

TFT LCD Approval Specification

MODEL NO.: PQ 3Qi-01

Customer: _____

Approved by: _____

Note:

CONTENTS

| | | |
|----------|--|-----------|
| 1 | GENERAL DESCRIPTION..... | 5 |
| 1.1 | OVERVIEW | 5 |
| 1.2 | FEATURES | 5 |
| 1.3 | APPLICATIONS | 5 |
| 1.4 | GENERAL SPECIFICATIONS..... | 5 |
| 1.5 | MECHANICAL SPECIFICATIONS..... | 5 |
| 2 | ABSOLUTE MAXIMUM RATINGS..... | 7 |
| 2.1 | ABSOLUTE MAXIMUMS, ENVIRONMENTAL..... | 7 |
| 2.2 | ABSOLUTE MAXIMUMS, ELECTRICAL..... | 8 |
| 2.2.1 | TFT LCD MODULE | 8 |
| 2.2.2 | BACKLIGHT CONVERTER INPUT..... | 8 |
| 2.2.3 | LED LIGHT BAR UNIT..... | 8 |
| 3 | ELECTRICAL CHARACTERISTICS..... | 9 |
| 3.1 | FUNCTIONAL BLOCK DIAGRAM..... | 9 |
| 3.2 | LCD ELECTRONICS SPECIFICATION..... | 9 |
| 3.3 | LVDS DATA FORMAT | 11 |
| 3.4 | INPUT SIGNAL TIMING SPECIFICATIONS | 12 |
| 3.5 | LED BACKLIGHT CONVERTER SPECIFICATIONS | 13 |
| 3.6 | LED LIGHT BAR UNIT | 15 |
| 3.7 | DISPLAY MODE CONTROL..... | 16 |
| 3.8 | TOTAL POWER CONSUMPTION | 17 |
| 3.9 | PIN ASSIGNMENT | 18 |
| 3.10 | POWER ON/OFF SEQUENCE..... | 20 |
| 3.11 | COLOR DATA INPUT ASSIGNMENT | 22 |
| 4 | OPTICAL CHARACTERISTICS | 23 |
| 4.1 | TEST CONDITIONS..... | 23 |
| 4.2 | OPTICAL SPECIFICATIONS..... | 23 |
| 5 | RELIABILITY TEST ITEMS | 27 |
| 6 | PRECAUTIONS..... | 28 |
| 6.1 | SYSTEM MATCHING PRECAUTIONS..... | 28 |



| | | |
|-----------------|----------------------------------|-----------|
| 6.2 | HANDLING PRECAUTIONS | 28 |
| 6.3 | STORAGE PRECAUTIONS | 28 |
| 6.4 | OPERATION PRECAUTIONS | 28 |
| 6.5 | OTHER PRECAUTIONS | 28 |
| 7 | PACKING | 29 |
| 7.1 | CARTON | 29 |
| 7.2 | PALLET | 30 |
| 8 | DEFINITION OF LABELS..... | 31 |
| 8.1 | MODULE LABEL | 31 |
| 8.2 | CARTON LABEL | 32 |
| APPENDIX | EDID DATA STRUCTURE..... | 33 |

