



➤➤ **DATA SHEET**
(DOC No. HX8643-A-DS)

➤➤ HX8643-A
480/320CH TFT Gate Driver
Version 03 June, 2006

1. General Description

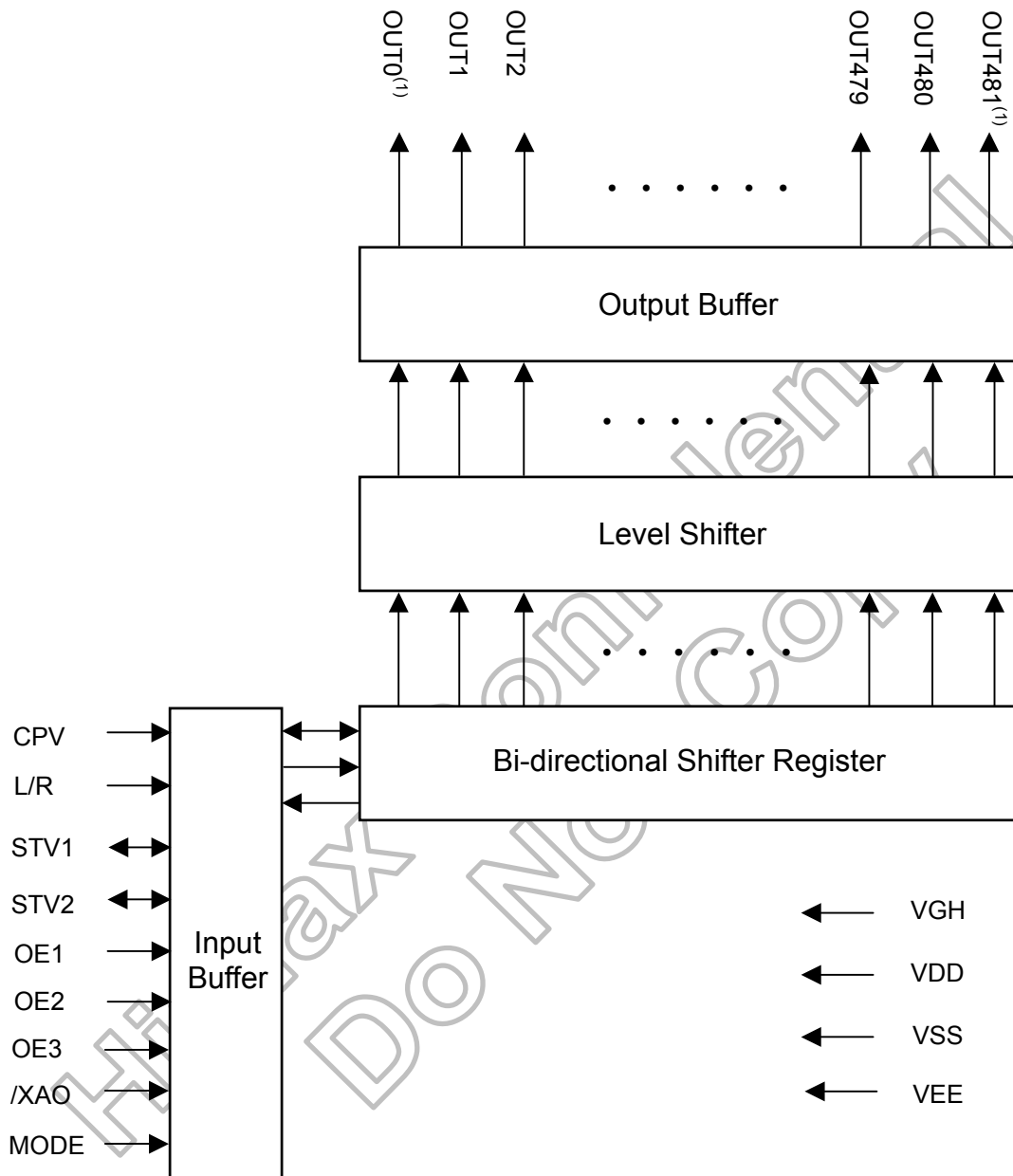
The HX8643-A is a 480/320 channels output gate driver used for driving the gate electrode of TFT LCD panel. It is designed for 2-level output with maximum +40V output driving voltage.

2. Features

- 2-level output gate driver for TFT LCD panel
- 480/320 channels output selectable gate driver with 2 dummy output
- Maximum +40V output driving voltage
- Bi-directional data shift capability
- 200KHz maximum operation frequency
- High voltage CMOS process technology
- COG/COF package

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3. Block Diagram



Note: (1) OUT0 and OUT481 are LCD panel auxiliary pins, these pins always output VEE level.

4. Pin Description

Pin name	I/O	Function	Description									
CPV	In	Shift clock input	This is the clock input for chip internal shift register. Data is shifted at each rising edge of this clock.									
L/R	In	Shift direction control pin	This pin controls the output shifting direction as listed below. L/R =H:STV1→OUT1→OUT2→...→OUT480→STV2 L/R =L:STV2→OUT480→...→OUT2→OUT1→STV1									
STV1 STV2	I/O	Start pulse input/output pin	These two pins are the device start pulse input or output pin. The function of these two pins depends on the status of L/R pin. <table border="1" style="margin-left: 20px;"> <thead> <tr> <th></th> <th>STV1</th> <th>STV2</th> </tr> </thead> <tbody> <tr> <td>L/R=H</td> <td>input</td> <td>output</td> </tr> <tr> <td>L/R=L</td> <td>output</td> <td>input</td> </tr> </tbody> </table>		STV1	STV2	L/R=H	input	output	L/R=L	output	input
	STV1	STV2										
L/R=H	input	output										
L/R=L	output	input										
OE1 OE2 OE3	In	Output enable control	These three pins are used to control the driver output. When OE1 ~ OE3 input are H, driver output is fixed to VEE regardless CPV. However, the internal shift register is not cleared even if OE1 ~ OE3 input are inactive.									
/XAO	In	Output all-on control	When /XAO input pin is L, all the output pins are forced to VGH level. Note that this pin has higher priority than OE. Also it has an internal pull high resistor, keep it to VDD is preferred when unused. The chip internal shift register is not cleared when /XAO input is active.									
MODE	In	Output Channel number selection	They is the output channel number selection pin: <table border="1" style="margin-left: 20px;"> <thead> <tr> <th>MODE</th> <th>Output</th> </tr> </thead> <tbody> <tr> <td>L</td> <td>320 channels</td> </tr> <tr> <td>H</td> <td>480 channels</td> </tr> </tbody> </table>	MODE	Output	L	320 channels	H	480 channels			
MODE	Output											
L	320 channels											
H	480 channels											
OUT1 ~ OUT480	Out	Driver output pins for driving gate electrode of LCD	The output voltage is either VGH or VEE for driving the gate electrode of TFT LCD panel depending on the data stored in shift register and the state of OE.									
OUT0 OUT481	Out	Auxiliary pins	LCD panel auxiliary pins, these pins always output VEE level.									
VGH	In	Power supply	Power supply for LCM drive output High									
VDD	In	Power supply	Digital power									
VSS	In	Power supply	Digital ground									
VEE	In	Power supply	Power supply for LCM drive output low.									
PATH	In	Internal link	Linked together internal.									

