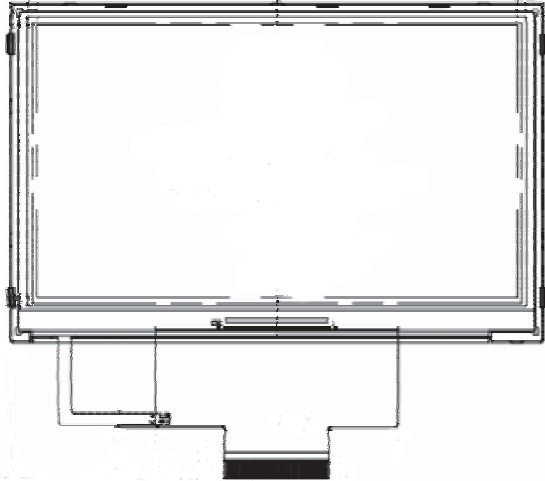




PRODUCT SPECIFICATION

# HDA430-5S

4.3', 480x272 TFT COLOR GRAPHICS  
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.:	REV.:	HDA430-5S	SHEET 1 OF 13
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## 1. GENERAL INFORMATION

Item	Cont	Unit
LCD Type	TFT TRANSMISSIVE	/
Viewing direction	12:00	O' Clock
Module Size (W - H)	105.5-67.2	mm
Active area (W-H)	95.04-53.86	mm
Number of Dots	480(RGB) *272	/
Driver IC	OTA5180A-C3	/
Colors	16M	/
Backlight type	LED	/
Interface Type	24- Bits RGB	/
Operating voltage	3.3	V
Operation Temperature Range	-20~70	°C
Storage Temperature Range	-30~80	°C
Surface luminance	250	cd/m <sup>2</sup>

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### 3.ABSOLUTE MAXIMUM RATINGS

Rating	Symbol	Value		Unit	
Digital supply voltage	VDDIO	-0.3	to	+4.5	V
Power Supply for Pump	VDD	-0.3	to	+4.5	V
Analog supply voltage	VDD2	-0.3	to	+7.0	V

**Note:** Stresses beyond those given in the Absolute Maximum Rating table may cause operational errors or damage to the device. For normal operational conditions see AC/DC Electrical Characteristics.

### 4.AC Characteristics

VDDIO=1.8V, VDD = 3.3V, AVDD = 6V, AGND = 0V, T<sub>A</sub> = -20°C to 80°C

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
CLK pulse duty	T <sub>cd</sub>	40	50	60	%	
Hsync width	T <sub>hw</sub>	1.0	-	-	DCLK	
Hsync period	T <sub>h</sub>	55	60	65	us	
Vsync setup time	T <sub>vst</sub>	12	-	-	ns	
Vsync hold time	T <sub>vhd</sub>	12	-	-	ns	
Hsync setup time	T <sub>hst</sub>	12	-	-	ns	
Hsync hold time	T <sub>hhd</sub>	12	-	-	ns	
Data set-up time	T <sub>dsu</sub>	12	-	-	ns	
Data hold time	T <sub>dhd</sub>	12	-	-	ns	
DE set-up time	T <sub>desu</sub>	12	-	-	ns	
DE hold time	T <sub>dehd</sub>	12	-	-	ns	
SD output stable time	T <sub>st</sub>	-	10	12	us	
GD output rise and fall time	T <sub>gst</sub>	-	500	1000	ns	
<b>Serial communication</b>						
Delay between CSB and Vsync	T <sub>cv</sub>	1			us	
CS input setup time	T <sub>s0</sub>	50			ns	
Serial data input setup time	T <sub>s1</sub>	50			ns	
CS input hold time	T <sub>h0</sub>	50			ns	
Serial data input hold time	T <sub>h1</sub>	50			ns	
SCL pulse high width	T <sub>wh1</sub>	50			ns	
SCL pulse low width	T <sub>wl1</sub>	50			ns	
CS pulse high width	T <sub>w2</sub>	400			ns	

### 5. BACKLIGHT CHARACTERISTICS

Item	Symbol	min.	typ.	max.	Unit	Condition
Forward Voltage	V <sub>f</sub>	18.6	19.8	21.0	V	1. IF = 20 mA/LED 2.Aperture:1°,12 Point 3.The Measurement instrument is:BM-7 4.Average=min/max*100%
Reverse Current	I <sub>r</sub>			15	μA	
Luminance	L <sub>v</sub>	5200			cd/m <sup>2</sup>	
Average		75			%	
Colour Coordinate	X	0.245		0.295		
	Y	0.245		0.295		

