AND-TFT-6SQ

320 x 234 Pixels LCD Color Monitor

The AND-TFT-6SQ is a compact full color TFT LCD module, that is suitable for applications such as a portable television (PAL and NTSC) and a display for monitors. This device consists of a twisted nematic (TN) liquid crystal cell, that incorporates a TFT-array that has 320 x 234 pixels on a 6-inch diagonal screen, X and Y drivers, an LSI controller, and a built-in CCFL backlight and inverter.

Features

- NTSC composite (1.0Vp-p) signal and analog RGB (0.7Vp-p)
- 6 inch (15 cm) diagonal screen
- High brightness CCFL backlight (250 Nits)
- Built-in CCFL inverter
- Operating temperature range 0 to 50° C
- Storage temperature range –40 to 85° C
- 9.5V single power supply
- Low specular reflection.

Mechanical Characteristics

Item	Specification	Unit
Screen Size	6 inch (15 cm) diagonal	
Outline Dimensions	144.0 typ. (W) x 109.4 (H) x 20 max. (D)	mm
Active Area	121 (W) x 90.8 (H)	mm
Drive System	a-Si TFT Active matrix, a line at a time Non-Interlace Drive	
Pixel Number (RGB trio)	320 (W) x 234 (H)	–
Sub Pixel No.	960 (W) x 234 (H)	–
Sub Pixel Arrangement	RGB stripe	–
Pixel Pitch	0.381 (W) x 0.381 (H)	mm

Absolute Maximum Rating

Item			Symbol	Conditions	Absolute Maximum Rating		Unit
					Min.	Max.	
Supply Voltage	for Video Circuit		VCC	Ta = 25°C	VSS -0.2	13.0	V
	for Backlight Inverter		VBL	Ta = 25°C	VSS -0.2	11.0	V
Input Signal Voltage	Video	Composite	CVID	Ta = 25°C, VCC = 9.5V VBL = 9.5V	–	1.5	Vp-p
		Analog RGB	VR, VG, VB		–	1.5	Vp-p
	Composite sync.		CSYNC		–	1.5	Vp-p
	Others		BRT, TINT, COLOR, VSW, U/D, L/R OSR, OSG, OSB		VSS -0.2	VDD +0.2	V
Operating Temperature			Top	–	0	50	°C
Storage Temperature			Tstg	–	-40	85	°C
Humidity (No condensation of water)			–	–	10	90	% RH

Note: Operating temperature range of the TFT-LCD module surface is -30 to +85°C. However, heat from the backlight will narrow the range.

Electrical Specification

Item		Symbol	Conditions	Specifications			Units
				Min.	Typ.	Max.	
Current Consumption	for Video Circuit	ICC	–	–	0.21	0.26	A
	for Backlight Inverter	IBL	DIM = Max.	–	0.3	0.4	A
Output Voltage		VDD	VCC = VBL = +9.5V	4.8	5.0	–	V
Vertical display start		Vpos	NTSC (59.94Hz)	–	21	–	H
Vertical display term		Vdis	NTSC (59.94Hz)	–	234	–	H
Horizontal display		Hpos	NTSC (15.73kHz)	–	9.85	–	µs
Horizontal display term		Hdis	NTSC (15.73kHz)	–	50.84	–	µs

(Ta = RT, VSS = 0V)

Recommended Operating Conditions

Item			Symbol	Conditions	Specifications			Unit
					Min.	Typ.	Max.	
Supply Voltage	for Video Circuit		VCC	–	8.5	9.5	10.5	V
	for Backlight Inverter		VBL	–	9.0	9.5	10.0	V
Input Signal Voltage	Video	Composite	CVID	75Ω	–	1.0	–	Vp-p
		Analog RGB	VR, VG, VB	75Ω	–	0.7	–	Vp-p
	Composite sync.		CSYNC	75Ω	–	1.0	–	Vp-p
	Others		BRT, TINT, COLOR, VSW, U/D, L/R, OSR, OSG, OSB		+1.35		+3.9	V
Frame Frequency			fVDN	NTSC	58	59.94	62	Hz
			fHDN		15.2	15.73	16.2	kHz
Color Sub-carrier Frequency			fCOLOR	NTSC	3.579395	3.579545	3.579695	MHz
Color Sub-carrier Amplitude			VCOLOR	NTSC	40	–	–	mV

Optical Specifications

Item	Symbol	Conditions	Specifications			Unit
			Min.	Typ.	Max.	
Luminance	LUM	RGB = 0/0.7V	200	250	–	cd/m
Contrast Ratio	CR	Dim = 3.90V, RGB = 0/0.7V	20	50	–	–
Specular Reflectance	RS		–	1	3	%
Viewing Angle	ϕ L/ ϕ R	RGB = 0/0.7V	–	45/45	–	deg
	ϕ U/ ϕ D		–	15/30	–	deg