5. Function Description

5.1 Device operation

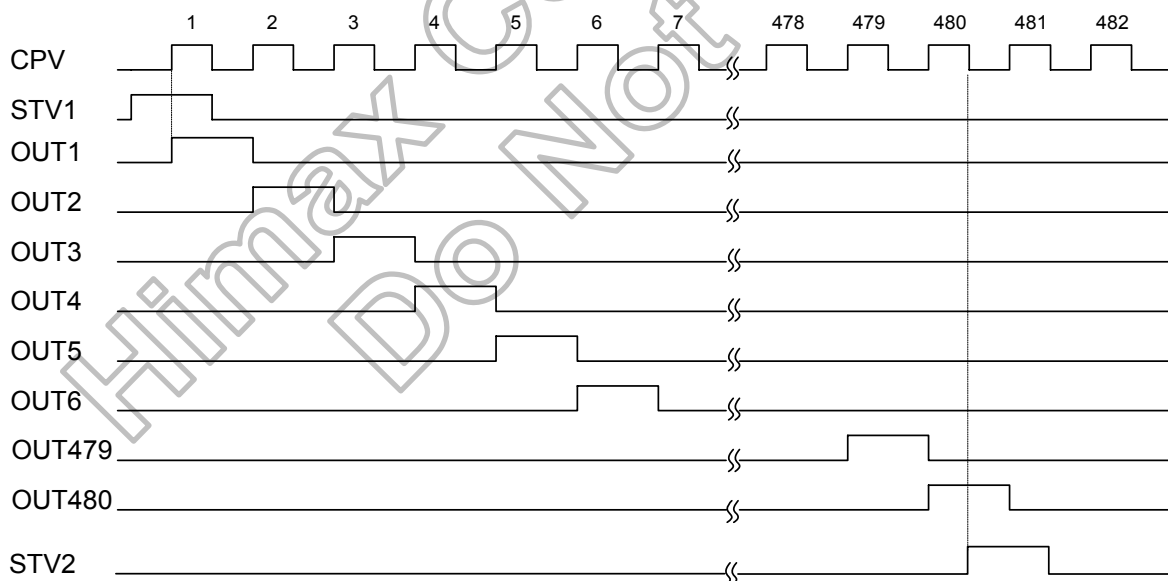
In the condition of MODE=H & L/R=H, the STV1 start pulse input is sensed at the rising edge of CPV and stored in the first stage of shift register, which causes the first scan signal is outputted from the OUT1 output pin. While stored data is transferred to the next stage shift register at the rising edge of next CPV, new data of STV1 is sensed and stored simultaneously.

The output pin (OUT1 to OUT480) supplies VGH voltage or VEE voltage to the LCD panel depending on the data stored in the shift register. For normal operation, a VGH voltage is outputted one by one from OUT1 to OUT480 in sync with CPV pulse.

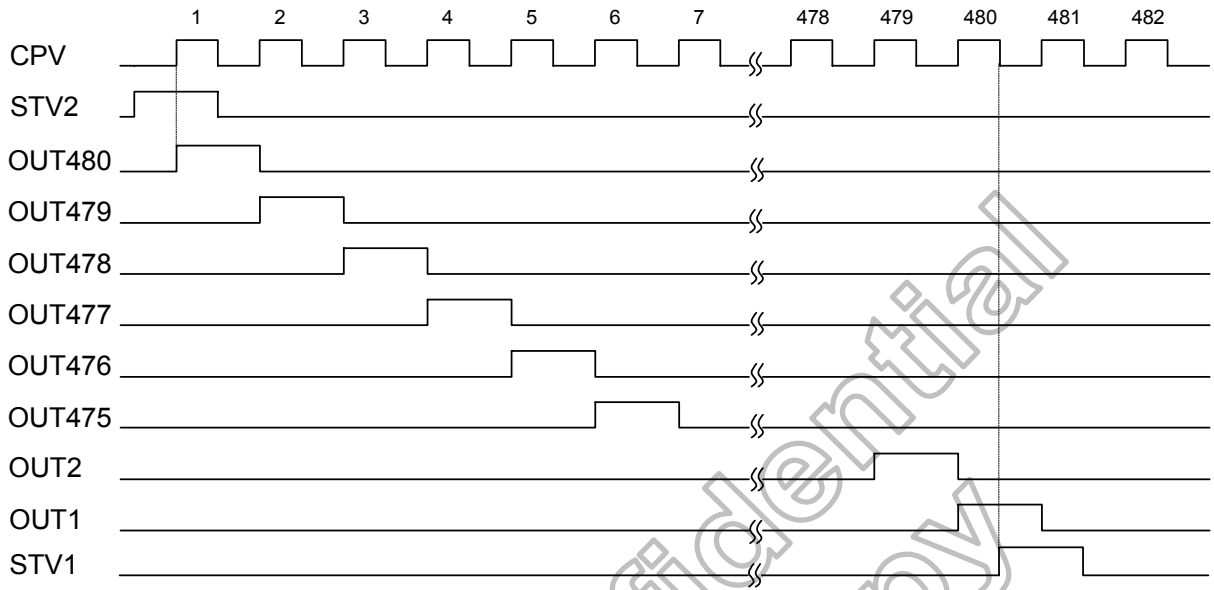
After 480 CPV rising edge are past, the STV2 goes up to high level at the 480th falling edge of CPV and goes down to low level at the 481st falling edge of CPV. This STV2 output signal becomes the STV1 start pulse input of next cascaded gate driver device.

During any H state of OE, the corresponding output channels are forced to VEE level regardless of CPV. The channel output returns to normal status as soon as OE go back to L.

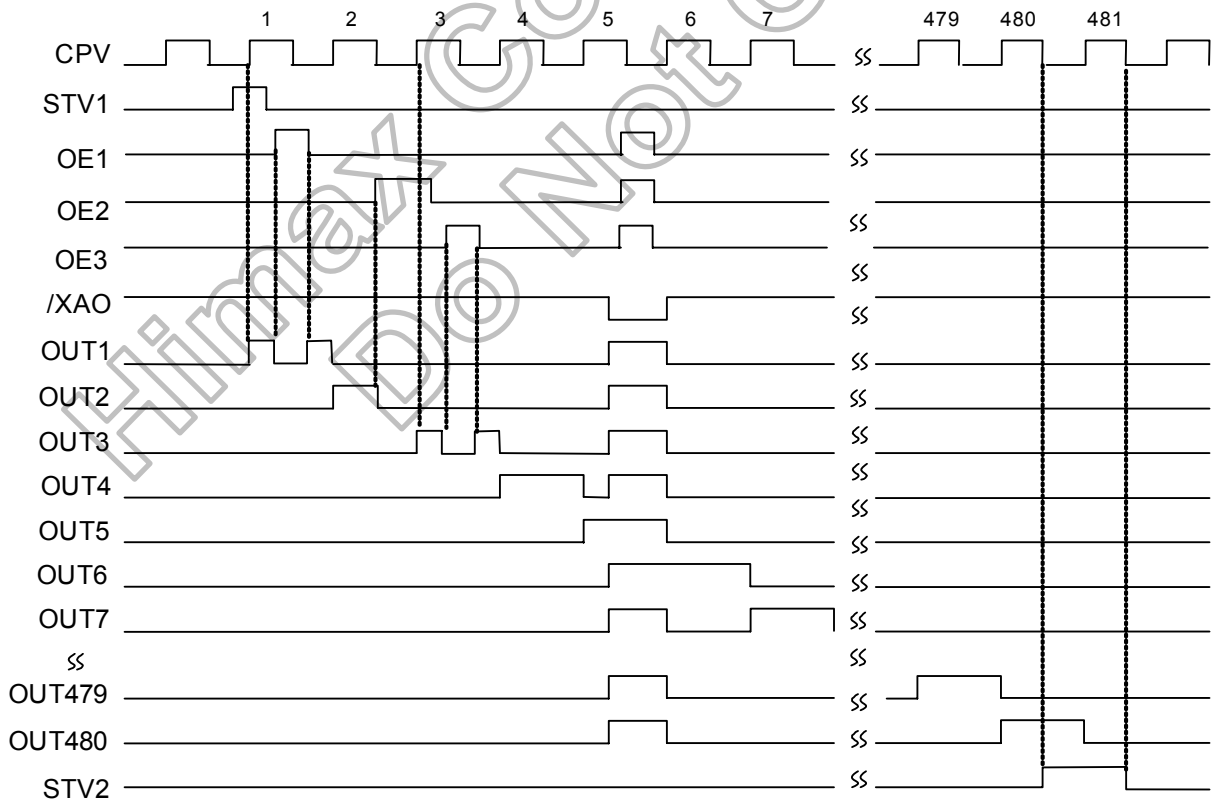
Example of input/output timing (MODE=H, L/R=H)



Example of input/output timing (MODE=H, L/R=L)



Example of input/output timing (MODE=H, L/R=H with OE & /XAO)



5.2 Relationship among L/R, and STV1/STV2

L/R	Start pulse		Data transfer direction
	Input	Output	
H	STV1	STV2	OUT1→OUT2→OUT3→ . . . →OUT480
L	STV2	STV1	OUT480→OUT479→OUT478→ . . . →OUT1

5.2 Output channel mode

MODE	Output channel	Enable output	Disable output
H	480	OUT1~OUT480	-
L	320	OUT1~OUT160, OUT321~OUT480	OUT161~OUT320

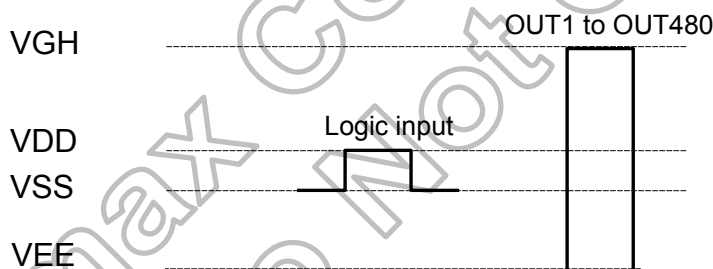
5.4 Device power supply

The HX8643-A must be used by the following conditions.

