

Product Specifications



BONA
Display Specialist

BT1527A

Product

- 2.8" TFT LCD
- 240(RGB)×320
- 4 chip LED Backlight
- Resistive Touch

Version	Prepared / Date	Approved / Date
0	CSB / 01-06-2015	HB / 01-06-2015

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[illegible]

Revision History

Version	Summary	Date
0	Original	01-06-2015

1.1 Caution

1. This BONA LCD module has been specifically designed for use only in Electronic devices in the Areas of mobile phone .The module should not be used in applications where panel failure could result In physical harm or loss of life, and BONA expressly disclaims any and all liability relating in any way To the use of the module in such applications.

2. Customer agrees to indemnity, defend and hold BONA harmless from and against any and all actions, claims, losses, damages, liabilities, awards, costs, and expenses, including legal fees, resulting From or arising out of Customer's use, or sale for use, of BONA module in applications.

1.2 Description

BT1527A is a transmissive type color active matrix TFT liquid crystal display that use amorphous Silicon TFT as switching devices .This module is composed of a TFT-LCD module , a driver circuit and back-light unit. The resolution of 2.8" contains240x320 pixels and can display up to 65Kcolors.

1.3 General Specifications

ITEM	Specification	
LCD Mode	TFT;RGB Color; Normal White; Transmissive	
Controllable Color	Indication data: Red-5bit,Green-6bit, Blue-5bit gradation control	65K Colors
Background Color	Indication data: Red(1,1,1,1,1)/Green (1,1,1,1,1)/Blue(1,1,1,1,1)	White
Viewing direction	12 0' CLOCK	
Backlight	LED white colored Backlight(LED unit,4chip LED)	
Driver IC	ILI9341	
Mounting methods	COG	
Operating temperature	-20° C ~70° C	
Storage temperature	-30° C ~80° C	
Operating humidity	Temp. \leq 40° C, 85%RH MAX. Temp. >40° C, Absolute humidity shall be less than 85%RH at40° C	
Storage humidity	Temp. \leq 40° C, 85%RH MAX. Temp. >40° C, Absolute humidity shall be less than 85%RH at40° C	

(Note) Color tone is slightly changed by temperature and driving voltage.

This product measure up Rohs standard.

1.4 Mechanical Specifications

ITEM	Specification
Outline Dimension	According to the annexes outline drawing No.BT1527A
Dots Matrix	(240)(W) x 320(H) Dots
Outline area(mm)	50.0*69.2
Active Area(mm)	43.2*57.6
Mass	TBD

1.5 Terminal Functions

NO	Symbol	Function	I/O
1-4	DB8~DB11	Data bus	P
5	GND	Ground	P
6	IOVCC	Power supply	I
7	CS	Chip select signal.	I
8	RS	Register select	I
9	WR	Write data when WRX is low.	I
10	RD	Read strobe signal. Read out data when RDX is low	I
11	GND	Ground	P
12	XL	X down for touch panel	-
13	YU	Y up touch panel	-
14	XR	X right for touch panel	-
15	YD	Y down for touch panel	-
16	LEDA	Anode of LED backlight	P
17~20	LEDK1~4	Cathode of LED backlight.	P
21	IMO	IM0=18 Bit DB8-15; IM0=0 16Bit DB0-DB15;	P
22	DB12	Data bus	I/O
23~30	DB0~DB7	Data bus	I/O
31	RESET	System reset pin.	I
32~33	VCI	Power supply	P
34	GND	Ground	P
35~37	DB13~DB15	Data bus	I/O

