

0.1 SDEC LCD MODULE NUMBERING SYSTEM

LM	C	—	S	T	C	2	E	16	D	L	Y	Y	—	
[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]		[13]

LM	G	—	S	S		12	A	64	U	E	G	W	—	
[1]	[2]		[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]		[13]

0.2 SDEC LCD MODULE VARIATION LIST

NO	ITEM	DESCRIPTION	
[1]	LCD MODULE	LIQUID CRYSTAL DISPLAY MODULE	
[2]	LCM MODULE	D	DIGITS MODEL C CHARACTER MODEL G GRAPHIC MODEL
[3]	LCM OF FUNCTION	B	BIG SIZE TYPE S SMALL/NORMAL TYPE
[4]	LCD MODEL	T	TN LCD H HTN LCD
		S	STN LCD F FSTN LCD
[5]	IC PACKING		PACKAGE TYPE C CHIP(OR COG)TYPE T TAB TYPE
[A]	STANDARD TYPE LCM	[6]	CHARACTER MODEL : NUMBER GRAPHIC MODEL : WIDE SIDE OF OF LINES DOTS
		[7]	FROM A TO Z
		[8]	CHARACTER MODEL:NUMBER GRAPHIC MODEL:HIGH SIDE OF OF CHARACTER DOTS
[B]	STANDARD OR CUSTOM DESIGNED TYPE LCM	[6]	DIGITS MODEL : YEAR+MONTH+NUMBER
		[7]	CHARACTER MODEL : CHARACTER+LINES+NUMBER
		[8]	GRAPHIC MODEL : WIDE SIDE DOTS+HIGH SIDE DOTS+NUMBER
[9]	VIEWING ANGLE	R	3 O'CLOCK D 6 O'CLOCK L 9 O'CLOCK U 12 O'CLOCK
[10]	BACKLIGHT	R	WITHOUT BACKLIGHT E EL (TRANSFLECTIVE)
		L	ARRAY LED (TRANSFLECTIVE) F FL (TRANSMISSIVE)
[11]	POLARIZER COLOR	G	GRAY Y YELLOW GREEN
		N	NEGATIVE STN TYPE : BLUE
			NEGATIVE FSTN TYPE : BLACK
[12]	BACKLIGHT COLOR	B	BLUE G GREEN
		O	ORANGE R RED
		W	WHITE Y YELLOW GREEN
[13]	VERSION	01	ENGLISH-JAPANESE 02 ENGLISH-EURPEAN
		03	ENGLISH-RUSSIAN E EDGE LED BACKLIGHT

※ All of our STN Panel belong “WIDE TEMPERATURE”

CONTENTS

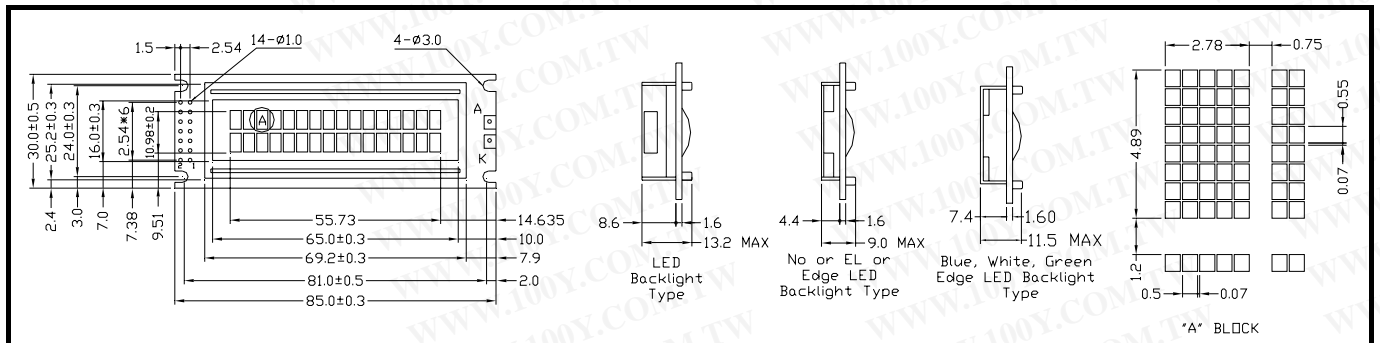
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1. Mechanical Specification

ITEM	STANDARD VALUE			UNIT
NUMBER OF CHARACTERS	16 CHARACTERS X 2 LINES			--
CHARACTER FORMAT	5 X 8 DOTS			--
MODULE DIMENSION NO BACKLIGHT, EL BACKLIGHT	85.0 (W) X 30.0 (H) X 9.5			mm
MODULE DIMENSION EDGE LED BACKLIGHT	85.0 (W) X 30.0 (H) X 9.5			mm
MODULE DIMENSION ARRAY LED BACKLIGHT	85.0 (W) X 30.0 (H) X13.2			mm
MODULE DIMENSION EDGE LED BACKLIGHT (BLUE)	85.0 (W) X 30.0 (H) X11.5			mm
VIEWING DISPLAY AREA	65.0 (W) X 16.0 (H)			mm
ACTIVE DISPLAY AREA	55.73 (W) X 10.98 (H)			mm
CHARACTER SIZE	2.78 (W) X 4.89 (H)			mm
CHARACTER PITCH	3.53 (W) X 6.09 (H)			mm
DOT SIZE	0.50 (W) X 0.55 (H)			mm
DOT PITCH	0.57 (W) X 0.62 (H)			mm
● EL Use INVERTER TYPE	SDEC-I001A			
INVERTER INPUT	DC+5V	V	25	mA
INVERTER OUTPUT	AC 90 ~ 110	V	400 ~ 700	Hz
BACKLIGHT HALF-LIFT TIME	3,000			HR.
● ARRAY LED BACKLIGHT COLOR	YELLOW GREEN OR ORANGE OR RED			
BACKLIGHT INPUT	DC +4.2V	V	100	mA
BACKLIGHT HALF-LIFT TIME	50,000			HR.
● EDGE LED BACKLIGHT COLOR	YELLOW GREEN			
BACKLIGHT INPUT	DC+4.2V	V	40	mA
BACKLIGHT HALF-LIFT TIME	30,000			HR.
● EDGE LED BACKLIGHT COLOR	BLUE OR WHITE OR GREEN			
BACKLIGHT INPUT	DC+3.2V	V	26	mA
BACKLIGHT HALF-LIFT TIME	3,000 (AVOID LIGHTING CONTINUOUSLY)			HR.

