 HannStar Display Corp.			
Document Title	HSD088IPW1-A Tentative Specification	Page No.	1/26
Document No.	DC120-	Revision	2.4

TO :

Date : Aug., 03, 2016

# **HannStar Product Specification** **(Tentative Specification)**

**Model: HSD088IPW1-A\***

Note:

1. The information contained herein is preliminary and may be changed without prior notices.
2. Please contact HannStar Display Corp. before designing your product based on this module specification.
3. 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.
4. The mark "\*\*\*" of Model means sub-model code.




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Document Title	HSD088IPW1-A Tentative Specification	Page No.	2/26
Document No.	DC120-	Revision	2.4

## Record of Revisions

Rev.	Date	Sub-Model	Description of change
1.0	Nov, 24, 2015	-A	Tentative Product Specification was first released.
2.0	Jan, 22,2016	-A	P26 Add Scan Direction Special Notice
2.1	Feb,01,2016	-A	P13 update TP_Sync note P17 Modify Power On/Off Sequence
2.2	Mar,03, 2016	-A	P5&18 Modify VF Spec
2.3	Mar,30,2016	-A	P6 Add Color chromaticity
2.4	Aug,3,2016	-A	Modify the Page 13 Electrical characteristics VGH voltage

 HannStar Display Corp.			
Document Title	HSD088IPW1-A Tentative Specification	Page No.	3/26
Document No.	DC120-	Revision	2.4

## Contents

1.0	General description .....	p.4
2.0	Absolute maximum ratings.....	p.5
3.0	Optical characteristics.....	p.6
4.0	Block diagram .....	p.10
5.0	Interface pin connection .....	p.13
6.0	Electrical characteristics .....	p.16
7.0	Reliability test items .....	p.21
8.0	Outline dimension .....	p.22
9.0	Lot mark .....	p.24
10.0	Package specification .....	p.25
11.0	General precaution .....	p.26

Document Title	HSD088IPW1-A Tentative Specification	Page No.	4/26
Document No.	DC120-	Revision	2.4

## 1.0 GENERAL DESCRIPTION

### 1.1 Introduction

HannStar Display model HSD088IPW1-A is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 8.8 (1:4) inch diagonally measured active display area with (480 horizontal by 1920 vertical pixel) resolution.

### 1.2 Features

- 8.8 inch (1:4 diagonal) configuration
- 16.7M color
- RoHS/ Halogen Free Compliance

### 1.3 Applications

- Automotive

### 1.4 TFT LCD General information

Item	Specification	Unit	
Outline Dimension	64.3 x 231.3 (typ)	mm	
Display area	54.72(H) x 218.88(V)	mm	
Number of Pixel	480 RGB (H) x 1920(V)	pixels	
Pixel pitch	0.114(H) x 0.114(V)	mm	
Pixel arrangement	RGB Vertical stripe		
Display mode	Normally Black		
NTSC	50 (typ.)	%	
Surface treatment	HC		
Weight	(100)g (Typ.)	g	
Back-light	White LED		
Power Consumption	Logic	0.65 (Max) @ White pattern · Frame rate 60Hz	W
	BL System	2.8 (Max) @ Black pattern w/o LED driver	W

### 1.5 Mechanical Information

Item	Min.	Typ.	Max.	Unit	
Module Size	Horizontal (H)	64.0	64.3	64.6	mm
	Vertical (V)	231.0	231.3	231.6	mm
	Depth (D)	—	4.8	5.1	mm
Weight	—	(100)	—	g	

Document Title	HSD088IPW1-A Tentative Specification	Page No.	5/26
Document No.	DC120-	Revision	2.4

## 2.0 ABSOLUTE MAXIMUM RATINGS

### 2.1 Electrical Absolute Rating

#### 2.1.1 TFT LCD Module

Item	Symbol	Min.	Max.	Unit	Note
Power supply voltage	$V_{DD}$	-0.5	4.0	V	
	$V_{GH}$	15	26	V	
	$V_{GL}$	-11.5	-4	V	
	$AV_{DD}$	7	12.5	V	
Logic Signal Input Level	$V_{DD}$	-0.5	4.0	V	

