HY-LINE®
COMPUTER COMPONENTS

TFT-Display Datenblatt

Modell FX040346DSSWBG01

Kurzdaten

Hersteller	Data Image
Diagonale	4,3“ / 10,9 cm
Format	16:9
Auflösung	480 x 272
Backlight	LED / 400 cd/m²
Interface	RGB
Touchscreen	nein
Temperatur	-20°… +70°C (Betrieb)

HY-LINE Computer Components Vertriebs GmbH
Inselkammerstr. 10, 82008 Unterhaching bei München
Tel.: +49 89 614 503 40 || Fax: +49 89 614 503 50

Vertrieb durch: HY-LINE COMPUTER COMPONENTS
Inselkammerstr. 10
82008 Unterhaching
Tel: +49 89 614 503 40
www.hy-line.de/computer

DATA IMAGE

Confidential Document

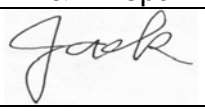
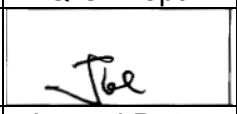
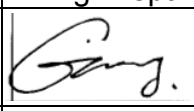
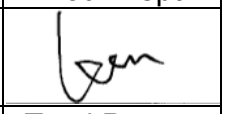
DATA IMAGE CORPORATION

TFT Module Specification

ITEM NO.: FX040346DSSWBG01

Table of Contents

1. COVER & CONTENTS ····· 1
2. RECORD OF REVISION ····· 2
3. FEATURE ····· 3
4. GENERAL SPECIFICATIONS ····· 3
5. ELECTRICAL CHARACTERISTICS ····· 3
6. BLOCK DIAGRAM ····· 4
7. PIN CONNECTIONS ····· 5
8. AC CHARACTERISTICS ····· 6
9. OPTICAL CHARACTERISTIC ····· 10
10. QUALITY ASSURANCE ····· 12
11. LCM PRODUCT LABEL DEFINE ····· 13
12. PRECAUTIONS IN USE LCM ····· 15
13. OUTLINE DRAWING ····· 16
14. PACKAGE INFORMATION ····· 17

Customer Companies	R&D Dept.	Q.C. Dept.	Eng. Dept.	Prod. Dept.
				
Approved by	Version:	Issued Date:	Sheet Code:	Total Pages:
	A	26/MAR/12’		17

HY-LINE Computer Components / www.hy-line.de/computer

2. RECORD OF REVISION

Rev	Date	Item	Page	Comment
1	01/JULY/10'			Initial preliminary
A	26/MAR/12'	13	16	Modify OUTLINE DRAWING from Rev:1 to 2 to A Release REV.A for production

HY-LINE Computer Components / www.hy-line.de/computer

3. FEATURE

- 64 gray level with 2 bit dithering function to realize 16M colors

4. GENERAL SPECIFICATIONS

Parameter	Specifications	Unit
Display resolution	480X R.G.B x 272	dot
Active area	95.04(W) x 53.856(H)	mm
Screen size	4.3(Diagonal)	inch
Dot pitch	0.066 (W) x 0.198(H)	mm
Color configuration	R.G.B. Stripe	
Overall dimension	105.5 (W) x 67.2(H) x 3.1(D)	mm
Weight	56	g
Surface treatment	Clear	
View Angle direction	6 o'clock	
Our components and processes are compliant to RoHS standard		

5. ELECTRICAL CHARACTERISTICS

GND=0V,Ta=25°C

Parameter	Symbol	MIN.	Typ.	MAX.	Unit	Remark
Power Supply voltage	V_{DD}	3.0	3.3	3.6	V	Note1
Power Supply Current	I_{DD}		21	30	mA	V_{DD} =3.3V
Ripple Voltage	V_{RPVDD}			100	mVp-p	
"H" level logical input voltage	V_{IH}	0.7VDD	--	VDD	V	
"L" level logical input voltage	V_{IL}	0	--	0.3VDD	V	
Operating temperature	Topa	-20	--	70	°C	Ambient temperature
Storage temperature	Tstg	-30	--	80	°C	Ambient temperature

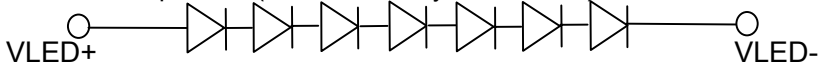
Note1: VDD Absolute Maximum Ratings -0.3V~+5V

