

SPECIFICATION

Aug-03-2010

OF

LIQUID CRYSTAL DISPLAY MODULE

CUSTOMER : STD

Model No. : UMSH-8173MD-8T

Model version : 0

Document Revision : 10

CUSTOMER APPROVED SIGNATURE			

This specification need to be signed by purchaser or customer as a specification of products production and delivery from URT. Without signature of this specification , any purchase order for this model no. will be treated and considered that this specification is automatically acknowledged and accepted by purchaser or customer.



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To Whom It May Concern:

In continuing to develop and promote the strategic partnership between United Radiant Technology (URT) and Microtips USA (MTUSA), URT is please to announce that we have entered into an agreement with MTUSA to support some key projects only through MTUSA and as such the attached spec with URT Part no. will be manufactured by URT but support and logistic of the sales will be handled by MTUSA.

URT is confident that this arrangement between our two companies will ultimately benefit the end customer.

Thank You.

Raymond Chen

Sales Manager: URT

Revision record

Document Revision	Model No. Version No.	Description	Revision by
0	UMSH-8173MD-T (UFSH-K106EY-FT) Version No. 0		Y.D. Shie Zi Xin Ou 14-Aug-2008
1	UMSH-8173MD-1T (UFSH-K106EY-FT) Version No. 0	Add the touch panel.	Y.D. Shie Zi Xin Ou 15-Aug-2008
2	UMSH-8173MD-1T (UFSH-K106EY-FT) Version No. 1	Modify backlight LED lifetime from 10000 hours to 50000 hours.	Y.D. Shie Zi Xin Ou 13-Feb-2009
3	UMSH-8173MD-T (UFSH-K106EY-FT) Version No. 2	Add Dot Defect information	Sharon Tsai 17-Jul-2009
4	UMSH-8173MD-2T (UFSH-K106EY-1FT) Version No. 0	1. Add Micro Reflective film on LCD. 2. Modify the module number from UMSH-8173MD-T to UMSH-8173MD-2T.	Y.D. Shie Zi Xin Ou 11-Aug-2009
5	UMSH-8173MD-3T (UFSH-K106EY-FT) Version No. 0	1. Modify the interface pin from DE mode to LVDS 18 bit mode. 2. Modify the module number from UMSH-8173MD-T to UMSH-8173MD-3T.	Y.D. Shie Zi Xin Ou
6	UMSH-8173MD-4T (UFSH-K106EY-FT) Version No. 0	1. Add the touch panel. 2. Modify the module number from UMSH-8173MD-3T to UMSH-8173MD-4T.	Y.D. Shie Zi Xin Ou
7	UMSH-8173MD-5T (UFSH-K106EY-FT) Version No. 0	1. Modify the interface pin define from LVDS 18 bit mode to LVDS 24 bit mode. 2. Modify the module number from UMSH-8173MD-3T to UMSH-8173MD-5T.	Y.D. Shie Zi Xin Ou
8	UMSH-8173MD-6T (UFSH-K106EY-FT) Version No. 0	1. Add the touch panel 2. Modify the module number from UMSH-8173MD-5T to UMSH-8173MD-6T.	Y.D. Shie Zi Xin Ou
9	UMSH-8173MD-7T (UFSH-K106EY-1FT) Version No. 0	1. Add the touch panel. 2. Modify the module number from UMSH-8173MD-2T to UMSH-8173MD-7T.	Y.D. Shie Zi Xin Ou 11-Aug-2009
10	UMSH-8173MD-8T (UFSH-K106EY-FT) Version No. 0	1. Add the capacitive touch panel. (1.6mm Thickness) 2. Modify the module number from UMSH-8173MD-T to UMSH-8173MD-8T.	Y.D. Shie Zi Xin Ou 03-Aug-2010
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1. BASIC SPECIFICATION

1.1 Mechanical specifications

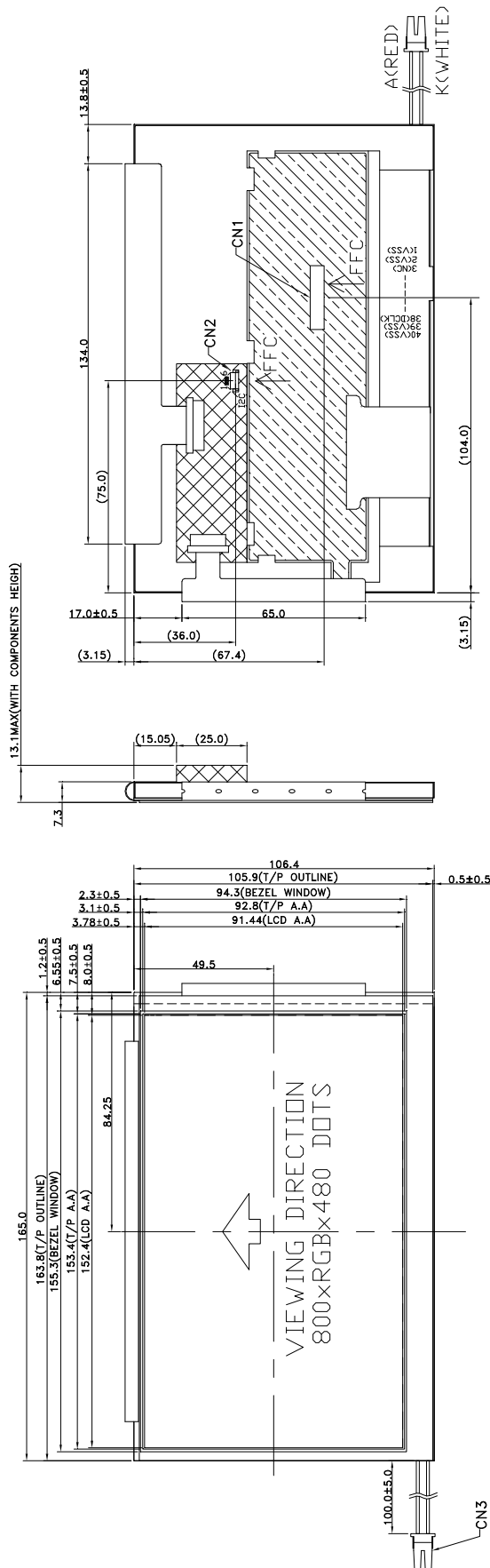
Items	Nominal Dimension	Unit
Active screen size	7" diagonal	-
Dot Matrix	800 x RGB x 480	dots
Module Size (W x H x T)	168.15 x 109.55 x 13.1(Max)	mm.
Active Area (W x H)	152.4 x 91.44	mm.
Pixel Size (W×H)	0.1905 x 0.1905	mm.
Color depth	262K	color
Interface	Parallel 18-bit RGB	-
Driving IC Package	COG	-
Module weight	193	g

1.2 Display specification

Display	Descriptions	Note
LCD Type	a-Si TFT	
LCD Mode	TN / Normal white	
Polarizer Mode	Transmissive	
Polarizer Surface	Normal	
Pixel arrangement	RGB-stripe	
Backlight Type	LED	
Viewing Direction	6 O'clock Direction	

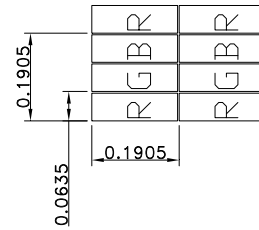
* Color tone is slightly changed by temperature and driving voltage.

