

AZ DISPLAYS, INC.

COMPLETE LCD SOLUTIONS

SPECIFICATIONS FOR LIQUID CRYSTAL DISPLAY

PART NUMBER:
DATE:

AGM1264W SERIES
MAY 09, 2007

1. GENERAL SPECIFICATIONS

1-1 SCOPE:

This specification covers the delivery requirements for the liquid crystal display delivered by AZ DISPLAYS, INC. to Customer

1-2 PRODUCTS:

Liquid Crystal Display Module (LCM)

1-3 MODULE NAME:

AGM1264W

2. FEATURES

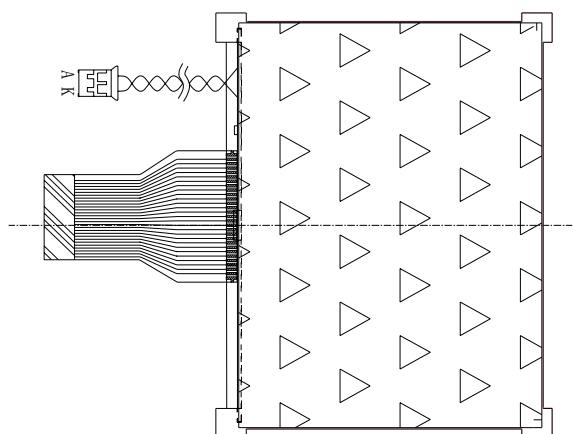
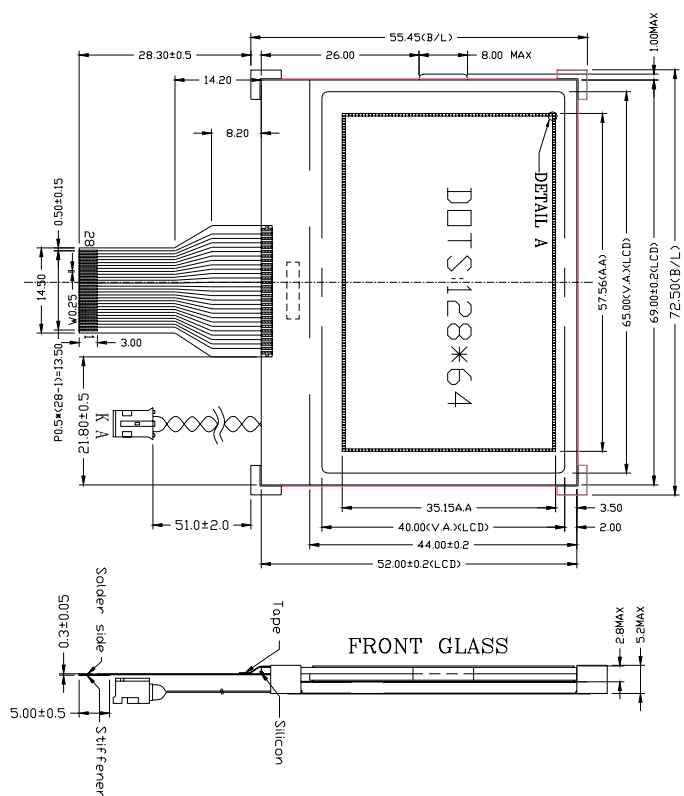
2-1 MAIN LCD (LARGE)

- (1) Display Type: FSTN, Transflective, 6o'clock, Positive
- (2) Driving Method: 1/65 duty, 1/9 bias
- (3) Built-in controller: S6B0724
- (4) With White or Blue Backlight

3. MECHANICAL SPECIFICATIONS

ITEM	SPECIFICATIONS	UNIT
OUTLINE DIMENSIONS	72.50(B/L) x55.45(B/L) x5.2MAX(T) (Exclude FPC) 72.50(B/L) x83.75(H) x5.2MAX(T) (Include FPC)	mm
VIEWING AREA	65.00(W) x40.00(H)	mm
ACTIVE AREA	57.56(W) x35.15(H)	mm
DISP.CONSTRUCTION	128x64 dots	---
NUMBER OF DOTS	128 x 64	Dots
DOT SIZE	0.41(W) × 0.50(H)	mm
DOT PITCH	0.45(W) × 0.55(H)	mm
ASSY.TYPE	COG	---
BACKLIGHT	WHITE OR BLUE	—
WEIGHT	TBD	g

4.OUTLINE DIMENSIONS



28	C/S1B	26	R/S1E	25	R/W	24	E	23	D0	22	D1	21	D2	20	D3	19	D4	18	D5	17	D6	16	D7	15	VDD	14	VSS	13	VOUT	12	C3+	11	C1+	10	C1+	9	C2+	8	C2-	7	V1	6	V2	5	V3	4	V4	3	V0	2	C68	1	NC	PIN
----	-------	----	-------	----	-----	----	---	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	----	-----	----	-----	----	------	----	-----	----	-----	----	-----	---	-----	---	-----	---	----	---	----	---	----	---	----	---	----	---	-----	---	----	-----

DISPLAY TYPE	TSN
	POSITIVE
	TRANSMISSIVE
OPERATING METHOD	1/65 DUTY
	1/9 BIAS
VIEWING ANGLE	6.00°
OPERATING TEMPERATURE	-10°C TO 60°C
STORAGE TEMPERATURE	-20°C TO 70°C
BACKLIGHT	WHITE OR BLUE

SYMBOL	AMENDMENT	DATE	NOTES	CUSTOMER'S APPROVAL		TITLE		MODULE SPEC	
				DRAWN	ME CHECKED	DRAW NO.	VER.	0.	
			1.TOLERANCE UNLESS: ±0.2			SRT-560359-01			