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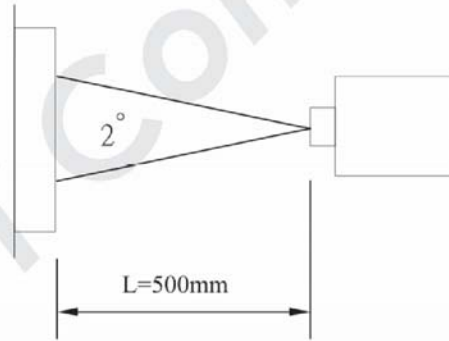
## 6.OPTICAL SPECIFICATIONS

(Transmittance · contrast · RT · viewing angle results are using CPT LC+ EWV Polarizer+ CPT's BLU (2L1D) reference only) (Note1 · Note2)

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
Transmittance	T		5.6	5.9		%	Note 2
Contrast Ratio	CR	*1)	250	350	--	--	Note 3
Response Time	Tr+ Tf	*3)	-	30	45	ms	Note 4
Viewing Angle	Vertical	$\theta$ *2)	CR $\geq$ 10	90	110	--	Note 5
	Horizontal	$\phi$ *2)				110	
Color Filter Chromacity with C light	White	x	$\theta = \phi = 0^\circ$	0.282	0.302	0.322	Note 6
		y		0.318	0.338	0.358	
	Red	x	$\theta = \phi = 0^\circ$	0.586	0.606	0.626	
		y		0.305	0.325	0.345	
	Green	x	$\theta = \phi = 0^\circ$	0.283	0.303	0.323	
		y		0.547	0.567	0.587	
Blue	x	$\theta = \phi = 0^\circ$	0.127	0.147	0.167		
	y		0.121	0.161	0.181		
NTSC			-	50%	-		

Note 1.Ambient condition : 25°C ±2°C · 60±10%RH · under 10 Lux in the darkroom ◦

Note 2.Measure device : BM-5A (TOPCON) · viewing cone=2° · I<sub>L</sub>=20mA ◦

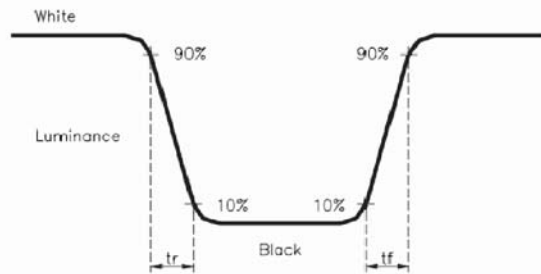


Note 3. Definition of Contrast Ratio :

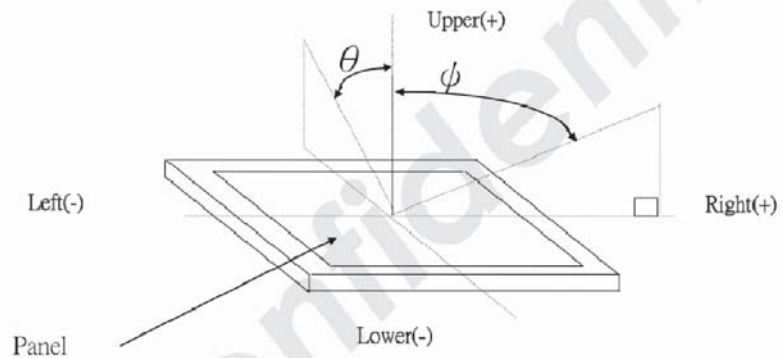
$$CR = \text{White Luminance (ON)} / \text{Black Luminance (OFF)}$$

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Note 4. Definition of response time : The response time is defined as the time interval between the 10% and 90% amplitudes.



Note 5. Definition of view angle( $\theta$ ,  $\psi$ ) :



Note 6. Light source: C light.

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## 7.INTERFACE DESCRIPTION

Pin No.	Symbol	Description
1-2	GND	Ground
3-4	VCC	Power supply
5-12	R0-R7	Data bit
13-20	G0-G7	Data bit
21-28	B0-B7	Data bit
29	GND	Ground
30	DOTCLK	Clock signal for data
31	DISPLAY	Display control/standby mode selection DISP= "Low":standby; (default) DISP= "High": Normal display
32	HSYNC	Horizontal sync signal; negative polarity
33	VSYNC	Vertical sync signal; negative polarity
34	NC	No connection
35	NC	No connection
36	NC	No connection
37	NC	No connection
38	NC	No connection
39-40	K,A	LED backlight

## 8.APPLICATION CIRCUIT

Please consult our technical department for detail information.

## 9.INITIAL CODE

Please consult our technical department for detail information

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### 10. RELIABILITY TEST

No.	Test Item	Test Condition	Inspection after test
1	High Temperature Storage	80±2°C/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°C/200 hours	
3	High Temperature Operating	70±2°C/120 hours	
4	Low Temperature Operating	-20±2°C/120 hours	
5	Temperature Cycle	-20 °C ~25 °C~70 °C × 10cycles (30min.) (5min.) (30min.)	
6	Damp Proof Test	50°C±5°C ×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.

