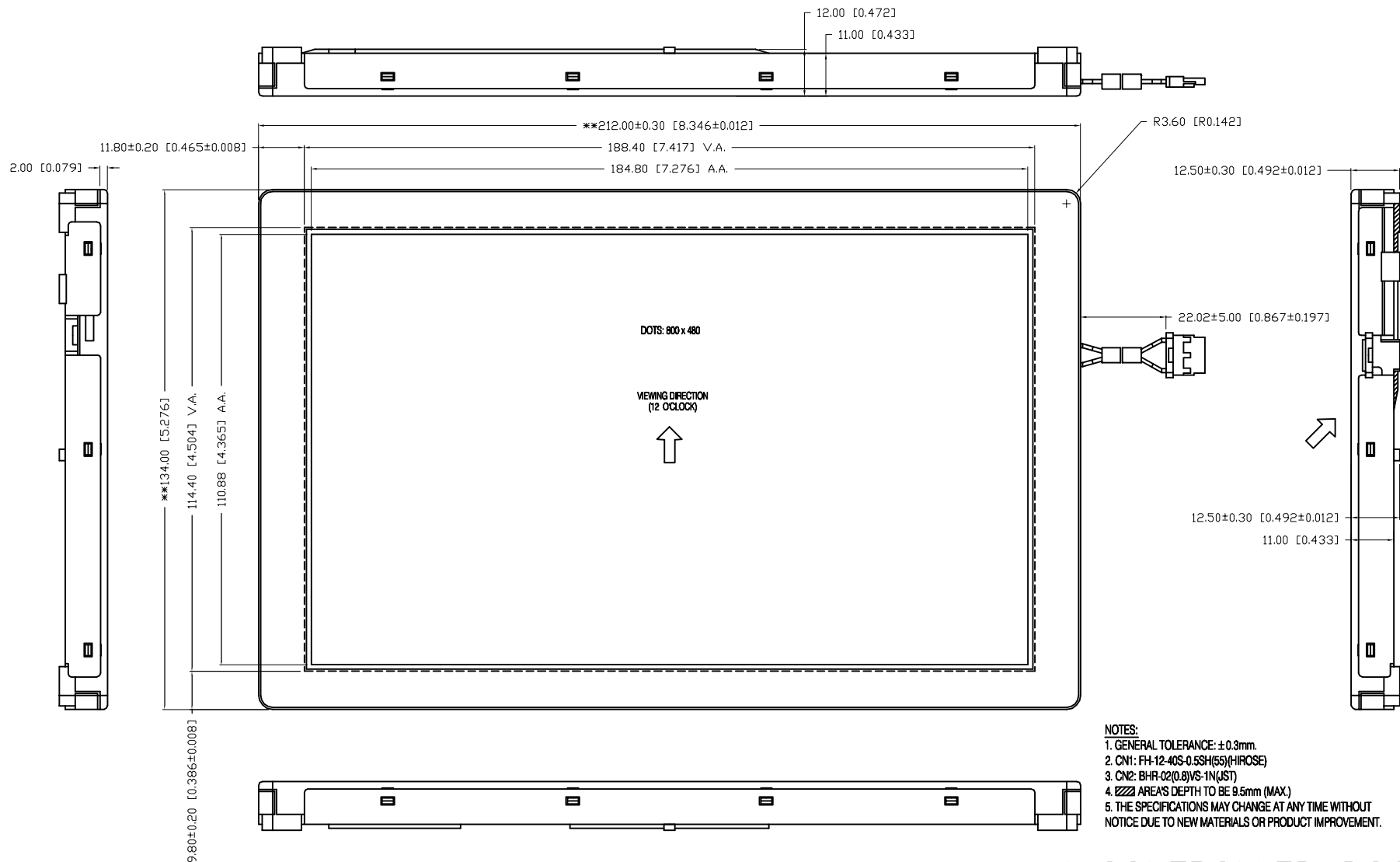




NOTES:

1. GENERAL TOLERANCE: ± 0.3 mm.
2. CN1: FH-12-40S-0.5SH(55)(HIROSE)
3. CN2: BHR-02(0.8)VS-1N(JST)
4. AREAS DEPTH TO BE 9.5mm (MAX.)
5. THE SPECIFICATIONS MAY CHANGE AT ANY TIME WITHOUT NOTICE DUE TO NEW MATERIALS OR PRODUCT IMPROVEMENT.



*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: X= ± 1 (± 0.039), X.X= ± 0.5 (± 0.020), X.XX= ± 0.25 (± 0.010), X.XXX= ± 0.127 (± 0.005). LEAD SIZE= ± 0.05 (± 0.002), LEAD LENGTH= ± 0.75 (± 0.030). MIN.= +DECIMAL PRECISION MAX.= +0.00 -DECIMAL PRECISION

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8.5" ACTIVE MATRIX FULL COLOR TFT PANEL
12:00 VIEW, CCFL BACKLIGHT,
0°C TO +75°C OPERATING TEMP.

RELIABILITY NOTE

OUR MANY YEARS OF EXPERIENCE DATA ACCUMULATION INDICATE THAT SOLDER HEAT IS A MAJOR CAUSE OF EARLY AND FUTURE FAILURE. PLEASE PAY ATTENTION TO YOUR SOLDERING PROCESS.

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JN

CHECKED BY:

APPROVED BY:

DATE: 05.07.09

PAGE: 1 OF 12

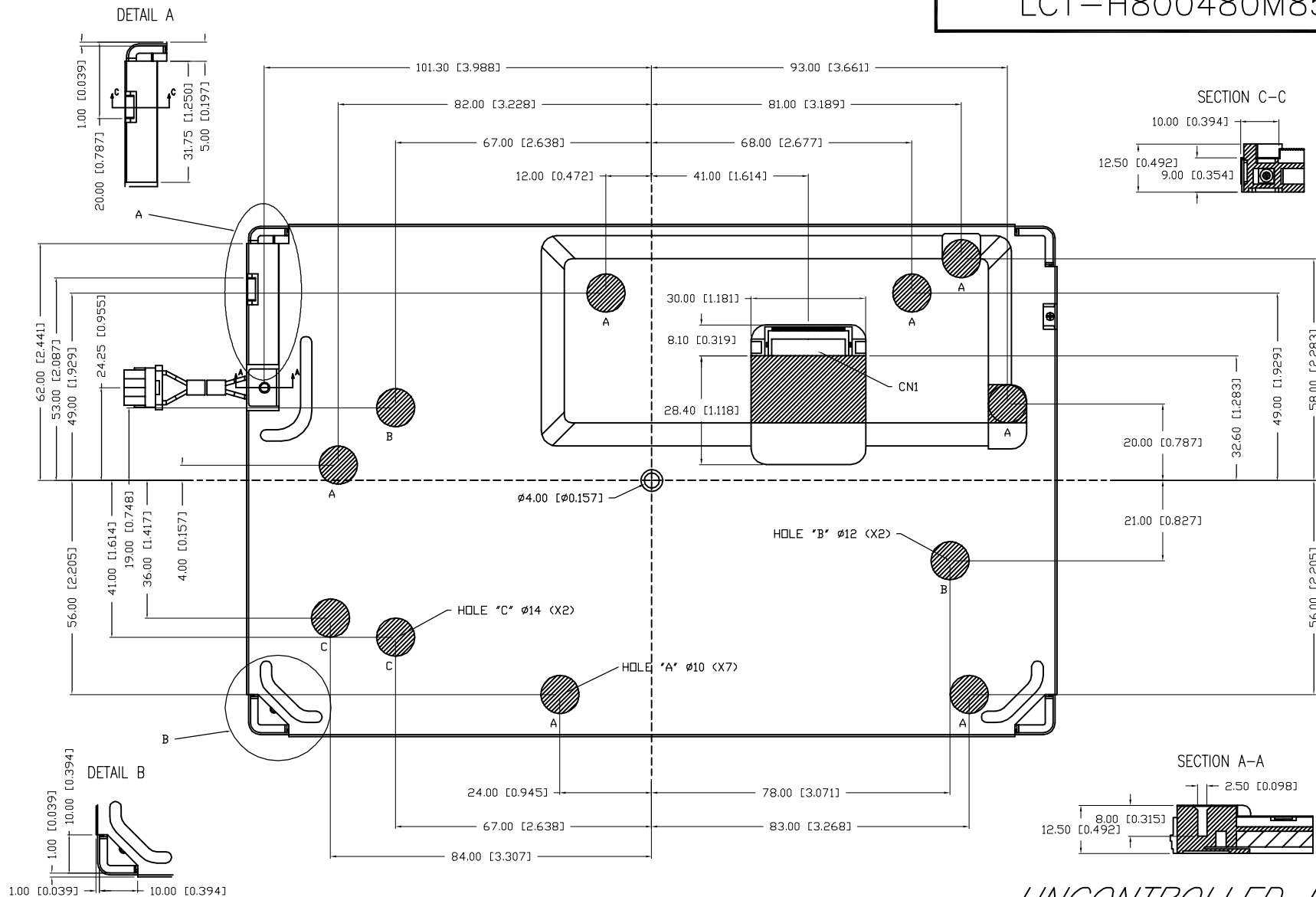
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ITEM	CONTENTS	UNIT
DISPLAY TECHNOLOGY	8.5" (DIAGONAL) TFT-COLOR TRANSMISSIVE LCD	-
MODULE OUTER DIMENSION	212.0(H) x 134.0 (V) x 12.5(D)	mm
PIXEL PITCH	0.231(H) x 0.231 (V)	mm
EFFECTIVE DISPLAY AREA	184.8(H) x 110.88 (V)	mm
NUMBER OF DOTS	800RGBx480	DOTS
VIEWING DIRECTION	12	CLOCK
PIXEL ARRANGEMENT	RGB STRIPE	-
BACKLIGHT	CCFL BACK-LIGHT/WHITE	-
PIXEL DRIVING ELEMENT	a-Si TFT	-
MPU INTERFACE	TTL	-
NUMBER OF COLORS	262K	-
OPERATING TEMPERATURE	0~75	°C
STORAGE TEMPERATURE	-25~75	°C
WEIGHT	380 (TYPICAL)	g

BACKLIGHT SPECIFICATIONS

ITEM	SYMBOL	CONDITIONS	STANDARD VALUE		UNIT	NOTES
			MIN	MAX.		
LAMP VOLTAGE	VL	-	2.5K	-	VRMS	(1),(2), IL=5.0mA
LAMP CURRENT	IL	-	2.0	7.0	mARMS	(1),(2)
LAMP FREQUENCY	FL	-	40	80	KHz	(1),(2)

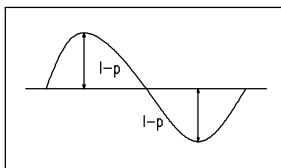
NOTE (1): PERMANENT DAMAGE MIGHT OCCUR IF THE MODULE IS OPERATED AT CONDITIONS EXCEEDING THE MAXIMUM VALUES.

NOTE (2): SPECIFIED VALUES ARE FOR LAMP (REFER TO CCFL BACKLIGHT ELECTRICAL-OPTICAL CHARACTERISTICS)

THE OUTPUT OF THE INVERTER MUST HAVE SYMMETRICAL (NEGATIVE AND POSITIVE) VOLTAGE NOT USE THE INVERTER WHICH HAS UNSYMETRICAL VOLTAGE AND UNSYMETRICAL CURRENT AND SPIKE WAVE. LAMP FREQUENCY MAY PRODUCE INTERFACE WITH HORIZONTAL SYNCHRONOUS FREQUENCY AND AS A RESULT THIS MAY CAUSE BEAT ON THE DISPLAY. THEREFORE LAMP FREQUENCY SHALL BE AS FAR POSSIBLE FROM THE HORIZONTAL SYNCHRONOUS FREQUENCY AND FROM ITS HARMONICS IN ORDER TO PREVENT INTERFERENCE.

REQUIREMENTS FOR A SYSTEM INVERTER DESIGN, WHICH IS INTENDED TO HAVE A BETTER DISPLAY PERFORMANCE, A BETTER POWER EFFICIENCY AND MORE RELIABLE LAMP. IT SHALL HELP INCREASE THE LAMP LIFETIME AND REDUCE ITS LEAKAGE CURRENT.

- THE ASYMMETRY RATE OF THE INVERTER WAVEFORM SHOULD BE 10% BELOW;
- THE DISTORTION RATE OF THE WAVEFORM SHOULD BE WITHIN $2\pm 10\%$;
- THE IDEAL SINE WAVE FORM SHALL BE SYMMETRIC IN POSITIVE AND NEGATIVE POLARITIES.



* ASYMMETRY RATE:
 $I_p - (-I_p) / I_{rms} \times 100\%$

* DISTORTION RATE:
 $I_p \text{ (OR } -I_p) / I_{rms}$

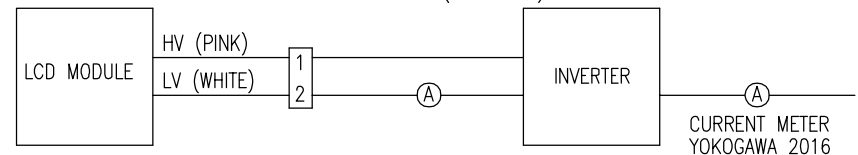


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BACKLIGHT SPECIFICATIONS

ITEM	SYMBOL	STANDARD VALUE			UNIT	NOTE
		MIN	TYP.	MAX		
LAMP INPUT VOLTAGE	VL	-	1030	-	VRMS	IL=5.0mA
LAMP CURRENT	IL	1.26	5.0	6.0	mARMS	(1)
LAMP TURN ON VOLTAGE	Vs(25°C)	-	-	1660	VRMS	(2)
	Vs(0°C)	-	-	2325	VRMS	(2)
OPERATING FREQUENCY	FL	35	55	80	KHz	(3)
LAMP LIFE TIME	LLB	25,000	-	-	Hrs	(5) IL=5.0mA
POWER CONSUMPTION	PL	-	5.15	-	W	(4) IL=5.0mA

NOTE (1): LAMP CURRENT IS MEASURED BY UTILIZING HIGH-FREQUENCY CURRENT METERS AFTER TURNING ON 30 MINUTES AS SHOWN BELOW ($T_a=25\pm 2^\circ\text{C}$):



NOTE (2): THE VOLTAGE SHOWN ABOVE SHOULD BE APPLIED TO THE LAMP FOR MORE THAN 1 SECOND AFTER STARTUP. OTHERWISE, THE LAMP MAY NOT BE TURNED ON NORMALLY.

