

IDK-1108R-45SVA1E

TFT-LCD 8.4" SVGA (LED
Backlight)

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Chapter 1

Overview

1.1 General Description

This document is for the 8.4 inch color TFT LCD module IDK-1108R-45SVA1E. IDK-1108R-45SVA1E is designed with wide viewing angle; wide operating temperature and long life LED backlight and is suited for display units for Industrial Applications. An LED driving board for backlight unit is included in this panel and the structure of the LED units is replaceable. IDK-1108R-45SVA1E has a built in timing controller and LVDS interface. The screen format is intended to support a 800 x 600 (H x W) SVGA screen and 16.2M (RGB 8-bits) or 262k colors (RGB 6-bits). IDK-1108R-45SVA1E is a RoHS product.

1.2 Display Characteristics

The following items are characteristics summary on the table under 25°C condition.

Items	Unit	Specifications
Screen Diagonal	[inch]	8.4 (213.4mm)
Active Area	[mm]	170.4(H) x 127.8(V)
Pixels H x V		800x3(RGB) x 600
Pixel Pitch	[mm]	0.213x 0.213
Pixel Arrangement		R.G.B. Vertical Stripe
Display Mode		TN, Normally White
Nominal Input Voltage VDD	[Volt]	3.3 (typ)
Typical Power Consumption	[Watt]	2.94 (typ)
Weight	[Grams]	328.5 (typ)
Physical Size	[mm]	203.0(W) x 142.6(H) x 10.3(D) (typ.)
Electrical Interface		1 channel LVDS
Surface Treatment		Anti-glare, Hardness 3H
Support Color		262K(6-bit) / 16.2M(8-bit)
Temperature Range		
Operating	[°C]	-5 to +60 (panel surface temperature)
Storage (Non-Operating)	[°C]	-30 to +70
RoHS Compliance		RoHS Compliance

1.3 Functional Block Diagram

The following diagram shows the functional block of the 12.1 inches Color TFT-LCD Module:

