TO :

Date : Feb., 03, 2015

HannStar Product Specification

(Preliminary)

3.97” Color TFT-LCD Module

Model : HSD040B8W9-A01

(1/4 cut)

Note:

(1) Please contact HannStar Display Corp. before designing your product based on this module specification.

(2) The information contained herein is presented merely to indicate the characteristics and performance of our products. No responsibility is assumed by HannStar for any intellectual property claims or other problems that may result from application based on the module described herein.

(3) The mark “ ** ” of Model means sub-model code.

Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Feb.03,2015	A01	Preliminary Specification was first released.

Contents

1.0 GENERAL DESCRIPTION

1.1 Introduction

HannStar Display model HSD040B8W9-A01 is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This TFT LCD has a 3.97 (15:9) inch diagonally measured active display area with WVGA (480 horizontal by 800 vertical pixel) resolution.

1.2 Features

- 3.97 (15:9 diagonal) inch configuration
- 16.7M color by 8 bit R.G.B signal input
- RoHS Compliance & Halogen Free

1.3 Applications

- Mobile Smart Phone
- Personal Navigation Device
- Multimedia applications and AV system

1.4 General Information

Item	Specification	Unit
Outline Dimension	54.64(H) x 93.265 (V) x 0.8 (T) (Typ.)	mm
Display Area	51.84(H) x 86.40(V)	mm
Number of Pixel	480 RGB (H) x 800(V)	pixels
Pixel Pitch	0.108(H) x 0.108(V)	mm
Pixel Arrangement	RGB Vertical Stripe	
Display Mode	Normally White	
Driving Method	2 Dot/1+2 Dot Inversion	

2.0 ABSOLUTE MAXIMUM RATINGS

(The following are maximum values which, if exceeded, may cause operation or damage to the unit.)

Item	Symbol	Min.	Max.	Unit	Note
LC Operating Voltage	VOP	--	4.5	V	*1,*2
Operating Temperature	T_{OP}	-20	70	℃	
Storage Temperature	T_{ST}	-30	80	℃	
Operating Ambient Humidity	H_{OP}	10	*4	RH	*3
Storage Humidity	H_{ST}	10	*4	RH	*3

Note:

*1. At 25±5℃

*2. Due to the characteristics of LC Material, the Liquid Crystal driving voltage varies with environmental temperature.

*3. Non-condensation.

*4. Temp.≤ 60℃,90%RH Max.

Temp. > 60℃,Absolute humidity shall be less than 90%RH.

3.0 ELECTRICALL SPECIFICATIONS

Item	Symbol	Min.	Typ.	Max.	Unit	Note
TFT Gate ON Voltage	VGH	--	15	--	V	*1,*2
TFT Gate OFF Voltage	VGL	--	-10	--	V	
TFT Common Voltage	Vcom	-2	--	-1	V	
Data (RGB signal) Voltage	Vsig	-5.0	--	5.0	V	

Note:

1. VGH is TFT Gate operating Voltage.

*2. VGL is TFT Gate operating Voltage.

The storage structure of this model is C_{ST}(Storage on Common)

*3. Vcom must be adjusted to optimize display quality _Cross talk, Contrast Ratio and etc.

3.1 FPC Pin Assignment

3.1.1 Novatek / Raydium

No.	Pin Define	No.	Pin Define	No.	Pin Define	No.	Pin Define
1	Dummy	46	VSSI	91	VSSAM	136	C21P
2	Dummy	47	VDDI	92	HSSI_CLK_P	137	C21N
3	VCOM	48	D23	93	HSSI_CLK_P	138	C21N
4	MTP_PWR	49	D22	94	HSSI_CLK_N	139	C22P
5	VGLX	50	D21	95	HSSI_CLK_N	140	C22P
6	VGLO	51	D20	96	VSSAM	141	C22N
7	VGL_REG	52	D19	97	HSSI_D0_P	142	C22N
8	VCL	53	D18	98	HSSI_D0_P	143	C23P
9	VREF_PWR	54	D17	99	HSSI_D0_N	144	C23P
10	VSSA	55	D16	100	HSSI_D0_N	145	C23N
11	VDDA	56	D15	101	VSSAM	146	C23N
12	VDDR	57	D14	102	MVDDL	147	C24P
13	VSSR	58	D13	103	MVDDL	148	C24P
14	VDD_DET	59	D12	104	MVDDA	149	C24N
15	DIOPWR	60	D11	105	MVDDA	150	C24N
16	VGSN/VGSN_VGSP	61	D10	106	VDDAM	151	VDDB
17	VGSP	62	D9	107	VDDR	152	VCL_VDDB/VCL/VCL_AVSS
18	VGMN/VGMN_VGMP	63	D8	108	VSSR	153	AVSS
19	VGMP	64	D7	109	VREFCP	154	VSSB
20	DVSS	65	D6	110	EXTP	155	C31P
21	DVDD	66	D5	111	CSP	156	C31P
22	VDDB	67	D4	112	EXTN	157	C31N
23	VCL/VCL_VDDB/VCL_AVSS	68	D3	113	CSN	158	C31N
24	AVSS	69	D2	114	VDDB	159	C32P
25	LANSEL	70	D1	115	VSSB	160	C32P
26	DSWAP	71	D0	116	C11P	161	C32N
27	PSWAP	72	DE	117	C11P	162	C32N
28	DSTB_SEL	73	PCLK	118	C11N	163	DVDD
29	NBWSEL	74	HS	119	C11N	164	DVSS
30	RGBBP	75	VS	120	C12P	165	C41P
31	I2C_SA0	76	LEDPWM	121	C12P	166	C41P
32	IM3	77	LEDON	122	C12N	167	C41N
33	IM2	78	VDDI	123	C12N	168	C41N
34	IM1	79	VSSI	124	C13P	169	VGH/VGHO
35	IM0	80	AVDD	125	C13P	170	C51P
36	EXB1T	81	AVSS_AVDD/AVSS	126	C13N	171	C51P
37	TE	82	AVEE_AVSS/AVEE	127	C13N	172	C51N
38	VSEL	83	VDDA	128	C14P	173	C51N
39	SDO	84	DVSS	129	C14P	174	VGL_REG
40	SDI	85	DVDD	130	C14N	175	VGLO
41	DCX	86	VSSAM	131	C14N	176	VGLX
42	WRX	87	HSSI_D1_P	132	AVDD	177	VCOM
43	RDX	88	HSSI_D1_P	133	AVSS_AVDD/AVSS	178	Dummy
44	CSX	89	HSSI_D1_N	134	AVEE_AVSS/AVEE	179	Dummy
45	RESX	90	HSSI_D1_N	135	C21P		

3.1.2 Himax

No.	Pin Define	No.	Pin Define	No.	Pin Define	No.	Pin Define
1	Dummy	46	VSSD	91	HS_VSS	136	C21P
2	Dummy	47	VDD1	92	HS_CLK_P	137	C21N
3	VCOM	48	D23	93	HS_CLK_P	138	C21N
4	OTP_PWR	49	D22	94	HS_CLK_N	139	C22P
5	VGL	50	D21	95	HS_CLK_N	140	C22P
6	VGLO_L	51	D20	96	HS_VSS	141	C22N
7	VGL_REG	52	D19	97	HS_D0_P	142	C22N
8	VCL	53	D18	98	HS_D0_P	143	C23P
9	VREF	54	D17	99	HS_D0_N	144	C23P
10	VSSAC	55	D16	100	HS_D0_N	145	C23N
11	VDD2	56	D15	101	HS_VSS	146	C23N
12	VDD3	57	D14	102	HS_LDOL	147	C24P
13	VSSA	58	D13	103	HS_LDOL	148	C24P
14	VDD3	59	D12	104	HS_LDO	149	C24N
15	Dummy_DIOPWR	60	D11	105	HS_LDO	150	C24N
16	VGSN	61	D10	106	HS_VCC	151	VDD3_P
17	VGSP	62	D9	107	VDD3	152	VCL
18	VSNR	63	D8	108	VSSA	153	VSSD_P
19	VGMP	64	D7	109	VTESTOUTP / VTESTOUTN	154	VSSD_P
20	VSSD	65	D6	110	VCSW2	155	C31P
21	VDDD	66	D5	111	CSP	156	C31P
22	VDD3	67	D4	112	VCSW1	157	C31N
23	VCL	68	D3	113	CSN	158	C31N
24	VSSA	69	D2	114	VDD3_P	159	C32P
25	LANSEL	70	D1	115	VSSD_P	160	C32P
26	DSWAP	71	D0	116	C11P	161	C32N
27	PSWAP	72	DE	117	C11P	162	C32N
28	DUMMY_DSTB_SEL	73	PCLK	118	C11N	163	VDDD
29	NBWSEL	74	HS	119	C11N	164	VSSD
30	DUMMY_RGBBP	75	VS	120	C12P	165	C41P
31	I2C_SA0	76	CABC_PWM_OUT	121	C12P	166	C41P
32	IM3	77	CABC_LED_EN	122	C12N	167	C41N
33	IM2	78	VDD1	123	C12N	168	C41N
34	IM1	79	VSSD	124	C13P	169	VGH/VGHO
35	IM0	80	VSP	125	C13P	170	C51P
36	IDLE_ON	81	VSSA	126	C13N	171	C51P
37	TE_L	82	VSN	127	C13N	172	C51N
38	LED_BOOST	83	VDD3	128	C14P	173	C51N
39	SDO	84	VSSD	129	C14P	174	VGL_REG
40	SDI_I2C_SDA	85	VDDD	130	C14N	175	VGLO_R
41	DCX	86	HS_VSS	131	C14N	176	VGL
42	SCL_I2C_SCL	87	HS_D1_P	132	VSP	177	VCOM
43	DUMMY_RDX	88	HS_D1_P	133	VSSD_P	178	Dummy
44	CSX	89	HS_D1_N	134	VSN	179	Dummy
45	RESX	90	HS_D1_N	135	C21P		