5.1 Backlight driving for power conditions

Ta= 25 °C

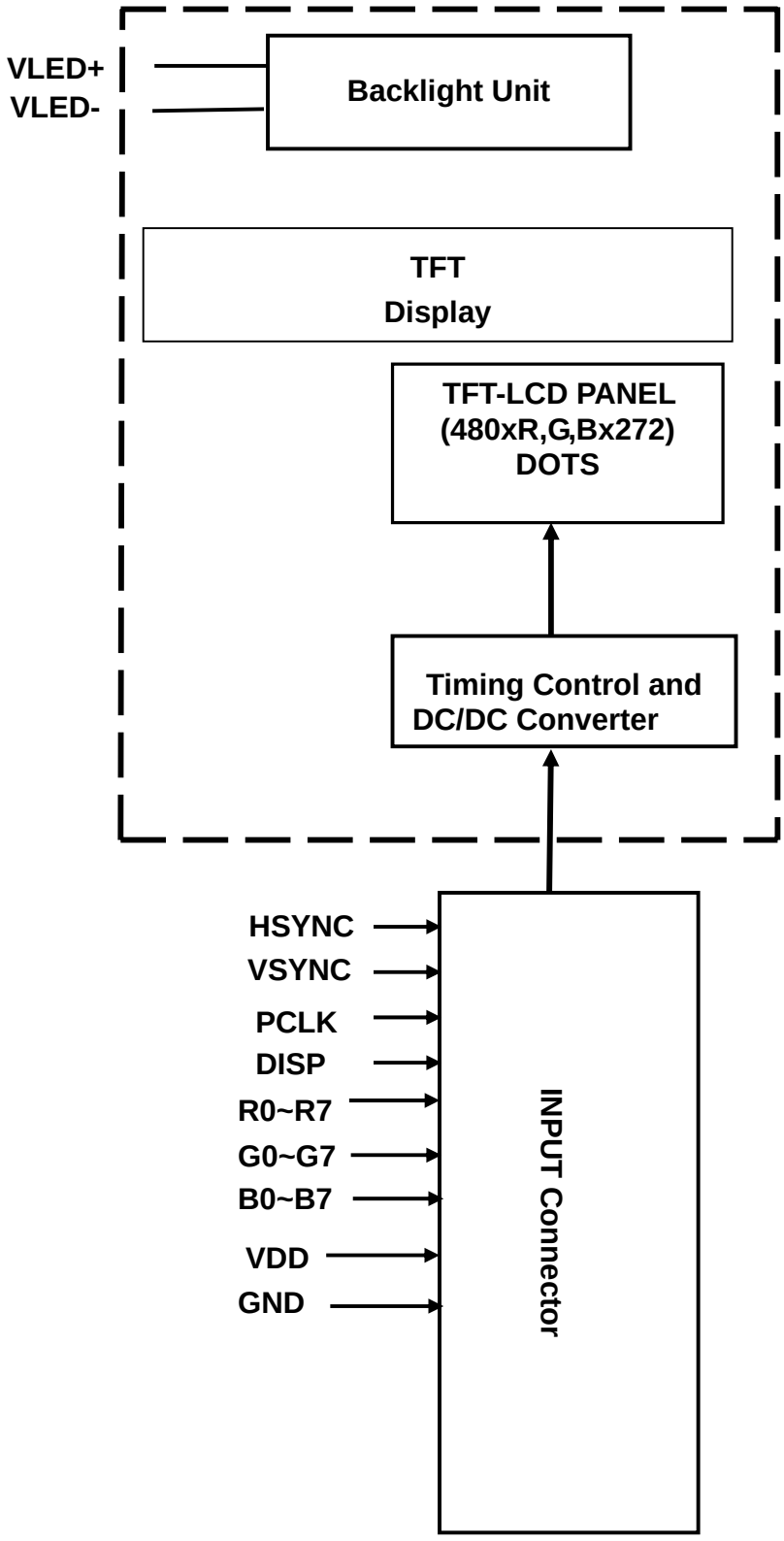
Parameter	Symbol	Min.	Typ.	Max.	Unit	Remark
LED current	I_L	--	20	--	mA	
VLED voltage	V_L	21	23.1	25.2	V	$I_{L=20}$ mA
LED life time			40,000		Hours	Note 1

Note 1 under room temperature(25 °C, Humidity 30-60% RH)and IL=20mA.



HY-LINE Computer Components / www.hy-line.de/computer

6. BLOCK DIAGRAM



HY-LINE Computer Components / www.hy-line.de/computer

7. PIN CONNECTIONS

7.1 Input Pins Connection

Pin No	Symbol	Function	Remark
1	VLED-	LED Power Supply Cathode.	
2	VLED+	LED Power Supply Anode.	
3	NC	No Connection	
4	VDD	Power Supply : +3.3V	
5	R0	Digital data input. R0 is LSB and R7 is MSB	
6	R1		
7	R2		
8	R3		
9	R4		
10	R5		
11	R6		
12	R7		
13	G0	Digital data input. G0 is LSB and G7 is MSB	
14	G1		
15	G2		
16	G3		
17	G4		
18	G5		
19	G6		
20	G7		
21	B0	Digital data input. B0 is LSB and B7 is MSB	
22	B1		
23	B2		
24	B3		
25	B4		
26	B5		
27	B6		
28	B7		
29	GND	Ground	
30	PCLK	clock signal to sample each data	
31	DISP	Display ON/OFF Control ON=H(VDD), OFF=L(GND)	
32	HSYNC	Horizontal synchronous signal	
33	VSYNC	Vertical synchronous signal	
34	NC	No Connection	
35	NC	No Connection	
36	GND	Ground	
37	NC(XR)	No Connection (Touch panel Right)	
38	NC(YD)	No Connection (Touch panel Down)	
39	NC(XL)	No Connection (Touch panel Left)	
40	NC(YU)	No Connection (Touch panel Up)	

HY-LINE Computer Components / www.hy-line.de/computer

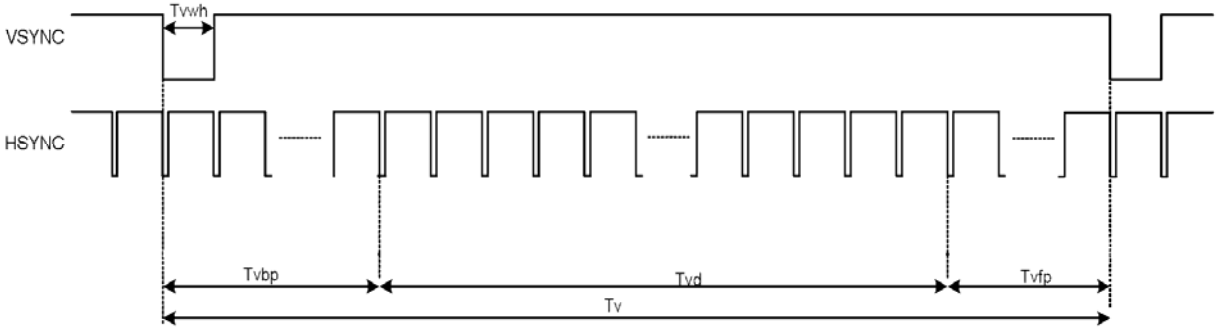
8. AC CHARACTERISTICS

8.1 Input Timing Requirement

(480RGBx272, Ta =25ºC, VCC=3.3V GND= 0V)

