

EXAMINED BY :	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS-51580
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David Chang		VERSION : 1
CUSTOMER ACCEPTANCE SPECIFICATIONS		
MODEL NO. : <u>ET020003DMU</u> (RoHS) FOR MESSRS : _____		
CUSTOMER'S APPROVAL DATE : _____ BY : _____		

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1. GENERAL SPECIFICATIONS

1.1 APPLICATION NOTES FOR CONTROLLER/DRIVER

PLEASE REFER TO :

ILITEK ILI9221/ILI9222

1.2 MATERIAL SAFETY DESCRIPTION

ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED DIPHENYL ETHERS (PBDE)

2. MECHANICAL SPECIFICATIONS

- (1) DISPLAY SIZE (inch) ----- 2.0"
- (2) NUMBER OF DOTS ----- 176W * (RGB) * 220H DOTS
- (3) MODULE SIZE ----- 38.18W * 53.32H * 3.1(D) mm
(WITHOUT FPC)
- (4) ACTIVE AREA ----- 31.68W * 39.6H mm (LCD)
- (5) DOT SIZE ----- 0.06W * 0.18H mm
- (6) PIXEL SIZE ----- 0.18W * 0.18H mm
- (7) LCD TYPE ----- TFT , TRANSMISSIVE
- (8) COLOR ----- 262K (18BIT)
- (9) VIEWING DIRECTION ----- 12 O'CLOCK
- (10) BACK LIGHT ----- LED , COLOR : WHITE

3. ABSOLUTE MAXIMUM RATINGS

3.1 ELECTRICAL ABSOLUTE MAXIMUM RATINGS.

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER SUPPLY FOR LOGIC	VCC	-0.3	4.6	V	
	IOVCC	-0.3	4.6	V	
	VCI	-0.3	4.6	V	
INPUT VOLTAGE	V _I	- 0.3	VCC+0.3	V	
STATIC ELECTRICITY	—	—	—	V	NOTE (1)

NOTE(1) : LCM SHOULD BE GROUNDED DURING HANDING LCM.

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS.

I T E M	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	- 20°C	70°C	- 30°C	80°C	NOTE (2), (3)
HUMIDITY	NOTE (4)		NOTE (4)		WITHOUT CONDENSATION
VIBRATION	—	2.45m/S ² (0.25G)	—	11.76m/S ² (1.2G)	5~20Hz , 1HR 20~500Hz(20Hz), 1HR 20~500Hz(500Hz), 1HR X,Y,Z, TOTAL 3HR
SHOCK	—	29.4m/S ² (3G)	—	490m/S ² (50G)	10 m SECONDS XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (2) : Ta AT -30°C : 48HR MAX .

80°C : 48HR MAX .

NOTE (3) : BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE
THIS PHENOMENON IS REVERSIBLE.

NOTE (4) : Ta ≤ 60°C : 90%HR MAX .

Ta > 60°C : ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF
90%RH AT 60°C.

4. ELECTRICAL CHARACTERISTICS

Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
INPUT POWER SUPPLY	VCC	—	2.5	2.8	3.3	V	
INTERNAL REFERENCE VOLTAGE	VCI	—	2.5	2.8	3.3	V	
INTERNAL SIGNAL VOLTAGE	IOVCC	—	2.5	2.8	3.3	V	
INPUT VOLTAGE	V _{IH}	H LEVEL	0.8VCC	—	VCC	V	
NOTE (1)	V _{IL}	L LEVEL	-0.3	—	0.2VCC	V	
OUTPUT VOLTAGE	V _{OH}	H LEVEL	0.8VCC	—	—	V	
NOTE (1)	V _{OL}	L LEVEL	—	—	0.2VCC	V	
OUTPUT CURRENT	IC	—	—	(4)	(6)	mA	
NOTE (2)							
VOLTAGE OF B/L	VF	IF=(40 mA)	—	(3.3)	(4.0)	V	