NOTE (3): THE LAMP FREQUENCY MAY PRODUCE INTERFERENCE WITH HORIZONTAL SYNCHRONIZATION FREQUENCY FROM THE DISPLAY, WHICH MIGHT CAUSE LINE FLOW ON THE DISPLAY. IN ORDER TO AVOID INTERFERENCE, THE LAMP FREQUENCY SHOULD BE DETACHED FROM THE HORIZONTAL SYNCHRONIZATION FREQUENCY AND ITS HARMONICS AS FAR AS POSSIBLE.

NOTE (4): $PL=IL \times VL$

NOTE (5): THE LIFE TIME OF LAMP CAN BE DEFINED AS THE TIME IN WHICH IT CONTINUES TO OPERATE UNDER THE CONDITION $T_a=25\pm 2^\circ\text{C}$ AND $IL=5.0\text{mA}$ RMS UNTIL ONE OF THE FOLLOWING EVENTS OCCURS:

- WHEN BRIGHTNESS BECOMES OR LOWER THAN 50% OF ITS ORIGINAL VALUE.
- WHEN THE EFFECTIVE IGNITION LENGTH BECOMES OR LOWER THAN 80% OF ITS ORIGINAL VALUE. (EFFECTIVE IGNITION LENGTH IS DEFINED AS AN AREA THAT HAS LESS THAN 70% BRIGHTNESS COMPARED TO THE BRIGHTNESS IN THE CENTER POINT.)

NOTE (6) THE WAVEFORM OF THE VOLTAGE OUTPUT OF INVERTER MUST BE AREA-SYMMETRIC AND THE DESIGN OF THE INVERTER MUST HAVE SPECIFICATIONS FOR THE MODULARIZED LAMP. THE PERFORMANCE OF THE BACKLIGHT, SUCH AS LIFE TIME OR BRIGHTNESS, IS GREATLY INFLUENCED BY THE CHARACTERISTICS OF THE DC-AC INVERTER FOR THE LAMP. ALL THE PARAMETERS OF AN INVERTER SHOULD BE CAREFULLY DESIGNED TO AVOID PRODUCING TOO MUCH CURRENT LEAKAGE FROM HIGH VOLTAGE OUTPUT OF THE INVERTER. WHEN DESIGNING OR ORDERING THE INVERTER PLEASE MAKE SURE THAT A POOR LIGHTING CAUSED BY THE MISMATCH OF THE BACKLIGHT AND THE INVERTER (MISS-LIGHTING, FLICKER, ETC.) NEVER OCCURS. IF ABOVE SITUATION IS CONFIRMED, THE MODULE SHOULD BE OPERATED IN THE SAME MANNERS WHEN IT IS INSTALLED IN YOUR INSTRUMENT.

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JN

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APPROVED BY:

DATE: 05.07.09

PAGE: 3 OF 12

SCALE: N/A

INTERFACE PIN CONNECTION

PIN	NAME	DESCRIPTION
1	GND	GROUND FIX
2	GND	GROUND
3	CK	TTL INPUT CLOCK
4	GND	GROUND
5	GND	GROUND FIX
6	N.C.	NO-CONNECTION
7	R0	RED DATA SIGNAL (LSB)
8	R1	RED DATA SIGNAL
9	R2	RED DATA SIGNAL
10	GND	GROUND
11	R3	RED DATA SIGNAL
12	R4	RED DATA SIGNAL
13	R5	RED DATA SIGNAL (MSB)
14	GND	GROUND
15	G0	GREEN DATA SIGNAL (LSB)
16	G1	GREEN DATA SIGNAL
17	G2	GREEN DATA SIGNAL
18	GND	GROUND
19	G3	GREEN DATA SIGNAL
20	G4	GREEN DATA SIGNAL
21	G5	GREEN DATA SIGNAL (MSB)
22	GND	GROUND
23	B0	BLUE DATA SIGNAL (LSB)
24	B1	BLUE DATA SIGNAL
25	B2	BLUE DATA SIGNAL
26	GND	GROUND
27	B3	BLUE DATA SIGNAL
28	B4	BLUE DATA SIGNAL
29	B5	BLUE DATA SIGNAL (MSB)
30	GND	GROUND
31	N.C.	NO-CONNECTION
32	GND	GROUND
33	N.C.	NO-CONNECTION
34	FGND	FRAME GROUND
35	ENAB	DATA ENABLE
36	N.C.	NO-CONNECTION
37	VCC	+3.3V INPUT POWER
38	VCC	+3.3V INPUT POWER
39	N.C.	NO-CONNECTION
40	VCC	+3.3V INPUT POWER

BACKLIGHT UNIT

PIN	SYMBOL	DESCRIPTION	REMARK
1	VHIGH	HIGH VOLTAGE	PINK
2	N.C.		
3	VLOW	LOW VOLTAGE	WHITE

NOTE: CONNECTOR PARTNO.: JST-BHR-02(8.0)VS-1N
OR EQUIVALENT

COLOR DATA INPUT ASSIGNMENT

THE BRIGHTNESS OF EACH PRIMARY COLOR(RED, GREEN AND BLUE) IS BASED ON THE 6 -BIT GRAY SCALE DATA INPUT FOR THE COLOR. THE HIGHER THE BINARY INPUT, THE BRIGHTER THE COLOR. THE TABLE BELOW PROVIDES THE ASSIGNMENT OF COLOR VERSUS DATA INPUT.

COLOR	DISPLAY	DATA SIGNAL															GRAY SCALE LEVEL			
		RED					GREEN					BLUE								
		R0	R1	R2	R3	R4	R5	G0	G1	G2	G3	G4	G5	B0	B1	B2	B3	B4	B5	
BASIC COLOR	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
	BLUE	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	1	1	1	
	GREEN	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0	
	CYAN	0	0	0	0	0	0	1	1	1	1	1	1	1	1	1	1	1	1	
	RED	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	
	MAGNETA	1	1	1	1	1	1	0	0	0	0	0	0	0	1	1	1	1	1	
	YELLOW	1	1	1	1	1	1	1	1	1	1	1	1	0	0	0	0	0	0	
	WHITE	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
GRAY SCALE OF RED	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R0	
	↑	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R1	
		0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	R2	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	R3~R60	
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		1	0	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	R61	
		0	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	R62	
RED	1	1	1	1	1	1	0	0	0	0	0	0	0	0	0	0	0	R63		
GRAY SCALE OF GREEN	BLACK	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	G0	
	↑	0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	G1	
		0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	G2	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	G3~G60	
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		0	0	0	0	0	0	1	0	1	1	1	1	0	0	0	0	0	G61	
		0	0	0	0	0	0	0	0	1	1	1	1	0	0	0	0	0	G62	
GREEN	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	G63		
GRAY SCALE OF BLUE	BLACK	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	B0	
	↑	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	B1	
		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	B2	
		:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	B3~B60	
	↓	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:	:		
		0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1	1	1	B61
		0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	B62
BLUE	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	B63		

NOTE: DEFINITION OF GRAY

RN: RED GRAY, GN: GREEN GRAY, BN: BLUE GRAY (N=GRAY LEVEL)

