

LCM APPROVAL SHEET

Project No.	IE-F-2531CS03S-CB-1		
Customer			
Module No.			
Product type	Type	:TFT LCD	
	Resolution	:240 (RGB)x 240 Dots	
	Screen Size	:1.3" display	
Signature by customer:			
Structure size:	<input type="checkbox"/> OK _____ <input type="checkbox"/> NG _____	备注:	
Electric property:	<input type="checkbox"/> OK _____ <input type="checkbox"/> NG _____	备注:	
公司 Company	Designed by	Checked by	Approved by
Signature			
Rev.	Date	Description	
V0	2020-9-18	Preliminary Specification Release	

1. General Description

■ InterElcom model IE-F-2531CS03S-CB-1 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 1.3 inch diagonally measured active display area with (240horizontal by 240 vertical pixel)resolution.

■ ROHS Compliance & Halogen Free

2. General Feature

Item	General feature	Remark
Outside dimensions	32.98mm(W)×39.45mm(H)×3.31mm(D)(Typ)	
Active area	LCD: 23.4mm(W) ×23.4mm(H)	
Number of Pixels	240(RGB) ×240 pixels	
Pixel Arrangement	RGB vertical stripes	
Display Mode	Normally Black. Transmissive LCD	
Viewing direction	ALL o'clock	
Input signals	MCU/SPI compatible 8080 I/F	
Driver IC	LCD :ST7789V/CTP :FT3267	

3. Absolute Maximum Ratings

Ta=25±5°C, GND=0

Item	Symbol	Ratings	Unit	Condition
Operating power	V _{dd}	- 0.3 ~ 4.6	V	
Operating temperature	T _{OPR}	- 20 ~ 70	°C	No condensation
Storage temperature	T _{STR}	- 30 ~ 80		

4. Electrical Specification

4.1 DC characteristics

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
Supply power	V _{dd}		2.5	2.8	3.3	V
Input high voltage	V _{IH}		0.7V _{dd}	-	V _{dd}	
Input low voltage	V _{IL}		0	-	0.3V _{dd}	
Output high voltage	V _{OH}		0.8V _{dd}	-	-	
Output low voltage	V _{OL}		0	-	0.2V _{dd}	

6.2 Back light circuit characteristics (2 LEDs):

Item	Symbol	Min	Typ.	Max.	Unit	Condition
Operating voltage	V _{LED}	-	3.2	-	V	
Operating current	I _{LED}	-	40	-	mA	Each LED =20mA
LCM luminance (display white)	B	250	290		cd/m ²	-
BL luminance (display white)	BL	5000	5500	-	cd/m ²	
LCM brightness uniformity (display white)	BU	80	-	-	%	-

Test condetion:LED*2+1

7. Optical Specification

7.1 LCD optical characteristics LCD

Ta=25°C

Item	Symbol	Condition	Min	Typ	Max	Unit	Remark
Response time	Tr+Tf	$\Theta=0^\circ;$ $\Phi=0^\circ;$	-	35	50	ms	Note4
Contrast ratio	Cr		-	350	-	-	Note3
Luminance uniformity	δ WHITE		80	-	-	%	Note7
Surface luminance	Lv		-	290		cd/m ²	Note6
View range angle (with polarizer)	Top	CR≥10	-	80	-	Degree	Note5
	Bottom		-	80	-		
	Left		-	80	-		
	Right		-	80	-		
CIE (X, Y)	Rx	$\Theta=0^\circ$	0.637	0.657	0.677	-	Note8
	Ry		0.300	0.320	0.340		
	Gx		0.267	0.287	0.307		
	Gy		0.571	0.591	0.611		
	Bx		0.120	0.140	0.160		
	By		0.060	0.080	0.100		
	Wx		0.290	0.310	0.330		
	Wy		0.307	0.327	0.347		

