TFT LCD Approval Specification

MODEL NO.: R181E1-L01
(IDT ITSX88E)

Customer: _____

Approved by: _____

Note:

記錄	工作	審核	角色	投票
2007-06-06 15:40:49 CST	Approve by Dept. Mgr.(QA RA)	tomy_chen(陳永一 /52720/54140/43150)	Department Manager(QA RA)	Accept
2007-06-06 13:29:11 CST	Approve by Director	wy_li(李汪洋/44701)	Director	Accept
2007-05-25 16:05:51 CST	Approve by Director	cc_chen(陳春成/56350/54951)	Director	Accept
2007-05-21 18:21:24 CST	Review by Director	kf_huang(黃崑峰 /56620/54380/14906/25075)	Director	Accept

REVISION HISTORY

Version	Date	Section	Description
Ver 2.0	Nov. 29, 06'	All	Index to IDT OEM I-88E-05
Ver 2.1	Apr. 11, 07'		Index to IDT OEM I-88E-06
		2.1	Contrast spec update(Reference to IDTech 2004 3/31 EC notice)
		4.0	Contrast spec update(Reference to IDTech 2004 3/31 EC notice)

Engineering Specification

Type 18.1 SXGA Monochrome TFT/LCD Module
Model Name: ITSX88E

Document Control Number: OEM I-88E-06

i Contents

ii Record of Revision

Date	Document Revision	Page	Summary
June 13,2001	OEM I-88E-01	All	First Edition for customer. Based on Internal Spec. as of June 1,2001
October 23,2001	OEM I-88E-02	5,8 5 7 8 19 21 24,25 27,28	Update by establishment of the New Company as "International Display Technology". Based on Internal Spec. EC H30912 as of October 22,2001. To update White Luminance. To update Weight, Optical Rise Time + Fall Time and Power Consumption. To update value of Shock Test Criteria. To update Viewing Angle, Response Time and White Balance. To update the Lamp Current versus Luminance Curve. To add Note for Timing Characteristics. To update Power Consupmtion. To update Reference Drawings.
January 28,2002	OEM I-88E-03	5,8	To update White Luminance.
February 25,2002	OEM I-88E-04	4 5 5,8 27	Based on Internal Spec. EC H30923. To add one of item for Handling Precautions. To update Power Consupmtion. To update Contrast Ratio. To add Note for Mechanical Characteristics.

February 15,2007	OEM I-88E-05		4.0 Optical Characteristics
		13	Optical equipment change.
			4.2 Image Retention
		14	Update Image Retention spec
			5.1 Connectors
		15	Change IF connector type to RoHs.
			Change Inverter connector type to RoHs.
		35	12.0 Backlight Life spec add.
		36,37	13.0 Packaging Specification add.
		38,39	14.0 Label spec add.
		40	15.0 Application Note add.
April 11,2007	OEM I-88E-06		2.1 Characteristics
		8	Contrast Ratio update (IDT ECN at 2004 3/31)
			(Typ 550 →600,min 300→500)
			4.0 Optical Characteristics (IDT ECN at 2004 3/31)
		11	Contrast Ratio update
			(Typ 550 →600,min 300→500)

1.0 Handling Precautions

- Damage to the panel or the panel electronics may result from any deviation from the recommended power on/off sequencing. The panel should not be hot plugged. Refer to the Power On/Off Sequence section in this Specification.
- Handle the panel with care. The LCD panel and CCFL (Cold Cathode Fluorescent Lamp)s are made of glass and may crack or break if dropped or subjected to excessive force.
- The CCFLs contain a small amount of Mercury so should not be disposed of to landfill. Dispose of as required by local ordinances or regulations.
- The LCD module contains small amounts of material having no flammability grade. The exemption conditions of the flammability requirements (4.7.3.4, IEC60950 3rd.Ed. or UL60950 3rd.Ed.) should be applied.
- The panel may be damaged by the application of twisting or bending forces to the module assembly.Care should be taken in the design of the monitor housing and the assembly procedure to prevent stress damage to the panel especially the lamp cable and the lamp connector..
- Use standard earthing/grounding procedures to prevent damage to the CMOS LSI while handling the module.
- Use earthing/grounding procedures, an ionic shower, or similar to prevent static damage while removing the protective front sheet.
- The front polarizer can be easily damaged. Take care not to scratch the front surface with any hard or abrasive material. Dust, finger marks, grease etc. can be removed with a soft damp cloth (a small amount of mild detergent can be used on the damp cloth). Do not apply water or detergent directly to the front surface as this may cause staining or damage the electronic components.
- Never use any solvent on the front polarizer or module as this may cause permanent damage.
- Do not open or modify the module assembly.
- Continuous operation of the panel with the same screen content may result in some image sticking. Over 10 hours operation with the same content is not recommended.
- Wipe off water drop immediately. Long contact with water may cause discoloration or spots.
- When the panel surface is soiled, wipe it with absorbent cotton or other soft cloth.
- Please do not use middle 3(three) screw holes on the upper(long) side and middle 3(three) screw holes on the lower(long) side for panel fixing. These screw holes are for manufacturing purpose only.

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2.0 General Description

This specification applies to the Type 18.1 Monochrome TFT/LCD Module 'ITSX88E'.
This module is designed for a LCD monitor style display unit.This module includes inverter card.
The screen format and electrical interface are intended to support the VESA SXGA (1280(H) x 1024(V)at 60Hz) screen.
Supported gray scale is 8-bit per 1(one) sub-pixel.
All input signals are LVDS(Low Voltage Differential Signaling) interface compatible.
This model meet RoHs requirements.

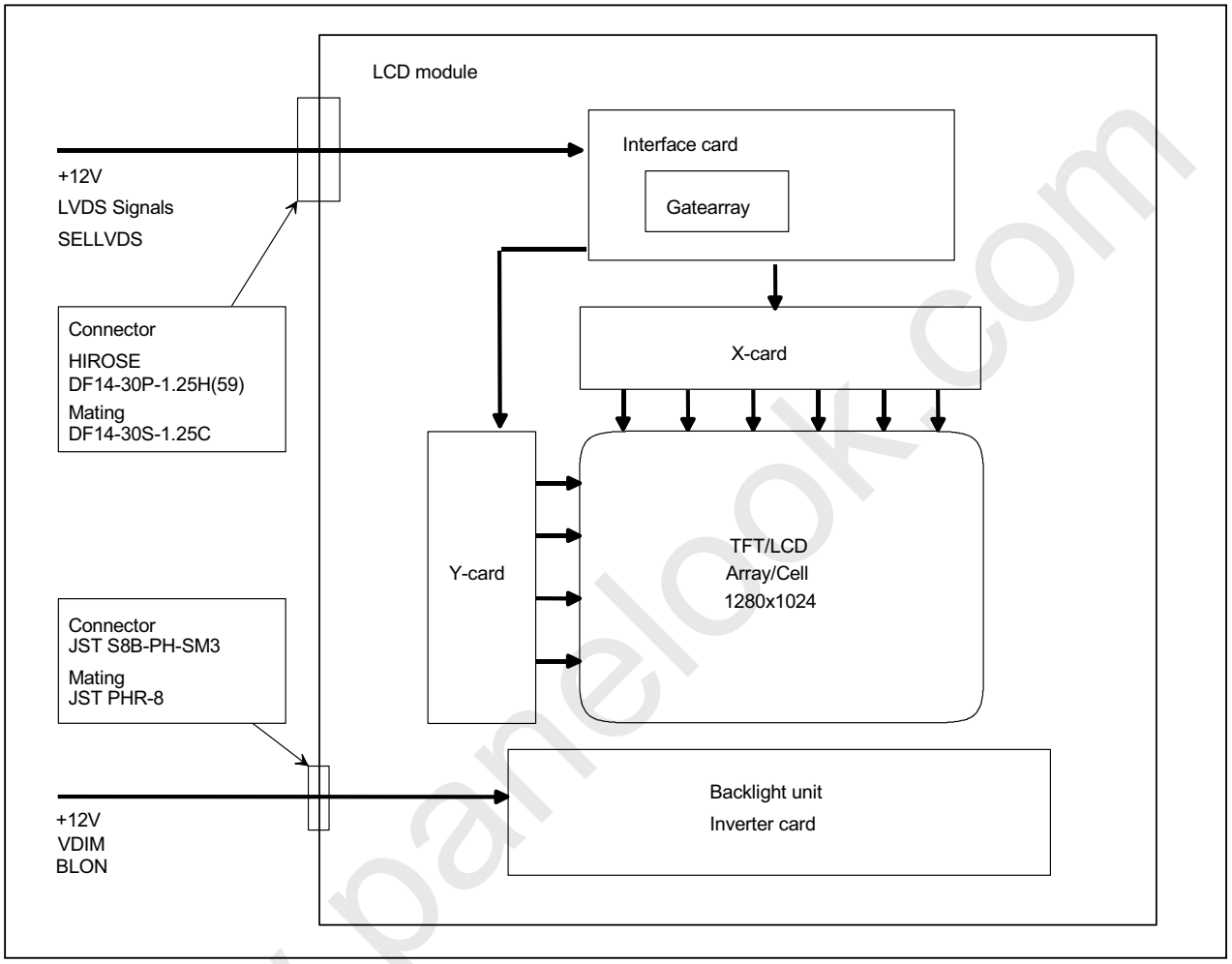
2.1 Characteristics

The following items are characteristics summary on the table under 25 degree C condition:

CHARACTERISTICS ITEMS	SPECIFICATIONS
Screen Diagonal [mm]	460
Pixels H x V	1280(x3) x 1024
Active Area [mm]	359.0(H) x 287.2(V)
Pixel Pitch [mm]	0.2805(per one triad) x 0.2805
Pixel Arrangement	Sub-pixel Vertical Stripe
Weight [grams]	2,900 typ.
Physical Size [mm]	389.0(W) typ. x 317.2(H) typ. x 35.0 (D) max.
Display Mode	Normally Black
Display Surface Treatment	Anti-Glare
Supported Grayscale	8-bit per 1(one) sub-pixel
White Luminance [cd/m^2]	700 Typ.
Contrast Ratio	600 : 1 Typ.
Optical Rise Time/Fall Time [msec]	Rise Time + Fall Time : 40 Typ (total)
Input Voltage [V]	+12 +/- 5%
Power Consumption [W]	38.8 typ., 46.6 max.
Electrical Interface	LVDS Dual (Even/Odd A/B/C Data(8bit), 3sync signals, Clock)
Temperature Range [degree C] Operating Storage (Shipping)	 0 to +50 -20 to +60

2.2 Functional Block Diagram

The following diagram shows the functional block of this Type 18.1 Monochrome TFT/LCD Module.