1.3 Outline dimension



12C

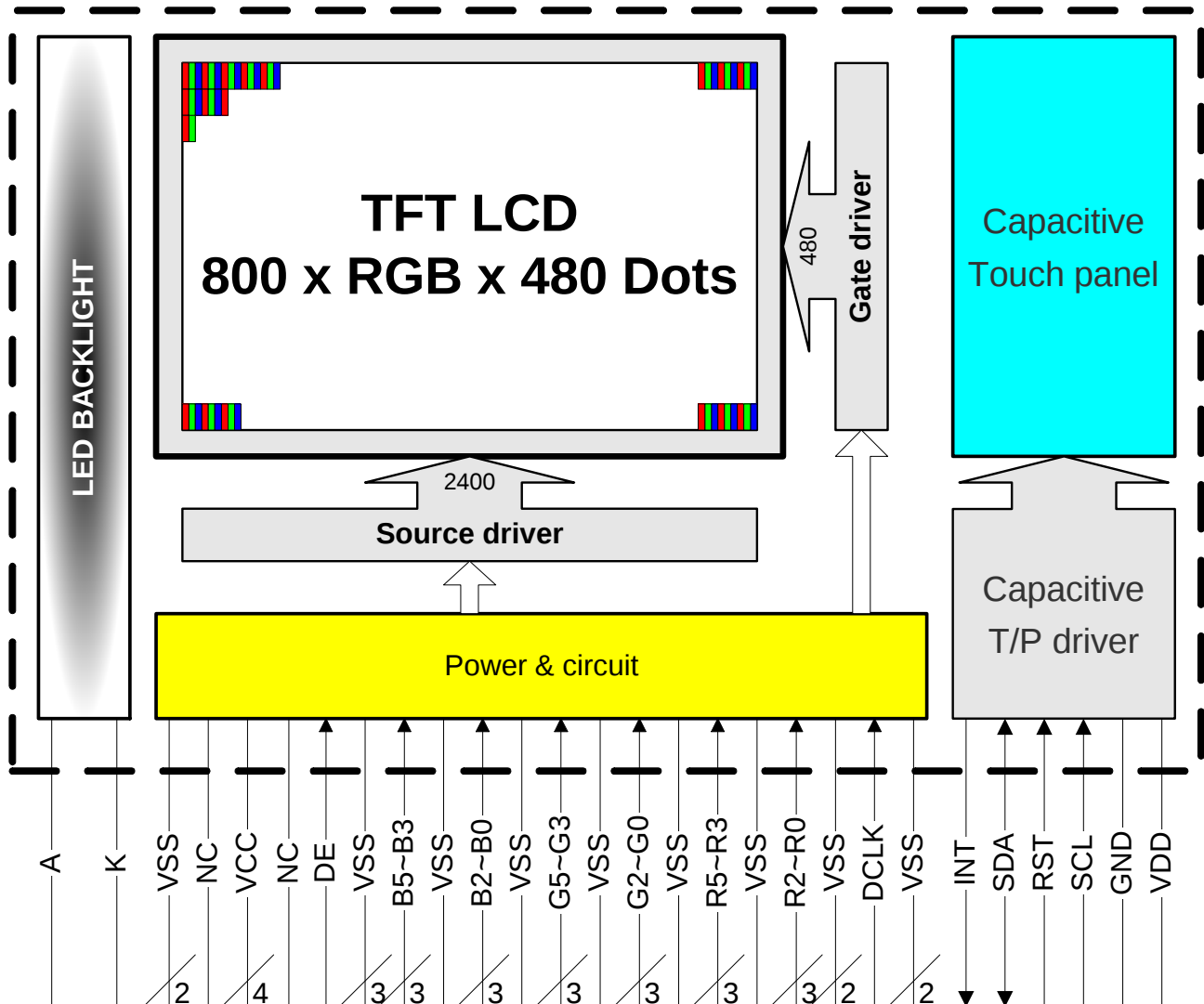
1	VDD
2	GND
3	RST
4	SCL
5	SDA
6	INT



DOTS DETAIL

- NOTE :
1. LCD : TFT TRANSMISSIVE TYPE , NORMAL WHITE
 2. VIEWING DIRECTION : 6 O'CLOCK
 3. Top : -20~70°C , Tst : -30~80°C
 4. LED COLOR : WHITE , 21 PCS DICE
CONSTANT CURRENT : 210mA ; Vled=9.9V(TYP)
 5. LCM MODULE BRIGHTNESS : 400 cd/m² (TYP)
 6. GENERAL TOLERANCE:±0.3
 7. CN1:9681-(IRISO)
 8. CN2:6702-E06N-00L(12C)
 9. CN3:BHSR-02VS-1(JST)

1.4 Block diagram:



1.5 Interface pin :

Pin No.	Pin Symbol	I/O	Description
1~2	VSS	P	GND
3	NC	-	No connection
4~7	VCC	P	Power supply for Module (+3.3V)
8	NC	-	No connection
9	DE	I	Data enable
10~12	VSS	P	GND
13~15	B5~B3	I	Blue data input
16	VSS	P	GND
17~19	B2~B0	I	Blue data input
20	VSS	P	GND
21~23	G5~G3	I	Green data input
24	VSS	P	GND
25~27	G2~G0	I	Green data input
28	VSS	P	GND
29~31	R5~R3	I	Red data input
32	VSS	P	GND
33~35	R2~R0	I	Red data input
36~37	VSS	P	GND
38	DCLK	I	Dot clock
39~40	VSS	P	GND

B/L interface pin :

Pin No.	Pin Symbol	I/O	Description
1	A	P	Power supply for LED+
2	K	P	Power supply for LED-

Capacitive touch panel (I2C) Interface:

Pin No.	Pin Symbol	I/O	Description
1	VDD	P	Power supply.(+3.3V)
2	GND	P	GND.
3	RST	I	Reset input pin. When RST is "H", internal initialization is executed.
4	SCL	I	Serial clock input.
5	SDA	I/O	Serial data access .
6	INT	O	Active low when data output from touch panel.

2. ELECTRICAL CHARACTERISTICS

2.1 Absolute Maximum Ratings

Items	Symbol	Min.	Max.	Unit
Power supply voltage	VCC	-0.3	7.0	V
	VDD	-0.5	6.0	V
Input voltage	V _{in}	-0.3	VCC+0.3	V
Operate temperature range	T _{OP}	TBD	TBD	°C
Storage temperature range	T _{ST}	-30	80	°C

2.2 DC Characteristics

$T_a = 25^{\circ}\text{C}$

Items	Symbol	Min.	Typ.	Max.	Unit	Condition
Supply voltage	VCC	-	3.3	-	V	-
	VDD	-	3.3	-	V	
Input Voltage	V_{IL}	0	-	0.3VCC	V	L level
	V_{IH}	0.7VCC	-	VCC	V	H level
Current consumption	I_{VCC}	-	160	250	mA	Note 1
	I_{vdd}	-	-	25	mA	

*Note1 :

Measuring Condition:

Standard Value MAX.

$T_a = 25^{\circ}\text{C}$

VCC -GND = 3.3V

Display Pattern = Check pattern



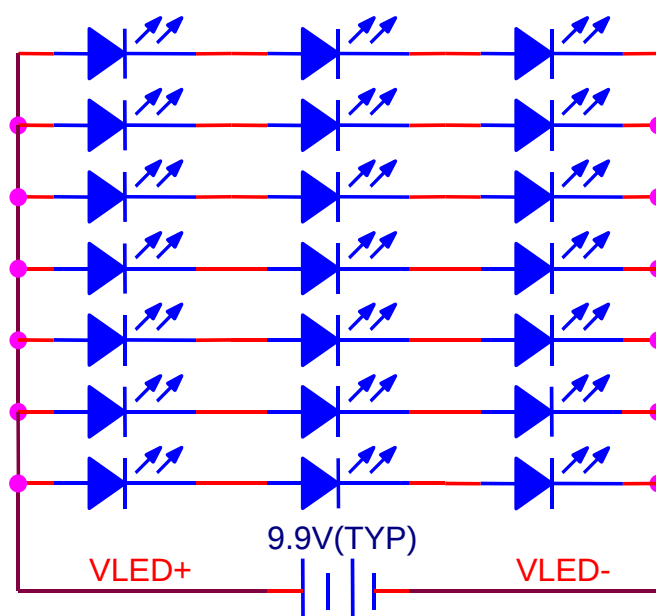
0 gray black pattern

2.3 Back-light Characteristics

PARAMETER	SYMBOL	MIN	TYP	MAX	Unit	Test Condition	NOTE
Supply Current	If	-	30	-	mA	Ta=25°C	single serial
Supply Voltage	Vf	-	9.9	-	V	Ta=25°C	single serial
Half-Life Time	Lf	-	50000	-	hrs	Ta=25°C	1

Note 1 : The " Half-Life Time" is defined as the LED chip brightness decreases to 50% than original brightness, Based on Ta 25±2°C ,60±10% RH condition .

Note 2 : LED backlight is 21 LEDs.