3.1.3 Orise

No.	Pin Define	No.	Pin Define	No.	Pin Define	No.	Pin Define
1	Dummy	46	VSS	91	LVDSVSS	136	C21P
2	Dummy	47	VDDIO	92	CLK_P	137	C21N
3	VCOM	48	D23	93	CLK_P	138	C21N
4	MTP_PWR	49	D22	94	CLK_N	139	C22P
5	VGL	50	D21	95	CLK_N	140	C22P
6	VGL	51	D20	96	LVDSVSS	141	C22N
7	VGL_REG1	52	D19	97	D0_P	142	C22N
8	VCL	53	D18	98	D0_P	143	C23P
9	VREF	54	D17	99	D0_N	144	C23P
10	VSSA	55	D16	100	D0_N	145	C23N
11	VDD	56	D15	101	LVDSVSS	146	C23N
12	VDD	57	D14	102	VDDP	147	C24P
13	VSS / AVSS	58	D13	103	VDDP	148	C24P
14	VDD	59	D12	104	LVDSVDD	149	C24N
15	DIOPWR	60	D11	105	LVDSVDD	150	C24N
16	VGSN	61	D10	106	VDDAM	151	VDD
17	VGSP	62	D9	107	VDD	152	VCL
18	VGMN	63	D8	108	VSS	153	VSSA / AVSS
19	VGMP	64	D7	109	VREFCP	154	VSS
20	VSS	65	D6	110	EXTP	155	C31P
21	VDD_18V	66	D5	111	CSP	156	C31P
22	VDD	67	D4	112	EXTN	157	C31N
23	VCL	68	D3	113	CSN	158	C31N
24	VSSA / AVSS	69	D2	114	VDD	159	C32P
25	LANSEL	70	D1	115	VSS / AVSS	160	C32P
26	DSWAP	71	D0	116	C11P	161	C32N
27	PSWAP	72	DE	117	C11P	162	C32N
28	DSTB_SEL	73	PCLK	118	C11N	163	VDD_18V
29	NBWSEL	74	HS	119	C11N	164	VSS
30	I2C_SA1	75	VS	120	C12P	165	C41P
31	I2C_SA0	76	LEDPWM	121	C12P	166	C41P
32	IM3	77	LEDON	122	C12N	167	C41N
33	IM2	78	VDDIO	123	C12N	168	C41N
34	IM1	79	VSS	124	C13P	169	VGH / VGHO
35	IM0	80	VDDA	125	C13P	170	C51P
36	EXB1T	81	VSSA / AVSS	126	C13N	171	C51P
37	TE_L	82	NVDDA / AVEE	127	C13N	172	C51N
38	VSEL	83	VCC	128	C14P	173	C51N
39	SDO	84	VSS	129	C14P	174	VGL_REG
40	SDI	85	VDD_18V	130	C14N	175	VGL
41	DCX	86	LVDSVSS	131	C14N	176	VGL
42	WRX	87	D1_P	132	VDDA / AVDD	177	VCOM
43	RDX	88	D1_P	133	VSS / VSSA / AVSS	178	Dummy
44	CSX	89	D1_N	134	NVDDA / AVEE	179	Dummy
45	RESX	90	D1_N	135	C21P		

3.1.4 ILITEK

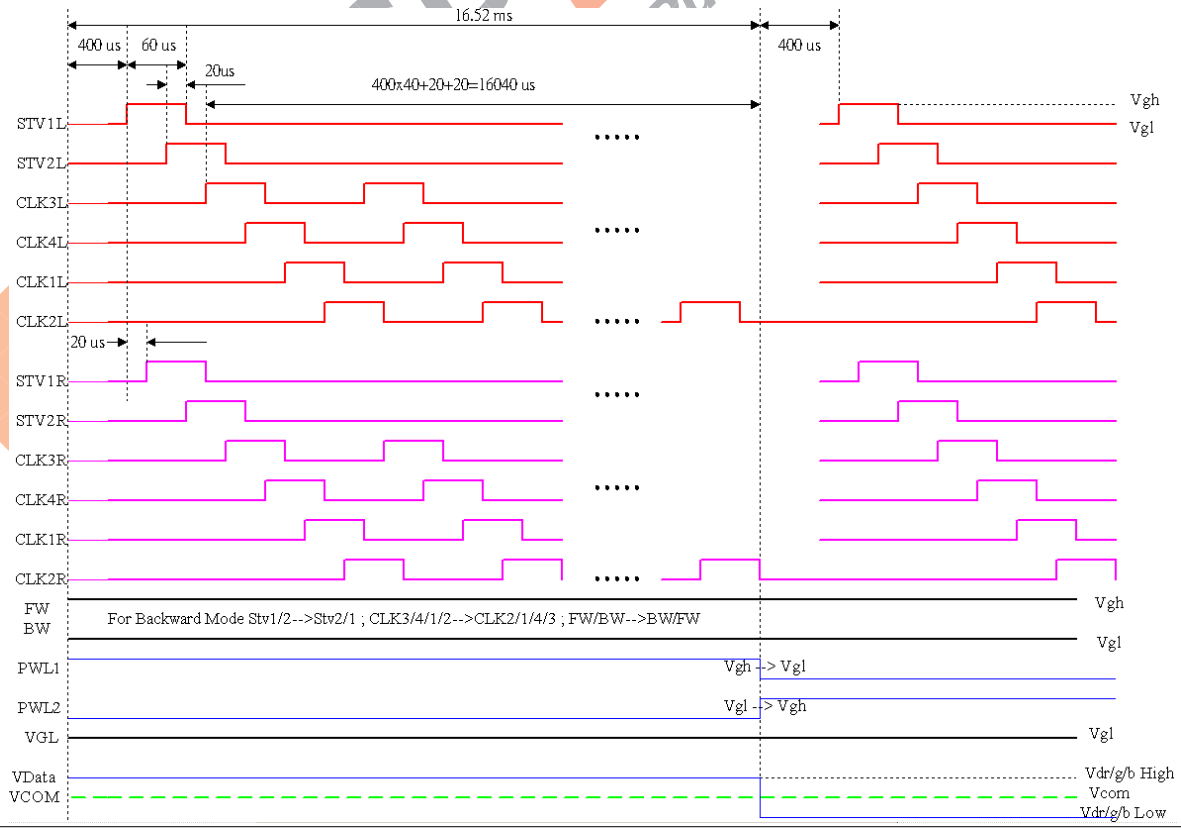
No.	Pin Define	No.	Pin Define	No.	Pin Define	No.	Pin Define
1	Dummy	46	DGND	91	DGND	136	C21P
2	Dummy	47	IOVCC	92	HS_CP	137	C21N
3	VCOM	48	DB[23]	93	HS_CP	138	C21N
4	VPP	49	DB[22]	94	HS_CN	139	C22P
5	VGL	50	DB[21]	95	HS_CN	140	C22P
6	VGLO	51	DB[20]	96	DGND	141	C22N
7	VGL_REG	52	DB[19]	97	HS_D0P	142	C22N
8	VCL	53	DB[18]	98	HS_D0P	143	C23P
9	VREF15	54	DB[17]	99	HS_D0N	144	C23P
10	AGND	55	DB[16]	100	HS_D0N	145	C23N
11	VCI	56	DB[15]	101	DGND	146	C23N
12	VCIR	57	DB[14]	102	V12_MIPI	147	C24P
13	VSSR[1]	58	DB[13]	103	V12_MIPI	148	C24P
14	DMY	59	DB[12]	104	VCORE_MIPI	149	C24N
15	TESTDIN[4]	60	DB[11]	105	VCORE_MIPI	150	C24N
16	DMY	61	DB[10]	106	VCI	151	VCIP
17	DMY	62	DB[9]	107	VCI	152	VCL
18	VREG2OUT	63	DB[8]	108	VSSR[2]	153	VSSR[3]
19	VREG1OUT	64	DB[7]	109	DMY	154	CGND
20	DGND	65	DB[6]	110	EXTP	155	C31P
21	VCORE	66	DB[5]	111	DMY	156	C31P
22	VCI	67	DB[4]	112	EXTN	157	C31N
23	VCL	68	DB[3]	113	DMY	158	C31N
24	AGND	69	DB[2]	114	VCIP	159	C32P
25	LANSEL	70	DB[1]	115	CGND	160	C32P
26	DSWAP	71	DB[0]	116	C11P	161	C32N
27	PSWAP	72	DE	117	C11P	162	C32N
28	TESTDIN[6]	73	PCLK	118	C11N	163	VCORE
29	NBWSEL	74	HS	119	C11N	164	AGND
30	TESTDIN[7]	75	VS	120	C12P	165	C41P
31	TESTDOUT[0]	76	LEDPWM	121	C12P	166	C41P
32	IM[3]	77	LEDON	122	C12N	167	C41N
33	IM[2]	78	IOVCC	123	C12N	168	C41N
34	IM[1]	79	DGND	124	C13P	169	VGH
35	IM[0]	80	DDVDH	125	C13P	170	C51P
36	TESTDOUT[1]	81	AGND	126	C13N	171	C51P
37	TE_L	82	DDVDL	127	C13N	172	C51N
38	TESTDOUT[2]	83	VCI	128	C14P	173	C51N
39	SDO	84	DGND	129	C14P	174	VGL_REG
40	SDI	85	VCORE	130	C14N	175	VGLO
41	TESTDOUT[3]	86	DGND	131	C14N	176	VGL
42	SCL	87	HS_D1P	132	DDVDH	177	VCOM
43	TESTD_EN	88	HS_D1P	133	CGND	178	Dummy
44	CSX	89	HS_D1N	134	DDVDL	179	Dummy
45	RESX	90	HS_D1N	135	C21P		

3.2 TFT Design Rules

Item		Specification	unit
COG Novatek NT35510S	Chip size	24000 x 963	um
	Pad number	2075	~
	Pin assignment	Based on the NT35510S Spec.	
COG Himax HX8379A	Chip size	24000 x 800	um
	Pad number	2077	~
	Pin assignment	Based on the HX8379A Spec.	
COG Raydium RM68171	Chip size	24000 x 850	um
	Pad number	2075	~
	Pin assignment	Based on the RM68171 Spec.	
COG Raydium RM68172	Chip size	24000 x 820	um
	Pad number	2075	~
	Pin assignment	Based on the RM68171 Spec.	
COG ILITEK ILI9806E	Chip size	24000 x 800	μm
	Pad number	2069	~
	Pin assignment	Based on the ILI9806E Spec.	
COG ILITEK ILI9806C	Chip size	24000 x 930	μm
	Pad number	2065	~
	Pin assignment	Based on the ILI9806C Spec.	
COG Novatek NT35512	Chip size	24000 x 888	μm
	Pad number	2075	
	Pin assignment	Based on the NT35512 Spec.	
COG Orise OTM8018B	Chip size	24000 x 950	μm
	Pad number	2075	~
	Pin assignment	Based on the OTM8018B Spec.	
COG Orise OTM8019A	Chip size	24000 x 817	μm
	Pad number	2075	~
	Pin assignment	Based on the OTM8019A Spec.	
COG Fitipower JD9161	Chip size	24000 x 840	μm
	Pad number	2075	~
	Pin assignment	Based on the JD9161 Spec.	

