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**16.3. Designation of Lot Mark**

Byte	1	2	3	4	5	6	7	8	9	10
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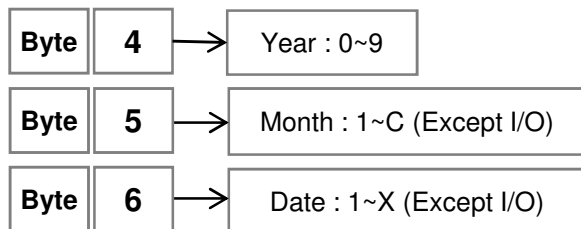
1. Factory Code

Byte	1	2		
Mark		Description	Mark	Description
M	3	Gumi	X	P
X	C	KRems	X	T
X	U	Tovis (Dalian)	J	1
X	L	Raygen (Yantai)	X	K

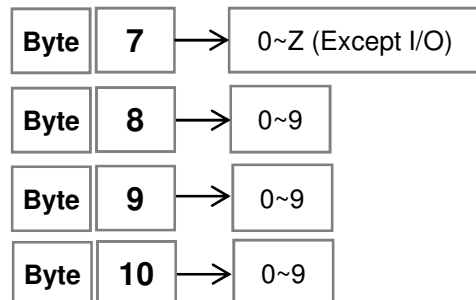
2. Lot Type

Byte	3	
Mark		Desc.
N		Normal
R		Rework
G		GIB
P		Packing

3. Year/Month/Data of Production



4. Serial Number : 0001 ~ Z999 (Except I/O)



## Product Specification

### 17. Reliability and Inspection Standard

#### 17.1. Reliability

No	Test Item	Test Conditions	Remark
1	High Temperature Operation	70°C , 96 Hr	
2	Low Temperature Operation	-20°C, 96 Hr	
3	High Temperature and High Humidity Operation	60°C, 90% RH, 96 Hr	
4	Low Temperature Storage	-30°C, 96 Hr	
5	High Temperature Storage	80°C, 96 Hr	
6	Thermal Shock	-30°C, 80°C (30Min) 20clcy	
7	Vibration Test	Random truck & air 1.5Grms	1Hr
8	Drop Test	76cm / 3Corner / 6Face, 1clcy	Packaged in a box
9	Electrostatic withstanding voltage	Air : 0Ohm 200pF ± 200V	
		Contact : 0Ohm 200pF ± 200V	
10	Mechanical Test	LCM 3 Point Bending : 9.1kgf (weibull 10%)	
		Panel 4 Point Bending : -	측정치 참조 관리
		D-IC 3 Point Bending : 350Mpa (weibull 10%)	

#### 17.2. Fault Judgment Criteria

TFT- LCD Module should be at room temperature for 8 hours when the display quality test is over. There should be no particular change which might affect the practical display function and the display quality test should be conducted under normal operating condition.

After Completing the reliability tests, leave the samples under the room temperature and (25°C, 40%RH) for the following inspection items.

- (1) No clearly visible defects or deterioration of display quality allowed.
- (2) Contrast ratio should be at least 50% of initial value.
- (3) No function-related abnormalities.
- (4) Current consumption must not exceed 2 times of initial value.
- (5) R, G and B color area must be at least 70% of initial value.

### 15.3. Inspection Standard

#### 15.3.1. Inspection Standard for Main LCD

No	Item	Criterion for Defects	Defect type
1	Non Lighting	Nothing	Major
2	Irregular Operation	Nothing	Major
3	Short	Nothing	Major
4	Open	Nothing	Major

## Product Specification



### Caution AND Handling Precaution

To avoid causing extended damages such as accidents resulting in injury or death, fire accidents, or social damages or social damages if the LCD module fails, , LG Display is always endeavor to maintain sufficient quality of the LCD module in process of designing and manufacturing.

Please pay attention to the followings when you use this TFT LCD Module.



### Safety

#### 1) DISASSEMBLING OR MODIFICATION

Do not disassemble or modify the modules. Sensitive parts inside LCD module may be damaged, and dusts or scratches may mar the displays. Toshiba Matsushita Display Technology does not warrant the modules, if customer disassembled or modified them.

#### 2) BREAKAGE OF LCD PANEL

Do not Ingest liquid crystal material, Do not Inhale this material, and Do not Permit this material to contact the skin, if glass of LCD panel is broken. If liquid crystal material contacts the skin, mouth or clothing, take the following actions immediately.

In case contact to the eye or mouth, rinse with large amount of running water for more than 15 minutes. In case contact to the skin or clothing, wipe it off immediately and wash with soap and large amount of running water for more than 15 minutes. The skin or closing may be damaged if liquid crystal material is left adhered. In case ingestion, rinse out the mouth well with water. After spewing up by drinking large amount of water, get medical treatment.