2.4 AC Characteristics

Switching characteristics

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
Data setup time	T_{dsu}	6	-	-	ns
Data hold time	T_{dhd}	6	-	-	ns
DE setup time	T_{esu}	6	-	-	ns
Source output settling time	T_{ST}	-	-	15	μ s
Source output loading R	R_{SL}	-	2	-	K ohm
Source output loading C	C_{SL}	-	60	-	pF

Parallel RGB Input Timing Requirement

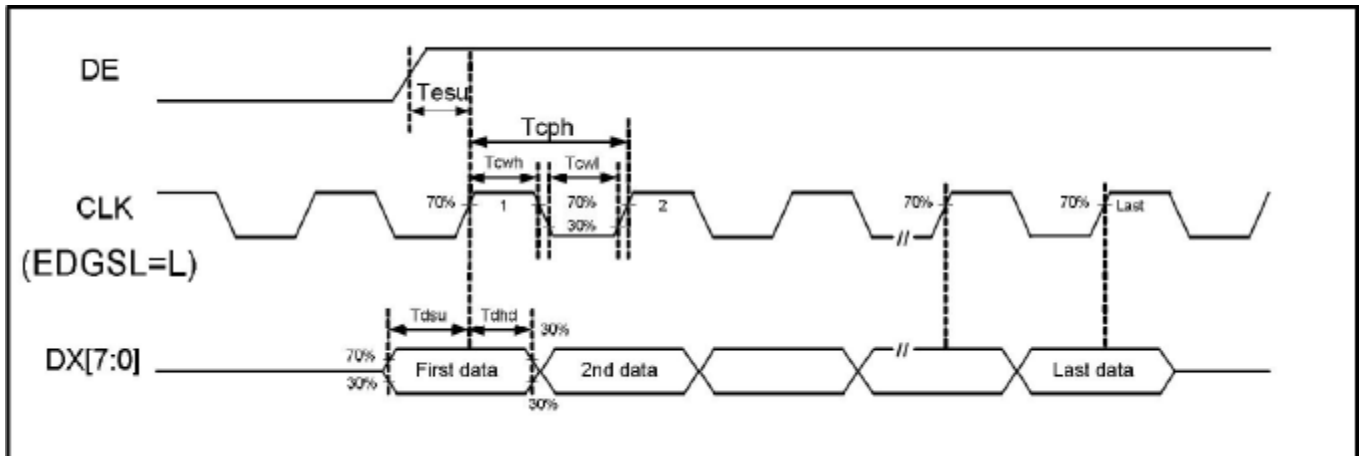
DE mode

PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
CLK frequency	F_{CPH}	-	33.26	-	MHz
CLK period	T_{CPH}	-	30.06	-	ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

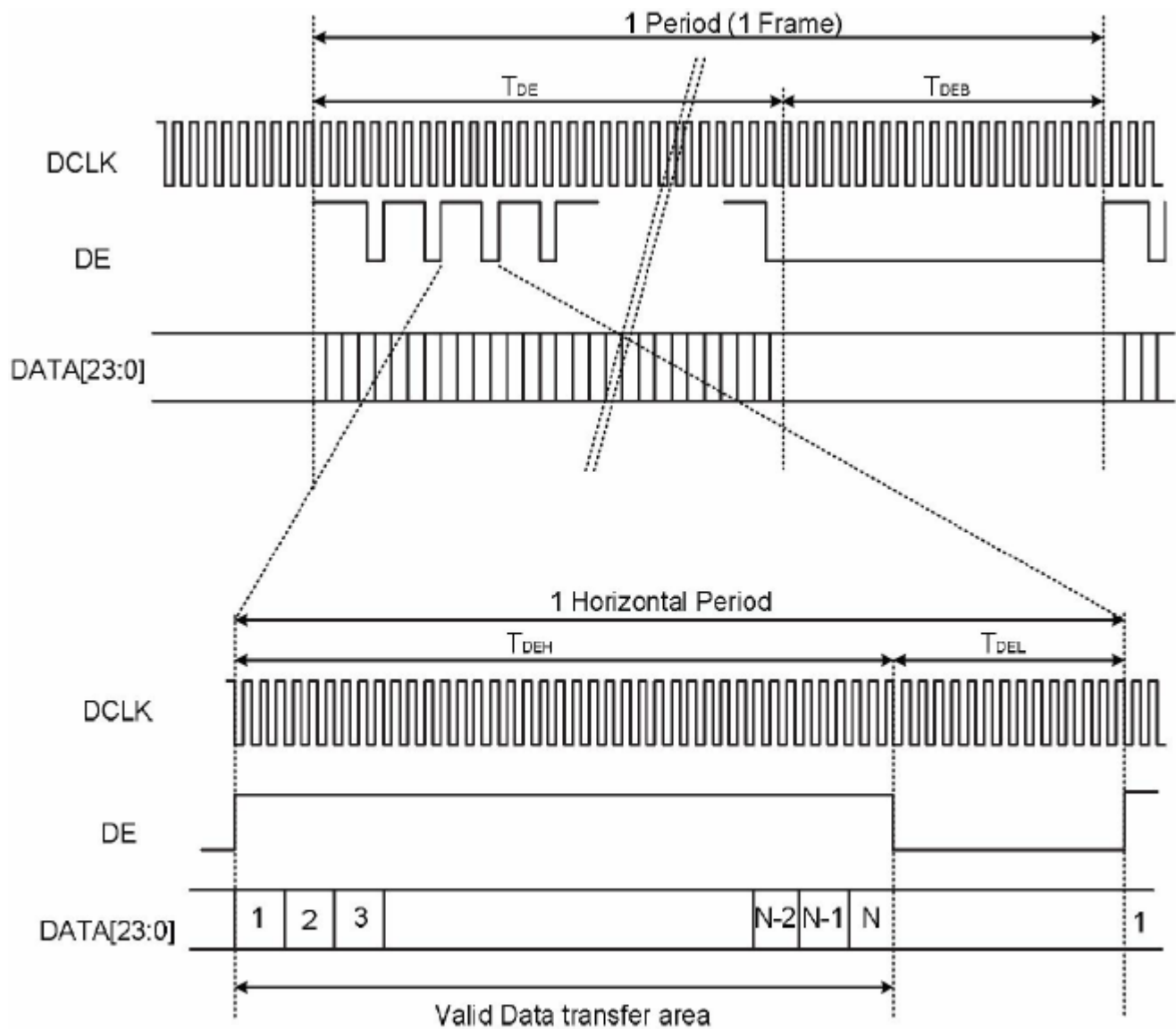
PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
OEV pulse width	T_{OEV}	-	150	-	T_{CPH}
CKV pulse width	T_{CKV}	-	133	-	T_{CPH}
DE(internal)-STV time	T_1	-	4	-	T_{CPH}
DE(internal)-CKV time	T_2	-	40	-	T_{CPH}
DE(internal)-OEV time	T_3	-	23	-	T_{CPH}
DE(internal)-POL time	T_4	-	157	-	T_{CPH}
STV pulse width	-	-	1	-	T_H

