

4. Application

This specification is applied to the 15.6 inch FHD supported TFT-LCD module, and can display true 16.2M colors(6bits+FRC). This module is composed of a 15.6" TFT-LCD panel, a driver circuit and backlight unit

5. Features

- FHD (1920×1080 pixels) resolution.
- eDP Interface
- LED driver circuit is built in this module.

6. General Specifications

Item	Specifications	Unit
Screen Size	15.6 (Diagonal)	inch
Display Format	1920RGB(H)×1080(V)	dot
Active Area	344.16(H)×193.59(V)	mm
Pixel Pitch	0.17925(H)×0.17925(V)	mm
Pixel Configuration	RGB Vertical Stripe	-
Display Mode	AAS/Transmissive Mode/Normally Black	-
Surface Treatment	Anti-Glare and Hard Coating(3H)	-
Viewing Direction	Full view angle	-
Outline Dimension	363.8(W)×215.9(H)×16.5(D)	mm
Weight	(1094)	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}	-30	+80	°C	(1)(2)
Operating Temperature	T _{OP}	-30	+80	°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 BACKLIGHT CONVERTER

Item	Symbol	Value			Unit	Note
		Min.	Typ	Max.		
Converter Voltage	V _i	0	12.0	18.0	V	(1)(2)
Enable Voltage	LED_EN	0	3.3 / 5	7	V	Duty=100%
Backlight Adjust	LED_PWM	0	3.3 / 5	7	V	(1), (2) Pulse Width ≤ 10msec and Duty ≤ 10%

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 input pin of LED light bar at Ta=25±2 °C

8. Electrical Characteristics

8.1 LCD ELETRONICS SPECIFICATION

(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	-	230	322	mA	(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

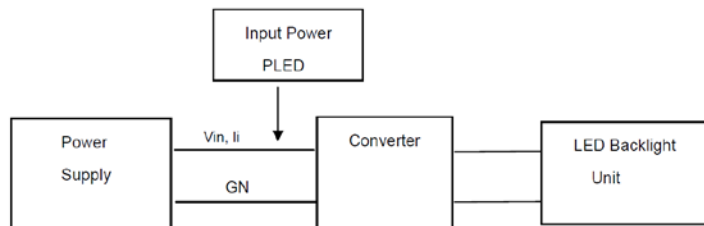
8.2 Backlight Unit

(Ta=25±2°C)

Parameter	Symbol	Value			Unit	Note	
		Min.	Typ.	Max.			
Converter Power Supply Voltage	Vi	10.8	12.0	13.2	V	-	
Converter Power Supply Current	Ii	-	1.3	1.8	A	@Vi= 12V Duty=100%	
Power Consumption	P	-	15.6	21.8	W	@Vii =12V Duty=100%	
EN Control Level	Backlight on	ENLED	2.0	5	5.5	V	-
	Backlight off		0	0	0.8		
PWM Control Level	PWM High Level	Dimming	2.0	3.3	5.0	V	-
	PWM Low Level		0	0	0.15		
PWM Control Duty Ratio	-	10		100	%	-	
PWM Control Frequency	fPWM	190	200	20k	Hz	-	
LED Life Time	LL	50,000	-	-	Hrs	-	