NOTE (1) : APPLIED TO TERMINALS , NRESET, VSYNC, HSYNC, DOTCLK, ENABLE, R5~R0,
G5~G0, B5~B0, SDO, SDI, NCS

NOTE (2) : IC : Ivcc + Ivci + Iiovcc

5. OPTICAL CHARACTERISTICS (NOTE1)

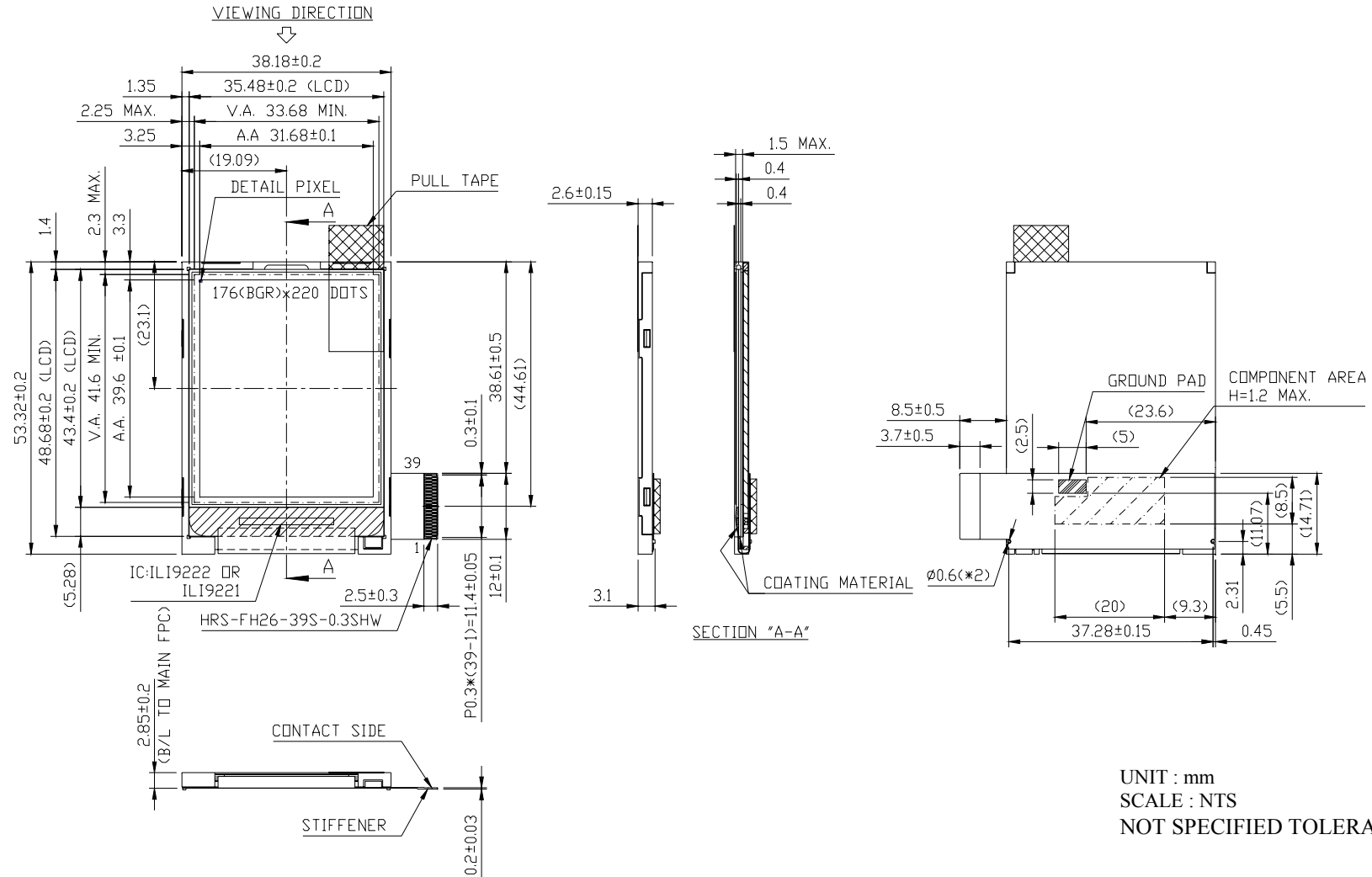
Ta = 25 °C

I T E M		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		$\theta y+$	$CR \geq 10$	$\theta x = 0^{\circ}$	(55)	(60)	—	deg .	—
		$\theta y-$			(15)	(20)	—		
		$\theta x-$		$\theta y = 0^{\circ}$	(40)	(45)	—		
		$\theta x+$			(40)	(45)	—		
CONTRAST RATIO		CR	$\theta x = \theta y = 0^{\circ}$		150	200	—		—
RESPONSE TIME		t r (rise)	$\theta x = \theta y = 0^{\circ}$		—	(12)	(16)	msec	—
		t f (fall)			—	(18)	(24)		
THE BRIGHTNESS OF MODULE		B	$\theta x = \theta y = 0^{\circ}$		200	250	—	cd/m ²	—
COLOR OF CIE COORDINATE	WHITE	X	VIEWING NORMAL AUNLE $\theta x = 0^{\circ}$ $\theta y = 0^{\circ}$		(0.290)	(0.310)	(0.330)	—	—
		Y			(0.312)	(0.341)	(0.361)		
	RED	X			(0.635)	(0.655)	(0.675)	—	—
		Y			(0.309)	(0.329)	(0.349)		
	GREEN	X			(0.292)	(0.312)	(0.332)	—	—
		Y			(0.555)	(0.575)	(0.595)		
	BLUE	X			(0.114)	(0.134)	(0.154)	—	—
		Y			(0.115)	(0.135)	(0.155)		
THE BRIGHTNESS OF UNIFORMITY		—	IF =(40 mA)		(70)	(75)	—	%	NOTE(1)

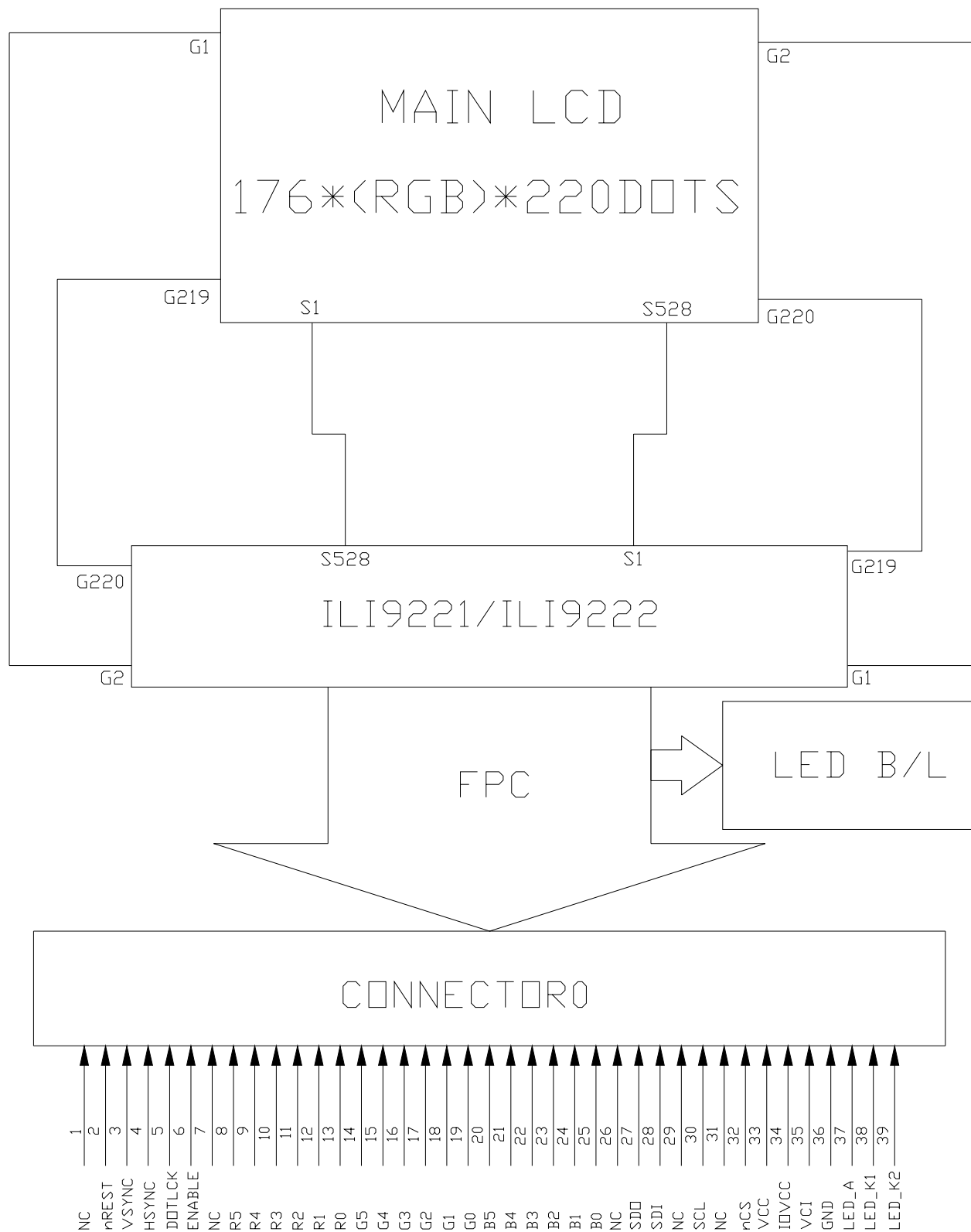
NOTE (1) : THE BRIGHTNESS UNIFORMITY CALCULATE METHOD

$$\left[1 - \frac{(\text{MAXIMUN} - \text{MINIMUN})}{\text{AVERAGE}} \right] \times 100\%$$