(i). $T_{HS}+T_{HA}<T_H$

Timing Controller Timing Chart



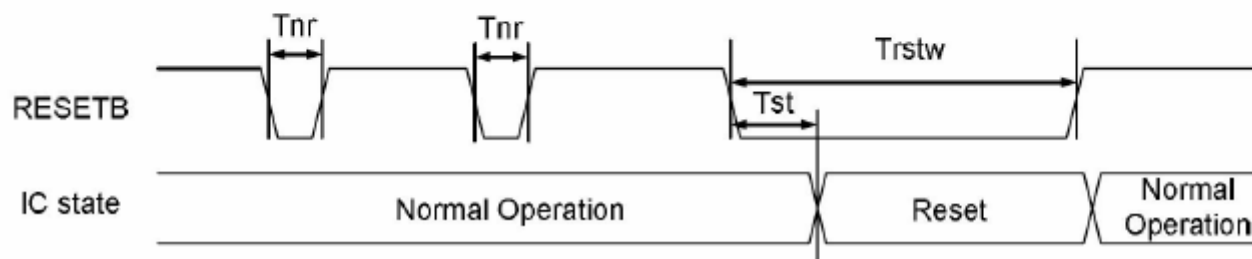
Clock and Data input waveforms



DE Mode Data Format

Hardware Reset Timing

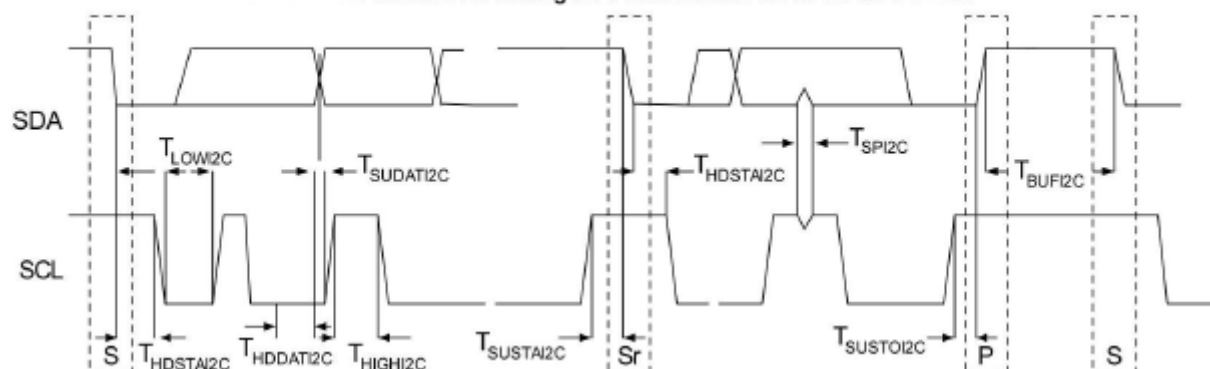
PARAMETER	Symbol	Spec.			Unit
		Min.	Typ.	Max.	
RESETB low pulse width	T_{rstw}	10	-	-	μs
Negative noise pulse width	T_{nr}		-	4	μs
Reset start time	T_{st}	4	-		μs



2.5 Capacitive touch panel controller AC Characteristics

Symbol	Description	Standard Mode		Fast Mode		Units	Notes
		Min	Max	Min	Max		
F_{SCLi2C}	SCL Clock Frequency	0	100	0	400	kHz	
$T_{HDSTAi2C}$	Hold Time (Repeated) START Condition. After this period, the first clock pulse is generated.	4.0	–	0.6	–	μ s	
T_{LOWi2C}	LOW Period of the SCL Clock	4.7	–	1.3	–	μ s	
$T_{HIGHi2C}$	HIGH Period of the SCL Clock	4.0	–	0.6	–	μ s	
$T_{SUSTAi2C}$	Setup Time for a Repeated START Condition	4.7	–	0.6	–	μ s	
$T_{HDDATI2C}$	Data Hold Time	0	–	0	–	μ s	
$T_{SUDATI2C}$	Data Setup Time	250	–	100 ^[16]	–	ns	
$T_{SUSTOI2C}$	Set-up Time for STOP Condition	4.0	–	0.6	–	μ s	
T_{BUFI2C}	Bus Free Time Between a STOP and START Condition	4.7	–	1.3	–	μ s	
T_{SPI2C}	Pulse Width of Spikes are Suppressed by the Input Filter.	–	–	0	50	ns	

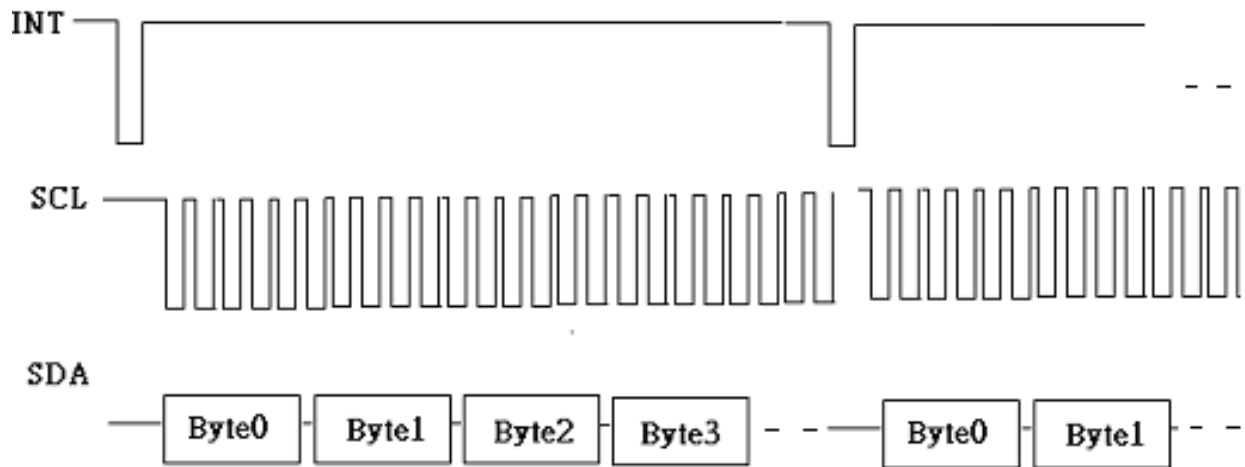
Definition for Timing for Fast/Standard Mode on the I²C Bus



2.6 Capacitive touch panel controller I2C Host Interface Protocol

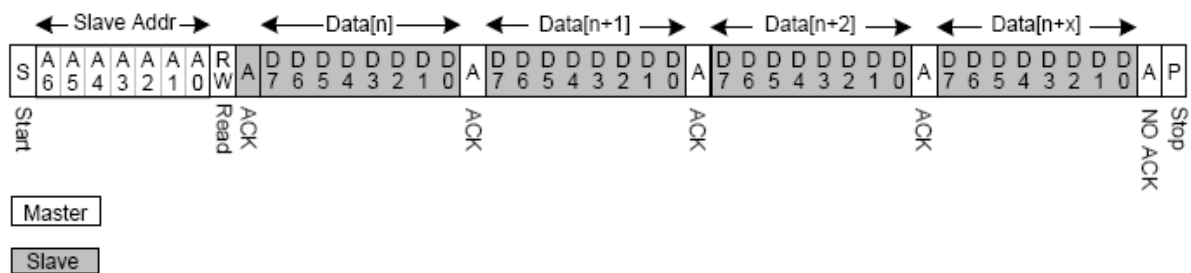
Communication protocol : I2C

Clock frequency : 400K Hz



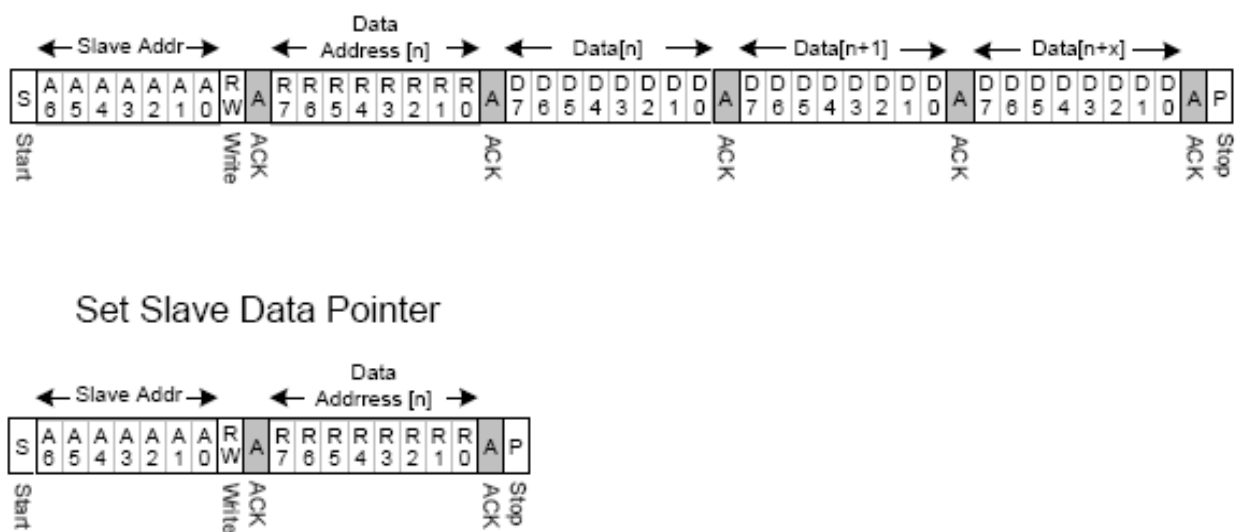
Register Read

Read x Bytes from I2C Slave

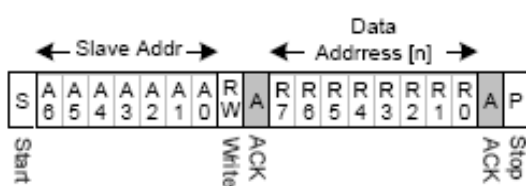


Register Write

Write x Bytes to I2C Slave



Set Slave Data Pointer



Note : Slave address is 0x38

Registers

Register	R/W	Function	Content
0x00	R	X coordinate High byte	0x0000~0x031F (0 ~ 799)
0x01	R	X coordinate low byte	
0x02	R	Y coordinate High byte	0x0000~0x01DF (0 ~ 479)
0x03	R	Y coordinate low byte	
0x04	R	Gesture code High byte	0x3100 : Zoom In
0x05	R	Gesture code Low byte	0x3200 : Zom Out
0x06	R	Firmware Version High byte	
0x07	R	Firmware Version low byte	