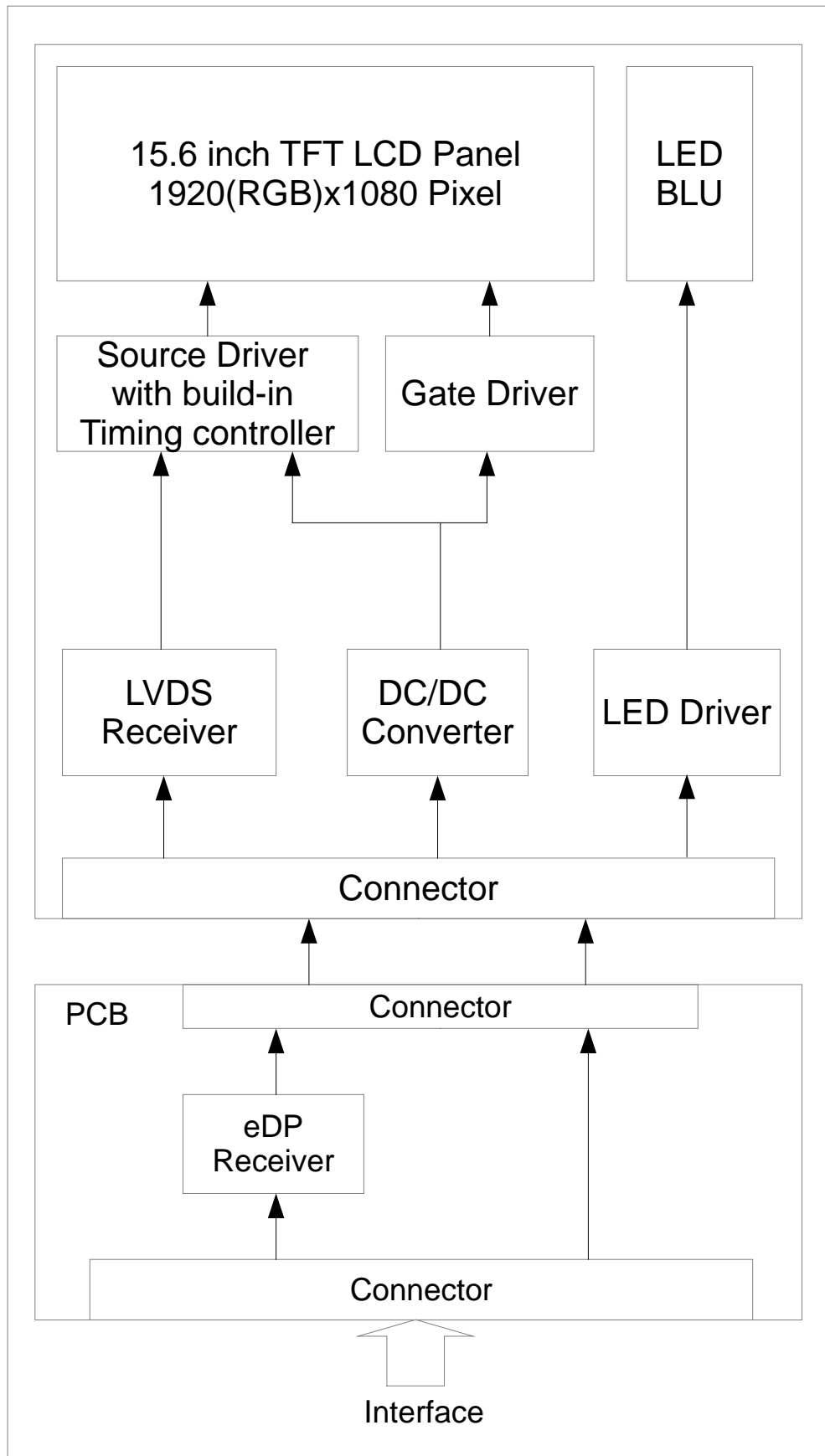
Note (1) LED light bar input voltage and current are measured by utilizing a true RMS multimeter as shown below:

Note (2) The lifetime of LED is estimated data and defined as the time when it continues to operate under the conditions at Ta = 25±2°C and Duty 100% until the brightness becomes $\leq 50\%$ of its original value. Operating LED under high temperature environment 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

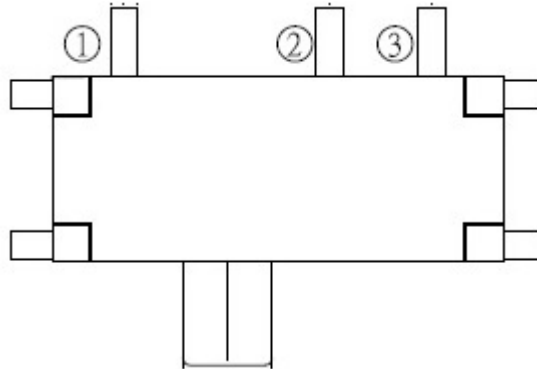
10.1 TFT-LCD Module

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

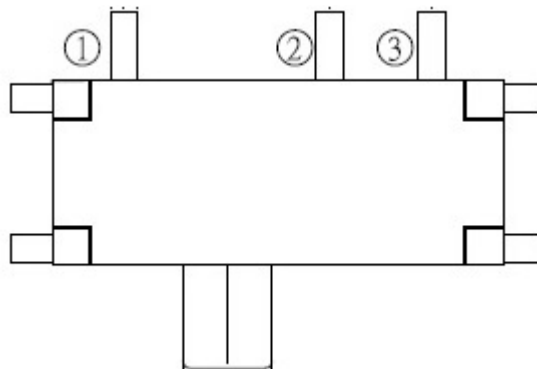
10.2 Slider Switch for Backlight Enable (S1)

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:

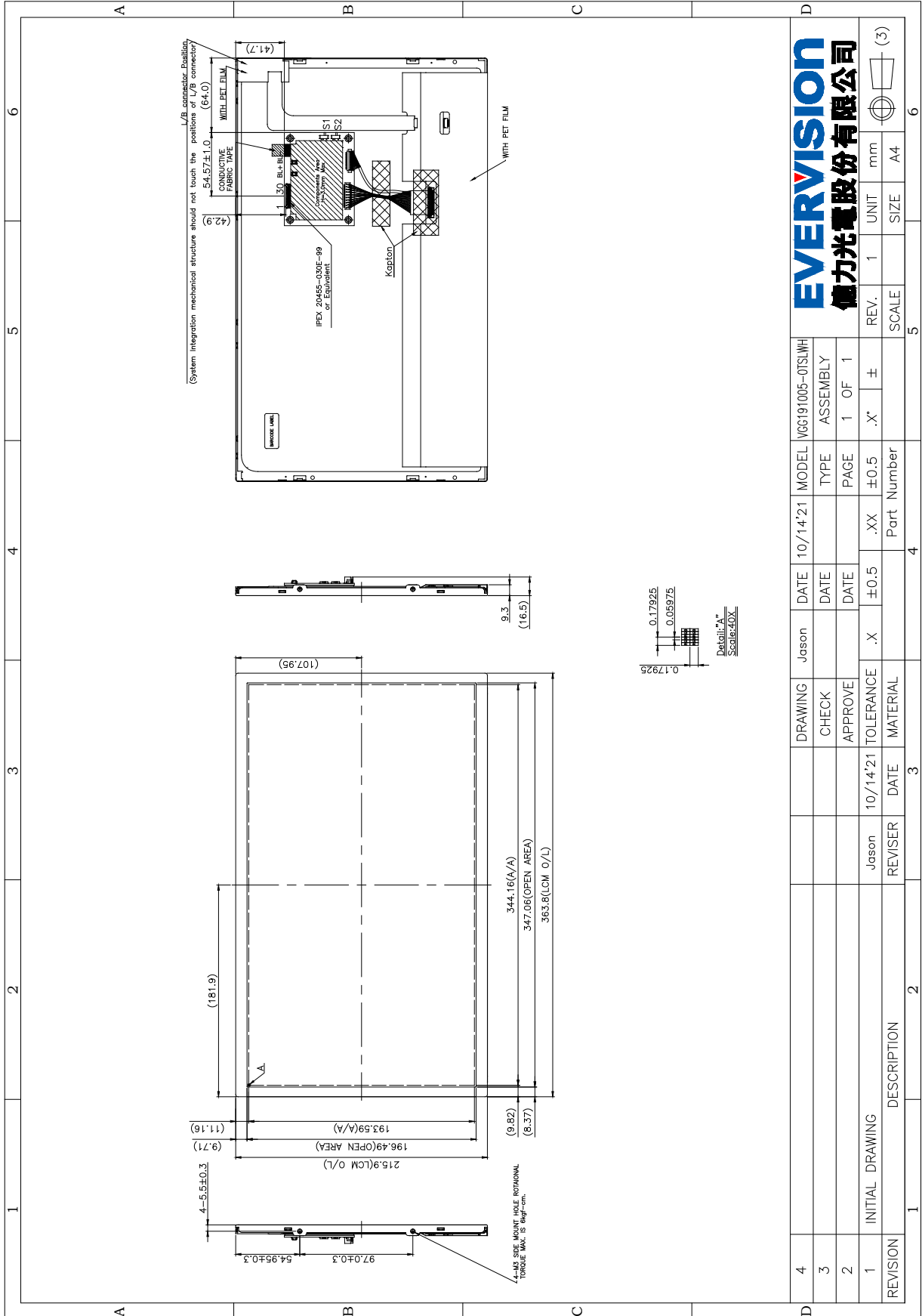
1. The internal control of brightness will need to switch S1&S2 to Pin2-3.
2. 100% brightness is preset and the adjustable range will be 0~100%(16 steps)
3. After adjusting the brightness, the brightness will be automatically memorized after 10 seconds.

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		600	800	-	-	(2)
Response Time		$T_R + T_F$		-	25	35	ms	(3)
Luminance(Center)		Y		360	(450)	-	cd/m ²	(4)
Brightness uniformity		BUNI		70	-	-	%	(5)
Color Chromaticity	Red	Rx		$\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle	0.602	0.652	0.702	-
		Ry	0.288		0.338	0.388	-	
	Green	Gx	0.282		0.333	0.383	-	
		Gy	0.563		0.613	0.663	-	
	Blue	Bx	0.10		0.15	0.20	-	
		By	0.00		0.05	0.100	-	
	White	Wx	0.263		0.313	0.363	-	
		Wy	0.279		0.329	0.379	-	
Viewing Angle	Horizontal	θ_{x+}	CR \geq 10	80	(85)	-	deg.	
		θ_{x-}		80	(85)	-		
	Vertical	θ_{y+}		80	(85)	-		
		θ_{y-}		80	(85)	-		

16.Outline Drawing



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4	DRAWING	Jason	DATE	10/14/21	MODEL	VGG191005-0TSLWH
3	CHECK		DATE		TYPE	ASSEMBLY
2	APPROVE		DATE		PAGE	1 OF 1
1	INITIAL DRAWING	Jason	TOLERANCE	.X ±0.5	Part Number	
REVISION	DESCRIPTION	REVISOR	DATE	3	SCALE	1 UNIT mm
				4	SIZE	A4
				5		(3)
				6		