晶采光電科技股份有限公司
AMPIRE CO., LTD.

# SPECIFICATIONS FOR LCD MODULE

| | |
|---|---|
| CUSTOMER | |
| CUSTOMER PART NO. | |
| AMPIRE PART NO. | AM-1280800N6TZQW-T15H-D |
| APPROVED BY | |
| DATE | |

☐ Preliminary Specification
☑ Formal Specification

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| Approved by | Checked by | Organized by |
|---|---|---|
| Patrick | Mark | Tank |

*This specification is subject to change without notice.

## RECORD OF REVISION

| Revision Date | Page | Contents | Editor |
|---|---|---|---|
| 2018/06/19 | - | New Release | Mark |
| 2019/03/15 | | Update drawing | Mark |
| | | Modify the cover glass thickness from 1.0mm to 1.1mm | |
| 2019/04/11 | | Rename to AM-1280800N6TZQW-T15H-C | Lawlite |
| 2019/04/19 | | Update the OUTLINE DIMENSION drawing which add the capton tape on conductive foil. | Mark |
| 2020/08/07 | 1 | Rename to AM-1280800N6TZQW-T15H-D | Tank |
| | 3 | Add Features | |
| 2020/10/06 | 11 | Modify Color Chromaticity for White Max & Min Value | Tank |

## 1. Features

10.1 TFT Liquid Crystal Display module is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a timing controller, voltage reference, common voltage, column driver, Projective Capacitive Touch (I2C Interface), and row driver circuit. This TFT LCD has a 10.1-inch diagonally measured active display area with 1280 horizontal by 800 vertical pixel array resolution.

- Double side adhesive(3M-9888T)
- Add copper foil to improve module grounding
- Touch panel FW:
  PCAP32_0659_v02_T2_0000_C000_Ampire_UI_DThqa_E2
- PCN for the bezel surface pattern change and the Diode USCD024H change to the USCD034H
- Add the capton tape on conductive foil.
- Change New vendor for TP FPC and Cover Lens

## 2. PHYSICAL SPECIFICATIONS

| Item | Specifications | Remark |
|---|---|---|
| LCD size | 10.1 inch(Diagonal) | |
| Driver element | a-Si TFT active matrix | |
| Display resolution | 1280 (W) × 3(RGB) x 800(H) dots | |
| Display mode | Normally Black, Transmissive (IPS) | |
| Dot pitch | 0.1695 (W) x0.1695 (H) mm | |
| Active area | 216.96 (W) x 135.6 (H) mm | |
| Module size | 247.0 (W) x 166.0 (H) × 7.955 (D) mm | |
| Color arrangement | R.G.B-stripe | |
| Interface | Digital | |

## 3. ABSOLUTE MAXIMUM RATINGS

| ITEM | SYMBOL | VALUES | | UNIT | REMARK |
|---|---|---|---|---|---|
| | | MIN | MAX | | |
| Power Voltage | $V_{DD}$ | -0.3 | 7.0 | V | VSS=0V, TA=25℃ |
| | $V_{BL}$ | -0.3 | 24 | V | $I_{BL}$=200mA |
| Operation Temperature | $T_{op}$ | -20 | 70 | ℃ | |
| Storage Temperature | $T_{st}$ | -30 | 80 | ℃ | |

Note 1: The absolute maximum rating values of this product are not allowed to be exceeded at any times. Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

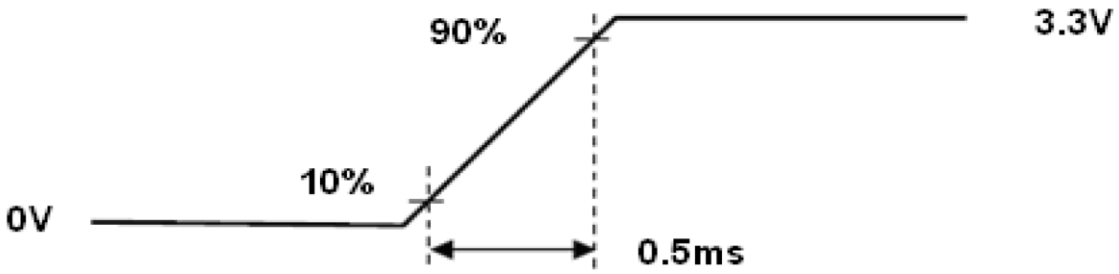
# 4. ELECTRICAL SPECIFICATIONS

## 4.1 Typical Operation Conditions

| Item | | Symbol | Min | Typ. | Max | Unit | Note |
|---|---|---|---|---|---|---|---|
| LCD Drive Voltage | | VDD | 3.0 | 3.3 | 3.6 | V | (4) |
| VDD Current | White Pattern | IDD | -- | 0.295 | -- | A | (3),(4) |
| VDD Power Consumption | White Pattern | PDD | -- | -- | 1.2 | W | (3),(4) |
| Rush Current | | Irush | | | 1.5 | A | (1),(4),(5) |
| Allowable Logic/LCD Drive Ripple Voltage | | VDDrp | | | 300 | mV | (4) |

Note 1.Measure Condition

**Figure 9 VDD rising time**

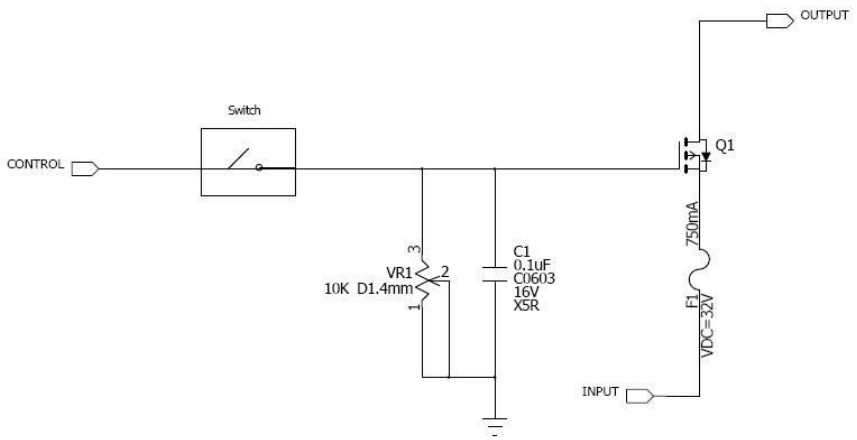



**VDD rising time**

Note (3) Frame Rate=60Hz, VDD=3.3V,DC Current.

Note (4) Operating temperature 25℃ , humidity 55%RH.

Note (5) The reference measurement circuit of rush current.