VGH - VEE = 40V (max.)

VGH - VSS = 7 ~ 35V

Example:



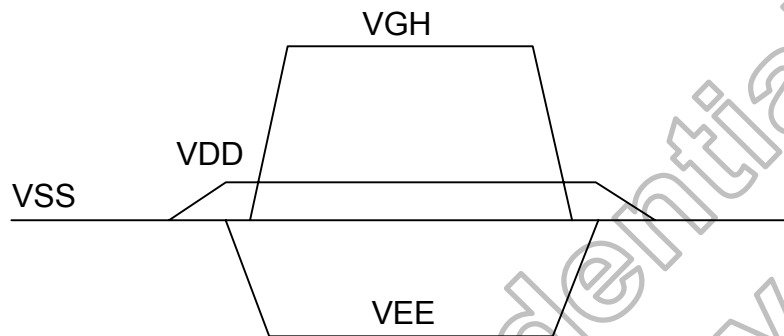
The input signal level of CPV, L/R, OE, STV1 and STV2 have to swing between VDD and VSS. The signal output level of start pulse (STV1 or STV2) to the next stage cascaded device is VDD for H and VSS for L.

5.5 Power ON/OFF sequence

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

When power on: VDD→VEE→VGH

When power off: VGH→VEE→VDD



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6. DC Characteristics

6.1 Absolute Maximum Rating (VSS=0V)

Parameter	Symbol	Rating			Unit
Power supply voltage (1)	VGH	-0.3	to	+42.0	V
Power supply voltage (2)	VDD	-0.3	to	+7.0	V
Power supply voltage (3)	VEE	VGH-42	to	+0.3	V
Input voltage	V _{IN}	-0.3	to	VDD+0.3	V
Storage temperature	T _{STG}	-55	to	+125	°C

Note:

- (1)All of the voltages listed above are with respective to VSS=0V.
- (2)Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above.

6.2 Recommended Operating Conditions (VSS=0V)

Parameter	Symbol	Rating			Unit
		Min.	Typ.	Max.	
Power supply voltage (1)	VGH	7	-	VEE+40	V
Power supply voltage (2)	VDD	1.7	3.3	5.5	V
Power supply voltage (3)	VEE	-20	-	-5	V
Power supply voltage (4)	VGH -VEE	12	-	40	V
Operation frequency	F _{CPV}	-	-	200	KHz
Operation temperature	T _a	-40	-	+95	°C

6.3 Electrical Characteristics (VSS=0V)

Parameter	Symbol	Condition	Rating			Unit	Application pin
			Min.	Typ.	Max.		
Input H voltage	V _{IH}	-	0.7VDD	-	VDD	V	All input ⁽³⁾
Input L voltage	V _{IL}	-	VSS	-	0.3VDD		All input ⁽³⁾
Output H voltage	V _{OH}	I _{OH} = 40μA	VDD-0.4	-	VDD	Ω	STV1,2
Output L voltage	V _{OL}	I _{OL} = 40μA	VSS	-	VSS+0.4		STV1,2
Output H resistance	R _{OH}	V _{OUT} = VGH -0.5V	-	-	1000	Ω	OUT0 ~ OUT481
Output L resistance	R _{OL}	V _{OUT} = VEE+0.5V	-	-	1000		OUT0 ~ OUT481
Input leakage current	I _{IN}	-	-5.0	-	+5.0	μA	Note ⁽²⁾
Pull high resistance	R _{PU}	V _{IN} =VSS	40	-	200		/XAO
VGH Power consumption	I _{VGH}	Note ⁽¹⁾	-	-	100	μA	-
VDD Power consumption	I _{VDD}		-	-	100		-

Note:

- (1)Power consumption with the following condition:
Output no load, VGH =20V, VEE = -8V, VDD =3.0V, V_{IH}=VDD, V_{IL}=VSS, F_{CPV}=50KHz, OE =V_{IL}, /XAO=V_{IH}.
- (2)All input except /XAO
- (3)When VDD<2.3V, V_{IH}=0.8VDD (Min.), V_{IL}=0.2VDD (Max.)

7. AC Characteristics

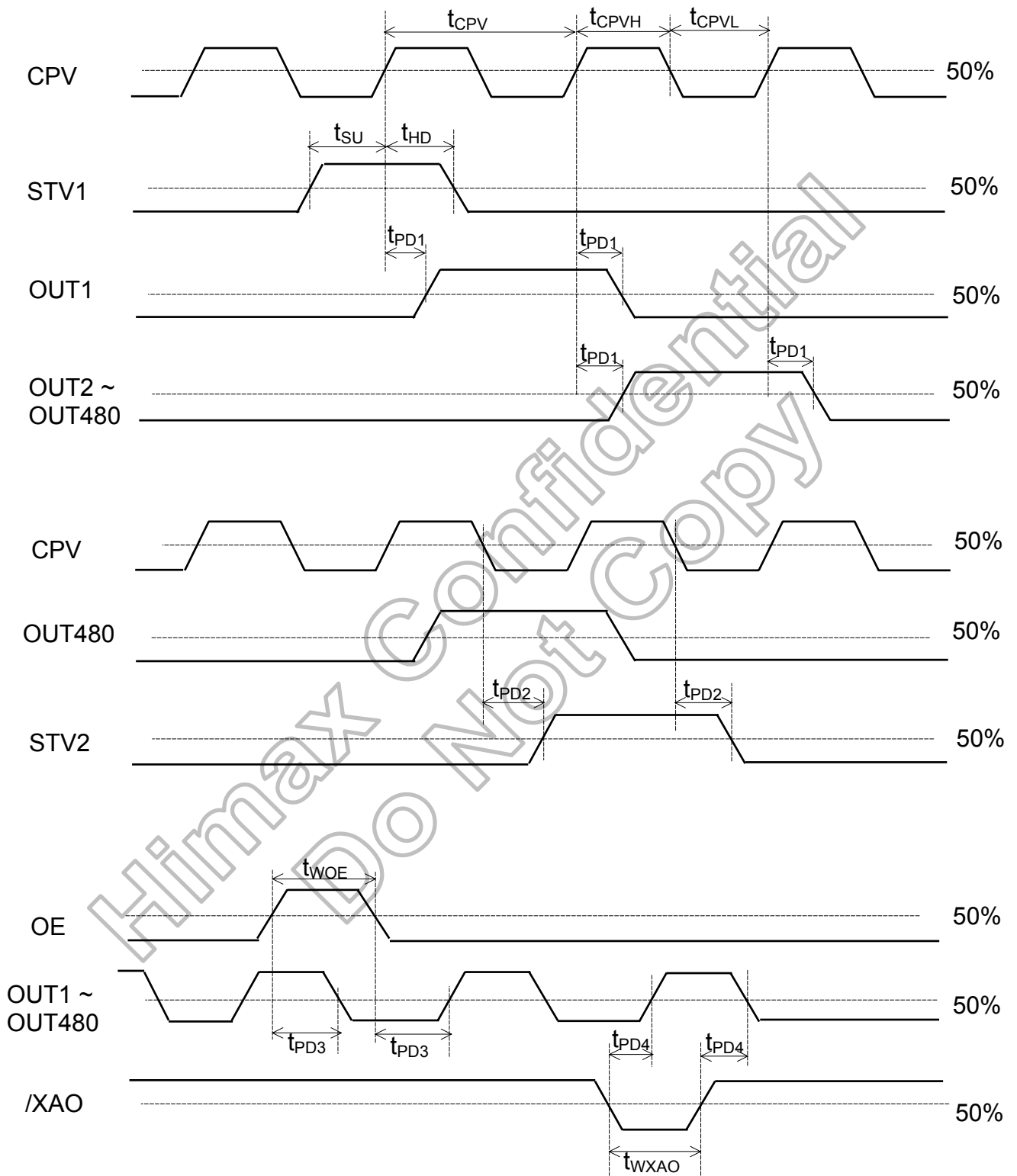
Parameter	Symbol	Condition	Spec			Unit
			Min.	Typ.	Max.	
CPV period	t_{CPV}	-	5	-	-	μs
CPV pulse width	t_{CPVH}, t_{CPVL}	50% duty cycle	2.5	-	-	
OE pulse width	t_{WOE}	-	1	-	-	
/XAO pulse width	t_{WXAO}	-	10	-	-	
Data setup time	t_{SU}	-	0.7	-	-	
Data hold time	t_{HD}	-	0.7	-	-	
CPV to output delay time	t_{PD1}	CL=300pF	-	-	1	
Start pulse output delay time	t_{PD2}	CL=30pF	-	-	0.8	
OE to output delay time	t_{PD3}	CL=300pF	-	-	0.8	
/XAO to output delay time	t_{PD4}	CL=300pF	-	-	30	

Note:

(1)The measurement point for all of above signals is at 50% of input/output amplitude.