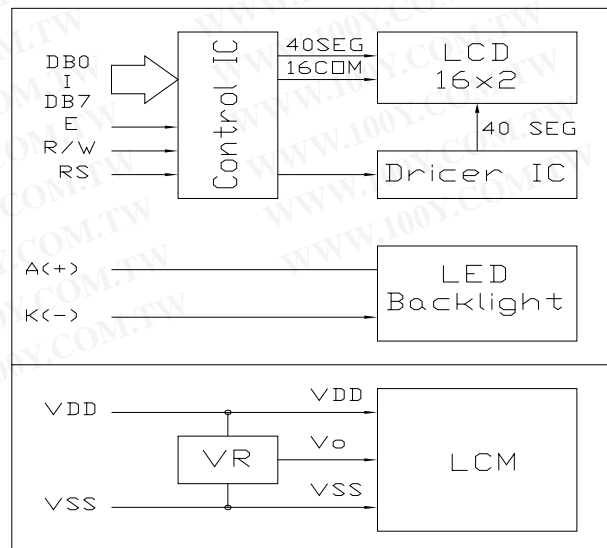
2. Mechanical Diagram



3. Interface Pin Connections

NO	SYMBOL	LEVEL	FUNCTION
1	VDD	--	DC +5V
2	VSS	--	GND(0V)
3	VO	H/L	Contrast Adjust
4	RS	H/L	Register select
5	R/W	H/L	Read/Write
6	E	H,H→L	Enable signal
7	DB0	H/L	Data Bit 0
8	DB1	H/L	Data Bit 1
9	DB2	H/L	Data Bit 2
10	DB3	H/L	Data Bit 3
11	DB4	H/L	Data Bit 4
12	DB5	H/L	Data Bit 5
13	DB6	H/L	Data Bit 6
14	DB7	H/L	Data Bit 7
	A(+)	--	LED Backlight +
	K(-)	0V	LED Backlight -

4. Block Diagram



5. Absolute Maximum Ratings

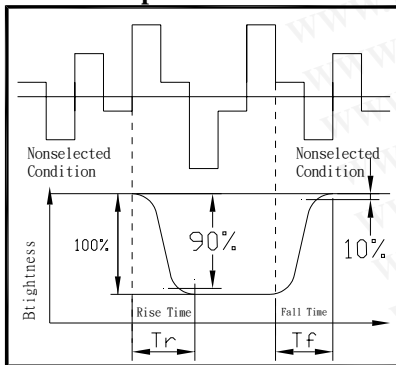
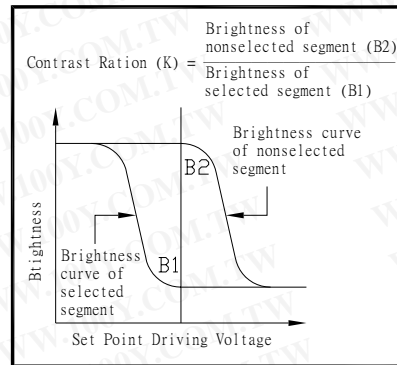
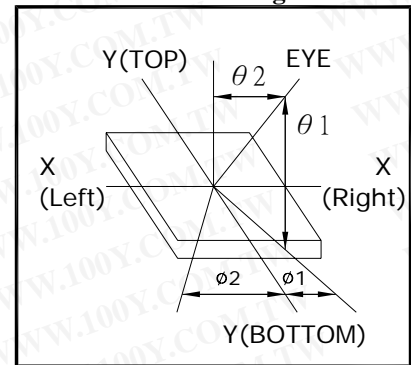
ITEM		SYMBOL	MIN.	TYPE	MAX.	UNIT
INPUT VOLTAGE		VI	VSS	—	VDD	V
SUPPLY VOLTAGE FOR LOGIC		VDD-VSS	—	5.0	6.5	V
SUPPLY VOLTAGE FOR LCD		VDD-VO	—	—	6.5	V
TN	NORMAL TEMPERATURE RANGE	OPERATING	-10~+50	STORAGE	-20~+60	°C
HTN	WIDE TEMPERATURE RANGE	OPERATING	-20~+70	STORAGE	-30~+80	°C
STN	WIDE TEMPERATURE RANGE	OPERATING	-20~+70	STORAGE	-30~+80	°C
FSTN	WIDE TEMPERATURE RANGE	OPERATING	-20~+70	STORAGE	-30~+80	°C
STATIC ELECTRICITY		Be sure that you are grounded when handing LCM.				

6. Electrical Characteristics

ITEM		SYN	CONDITION	MIN.	TYPE	MAX.	UNIT
SUPPLY VOLTAGE FOR LOGIC		VDD-VSS	—	4.5	5.0	5.5	V
SUPPLY VOLTAGE FOR LCD		VDD-VO	Ta=-10/-20°C	—	4.6/4.8	—	V
			Ta= 25°C	—	4.4	—	V
			Ta=+50/+70°C	—	4.2/3.9	—	V
INPUT HIGH VOLTAGE		VIH	—	2.2	—	VDD	V
INPUT LOW VOLTAGE		VIL	—	0	—	0.6	V
OUTPUT HIGH VOLTAGE		VOH	—	2.4	—	—	V
OUTPUT LOW VOLTAGE		VOL	—	—	—	0.4	V
SUPPLY CURRENT		IDD	VDD=+5V	—	2.0	3.5	mA

7. Optical Characteristics
Ta at 25°C

ITEM	SYM	CONDITION	MIN.	TYPE	MAX.	UNIT
VIEW ANGLE (TOP/BOTTOM)	$\theta 1 \sim \theta 2$	$CR \geq 3$	-30	—	40	deg.
VIEW ANGLE (LEFT/RIGHT)	$\varphi 1 \cdot \varphi 2$	$CR \geq 3$	-30	—	30	deg.
CONTRAST RATIO	CR	—	—	6	—	—
RESPONSE TIME (RISE)	TON/Tr	—	—	180	230	mS
RESPONSE TIME (DECAY)	TOFF/Tf	—	—	100	150	mS

8. Optical Definitions
Response Time

Contrast Ration

View Angle

9. Display Address

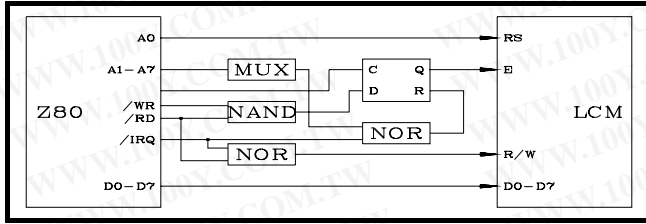
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Line 1	80	81	82	83	84	85	86	87	88	89	8A	8B	8C	8D	8E	8F				
Line 2	C0	C1	C2	C3	C4	C5	C6	C7	C8	C9	CA	CB	CC	CD	CE	CF				
Line 3																				
Line 4																				

	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Line 1																				
Line 2																				
Line 3																				
Line 4																				

