

Introduction

The LMT263-121X1 is a 12.1" LCD module with a PCAP touch screen. The LCD resolution is 1,024 x 768 (XGA). The module has a high screen brightness of 630 nits with the PCAP touch screen. At this level, the backlight power consumption is about 10 Watts with the built-in LED driver.

The LMT263 has a low reflective front surface. With 630 nits screen brightness, the display is suitable for applications under bright ambient lighting, including some outdoor environments.

Characteristics (Note 1, 2)

Parameters	Specifications	Units	Conditions
LCD Screen Luminance	630	Cd/m ²	With the PCAP Touch Screen LCD in OFF state (normally White)
Luminance Uniformity	75% or better		Note 3
Backlight Power Consumption	10	Watts	Including LED converter losses
Typical LCD Contrast Ratio	850:1		White vs. Black (measured in the dark along the normal direction)
Typical Viewing Angles			
3:00 direction	80	Degrees	Contrast ratio ≥ 10
9:00 direction	80	Degrees	Contrast ratio ≥ 10
6:00 direction	70	Degrees	Contrast ratio ≥ 10
12:00 direction	70	Degrees	Contrast ratio ≥ 10
LCD Screen Chromaticity (x, y)			
White	(0.313, 0.329)		Measured at the normal direction
Red	(0.620, 0.358)		Measured at the normal direction
Green	(0.320, 0.605)		Measured at the normal direction
Blue	(0.145, 0.088)		Measured at the normal direction
PCAP Touch Function	Multi Touch		
PCAP Touch Interface	USB		
LCD Module Weight	850	Grams	

Note 1: Please contact Landmark for the detailed electrical specification of this LCD.

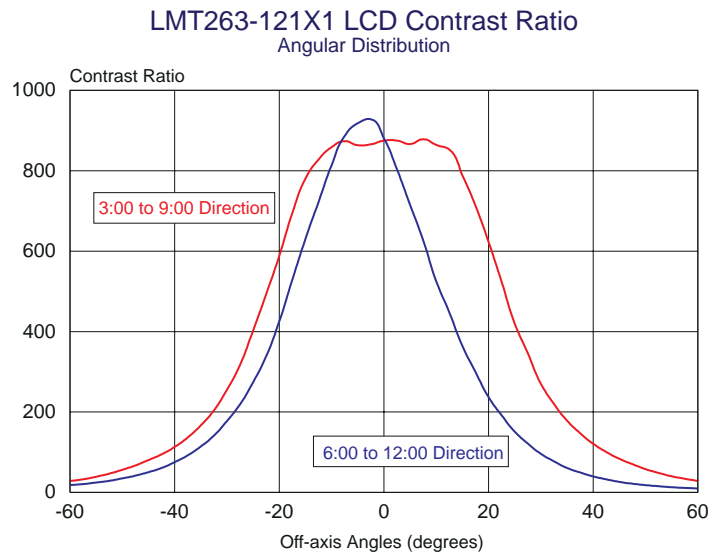
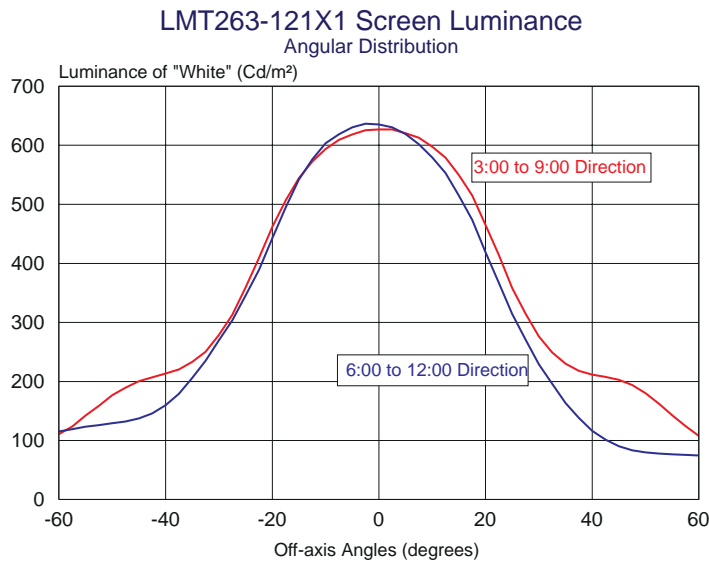
Note 2: All data is measured at 25^o C ± 2^o C ambient temperature.