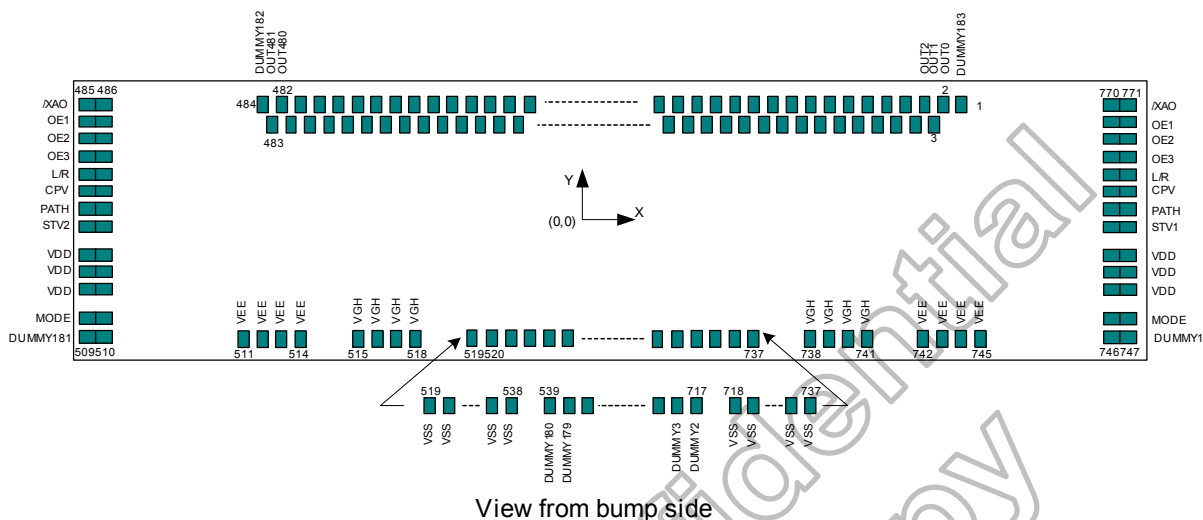
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8. Waveform



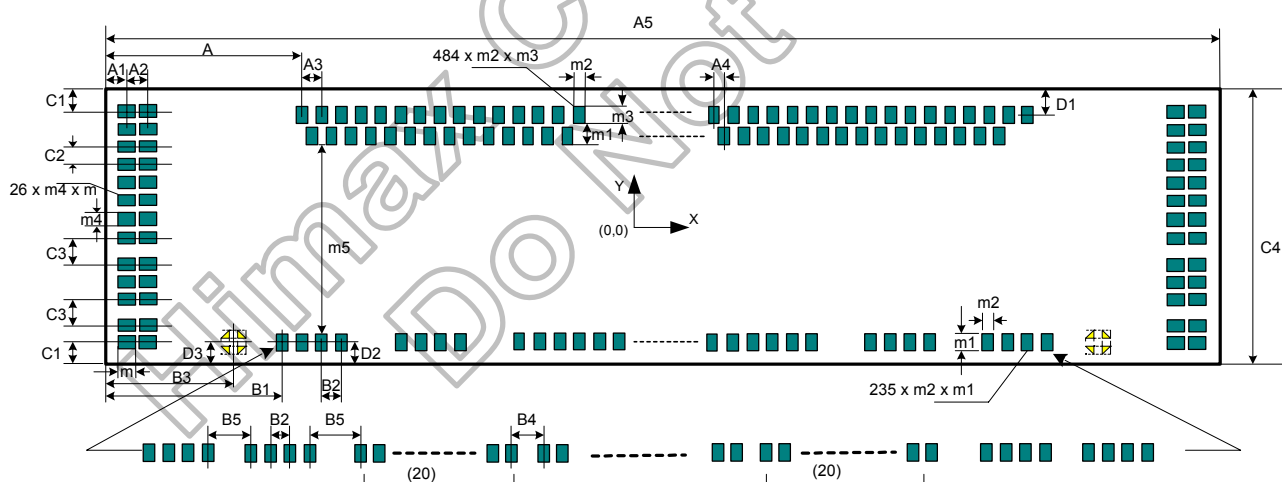
9. Pad Coordinate

9.1 HX8643-A Gate Driver Bump Location



Chip size: 18230 μ m x 1120 μ m (scribe line included)
Scribe line: 100 μ m

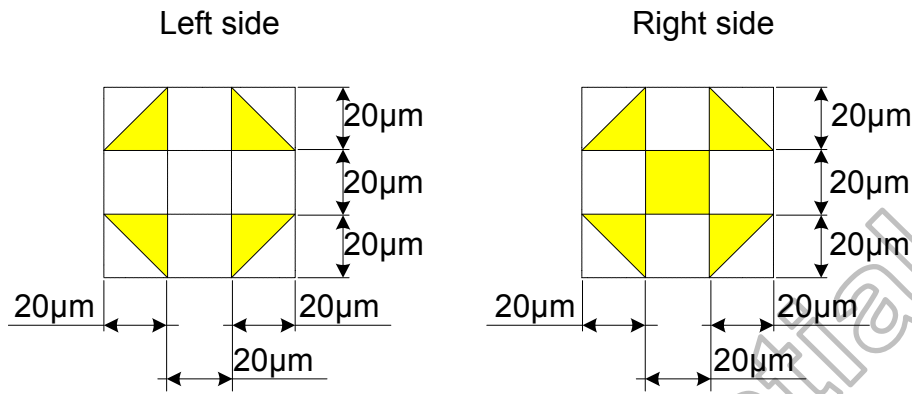
9.2 Bump Outline Dimensions



Symbol	Dimensions in μ m	Symbol	Dimensions in μ m
A	645	C2	65
A1	100	C3	137.5
A2	65	C4	1120
A3	70	D1	105
A4	35	D2	117.5
A5	18230	D3	110
B1	575	m	50
B2	70	m1	85
B3	433	m2	35
B4	140	m3	60
B5	210	m4	45
C1	97.5	m5	740

(Scribe line included)

9.3 Alignment Mark



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9.4 Bump Center Coordinate

No.	Name	X	Y	Bump size(μm)
1	DUMMY183	8470	455	35x60
2	OUT0	8400	455	35x60
3	OUT1	8365	370	35x60
4	OUT2	8330	455	35x60
5	OUT3	8295	370	35x60
6	OUT4	8260	455	35x60
7	OUT5	8225	370	35x60
8	OUT6	8190	455	35x60
9	OUT7	8155	370	35x60
10	OUT8	8120	455	35x60
11	OUT9	8085	370	35x60
12	OUT10	8050	455	35x60
13	OUT11	8015	370	35x60
14	OUT12	7980	455	35x60
15	OUT13	7945	370	35x60
16	OUT14	7910	455	35x60
17	OUT15	7875	370	35x60
18	OUT16	7840	455	35x60
19	OUT17	7805	370	35x60
20	OUT18	7770	455	35x60
21	OUT19	7735	370	35x60
22	OUT20	7700	455	35x60
23	OUT21	7665	370	35x60
24	OUT22	7630	455	35x60
25	OUT23	7595	370	35x60
26	OUT24	7560	455	35x60
27	OUT25	7525	370	35x60
28	OUT26	7490	455	35x60
29	OUT27	7455	370	35x60
30	OUT28	7420	455	35x60
31	OUT29	7385	370	35x60
32	OUT30	7350	455	35x60
33	OUT31	7315	370	35x60
34	OUT32	7280	455	35x60
35	OUT33	7245	370	35x60
36	OUT34	7210	455	35x60
37	OUT35	7175	370	35x60
38	OUT36	7140	455	35x60
39	OUT37	7105	370	35x60
40	OUT38	7070	455	35x60
41	OUT39	7035	370	35x60
42	OUT40	7000	455	35x60
43	OUT41	6965	370	35x60
44	OUT42	6930	455	35x60
45	OUT43	6895	370	35x60
46	OUT44	6860	455	35x60
47	OUT45	6825	370	35x60
48	OUT46	6790	455	35x60
49	OUT47	6755	370	35x60
50	OUT48	6720	455	35x60
51	OUT49	6685	370	35x60
52	OUT50	6650	455	35x60
53	OUT51	6615	370	35x60
54	OUT52	6580	455	35x60
55	OUT53	6545	370	35x60
56	OUT54	6510	455	35x60
57	OUT55	6475	370	35x60
58	OUT56	6440	455	35x60
59	OUT57	6405	370	35x60
60	OUT58	6370	455	35x60