3.0 Absolute Maximum Ratings

Absolute maximum ratings of the module is as follows:

Item	Symbol	Min	Max	Unit	Conditions
Logic/LCD Drive Voltage	Vin	-0.3	+13.2	V	
Backlight Voltage	VBL	-0.3	+13.2	V	
Select LVDS data order	SELLVDS	-0.3	3.3	V	
Brightness control	VDIM	-0.3	5.3	V	
Backlight on signal	BLON	-0.3	+5.3	V	
Operating Temperature	TOP	0	+50	deg.C	**(Note 1)**
Operating Humidity	HOP	8	80	%RH	**(Note 1)**
Storage Temperature	TST	-20	+60	deg.C	**(Note 1)**
Storage Humidity	HST	5	95	%RH	**(Note 1)**
Vibration			1.5	G Hz	**(Note 2)**
Shock			50 11	G ms	**(Note 2)** Half sine wave

Note 1: Maximum Wet-Bulb should be 39 degree C and No condensation.

Note 2: Vibration Specification

- Sign Vibration:10-200-10Hz, 1.5G, 30 min, X, Y,Z Axis, Each One Time.

  Shock Specification

- Half sine wave:50G 11msec. -X+/-, -Y+/-, -Z+/- (Total 6 directions), Each one time Shock.

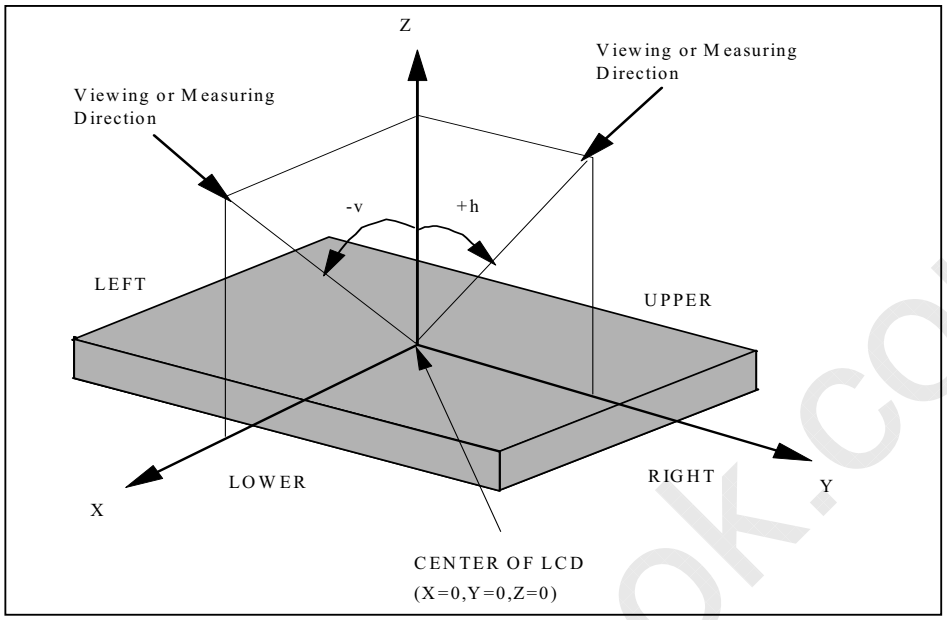
4.0 Optical Characteristics

The optical characteristics are measured under stable conditions as follows under 25 degree C condition:

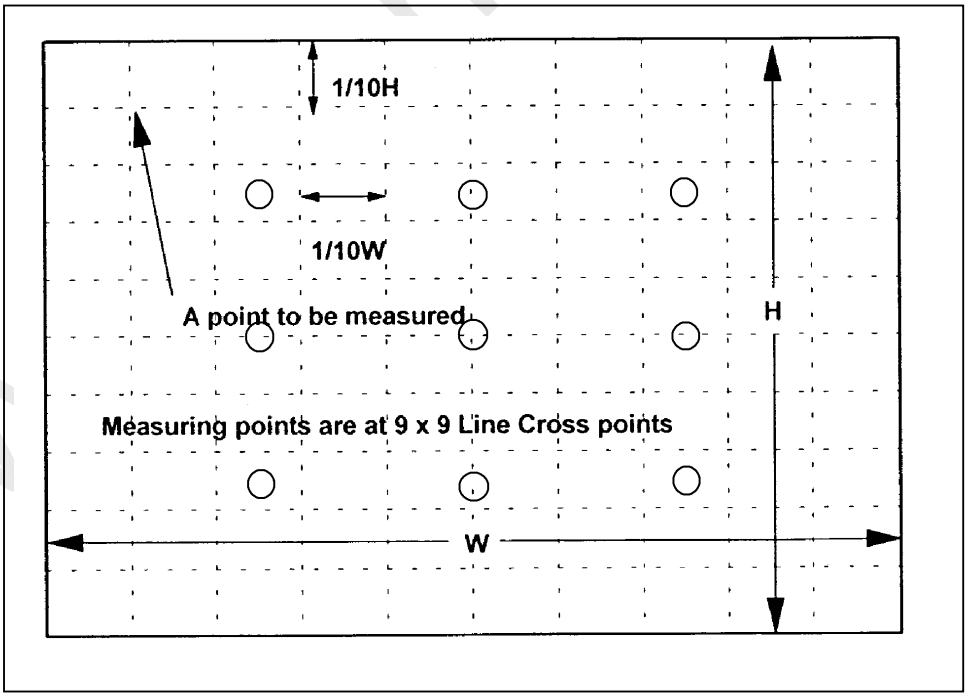
Item	Conditions	Specification	
		Typ.	Note
Viewing Angle (Degrees) K:Contrast Ratio	Horizontal (Right) K≧15 (Left)	85 85	- -
	Vertical (Upper) K≧15 (Lower)	85 85	- -
	Horizontal (Right) K≧10 (Left)	- -	85 Min. 85 Min.
	Vertical (Upper) K≧10 (Lower)	- -	85 Min. 85 Min.
Contrast ratio		600	500 Min.
Response Time (ms)	Rising (10%->90%) + Falling (90%->10%)	40	-
White Balance	White x	0.299	±0.030
	White y	0.305	±0.030
Maximum White Luminance (cd/m^2)	VDIM=0V	700	610 Min.

Measure center of the screen.

The following is the note for the Optical Characteristics:



There is the Uniformity Measurement below:
'Lbright' represents the Luminance of the point that is brighter than the other point to be compared.
'Ldark' represents the Luminance of the point that is darker than the other point to be compared.
Measuring points are shown in the following Fig. 9 circles are defined for 9 points.



Chromaticity and White Balance are defined as the C.I.E. 1931 x,y coordinates at the center of LCD.
The Standard Equipment are as shown below table.

Item	Standard Equipment
Viewing Angle	BM5A by Topcon Optical
Contrast	USB 2000 Ocean Optics
Response Time	6030 Lecory
White Luminance	USB 2000 Ocean Optics
Luminance Uniformity	USB 2000 Ocean Optics
Chromaticity	CS1000T by Konica Minolta
White Balance	USB 2000 Ocean Optics

The measurement is to be done after 120 minutes of Power-on of BackLight.
Unless otherwise specified, the ambient conditions are as following.

Ambient Temperature	:	25	+	2	(degreeC)
Ambient Humidity	:	25	-	85	(%)
Atmospheric Pressure	:	86.0	-	104.0	(kPa)

4.1 Luminance Uniformity

When the backlight is on with all pels in the selected state (white), the luminance uniformity is defined as follows;

Where:
L_{bright}: The luminance of the brightness part of the area
L_{dark} : The luminance of the darkest part of the area

1. Adjacent Area

$$\text{Luminance Uniformity} = \frac{L_{dark}}{L_{bright}} \geq 0.90$$

over a circular area of 10mm diameter placed anywhere on the screen.

2. Screen Total

$$\text{Luminance Uniformity} = \frac{L_{dark}}{L_{bright}} \geq 0.70$$

over the entire screen.

3. Screen Total (9 points measurement)

$$\text{Luminance Uniformity} = \frac{L_{dark}}{L_{bright}} \geq 0.80$$

over the entire screen.

4.2 Image Retention

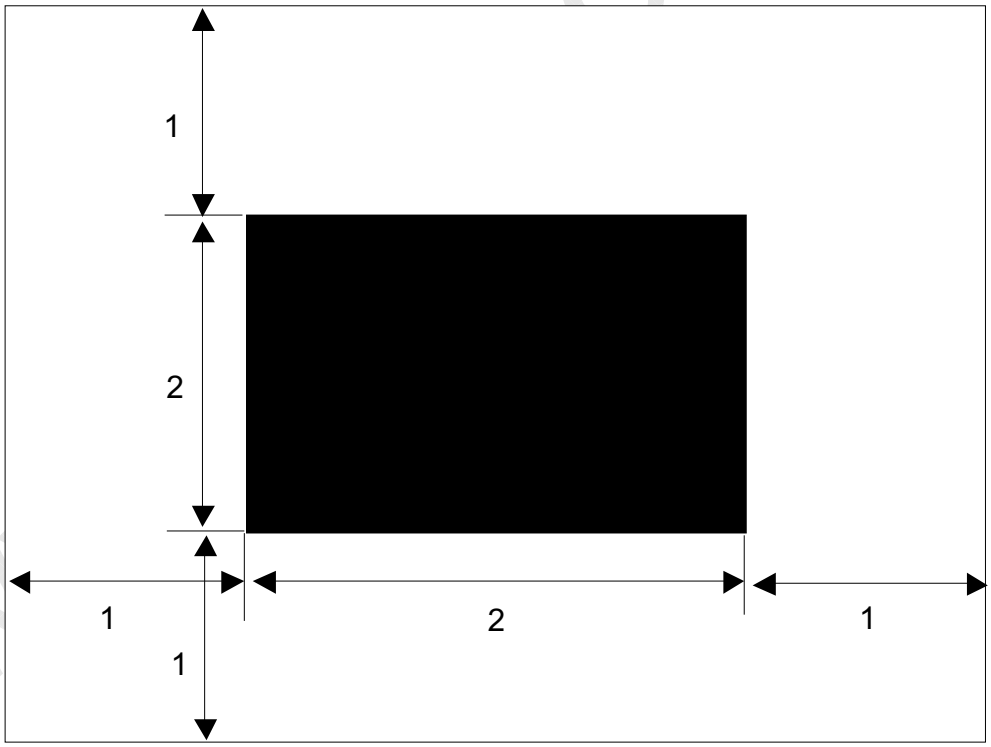
The panel spec of image sticking / retention is as follows.

Test method: The L0/L255 Window pattern below is displayed for the display time Then, change the pattern to L128 All gray pattern and count the time until the retention/sticking image disappears.

Display Time	5sec	60sec
Time until disappearing	**5sec**	**15sec**

Definition of disappearing time: The time when the brightness will reach to 0.89% difference from background level (L128).

$$\frac{|\,L\,logo - L128\,|}{L128} \times 100 \leq 0.89\%$$



L128

5.0 Signal Interface

5.1 Connectors

Physical interface is described as for the connector on module.
These connectors are capable of accommodating the following signals and will be following components.