#### 2.1.2 Backlight unit

Item	Symbol	Typ.	Max.	Unit	Note
LED current	$I_L$	160	-	mA	(1) (2)(3)
LED voltage	$V_L$	16	17.5	V	(1) (2)(3)
LED reverse voltage	$V_R$	--	5	V	
LED forward current	$I_F$		80	mA	

Note:

- (1) Permanent damage may occur to the LCD module if beyond this specification. Functional operation should be restricted to the conditions described under normal operating conditions.
- (2)  $T_a = 25 \pm 2^\circ\text{C}$
- (3) Test Condition: LED current 160 mA. The LED lifetime could be decreased if operating  $I_L$  is larger than 160mA.

#### 2.1.3 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	$T_{opa}$	-20	70	$^\circ\text{C}$	
Storage Temperature	$T_{stg}$	-30	80	$^\circ\text{C}$	

Document Title	HSD088IPW1-A Tentative Specification	Page No.	6/26
Document No.	DC120-	Revision	2.4

### 3.0 OPTICAL CHARACTERISTICS

#### 3.1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	$\theta=0$ Normal viewing angle	600	800	—		(1)(2)(4)
Response time		Tr+Tf		—	30	40	msec	(1)(3)
White luminance (Center)		$Y_L$		480	600	—	cd/m <sup>2</sup>	(1)(4) ( $I_L=160mA$ )
Color chromaticity (CIE1931)	Red	$R_x$		0.576	0.626	0.676		c-light
		$R_y$		0.295	0.345	0.395		
	Green	$G_x$		0.262	0.312	0.362		
		$G_y$		0.493	0.543	0.593		
	Blue	$B_x$		0.097	0.147	0.197		
		$B_y$		0.059	0.109	0.159		
	White	$W_x$		0.250	0.300	0.350		
		$W_y$	0.272	0.322	0.372			
Viewing angle	Hor.	$\theta_L$	75	85	—		(1)(4)	
		$\theta_R$	75	85	—			
	Ver.	$\theta_U$	75	85	—			
		$\theta_D$	75	85	—			
Brightness uniformity		$B_{UNI}$	$\theta=0$ (9point)	70	80	—		(5)
View Direction		ALL						(6)

#### 3.2 Measuring Condition

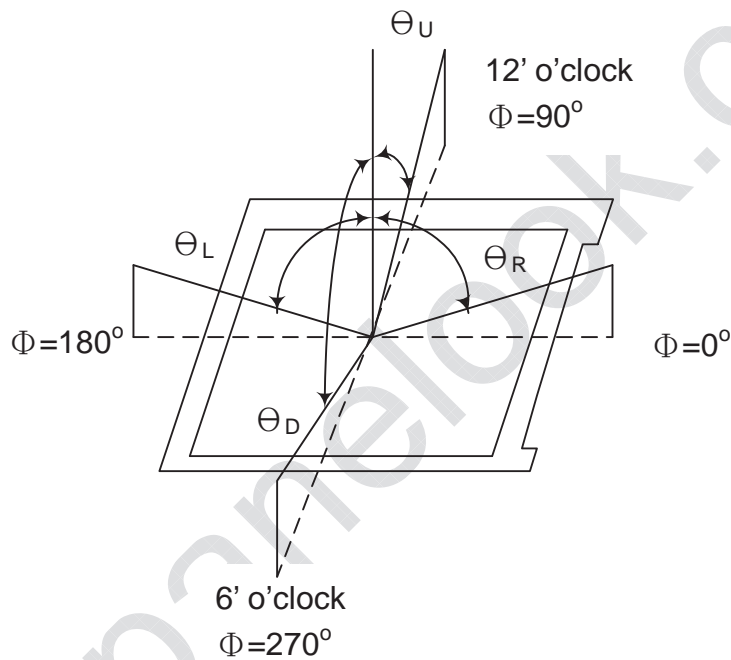
- Measuring surrounding : dark room
- LED current  $I_L$ : 160mA
- Ambient temperature :  $25\pm 2^\circ C$
- 15min. warm-up time.