No.	Name	X	Y	Bump size(μm)
61	OUT59	6335	370	35x60
62	OUT60	6300	455	35x60
63	OUT61	6265	370	35x60
64	OUT62	6230	455	35x60
65	OUT63	6195	370	35x60
66	OUT64	6160	455	35x60
67	OUT65	6125	370	35x60
68	OUT66	6090	455	35x60
69	OUT67	6055	370	35x60
70	OUT68	6020	455	35x60
71	OUT69	5985	370	35x60
72	OUT70	5950	455	35x60
73	OUT71	5915	370	35x60
74	OUT72	5880	455	35x60
75	OUT73	5845	370	35x60
76	OUT74	5810	455	35x60
77	OUT75	5775	370	35x60
78	OUT76	5740	455	35x60
79	OUT77	5705	370	35x60
80	OUT78	5670	455	35x60
81	OUT79	5635	370	35x60
82	OUT80	5600	455	35x60
83	OUT81	5565	370	35x60
84	OUT82	5530	455	35x60
85	OUT83	5495	370	35x60
86	OUT84	5460	455	35x60
87	OUT85	5425	370	35x60
88	OUT86	5390	455	35x60
89	OUT87	5355	370	35x60
90	OUT88	5320	455	35x60
91	OUT89	5285	370	35x60
92	OUT90	5250	455	35x60
93	OUT91	5215	370	35x60
94	OUT92	5180	455	35x60
95	OUT93	5145	370	35x60
96	OUT94	5110	455	35x60
97	OUT95	5075	370	35x60
98	OUT96	5040	455	35x60
99	OUT97	5005	370	35x60
100	OUT98	4970	455	35x60
101	OUT99	4935	370	35x60
102	OUT100	4900	455	35x60
103	OUT101	4865	370	35x60
104	OUT102	4830	455	35x60
105	OUT103	4795	370	35x60
106	OUT104	4760	455	35x60
107	OUT105	4725	370	35x60
108	OUT106	4690	455	35x60
109	OUT107	4655	370	35x60
110	OUT108	4620	455	35x60
111	OUT109	4585	370	35x60
112	OUT110	4550	455	35x60
113	OUT111	4515	370	35x60
114	OUT112	4480	455	35x60
115	OUT113	4445	370	35x60
116	OUT114	4410	455	35x60
117	OUT115	4375	370	35x60
118	OUT116	4340	455	35x60
119	OUT117	4305	370	35x60
120	OUT118	4270	455	35x60

No.	Name	X	Y	Bump size(μm)
121	OUT119	4235	370	35x60
122	OUT120	4200	455	35x60
123	OUT121	4165	370	35x60
124	OUT122	4130	455	35x60
125	OUT123	4095	370	35x60
126	OUT124	4060	455	35x60
127	OUT125	4025	370	35x60
128	OUT126	3990	455	35x60
129	OUT127	3955	370	35x60
130	OUT128	3920	455	35x60
131	OUT129	3885	370	35x60
132	OUT130	3850	455	35x60
133	OUT131	3815	370	35x60
134	OUT132	3780	455	35x60
135	OUT133	3745	370	35x60
136	OUT134	3710	455	35x60
137	OUT135	3675	370	35x60
138	OUT136	3640	455	35x60
139	OUT137	3605	370	35x60
140	OUT138	3570	455	35x60
141	OUT139	3535	370	35x60
142	OUT140	3500	455	35x60
143	OUT141	3465	370	35x60
144	OUT142	3430	455	35x60
145	OUT143	3395	370	35x60
146	OUT144	3360	455	35x60
147	OUT145	3325	370	35x60
148	OUT146	3290	455	35x60
149	OUT147	3255	370	35x60
150	OUT148	3220	455	35x60
151	OUT149	3185	370	35x60
152	OUT150	3150	455	35x60
153	OUT151	3115	370	35x60
154	OUT152	3080	455	35x60
155	OUT153	3045	370	35x60
156	OUT154	3010	455	35x60
157	OUT155	2975	370	35x60
158	OUT156	2940	455	35x60
159	OUT157	2905	370	35x60
160	OUT158	2870	455	35x60
161	OUT159	2835	370	35x60
162	OUT160	2800	455	35x60
163	OUT161	2765	370	35x60
164	OUT162	2730	455	35x60
165	OUT163	2695	370	35x60
166	OUT164	2660	455	35x60
167	OUT165	2625	370	35x60
168	OUT166	2590	455	35x60
169	OUT167	2555	370	35x60
170	OUT168	2520	455	35x60
171	OUT169	2485	370	35x60
172	OUT170	2450	455	35x60
173	OUT171	2415	370	35x60
174	OUT172	2380	455	35x60
175	OUT173	2345	370	35x60
176	OUT174	2310	455	35x60
177	OUT175	2275	370	35x60
178	OUT176	2240	455	35x60
179	OUT177	2205	370	35x60
180	OUT178	2170	455	35x60

No.	Name	X	Y	Bump size(μm)
181	OUT179	2135	370	35x60
182	OUT180	2100	455	35x60
183	OUT181	2065	370	35x60
184	OUT182	2030	455	35x60
185	OUT183	1995	370	35x60
186	OUT184	1960	455	35x60
187	OUT185	1925	370	35x60
188	OUT186	1890	455	35x60
189	OUT187	1855	370	35x60
190	OUT188	1820	455	35x60
191	OUT189	1785	370	35x60
192	OUT190	1750	455	35x60
193	OUT191	1715	370	35x60
194	OUT192	1680	455	35x60
195	OUT193	1645	370	35x60
196	OUT194	1610	455	35x60
197	OUT195	1575	370	35x60
198	OUT196	1540	455	35x60
199	OUT197	1505	370	35x60
200	OUT198	1470	455	35x60
201	OUT199	1435	370	35x60
202	OUT200	1400	455	35x60
203	OUT201	1365	370	35x60
204	OUT202	1330	455	35x60
205	OUT203	1295	370	35x60
206	OUT204	1260	455	35x60
207	OUT205	1225	370	35x60
208	OUT206	1190	455	35x60
209	OUT207	1155	370	35x60
210	OUT208	1120	455	35x60
211	OUT209	1085	370	35x60
212	OUT210	1050	455	35x60
213	OUT211	1015	370	35x60
214	OUT212	980	455	35x60
215	OUT213	945	370	35x60
216	OUT214	910	455	35x60
217	OUT215	875	370	35x60
218	OUT216	840	455	35x60
219	OUT217	805	370	35x60
220	OUT218	770	455	35x60
221	OUT219	735	370	35x60
222	OUT220	700	455	35x60
223	OUT221	665	370	35x60
224	OUT222	630	455	35x60
225	OUT223	595	370	35x60
226	OUT224	560	455	35x60
227	OUT225	525	370	35x60
228	OUT226	490	455	35x60
229	OUT227	455	370	35x60
230	OUT228	420	455	35x60
231	OUT229	385	370	35x60
232	OUT230	350	455	35x60
233	OUT231	315	370	35x60
234	OUT232	280	455	35x60
235	OUT233	245	370	35x60
236	OUT234	210	455	35x60
237	OUT235	175	370	35x60
238	OUT236	140	455	35x60
239	OUT237	105	370	35x60
240	OUT238	70	455	35x60