www.display-solution.com



REVISION HISTORY

| Version | Date | Page (New) | Section | Description |
|-----------|---------------|------------|-------------|--|
| Ver 1.0 | Apr. 20, 2009 | All | All | Initial customer release |
| Ver 1.1 | June 16 2009 | | | Modifications based on measured performance of first working samples |
| Ver 1.2 | July 21, 2009 | | | Updated electrical specifications |
| Ver 1.3 | July 28, 2009 | | 8 | Optical specifications revised. |
| Ver 1.4 | Sept 4, 2009 | | 3, 8 | Electrical and optical specifications revised. |
| Ver 1.5 | Jan 22, 2010 | | 8 | Optical specifications revised |
| Ver 1.6 | Jan 27, 2010 | | 3.1, 3.3, 8 | Power and optical characteristics updated |
| Ver 1.7 | Mar 10, 2010 | | 3.1, 3.3, 8 | Power and optical characteristics updated |
| Ver 1.7.1 | Mar 16, 2010 | 29 | 8 | Updated white point tolerance |
| Ver 1.8 | Apr 18, 2010 | | 8 | Added brightness in office lighting and sunlight |
| Ver 1.8.1 | Apr 19, 2010 | | 8 | Corrected typo in table 8.2 |
| Ver 1.9 | June 4, 2010 | 29 | 3,1, 3.3, 8 | Power and optical characteristics updated |
| Ver 2.0 | July 13, 2010 | | 3, 6, 8 | Updated power, optics data, and reflectivity measurement method |
| Ver 2.1 | July 21, 2010 | | | Reorganized sections |
| Ver 2.2 | Sept 19, 2011 | 7 | 2.1 | Updated operating and storage temperature range |

Note: All specifications are subject to change without notice.

www.display-solution.com



1 GENERAL DESCRIPTION

1.1 OVERVIEW

PQ 3Qi-01 is a 10.1" TFT Liquid Crystal Display module with LED backlight unit and 40 pin LVDS interface. This module supports 1024 x 600 Wide-SVGA (WSVGA) mode and can display 262,144 colors. This module also supports two low power modes: a transmissive mode with lower color and a reflective black and white (64 greyscales) mode. The converter module for backlight is built in.

1.2 FEATURES

- WSVGA (1024 x 600 pixels) resolution
- 3.3V LVDS (Low Voltage Differential Signaling) interface with 1 pixel/clock
- Built in LED Converter
- Transmissive, transreflective, and reflective display modes