Note 3: Uniformity = (L_{min} / (L_{max})) where L_{max} (L_{min}) is the maximum (minimum) luminance measured over the 5 points (the center point plus 4 points half way toward the corner) of the active area.

LCD Module Optical Performances

Luminance & Contrast Ratio

The typical LMT263-121X1 LCD module screen luminance and contrast ratio are shown in the figures below: At the best viewing direction, this module delivers a screen luminance of about 630 Cd/m². Since this module is a normally white LCD, the screen luminance is measured with the LCD in the “Off” state (i.e. the pixels are not energized). This is the “white” state that provides the maximum possible luminance. The “white” color displayed on the screen when the video signal is applied may have a lower luminance which can be caused by improperly setting the LCD controller and/or the graphics card. When the LCD is properly driven, the measured luminance of the “white” color displayed on the screen should be within 10% of the specified value.



The LMT263-121X1 LCD module also has a high contrast ratio (CR) of about 850:1 measured on axis. For all practical viewing angles, the CR value exceeds 50:1. These CR values are measured in a dark room. Under bright ambient lighting, particularly in outdoor environments, the CR value of the display drops significantly. Basically the front surface of the LCD reflects the ambient illumination. Thus, the luminance of the black color increases significantly which reduces the CR value. For details, please refer to Landmark Tecknote TK0101.

LED Backlight Driving Specifications

Parameter	Symbol	Specification			Unit	Remark
		Min	Typ.	Max		
Power Supply Voltage	V_i	7	12.0	17	V	
Power Supply Current	I_i	0.7	0.83	0.9	mA	At 12V, 100% duty
LED Backlight Power	P_{LED}		10		W	At 12V, 100% duty
EN Control	Backlight On	2.0	3.3	5.0	V	
	Backlight Off	0		0.8	V	
PWM Dimming	High Level	2.0	3.3	5.0	V	
	Low Level	0		0.15	V	
PWM Dimming Ratio		10%		100%		
PWM Dimming Frequency	f_{PWM}	190	200	210	Hz	

Backlight Driving Unit (connection pin assignments)

Connector: Aces 91208-01001-H01

User's connector: Aces 91209-01011

Pin #	Symbol	Function	Pin #	Symbol	Function
1,2,3,4	V_i	+12V DC Input	9	EN	Backlight On/Off control
5,6,7,8	GND	Ground	10	ADJ	Brightness adjust. PWM dimming

Projected Capacitive Touch

Items	Symbol	Specification			Unit
		Min	Typ.	Max	
Power Supply Voltage	V_{dd}	4.8	5.0	5.2	V
Power Supply Current	I_{dd}		32.2	45.1	mA
Output Threshold Voltage (High)	V_{OH}	2.8			V
Output Threshold Voltage (Low)	V_{OL}			0.8	V
Differential Input Sensitivity $I(D+) - (D-)$	V_{DI}	0.2			V
Differential Input Common Mode Range	V_{CM}	0.8		2.5	V
Power Consumption	PL		161	235	mWatt

Projected Capacitive Touch Connector Pin Assignments

Connector CN1 (JST S5B-PH-SM4TB)

Pin #	Symbol	Function	Pin #	Symbol	Function
1	VDD	+5.0 V DC Input	4	GND	System Ground
2	D-	USB D-	5	NC	No Connection
3	D+	USB D+			

Thermal Management

The backlight power consumption of the LMT263 LCD module is about 10 Watts at full screen brightness of 630 nits. With this power, the LCD temperature increase is small and thus do not requires any thermal management.