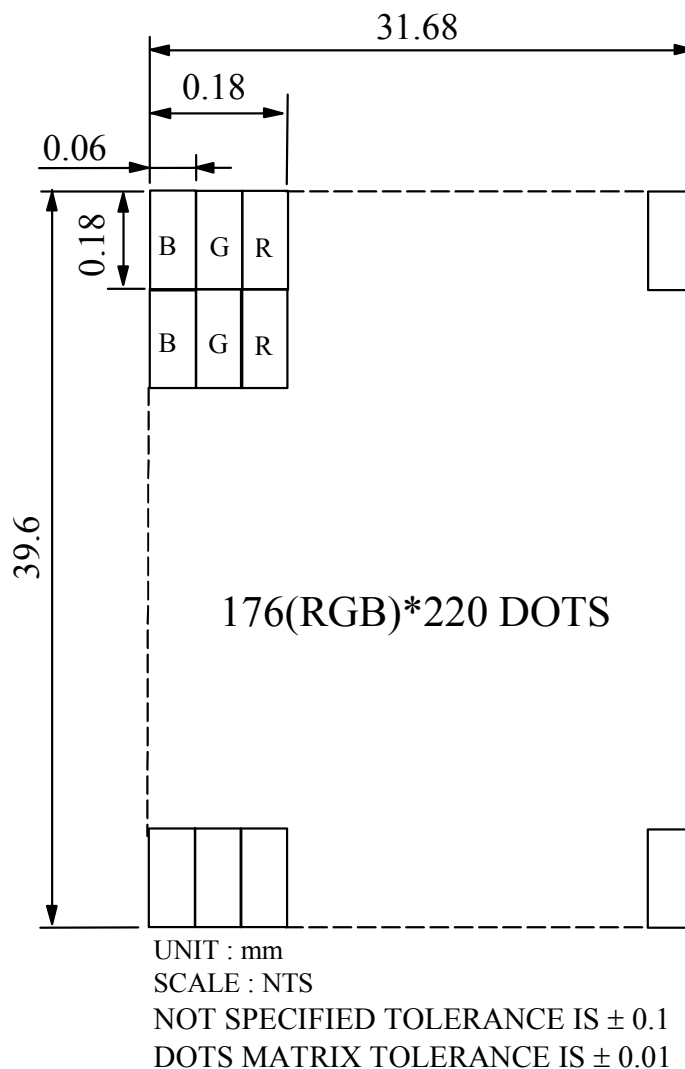
6. OUTLINE DIMENSIONS



7. BLOCK DIMENSION



8. DETAIL DRAWING OF DOT MATRIX

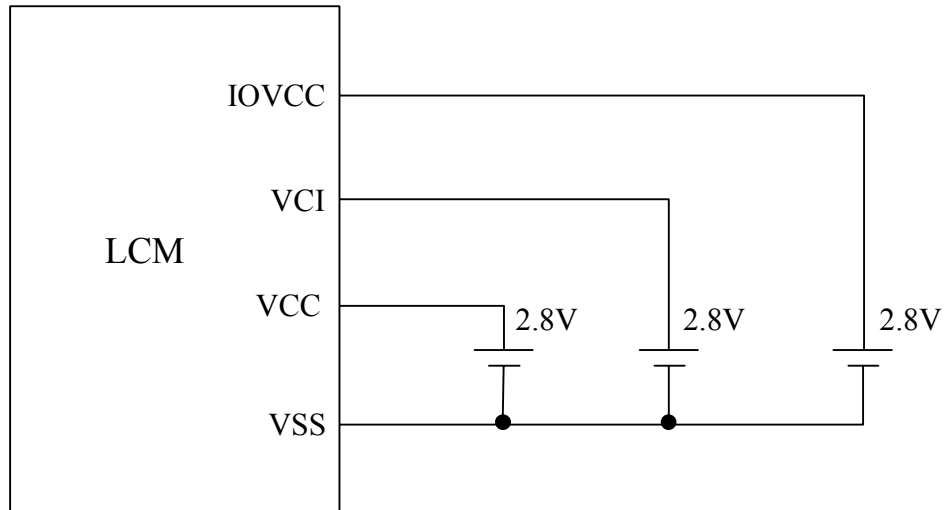


9. INTERFACE SIGNALS

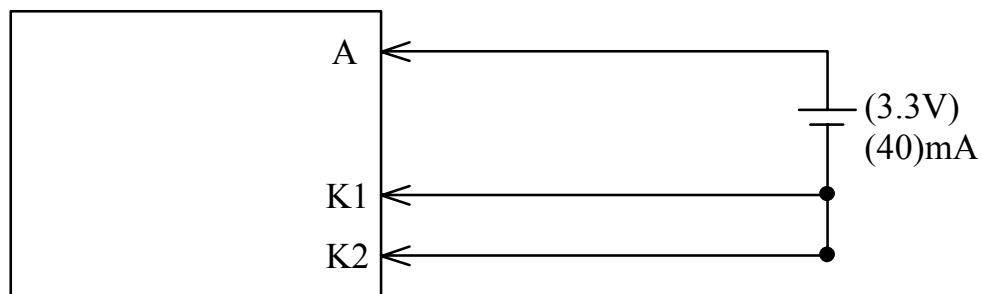
PIN NO	SYMBOL	FUNCTION
1	NC	NOT CONNECTED
2	nRESET	RESET
3	VSYNC	FRAME SYNCHRONIZING SIGNAL
4	HSYNC	LINC SYNCHRONIZING SIGNAL
5	DOTLCK	DOT CLOCK
6	ENABLE	DATA ENABLE
7	NC	NOT CONNECTED
8	R5	DATA BUS
9	R4	DATA BUS
10	R3	DATA BUS
11	R2	DATA BUS
12	R1	DATA BUS
13	R0	DATA BUS
14	G5	DATA BUS
15	G4	DATA BUS
16	G3	DATA BUS
17	G2	DATA BUS
18	G1	DATA BUS
19	G0	DATA BUS
20	B5	DATA BUS
21	B4	DATA BUS
22	B3	DATA BUS
23	B2	DATA BUS
24	B1	DATA BUS
25	B0	DATA BUS
26	NC	NOT CONNECTED
27	SDO	SERIAL INSTRUCTION DATA OUTPUT
28	SDI	SERIAL INSTRUCTION DATA INPUT
29	NC	NOT CONNECTED
30	SCL	SERIAL CLOCK
31	NC	NOT CONNECTED
32	nCS	CHIP SELECT SIGNAL
33	VCC	POWER SUPPLY FOR LOGIC
34	IOVCC	POWER SUPPLY FOR INTERFACE SIGNAL
35	VCI	POWER SUPPLY FOR ANALOG
36	GND	GROUND
37	VLED_A	LED BACKLIGHT POWER (A)
38	LED_K1	LED BACKLIGHT POWER (K1)
39	LED_K2	LED BACKLIGHT POWER (K2)

