First Edition
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Final Revision

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LCD Module Technical Specification

Type No. **T-51944D104J-FW-A-AA**

Approved by (Quality Assurance Division)

Checked by (ACI Engineering Division)

Prepared by (ACI Engineering Division)

1. APPLICATION

This specification applies to color TFT-LCD module, T-51944D104J-FW-A-AA.

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OPTREX classifies the usage of the TFT-LCD module as follows. Please confirm the usage before using the product.

(1) Standard Usage

Computers, office equipment, factory automation equipment, test and measurement equipment, communications, transportation equipment(automobiles, ships, trains, etc.), provided, however, that operation is not influenced by TFT-LCD directly.

(2) Special Usage

Medical equipment, safety equipment, transportation equipment, provided, however, that TFT-LCD is necessary to its operation.

(3) Specific Usage

Cockpit Equipment, military systems, aerospace equipment, nuclear reactor control systems, life support systems and any other equipment. OPTREX should make a contract that stipulate apportionment of responsibilities between OPTREX and our customer.

The product specified in this document is designed for “Standard Usage” unless otherwise specified in this document. If customers intend to use the product for applications other than those specified for “Standard Usage”, they should contact OPTREX sales representative in advance.

OPTREX has been making continuous effort to improve the reliability of its products. Customers should implement sufficient reliability design of their application equipments such as redundant system design, fail-safe functions, anti-failure features.

OPTREX assumes no responsibility for any damage resulting from the use of the product that does not comply with the instructions and the precautions specified in this document.

Please contact and consult a OPTREX sales representative for any questions regarding this product.

2. OVERVIEW

T-51944D104J-FW-A-AA is 10.4" color TFT-LCD (Thin Film Transistor Liquid Crystal Display) module composed of LCD panel, driver ICs, control circuit, and backlight unit.

By applying 6 bit or 8 bit digital data, 800 × 600, 260 K-color or 16.7 M-color images are displayed on the 10.4" diagonal screen. Input power voltage is 3.3V for LCD driving.
The type of data and control signals are digital and transmitted via LVDS interface per Typ. 40 MHz clock cycle.

Inverter for backlight is not included in this module. General specifications are summarized in the following table:

ITEM	SPECIFICATION
Display Area (mm)	211.2 × 158.4 (10.39-inch diagonal)
Number of Dots	800 × 3 (H) × 600 (V)
Pixel Pitch (mm)	0.264 (H) × 0.264 (V)
Color Pixel Arrangement	RGB vertical stripe
Display Mode	Normally white TN
Number of Color	260 K(6 bit/color), 16.7 M(8 bit/color)
Brightness (cd/m^2)	400
Wide Viewing Angle Technology	Optical Compensation Film
Viewing Angle (CR ≥ 10)	-70~70° (H) -60~50° (V)
Surface Treatment	Anti-glare and hard-coating 3H
Electrical Interface	LVDS(6 bit/8 bit)
Optimum Viewing Angle (Contrast ratio)	6 o'clock
Module Size (mm)	243.0 (W) × 181.6 (H) × 12.2 (D)
Module Mass (g)	570
Backlight Unit	CCFL, 2-tubes, edge-light, replaceable

Characteristic value without any note is typical value.

3. ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	MIN.	MAX	UNIT
Power Supply Voltage for LCD	VCC	0	4.0	V
Logic Input Voltage	VI	0	VCC+0.3	V
Lamp Voltage	VL	0	1500	Vrms
Lamp Current	IL	0	9	mArms
Lamp Frequency	FL	40	100	kHz
Operation Temperature (Panel) Note 1,2)	$T_{op(Panel)}$	-20	70	°C
Operation Temperature (Ambient) Note 2)	$T_{op(Ambient)}$	-20	70	°C
Storage Temperature Note 2)	T_{stg}	-20	80	°C

[Note]

1) Measured at the center of active area and at the center of panel back surface

2) Top,Tstg ≤ 40°C : 90%RH max. without condensation

Top,Tstg > 40°C : Absolute humidity shall be less than the value of 90%RH at 40°C without condensation.