Parameter	Symbol	Min.	Typ. Value	Max.	Unit
CK frequency	fclk	5	9	12	MHz
VSYNC period time	Tv	282	288	373	H
VSYNC display area	Tvd		272		H
VSYNC back porch	Tvbp	8	8	8	H
VSYNC front porch	Tvfp	2	8	93	H
HSYNC period time	Th	524	525	585	CK
HSYNC display area	Thd		480		CK
HSYNC back porch	Thbp	40	40	40	CK
HSYNC front porch	Thfp	4	5	65	CK

Vertical input timing



HY-LINE Computer Components / www.hy-line.de/computer

Horizontal input timing

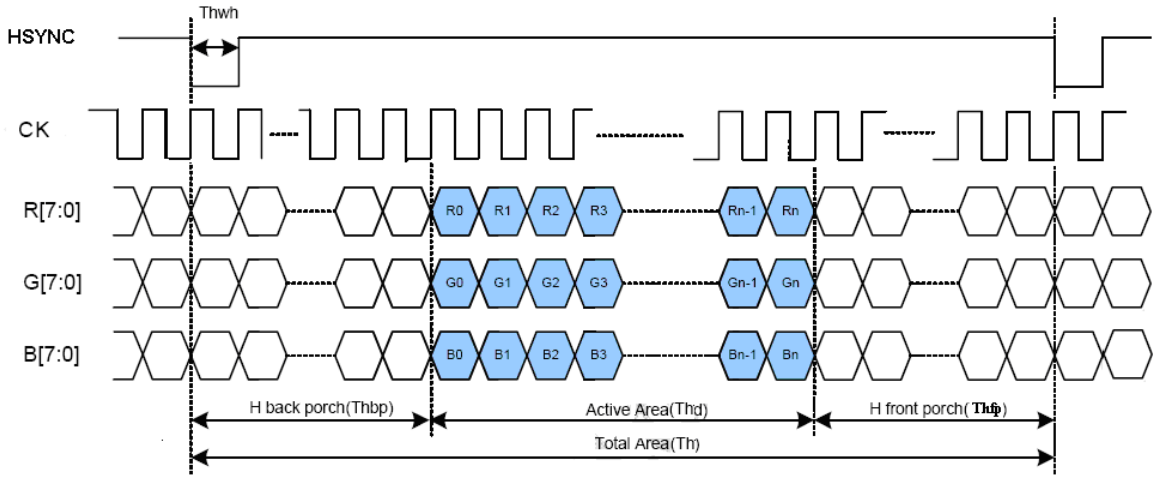


Fig 1. Parallel RGB input timing

8.2 Input Setup Timing Requirement
(VCC = 3.0 to 3.6V, GND=0V, TA=-20 to +85℃)

Parameters	Symbol	Min.	Typ.	Max.	Unit	Conditions
CK clock time	Tclk	33.3	-	-	ns	CK =30MHz
CK clock low period	Tcwl	40	-	60	%	
CK clock high period	Tcwh	40	-	60	%	
Clock rising time	Trck	9	-	-	ns	
Clock falling time	Tfck	9	-	-	ns	
HSYNC width	Thwh	1	-	-	CK	
HSYNC period time	Th	55	60	65	us	
HSYNC setup time	Thsu	12	-	-	ns	
HSYNC hold time	Thhd	12	-	-	ns	
VSYNC width	Tvwh	1	-	-	Th	
VSYNC setup time	Tvsu	12			ns	
VSYNC hold time	Tvhd	12			ns	
Data setup time	Tdasu	12	-	-	ns	
Data hold time	Tdahd	12	-	-	ns	