Connector Name / Designation	Signal Connector
Manufacturer	HIROSE
Type / Part Number	DF14-30P-1.25H(56)
Mating Type / Part Number	DF14-30S-1.25C
Contact / Part Number	DF14-2628SCFA

Connector Name / Designation	For Backlight Connector on Inverter card
Manufacturer	JST
Type / Part Number	S8B-PH-SM3-TB(D)(LF) or S8B-PH-SM4-TB(LF)(SN)
Mating Type / Part Number	PHR-8

5.2 Interface Signal Connector

Pin #	Signal Name	Pin #	Signal Name
30	Vin(+12V)	29	Vin(+12V)
28	Vin(+12V)	27	VinRTN(GND)
26	VinRTN(GND)	25	VinRTN(GND)
24	SELLVDS	23	(RESERVED) **Note1**
22	DGND	21	RxOIN3+
20	RxOIN3-	19	RxOCLKIN+
18	RxOCLKIN-	17	RxOIN2+
16	RxOIN2-	15	RxOIN1+
14	RxOIN1-	13	RxOIN0+
12	RxOIN0-	11	RxEIN3+
10	RxEIN3-	9	RxECLKIN+
8	RxECLKIN-	7	RxEIN2+
6	RxEIN2-	5	RxEIN1+
4	RxEIN1-	3	RxEIN0+
2	RxEIN0-	1	LVDSGND

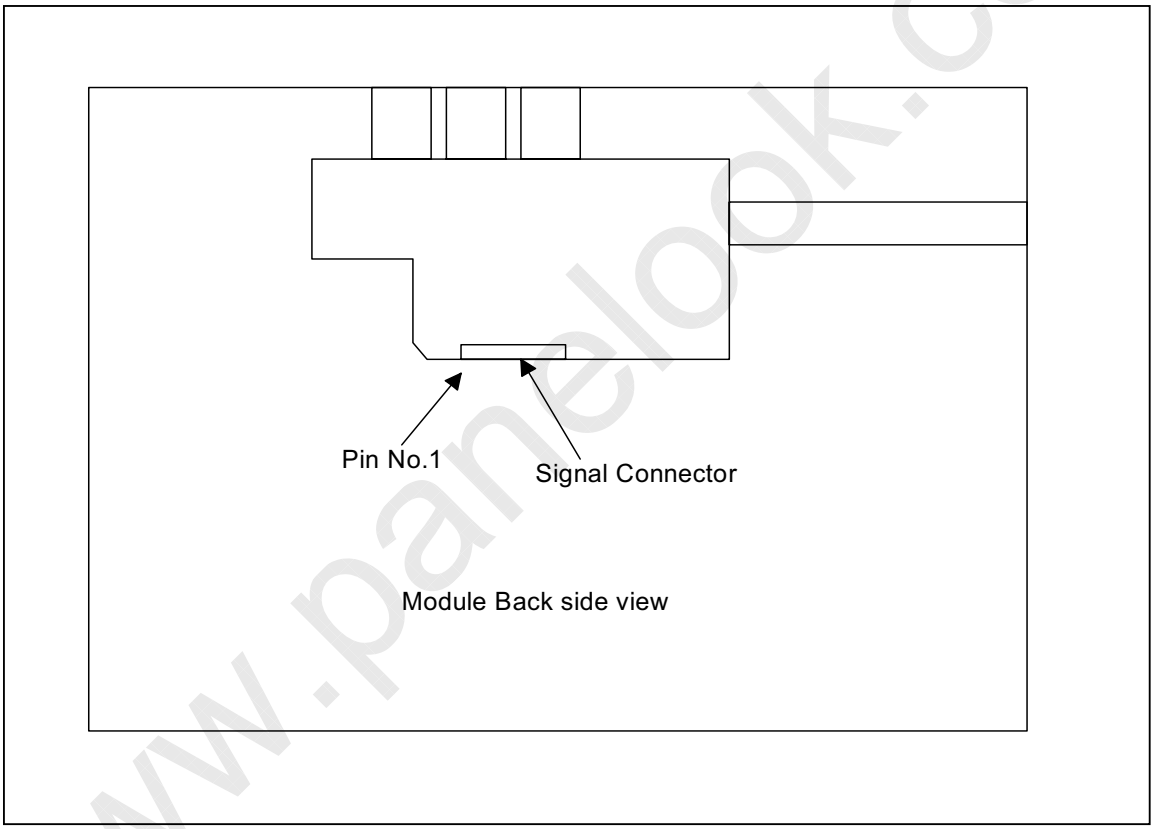
Note1: Please set this line open.

5.3 Interface Signal Description

The module uses a pair of LVDS receiver SN75LVDS82(Texas Instruments) or compatible. LVDS is a differential signal technology for LCD interface and high speed data transfer device. Transmitter shall be SN75LVDS83(negative edge sampling) or compatible.
The first LVDS port (RxExxx) transmits even pixels while the second LVDS port (RxOxxx) transmits odd pixels.

Pin numberings have been changed from previous models of ITSX94, ITSX94N, ITSX94N1, and ITSX96R, due to signal connector type change. Physical order of singals are not changed.
Please refer to the chart below for pin #1.