5. INTERFACE ASSIGNMENT

PIN NO.	FUNCTION DESCRIPTIONS	SYMBOL
1	No connection	NC
2	Microprocessor Interface Select input pin in parallel mode C68= "H": 6800 series; C68=: L " 8080 series.	C68
3	LCD driver Power supply voltages	V0
4	LCD driver Power supply voltages	V4
5	LCD driver Power supply voltages	V3
6	LCD driver Power supply voltages	V2
7	LCD driver Power supply voltages	V1
8	Capacitor 2- connected to the internal voltage converter	C2-
9	Capacitor 2+ connected to the internal voltage converter	C2+
10	Capacitor 1+ connected to the internal voltage converter	C1+
11	Capacitor 1- connected to the internal voltage converter	C1-
12	Capacitor3+ connected to the internal voltage converter	C3+
13	Voltage converter output pin.	VOOUT
14	ground	VSS
15	Power supply	VDD
16-	Data Bus	D7
17	Data Bus	D6
18	Data Bus	D5
19	Data Bus	D4
20	Data Bus	D3
21	Data Bus	D2
22	Data Bus	D1
23	Data Bus	D0
24	Enable Signal when 6800 Series; Read Signal when 8080 Series	E
25	Write/Read Select Signal when 6800 Series; Write Signal when 8080 Series	R/W
26	Display/Control Data Command Register select pin	A0
27	Reset input pin	/RESET
28	Chip select input pins	/CS1B

8.TIMING CHARACTERISTICS

Read / Write Characteristics (8080-series MPU)

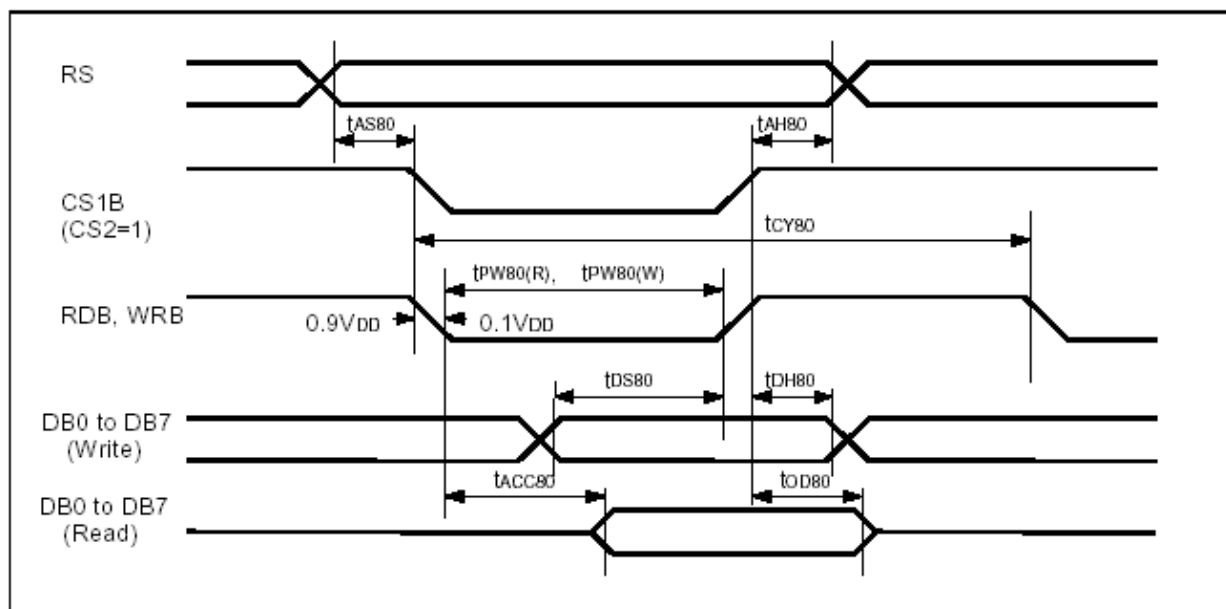


Figure 30. Read / Write Characteristics (8080-series MPU)

($V_{DD} = 2.4$ to $3.6V$, $T_a = -40$ to $+85^{\circ}C$)

Item	Signal	Symbol	Min.	Typ.	Max.	Unit	Remark
Address setup time	RS	t_{AS80}	0	-	-	ns	
Address hold time	RS	t_{AH80}	0	-	-	ns	
System cycle time	RS	t_{CY80}	300	-	-	ns	
Pulse width (WRB)	RW_WRB	$t_{PW80(W)}$	60	-	-	ns	
Pulse width (RDB)	E_RDB	$t_{PW80(R)}$	60	-	-	ns	
Data setup time	DB7 to DB0	t_{DS80}	40	-	-	ns	
Data hold time		t_{DH80}	15	-	-	ns	
Read access time	DB0	t_{ACC80}	-	-	140	ns	$C_L = 100$ pF
Output disable time		t_{OD80}	10	-	100	ns	

Read / Write Characteristics (6800-series Microprocessor)