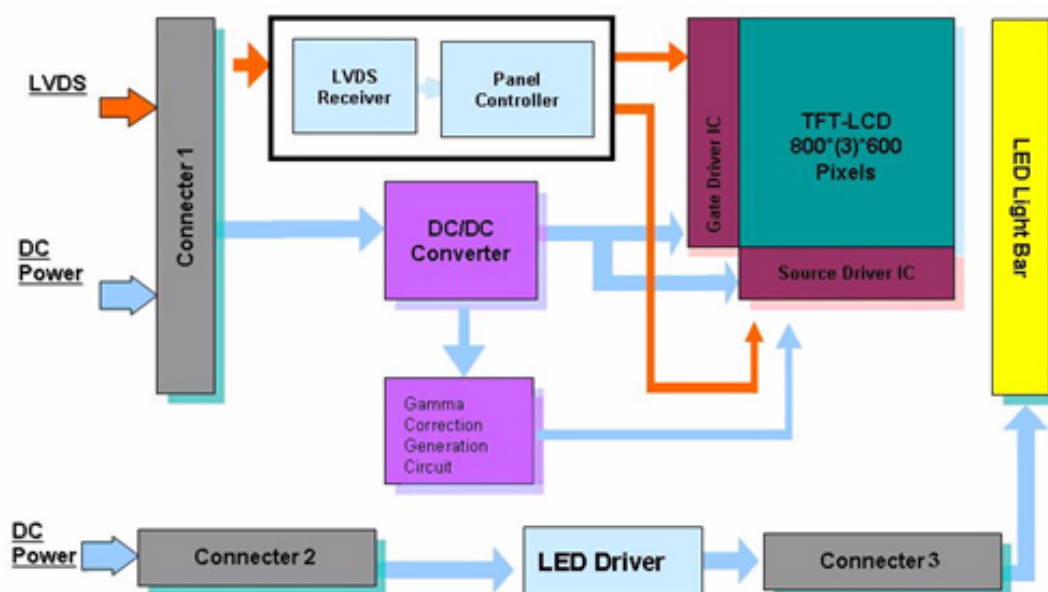


Figure 1.1 Function block diagram

1.4 Absolute Maximum Ratings

1.4.1 Absolute Ratings of TFT LCD Module

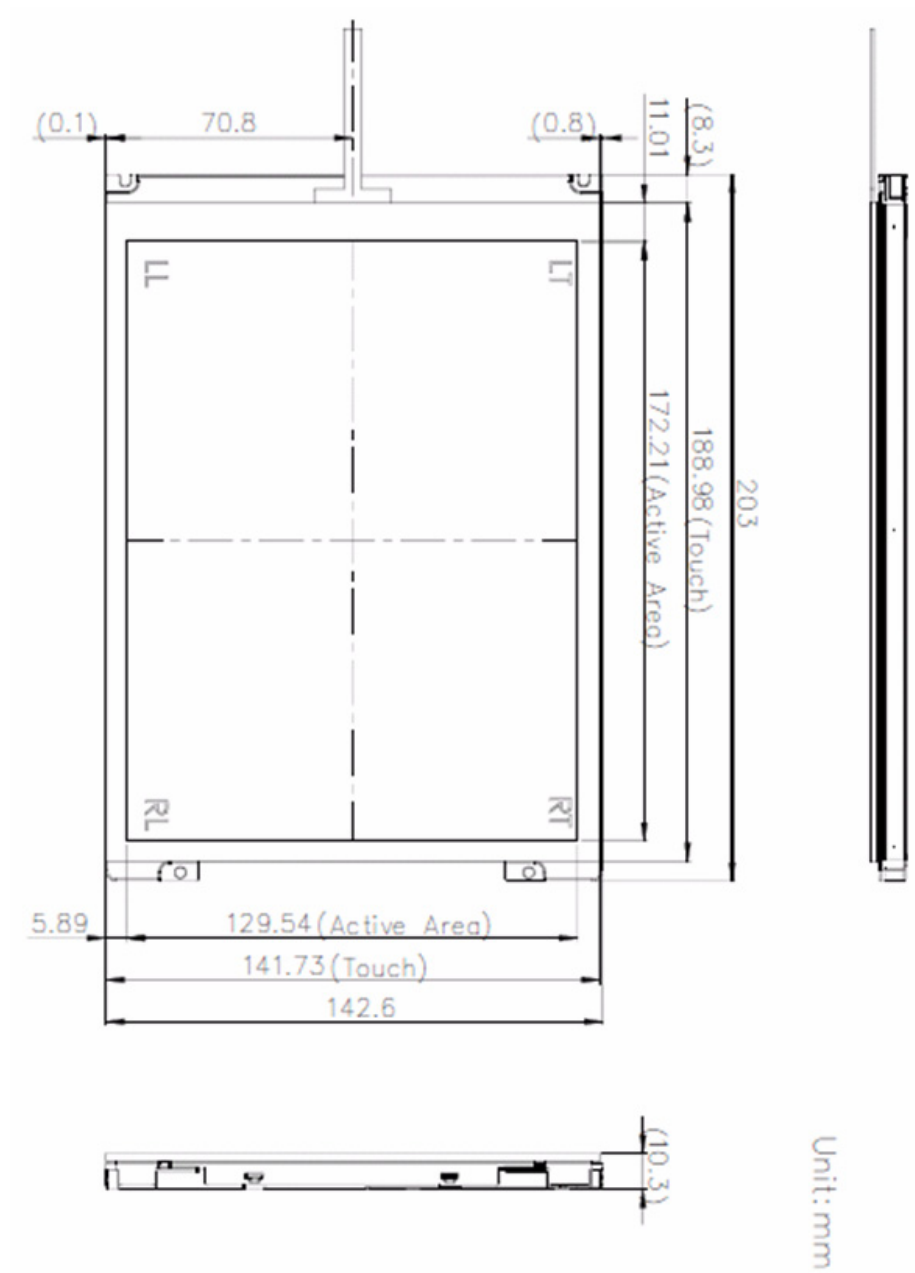
Item	Symbol	Min.	Max.	Unit
Logic/LCD Drive	VDD	-0.3	+3.6	[Volt]

1.4.2 Absolute Ratings of Environment

Item	Symbol	Min.	Max.	Unit
Operating Temperature	TOP	-5	+60	[oC]
Operation Humidity	HOP	10	90	[%RH]
Storage Temperature	TST	-30	+85	[oC]
Storage Humidity	HST	10	90	[%RH]

Note: Maximum Wet-Bulb should be 39°C and no condensation.