3.3 Cell Test Light On Waveform

Voltage	Gray	White	Black	Red	Green	Blue
Vgg	+30V	+30V	+30V	+30V	+30V	+30V
Vcom	-1.55V	-1.55V	-1.55V	-1.55V	-1.55V	-1.55V
Vgh	+15V	+15V	+15V	+15V	+15V	+15V
Vgl	-10V	-10V	-10V	-10V	-10V	-10V
Vdr High	+2.5V	0.1V	+5V	0.1V	+5V	+5V
Vdr Low	-2.5V	-0.1V	-5V	-0.1V	-5V	-5V
Vdg High	+2.5V	0.1V	+5V	+5V	0.1V	+5V
Vdg Low	-2.5V	-0.1V	-5V	-5V	-0.1V	-5V
Vdb High	+2.5V	0.1V	+5V	+5V	+5V	0.1V
Vdb Low	-2.5V	-0.1V	-5V	-5V	-5V	-0.1V



4.0 OPTICAL CHARACTERISTICS

4.1 Optical Specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (with Polarizer)		T (%)	Θ=0 Normal viewing angle	—	3.8	—	%	Measuring with EWV Polarizer，Reference Only
Transmittance (without Polarizer)		T (%)		—	10	—	%	
Contrast Ratio		CR		560	700	—	—	(1)(2)
Response Time	Rising	T_R		—	4	8	msec	(1)(3)
	Falling	T_F		—	12	24		
Color Gamut	S(%)			54	60	—	%	C-light
Color Chromaticity (CIE1931)	White	W_x		0.290	0.310	0.330	—	(1)(4) CF glass
		W_y		0.322	0.342	0.362		
	Red	R_x		0.633	0.653	0.673	—	
		R_Y		0.310	0.33	0.350		
	Green	G_x		0.301	0.321	0.341	—	
		G_Y		0.552	0.572	0.592		
	Blue	B_x		0.114	0.134	0.154	—	
		B_Y		0.099	0.119	0.139		
Viewing Angle	Hor.	$Θ_L$	CR>10	60	70	—	—	(1)(4) Measuring with EWV Polarizer，Reference Only
		$Θ_R$		60	70	—		
	Ver.	$Θ_U$		60	70	—		
		$Θ_D$		40	60	—		
Optima View Direction		12 o'clock						(5)

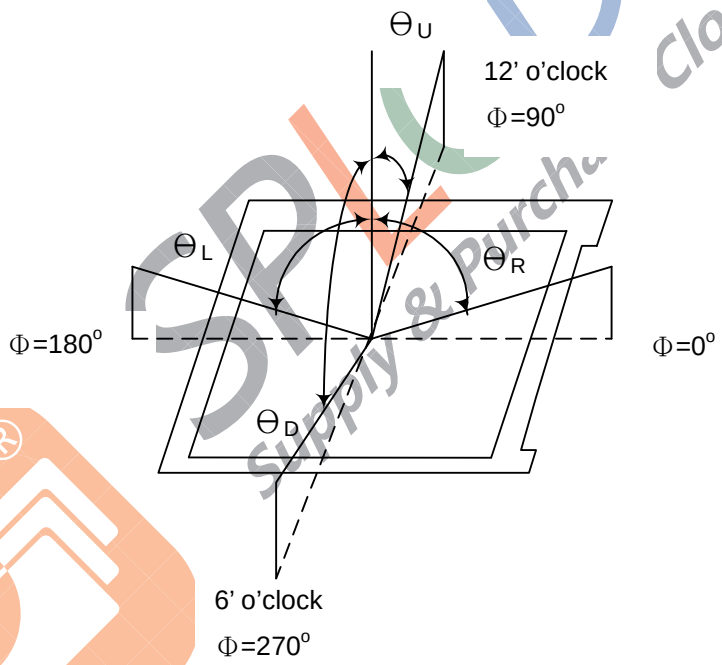
4.2 Measuring Condition

- Measuring surrounding：dark room
- Ambient temperature：25±2°C
- 15min. warm-up time.

4.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.

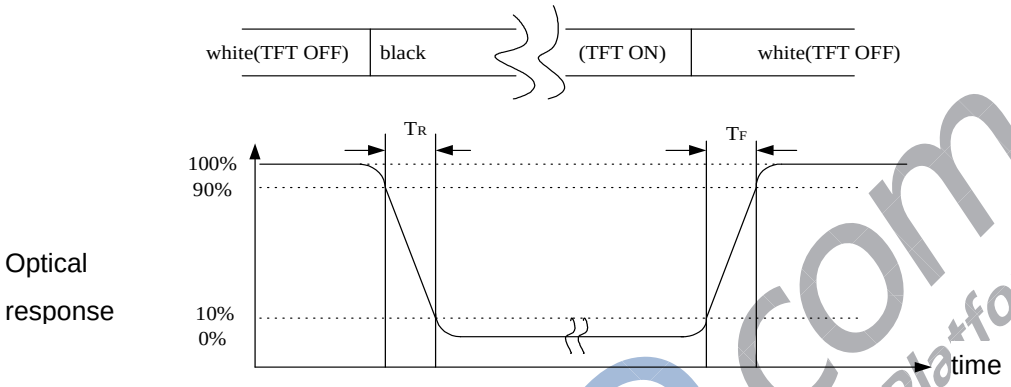
Note (1) Definition of Viewing Angle:



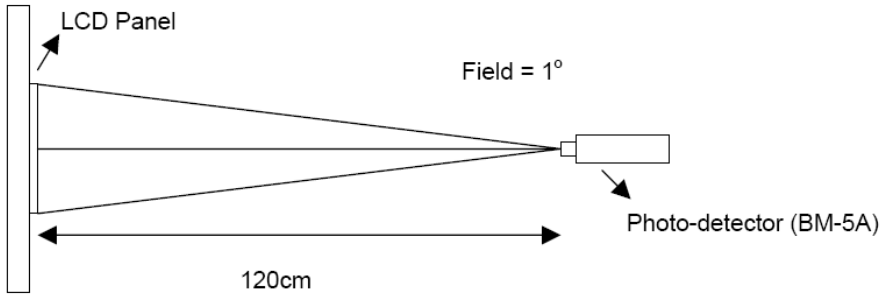
Note (2) Definition of Contrast Ratio (CR):
measured at the center point of panel

$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

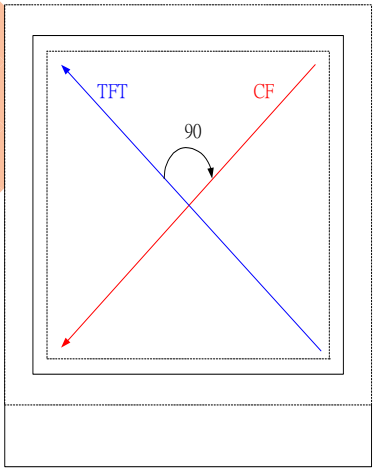
Note (3) Definition of Response Time: Sum of T_R and T_F



Note (4) Definition of optical measurement setup

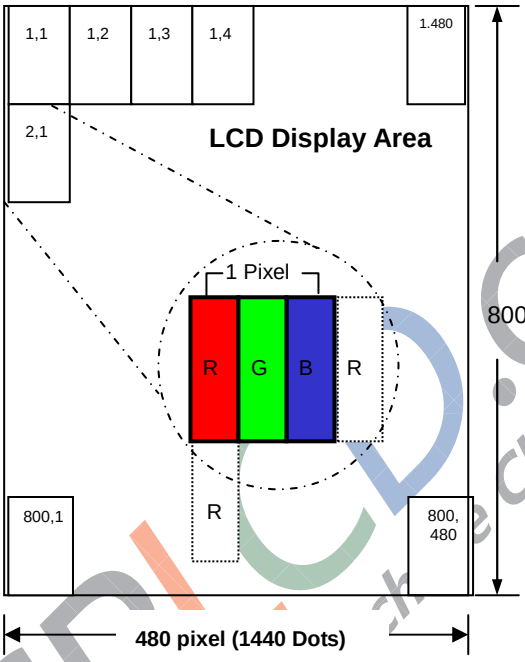


Note (5) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.)