1.3 APPLICATIONS

- Mobile notebook or netbook
- Multimedia tablet

1.4 GENERAL SPECIFICATIONS

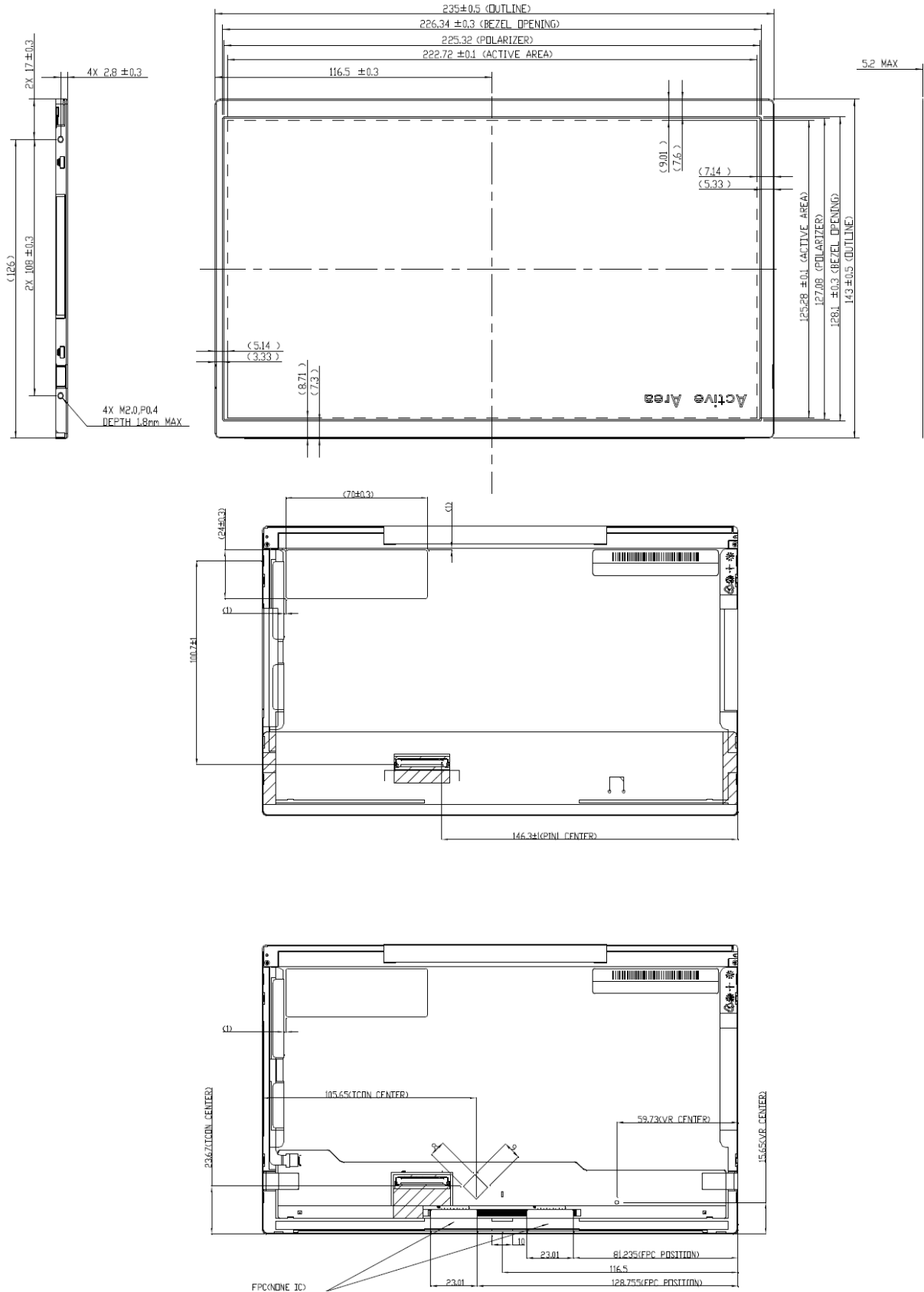
| Item | Specification | Unit | Note |
|-------------------------|--|-------|------|
| Active Area | 222.72 (H) x 125.28 (V) (10.06" diagonal) | mm | (1) |
| Bezel Opening Area | 226.34 (H) x 128.1 (V) | mm | |
| Driver Element | a-Si TFT active matrix | - | - |
| Pixel Number | 1024 x R.G.B. x 600 | pixel | (2) |
| Pixel Pitch | 0.2175 (H) x 0.2088 (V) | mm | - |
| Pixel Arrangement | RGB vertical stripe + 3 reflective subpixels | - | - |
| Display Colors | 262,144 | color | - |
| Display Operating Modes | Transmissive, transreflective, reflective. Normally black | - | - |
| Surface Treatment | Hard coating (3H), Anti-Glare | - | - |

1.5 MECHANICAL SPECIFICATIONS

| Item | Min. | Typ. | Max. | Unit | Note | |
|-------------|---------------|-------|-------|-------|------|-----|
| Module Size | Horizontal(H) | 234.5 | 235.0 | 235.5 | mm | (1) |
| | Vertical(V) | 142.5 | 143.0 | 143.5 | mm | |
| | Thickness(T) | - | 4.9 | 5.2 | mm | |
| Weight | - | 185 | 195 | g | | |

Note (1) Please refer to the attached drawings for more information of front and back outline dimensions.

Note (2) Each pixel is composed of 3 transmissive subpixels (RGB) and 3 reflective subpixels (grayscale).