INPUT SIGNAL: 0=LOW LEVEL VOLTAGE, 1=HIGH LEVEL VOLTAGE

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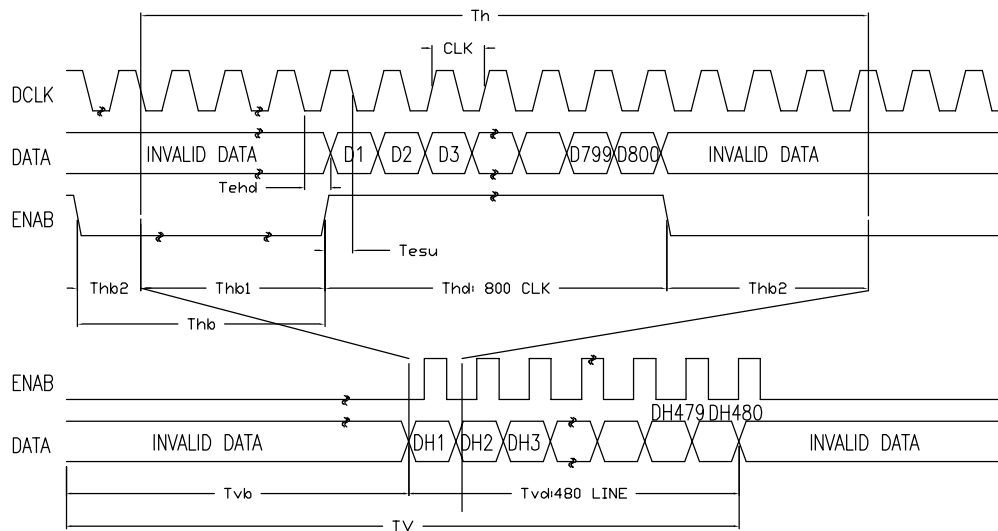
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SCALE: N/A

INTERFACE TIMING

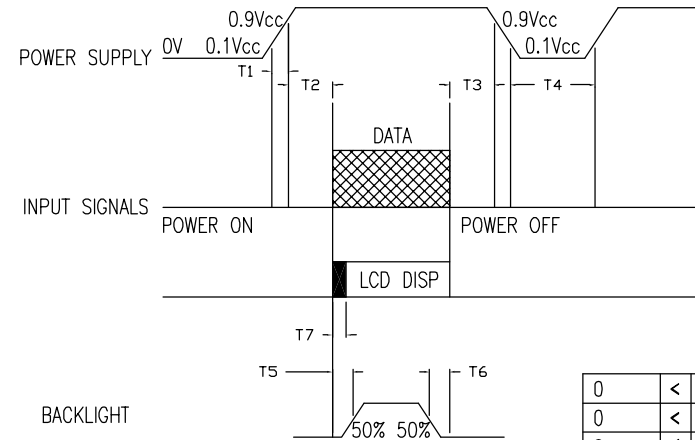
SIGNAL	ITEM	SYMBOL	STANDARD VALUE			UNIT	NOTE
			MIN	TYP.	MAX		
CLOCK	FREQUENCY	FC	25	27	35	MHz	
	HIGH LEVEL WIDTH	TcH	10		± -	ns	
	LOW LEVEL WIDTH	TcL	10	-	-	ns	
	PERIOD	Tc	40	33	28.6	ns	
	DATA SETUP TIME	Tdsu	8	-	-	ns	
	DATA HOLD TIME	Tdhd	8	-	-	ns	
	ENAB SETUP TIME	Tesu	8	-	-	ns	
	ENAB HOLD TIME	Tehd	8	-	-	ns	
VERTICAL ACTIVE DISPLAY TERM	FRAME RATE	Fr	-	60	72	Hz	
	TOTAL	Tv	486	500	550	Th	Tv=Tvd+Tvb
	DISPLAY	Tvd	-	480	-	Th	
	BLANK	Tvb	6	20	70	Th	
HORIZONTAL ACTIVE DISPLAY TERM	TOTAL	Th	870	900	1070	Tc	Th=Thd+Thb
	DISPLAY	Thd	-	800	-	Tc	-
	BLANK	Thb	70	100	270	Tc	Thb=Thb1+Thb2

NOTE (1): THIS MODULE IS OPERATED BY DE(ENAB) MODE ONLY.



POWER ON/OFF SEQUENCE

TO PREVENT A LATCH-UP OR DC OPERATION OF LCD MODULE, THE POWER ON/OFF SEQUENCE SHOULD FOLLOW THE CONDITIONS SHOWN IN THE FOLLOWING DIAGRAM.



0	<	T1	≤	10 ms
0	<	T2	≤	1 sec
0	≤	T3	≤	1 sec
200 ms	<	T4		
200 ms	≤	T5		
200 ms	≤	T6		
		T7	<	200 ms

NOTES:

- (1) THE SUPPLY OF THE EXTERNAL SYSTEM FOR THE MODULE INPUT SHOULD BE THE SAME AS THE DEFINITION OF VCC.
- (2) PLEASE APPLY THE LAMP VOLTAGE WITHIN THE LCD OPERATION RANGE. WHEN THE BACKLIGHT TURNS ON BEFORE THE LCD OPERATION OF THE LCD TURNS OFF, THE DISPLAY MAY, INSTANTLY, FUNCTION ABNORMALLY.
- (3) IN CASE OF VCC=OFF LEVEL, PLEASE KEEP THE LEVEL OF INPUT SIGNALS ON THE LOW OR KEEP A HIGH IMPEDANCE.
- (4) T4 SHOULD BE MEASURED AFTER THE MODULE HAS BEEN FULLY DISCHARGED BETWEEN POWER ON/OFF PERIODS.
- (5) INTERFACE SIGNAL SHALL NOT BE KEPT AT HIGH IMPEDANCE WHEN THE POWER IS ON.

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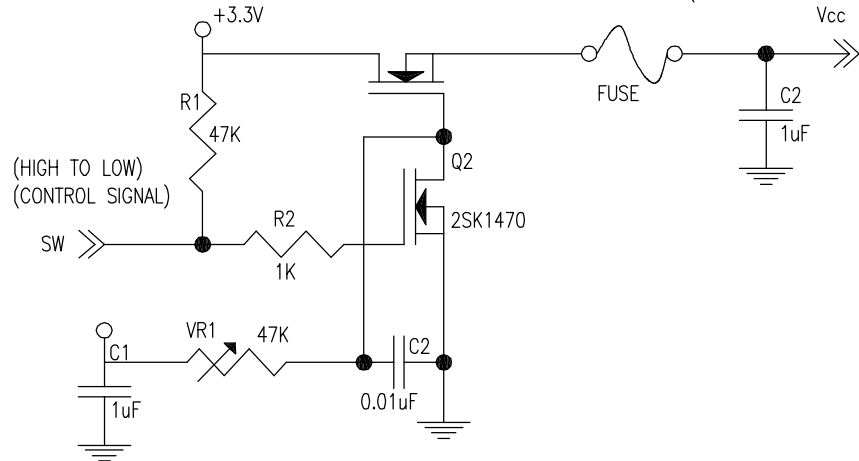
DC CHARACTERISTICS

PARAMETER	SYMBOL	STANDARD VALUE			UNIT	NOTE
		MIN	TYP.	MAX		
POWER SUPPLY VOLTAGE	VCC	+3.0	+3.3	+3.6	V	(1)
RIPPLE VOLTAGE	VRP	—	—	±200	V	—
RUSH CURRENT	IRUSH	—	—	TBD	V	(2)
POWER SUPPLY CURRENT	ICC	—	250	300	mA	(3)
TTL INPUT LOW VOLTAGE	VIL	0	—	0.2V _{CC}	V	(4)
TTL INPUT HIGH VOLTAGE	VIH	0.8V _{CC}	—	V _{CC}	V	
TTL INPUT LEAK CURRENT (LOW)	I _{IL}	—	—	1.0	mV	
TTL INPUT LEAK CURRENT (HIGH)	I _{IH}	—	—	1.0	mV	VI=3.3V(4)

NOTE (1): THE MODULE IS RECOMMENDED TO OPERATE WITHIN SPECIFICATION RANGES LISTED ABOVE FOR NORMAL FUNCTION.

