AND-TFT-5SQ

320 x 234 Pixels
LCD Color Monitor

The AND-TFT-5SQ 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 5-inch diagonal screen, X and Y drivers, an LSI controller, and a built-in CCFL backlight and inverter.

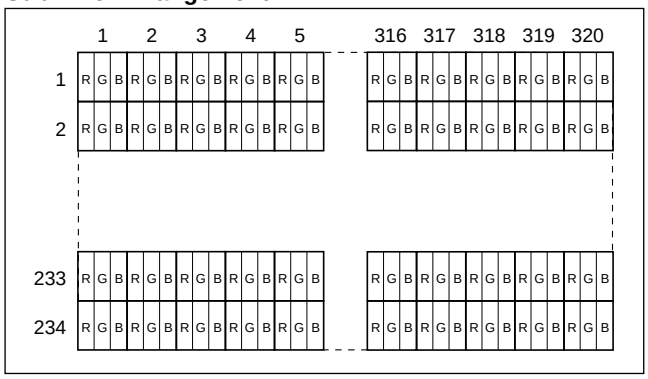
Features

- NTSC composite (1.0Vp-p) signal and analog RGB (0.7Vp-p)
- 5 inch (13 cm) diagonal screen
- High brightness CCFL backlight (300 Nits)
- Built-in CCFL inverter
- PAL & RGB version available (AND-TFT-5QP*)
  (*Available in Q4 1997)
- 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	5 inch (13 cm) diagonal	
Outline Dimensions	120.5 typ. (W) x 89.6 (H) x 20.0 max. (D)	mm
Active Area	101.6 (W) x 74.7 (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	0.318 (W) x 0.318 (H)	mm

Sub Pixel Arrangement



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, Backlight Inverter	ICC, IBL	DIM = Max.	–	0.54	–	A
Output Voltage		VDD	VCC = VBL = 9.5V	–	5.0	–	V
Output Current		IDD	VCC = VBL = 9.5V	–	2.0	20.0	mA
Vertical display start start position		Vpos	NTSC (59.94Hz)	–	22	–	H
			PAL (50.00Hz)	–	27	–	H
Vertical display term		Vdis	NTSC (59.94Hz)	–	234	–	H
			PAL (50.00Hz)	–	281	–	H
Horizontal display start position		Hpos	NTSC (15.73kHz)	–	9.35	–	µs
			PAL (15.63kHz)	–	10.14	–	µs
Horizontal display term		Hdis	NTSC (15.73kHz)	–	50.01	–	µs
			PAL (15.63kHz)	–	50.69	–	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	Level “H”	4.6	–	VDD	V
				Level “L”	VSS	–	0.4	V
Frame Frequency			fVDN	NTSC	58	59.94	62	Hz
			fHDN		15.2	15.7	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.	
Contrast Ratio	CR	RGB = 0/0.7V	30	100	–	–
Maximum Luminance	LUM	Dim = 3.90V, RGB = 0.7V	220	300	–	cd/m^2
Viewing Angle	ϕ L/ ϕ R	RGB = 0/0.7V	–	45/45	–	deg
	ϕ U/ ϕ D		–	15/30	–	deg

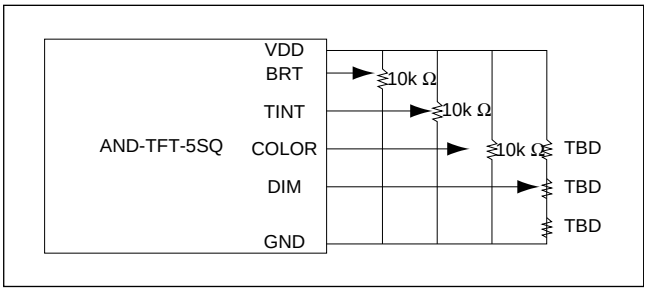
Interface Pin Assignment (Video Signals)
Connector: 52207-1490 (Molex)