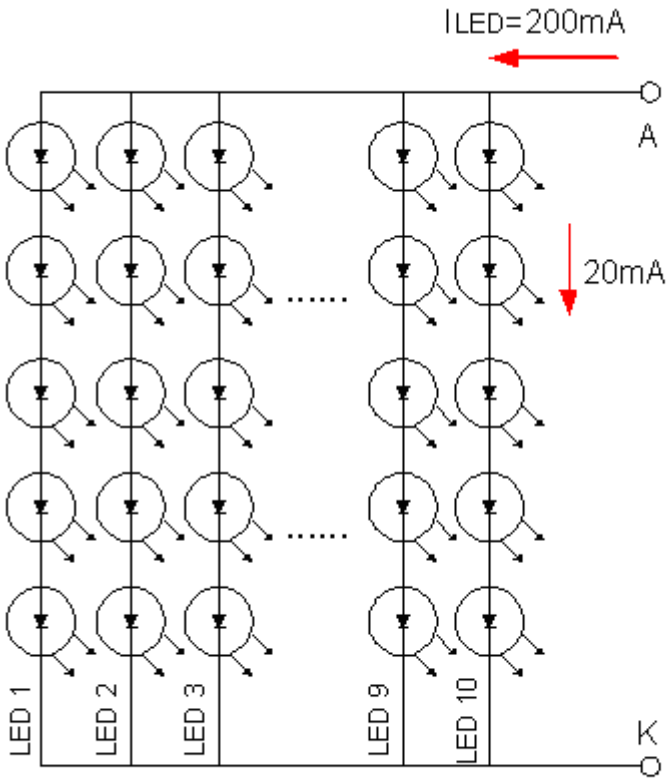


**4-2 LED Driving Conditions**

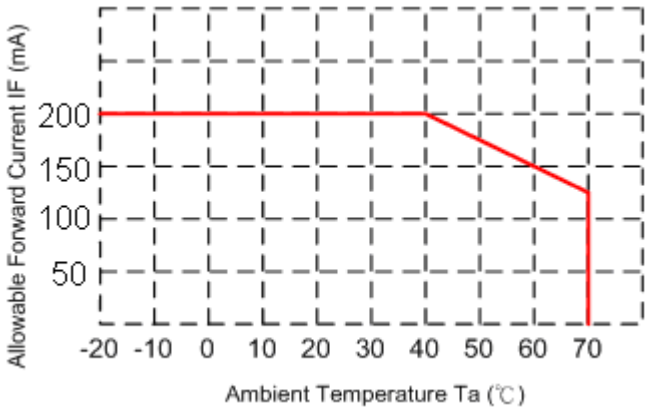
| ITEM | SYMBOL | MIN | TYP | MAX | UNIT | CONDITION |
|---|---|---|---|---|---|---|
| LED Backlight Voltage | $V_{BL}$ | -- | 16 | 21 | V | $I_{BL}$=200mA |
| LED Backlight Current | $I_{BL}$ | - | 200 | -- | mA | **Ta=25℃** |
| LED Life Time | | -- | 30K | - | kHr | Note* |

Note* : Brightness to be decreased to 50% of the initial value.

Ta=25℃




When LCM is operated over 40℃ ambient temperature, the ILED should be follow :



### 4.3 Power Sequence

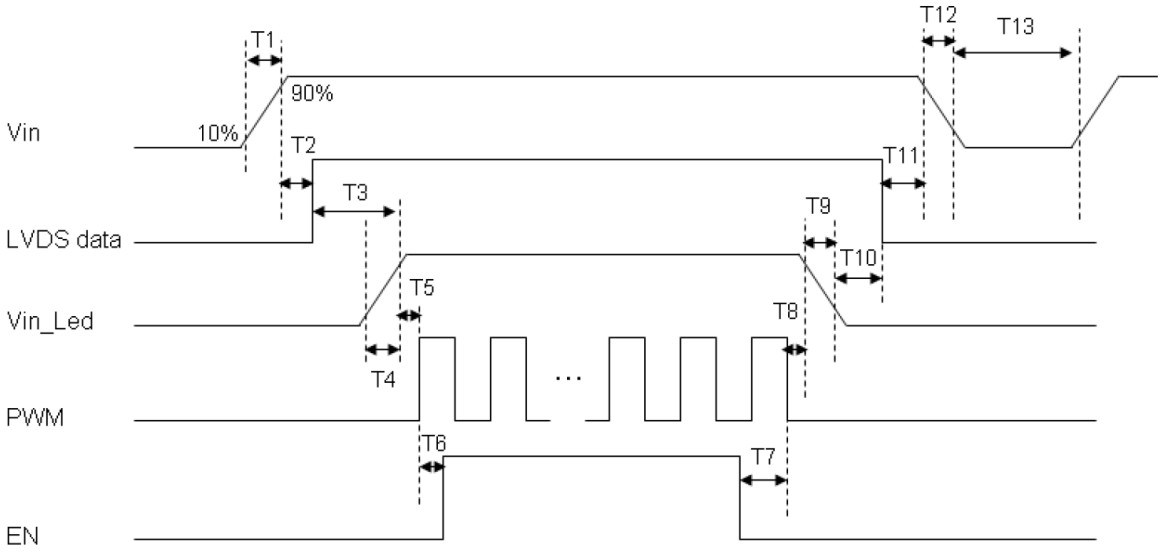



**Table 10 Power Sequencing Requirements**

| Parameter | Symbol | Unit | Min | Typ. | Max |
|---|---|---|---|---|---|
| VIN Rise Time | T1 | ms | 0.5 | -- | 10 |
| VIN Good to Signal Valid | T2 | ms | 30 | -- | 90 |
| Signal Valid to Backlight On | T3 | ms | 200 | -- | -- |
| Backlight Power On Time | T4 | ms | 0.5 | -- | -- |
| Backlight VDD Good to System PWM On | T5 | ms | 10 | -- | -- |
| System PWM ON to Backlight Enable ON | T6 | ms | 10 | -- | -- |
| Backlight Enable Off to System PWM Off | T7 | ms | 0 | -- | -- |
| System PWM Off to B/L Power Disable | T8 | ms | 10 | -- | -- |
| Backlight Power Off Time | T9 | ms | -- | 10 | 30 |
| Backlight Off to Signal Disable | T10 | ms | 200 | -- | -- |
| Signal Disable to Power Down | T11 | ms | 0 | -- | 50 |
| VIN Fall Time | T12 | ms | -- | 10 | 30 |
| Power Off | T13 | ms | 500 | -- | -- |

## 4.4 LVDS Signal Timing Characteristics

### 4.4.1 AC Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Differential Input High | Vth | - | - | +100 | mV | $V_{CM}$=+1.2V |
| Differential Input Low | Vtl | -100 | - | - | mV | $V_{CM}$=+1.2V |
| Magnitude Differential Input | $\|V_{ID}\|$ | 200 | - | 400 | mV | - |
| Common Mode Voltage | $V_{CM}$ | 0.3+(VID/2) | - | VDD-1.2-(VID/2) | V | - |
| Common Mode Voltage | $\Delta V_{CM}$ | - | - | 50 | mV | $V_{CM}$=+1.2V |

Note (1) Input signals shall be low or Hi-Z state when VDD is off.

(2) All electrical characteristics for LVDS signal are defined and shall be measured at the interface connector of LCD.