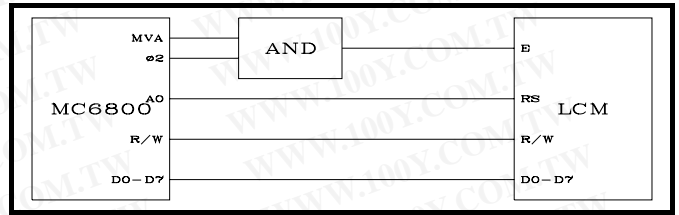
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10. Interface to MPU

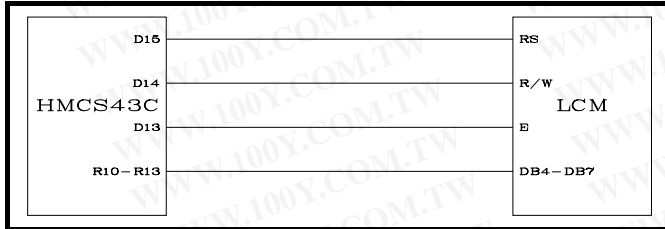
10.1 Interface to Z-80 CPU



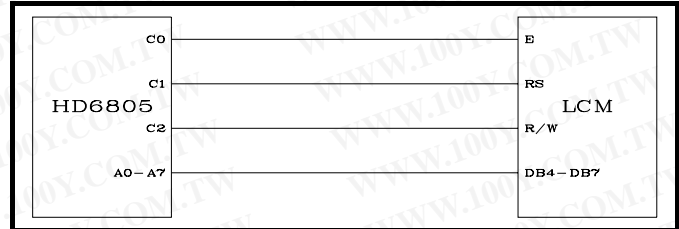
10.2 Interface to MC6800 CPU



10.3 Interface to 4-bit CPU (HMCS43C)



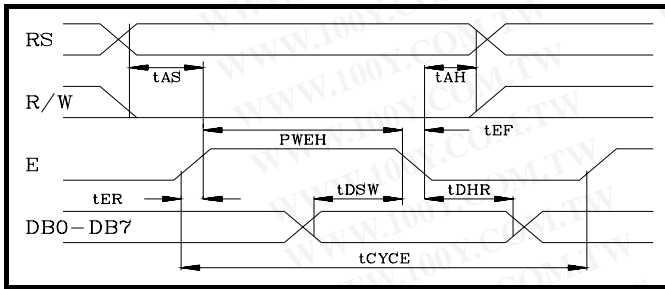
10.4 Interface to HD6805 MP



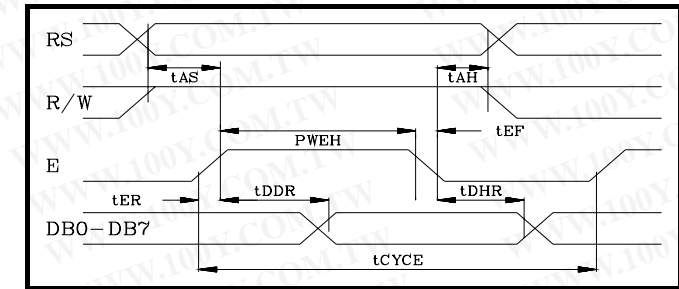
11. Timing Control

11.1 Write and Read Operation

Write Operation

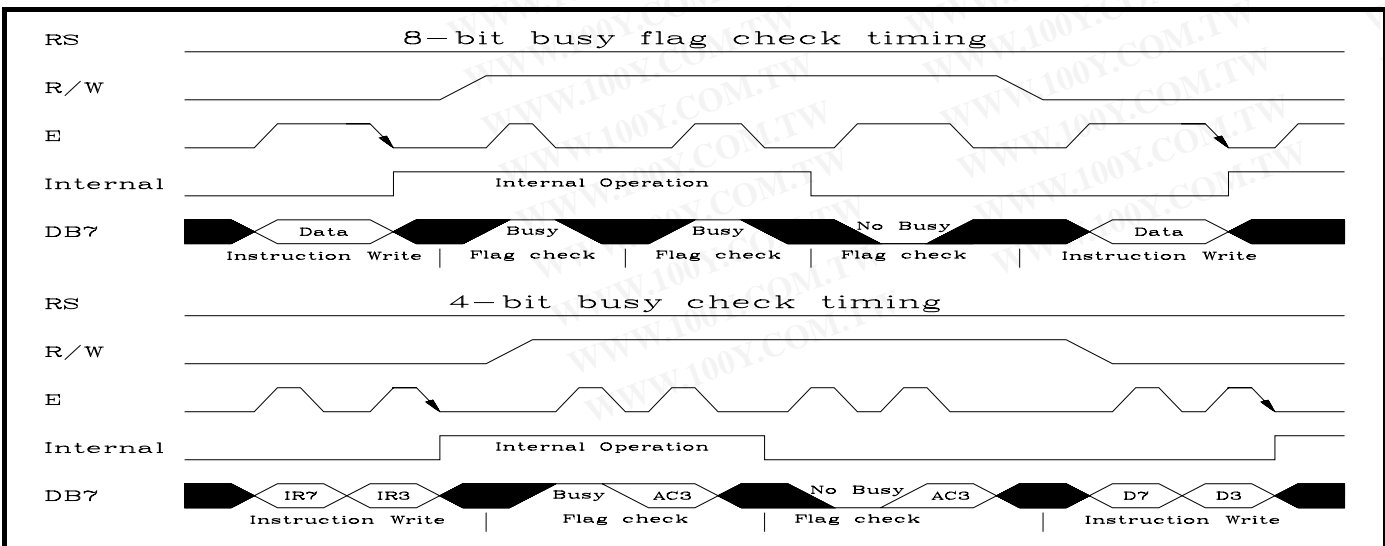


Read Operation



Item	Symbol	Limit (Min.)	Limit (Max.)	Unit
Enable Cycle Time	tCYCE	1000	--	ns
Enable Pules Width (High level)	PWEH	450	--	ns
Enable Rise/Fall Time	tER,tEF	--	25	ns
Address Set-Up Time (RS,R/W,E)	tAS	100	--	ns
Address Hole Time	tAH	10	--	ns
Data Set-Up Time	tDSW	100	--	ns
Data Delay Time	tDDR	--	190	ns
Data Hold Time	tDHR	20	--	ns

11.2 Busy flag check timing

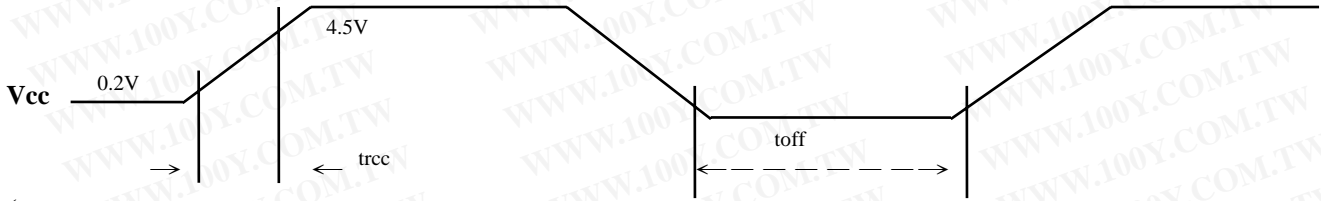


Note: IR7, IR3: Instruction 7th bit, 3rd bit; AC3: Address Counter 3rd bit.