No.	Name	X	Y	Bump size(μm)
241	OUT239	35	370	35x60
242	OUT240	0	455	35x60
243	OUT241	-35	370	35x60
244	OUT242	-70	455	35x60
245	OUT243	-105	370	35x60
246	OUT244	-140	455	35x60
247	OUT245	-175	370	35x60
248	OUT246	-210	455	35x60
249	OUT247	-245	370	35x60
250	OUT248	-280	455	35x60
251	OUT249	-315	370	35x60
252	OUT250	-350	455	35x60
253	OUT251	-385	370	35x60
254	OUT252	-420	455	35x60
255	OUT253	-455	370	35x60
256	OUT254	-490	455	35x60
257	OUT255	-525	370	35x60
258	OUT256	-560	455	35x60
259	OUT257	-595	370	35x60
260	OUT258	-630	455	35x60
261	OUT259	-665	370	35x60
262	OUT260	-700	455	35x60
263	OUT261	-735	370	35x60
264	OUT262	-770	455	35x60
265	OUT263	-805	370	35x60
266	OUT264	-840	455	35x60
267	OUT265	-875	370	35x60
268	OUT266	-910	455	35x60
269	OUT267	-945	370	35x60
270	OUT268	-980	455	35x60
271	OUT269	-1015	370	35x60
272	OUT270	-1050	455	35x60
273	OUT271	-1085	370	35x60
274	OUT272	-1120	455	35x60
275	OUT273	-1155	370	35x60
276	OUT274	-1190	455	35x60
277	OUT275	-1225	370	35x60
278	OUT276	-1260	455	35x60
279	OUT277	-1295	370	35x60
280	OUT278	-1330	455	35x60
281	OUT279	-1365	370	35x60
282	OUT280	-1400	455	35x60
283	OUT281	-1435	370	35x60
284	OUT282	-1470	455	35x60
285	OUT283	-1505	370	35x60
286	OUT284	-1540	455	35x60
287	OUT285	-1575	370	35x60
288	OUT286	-1610	455	35x60
289	OUT287	-1645	370	35x60
290	OUT288	-1680	455	35x60
291	OUT289	-1715	370	35x60
292	OUT290	-1750	455	35x60
293	OUT291	-1785	370	35x60
294	OUT292	-1820	455	35x60
295	OUT293	-1855	370	35x60
296	OUT294	-1890	455	35x60
297	OUT295	-1925	370	35x60
298	OUT296	-1960	455	35x60
299	OUT297	-1995	370	35x60
300	OUT298	-2030	455	35x60

No.	Name	X	Y	Bump size(μm)
301	OUT299	-2065	370	35x60
302	OUT300	-2100	455	35x60
303	OUT301	-2135	370	35x60
304	OUT302	-2170	455	35x60
305	OUT303	-2205	370	35x60
306	OUT304	-2240	455	35x60
307	OUT305	-2275	370	35x60
308	OUT306	-2310	455	35x60
309	OUT307	-2345	370	35x60
310	OUT308	-2380	455	35x60
311	OUT309	-2415	370	35x60
312	OUT310	-2450	455	35x60
313	OUT311	-2485	370	35x60
314	OUT312	-2520	455	35x60
315	OUT313	-2555	370	35x60
316	OUT314	-2590	455	35x60
317	OUT315	-2625	370	35x60
318	OUT316	-2660	455	35x60
319	OUT317	-2695	370	35x60
320	OUT318	-2730	455	35x60
321	OUT319	-2765	370	35x60
322	OUT320	-2800	455	35x60
323	OUT321	-2835	370	35x60
324	OUT322	-2870	455	35x60
325	OUT323	-2905	370	35x60
326	OUT324	-2940	455	35x60
327	OUT325	-2975	370	35x60
328	OUT326	-3010	455	35x60
329	OUT327	-3045	370	35x60
330	OUT328	-3080	455	35x60
331	OUT329	-3115	370	35x60
332	OUT330	-3150	455	35x60
333	OUT331	-3185	370	35x60
334	OUT332	-3220	455	35x60
335	OUT333	-3255	370	35x60
336	OUT334	-3290	455	35x60
337	OUT335	-3325	370	35x60
338	OUT336	-3360	455	35x60
339	OUT337	-3395	370	35x60
340	OUT338	-3430	455	35x60
341	OUT339	-3465	370	35x60
342	OUT340	-3500	455	35x60
343	OUT341	-3535	370	35x60
344	OUT342	-3570	455	35x60
345	OUT343	-3605	370	35x60
346	OUT344	-3640	455	35x60
347	OUT345	-3675	370	35x60
348	OUT346	-3710	455	35x60
349	OUT347	-3745	370	35x60
350	OUT348	-3780	455	35x60
351	OUT349	-3815	370	35x60
352	OUT350	-3850	455	35x60
353	OUT351	-3885	370	35x60
354	OUT352	-3920	455	35x60
355	OUT353	-3955	370	35x60
356	OUT354	-3990	455	35x60
357	OUT355	-4025	370	35x60
358	OUT356	-4060	455	35x60
359	OUT357	-4095	370	35x60
360	OUT358	-4130	455	35x60

No.	Name	X	Y	Bump size(μm)
361	OUT359	-4165	370	35x60
362	OUT360	-4200	455	35x60
363	OUT361	-4235	370	35x60
364	OUT362	-4270	455	35x60
365	OUT363	-4305	370	35x60
366	OUT364	-4340	455	35x60
367	OUT365	-4375	370	35x60
368	OUT366	-4410	455	35x60
369	OUT367	-4445	370	35x60
370	OUT368	-4480	455	35x60
371	OUT369	-4515	370	35x60
372	OUT370	-4550	455	35x60
373	OUT371	-4585	370	35x60
374	OUT372	-4620	455	35x60
375	OUT373	-4655	370	35x60
376	OUT374	-4690	455	35x60
377	OUT375	-4725	370	35x60
378	OUT376	-4760	455	35x60
379	OUT377	-4795	370	35x60
380	OUT378	-4830	455	35x60
381	OUT379	-4865	370	35x60
382	OUT380	-4900	455	35x60
383	OUT381	-4935	370	35x60
384	OUT382	-4970	455	35x60
385	OUT383	-5005	370	35x60
386	OUT384	-5040	455	35x60
387	OUT385	-5075	370	35x60
388	OUT386	-5110	455	35x60
389	OUT387	-5145	370	35x60
390	OUT388	-5180	455	35x60
391	OUT389	-5215	370	35x60
392	OUT390	-5250	455	35x60
393	OUT391	-5285	370	35x60
394	OUT392	-5320	455	35x60
395	OUT393	-5355	370	35x60
396	OUT394	-5390	455	35x60
397	OUT395	-5425	370	35x60
398	OUT396	-5460	455	35x60
399	OUT397	-5495	370	35x60
400	OUT398	-5530	455	35x60
401	OUT399	-5565	370	35x60
402	OUT400	-5600	455	35x60
403	OUT401	-5635	370	35x60
404	OUT402	-5670	455	35x60
405	OUT403	-5705	370	35x60
406	OUT404	-5740	455	35x60
407	OUT405	-5775	370	35x60
408	OUT406	-5810	455	35x60
409	OUT407	-5845	370	35x60
410	OUT408	-5880	455	35x60
411	OUT409	-5915	370	35x60
412	OUT410	-5950	455	35x60
413	OUT411	-5985	370	35x60
414	OUT412	-6020	455	35x60
415	OUT413	-6055	370	35x60
416	OUT414	-6090	455	35x60
417	OUT415	-6125	370	35x60
418	OUT416	-6160	455	35x60
419	OUT417	-6195	370	35x60
420	OUT418	-6230	455	35x60

No.	Name	X	Y	Bump size(μm)
421	OUT419	-6265	370	35x60
422	OUT420	-6300	455	35x60
423	OUT421	-6335	370	35x60
424	OUT422	-6370	455	35x60
425	OUT423	-6405	370	35x60
426	OUT424	-6440	455	35x60
427	OUT425	-6475	370	35x60
428	OUT426	-6510	455	35x60
429	OUT427	-6545	370	35x60
430	OUT428	-6580	455	35x60
431	OUT429	-6615	370	35x60
432	OUT430	-6650	455	35x60
433	OUT431	-6685	370	35x60
434	OUT432	-6720	455	35x60
435	OUT433	-6755	370	35x60
436	OUT434	-6790	455	35x60
437	OUT435	-6825	370	35x60
438	OUT436	-6860	455	35x60
439	OUT437	-6895	370	35x60
440	OUT438	-6930	455	35x60
441	OUT439	-6965	370	35x60
442	OUT440	-7000	455	35x60
443	OUT441	-7035	370	35x60
444	OUT442	-7070	455	35x60
445	OUT443	-7105	370	35x60
446	OUT444	-7140	455	35x60
447	OUT445	-7175	370	35x60
448	OUT446	-7210	455	35x60
449	OUT447	-7245	370	35x60
450	OUT448	-7280	455	35x60
451	OUT449	-7315	370	35x60
452	OUT450	-7350	455	35x60
453	OUT451	-7385	370	35x60
454	OUT452	-7420	455	35x60
455	OUT453	-7455	370	35x60
456	OUT454	-7490	455	35x60
457	OUT455	-7525	370	35x60
458	OUT456	-7560	455	35x60
459	OUT457	-7595	370	35x60
460	OUT458	-7630	455	35x60
461	OUT459	-7665	370	35x60
462	OUT460	-7700	455	35x60
463	OUT461	-7735	370	35x60
464	OUT462	-7770	455	35x60
465	OUT463	-7805	370	35x60
466	OUT464	-7840	455	35x60
467	OUT465	-7875	370	35x60
468	OUT466	-7910	455	35x60
469	OUT467	-7945	370	35x60
470	OUT468	-7980	455	35x60
471	OUT469	-8015	370	35x60
472	OUT470	-8050	455	35x60
473	OUT471	-8085	370	35x60
474	OUT472	-8120	455	35x60
475	OUT473	-8155	370	35x60
476	OUT474	-8190	455	35x60
477	OUT475	-8225	370	35x60
478	OUT476	-8260	455	35x60
479	OUT477	-8295	370	35x60
480	OUT478	-8330	455	35x60

