-8240.5	408	17X110
1358	SO1061	-8257.5	268	17X110
1359	SO1062	-8274.5	128	17X110
1360	SO1063	-8291.5	408	17X110
1361	SO1064	-8308.5	268	17X110
1362	SO1065	-8325.5	128	17X110
1363	SO1066	-8342.5	408	17X110
1364	SO1067	-8359.5	268	17X110
1365	SO1068	-8376.5	128	17X110
1366	SO1069	-8393.5	408	17X110
1367	SO1070	-8410.5	268	17X110
1368	SO1071	-8427.5	128	17X110
1369	SO1072	-8444.5	408	17X110
1370	SO1073	-8461.5	268	17X110
1371	SO1074	-8478.5	128	17X110
1372	SO1075	-8495.5	408	17X110
1373	SO1076	-8512.5	268	17X110
1374	SO1077	-8529.5	128	17X110
1375	SO1078	-8546.5	408	17X110
1376	SO1079	-8563.5	268	17X110
1377	SO1080	-8580.5	128	17X110
1378	SO1081	-8597.5	408	17X110
1379	SO1082	-8614.5	268	17X110
1380	SO1083	-8631.5	128	17X110
1381	SO1084	-8648.5	408	17X110
1382	SO1085	-8665.5	268	17X110
1383	SO1086	-8682.5	128	17X110
1384	SO1087	-8699.5	408	17X110
1385	SO1088	-8716.5	268	17X110
1386	SO1089	-8733.5	128	17X110
1387	SO1090	-8750.5	408	17X110
1388	SO1091	-8767.5	268	17X110
1389	SO1092	-8784.5	128	17X110
1390	SO1093	-8801.5	408	17X110
1391	SO1094	-8818.5	268	17X110
1392	SO1095	-8835.5	128	17X110
1393	SO1096	-8852.5	408	17X110
1394	SO1097	-8869.5	268	17X110
1395	SO1098	-8886.5	128	17X110
1396	SO1099	-8903.5	408	17X110
1397	SO1100	-8920.5	268	17X110
1398	SO1101	-8937.5	128	17X110
1399	SO1102	-8954.5	408	17X110
1400	SO1103	-8971.5	268	17X110

No.	Name	X	Y	Bump size
1401	SO1104	-8988.5	128	17X110
1402	SO1105	-9005.5	408	17X110
1403	SO1106	-9022.5	268	17X110
1404	SO1107	-9039.5	128	17X110
1405	SO1108	-9056.5	408	17X110
1406	SO1109	-9073.5	268	17X110
1407	SO1110	-9090.5	128	17X110
1408	SO1111	-9107.5	408	17X110
1409	SO1112	-9124.5	268	17X110
1410	SO1113	-9141.5	128	17X110
1411	SO1114	-9158.5	408	17X110
1412	SO1115	-9175.5	268	17X110
1413	SO1116	-9192.5	128	17X110
1414	SO1117	-9209.5	408	17X110
1415	SO1118	-9226.5	268	17X110
1416	SO1119	-9243.5	128	17X110
1417	SO1120	-9260.5	408	17X110
1418	SO1121	-9277.5	268	17X110
1419	SO1122	-9294.5	128	17X110
1420	SO1123	-9311.5	408	17X110
1421	SO1124	-9328.5	268	17X110
1422	SO1125	-9345.5	128	17X110
1423	SO1126	-9362.5	408	17X110
1424	SO1127	-9379.5	268	17X110
1425	SO1128	-9396.5	128	17X110
1426	SO1129	-9413.5	408	17X110
1427	SO1130	-9430.5	268	17X110
1428	SO1131	-9447.5	128	17X110
1429	SO1132	-9464.5	408	17X110
1430	SO1133	-9481.5	268	17X110
1431	SO1134	-9498.5	128	17X110
1432	SO1135	-9515.5	408	17X110
1433	SO1136	-9532.5	268	17X110
1434	SO1137	-9549.5	128	17X110
1435	SO1138	-9566.5	408	17X110
1436	SO1139	-9583.5	268	17X110
1437	SO1140	-9600.5	128	17X110
1438	SO1141	-9617.5	408	17X110
1439	SO1142	-9634.5	268	17X110
1440	SO1143	-9651.5	128	17X110
1441	SO1144	-9668.5	408	17X110
1442	SO1145	-9685.5	268	17X110
1443	SO1146	-9702.5	128	17X110
1444	SO1147	-9719.5	408	17X110
1445	SO1148	-9736.5	268	17X110
1446	SO1149	-9753.5	128	17X110
1447	SO1150	-9770.5	408	17X110
1448	SO1151	-9787.5	268	17X110
1449	SO1152	-9804.5	128	17X110
1450	SO1153	-9821.5	408	17X110