10. POWER SUPPLY

10.1 POWER SUPPLY FOR LCM



10.2 POWER SUPPLY FOR LCM BACKLIGHT



11. SPECIFICATION OF AUDACITY ASSURANCE

11.1 APPLICATION

THIS INSPECTION STANDARD IS TO BE APPLIED TO THE LCD MODULE DELIVERED FROM EMERGING DISPLAY TECHNOLOGIES CORP.(E.D.T) TO CUSTOMERS

11.2 INSPECTION CONDITIONS

11.2.1 ENVIRONMENTAL CONDITIONS

ROOM TEMPERATURE : $25^{\circ}\text{C} \pm 5^{\circ}\text{C}$

HUMIDITY : $50 \pm 10\% \text{ RH}$

11.2.2 DISPLAY-ON INSPECTION, VISUAL APPEARANCE INSPECTION ON SCREEN

THE DISTANCE BETWEEN THE MODULE AND THE INSPECTOR'S EYES SHALL BE AT LEAST 30cm UNDER ILLUMINATION OF ONE FLUORESCENT LAMP OF 20W.

11.2.3 INSPECTION LOT

QUANTITY PER DELIVERY LOT FOR EACH MODEL

11.2.4 INSPECTION METHOD

A SAMPLING INSPECTION SHALL BE MADE ACCORDING TO THE FOLLOWING PROVISIONS TO JUDGE THE ACCEPTABILITY

(a)APPLICABLE STANDARD : MIL-STD-105E

NORMAL INSPECTION, SINGLE SAMPLING
LEVEL II

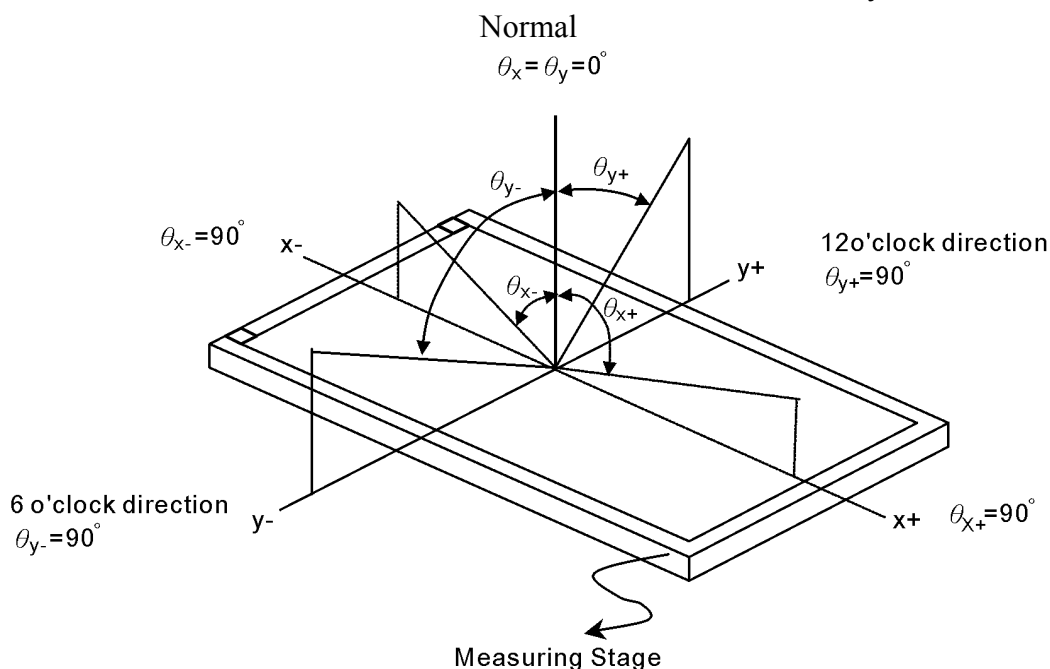
(b)AQL : MAJOR DEFECT : AQL 0.65

MINOR DEFECT : AQL 2.5

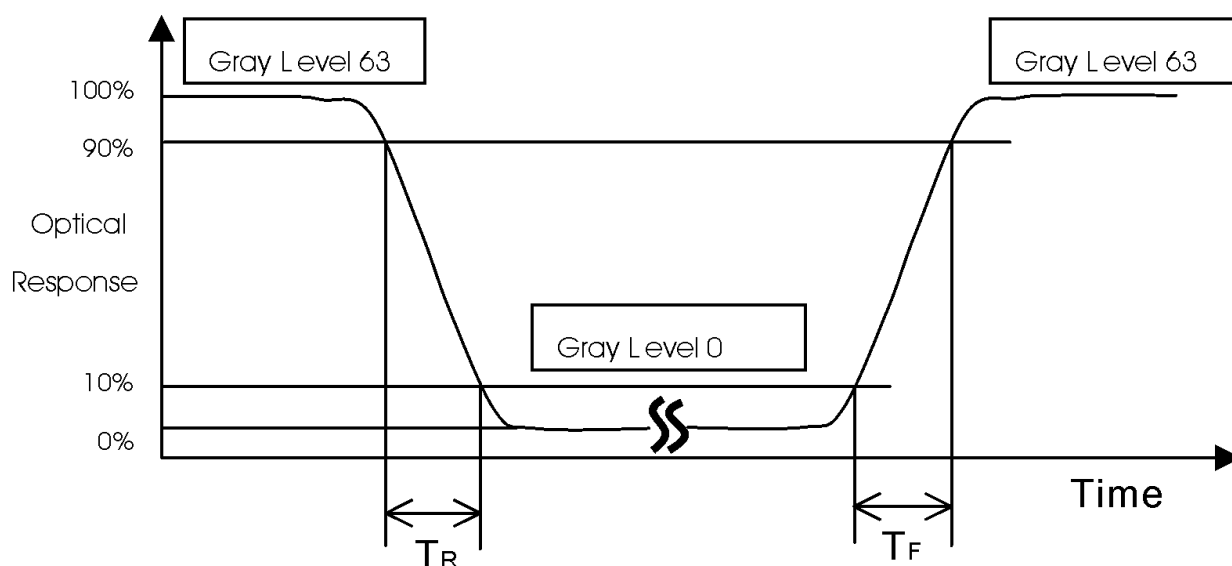
TOTAL DEFECTS : AQL 2.5

11.3 DEFINITION OF OPTICAL CHARACTERISTICS

11.3.1 THE DEFINITION OF VIEWING ANGLE θ_x AND θ_y



11.3.2 DEFINITION OF OPTICAL RESPONSE TIME (T_R, T_F)



NOTE : DEFINITION OF CONTRAST RATIO (CR):

THE CONTRAST RATIO CAN BE CALCULATED BY THE FOLLOWING EXPRESSION.