If the LMT263 LCD is used for outdoor display applications where the LCD may be subject to direct sunlight exposure, the LCD can absorb up to 45 Watts of the sunlight power. This is four and half times of the power consumption of the LED backlight. As a result, the LCD temperature can rise significantly.

However, LMT263-121X1 has an operating temperature range from -30 to 80°C, which reduces the thermal management issue. Some cooling fans can be used to maintain the LCD temperature in the operating temperature range. In addition, both the LED efficiency (in Lumens per Watt) and the LED life span decrease when the ambient temperature rises beyond a certain level. Thus, please implement cooling measures to maintain the LCD temperature below 60° C to ensure good display performance and long backlight life.

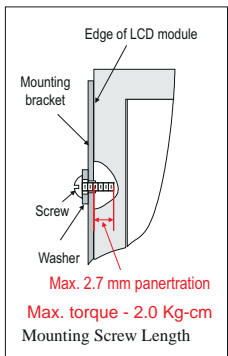
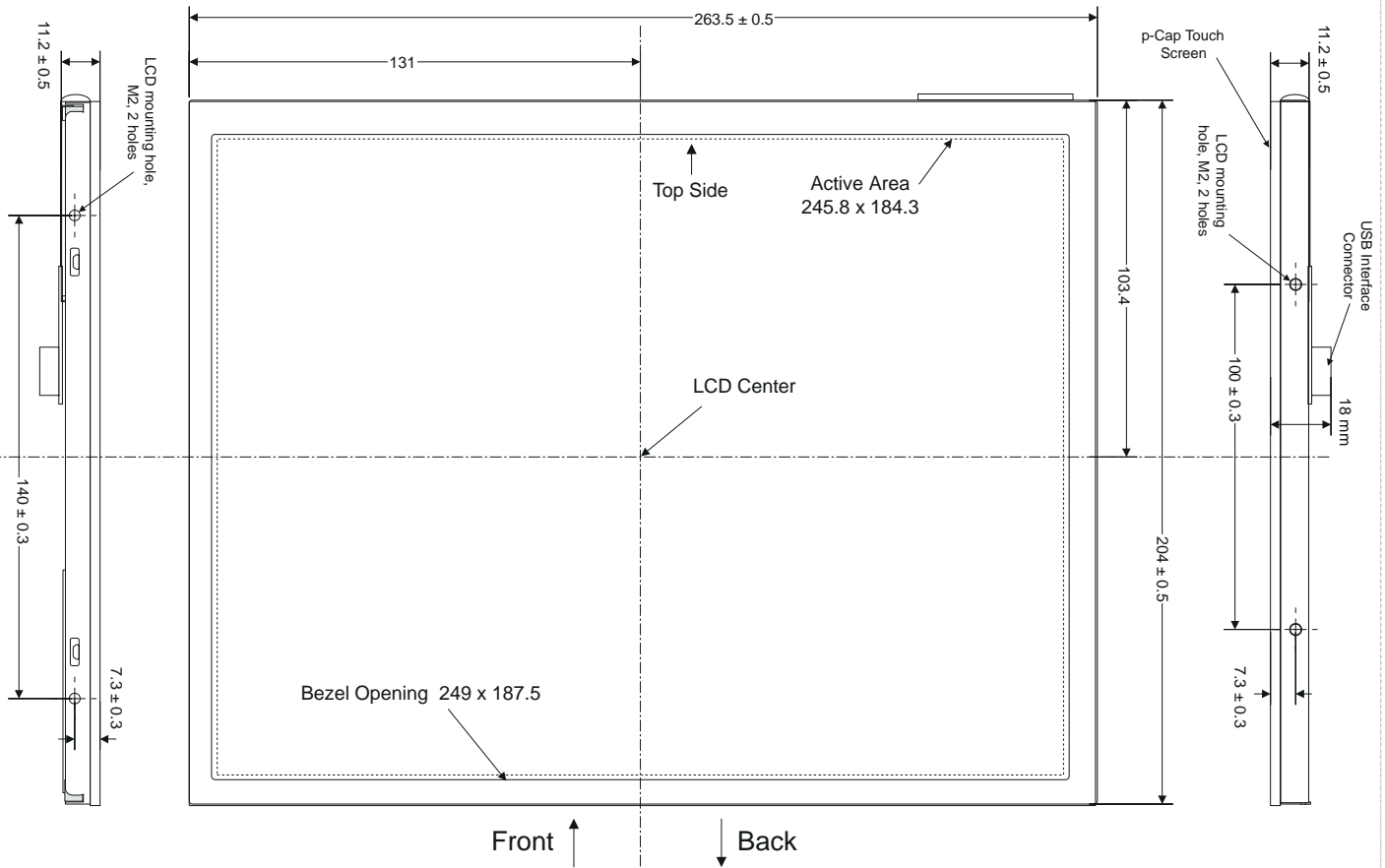
For outdoor applications in very cold weather, the ambient temperature may drop below -30° C. Therefore, the thermal management (cooling and heating) system should be designed according to the worse case conditions anticipated for the LCD to ensure that the LMT263 LCD with its LED backlight will operate properly.

