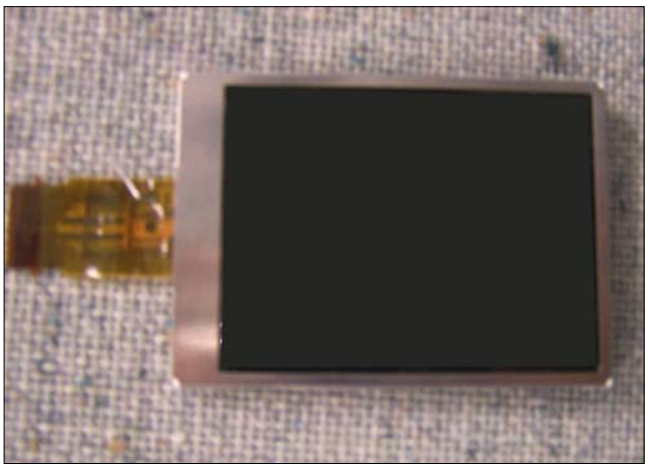
AND Displays



ANDpSi025TD-LED-KIT

2.5” Active Color TFT LCD Color Monitor

The ANDpSi025TD-LED-KIT is an 640 x 240 active matrix color TFT LCD Module with Digital and Analog Interface that utilizes new low temperature poly-silicon (p-Si) technology to provide brighter, thinner and lighter display with high resolution. Both of horizontal and vertical scan are reversible and controlled by the serial interface commands. The product is designed for the requirement of the green product, and the specification complies with Toppoly’s “Green Product Chemical Substance Specification Standard Hand Book”. All these features making it ideal for portable applications including personal digital assistants (PDAs), medical instruments and test & measurements instruments.

Features

- p-Si construction with drivers on glass
- High luminance
- Digital and Analog Interface
- NTSC and PAL format compatible
- 16 Million/Full Color
- Slim (2.53 mm) and lightweight design
- Transmissive type. FIxed current LED backlight
- **RoHS Compliant**

Mechanical Characteristics

Item	Specification	Unit
Display Size (diag.)	2.0	inch
Display Type	Transmissive	–
Active Area	40.672 (H) x 30.48 (V)	mm
Number of Dots	640 (H) x RGB x 240 (V)	dot
Dot Pitch	0.0635 (H) x 0.127 (V)	mm
Color Arrangement	RGB Delta	–
Color Numbers	16 Million/Full Color	–
Outline Dimensions	46.1(H) x 40.96(V) x 2.53* (D)	mm
Weight	8.5	g
Panel surface treatment	Hard Coating (3H)	–

* Exclude FPC and protrusions.

Absolute Maximum Ratings (GND=0V)

Item	Symbol	Min.	Max.	Unit
Logic Power Supply Voltage	V_{CC}	-0.5	4.5	V
Input Signal Voltage VD, HD, DCLK, DIN[0:7], SDA, SCL, SCEN, SHDB, GRESTB	V_{IN1}	0	VCC	V
Backlight Forward current	I_F	–	25	mA

Absolute Maximum Ratings (Cont.) (GND=0V)

Item	Symbol	Min.	Max.	Unit
Operating Temp.	Topr	-10	+60	ºC
Storage Temp.	Tstg	-30	+80	ºC

Electrical Characteristics (GND=0V, Ta = 25°C) Driving TFT LCD Panel

Item		Symbol	Min.	Typ.	Max.	Unit
Power Supply for H/V Driver		V_{CC}	2.85	3.0	3.6	V
Input Driver Voltage VD, HD, DCLK, DIN[0:7], SDA, SCL, SCEN, SHDB, GRESTB	Low	V_{IL}	GND	–	0.2 x V_{CC}*	V
	High	V_{IH}	0.8 x V_{CC}*	–	V_{CC}*	
PWM Output Voltage		V_{PWM}	0	–	V_{CC}*	V
Feedback Voltage		V_{FB}	0.55	0.6	0.65	V
Panel Power Consumption		Wp	–	50	60	mW

VCC*=VCC(TYP)

Note 1: The V_{CC} power is provided for overall panel module supply voltage.