NOTE (2): MEASURED CONDITIONS:

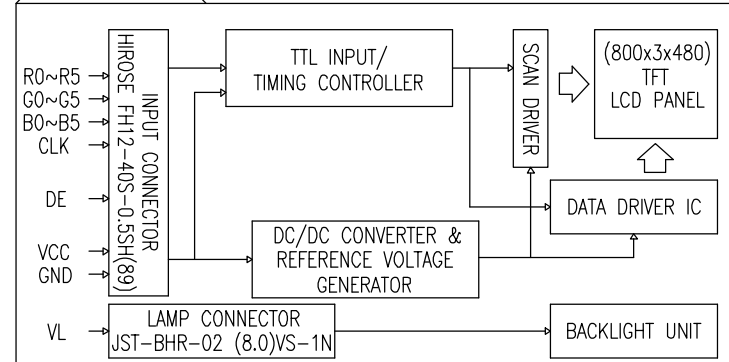
(LCD MODULE INPUT)



NOTE (3): THE SPECIFIED POWER SUPPLY CURRENT IS UNDER THE CONDITIONS AT V_{CC}=3.3V, T_a=25±2°C, f_v=60Hz, WHEREAS A GRAY LEVEL VERTICAL STRIPE PATTERN IS DISPLAYED.

NOTE (4): CK, R0~R5, G0~G5, B0~B5, ENAB.

BLOCK DIAGRAM



ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	TEST CONDITION	STANDARD VALUE			UNIT
			MIN	TYP.	MAX	
LOGIC SUPPLY VOLTAGE, VDD	—	—	-0.5	—	5	V
DIGITAL INPUT VOLTAGE	—	—	-0.5	—	5	V
OUTPUT VOLTAGE	—	—	-0.5	—	5	V

AC ELECTRICAL CHARACTERISTICS

(VDD=3.3V±5%, GND=PGND=0V, T_a=0~50°C

PARAMETER	SYMBOL	TEST CONDITION	STANDARD VALUE			UNIT
			MIN	TYP.	MAX	
DCLK CYCLE TIME	TCLIC	—	25	—	200	ns
DCLK PULSE DUTY	TCWH	—	40	50	60	%

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REV.

PART NUMBER

LCT-H800480M85C1

8.5" ACTIVE MATRIX FULL COLOR TFT PANEL
12:00 VIEW, CCFL BACKLIGHT,
0°C TO +75°C OPERATING TEMP.

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RELIABILITY NOTE

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DRAWN BY:

JN

CHECKED BY:

APPROVED BY:

DATE: 05.07.09

PAGE: 6 OF 12

SCALE: N/A

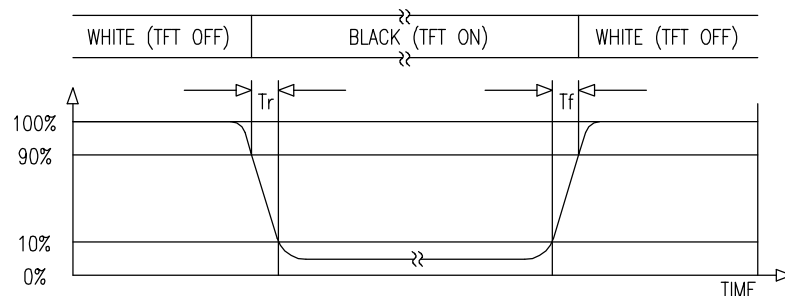
OPTICAL CHARACTERISTICS

ITEM		SYMBOL	CONDITION		STANDARD VALUE			UNIT	NOTE
					MIN	TYP.	MAX		
RESPONSE TIME		Tr		25°C	—	15	30	ms	1
		Tf			—	35	50		
CONTRAST RATIO		CR		25°C	—	250	—	—	2
VIEWING ANGLE (CR≥10)		RIGHT		25°C	50	55	—	DEG	3,4
		LEFT		25°C	50	55	—	DEG	
		UPPER		25°C	50	60	—	DEG	
		LOWER		25°C	30	40	—	DEG	
LUMINANCE OF WHITE (CENTER POINT OF LCM)		L		25°C	200	300	—	Cd/m ²	4
COLOR CROMACITY (CIE1931)		Rx		TYP— 0.05	0.586	TYP+ 0.05	—	4 NTSC =50%	
		Ry			0.334		—		
"SIMULATION DATA REFERENCE ONLY"		Gx			0.292		—		
		Gy			0.549		—		
		Bx			0.148		—		
		By			0.120		—		
	Wx	0.306			—				
	Wy	0.328			—				
OPTIMUM VIEWING DIRECTION		6 O'CLOCK							—
LUMINANCE UNIFORMITY		Yu			72	80	—	—	4,5

NOTE(1): DEFINITION OF RESPONSE TIME

DISPLAY DATA

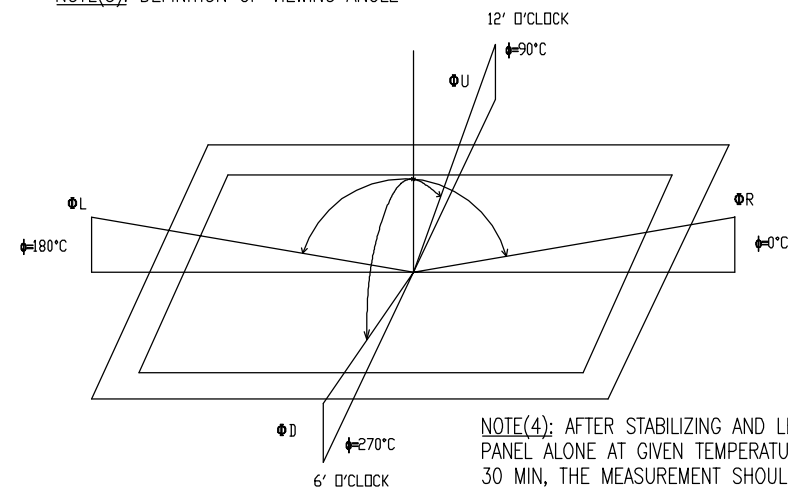
OPTICAL RESPONSE



NOTE(2): DEFINITION OF CONTRAST RATIO

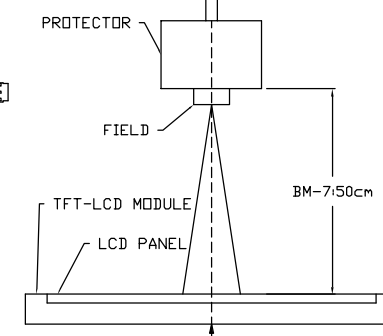
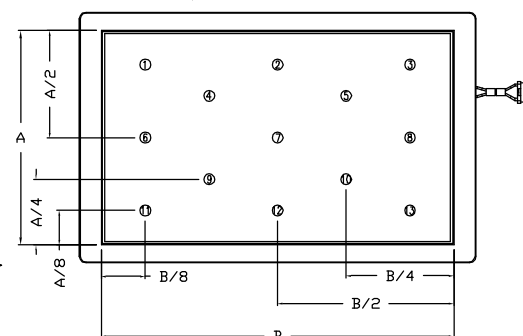
CR=BRIGHTNESS AT ALL PIXELS "WHITE" / BRIGHTNESS AT ALL PIXELS "BLACK"

NOTE(3): DEFINITION OF VIEWING ANGLE



NOTE(4): AFTER STABILIZING AND LEAVING THE PANEL ALONE AT GIVEN TEMPERATURE FOR 30 MIN, THE MEASUREMENT SHOULD BE EXECUTED. MEASUREMENT SHOULD BE EXECUTED IN STABLE, WINDLESS, AND DARK ROOM 30 MINS AFTER LIGHTING THE BACK-LIGHT. THIS SHOULD BE MEASURED IN THE CENTER OF SCREEN. ENVIRONMENT CONDITION: Ta=25±2°C BACK-LIGHT ON CONDITION

NOTE(5): DEFINITION OF WHITE VARIATION:
MEASURE THE LUMINANCE OF GRAY LEVEL 255 AT 13 POINTS (LC DRIVEN CIRCUIT WAS OFF.)