12. Initialization of LCM

The LCM automatically initializes (reset) when power is turned on using the internal reset circuit. If the power supply conditions for correctly operating of the internal reset circuit are not met, initialization by instruction is required. Use the procedure is next page for initialization.

Internal Power Supply reset



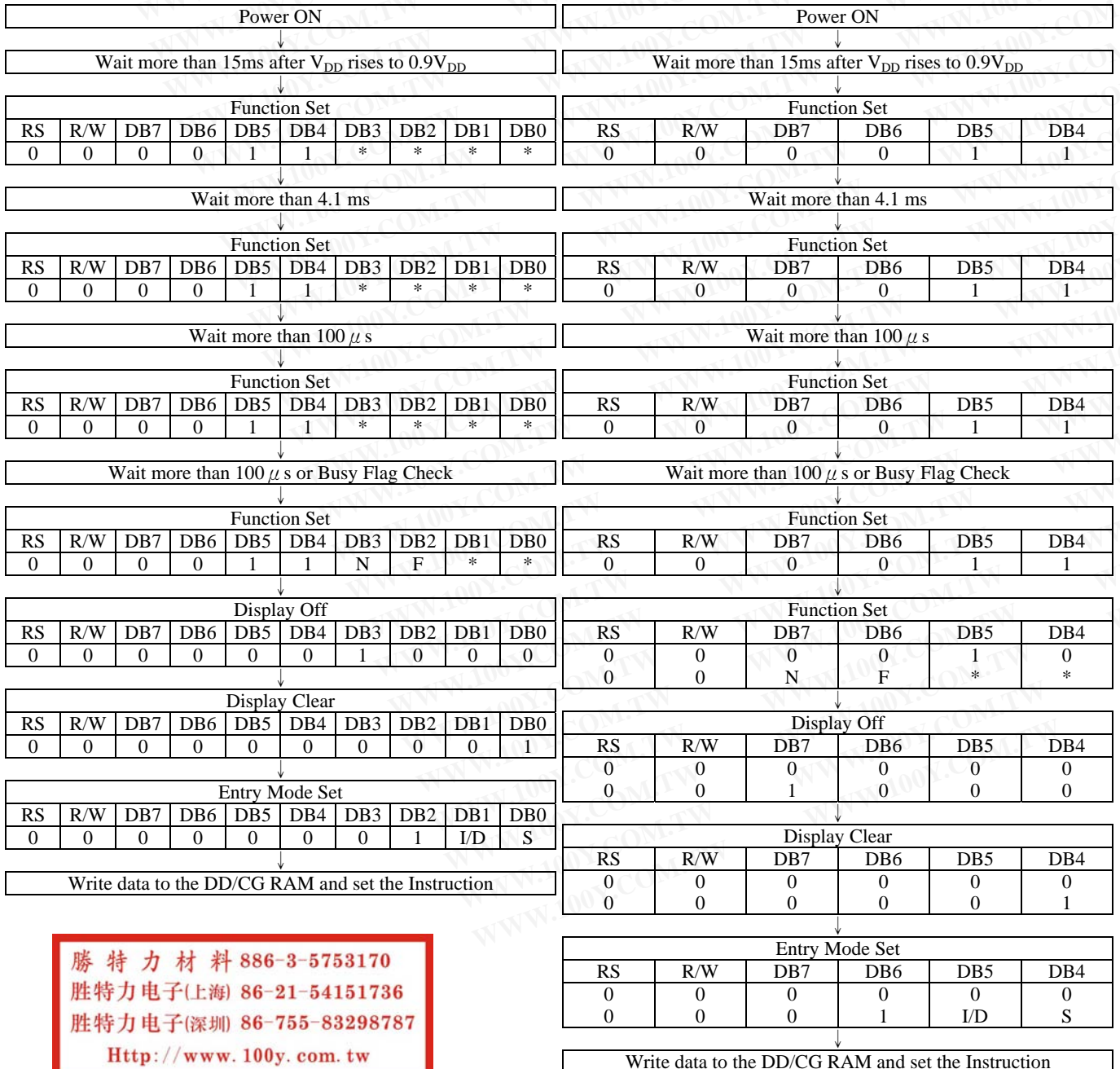
(Note 1) $10\text{ ms} \geq \text{trcc} \geq 0.1\text{ ms}$, $\text{toff} \geq 1\text{ ms}$.

(Note 2) toff stipulates the time of power OFF for momentary power supply dip or when power supply cycles ON and OFF.

Item	Symbol	Test condition	Limit (Min.)	Limit (Max.)	Unit
Power supply rise time	trcc	--	0.1	10	ms
Power supply off time	toff	--	1	--	ms

(a) 8-bit interface

(b) 4-bit interface



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13. Instruction Set

FUNCTION	R S	R /W	D B 7	D B 6	D B 5	D B 4	D B 3	D B 2	D B 1	D B 0	DESCRIPTION	EXECU. TIME* (MAX.)
Clear Display	0	0	0	0	0	0	0	0	0	1	Clears entire display and returns the cursor to home position (address 0).	1.64ms
Return Home	0	0	0	0	0	0	0	0	1	x	Return the cursor to the home position. Also returns the display being shifted to the original position. DD RAM contents remain unchanged.	1.64ms
Entry mode set	0	0	0	0	0	0	0	1	I / D	S	Set cursor move direct and specifies display shift. These operations are performed during data rite/read. For normal operation, set S to zero. I/D=1: increment; 0: decrement; S=1: accompanies display shift when data is written, for normal operation, set to zero.	40 μs
Display ON/OFF control	0	0	0	0	0	0	1	D	C	B	Set ON/OFF all display (D), cursor ON/OFF(C), and blink of cursor position character(B). D=1: ON display; 0:OFF display. C=1: ON cursor;0: OFF cursor. B=1: ON blink cursor; 0: OFF blink cursor.	40 μs
Cursor or Display shift	0	0	0	0	0	1	S / C	R / L	x	x	Move the cursor and shift the display without changing DD RAM contents. S/C=1: Display shift; 0:Cursor move. R/L=1: shift to right; 0: shift to left.	40 μs
Function Set	0	0	0	0	1	D L	N	F	x	x	Set the interface data length (DL). Number of display lines (N) and character font (F). DL=1: 8 bits; 0:4 bits. N=1: 2 lines; 0: 1 lines. F=1: 5x10 dots; 0: 5x7 dots.	40 μs
Set CG RAM address	0	0	0	1	ACG					Set CG RAM address. CG RAM data is sent and received after this setting.	40 μs	
Set DD RAM address	0	0	1	ADD					Set DD RAM address. DD RAM data is sent and received after this setting	40 μs		
Read busy flag & address	0	1	B F	AC					Reads Busy Flag (BF) indicating internal operation is being performed and reads address counter contents. BF=1: internally operating. 0: can accept instruction	1 μs		
Write Data to CG/DDRAM	1	0	WRITE DATA					Write data into DD RAM or CG RAM.			40 μs	
Read Data for CG/DDRAM	1	1	READ DATA					Read data from DD RAM or CG RAM			40 μs	