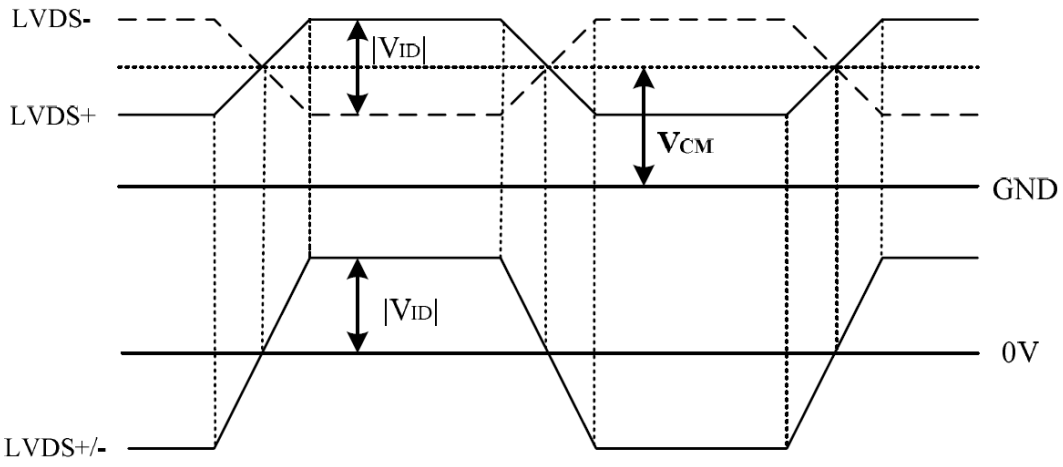
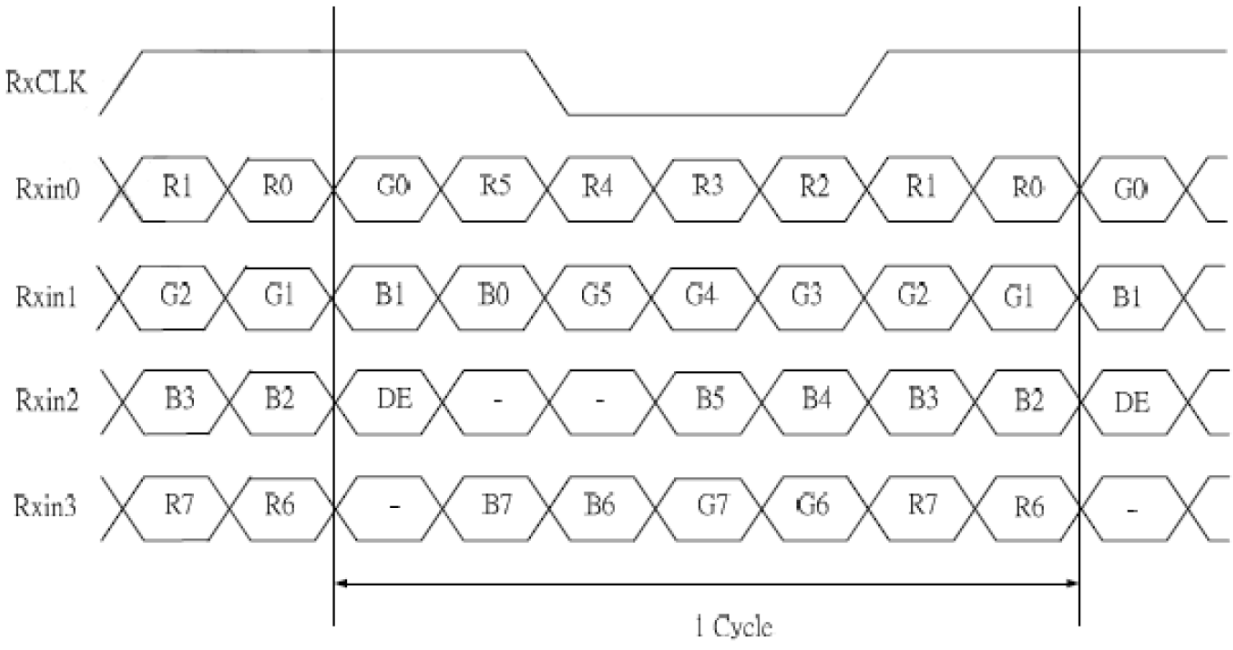
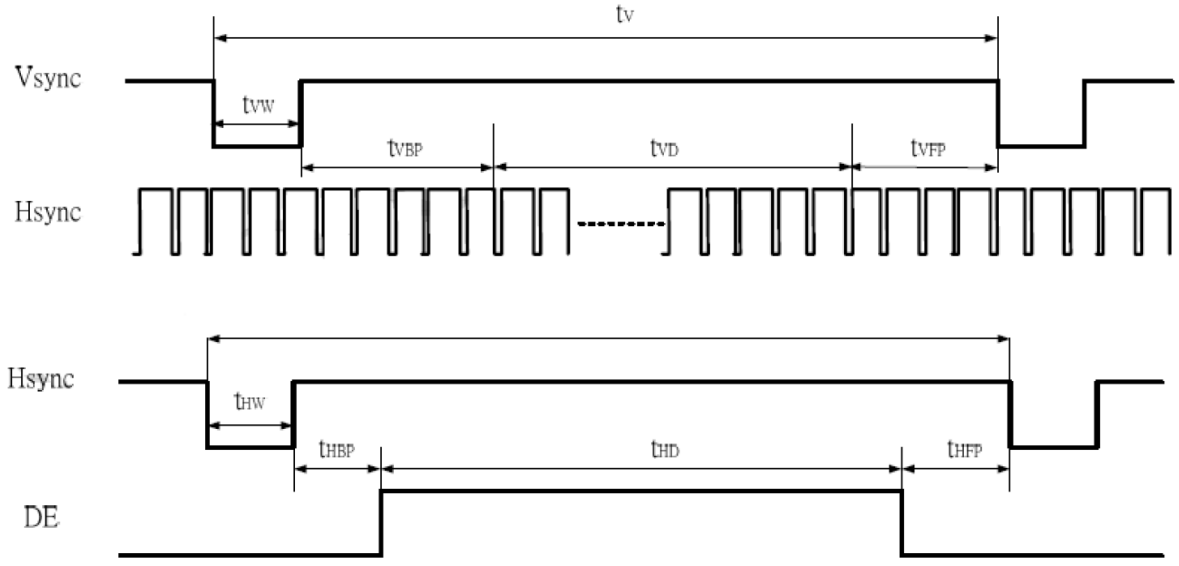



**Figure 9 LVDS Data Mapping**



4.4.2 Timing Table

| Parameter | Symbol | Unit | Min. | Typ. | Max. |
|---|---|---|---|---|---|
| Frame Rate | -- | Hz | - | 60 | - |
| Frame Period | $t_V$ | line | (815) | (823) | (1023) |
| Vertical Display Time | $t_{VD}$ | line | | 800 | |
| Vertical Blanking Time | $t_{VW}+t_{VBP}+t_{VFP}$ | line | (15) | (23) | (33) |
| 1 Line Scanning Time | $t_H$ | clock | (1410) | (1440) | (1470) |
| Horizontal Display Time | $t_{HD}$ | clock | | 1280 | |
| Horizontal Blanking Time | $t_{HW}+t_{HBP}+t_{HFP}$ | clock | (60) | (160) | (190) |
| Clock Rate | $1/T_C$ | MHz | (68.9) | (71.1) | (73.4) |



## 5. INTERFACE

| Pin # | Signal Name | Description | Remarks |
|---|---|---|---|
| 1 | NC | Not Connect | - |
| 2 | VDD | Power Supply, 3.3V (typical) | - |
| 3 | VDD | Power Supply, 3.3V (typical) | |
| 4 | VDD_EDID | Power Supply for EDID I2C Flash IC | |
| 5 | SCL_EDID | I2C Serial Clock for EDID I2C Flash IC | |
| 6 | SDA_EDID | I2C Serial Data for EDID I2C Flash IC | |
| 7 | NC | Not Connect | |
| 8 | LV0N | -LVDS differential data input | |
| 9 | LV0P | +LVDS differential data input | |
| 10 | GND | Ground | |
| 11 | LV1N | -LVDS differential data input | |
| 12 | LV1P | +LVDS differential data input | |
| 13 | GND | Ground | |
| 14 | LV2N | -LVDS differential data input | |
| 15 | LV2P | +LVDS differential data input | |
| 16 | GND | Ground | |
| 17 | LVCLKN | -LVDS differential data input | |
| 18 | LVCLKP | +LVDS differential data input | |
| 19 | GND | Ground | |
| 20 | LV3N | -LVDS differential data input | |
| 21 | LV3P | +LVDS differential data input | |
| 22 | GND | Ground | |
| 23 | LED_GND | Not Connect | |
| 24 | LED_GND | Not Connect | |
| 25 | LED_GND | Not Connect | |
| 26 | NC | Not Connect | |
| 27 | LED_PWM | Not Connect | |
| 28 | LED_EN | Not Connect | |
| 29 | CABC_EN | Content Adaptive Brightness Control Function Enable | Enable: Hi<br>Disable: Lo |
| 30 | NC | Not Connect | |
| 31 | LED_VCC | Not Connect | |
| 32 | LED_VCC | Not Connect | |
| 33 | LED_VCC | Not Connect | |
| 34 | NC | Not Connect | |
| 35 | BIST | BIST pin | |
| 36-40 | NC | Not Connect | |