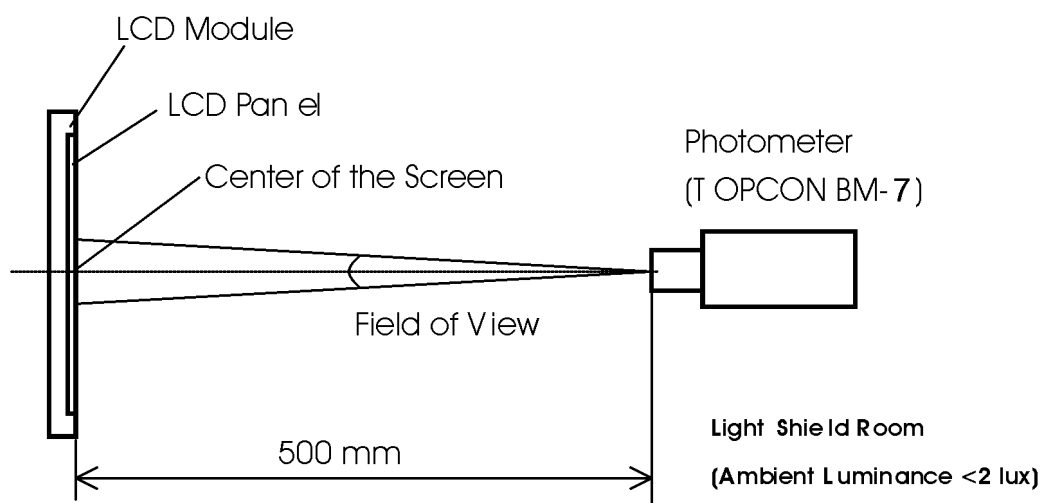
CONTRAST RATIO (CR) = L_{63} / L_0

L63: LUMINANCE OF GRAY LEVEL 63

L 0: LUMINANCE OF GRAY LEVEL 0

CR = CR (10)

11.4 OUTLINE OF OPTICAL MEASURING SYSTEM



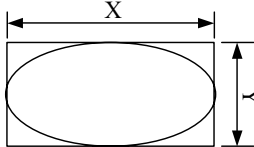
11.5 INSPECTION STANDARDS

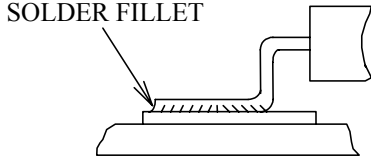
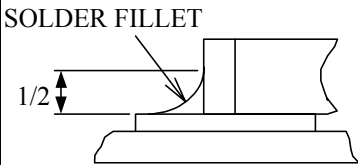
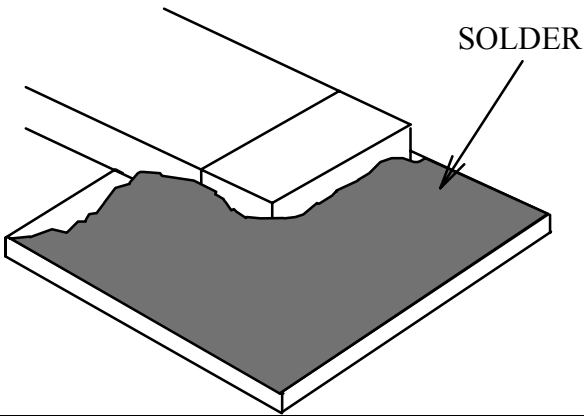
11.5.1 VISUAL DEFECTS CLASSIFICATION

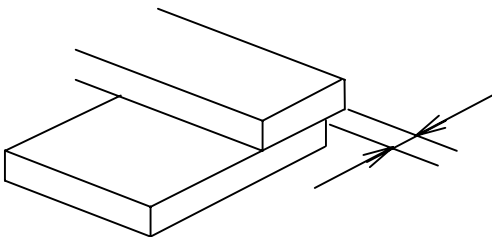
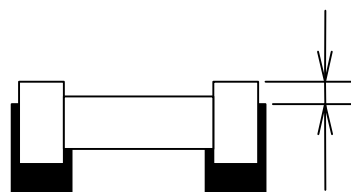
TYPE OF DEFECT	INSPECTION ITEM	DEFECT FEATURE	AQL
MAJOR DEFECT	1.DISPLAY ON	• DEFECT TO MISS SPECIFIED DISPLAY FUNCTION , FOR ALL AND SPECIFIED DOTS - EX : DISCONNECTION , SHORT CIRCUIT ETC	0.65
	2.BACKLIGHT	• NO LIGHT • FLICKERING AND OTHER ABNORMAL ILLUMINATION	
	3.DIMENSIONS	• SUBJECT TO INDIVIDUAL ACCEPTANCE SPECIFICATIONS	
MINOR DEFECT	1.DISPLAY ZONE	• BLACK/WHITE SPOT • BUBBLES ON POLARIZER • BLACK/WHITE LINE • SCRATCH • CONTAMINATION • LEVER COLOR SPREED	2.5
	2.BEZEL ZONE	• STAINS • SCRATCHES • FOREIGN MATTER	
	3.PCB	• CRACKS • SCRATCHES • STAINS	
	4.SOLDERING	• INSUFFICIENT SOLDER • SOLDERED IN INCORRECT POSITION • CONVEX SOLDERING SPOT • SOLDER BALLS • SOLDER SCRAPS	
	5.DISPLAY ON (ALL ON)	• LIGHT LINE	

