SAMSUNG SDI

Date : Oct. 3th, 2007

Specification for Approval

Product Name : AMOLED Module

Model Name : AMDM001

Description : 2.6" LQVGA(240×400) 262K Color

Proposed by			Customer's Approval
Designed	Checked	Approved	
YANGSOO KIM	JAEYONG KIM	SEUNGIN KANG	
Oct. 3th, '07	Oct. 3th, '07	Oct. 4th, '07	

AMOLED

Revision History

Date	Rev. No.	Contents	Remark
Feb. 13. '07	0.0	- initial issue	-
May.14.'07	1.0	- Chaning Reliability test conditions	Modified by y.s.kim
July.23.'07	2.0	- Modify power sequence	by jin hyun choi
July.24.'07	2.1	- Add SMD Defect Criteria	Modified by y.s.kim
July.24.'07	2.2	- Add circuit diagram & mechanical drawing	Modified by y.s.kim
Aug.17.'07	2.3	- Add SMD standards - Modify Drawing of Package, Pruduct - Modify Product Partlist	Modified by h.k.Lee
Aug.17.'07	2.4	- add packing label spec.	Modified by y.s.kim
Sept.11.'07	2.5	- change inner packing label spec.	Modified by y.s.kim
Sept.13.'07	2.6	- change circuit diagram.(C22 10pF → 27pF) - add fpcb, fpcb assy's drawing, placement spec	Modified by y.s.kim
Sept.13.'07	2.7	- add Reliability Test condition (room temp, high humidity operation)	Modified by y.s.kim
Sept.29.'07	2.8	- change darkpixel spec(2 → 1)	Modified by y.s.kim
Oct. 2.'07	2.9	- Change spec of pol dent and scratch. - Change Idd spec and add comment for DC/DC sleep mode	Modified by y.s.kim
Oct. 3.'07	3.0	- Change darkpixel size spec. - Change PCT test method.	Modified by y.s.kim

Contents

1. Scope

This Specification defines general provisions as well as inspection standards for AMOLED module supplied by SAMSUNG SDI Co., LTD.,
If the event of unforeseen problems or unspecified items occurs, we naturally shall negotiate and agree to solution with customer.

2. Warranty

Basically, warranty term is **15 months** of reliability characteristics of quality level after the outgoing date in SAMSUNG SDI Co., LTD., and SAMSUNG SDI Co., LTD. , could compensate for defectives which happens within warranty term under condition that the products should be stored or be used as specified under normal condition within the contents of specification.
Otherwise, it is impossible to compensate for defectives when they happens by customer's mistake such as careless handing or circuit change, etc.
And after 15 months of warranty term, all replacements for defectives will be charged.

This Specification stipulates the final and comprehensive requirements for the respective products hereof. Beyond this Specification, it is responsibility of the customer to explicitly disclose any additional requirements, information or reservations regarding these requirements to Samsung SDI prior to implementation, where any and all disclosures of the customer shall be with an authorized representative of Samsung SDI in writing. Samsung SDI shall not be responsible for safety, performance, functionality, compatibility of the system with which the Samsung SDI-supplied components are integrated unless such features have been expressly communicated and described in the Specification. **SAMSUNG SDI MAKES NO GUARANTY OR WARRANTY, EXPRESS OR IMPLIED , INCLUDING BUT NOT LIMITED TO MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, TO ANY PARTY**.
Moreover, any party should do their own due diligence regarding these requirements prior to implementation.

3. Features

1) Display Color : 262K_Color (RGB)
2) Display Format : 240(W)×RGB×400(H) dots
3) CPU Interface : CPU-18bits.
4) Control IC / Driver IC : D53E4EA7554 By MagnaChip

4. Mechanical Specification

Item	Specifications	Unit
Dimensional outline (Glass)	37.78(W) X 64.70(H) X 1.66(T) 0.4t glass	mm
Number of dots	240(W) X RGB X 400(H)	Dots
Viewing area	34.84(W) X 57.40(H)	mm
Active area	33.84(W) X 56.40(H)	mm
Diagonal Inch	2.6	inch
Pixel pitch	0.141(W) X 0.141(H)	mm
Dots size	0.047(W) X 0.141(H)	mm

5. Maximum Rating

Item		Symbol	Min.	Max.	Unit	Note
Supply voltage	Logic	VCI	-0.3	4.0	V	(1),(2)
		VDD2	-0.3	4.0	V	(1),(2)
	Power	Vbat	-0.3	7.0	V	(1),(2)
Input voltage		VI	-0.3	VDD2+0.3	V	(2)
Operating temperature		Top	-30	70	℃	-
Humidity		Hop	10	95	%(RH)	-
Polarizer Surface Hardness		3H				-
Storage temperature		Tstg	-40	85	℃	-
Humidity		Hstg	10	95	%RH	(3)

Note 1) VCI, Vbat should satisfy the condition of
VCI, VDD2, Vbat > Vss (GND).

Note 2) If the supplied voltage exceeds the maximum limitation, LSI can be damaged permanently. Therefore, while operating, it is recommend to use LSI within the maximum electrical limitation.
If not, LSI can cause decreased reliability or operational problems.

6. Electrical Characteristics

[Vss=0V, Ta=-20 to 60℃]

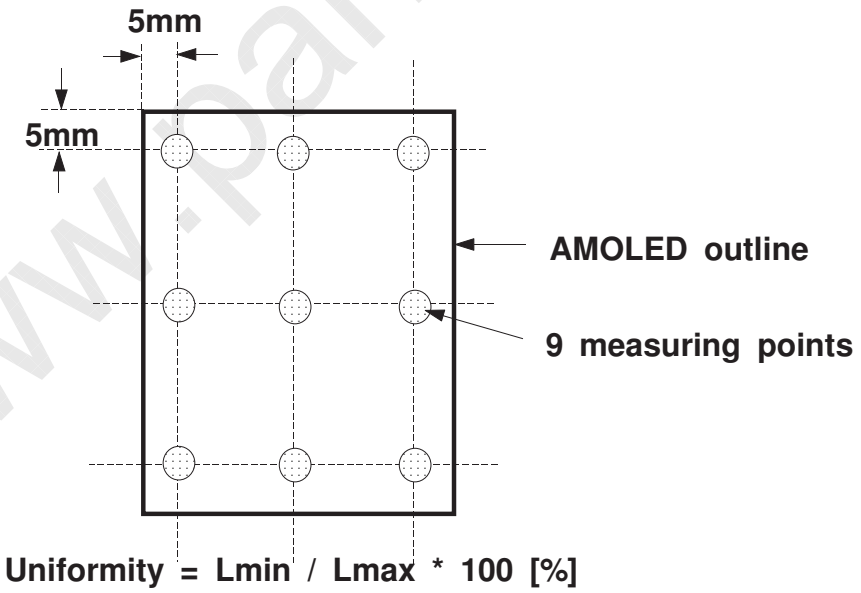
Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Supply voltage	Logic	VCI	-	2.5	2.8	3.3	V	
		VDD2	-	1.65	1.8	3.3		
	Power	Vbat	-	3.2	3.8	4.5		
Input Voltage	"H" level	VIH	-	0.8VDD2	-	VDD	V	(1)
	"L" level	VIL	-	0	-	0.2VDD2		
Output Voltage	"H" level	VOH	IOH = -0.4mA IOL = 0.4mA	Vdd2-0.4	-	-	V	(2)
	"L" level	VOL		-	-	0.4		
Leakage Current	Input	ILI	VI=VDD2 or VSS	-1.0	-	+1.0	uA	(3)
	Output	ILO		-1.0	-	+1.0	uA	(4)
Supply Current	EL Power	Ibat	Vbat=T.B.D	-	230	300	mA	
		Pvbat		-		1110	mW	
Driver IC Current Consumption		IVCI	VCI=T.B.D	-	-	10	mA	
		IVDD	VDD=RVDD=T.B.D	-	-	3	mA	
		Istby	VDD=RVDD=1.8 VDD2=VCI=2.8	-	-	50	uA	(5)

(1) DB0~DB17, SEL68, WRB, RDB, P/S, CS, RESB, SELMDDI, RL, SDA, SCL, VSTBY, VSYNC, HSYNC, ENABLE, DOTCLK ports
(2) DB0~DB17, TES2, TEST3, ports
(3) SEL68, WRB, RDB, P/S, RS, CSB, RESB, SELMDDI, RL, SDA, SCL, VSTBY, VSYNC, HSYNC, ENABLE, DOTCLK ports
(4) Applicable at D0~D17 = high impedance state.
(5) DC/DC sleep mode current takes 1minute to stabilize..

7. Electro-optical characteristics

Item		Symbol	Temp	Condition	Min.	Typ.	Max.	Unit	Note
Brightness			25℃	Normal (White Mode)	**170**	**200**	**230**	cd/m²	(1)
Uniformity			25℃	Normal (White Mode)	82	90	-	%	(1)
Contrast ratio		K	25℃	Φ=0°,θ=0°	2,000	-	-	-	(1),(2)
Color of CIE coordinate	White	X	25℃	Φ=0° θ=0°	**0.275**	**0.300**	**0.325**	-	(1),(2),(3)
		Y			**0.285**	**0.310**	**0.335**	-	
	Red	X			0.625	0.675	0.725	-	
		Y			0.275	0.325	0.375	-	
	Green	X			0.170	0.220	0.270	-	
		Y			0.675	0.725	0.775	-	
	Blue	X			0.095	0.145	0.195	-	
		Y			0.005	0.055	0.105	-	
Life Time			25℃	Normal (Full White Mode)	21,000	-	-	Hr	(4)

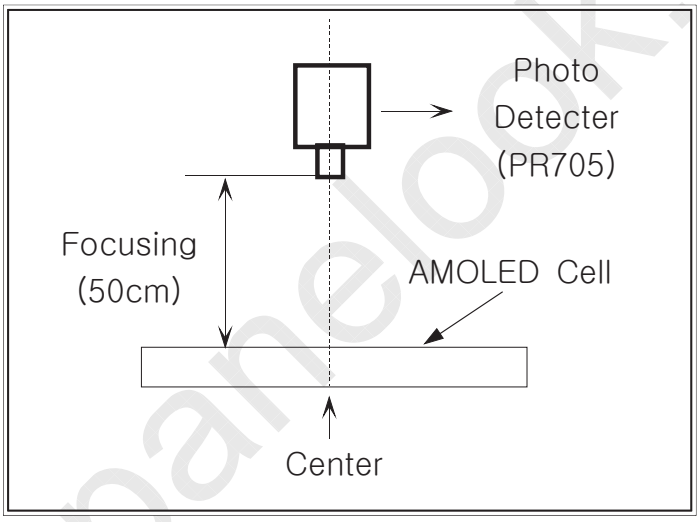
NOTE1) Uniformity Measuring Point



Note 2) Definition of contrast ratio (K)

$$\text{Contrast Ratio(K)} = \frac{\text{Brightness of selected dot (White patterned area) at 200cd/m}^2}{\text{Brightness of non-selected dot (Black patterned area) at 200cd/m}^2}$$

Note 3) Optical measuring system
temperature regulated chamber



Note 4) Life Time : The elapsed time that the full white brightness decreases to the half of initial value.