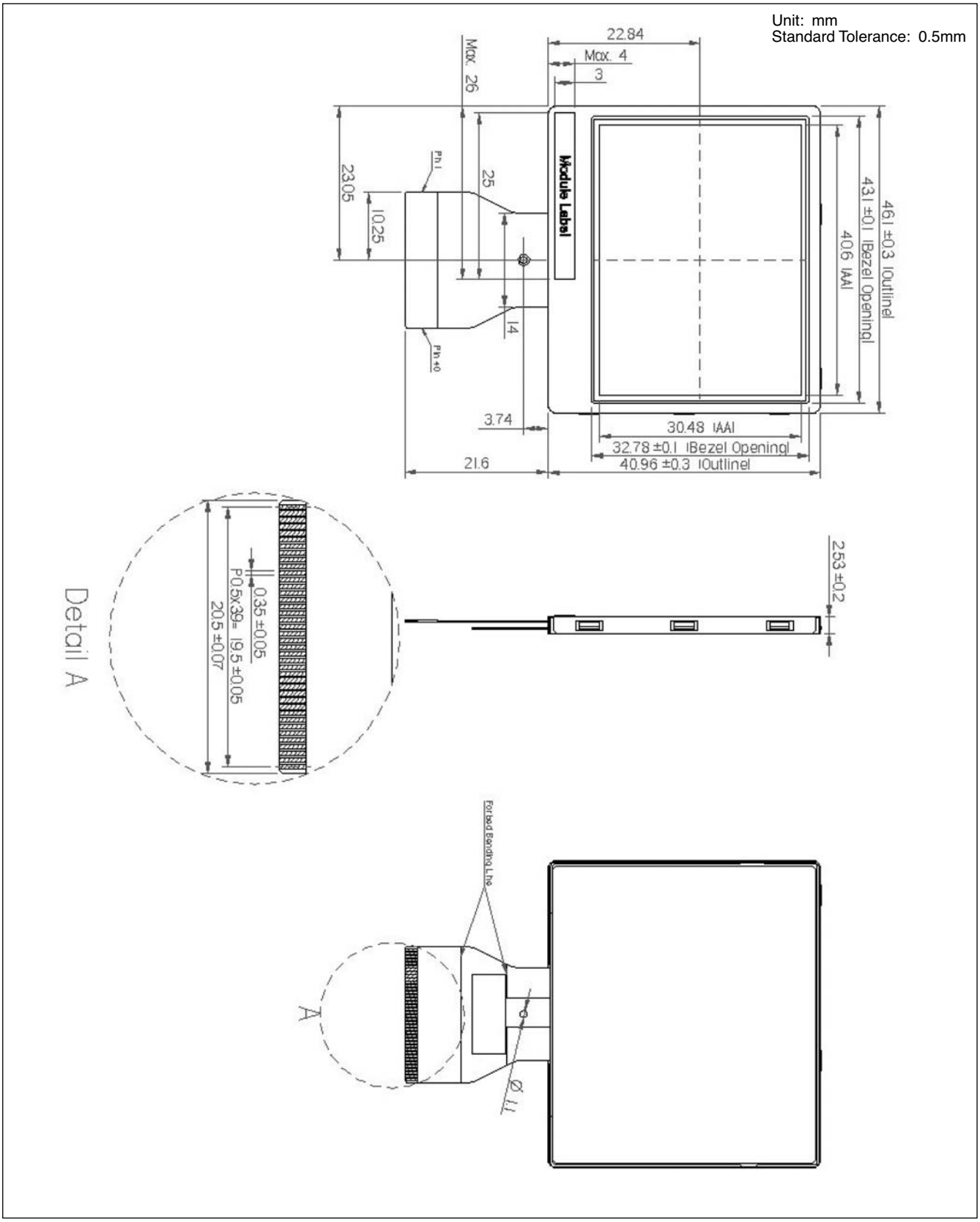
Note 2: DC/DC feedback control voltage.

