4. Application

This specification is applied to the 12.1 inch WXGA supported TFT-LCD module and can display true 16.2M colors. This module is composed of a 12.1" TFT-LCD panel, a driver circuit built in LED Driver.

5. Features

- WXGA (1280×800 pixels) resolution.
- eDP Interface
- LED driver circuit is built in this module to provide PWM Dimmer function.

6. General Specifications

Item	Specifications	Unit
Screen Size	12.1 (Diagonal)	inch
Display Format	1280RGB(H)×800(V)	Pixels
Active Area	261.12(H)×163.2(V)	mm
Pixel Pitch	0.204(H)×0.204(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	AAS Type / Transmissive Mode / Normally Black	-
Surface Treatment	AG type, 3H hard coating	-
Viewing Direction	Full view angle	-
Outline Dimension	278.0(W)×184.0(H)x13.6(D)	mm
Weight	（493.0）	g
RoHS Compliance	RoHS Compliance	-

7. Absolute Maximum Ratings

7.1 Absolute Ratings of Environment

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Storage Temperature	T_{ST}	-20	+70	°C	(1)(2)
Operating Ambient Temperature	T_{OP}	-20	+70	°C	(1)(2)

Note1: Background color changes slightly depending on ambient temperature.
This phenomenon is reversible.

Note2: Please refer to item of RELIABILITY.

7.2 Electrical Absolute Ratings

7.2.1 TFT-LCD Module

(Ta=25±2°C, GND=V_{SS}=0V)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Digital Power Supply Voltage	VCC	-0.5	5.0	V	-

7.2.2 LED CONVERTER

Item	Symbol	Value		Unit	Note
		Min.	Max.		
Converter Voltage	V_i	-0.3	18	V	(1) , (2)
Enable Voltage	EN	---	5.5	V	
Backlight Adjust	Dimming	---	5.5	V	

Note (1) Permanent damage to the device may occur if maximum values are exceeded. Function operation should be restricted to the conditions described under Normal Operating Conditions

Note (2) Specified values are for LED (Refer to Section 8.2 for further information).

8. Electrical Characteristics

8.1 TFT-LCD Module

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	VCC	3.1	3.3	3.5	V	-
Power Supply Current	ICC	-	760	1064	mA	(1)
Power Consumption	P_L	-	2508	3511	mW	(1)
VSYNC Frequency	F_V	-	60	-	Hz	-

Note (1) The specified power consumption is under the conditions at VCC=3.3V, F_V=60Hz, whereas a power dissipation check pattern below is displayed.