www.display-solution.com

2 ABSOLUTE MAXIMUM RATINGS

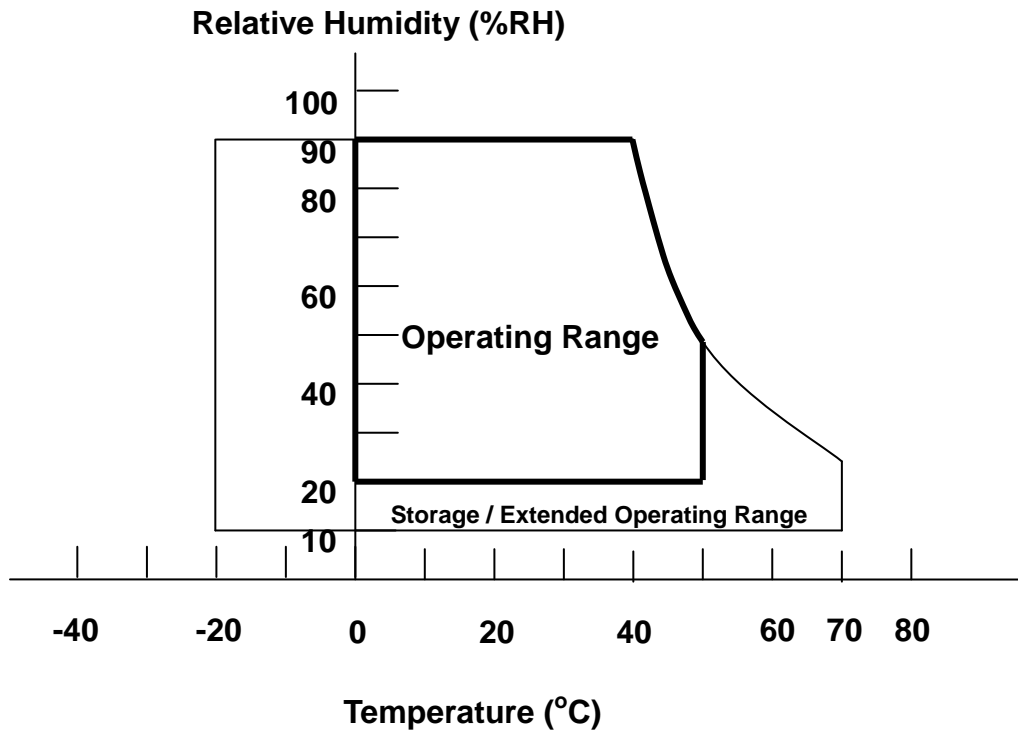
2.1 ABSOLUTE MAXIMUMS, ENVIRONMENTAL

| Item | Symbol | Value | | Unit | Note |
|----------------------------------|------------|-------|------|------|----------|
| | | Min. | Max. | | |
| Storage Temperature | T_{ST} | -20 | +70 | °C | (1) |
| Operating Ambient Temperature | T_{OP} | 0 | +50 | °C | (1), (2) |
| Extended Operational Temperature | T_{EOPD} | -20 | +70 | °C | (1d) |

Note (1) Temperature and relative humidity range is shown in the figure below:

- (a) 90 %RH Max. ($T_a \leq 40$ °C)
- (b) Wet-bulb temperature should be 39 °C Max. ($T_a > 40$ °C)
- (c) No condensation
- (d) Panel will function but may not meet performance specifications in the extended operational temperature range.

Note (2) The temperature of panel surface area should be 0 °C min. and 50 °C max.



2.2 ABSOLUTE MAXIMUMS, ELECTRICAL

Permanent damage to the device may occur if maximum values are exceeded. Operation should be restricted to the conditions described under Normal Operating Conditions.

2.2.1 TFT LCD MODULE

| Item | Symbol | Value | | Unit | Note |
|----------------------|----------|-------|--------------|------|------|
| | | Min. | Max. | | |
| Power Supply Voltage | V_{CC} | -0.3 | +4.0 | V | |
| Logic Input Voltage | V_{IN} | -0.3 | $V_{CC}+0.3$ | V | |

2.2.2 BACKLIGHT CONVERTER INPUT

| Item | Symbol | Value | | Unit | Note |
|--------------------------|--------------|-------|-------|------|------|
| | | Min. | Max. | | |
| Converter Input Voltage | LED V_{CC} | -0.3 | +25.0 | V | |
| Converter Control Signal | LED PWM | -0.3 | +5.5 | V | |
| Converter Control Signal | LED EN | -0.3 | +5.5 | V | |