11.5.2 INSPECTION CRITERION

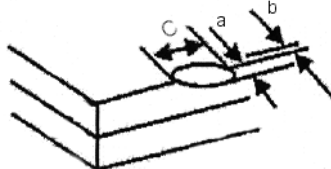
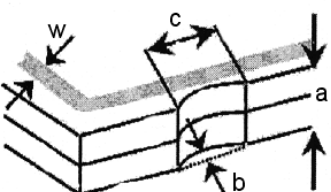
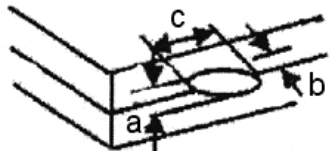
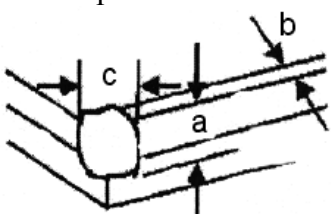
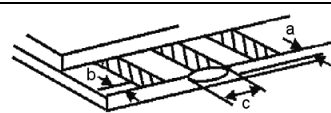
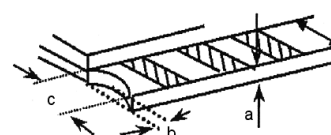
NO.	ITEM	CRITERIA													
1.	DISPLAY ON INSPECTION	(1)INCORRECT PATTERN (2)MISSING SEGMENT (3)DIM SEGMENT (4)OPERATING VOLTAGE BEYOND SPEC													
2.	OVERALL DIMENSIONS	(1)OVERALL DIMENSION BEYOND SPEC													
3.	BLACK SPOT I WHITE SPOT I ON-DISPLAY	(1)INSPECTION PATTERN : FULL WHITE,FULL BLACK,RED,GREEN AND BLUE SCREENS. (2) <table border="1"> <tr> <td rowspan="6">DOT DEFECT</td><td>BRIGHT DOT</td><td>$N \leq 3$</td></tr> <tr> <td>DARK DOT</td><td>$N \leq 3$</td></tr> <tr> <td>TOTAL DOT</td><td>$N \leq 3$</td></tr> <tr> <td>MINIMUM DISTANCE BETWEEN BRIGHT DOTS</td><td>$L \geq 5\text{mm}$</td></tr> <tr> <td>MINIMUM DISTANCE BETWEEN BRIGHT DOTS AND DARK DOTS</td><td>$L \geq 5\text{mm}$</td></tr> <tr> <td>MINIMUM DISTANCE BETWEEN DARK DOTS</td><td>$L \geq 5\text{mm}$</td></tr> </table> NOTE : THE DEFINITION OF DOT DEFECT:THE DOT DEFECT WAS JUDGED AFTER REPAIR AND THE SIZE OF A DEFECTIVE DOT OVER 1/2 OF WHOLE DOT IS REGARDED AS ONE DEFECTIVE DOT.	DOT DEFECT	BRIGHT DOT	$N \leq 3$	DARK DOT	$N \leq 3$	TOTAL DOT	$N \leq 3$	MINIMUM DISTANCE BETWEEN BRIGHT DOTS	$L \geq 5\text{mm}$	MINIMUM DISTANCE BETWEEN BRIGHT DOTS AND DARK DOTS	$L \geq 5\text{mm}$	MINIMUM DISTANCE BETWEEN DARK DOTS	$L \geq 5\text{mm}$
DOT DEFECT	BRIGHT DOT	$N \leq 3$													
	DARK DOT	$N \leq 3$													
	TOTAL DOT	$N \leq 3$													
	MINIMUM DISTANCE BETWEEN BRIGHT DOTS	$L \geq 5\text{mm}$													
	MINIMUM DISTANCE BETWEEN BRIGHT DOTS AND DARK DOTS	$L \geq 5\text{mm}$													
	MINIMUM DISTANCE BETWEEN DARK DOTS	$L \geq 5\text{mm}$													
4.	BLACK LINE WHITE LINE ON-DISPLAY	(1)THE FOLLOWING BLACK LINE , WHITE LINE ARE WITHIN THE VIEWING AREA . WIDTH : Wmm , LENGH : Lmm <table border="1"> <tr> <th>LENGTH : L</th><th>WIDTH : W</th><th>PERMISSIBLE NO.</th></tr> <tr> <td>$L \leq 0.5$</td><td>$W \leq 0.1$</td><td>IGNORE</td></tr> <tr> <td>$0.5 < L \leq 3$</td><td>$0.1 < W \leq 0.5$</td><td>3</td></tr> <tr> <td>$3 < L$</td><td>$0.5 \leq W$</td><td>NONE</td></tr> </table>	LENGTH : L	WIDTH : W	PERMISSIBLE NO.	$L \leq 0.5$	$W \leq 0.1$	IGNORE	$0.5 < L \leq 3$	$0.1 < W \leq 0.5$	3	$3 < L$	$0.5 \leq W$	NONE	
LENGTH : L	WIDTH : W	PERMISSIBLE NO.													
$L \leq 0.5$	$W \leq 0.1$	IGNORE													
$0.5 < L \leq 3$	$0.1 < W \leq 0.5$	3													
$3 < L$	$0.5 \leq W$	NONE													

NO.	ITEM	CRITERIA																									
5.	BUBBLES OF POLARIZER /SURFACE STAINS /DIRT/CF FAIL /SPOT	<table><tr><td rowspan="5">BUBBLE ON THE POLARIZER</td><td rowspan="2">LINE SHAPE L:LENGTH(mm)</td><td>$L \leq 0.5, W \leq 0.1$</td><td>LGNORE</td></tr><tr><td>$0.5 < L \leq 3$ $0.1 < W \leq 0.5$</td><td>$N \leq 2$</td></tr><tr><td rowspan="3">DOT SHAPE D:AVERAGE DIAMETER(mm)</td><td>$D \leq 0.25$</td><td>LGNORE</td></tr><tr><td>$0.25 < D \leq 0.5$</td><td>$N \leq 5$</td></tr><tr><td>$0.5 < D$</td><td>NOTE</td></tr><tr><td colspan="2" rowspan="2">SURFACE STATUS</td><td>$D < 0.1 \text{ mm}$</td><td>IGNORE</td></tr><tr><td>$0.1 < D \leq 0.3\text{mm}$</td><td>$N \leq 3$</td></tr><tr><td colspan="2" rowspan="2">CF FAIL / SPOT</td><td>$D < 0.1 \text{ mm}$</td><td>IGNORE</td></tr><tr><td>$0.1 < D \leq 0.3\text{mm}$</td><td>$N \leq 3$</td></tr></table> NOTE : (1)POLARIZER BUBBLE IS DEFINED AS THE BUBBLE APPEARS ON ACTIVE DISPLAY AREA. THE DEFECT OF POLARIZER BUBBLE SHALL BE IGNORED IF THE POLARIZER BUBBLE APPEARS ON THE OUTSIDE OF ACTIVE DISPLAY AREA. (2)THE EXTRANEIOUS SUBSTANCE IS DEFINED AS IT CAN BE OBSERVED WHEN THE MODULE IS POWER ON. (3)THE DEFINITION OF AVERAGE DIAMETER ,D IS DEFINED AS FOLLOWING. AVERAGE DIAMETER(D)=(X+Y)/2 , WHERE 	BUBBLE ON THE POLARIZER	LINE SHAPE L:LENGTH(mm)	$L \leq 0.5, W \leq 0.1$	LGNORE	$0.5 < L \leq 3$ $0.1 < W \leq 0.5$	$N \leq 2$	DOT SHAPE D:AVERAGE DIAMETER(mm)	$D \leq 0.25$	LGNORE	$0.25 < D \leq 0.5$	$N \leq 5$	$0.5 < D$	NOTE	SURFACE STATUS		$D < 0.1 \text{ mm}$	IGNORE	$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$	CF FAIL / SPOT		$D < 0.1 \text{ mm}$	IGNORE	$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$
BUBBLE ON THE POLARIZER	LINE SHAPE L:LENGTH(mm)	$L \leq 0.5, W \leq 0.1$			LGNORE																						
		$0.5 < L \leq 3$ $0.1 < W \leq 0.5$		$N \leq 2$																							
	DOT SHAPE D:AVERAGE DIAMETER(mm)	$D \leq 0.25$		LGNORE																							
		$0.25 < D \leq 0.5$		$N \leq 5$																							
		$0.5 < D$	NOTE																								
SURFACE STATUS		$D < 0.1 \text{ mm}$	IGNORE																								
		$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$																								
CF FAIL / SPOT		$D < 0.1 \text{ mm}$	IGNORE																								
		$0.1 < D \leq 0.3\text{mm}$	$N \leq 3$																								
6.	SCRATCHES AND DENT ON GLASS POLARIZER	(1) PLS REFER TO THE ABOVE NO.3 AND 4 TO DETERMINE SCRATCHES AND DENT ON POLARIZER OR GLASS																									
7.	UNEVEN COLOR SPREAD , COLORATION	(1)TO BE DETERMINED BASED UPON THE STANDARD SAMPLE .																									
8.	BEZEL APPEARANCE	(1)BEZEL MAY NOT HAVE RUST ,BE DEFORMED OR HAVE FINGER PRINTS STAINS OF OTHER CONTAMINATION . (2)BEZEL MUST COMPLY WITH JOB SPECIFICATIONS .																									