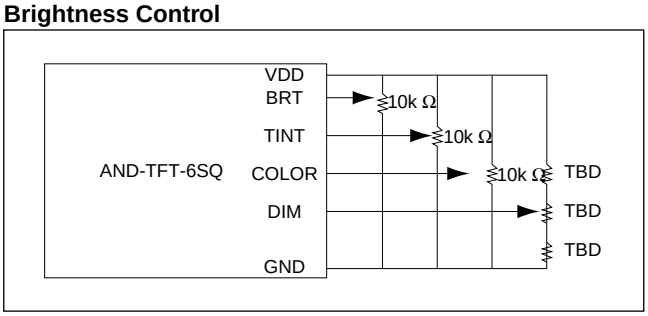
Interface Pin Assignment Connector 1: Connector 506B-PH-SM3B-TB (Nichiatsu)

Pin No.	Symbol	Function	Input/Output
1	VBL	Power Supply for Backlight Unit +9.5V	Input
2	NC	No connection	–
3	GND (B/L)	Ground for Backlight Unit	–
4	GND (VCC)	Ground for Video Interface Unit	–
5	NC	No connection	–
6	VCC	Power Supply for Video Interface Unit +9.5	–

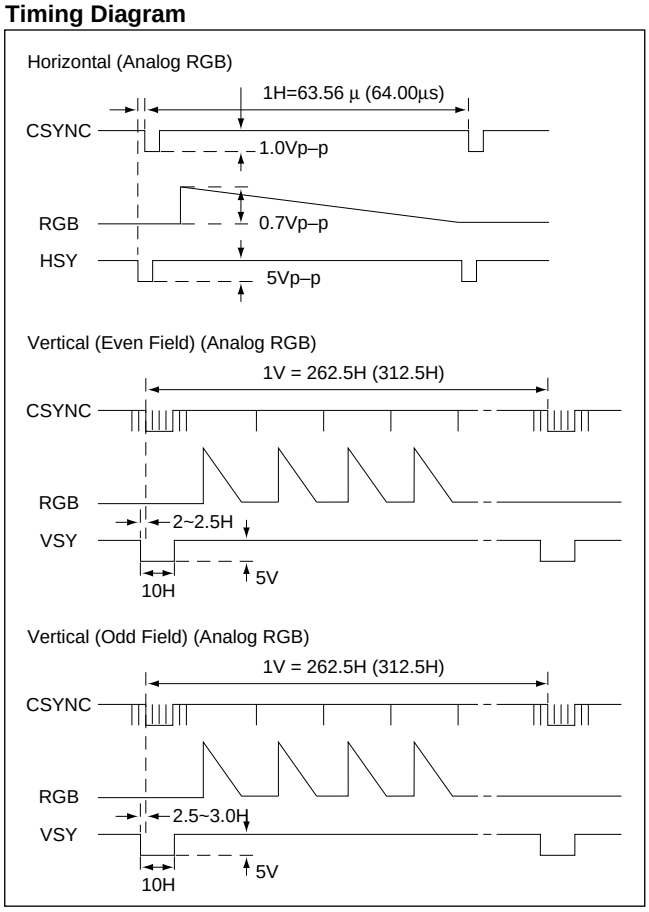
Interface Pin Assignment Connector 2: Connector 52207-2690 (Molex)

Pin No.	Symbol	Function		Input/Output
1	VIDEO	Sync. Signal Selection	1.0Vp-p, 75Ω	Input
2	GND	Ground		–
3	SYNC1	Composite Sync. Input 1	1.0V, Negative, 75 Ω	Input
4	VR1	Video Input R1	0.7Vp-p, 75 Ω	Input
5	VG1	Video Input G1	0.7Vp-p, 75 Ω	Input
6	VB1	Video Input B1	0.7Vp-p, 75 Ω	Input
7	GND	Ground		–
8	$\overline{\text{HSY}}$	Horizontal Sync. Output	5V, Negative, C-MOS	Output
9	$\overline{\text{VSY}}$	Vertical Sync. Output	5V, Negative, C-MOS	Output
10	SYNC2	Composite Sync. Input 2	1.0V, Negative, 75 Ω	Input
11	VR2	Video Input R2	0.7Vp-p, 75 Ω	Input
12	VG2	Video Input G2	0.7Vp-p, 75 Ω	Input
13	VB2	Video Input B2	0.7Vp-p, 75 Ω	Input
14	GND	Ground		–
15	SYNC SW	Sync. Signal Selection	0V: Composite, 5V:RGB	Input
16	RGB SW	RGB Input Channel Selection	0V: RGB1, 5V: RGB2	Input
17	GND	Ground		–
18	VDD	+5V Output for Control Signal		Output
19	$\overline{\text{L}}$/R	Horizontal Scan Direction	0V: Normal, 5V: Reverse	Input
20	$\overline{\text{U}}$/D	Vertical Scan Direction	0V: Normal, 5V: Reverse	Input
21	GND	Ground		–
22	BRT	Brightness Control	0 to 5V	Input
23	DIM	Dimmer (Backlight) Control	1.35 to 3.9V	Input
24	COLOR	Color Purity Control	0 to 5V	Input
25	TINT	Tint (Hue) Control	0 to 5V	Input
26	VIDEO SW	Video Signal Input Selection	0V: Composite, 5V: RGB	Input

Brightness Control



Timing Diagram



Dimensional Outline