Touch Panel Button Definition : front side view



2.7 Touch Panel Specifications

Display	Descriptions	Note
Type	Capacitive Touch Panel	-
Structure	ITO Film : T=0.7mm	-
	ITO Glass : T=0.7mm	-
Surface Hardness	$\geq 3H$	3H pencil, pressure 500g/45° (JIS-K5600)
Input mode	Finger	-
Connector Type	FPC	-
Resolution	800 x 480	1024 x 1024 (Max)

2.7.1 Electric Characteristics

Items	Descriptions	Note
FPC Strength (Vertical)	Strength $\geq 600g/cm$	-
FPC Bending	Min. 10 times for each side	Normal performance after bending 90° test, no damage on FPC.

3. OPTICAL CHARACTERISTICS

3.1 Characteristics

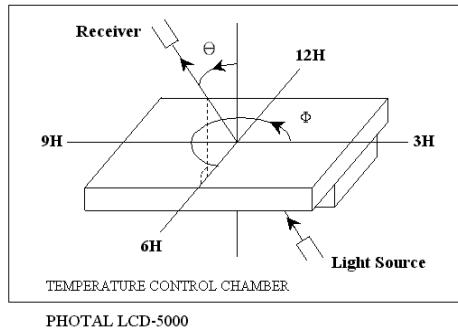
Electrical and Optical Characteristics

No.	Item		symbol / temp.		Min.	Typ.	Max.	Unit	Note
1	Response Time		Tr	25 °C	NA	5	10	ms	2
			Tf	25 °C	NA	15	20		
2	Viewing Angle	Hor.	Θ ₂₊	Center CR>=10	60	85	-	degree	3
			Θ ₂₋		60	85	-		
		Ver.	Θ ₂₊		60	85	-		
			Θ ₂₋		60	85	-		
3	Contrast Ratio		Cr	25 °C	400	800	-	-	4
4	Red x-code		Rx	25 °C	0.53	0.58	0.63	-	5
	Red y-code		Ry		0.30	0.35	0.40		
	Green x-code		Gx		0.30	0.35	0.40		
	Green y-code		Gy		0.53	0.58	0.63		
	Blue x-code		Bx		0.10	0.15	0.20		
	Blue y-code		By		0.09	0.14	0.19		
	White x-code		Wx		0.27	0.32	0.37		
	White y-code		Wy		0.29	0.34	0.39		
	Brightness		Y		210	300	-	cd/m ²	
5	Brightness Uniformity			25 °C	80	-	-	%	6

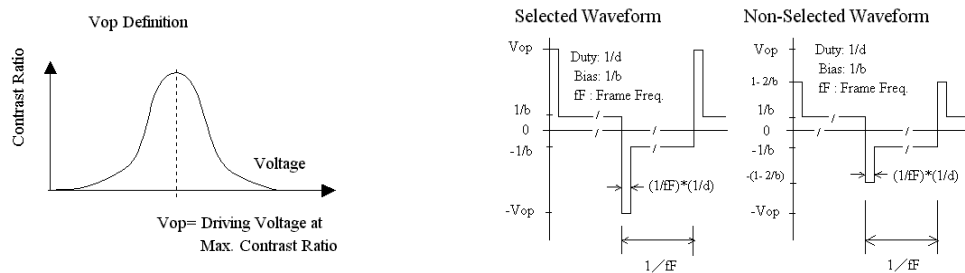
3.2 Definition of optical characteristics

Measurement condition :

Transmissive and Transflective type

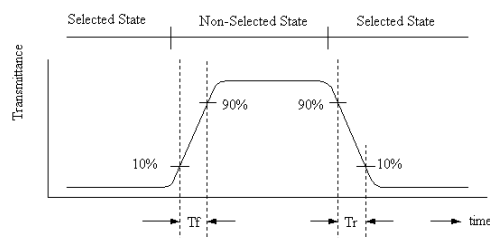


[Note 1] Definition of LCD Driving Vop and Waveform :

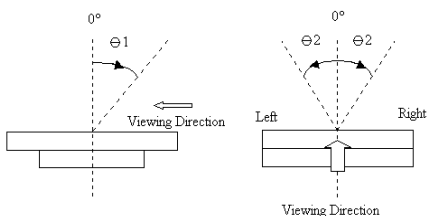


[Note 2] Definition of Response Time

for Positive type :

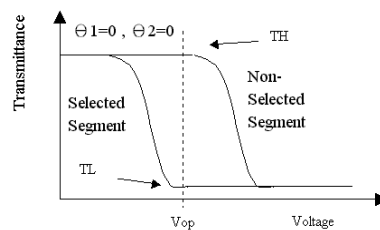


[Note 3] Definition of Viewing Angle :



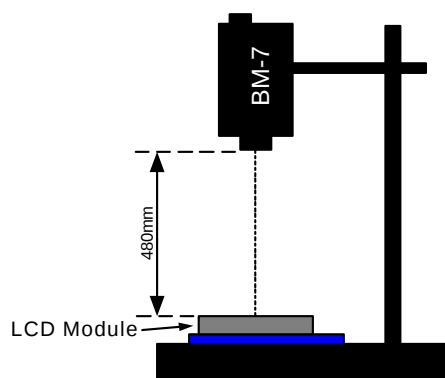
[Note 4] Definition of Contrast Ratio :

for Positive type

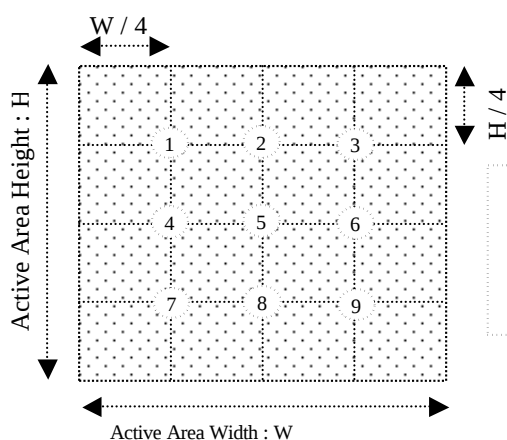


$$\text{Contrast Ratio} = \frac{TH}{TL}$$

[Note 5] Definition of measurement of Color Chromaticity and Brightness

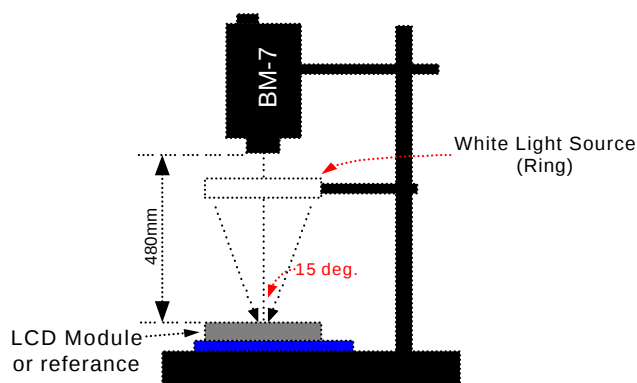


[Note 6] Definition of Brightness Uniformity



$$\text{Brightness Uniformity} = \frac{\text{Minimum Brightness of Point 1~9}}{\text{Maximum Brightness of Point 1~9}}$$

[Note 7] Definition of Measurement of Reflectance



4. RELIABILITY :

Item No	Items	Condition
1	High temperature operating	70 , 200 hours
2	Low temperature operating	-20 , 200 hours
3	High temperature storage	80 , 200 hours
4	Low temperature storage	-30 , 200 hours
5	High temperature & humidity storage	60 , 90%RH, 100 hours
6	Thermal Shock storage	-30 , 30min.<=> 80 , 30min. 10 Cycles
7	Vibration test	10 => 55 =>10 => 55 => 10 Hz , within 1 minute Amplitude : 1.5mm. 15 minutes for each Direction (X,Y,Z)
8	Drop test	Packed, 100CM free fall, 6 sides, 1 corner, 3edges
9	Life time	50,000 hours 25 , 60%RH , specification condition driving

* One single product test for only one item.