## 6. Optical Specifications

**Table 2 Optical Characteristics**

| Item | Conditions | | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|---|
| Viewing Angle ( CR>10 ) | Horizontal | θ L | (75) | (85) | - | degree | (1),(2),(3) |
| | | θ R | (75) | (85) | - | | |
| | Vertical | θT | (75) | (85) | - | | |
| | | θ B | (75) | (85) | - | | |
| Contrast Ratio | Center | | (600) | (800 ) | - | - | (1),(2),(4) |
| Response Time | Rising | | - | - | - | ms | (1),(2),(5) |
| | Falling | | - | - | - | ms | |
| | Rising + Falling | | - | 25 | - | ms | |
| Color Chromaticity (CIE1931) | NTSC | | - | 45 | - | % | (1),(2) |
| | Red | x | Typ. -0.05 | 0.561 | Typ. +0.05 | - | (1),(2) |
| | Red | y | | 0.334 | | - | |
| | Green | x | | 0.341 | | - | |
| | Green | y | | 0.568 | | - | |
| | Blue | x | | 0.161 | | - | |
| | Blue | y | | 0.129 | | - | |
| | White | x | | 0.313 | | - | |
| | White | y | | 0.329 | | - | |
| White Luminance | Center | | 340 | 425 | - | cd/m^2 | (1),(2),(6) |
| Luminance Uniformity | 9Points | | 70 | 75 | - | % | (1),(2),(6) |

Note (1) Measurement Setup:

The LCD module should be stabilized at given temperature(25℃) for 15 minutes to Avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 15 minutes in a windless room.

**Figure 4 Measurement Setup**

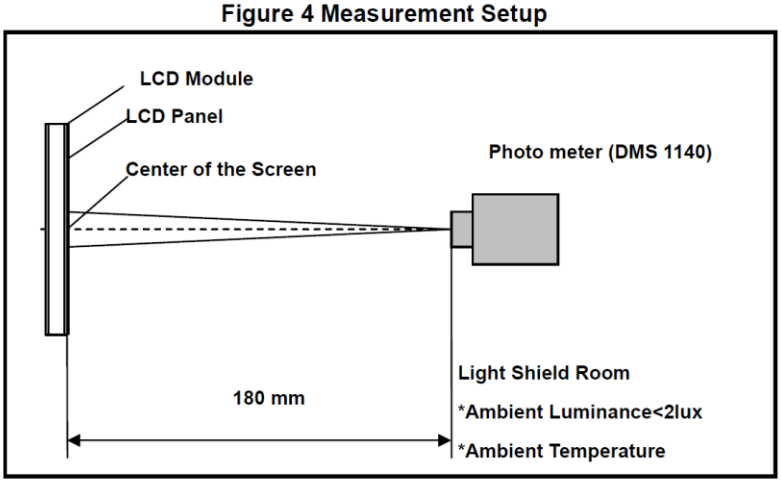
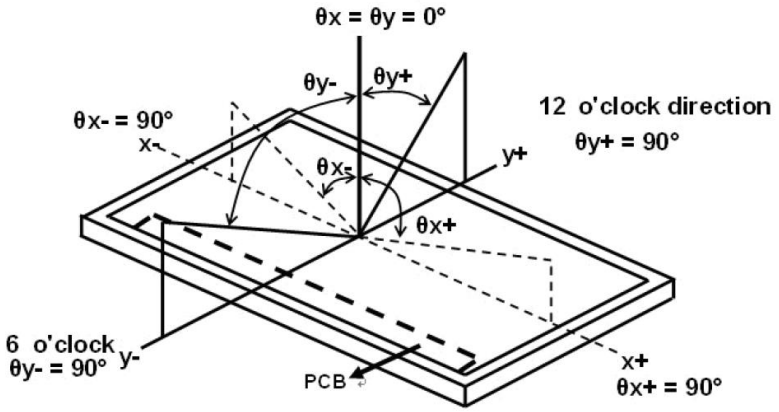


**Figure 5 Definition of Viewing Angle**




Note (4) Definition Of Contrast Ratio (CR)

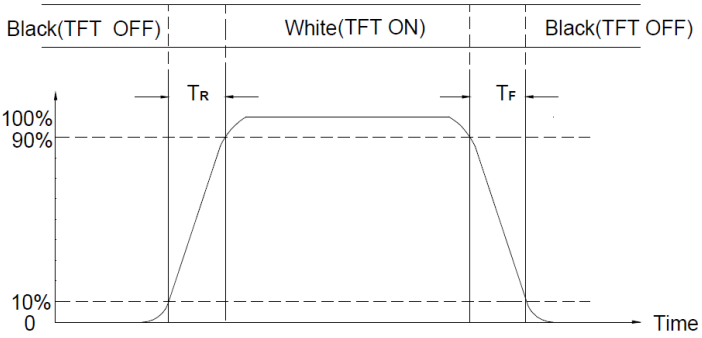
The contrast ratio can be calculated by the following expression

Contrast Ratio (CR) = L255 / L0

L63: Luminance of gray level 255, L0: Luminance of gray level 0

Note (5) Definition Of Response Time ($T_R$, $T_F$)

**Figure 6 Definition of Response Time**

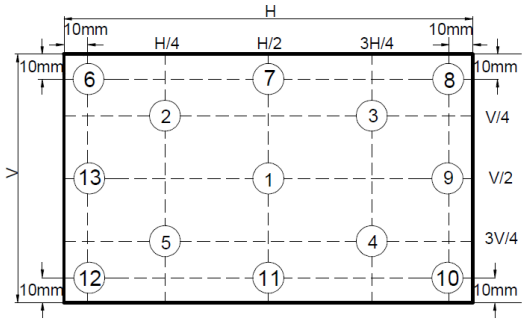



Note (6) Definition Of brightness Luminance

$$\text{Luminance uniformity} = \frac{\text{Min}(L1, L6, L7, L8, L9, L10, L11, L12, L13)}{\text{Max}(L1, L6, L7, L8, L9, L10, L11, L12, L13)} \times 100\%$$

H—Active area length V—Active area width

**Figure 7 Measurement Locations**



# 7. Projected capacitive-type Touch panel specification

## 7.1 Basic Characteristic

| ITEM | SPECIFICATION |
|---|---|
| **Type** | Projective Capacitive Touch Panel |
| **Cover Lens** | Cover Lens(247.0*166.0*T=1.0) |
| **Activation** | 10-fingers |
| **X/Y Position Reporting** | Absolute Position |
| **Touch Force** | No contact pressure required |
| **Calibration** | No need for calibration |
| **Report Rate** | Approx 100 points/sec |
| **Control IC** | **EETI EXC3000** |