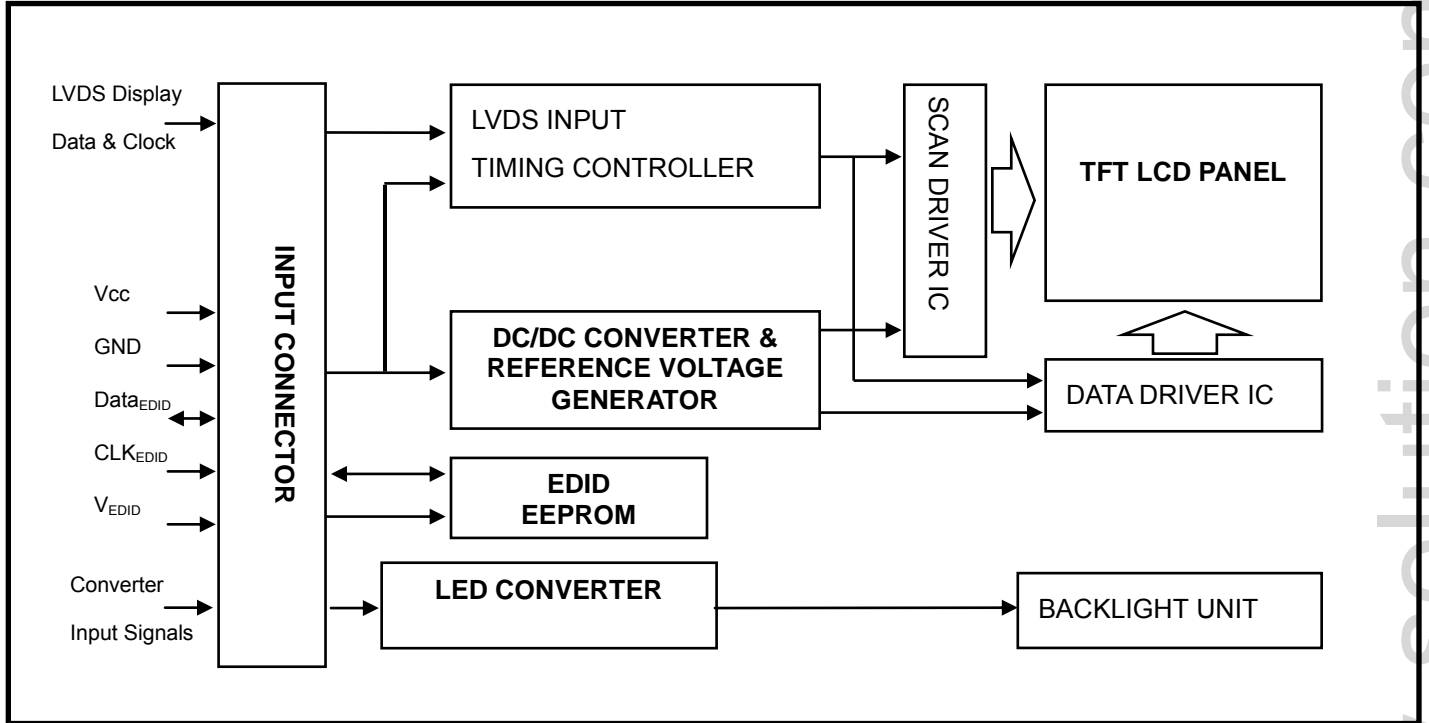
2.2.3 LED LIGHT BAR UNIT

| Item | Value | | Unit | Note |
|------------------------------------|-------|------|-----------|------|
| | Min | Max. | | |
| LED Light Bar Power Supply Voltage | -45 | 30.6 | V_{DC} | (1) |
| LED Light Bar Power Supply Current | 0 | 75 | mA_{DC} | |

Note (1) Specified values are for the LED light bar (Refer to Section 3.5 for further information).