7.2 Measurement Equipment

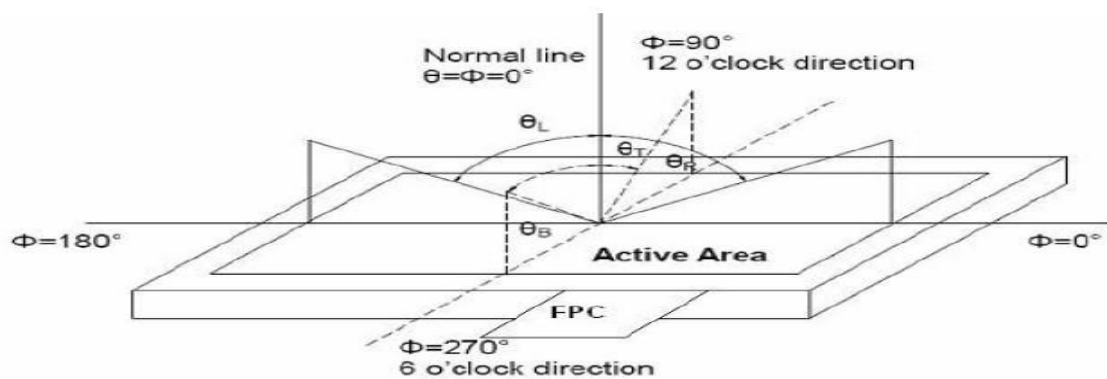
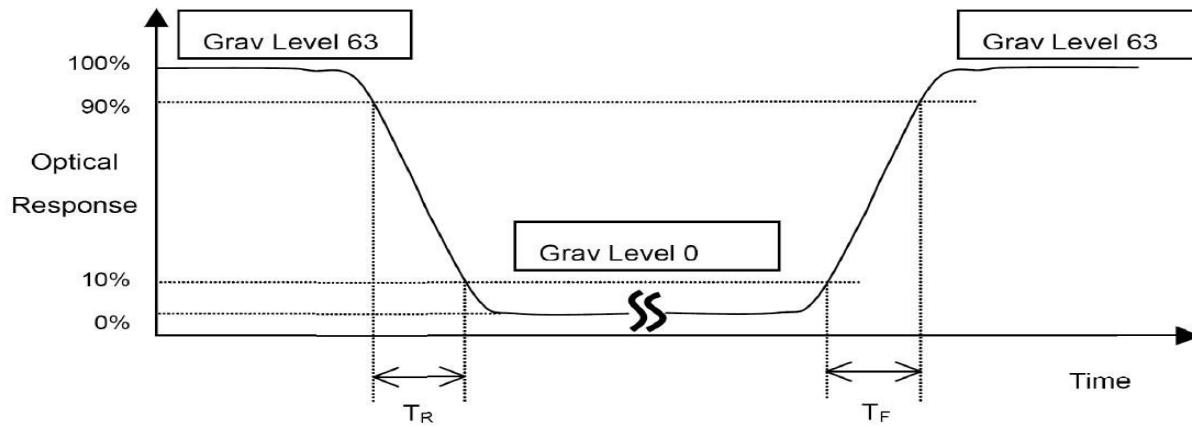


Fig. 1 Definition of viewing angle

- Viewing angle is the angle at which the contrast ratio is greater than 10. The angles are determined for the horizontal or x axis and the vertical or y axis with respect to the z axis which is normal to the LCD surface.

(2) Response time



- Response time is the time required for the display to transition from white to black (Rising time, T_R) and from black to white (Falling time, T_F).for additional information

(3) Contrast Ratio(CR)

Contrast Ratio(CR) is defined mathematically as:

$$\text{Contrast Ratio} = \frac{\text{Surface Luminance with all white pixels}}{\text{Surface Luminance with all black pixels}}$$

- Surface luminance is the center point across the lcd surface 500mm from the surface with all pixels displaying white.

4. Pin Description

NO.	Symbol	Function
1	LEDA	LED, anode.
2	LEDK	LED, cathode
3	GND	GND
4	VCC	Power Supply for Analog, Digital System and Booster Circuit.
5	IOVCC	Power Supply 1.8V
6	IM1/2	MCU/SPI4
7	RESET	Reset signal.
8	CS	Command / data select.
9	DC	Display data/command selection pin in parallel interface.
10	WR	Write enable in MCU parallel interface.
11	RD	Read signal.
12	SDA	SPI Data bus
13-20	DB0-DB7	Data bus
21	TE	Tearing effect signal is used to synchronize MCU to frame memory
22	NC	No pin
23	GND	GND
24	GND	GND

8. Timing Characteristics

Refer to IC datasheet.

11. Reliability and inspection standard

Samples OK before testing

Test item	Test condition
High temperature storage	80°C , 48hr
Low temperature storage	-30°C , 240 hr/ -40°C , 8hr
High temperature operation	70°C , 48 hr
Low temperature operation	-20°C , 48 hr
High temperature and high humidity operation	60°C、95%RH, 48 hr
Thermal shock	-40°C (30min) → 80°C (30min) 48 cycles

After completing the reliability test, leave the samples under the room temperature and for the following inspection items:

- ① No clearly visible defects or deterioration of display quality allowed.
- ② No function-related abnormalities.
- ③ Connected parts still connecting tightly.
- ④ Display characteristics fulfill initial value , contrast ratio should be an least 30% of initial value.