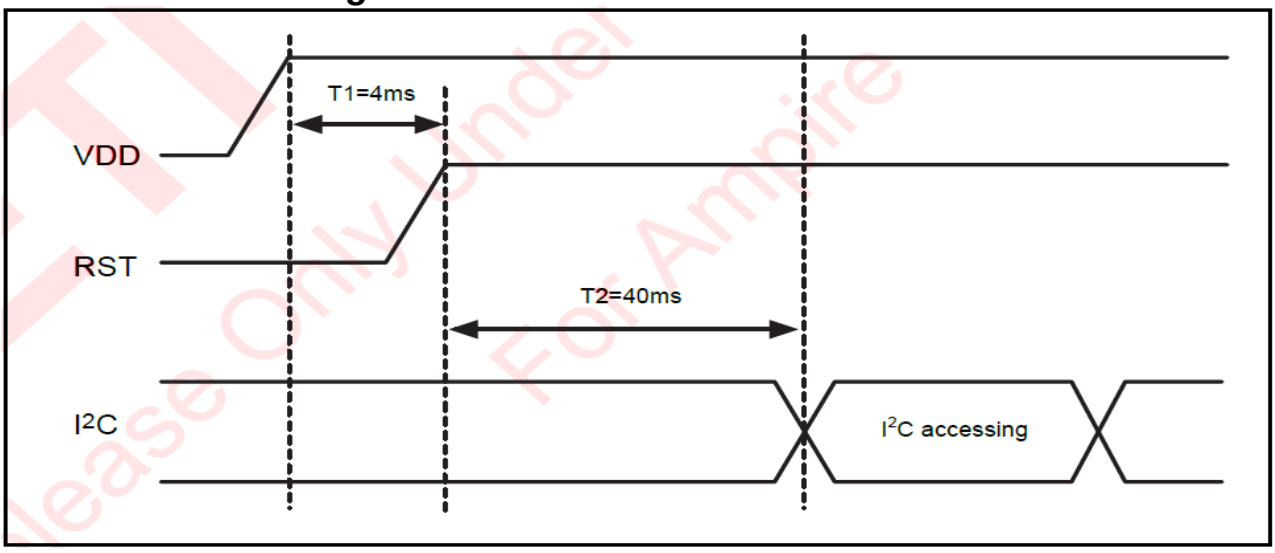
| Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|---|---|---|---|---|---|---|
| Power Supply Voltage | VDD | 3.0 | 3.3 | 3.6 | V | |
| Low Level Input Voltage | VIL | 0 | -- | 0.8 | V | 1 |
| High Level Input Voltage | VIH | 0.8*VIN | -- | VIN | V | 1 |
| Power Consumption | $I_{VDD}$ | | T.B.D | | mA | |

Note 1: SDA , SCL ,/INT, RES

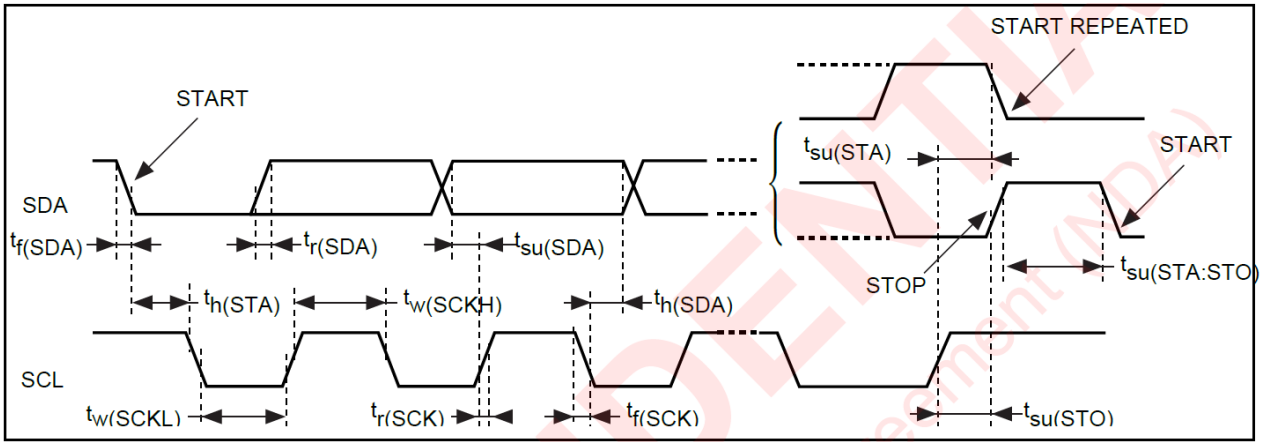
## 7.2 Interface

| Pin | Name | Description |
|---|---|---|
| 1 | VDD | Power supply 3.3V |
| 2 | SCL | $I^2C$ Clock |
| 3 | SDA | $I^2C$ Data |
| 4 | /INT | Interrupt Output pin. Active “Low” |
| 5 | RES | Rest input pin to Master Chip. Active “Low” |
| 6 | DGND | Power GND |

## 7.3 Power- on Timing Chart




## 7.4 I2C AC Waveform




I2C Characteristics

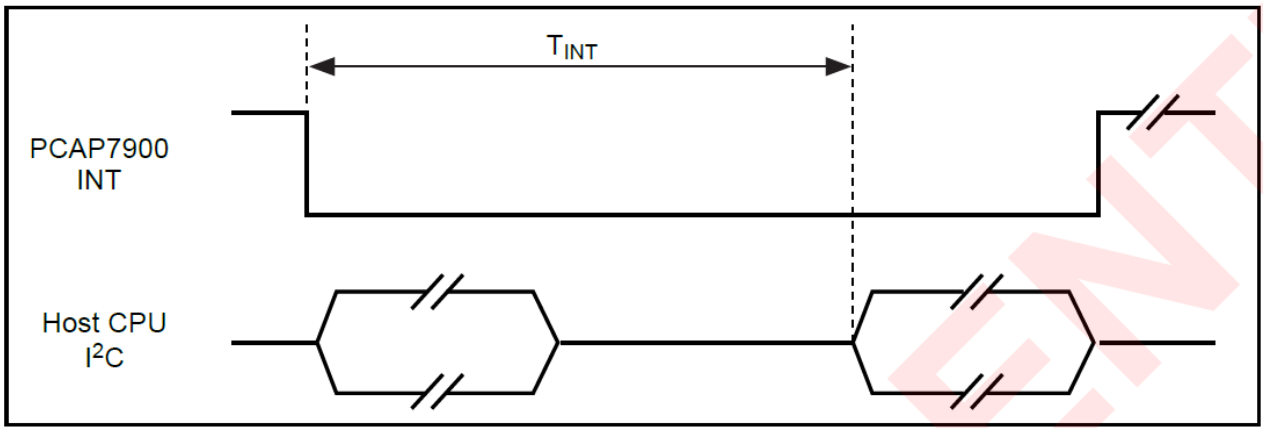
| Symbol | Parameter | SCL = 100KHz | | SCL = 400KHz | | Unit |
|---|---|---|---|---|---|---|
| | | Min | Max | Min | Max | |
| $t_{w(SCLH)}$ | SCL clock high time | 4.7 | | 1.3 | | μs |
| $t_{w(SCLL)}$ | SCL clock low time | 4.0 | | 0.6 | | |
| $t_{su(SDA)}$ | SDA setup time | 250 | | 100 | | ns |
| $t_{h(SDA)}$ | SDA data hold time | 0 | | 0 | 900 | |
| $t_{r(SDA)}$ $t_{r(SCL)}$ | SDA and SCL rise time | | 1000 | | 300 | |
| $t_{f(SDA)}$ $t_{f(SCL)}$ | SDA and SCL fall time | | 300 | | 300 | |
| $t_{h(STA)}$ | Start condition hold time | 4.0 | | 0.6 | | μs |
| $t_{su(STA)}$ | Repeated Start condition setup time | 4.7 | | 0.6 | | |
| $t_{su(STO)}$ | Stop condition setup time | 4.0 | | 0.6 | | μs |
| $t_{w(STO:STA)}$ | Stop to Start condition time (bus free) | 4.7 | | 1.3 | | μs |

## 7.5 Software Protocol

I2C Transaction Frame: each I2C transaction frame transfers one I2C packet data.