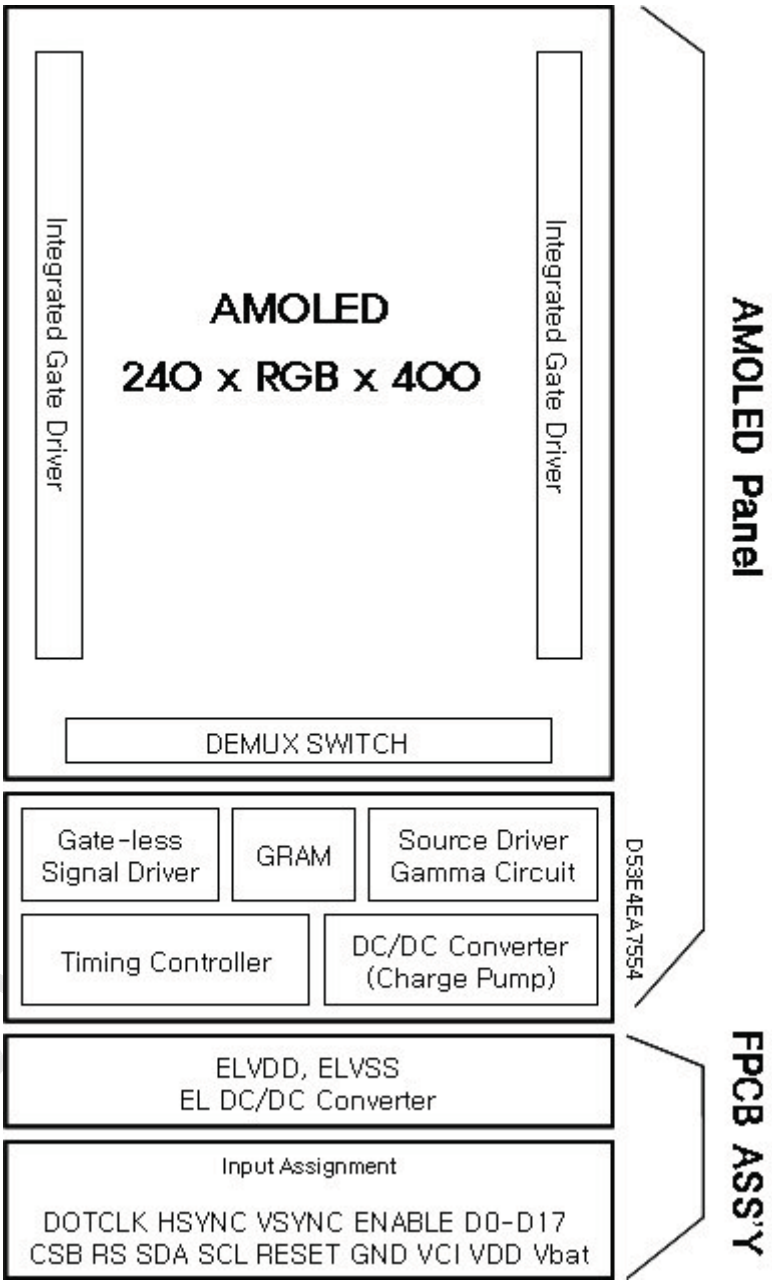
8. Input/output Terminal Assignment

8-1. I/O Connection

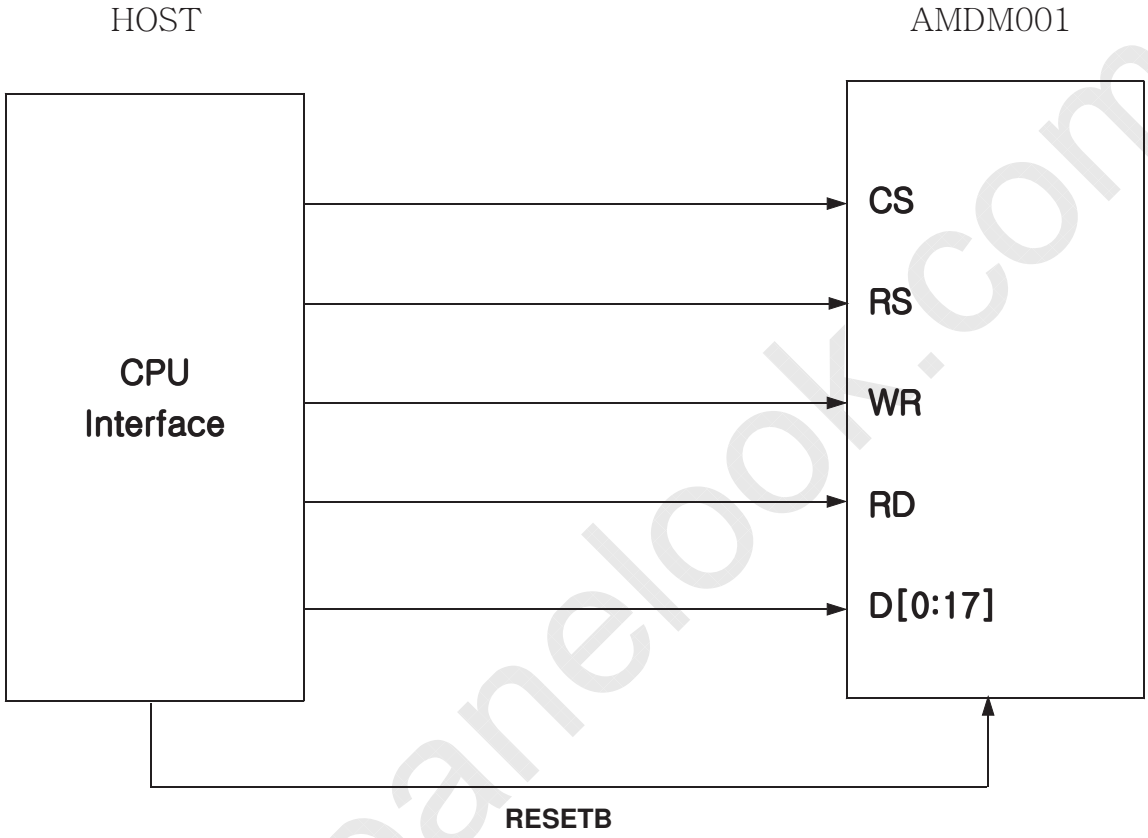
Pin No.	Symbol	I/O	Function
1	GND	-	Ground
2	GND	-	Ground
3	VDD	-	System power supply for Logic I/O
4	VCI	-	Power supply analog circuit
5	VDD	-	System power supply for Logic I/O
6	VCI	-	Power supply analog circuit
7	GND	-	Ground
8	GND	-	Ground
9	GND	-	Ground
10	FLM	O	Start pulse of frame
11	D17	I/O	Data bus for system interface
12	D8	I/O	Data bus for system interface
13	D16	I/O	Data bus for system interface
14	D7	I/O	Data bus for system interface
15	D15	I/O	Data bus for system interface
16	D6	I/O	Data bus for system interface
17	D14	I/O	Data bus for system interface
18	D5	I/O	Data bus for system interface
19	D13	I/O	Data bus for system interface
20	D4	I/O	Data bus for system interface
21	D12	I/O	Data bus for system interface
22	D3	I/O	Data bus for system interface
23	D11	I/O	Data bus for system interface
24	D2	I/O	Data bus for system interface
25	D10	I/O	Data bus for system interface
26	D1	I/O	Data bus for system interface
27	D9	I/O	Data bus for system interface
28	D0	I/O	Data bus for system interface
29	RS	I	Input Register/Data selection pin
30	RDB	I	Read control signal
31	WRB	I	Write control signal
32	CSB	I	Chip selection pin
33	GND	-	Ground
34	VBAT	-	Battery Voltage
35	RESETB	I	Reset pin
36	VBAT	-	Battery Voltage
37	GND	-	Ground
38	MTP	-	OPEN
39	GND	-	Ground