1.5 Outline Dimension



Chapter 2

Electrical
Characteristics

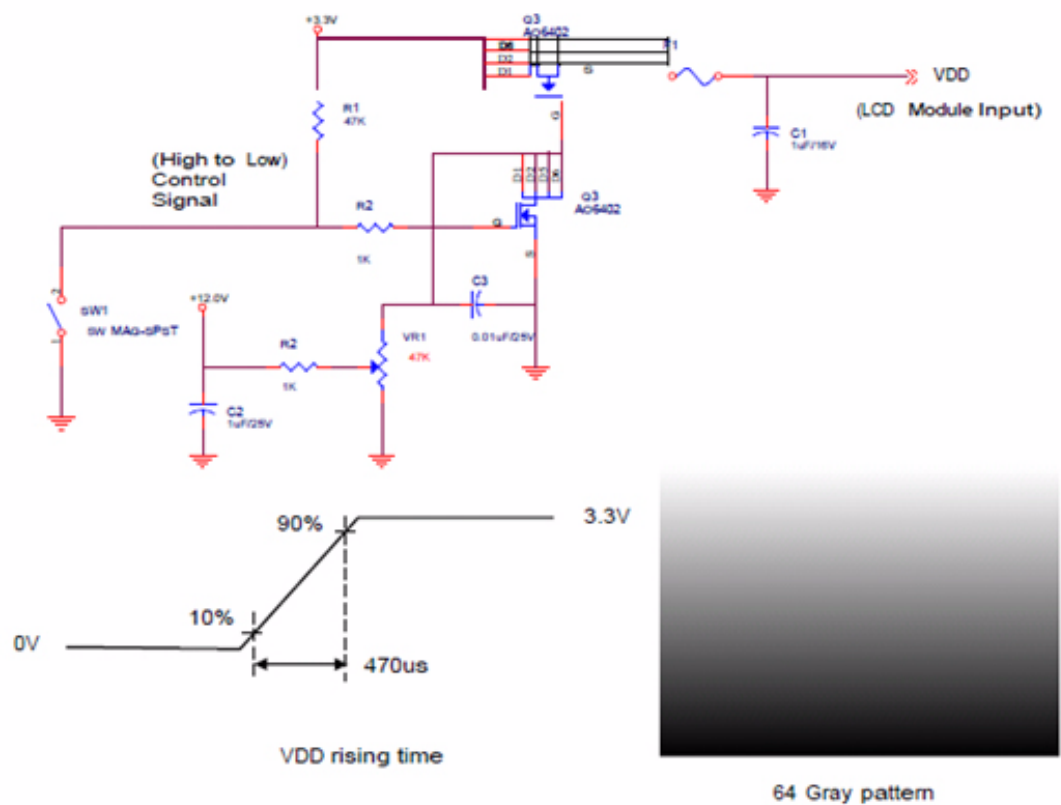
2.1 TFT LCD Module

2.1.1 Power Specification

Table 2.1: Power Specification

Symbol	Parameter	Min.	Typ.	Max.	Unit	Condition
VDD	Logic/LCD Drive Voltage	3.0	3.3	3.6	[Volt]	10%
IDD	Input Current	-	200	220	[mA]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)
PDD	VDD Power	-	0.66	0.73	[Watt]	64 Gray Bar Pattern (VDD=3.3V, at 60Hz)

Note1 Measurement condition:



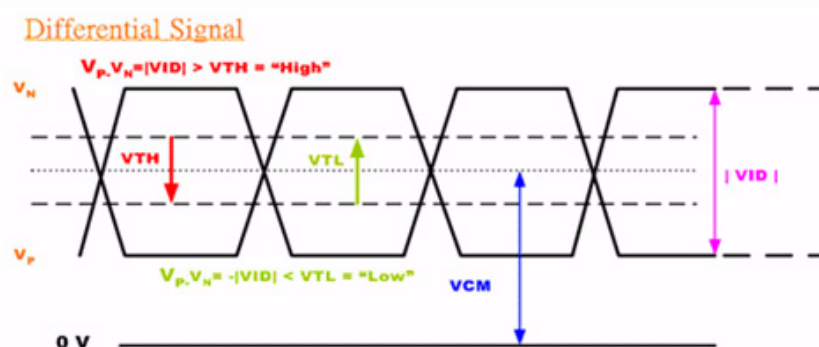
2.1.2 Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when VDD is off.

Table 2.2: Signal Electrical Characteristics

Symbol	Item	Min.	Typ.	Max.	Unit	Remark
VTH	Differential Input High Threshold	-	-	100	[mV]	VCM=1.2V
VTL	Differential Input Low Threshold	-100	-	-	[mV]	VCM=1.2V
VID	Input Differential Voltage	100	400	600	[mV]	
VICM	Differential Input Common Mode Voltage	1.1	-	1.6	[V]	VTH / VTL = ±100mV

Note LVDS Signal Waveform.



2.2 Backlight Unit

2.2.1 Parameter Guideline for LED Backlight

Following characteristics are measured under a stable condition using an inverter at 25°C (Room Temperature):

Table 2.3: Backlight Driving Conditions						
Symbol	Parameter	Min.	Typ.	Max.	Unit	Remark
VCC	Input Voltage	10.8	12	12.6	[Volt]	
I _{VCC}	Input Current	-	0.17	-	[A]	100% PWM Duty
P _{VCC}	Power Consumption	-	2.04	2.14	[Watt]	100% PWM Duty
P _{PWM}	Dimming Frequency	20	-	20K	[Hz]	
	Swing Voltage	3	3.3	5	V	
	Dimming Duty Cycle	5	-	100	%	
I _F	LED Forward Current	-	50	52.5	mA	Ta = 25°C
		-	21		Volt	I _F = 50mA, Ta = -30°C
V _F	LED Forward Voltage		19.2	21.9	Volt	I _F = 50mA, Ta = 25°C
			18.3			I = 50mA, Ta = 85°C
P _{LED}	LED Power Consumption	-	1.92	-	Watt	I _F = 50mA, Ta = 25°C (total power)
Operation Lifetime		50,000			Hrs	I _F = 50mA, Ta = 25°C

Note1 Ta means ambient temperature of TFT-LCD module.

Note2 VCC, I_{VCC}, P_{VCC}, are defined for LED B/L.(100% duty of PWM dimming)

Note3 IF, VF are defined for each channel of LED Light Bar. There are two LED channels (AN1-CA1-CA2) in backlight unit.

Note4 If IDK-1108R-45SVA1E module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

Note5 Operating life means brightness goes down to 50% initial brightness. Minimum operating life time is estimated data.

Chapter 3

Signal Characteristics

3.1 Signal Description

LVDS is a differential signal technology for LCD interface and high speed data transfer device. Connector pin definitions are below.

