

MAXEN ELECTRONICS LIMITED

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SPECIFICATION

Model:MX-A101FM40-IX15

For Customer's Acceptance:

Approved By	Comment		
PREPARED	CHECKED	VERIFIED BY QA DEPT	VERIFIED BY R&D DEPT

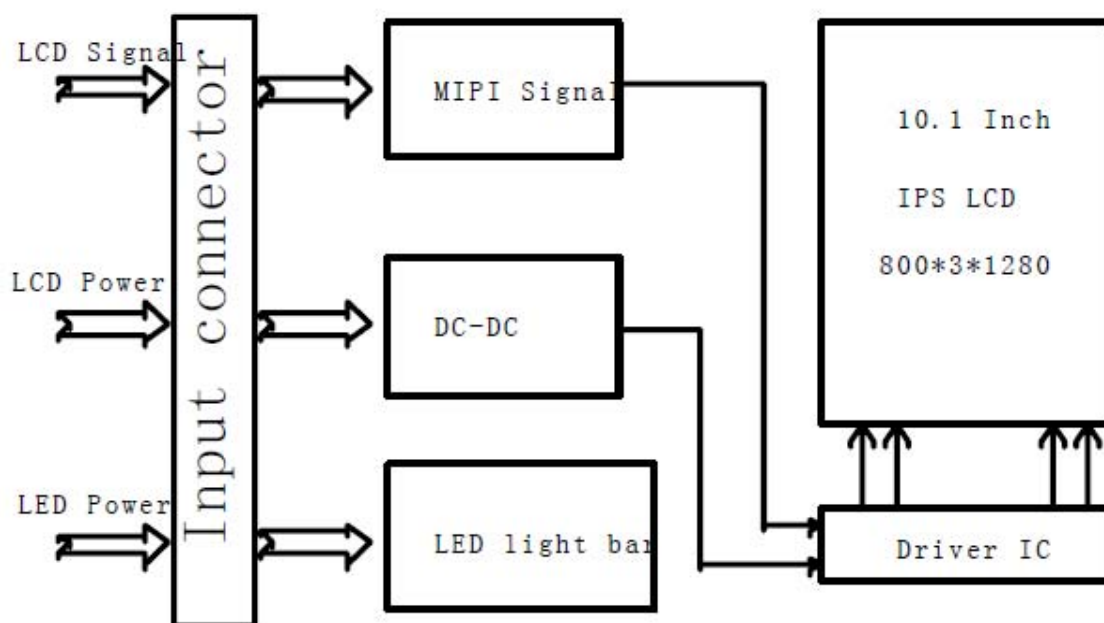
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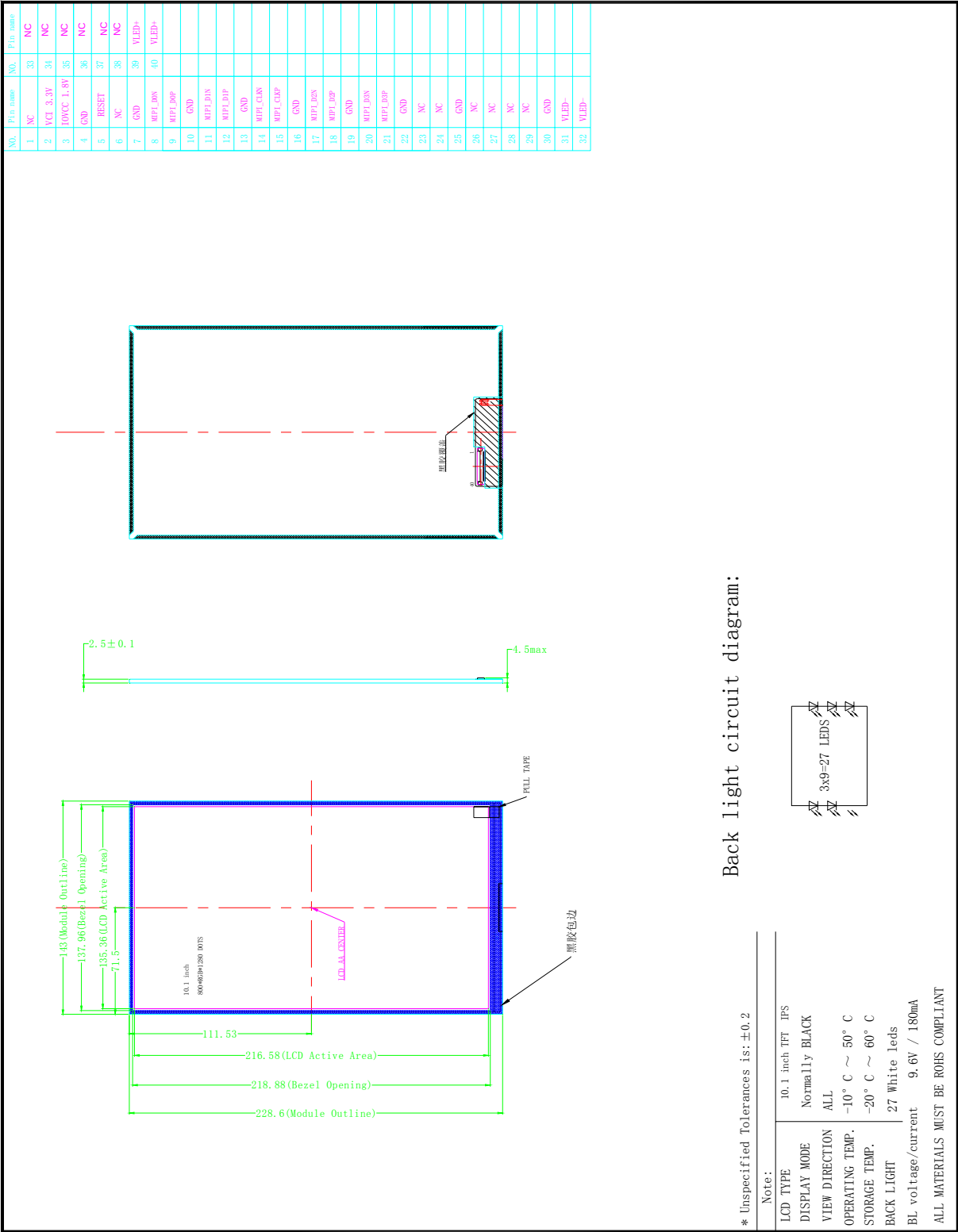
1. PHYSICAL DATA