The IRQ pin is low level trigger.

The controller will pulls IRQ pin low until no data in the controller buffer.




Report rate = 1 / TINT , it depends on properties of touch screen such as resistive value, I2C clock rate, channel number, thickness and material of cover lens, etc.

For better touch performance, we strongly recommend using the 400K clock rate.

| | |
|---|---|
| | From Host to Device |
| | From Device to Host |

S = START condition
Sr = Repeat START condition
P = STOP condition
R = Data direction READ (SDA HIGH)
W = Data direction WRITE (SDA LOW)
Ack = Acknowledge (SDA LOW)
Nak = Not acknowledge (SDA HIGH)
Address = 7-bit (0x2A)
DATA = 8-bit

**Read mode :** Host-receiver, Device-transmitter.

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| S | Address | R | Ack | Len-LSB | Ack | Len-MSB | Ack | DATA | Ack |
| DATA | Ack | | | | DATA | | Nak | P | |

Host need to read 66 Bytes for input report retrieval. The total 66 Bytes contains 2 Bytes “Length” and 64 Bytes data payload. The value of “Len” is calculated by 2 Bytes for “Len” field and n Bytes for valid “Input Data” in the payload.

The input data packet format inside the I2C payload is defined as

| Report ID | Data |
|---|---|

According to different report ID, there are different data format as below.
Report ID = 6, for parallel mode multi-touch data.

Multi-Touch format :

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| Report ID = 0x06 | Num Of Fingers* | Contact data 1 | | | | | | | |
| Byte10 | Byte11 | Byte12 | Byte13 | Byte14 | Byte15 | Byte16 | Byte17 | Byte18 | Byte19 |
| Contact data 1 | | Contact data 2 | | | | | | | |
| Byte20 | Byte21 | Byte22 | Byte23 | Byte24 | Byte25 | Byte26 | Byte27 | Byte28 | Byte29 |
| Contact data 2 | | Contact data 3 | | | | | | | |
| Byte30 | Byte31 | Byte32 | Byte33 | Byte34 | Byte35 | Byte36 | Byte37 | Byte38 | Byte39 |
| Contact data 3 | | Contact data 4 | | | | | | | |
| Byte40 | Byte41 | Byte42 | Byte43 | Byte44 | Byte45 | Byte46 | Byte47 | Byte48 | Byte49 |
| Contact data 4 | | Contact data 5 | | | | | | | |
| Byte50 | Byte51 | Byte52 | Byte53 | Byte54 | Byte55 | | | | |
| Contact data 5 | | Scan Time | | | | | | | |

The device input report contains maximum 5 contacts in one I2C frame. If it must report 10 contacts, device will break these down into 2 I2C frames that report 5 contacts each. The “Nums of Fingers” indicates the actual contact in this report. The actual contact number is reported in the first frame. The other frames should have an actual count of 0. For 10 contacts example, the actual count in the first frame has a value of 10, and the second frame has an actual count of 0.

Contact data format :

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| State** | Finger ID | X *** (LSB) | X (MSB) | Y *** (LSB) | Y (MSB) | reserved | | reserved | |

** tate: Bit0=Down/Up bit, Bit0 = 1 for Touch Down, Bit0 = 0 for Lift off.

*** The X/Y resolution is 4096.

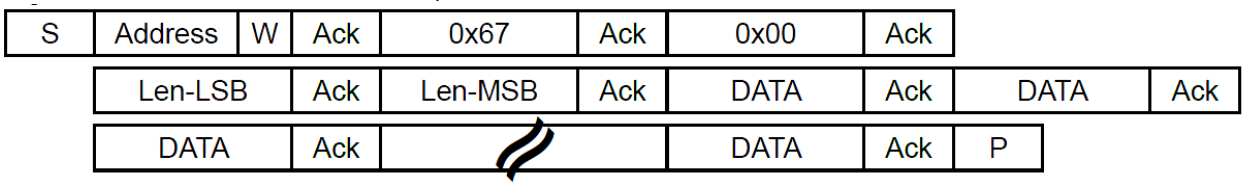
Report ID = 3, for vendor specific diagnostics data.

Diagnostics packet format

| Byte0 | Byte1 | |
|---|---|---|
| Report ID = 0x03 | Length | data stream |

The “Length” indicates the length of the coming data stream. This data stream must follow EETI eGalax diagnostics format. The software integrator must be carefully handling this data stream.

**Write mode :** Host-transmitter, Device-receiver.




Host need to write 2 Bytes [0x67] [0x00] to device first, and follow 2 Bytes length field and data payload. Each I2C transaction always contains 64 Bytes data payload so the length field should be always as 66 Bytes (2 Bytes for “Len”+64 Bytes for “Data” payload).If the data to be sent to the controller is less than 64 Bytes, 0 padding is necessary.

The packet format in the payload is defined as diagnostics packet.

Diagnostics packet format :

| Byte0 | Byte1 | |
|---|---|---|
| Report ID = 0x03 | Length | data stream |

The “Length” indicates the length of the coming data stream. This data stream must follow EETI eGalax diagnostics format. The software integrator must be carefully handling this data stream.

## 7.6 Command Example

### Query firmware version

Host → Device

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x67 | 0x00 | 0x42 | 0x00 | 0x03 | 0x01 | 'D' | 0x00 | 0x00 | 0x00 |
| Byte10 → Byte67 | | | | | | | | | |
| 0x00 | | | | | | | | | |

⬇

<Device triggers INT pin low. Host call the read function to retrieve the device response data>

⬇

Device → Host

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x42 | 0x00 | 0x03 | 0x07 | 'D' | '0' | '.' | '0' | '0' | '2' |
| Byte10 | Byte11 → Byte65 | | | | | | | | |
| 0x00 | 0x00 | | | | | | | | |

Host → Device

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x67 | 0x00 | 0x42 | 0x00 | 0x03 | 0x01 | 'E' | 0x00 | 0x00 | 0x00 |
| Byte10 → Byte67 | | | | | | | | | |
| 0x00 | | | | | | | | | |

⬇

<Device triggers INT pin low. Host call the read function to retrieve the device response data>

⬇

Device → Host

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x42 | 0x00 | 0x03 | 0x0C | 'E' | 'P' | '7' | '9' | '0' | '0' |
| Byte10 | Byte11 | Byte12 | Byte13 | Byte14 | BYTE15 | Byte16 → Byte65 | | | |
| '-' | PID | | | | 0x00 | 0x00 | | | |

⬇

Note: Byte[11:14] = 001A stands for model PID 001A

### Query controller model name

## 7.7 Power Saving Mechanism

EXC7900 - supports 3 working mode for power saving.

**Fully working mode :**

After reset, the controller module works at full power working state.

**Idle mode:**

After EXC7900 receives a software packet from host computer to request MCU entering idle state, this controller module will enter idle state. At idle state, IRQ pin will be released to high state. Host computer can wake up this controller module via generating a falling edge signal at IRQ pin. When controller transfers to fully working mode, it will reply a wakeup command to host.

**Set idle command**

Host → Device

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x67 | 0x00 | 0x42 | 0x00 | 0x03 | 0x04 | 0x36 | 0x3F | 0x01 | T |
| Byte10 → Byte67 | | | | | | | | | |
| 0x00 | | | | | | | | | |

Host computer send this command as above for idle state configuration setting. Where, T means the scanning interval when in idle state. The touch controller will wakeup every that period of time to scan touch screen to check if the touchscreen touched or not. Once it detects sensor touched, the controller will back to fully working state automatically.