40	GND	-	Ground

8-2. Circuit block diagram

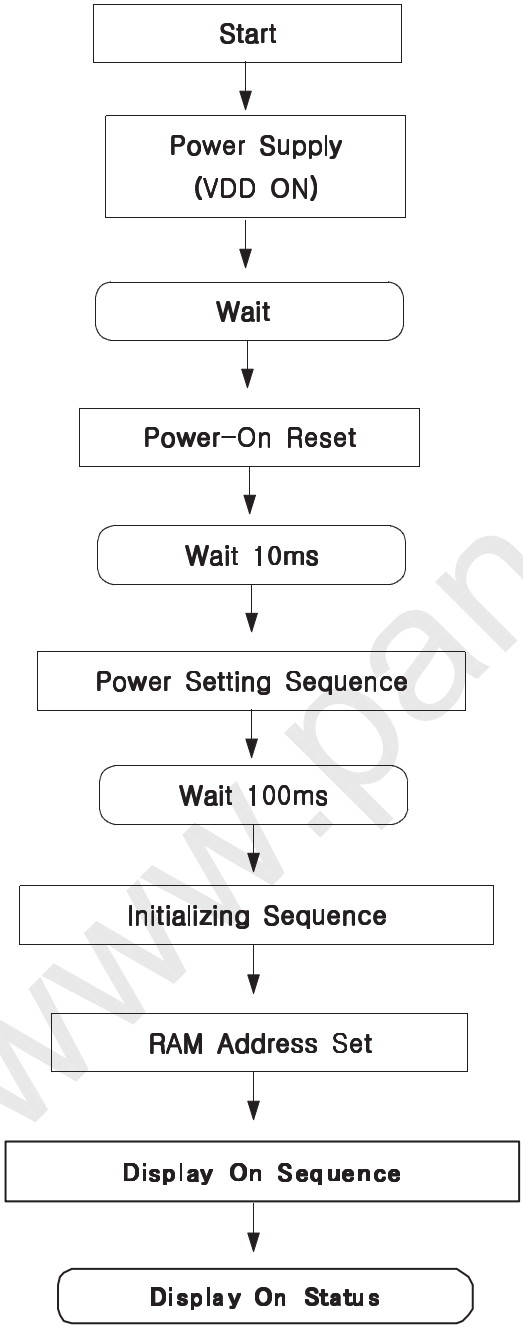


8-3. CPU Interface

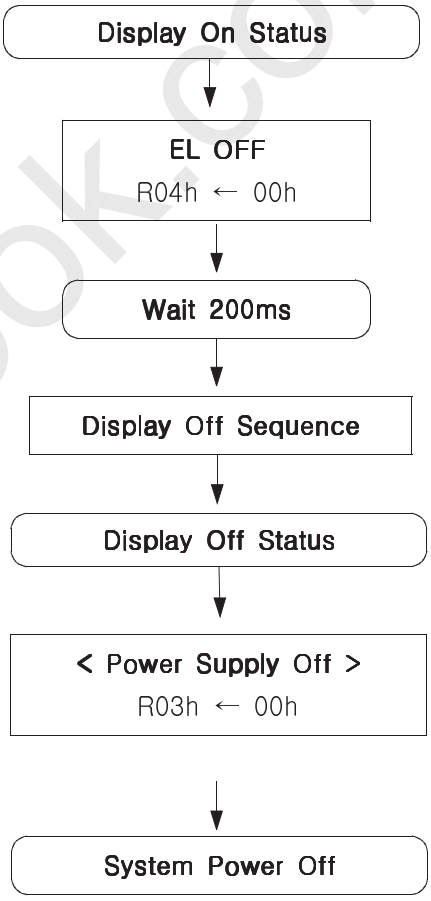


8-4 AMOLED Control State Diagram

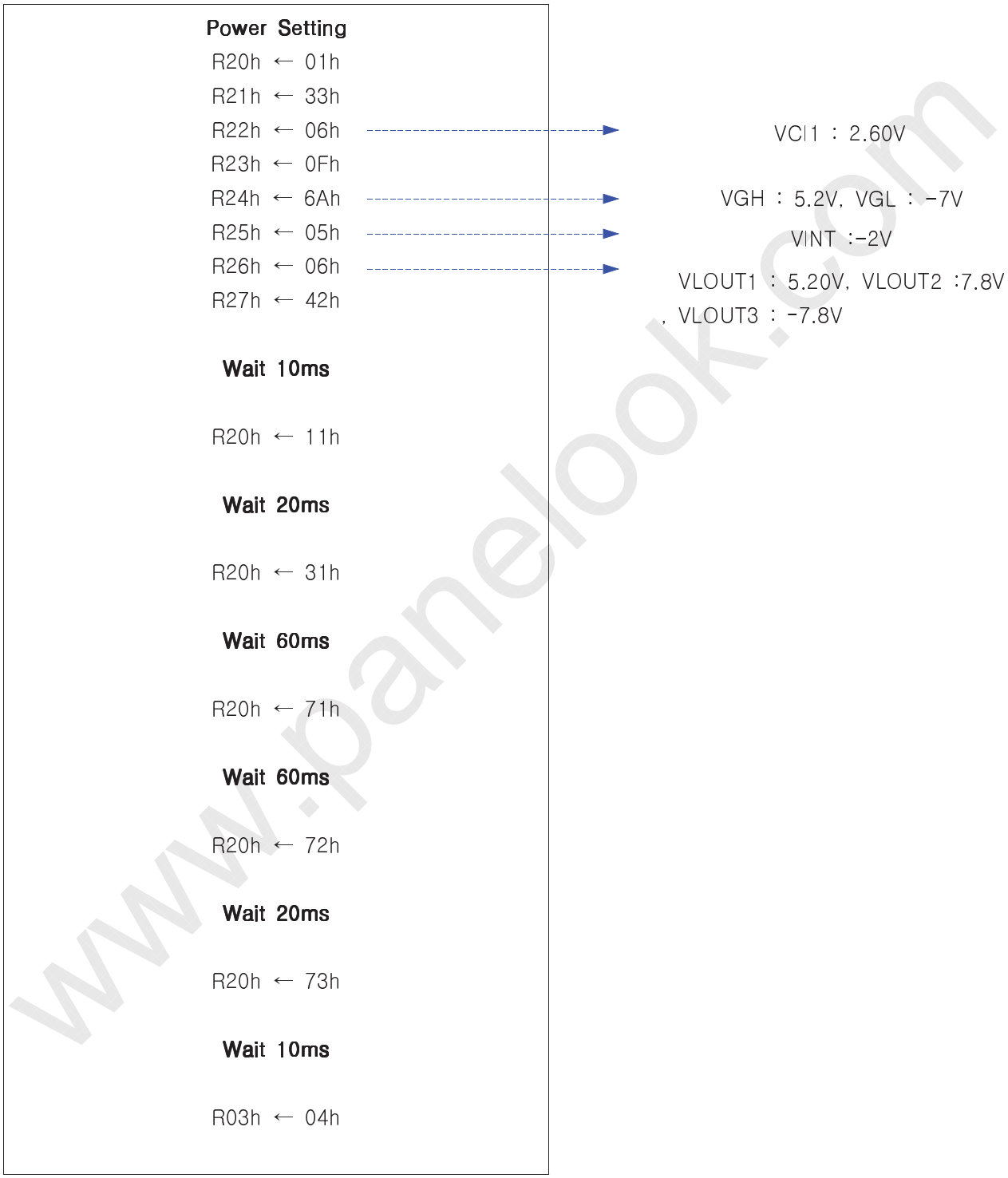
< Power On Sequence >



< Power Off Sequence >



8-4-1 Power Setting Sequence



8-4-2 Initializing Sequence

R01h ← 00h
R02h ← 42h
R06h ← 0Ch
R07h ← 0Ch
R08h ← 0Ch
R09h ← 74h
R0Ah ← 11h
R0Bh ← 00h
R0Ch ← 00h
R0Dh ← 00h
R0Eh ← 00h
GAMMA CORRECTION
R30h ← 05h
R31h ← 05h
R32h ← 05h
R33h ← 39h
R34h ← 40h
R35h ← 4Dh
R36h ← 17h
R37h ← 18h
R38h ← 15h
R39h ← 12h
R3Ah ← 14h
R3Bh ← 11h
R3Ch ← 0Fh
R3Dh ← 1Ah
R3Eh ← 14h
R3Fh ← 00h
R40h ← 3Bh
R41h ← 3Ch

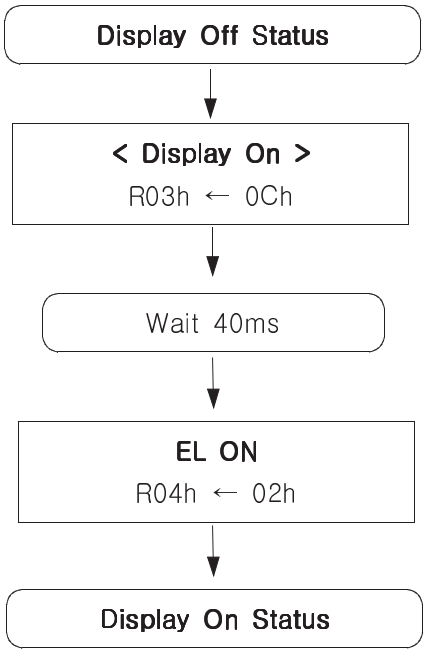
8-4-3 Ram Address Sequence

R10h ← 00h
R12h ← 00h
R13h ← 00h
R14h ← 00h
R15h ← EFh
R16h ← 0Fh
R17h ← 18h

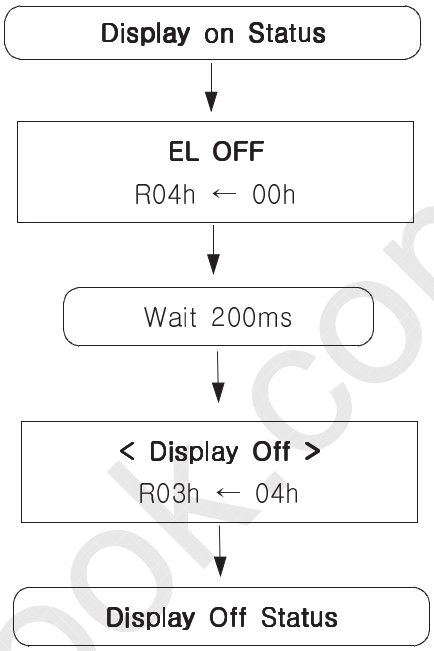
R11h ← 08h

R11h ← 00h

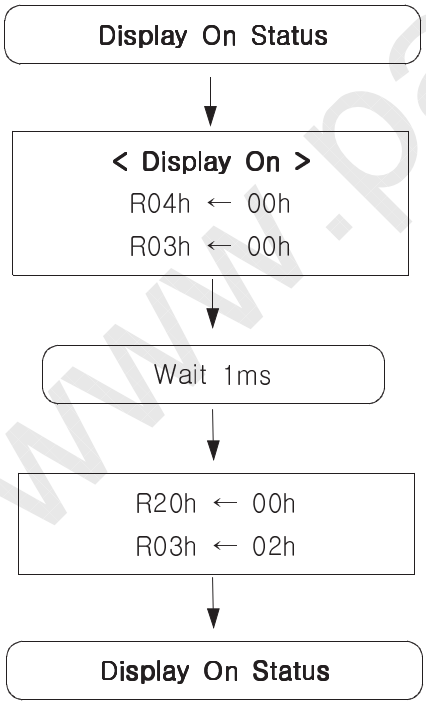
8-4-4 Display On Sequence



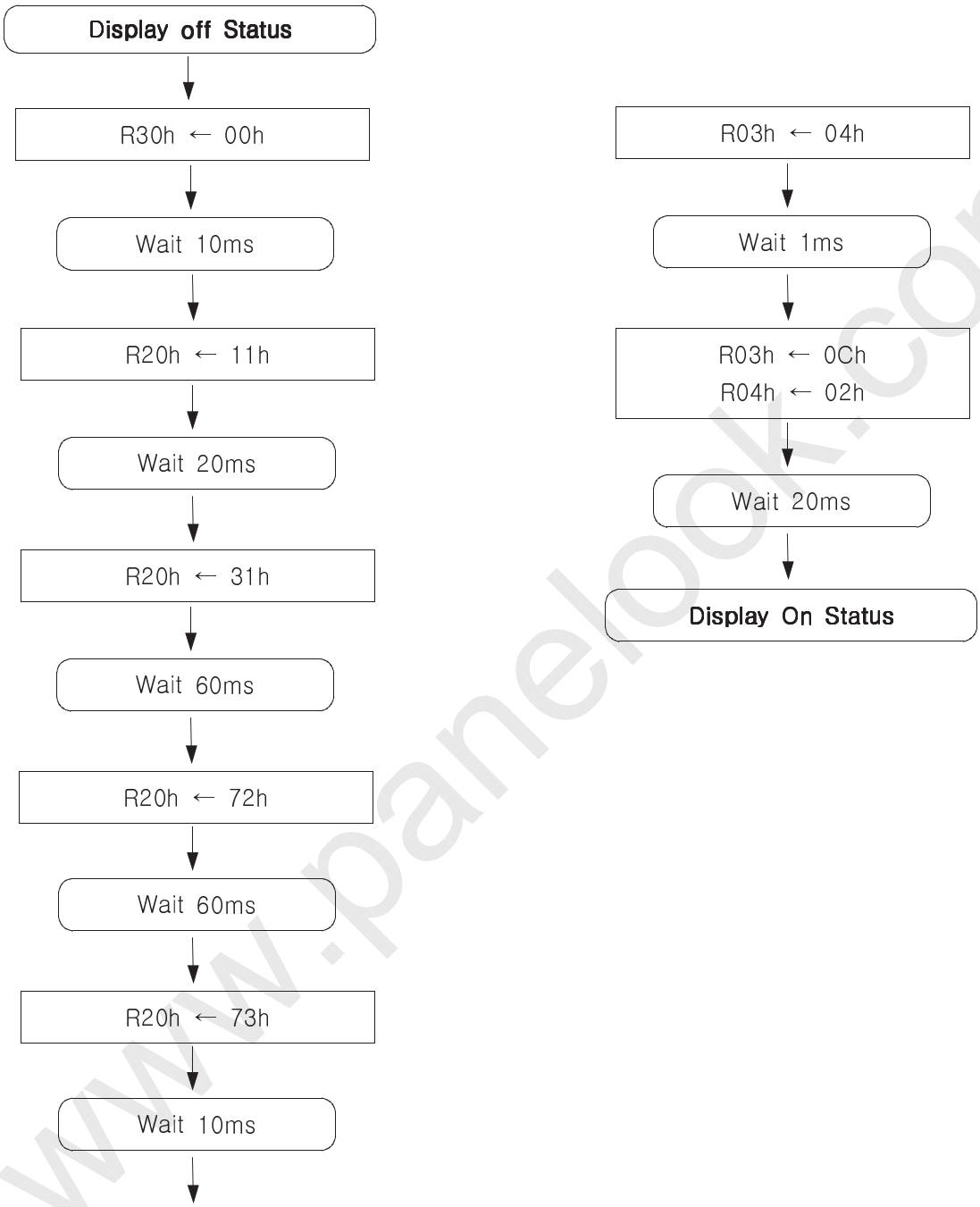
8-4-5 Display Off Sequence



8-4-6 Stand-by Sequence

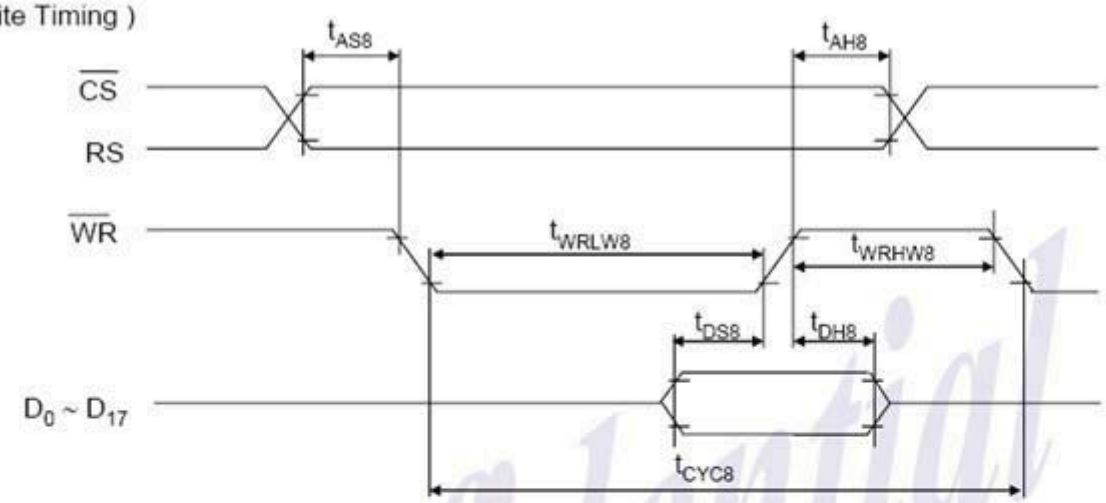


8-4-7 Stand-by Off Sequence



8-5 AC Characteristics

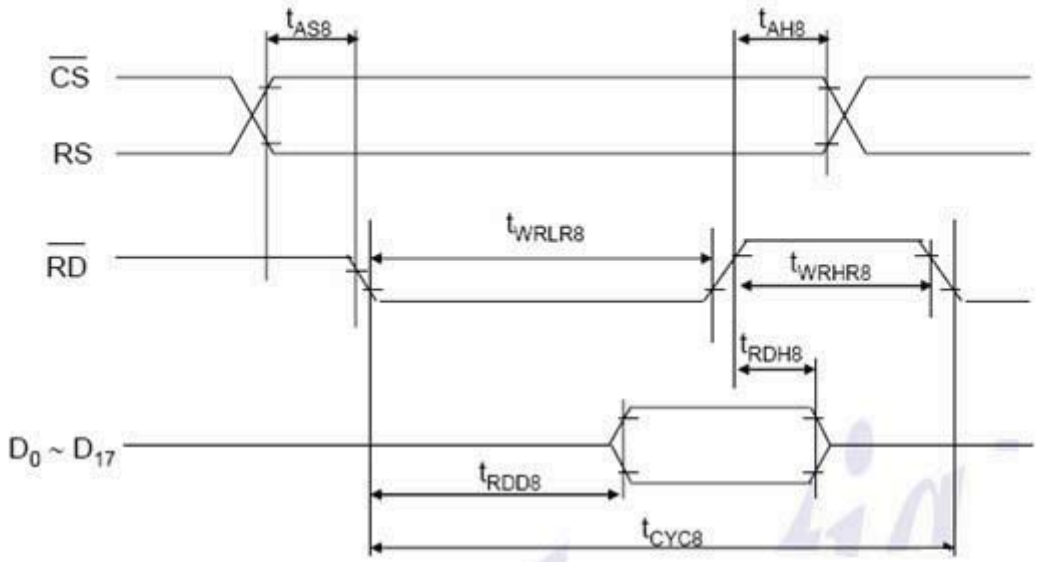
(Write Timing)



ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing Address setup timing	t_{AH8} t_{AS8}		10 10		ns ns	CSB RS
System cycle timing Write "L" pulse width Write "H" pulse width	t_{CYC8} t_{WRLW8} t_{WRHW8}		100 40 40		ns ns	WRB
Data setup timing Data hold timing	t_{DS8} t_{DH8}		20 20		ns ns	DB0~DB17

notice) All timing reference is 20% and 80% of VDD

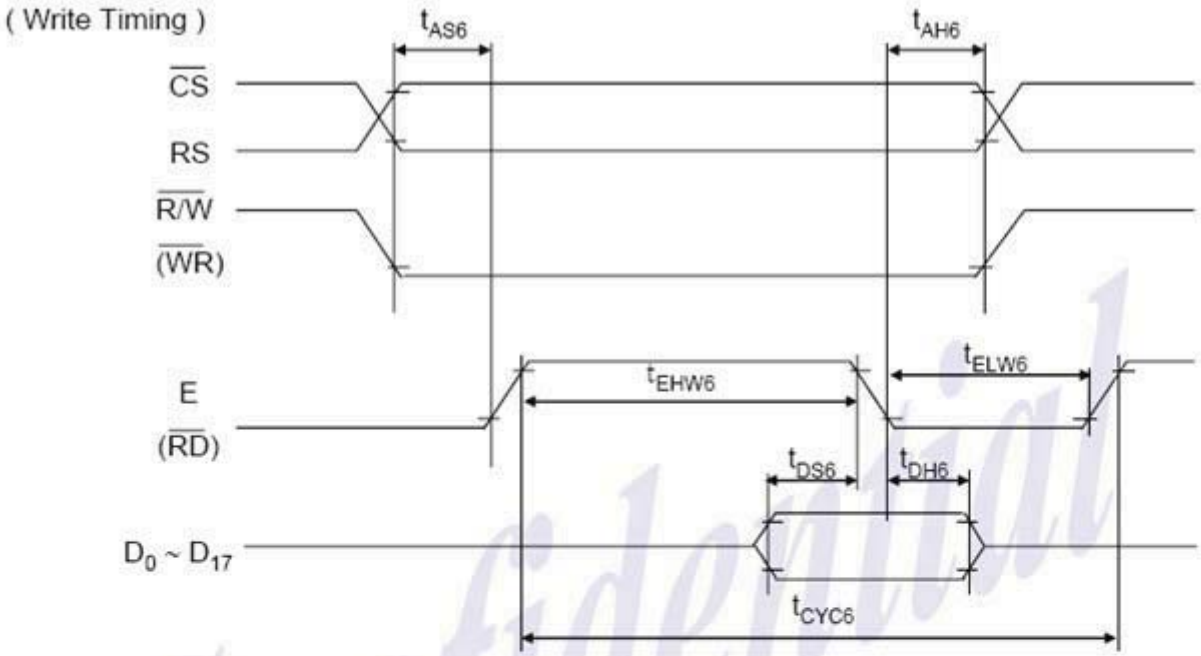
(Read Timing)



ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing Address setup timing	t_{AH8} t_{AS8}		30 30		ns ns	CSB RS
System cycle timing Read "L" pulse width Read "H" pulse width	t_{CYC8} t_{WRLR8} t_{WRHR8}		500 150 90		ns ns	RDB
Read data output delay time Data hold timing	t_{RDD8} t_{RDH8}	CL=15pF	 0	100	ns ns	DB0~DB17

notice) All timing reference is 20% and 80% of VDD

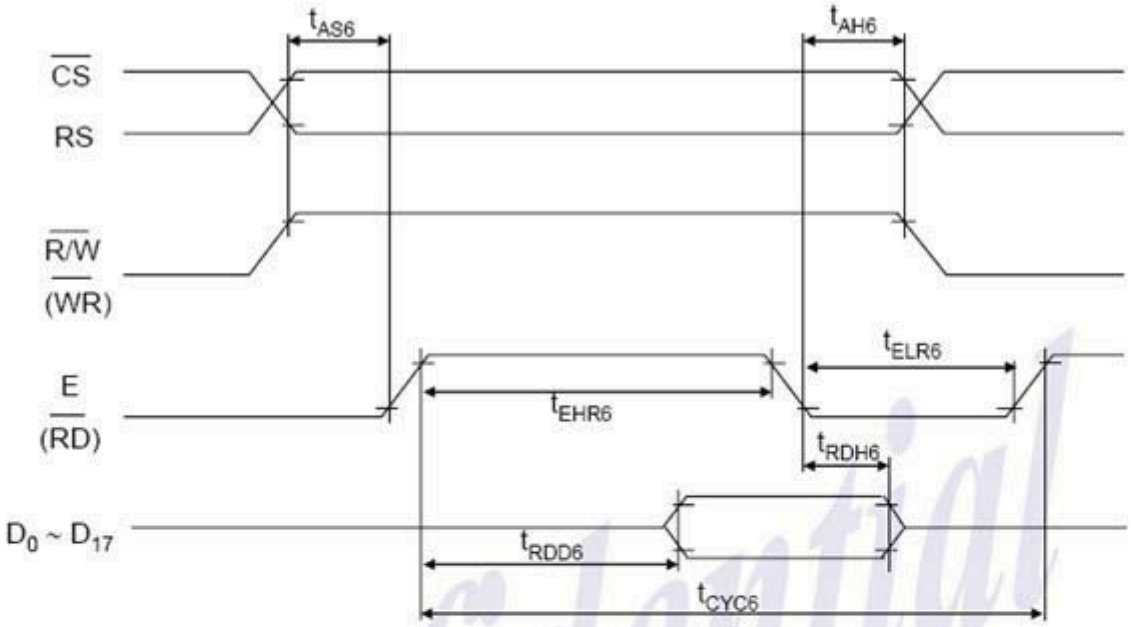
■ System Bus Read/Write Timing(68 Series CPU Interface)



ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing Address setup timing	t_{AH6} t_{AS6}		10 10		ns ns	CSB RS
System cycle timing Write "L" pulse width Write "H" pulse width	t_{CYC6} t_{ELW6} t_{EHW6}		100 40 40		ns ns	E
Data setup timing Data hold timing	t_{DS6} t_{DH6}		20 20		ns ns	DB0~DB17

notice) All timing reference is 20% and 80% of VDD

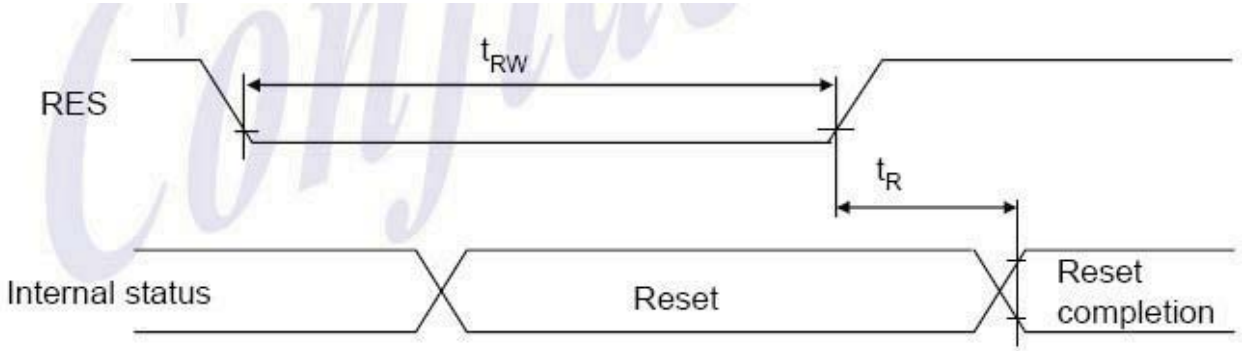
(Read Timing)



ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Address hold timing Address setup timing	t_{AH6} t_{AS6}		30 30		ns ns	CSB RS
System cycle timing Read "L" pulse width Read "H" pulse width	t_{CYC6} t_{ELR6} t_{EHR6}		500 90 180		ns ns	E
Read data output delay time Data hold timing	t_{RDD6} t_{RDH6}	CL=15pF	 0	100	ns ns	DB0~DB17

notice) All timing reference is 20% and 80% of VDD

■ RESETB Timing



ITEM	SYMBOL	CONDITION	MIN	MAX	UNIT	PORT
Reset time	t_R			2	us	
RESB "L" pulse width	t_{RW}		50		us	RESB

notice) All timing reference is 20% and 80% of VDD

9. Quality Level

9-1. Environment Condition

The environmental conditions for inspection shall be as follows.

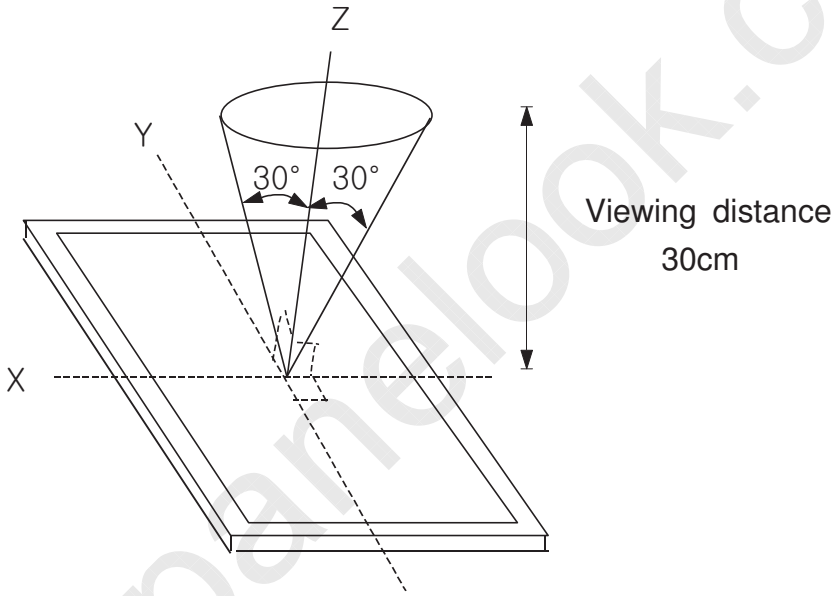
① Temperature & Humidity

Room temperature : 22 ± 3℃

Humidity : 65 ± 20%RH

② Viewing distance : 30cm

Viewing angle(tolerance) : 30°



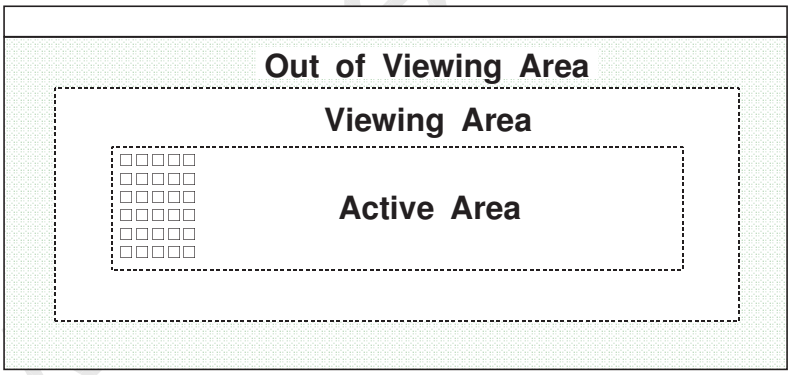
9-2. Sampling Procedures for each item's acceptance table

Defect type	Sampling Procedures	AQL
Major Defect	MIL-STD-105D Inspection level Ⅰ normal inspection single sample inspection	**0.4**
Minor Defect	MIL-STD-105D Inspection level Ⅰ normal inspection single sample inspection	**0.4**

① Major defect
: A major defect refers to a defect which may substantially degrade usability for product applications.

