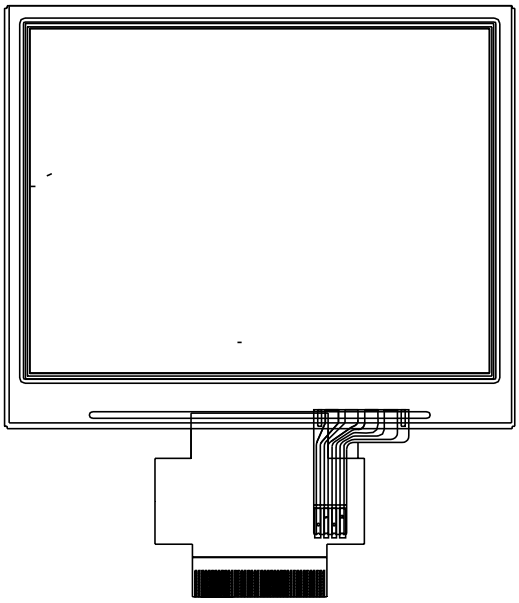
HANTRONIX

PRODUCT SPECIFICATION

HDA350T-3S

QVGA, TFT COLOR GRAPHICS
LCD DISPLAY MODULE



HANTRONIX, INC. 10080 BUBB RD. CUPERTINO, CA 95014	Q.A.: Z.W.	REV.: 1.0	HDA350T-3S	SHEET 1 OF 15 DATE: 3/30/12

1. GENERAL INFORMATION

Item	Contents	Unit
LCD Type	TFT TRANSMISSIVE	/
Viewing direction	12:00	O' Clock
Module Size (W - H)	77.80-64.50	mm^2
Active area (W - H)	70.08-52.56	mm^2
Number of Dots	320(RGB) *240	/
Driver IC	HX8238-D	/
Colors	16M	/
Backlight type	LED	/
Interface Type	24- bits RGB	/
Operating voltage	3.3	V
Surface luminance	300	cd/m^2

3.ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Spec.			Unit
		Min.	Typ.	Max.	
VDD	Supply Voltage	-0.3	-	2.7	V
VDDIO		-0.3	-	4.0	V
VCI	Input Voltage	VSS-0.3	-	5.0	V
I	Current Drain Per Pin Excluding VDD and VSS	-	25	-	mA

4.ELECTRICAL SPECIFICATION

Item	Symbol	Specification			Unit
		Min.	Typ	Max.	
TFT gate on voltage	V_{GH}	-	+15	-	V
TFT gate off voltage	V_{GL}	-	-10	-	V
TFT common electrode voltage	V_{comH}	2.5	(3.6)	4.5	V
	V_{comL}	-3	(-2.4)	0	

Note: (1) Vcom must be adjusted to optimize display quality: cross talk, contrast ratio and etc.