Driving Backlight in Standard Mode (Ta = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Forward Current	I_F	–	23	25	mA
Forward Current Volt.	V_F	–	3.4	3.6	V
Backlight Power Consumption*	W_{BL}	–	78.2	90	mW

* Backlight driving circuit is recommended as the fix current circuit

Dimensional Outline



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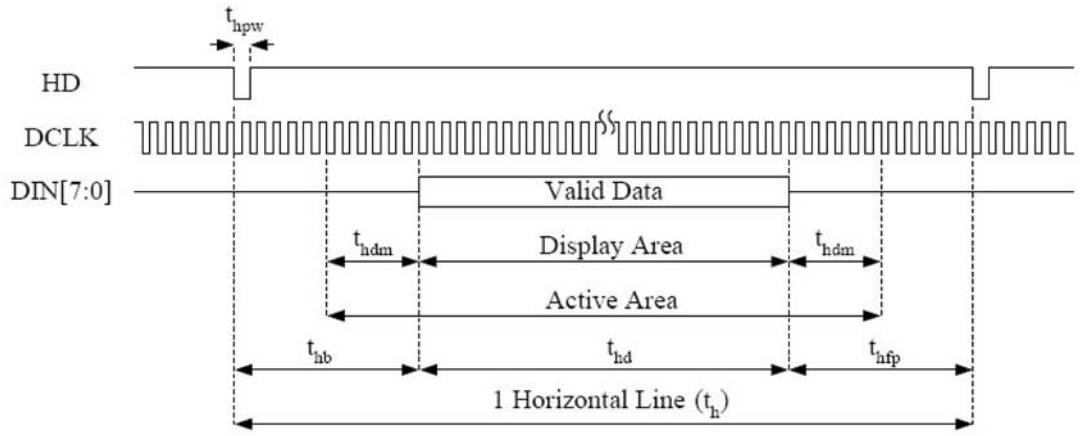
Timing Chart
YUV Mode: ITUR601-NTSC

Item	Symbol	Min.	Typ.	Max.	Unit
Dot Clock Frequency	DCLK	–	27	–	MHz
Horizontal Display Active	Display Area	–	1440	–	DCLK
Horizontal Line	t_h	–	1716	–	DCLK
HSYNC PUlse Width	t_{hpw}	1	1	–	DCLK
Horizontal Back Porch	t_{hb}	–	240	–	DCLK
Horizontal Front Porch	t_{hfp}	–	36	–	DCLK
Horizontal Dummy Time	t_{hdm}	–	4	–	DCLK

Serial RGB Dummy Mode and Serial YUV 4:2:2 Mode: Horizontal



YUV Mode: ITUR601-PAL

Item	Symbol	Min.	Typ.	Max.	Unit
Dot Clock Frequency	DCLK	–	27	–	MHz
Horizontal Display Active	Display Area	–	1440	–	DCLK
Horizontal Line	t_h	–	1728	–	DCLK
HSYNC PUlse Width	t_{hpw}	1	1	–	DCLK
Horizontal Back Porch	t_{hb}	–	240	–	DCLK
Horizontal Front Porch	t_{hfp}	–	48	–	DCLK
Horizontal Dummy Time	t_{hdm}	–	4	–	DCLK

Timing Chart With Analog Interface

Item		Symbol	Min	Typ	Max	Unit
Dot Clock Frequency	QVGA	DCLK	–	25	–	MHz
	NTSC		–	24.54	–	
	PAL		–	24.38	–	
Horizontal Display Active		Display Area	–	1280	–	DCLK
Horizontal Line		t_h	–	1560	–	DCLK
HSYNC PUlse Width		t_{hpw}	–	1	–	DCLK
Horizontal Back Porch		t_{hb}	–	240	–	DCLK
Horizontal Front Porch		t_{hfp}	–	40	–	DCLK
Horizontal Dummy Time		t_{hdm}	–	4	–	DCLK