#### 3) GLASS OF LCD PANEL

Be careful with chips of Glass that may cause injuring fingers or skin, when the glass is broken.

#### 4) ABSOLUTE MAXIMUM RATINGS

Do not exceed the absolute maximum rating values under the worst probable conditions caused by the supply voltage variation, input voltage variation, variation in parts' constants, environmental temperature, etc., otherwise LCD module may be damaged.

#### 5) POWER PROTECTION CIRCUIT

Employ protection circuit for power supply, whenever the specification specifies it. A suitable protection circuit should be applied, based on each system design. A fuse is not fitted to this module. Therefore, without a suitable power-supply protection device, dust or partial circuit failure may cause overheating and/or burning , which may lead to injury.

#### 6) DISPOSAL

Always comply with all applicable environmental regulations, when disposing of the LCD.

## Product Specification

### 7) EDGES OF PARTS

Be careful with edges of glass parts and metal frame, it may cause injuring.  
 For designing the system, give special consideration that the wiring and parts do not touch those edges.

### 8) RECOMMENDED OPERATING CONDITIONS

Don't exceed "the recommended operation conditions" in this specification. The performance and quality of the LCD module are warranted only when the LCD module is used within "the recommended operation conditions". To use the LCD module over "the recommended operation conditions" may have bad influence on the characteristics and reliability of the LCD module and may shorten the life of the LCD module.

Therefore, when designing the whole set, not to be over "the recommended operation conditions", you should fully take care of supply voltage change, characteristic of connection parts, surge of input-and-output line, and surrounding temperature.



## Installation in Assembly

### 1. ESD (ELECTRO-STATIC DISCHARGE) PREVENTION

The circuit used in LCD module is very sensitive to ESD. The following caution should be taken when installing LCD module to an enclosure of the system in order to prevent damage of circuit used in LCD module.

#### 1) HUMIDITY

Ambient humidity of working area is recommended to be higher than 50%(RH) in order to avoid ESD.

#### 2) GROUNDING

- Person handling LCD modules should be grounded with wrist band.
- Tools like soldering iron and screw drivers and working benches should be grounded.
- Grounded electro-conductive mats are recommended to be covered on the floor of working area and surface of working benches.
- The grounding should be done through a resistor of 0.5~1Mohms in order to prevent spark of ESD.

#### 3) Be careful with touching metal portion of testing instruments in order to prevent unnecessary ESD.

#### 4) Do not touch the electrode area of PCB and electrical parts like LSI, capacitor, connector pin, etc.

#### 5) IONIZER

Using ionizer (an antistatic blower) is recommended at working area in order to reduce electro-static voltage.

#### 6) REMOVING PROTECTION FILM

When removing protection film from LCD panel, peel off the tag slowly (more than one second) while blowing with ionizer toward the peeling face to minimize ESD which may damage electrical circuit.

### 2. DUST AND STAIN PREVENTION

#### 1) WORKING AREA

Reduce dust level in working area. Especially the level of metal particle should be decreased, otherwise electrical circuit in LCD module may be damaged due to short circuit by metal particles.

## Product Specification

### 2) FINGER PRINT

Use finger stalls or soft and dust-free gloves in order to keep clean appearance of LCD module when handled for incoming inspection and assembly.

### 3) PROTECTION FILM

LCD module may be shipped with "protection film" on LCD panel in order to prevent from scratches and dust. It is recommended to remove the film at later process of assembling.

### 4) WIPING OFF DUST ON THE PANEL

When LCD panel becomes dirty, wipe the panel surface off softly with absorbent cotton or another soft cloth. If necessary, breathe upon the panel surface and then wipe off immediately and softly again. Be careful not to spill organic solvents into the inside of LCD module. The solvents may damage driver IC and PCB area used inside module. The polarizer laminated to LCD panel and adhesives may be damaged by the solvents, so do not use any organic solvents for wiping off LCD panel.

### 5) ADHESIVE ON LCD PANEL

Be careful not to attach adhesive, grease, etc., on LCD panel, because it is difficult to remove them without any damages on LCD panel.

### 6) WATER SPOTS ON THE PANEL

Avoid the dewing or water condensation.

Wipe off a spot or spots of water or mist on LCD panel softly with absorbent cotton or another cloth as soon as possible if happened, otherwise discoloration or stain may be caused. And, damage may occur if water penetrates the inside.

## 3. INSTALLING LCD MODULE TO THE ENCLOSURE

### 1) INSTALLING LCD MODULE TO THE ENCLOSURE

Do not bend or twist LCD module even momentarily when the LCD module is installed into the system.