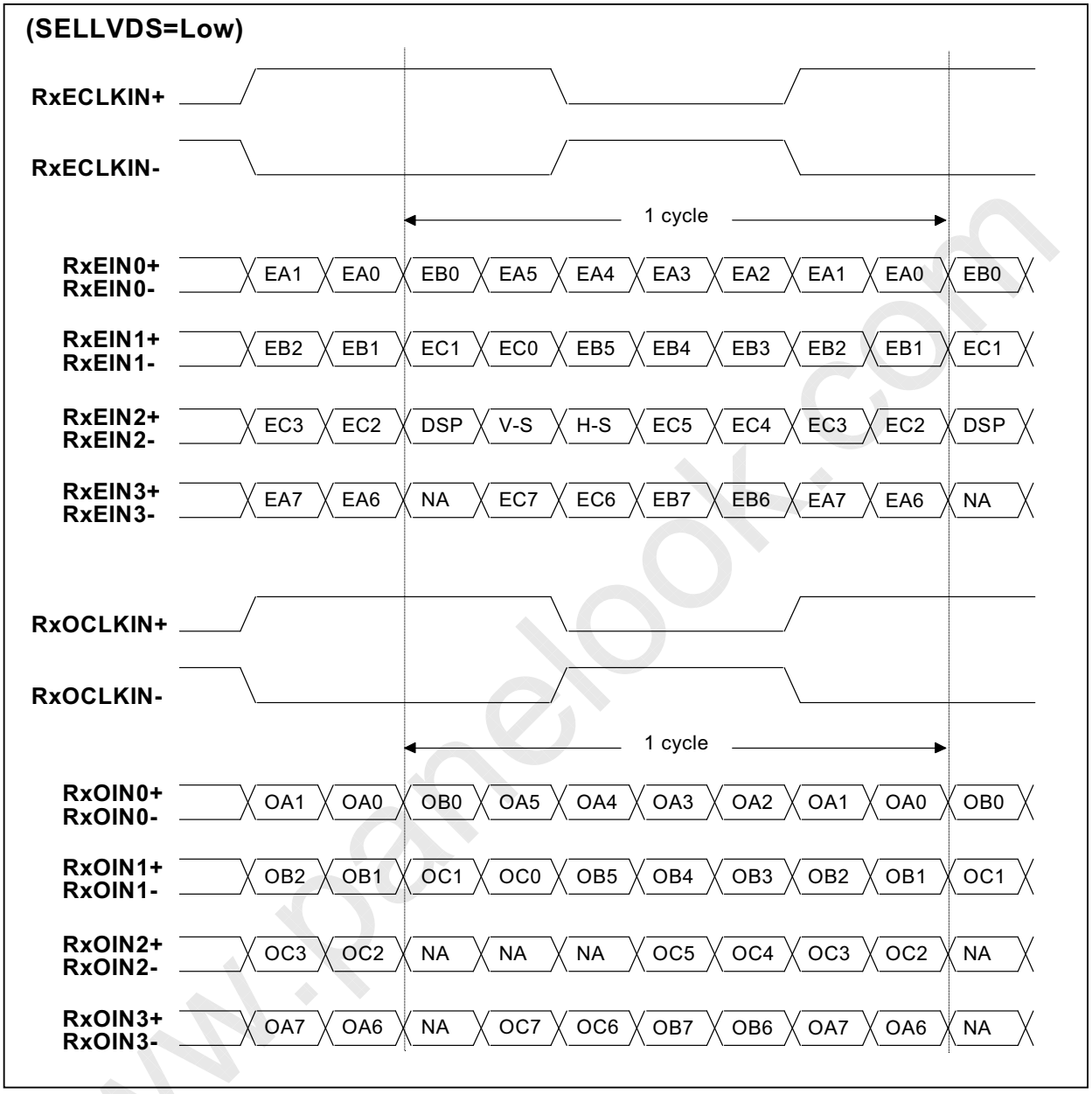
LCD Drive Connector No.1 Pin location



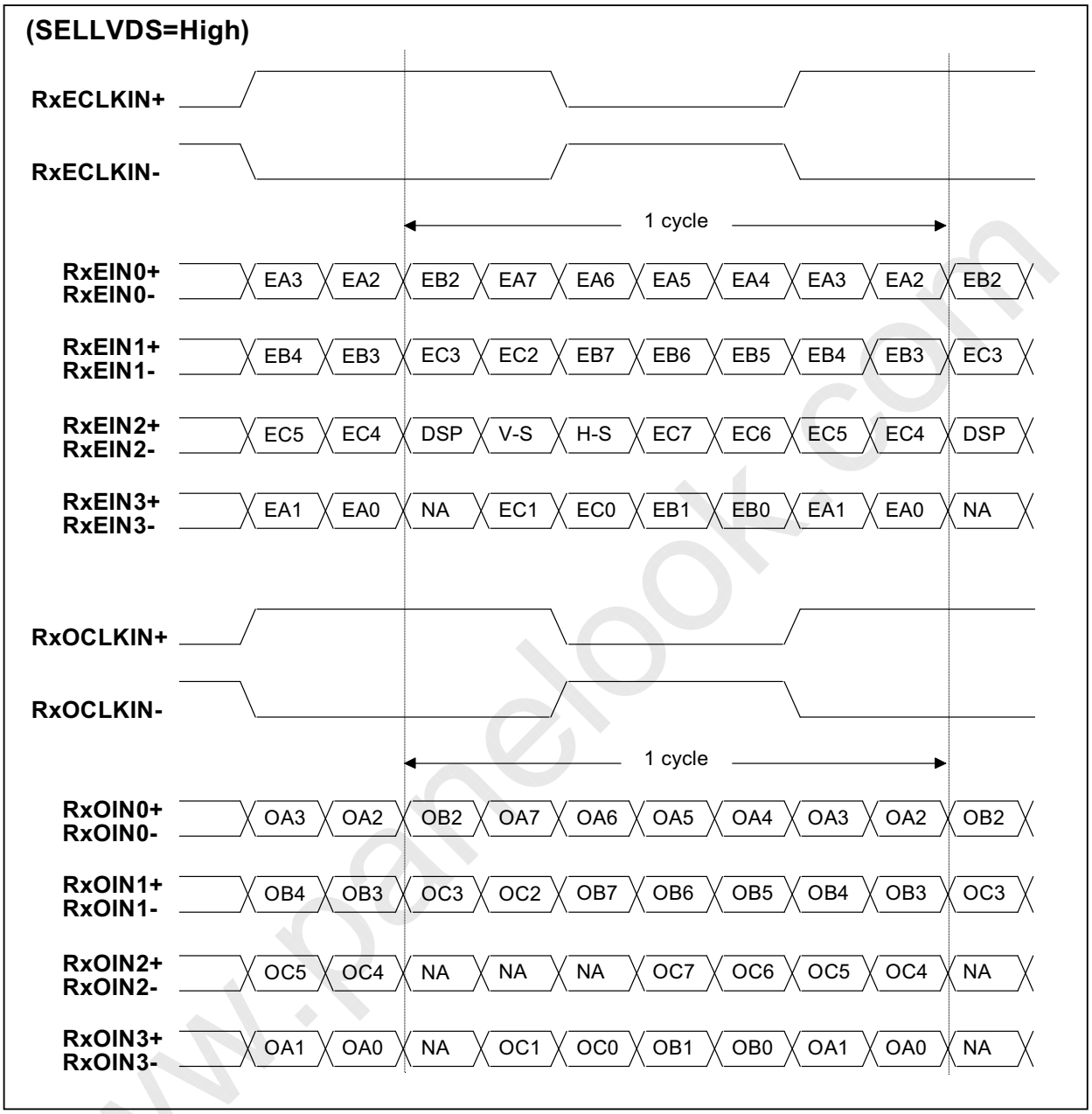
PIN #	SIGNAL NAME	Description
30	Vin	+12.0V Power Supply
29	Vin	+12.0V Power Supply
28	Vin	+12.0V Power Supply
27	VinRTN	Ground for Vin line
26	VinRTN	Ground for Vin line
25	VinRTN	Ground for Vin line
24	SELLVDS	Select LVDS data order. See the following figure.
23	(RESERVED)	This pin should be left open.
22	DGND	Signal Ground
21	RxOIN3+	Positive LVDS differential data input (Odd data)
20	RxOIN3-	Negative LVDS differential data input (Odd data)
19	RxOCLKIN+	Positive LVDS differential clock input (Odd Clock)
18	RxOCLKIN-	Negative LVDS differential clock input (Odd Clock)
17	RxOIN2+	Positive LVDS differential data input (Odd data)
16	RxOIN2-	Negative LVDS differential data input (Odd data)
15	RxOIN1+	Positive LVDS differential data input (Odd data)
14	RxOIN1-	Negative LVDS differential data input (Odd data)
13	RxOIN0+	Positive LVDS differential data input (Odd data)
12	RxOIN0-	Negative LVDS differential data input (Odd data)
11	RxEIN3+	Positive LVDS differential data input (Even data)
10	RxEIN3-	Negative LVDS differential data input (Even data)
9	RxECLKIN+	Positive LVDS differential clock input (Even Clock)
8	RxECLKIN-	Negative LVDS differential clock input (Even Clock)
7	RxEIN2+	Positive LVDS differential data input (Even data,H-Sync,V-Sync,DSPTMG)
6	RxEIN2-	Negative LVDS differential data input (Even data,H-Sync,V-Sync,DSPTMG)
5	RxEIN1+	Positive LVDS differential data input (Even data)
4	RxEIN1-	Negative LVDS differential data input (Even data)
3	RxEIN0+	Positive LVDS differential data input (Even data)
2	RxEIN0-	Negative LVDS differential data input (Even data)
1	DGND	Signal Ground

Note: Input signals of odd and even clock shall be the same timing.

The interface card has a 100ohm resistor between positive and negative lines of each LVDS signal input on the internal circuit.



Note: A/B/C data 7:MSB, A/B/C data 0:LSB



Note: A/B/C data 7:MSB, A/B/C data 0:LSB

The following is LVDS Signal description.

LVDS DATA NAME	Description	
DSP	**Display Timing**	When the signal is high, the pixel data shall be valid to be displayed.
V-S	**Vertical Sync**	Both Positive and negative polarity are acceptable.
H-S	**Horizontal Sync**	Both Positive and negative polarity are acceptable.

TI LVDS X'mitter (SN75LVDS83) Signal name	ITSX88E LVDS Signal (SELLVDS=Low)	ITSX88E LVDS Signal (SELLVDS=High)
D0	A0	A2
D1	A1	A3
D2	A2	A4
D3	A3	A5
D4	A4	A6
D5	A7	A1
D6	A5	A7
D7	B0	B2
D8	B1	B3
D9	B2	B4
D10	B6	B0
D11	B7	B1
D12	B3	B5
D13	B4	B6
D14	B5	B7
D15	C0	C2
D16	C6	C0
D17	C7	C1
D18	C1	C3
D19	C2	C4
D20	C3	C5
D21	C4	C6
D22	C5	C7
D23	NA	NA
D24	H Sync	H Sync
D25	V Sync	V Sync
D26	Disp Timing	Disp Timing
D27	A6	A0

Note:
SELLVDS: Pin#7 of Signal connector
A0: LSB, A7: MSB

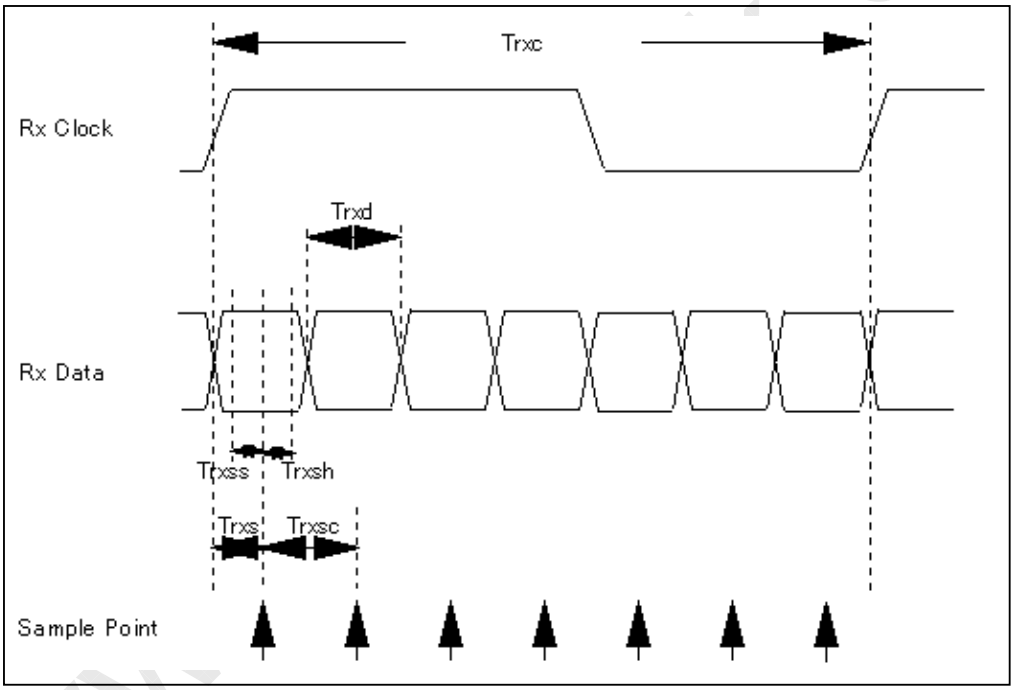
5.4 Interface Signal Electrical Characteristics

Input signals shall be low or Hi-Z state when Vin is off.
It is recommended to refer the specifications of SN75LVDS82DGG(Texas Instruments) in detail.

Signal electrical characteristics are as follows;

Parameter	Condition	Min	Max	unit
Vth	Differential Input High Voltage (Vcm=+1.2V)		100	mV
Vtl	Differential Input High Voltage (Vcm=+1.2V)	-100		mV

LVDS Timing



LVDS Macro AC characteristics.

Parameter	Symbol	Min	Typ	Max	Unit
LVDS Clock Cycle	Trxc	17.6	18.5	20	[ns]
LVDS Data Cycle	Trxd		Trxc/7		[ns]
Sample Data Setup Time (Trxc=Typ.)	Trxss	600			[ps]
Sample Data Hold Time (Trxc=Typ.)	Trxsh	600			[ps]
Data Sample Time	Trxs		Trxc/14		[ns]
Data Sample Cycle	Trxsc		Trxc/7		[ns]

Name	Description	Min	Typ	Max	Unit	Note
SELLVDS	High voltage	2	3	3.3	V	
	Low voltage	-0.1	0	0.7	V	
	Current	-1	-	1	mA	

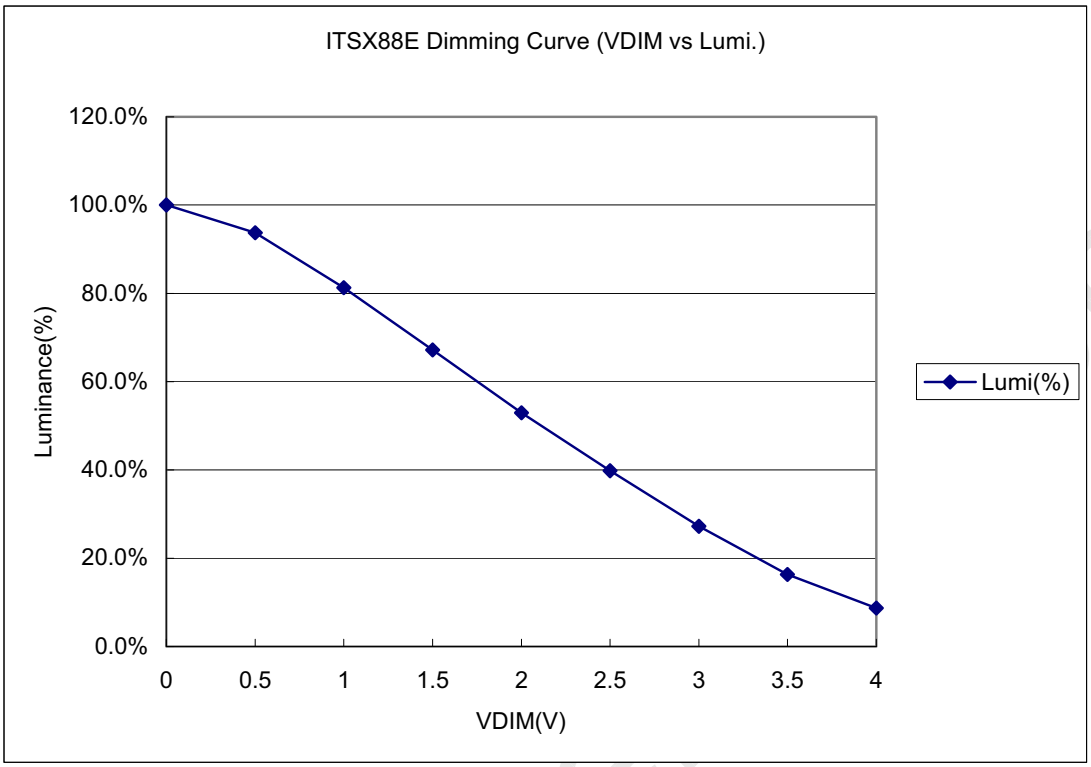
5.5 Backlight Connector Signal Description