No.	Name	X	Y	Bump size(μm)
481	OUT479	-8365	370	35x60
482	OUT480	-8400	455	35x60
483	OUT481	-8435	370	35x60
484	DUMMY182	-8470	455	35x60
485	/XAO	-9015	462.5	50x45
486	/XAO	-8950	462.5	50x45
487	OE1	-9015	397.5	50x45
488	OE1	-8950	397.5	50x45
489	OE2	-9015	332.5	50x45
490	OE2	-8950	332.5	50x45
491	OE3	-9015	267.5	50x45
492	OE3	-8950	267.5	50x45
493	L/R	-9015	202.5	50x45
494	L/R	-8950	202.5	50x45
495	CPV	-9015	137.5	50x45
496	CPV	-8950	137.5	50x45
497	PATH	-9015	72.5	50x45
498	PATH	-8950	72.5	50x45
499	STV2	-9015	7.5	50x45
500	STV2	-8950	7.5	50x45
501	VDD	-9015	-130	50x45
502	VDD	-8950	-130	50x45
503	VDD	-9015	-195	50x45
504	VDD	-8950	-195	50x45
505	VDD	-9015	-260	50x45
506	VDD	-8950	-260	50x45
507	MODE	-9015	-397.5	50x45
508	MODE	-8950	-397.5	50x45
509	DUMMY181	-9015	-462.5	50x45
510	DUMMY181	-8950	-462.5	50x45
511	VEE	-8540	-442.5	35x85
512	VEE	-8470	-442.5	35x85
513	VEE	-8400	-442.5	35x85
514	VEE	-8330	-442.5	35x85
515	VGH	-8120	-442.5	35x85
516	VGH	-8050	-442.5	35x85
517	VGH	-7980	-442.5	35x85
518	VGH	-7910	-442.5	35x85
519	VSS	-7700	-442.5	35x85
520	VSS	-7630	-442.5	35x85
521	VSS	-7560	-442.5	35x85
522	VSS	-7490	-442.5	35x85
523	VSS	-7420	-442.5	35x85
524	VSS	-7350	-442.5	35x85
525	VSS	-7280	-442.5	35x85
526	VSS	-7210	-442.5	35x85
527	VSS	-7140	-442.5	35x85
528	VSS	-7070	-442.5	35x85
529	VSS	-7000	-442.5	35x85
530	VSS	-6930	-442.5	35x85
531	VSS	-6860	-442.5	35x85
532	VSS	-6790	-442.5	35x85
533	VSS	-6720	-442.5	35x85
534	VSS	-6650	-442.5	35x85
535	VSS	-6580	-442.5	35x85
536	VSS	-6510	-442.5	35x85
537	VSS	-6440	-442.5	35x85
538	VSS	-6370	-442.5	35x85
539	DUMMY180	-6230	-442.5	35x85
540	DUMMY179	-6160	-442.5	35x85

No.	Name	X	Y	Bump size(μm)
541	DUMMY178	-6090	-442.5	35x85
542	DUMMY177	-6020	-442.5	35x85
543	DUMMY176	-5950	-442.5	35x85
544	DUMMY175	-5880	-442.5	35x85
545	DUMMY174	-5810	-442.5	35x85
546	DUMMY173	-5740	-442.5	35x85
547	DUMMY172	-5670	-442.5	35x85
548	DUMMY171	-5600	-442.5	35x85
549	DUMMY170	-5530	-442.5	35x85
550	DUMMY169	-5460	-442.5	35x85
551	DUMMY168	-5390	-442.5	35x85
552	DUMMY167	-5320	-442.5	35x85
553	DUMMY166	-5250	-442.5	35x85
554	DUMMY165	-5180	-442.5	35x85
555	DUMMY164	-5110	-442.5	35x85
556	DUMMY163	-5040	-442.5	35x85
557	DUMMY162	-4970	-442.5	35x85
558	DUMMY161	-4900	-442.5	35x85
559	DUMMY160	-4830	-442.5	35x85
560	DUMMY159	-4760	-442.5	35x85
561	DUMMY158	-4690	-442.5	35x85
562	DUMMY157	-4620	-442.5	35x85
563	DUMMY156	-4550	-442.5	35x85
564	DUMMY155	-4480	-442.5	35x85
565	DUMMY154	-4410	-442.5	35x85
566	DUMMY153	-4340	-442.5	35x85
567	DUMMY152	-4270	-442.5	35x85
568	DUMMY151	-4200	-442.5	35x85
569	DUMMY150	-4130	-442.5	35x85
570	DUMMY149	-4060	-442.5	35x85
571	DUMMY148	-3990	-442.5	35x85
572	DUMMY147	-3920	-442.5	35x85
573	DUMMY146	-3850	-442.5	35x85
574	DUMMY145	-3780	-442.5	35x85
575	DUMMY144	-3710	-442.5	35x85
576	DUMMY143	-3640	-442.5	35x85
577	DUMMY142	-3570	-442.5	35x85
578	DUMMY141	-3500	-442.5	35x85
579	DUMMY140	-3430	-442.5	35x85
580	DUMMY139	-3360	-442.5	35x85
581	DUMMY138	-3290	-442.5	35x85
582	DUMMY137	-3220	-442.5	35x85
583	DUMMY136	-3150	-442.5	35x85
584	DUMMY135	-3080	-442.5	35x85
585	DUMMY134	-3010	-442.5	35x85
586	DUMMY133	-2940	-442.5	35x85
587	DUMMY132	-2870	-442.5	35x85
588	DUMMY131	-2800	-442.5	35x85
589	DUMMY130	-2730	-442.5	35x85
590	DUMMY129	-2660	-442.5	35x85
591	DUMMY128	-2590	-442.5	35x85
592	DUMMY127	-2520	-442.5	35x85
593	DUMMY126	-2450	-442.5	35x85
594	DUMMY125	-2380	-442.5	35x85
595	DUMMY124	-2310	-442.5	35x85
596	DUMMY123	-2240	-442.5	35x85
597	DUMMY122	-2170	-442.5	35x85
598	DUMMY121	-2100	-442.5	35x85
599	DUMMY120	-2030	-442.5	35x85
600	DUMMY119	-1960	-442.5	35x85

