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4. Application

This specification is applied to the 15.6 inch FHD supported TFT-LCD module, and can display true 16.2M colors. This module is composed of a 15.6" TFT-LCD panel, a driver circuit and backlight unit and used as the input devices for general electric appliances via both finger and Capacitive stylus pen.

5. Features

- 15.6" Industrial Open Frame Monitor
- Versatile mounting methods for rear mounting and VESA mounting
- Signal interface: VGA & DVI & HDMI
- Build-in 4Ω 2W*2 Speaker
- Support OSD Function
- Projected Capacitive Touch
 - USB Interface
 - Multi Touch (TWO points)
 - 4096 x 4096 resolution

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	Clear(7H)	-
Viewing Direction	Full view angle	-
Outline Dimension	400.0(W)×260.0 (H)×41.75 (D)	mm
Weight	(3320)	-
RoHS Compliance	RoHS Compliance	-

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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}	0	+70	°C	(1)(2)

7.2 Electrical Absolute Ratings

(Ta=25±2°C)

Item	Symbol	Value		Unit	Note
		Min.	Max.		
System Power Supply Input	V _{IN}	0	15.0	V	-

8. Electrical Characteristics

8.1 Recommended Operating Conditions

(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
System Power Supply Input	V _{IN}	11.5	12.0	12.5	V	-
System Power Supply Current	I _{IN}	-	1.30	1.82	A	-
LED Life Time(25°C)	-	50000	-	-	hr	(1)

Note (1) : LED life time is defined as under 25±2°C , when the average brightness decrease to 50% of original brightness

8.2 Projected Capacitive Touch

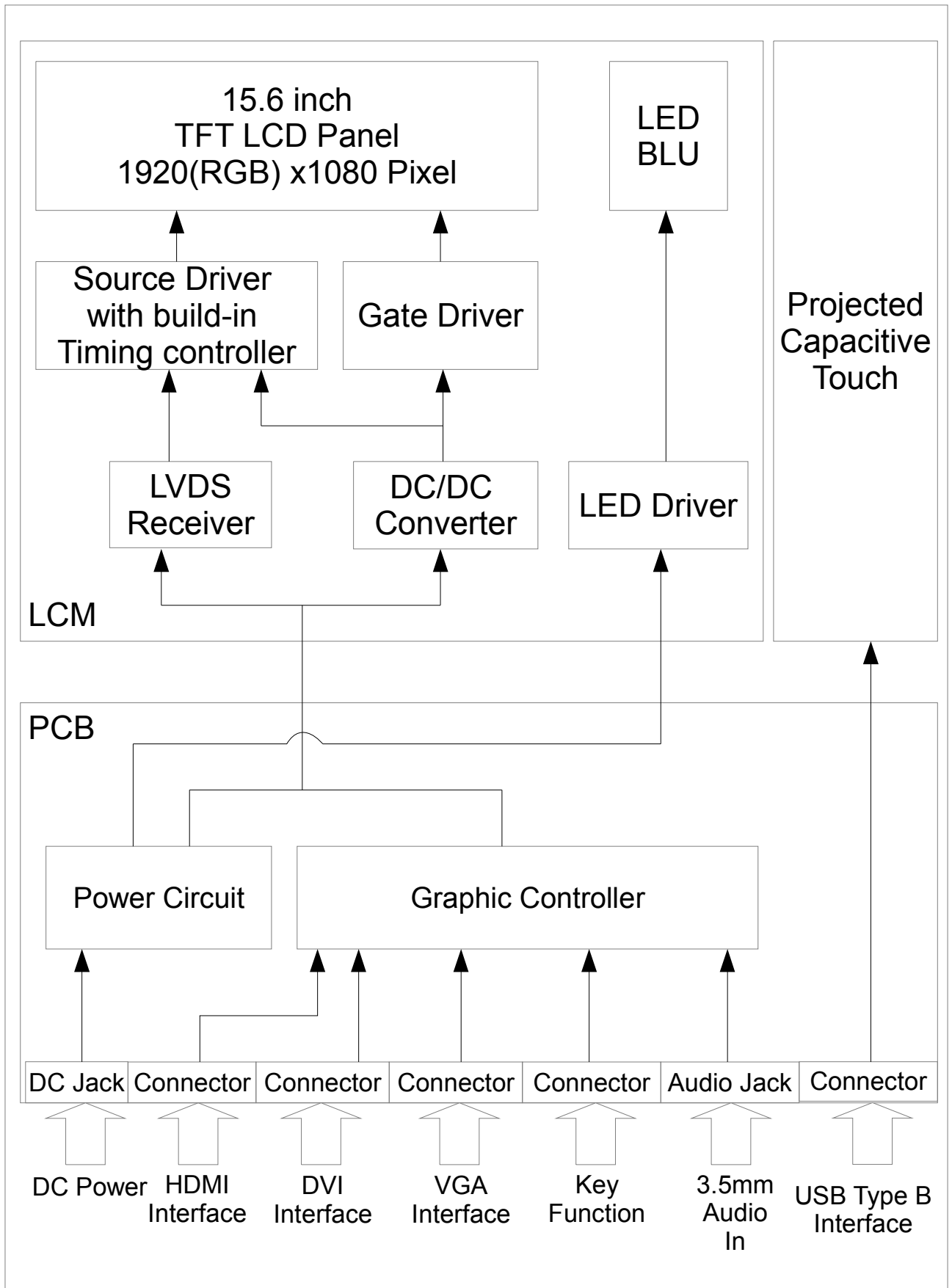
(Ta=25±2°C)