PIN #	SIGNAL NAME	Description
1	VBL	+12.0V Power Supply for backlight
2	VBL	+12.0V Power Supply for backlight
3	VBL	+12.0V Power Supply for backlihgt
4	RTN	Ground for VBL line, VDIM and BLON
5	RTN	Ground for VBL line, VDIM and BLON
6	RTN	Ground for VBL line, VDIM and BLON
7	VDIM	Brightness control voltage input(0-4V), (0V:brightness MAX, 4V:brightness MIN)
8	BLON	backlihgt on/off signal(Hi:backlight ON, Low:backlight OFF) TTL level

5.6 Backlight Input Signal Electrical Characteristics

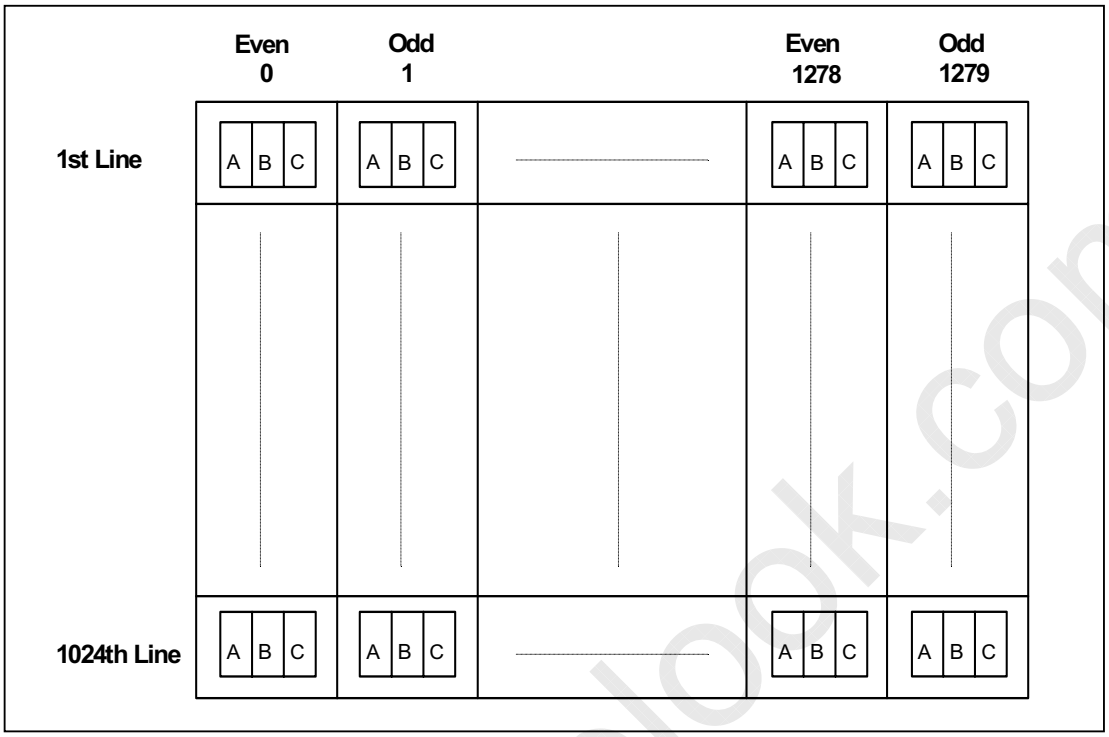
Name	Description	Min	Typ	Max	Unit	Note
BLON	High voltage	2.0	5.0	5.25	V	
	Low voltage	-0.1	0	0.8	V	
	Current	-1.0	-	1.0	mA	
VDIM	Input Voltage Range	0	-	4.0	V	0V:Brightness Max. 4V:Brightness Min.
	Current	-1.0	-	1.0	mA	

The following chart is the Dimming Signal (VDIM) versus Luminance curve for your reference.



6.0 Pixel format image

Following figure shows the relationship of the input signals and LCD pixel format image. Odd and even pair of ABC data are sampled at a time.



7.0 Interface Timings

Basically, interface timings described here is not actual input timing of LCD module but output timing of SN75LVDS82DGG(Texas Instruments) or equivalent.

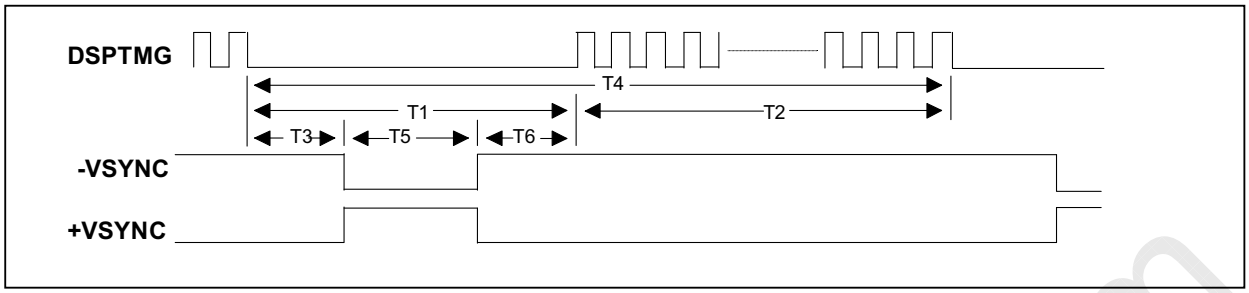
7.1 Timing Characteristics

Signal	Item	Symbol	MIN.	TYP.	MAX.	Unit
DTCLK	Freq.	Fdck	50	54	56.8	MHz
DTCLK	Cycle	Tck	17.6	18.5	20	ns
+V-Sync	Frame Rate	11/Tv	56.25	60.02	61	Hz
+V-Sync	Cycle	Tv	16.39	16.66	17.78	ms
+V-Sync	Cycle	Tv	1035	1066	2047	lines
+V-Sync	active level	Tva	3	3		lines
+V-Sync	V-back porch	Tvb	7	38	63	lines
+V-Sync	V-front porch	Tvf	1	1		lines
+DSPTMG	V-Line	m	-	1024	-	lines
+H-Sync	Scan Rate	1/Th	-	63.98	-	KHz
+H-Sync	Cycle	Th	844	844	1023	Tck
+H-Sync	active level	Tha(*1)	4	56		Tck
+H-Sync	Back porch	Thb(*1)	4	124		Tck
+H-Sync	Front porch	Thf	4	24		Tck
+DSPTMG	Display Pixels	n	-	640	-	Tck

Note1: Typical value is refer to VESA STANDARD.
(*1): Tha+Thb should be less than 1024 Tck.
Note2: When there are invalid timing, Display appears black pattern.
Synchronous Signal Defects and enter Auto Refresh for LCD Module Protection Mode.