NO.	ITEM	CRITERIA
9.	SOLDERING	(1)NO SOLDERING FOUND ON THE SPECIFIED PLACE (2)INSUFFICIENT SOLDER (a)LSI , IC A POOR WETTING OF SOLDER IS BETWEEN LOWER BEND OR “HEEL” OF LEAD AND PAD  (b)CHIP COMPONENT · SOLDER IS LESS THAN 50% OF SIDES AND FRONT FACE WETTING  • SOLDER WETS 3 SIDES OF TERMINAL , BUT LESS THAN 25% OF SIDES AND FRONT SURFACE AREA ARE COVERED 

NO.	ITEM	CRITERIA
9.	SOLDERING	(3)PARTS ALIGMENT (a)LSI , IC LEAD WIDTH IS MORE THAN 50% BEYOND PAD OUTLINE  (b)CHIP COMPONENT COMPONENT IS OFF CENTER , AND MORE THAN 50% OF THE LEADS IS OFF THE PAD OUTLINE  (4)NO UNMELTED SOLDER PASTE MAY BE PRESENT ON THE PCB. (5)NO COLD SOLDER JOINTS , MISSING SOLDER CONNECTIONS, OXIDATION OR ICICLE. (6)NO RESIDUE OR SOLDER BALLS ON PCB. (7)NO SHORT CIRCUITS IN COMPONENTS ON PCB.
10.	BACKLIGHT	(1)NO LIGHT (2)FLICKERING AND OTHER ABNORMAL ILLUMINATION (3)SPOTS OR SCRATCHES THAT APPEAR WHEN LIT MUST BE JUDGED USING LCD SPOT , LINES AND CONTAMINATION STANDARDS. (4)BACKLIGHT DOESN'T LIGHT OR COLOR IS WRONG.

NO.	ITEM	CRITERIA
11.	PCB , COB	(1)COB SEAL MAY NOT HAVE PINHOLES LARGER THAN 0.2mm OR CONTAMINATION. (2)COB SEAL SURFACE MAY NOT HAVE PINHOLES THROUGH TO THE IC. (3)THE HEIGHT OF THE COB SHOULD NOT EXCEED THE HEIGHT INDICATED IN THE ASSEMBLY DIAGRAM. (4)THERE MAY NOT BE MORE THAN 2mm OF SEALANT OUTSIDE THE SEAL AREA ON THE PCB,AND THERE SHOULD BE NO MORE THAN THREE PLACES. (5)NO OXIDATION OR CONTAMINATION PCB TERMINALS (6)PARTS ON PCB MUST BE THE SAME AS ON THE PRODUCTION CHARACTERISTIC CHART. THERE SHOULD BE NO WRONG PARTS , MISSING PARTS OR EXCESS PARTS . (7)THE JUMPER ON THE PCB SHOULD CONFORM TO THE PRODUCT CHARACTERISTIC CHART. (8)IF SOLDER GETS ON BEZEL TAB PADS,LED PAD, ZEBRA PAD OR SCREW HOLD PAD,MAKE SURE IT IS SMOOTHED DOWN .
12.	GENERAL APPEARANCE	(1)NO OXIDATION,CONTAMINATION,CURVES OR,BENDS ON INTERFACE PIN (OLB) OF TCP. (2)NO CRACKS ON INTERFACE PIN (OLB) OF TCP. (3)NO CONTAMINATION, SOLDER RESIDUE OR SOLDER BALLS ON PRODUCT. (4)THE IC ON THE TCP MAY NOT BE DAMAGED, CIRCUITS. (5)THE UPPERMOST EDGE OF THE PROTECTIVE STRIP ON THE INTERFACE PIN MUST BE PRESENT OR LOOK AS IF IT CAUSE THE INTERFACE PIN TO SEVER. (6)THE RESIDUAL ROSIN OR TIN OIL OF SOLDERING (COMPONENT OR CHIP COMPONENT) IS NOT BURNED INTO BROWN OR BLACK COLOR. (7)SEALANT ON TOP OF THE ITO CIRCUIT HAS NOT HARDENED. (8)PIN TYPE MUST MATCH TYPE IN SPECIFICATION SHEET. (9)LCD PIN LOOSE OR MISSING PINS. (10)PRODUCT PACKAGING MUST THE SAME AS SPECIFIED ON PACKAGING SPECIFICATION SHEET. (11)PRODUCT DIMENSION AND STRUCTURE MUST CONFORM TO PRODUCT SPECIFICATION SHEET. (12)THE APPEARANCE OF HEAT SEAL SHOULD NOT ADMIT ANY DIRT AND BREAK.

NO.	ITEM	CRITERIA											
13.	CRACKED GLASS	THE LCD WITH EXTENSIVE CRACK IS NOT ACCEPTABLE											
		General glass chip :											
			<table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t/2$</td><td>< VIEWING AREA</td><td>$\leq 1/8X$</td></tr><tr><td>$t/2 > , \leq 2t$</td><td>$\leq W/3$</td><td>$\leq 1/8X$</td></tr></table>	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$t/2 > , \leq 2t$	$\leq W/3$	$\leq 1/8X$	
		a	b	c									
		$\leq t/2$	< VIEWING AREA	$\leq 1/8X$									
		$t/2 > , \leq 2t$	$\leq W/3$	$\leq 1/8X$									
		*W=EFFECTIVE SEAL WIDTH X = LCD SIDE LENGTH t = GLASS THICKNESS											
													