No.	Name	X	Y	Bump size
1451	SO1154	-9838.5	268	17X110
1452	SO1155	-9855.5	128	17X110
1453	SO1156	-9872.5	408	17X110
1454	SO1157	-9889.5	268	17X110
1455	SO1158	-9906.5	128	17X110
1456	SO1159	-9923.5	408	17X110
1457	SO1160	-9940.5	268	17X110
1458	SO1161	-9957.5	128	17X110
1459	SO1162	-9974.5	408	17X110
1460	SO1163	-9991.5	268	17X110
1461	SO1164	-10008.5	128	17X110
1462	SO1165	-10025.5	408	17X110
1463	SO1166	-10042.5	268	17X110
1464	SO1167	-10059.5	128	17X110
1465	SO1168	-10076.5	408	17X110
1466	SO1169	-10093.5	268	17X110
1467	SO1170	-10110.5	128	17X110
1468	SO1171	-10127.5	408	17X110
1469	SO1172	-10144.5	268	17X110
1470	SO1173	-10161.5	128	17X110
1471	SO1174	-10178.5	408	17X110
1472	SO1175	-10195.5	268	17X110
1473	SO1176	-10212.5	128	17X110
1474	SO1177	-10229.5	408	17X110
1475	SO1178	-10246.5	268	17X110
1476	SO1179	-10263.5	128	17X110
1477	SO1180	-10280.5	408	17X110
1478	SO1181	-10297.5	268	17X110
1479	SO1182	-10314.5	128	17X110
1480	SO1183	-10331.5	408	17X110
1481	SO1184	-10348.5	268	17X110
1482	SO1185	-10365.5	128	17X110
1483	SO1186	-10382.5	408	17X110
1484	SO1187	-10399.5	268	17X110
1485	SO1188	-10416.5	128	17X110
1486	SO1189	-10433.5	408	17X110
1487	SO1190	-10450.5	268	17X110
1488	SO1191	-10467.5	128	17X110
1489	SO1192	-10484.5	408	17X110
1490	SO1193	-10501.5	268	17X110
1491	SO1194	-10518.5	128	17X110
1492	SO1195	-10535.5	408	17X110
1493	SO1196	-10552.5	268	17X110
1494	SO1197	-10569.5	128	17X110
1495	SO1198	-10586.5	408	17X110
1496	SO1199	-10603.5	268	17X110
1497	SO1200	-10620.5	128	17X110
1498	SHIELDING	-10664	428	30X70
1499	COM1_T	-10714	428	30X70
1500	COM1_T	-10764	428	30X70

No.	Name	X	Y	Bump size
1501	SHIELDING	-10814	428	30X70
1502	DCMPR	-10864	428	30X70
1503	DCMPR	-10914	428	30X70
1504	OEVR	-11049	328	100X30
1505	INBVR	-11049	408	100X30
1506	INBVR	-11179	408	100X30
1507	OEVR	-11179	328	100X30
1508	UDR	-11179	248	100X30
1509	UDR	-11049	248	100X30
1510	CKVR	-11179	168	100X30
1511	CKVR	-11049	168	100X30
1512	STV1R	-11179	88	100X30
1513	STV1R	-11049	88	100X30
1514	STV2R	-11179	8	100X30
1515	STV2R	-11049	8	100X30
1516	STV1R	-11179	-72	100X30
1517	STV1R	-11049	-72	100X30
1518	STBNR	-11179	-152	100X30
1519	STBNR	-11049	-152	100X30
1520	DUMR	-11179	-232	100X30
1521	DUMR	-11049	-232	100X30

15. Ordering Information

Part no.	Package
HX8264-E00DPDxxx	PD : mean COG xxx : mean chip thickness (μm)

16. Revision History

Version	Date	Description of Changes
01	2010/08/30	New setup

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