14. User Font Patterns (CG RAM Character)

Character Code (DD RAM data)	CG RAM Address	Character Pattern (CG RAM data)
Hi 7 6 5 4 3 2 1 0 Lo	5 4 3 2 1 0	Hi 7 6 5 4 3 2 1 0 Lo
0000x000	000 001 010 000 011 100 101 110 111	xxx 1 1 1 1 0 xxx 1 0 0 0 1 xxx 1 0 0 0 1 xxx 1 1 1 1 0 xxx 1 0 1 0 0 xxx 1 0 0 1 0 xxx 1 0 0 0 1 xxx 0 0 0 0 0
0000x001	001 010 001 011 100 101 110 111	xxx 1 0 0 0 1 xxx 0 1 0 1 0 xxx 1 1 1 1 1 xxx 0 0 1 0 0 xxx 1 1 1 1 1 xxx 0 0 1 1 0 xxx 0 0 1 0 0 xxx 0 0 0 0 0
-----	-----	-----
0000x111	000 001 010 111 011 100 101 110 111	

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15. Software Example

15.1 8-bit operation (8 bits 2 lines)

Function	R S	R w	D 7	D 6	D 5	D 4	D 3	D 2	D 1	D 0	Display	Description
Power on delay												Initialization. No display appears.
Function set	0	0	0	0	1	1	0	0	x	x		Sets to 8-bit operation and selects 2-line display and 5x7 dots character font. (Note: number of display lines and character fonts cannot be changed after this.)
Display OFF	0	0	0	0	0	0	1	0	0	0		Turn off display.
Display ON	0	0	0	0	0	0	1	1	1	0	-	Turn on display and cursor
Entry Mode Set	0	0	0	0	0	0	0	1	1	0	-	Set mode to increment the address by one and to shift the cursor to the right, at the time of write, to the DD/CG RAM Display is not shifted.
Write data to CG/DD RAM	1	0	0	1	0	1	0	0	1	1	S_	Write "S". Cursor incremented by one and shift to right.
Write data to CG/DD RAM	1	0	0	1	0	0	0	1	0	0	SDEC_	Write "D", "E", and "C".
Write data to CG/DD RAM	1	0	0	1	0	0	0	1	0	1		
Set DD RAM	0	0	1	1	0	0	0	0	0	0	SDEC	Set RAM address so that the cursor is propositioned at the head of the second line.
Write data to CG/DD RAM				*	*						SDEC CR_	Write "C" and "R".
Cursor or display shift	0	0	0	0	0	1	0	0	x	x	SDEC CR	Shift only the cursor position to the left.
Write data to CG/DD RAM				*	*						SDEC CO., LTD._	Write "O., LTD.".
Entry Mode Set	0	0	0	0	0	0	0	1	1	1	SDEC CO., LTD._	Set display mode shift at the time during writing operation.
Write data to CG/DD RAM	1	0	0	1	1	1	1	0	0	0	DEC O., LTD. x	Write "x". Cursor incremented by one and shift to right. (The display move to left.)
Write data to CG/DD RAM				*	*							Write other characters.
Return Home	0	0	0	0	0	0	0	0	1	0	SDEC CO., LTD.	Return both display and cursor to the original position (Set address to zero).

15.2 4-bit operation (4-bit, 1 line)

Function	RS	R/ W	D7	D6	D5	D4	Display	Description
Power on delay								Initialization. No display appears.
Function set	0	0	0	0	1	0		Sets to 4-bit operation. In this case, operation is handled as 8-bits by initialization, and only this instruction completes with one write.
Function set	0	0	0	0	1	0		Sets 4-bit operation and selects 1-line display and 5x7 dot character font on and resetting is needed. (Number of display lines and character fonts cannot be changed hence after).
Function set	0	0	0	0	x	x		(Number of display lines and character fonts cannot be changed hence after).
Display ON/OFF Control	0	0	0	0	0	0	-	Turn on display and cursor.
Display ON/OFF Control	0	0	1	1	1	0		
Entry Mode Set	0	0	0	0	0	0	-	Set mode to incremented the address by one and to shift the cursor to the right, at the time of write. To the DD/CG RAM display is not shifted.
Entry Mode Set	0	0	0	1	1	0		
Write data to CG/DD RAM	1	0	0	1	0	1	S_	Write "S". Cursor incremented by one and shift to right.
Write data to CG/DD RAM	1	0	0	0	1	1		

same as 8-bit operation

16. Character Generator ROM Map

		CHARACTER PATTERN CHART (5x7DOTS+CURSOR)												
		0000	0010	0011	0100	0101	0110	0111	1010	1011	1100	1101	1110	1111
Lower 4-bit of Character Code (Hexadecimal I)	Higher 4 bit													
	Lower 4 bit													
	xxxx0000	CG RAM (1)	0	1	2	3	4	5	6	7	8	9	A	B
	xxxx0001	(2)	!	!	!A	!Q	!a	!q	!	!	!	!	!	!
	xxxx0010	(3)	"	"	"B	"R	"b	"r	"	"	"	"	"	"
	xxxx0011	(4)	#	#	#C	#S	#c	#s	#	#	#	#	#	#
	xxxx0100	(5)	\$	\$	\$D	\$T	\$d	\$t	\$	\$	\$	\$	\$	\$
	xxxx0101	(6)	%	%	%E	%U	%e	%u	%	%	%	%	%	%
	xxxx0110	(7)	&	&	&F	&V	&f	&v	&	&	&	&	&	&
	xxxx0111	(8)	'	'	'G	'W	'g	'w	'	'	'	'	'	'
	xxxx1000	(1)	(	(	(H	(X	(h	(x	((((((
	xxxx1001	(2)	)	)	)I	)Y	)i	)y))))))
	xxxx1010	(3)	*	*	*J	*Z	*j	*z	*	*	*	*	*	*
	xxxx1011	(4)	+	+	+K	+L	+k	+l	+	+	+	+	+	+
	xxxx1100	(5)	,	,	,L	,#	,l	,#	,	,	,	,	,	,
	xxxx1101	(6)	-	-	-M	-N	-m	-n	-	-	-	-	-	-
xxxx1110	(7)	.	.	.N	.^	.n	.^	.	.	.	.	.	.
xxxx1111	(8)	/	/	/O	/_	/o	/_	/	/	/	/	/	/	