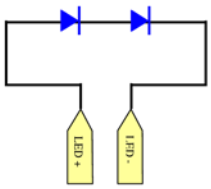
Optical Specification Ta=25°C

Item		Symbol	Condition	Min.	Typ.	Max.	Unit
Viewing Angle		θ11	CR ≥ 10	30	40	–	degree
		θ12		30	40	–	
		θ21		15	20	–	
		θ22		40	50	–	
Contrast Ratio		CR	θ = 0°	200	300	–	–
Response Time	Rising	Tr		–	13	20	ms
	Falling	Tf		–	22	30	
Luminance	I_F=23mA	L		200	250	–	cd/m^2
Chromaticity	White	x_w		0.26	0.31	0.36	–
		y_w		0.29	0.34	0.39	

Input/Output Terminals

TFT LCD Panel - Recommended connector Molex 51374-4073

Pin	Symbol	Input/Output	Description
1	CP3	C	Capacitor for power setting
2	CP4	C	Capacitor for power setting
3	CP5	C	Capacitor for charge pump
4	CP6	C	Capacitor for charge pump
5	CP7	C	Capacitor for charge pump
6	CP8	C	Capacitor for charge pump
7	DUMMY	–	Dummy
8	DUMMY	–	Dummy
9	PCD	C	Capacitor for pre-charge data signal high
10	VCOML	C	Capacitor for VCOM low
11	VCOMH	C	Capacitor for VCOM high
12	AGND	–	Analog ground
13	DUMMY	–	Dummy
14	AVDD	C	Regulation capacitor for analog voltage
15	CP1	C	Capacitor for charge pump
16	CP2	C	Capacitor for charge pump
17	PWM	O	Power transistor gate signal for the boost converter
18	FB	I	Main boost regulator feedback input
19	LED-	–	LED power: cathode; Note 1 below
20	DUMMY	–	Dummy
21	DUMMY	–	Dummy
22	LED+	–	LED power: anode; Note 1 below
23	GND	–	Ground
24	VCC	–	Power supply for digital circuit and charge pump circuit
25	VSYNC	I	Vertical sync input. Negative polarity
26	HSYNC	I	Horizontal syn input. Negative polarity
27	DCLK	I	Clock signal, latch data onto line latches at the rising edge
28	DIN0	I	Data input
29	DIN1	I	Data input
30	DIN2	I	Data input
31	DIN3	I	Data input
32	DIN4	I	Data input
33	DIN5	I	Data input
34	DIN6	I	Data input
35	DIN7	I	Data input
36	SDA	I/O	Serial interface data line
37	SCL	I	Serial interface clock line
38	SCEN	I	Serial interface chip enable line
39	SHDB	I	Shutdown input
40	GREST	I	System reset pin



Note 1: The figure to the left shows the connection of backlight LED.

PC-TFT-25TD

Interface Board

Features

- Used for TFT-LCD display: 2.5” ANDpSi025TD-LED
- Both PAL + NTSC
- 1 x CVBS input signal (1.0Vp-p)
- OSD Menu
- IR remote control (optional).

The PC-TFT-25TD is designed to work with the ANDpSi025TD-LED color TFT display which is suitable for automotive, small size home use TV, video broadcasting & test equipment.

