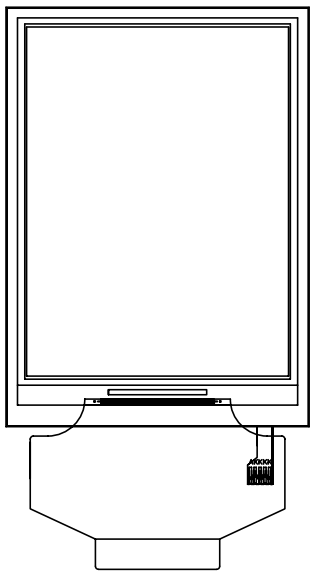
HANTRONIX

PRODUCT SPECIFICATION

HDA280-3S

240X320 , TFT COLOR GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA280-3S	SHEET 1 OF 14 DATE: 6/4/12

1. GENERAL INFORMATION

Item	Contents	Unit
LCD Type	TFT TRANSMISSIVE	/
Viewing direction	6:00	O' Clock
Module Size (W H)	50.00-69.2	mm^2
Viewing area (W - H)	43.8-58.6	mm^2
Number of Dots	240RGB *320	/
Driver IC	ILI9341	/
Colors	262K	/
Backlight type	LED	/
Interface Type	Serial,Parallel	/
Operating voltage	Vdd=3.0V typ.	V
Luminance(without touch panel)	310	cd/m2

3.ABSOLUTE MAXIMUM RATINGS

Ta = 25℃

Item	Symbol	Min.	Max.	Unit	Remark
Supply Voltage	VCC	1.65	3.3	V	
Analog Supply Voltage	VCC	1.65	3.3	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

4. BACKLIGHT CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Units	Condition
Forward Voltage	Vf	2.9	3.2	3.5	V	If= 60 mA
Reverse Current	Ir				μA	Vr= V
CIE	X	0.250		0.3		If= 60 mA
	Y	0.260		0.31		
Luminance		10nit	MIN		cd/m²	
Uniformity	△	80			%	

5. TIMING OF POWER SUPPLY

See attached sheet

6.ELECTRICAL SPECIFICATION

Item	Symbol	Specification			Unit
		Min.	Typ.	Max.	
TFT Gate On Voltage	VGH	--	15	--	V
TFT Gate Off Voltage	VGL	--	-10	--	V
TFT Common Electrode Voltage	VcomH	3	5	5	V
	VcomL	-2	0	0	V

Note:
(1) Vcom must be adjusted to optimize display quality: cross talk, contrast ratio and etc.
(2) VGH is TFT gate on voltage
(3) VGL is TFT gate off voltage
The storage capacitance structure of this product is Cst(Storage on Common).
The low voltage level of VGL signal must be fluctuated with same phase as Vcom, in case of Storage on Gate structure.
(4) Environmental condition : 25℃
(5) Base on ILI9340

7. OPTICAL SPECIFICATIONS

Light Source : C-light Ta=25℃

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
View Angles		θT	CR≧10	60	70	-	Degree	Note 2
		θB		50	60	-		
		θL		60	70	-		
		θR		60	70	-		
Contrast Ratio		CR	θ=0°	400	500	-		Note1
Response Time		T_{ON}	25℃	-	25	30	ms	Note1 Note4
		T_{OFF}						
Chromaticity	White	x	C-light		0.298			Note5 Note1
		y			0.354			
	Red	x			0.649			
		y			0.323			
	Green	x			0.289			
		y			0.588			
	Blue	x			0.133			
		y			0.133			
NTSC					65	-	%	Note 5
Transmittance		T			5.7	-	%	Note1

Test Conditions:

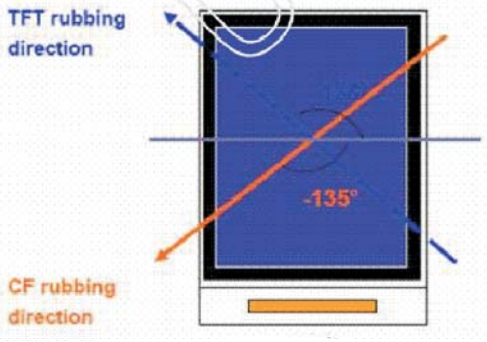
1. The ambient temperature is 25℃.
2. The test systems refer to Note 1 and Note 2.