Table 3.1: Symbol Description

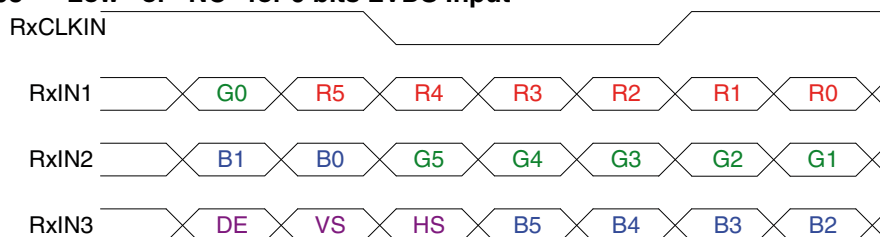
Pin No.	Symbol	Description
1	VDD	Power Supply, 3.3V(typical)
2	VDD	Power Supply, 3.3V(typical)
3	UD	Vertical Reverse Scan Control, When UD=Low or NC -> Normal Mode. When UD=High -> Vertical Reverse Scan. Note
4	LR	Horizontal Reverse Scan Control, When LR=Low or NC -> Normal Mode. When LR=High -> Horizontal Reverse Scan. Note
5	RxIN1-	LVDS differential data input Pair 0
6	RxIN1+	
7	GND	Ground
8	RxIN2-	LVDS differential data input Pair 1
9	RxIN2+	
10	GND	Ground
11	RxIN3-	LVDS differential data input Pair 2
12	RxIN3+	
13	GND	Ground
14	RxCLKIN-	LVDS differential Clock input Pair
15	RxCLKIN+	
16	GND	Ground
17	SEL 68	LVDS 6/8 bit select function control, Low or NC -> 6 Bit Input Mode. High -> 8 Bit Input Mode. Note
18	NC	NC
19	RxIN4-	LVDS differential data input Pair 3. Must be set to NC in 6 bit input mode.
20	RxIN4+	

Note1 “Low” stands for 0V. “High” stands for 3.3V. “NC” stands for “No Connected.”

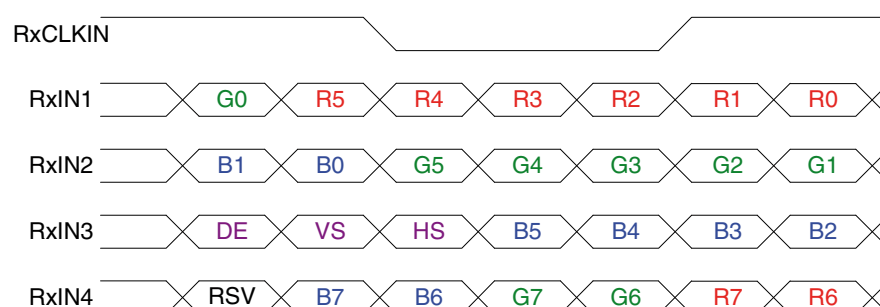
3.2 The Input Data Format

3.2.1 SEL68

SEL68 = "Low" or "NC" for 6 bits LVDS Input



SEL68 = "High" for 8 bits LVDS Input



Note1: Please follow PSWG.

Note2: R/G/B data 7:MSB, R/G/B data 0:LSB

Signal Name	Description	Remark
R7	Red Data 7 (MSB)	Red-pixel Data Each red pixel's brightness data consists of these 8 bits pixel data.
R6	Red Data 6	
R5	Red Data 5	
R4	Red Data 4	
R3	Red Data 3	
R2	Red Data 2	
R1	Red Data 1	
R0	Red Data 0 (LSB)	
G7	Green Data 7 (MSB)	Green-pixel Data Each green pixel's brightness data consists of these 8 bits pixel data.
G6	Green Data 6	
G5	Green Data 5	
G4	Green Data 4	
G3	Green Data 3	
G2	Green Data 2	
G1	Green Data 1	
G0	Green Data 0 (LSB)	

B7	Blue Data 7 (MSB)	Blue-pixel Data Each blue pixel's brightness data consists of these 8 bits pixel data.
B6	Blue Data 6	
B5	Blue Data 5	
B4	Blue Data 4	
B3	Blue Data 3	
B2	Blue Data 2	
B1	Blue Data 1	
B0	Blue Data 0 (LSB)	
RxCLKIN+ RxCLKIN-	LVDS Clock Input	
DE	Display Enable	
VS	Vertical Sync	
HS	Horizontal Sync	

Note: Output signals from any system shall be low or Hi-Z state when VDD is off.