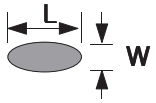
② Minor defect
: A minor defects refers to a defect which is not considered to substantially degrade product application,or a defect which deviates from existing standards almost unrelated to the effective use of the product or its operation.

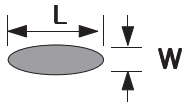
③ Defect application zone : Active Area + Viewing Area

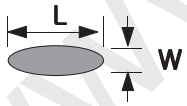


- Defect in "Out of View Area" Zone should not be judged.

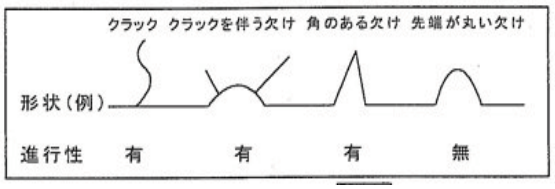
9-3. Judgment Criteria

<table>
<tr><th>No.</th><th>Item</th><th>Criterion for Defects</th><th>Type</th></tr>
<tr><td>1</td><td>No Display</td><td>disallowance</td><td>Major</td></tr>
<tr><td>2</td><td>Irregular operating</td><td>disallowance</td><td>Major</td></tr>
<tr><td>3</td><td>Line defect</td><td>disallowance (Vertical line/ Horizontal line / Periodical line)</td><td>Major</td></tr>
<tr><td>4</td><td>Dark/Bright Dot
 

Ø=(L+W)/2</td><td>
<table>
<tr><td></td><td>Dark</td><td>Bright</td></tr>
<tr><td>Acceptable number</td><td>1</td><td>0</td></tr>
<tr><td colspan="3">※ Criterion: Ø ≤0.15</td></tr>
</table>
* Distance between dots is more than 20mm.
</td><td>Minor</td></tr>
<tr><td>5</td><td>Polarizer dent
 

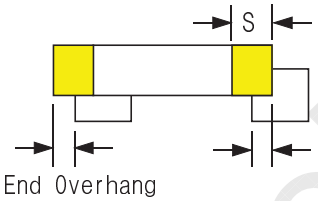
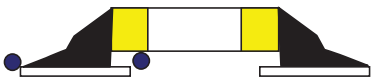
Ø=(L+W)/2</td><td>
<table>
<tr><td>Size Ø (mm)</td><td>Acceptable number</td></tr>
<tr><td>Ø ≤ 0.1</td><td>No count</td></tr>
<tr><td>0.1 < Ø ≤0.15</td><td>1</td></tr>
<tr><td>0.15 < Ø</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>6</td><td>Scratch on Polarizer (Line shape)</td><td>
<table>
<tr><td>Width (㎜)</td><td>Length (㎜)</td><td>Acceptable number</td></tr>
<tr><td>W≤0.01</td><td>No count</td><td>No count</td></tr>
<tr><td>0.01 < W≤0.02</td><td>L≤1.0</td><td>1</td></tr>
<tr><td>0.02 < W
1.0 < L</td><td>0</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td rowspan="2">7</td><td>Bubble in Polarizer (Spot shape)
 

Ø=(L+W)/2</td><td>
<table>
<tr><td>Size Ø (mm)</td><td>Acceptable number</td></tr>
<tr><td>Ø ≤ 0.1</td><td>No count</td></tr>
<tr><td>0.1 < Ø ≤0.15</td><td>1</td></tr>
<tr><td>0.15 < Ø</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>Bubble in Polarizer (Line shape)
 
</td><td>
<table>
<tr><td>Width (㎜)</td><td>Length (㎜)</td><td>Acceptable number</td></tr>
<tr><td>W≤0.01</td><td>No count</td><td>No count</td></tr>
<tr><td>0.01 < W≤0.02</td><td>L≤1.0</td><td>1</td></tr>
<tr><td>0.02 < W
1.0 < L</td><td>0</td><td>0</td></tr>
</table>
</td><td>Minor</td></tr>
<tr><td>8</td><td>Stain, Blemish</td><td>disallowance</td><td>Minor</td></tr>
</table>

9	(Progressive) Crack	disallowance 	Major
10	Surface Stain	Stain which can not clean on the display surface by using soft cloth and wiping gently.	Minor

※ Note

	Checking Condition
Luminance	2500 ± 500 Lux
Distance	30~50cm from panel, 30° range

No.	Item	Criterion for Defects	Defect Type
11	SMT(Soldering)	(1) No polarity opposition (2) No wrong insertion	Major
12	Solder Short	Short of proximity PATTERN and LAND is defect.	Major
13	Defects, crack	No defect gives an effect to quality of the pixel, or element	Major
14	END OVERHANG	The size above 1/2 of soldering electrode of the parts overhang to the LAND is prohibited. (but, contacting near other components is prohibited.) 	Minor
15	FPCB Sn plating (PATTERN) Peeling off	Peeling off is prohibited. but, unavailable Pattern and if it unaffected to quality is O.K. (EX:DUMMY PATTERN)	Major
16	Foreign matter	conduction particle between pattern is prohibited.	Minor
17	Bracket Distortion	Disallowance	Minor
18	Solder Ball	Disallowed if (Φ > 150um) 	Minor

10. Reliability

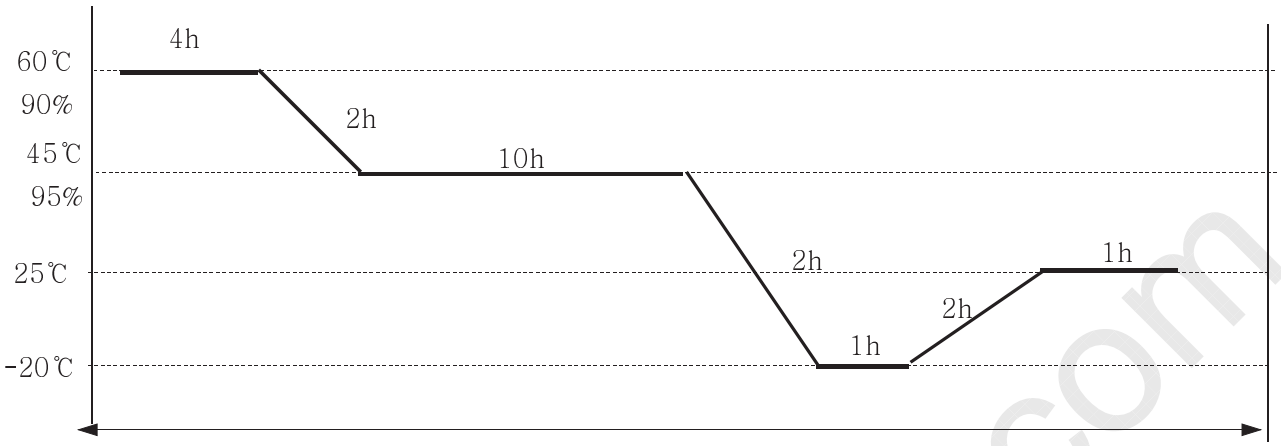
10-1. Test item

: All test result of items should be judged in 2 hours recovery time at room temperature.

No	Item	Condition	Qty.	Judgment Criterion
1	High Temperature Operation	60℃ 96hours	10	- After testing, Cosmetic defects should not happen. - After testing, the defective of brightness should be less than 30% of the initial value. - After testing, total current consumption should be in the range of initial spec. - After testing, color coordinate value should be in the range of initial spec.
2	Low Temperature Operation	-20℃ 96hours	10	
3	Low Temperature Storage	-30℃ 240hours	10	
4	High Temperature Humidity Operation	40℃ 95%RH 168hours	10	
5	High Humidity Storage	40℃ 95%RH 240hrs	10	
6	Thermal Shock	-30℃(1h)↔85℃(1h) 20cycle	10	
7	Temperature Humidity Cycle	+60℃ 90%RH 4h->2h ->+45℃ 95%RH 10h->2h ->-20℃ 1h->2h->25℃ 1h 10cycle (NOTE 1)	10	
8	High Temperature Storage	85℃ 240hours	10	
9	Room Temperature High Humidity Operation	25℃ 95%RH 240hrs	10	
9	PCT	121℃, 100%RH, 2atm, check after 10 hr	10	- After testing, Cosmetic defects should not happen. (without polarizer) - After testing, Missing line and nondisplay is not allowed.

No	Item	Condition	Qty.	Judgment Criterion
10	ESD	100PF, 1.5KΩ ± 8kV 10 times air discharge. (Non-operation) 200PF, 0Ω ± 200V 10 times connector discharge. (Non-operation)	10	- After testing,cosmetic and electrical defects should not happen. - Total current consumption should be below double of initial value. (NOTE2)
11	Vibration (Packing)	Width : 1.5mm frequency : 10->55->10hz direction/time : x,y,z 2h 1min/1cycle	10	- After testing,cosmetic and electrical defects should not happen
12	Drop (With set)	Height : 1.5m (with JIG) Direction: 6sides (±X•±Y•±Z) on the concrete 3cycle	10	
13	Life Test	Room temperature 700hrs, Full white mode	10	- 21,000hrs to the half of initial value
14	Glass strength (Point load)	Ø 10 metal bar,all area 1mm/min direction top->bottom	10	- Breaking Strength : over 20(N)
15	Glass strength (Area load)	Ø 10 metal bar, all area 1mm/min top->bottom, bottom->top	10	- Breaking Strength : over 50(N)
16	Glass strength (4point bending)	upholding width 30mm Pressing witdth 10mm top->bottom, bottom->top (Note3)	10	

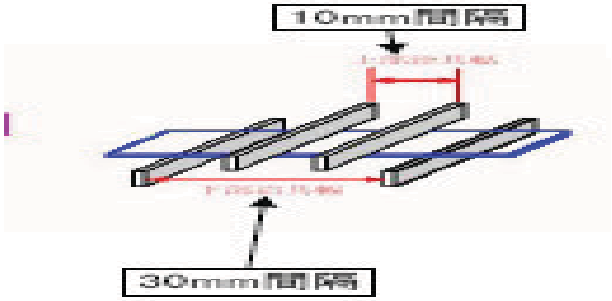
(Note 1) Temperature Humidity Cycle Test



(Note 2) ESD

-In case of malfunction defect caused by ESD damage,if it would be recovered to normal state after resetting, it would be judged as a good part.

(Note 3)



11. Handling Precautions

11-1. Mounting Method

The AMOLED panel of SAMSUNG SDI CO.,LTD. module consists of two slim glasses with polarizer which can easily get damaged. Since the module is constructed as to be fixed by utilizing fitting holes in the printed circuit board. Extreme care should be used when handling the AMOLED modules.

11-2. Caution of AMOLED Handling and Cleaning

When cleaning the display surface, use soft cloth solvent as recommended below and wipe gently.

◎ Isopropyl alcohol
◎ Ethyl alcohol
◎ Trichlorotriflorothane

Do not wipe the display surface with dry or hard materials that will damage the polarizer surface. Do not use the following solvent.