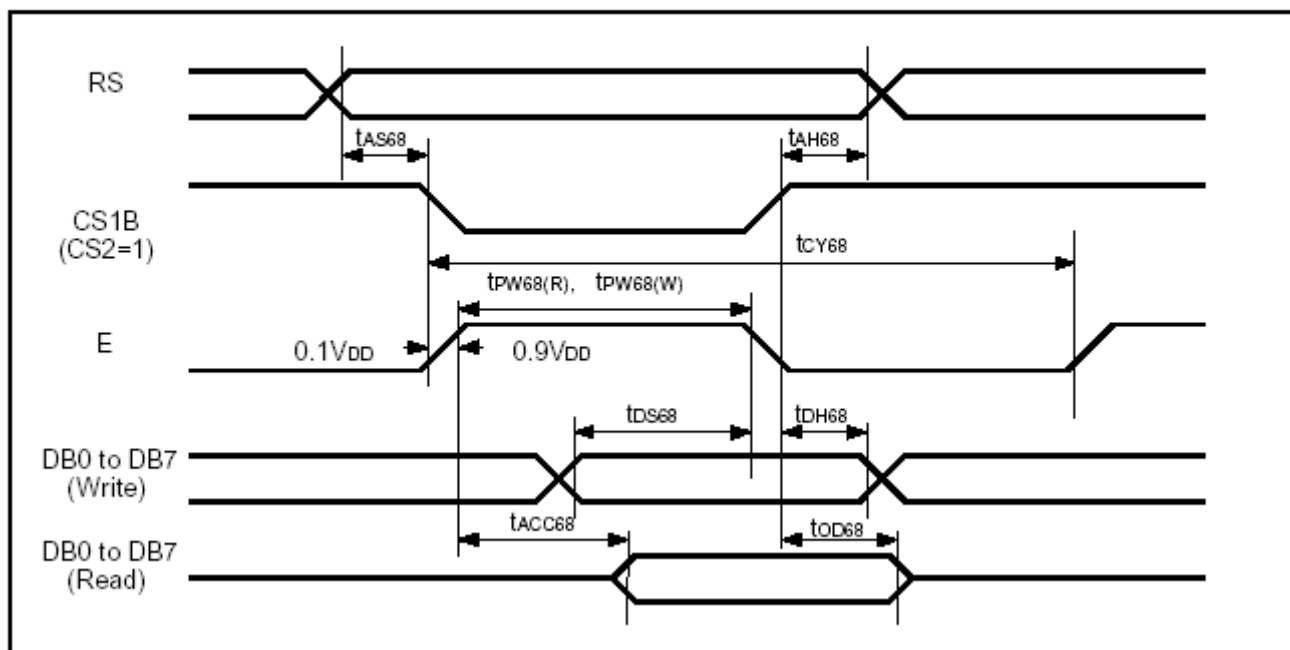


Figure 31. Read / Write Characteristics (6800-series Microprocessor)

($V_{DD} = 2.4$ to $3.6V$, $T_a = -40$ to $+85^{\circ}C$)

Item	Signal	Symbol	Min.	Typ.	Max.	Unit	Remark
Address setup time	RS	t_{AS68}	0	-	-	ns	
Address hold time	RS	t_{AH68}	0	-	-	ns	
System cycle time	RS	t_{CY68}	300	-	-	ns	
Data setup time	DB7 to DB0	t_{DS68}	40	-	-	ns	
Data hold time		t_{DH68}	15	-	-	ns	
Access time		t_{ACC68}	-	-	140	ns	$C_L = 100$ pF
Output disable time		t_{OD68}	10	-	100	ns	
Enable pulse width	Read Write	$t_{PW68(R)}$ $t_{PW68(W)}$	120 60	-	-	-	

9.RESET TIMING CHARACTERISTICS

Reset Input Timing

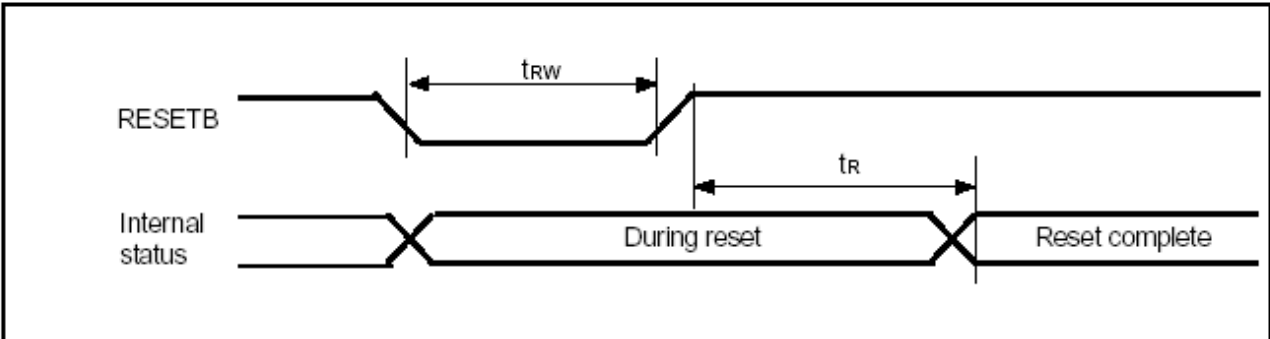


Figure 33. Reset Input Timing

(VDD = 2.4 to 3.6V, Ta = -40 to +85°C)

Item	Signal	Symbol	Min.	Typ.	Max.	Unit	Remark
Reset low pulse width	RESETB	t_{RW}	1.0	-	-	μs	
Reset time	-	t_R	-	-	1.0	μs	