TFT Face up

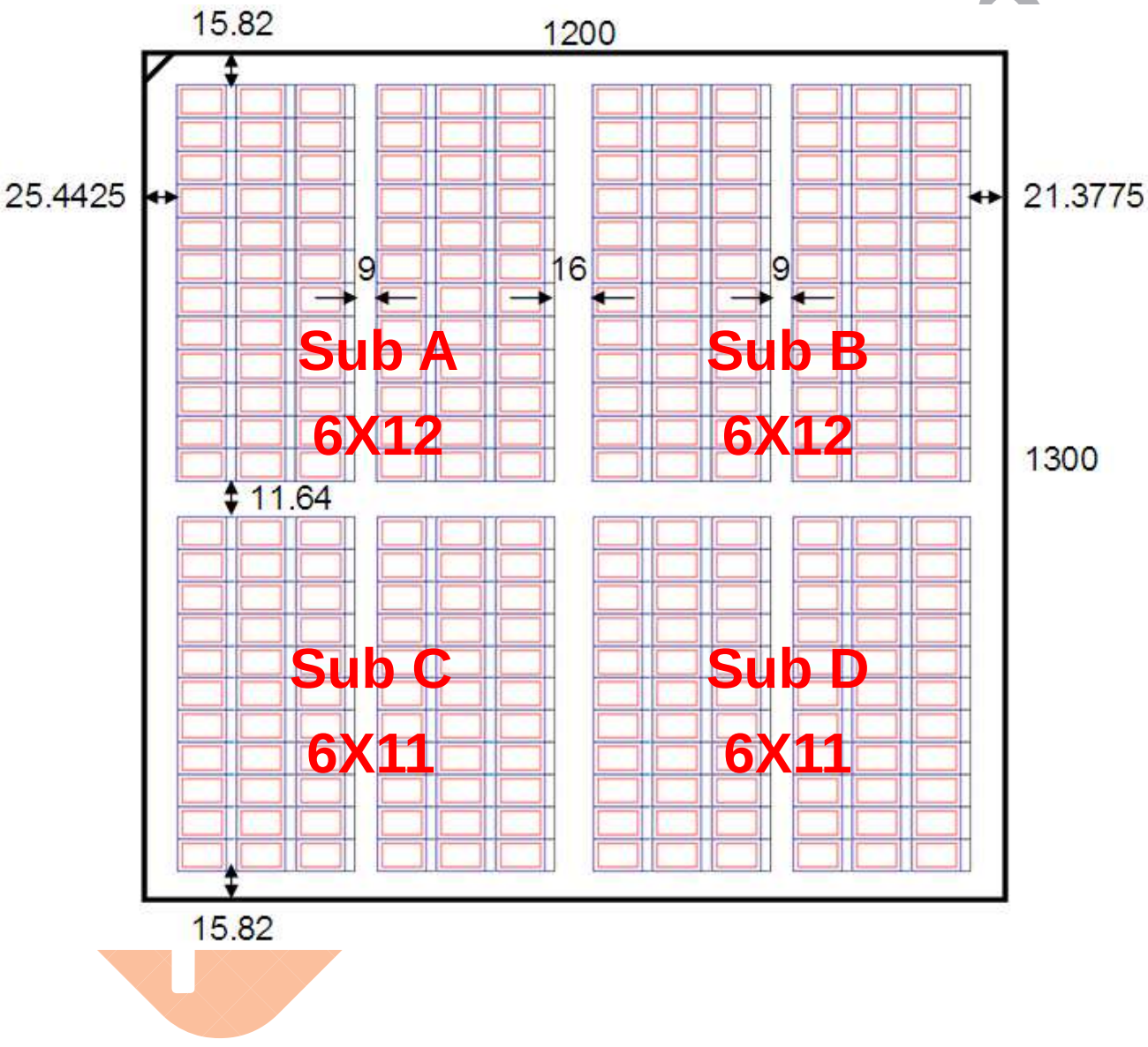
5.0 PIXEL FORMAT



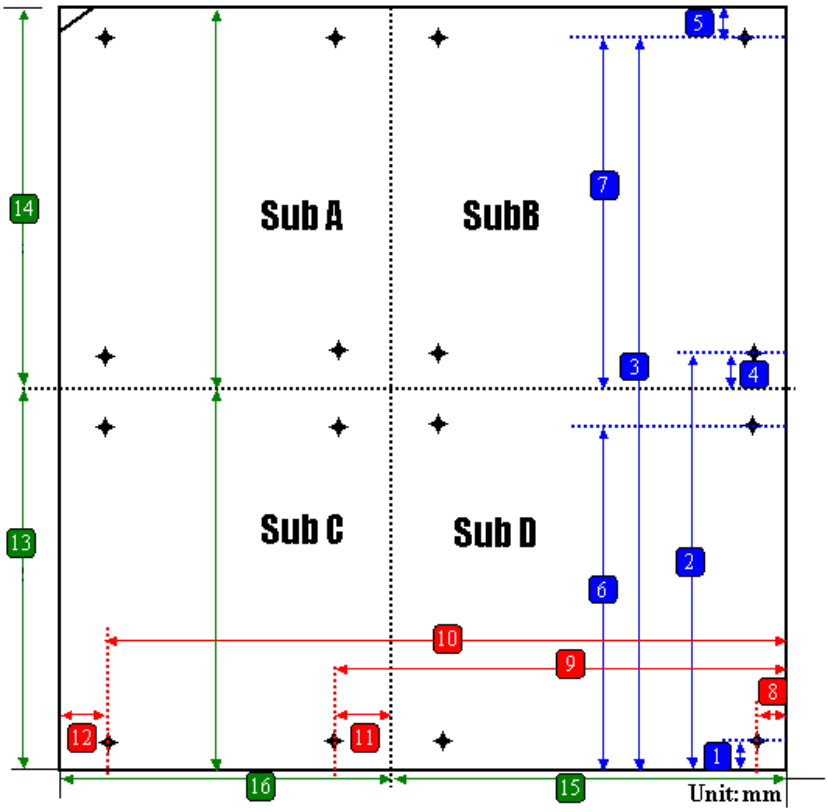
6.0 OUTLINE DIMENSION

6.1 Outline Dimension of Mother Glass (Unit : mm)

For TFT Array film up



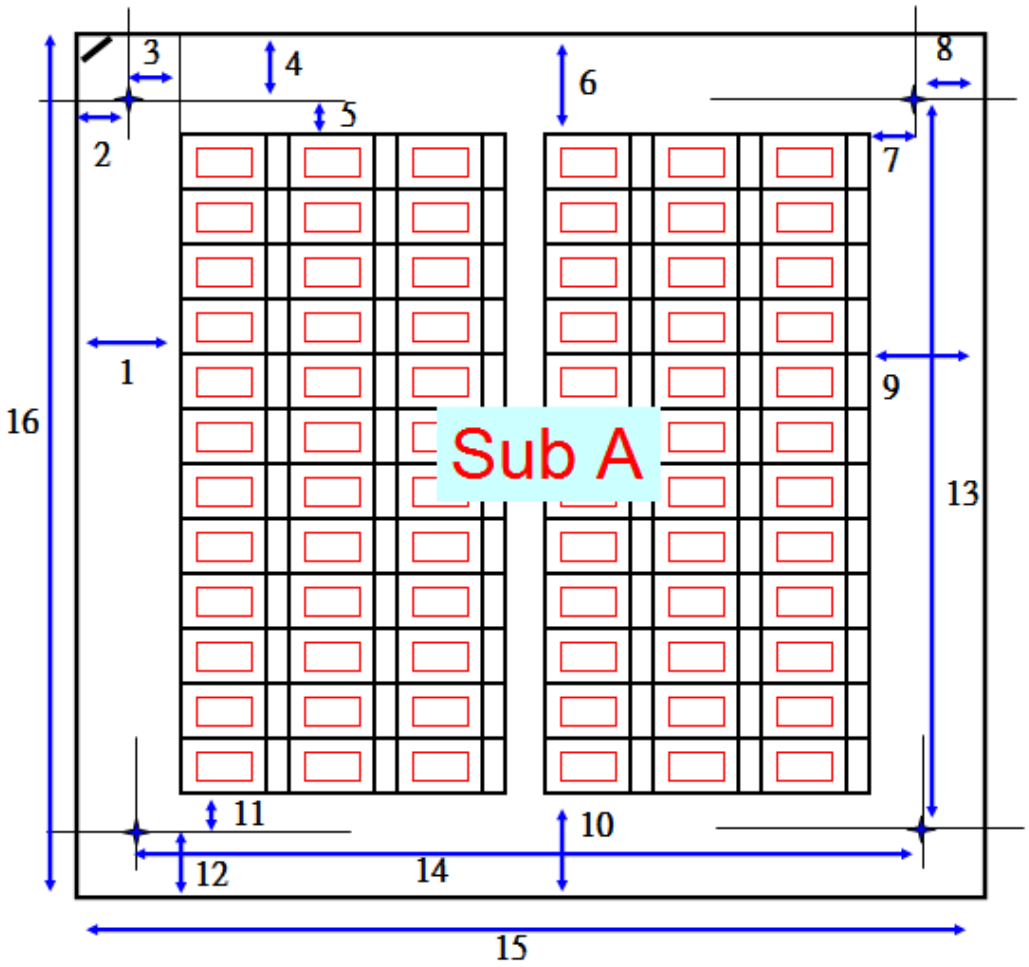
6.2 Chip Cut Mark Position (Array film up)



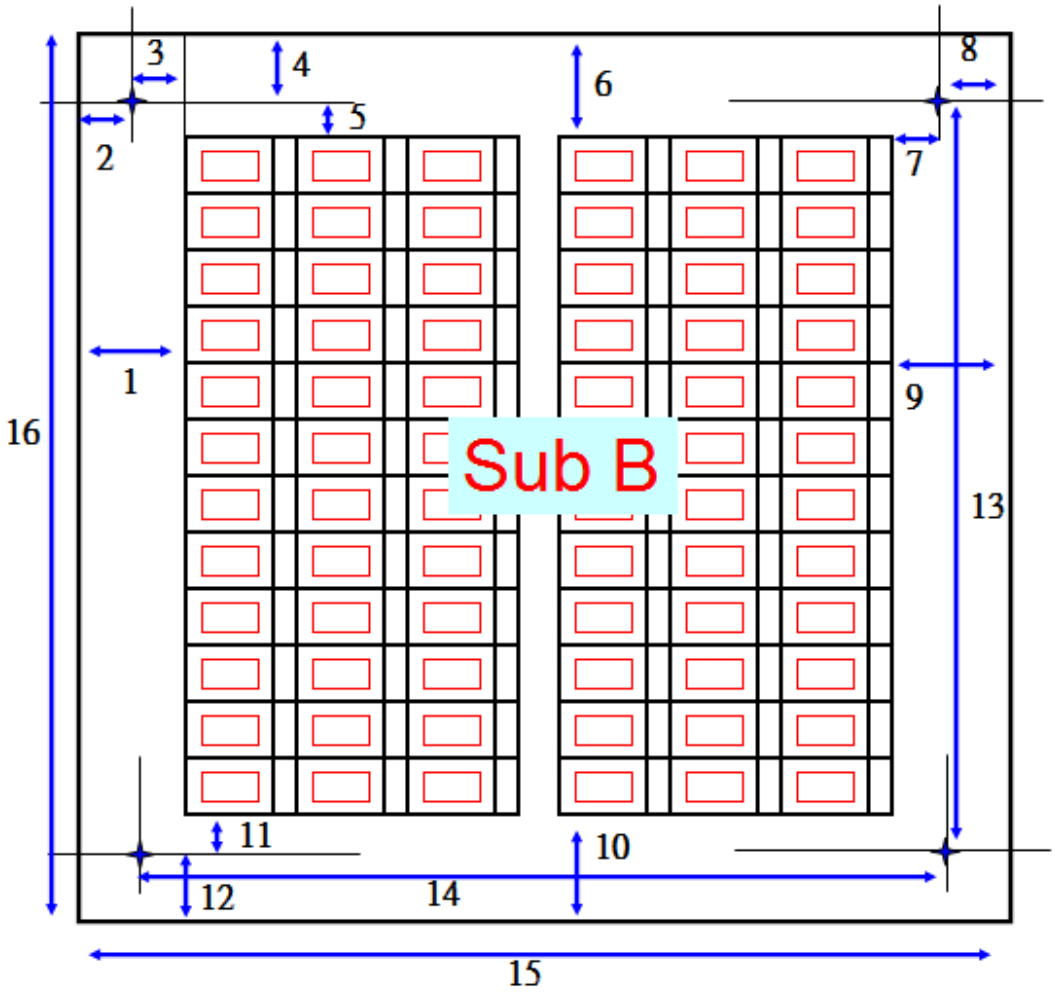
	Distance		Distance
1	13.5	**9**	602.0575
2	626.18	**10**	1178.6475
3	1287.97	**11**	4.1325
4	3.5	**12**	21.3525
5	12.03	**13**	622.68
6	618.18	**14**	677.32
7	665.29	**15**	597.925
8	17.4675	**16**	602.075

