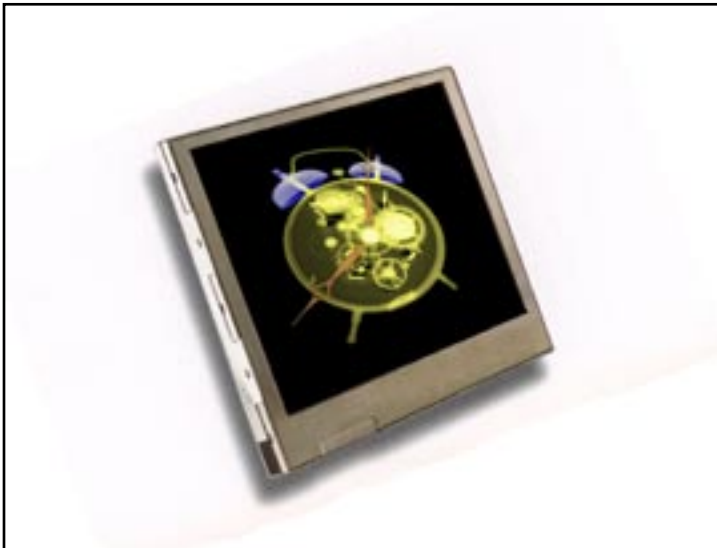


AND-TFT-35XS-LED
3.5" TFT LCD
LCD Color Module

The AND-TFT-35XS-LED is a compact full color TFT LCD module, that is suitable for camcorder, digital camera applications and other electronic products which require high quality flat panel displays. This device consists of a twisted nematic (TN) liquid crystal cell, that incorporates a TFT-array that has 320 x 234 pixels on a 3.5 inch diagonal screen, X and Y drivers, an LSI controller, and a built-in LED backlight.

Features

- Long life LED backlight
- No controller chip is necessary
- Compatible with NTSC or PAL system (switchable)
- High Resolution: 112,320 dots
- Optimum viewing direction: 6 o'clockSurface
- Up/Down and Left/Right image inversion
- Transmissive Type
- RoHS compliant



Mechanical Characteristics

Item	Standard Value	Unit
Screen size	3.5 inch (diagonal)	–
Outline Dimensions	83.5 (W) x 63.1 (H) x 3.6 (D)	mm
Active Area	71.6 (W) x 52.65 (H)	mm
Surface Treatment	Anti-Glare	–
Pixel Number (RBG trio)	320 (W) x 234 (H)	–
Pixel Configuration	Delta	–
Dot Pitch	0.074 (W) x 0.225 (H)	mm
Weight	58 ± 5	g

Absolute Maximum Ratings: GND = 0V, Ta = 25°C

Item	Symbol	Conditions	Absolute Maximum Rating		Unit	
			Min.	Max.		
Supply Voltage	for Source Driver	Analog	Ta = 25° C	-0.3	+7.0	V
		Digital		-0.3	+7.0	
	for Gate Driver	Positive		-0.3	+45	
		Negative		-23	+0.3	
				+15	+40	
Analog Input Voltage (means $V_{R'}$, $V_{G'}$, $V_{B'}$)	$V_{GH} - V_{GL}$ V_{VIDEO}		-0.3	+7.3	V	
Operating Temperature (Define that contrast, response time, other display optical characters are Ta = +25)	T _{OP}	–	0	+60	° C	
Storage Temperature	T _{STG}	–	-20	+70	° C	

Product specifications contained herein may be changed without prior notice.

□

Power Consumption (Ta = 25°C)

Backlight Connector: JST BHR-03VS-1

Item	Symbol	Remarks	Specifications Typ.	Units
LCD Panel Power Consumption	–	Power consumption for backlight is not included	33.5	mW
Backlight Lamp Power Consumption	–	calculated by $I_L \times V_L$	0.65	W
Total Power Consumption	–	–	0.69	W