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## 12.INSPECTION CRITERION

OUTGOING QUALITY STANDARD	PAGE 1 OF 4
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA	
<p>This specification is made to be used as the standard acceptance/rejection criteria for Color mobile phone LCM.</p> <p>1 Sample plan</p> <p>Sampling plan according to GB/T2828.1-2003/ISO 2859-1: 1999 and ANSI/ASQC Z1.4-1993, normal level 2 and based on:</p> <p>Major defect: AQL 0.65</p> <p>Minor defect: AQL 1.5</p> <p>2. Inspection condition</p> <p>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.</p> <p>3. Definition of inspection zone in LCD.</p> <div data-bbox="560 978 980 1167" data-label="Diagram"> </div> <p>Zone A: character/Digit area</p> <p>Zone B: viewing area except Zone A (ZoneA+ZoneB=minimum Viewing area)</p> <p>Zone C: Outside viewing area (invisible area after assembly in customer's product)</p> <p>Fig.1 Inspection zones in an LCD.</p> <p>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.</p>	

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TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

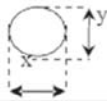
**4. Inspection standards**

**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	For dark/white spot, size $\Phi$ is defined as $\Phi = (x+y)/2$	Minor		
	Black and white Spot defect Pinhole, Foreign Particle, Dirt under polarizer	1.			
		Zone		Acceptable Qty	
		Size(mm)		A B C	
		$\Phi \leq 0.10$		Ignore	Ignore
		$0.10 < \Phi \leq 0.15$		2	
	$0.15 < \Phi \leq 0.20$	1			
	$\Phi > 0.20$	0			
	Dim Spots	2.			
	Circle shaped and dim edged defects	2. Zone		Acceptable Qty	
Size(mm)		A B C			
$\Phi \leq 0.2$		Ignore	Ignore		
$0.20 < \Phi \leq 0.40$		3			
$0.40 < \Phi \leq 0.60$		2			
$0.60 < \Phi \leq 0.80$		1			
$0.80 < \Phi$	0				



TITLE: FUNCTIONAL TEST & INSPECTION CRITERIA

4.2. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard				Classification of defects		
4.2.2	Line defect Black line, White line, Foreign material under polarizer,	Size(mm)		Acceptable Qty			Minor	
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	$W \leq 0.02$	Ignore				
		$L \leq 3.0$	$0.02 < W \leq 0.03$	2				
$L \leq 2.0$	$0.03 < W \leq 0.05$	1						
	$0.05 < W$	Define as spot defect						
4.2.3	Polarizer scratch	Size(mm)		Acceptable Qty			Minor	
		L(Length)	W(Width)	Zone				
				A	B	C		
		Ignore	$W \leq 0.03$	Ignore				
		$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$	2				
$L \leq 5.0$	$0.05 < W \leq 0.08$	1						
	$0.08 < W$	0						
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer					Minor	
		Size(mm)	2. Zone		Acceptable Qty			
			A	B	C			
		$\Phi \leq 0.2$	Ignore			Ignore		
		$0.20 < \Phi \leq 0.30$	2					
$0.30 < \Phi \leq 0.50$	1							
$0.50 < \Phi$	0							

TITLE: FUNCTIONAL TEST & INSPECTION CRITERIA

4.2. Cosmetic Defect

Item No	Items to be inspected	Inspection Standard				Classification of defects	
4.2.2	Line defect Black line, White line, Foreign material under polarizer.	Size(mm)		Acceptable Qty		Minor	
		L(Length)	W(Width)	Zone			
				A	B		C
		Ignore	$W \leq 0.02$	Ignore			Ignore
		$L \leq 3.0$	$0.02 < W \leq 0.03$	2			
		$L \leq 2.0$	$0.03 < W \leq 0.05$	1			
	$0.05 < W$	Define as spot defect					
4.2.3	Polarizer scratch	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.				Minor	
		Size(mm)		Acceptable Qty			
		L(Length)	W(Width)	Zone			
				A	B		C
		Ignore	$W \leq 0.03$	Ignore			Ignore
		$5.0 < L \leq 10.0$	$0.03 < W \leq 0.05$	2			
$L \leq 5.0$	$0.05 < W \leq 0.08$	1					
	$0.08 < W$	0					
4.2.4	Polarize Air bubble	Air bubbles between glass & polarizer				Minor	
		Size(mm)	Acceptable Qty				
			A	B	C		
		$\Phi \leq 0.2$	Ignore		Ignore		
		$0.20 < \Phi \leq 0.30$	2				
$0.30 < \Phi \leq 0.50$	1						
$0.50 < \Phi$	0						