Unit : mm

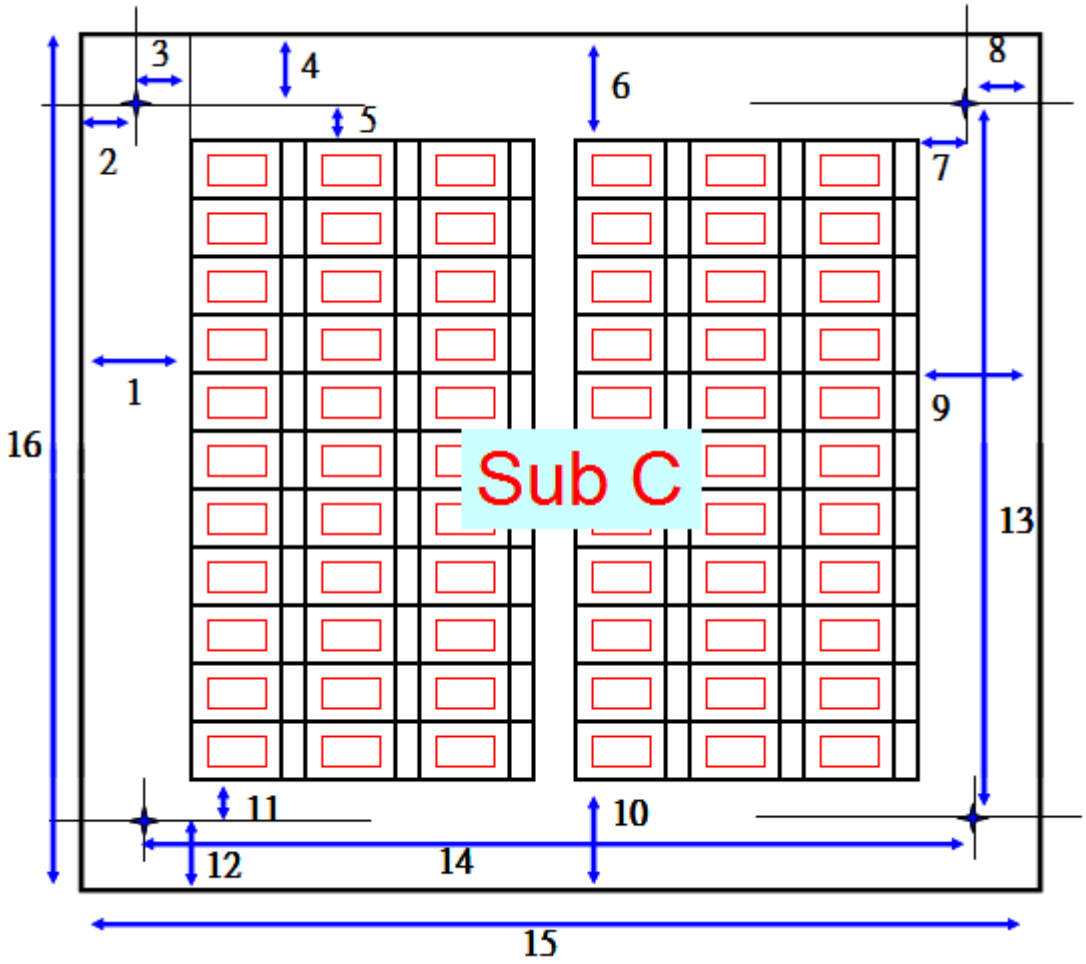
Sub A,B,C,D Array Film Up (no pre-cut) Unit : mm



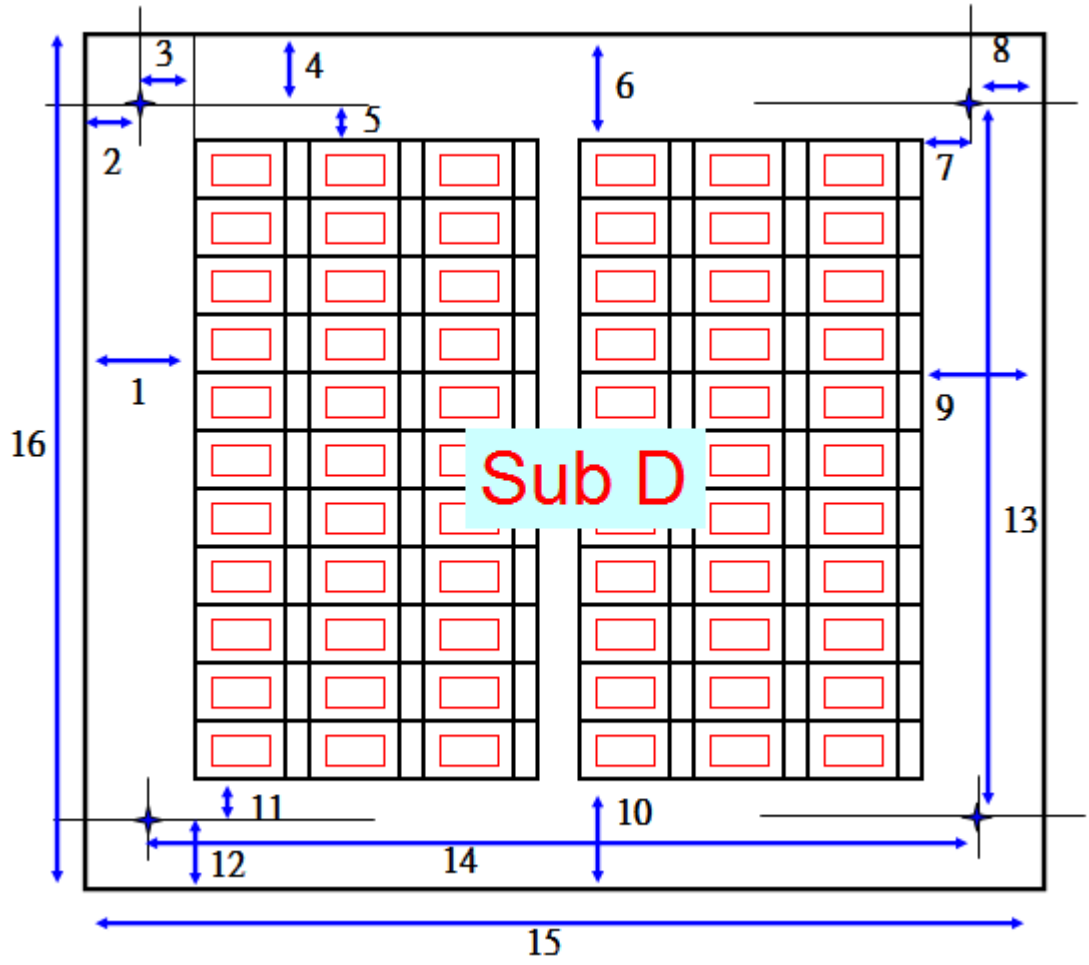
	Distance		Distance		Distance
1.	25.4425	**7.**	3.91	**13.**	661.79
2.	21.3525	**8.**	4.1325	**14.**	576.59
3.	4.09	**9.**	8.0425	**15.**	602.075
4.	12.03	**10.**	5.82	**16.**	677.32
5.	3.79	**11.**	2.32		
6.	15.82	**12.**	3.5		**unit: mm**



	Distance		Distance		Distance
1.	7.9575	**7.**	3.91	**13.**	661.79
2.	3.8675	**8.**	17.4675	**14.**	576.59
3.	4.09	**9.**	21.3775	**15.**	597.925
4.	12.03	**10.**	5.82	**16.**	677.32
5.	3.79	**11.**	2.32		
6.	15.82	**12.**	3.5		**unit: mm**