* Judgment after test : keep in room temperature for more than 2 hours.

- Current consumption < 2 times of initial value
- Contrast > 1/2 initial value
- Function : work normally

5. PRODUCT HANDLING AND APPLICATION

☐ PRECAUTION FOR HANDLING LCM

- The LCD module contains a C-MOS LSI. People who operate the LCM should wear ESD protection equipment to prevent ESD hurt on products.
- Do not input any signal before power is turned on.
- Do not take LCM from its packaging bag until it is assembled.
- Peel off the LCM protective film slowly since static electricity may be generated.
- Pay attention to the humidity of the work shop, 50~60%RH is satisfactory.
- Use a non-leak iron for soldering LCM.
- Do not touch the display surface or connection terminals area with bare hands. Smudges on the display surface reduce the insulation between terminals.
- Cautions for soldering to LCM:
Condition for soldering I/O terminals:
Temperature at iron tip :350 ±15 .
Soldering time : 3~4sec./ terminals.
Type of solder : Eutectic solder(rosin flux filled).

☐ PRECAUTION IN USE OF LCD

- Do not contact or scratch the front surface and the contact pads of a LCD panel with hard materials such as metal or glass or with one's nail.
- To clean the surface , wipe it gently with soft cloth dampened by alcohol.
- Do not attempt to wipe off the contact pads.
- Keep LCD panels away from direct sunlight , also avoid them in high-temperature & high humidity environment for a long period.
- Do not drive LCD panels by DC voltage.
- Do not expose LCD panels to organic solvent.
- Liquid in LCD is hazardous substance. In case a contact with liquid crystal material is occurred, be sure to immediately wash such material away by soap and water.
- The polarizer is easily damaged and should be handle with special care. Don't press or rub it with hard objects.

☐ PRECAUTION FOR STORING AND USE OF LCM

- To avoid degradation of the device , do not store the module under the conditions of direct sunlight , high temperature or high humidity . Keep the module in bags designed to prevent static electricity charging under low temperature / normal humidity conditions(avoid high temperature / high humidity and low temperature below 0)
- Never use the LCD , LCM under 45 Hz , the liquid crystal will decomposition and cause permanently damage on display !!

☐ USING ON MEDICAL CARE , SAFETY OR HAZARDOUS APPLICATION OR SYSTEM

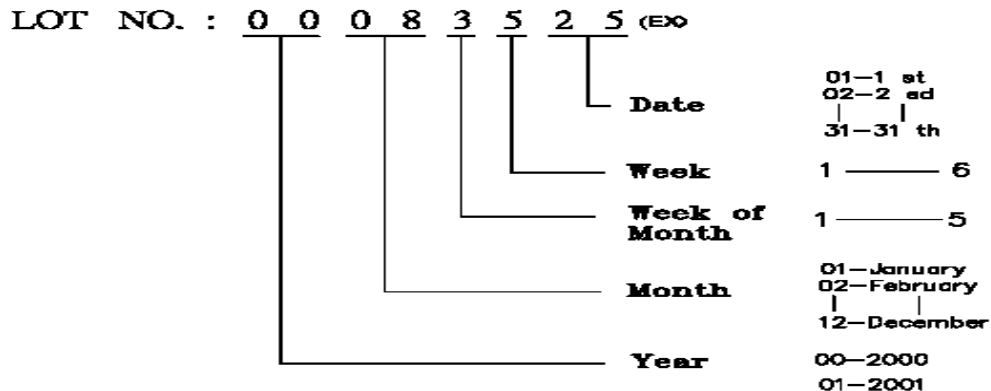
- For the application in medical care, safety and hazardous products or systems, an authorization from URT is required. URT will not responsible for any damage or loss which caused by the products without any authorization given by URT.
- This product is not allowed to be designed and used for military application and/or purpose.
- The delivery of this product to the countries and/or regions where the embargoes are imposed by U.N. is prohibited.
- The application and delivery of this product must comply with Strategic High-Tech Commodities (SHTC) export control and the sales to the embargoed and/or sanctioned countries or regions are strictly prohibited.

6. DATE CODE OF PRODUCTS

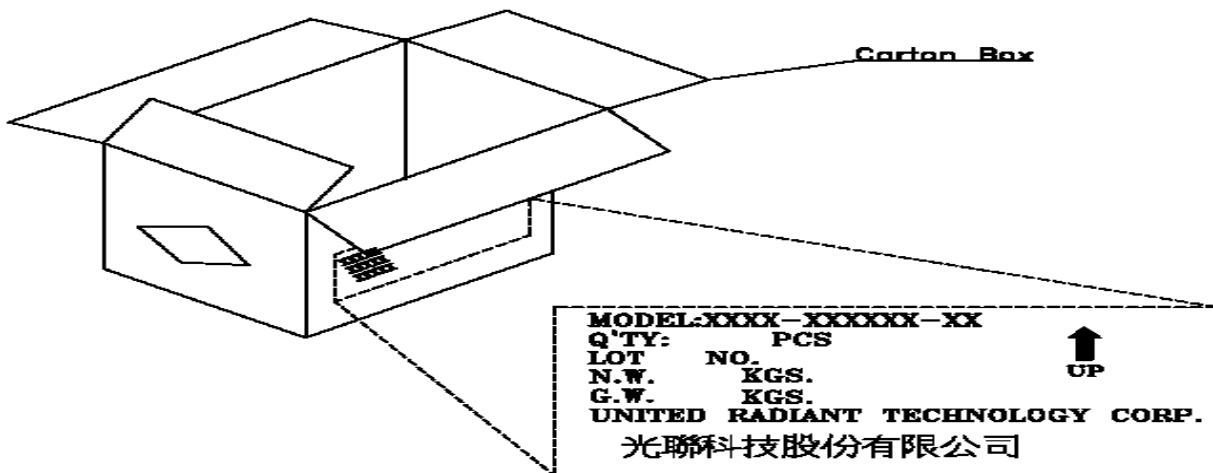
- Date code will be shown on each product :
- **YY MM DD - XXXX**
| | | |
Year Month Day - Production lots
- Example: 090508 - 0 0 0 3 ==>Year 2009, May.,08rd , Batch no.03

7. PACKING

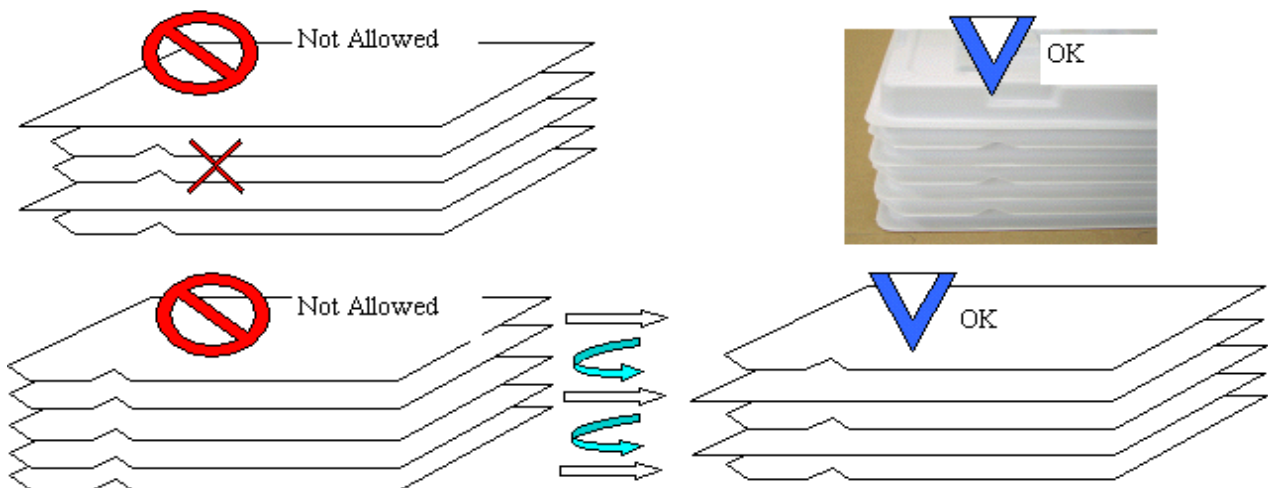
Instruction of lot number:



Label of carton:



Packing tray must be stacked with alternated direction to each others.
To tacks packing trays in same direction will cause product damaged.