Item	Contents	Unit
LCD type	TFT TRANSMISSIVE	---
Viewing direction (Human eye)	U/D/L/R 80/80/80/80	o'clock
Module size (W×H×T)	143 × 228.6 × 2.5	mm ³
Active area(W×H)	216.58 x 135.36	mm ²
Number of dots(W×H)	800(RGB) × 1280	dots
Pixel Pitch(W×H))	0.1692×0.1692	mm
Display mode	Normally black	---
Colors	16.7M	---
Backlight Type	27 white leds 9.6V 180mA	---
Interface Type	MIPI	---

2. BLOCK DIAGRAM



3. Mechanical Dimension



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4. Pin Descriptions

Pin No.	Symbol	Functional	Notes
1	NC	No connection	
2	VCI	Logic Power Supply 3.3V	
3	IOVCC	Interface Power Supply 1.8V	
4	NC	No connection	
5	RESET	Global reset pin	
6	NC	No connection	
7	GND	Ground	
8	MIPI_D0N	-MIPI differential data input	
9	MIPI_D0P	+MIPI differential data input	
10	GND	Ground	
11	MIPI_D1N	-MIPI differential data input	
12	MIPI_D1P	+ MIPI differential data input	
13	GND	Ground	
14	MIPI_CLKN	- MIPI differential data input	
15	MIPI_CLKP	+ MIPI differential data input	
16	GND	Ground	
17	MIPI_D2N	- MIPI differential clock input	
18	MIPI_D2P	+ MIPI differential clock input	
19	GND	Ground	
20	MIPI_D3N	- MIPI differential data input	
21	MIPI_D3P	+ MIPI differential data input	
22	GND	Ground	
23-24	NC	No connection	
25	GND	Ground	
26	NC	No connection	
27	NC	No connection	
28	NC	No connection	
29	NC	No connection	
30	GND	Ground	
31-32	VLED-	Back light LED Cathode	
33	NC	No connection	
34	NC	No connection	
35	NC	No connection	
36	NC	No connection	
37	NC	No connection	
38	NC	No connection	
39-40	VLED+	Back light LED Anode	