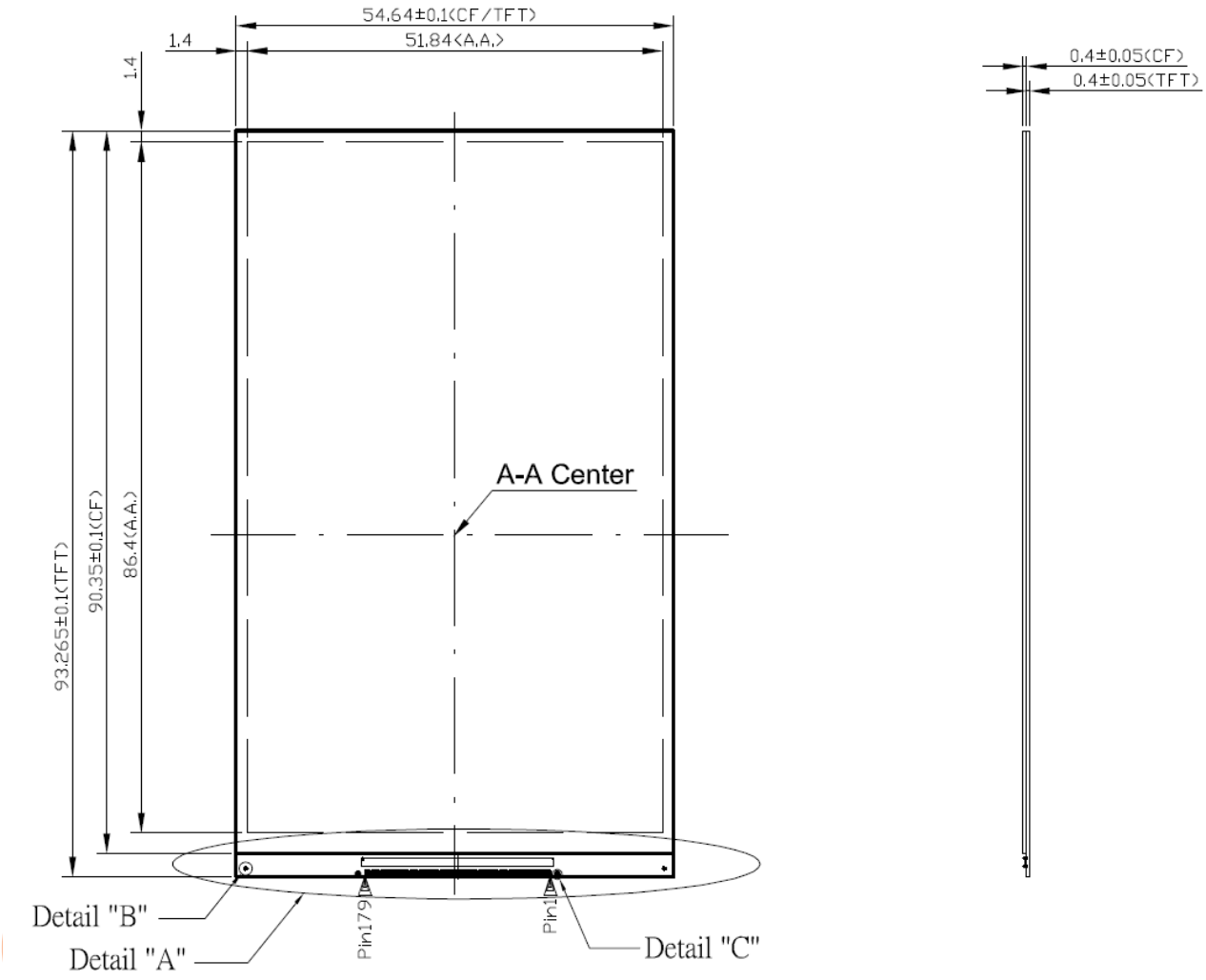


	Distance		Distance		Distance
1	25.4425	**7**	3.91	**13**	604.68
2	21.3525	**8**	4.1325	**14**	576.59
3	4.09	**9**	8.0425	**15**	602.075
4	4.5	**10**	15.82	**16**	622.68
5	1.32	**11**	2.32		
6	5.82	**12**	13.5		**unit: mm**

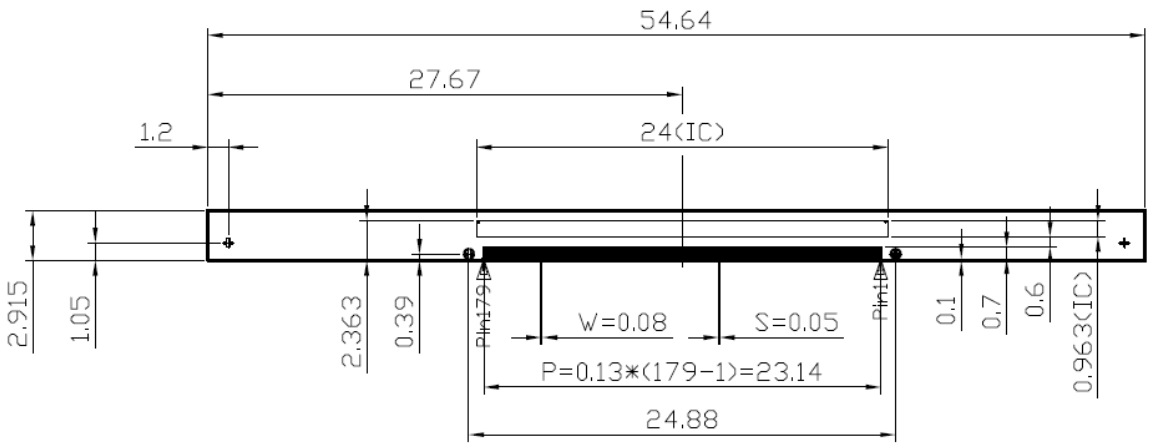


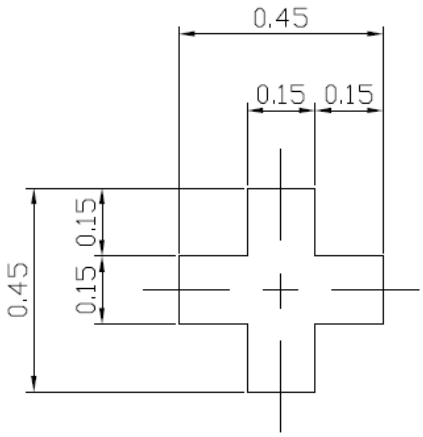
	Distance		Distance		Distance
1	7.9575	**7**	3.91	**13**	604.68
2	3.8675	**8**	17.4675	**14**	576.59
3	4.09	**9**	21.3775	**15**	597.925
4	4.5	**10**	15.82	**16**	622.68
5	1.32	**11**	2.32		
6	5.82	**12**	13.5		**unit: mm**

6.3 Chip Size

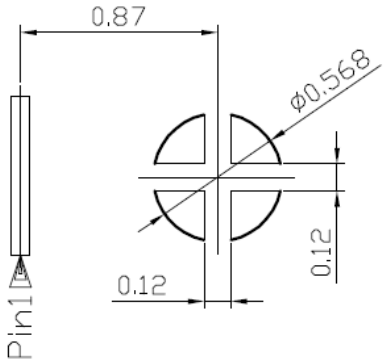


Notes ;
1. General Tolerance: ±0.2
2. FPC Pad Tolerance: ±0.02



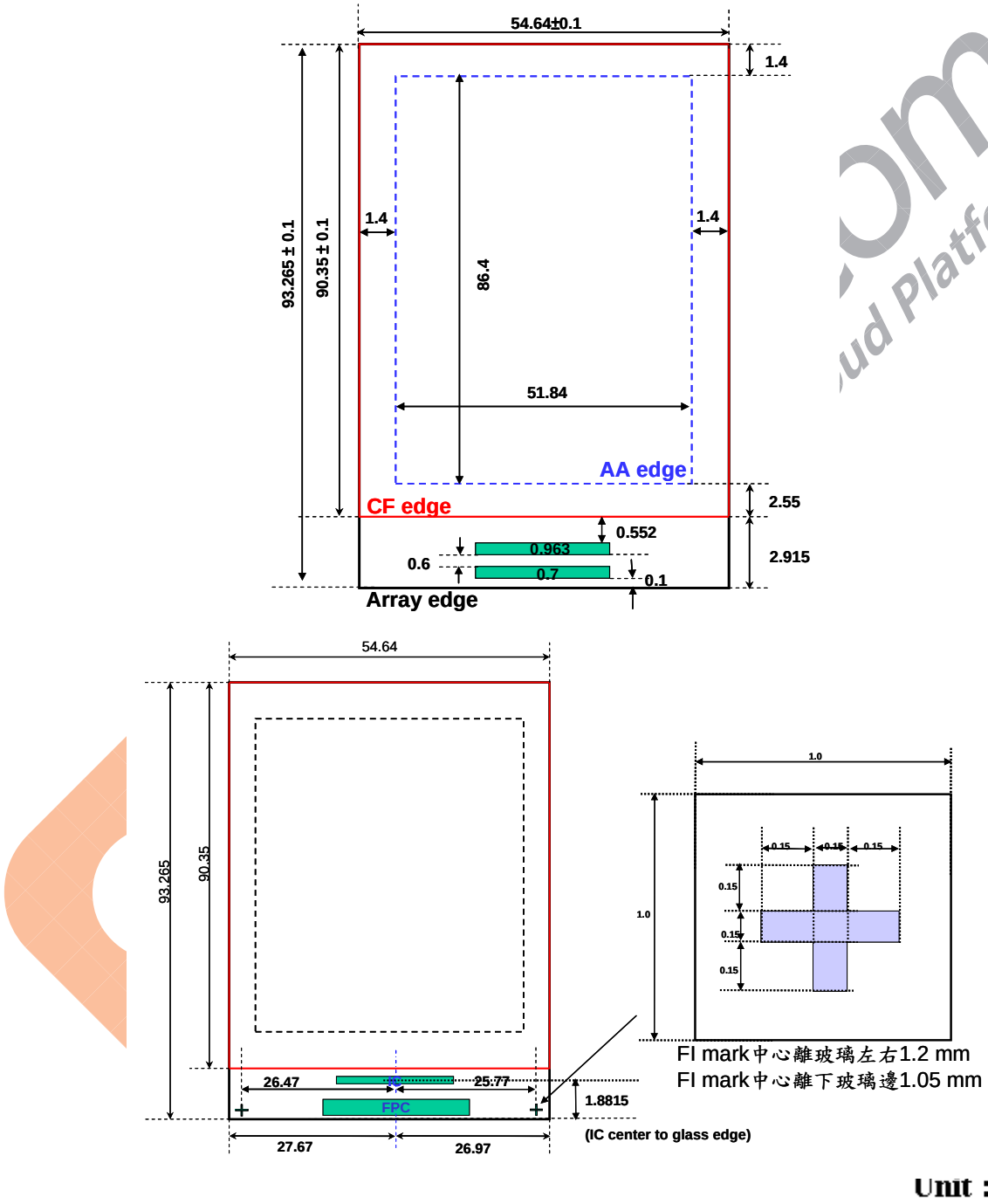


Detail "B" (S=50:1)