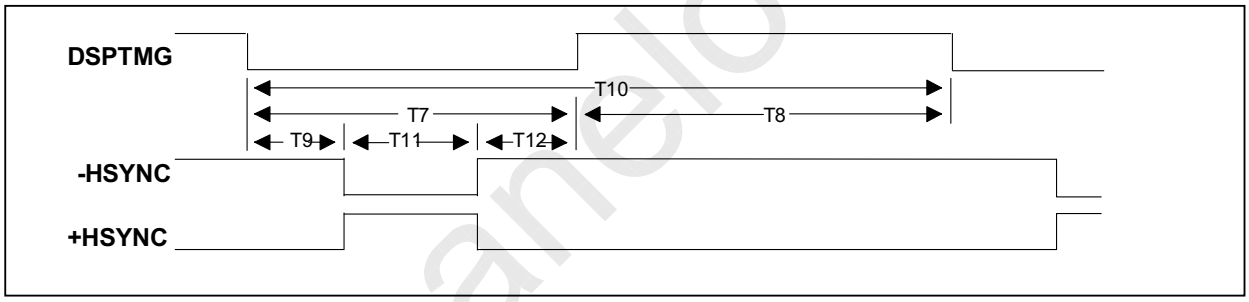
7.2 Timing Definition

Vertical Timing

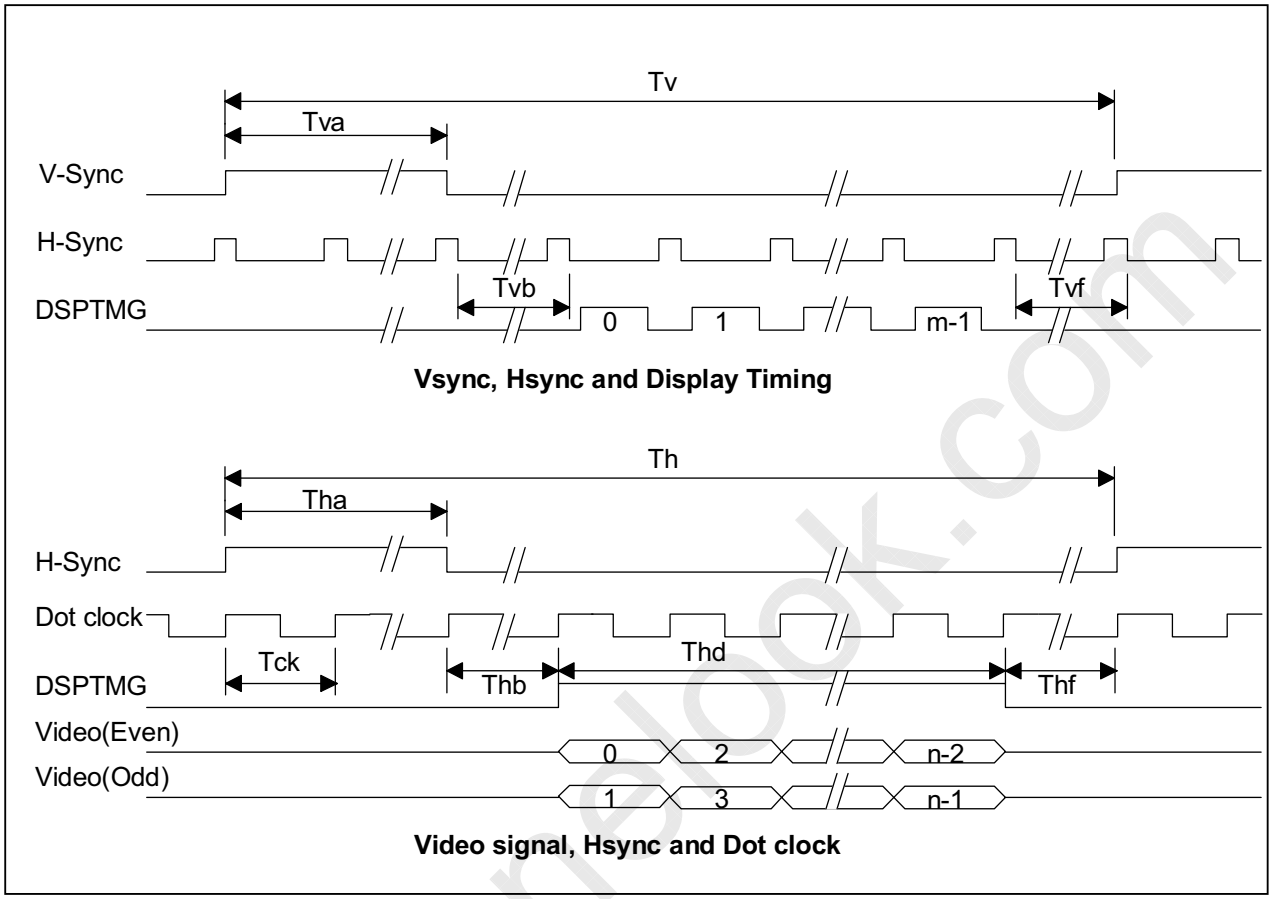


Support mode	T1 Vertical Blanking	T2 Active Field	T3 VSYNC Front Porch	T4 Frame Time	T5 VSYNC Width	T6 VSYNC Back Porch
1280 x 1024 at 60Hz (VESA STANDARD) (H line rate : 15.6 us)	0.656 ms (42 lines)	16.005 ms (1024 lines)	0.016 ms (1 line)	16.661 ms (1066 lines)	0.047 ms (3 lines)	0.594 ms (38 lines)

Horizontal Timing



Support mode	T7 Horizontal	T8 Active Field	T9 HSYNC	T10 H line Time	T11 HSYNC	T12 HSYNC
1280 x 1024 (VESA STANDARD) (Dotclock : 108.000	3.778 us (408 dots)	11.852 us (1280 dots)	0.444 us (48 dots)	15.630 us (1688 dots)	1.037 us (112 dots)	2.296 us (248 dots)



Vsync, Hsync and Display Timing

Video signal, Hsync and Dot clock

8.0 Power Consumption

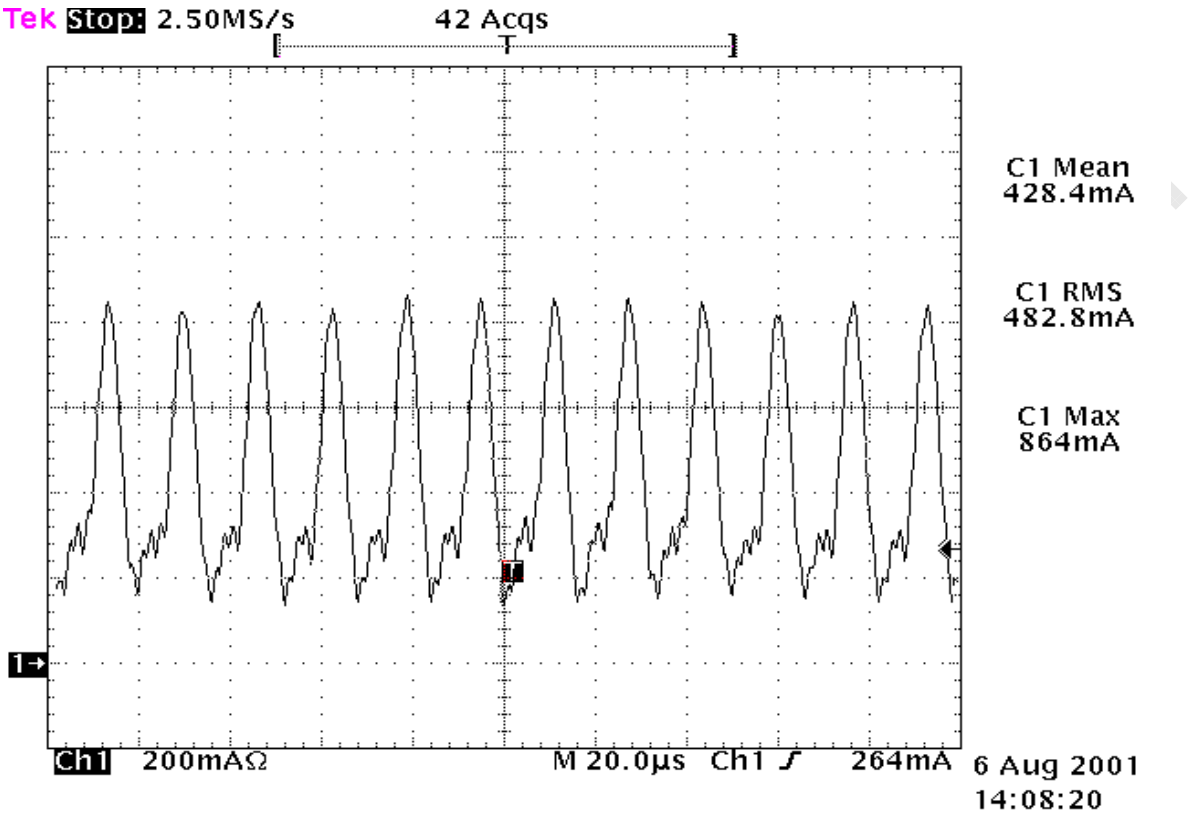
Input power specifications are as follows;

SYMBOL	PARAMETER	Min	Typ	Max	UNITS	CONDITION
Vin	Logic/LCD Drive Voltage	11.4	12	12.6	V	
Iin	Vin Current			550	mA	All White Pattern Vin=11.4V *1
Pin(1)	Vin Power		4.5		W	Typical Load Condition (Vertical Gray Bar, 256 Scale)
Pin(2)			5.2	6.3	W	Maximum Load Condition (All White)
	Logic/LCD DC current Waveform	Refer to the Typical Logic/LCD Current Waveform shown in the following Figure. Waveform may vary in paticular application. Actual current waveform on user application must be evaluated and make sure the ripple current and/or peak current should be allowable to user power supply.				Maximum Load Condition (All White)
Vin rp	Allowable Logic/LCD Drive Ripple Voltage			500	mVp-p	
VBL	Backlight power voltage	11.4	12	12.6	V	
PBL	Backlight power consumption		33.6	40.3	W	Brightness = max.

(Note) A used DC power supply for this LCD module should be have a over current protection function to safety.
*1 This value indicates long term average.

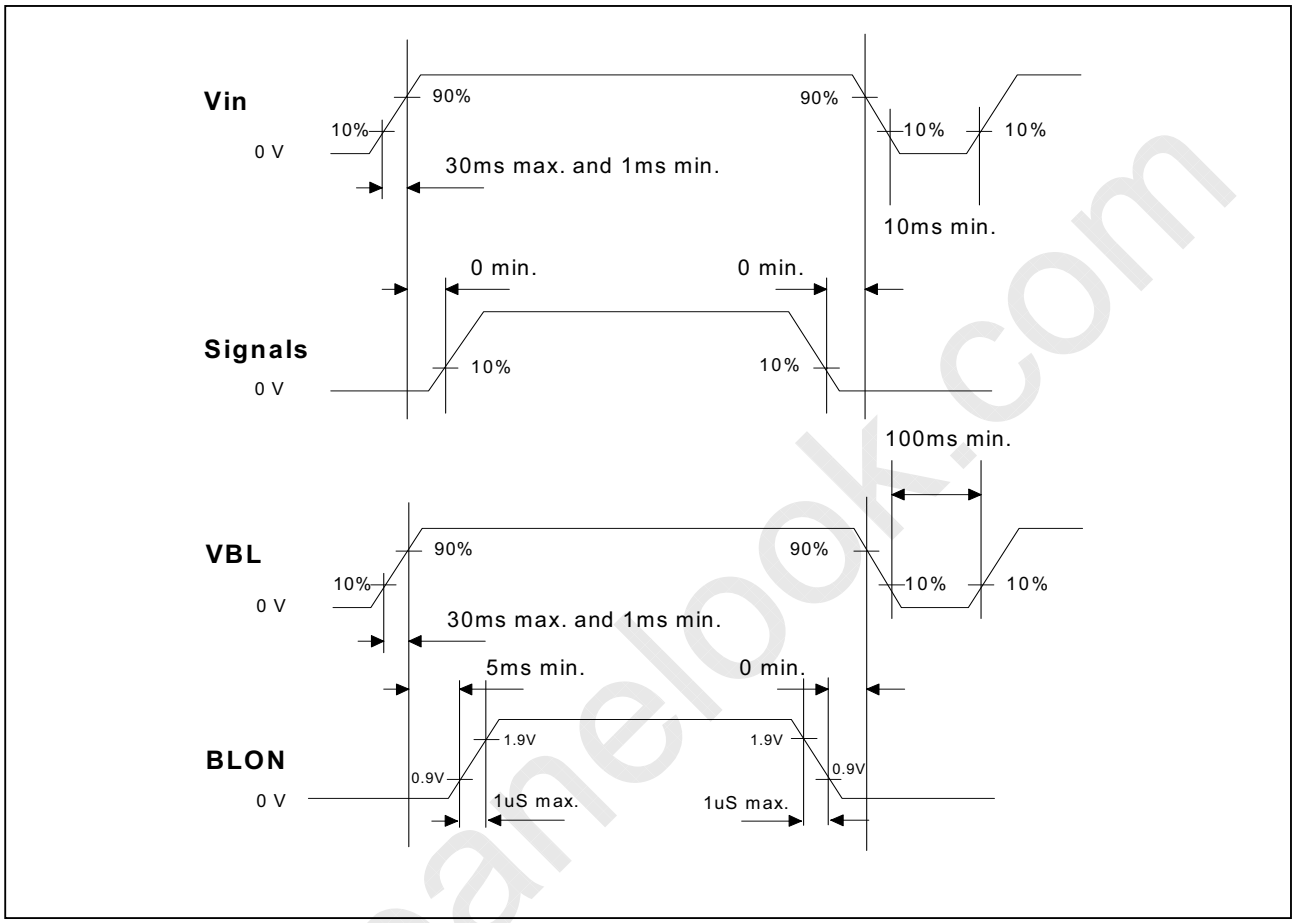
Typical Logic/LCD Current Waveform

Condition: Maximum Load Condition(All White)
Voltage: 12.0V measured at Interface Connector J1
Interface Cable: AWG28, 30 Conductors, L=500mm from Voltage Source to EUT