Pin No.	Symbol	Function		Input/ Output
1	VIN	Composite Video Input	(1.0Vp-p, 75Ω)	Input
2	GND	Ground (0V)		–
3	SYNC	Composite Sync.Input	Negative 1.0Vp-p, 75Ω	Input
4	R	Video Input R	(0.7Vp-p, 75Ω)	Input
5	G	Video Input G	(0.7Vp-p, 75Ω)	Input
6	B	Video Input G	(0.7Vp-p, 75Ω)	Input
7	GND	Ground (0V)		–
8	$\overline{HSY}$	Horizontal Sync. Output	(Negative, C-MOS)	Output
9	$\overline{VSY}$	Vertical Sync. Output	(Negative, C-MOS)	Output
10	NC	No connect		–
11	NC	No connect		–
12	NC	No connect		–
13	NC	No connect		–
14	GND	Ground (0V)		

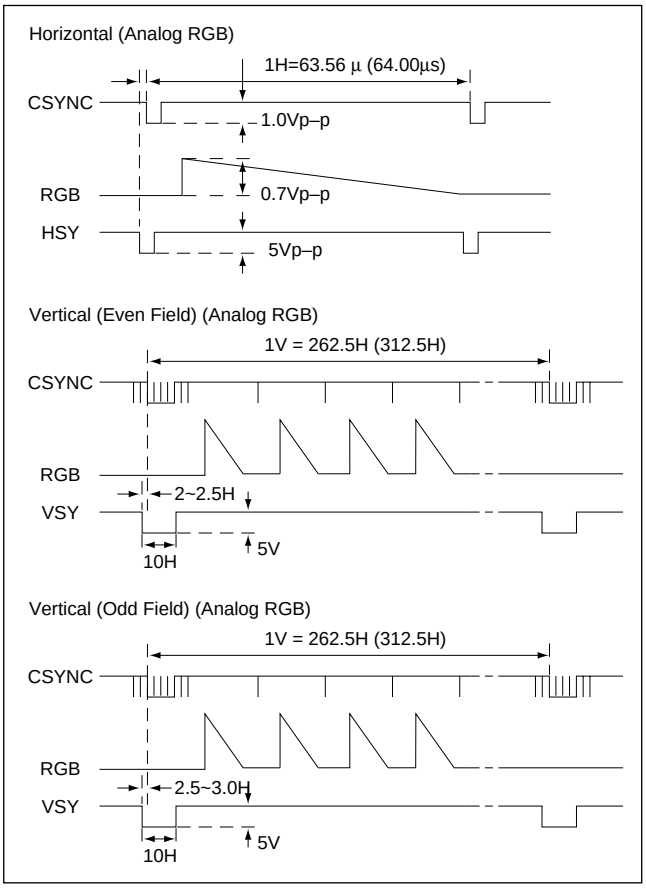
Interface Pin Assignment (Power and Control Signals)
Connector: & 52207-1890 (Molex)

Pin No.	Symbol	Function		Input/ Output
1	VCC1	Power Supply 9.5 for Backlight		Input
2				
3	GND	Ground (0V) for Backlight		–
4				
5	VCC2	Power Supply 9.5V for Video Circuit		Input
6	GND	Ground (0V) for Video Circuit		–
7	SSW	Sync. Signal Selection	(0V: Composite, 5V: RGB)	Input
8	NC	No Connect		–
9	GND	Ground (0V)		–
10	VDD	5V Output for Control Terminals		Output
11	$\overline{L}$/R	Scanning Direction Switch	0V: Left to Right 5V: Right to Left	Input
12	$\overline{U}$/D	Scanning Direction Switch	0V: Up to Down 5V: Down to Up	Input
13	GND	Ground (0V)		–
14	BRT	Brightness Control	(0V to 5V)	Input
15	DIM	Dimmer Control		Input
16	COLOR	Color Control	(0V to 5V)	Input
17	TINT	Tint Control	(0V to 5V)	Input
18	VSW	Video Signal Selection	(0V:Composite, 5V:RGB)	–

Brightness Control



Timing Diagram



Dimensional Outline