b) Rubbing Direction

CF Substrate Rubbing direction: -135°

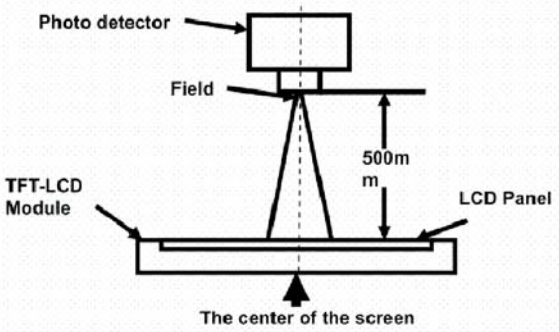
TFT Substrate Rubbing direction: 135°

Pi Rubbing 示意图



Note 1: Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.



Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Chromaticity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system,

viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).

Viewing angle is measured With EWV Polarizer.

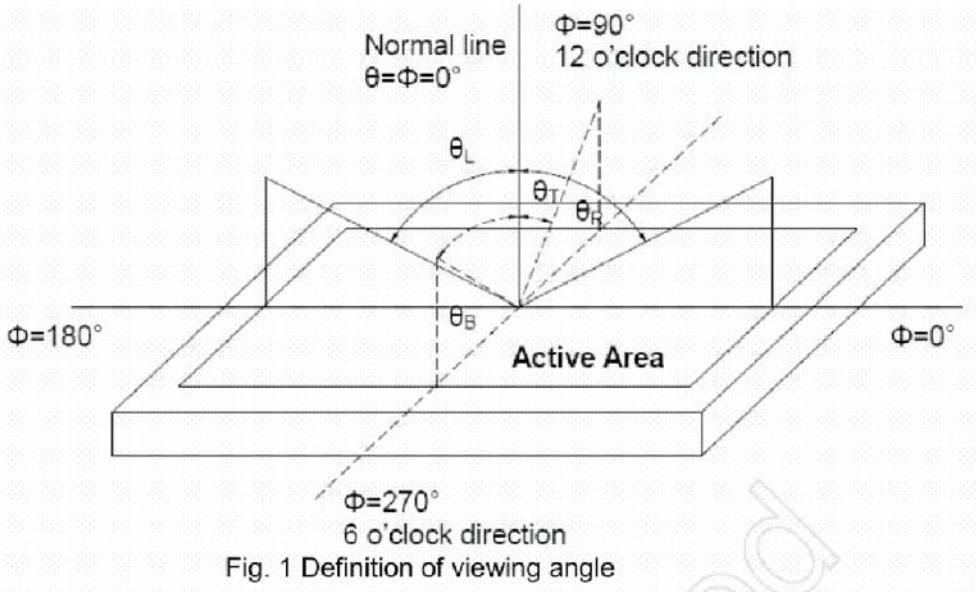


Fig. 1 Definition of viewing angle

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8.INTERFACE DESCRIPTION

Pin	Symbol	Function	Remark
1	LEDK2	LED backlight(cathode)	
2	LEDK1	LED backlight(cathode)	
3	LEDA	LED backlight(anode)	
4	VDDI	Low voltage power supply for interface logic circuits(1.65~3.3V)	
5	VCI	High voltage power supply for analog circuit blocks(2.5~3.3V)	
6	GND	Ground	
7	CSX	Chip select input pin("low"enable)	
8	DCX	This pin is used to select "Data or Command" in the parallel interface or 4-wire 8-bit serial data interface. When DCX = '1', data is selected. When DCX = '0', command is selected. This pin is used serial interface clock in 3-wire 9-bit / 4-wire 8-bit serial data interface. If not used, this pin should be connected to VDDI or VSS.	
9	WRX	- 8080- Ⅰ/8080- Ⅱ system (WRX): Serves as a write signal and writes data at the rising edge. - 4-line system (D/CX): Serves as command or parameter select. *Fix to VDDI level when not in use.*	
10	RDX	8080- Ⅰ/8080- Ⅱ system (RDX): Serves as a read signal and MCU read data at the rising edge. *Fix to VDDI level when not in use.*	
11	RESX	This signal will reset the device and must be applied to properly initialize the chip. Signal is active low.	
12-29	DB0-DB17	Data bus	
30	SDO	Serial output signal. The data is outputted on the falling edge of the SCL signal. If not used, open this pin.	
31	SDA	When IM[3] : Low, Serial in/out signal. When IM[3] : High, Serial input signal. The data is applied on the rising edge of the SCL signal. If not used, fix this pin at VDDI or VSS.	
32	LEDPWM	Output pin for PWM(pulse width modulation)signal of LED	
33	LEDON	Output pin for enabling LED driving	
34	IM0	Select the MCU interface mode	
35	IM1	Select the MCU interface mode	
36	IM2	Select the MCU interface mode	
37	X1(NC)	Dummy pin	
38	Y1(NC)	Dummy pin	
39	X2(NC)	Dummy pin	
40	Y2(NC)	Dummy pin	

10.INITIAL CODE

Please consult our technical department for detail information

11. RELIABILITY TEST

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±2℃/200 hours	Inspection after 2~4hours storage at room temperature,the sample shall be free from defects: 1.Air bubble in the LCD; 2.Sealleak; 3.Non-display; 4.missing segments; 5.Glass crack; 6.Current Idd is twice higher than initial value.