(2) VGH is TFT gate operating voltage

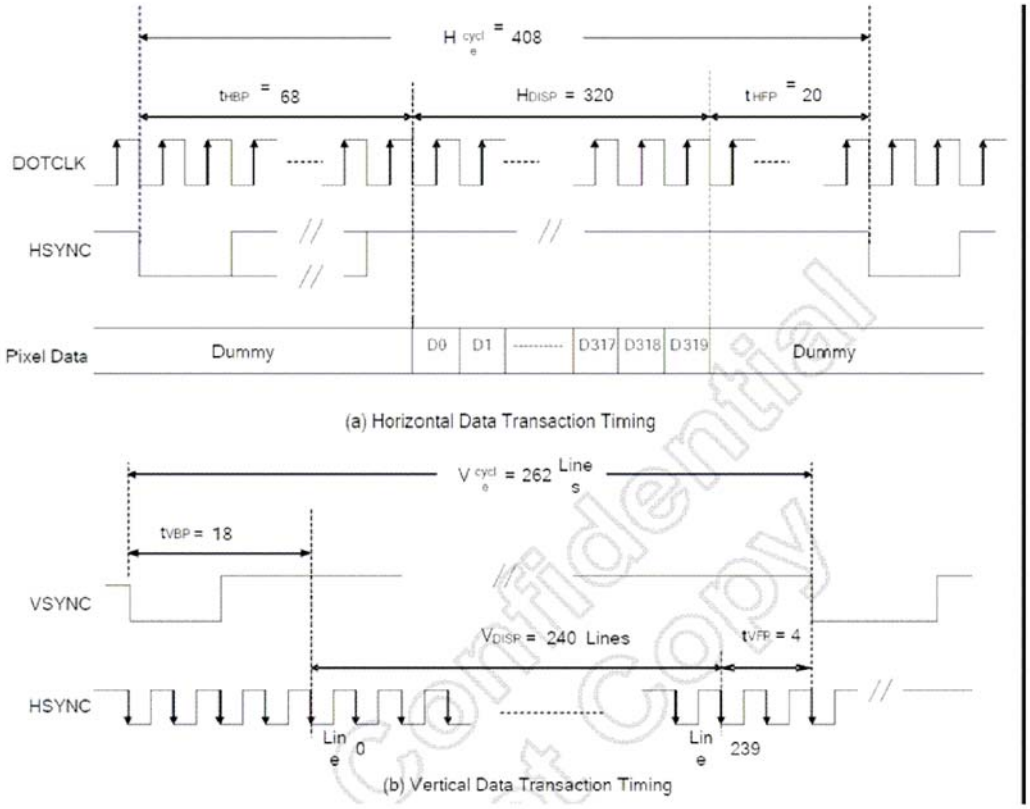
(3) VGL is TFT gate operating voltage

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℃

5. TIMING OF POWER SUPPLY



Data Transaction Timing in Parallel RGB (24 bit) Interface (SYNC Mode)

Characteristics		Symbol	Min.		Typ.		Max.		Unit
			24 bit	8 bit	24 bit	8 bit	24 bit	8 bit	
DOTCLK Frequency		fDOTCLK	-	-	6.5	19.5	10	30	MHz
DOTCLK Period		tDOTCLK	100	33.3	154	51.3	-	-	ns
Horizontal Frequency (Line)		fH	-		14.9		22.35		KHz
Vertical Frequency (Refresh)		fV	-		60		90		Hz
Horizontal Back Porch		tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Front Porch		tHFP	-	-	20	60	-	-	tDOTCLK
Horizontal Data Start Point		tHBP	-	-	68	204	-	-	tDOTCLK
Horizontal Blanking Period		tHBP + tHFP	-	-	88	264	-	-	tDOTCLK
Horizontal Display Area		HDISP	-	-	320	960	-	-	tDOTCLK
Horizontal Cycle		Hcycle	-	-	408	1224	450	1350	tDOTCLK
Vertical Back Porch		tVBP	-		18		-		Lines
Vertical Front Porch		tVFP	-		4		-		Lines
Vertical Data Start Point		tVBP	-		18		-		Lines
Vertical Blanking Period		tVBP + tVFP	-		22		-		Lines
Vertical Display Area	NTSC	VDISP	-		240		-		Lines
	PAL				280(PALM=0)				
	PAL				288(PALM=1)				
Vertical Cycle	NTSC	Vcycle	-		262		350		Lines
	PAL				313				

Data Transaction Timing in Normal Operating Mode

6. BACKLIGHT CHARACTERISTICS

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT	CONDITIONS
Forward Voltage	Vf	9.0	10.2	10.8	V	If= 20*2 mA
Forward Current	If	--	20*2	---	mA	
Power Dissipation	Pd		0.384		W	If= 20*2 mA
Reverse Voltage	VR	--	--	3.0	V	
Reverse Current	IR			---	mA	
Luminous Intensity	Iv	6000	--		cd/m^2	If= 20*2 mA
Luminous Uniformity		75	80		%	
Chromaticity coordinate		X=0.27		X=0.33		If=20mA Ta=25℃ Each chip
		Y=0.27		Y=0.33		

7. OPTICAL SPECIFICATIONS

Item		Symbol	Conditions	Specifications			Unit	Note
				Min.	Typ.	Max.		
Transmittance		T%	Viewing normal angle $\theta_X = \theta_Y = 0°$		7.4		%	All left side data are based on CMO's following condition –T6 NTSC: 60% LC:5091 Light : C light (Machine:BM5A) Normal Polarizer Without DBEF **"Simulation Data Reference Only"**
Contrast Ratio		CR		200	300		--	
Response Time		T_R			15	30	ms	
		T_F			35	50	ms	
Chromaticity	Red	X_R		0.609	0.639	0.669		
		Y_R		0.314	0.344	0.374		
	Green	X_G		0.264	0.294	0.324		
		Y_G		0.557	0.587	0.617		
	Blue	X_B		0.102	0.132	0.162		
		Y_B		0.106	0.136	0.166		
	White	X_W		0.282	0.312	0.342		
		Y_W		0.319	0.349	0.379		
Viewing Angle	Hor.	θ_{X+}	Center CR≥10		60		deg.	
		θ_{X-}			60			
	Ver.	θ_{Y+}			60			
		θ_{Y-}			60			

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

The contrast ratio can be calculated by the following expression.