◎ Water
◎ Ketone
◎ Aromatics

Do not wipe ITO pad area with the dry or hard materials that will damage the ITO patterns.
Do not use the following solvent on the pad and prevent it from being contaminated.

◎ HCFC
◎ Soldering flux
◎ Chlorine(Cl), Sulfur(S)
◎ Spittle, FingerprintIf

If the product is not wrapped with a desiccant added pad, ITO pattern can be damaged by corrosion. SAMSUNG SDI CO,.LDT. suggests wrapping a product with adesiccant unless customers particularly indicate that they do not want it. In case ITO pattern corrodes due to the usage of chlorine, sulfur or customer's mishandling of the product, the responsibility lies with the customer.

11-3. Caution Against Static Charge

For AMOLED module, use C-MOS LSI drivers, therefore we recommend that you ;
Connect any unused input terminal to Vdd or Vss, do not input any signals before power is turned on, and ground your body, work/assembly areas, assembly equipment to protect against static electricity. It could occur static electricity when taping off the film which protects AMOLED.
Against static charge, you should make sure that the product is safe or not by experiment in advance.

11-4. Packing

◎ The packing principle is that AMOLED module should keep its packing condition at the time of delivery. When storing the AMOLED after unpacking, note the followings.

◎ AMOLED module is consisted of GLASS and assemblies. It should avoid pressure, strong impact, and being dropped from a height.

◎ To prevent modules from degradation, do not operate or store them in a place where they are directly exposed to sunlight or high temperature/humidity.

11-5. Caution for Operation

◎ If you do not follow normal POWER ON , OFF sequence or abnormal operating, then AMOLED module can be damaged electro-optically and does not recover.

◎ Response time may extremely delay at a temperature lower than operating range, AMOLED does not normally operate at a high temperature. But this may recover at a proper temperature.

◎ When you set optimal operating voltage to AMOLED module, you can see the optimal contrast of AMOLED. So, add voltage controllable function at SET Module.

◎ AMOLED module may not display normally when twisting power or pressing power is added. Therefore you should secure AMOLED module maximum thickness at set assembly not to have any pressure affect AMOLED module.

◎ Electro-chemical reaction may occur when there is humidity on pad, therefore, you should use AMOLED Module below maximum operating humidity.

◎ AMOLED Module Power Vdd should be designed to protect surge current at SET Module.

◎ You should not damage connector and cable for AMOLED module assembly by force folding or by applying extreme power.

◎ AMOLED may not display normally when it is interfered by surrounding elements, therefore you should consider setting design not to damage AMOLED module by surrounding elements.

◎ To satisfy EMI standards, you should plan your design after considering emitting energy.

◎ We can not guarantee display characteristics outside viewing area, therefore your set window should be fixed into viewing area.

◎ Image-sticking may occur if AMOLED displays same image for a long time, so you need to make a pattern change for AMOLED.

11-6. Storage

◎ Place in a dark place where neither exposure to direct sunlight or any fluorescent light is permitted and keep at room temperature & room humidity.

◎ Store with no contact with polarizer surface.

[It is recommended to store them as they have been contained in the inner container when we delivered them.]

11-7. Safety Precautions

◎ Disassembly or modification may cause electric shock, damages to sensitive part inside of the AMOLED module, dust adhesion, or scratches on the display part.

◎ In the event that the contents of AMOLED module are on skin, wipe them with a paper towel or gauge and wash the part well, and receive medical attention if necessary.

◎ Do not use the AMOLED module for the special purpose besides display units.

◎ Be careful of the glass chips that may cause injury to fingers of skin, when the display part is broken.

11-8. Precautions before Use

You should discuss the following case with SAMSUNG SDI CO., LTD.

◎ in case of any questions about contents of this "Specification For Approval".

◎ in case of occurring new problems not mentioned at this "Specification For Approval".

◎ in case of your request about income inspection specification change.

◎ in case of occurring new problem at your driving test.

※ If SDI has to change the conditions specified in the specification, previously the negotiation shall be held and decided.

12. Partlist of Product

<FPCB ASSY'S>

NO	CATEGORY	Ref No.	SPECIFICATION	품명	SDI CODE(P/N)
1	IC-DCDC	U2	NCP5810UMU,LLGA,12P,3*3*0.55mm	NCP5810	1203-004466
2	INDUCTOR-SMD	L1, L2	6.8uH,20%,2.7*2.7*1.0,	CXFU0210-6R8	2703-003327
3	DIODE-SCHOTTKY	D1	RB520S-30, 200mA/30V ,0806	RB520S-30	0404-001172
4	DIODE	D3	MA21D38009SA,30V,1000mA,SMini2-F2-B,TP	MA21D38009SA	0404-001371
5	R-CHIP	R1	287Kohm,1%,1/16W,TP,1005	NOTE 1	2007-009783
6	R-CHIP	R2	30Kohm,1%,1/16W,TP,1005	NOTE 1	2007-008275
7	R-CHIP	R5	0ohm,5%,1/16W,TP,1005	NOTE 2	2007-000171
8	R-CHIP	R6	100Kohm,5%,1/16W,TP,1005	NOTE 1	2007-000162
9	C-CER, CHIP	C1, C15, C23, C29, C35~C38	1uF,10%,16V,X5R,TP,1608	NOTE 2	2203-006263
10	C-CER, CHIP	C18, C20~C21	10uF,10%,10V,X5R,2012	NOTE 2	2203-006837
11	C-CER, CHIP	C19, C30	100nF, 10%, 10V, X5R ,1005	NOTE 2	2203-005482
12	C-CER, CHIP	C22	27pF,5%,50V,-,1005	NOTE 2	2203-002851
13	C-CER, CHIP	C26~C28	0.1nF,5%,50V,C0G,1005	NOTE 2	2203-000233
14	C-CER, CHIP	AC1~AC3, AC6	1UFX2,+20%,16V,1410,-	NOTE 2	2503-001062
15	BEAD	BE1, BE2	600ohm,1005,TP,-,-	BLM15HD601SN1	3301-001937
16	C-CER, CHIP	C39, C40	0.01uF, 16V, 1005, 10%	NOTE2	2203-000254
17	CONNECTOR	U5	HEADER-BOARD TO BOARD, 40P,2R,0.4mm,SMD-S,Au,BLK	DF30FC-40DP-0.4V	3711-006490
18	FPCB		AMDM001	AMDM001	LJ41-05060A
	FPCB Assy'		-	-	LJ96-03934A

Note)