9.0 Power ON/OFF Sequence

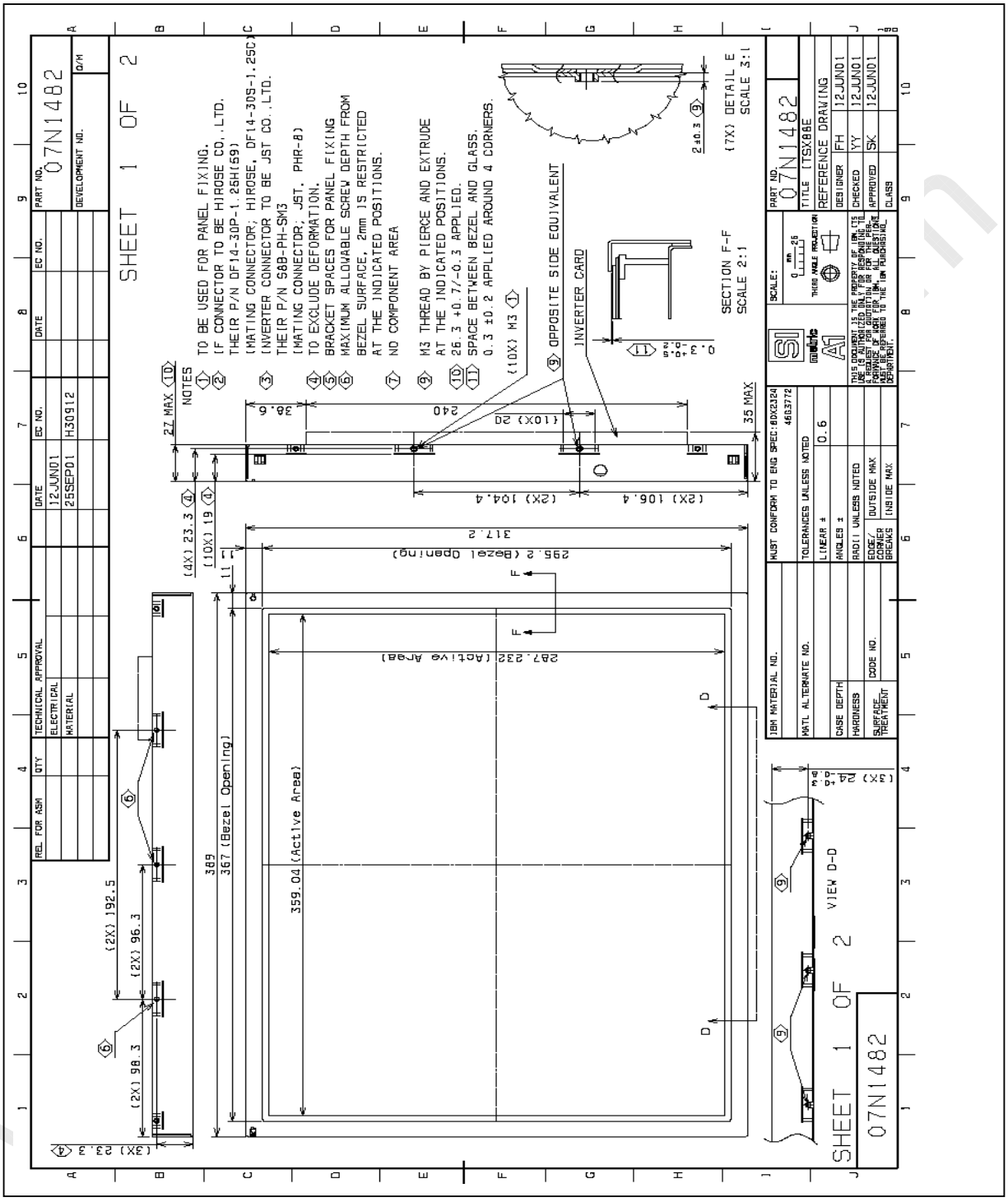
Vin and VBL power and lamp on/off sequence is as follows. Interface signals are also shown in the chart. Signals from any system shall be Hi-Z state or low level when Vin and VBL are off.
It is recommended that the BLON should be supplied after other signals are stable in order to avoid visible screen noise when power-on.

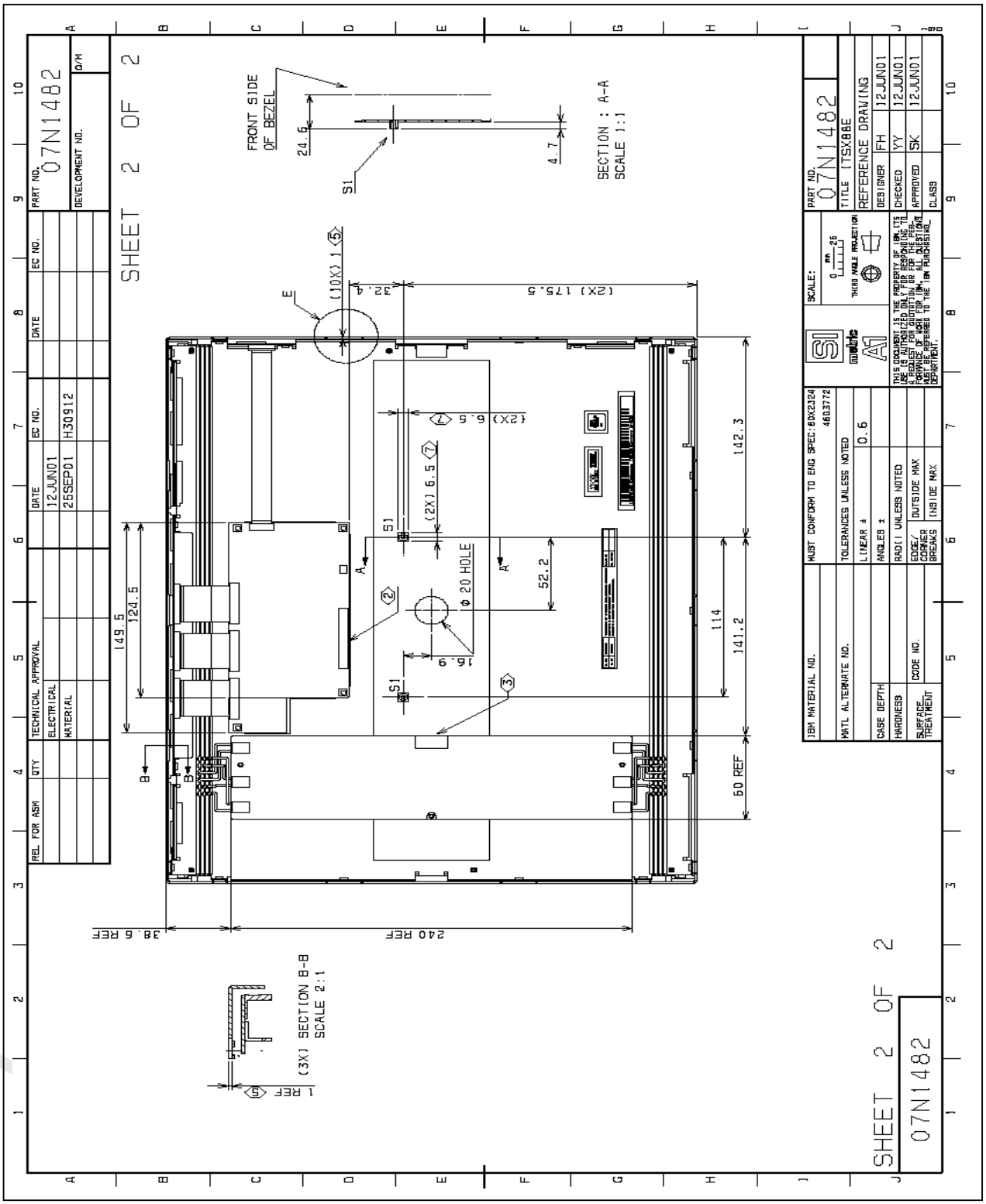


10.0 Mechanical Characteristics

Note: Please do not use middle 3(three) screw holes on the upper(long) side and middle 3(three) screw holes

on the lower(long) side for panel fixing. These screw holes are for manufacturing purpose only.





11.0 National Test Lab Requirement

The display module is authorized to Apply the UL Recognized Mark.

Conditions of Acceptability

Conditions of Acceptability - When installed on the end-product, consideration shall be given to the following;

1. This component has been judged on the basis of the required spacings in the Standard for Safety of Information Technology Equipment, CAN/CSA C22.2 No. 60950-00 *UL60950, Third Edition, which are based on the IEC 60950, Third Edition, which would cover the component itself if submitted for Listing.
2. The inverter output circuits are Limited Current Circuits.
3. The units are intended to be supplied by SELV.
4. The terminals and connectors are suitable for factory wiring only.
5. A suitable Electrical enclosure shall be provided.