MODEL NO: UM*

T.B.D. pcs / Tray

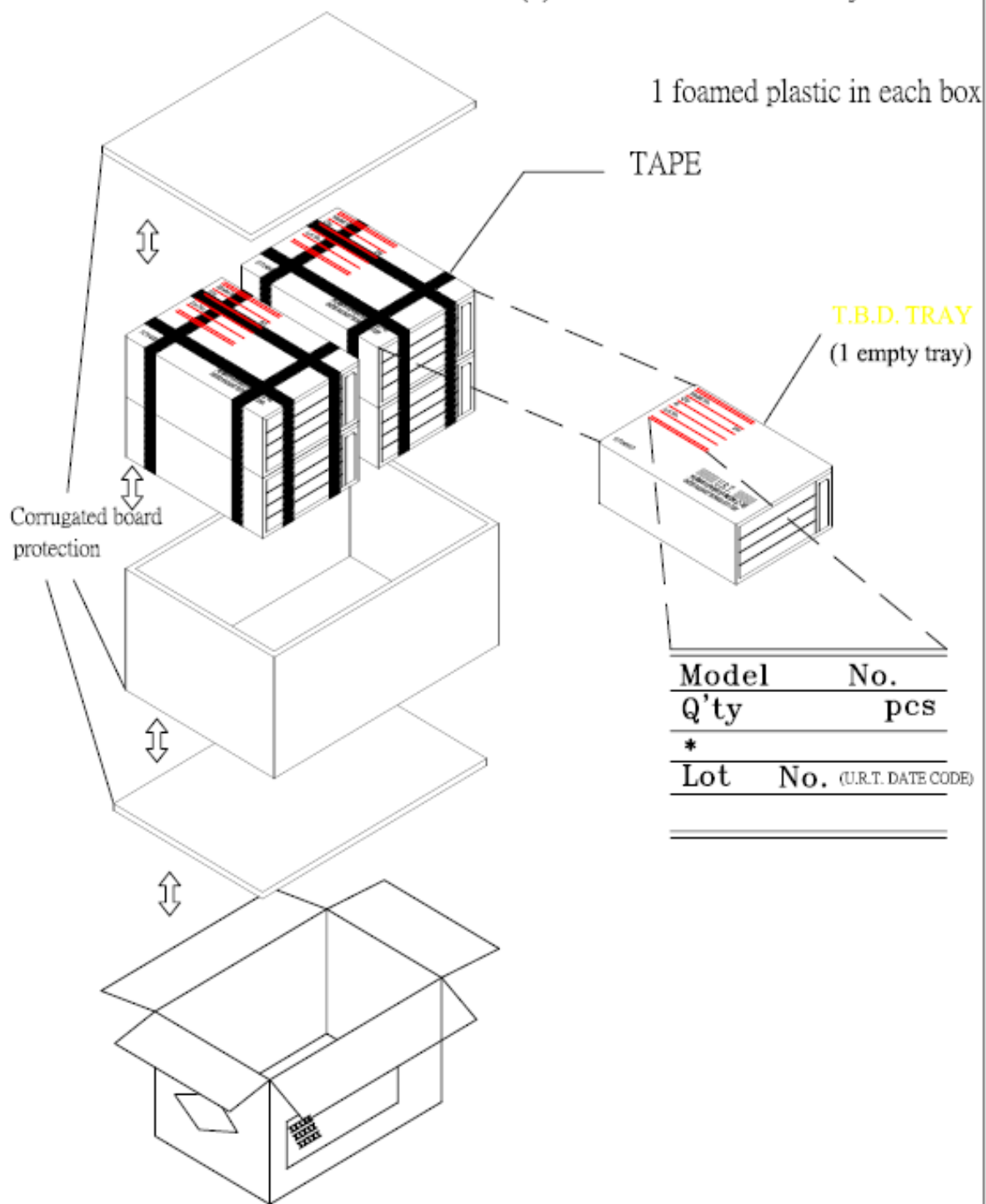
T.B.D. Tray / Box

T.B.D. Box / Carton

T.B.D. pcs / Carton

NOTE:

- (1) Be warned, the direction of the tray has to turn it by 180 degree before stack it up. Otherwise, it will be packager's responsibility!!
- (2) Safe Stack : 5 cartons only



8. INSPECTION STANDARD

8.1. QUALITY :

THE QUALITY OF GOODS SUPPLIED TO PURCHASER SHALL COME UP TO THE FOLLOWING STANDARD.

8.1.1. THE METHOD OF PRESERVING GOODS

AFTER DELIVERY OF GOODS FROM U.R.T. TO PURCHASER. PURCHASER SHALL CONTROL THE LCM AT -10 40 ,AND IT MIGHT BE DESIRABLE TO KEEP AT THE NORMAL ROOM TEMPERATURE AND HUMIDITY UNTIL INCOMING INSPECTION OR THROWING INTO PROCESS LINE.

8.1.2. INCOMING INSPECTION

(A) THE METHOD OF INSPECTION

IF PURCHASER MAKE AN INCOMING INSPECTION , A SAMPLING PLAN SHALL BE APPLIED ON THE CONDITION THAT QUALITY OF ONE DELIVERY SHALL BE REGARDED AS ONE LOT.

(B) THE STANDARD OF QUALITY

ISO-2859-1 (or MIL-STD-105E) , LEVEL SINGLE PLAN.

CLASS	AQL(%)
CRITICAL	0.4 %
MAJOR	0.65 %
MINOR	1.5 %
TOTAL	1.5 %

EVERY ITEM SHALL BE INSPECTED ACCORDING TO THE CLASS.

(C) MEASURE

IF AS THE RESULT OF ABOVE RECEIVING INSPECTION , A LOT OUT IS DISCOVERED.

PURCHASER SHALL BE INFORM SELLER OF IT WITHIN SEVEN DAYS. BUT FIRST SHIPMENT WITHIN FOURTEEN DAYS.

8.1.3. WARRANTY POLICY

U.R.T. WILL PROVIDE ONE-YEAR WARRANTY FOR THE PRODUCTS ONLY IF UNDER SPECIFICATION OPERATING CONDITIONS. U.R.T. WILL REPLACE NEW PRODUCTS FOR THESE DEFECT PRODUCTS WHICH UNDER WARRANTY PERIOD AND BELONG TO THE RESPONSIBILITY OF U.R.T.

8.2. CHECKING CONDITION

8.2.1. CHECKING DIRECTION SHALL BE IN THE 45 DEGREE AREA TO FACE THE SAMPLE.

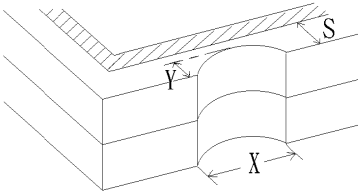
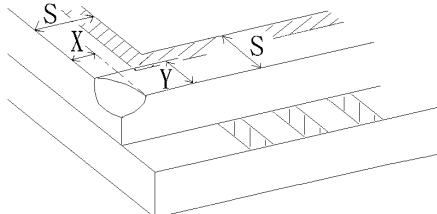
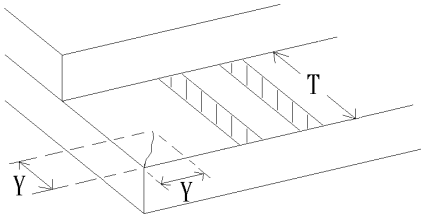
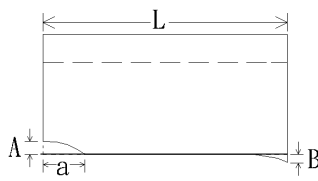
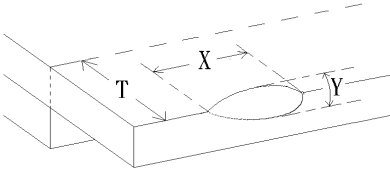
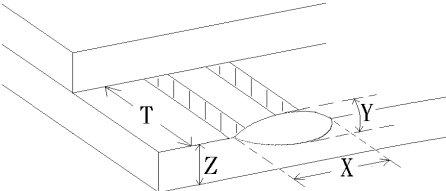
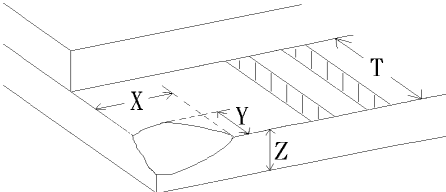
8.2.2. CHECKER SHALL SEE OVER 30 cm. WITH BARE EYES FAR FROM SAMPLE AND USING 2 PCS. OF 20W FLUORESCENT LAMP.