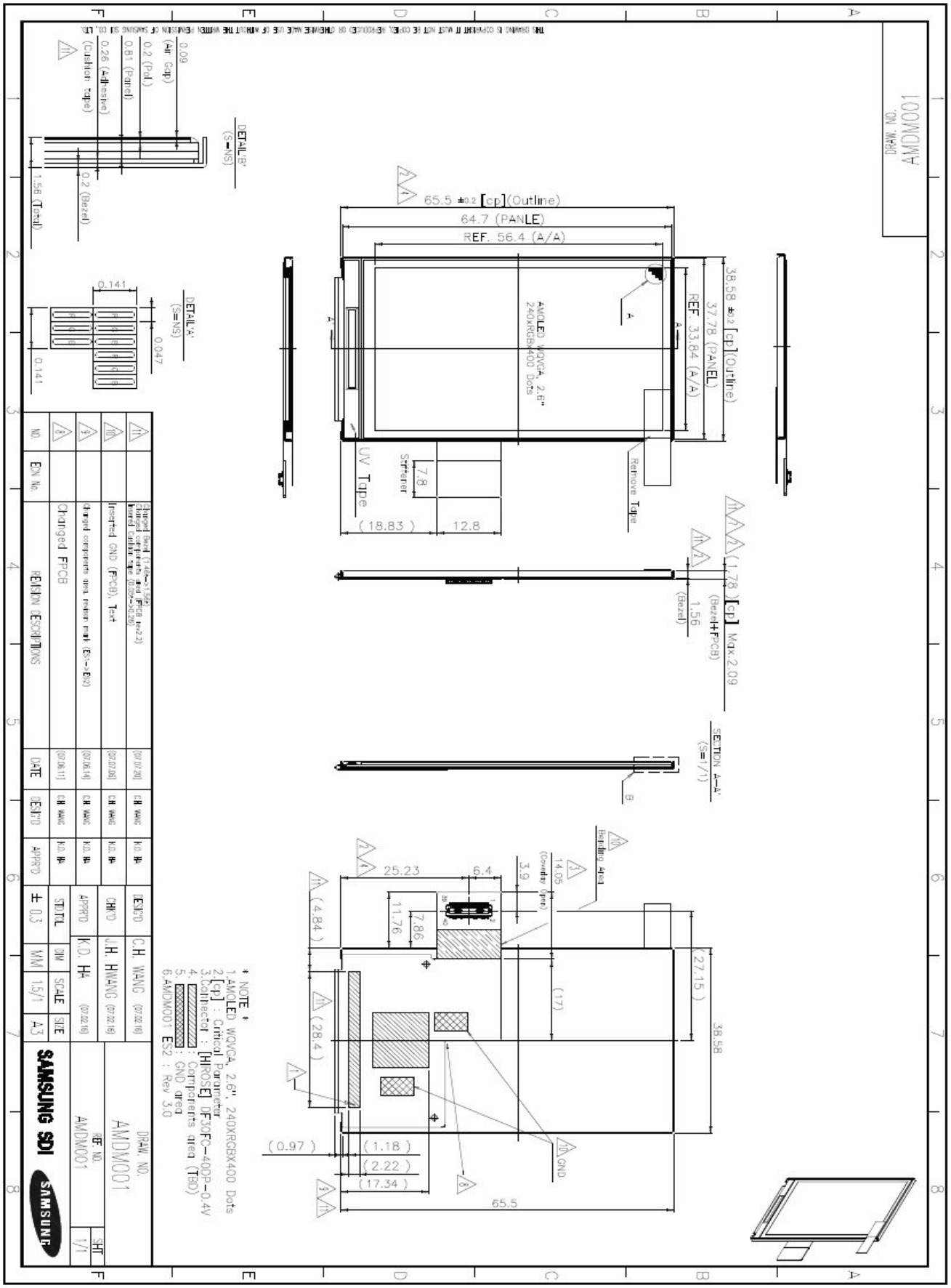
Note #1 : ROHM, HAN-RYUK, SEM

Note #2 : SEMCO, AVX/KYOCERA, MURATA, TAIYO YUDEN, SAMHWA

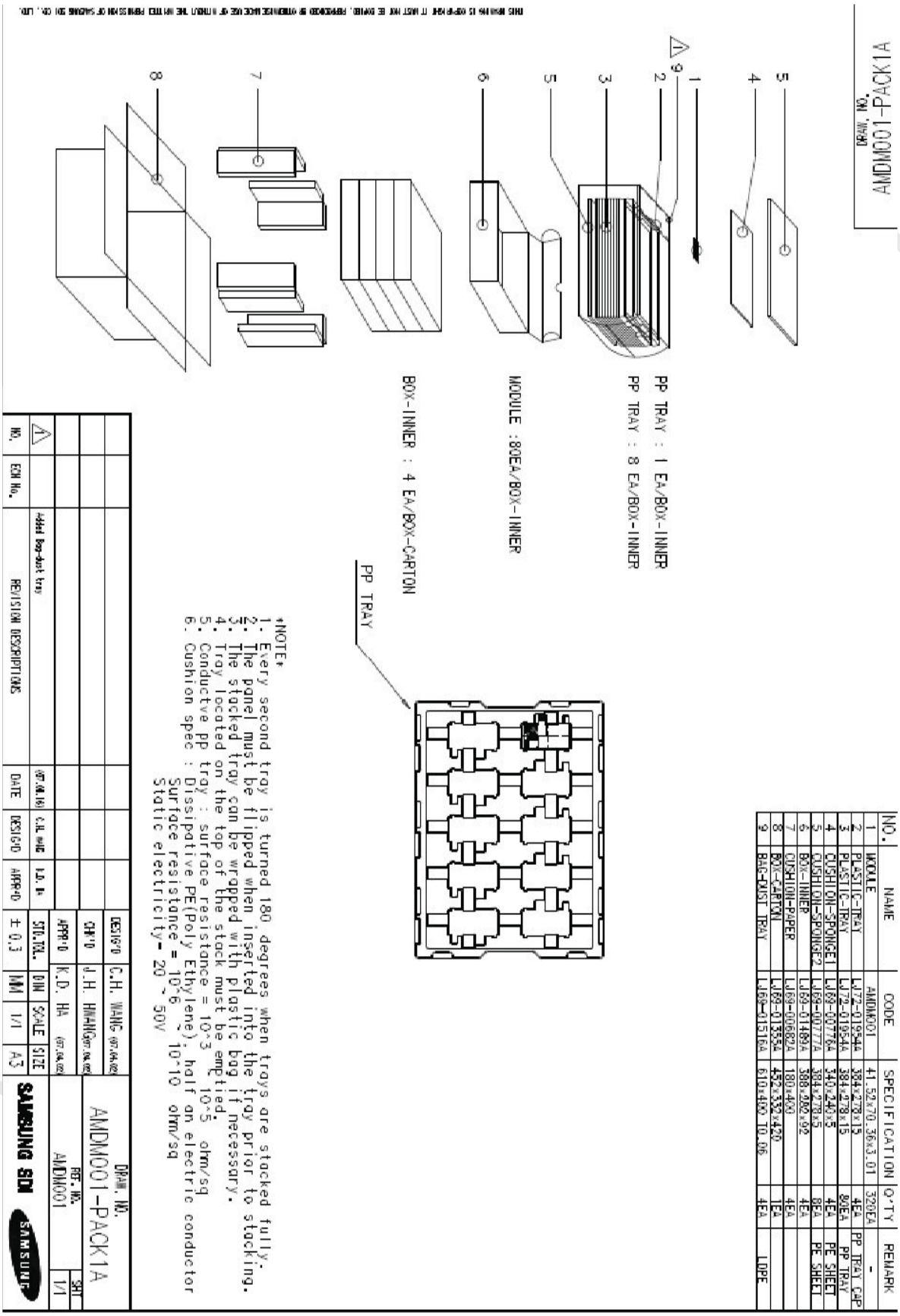
NO	CATEGORY	Ref No.	SPECIFICATION	품명	SDI CODE
19	Bezel		AMDM001,SUS,L65.5 x W38.58,1.56t,-,-,-	Bezel	LJ70-00245A
20	D-IC	L1		D53E4EA7554	LJ13-01615A
21	Tape		AMDM001,#850B,PET,0.05,36.98,2.96,BLK,S/F	UV tape	LJ02-04271A
22	Tape		Red	Remove Tape	LJ02-10109A
23	Tape		#4972, 50㎛	FPCB tape	LJ02-04366A
24	Tape		AMDM001,#STN2038WM,PET,0.07,3.6,SIL,S/F	Conductive Tape	LJ02-04339A
25	Tape		#4983(0.03)+ PSR0.2 + #4983,PET,0.26,37.83,64.3,BLK,S/F	Cushion Tape	LJ02-04458A
26	POL'		WRF-NBF-TF,TEQHC 60.54*37.48	Polarlizar	LJ01-05623A
27	PNL		2.6" LQVGA (240*400)		APDM01C
28	TRAY		Plastic-Module	PP	LJ72-01954A

13. Drawings

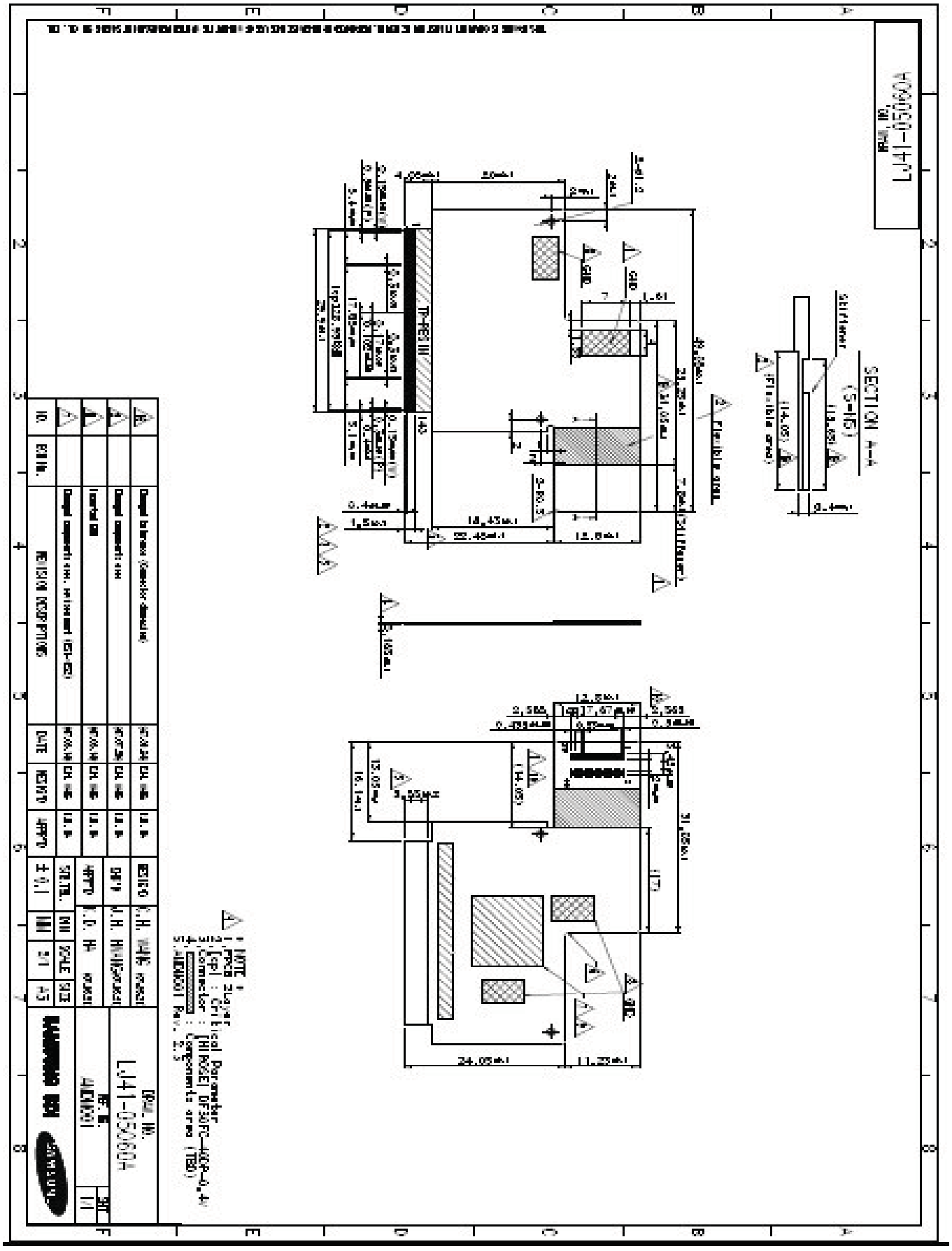
Product Drawing



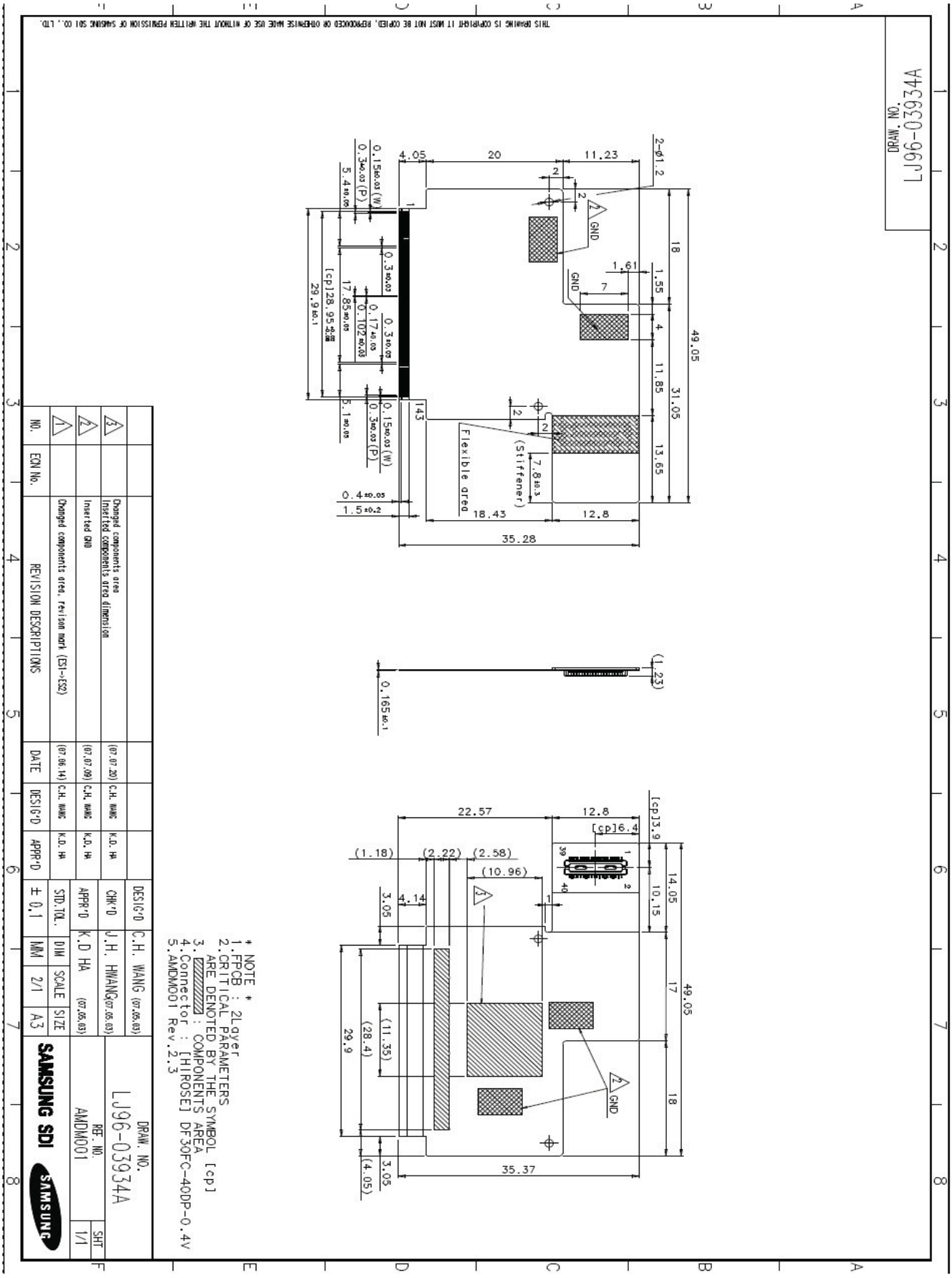
Package Drawing



FPCB Drawing



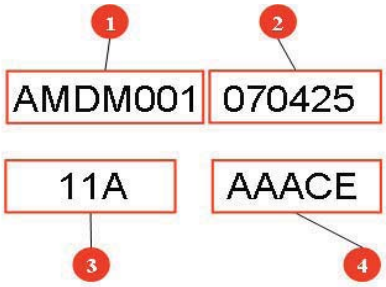
FPCB Assy's Drawing



PLACEMENT SPEC	DESIGNED	APROVED
	J.S.KIM 2007.07.31	S.Y.KIM 2007.07.31

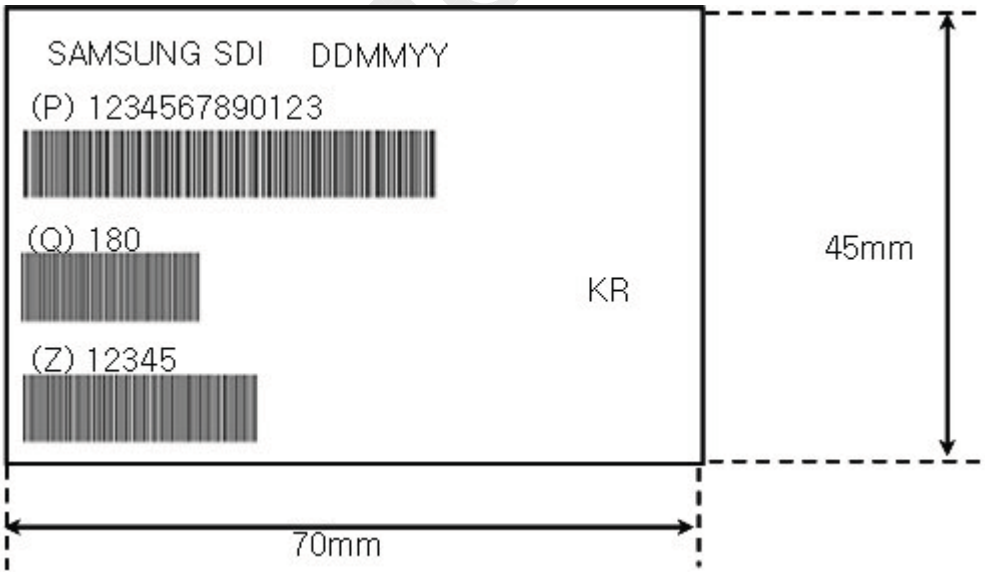
1. PLACEMENT (REAR)