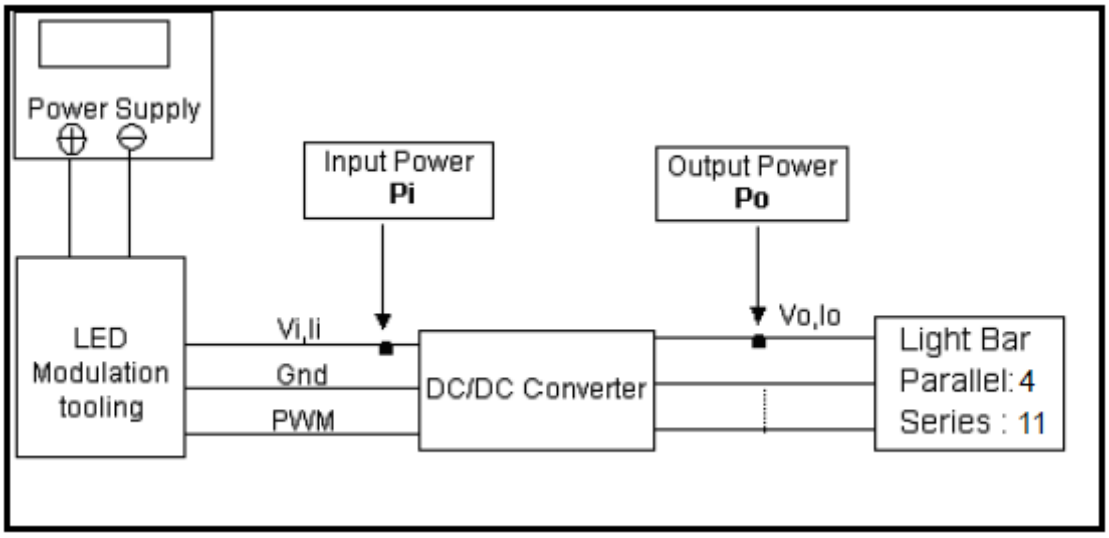
White Pattern / 255 Gray

Active Area

8.2 Backlight Unit

Parameter		Symbol	Value			Unit	Note
			Min.	Typ.	Max.		
Converter Input Voltage		V_i	10.8	12.0	13.2	V_{DC}	(Duty 100%)
Converter Input Ripple Voltage		V_{iRP}	-	-	350	mV	
Converter Input Current		I_i	-	0.55	0.7	A_{DC}	@ Vi = 12V (Duty 100%)
Converter Inrush Current		I_{iRUSH}	-	-	3.0	A	@ Vi rising time=20ms (Vi=12V)
Input Power Consumption		P_i	-	6.6	8.4	W	(1)
EN Control Level	Backlight on	ENLED (BLON)	2.5	3.3	5.0	V	
	Backlight off		0	-	0.3	V	
PWM Control Level	PWM High Level	Dimming (E_PWM)	2.5	-	5.0	V	
	PWM Low Level		0	-	0.15	V	
PWN Noise Range		VNoise	-	-	0.1	V	
PWM Control Frequency		f_{PWM}	190	200	20k	Hz	(2)
PWM Dimming Control Duty Ratio		-	5	-	100	%	(2), Suggestion @ 190Hz<f_{PWM}<1kHz
			20	-	100	%	(2), @ 1kHz≦f_{PWM}<20kHz
LED Life Time		L_{LED}	30,000		-	Hrs	(3)

Note (1)LED current is measured by utilizing a high frequency current meter as shown below:

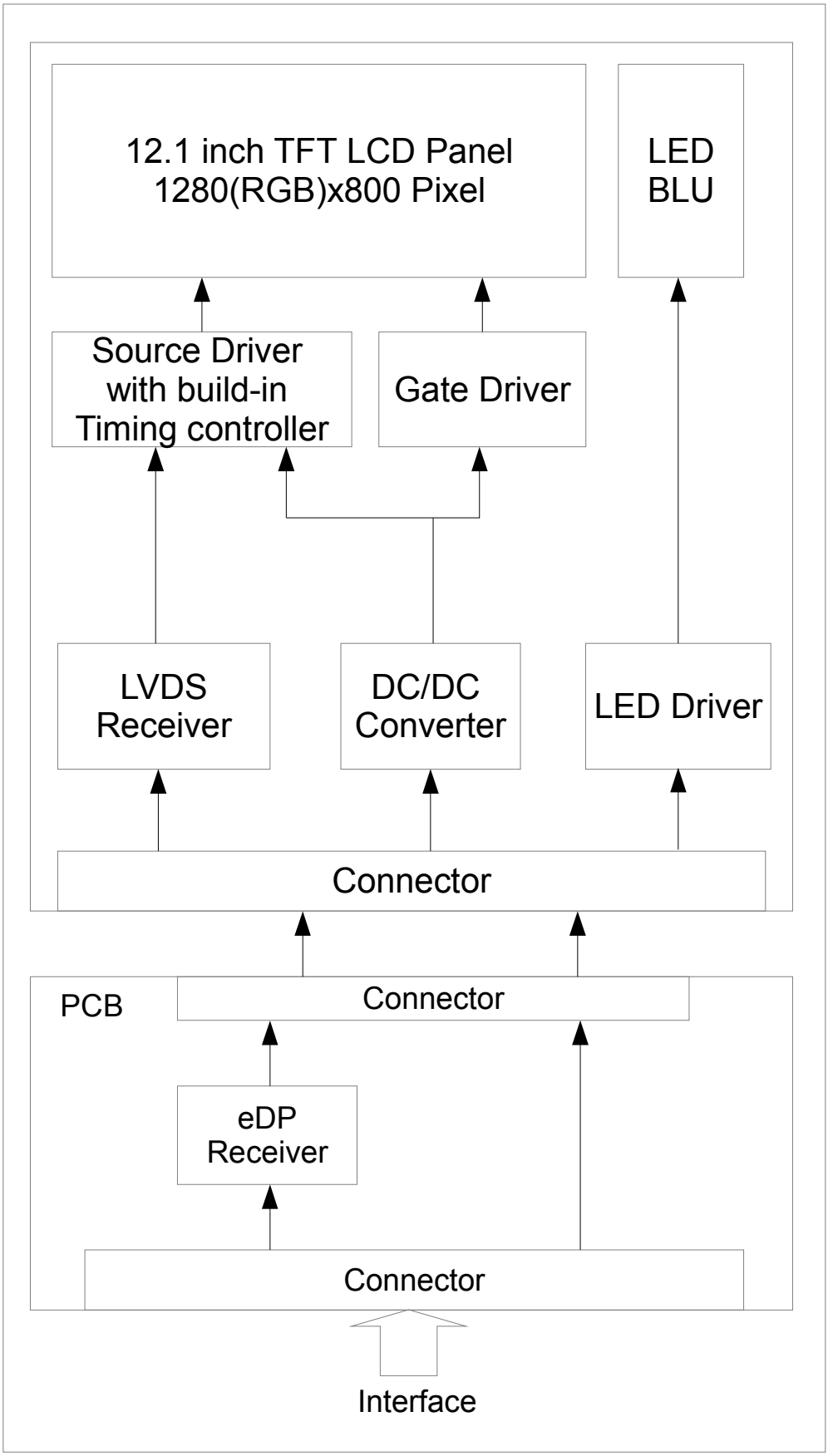


Note (2) At 190 ~1kHz PWM control frequency, duty ratio range is restricted from 5% to 100%.
1K ~20kHz PWM control frequency, duty ratio range is restricted from 20% to 100%.
If PWM control frequency is applied in the range from 1KHz to 20KHZ,
The “non-linear” phenomenon on the Backlight Unit may be found. So It’s a suggestion that PWM control frequency should be less than 1KHz.

Note (3) The lifetime of LED is estimated data and defined as the time when it continues to operate under the conditions at Ta = 25 ±2 ºC and Duty 100% until the brightness becomes≦50% of its original value. Operating LED at high temperature condition will reduce life time and lead to color shift.