HY-LINE Computer Components / www.hy-line.de/computer

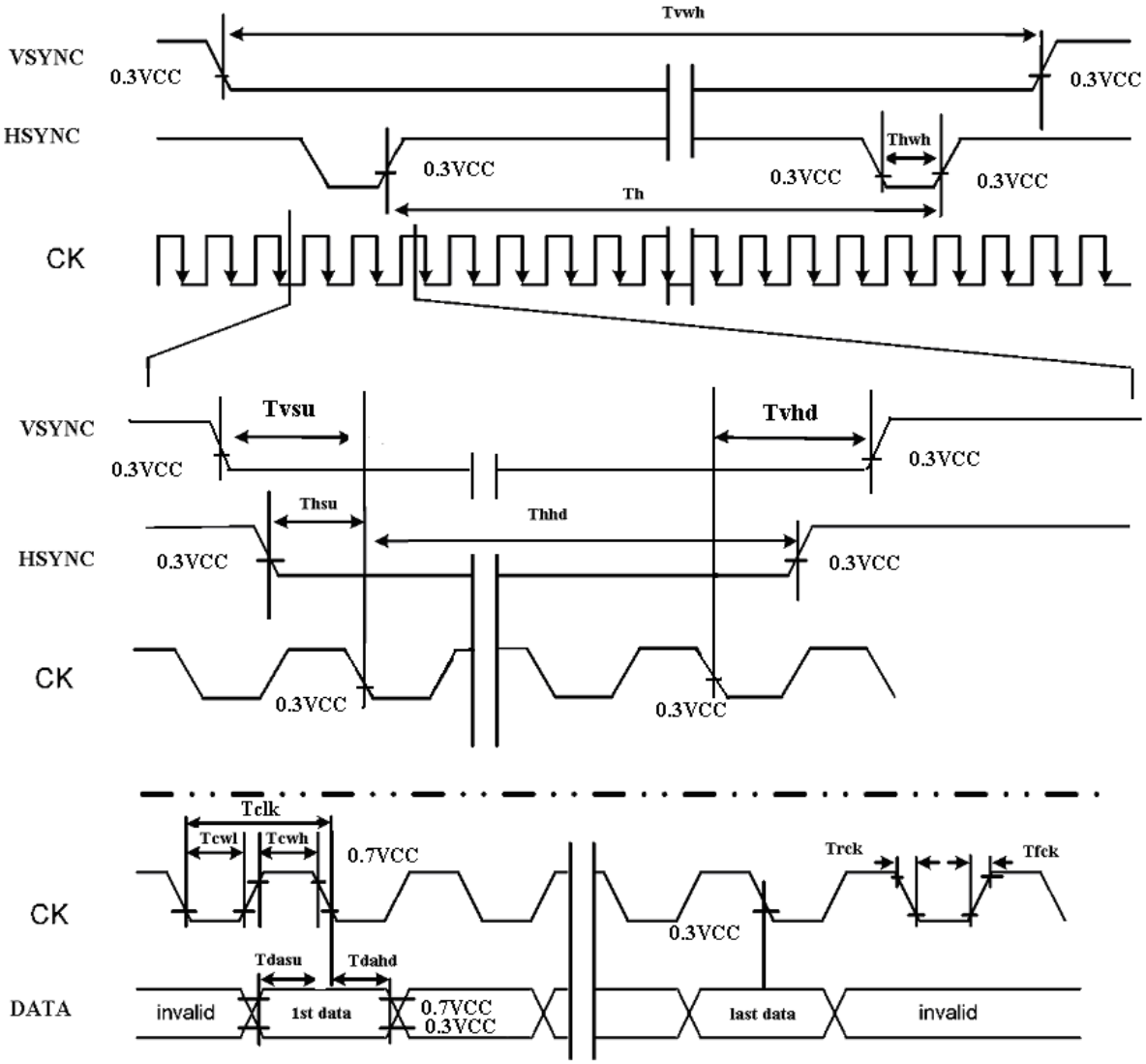
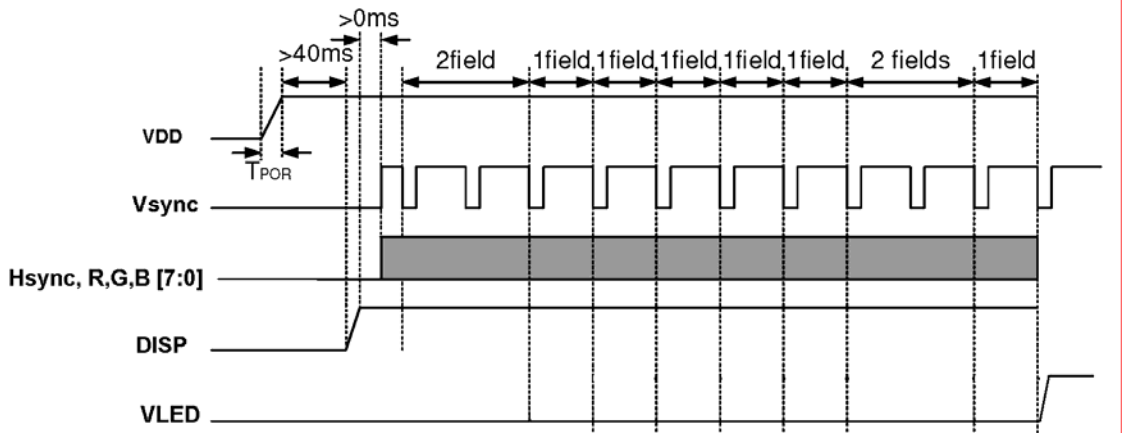


Fig 2. Input setup timing requirement

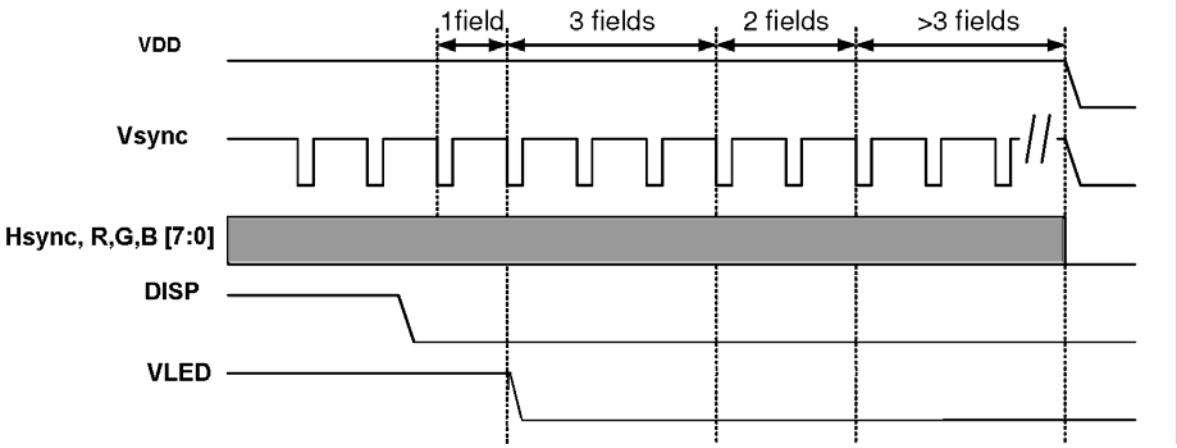
HY-LINE Computer Components / www.hy-line.de/computer