⬇

The default value of T is 30, the interval = T x 0.25 = 7.5ms

**Sleep mode:**

Whenever the host computer wants to deep sleep, it issues a sleep command packet to controller. Once the controller firmware receives such sleep command, it enters deep sleep state and does not response until it wakes up from this sleep state. Only host computer can wake up this device via generating a falling edge signal at IRQ pin.
When controller transfers to fully working mode, it will reply a wakeup command to host.

**Set sleep command**

Host → Device

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x67 | 0x00 | 0x42 | 0x00 | 0x03 | 0x03 | 0x36 | 0x3F | 0x02 | 0x00 |
| Byte10 → Byte67 | | | | | | | | | |
| 0x00 | | | | | | | | | |

Host computer send above command packet to touch controller device to make the device enter sleep state for power saving.

**Wakeup notification command**

Once the controller transfers to working state from idle and sleep state, it will trigger INT pin low and reply below command to host.

| Byte0 | Byte1 | Byte2 | Byte3 | Byte4 | Byte5 | Byte6 | Byte7 | Byte8 | Byte9 |
|---|---|---|---|---|---|---|---|---|---|
| 0x42 | 0x00 | 0x03 | 0x03 | 0x36 | 0x3F | 0x01 | 0x00 | 0x00 | 0x00 |
| Byte10 → Byte65 | | | | | | | | | |
| 0x00 | | | | | | | | | |

## 8. ELIABILITY TEST CONDITIONS

| Test Item | Test Conditions | Note |
|---|---|---|
| High Temperature Operation | 70±3°C ,Dry t=240 hrs | |
| Low Temperature Operation | -20±3°C, Dry t=240 hrs | |
| High Temperature Storage | 80±3°C , Dry t=240 hrs | 1,2 |
| Low Temperature Storage | -30±3°C ,Dry t=240 hrs | 1,2 |
| Thermal Shock Test | -20°C ~ 25°C ~ 70°C<br>30 m in. 5 min. 30 min. ( 1 cycle )<br>Total 100 cycle(Dry) | 1,2 |
| Storage Humidity Test | 60 °C, Humidity 90%, 240 hrs | 1,2 |
| Vibration Test (Packing) | Sweep frequency : 10 ~ 55 ~ 10 Hz/1min<br>Amplitude : 0.75mm<br>Test direction : X.Y.Z/3 axis<br>Duration : 30min/each axis | 2 |

Note 1 : Condensation of water is not permitted on the module.

Note 2 : The module should be inspected after 1 hour storage in normal conditions (15-35°C , 45-65%RH).

Note 3 : The module shouldn't be tested more than one condition, and all the test conditions are independent.

Note 4 : All the reliability tests should be done without protective film on the module.

Definitions of life end point:

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

# 9. GENERAL PRECAUTION

## 9.1 Use Restriction

This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

## 9.2 Disassembling or Modification

Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. AMPIRE does not warrant the module, if customers disassemble or modify the module.

## 9.3 Breakage of LCD Panel

(1) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
(2) If liquid crystal contacts mouth or eyes, rinse out with water immediately.
(3) If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
(4) Handle carefully with chips of glass that may cause injury, when the glass is broken.

## 9.4 Electric Shock

(1) Disconnect power supply before handling LCD module.
(2) Do not pull or fold the LED cable.
(3) Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

## 9.5 Absolute Maximum Ratings and Power Protection Circuit

(1) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
(2) Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
(3) It's recommended to employ protection circuit for power supply.

### 9.6 Operation

(1) Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
(2) Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
(3) When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
(4) Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may cause deformation or color fading.
(5) When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.

### 9.7 Mechanism

Please mount LCD module by using mounting holes arranged in four corners tightly.

### 9.8 Static Electricity

(1) Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
(2) Because LCD modules use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

### 9.9 Strong Light Exposure

The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

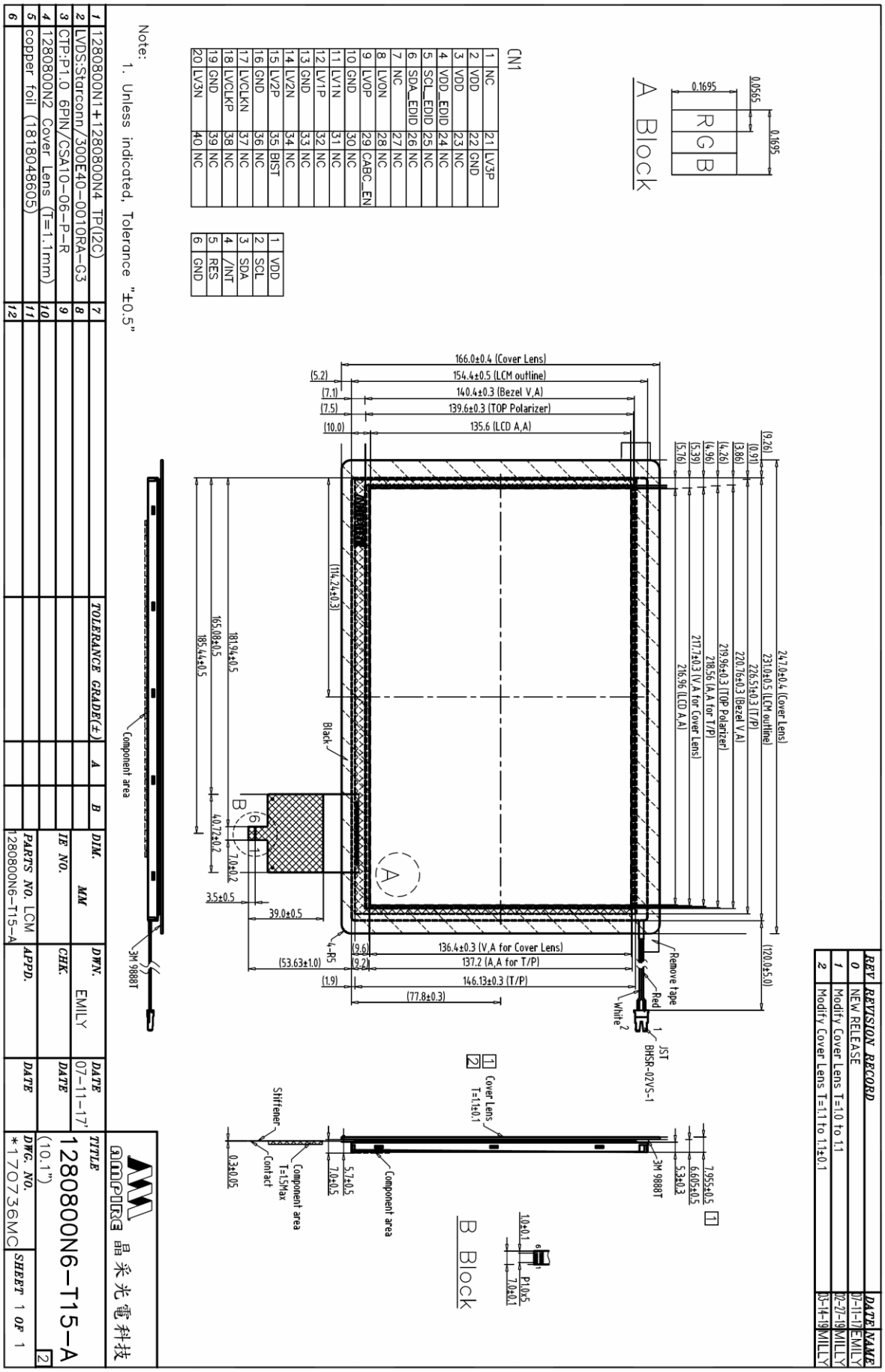
### 9.10 Disposal

When disposing LCD module, obey the local environmental regulations.