3 ELECTRICAL CHARACTERISTICS

3.1 FUNCTIONAL BLOCK DIAGRAM



3.2 LCD ELECTRONICS SPECIFICATION

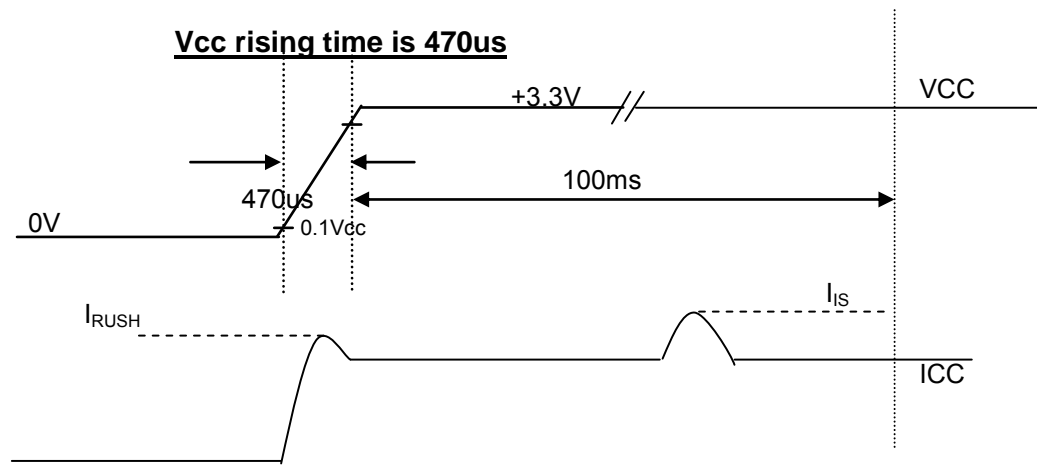
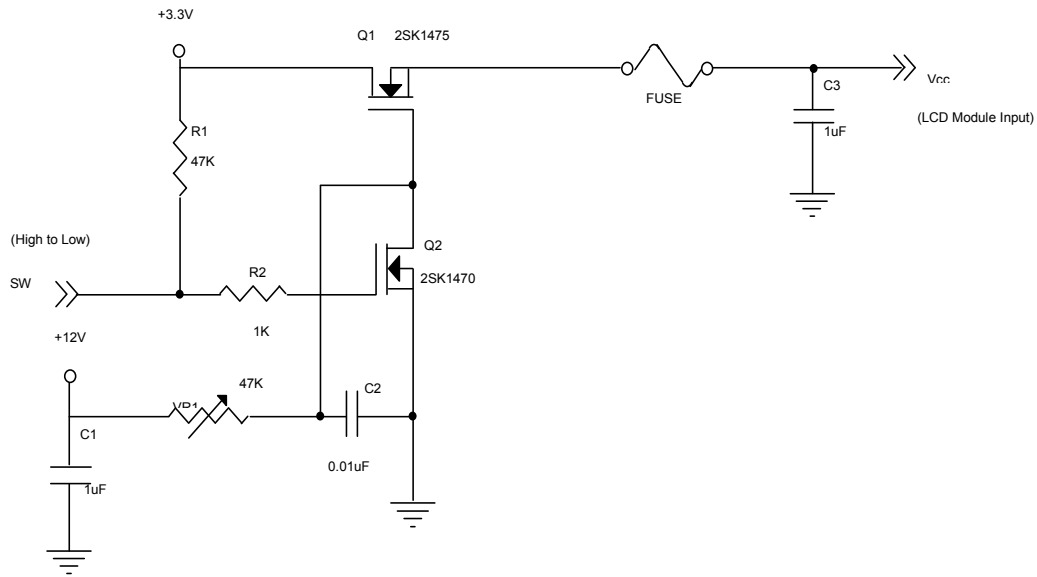
| Parameter | Symbol | Value | | | Unit | Note |
|--|-----------------------|-------|------|-------|------|-------------------------------|
| | | Min. | Typ. | Max. | | |
| Power Supply Voltage | V _{CC} | 3.0 | 3.3 | 3.6 | V | - |
| Ripple Voltage | V _{RP} | - | 50 | | mV | - |
| Rush Current | I _{RUSH} | - | - | 1.5 | A | (2) |
| Initial Stage Current | I _{IS} | - | - | 1.0 | A | (2) |
| Power Supply Current | White | 179 | 203 | 228 | mA | (3)a |
| | Black | 135 | 153 | 171 | mA | (3)b |
| LVDS Differential Input High Threshold | V _{TH(LVDS)} | - | - | +100 | mV | (4), V _{CM} =1.2V |
| LVDS Differential Input Low Threshold | V _{TL(LVDS)} | -100 | - | - | mV | (4) V _{CM} =1.2V |
| LVDS Common Mode Voltage | V _{CM} | 1.125 | - | 1.375 | V | (4) |
| LVDS Differential Input Voltage | V _{ID} | 100 | - | 600 | mV | (4) |
| Terminating Resistor | R _T | - | 100 | - | Ohm | - |