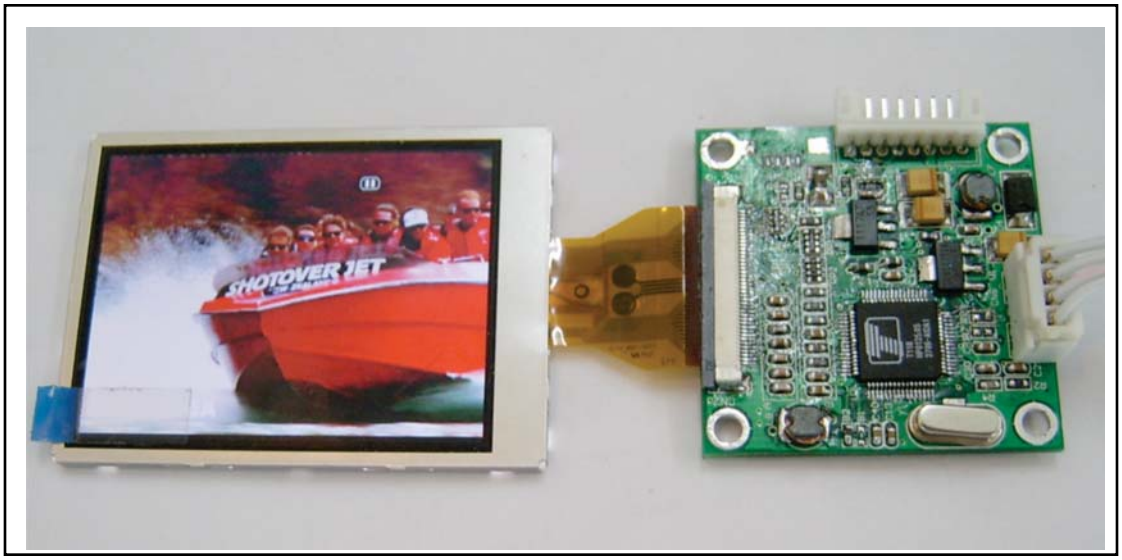
Environment:
Working Temp.: -20~60ºC
Relative Humidity: 5~95% RH
Storage Temp: -25ºC ~ +70ºC
Relative Humidity: 0~90% RH

OSD Function Description: Menu (PICTURE)

Item	Description	Value
Brightness	Adjust brightness	0-100
Contrast	Adjust contrast	0-100
Color	Adjust color	0-100
Sharpness	Adjust sharpness	0-100
Hue	Adjust HUE (only work on NTSC)	0-100

Keys function:

Button	Function
Y2	Power switch
MENU	OSD menu On/Off
ENTER	Select the item iniside the OSD menu
UP	Increase the current item’s value
DOWN	Decrease the current item’s value



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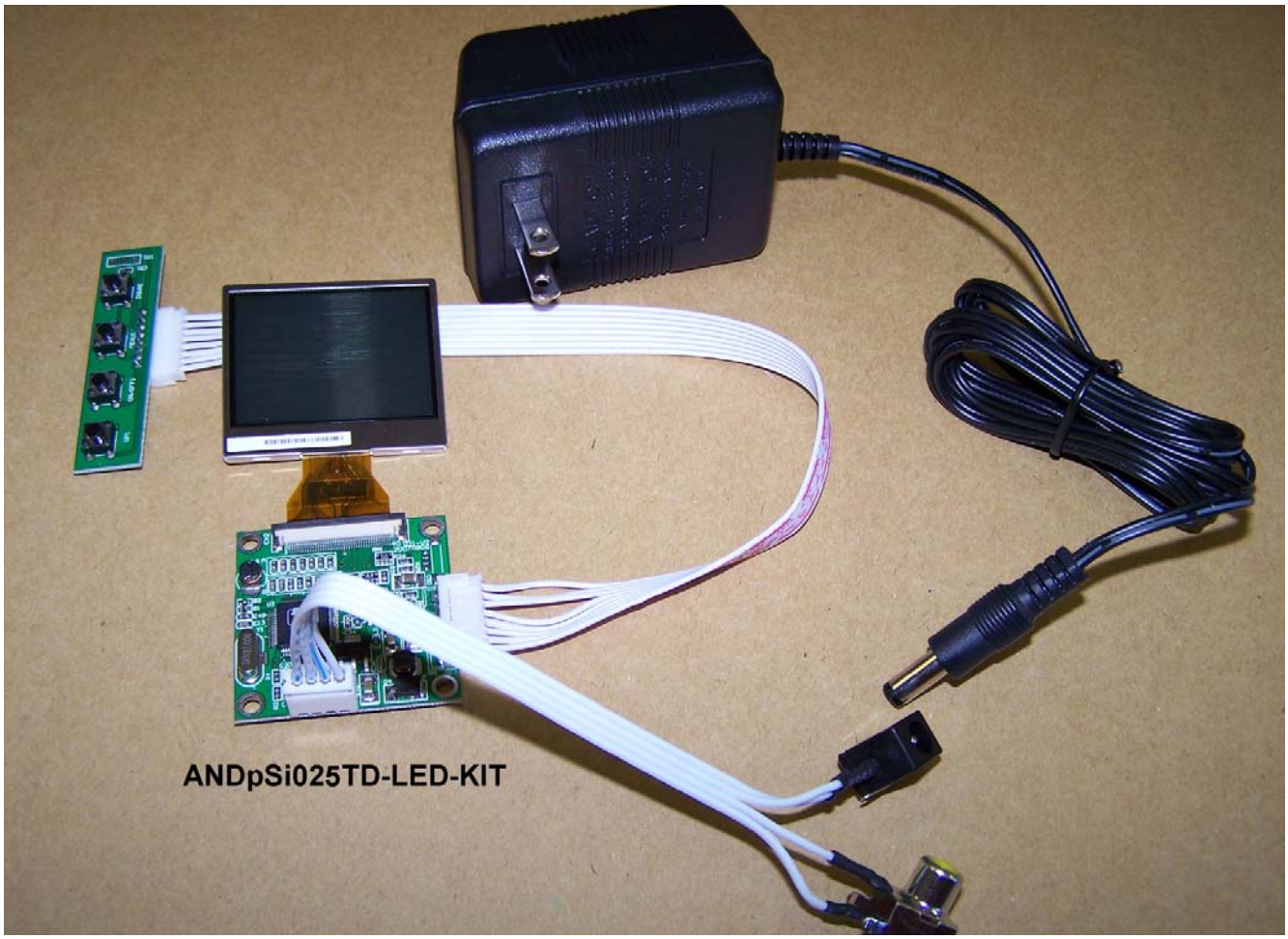
Connector