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DATE: 05.07.09

PAGE: 7 OF 12

SCALE: N/A

STANDARD SPECIFICATION FOR REABILITY

STANDARD SPECIFICATION OF REABILITY TEST

NO	TEST ITEM	CONTENT OF TEST	TEST CONDITION	APPLICABLE STANDARD
1	HIGH TEMPERATURE STORAGE	ENDURANCE TEST APPLYING THE HIGH STORAGE TEMPERATURE FOR A LONG TIME.	75+/-3°C 240HRS	- - - -
2	LOW TEMPERATURE STORAGE	ENDURANCE TEST APPLYING THE HIGH STORAGE TEMPERATURE FOR A LONG TIME.	-25+/-3°C 240HRS	- - - -
3	HIGH TEMPERATURE OPERATION	ENDURANCE TEST APPLYING THE ELECTRIC STRESS (VOLTAGE & CURRENT) AND THE THERMAL STRESS TO THE ELEMENT FOR A LONG TIME.	75+/-3°C 240HRS	- - - -
4	LOW TEMPERATURE OPERATION	ENDURANCE TEST APPLYING THE ELECTRIC STRESS UNDER LOW TEMPERATURE FOR A LONG TIME.	0+/-3°C 240HRS	- - - -
5	HIGH TEMPERATURE/HUMIDITY OPERATION	ENDURANCE TEST APPLYING THE ELECTRIC STRESS (VOLTAGE & CURRENT) AND TEMPERATURE / HUMIDITY STRESS TO THE ELEMENT FOR A LONG TIME.	40°C, 90%RH 120HRS	MIL-202E-103B JIS-C5023
6	TEMPERATURE CYCLE	ENDURANCE TEST APPLYING THE LOW AND HIGH TEMPERATURE CYCLE. $\begin{array}{ccccc} -25^{\circ}\text{C} & \xrightleftharpoons[30\text{ MIN}]{5\text{ MIN}} & 25^{\circ}\text{C} & \xrightleftharpoons[5\text{ MIN}]{30\text{ MIN}} & 75^{\circ}\text{C} \\ & & \text{1 CYCLE} & & \end{array}$	-25°C/ 75°C 50 CYCLES	- - - -
7	ESD TEST OPERATION	ENDURANCE TEST APPLYING THE ELECTROSTATIC DISCHARGE TO THE ELEMENT.	EACH CONNECTOR ONCE, ± 200V, 200pF [0Ω], UNDER OPERATION.	- - - -
8	SHOCK TEST (NON-OPERATION)	ENDURANCE TEST APPLYING THE SHOCK ENERGY TO THE ELEMENT.	50G, 11ms, HALF-SINE WAVE, 1 TIME FOR ±X, ±Y, ±Z.	- - - -
9	SHOCK TEST (NON-OPERATION)	ENDURANCE TEST APPLYING THE VIBRATION DURING TRANSPORTATION.	(1) 10~57Hz: AMPTUDE 0.075mm (2) 57~200Hz: ACCELERATION 1.0G SWEEP RATE 11min/ CYCLE, 60min FOR X,Y,Z AXIS.	- - - -

REMARKS:

1. FOR OPERATION TEST, ABOVE SPECIFICATION IS APPLICABLE WHEN TEST PATTERN IS CHANGING DURING ENTIRE OPERATION TEST.
2. INSPECTIONS AFTER RELIABILITY TESTS ARE PERFORMED WHEN THE DISPLAY TEMPERATURE RESUMES BACK TO ROOM TEMPERATURE.
3. IT IS A NORMAL CHARACTERISTIC THAT SOME DISPLAY ABNORMALITY CAN BE SEEN DURING REABILITY TEST. IF THE DISPLAY ABNORMALITY CAN RESUME BACK TO NORMAL CONDITION AT ROOM TEMPERATURE WITHIN 24 HOURS, THERE IS NO PERMANENT DESTRUCTION OVER THE DISPLAY. THE DISPLAY STILL POSSESSES ITS FUNCTIONALITY AFTER REABILITY TESTS.

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QUALITY ASSURANCE

ACCEPTABLE QUALITY LEVEL (AQL)

EACH LOT SHOULD SATISFY THE QUALITY LEVEL DEFINED AS FOLLOWS:

A. INSPECTION METHOD: MIL-STD-105E LEVEL II NORMAL ONE TIME SAMPLING.

B. AQL LEVEL.

CATEGORY	AQL	DEFINITION
MAJOR	0.25%	FUNCTIONAL DEFECTIVE AS PRODUCT.
MINOR	1.00%	SATISFY ALL FUNCTIONS AS PRODUCT BUT NOT SATISFY COSMETIC STANDARD.

COSMETIC SCREENING CRITERIA

NO	DEFECT	JUDGMENT CRITERIA	CATEGORY
1	SPOTS/DUST /BUBBLE (ROUND TYPE)	SIZE, D(mm) D≤0.15 ACCEPTABLE QUANTITY IN ACTIVE AREA 0.15<D≤0.20 DISREGARD 3 D>0.20 0	MINOR
2	DUST/ SCRATCHES/ BLACK STREAK (LINE TYPE)	WIDTH, W(mm) LENGTH, L(mm) IN ACTIVE AREA W≤0.02 DISREGARD DISREGARD W≤0.03 L ≤ 1.0 DISREGARD W≤0.05 L ≤ 2.0 3 W>0.05 DISREGARD 0	MINOR
3	ALLOWABLE DENSITY	ABOVE DEFECTS SHOULD BE SEPARATED MORE THAN 5mm EACH OTHER.	MINOR
4	RAINBOW	OBVIOUS UNVEN COLOR (RAINBOW) SHALL NOT BE NOTICEABLE.	MINOR
5	DISPLAY CONDITION	DIM DISPLAY ON THE PATTERNS, EXTRA PATTERN AND SHORT CIRCUIT ARE NOT ACCEPTABLE.	MAJOR
6	NO DISPLAY OR MISSING DISPLAY	THE PATTERNS OF DISPLAY SHALL LIGHT UP AS REQUIRED. NO DISPLAY OR MISSING DISPLAY ARE NOT ACCEPTABLE.	MAJOR

NOTE: D= (LONG LENGTH + SORTH LENGTH)/2

FAILURE JUDGMENT CRITERIA

AFTER REABILITY TEST ABOVE, TEST SAMPLE SHALL BE LET RUN TO ROOM TEMPERATURE AND HUMIDITY AT LEAST 4 HOURS BEFORE FINAL TESTS ARE CARRIED OUT.

CRITERION ITEM	FAILURE JUDGMENT CRITERIA
ELECTRICAL CHARACTERISTIC	ELECTRICAL SHORT AND OPEN.
MECHANICAL CHARACTERISTIC	OUT OF MECHANICAL SPECIFICATION.
OPTICAL CHARACTERISTIC	OUT OF APPERANCE STANDARD.