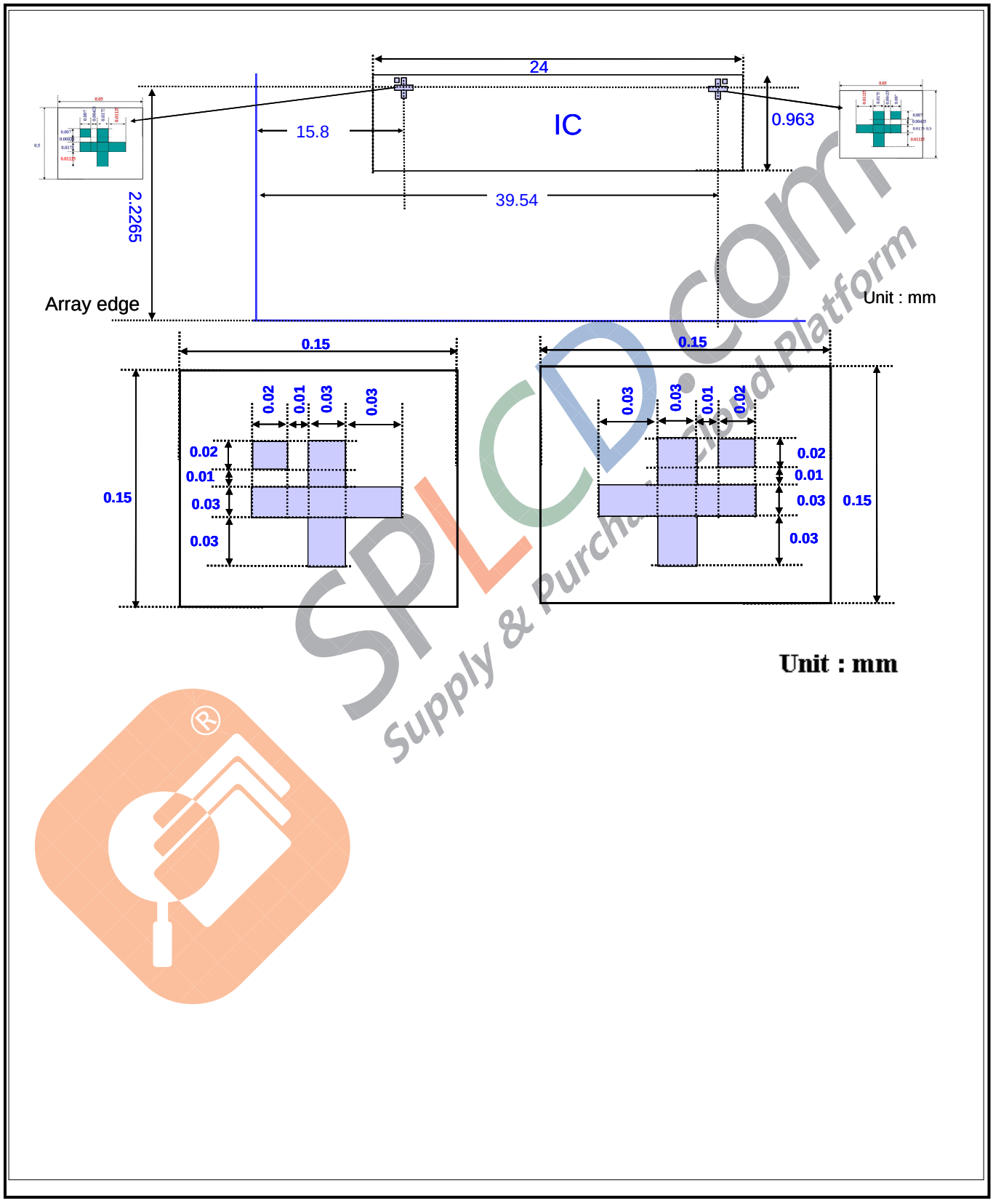


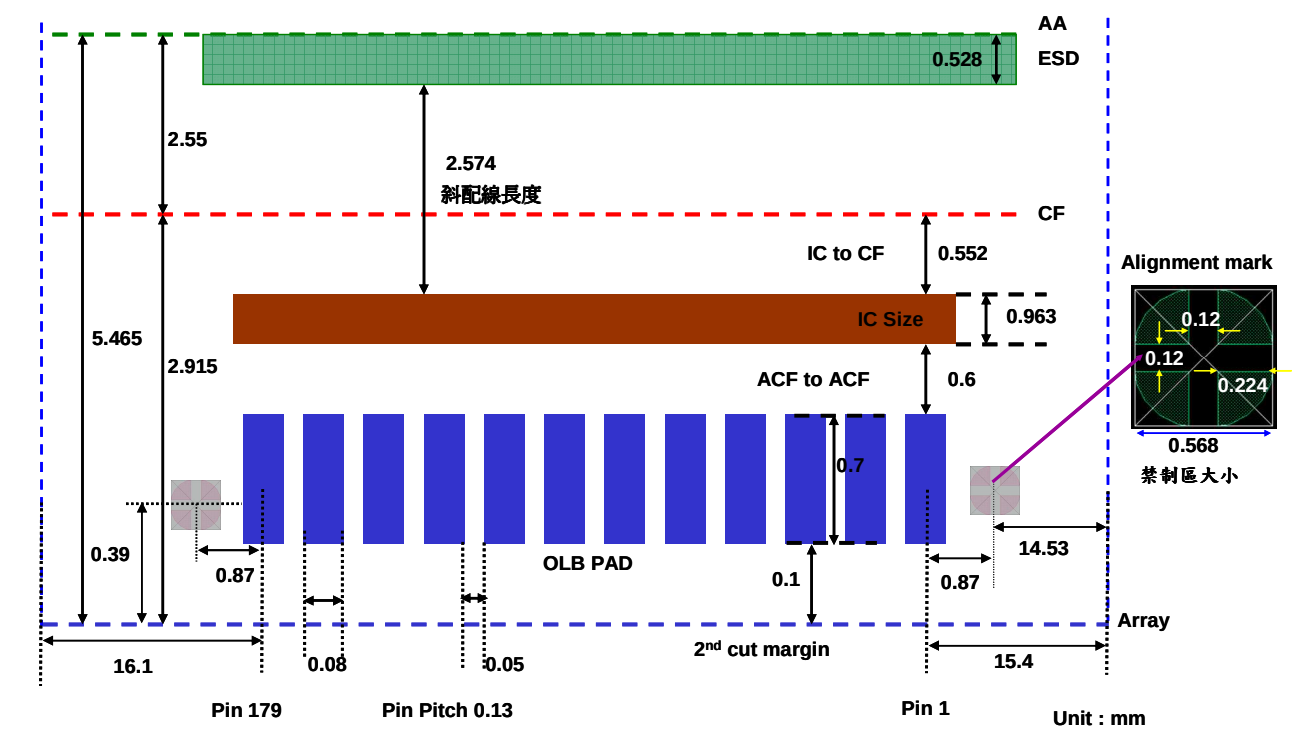
Detail "C" (S=25:1)

6.4 IC & FPC Position

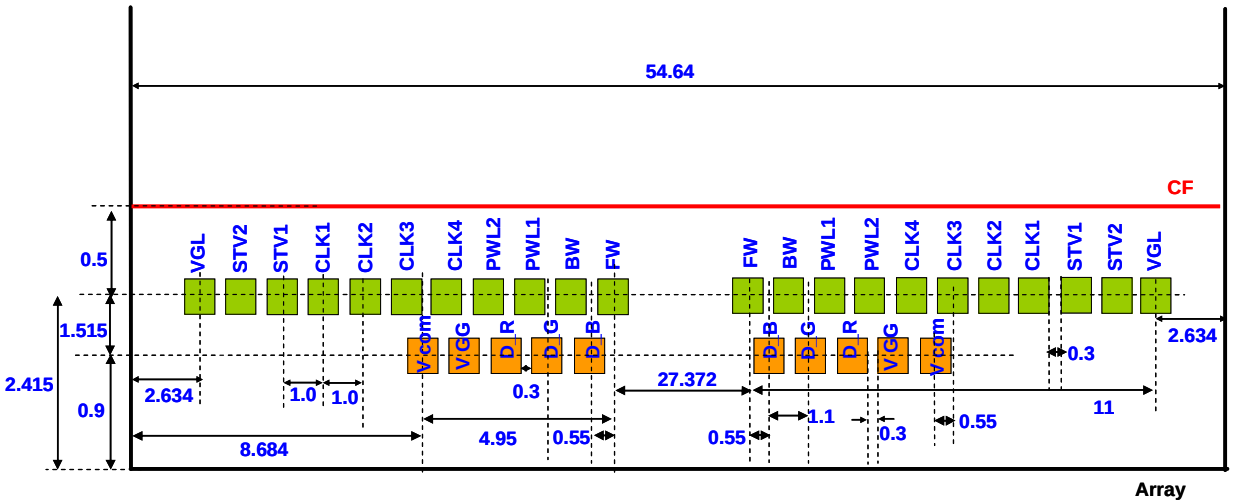


Unit : mm





6.5 Cell Test



Pad size : 0.8 x 0.8mm

Pad pitch 左右 : 1.1mm

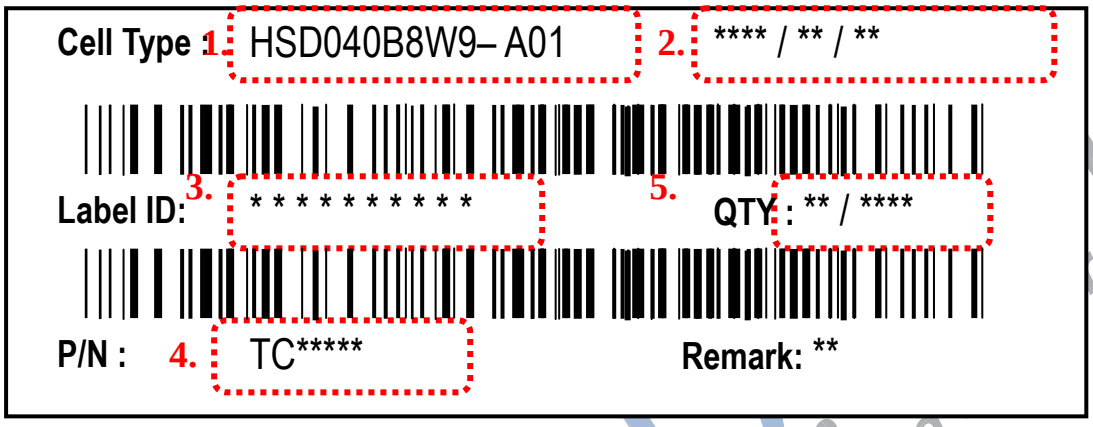
7.0 RELIABILITY TEST ITEMS

No.	Item	Conditions	Remark
1	High Temperature Storage	Ta=+80°C, 240hrs	
2	Low Temperature Storage	Ta=-30°C, 240hrs	
3	High Temperature Operation	Ta=+70°C, 240hrs	
4	Low Temperature Operation	Ta=-20°C, 240hrs	
5	High Temperature and High Humidity (Operating)	Ta=+60°C, 90%RH, 240hrs	

Note: (1) All tests above are practiced at module type.

(2) There is no display function NG issue occurred, all the cosmetic specification is judged before the reliability stress.

8.0 LOT MARK



8.1 Lot Mark

(1) Cell Type: Production name

1	2	3	4	5	6	7	8	9	10	11	12	13	14
H	S	D	0	4	0	C	8	W	1	-	A	*	*

code 1~3: Hannstar Display Co.

code 4~6: Display Area Diagonal size(inch)

011=1.1”

015=1.5”

018=1.8”,……

code 7 : Shipment type

A= Full Size before 2nd cut

B= 1/4 Cut

D= 1/16 Cut

F= Full cell without Polarizer

G= Full cell with Polarizer+IC

code 8 : Resolution

1=QQVGA ; 2=QCIF+ ; 3=QVGA ; 4=QQVGA- ;5=960x234 ; 6=480x234/480x240 ; 8=480X854/480X800 ; 9=480x272 ; A=240x400/240x432 ; C=640x234; D=800x480 ; E=SXGA ; F=1024x576/1024x600 ; G=WXGA+; H=HDTV ;J=720x480; K=WSXGA+ ;M=qHD ; S=SVGA ; X=XGA ; U=WUXGA/FHD ; V=VGA ; W=WXGA ;

code 9 : Aspect ratio

N=Standard , W=Wide

code10 :Serial No.

code12 :Version No.

code 13,14:Reversion No.