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5. OUTPUT VOLTAGE RATINGS

Parameter	Symbol	Min	Max	Unit
Power supply1	VCI	1.65	3.6	V
Power supply2	Avdd	4.5	6.3	V
Power supply3	Avee	-4.5	-6.3	V
Analog voltage	VGH	7	20	V
Analog voltage	VGL	-7	-15	V

6. ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Unit	Value	Note
IOVCC	Interface Supply Voltage	V	-0.3 to +3.6	Note ^{(3),(4)}
VCI	Logic Supply Voltage	V	-0.3 to +6.6	Note ^{(3),(5)}
VCIP	Analog Supply Voltage	V	-0.3 to +6.6	Note ^{(3),(6)}
VCCH	High speed interface Supply Voltage	V	-0.3 to +3.6	Note ^{(3),(7)}
AVDD	Positive Voltage input	V	-0.3 to +6.6	Note ⁽⁸⁾
AVEE	Negative Voltage input	V	0 to -6.6	Note ⁽⁹⁾
VGH	Power Supply Voltage	V	-0.3 to +25	Note ⁽¹⁰⁾
VGL	Power Supply Voltage	V	0 to -16	Note ⁽¹¹⁾
Top	Operating Temperature	°C	-40 to +85	Note ⁽¹²⁾
Tstg	Storage Temperature	°C	-55 to +110	Note ⁽¹³⁾

Note: (1) Permanent device damage may occur if absolute maximum conditions are exceeded.

(2) Functional operation should be restricted to the conditions described under DC Characteristics.

(3) IOVCC, VSSD must be maintained.

(4) To make sure $IOVCC \geq VSSD$.

(5) To make sure $VCIP \geq AVSS$.

(6) To make sure $VCI \geq AVSS$.

(7) To make sure $VCCH \geq VSSH$.

(8) To make sure $AVDD \geq AVSS$.

(9) To make sure $AVSS \geq AVEE$.

(10) To make sure $VGH \geq AVSS$.

(11) To make sure $AVSS \geq VGL$.

$VGH + |VGL| < 30V$

(12) For die and wafer products, specified up to +85°C.

(13) This temperature specifications apply to the COG package.

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7. DC ELECTRICAL CHARACTERISTICS

Item	Symbol	Condition	Min.	Typ.	Max.	Unit
VCCD/IOVCC	V _{IN}	Interface Supply Voltage	1.65	-	3.6	
VCIP	V _{IN}	Logic Supply Voltage	2.5	-	6.0	
VCI	V _{IN}	Analog Supply Voltage	2.5	-	6.0	
VCCH	V _{IN}	High speed interface Supply Voltage	1.65	-	3.6	
Input high voltage	V _{IH}	VCCD/IOVCC= 1.65 ~ 3.3V	0.7 VCCD/IOVCC	-	VCCD/IOVCC	V
Input low voltage	V _{IL}	VCIP= 2.5 ~ 3.3V VCI= 2.5 ~ 3.3V	0	-	0.3 VCCD/IOVCC	V
VPP	V _{IH} V _{IL}	VPP	7.25V	7.5V	7.75V	V
Output high voltage (SDO, LEDPWM)	V _{OH1}	I _{OH} = -1.0 mA	0.8 VCCD/IOVCC	-	VCCD/IOVCC	V
Output low voltage (SDO, LEDPWM)	V _{OL1}	VCCD/IOVCC= 1.65 ~ 2.4V I _{OL} = 1.0 mA	0	-	0.2 VCCD/IOVCC	V
Logic High level input current	I _{IH}	VSYNC, HSYNC	-	-	1	μA
		RESX, DCX_SCL, CSX, RDX, WRX_SCL	-	-	1	μA
	I _{IHD}	DB[23...0], SDI, DCX	-	-	1	μA
		DB[23...0]	-	-	1	μA
Logic Low level input current	I _{IL}	VSYNC, HSYNC	-1	-		μA
		RESX, DCX, CSX, RDX, WRX_SCL	-1	-		μA
	I _{ILD}	DB[23...0], SDI, DCX	-1	-		μA
		DB[23...0]	-1	-		μA
Current consumption standby mode (VCIP/VCI-VSSD)	I _{ST(VDD)}	VCIP/VCI=2.8V, VCCD/IOVCC=1.8V T _A =25°C	-	TBD	-	μA
Current consumption standby mode (VCCD/IOVCC-VSSD)	I _{ST(VCCD/IOVCC)}		-	TBD	-	μA
Current consumption during Deep-standby mode (VCIP/VCI-VSSD)	I _{DP-ST(VDD)}	VCIP/VCI=2.8V, VCCD/IOVCC=1.8V T _A =25°C	-	TBD	-	μA
Current consumption during Deep-standby mode (VCCD/IOVCC-VSSD)	I _{DP-ST(VCCD/IOVCC)}		-	TBD	-	μA