8.3 Power on/off sequence:

- **Power on sequence**



- **Power off sequence**

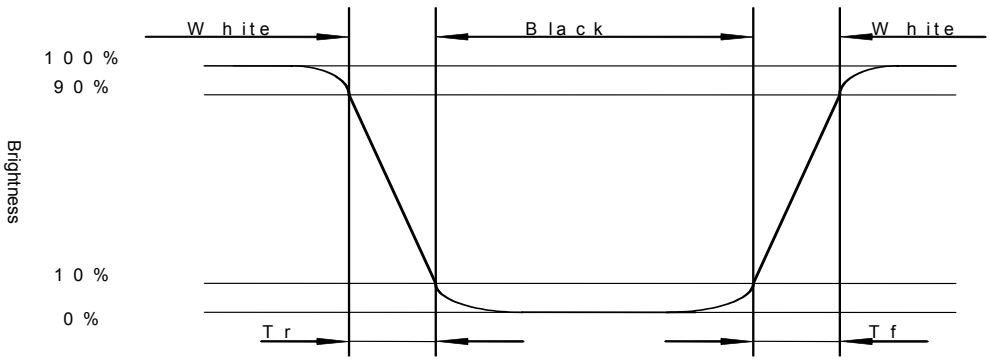


HY-LINE Computer Components / www.hy-line.de/computer

9. Optical Characteristics

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Response time		Tr+Tf	θ=0°	-	25	-	ms	Note 4
Contrast ratio		CR	At optimized viewing angle	100	400			Note 5
Viewing angle	Top		CR≥10	40	50	-	Deg.	Note 6
	Bottom			60	70	-		
	Left			60	70	-		
	Right			60	70	-		
Luminance of white			θ=0°	320	400	--	cd/m2	Note 7,8
Uniformity				70	--		%	Note 8,9
White chromaticity		X	θ=0°	0.27	0.32	0.37		Note 7
		y		0.28	0.33	0.38		

Note 1: Ambient temperature =25°C. LED current I_L= 20 mA.
Note 2: To be measured in the dark room.
Note 3: To be measured on the center area of panel with a viewing cone of 1° by Topcon luminance meter BM-7A, after 2 minutes operation.
Note 4: Definition of response time:
The output signals of photo-detector are measured when the input signals are changed from “white” to “black”(rising time) and from “black” to “white”(falling time),respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as shown below.

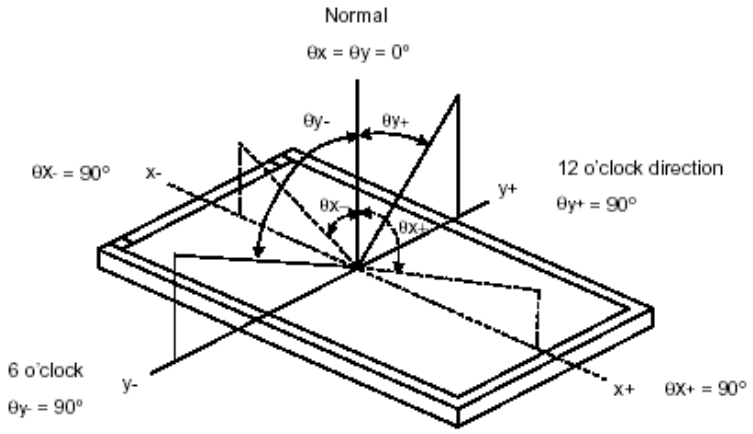


Note5: Definition of contrast ratio:
Contrast ratio is calculated with the following formula.

$$\text{Contrast ratio (CR)} = \frac{\text{Photo-detector output when LCD is at “White” state}}{\text{Photo-detector output when LCD is at “Black” state}}$$

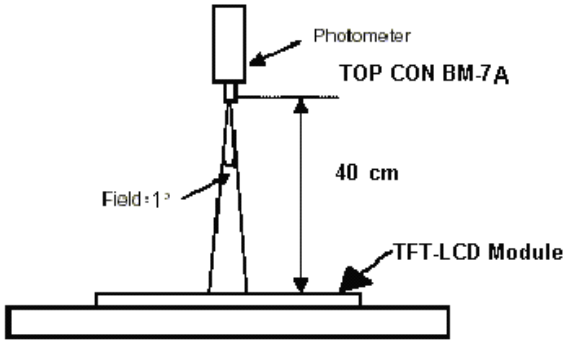
HY-LINE Computer Components / www.hy-line.de/computer

Note 6: Definition of viewing angle:
Refer to figure as below.

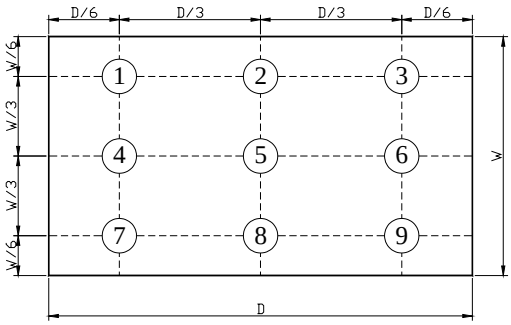


Note 7: Measured at the center area of the panel when all the input terminals of LCD panel are electrically opened.

Note8: The method of optical measurement



Note 9: Definition of Brightness Uniformity (B-uni):



$$\text{B-uni} = \frac{\text{Minimum luminance of 9 points}}{\text{Maximum luminance of 9points}} \quad \text{(Note 5).}$$

HY-LINE Computer Components / www.hy-line.de/computer

10. QUALITY ASSURANCE

10.1 Test Condition

10.1.1 Temperature and Humidity(Ambient Temperature)

Temperature : 25 ± 5°C
Humidity : 65 ± 5%

10.1.2 Operation

Unless specified otherwise, test will be conducted under function state.

10.1.3 Container

Unless specified otherwise, vibration test will be conducted to the product itself without putting it in a container.

10.1.4 Test Frequency

In case of related to deterioration such as shock test. It will be conducted only once.