Module Marking Rule



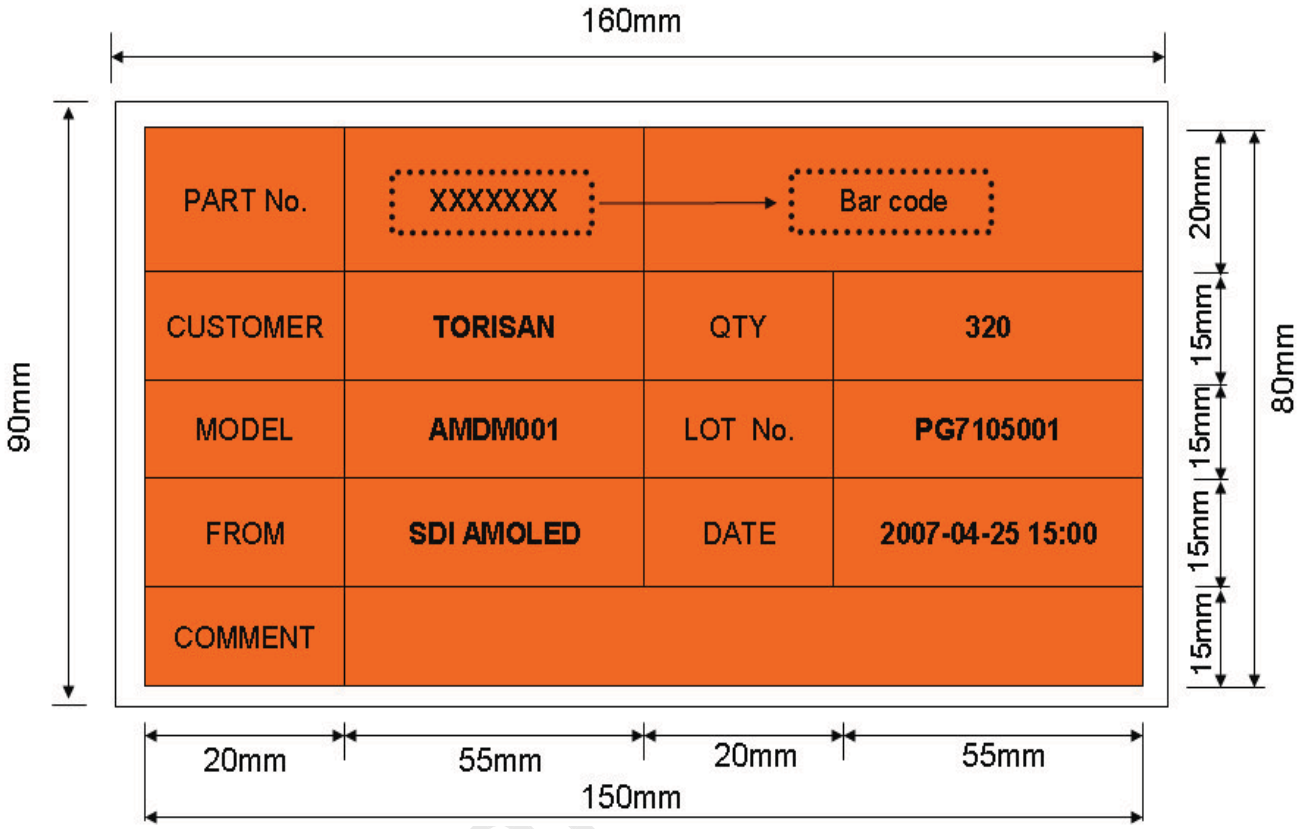
1. Product CODE : AMDM001
2. Module Process Date : 070425
3. 1:M1-Line, 1: Line No. A: Duty Shift
   (Day Shift=A, Night Shift=B)
4. AAACE : MODULE PROCESS LOT ID

Inner Box Label

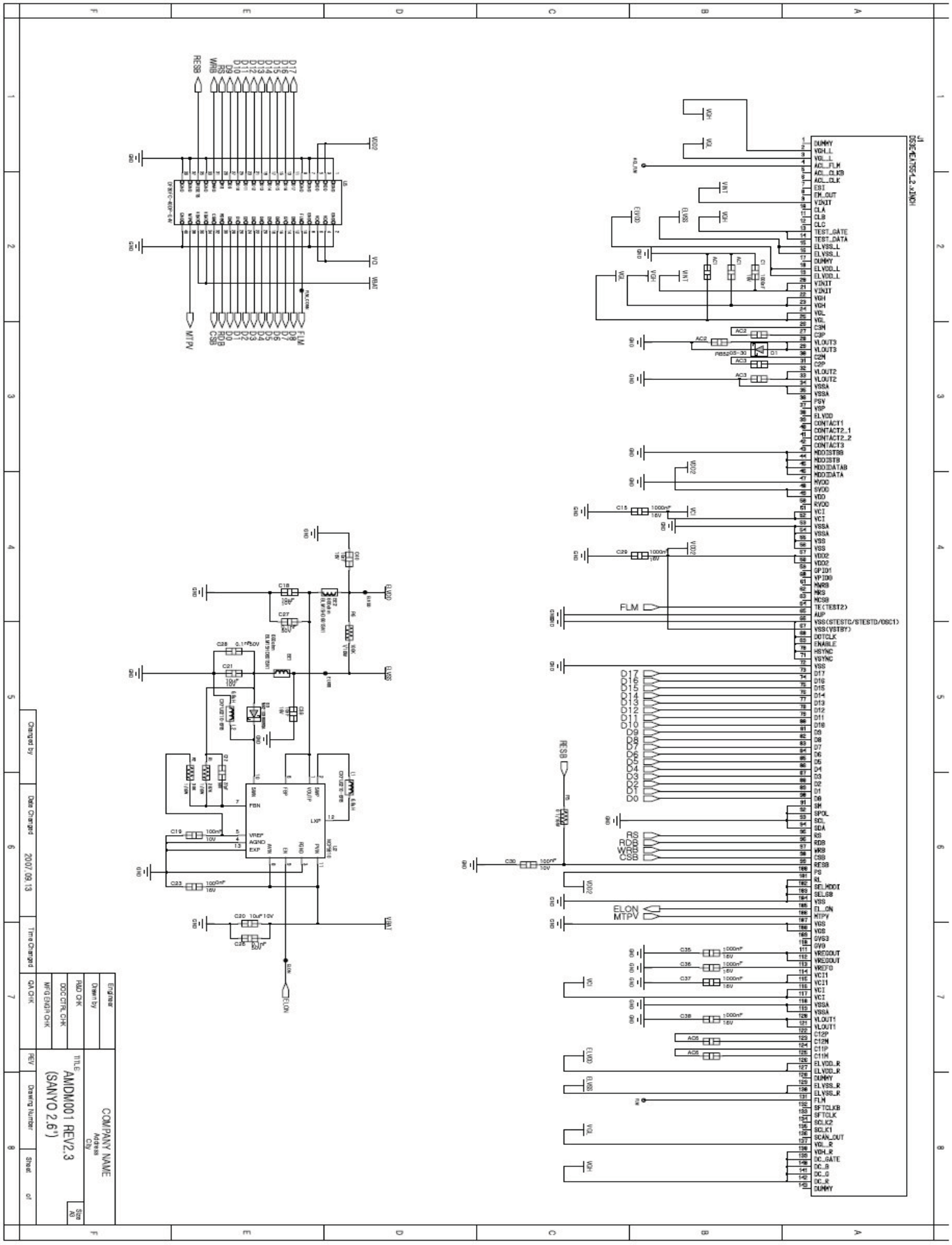


1. (P) TORISAN PARTNUMBER
2. (Q) Module quantity in INNER BOX
3. (Z) Module Lot ID

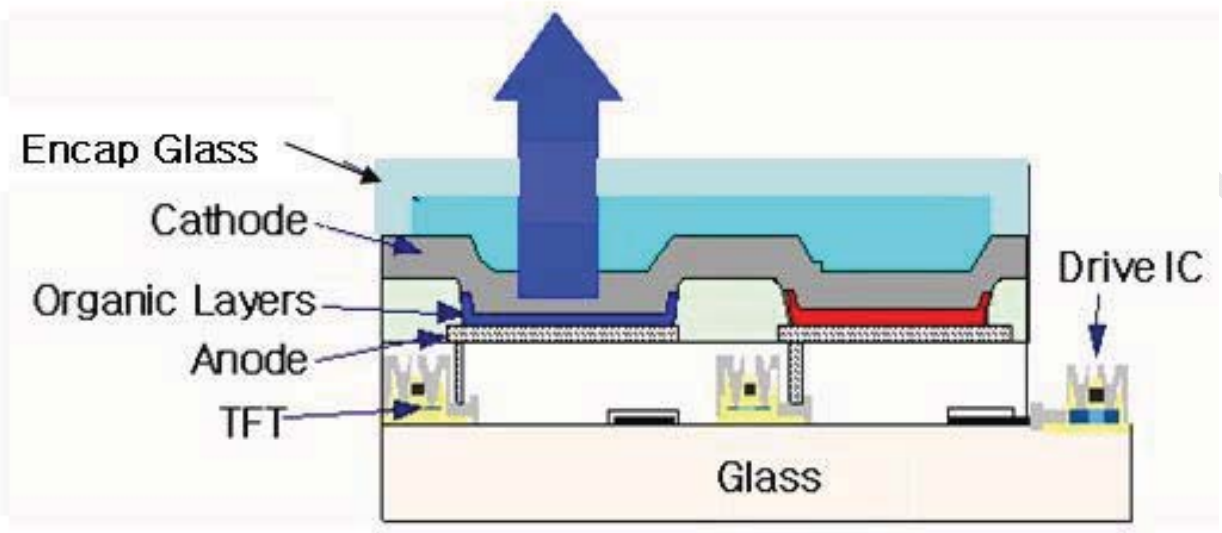
Carton Box Label



Circuit diagram



AMOLED Structure



製品構造圖

Inside Business

NO	Process	Company Name	Address
1	Panel	SAMSUNG SDI	508, Sungsung-dong, Cheonan city, Chungcheongnam-do, 330-300

Outside Business

NO	Process	Company Name	Address
1	COG	JUNGKWAN	Naesung-ri 4-1, Sungbok-myeon, Yangsan city
2	FOG	JUNGKWAN	Naesung-ri 4-1, Sungbok-myeon, Yangsan city
3	MAIN AMOLED FPCB SMD	SUNGIL TELECOM	Gongdan-dong 321, Gumi city
4	ASS'Y	JUNGKWAN	Naesung-ri 4-1, Sungbok-myeon, Yangsan city

※ For question, please contact Y.S.Kim(Senior Engineer) at 82-41-520-6064

(別紙)-三星SDIの品質管理基準

1. 色度
   1)SDIの内部管理基準は±0.02にします。
   2)チャンピオン品4.0Kについては±0.01にて管理します。
   3)色度はチャンピオン品4.0K生産データに準じて再協議します。

2. 輝度
   1)SDIの内部管理基準は±10%にします。

3. AQL
   1) SDIの内部管理基準は抜取りロットを増やして0.1レベルを確保して管理します。

以 上