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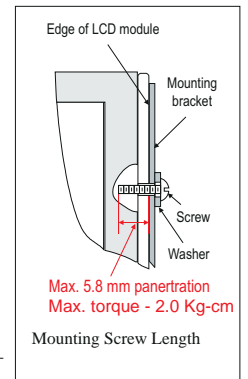
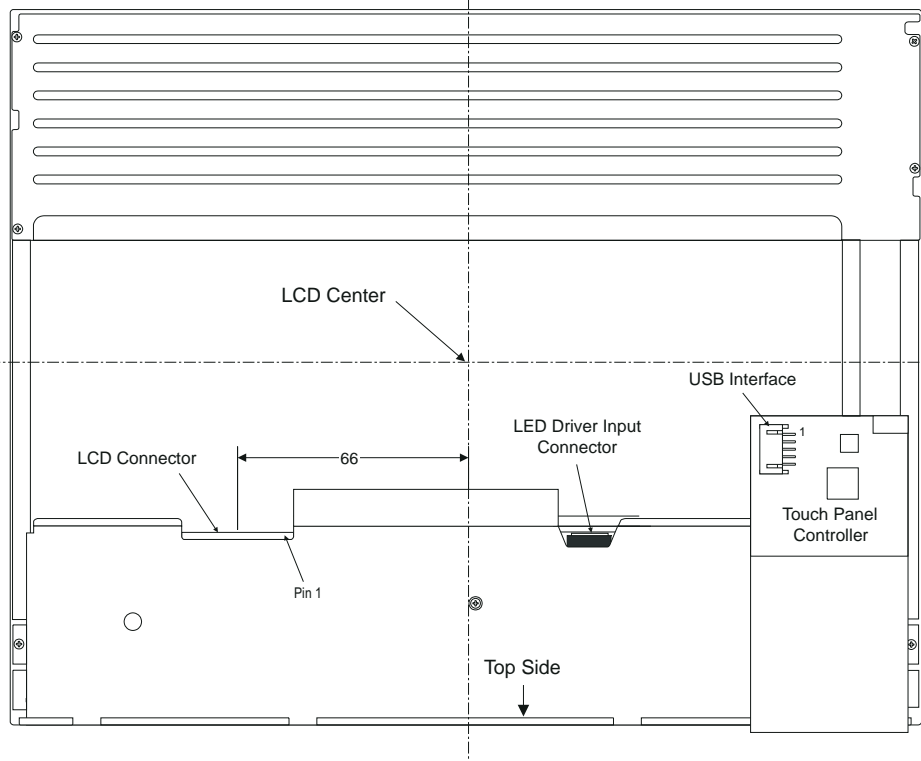
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LMT263-121X1 Mechanical Dimensions



Warning:

Using a longer screw or tightening it with a torque exceeding 2.0 Kg-cm will damage the LCD module.



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All dimensions are in mm