2.1 Absolute maximum ratings

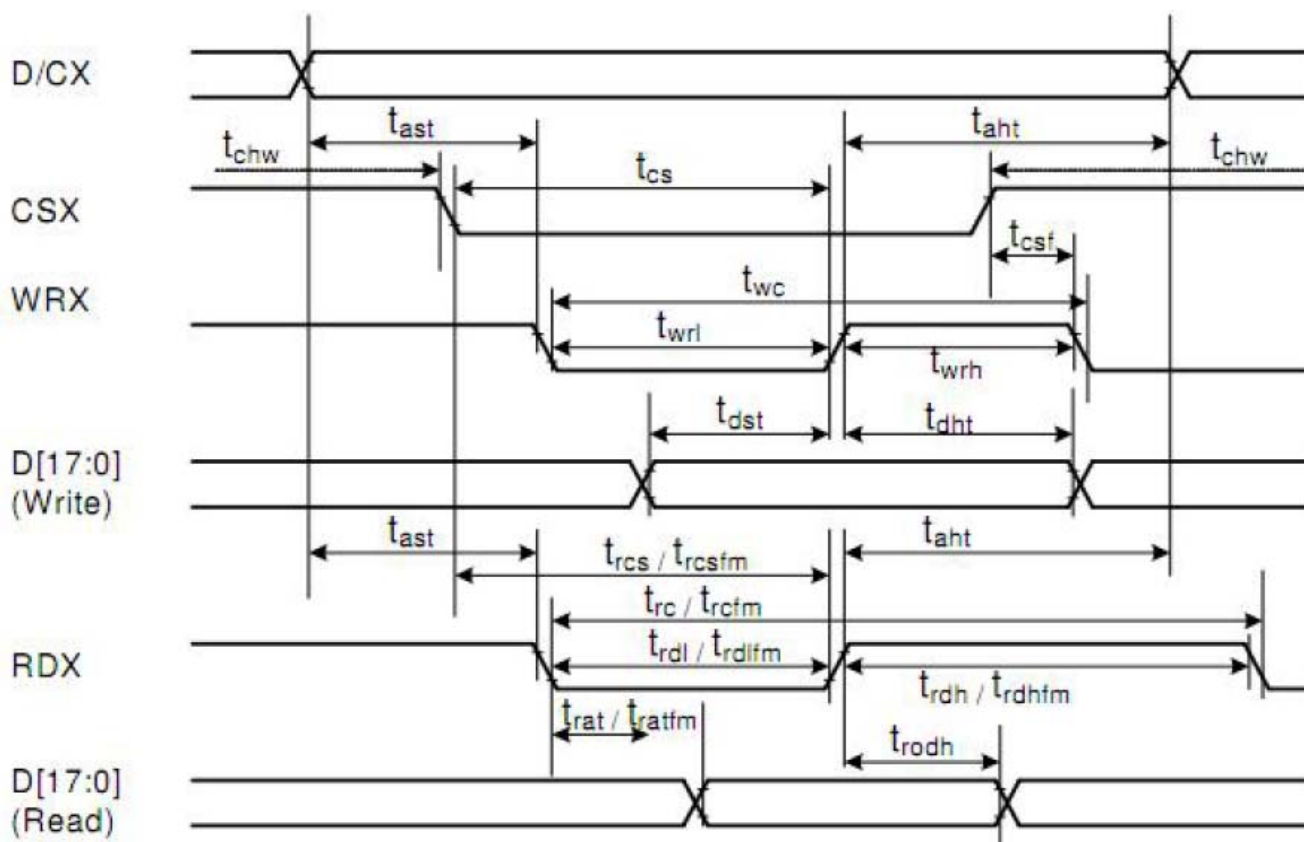
Item	Symbol	Value	Unit
Operation Temperature	Top	-20~70	°C
Storage Temperature	Tstr	-30~80	°C
Power supply voltage	VDD	-0.3~4.6	V

2.2 LED back light specification (per a chip)

Item	Symbol	Condition	Min	Type	Max	Unit
Forward voltage	Vf	If=15mA	2.8	3.2	3.4	V
Forward current	Ipn	/1-chip	-	15	-	mA
Reverse voltage	Vr	Per chip	-	-	4.0	V
Reverse Current	Ir	Vr=4V	-	-	15	uA
Uniformity(with L/G)	-	If=15mA	70	-	-	%
Luminance	No LCD	Lv	If=15mA	-	-	Cd/m2
	With LCD	Lv	If=15mA	150	180	Cd/m2
Luminous color		White				