9. Block Diagram

9.1 TFT-LCD Module with Backlight Unit



10. Input / Output Terminals Pin Assignment

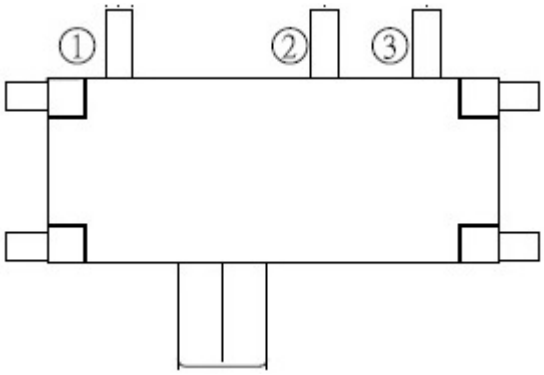
10.1 TFT-LCD Module

Connector: J2, IPEX 20455-030E-99 or equivalent

No.	Symbol	I/O	Description
1	N.C.	-	Not Connection
2	GND	I	Ground
3	DP1–	I	Main Link Lane 1- Input
4	DP1+	I	Main Link Lane 1+ Input
5	GND	I	Ground
6	DP0–	I	Main Link Lane 0- Input
7	DP0+	I	Main Link Lane 0+ Input
8	GND	I	Ground
9	AUX+	I/O	AUX Channel Differential Input/Output
10	AUX-	I/O	AUX Channel Differential Input/Output
11	GND	I	Ground
12	VCC	I	Power supply
13	VCC	I	Power supply
14	N.C.	-	Not Connection
15	GND	I	Ground
16	GND	I	Ground
17	HPD	O	Hot Plug Detect
18	GND	I	Ground
19	GND	I	Ground
20	GND	I	Ground
21	GND	I	Ground
22	ENLED	I	Backlight enable pin
23	Dimming	I	Backlight adjust
24	N.C.	-	Not Connection
25	N.C.	-	Not Connection
26	Vi	I	LED driver power supply
27	Vi	I	LED driver power supply
28	Vi	I	LED driver power supply
29	Vi	I	LED driver power supply
30	N.C.	-	Not Connection

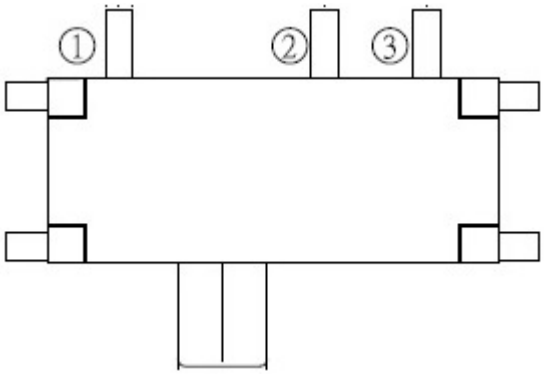
10.2 Slider Switch for Backlight Enable (S1)

Pin	Description	Note
1-2	ENLED	Default
2-3	eDP-EN	-



10.3 Slider Switch for Backlight PWM (S2)

Pin	Description	Note
1-2	Dimming	Default
2-3	eDP-PWM	-



10.4 Tact Switch for Backlight Brightness Adjustment

Symbol	Description
BL+	Increment Backlight Brightness
BL-	Decrement Backlight Brightness

Note:

1. The internal control of brightness will need to switch S1&S2 to Pin2-3.
2. 100% brightness is preset and the adjustable range will be 0~100%(16 steps)
3. After adjusting the brightness, the brightness will be automatically memorized after 10 seconds.

12. Optical Characteristics

The optical characteristics should be measured in a dark environment (≦ 1 lux) or equivalent state with the methods shown in Note (4).

Item		Symbol	Conditions	Min.	Typ.	Max.	Unit	Note
Contrast Ratio		CR	θ_x=0°, θ_Y =0° Viewing Normal Angle	600	(800)	-	-	(2)
Response Time		T_R		-	12	17	ms	(3)
		T_F		-	8	13		
Luminance(Center)		Y		320	(400)	-	cd/m^2	(4)
White Variation		δW		70	(80)	-	%	(5)
Color Chromaticity	Red	Rx		0.602	0.652	0.702	-	(1),(4)
		Ry		0.288	0.338	0.388	-	
	reen	Gx		0.276	0.326	0.376	-	
		Gy		0.558	0.608	0.658	-	
	Blue	Bx		0.100	0.150	0.200	-	
		By		0.003	0.053	0.103	-	
	White	Wx		0.263	0.313	0.363	-	
		Wy		0.279	0.329	0.379	-	
Viewing Angle	Horizontal	θ_x+	CR≥10	70	(80)	-	deg.	
		θ_x-		70	(80)	-		
	Vertical	θ_Y+		70	(80)	-		
		θ_Y-		70	(80)	-		

16.Outline Drawing