10. POWER ON/OFF SEQUENCE

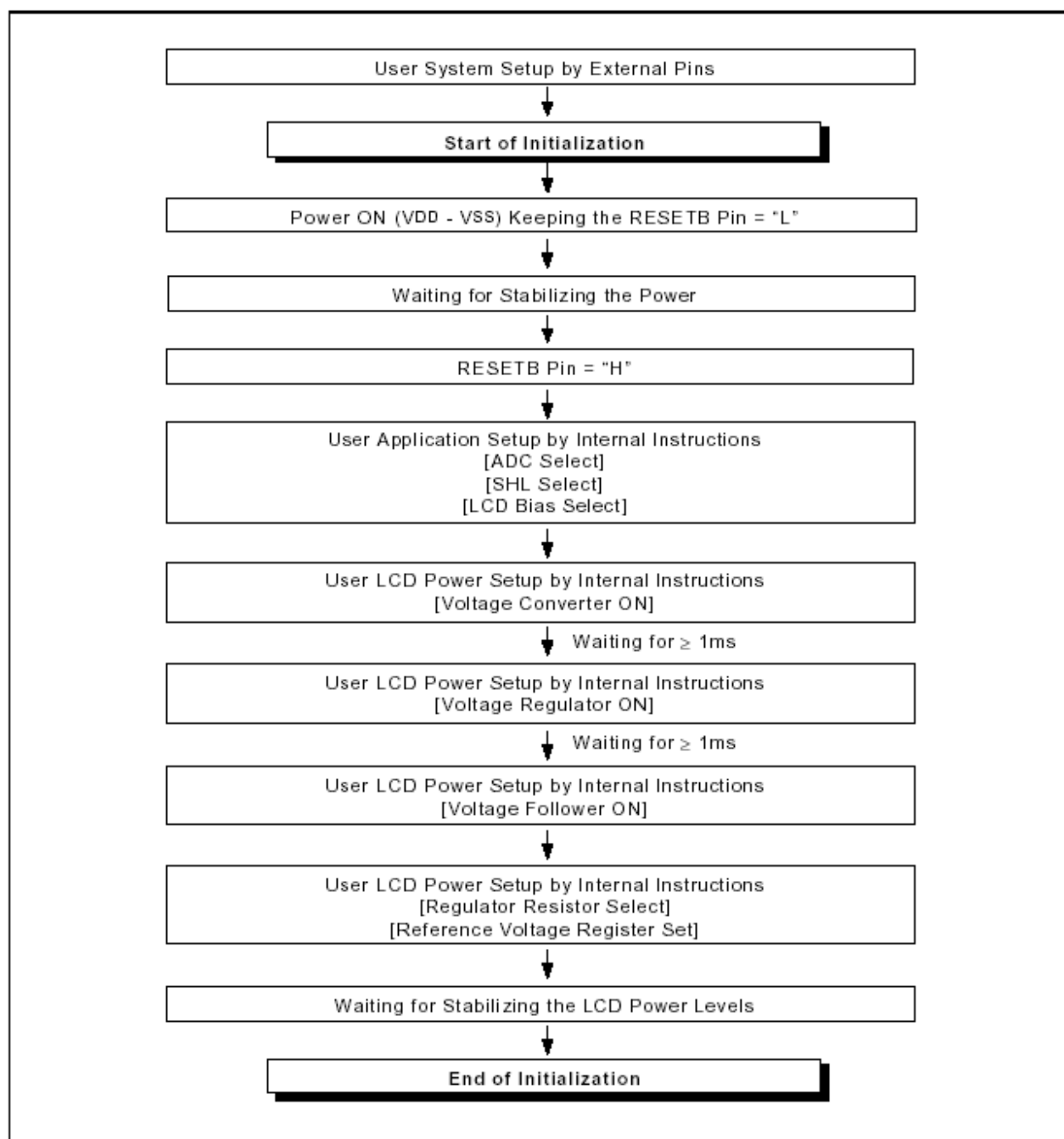


Figure 26. Initializing with the Built-in Power Supply Circuits

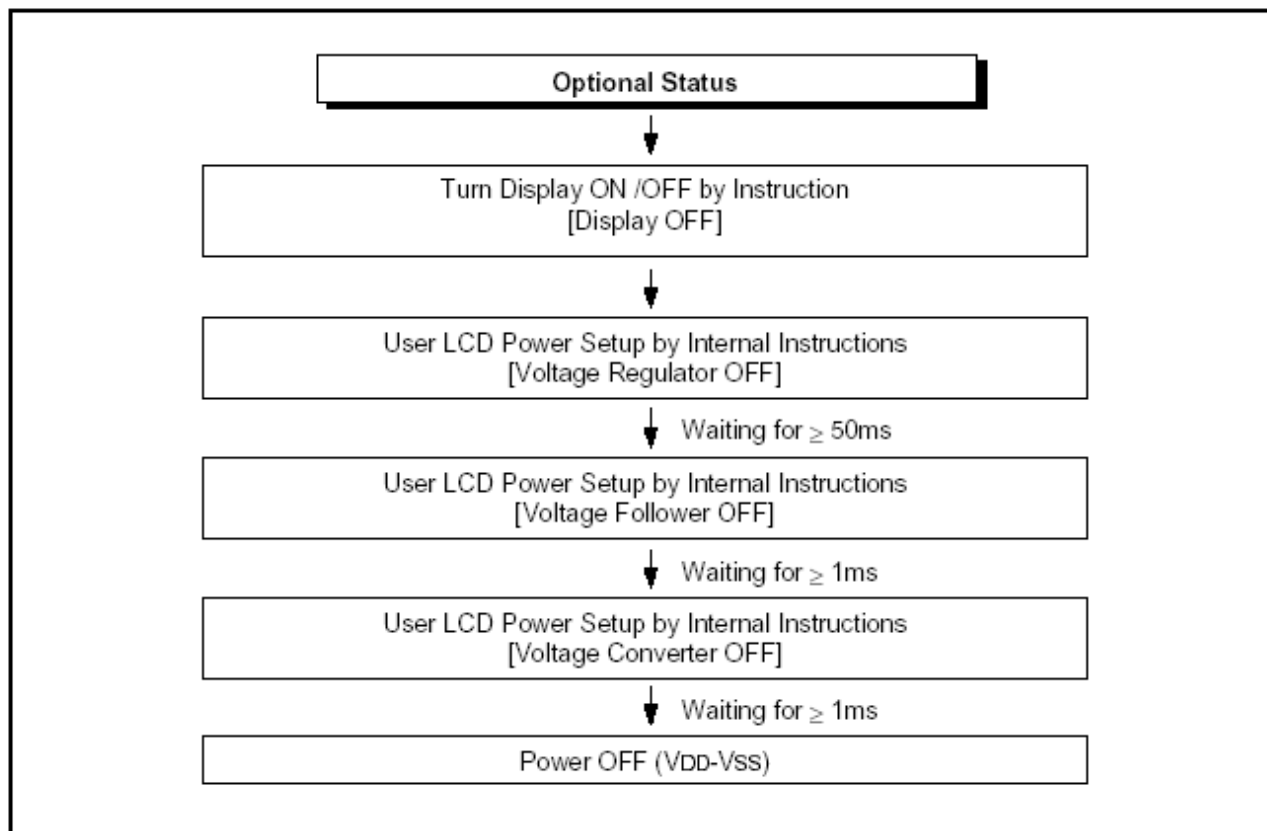
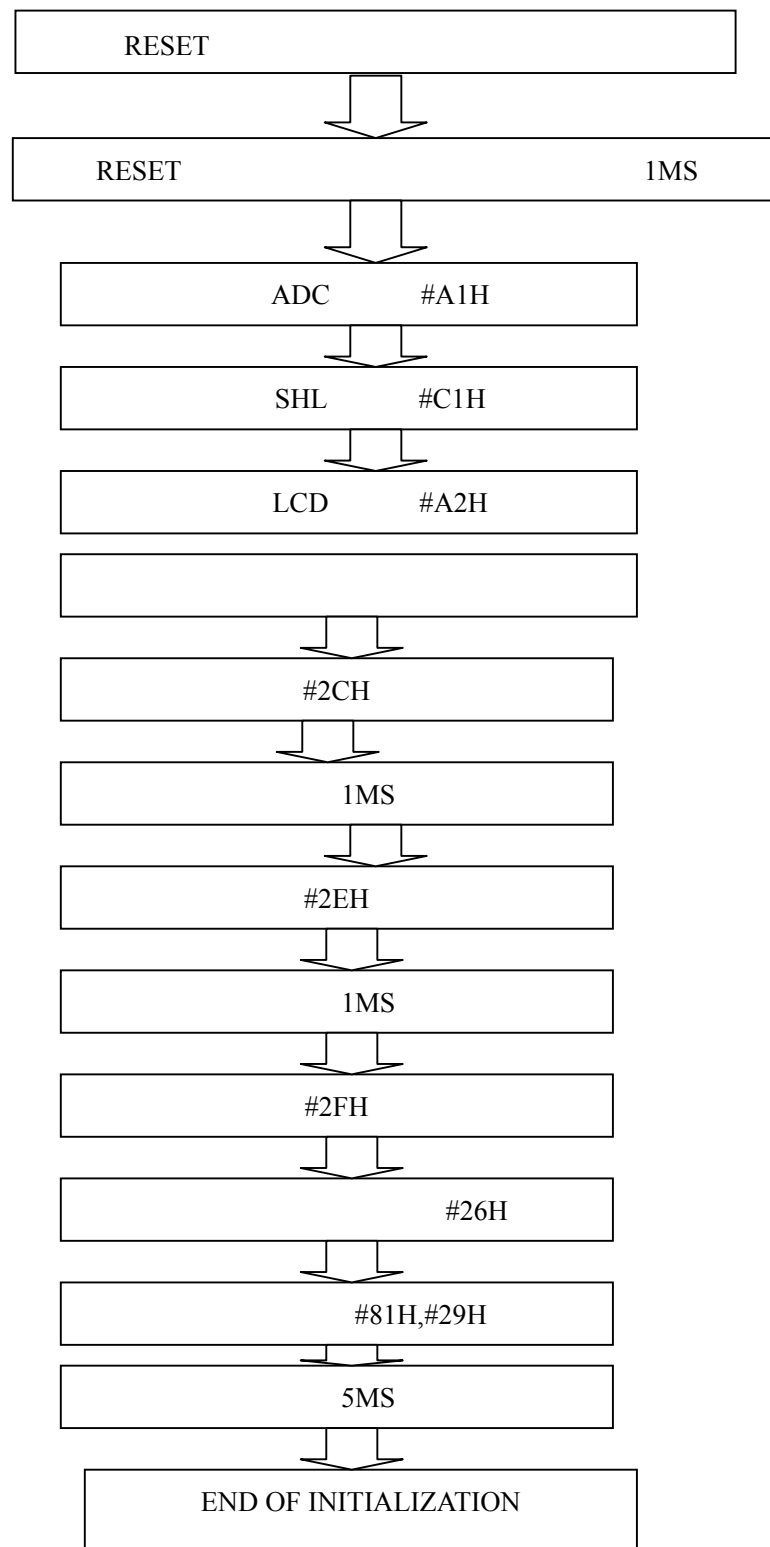


Figure 29. Power OFF

11. INITIALIZED CODE



12. INSTRUCTION TABLE

×: Don't care

Instruction	RS	RW	DB7	DB6	DB5	DB4	DB3	DB2	DB1	DB0	Description
Display ON / OFF	0	0	1	0	1	0	1	1	1	DON	Turn on/off LCD panel When DON = 0: display OFF When DON = 1: display ON
Initial display line	0	0	0	1	ST5	ST4	ST3	ST2	ST1	ST0	Specify DDRAM line for COM0
Set page address	0	0	1	0	1	1	P3	P2	P1	P0	Set page address
Set column address MSB	0	0	0	0	0	1	Y7	Y6	Y5	Y4	Set column address MSB
Set column address LSB	0	0	0	0	0	0	Y3	Y2	Y1	Y0	Set column address LSB
Read status	0	1	BUSY	ADC	ONCF	RESEB	0	0	0	0	Read the internal status
Write display data	1	0	Write data								Write data into DDRAM
Read display data	1	1	Read data								Read data from DDRAM
ADC select	0	0	1	0	1	0	0	0	0	ADC	Select SEG output direction When ADC = 0: normal direction (SEG0→SEG131) When ADC = 1: reverse direction (SEG131→SEG0)
Reverse display ON / OFF	0	0	1	0	1	0	0	1	1	REV	Select normal / reverse display When REV = 0: normal display When REV = 1: reverse display