2	Low Temperature Storage	-30±2℃/200 hours	
3	High Temperature Operating	70±2℃/120 hours	
4	Low Temperature Operating	-20±2℃/120 hours	
5	Temperature Cycle	-20 ℃ ~25 ℃ ~70 ℃ × 10cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test	50℃±5℃×90%RH/120 hours	
7	Vibration Test	Frequency：10Hz~55Hz~10Hz Amplitude：1.5mm, X，Y，Z direction for total 3hours (Packing condition)	
8	Drooping test	Drop to the ground from 1m height, one time, every side of carton. (Packing condition)	
9	ESD test	Voltage:±8KV R: 330Ω C: 150pF Air discharge, 10time	

Remark:

1.The test samples should be applied to only one test item.

2.Sample size for each test item is 5~10pcs.

3.For Damp Proof Test, Pure water(Resistance＞10MΩ) should be used.

4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judge as a good part.

5.EL evaluation should be excepted from reliability test with humidity and temperature: Some defects such as black spot/blemish can happen by natural chemical reaction with humidity and Fluorescence EL has.

6.Failure Judgment Criterion: Basic Specification, Electrical Characteristic, Mechanical Characteristic, Optical Characteristic.

7.Please use automatic switch menu(or roll menu) testing mode when test operating mode.

12.INSPECTION CRITERION

OUTGOING QUALITY STANDARD	PAGE 1 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	

This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM.

1 Sample plan

Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:

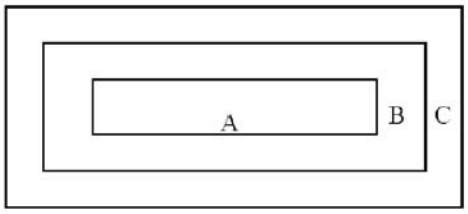
Major defect: AQL 0.65

Minor defect: AQL 1.5

2. Inspection condition

Viewing distance for cosmetic inspection is about 30cm with bare eyes, and under an environment of 20~40W light intensity, all directions for inspecting the sample should be within
45° against perpendicular line.

3. Definition of inspection zone in LCD.



Zone A: character/Digit area

Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

Fig.1 Inspection zones in an LCD.

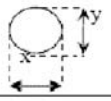
Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

4. Inspection standards

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All functional defects	1) No display 2) Display abnormally 3) Missing vertical, horizontal segment 4) Short circuit 5) Back-light no lighting, flickering and abnormal lighting.	Major
4.1.2	Missing	Missing component	
4.1.3	Outline dimension	Overall outline dimension beyond the drawing is not allowed.	

4.2 Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.2.1	Clear Spots Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	For dark/white spot, size Φ is defined as $\Phi = (x+y)/2$ 	Minor
		1.	