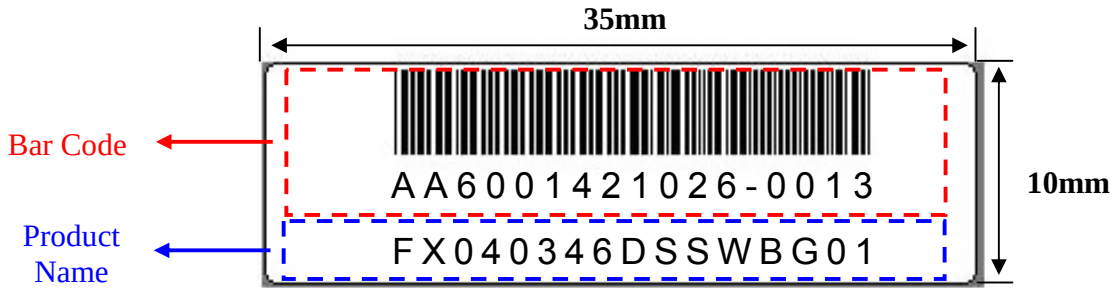
10.1.5 Test Method

No.	Reliability Test Item & Level	Test Level
1	High Temperature Storage Test	T=80°C,240hrs
2	Low Temperature Storage Test	T=-30°C,240hrs
3	High Temperature Operation Test	T=70°C,240hrs
4	Low Temperature Operation Test	T=-20°C,240hrs
5	High Temperature and High Humidity Operation Test	T=60°C,90% RH,240hrs
6	Thermal Cycling Test (No operation)	-30°C → +25°C → +80°C,200 Cycles 30 min 5min 30 min
7	Vibration Test (No operation)	Frequency:0 ~ 55 Hz Amplitude:1.5 mm Sweep Time:11min Test Period:6 Cycles for each Direction of X,Y,Z
8	Electrostatic Discharge Test (No operation)	150pF,330Ω Air:± 15KV;Contact: ± 8KV 10 times/point;4 points/panel face

HY-LINE Computer Components / www.hy-line.de/computer

11. LCM PRODUCT LABEL DEFINE

Product Label style:



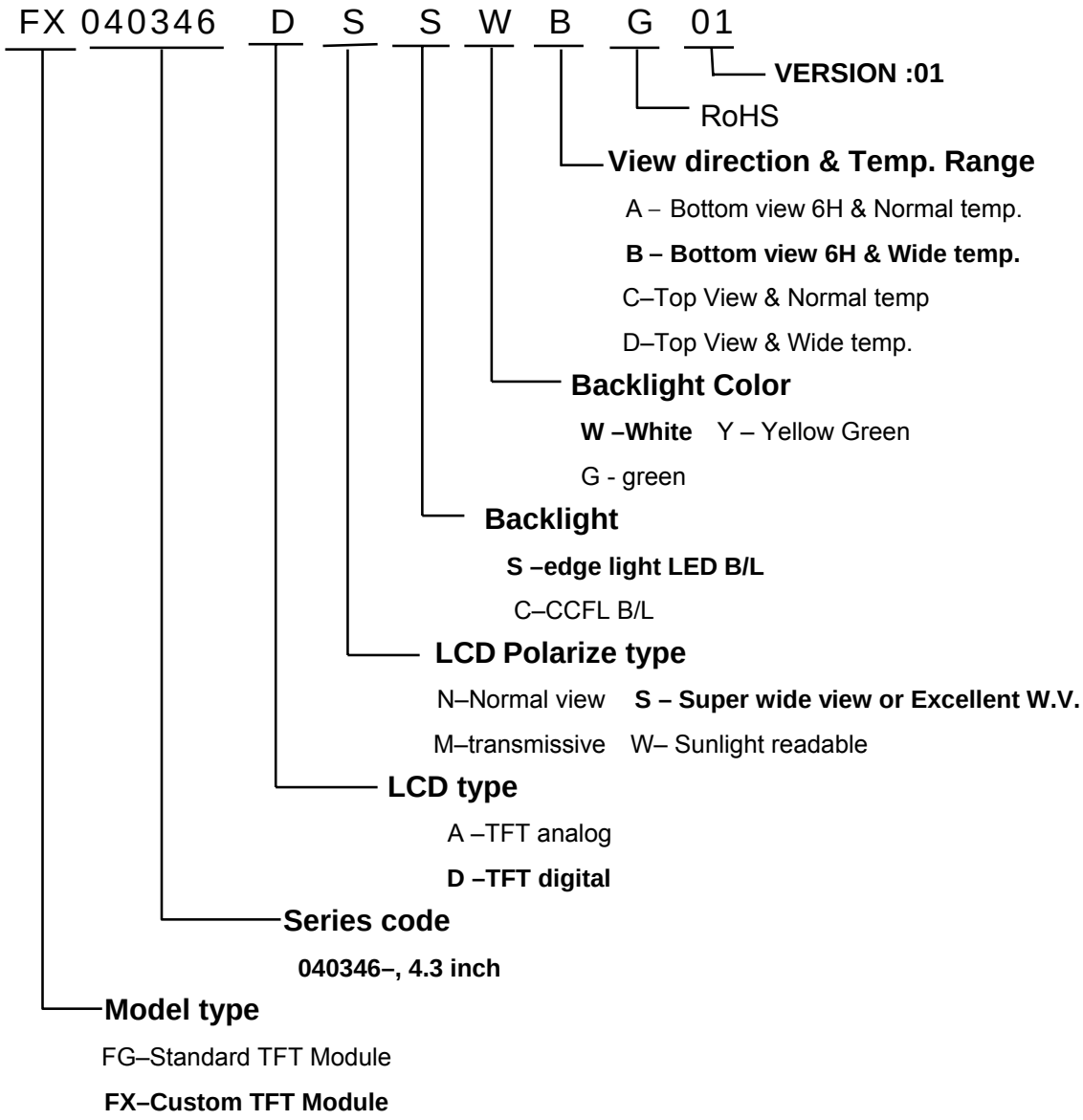
BarCode Define:

A A 6 0014 2 10 26-0013

- Serial number of the products
  Serial number starts from 0000
  Every work order is 10K at most
- Week of production
- Year of production
- Storage area
- Serial number of work order
  Serial number starts from 0000 each month
- Month of work order
- Year of work order
- The first 3 numbers of work order

HY-LINE Computer Components / www.hy-line.de/computer

Product Name Define:



HY-LINE Computer Components / www.hy-line.de/computer

12. PRECAUTIONS IN USE LCM

1. LIQUID CRYSTAL DISPLAY (LCD)

LCD is made up of glass, organic sealant, organic fluid, and polymer based polarizers. The following precautions should be taken when handing,

(1). Keep the temperature within range of use and storage. Excessive temperature and humidity could cause polarization degredation, polarizer peel off or bubble.