Connector	Input/Output	Remark
CN2	CVBS signal input	
CON5	DC voltage input	Suggest to use 12V DC only

Panel

Pin	Symbol	I/O	Description
1	CP3	C	Capacitor for charge pump
2	CP4	C	Capacitor for charge pump
3	CP5	C	Capacitor for charge pump
4	CP6	C	Capacitor for charge pump
5	CP7	C	Capacitor for charge pump
6	CP8	C	Capacitor for charge pump
7	NC	–	No connection
8	PCDL	C	Capacitor for pre-charge data signal low
9	PCDH	C	Capacitor for -repcharge data signal high
10	VCOML	C	Capacitor for VCOM low
11	VCOMH	C	Capacitor for CVOM high
12	AGND	–	Analog ground
13	PVDD	C	Regulation capacitor for charge pump
14	AVDD	C	Regulation capacitor for analog voltage
15	CP1	C	Capacitor for charge pump
16	CP2	C	Capacitor for charge pump
17	PWM	O	Power transistor gate signal for the boost converter
18	FB	I	Main boost regulator feedback input
19	LED-	–	LED power: cathode
20	LED+	–	LED power: anode
21	NC	–	No connection
22	GND	–	Ground
23	VCC	–	Power supply
24	VD	I	Vertical sync input
25	HD	I	Horizontal sync input
26	DCLK	I	Clock signal, latch data onto line latches at the rising edge
27	DIN0	I	Data input
28	DIN1	I	Data input
29	DIN2	I	Data input
30	DIN3	I	Data input
31	DIN4	I	Data input
32	DIN5	I	Data input
33	DIN6	I	Data input
34	DIN7	I	Data input
35	SDA	I/O	Serial interface data line
36	SCL	I	Serial interface clock line
37	SCEN	I	Serial interface chip enable line
38	SHDB	I	Sleep mode setting pin
39	GRESTB	I	Global reset pin



ID	Input/Output	Remarks
CN6	CVBS signal & Power Input	Suggest to use stabilized 12 V DC
JP1	OSD control connector	
CN1	TFT panel input connector	Molex 51374-4073

Electrical Parameters

Item		Value			Unit
		Min.	Typ.	Max.	
Working voltage		6	12	15	V
Working current	with panel	110	110	110	mA
	without panel	60	60	60	mA