3.3 Interface Timing

3.3.1 Timing Characteristics

DE mode only

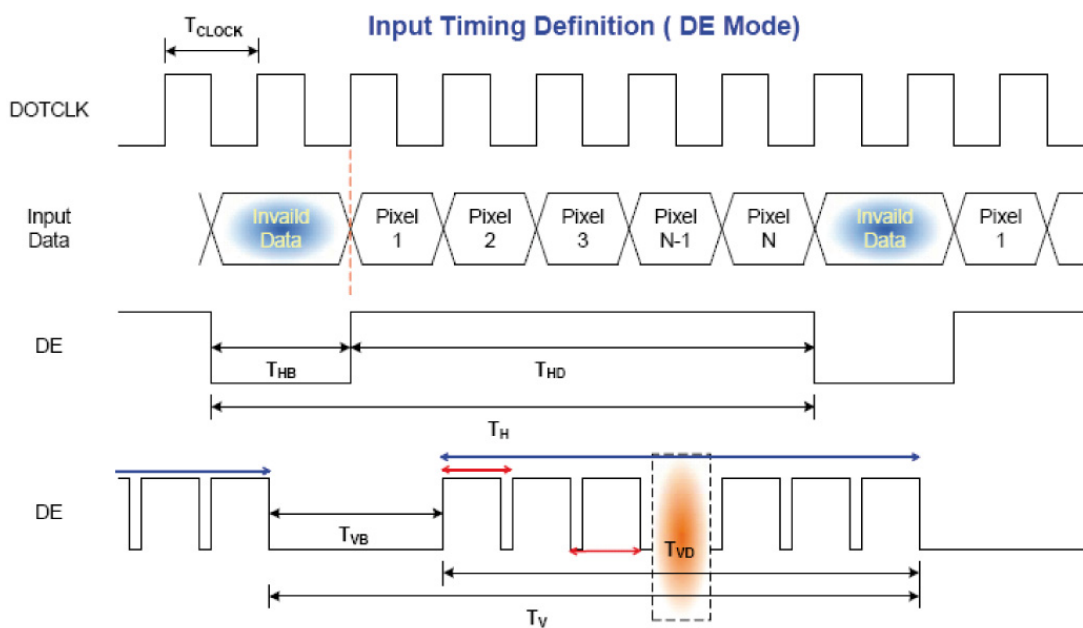
Table 3.2: Timing Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit
Clock frequency	$1/T_{\text{Clock}}$	33.6	39.8	48.3	MHz
Vertical Section	Period	T_V	608	628	650
	Active	T_{VD}	600	600	600
	Blanking	T_{VB}	8	28	50
Horizontal Section	Period	T_H	920	1056	1240
	Active	T_{HD}	800	800	800
	Blanking	T_{HB}			

Note Frame rate is 60 Hz.

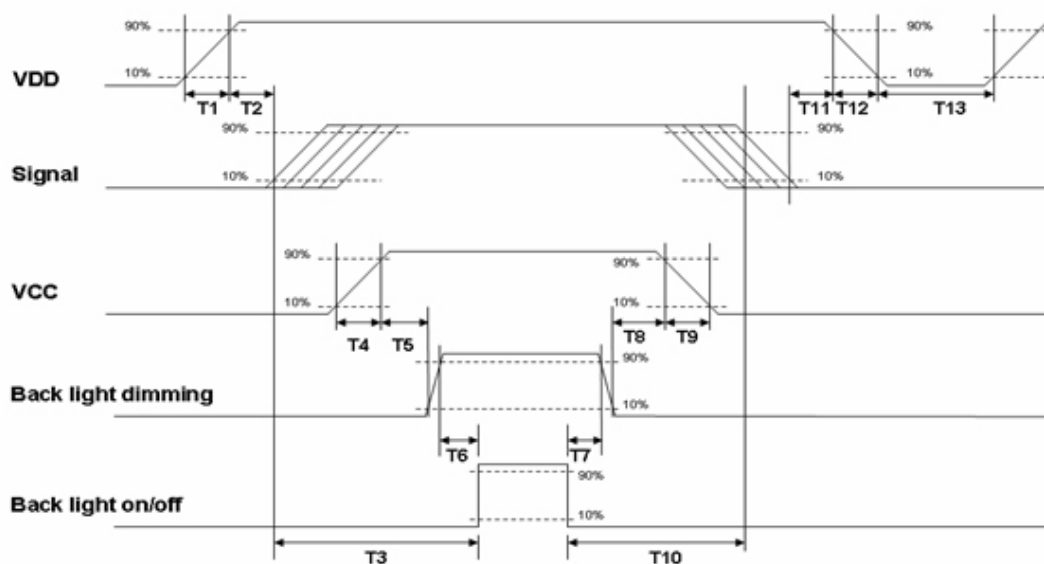
Note DE mode.

3.3.2 Input Timing Diagram



3.4 Power ON/OFF Sequence

VDD power and lamp on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when VDD is off.



Power ON/OFF Sequence Timing

Parameter	Value			Unit
	Min.	Typ.	Max.	
T1	0.5	-	10	[ms]
T2	30	40	50	[ms]
T3	200	-	-	[ms]
T4	0.5	-	10	[ms]

T5	10	-	-	[ms]
T6	10	-	-	[ms]
T7	0	-	-	[ms]
T8	10	-	-	[ms]
T9	-	-	10	[ms]
T10	110	-	-	[ms]
T11	0	16	50	[ms]
T12	-	-	10	[ms]
T13	1000	-	-	[ms]

The above on/off sequence should be applied to avoid abnormal function in the display. Please make sure to turn off the power when you plug the cable into the input connector or pull the cable out of the connector.