Bending or twisting the LCD module may cause permanent damage.

When the FPC is bent, the radius of FPC curvature must be more than value of recommendation to prevent bending and twisting forces from affecting the connection of FPC.

Even temporary bending or twisting sometimes causes damage.

### 2) INTERFACE

Do not fasten screws, with catching interface FPC between LCD module and the enclosure.

This may cause bending of LCD module, or become the cause of a failure by damaging FPC.

## 4. MECHANICAL FORCES

### 1) CARRY

Hold the side of the plastic frame when you carry an LCD module by hand. If an LCD is carried using the FPC, it is likely to be damaged and the LCD will then malfunction. If you turn on the LCD with a broken FPC, it may cause smoke or burning.

Protection (eg gloves) for fingers and hands is recommended to avoid injury by broken glass.

### 2) STRONG MECHANICAL SHOCK

Avoid strong mechanical shock, such as dropping the LCD from the work bench, or knocking it against a hard object.

These may cause the glass panel to crack, or cause other mis-operation.

### 3) EXCESSIVE FORCE

Avoid applying excessive force, like pushing the surface of LCD panel. This may cause scratches or breakage of the panel, or a failure of the module.

## Product Specification

### 4) SCRATCHES ON THE PANEL

Do not put heavy object such as tools, books, etc., and do not pile up LCD modules. Be careful not to touch the surface of the polarizer with any hard and sharp object. These parts are so sensitive and can easily be scratched, even if protected by a film.

### 5) Connector

When inserting or disconnecting the connector into a connector of the LCD module, care should be taken to ensure that no strong external force is applied to the connector on the LCD module side. A strong external force applied to the connector or the FPC may damage their connections. When assembling a module into a system, pay extra attention to ensure that no part such as the FPC etc. should be caught between the case of the system and the module. Make sure that the input signal connector of a module is securely and correctly connected to the connector on the system, not skewed, or incompletely connected. Inputting a signal etc. into the module with connectors incorrectly inserted may cause a circuit component or components to malfunction.

### 6) FPC

When inserting or disconnecting the connector of the LCD module into a connector of the system, care should be taken to ensure that no strong external force is applied to the FPC on the LCD module side. A strong external force applied to the FPC may damage their connections. When assembling a module into a system, pay extra attention to ensure that no part such as the FPC etc. should be caught between the case of the system and the module. Make sure that the input signal connector of a module is securely and correctly connected to the connector on the system, not skewed, or incompletely connected. Inputting a signal etc. into the module with connectors incorrectly inserted may cause a circuit component or components to malfunction. Be careful not to pull or damage the FPC cables, to avoid mechanical damage in FPC and connection part of FPC and cell.

## 5. OPERATION

### 1) POWER SUPPLY

Power supplies should always be turned off during the assembly process. Do not connect or disconnect the power cables and connectors with power applied to LCD module. This may cause damage to the LCD module circuit. In operating module at the inspection process, and so on, the supply voltage and signals of driving device must satisfy the sequence of power supplies and signals described in this specifications.

### 2) GAS

Do not expose the LCD module to any gas which is not normally contained in the atmosphere, it may cause mis-operation or defects.

### 3) USED FOR LONG TERM

When a LCD module is used for a long term, the characteristics of LCD module might be changed and it may be out of the standard of "4.3 Optical Specifications" due to LED discoloration. LED has the characteristics of shifting optical characteristics by the long term use.

**Product Specification****Transportation and Storage****1) TEMPERATURE**

Do not store LCD modules in a high temperature and high humidity condition, higher than 35°C and 70%(RH) for a long term, meaning about one month or more, otherwise this may deteriorate the quality of the display. When you unavoidably store LCD modules for a long time, store between 0 and 35°C, with a relative humidity 70% or lower.

**2) LOW TEMPERATURE**

Be careful not to leave it where the temperature is below specified storage temperature because the liquid crystal of the display panel may be damaged.

**3) ULTRA VIOLET RAY**

Store LCD module without exposure to direct sunlight or fluorescent lamps in order to prevent the module from strong ultra violet ray.

**4) CLEANLINESS**

Keep the LCD module in clean place, because any dust, hard particle may damage the polarizer, or dust invades the inside of the LCD module.

**5) CONDENSATION OF WATER**

The modules should be stored under a condition where no condensation of water is allowed. It may cause mis-operation or defects. Be especially careful not to make a module work under the condition that condensation of water appears.

**6) PACKAGING**

When you must re-package a LCD module after it has been removed from the original packaging, it is recommended to re-pack using the original package box and package material.