Entire display ON / OFF	0	0	1	0	1	0	0	1	0	EON	Select normal/entire display ON When EON = 0: normal display. When EON = 1: entire display ON
LCD bias select	0	0	1	0	1	0	0	0	1	BIAS	Select LCD bias
Set modify-read	0	0	1	1	1	0	0	0	0	0	Set modify-read mode
Reset modify-read	0	0	1	1	1	0	1	1	1	0	release modify-read mode
Reset	0	0	1	1	1	0	0	0	1	0	Initialize the internal functions
SHL select	0	0	1	1	0	0	SHL	×	×	×	Select COM output direction When SHL = 0: normal direction (COM0→COM63) When SHL = 1: reverse direction (COM63→COM0)
Power control	0	0	0	0	1	0	1	VC	VR	VF	Control power circuit operation
Regulator resistor select	0	0	0	0	1	0	0	R2	R1	R0	Select internal resistance ratio of the regulator resistor
Set reference voltage mode	0	0	1	0	0	0	0	0	0	1	Set reference voltage mode
Set reference voltage register	0	0	×	×	SV5	SV4	SV3	SV2	SV1	SV0	Set reference voltage register
Set static indicator mode	0	0	1	0	1	0	1	1	0	SM	Set static indicator mode
Set static indicator register	0	0	×	×	×	×	×	×	S1	S0	Set static indicator register
Power save	-	-	-	-	-	-	-	-	-	-	Compound Instruction of display OFF and entire display ON
NOP	0	0	1	1	1	0	0	0	1	1	<u>Non-Operation command</u>
Test Instruction_1	0	0	1	1	1	1	×	×	×	×	<u>Don't use this instruction</u>
Test Instruction_2	0	0	1	0	0	1	×	×	×	×	<u>Don't use this instruction</u>