Item	Symbol	Value			Unit	Note
		Min.	Typ.	Max.		
Power Supply Voltage	V _{TP}	4.8	5.0	5.2	V	-
Power Supply Current	I _{TP}	-	34.5	48.3	mA	(1)
Output High Threshold Voltage	V _{OH}	2.8	-	-	V	-
Output Low Threshold Voltage	V _{OL}	-	-	0.8	V	-
Differential Input Sensitivity [(D+)-(D-)]	V _{DI}	0.2	-	-	V	-
Differential Input Common Mode Range	V _{CM}	0.8	-	2.5	V	
Power Consumption	P _L	-	172.5	241.16	mW	@5.0V
Report Rate	R _R	-	60	-	Hz	-

Note (1) This test condition is touched with 2 points.

9. Block Diagram

9.1 TFT-LCD Module with Backlight Unit



10. Input / Output Terminals Pin Assignment

10.1 Input Terminals Pin Assignment

Connector: J1, HDMI Connector

No.	Symbol	I/O	Description
1	TMDS Data2+	I	Channel-2 positive receiver input – Positive side of channel-2 TMDS low-voltage signal differential input pair.
2	TMDS Data2 Shield	I	Ground
3	TMDS Data2–	I	Channel-2 negative receiver input – Negative side of channel-2 TMDS low-voltage signal differential input pair.
4	TMDS Data1+	I	Channel-1 positive receiver input – Positive side of channel-1 TMDS low-voltage signal differential input pair.
5	TMDS Data1 Shield	I	Ground
6	TMDS Data1–	I	Channel-1 negative receiver input – Negative side of channel-1 TMDS low-voltage signal differential input pair.
7	TMDS Data0+	I	Channel-0 positive receiver input – Positive side of channel-0. TMDS low-voltage signal differential input pair.
8	TMDS Data0 Shield	I	Ground
9	TMDS Data0–	I	Channel-0 negative receiver input – Negative side of channel-0. TMDS low-voltage signal differential input pair.
10	TMDS Clock+	I	Clock positive receiver input – Positive side of reference clock. TMDS low-voltage signal differential input pair
11	TMDS Clock Shield	I	Ground
12	TMDS Clock–	I	Clock negative receiver input – Negative side of reference clock. TMDS low-voltage signal differential input pair
13	N.C.	-	Not Connection
14	N.C.	-	Not Connection

No.	Symbol	I/O	Description
15	HDMI_DDC_SCL	I	Serial Clock
16	HDMI_DDC_SDA	I	Serial Data
17	N.C.	-	Not Connection
18	HDMI 5V Power	I	5V
19	HDMI_HPD	O	Hot Plug Detect