Chapter 4

Display Connector Definition

4.1 TFT LCD Signal (CN1): LVDS Connector

Table 4.1: TFT LCD Signal (CN1): LVDS Connector

Connector Name / Description	Signal Connector
Manufacturer	STM, Hirose or compatible
Connector Model Number	STM -MSB24013P20HA, Hirose- DF19LA-20P-1H or compatible
Mating Model Number	STM-P24013P20, Hirose-DF19-20S-1C or compatible

Table 4.2: Pin Assignment

Pin No.	Signal Name	Pin No.	Signal Name
1	VDD	2	VDD
3	UD	4	LR
5	RxIN1	6	RxIN1
7	GND	8	RxIN2
9	RxIN2	10	GND
11	RxIN3	12	RxIN3
13	GND	14	RxCKIN
15	RxCKIN+	16	GND
17	SEL	18	NC
19	RxIN4	20	RxIN4

4.2 LED Backlight Unit (CN2): LED Driver Connector

Connector Name / Designation	LED Connector
Manufacturer	ENTERY
Connector Model Number	ENTERY 3808K-F04N-02R or compatible
Mating Model Number	ENTERY H208K-P04N-02B or compatible.

Pin #	Symbol	Pin Description
1	VCC	12V input
2	GND	GND
3	Display ON/OFF	+5.0V or +3.3 V:ON, 0V:OFF
4	Dimming	PWM

4.3 LED Light Bar Input Connector (CN3)

Table 4.3: LED Light Bar Input Connector (CN3)

Connector Name / Description	Signal Connector
Manufacturer	ENTERY 3800K-F03N-03 or compatible
Mating Connector Model Number	ENTERY H203K-D03N-04B or compatible

Pin #	Symbol	Pin Description
1	AN	LED
2	CA	LED
3	CA	LED

Pin #	Symbol	Pin Description
1	AN1	Red
2	CA1	Black
3	CA2	Black

Chapter 5

Touch Screen

5.1 Touch Characteristics

Resistance type touch panels are used with flat displays like LCDs. Once a user touches it with a stylus or a finger, the circuit sends coordinate points to the PC from voltage contact points.

5.2 Optical Characteristics

Item	Specification	Remarks
1 TRANSPARENCY	82.5% Typ. 80% Min. (Active area) (Inside of guaranteed active area)	JIS K-7105
2 HAZE	8.0% Typ. (Anti-glare)	JIS K-7105

5.3 Environmental Characteristics

Item	Specification	Remarks
1 Operation temperature	-5°C ~ 60°C	Max. wet Temp is 38°C(No dew)
2 Storage temperature	-30°C ~ 70°C	
3 Operation Humidity	20% ~ 90%RH	
4 Storage temperature	10% ~ 90%RH	

5.4 Mechanical Characteristics

Item	Specification	Remarks
1 Hardness of surface	Pencil hardness 3H.	JIS K-5600-5-4 150gf, 45 degree
2 FPC peeling strength	1) 5N (5N Min.) 2) 19.6N (19.6N Min.)	1) Peeling upward by 90° 2) Peeling downward by 90°
3 Operation force	Pen 0.05N~1.96 N (5~200gf) Finger	Dot-Spacer Within "guaranteed active area", but not on the age and Dot-Spacer.

5.5 Electronic Characteristics

Item	Specification	Remarks
1 Rated Voltage	DC 7V max.	
2 Resistance	X axis: 200Ω ~ 1000Ω (Glass side) Y axis: 100Ω ~ 800Ω (Film side)	FPC connector
3 Linearity	±1.5% max initial value ±2.0% max "after environmental & life test"	
4 Chattering	20ms Max At connector pin	
5 Insulation Resistance	10MΩ min (DC 25V)	

Chapter 6

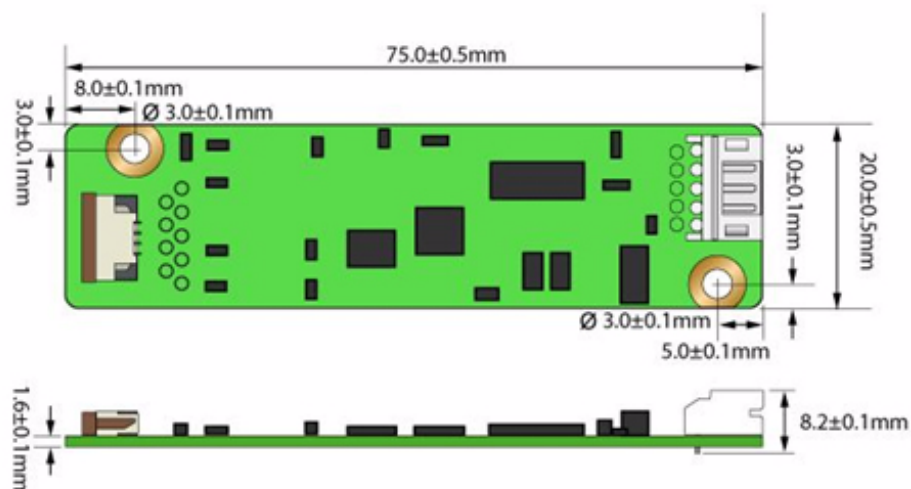
Touch Controller

6.1 Touch Controller Characteristics

Touch control board meets the latest Restriction of Hazardous Substances (RoHS) directive. This touch panel controller provides top performance for your analog resistive touch panels for 4-wire models. It communicates with PC systems directly through a USB connector. You can see how superior the design is in sensitivity, accuracy, and user-friendly operation. The touch panel driver emulates mouse left and right button functions and supports the following OS.