2.3 Time Sequence

2.3.1 Display Parallel 18/16/9/8-bit Interface Timing Characteristics (8080-series)



Signal	Symbol	Parameter	min	max	Unit	Description
DCX	tast	Address setup time	0	-	ns	
	taht	Address hold time (Write/Read)	0	-	ns	
CSX	tchwh	CSX "H" pulse width	0	-	ns	
	tcs	Chip Select setup time (Write)	15	-	ns	
	trcs	Chip Select setup time (Read ID)	45	-	ns	
	trcsfm	Chip Select setup time (Read FM)	355	-	ns	
	tcsf	Chip Select Wait time (Write/Read)	10	-	ns	
WRX	twc	Write cycle	66	-	ns	
	twrh	Write Control pulse H duration	15	-	ns	
	twrl	Write Control pulse L duration	15	-	ns	
RDX (FM)	trcfm	Read Cycle (FM)	450	-	ns	
	trdhfm	Read Control H duration (FM)	90	-	ns	
	trdlfm	Read Control L duration (FM)	355	-	ns	
RDX (ID)	trc	Read cycle (ID)	160	-	ns	
	trdh	Read Control pulse H duration	90	-	ns	
	trdl	Read Control pulse L duration	45	-	ns	
D[17:0], D[15:0], D[8:0], D[7:0]	tdst	Write data setup time	10	-	ns	For maximum CL=30pF For minimum CL=8pF
	tdht	Write data hold time	10	-	ns	
	trat	Read access time	-	40	ns	
	tratfm	Read access time	-	340	ns	
	trod	Read output disable time	20	80	ns	

2.4 Electrical characteristics

Item	Symbol	Condition	Min	Type	Max	Unit
Power supply voltage	VDD		2.5	-	3.3	V
Power supply voltage	IOVCC		1.65		3.3	V
Input high voltage	Vih		0.8VDD	-	VDD	V
Input low voltage	Vil		-0.3	-	0.2VDD	V
Output high voltage	Voh	Ioh=-0.1mA	0.8VDD	-	-	V
Output low voltage	Vol	Iol=-0.1mA	-	-	0.2VDD	V
Input leakage current	Iil	Vin=0--Vdd	-1.0	-	1.0	uA
Current consumption	Idd	-	-	9	-	uA

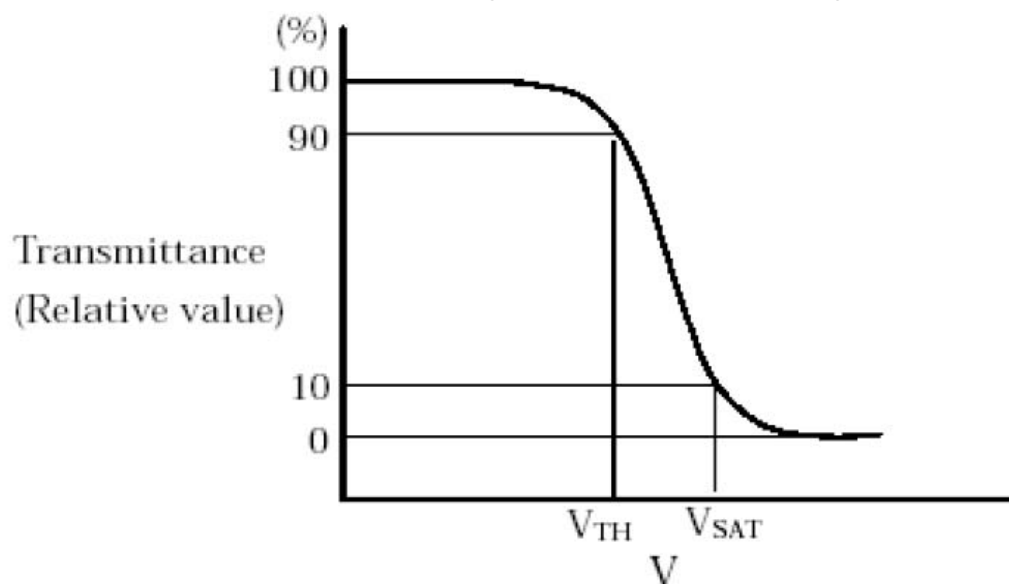
3.1 Optical Characteristics

Item	Symbol		Min	Type	Max	Unit	Condition
Response time*1	Tr		-	4	-	ms	$\Phi=0^\circ \theta=0^\circ 25^\circ\text{C}$
	Td		-	12	-	ms	
Viewing Angle*1	Hor.	L	-	45	-	Deg.	CR>10
		R	-	45	-		
	Ver.	U	-	45	-		
		D	-	20	-		
Contrast Ratio	Cr		-	500	-	-	$\Phi=0^\circ$ $\theta=0^\circ$
Color of CIE Coordinate	W	x	0.253	0.303	0.353		$\Phi=0^\circ$ $\theta=0^\circ$
		y	0.265	0.325	0.385		
NTSC Ratio	S			65		%	