(2) Production date

(3) Label ID: serial number for barcode.

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)

Code (1),(2) : Out source code
Code (3) : Grade (D)
Code (4) : Year

Year	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Mark	6	7	8	9	0	1	2	3	4	5

Code (5) : Month

Month	Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct	Nov.	Dec.
Mark	1	2	3	4	5	6	7	8	9	A	B	C

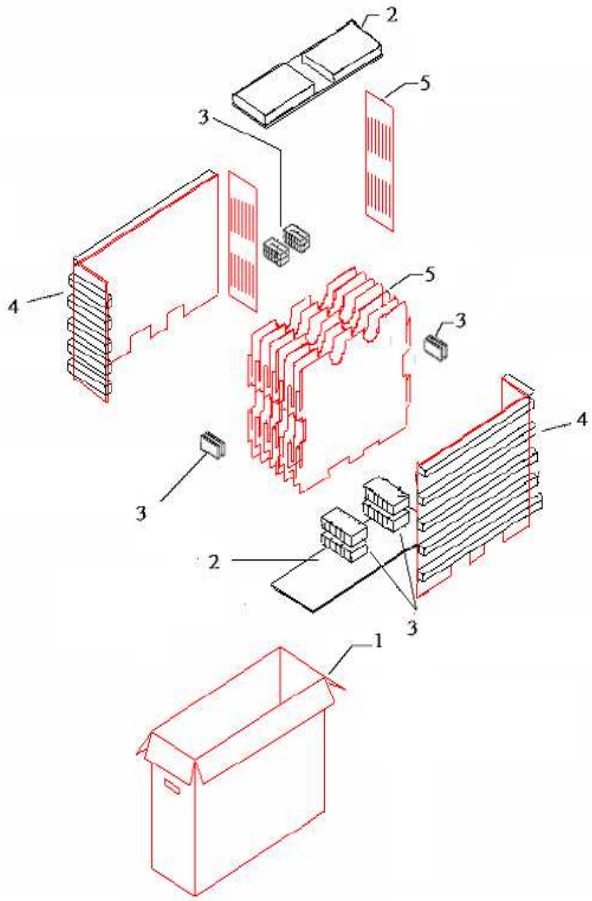
Code (6) : Date (1~9, A~X exp.I/O:10~31)
Code (7),(8),(9),(10) : Serial No.

(4) P/N: Hannstar internal part number

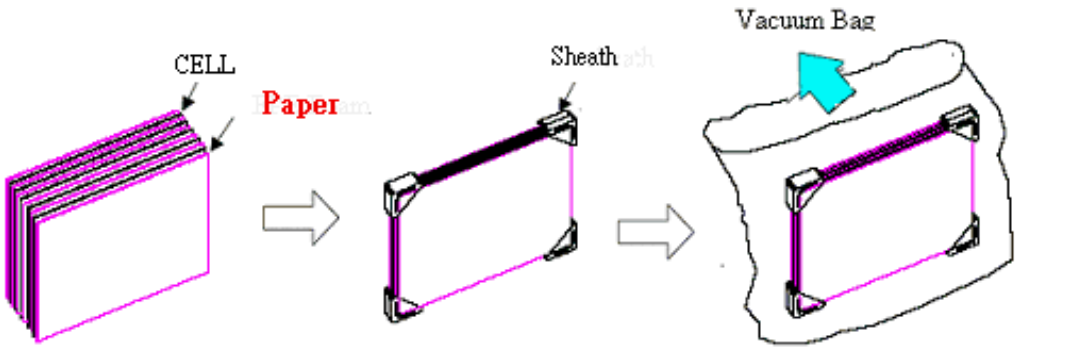
(5) QTY: Quantity of chip

9.0 PACKAGE SPECIFICATION

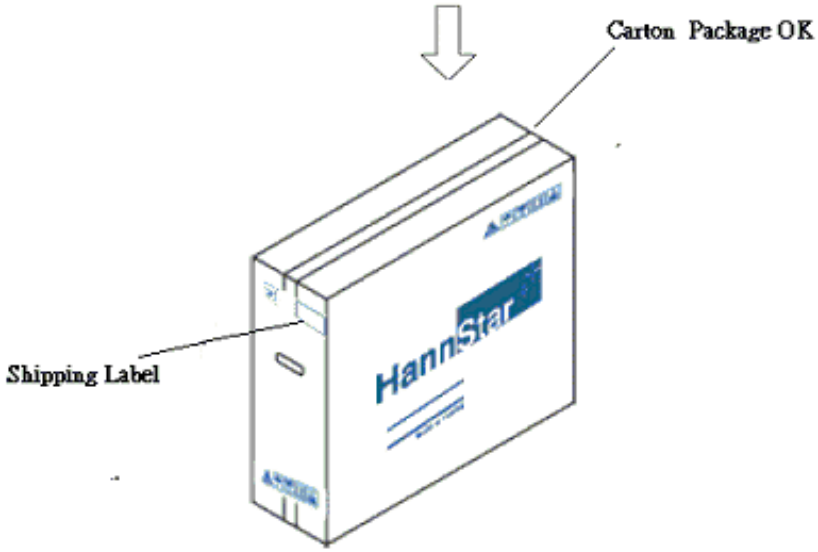
9.1 Packing Form



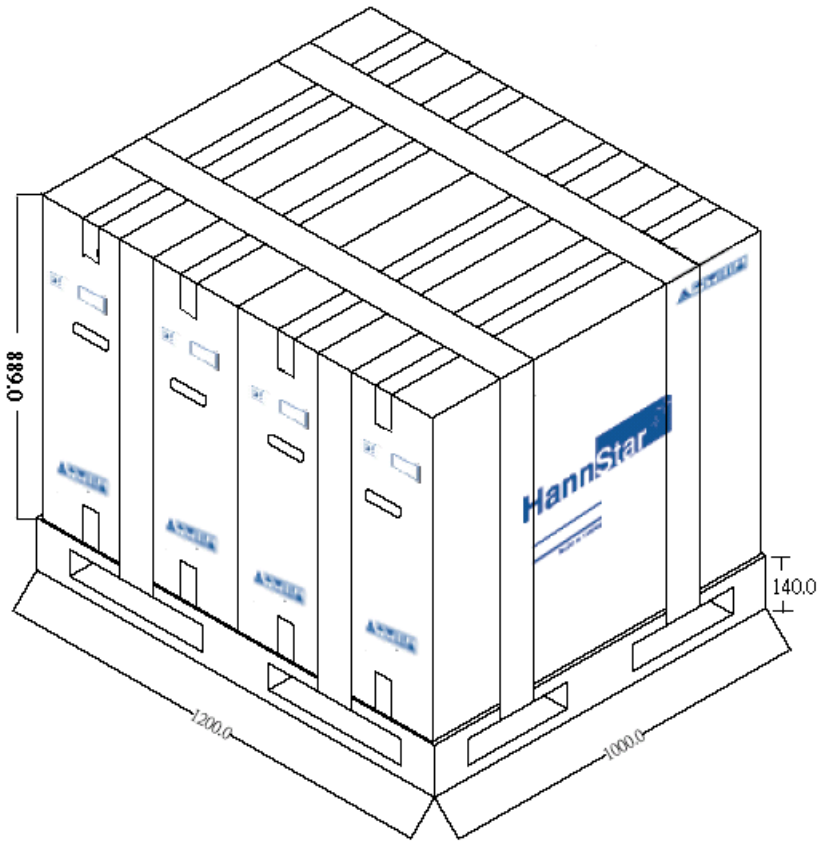
瀚宇編號	品名	Unit	Q'TY	附註
1	Carton	PC	1	
2	EPE Cushion(T/B)	PCS	2	1.EPE Cushion (T):B楞平板+EPE 片狀 2.EPE Cushion (B):
3	EPE buffer Cushion(T/B and both sides)	PCS	8~10	1Carton 有8pcs~10pcs
4	Around board=cardboard+EPE Cushion	PCS	2	B楞平板+EPE 條狀
5	Cardboard of partition	EA	1	
6	EPE Foam	PCS	56~72	0.3t -72 pcs，0.5t -56pcs
7	Vacuum Bag	PCS	8	
8	PET sheath	EA	32	



5 sheets x 8 packs=40 sheets



9.2 Packing Assembly Drawings



Notes:
1 Pallet: 4 set Cartons
1 Pallet: 160 sheet Cells

10.0 GENERAL PRECAUTION

10.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

10.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. HannStar does not warrant the module, if customers disassemble or modify the module.

10.3 Breakage of LCD Panel

10.3.1 If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.

10.3.2. If liquid crystal contacts mouth or eyes, rinse out with water immediately.

10.3.3. If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.

10.3.4. Handle carefully with chips of glass that may cause injury, when the glass is broken.

10.4 Electric Shock

10.4.1. Disconnect power supply before handling LCD module.

10.4.2. Do not pull or fold the LED cable.

10.4.3. Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

10.5 Absolute Maximum Ratings and Power Protection Circuit

10.5.1. Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.

10.5.2. Please do not leave LCD module in the environment of high humidity and high temperature for a long time.

10.5.3. It's recommended to employ protection circuit for power supply.

10.6 Operation

10.6.1 Do not touch, push or rub the polarizer with anything harder than HB pencil lead.

10.6.2 Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.

10.6.3 When the surface is dusty, please wipe gently with absorbent cotton or other soft material.

10.6.4 Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may causes deformation or color fading.

10.6.5 When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzine or other adequate solvent.

10.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

10.8 Static Electricity

10.8.1 Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.

10.8.2 Because LCD module use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

10.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

10.10 Disposal

When disposing LCD module, obey the local environmental regulations.

4.0 OPTICAL CHARACTERISTICS → min 值僅供特殊客戶有特殊需求時標示。

4.1 Optical Specification

Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Transmittance (with Polarizer)	T (%)	Θ=0 Normal viewing angle	3.4	3.8	–	%	Measuring with EWV Polarizer，Reference Only
Transmittance (without Polarizer)	T (%)		8.9	10.0	–	%	