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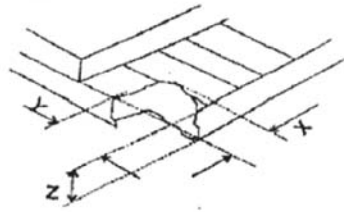
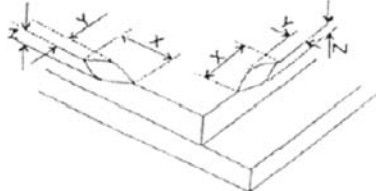
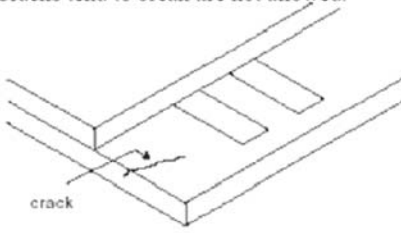
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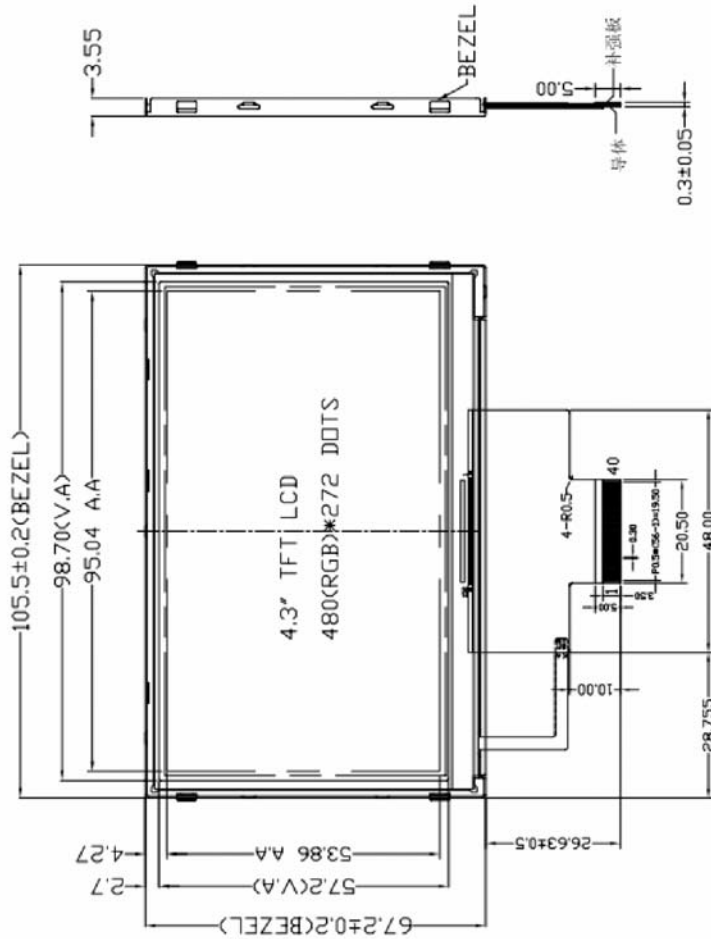
TITLE:FUNCTIONAL TEST & INSPECTION CRITERIA

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 border="1" data-bbox="544 688 1060 768"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>≤2.0</td> <td>≤S</td> <td>Disregard</td> </tr> </table> <p>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.</p>	X	Y	Z	≤2.0	≤S	Disregard	Minor
		X	Y	Z					
		≤2.0	≤S	Disregard					
(ii) Usual surface cracks  <table border="1" data-bbox="524 1129 1078 1209"> <tr> <td>X</td> <td>Y</td> <td>Z</td> </tr> <tr> <td>≤3.0</td> <td>&lt;Inner border line of the seal</td> <td>Disregard</td> </tr> </table>	X	Y	Z	≤3.0	<Inner border line of the seal	Disregard	Minor		
X	Y	Z							
≤3.0	<Inner border line of the seal	Disregard							
(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.							

PIN	SYMBOL	PIN	SYMBOL
1	GND	21	B0
2	GND	22	B1
3	VCC	23	B2
4	VCC	24	B3
5	R0	25	B4
6	R1	26	B5
7	R2	27	B6
8	R3	28	B7
9	R4	29	GND
10	R5	30	DOTCLK
11	R6	31	DISPLAY
12	R7	32	HSYNC
13	G0	33	VSYNC
14	G1	34	NC
15	G2	35	NC
16	G3	36	NC
17	G4	37	NC
18	G5	38	NC
19	G6	39	K
20	G7	40	A

1	Operating Voltage:	Vcc=3.3V typ.
2	Resolution:	480RGB*272
3	Color:	16M
4	Interface:	24-bits RCB
5	Display type:	Transmissive
6	polarizer surface treatment	Clare
7	Viewing Direction:	12:00
8	Operating Temp:	-20°C~70°C
9	Storage Temp:	-30°C~80°C
10	Driver IC:	07A5180A-C3
11	Unspecified tolerance:	±0.2



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