													
		Corner part :											
	<table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t/2$</td><td>< VIEWING AREA</td><td>$\leq 1/8X$</td></tr><tr><td>$> t/2 , \leq 2t$</td><td>$\leq W/3$</td><td>$\leq 1/8X$</td></tr></table>	a	b	c	$\leq t/2$	< VIEWING AREA	$\leq 1/8X$	$> t/2 , \leq 2t$	$\leq W/3$	$\leq 1/8X$			
a	b	c											
$\leq t/2$	< VIEWING AREA	$\leq 1/8X$											
$> t/2 , \leq 2t$	$\leq W/3$	$\leq 1/8X$											
*W=EFFECTIVE SEAL WIDTH X=LCD SIDE LENGTH Y=GLASS THICKNESS													
CHIP ON ELECTRODE PAD													
	<table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t$</td><td>$\leq 0.5\text{mm}$</td><td>$\leq 1/8X$</td></tr></table>	a	b	c	$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$						
a	b	c											
$\leq t$	$\leq 0.5\text{mm}$	$\leq 1/8X$											
* X=LCD SIDE WIDTH t=GLASS THICKNESS													
	<table><tr><th>a</th><th>b</th><th>c</th></tr><tr><td>$\leq t$</td><td>$\leq 1/8X$</td><td>$\leq L$</td></tr></table>	a	b	c	$\leq t$	$\leq 1/8X$	$\leq L$						
a	b	c											
$\leq t$	$\leq 1/8X$	$\leq L$											
*X=LCD SIDE WIDTH t = GLASS THICKNESS L=ELECTRODE PAD LENGTH ①IF GLASS CHIPPING THE ITO TERMINAL , OVER 2/3 OF THE ITO MUST REMAIN AND BE , INSPECTED ACCORDING TO ELECTRODE TERMINAL SPECIFICATIONS ②IF THE PRODUCT WILL BE HEAT SEALED BY THE CUSTOMER , THE ALIGNMENT MARK MUST NOT BE DAMAGED													

11.6 RELIABILITY TEST

11.6.1 STANDARD SPECIFICATIONS FOR RELIABILITY OF LCD MODULE

NO	ITEM	DESCRIPTION
1	HIGH TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +70°C FOR 240 hrs
2	LOW TEMPERATURE OPERATION	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -20°C FOR 240 hrs
3	HIGH TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT +80°C FOR 240 hrs
4	LOW TEMPERATURE STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT -30°C FOR 240 hrs
5	HIGH TEMPERATURE / HUMIDITY TEST	THE SAMPLE SHOULD BE ALLOWED TO STAND AT 40°C, 90% RH 240 hrs
6	HIGH TEMPERATURE / HIGH HUMIDITY STORAGE	THE SAMPLE SHOULD BE ALLOWED TO STAND AT 40°C, 90% RH 240 hrs
7	THERMAL SHOCK (NOT OPERATED)	THE SAMPLE SHOULD BE ALLOWED TO STAND THE FOLLOWING 10 CYCLES OF OPERATION : -30°C FOR 30 MINUTES +80°C FOR 30 MINUTES
8	ESD (ELECTROSTATIC DISCHARGE)	AIR DISCHARGE $\pm 4KV$ CONTACT DISCHARGE $\pm 2KV$
9	DROP TEST (1 BOX)	6 FACES, 2 CORNERS HEIGHT : 750mm

11.6.2 TESTING CONDITIONS AND INSPECTION CRITERIA

FOR THE FINAL TEST THE TESTING SAMPLE MUST BE STORED AT ROOM TEMPERATURE FOR 24 HOURS, AFTER THE TESTS LISTED IN TABLE 6.2 , STANDARD SPECIFICATIONS FOR RELIABILITY HAVE BEEN EXECUTED IN ORDER TO ENSURE STABILITY .

NO	ITEM	TEST MODEL	INSPECTION CRITERIA
1	CURRENT CONSUMPTION	REFER TO SPECIFICATION	THE CURRENT CONSUMPTION SHOULD CONFORM TO THE PRODUCT SPECIFICATION.
2	CONTRAST	REFER TO SPECIFICATION	AFTER THE TESTS HAVE BEEN EXECUTED , THE CONTRAST MUST BE LARGER THAN HALF OF ITS INITIAL VALUE PRIOR TO THE TESTS.
3	APPEARANCE	VISUAL INSPECTION	DEFECT FREE

11.6.3 LIFE TIME

LIFE TIME	FUNCTIONS , PERFORMANCE , APPEARANCE , ETC . SHALL BE FREE FROM REMARKABLE DETERIORATION WITHIN 50,000 HOURS UNDER ORDINARY OPERATING AND STORAGE CONDITIONS ROOM TEMPERATURE (25±10°C) , NORMAL HUMIDITY (45±20% RH) , AND IN AREA NOT EXPOSED TO DIRECT SUN LIGHT. (LIFE TIME OF BACKLIGHT , PLEASE REFER TO DATA ABOUT BACKLIGHT .)
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NOTE : FROM OUR EXPERIENCE THE LIFE TIME OF HIGH HUMIDITY OPERATION AND HIGH TEMPERATURE OPERATION AS ABOVE MENTIONED COULD BE ACHIEVED.

11.7 OPERATION

- 11.7.1 Do not connect or disconnect modules to or from the main system while power is being supplied .
- 11.7.2 Use the module within specified temperature ; lower temperature causes the retardation of blinking speed of the display ; higher temperature makes overall display discolor . When the temperature returns to normality , the display will operate normally .
- 11.7.3 Adjust the LC driving voltage to obtain the optimum contrast .
- 11.7.4 Power On Sequence input signals should not be supplied to LCD module before power supply voltage is applied and reaches the specified value (5 $\pm 0.25v$) .
If above sequence is not followed , CMOS LSIs of LCD modules may be damaged due to latch - up problem .

11.8 NOTICE

- 11.8.1 Use a grounded soldering iron when soldering connector I/O terminals . For soldering or repairing , take precaution against the temperature of the soldering iron and the soldering time to prevent peeling off the through-hole-pad .
- 11.8.2 Do not disassemble . EDT shall not be held responsible if the module is disassembled and upon the reassembly the module failed .
- 11.8.3 Do not charge static electricity , as the circuit of this module contains CMOS LSIs. A workman's body should always be static-protected by use of an ESD STRAP . Working clothes for such personnel should be of static-protected material .
- 11.8.4 Always ground the electrically-powered driver before using it to install the LCD module . While cleaning the work station by vacuum cleaner , do not bring the sucking mouth near the module ; static electricity of the electrically-powered driver or the vacuum cleaner may destroy the module .
- 11.8.5 Don't give external shock.
- 11.8.6 Don't apply excessive force on the surface.
- 11.8.7 Liquid in LCD is hazardous substance .Must not lick and swallow.
When the liquid is attach to your,skin,cloth etc.wash it out thoroughly and immediately.
- 11.8.8 Don't operate it above the absolute maximum rating.
- 11.8.9 Storage in a clean environment , free from dust,active gas,and solvent.
- 11.8.10 Store without any physical load.
- 11.8.11 Rewiring : no more than 3 times .