No.	Name	X	Y	Bump size(μm)
601	DUMMY118	-1890	-442.5	35x85
602	DUMMY117	-1820	-442.5	35x85
603	DUMMY116	-1750	-442.5	35x85
604	DUMMY115	-1680	-442.5	35x85
605	DUMMY114	-1610	-442.5	35x85
606	DUMMY113	-1540	-442.5	35x85
607	DUMMY112	-1470	-442.5	35x85
608	DUMMY111	-1400	-442.5	35x85
609	DUMMY110	-1330	-442.5	35x85
610	DUMMY109	-1260	-442.5	35x85
611	DUMMY108	-1190	-442.5	35x85
612	DUMMY107	-1120	-442.5	35x85
613	DUMMY106	-1050	-442.5	35x85
614	DUMMY105	-980	-442.5	35x85
615	DUMMY104	-910	-442.5	35x85
616	DUMMY103	-840	-442.5	35x85
617	DUMMY102	-770	-442.5	35x85
618	DUMMY101	-700	-442.5	35x85
619	DUMMY100	-630	-442.5	35x85
620	DUMMY99	-560	-442.5	35x85
621	DUMMY98	-490	-442.5	35x85
622	DUMMY97	-420	-442.5	35x85
623	DUMMY96	-350	-442.5	35x85
624	DUMMY95	-280	-442.5	35x85
625	DUMMY94	-210	-442.5	35x85
626	DUMMY93	-140	-442.5	35x85
627	DUMMY92	-70	-442.5	35x85
628	DUMMY91	0	-442.5	35x85
629	DUMMY90	70	-442.5	35x85
630	DUMMY89	140	-442.5	35x85
631	DUMMY88	210	-442.5	35x85
632	DUMMY87	280	-442.5	35x85
633	DUMMY86	350	-442.5	35x85
634	DUMMY85	420	-442.5	35x85
635	DUMMY84	490	-442.5	35x85
636	DUMMY83	560	-442.5	35x85
637	DUMMY82	630	-442.5	35x85
638	DUMMY81	700	-442.5	35x85
639	DUMMY80	770	-442.5	35x85
640	DUMMY79	840	-442.5	35x85
641	DUMMY78	910	-442.5	35x85
642	DUMMY77	980	-442.5	35x85
643	DUMMY76	1050	-442.5	35x85
644	DUMMY75	1120	-442.5	35x85
645	DUMMY74	1190	-442.5	35x85
646	DUMMY73	1260	-442.5	35x85
647	DUMMY72	1330	-442.5	35x85
648	DUMMY71	1400	-442.5	35x85
649	DUMMY70	1470	-442.5	35x85
650	DUMMY69	1540	-442.5	35x85
651	DUMMY68	1610	-442.5	35x85
652	DUMMY67	1680	-442.5	35x85
653	DUMMY66	1750	-442.5	35x85
654	DUMMY65	1820	-442.5	35x85
655	DUMMY64	1890	-442.5	35x85
656	DUMMY63	1960	-442.5	35x85
657	DUMMY62	2030	-442.5	35x85
658	DUMMY61	2100	-442.5	35x85
659	DUMMY60	2170	-442.5	35x85
660	DUMMY59	2240	-442.5	35x85

No.	Name	X	Y	Bump size(μm)
661	DUMMY58	2310	-442.5	35x85
662	DUMMY57	2380	-442.5	35x85
663	DUMMY56	2450	-442.5	35x85
664	DUMMY55	2520	-442.5	35x85
665	DUMMY54	2590	-442.5	35x85
666	DUMMY53	2660	-442.5	35x85
667	DUMMY52	2730	-442.5	35x85
668	DUMMY51	2800	-442.5	35x85
669	DUMMY50	2870	-442.5	35x85
670	DUMMY49	2940	-442.5	35x85
671	DUMMY48	3010	-442.5	35x85
672	DUMMY47	3080	-442.5	35x85
673	DUMMY46	3150	-442.5	35x85
674	DUMMY45	3220	-442.5	35x85
675	DUMMY44	3290	-442.5	35x85
676	DUMMY43	3360	-442.5	35x85
677	DUMMY42	3430	-442.5	35x85
678	DUMMY41	3500	-442.5	35x85
679	DUMMY40	3570	-442.5	35x85
680	DUMMY39	3640	-442.5	35x85
681	DUMMY38	3710	-442.5	35x85
682	DUMMY37	3780	-442.5	35x85
683	DUMMY36	3850	-442.5	35x85
684	DUMMY35	3920	-442.5	35x85
685	DUMMY34	3990	-442.5	35x85
686	DUMMY33	4060	-442.5	35x85
687	DUMMY32	4130	-442.5	35x85
688	DUMMY31	4200	-442.5	35x85
689	DUMMY30	4270	-442.5	35x85
690	DUMMY29	4340	-442.5	35x85
691	DUMMY28	4410	-442.5	35x85
692	DUMMY27	4480	-442.5	35x85
693	DUMMY26	4550	-442.5	35x85
694	DUMMY25	4620	-442.5	35x85
695	DUMMY24	4690	-442.5	35x85
696	DUMMY23	4760	-442.5	35x85
697	DUMMY22	4830	-442.5	35x85
698	DUMMY21	4900	-442.5	35x85
699	DUMMY20	4970	-442.5	35x85
700	DUMMY19	5040	-442.5	35x85
701	DUMMY18	5110	-442.5	35x85
702	DUMMY17	5180	-442.5	35x85
703	DUMMY16	5250	-442.5	35x85
704	DUMMY15	5320	-442.5	35x85
705	DUMMY14	5390	-442.5	35x85
706	DUMMY13	5460	-442.5	35x85
707	DUMMY12	5530	-442.5	35x85
708	DUMMY11	5600	-442.5	35x85
709	DUMMY10	5670	-442.5	35x85
710	DUMMY9	5740	-442.5	35x85
711	DUMMY8	5810	-442.5	35x85
712	DUMMY7	5880	-442.5	35x85
713	DUMMY6	5950	-442.5	35x85
714	DUMMY5	6020	-442.5	35x85
715	DUMMY4	6090	-442.5	35x85
716	DUMMY3	6160	-442.5	35x85
717	DUMMY2	6230	-442.5	35x85
718	VSS	6370	-442.5	35x85
719	VSS	6440	-442.5	35x85
720	VSS	6510	-442.5	35x85

No.	Name	X	Y	Bump size(μm)
721	VSS	6580	-442.5	35x85
722	VSS	6650	-442.5	35x85
723	VSS	6720	-442.5	35x85
724	VSS	6790	-442.5	35x85
725	VSS	6860	-442.5	35x85
726	VSS	6930	-442.5	35x85
727	VSS	7000	-442.5	35x85
728	VSS	7070	-442.5	35x85
729	VSS	7140	-442.5	35x85
730	VSS	7210	-442.5	35x85
731	VSS	7280	-442.5	35x85
732	VSS	7350	-442.5	35x85
733	VSS	7420	-442.5	35x85
734	VSS	7490	-442.5	35x85
735	VSS	7560	-442.5	35x85
736	VSS	7630	-442.5	35x85
737	VSS	7700	-442.5	35x85
738	VGH	7910	-442.5	35x85
739	VGH	7980	-442.5	35x85
740	VGH	8050	-442.5	35x85
741	VGH	8120	-442.5	35x85
742	VEE	8330	-442.5	35x85
743	VEE	8400	-442.5	35x85
744	VEE	8470	-442.5	35x85
745	VEE	8540	-442.5	35x85
746	DUMMY1	8950	-462.5	50x45
747	DUMMY1	9015	-462.5	50x45
748	MODE	8950	-397.5	50x45
749	MODE	9015	-397.5	50x45
750	VDD	8950	-260	50x45
751	VDD	9015	-260	50x45
752	VDD	8950	-195	50x45
753	VDD	9015	-195	50x45
754	VDD	8950	-130	50x45
755	VDD	9015	-130	50x45
756	STV1	8950	7.5	50x45
757	STV1	9015	7.5	50x45
758	PATH	8950	72.5	50x45
759	PATH	9015	72.5	50x45
760	CPV	8950	137.5	50x45
761	CPV	9015	137.5	50x45
762	L/R	8950	202.5	50x45
763	L/R	9015	202.5	50x45
764	OE3	8950	267.5	50x45
765	OE3	9015	267.5	50x45
766	OE2	8950	332.5	50x45
767	OE2	9015	332.5	50x45
768	OE1	8950	397.5	50x45
769	OE1	9015	397.5	50x45
770	/XAO	8950	462.5	50x45
771	/XAO	9015	462.5	50x45

9.5 Alignment Mark center coordinate

Name	X	Y
L_AMK	-8682	-450
R_AMK	8682	-450

10. Ordering Information

Part NO.	Package
HX8643-A00xPDxxx	A000:mean wafer manufacture by TSMC A00L:mean wafer manufacture by Liteon PD : mean COG xxx : mean chip thickness (μm) , (default 400 μm)

11. Revision History

Version	EFF.DATE	DESCRIPTION OF CHANGES
01	2004/12/17	New setup
02	2006/04/07	All pages Remove 'preliminary' wording from the data sheet. Page 8 Add the conditions of power consumption.
03	2006/06/09	Page 8 Revise VDD min. voltage from 2.3V to 1.7V. Add Note(3) to explain when VDD<2.3V,the H/L input voltage rating. Page 9 Revise '/XAO to output delay time' spec maximum to 30μs. Page 20 Revise Part NO. form HX8643-A000PDxxx to HX8643-A00xPDxxx. Add A000: mean wafer manufacture by TSMC. A00L: mean wafer manufacture by Liteon.