13. DDRAM ARRANGEMENT

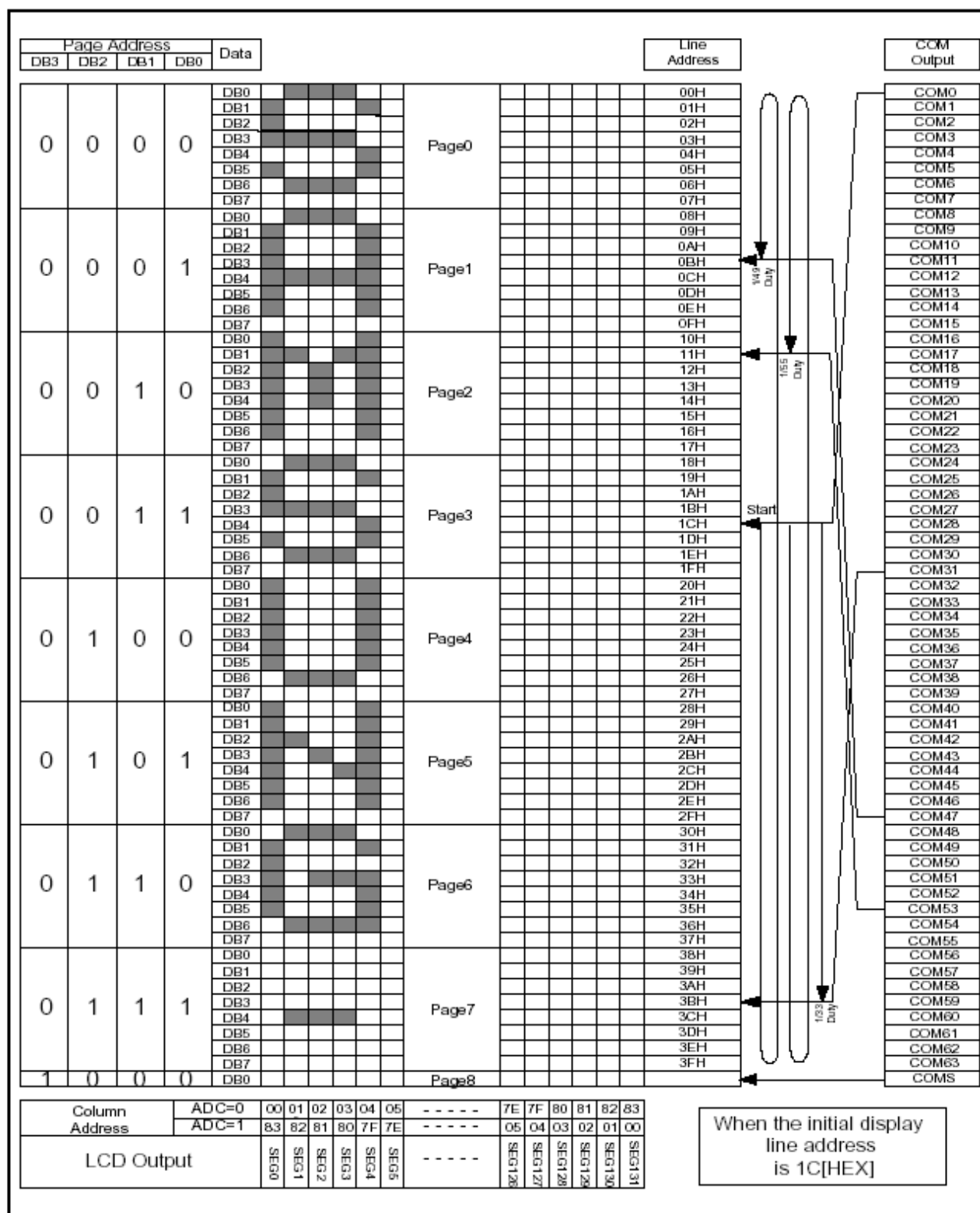


Figure 8. Display Data RAM Map

14. ABSOLUTE MAXIMUM RATING

ITEM	SYMBOL	CONDITION	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY FOR LOGIC	VDD — VSS	Ta=25°C	-0.3	—	7.0	V
POWER SUPPLY FOR LCD DRIVING	V0 — VSS	Ta=25°C	-0.3	—	17	V
INPUT VOLTAGE	VIN	Ta=25°C	-0.3	—	VDD+0.3	V
OPERATION TEMPERATURE	TOPR	---	- 10	—	60	°C
STORAGE TEMPERATURE	TSTG	---	- 20	—	70	°C

NOTES:

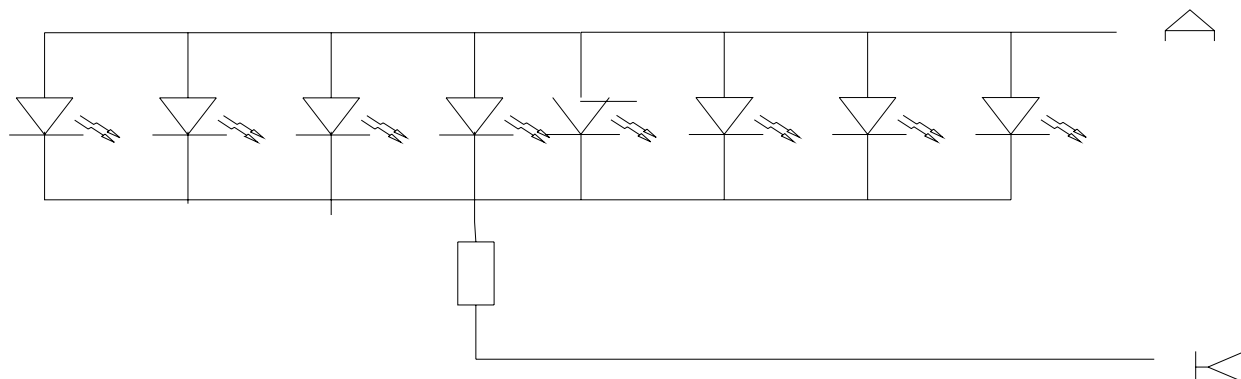
(1) LCM should be grounded during handling LCM.

15. ELECTRICAL CHARACTERISTICS

ITEM	SYMBOL	CONDITIONS	STANDARD VALUE			UNIT
			MIN	TYP	MAX	
POWER SUPPLY VOLTAGE	VDD — VSS	Ta= +25°C	3.2	3.3	3.6	V
POWER SUPPLY FOR LCD DRIVING	V0 — VSS	Ta= +25°C	11.00	11.15	11.30	V
INPUT VOLTAGE “H” LEVEL	VIH	—	0.8VDD	—	VDD	V
INPUT VOLTAGE “L” LEVEL	VIL	—	VSS	—	0.2VDD	V
OUTPUT VOLTAGE “H” LEVEL	VOH	IOH=-0.5mA	0.8VDD	—	VDD	V
OUTPUT VOLTAGE “L” LEVEL	VOL	IOL=0.5mA	VSS	—	0.2VDD	V

16. LED BACKLIGHT

16-1 POWER SUPPLY FOR LED BACKLIGHT



16-2 ABSOLUTE MAXIMUM RATING

PARAMETER	SYMBOL	SPECIFICATIONS	UNIT
POWER DISSIPATION	PD	500	mW
FORWARD CURRENT	IFm	20*8	mA
REVERSE VOLTAGE	VR	4	V
OPERATION TEMPERATURE	TOPR	-20℃ +70℃	℃
STORAGE TEMPERATURE	TSTG	-30℃ +80℃	℃

16-3 ELECTRICAL CHARACTERISTICS

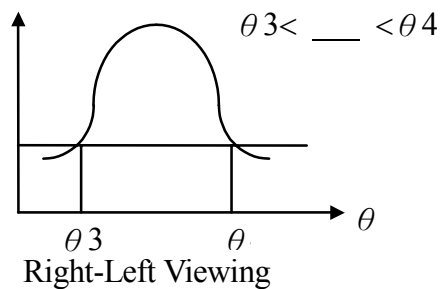
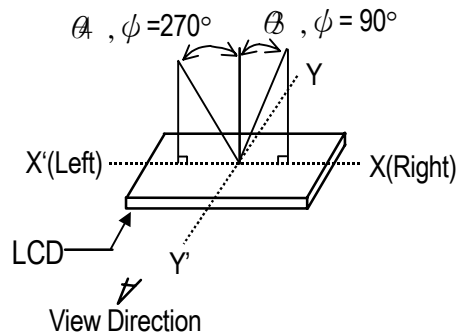
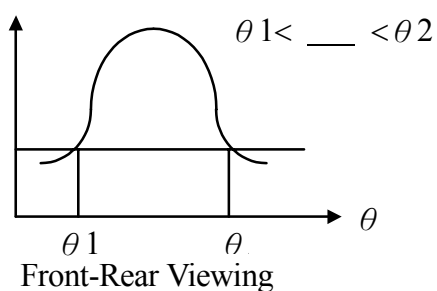
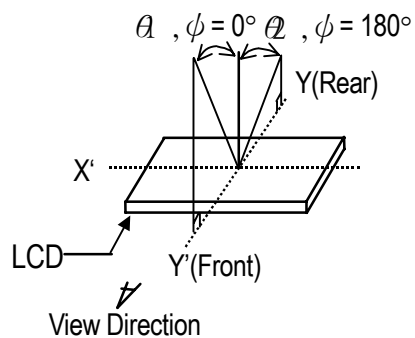
PARAMETER	SYMBOL	LIGHT SOURCE	CONDITIONS	STANDARD VALUE			UNIT
				MIN	TYP	MAX	
PARAMETER	VAK	WHITE	—	4.0	4.2	4.4	V