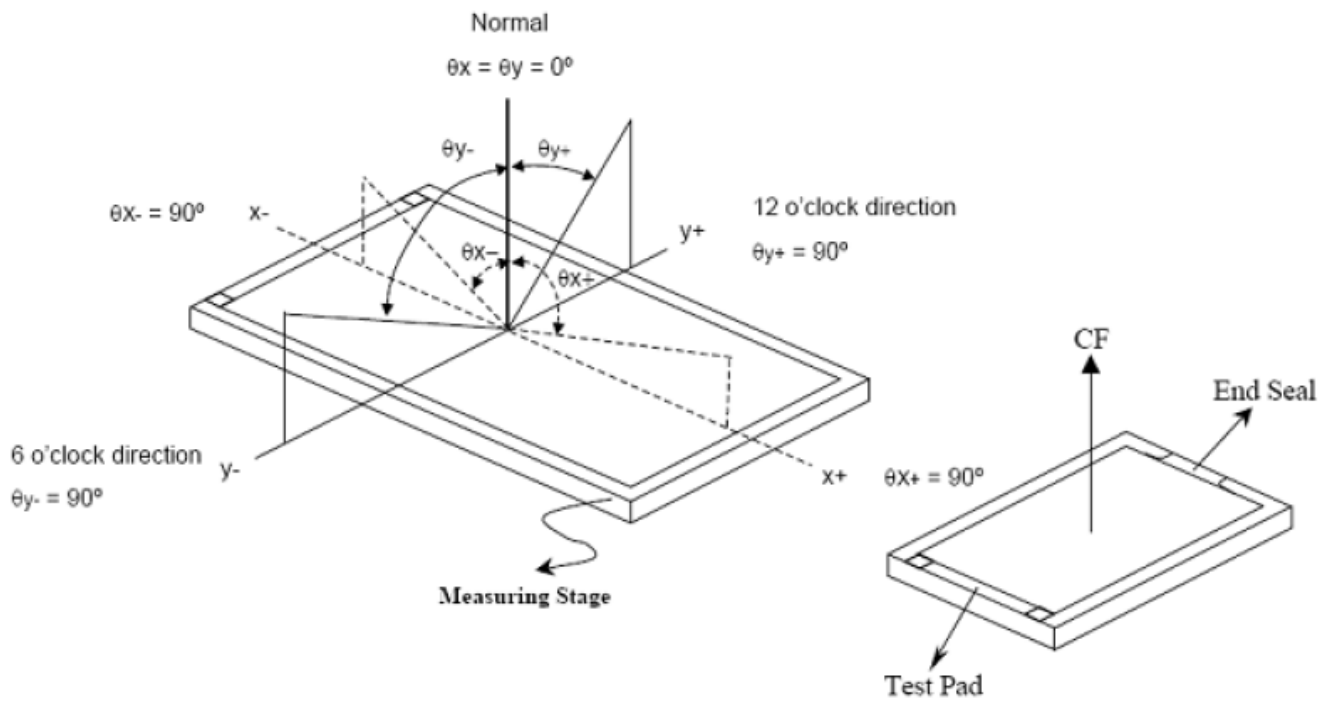
(Note*1)The data above is only for panel.

3.2 Definition of Optical Characteristics

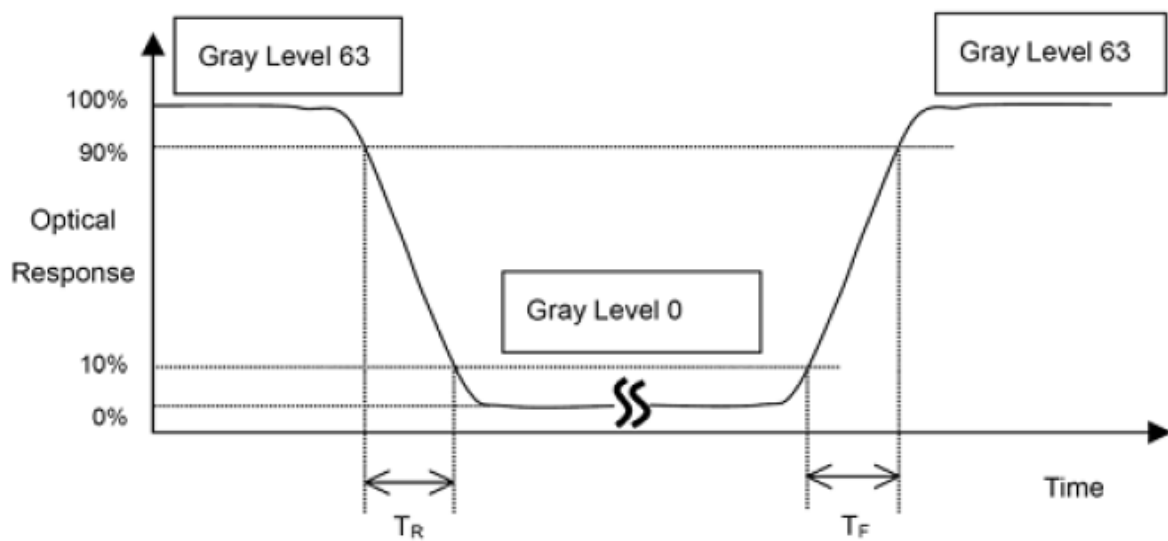
3.2.1 Definition of Threshold voltage and Saturation voltage