OS	Version	Interfaces
Windows	Windows 7, Vista, XP/2000, ME/98 Windows XP Tablet PC edition Windows CE 2.12/3.0/4.0/5.0/6.0 Windows Embedded XP	RS232/USB/ PS2
	Windows NT4, Windows 95	RS232/PS2
Linux	Support kernel 2.4.x / 2.6.x with XFree 4.x / xorg 6.7 to 7.5 (Up to X server 1.6.x) The new Linux public driver supports most of the Linux distributions 32/64 versions, including: CentOS, Debian, Fedora, Gentoo, Mandrake (Mandriva), Red Hat, Ubuntu(Xubuntu), Slackware, SuSE(open SuSE) etc.	RS232/USB/ PS2 (up to Kernel 2.6.x)
	Android 3.0 - Google Meego 1.x - Intel Nokia	RS232/USB I2C
DOS	DOS 6.22	RS232/PS2
Mac	Mac OS9, Mac OS X (PowerPC, Intel CPU)	USB
QNX	QNX RTOS v6.3	RS232/USB

6.2 Dimensions



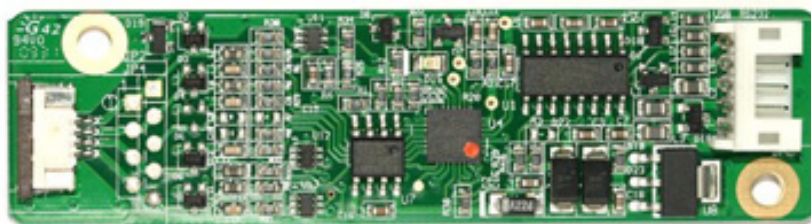
6.3 Specifications

Table 6.1: USB Type Controller

Circuit Board Dimension	20mm x 75mm (0.79inches x 2.95inches)----(4-Wire)
Power Requirements	D.C.+5V (100mA typical, 50mV peak to peak maximum ripple and noise)
Operating Temperature	-25 to 85°C
Storage Temperature	-55 to 150°C
Relative Humidity	95% at 60°C
Interface	Bi-directional RS-232 serial communication USB: 1.1 Full Speed (12Mbps)
Protocol	No parity,8 data bits,1 stop bit,9600 baud(N,8,1,9600)
Resolution	2048x2048 resolution
Report rate	RS232: Max. 160 points/sec USB: Max. 200 points/sec
Response time	Max. 20 ms
Attached Cable	RS232: 180cm shielded cable with 9-pin D-sub connector USB: 180cm shielded cable with USB-A connector
Regulatory Approvals	FCC-B , CE, Unaffected by EMI from other nearly CRTs and other display devices CRTs
EMI	Unaffected by environmental EMI
Panel resistance	4, 8 wire resistive model: 200 ~ 900 ohm 5 wire resistive model: 50 ~ 200 ohm
MTBF	200,000 hrs

6.4 Product Package

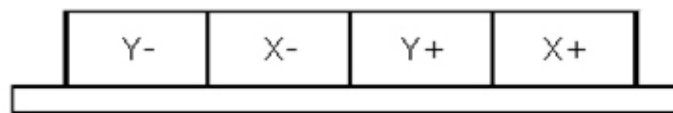
(1) 96TS-CTR-4WRI02 (4 wire USB control board)



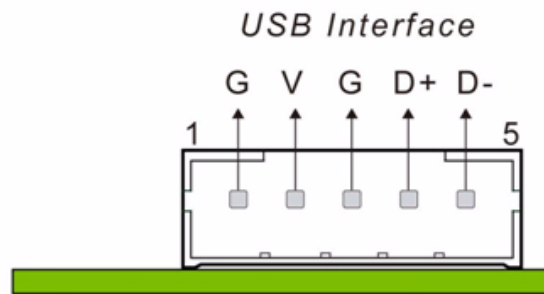
(2) 1700019909 (USB cable)



(3) Controller panel pin alignment



(4) Controller wafer pin alignment



Appendix **A**

Optical Characteristics

A.1 Optical Characteristics

The optical characteristics are measured under stable conditions at 25°C (Room Temperature):