Connector: J3, DVI Connector

No.	Symbol	I/O	Description
1	TMDS Data2-	I	Channel-2 negative receiver input – Negative side of channel-2 TMDS low-voltage signal differential input pair.
2	TMDS Data2+	I	Channel-2 positive receiver input – Positive side of channel-2 TMDS low-voltage signal differential input pair.
3	TMDS Data2 Shield	I	Ground
4	NC	-	Not Connection
5	NC	-	Not Connection
6	DVI_DDC_SCL	I	Serial Clock
7	DVI_DDC_SDA	I	Serial Data
8	NC	-	Not Connection
9	TMDS Data1-	I	Channel-1 negative receiver input – Negative side of channel-1 TMDS low-voltage signal differential input pair.
10	TMDS Data1+	I	Channel-1 positive receiver input – Positive side of channel-1 TMDS low-voltage signal differential input pair.
11	TMDS Data1 Shield	I	Ground
12	NC	-	Not Connection
13	NC	-	Not Connection

No.	Symbol	I/O	Description
14	DVI 5V Power	I	5V
15	GND	I	Ground
16	DVI_HPD	O	Hot Plug Detect
17	TMDS Data0-	I	Channel-0 negative receiver input – Negative side of channel-0. TMDS low-voltage signal differential input pair.
18	TMDS Data0+	I	Channel-0 positive receiver input – Positive side of channel-0. TMDS low-voltage signal differential input pair.
19	TMDS Data0 Shield	I	Ground
20	NC	-	Not Connection
21	NC	-	Not Connection
22	TMDS Clock Shield	I	Ground
23	TMDS Clock+	I	Clock positive receiver input – Positive side of reference clock. TMDS low-voltage signal differential input pair
24	TMDS Clock-	I	Clock negative receiver input – Negative side of reference clock. TMDS low-voltage signal differential input pair
C1	NC	-	Not Connection
C2	NC	-	Not Connection
C3	NC	-	Not Connection
C4	NC	-	Not Connection
C5	GND	I	Ground

Connector: J2, VGA Connector

No.	Symbol	I/O	Description
1	Red	I	Red Signal
2	Green	I	Green Signal
3	Blue	I	Blue Signal
4	NC	-	Not Connection
5	GND	I	Ground
6	Red_Return	I	Ground
7	Green_Return	I	Ground
8	Blue_Return	I	Ground
9	VGA 5V Power	I	5V
10	GND	I	Ground
11	NC	-	Not Connection
12	DVI_DDC_SDA	I	Serial Data
13	VGA_HS	I	Horizontal Signal
14	VGA_VS	I	Vertical Signal
15	DVI_DDC_SCL	I	Serial Clock

Connector: J8, USB Type B Connector

No.	Symbol	I/O	Description
1	V _{TP}	I	+5.0V USB Power Supply Input
2	D-	I	USB D- Signal
3	D+	I	USB D+ Signal
4	GND	I	Ground

11. Interface Timing

11.1 Applicable Format

Input Signal	Resolution
VGA	640x480@60Hz
	800x600@60Hz
	1024x768@60Hz
	1920x1080@60Hz
DVI	640x480@60Hz
	800x600@60Hz
	1024x768@60Hz
	1920x1080@60Hz
HDMI	800x600@60Hz
	1024x768@60Hz
	1920x1080@60Hz

11.2 USB Interface

11.2.1 Single Touch Function

Single Touch Function works with plug'n play under system Windows 2000 or later.
For other operating systems like Linux a driver must be programmed.