### 9.11 Others

Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.

## 10. OUTLINE DIMENSION




| 1 | NC | 21 | LV3P |
|---|---|---|---|
| 2 | VDD | 22 | GND |
| 3 | VDD | 23 | NC |
| 4 | VDD_EDID | 24 | NC |
| 5 | SCL_EDID | 25 | NC |
| 6 | SDA_EDID | 26 | NC |
| 7 | NC | 27 | NC |
| 8 | LVON | 28 | NC |
| 9 | LVOP | 29 | CABC_EN |
| 10 | GND | 30 | NC |
| 11 | LV1N | 31 | NC |
| 12 | LV1P | 32 | NC |
| 13 | GND | 33 | NC |
| 14 | LV2N | 34 | NC |
| 15 | LV2P | 35 | BIST |
| 16 | GND | 36 | NC |
| 17 | LVCLKN | 37 | NC |
| 18 | LVCLKP | 38 | NC |
| 19 | GND | 39 | NC |
| 20 | LV3N | 40 | NC |

| 1 | VDD |
|---|---|
| 2 | SCL |
| 3 | SDA |
| 4 | /INT |
| 5 | RES |
| 6 | GND |

| REV. | REVISION RECORD | DATE | NAME |
|---|---|---|---|
| 0 | NEW RELEASE | 07-11-17 | EMILY |
| 1 | Modify Cover Lens T=1.0 to 1.1 | 02-27-19 | MILLY |
| 2 | Modify Cover Lens T=1.1 to 1.1±0.1 | 03-14-19 | MILLY |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1280800N1+1280800N4 TP(I2C) | 7 | | | | | |
| 2 | LVDS:Starconn/300E40-0010RA-G3 | 8 | | | | | |
| 3 | CTP:P1.0 6PIN/CSA10-06-P-R | 9 | | | | | |
| 4 | 1280800N2 Cover Lens (T=1.1mm) | 10 | | | | | |
| 5 | copper foil (1818048605) | 11 | | | | | |
| 6 | | 12 | | | | | |

| | TOLERANCE GRADE(±) | A | B |
|---|---|---|---|
| DIM. | MM | | |
| TE NO. | | | |

| DWN. | EMILY | DATE | 07-11-17' |
|---|---|---|---|
| CHK. | | DATE | |
| APPD. | | DATE | |
| PARTS NO. | LCM 1280800N6-T15-A | DWG. NO. | *170736MC |

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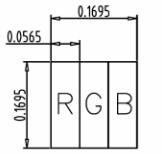
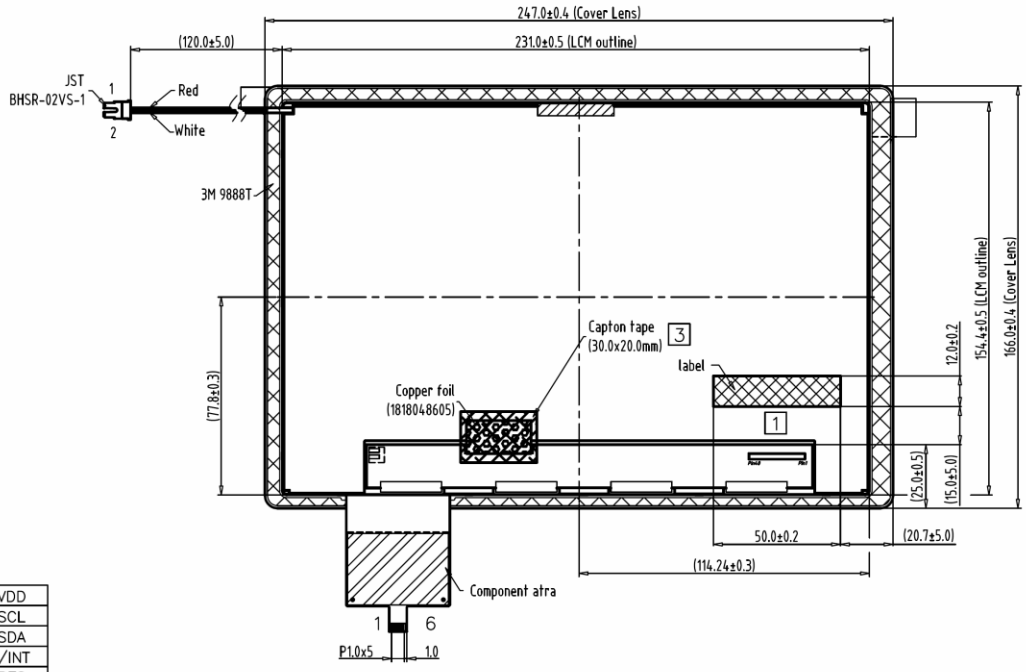
TITLE: 1280800N6-T15-A (10.1") 2

SHEET 1 OF 1

| REV | REVISION RECORD | DATE | NAME |
|---|---|---|---|
| 0 | NEW RELEASE | 07-11-17 | EMILY |
| 1 | Added Label Place | 10-30-17 | J.E.D |
| 2 | Modify Cover Lens T=1.0 to 1.1 | 02-27-19 | MILLY |
| 3 | Add Capton tape | 04-19-19 | MILLY |




A Block




Back view

CN1

| | | | |
|---|---|---|---|
| 1 | NC | 21 | LV3P |
| 2 | VDD | 22 | GND |
| 3 | VDD | 23 | NC |
| 4 | VDD_EDID | 24 | NC |
| 5 | SCL_EDID | 25 | NC |
| 6 | SDA_EDID | 26 | NC |
| 7 | NC | 27 | NC |
| 8 | LV0N | 28 | NC |
| 9 | LV0P | 29 | CABC_EN |
| 10 | GND | 30 | NC |
| 11 | LV1N | 31 | NC |
| 12 | LV1P | 32 | NC |
| 13 | GND | 33 | NC |
| 14 | LV2N | 34 | NC |
| 15 | LV2P | 35 | BIST |
| 16 | GND | 36 | NC |
| 17 | LVCLKN | 37 | NC |
| 18 | LVCLKP | 38 | NC |
| 19 | GND | 39 | NC |
| 20 | LV3N | 40 | NC |

| | |
|---|---|
| 1 | VDD |
| 2 | SCL |
| 3 | SDA |
| 4 | /INT |
| 5 | RES |
| 6 | GND |

Note:
1. Unless indicated, Tolerance "±0.5"

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1280800N1+1280800N4 TP(I2C) | 7 | | TOLERANCE GRADE(±) | A | B | DIM. MM | DWN. EMILY | DATE 07-11-17' | TITLE 1280800N6-T15-A (10.1") 3 |
| 2 | LVDS:Starconn/300E40-0010RA-G3 | 8 | | | | | | | | |
| 3 | CTP:P1.0 6PIN/CSA10-06-P-R | 9 | | | | | IE NO. | CHK. | DATE | |
| 4 | 1280800N2 Cover Lens (T=1.1mm) | 10 | | | | | | | | |
| 5 | copper foil (1818048605) | 11 | | | | | PARTS NO. LCM-1 1280800N6-T15-A | APPD. | DATE | DWG. NO. *170737MD SHEET 1 OF 1 |
| 6 | | 12 | | | | | | | | |

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AMPIRE CO., LTD.

Date : 2020/10/06