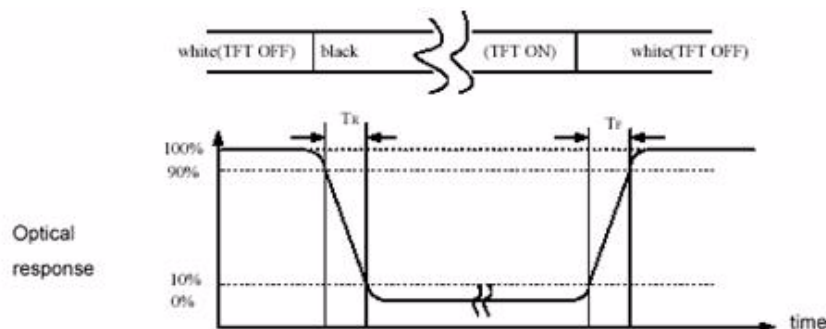
Table A.1: Optical Characteristics

Item	Unit	Conditions	Min.	Typ.	Max.	Note
White Luminance	[cd/m ²]	IF= 50mA (center point)	350	450	-	1
Uniformity	%	9 Points	70	75	-	1,2,3
Contrast Ratio			400	600	-	4
Response Time	[msec]	Rising	-	20	30	5
	[msec]	Falling	-	10	20	
	[msec]	Rising + Falling	-	30	50	
Viewing Angle	[degree]	Horizontal (Right)	70	80	-	6
	[degree]	CR = 10 (Left)	70	80	-	
	[degree]	Vertical (Upper)	70	80	-	
	[degree]	CR = 10 (Lower)	70	80	-	
Color/Chromaticity Coordinates (CIE 1931)		Red x	0.559	0.609	0.659	4
		Red y	0.283	0.333	0.383	
		Green x	0.315	0.365	0.415	
		Green y	0.520	0.570	0.620	
		Blue x	0.101	0.151	0.201	
		Blue y	0.056	0.106	0.156	
		White x	0.26	0.31	0.36	
		White y	0.28	0.33	0.38	
Contrast Ratio				45	-	1

Note

These items are measured by BM-5A(TOPCON) or CA-1000(MINOLTA) in the dark room (no ambient light) After 5 minutes operation, the optical properties are measured at the center point of the LCD screen.

Note1 Definition of Response Time (White-Black)



Note2 Definition of Contrast Ratio

Contrast ratio is calculated with the following formula :

Contrast Ratio(CR)=(White)Luminance of ON ÷ (Black)Luminance of OFF

Note3 Definition of Luminance

Measure the luminance of white state at center point.

Note4 Definition of Luminance Uniformity

Measured Maximum luminance [L(MAX)] and Minimum luminance[L(MIN)] on the 9 points

Luminance Uniformity is calculated with the following formula:

$$\Delta L = [L(\text{MIN}) / L(\text{MAX})] \times 100\%$$

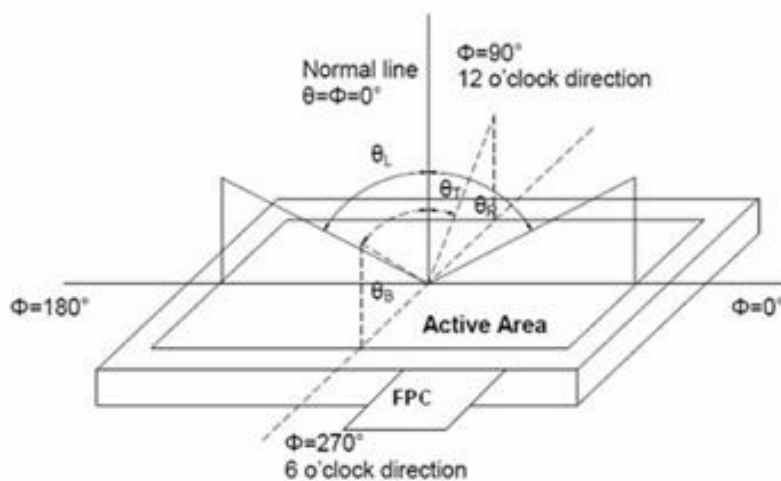
Note5 Definition of Viewing Angle

Fig. 1 Definition of viewing angle

Appendix **B**

Handling Precautions

B.1 Handling Precautions

The optical characteristics are measured under stable conditions at 25°C (Room Temperature)

1. Since front polarizer is easily damaged, pay attention not to scratch it.
2. Be sure to turn off power supply when inserting or disconnecting from input connector.
3. Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
4. When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
5. Since the panel is made of glass, it may break or crack if dropped or bumped on hard surface.
6. Since CMOS LSI is used in this module, take care of static electricity and insure human earth when handling.
7. Do not open or modify the Module Assembly.
8. Do not press the reflector sheet at the back of the module to any directions.
9. In case if a Module has to be put back into the packing container slot after once it was taken out from the container, please press at the far ends of the LED light bar reflector edge softly. Otherwise the TFT Module may be damaged.
10. At the insertion or removal of the Signal Interface Connector, be sure not to rotate nor tilt the Interface Connector of the TFT Module.
11. After installation of the TFT Module into an enclosure, do not twist nor bend the TFT Module even momentary. At designing the enclosure, it should be taken into consideration that no bending/twisting forces are applied to the TFT Module from outside. Otherwise the TFT Module may be damaged.
12. Small amount of materials having no flammability grade is used in the LCD module. The LCD module should be supplied by power complied with requirements of Limited Power Source (IEC60950 or UL1950), or be applied exemption.



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