8.3. INSPECTION PLAN :

CLASS	ITEM	JUDGEMENT	CLASS
PACKING & INDICATE	1. OUTSIDE AND INSIDE PACKAGE	"MODEL NO." , "LOT NO." AND "QUANTITY" SHOULD INDICATE ON THE PACKAGE.	Minor
	2. MODEL MIXED AND QUANTITY	OTHER MODEL MIXED.....REJECTED QUANTITY SHORT OR OVER.....REJECTED	Critical
	3. PRODUCT INDICATION	"MODEL NO." SHOULD INDICATE ON THE PRODUCT	Major
ASSEMBLY	4. DIMENSION, LCD GLASS SCRATCH AND SCRIBE DEFECT.	ACCORDING TO SPECIFICATION OR DRAWING.	Major
APPEARANCE	5. VIEWING AREA	POLARIZER EDGE OR LCD'S SEALING LINE IS VISABLE IN THE VIEWING AREAREJECTED	Minor
	6. BLEMISH, BLACK SPOT, WHITE SPOT IN THE LCD AND LCD GLASS CRACKS	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	7. BLEMISH, BLACK SPOT WHITE SPOT AND SCRATCH ON THE POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	8. BUBBLE IN POLARIZER	ACCORDING TO STANDARD OF VISUAL INSPECTION (INSIDE VIEWING AREA)	Minor
	9. LCD'S RAINBOW COLOR	STRONG DEVIATION COLOR (OR NEWTON RING) OF LCD.....REJECTED. OR ACCORDING TO LIMITED SAMPLE (IF NEEDED, AND INSIDE VIEWING AREA)	Minor
ELECTRICAL	10. ELECTRICAL AND OPTICAL CHARACTERISTICS (CONTRAST, VOP, CHROMATICITY ... ETC)	ACCORDING TO SPECIFICATION OR DRAWING . (INSIDE VIEWING AREA)	Critical
	11.MISSING LINE	MISSING DOT, LINE, CHARACTERREJECTED	Critical
	12.SHORT CIRCUIT, WRONG PATTERN DISPLAY	NON DISPLAY, WRONG PATTERN DISPLAY, CURRENT CONSUMPTION OUT OF SPECIFICATION..... REJECTED	Critical
	13. PIN HOLE, PATTERN DEFORMITY	ACCORDING TO STANDARD OF VISUAL INSPECTION	Minor

8.4. STANDARD OF VISUAL INSPECTION

NO.	CLASS	ITEM	JUDGEMENT																																	
8.4.1	MINOR	. BLEMISH、 BLACK SPOT、 WHITE SPOT IN THE LCD.	(A) ROUND TYPE: unit : mm. <table><tr><td>DIAMETER (mm.)</td><td>ACCEPTABLE Q'TY</td></tr><tr><td>Φ 0.1</td><td>DISREGARD</td></tr><tr><td>0.1 < Φ 0.2</td><td>2</td></tr><tr><td>0.2 < Φ 0.25</td><td>1</td></tr><tr><td>0.25 < Φ</td><td>0</td></tr></table>	DIAMETER (mm.)	ACCEPTABLE Q'TY	Φ 0.1	DISREGARD	0.1 < Φ 0.2	2	0.2 < Φ 0.25	1	0.25 < Φ	0																							
		DIAMETER (mm.)	ACCEPTABLE Q'TY																																	
Φ 0.1	DISREGARD																																			
0.1 < Φ 0.2	2																																			
0.2 < Φ 0.25	1																																			
0.25 < Φ	0																																			
		. BLEMISH、 BLACK SPOT、 WHITE SPOT AND SCRATCH ON THE POLARIZER	NOTE: Φ=(LENGTH+WIDTH)/2 (B) LINER TYPE: unit : mm. <table><tr><td>LENGTH</td><td>WIDTH</td><td>ACCEPTABLE Q'TY</td></tr><tr><td>-----</td><td>W 0.03</td><td>DISREGARD</td></tr><tr><td>L 5.0 0.03 < W 0.05</td><td></td><td>3</td></tr><tr><td>L 5.0 0.05 < W 0.07</td><td></td><td>1</td></tr><tr><td>----- 0.07 < W</td><td></td><td>FOLLOW ROUND TYPE</td></tr></table>	LENGTH	WIDTH	ACCEPTABLE Q'TY	-----	W 0.03	DISREGARD	L 5.0 0.03 < W 0.05		3	L 5.0 0.05 < W 0.07		1	----- 0.07 < W		FOLLOW ROUND TYPE																		
LENGTH	WIDTH	ACCEPTABLE Q'TY																																		
-----	W 0.03	DISREGARD																																		
L 5.0 0.03 < W 0.05		3																																		
L 5.0 0.05 < W 0.07		1																																		
----- 0.07 < W		FOLLOW ROUND TYPE																																		
8.4.2	MINOR	BUBBLE IN POLARIZER	unit : mm. <table><tr><td>DIAMETER</td><td>ACCEPTABLE Q'TY</td></tr><tr><td>Φ 0.15</td><td>DISREGARD</td></tr><tr><td>0.15 < Φ 0.5</td><td>2</td></tr><tr><td>0.5 < Φ</td><td>0</td></tr></table>	DIAMETER	ACCEPTABLE Q'TY	Φ 0.15	DISREGARD	0.15 < Φ 0.5	2	0.5 < Φ	0																									
DIAMETER	ACCEPTABLE Q'TY																																			
Φ 0.15	DISREGARD																																			
0.15 < Φ 0.5	2																																			
0.5 < Φ	0																																			
8.4.3	MINOR	Dot Defect	<table><tr><td>Items</td><td>ACC. Q'TY</td></tr><tr><td>Bright dot</td><td>N 4</td></tr><tr><td>Dark dot</td><td>N 4</td></tr></table> Pixel Define <table><tr><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td></tr><tr><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td></tr><tr><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td><td>R</td><td>G</td><td>B</td></tr></table> Not 1: The definition of dot: The size of a defective dot over 1/2 of whole dot is regarded as one defective dot. Not 2: Bright dot: Dots appear bright and unchanged in size in which LCD panel is displaying under black pattern. Not 3: Dark dot: Dots appear dark and unchanged in size in which LCD panel is displaying under pure red, green ,blue pattern.	Items	ACC. Q'TY	Bright dot	N 4	Dark dot	N 4	R	G	B	R	G	B	R	G	B	R	G	B	R	G	B	R	G	B	R	G	B	R	G	B	R	G	B
Items	ACC. Q'TY																																			
Bright dot	N 4																																			
Dark dot	N 4																																			
R	G	B	R	G	B	R	G	B																												
R	G	B	R	G	B	R	G	B																												
R	G	B	R	G	B	R	G	B																												

NO.	CLASS	ITEM	JUDGEMENT
8.4.4	MINOR	CHIPPING	 $Y > S$ REJ.
8.4.5	MINOR	CHIPPING	 $X \text{ or } Y > S$ REJ.
8.4.6	MAJOR	GLASS CRACK	 $Y > (1/2) T$ REJ.
8.4.7	MAJOR	SCRIBE DEFECT	 $a > L/3$, $A > 1.5\text{mm}$. REJ. - B : ACCORDING TO DIMENSION
8.4.8	MINOR	CHIPPING (ON THE TERMINAL AREA)	 $\Phi = (x+y)/2 > 2.5 \text{ mm}$ REJ.
8.4.9	MINOR	CHIPPING (ON THE TERMINAL SURFACE)	 $Y > (1/3) T$ REJ.
8.4.10	MINOR	CHIPPING	 $Y > T$ REJ.

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