Contrast Ratio (CR) = L63 / L0

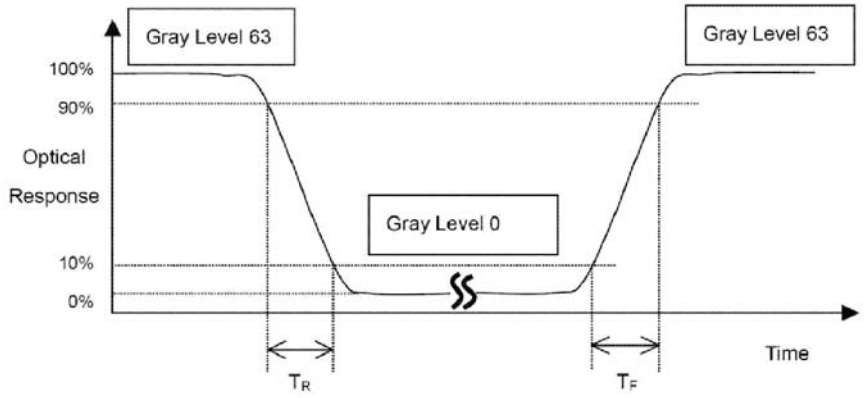
L63: Luminance of gray level 63

L0: Luminance of gray level 0

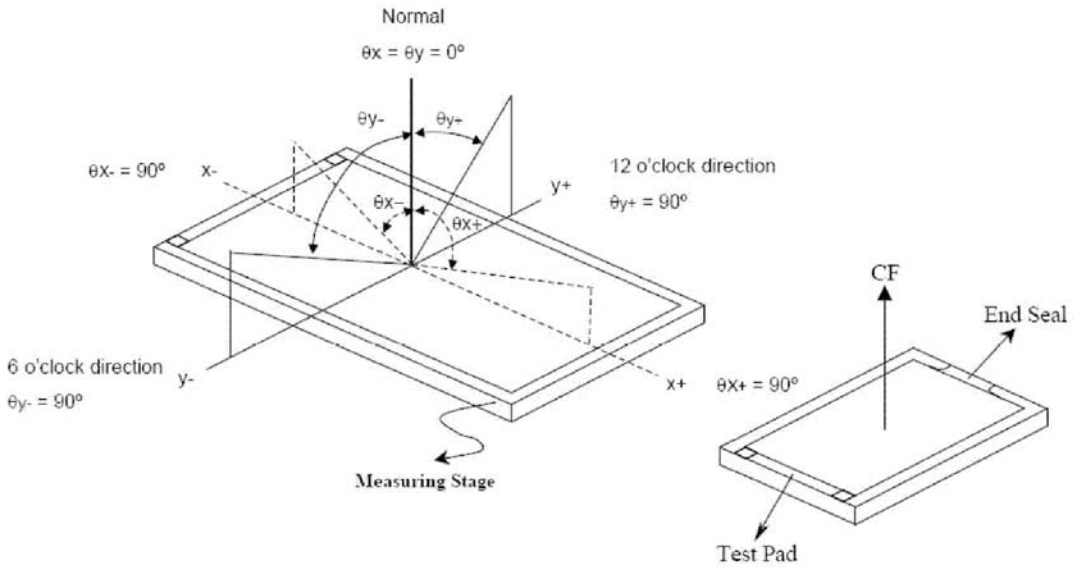
CR = CR (10)

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

Note (2) Definition of Response Time (TR, TF):