Note: 1. The VOTP pin is open on normal mode and in used while OTP programming condition.

2. The GRAM data is eliminated under the Deep standby mode.

8. Backlight Characteristic

Item	Symbol	Min	Typical	Max	Unit
LED module Forward voltage	V_{LED}	9.0	9.3	9.6	V
LED module current	I_{LED}	--	180	--	mA
LCM Surface Luminance ★1	L_S	--	300	--	mcd
LCM Surface brightness uniform ★2	L_D	80	--	--	%

★ 1 Test condition is:

(a) Center point on active area.

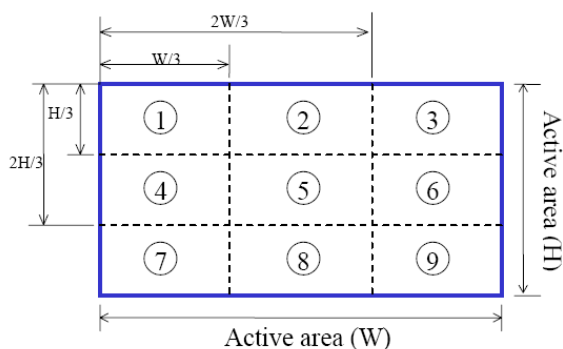
(b)Best Contrast.

★2 Uniform measure condition:

(1)Measure 9 point. Measure location show below;

(2)Uniform=(Min. brightness /Max. brightness)*100%

(3)Best Contrast.



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9.Electro-optical Characteristics

Item		Symbol	Conditions	Specifications			Unit	Note	
				Min.	Typ.	Max.			
Transmittance (w/o APCF, w/o DBEF)		T%	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	4.65	5.41	--	%	All left side data are based on Innolux's following condition – 1.LC : AAS 2.Light Source : Innolux Silicate LED 3. Polarizer : CF: SRW062FPN1HC5 TFT: SRW062FPN1HC5 4.Machine :DMS-803/DMS-900 5. By quick VLC dark = 0.3V, VLC white = 4.6V	
Contrast Ratio		CR		800	1000	--	--		
Response Time		T _{on} + T _{off}		-	25	35	ms		
Viewing Angle	Hor.	θ_{x+}	Center CR>10		80	--	deg.		
		θ_{x-}			80	--			
	Ver.	θ_{y+}			80	--			
		θ_{y-}			80	--			
CF only Color Chromaticity (CIE 1931)	Red	R _x	Viewing normal angle $\theta_x = \theta_y = 0^\circ$	0.621	0.641	0.661	-	Under C light Simulation	
		R _y		0.313	0.333	0.353	-		
	Green	G _x		0.264	0.284	0.304	-		
		G _y		0.529	0.549	0.569	-		
	Blue	B _x		0.120	0.140	0.160	-		
		B _y		0.081	0.101	0.121	-		
	White	W _x		0.282	0.302	0.322	-		
		W _y		0.309	0.329	0.349	-		
	Color Gamut					60	--		%

*Note(1) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L_{255} / L_0

L255 : Luminance of gray level 255

L 0: Luminance of gray level 0

CR = CR (5)

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (5).