17. Reliability Condition

		TN Type		STN/FSTN Type		
		Normal Temp.	Wide Temp.	Normal Temp.	Wide Temp.	
Viewing Angle	Horizontal Φ	$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$	$\pm 30^\circ$	
	Vertical Θ (mm)	-10° to 30°	-10° to 30°	-10° to 40°	-10° to 40°	
Operating Temperature		-10 to 70°C	-25 to 80°C	0 to 50°C	*-20 to 70°C	
Storage Temperature		-20 to 80°C	-35 to 90°C	-20 to 70°C	*-30 to 80°C	
High Temperature (Power Off)		240 Hours @ 70°C	240 Hours @ 90°C	240 Hours @ 65°C	240 Hours @ 75°C	
Low Temperature (Power Off)		240 Hours @ -20°C	240 Hours @ -35°C	240 Hours @ -15°C	240 Hours @ -25°C	
High Temperature (Power On)		240 Hours @ 70°C	240 Hours @ 80°C	240 Hours @ 60°C	240 Hours @ 70°C	
Low Temperature (Power On)		240 Hours @ -10°C	240 Hours @ -25°C	240 Hours @ -10°C	240 Hours @ -20°C	
High Temperature & High Humidity		$45^\circ\text{C}/90\%\text{RH}$ 240 Hours	$55^\circ\text{C}/90\%\text{RH}$ 240 Hours	$45^\circ\text{C}/90\%\text{RH}$ 240 Hours	$55^\circ\text{C}/90\%\text{RH}$ 240 Hours	
Thermal Shock 5 Cycle		A	60min @ -20°C	60min @ -35°C	60min @ -20°C	60min @ -30°C
		B	5min @ 25°C	5min @ 25°C	5min @ 25°C	5min @ 25°C
		C	60min @ 70°C	60min @ 90°C	60min @ 70°C	60min @ 80°C
Expected Lift		50,000 Hours	50,000 Hours	50,000 Hours	50,000 Hours	

*Wide temp. version may not available for some products, Please consult our sales engineer or representatives.

18. Functional Test & Inspection Criteria

18.1 Sample plan

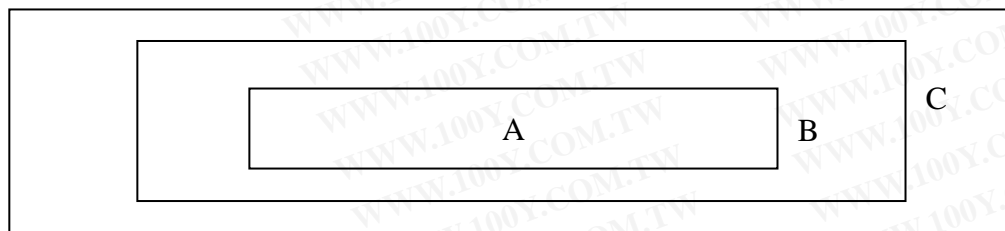
Sample plan according to MIL-STD-105D level 2, and acceptance/rejection criteria is.

Base on: Major defect: AQL 0.65 Minor defect: AQL 2.5

Inspection condition

Viewing distance for cosmetic inspection is 30cm with bare eyes, and under an environment of 800 lus (20W) light intensity. All direction for inspecting the sample should be within 45° against perpendicular line.

18.3 Definition of Inspection Zone in LCD



Zone A: Character / Digit area

Zone B: Viewing area except Zone A (Zone A + Zone B = minimum Viewing area)

Zone C: Outside viewing area (invisible area after assembly in customer's product)

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.

18.4 Major Defect

All functional defects such as open (or missing segment), short, contrast differential, excess power consumption, smearing, leakage, etc. and overall outline dimension beyond the drawing. Are classified as major defects.