(2). Do not contact the exposed polarizers with anything harder than an HB pencil lead. To clean dust off the display surface, wipe gently with cotton, chamois or other soft material soaked in petroleum benzin.

(3). Wipe off saliva or water drops immediately. Contact with water over a long period of time may cause polarizer deformation or color fading, while an active LCD with water condensation on its surface will cause corrosion of ITO electrodes.

(4). Glass can be easily chipped or cracked from rough handling, especially at corners and edges.

(5). Do not drive LCD with DC voltage.

2. Liquid Crystal Display Modules

2.1 Mechanical Considerations

LCM are assembled and adjusted with a high degree of precision. Avoid excessive shocks and do not make any alterations or modifications. The following should be noted.

(1). Do not tamper in any way with the tabs on the metal frame.

(2). Do not modify the PCB by drilling extra holes, changing its outline, moving its components or modifying its pattern.

(3). Do not touch the elastomer connector, especially insert an backlight panel (for example, EL).

(4). When mounting a LCM make sure that the PCB is not under any stress such as bending or twisting . Elastomer contacts are very delicate and missing pixels could result from slight dislocation of any of the elements.

(5). Avoid pressing on the metal bezel, otherwise the elastomer connector could be deformed and lose contact, resulting in missing pixels.

2.2. Static Electricity

LCM contains CMOS LSI's and the same precaution for such devices should apply, namely

(1). The operator should be grounded whenever he/she comes into contact with the module. Never touch any of the conductive parts such as the LSI pads, the copper leads on the PCB and the interface terminals with any parts of the human body.

(2). The modules should be kept in antistatic bags or other containers resistant to static for storage.

(3). Only properly grounded soldering irons should be used.

(4). If an electric screwdriver is used, it should be well grounded and shielded from commutator sparks.

(5) The normal static prevention measures should be observed for work clothes and working benches; for the latter conductive (rubber) mat is recommended.

(6). Since dry air is inductive to statics, a relative humidity of 50-60% is recommended.

2.3 Soldering

(1). Solder only to the I/O terminals.

(2). Use only soldering irons with proper grounding and no leakage.

(3). Soldering temperature : 280°C ± 10°C

(4). Soldering time: 3 to 4 sec.

(5). Use eutectic solder with resin flux fill.

(6). If flux is used, the LCD surface should be covered to avoid flux spatters. Flux residue should be removed after wards.

2.4 Operation

(1). The viewing angle can be adjusted by varying the LCD driving voltage V0.

(2). Driving voltage should be kept within specified range; excess voltage shortens display life.

(3). Response time increases with decrease in temperature.

(4). Display may turn black or dark blue at temperatures above its operational range; this is (however not pressing on the viewing area) may cause the segments to appear "fractured".

(5). Mechanical disturbance during operation (such as pressing on the viewing area) may cause the segments to appear "fractured".

2.5 Storage

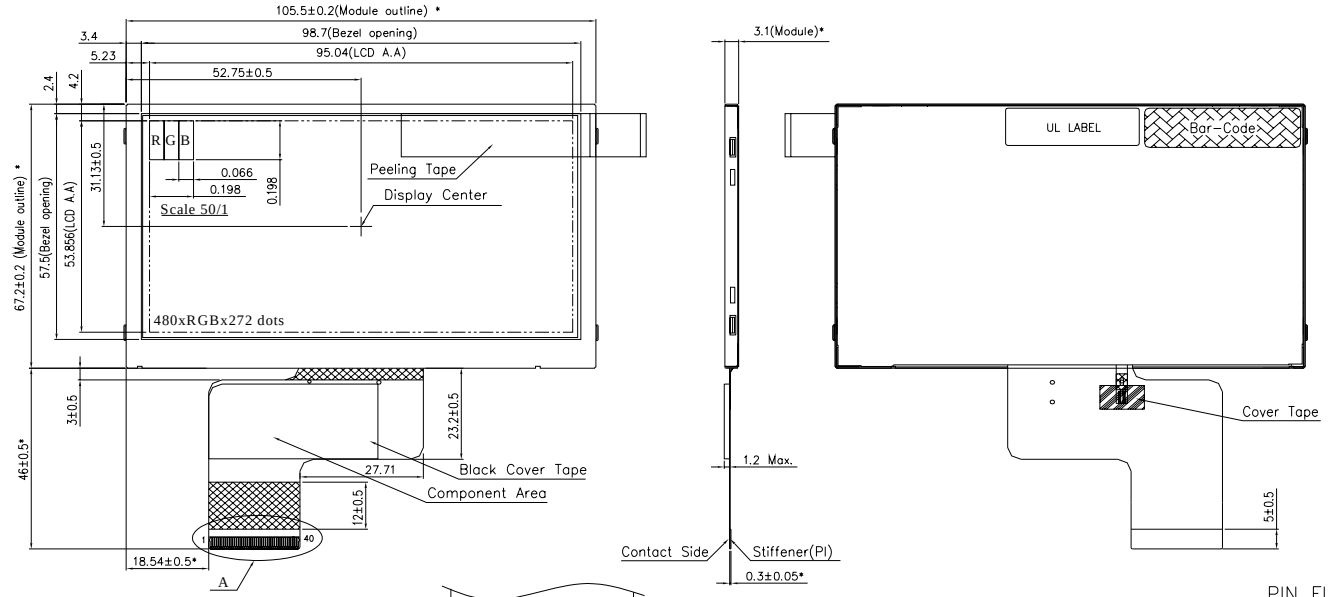
If any fluid leaks out of a damaged glass cell, wash off any human part that comes into contact with soap and water. Never swallow the fluid. The toxicity is extremely low but caution should be exercised at all the time.