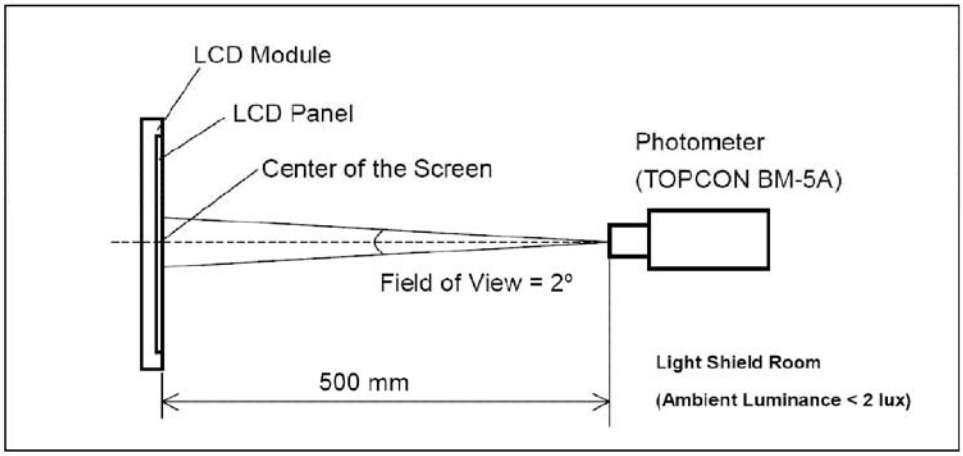
*Note(3) Definition of Viewing Angle



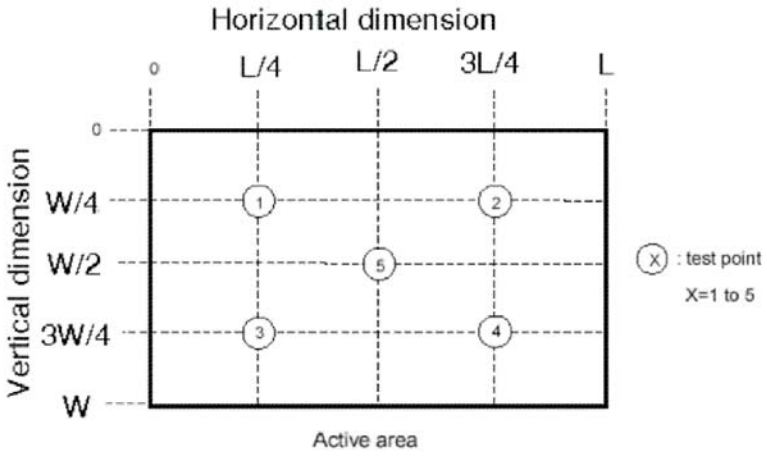
*** The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality. View Direction for good image quality is 12 O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.

*Note (4) Measurement Set-Up:

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note (5)



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8.INTERFACE DESCRIPTION

Pin No.	Symbo	Description
1	K	LED Backlight
2	A	LED Backlight
3	X2	The pin of touch panel
4	Y2	The pin of touch panel
5	X1	The pin of touch panel
6	Y1	The pin of touch panel
7	RESET	Reset pin.
8	CS	Chip select pin
9	SCL	Clock pin of serial interface
10	SDI	Data input pin in serial mode
11-18	BB0-BB7	Blue Data
19-26	GG0-GG7	Green Data
27-34	RR0-RR7	Red Data
35	ENABLE	Display enable pin from controller
36	HSYNC	Line synchronization signal
37	VSYNC	Frame synchronization signal
38	DOTCLK	Dot-clock signal and oscillator source
39	VDD	Power supply
40	GND	Ground

9.APPLICATION CIRCUIT

Please consult our technical department for detail information.

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:

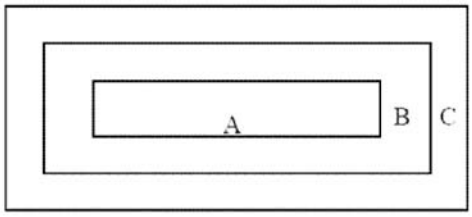
Major defect: AQL 0.65

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.

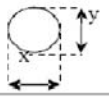
Note: As a general rule, visual defects in Zone C are permissible, when it is no trouble for quality and assembly of customer's product.

4. Inspection standards

4.1 Major Defect

Item No	Items to be inspected	Inspection Standard	Classification of defects
4.1.1	All funetional 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 $\Phi = (x+y)/2$  1.	Minor
	Dim Spots Circle shaped and dim edged defects	2.	Minor

1.

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

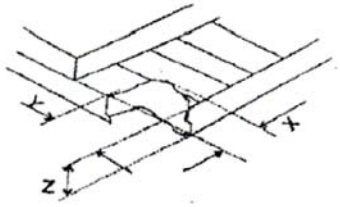
2.

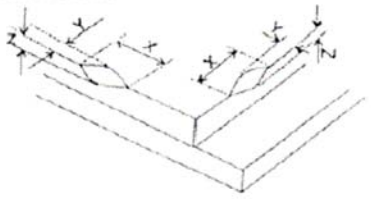
2. Zone / Size(mm)	Acceptable Qty A	B	C
Φ≤0.2	Ignore		
0.20<Φ≤0.40	3		Ignore
0.40<Φ≤0.60	2		
0.60<Φ≤0.80	1		
0.80<Φ	0		

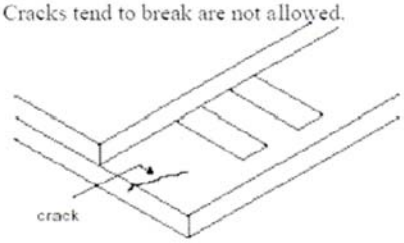
4.2. Cosmetic Defect

<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

<table>
<tr><th>Item No</th><th>Items to be inspected</th><th>Inspection Standard</th><th>Classification of defects</th></tr>
<tr><td rowspan="3">4.3.5</td><td rowspan="3">Glass defect</td><td>(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.</td><td>Minor</td></tr>
<tr><td>(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></td><td>Minor</td></tr>
<tr><td>(iii) Crack
Cracks tend to break are not allowed.
 