11.2.2 Multi Touch Function

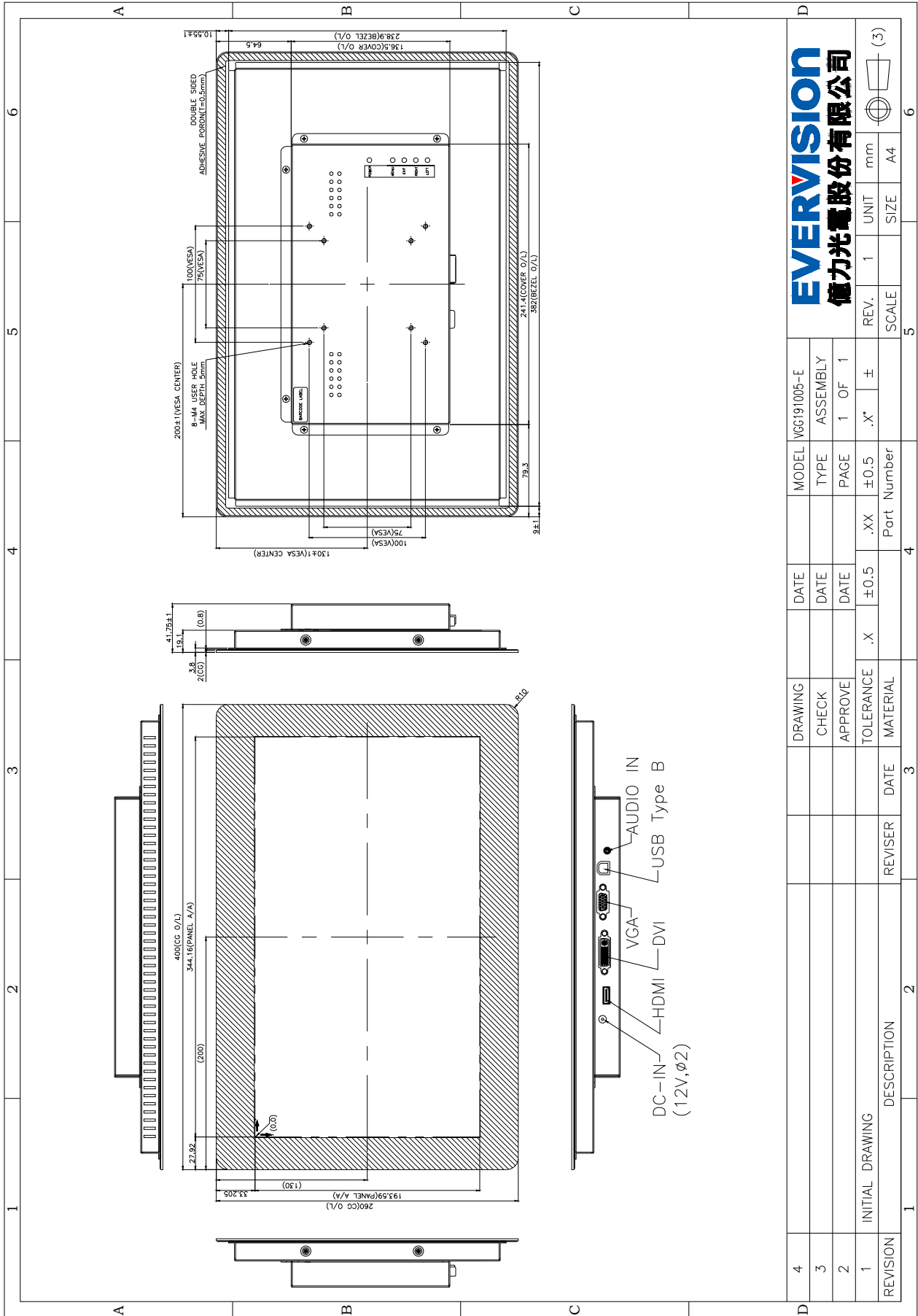
The Multi Touch Function works with plug'n play under system Windows 7 or later.
For older Windows systems or other operating systems a driver must be programmed.

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		270	(360)	-	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	DATE	MODEL	VGG191005-E	REV.	1	UNIT	mm
3	CHECK	DATE	TYPE	ASSEMBLY	SCALE	1	SIZE	A4
2	APPROVE	DATE	PAGE	1 OF 1				
1	INITIAL DRAWING	TOLERANCE	.X ±0.5 .XX ±0.5 .X ±0.5 .X ±	Part Number				
REVISION	DESCRIPTION	REVISER	DATE	3	5	6		