2.6 Limited Warranty

Unless otherwise agreed between DATA IMAGE and customer, DATA IMAGE will replace or repair any of its LCD and LCM which is found to be defective electrically and visually when inspected in accordance with DATA IMAGE acceptance standards, for a period on one year from date of shipment. Confirmation of such date shall be based on freight documents. The warranty liability of DATA IMAGE is limited to repair and/or replacement on the terms set forth above. DATA IMAGE will not responsible for any subsequent or consequential events.

HY-LINE Computer Components / www.hy-line.de/computer

13. OUTLINE DRAWING



Note:
1. Luminance : 400 cd/m^2 (Typ.)
2. Uniformity : 70%
3. LCD FPC Match Connector: Molex 502790-4091 or equivalent
4. Tolerance is ±0.3 unless otherwise noted.
5. The bending radius of FPC should be larger than 0.6mm
6. for RoHS
7. ⊠ Bending Area
8. * is important dimension.
9. Surface treatment:clear.

PIN FUNCTIONS

1	VLED−	11	R6	21	B0	31	DISP
2	VLED+	12	R7	22	B1	32	Hsync
3	NC	13	G0	23	B2	33	Vsync
4	VDD	14	G1	24	B3	34	NC
5	R0	15	G2	25	B4	35	NC
6	R1	16	G3	26	B5	36	GND
7	R2	17	G4	27	B6	37	NC(XR)
8	R3	18	G5	28	B7	38	NC(YD)
9	R4	19	G6	29	GND	39	NC(XL)
10	R5	20	G7	30	PCLK	40	NC(YU)

AUTH	DESCRIPTION	DATE	APPROVED
	Change the drawing <<FX040346SG01>> from Rev.2 to Rev.A		

REVISIONS

DATE: 06/29/10'
DRAWN:
CHECK:
APPROVE:

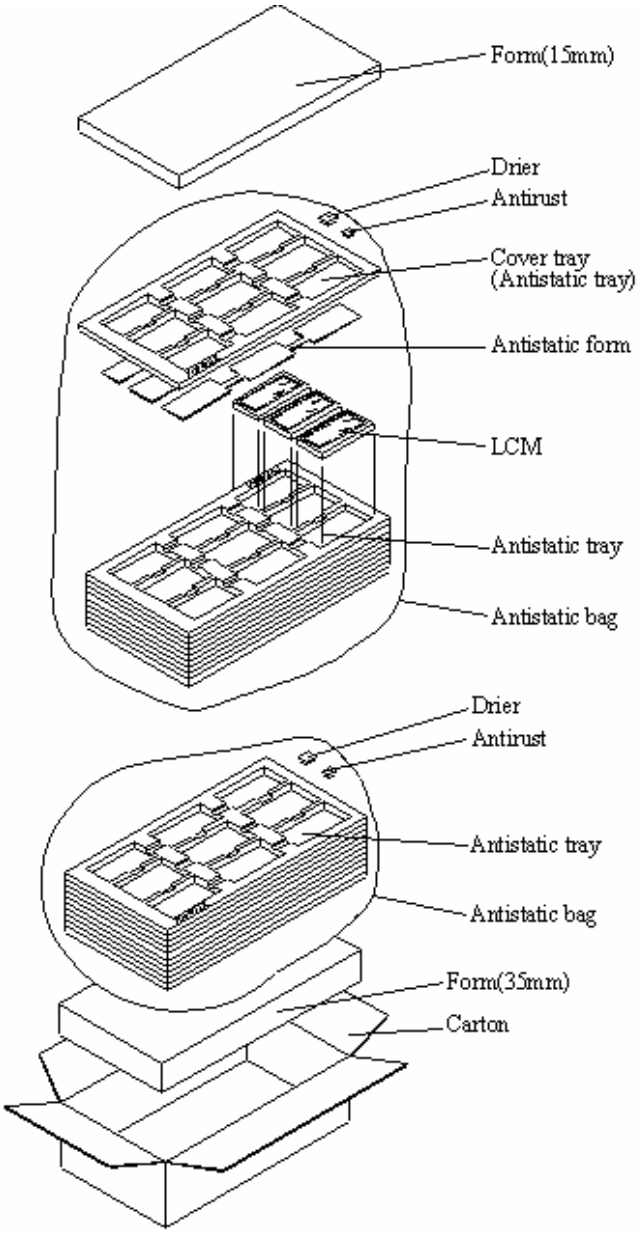
TITLE: LCM OUTLINE DIMENSION

DWG. NO. FX040346SG01
UNITS M M
REV. A
SCALE Scale
SHEET 1 OF 1

DATA IMAGE

HY-LINE Computer Components / www.hy-line.de/computer

14. PACKAGE INFORMATION



Material

1 Carton + 1 Form (15mm) + 2 Anti-static bag + 20 Anti-static tray + 2 Drier + 2 Antirust + 1 Form (35mm)

Total pcs

1 Antistatic tray = 9 pcs (modules)

1 Anti-static bag = 9 Anti-static tray + cover tray = 9*9 + 1*0 =81 pcs

1 Carton = 2 Anti-static bag = 2*81 = 162 pcs

1 Carton = 162 pcs

Carton size : 465L x 380W x 395H (mm)

Total Weight = 9.6 kgw

FG040344 TFT LCM PACKING

HY-LINE Computer Components http://www.hy-line.de/computer