4. ELECTRICAL CHARACTERISTICS

(1) TFT-LCD

Ambient temperature: Ta = 25℃

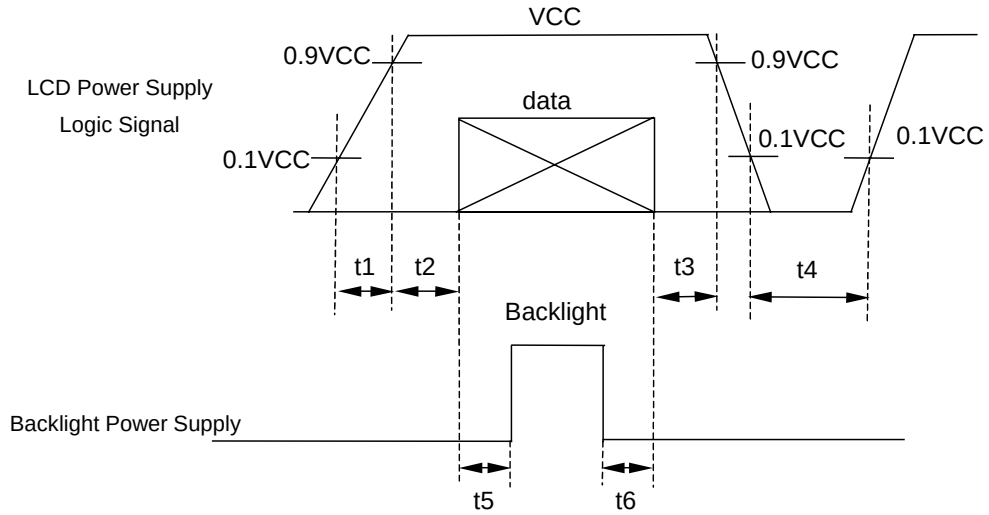
ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
Power Supply Voltage for LCD	VCC	3.0	3.3	3.6	V	*1)
Power Supply Current for LCD	ICC	--	270	430	mA	*2)
Permissive Input Ripple Voltage	VRP	--	--	100	mVp-p	VCC = +3.3V

*1) Power and signals sequence:

t1 ≤ 10 ms 200 ms ≤ t4

0 < t2 ≤ 50 ms 200 ms ≤ t5

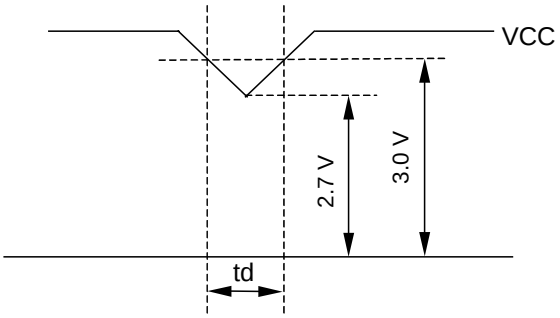
0 < t3 ≤ 50 ms 0 ≤ t6



data: RGB DATA, DCLK, HD, VD, DENA

VCC-dip conditions:

1) When 2.7 V ≤ VCC < 3.0 V, td ≤ 10 ms
2) When VCC < 2.7 V
   VCC-dip conditions should also follow the power and signals sequence.



*2) Typical current condition:

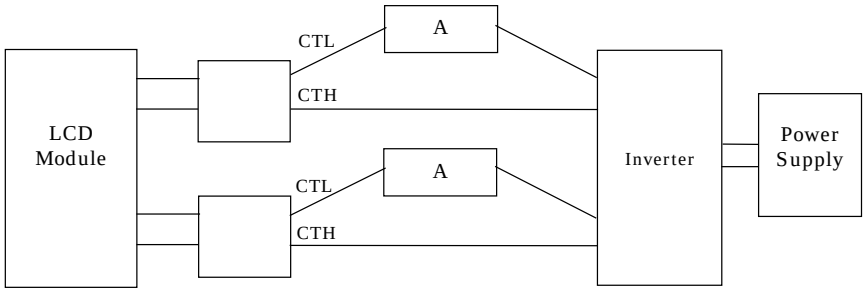
64-gray-bar pattern
600 line mode
VCC = +3.3 V , f_H=37.9 kHz, f_V=60 Hz, f_{CLK}= 40 MHz

(2) Backlight

Ta = 25℃

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	Remarks
Lamp Voltage	VL	--	470	--	Vrms	IL = 6.5 mArms
Lamp Current	IL	3.0	6.5	7.5	mArms	*1),*5)
Lamp Frequency	FL	40	--	100	kHz	*2)
Starting Lamp Voltage	VS	900	--	--	Vrms	Ta = 25°C
		1350	--	--	Vrms	Ta = 0°C
		1440	--	--	Vrms	Ta = –20°C
Lamp Life Time	LT	50,000	--	--	h	*3),*4) IL = 6.5 mArms, Continuous operation

*1) Lamp Current measurement method (The current meter is inserted in low voltage line.)



*2) Lamp frequency of inverter may produce interference with horizontal synchronous frequency, and this may cause horizontal beat on the display. Therefore, please adjust lamp frequency, and keep inverter as far from module as possible or use electronic shielding between inverter and module to avoid the interference.

*3) Lamp life time is defined as the time either when the brightness becomes 50% of the initial value, or when the starting lamp voltage does not meet the value specified in this table.

*4) The life time of the backlight depends on the ambient temperature. The life time will decrease under low/high temperature.