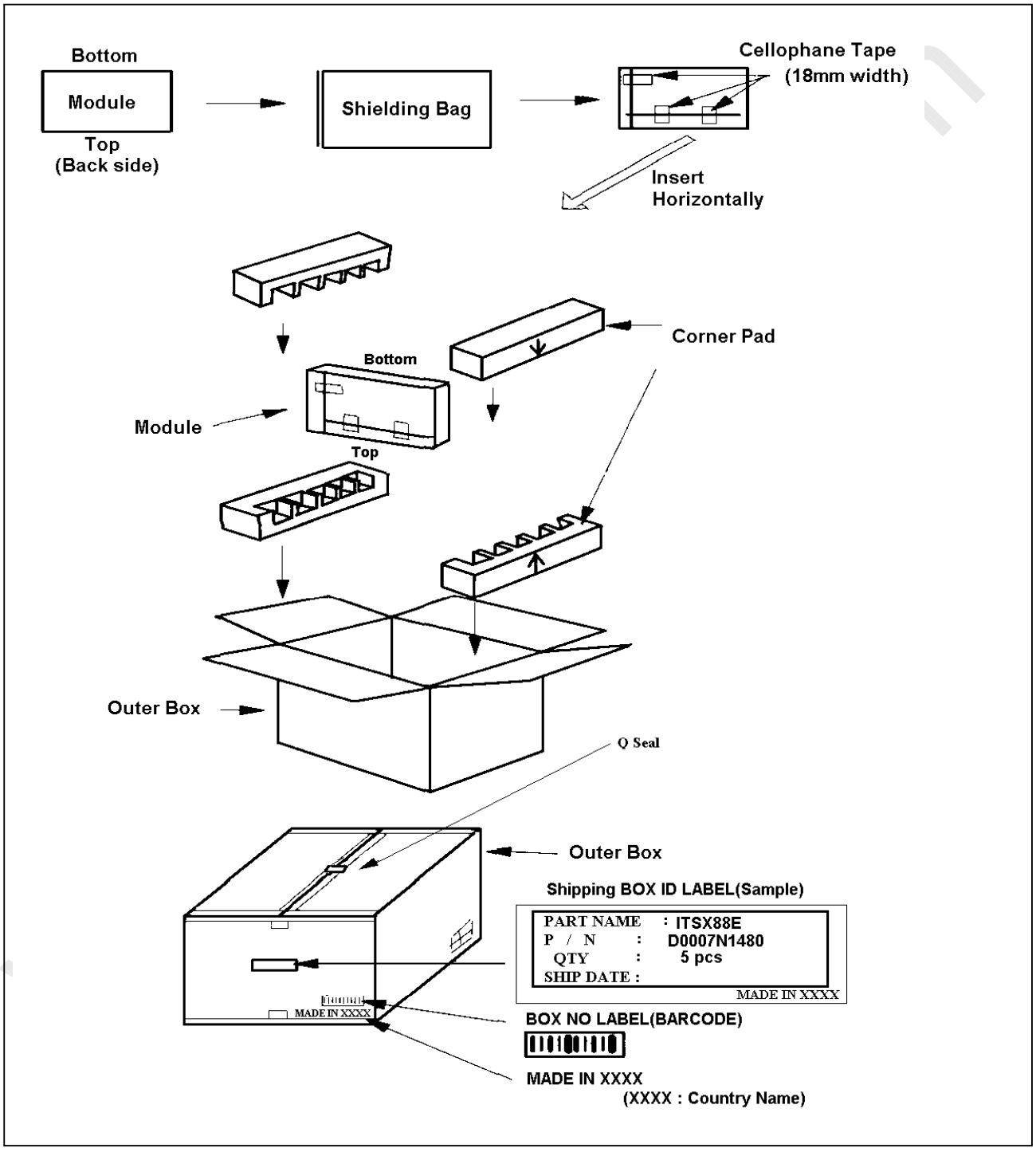
12.0 Backlight Life

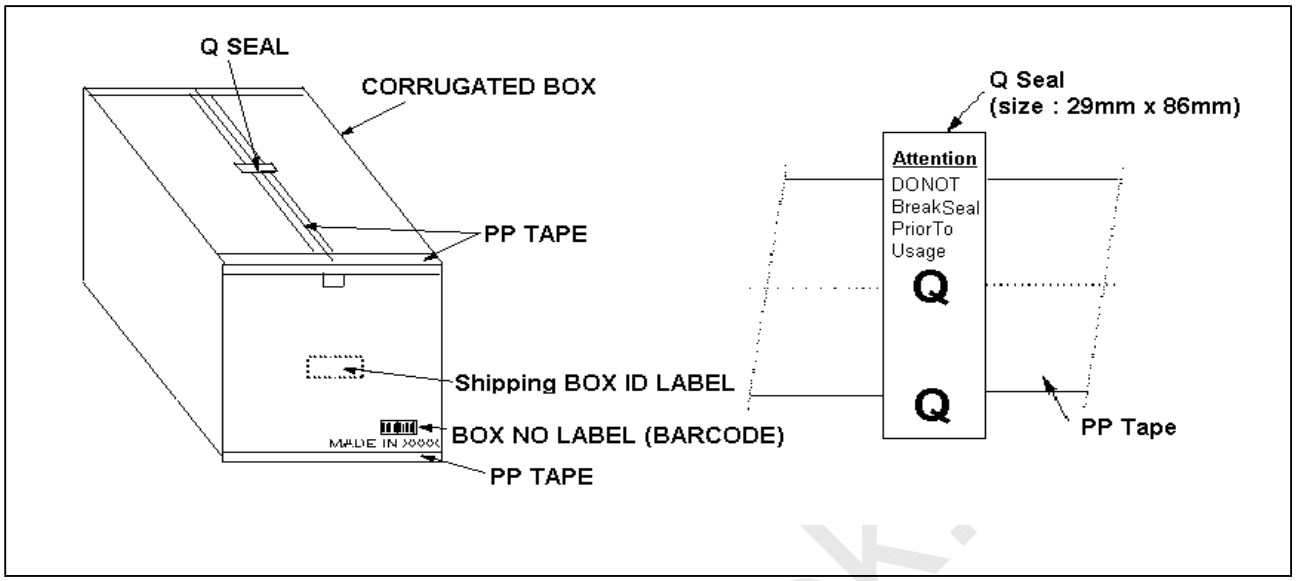
Backlight Life Time	50,000 Hours (Typ) 30,000 Hours (Min)	condition 25 degree C

The assumed Backlight Life will be until the luminance becomes 305 cd/m^2 or more at maximum white luminance.

13.0 Packaging Requirement

The packaging of the LCD meets 75 cm drop test.
The following is the drawing of the package.



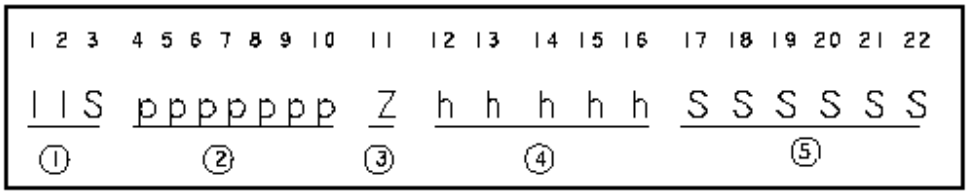


14.0 Label

There are labels on the rear side of the Module.

Serial Number Label

BARCODE CHARACTER AREA



① IIS = FIXED
STARTING IDENTIFIER WHICH IS COMMON TO COMPONENT LEVEL SERIAL NUMBERS

② SEVEN DIGIT IDT PART NUMBER ASSIGNED BY THE IDT RELEASING THE PART

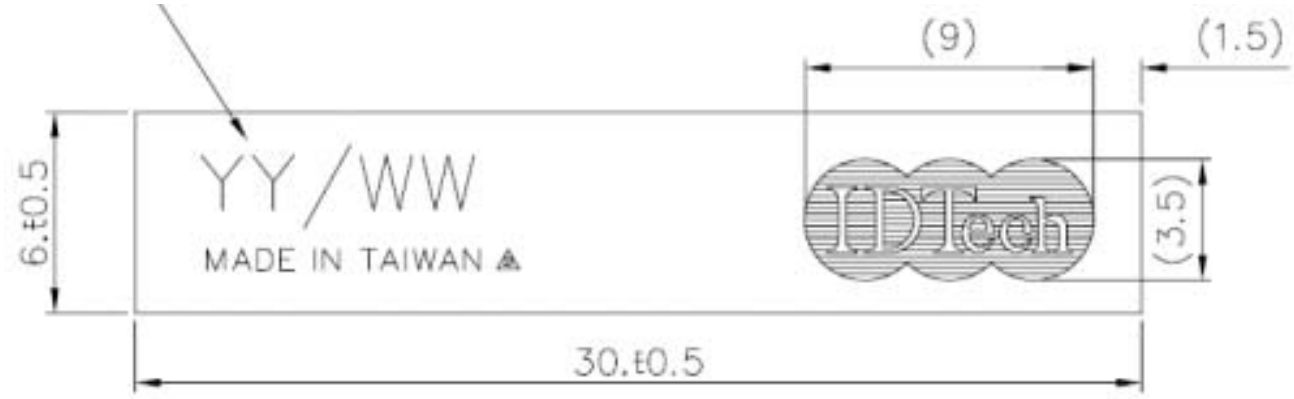
③ Z = FIXED
AUTOMATICALLY GIVEN WHEN USING THE IIS-Z FORMAT

④ hhhhh=HEADER CODE(EC LEVEL)

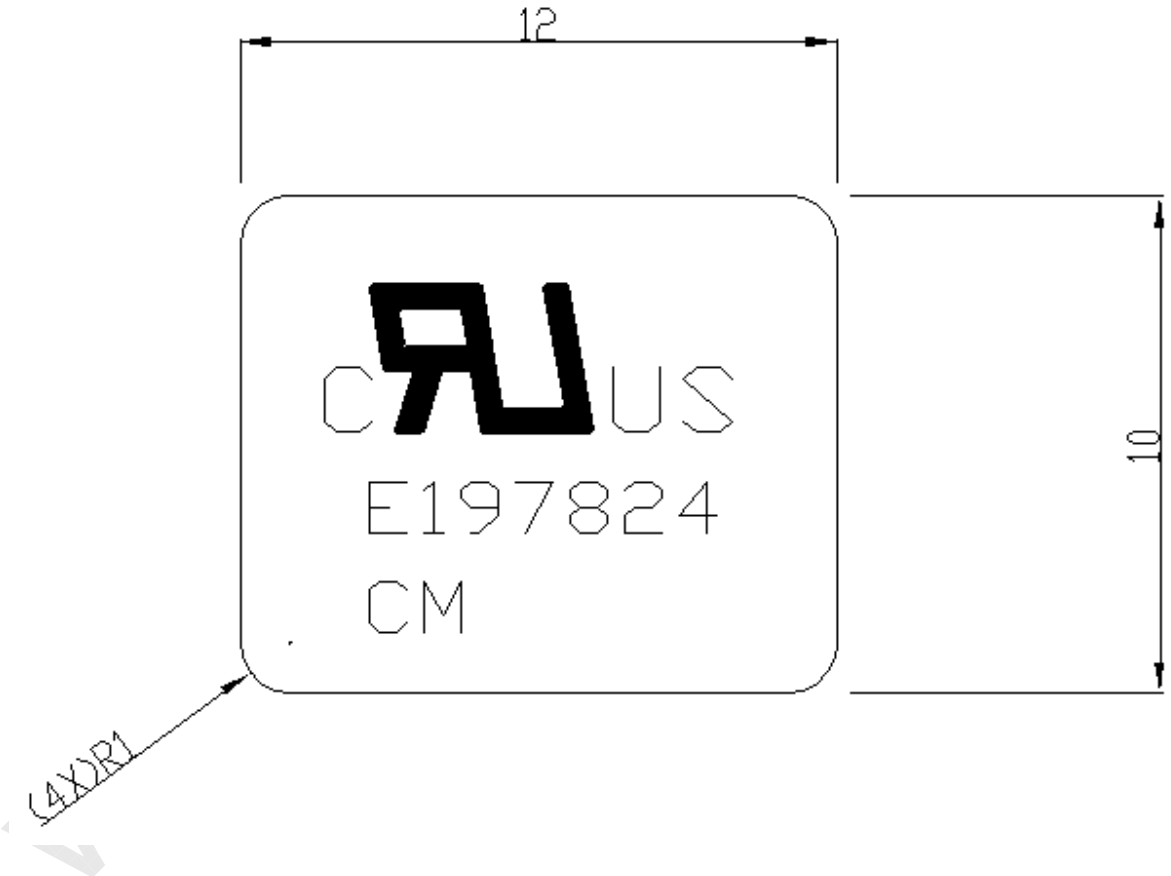
⑤ SSSSS=SEQUENCE

Date Label

YY and WW of the Week Code stand for the Year and the Week of the Year of manufacturing of the Module respectively.



UL Label



15.0 Application Note

The table below shows the maximum component temperature Spec.

Component	Max. Temp. Spec (degree C)
Gate Array	95
X-Driver IC	85
Transformer (Inverter)	105
Inductor Coil (DC/DC)	100
Polarizer (Cell)	60

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