Recommended Operating Conditions

Item	Symbol	Remarks	Specifications			Units
			Min.	Typ.	Max.	
Power Supply (Ta = 25 °C)	V _{CC}		+4.5	+5.0	+5.5	V
	V _{DD}		+3.0	+3.3	+3.6	
	AV _{DD}		+4.5	+5.0	+5.5	
	V _{GH}		+14.5	+15.0	+15.5	
	V _{EE}		-15.5	-15.0	-14.5	
	V _{GLAC}	AC Component of V _{GL}	–	+6.0	–	V _{P-P}
	V _{GLDC}	DC Component of V _{GL}	-12.5	-11.0	-9.5	V
Video Signal (V _R , V _G , V _B)	V _{IAC}	AC Component, Note 2	–	+4.0	+4.2	V _{P-P}
	V _{IDC}	DC Component	–	+2.5	–	V
V _{COM}	V _{COMAC}	AC Component of V _{COMM}	–	+6.0	–	V _{P-P}
	V _{COMDC}	DC Component of V _{COMM}	+0.9	+1.0	+1.1	V
H Level	V _{IH}	Note 1	+0.7 V _{DD}	–	–	V
	L Level		V _{IL}	–	–	+0.3 V _{DD}

Note 1: STH1, STH2, CPH1, CPH2, CPH3, Q2H, INH, CPV, XOE, DIO1, DIO2

Note 2: Both NTSC & PAL system Video Signal input waveform is based on 8 steps gray scale.

Recommended Operating Conditions

Item	Symbol	Remarks	Specifications			Units	
			Min.	Typ.	Max.		
Viewing Angle	Horizontal	θ	CR ≥ 10	± 45	± 50	deg	
	Vertical	θ (to 12 o'clock)		10	15		
		θ (to 6 o'clock)		30	35		
Contrast Ratio <u>Luminance when LCD is white</u> Luminance when LCD is black		CR	At optimized viewing angle	110	150	–	
Response Time	Rise	Tr	θ = 0°	–	15	ms	
	Fall	Tf	φ = 0°	–	25		50
Transmission	Ratio	T	–	7.5	8.0	8.5	%
Uniformity	U	–	–	65	70	–	–
Brightness	LUM	–	–	200	250	–	cd/m ²
White Chromaticity	X	θ = 0°	–	0.280	0.310	0.340	–
	Y		0.310	0.340	0.370		
	Tc		6650	6850	7050		
Lamp Life Time	+25 °C	–	decay to 75%	10,000	–	–	hr

Interface Pin Assignment

Pin No.	Symbol	Function	Input/Output	Remarks
1	STH1	Start pulse for source driver	I/O	Note 1
2	AV _{SS}	Analog GND for source driver	I	–
3	AV _{DD}	Analog power input for source driver	I	Note 2
4	V _B	Videoinput B	I	Note 4
5	V _G	Video input G	I	Note 4
6	V _R	Video input R	I	Note 4
7	VSS	Digital GND	I	
8	V _{DD}	Digital power input	I	Note 3
9	CPH1	Sampling and shift clock for source driver	I	
10	CPH2	Sampling and shift clock for source driver	I	
11	CPH3	Sampling and shift clock for source driver	I	
12	STH2	Start pulse for source driver	I/O	Note 1
13	Q2H	Video input rotation control	I	
14	INH	Output enable for source driver	I	
15	R/L	Left/Right Control for source driver	I	
16	V _{COM}	Common electrode voltage	I	Note 4
17	V _{COM}	Common electrode voltage	I	Note 4
18	XOE	Output enable for gate driver	I	
19	CPV	Clock input for gate driver	I	
20	U/D	Up/Down Control for gate driver	I	
21	DIO2	Vertical start pulse	I/O	Note 5
22	DIO1	Vertical start pulse	I/O	Note 5
23	V _{GL}	Gate off voltage (alternative every 1-H)	I	Note 4
24	V _{EE}	Gate driver negative voltage	I	Note 6
25	V _{SS}	GND	I	
26	V _{CC}	Logic power for gate driver	I	Note 3
27	V _{GH}	Gate on voltage	I	Note 7
28	NC	No connection	–	

Note 1: STHL, STHR, and R/L Mode

R/L	STHL	STHR	Remarks
High (VDD)	Input	Output	Left to Right
Low (0 Volt)	Output	Input	Right to Left

Note 2: AV_{DD} = +5V (Typ.)

Note 3: V_{DD}, V_{CC} = +5V (Typ.)

Note 4: V_{COM} = 6V_{pp}

Note 5: DIO1, DIO2 and U/D Mode

U/D	DIO1	DIO2	Remarks
High (VDD)	Input	Output	Down to Up
Low (0 Volt)	Output	Input	Up to Down

Note 6: V_{EE} = -15V (Typ.)

Note 7: V_{GH} = -15V (Typ.)

Dimensional Outline:

