ANDpSiTFT04C380K-HB

4" VGA Color p-Si TFT LCD Module

The ANDpSiTFT04C380K-HB is 640 x 480 Color TFT display that utilizes new poly-silicon (p-Si) technology to provide a brighter, thinner and lighter display with high-resolution. The p-Si TFT technology allows the row and column LCD drivers to be fabricated directly on the LCD glass. This eliminates the need for discrete TAB drivers. Wide viewing angle technology provides excellent images from all directions. The single tube CCFL backlight offers a very bright display, thus making it ideal for portable applications including: personal digital assistants (PDAs), medical instruments, and test & measurement instruments.

Features

- p-Si construction with drivers on glass
- Wide viewing angle (± 45° at CR> 30)
- High luminance, long life backlight (50,000 hours)
- Super high resolution (202 pixels/inch)
- Clear 256K colors (K=1024)
- Thin and lightweight design
- VGA (640 x 480 pixels color display)
- Applications: portable instruments

Mechanical Characteristics

Item	Specification	Unit
Outline Dimensions	117.9 (H) x 72.5 (V) x 6.4 max (D)	mm
Number of Pixels	640 (H) x 480 (V)	pixels
Active Area	80.64 (H) x 60.48 (V)	mm
Pixel Pitch	0.126 (H) x 0.126 (V)	mm
Weight (approx.)	65	gram
Backlight	Single CCFL, Side-light type	–

Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit
Supply Voltage	V_{DD}	0.0	4.5	V
	V_{FL}	–	1500	Vrms
FL Driving Frequency	f_{FL}	–	160	kHz
Input Signal Voltage	V_{IN}	-0.3	V_{DD} + 0.3	V
Operating Temperature	T_{op}	0	50	°C
Storage Temperature	T_{stg}	-20	60	°C
Humidity (Max. Wet bulb temp = 29°C)	–	10	90	% RH

Electrical Characteristics (Ta = 25°C)

Item	Symbol	Min.	Typ.	Max.	Unit
Supply Voltage (I_{FL}=3mA)	V_{DD}	3.0	3.3	3.6	V
	V_{FL}	–	325	–	Vrms
FL Start Voltage (Ta = 0°C)	–	750	–	–	Vrms
High Level Input Voltage	V_{IH}	0.8x V_{DD}	–	V_{DD}	V
Low Level Input Voltage	V_{IL}	0	–	0.2x V_{DD}	V
Current Consumption	I_{DD}	–	115	–	mA
	I_{FL}	–	2.0	3.0	mArms
Power Consumption (*1 *2)	P	–	1.1	1.7	W

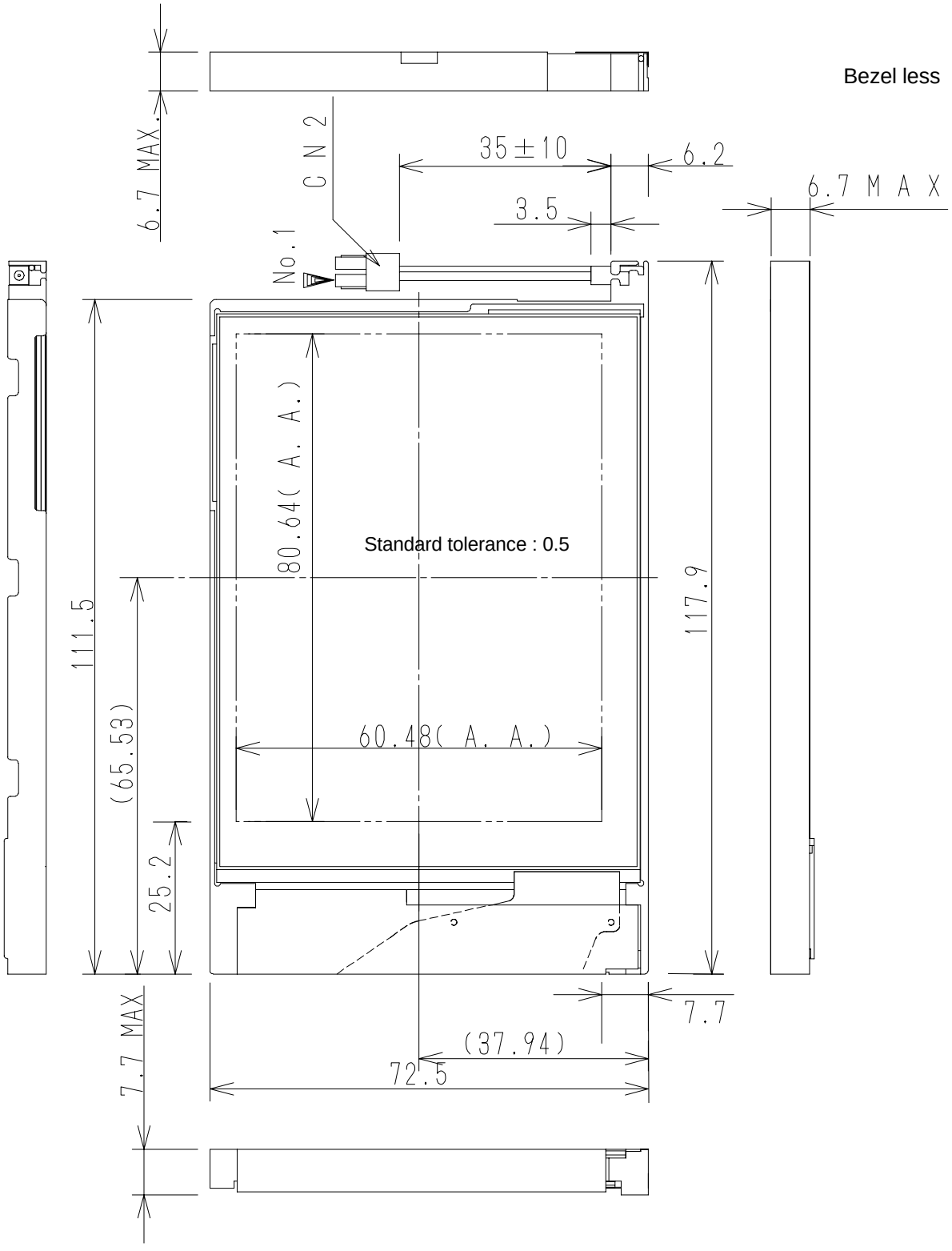
*1: 8 color bars pattern
*2: Except the efficiency of FL inverter

Optical Characteristics (Ta = 25˚C)

Item	Symbol	Min.	Typ.	Max.	Unit
Contrast	CR	100	250	–	–
Response	t_{on}	–	–	50	ms
	t_{off}	–	–	50	ms
Luminance (I_{FL} =2mA)	L	–	130	–	cd/m^2
Luminance (I_{FL} =3mA)	L	–	200	–	cd/m^2
Viewing Angle (CR>30)	ϕL/ ϕR	40/40	45/45	–	deg
	ϕU/ ϕD	45/45	50/50	–	deg

Dimensional Outline

Unit: mm
Standard tolerance: 0.5



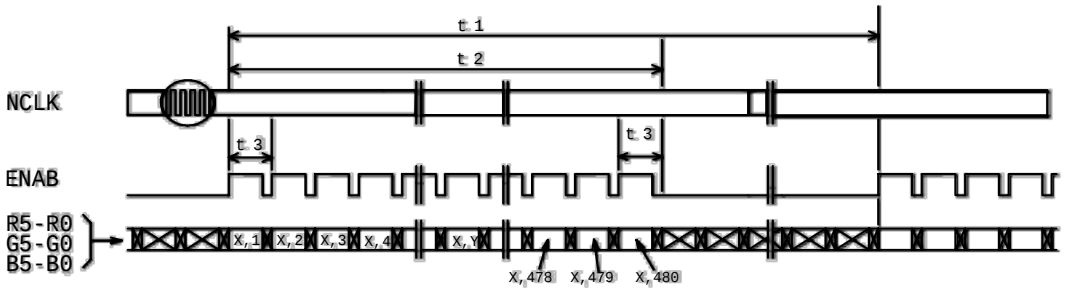
Timing Specifications (*1*2*3)

Item	Symbol	Min	Typ	Max	Unit
Frame Period (*4)	t1	489 x t3 –	525 x t3 16.68	525 x t3 17.85	– ms
Vertical Display Term	t2	480 x t3	480 x t3	480 x t3	t2 = N •t3
One Line Scanning Time (*4)	t3	784 x t5 31..5	800 x t5 31.78	860 x t5 36.5	– µs
Horizontal Display Period	t4	640 x t5	640 x t5	640 x t5	–
Clock Period	t5	35.0	39.72	46.5	ns
Clock “L” Time	t6	10.0	–	–	ns
Clock “H” Time	t7	7.0	–	–	ns
Set Up Time	t8	5.0	–	–	ns
Hold Time	t9	10.0	–	–	ns

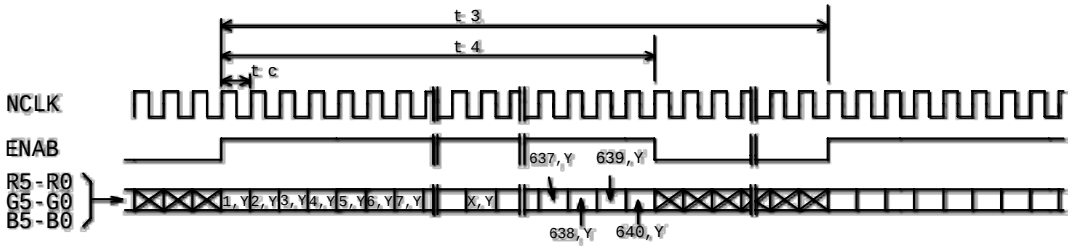
Note 1: When ENAB is fixed to “H” level or “L” level after NCLK input, the panel is displayed as black. However, it may be occurred a flicker on the display.
Note 2: When NCLK is fixed to “H” level or “L” level, the panel becomes white stage after several seconds.
Note 3: Do not change t1 and t3 values in the operation. When t1 or t3 is changed, the panel is displayed as black.
Note 4: Please adjust LCD operatin gsignal timing and FL driving frequency, to optimize the display quality. There is a possibility that flicker is observed by the interference of LCD operating signal timing and FL driving condition (especially driving frequency.)

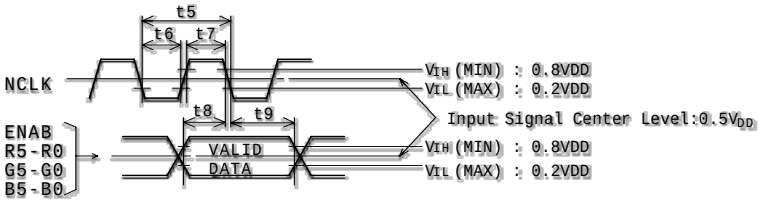
Timing Chart

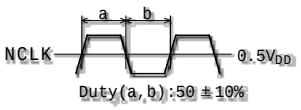
(1) Vertical Timing

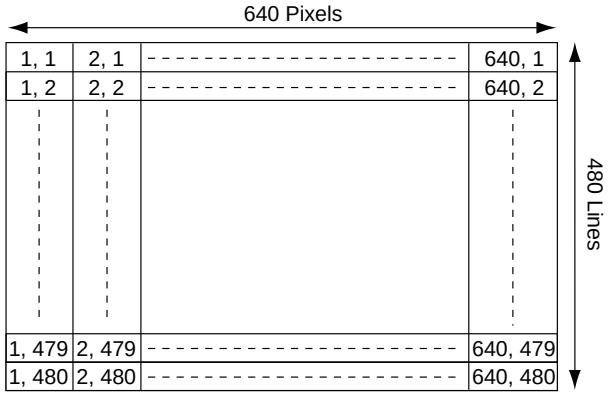


(2) Horizontal Timing



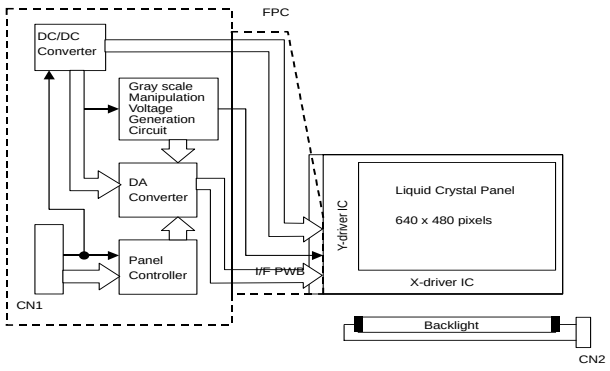






Recommended Inverter: TBD

Block Diagram



1) Drivers are fabricated on the LCD glass

2) Connectors
IL-FHJ-27S-HF/Japan Aviation Elec.
Mating Connector - FFC(0.3m Pitch)

HV-2S-C1/Japan Aviation Elec.
Mating Connector - HV-2P-HF

Connector Pin Assignment for Interface

CN1 Input Signal (1)
(IL-FHJ-27S-HF/Japan Aviation Elec.)

Terminal No.		Symbol	Function
1		VDD	+3.3V Power Supply
	2	VDD	+3.3V Power Supply
3		VDD	+3.3V Power Supply
	4	ENAB	Compound Synchronization Signal
5		B5(2)	Blue Display Data (MSB)
	6	B4(2)	Blue Display Data
7		B3(2)	Blue Display Data
	8	B2(2)	Blue Display Data
9		B1(2)	Blue Display Data
	10	B0(2)	Blue Display Data (LSB)
11		GND	Ground
	12	G5(2)	Green Display Data (MSB)
13		G4(2)	Green Display Data
	14	G3(2)	Green Display Data
15		G2(2)	Green Display Data
	16	G1(2)	Green Display Data
17		G0(2)	Green Display Data (LSB)
	18	GND	Ground
19		R5(2)	Red Display Data (MSB)
	20	R4(2)	Red Display Data
21		R3(2)	Red Display Data
	22	R2(2)	Red Display Data
23		R1(2)	Red Display Data
	24	R0(2)	Red Display Data (LSB)
25		GND	Ground
	26	NCLK	Sampling Clock
27		GND	Ground

CN2 CCFL Power Source
(HV-2S-C1/Japan Aviation Elec.)

Terminal No.	Symbol	Function
1	VL	CCFL Power Supply (High Voltage)
2	GL	CCFL Power Supply (Low Voltage)

Note (2): 256K colors are displayed by the combinations of 18 data bits.

	Display	R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0	Gray Scale Level
Basic Color	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	–
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	–
	Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	–
	Lt. Blue	L	L	L	L	L	L	H	H	H	H	H	H	H	H	H	H	H	H	–
	Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	–
	Purple	H	H	H	H	H	H	L	L	L	L	L	L	H	H	H	H	H	H	–
	Yellow	H	H	H	H	H	H	H	H	H	H	H	H	L	L	L	L	L	L	–
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		–
Gray Scale of Red	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L1
		L	L	L	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L2
					:						:						:			L3~L60
					:						:						:			
		H	H	H	H	L	H	L	L	L	L	L	L	L	L	L	L	L	L	L61
	Light	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	L	L62
	Red	H	H	H	H	H	H	L	L	L	L	L	L	L	L	L	L	L	L	Green L63
Gray Scale of Green	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L1
		L	L	L	L	L	L	L	L	L	L	H	L	L	L	L	L	L	L	L2
					:						:						:			L3~L60
					:						:						:			
		L	L	L	L	L	L	H	H	H	H	L	H	L	L	L	L	L	L	L61
	Light	L	L	L	L	L	L	H	H	H	H	H	L	L	L	L	L	L	L	L62
	Green	L	L	L	L	L	L	H	H	H	H	H	H	L	L	L	L	L	L	Green L63
Gray Scale of Blue	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L1
		L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	H	L	L2
					:						:						:			L3~L60
					:						:						:			
		L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	L	H	L61
	Light	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	L	L62
	Blue	L	L	L	L	L	L	L	L	L	L	L	L	H	H	H	H	H	H	Blue L63
Gray Scale of White & Black	Black	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L	L0
	Dark	L	L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L1
		L	L	L	L	H	L	L	L	L	L	H	L	L	L	L	L	H	L	L2
					:						:						:			L3~L60
					:						:						:			
		H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	H	L61
	Light	H	H	H	H	H	L	H	H	H	H	H	L	H	H	H	H	H	L	L62
	White	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	White L63

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