Zone / Size(mm)	Acceptable Qty		
	A	B	C
Φ≤0.10	Ignore		Ignore
0.10<Φ≤0.15	2		
0.15<Φ≤0.20	1		
Φ>0.20	0		

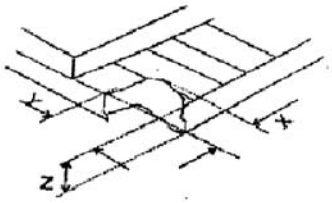
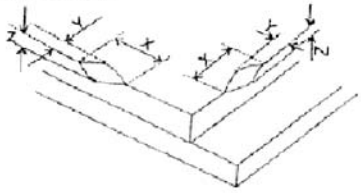
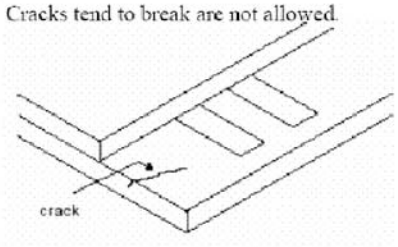
Item No	Items to be inspected	Inspection Standard	Classification of defects
	Dim Spots Circle shaped and dim edged defects	2.	Minor

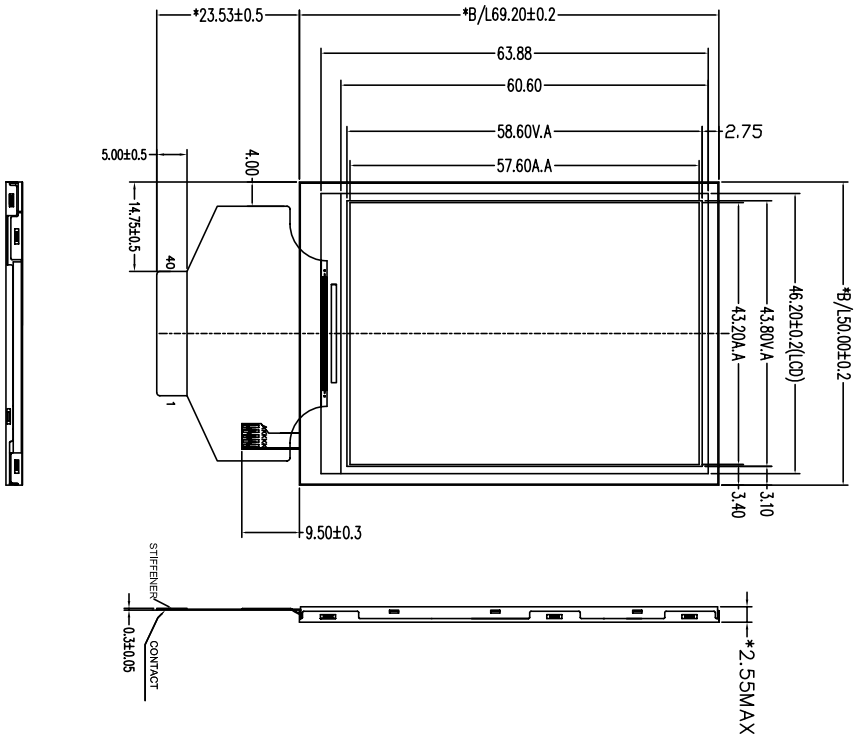
2. Zone / Size(mm)	Acceptable Qty		
	A	B	C
Φ≤0.2	Ignore		Ignore
0.20<Φ≤0.40	3		
0.40<Φ≤0.60	2		
0.60<Φ≤0.80	1		
0.80<Φ	0		