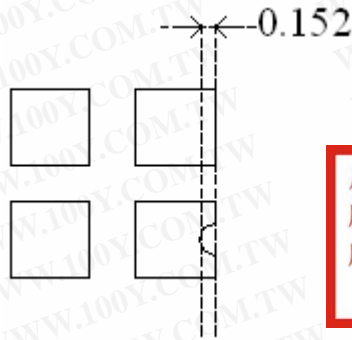
18.5 Inspection Parameters

NO	Parameter	Criteria																													
1	Black or White spots	<table border="1"> <thead> <tr> <th data-bbox="592 271 858 421" rowspan="2">Zone Dimension</th> <th colspan="2" data-bbox="858 271 1198 340">Acceptable number</th> <th data-bbox="1198 271 1345 421" rowspan="2">Class Of Defects</th> <th data-bbox="1345 271 1465 421" rowspan="2">AQL Level</th> </tr> <tr> <th data-bbox="858 340 1031 421">A</th> <th data-bbox="1031 340 1198 421">B</th> </tr> </thead> <tbody> <tr> <td data-bbox="592 421 858 465">D < 0.15</td> <td data-bbox="858 421 1031 465">*</td> <td data-bbox="1031 421 1198 465">*</td> <td data-bbox="1198 421 1345 613" rowspan="4">Minor</td> <td data-bbox="1345 421 1465 613" rowspan="4">2.5</td> </tr> <tr> <td data-bbox="592 465 858 510">0.15 ≤ D ≤ 0.2</td> <td data-bbox="858 465 1031 510">4</td> <td data-bbox="1031 465 1198 510">4</td> </tr> <tr> <td data-bbox="592 510 858 555">0.2 ≤ D ≤ 0.25</td> <td data-bbox="858 510 1031 555">2</td> <td data-bbox="1031 510 1198 555">2</td> </tr> <tr> <td data-bbox="592 555 858 613">D ≤ 0.3</td> <td data-bbox="858 555 1031 613">0</td> <td data-bbox="1031 555 1198 613">1</td> </tr> </tbody> </table> <p style="text-align: center;">D = (Long + Short) / 2 * : Disregard</p>				Zone Dimension	Acceptable number		Class Of Defects	AQL Level	A	B	D < 0.15	*	*	Minor	2.5	0.15 ≤ D ≤ 0.2	4	4	0.2 ≤ D ≤ 0.25	2	2	D ≤ 0.3	0	1					
Zone Dimension	Acceptable number		Class Of Defects	AQL Level																											
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0.2 ≤ D ≤ 0.25	2	2																													
D ≤ 0.3	0	1																													
2	Scratch, Substances	<table border="1"> <thead> <tr> <th data-bbox="592 680 738 873" rowspan="2">X(mm) Y(mm)</th> <th data-bbox="738 680 876 873" rowspan="2">Zone</th> <th colspan="2" data-bbox="876 680 1198 750">Acceptable number</th> <th data-bbox="1198 680 1345 873" rowspan="2">Class Of Defects</th> <th data-bbox="1345 680 1465 873" rowspan="2">AQL Level</th> </tr> <tr> <th data-bbox="876 750 1031 873">A</th> <th data-bbox="1031 750 1198 873">B</th> </tr> </thead> <tbody> <tr> <td data-bbox="592 873 738 918">*</td> <td data-bbox="738 873 876 918">0.04 ≥ W</td> <td data-bbox="876 873 1031 918">*</td> <td data-bbox="1031 873 1198 918">*</td> <td data-bbox="1198 873 1345 1066" rowspan="4">Minor</td> <td data-bbox="1345 873 1465 1066" rowspan="4">2.5</td> </tr> <tr> <td data-bbox="592 918 738 963">3.0 ≥ L</td> <td data-bbox="738 918 876 963">0.06 ≥ W</td> <td data-bbox="876 918 1031 963">4</td> <td data-bbox="1031 918 1198 963">4</td> </tr> <tr> <td data-bbox="592 963 738 1008">2.0 ≥ L</td> <td data-bbox="738 963 876 1008">0.08 ≥ W</td> <td data-bbox="876 963 1031 1008">2</td> <td data-bbox="1031 963 1198 1008">3</td> </tr> <tr> <td data-bbox="592 1008 738 1066">—</td> <td data-bbox="738 1008 876 1066">0.1 ≥ W</td> <td data-bbox="876 1008 1031 1066">0</td> <td data-bbox="1031 1008 1198 1066">1</td> </tr> </tbody> </table> <p>X : Length Y : Width * : Disregard</p> <p>Total defects should not exceed 4/module</p>				X(mm) Y(mm)	Zone	Acceptable number		Class Of Defects	AQL Level	A	B	*	0.04 ≥ W	*	*	Minor	2.5	3.0 ≥ L	0.06 ≥ W	4	4	2.0 ≥ L	0.08 ≥ W	2	3	—	0.1 ≥ W	0	1
X(mm) Y(mm)	Zone	Acceptable number		Class Of Defects	AQL Level																										
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—	0.1 ≥ W	0	1																												
3	Air Bubbles (between glass & polarizer)	<table border="1"> <thead> <tr> <th data-bbox="592 1184 858 1335" rowspan="2">Zone Dimension</th> <th colspan="2" data-bbox="858 1184 1198 1254">Acceptable number</th> <th data-bbox="1198 1184 1345 1335" rowspan="2">Class Of Defects</th> <th data-bbox="1345 1184 1465 1335" rowspan="2">AQL Level</th> </tr> <tr> <th data-bbox="858 1254 1031 1335">A</th> <th data-bbox="1031 1254 1198 1335">B</th> </tr> </thead> <tbody> <tr> <td data-bbox="592 1335 858 1379">D ≤ 0.15</td> <td data-bbox="858 1335 1031 1379">*</td> <td data-bbox="1031 1335 1198 1379">*</td> <td data-bbox="1198 1335 1345 1478" rowspan="3">Minor</td> <td data-bbox="1345 1335 1465 1478" rowspan="3">2.5</td> </tr> <tr> <td data-bbox="592 1379 858 1424">0.15 < D ≤ 0.25</td> <td data-bbox="858 1379 1031 1424">2</td> <td data-bbox="1031 1379 1198 1424">*</td> </tr> <tr> <td data-bbox="592 1424 858 1478">0.25 < D</td> <td data-bbox="858 1424 1031 1478">0</td> <td data-bbox="1031 1424 1198 1478">1</td> </tr> </tbody> </table> <p>* : Disregard</p> <p>Total defects shall not excess 3/module.</p>				Zone Dimension	Acceptable number		Class Of Defects	AQL Level	A	B	D ≤ 0.15	*	*	Minor	2.5	0.15 < D ≤ 0.25	2	*	0.25 < D	0	1								
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4

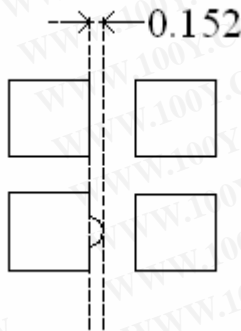
Uniformity of Pixel

Pixel shape (with Dent)



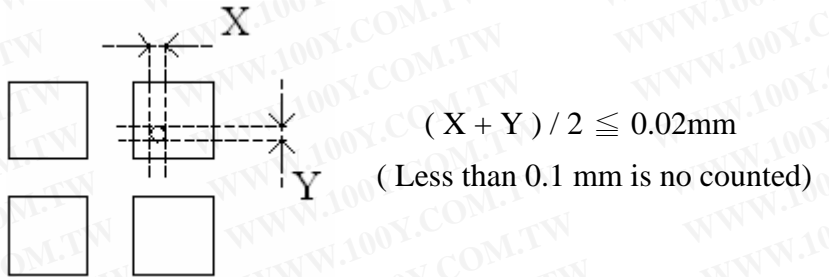
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 勝特力电子(上海) 86-21-54151736
 勝特力电子(深圳) 86-755-83298787
[Http://www.100y.com.tw](http://www.100y.com.tw)

Pixel shape (with Projection)

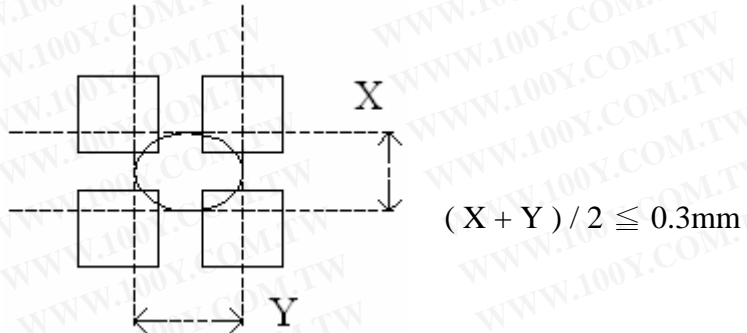


Should not be connected
next pixel

Deformation



(4) Deformation



Total acceptable number : 1 / pixel , 5 / cell

19. Test

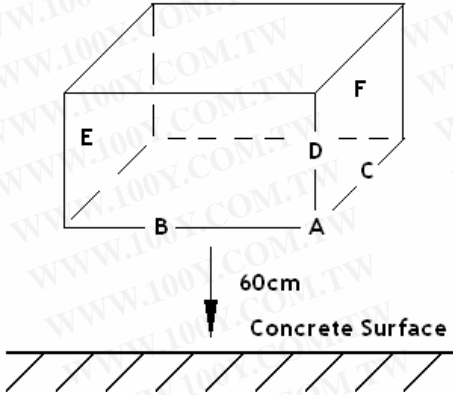
No change no display and in operation under the following text condition.