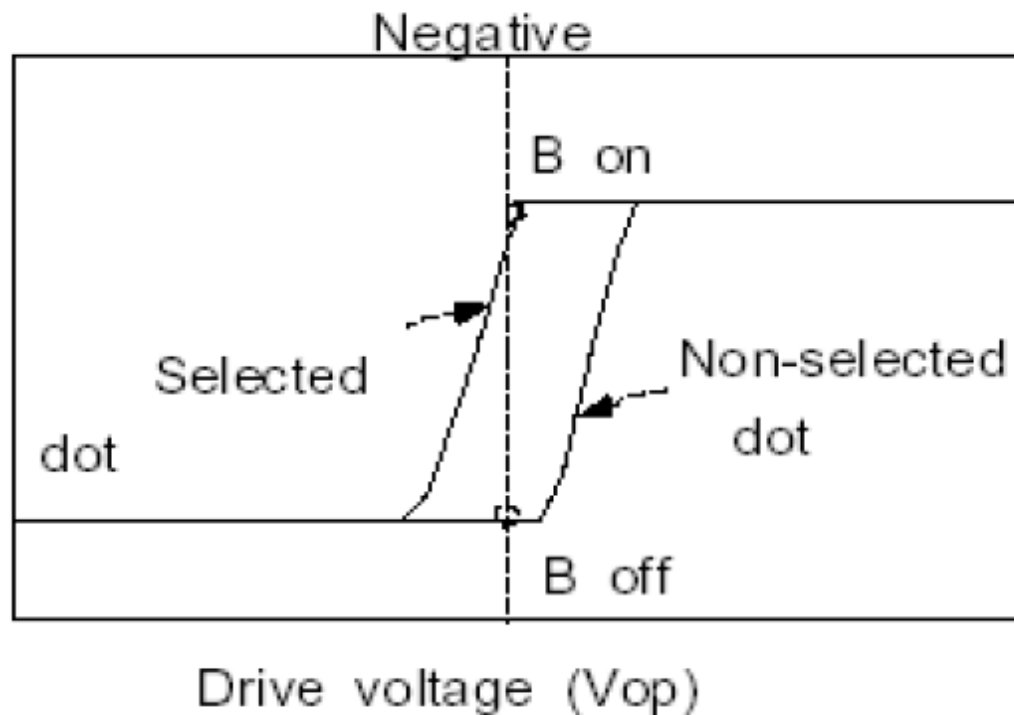
3.2.2 Definition of Viewing Angle



3.2.3 Definition of Response Time



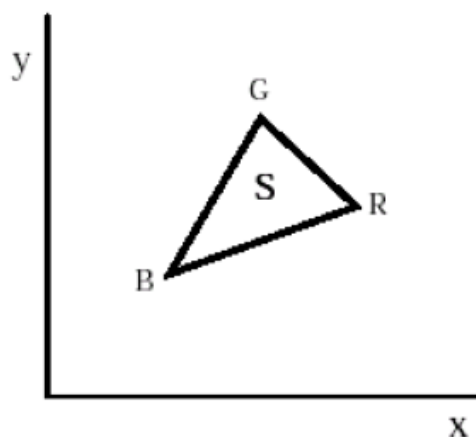
3.2.4 Definition of Contrast Ratio



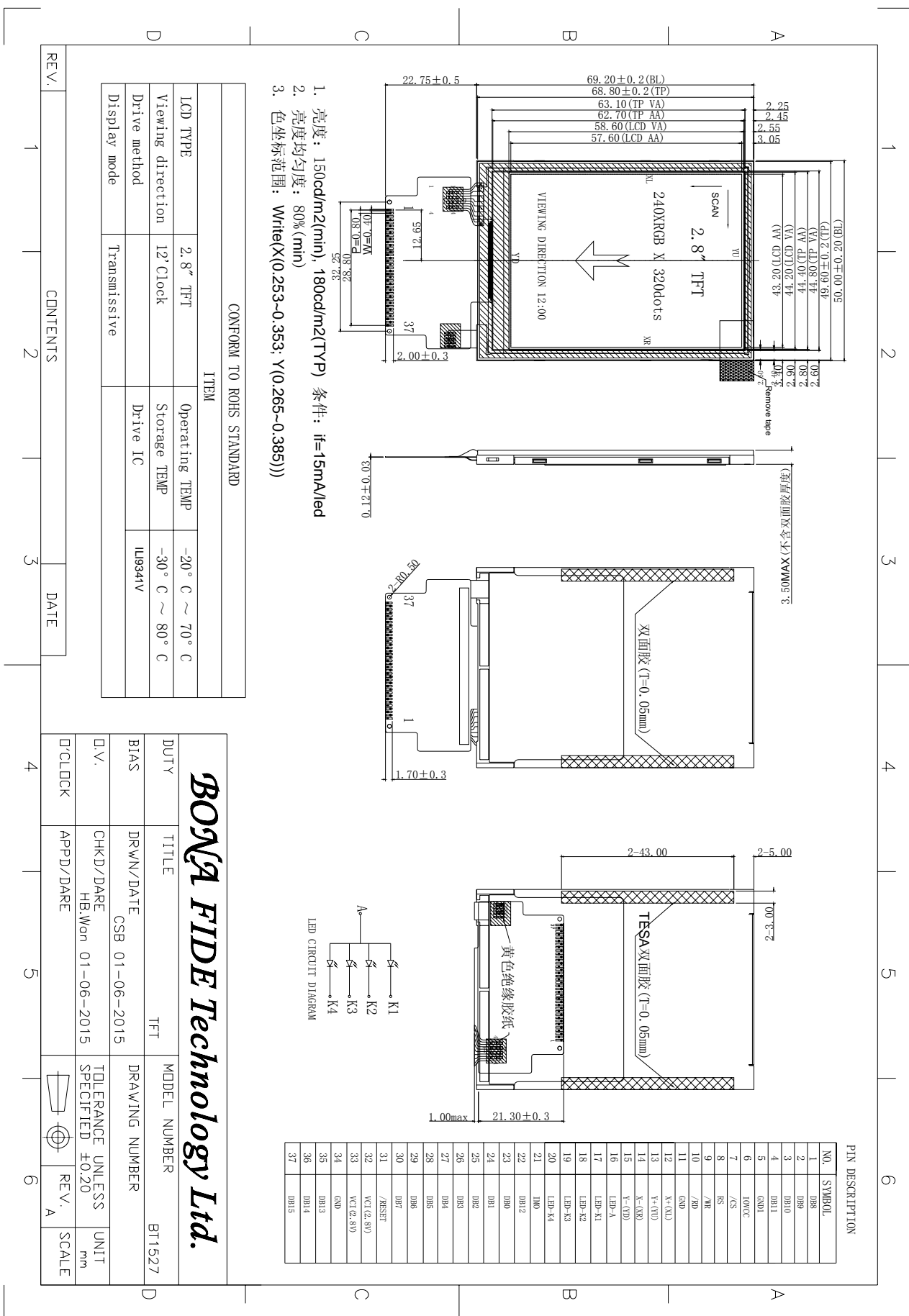
$$\text{Contrast Ratio} = \frac{\text{Brightness of all pixel white}}{\text{Brightness of all pixel black}}$$

3.2.5 Definition of Color gamut

$$\text{Color gamut: } S = \left(\frac{\text{RGB triangle Area}}{\text{NTSC triangle Area}} \right) \times 100$$



4.1 Module outline



5.1 Content or Reliability Test

No.	Test Item	Test Conditions
1	High Temperature Storage Test	TA=80℃, 48hrs/96hrs
2	Low Temperature Storage Test	TA=30℃, 48hrs/96hrs
3	High Temperature and High Humidity Operation Test	TA=40℃, 90%RH, 48Hrs/96hrs (No Condensation Dew)
4	High Temperature Operation Test	TA=70℃, 48hrs/96hrs
5	Low Temperature Operation Test	TA=-20℃, 48hrs/96hrs
6	Heat Shock Test	TA=-30℃(0.5hrs)~80℃(0.5hrs, 48hrs/10Cycle

A test LCD panel is used in all the tests./Each test item uses a test LCD panel only once.
The tested LCD panel is not used in any other tests.