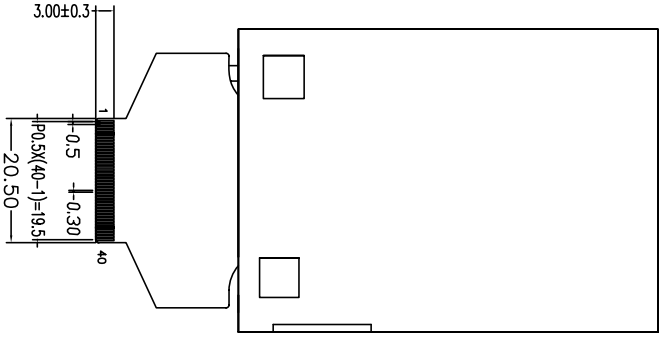
4.2. Cosmetic Defect

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td>4.2.2</td><td>Line defect
Black line,
White line,
Foreign material
under polarizer.</td><td>
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.02</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>L≤3.0</td><td>0.02＜W≤0.03</td><td colspan="2">2</td></tr>
<tr><td>L≤2.0</td><td>0.03＜W≤0.05</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.05＜W</td><td colspan="2">Define as spot defect</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.3</td><td>Polarizer scratch</td><td>If the Polarizer scratch can be seen after mobile phone cover assembling or in the operating condition, judge by the line defect of 4.2.2.
If the Polarizer scratch can be seen only in non-operating condition or some special angle, judge by the following.
<table>
<tr><th colspan="2">Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th rowspan="2">L(Length)</th><th rowspan="2">W(Width)</th><th colspan="3">Zone</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Ignore</td><td>W≤0.03</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>5.0＜L≤10.0</td><td>0.03＜W≤0.05</td><td colspan="2">2</td></tr>
<tr><td>L≤5.0</td><td>0.05＜W≤0.08</td><td colspan="2">1</td></tr>
<tr><td></td><td>0.08＜W</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>4.2.4</td><td>Polarize Air bubble</td><td>Air bubbles between glass & polarizer
<table>
<tr><th>2. Zone
Size(mm)</th><th colspan="3">Acceptable Qty</th></tr>
<tr><th>A</th><th>B</th><th>C</th></tr>
<tr><td>Φ≤0.2</td><td colspan="2">Ignore</td><td rowspan="4">Ignore</td></tr>
<tr><td>0.20＜Φ≤0.30</td><td colspan="2">2</td></tr>
<tr><td>0.30＜Φ≤0.50</td><td colspan="2">1</td></tr>
<tr><td>0.50＜Φ</td><td colspan="2">0</td></tr>
</table>
</td><td>Minor</td></tr>
</table>

4.3. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.3.5	Glass defect	(i) Chips on corner  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≦2.0</td><td>≦S</td><td>Disregard</td></tr></table> Notes: S=contact pad length Chips on the corner of terminal shall not be allowed to extend into the ITO pad or expose perimeter seal.	Minor
		(ii)Usual surface cracks  <table><tr><th>X</th><th>Y</th><th>Z</th></tr><tr><td>≦3.0</td><td><Inner border line of the seal</td><td>Disregard</td></tr></table>	Minor
		(iii) Crack Cracks tend to break are not allowed. 	Major
4.3.6	Parts alignment	1) Not allow IC and FPC/heat-seal lead width is more than 50% beyond lead pattern. 2) Not allow chip or solder component is off center more than 50% of the pad outline.	Minor
4.3.7	SMT	According to the <Acceptability of electronic assemblies> IPC-A-610C class 2 standard. Component missing or function defect are Major defect, the others are Minor defect.	





1	LEDK2	21	DB9
2	LEDK1	22	DB10
3	LEDA	23	DB11
4	VDDI	24	DB12
5	VCI	25	DB13
6	GND	26	DB14
7	CSX	27	DB15
8	DCX	28	DB16
9	WRX	29	DB17
10	RDX	30	SDO
11	RESX	31	SDA
12	DB0	32	LEDPWM
13	DB1	33	LEDON
14	DB2	34	IM0
15	DB3	35	IM1
16	DB4	36	IM2
17	DB5	37	X1(NC)
18	DB6	38	Y1(NC)
19	DB7	39	X2(NC)
20	DB8	40	Y2(NC)

1	Operating Voltage:	Vcc=3.0V typ.
2	Resolution:	240RGB*320
3	Color:	262k
4	Interface:	Serial,Parallel
5	Display type:	Transmissive
6	Viewing Direction:	6:00
7	Operating Temp:	-20°C~70°C
8	Storage Temp:	-30°C~80°C
9	Driver IC:	ILI9341
10	Unspecified tolerance:	±0.2

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