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HANDLING PRECAUTIONS

1. THE DISPLAY PANEL IS MADE OF GLASS AND POLARIZER. DO NOT SUBJECT IT TO MECHANICAL SHOCK BY DROPPING OR IMPACT WHICH MAY CAUSE CHIPPING ESPECIALLY ON THE EDGES.
2. DO NOT TOUCH, PUSH OR RUB THE EXPOSED POLARIZERS WITH ANYTHING HARDER THAN AN HB PENCIL LEAD (GLASS, TWEEZERS, ETC.). THE POLARIZER COVERING THE DISPLAY SURFACE OF THE LCD MODULE IS SOFT AND EASILY SCRATCHED. HANDLE THIS POLARIZER CAREFULLY.
3. IF THE DISPLAY SURFACE BECOMES CONTAMINATED, BREATHE ON THE SURFACE AND GENTLY WIPE IT WITH A SOFT DRY CLOTH. IF IT IS HEAVILY CONTAMINATED, MOISTEN CLOTH WITH ISOPROPYL ALCOHOL OR ETHYL ALCOHOL. AVOID USING SOLVENTS LIKE ACETONE (KETENE), WATER, TOLUENE, ETHANOL TO CLEAN THE POLARIZER SURFACE.
4. PLEASE KEEP THE TEMPERATURE WITHIN SPECIFIED RANGE FOR USE AND STORAGE. POLARIZATION DEGRADATION, BUBBLE GENERATION OR POLARIZER PEEL-OFF MAY OCCUR WITH HIGH TEMPERATURE AND HIGH HUMIDITY.
5. DO NOT APPLY EXCESSIVE FORCE TO THE DISPLAY SURFACE OR THE ADJOINING AREAS SINCE THIS MAY CAUSE THE COLOR TONE TO VARY.
6. INSTALL THE LCD MODULE BY USING THE MOUNTING HOLES. WHEN MOUNTING THE LCD MODULE MAKE SURE IT IS FREE OF TWISTING, WARPING AND DISTORTION.
7. EXERCISE CARE TO MINIMIZE CORROSION OF THE ELECTRODE. CORROSION OF THE ELECTRODES IS ACCELERATED BY WATER DROPLETS, MOISTURE CONDENSATION OR A CURRENT FLOW IN A HIGH-HUMIDITY ENVIRONMENT.
8. NC TERMINAL SHOULD BE OPEN. DO NOT CONNECT ANYTHING.
9. IF THE LOGIC CIRCUIT POWER IS OFF, DO NOT APPLY THE INPUT SIGNALS.
10. AVOID CONTACTING OIL AND FATS.
11. CONDENSATION ON THE SURFACE AND CONTACT WITH TERMINALS DUE TO COLD WILL DAMAGE, STAIN OR DIRTY THE POLARIZERS. AFTER PRODUCTS ARE TESTED AT LOW TEMPERATURE THEY MUST BE WARMED UP IN A CONTAINER BEFORE COMING IN CONTACT WITH ROOM TEMPERATURE AIR.
12. WIPE OFF SALIVA OR WATER DROPS IMMEDIATELY, CONTACT WITH WATER OVER A LONG PERIOD OF TIME MAY CAUSE DEFORMATION OR COLOR FADING.

ELECTRO-STATIC DISCHARGE CONTROL

1. SINCE THIS MODULE USES A CMOS LSI, THE SAME CAREFUL ATTENTION SHOULD BE PAID TO ELECTROSTATIC DISCHARGE AS FOR AN ORDINARY CMOS IC.
2. BE SURE TO GROUND THE BODY WHEN HANDLING THE LCD MODULES. TOOLS REQUIRED FOR ASSEMBLING, SUCH AS SOLDERING IRONS, MUST BE PROPERLY GROUNDED.
3. TO REDUCE THE AMOUNT OF STATIC ELECTRICITY GENERATED, DO NOT CONDUCT ASSEMBLING AND OTHER WORK UNDER DRY CONDITIONS. TO REDUCE THE GENERATION OF STATIC ELECTRICITY, BE CAREFUL THAT THE AIR IN THE WORK IS NOT TOO DRIED. A RELATIVE HUMIDITY OF 50%-60% IS RECOMMENDED.
4. THE LCD MODULE IS COATED WITH A FILM TO PROTECT THE DISPLAY SURFACE. EXERCISE CARE WHEN PEELING OFF THIS PROTECTIVE FILM SINCE STATIC ELECTRICITY MAY BE GENERATED.
5. WHEN SOLDERING THE TERMINAL OF LCM, MAKE CERTAIN THE AC POWER SOURCE FOR THE SOLDERING IRON DOES NOT LEAK.

PRECAUTION OF SOLDERING TO THE LCM

1. OBSERVE THE FOLLOWING WHEN SOLDERING LEAD WIRE, CONNECTOR CABLE AND ETC. TO THE LCD MODULE.

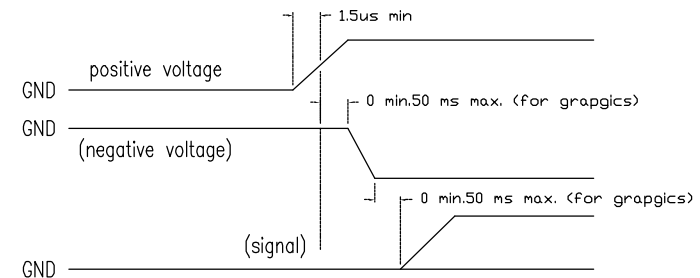
- SOLDERING IRON TEMPERATURE: 300~350°C.
- SOLDERING TIME: ≤ 3 SEC.
- SOLDER: EUTECTIC SOLDER.

ABOVE IS A RECOMMENDED APPROACH. DUE TO DIFFERENT SOLDER COMPOSITION AND PROCESSING METHOD, IT IS RECOMMENDED THAT CUSTOMER TO STUDY AND FINE TUNING THEIR SOLDERING PROCESS PARAMETERS ACCORDINGLY.

2. IF SOLDERING FLUX IS USED, BE SURE TO REMOVE ANY REMAINING FLUX AFTER FINISHING TO SOLDERING OPERATION. (THIS DOES NOT APPLY IN THE CASE OF A NON-HALOGEN TYPE OF FLUX.) IT IS RECOMMENDED THAT YOU PROTECT THE LCD SURFACE WITH A COVER DURING SOLDERING TO PREVENT ANY DAMAGE DUE TO FLUX SPATTERS.

PRECAUTION FOR OPERATION

1. VIEWING ANGLE VARIES WITH THE CHANGE OF LIQUID CRYSTAL DRIVING VOLTAGE (V_0). ADJUST V_0 TO SHOW THE BEST CONTRAST.
2. DRIVING THE LCD IN THE VOLTAGE ABOVE THE LIMIT SHORTENS ITS LIFETIME.
3. RESPONSE TIME IS GREATLY DELAYED AT TEMPERATURE BELOW THE OPERATING TEMPERATURE RANGE. HOWEVER, IT WILL RECOVER WHEN IT RETURNS TO THE SPECIFIED TEMPERATURE RANGE.
4. IF THE DISPLAY AREA IS PUSHED HARD DURING OPERATION, THE DISPLAY WILL BECOME ABNORMAL. HOWEVER, IT WILL RETURN TO NORMAL IF IT IS TURNED OFF AND THEN BACK ON.
5. WHEN TURNING THE POWER ON, INPUT EACH SIGNAL AFTER THE POSITIVE/NEGATIVE VOLTAGE BECOMES STABLE (BELOW FIGURE IS A GENERAL ILLUSTRATION WHERE TYPICAL VALUE DEPENDS ON INDIVIDUAL PRODUCT DESIGN).