The LCD panel is tested in circumstances in which there is no condensation.

The tested LCD is inspected after 2 hours of storage at room temperature and room humidity after each test is finished.

6.1 Handling Precautions of panel

As LCD module is glass product of precision processing and special treatment, It is vulnerable enough to have chips and cracks easily. And especially edges should Be protected from shocks. If the liquid crystals in LCD flows out when the product Is broken pay most attention to that you do not put the liquid crystal into your eyes And mouth. If the liquid crystal touches your hand, skin, or clothing, wash it away with soap and water immediately and completely.

The polarizer on LCD is soft and easily scratched. If the surface is stained, use Soft dry cloth and wipe gently. If the surface is heavily stained, use the following Solvents: 1 , Isopropyl alcohol . 2. Ethyl alcohol. Other solvents may damage the polarizer. Especially, do not use water, ketone and aromatic solvents.

Do not give any pressure to the surface of LCD, and of not give excessive stresses to the side of LCD module. It may cause a distortion of color on the LCD.

As LCD module uses CMOS devices, it is very sensitive to static electricity.

Touching the IC or LCD module may cause abnormal display that cannot recover. Do not touch the IC of LCD module.

If the logic circuit power is OFF, do not apply the input signals.

Be sure to ground the body when handling the LCD module.

Tools required for assembly, such as soldering irons, must be properly grounded.

To prevent destruction of the elements by static electricity be careful to maintain an optimum work environment.

Do not forcibly pull or bend the I/O cable.

Do not disassemble or process the LCD module.

NC terminal should be open. Do not connect anything.

To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

The LCD module is coated with a film to protect the display surface. Take care when peeling off this protective film since static electricity may be charged.

Please handle carefully, because the glass has a sharp edge.

6.2 Storage Precautions

Take care to minimize corrosion of the electrode. Moisture condensation on a Current flow in a high humidity environment accelerates corrosion of the electrode.

When storing the LCD module, avoid exposure to direct sunlight or the light of Fluorescent lamps . Keep the LCD module in bags designed to prevent static electricity charging under low temperature/normal humidity conditions(avoid high temperature/high humidity and low temperature below 0° C)

6.3 Design Precautions

The absolute maximum ratings represent the rated value beyond which LCD module can not exceed. When the LCD module is used in excess of this rated value, Their operating characteristics may be adversely affected. To prevent the occurrence Of erroneous operation caused by the noise, attention must be paid to satisfy VIL, VIH specification values, including taking the precaution of using signal cables that are short

The liquid crystal display exhibits temperature dependency characteristics. Since recognition of the display becomes difficult when the LCD is used out of its designated Operating temperature range, be sure to use the LCD within this range.

We recommend that power supply lines (VDD, VEE) have over-current protection Line.(Fuse etc)

Sufficiently notice the mutual noise interference occurred by peripheral devices.

To cope with EMI ,take measure basically on outputting side.

When fixing LCD module, which is consisted of glass panel, TCP fixes it at plastic Case side . In case PCB is fixed, there is the possibility that the disconnection is occurred by somewhat stress.

When mounting the LCD module, make sure that it is free of twisting, warping and distortion. Distortion has great influence upon display quality. Also keep the shiftiness enough regarding the outer case.

6.4 Others

Liquid crystals solidify under low temperature (below the storage temperature range) leading to defective orientation or the generation of air bubbles . Air bubbles may also be generated if the LCD module is subject to a low temperature.

If the LCD modules have been operating for a long time showing the same display patterns, the display patterns may remain on the screen as ghost images and a slight contrast irregularity may also appear. A normal operating status can be regained by suspending use for some time. It should be noted that this phenomenon does not adversely affect performance reliability.

To minimize the performance degradation of the LCD modules resulting from destruction caused by static electricity etc., exercise care to avoid holding the following sections when handling the modules.

1. Terminal electricity sections, 2.Part of pattern wiring on FPC, etc.