Conditions : Unless otherwise specified, test will be conducted under the following condition.

Temperature : $20 \pm 5 \text{ }^\circ\text{C}$

Humidity : $65 \pm 5\% \text{RH}$

Tests will be not conducted under functioning state.

NO	Parameter	Conditions	Notes
1	High Temperature Operating	$70^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, 96 hrs (operation state)	
2	Low Temperature Operating	$-20^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, 96 hrs (operation state)	1
3	High Temperature Storage	$80^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, 96 hrs	2
4	Low Temperature Storage	$-30^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, 96 hrs	1 , 2
5	Damp Proof Test	$40^\circ\text{C} \pm 2 \text{ }^\circ\text{C}$, 90 ~ 95%RH , 96hr	1 , 2
6	Vibration Test	Total fixed amplitude : 1.5 mm Vibration Frequency : 10 ~ 55 Hz One cycle 60 seconds to 3 directions of X , Y , Z for each 15 minutes	3
7	Shock Test	To be measured after dropping from 60cm high on the concrete surface in packing state.  Dropping method comer dropping A comer : once Edge dropping B , C , D edge : once Face dropping E , F , G face : once	

Note 1 : No dew condensation to be observed.

Note 2 : The function test shall be conducted after 4 hours storage at the normal

Temperature and humidity after removed from the test chamber

Note 3 : Vibration test will be conducted to the product itself without putting it in a container.

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20. Precautions Against Product Handling

The following precautions will guide you in handling our product correctly.

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20.1 Care of the LCD module against static electricity discharge.

- 20.1.1 When working with the module, be sure to ground your body and any electrical equipment you may be using. We strongly recommend the use of anti static mats (made of rubber), to protect work tables against the hazards of electrical shock.
- 20.1.2 Slowly and carefully remove the protective film from the LCD module, since this operation can generate static electricity.
- 20.1.3 Avoid the use of work clothing made of synthetic fibers. We recommend cotton clothing or other conductivity-treated fibers.

20.2 Liquid crystal display devices (LCD devices)

- 20.2.1 The polarizer adhering to the surface of the LCD is made of a soft material. Guard against scratching it.
- 20.2.2 The LCD device panel used in the LCM is made of plate glass. Avoid any strong mechanical shock. Should the glass break handle it with care.

20.3 When the LCD module alone must be stored form long periods of time:

- 20.3.1 Protect the modules from excessive external forces.
- 20.3.2 Protect the modules from high temperature and humidity.
- 20.3.3 Keep the modules out of direct sunlight or direct exposure to ultraviolet rays.

20.4 Use the module with a power supply that is equipped with an overcurrent protector circuit, since the module is not provided with this protective feature.

20.5 Do not ingest the LCD fluid itself should it leak out of a damaged LCD module. Should hands or clothing come in contact with LCD fluid, wash immediately with soap.

20.6 Conductivity is not guaranteed for models that use metal holders where solder connections between the metal holder and the PCB are not used. Please contact us to discuss appropriate ways to assure conductivity.

20.7 For models which use CCFL:

- 20.7.1 High voltage of 1000V or greater is applied to the CCFL cable connector area.
- 20.7.2 Protect CCFL cables from rubbing against the unit and thus causing the wire jacket to become worn.
- 20.7.3 The use of CCFLs for extended periods of time at low temperatures will significantly shorten their service life.

20.8 For models which use touch panels:

- 20.8.1 Do not stack up modules since they can be damaged by components on neighboring modules.
- 20.8.2 Do not place heavy objects on top of the product. This could cause glass breakage.

20.9 For models which use COG & TAB:

- 20.9.1 The mechanical strength of the product is low since the IC chip faces out unprotected from the rear. Be sure to protect the rear of the IC chip from external forces.
- 20.9.2 Given the fact that the rear of the IC chip is left exposed, in order to protect the unit from electrical damage, avoid installation configurations in which the rear of the IC chip runs the risk of making any electrical contact.

20.10 Models which use flexible cable, heat seal, or TAB:

20.10.1 In order to maintain reliability, do not touch or hold by the connector area.

20.10.2 Avoid any bending, pulling, or other excessive force, which can result in broken connections.

20.11 In case of acrylic plate is attached to front side of LCD panel, cloudiness (very small cracks) can occur on acrylic plate, being influenced by some components generated from polarizer film.

Please check and evaluate those acrylic materials carefully before use.

20.12 In case of buffer material such as cushion/gasket is assembled into LCD module, it may have an adverse effect on connecting parts (LCD panel-TCP/ HEAT SEAL/ FPC, PCB-TCP/HEAT SEAL/FPC, TCP-HEAT SEAL, TCP-FPC, HEAT SEAL-FPC) depending on its materials.

Please check and evaluate these materials carefully before use.

21. Warranty

This product has been manufactured to your company's specifications as a part for use in your company's general electronic products. It is guaranteed to perform according to delivery specifications. For any other use apart from general electronic equipment, we cannot take responsibility if the product is used in medical devices, nuclear power control equipment, aerospace equipment, fire and security systems, or any other applications in which there is a direct risk to human life and where extremely high levels of reliability are required. If the product is to be used in any of the above applications, we will need to enter into a separate product liability agreement.

21.1 We cannot accept responsibility for any defect, which may arise after the application of strong external force to the product.

21.2 We cannot accept responsibility for any defect, which may arise from additional manufacturing of the product (including disassembly and reassembly), after product delivery.

21.3 We cannot accept responsibility for any defect, which may arise due to the application of static electricity after the product, has passed your company's acceptance inspection procedures.

21.4 We cannot accept responsibility for intellectual property of a third party, which may arise through the application of our product to your assembly with exception to those issues relating directly to the structure or method of manufacturing of our product.

21.5 When the product is in CCFL models, CCFL service life and brightness will vary according to the performance of the inverter used, leaks, etc. We cannot accept responsibility for product performance, reliability, or defect, which may arise.

21.6 SDEC will not be held responsible for any quality guarantee issue for defect products longer than 1(one) year from SDEC production which ever comes later.

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