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10. Reliability

10.1 Mtbf

The LCD module shall be designed to meet a minimum MTBF value of 50000 hours with normal

10.2 Test condition

NO.	ITEM	CONDITION	CRITERION
1	High Temperature Non-Operating Test	60°C*120Hrs	No Defect Of Operational Function In Room Temperature Are Allowable
2	Low Temperature Non-Operating Test	-20°C*120Hrs	
3	High Temperature/Humidity Non Operating Test	60°C*75%RH*120Hrs	
4	High Temperature Operating Test	50°C*120Hrs	
5	Low Temperature Operating Test	-10°C*120Hrs	
6	Thermal Shock Test	-10 °C (30Min) - 50 °C (30Min) *10CYCLES	

Notes:

1. Judgments should be made after exposure in room temperature for two hours.
2. The distill water is used for the high temperature/humidity test.
3. The sample above is individually for every reliability tests condition.

11. Inspection standards

1.AQL(Acceptable Quality Level)

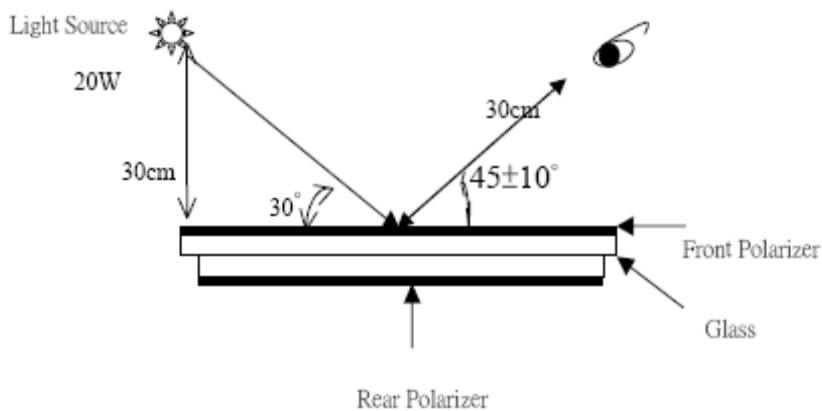
AQL of major and minor defect.

	MAJOR DEFECT	MINOR DEFECT
AQL	0.65	1.5

2. Basic conditions for inspection

The LCM face to us, in normal environment, the lux is 1000 ± 200 . (Darkroom's lux: 100 ± 50), About an angle of incidence 30, a distance of 30 cm with an angle of 45 degree to check the products without uncovering the film!

(As shown below)



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12.Precautions for using LCD modules.

12.1 Safety

- (1) Do not swallow any liquid crystal, even if there is no proof that liquid crystal is poisonous.
- (2) If the LCD panel breaks, be careful not to get liquid crystal to touch your skin.
- (3) If skin is exposed to liquid crystal, wash the area thoroughly with alcohol or soap.

12.2 Storage Conditions

- (4) Store the panel or module in a dark place where the temperature is $23 \pm 5^{\circ}\text{C}$ and the humidity is below $45 \pm 20\% \text{RH}$.
- (5) Store in anti-static electricity container.
- (6) Store in clean environment, free from dust, active gas, and solvent.
- (7) Do not place the module near organics solvents or corrosive gases.
- (8) Do not crush, shake, or jolt the module.

12.3 Handling Precautions

- (9) Avoid static electricity, which can damage the CMOS LSI.
- (10) The polarizing plate of the display is very fragile, please handle it very carefully.
- (11) Do not give external shock.
- (12) Do not apply excessive force on the surface.
- (13) Do not wipe the polarizing plate with a dry cloth, as it may easily scratch the surface of plate.
- (14) Do not use ketonics solvent & Aromatic solvent, use with a soft cloth soaked with a cleaning naphtha solvent.
- (15) Do not operate it above the absolute maximum rating.
- (16) Do not remove the panel or frame from the module.

12.4 Warranty

The period is within twelve months since the date of shipping out under normal using and storage conditions.