Document Title	HSD088IPW1-A Tentative Specification	Page No.	7/26
Document No.	DC120-	Revision	2.4

### 3.3 Measuring Equipment

- FPM520 of Westar Display technologies, INC., which utilized SR-3 for Chromaticity and BM-5A for other optical characteristics.
- Measuring spot size : 20 ~ 21 mm

**Note (1)** Definition of Viewing Angle:

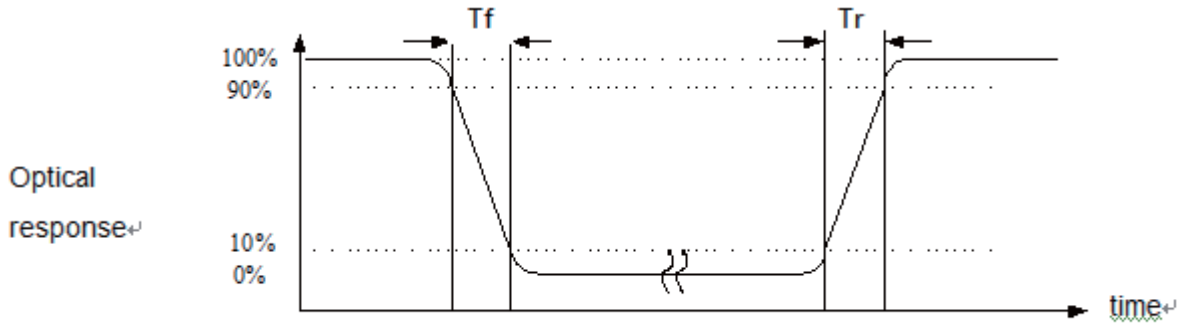


**Note (2)** Definition of Contrast Ratio (CR) :  
measured at the center point of panel

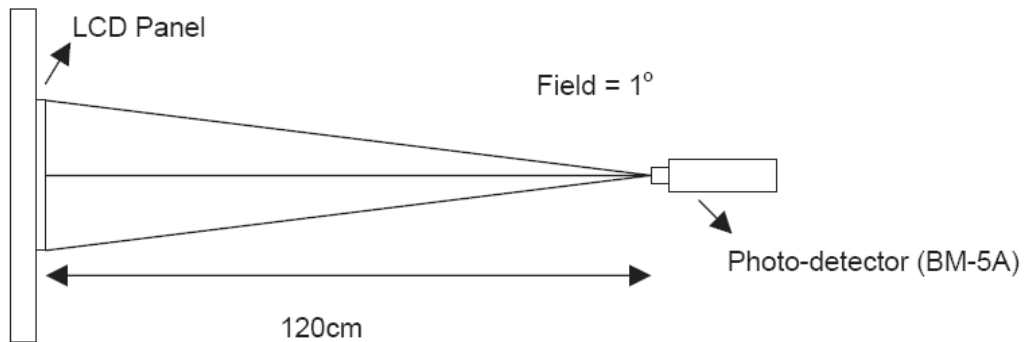
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Document Title	HSD088IPW1-A Tentative Specification	Page No.	8/26
Document No.	DC120-	Revision	2.4

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



**Note (4)** Definition of optical measurement setup





Document Title	HSD088IPW1-A Tentative Specification	Page No.	9/26
Document No.	DC120-	Revision	2.4

**Note (5)** Definition of Average Luminance Uniformity of White (Center)  
Definition of brightness uniformity



$$\text{Luminance uniformity} = \frac{(\text{Min Luminance of 9 points})}{(\text{Max Luminance of 9 points})} \times 100\%$$

**Note (6)** Rubbing Direction (The different Rubbing Direction will cause the different optimal view direction.)

Document Title	HSD088IPW1-A Tentative Specification	Page No.	10/26
Document No.	DC120-	Revision	2.4

## 4.0 BLOCK DIAGRAM

### 4.1 TFT LCD Module