</td><td>Major</td></tr>
<tr><td>4.3.6</td><td>Parts alignment</td><td>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.</td><td>Minor</td></tr>
<tr><td>4.3.7</td><td>SMT</td><td>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.</td><td></td></tr>
</table>

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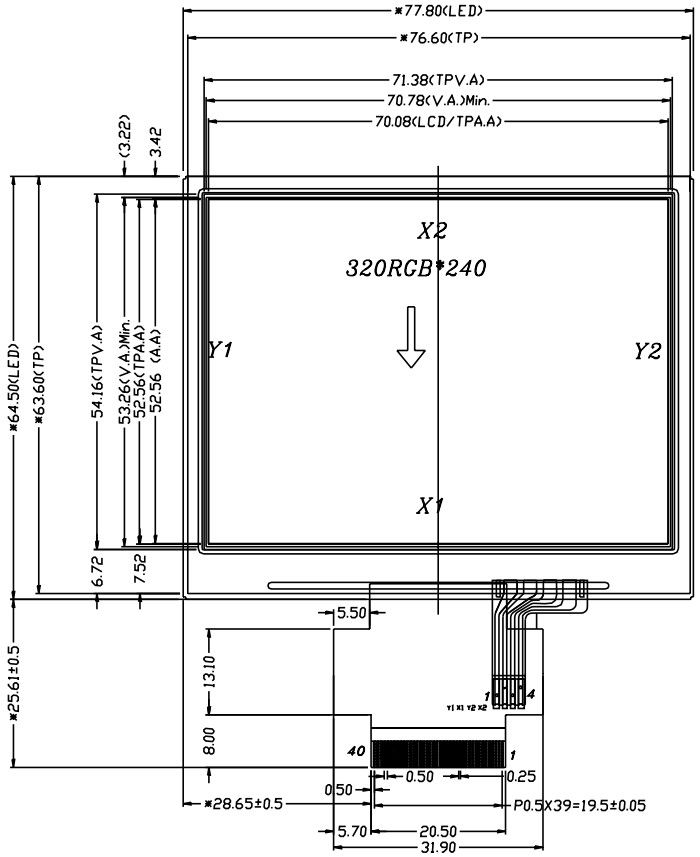

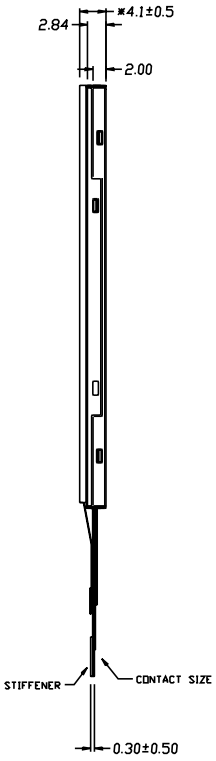

1	K	21	GC2
2	A	22	GC3
3	X2	23	GC4
4	Y2	24	GC5
5	X1	25	GC6
6	Y1	26	GC7
7	RESET	27	RR0
8	CS	28	RR1
9	SCL	29	RR2
10	SDI	30	RR3
11	BB0	31	RR4
12	BB1	32	RR5
13	BB2	33	RR6
14	BB3	34	RR7
15	BB4	35	ENABLE
16	BB5	36	HSYNC
17	BB6	37	VSYNC
18	BB7	38	DOTCLK
19	GC0	39	VDD
20	GC1	40	GND

1	Operating Voltage:	Vcc=3.3V typ.
2	Resolution:	320RGB*240
3	Color:	16M
4	Interface:	24-bits RGB
5	Display type:	Transmissive
6	Viewing Direction:	12:00
7	Operating Temp:	-20°C~70°C
8	Storage Temp:	-30°C~80°C
9	Driver IC:	HX8238-D
10	Unspecified tolerance:	±0.2

Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

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- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits,General Dynamics и др.);

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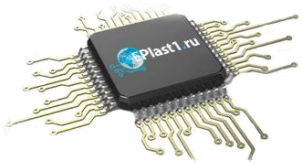
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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