17.OPTICAL CHARACTERISTICS

for LCD 1/65 Duty, 1/9 Bias

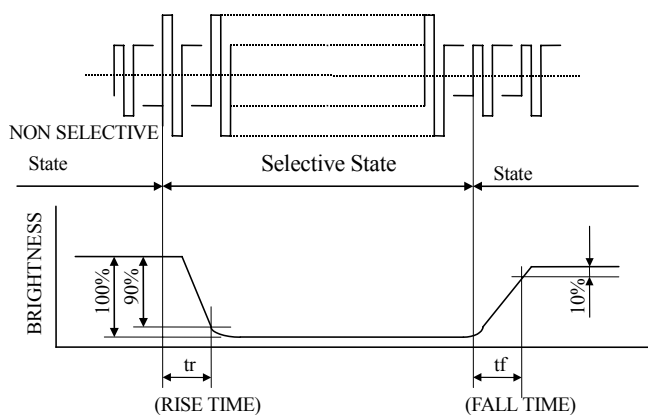
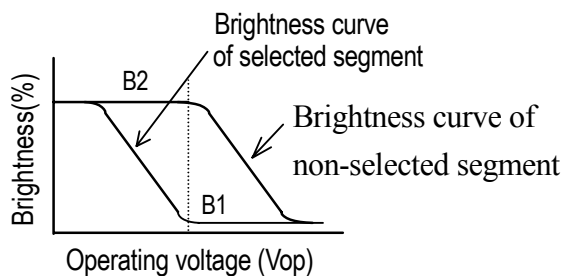
Item		Symbol	Temp.	Condition	Min.	Typ.	Max.	Unit.	Note
Response Time	Rise time	tr	-20℃	= 0° = 0°				mS	
			25℃			220			
	Decay time	td	-20℃						
			25℃			330			
Viewing Angle (06:00 H)			25℃ K 2	= 0°		40		deg.	
			= 90°		30				
			= 180°		30				
			= 270°		30				
Uniformity		Bn	25℃	= = 0°	70%				
Contrast Ratio		K	25℃	= = 0°		8			
Color of CIE(1931) coordinate	White	X	25℃	= = 0°				-	
		Y						-	
	Red	X						-	
		Y						-	
	Green	X						-	
		Y						-	
	Blue	X						-	
		Y						-	
NTSC Ratio	S				-		-	-	

(1) DEFINITION OF VIEWING ANGLE

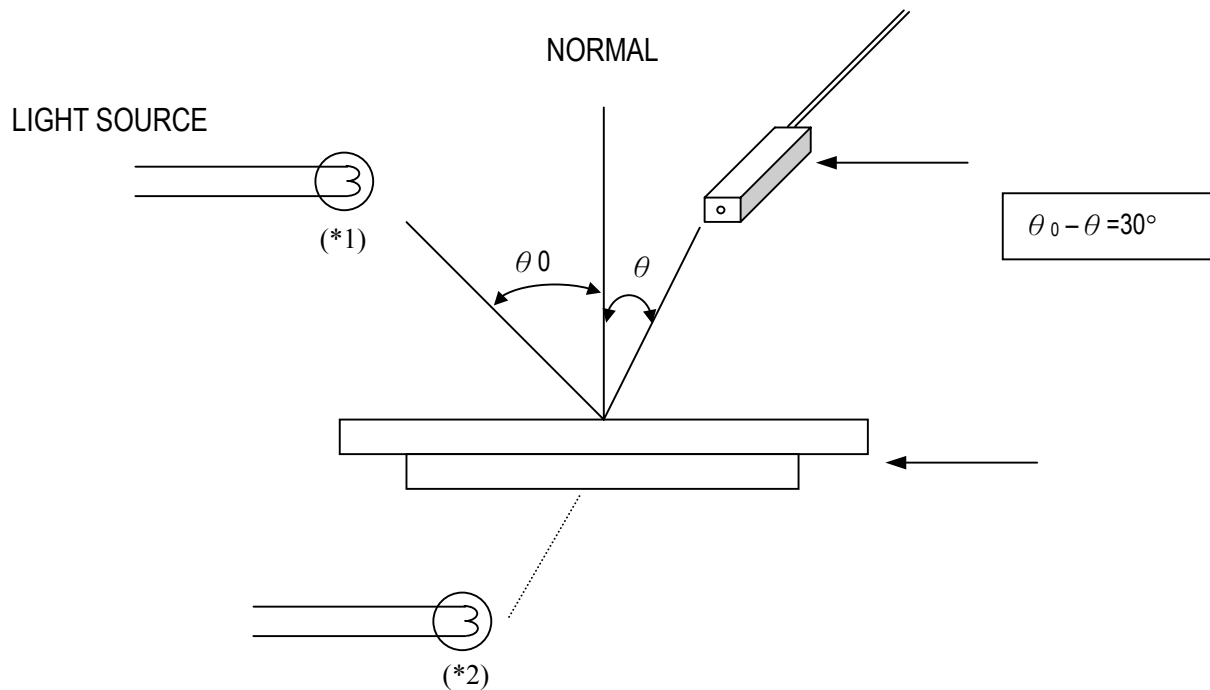


(3) DEFINITION OF RESPONSE

$$C.R = \frac{\text{Brightness of non-selected segment (B2)}}{\text{Brightness of selected segment (B1)}}$$



(4) Measuring Instruments For Electro-optical Characteristics



*1. Light source position for measuring the reflective type of LCD panel

*2. Light source position for measuring the transfective / transmissive types of LCD panel

18. ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	SYMBOL	CONDITIONS	CRITERION
OPERATING TEMPERATURE	TOPR	-10°C +60°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
STORAGE TEMPERATURE	TSTG	-20°C +70°C	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
HUMIDITY	—	See Note	WITHOUT CONDENSATION

19. RELIABILITY

19-1 RELIABILITY TEST

ITEM	CONDITIONS	CRITERION
OPERATING TEMPERATURE	HIGH TEMPERATURE +60°C 24HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE - 10°C 12HRS	
STORAGE TEMPERATURE	HIGH TEMPERATURE +70°C 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
	LOW TEMPERATURE - 20°C 16HRS	
HUMIDITY	40°C 90%RH 96HRS	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
VIBRATION	Operating Time: thirty minutes exposure for each direction (X,Y,Z) Sweep Frequency: 10 55Hz (1 min) Amplitude: 1.5mm	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION
THERMAL SHOCK	-20°C (30mins) +65°C (30mins) 10 cycles	NO DEFECT IN DISPLAYING AND OPERATIONAL FUNCTION

*NOTE: TEST CONDITION

(1) TEMPERATURE AND HUMIDITY: IF NO SPECIFICATION, TEMP. SET AT 25±2°C, HUMIDITY SET AT 60±5%RH

(2) OPERATING STATE: SAMPLES SUBJECT TO THE TESTS SHALL BE IN "OPERATING" CONDITION