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RoHS COMPLIANT PRODUCT

1. CADMIUM AND CADMIUM COMPOUNDS	LESS THAN 100PPM
2. HEXAVALENT CHROMIUM COMPOUNDS	LESS THAN 1000PPM
3. LEAD AND LEAD COMPOUNDS	LESS THAN 1000PPM
4. MERCURY AND MERCURY COMPOUNDS	LESS THAN 1000PPM
5. POLYBROMINATED BIPHENYLS (PBBs)	LESS THAN 1000PPM
6. POLYBROMINATED DIPHENYL ETHERS (PBDEs)	LESS THAN 1000PPM

PACKAGING STANDARD

PRODUCT NO.	LCT-H800480M85C	RELEASE DATE	04/APR. 2007
PRODUCT NAME.	TFT MODULE	PREPARE BY:	
QUANTITY/ EACH BOX	50 PCS.	BOX MATERIAL	PAPER CARTON
OUTER CARTON BOX SIZE	535mm x 320mm x 255mm	BOX TYPE	NEW
QUANTITY/ INNER BOX QUANTITY/ OUTER BOX	N/A	WEIGHT	N/A KG

THERE ARE 12 PCS LCD PER EACH ANTI-STATIC PLASTIC PLATE.
THERE ARE 7 LAYER PLASTIC PLATES PER EACH INNER CARTON BOX.
THERE ARE 2 INNER CARTON BOX PER EACH OUTER CARTON BOX.

STORAGE

1. WHEN STORING LCDS AS SPARES FOR SOME YEARS, THE FOLLOWING PRECAUTIONS ARE NECESSARY.
2. STORE THEM IN A SEALED POLYETHYLENE BAG. IF PROPERLY SEALED, THERE IS NO NEED FOR DESICCANT.
3. STORE THEM IN A DARK PLACE. DO NOT EXPOSE TO SUNLIGHT OR FLUORESCENT LIGHT, KEEP THE TEMPERATURE BETWEEN 0°C AND 35°C.
4. ENVIRONMENTAL CONDITIONS:
5. DO NOT LEAVE THEM FOR MORE THAN 168HRS. AT 60°C.
6. SHOULD NOT BE LEFT FOR MORE THAN 48HRS. AT -20°C.

SAFETY

1. ITS RECOMMENDED TO CRUSH DAMAGED OR UNNECESSARY LCD INTO PIECES AND WASH THEM OFF WITH SOLVENTS SUCH AS ACETONE AND ETHANOL, WHICH SHOULD LATER BE BURNED.
2. IF ANY LIQUID LEAKS OUT OF DAMAGED GLASS CELL AND COMES IN CONTACT WITH THE HANDS, WASH OFF THOROUGHLY WITH SOAP AND WATER.

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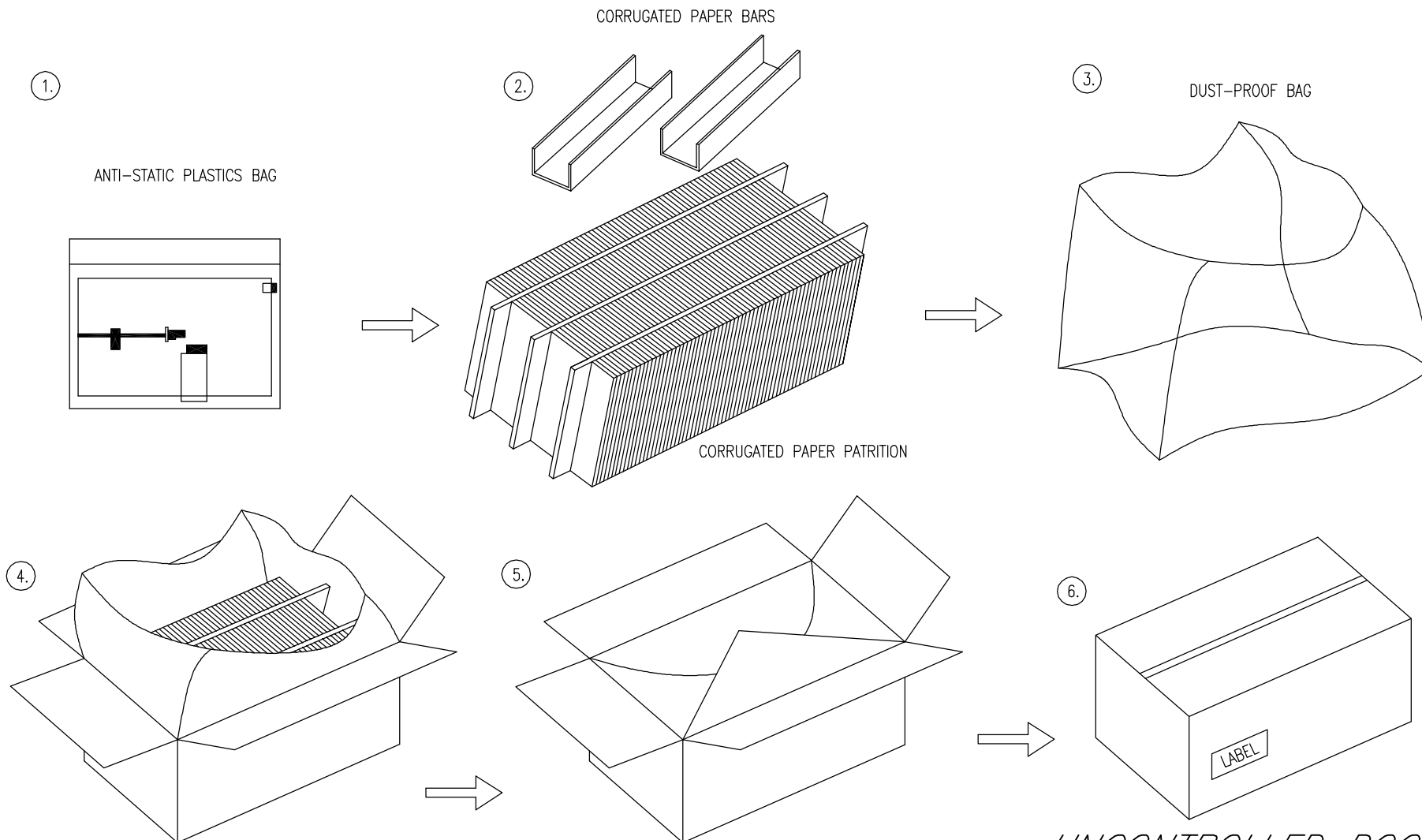
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PAGE: 11 OF 12

SCALE: N/A



*UNLESS OTHERWISE SPECIFIED TOLERANCES PER DECIMAL PRECISION ARE: $X=\pm 1$ (± 0.039), $X.X=\pm 0.5$ (± 0.020), $X.XX=\pm 0.25$ (± 0.010), $X.XXX=\pm 0.127$ (± 0.005). LEAD SIZE= ± 0.05 (± 0.002), LEAD LENGTH= ± 0.75 (± 0.030). MIN.= +DECIMAL PRECISION MAX.= +0.00 -DECIMAL PRECISION

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