Note (1) The ambient temperature is Ta = 25 ± 2 °C.

Note (2) I_{RUSH}: the maximum current when V_{CC} is rising

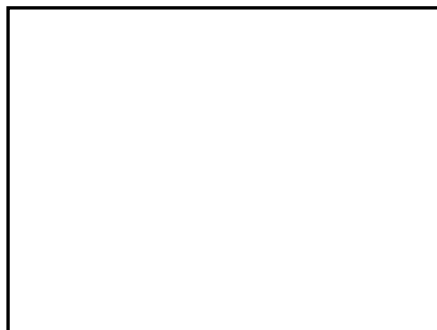
I_{IS}: the maximum current of the first 100ms after power-on

Measurement Conditions: Shown in the following figure. Test pattern: black.



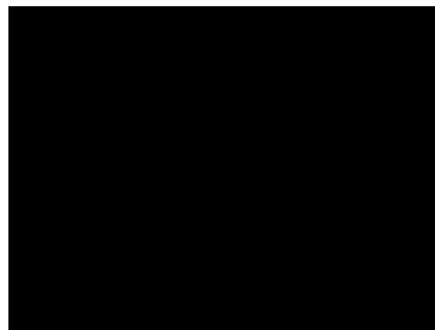
Note (3) The specified power supply current is under the conditions at $V_{cc} = 3.3\text{ V}$, $T_a = 25 \pm 2\text{ }^\circ\text{C}$, DC and $f_v = 60\text{ Hz}$, with a power dissipation check pattern (below) displayed.

a. White Pattern



Active Area

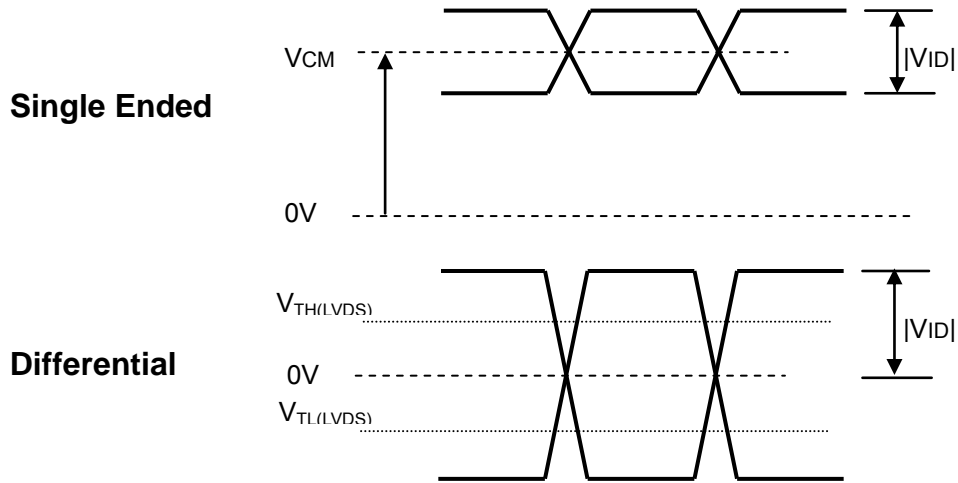
b. Black Pattern



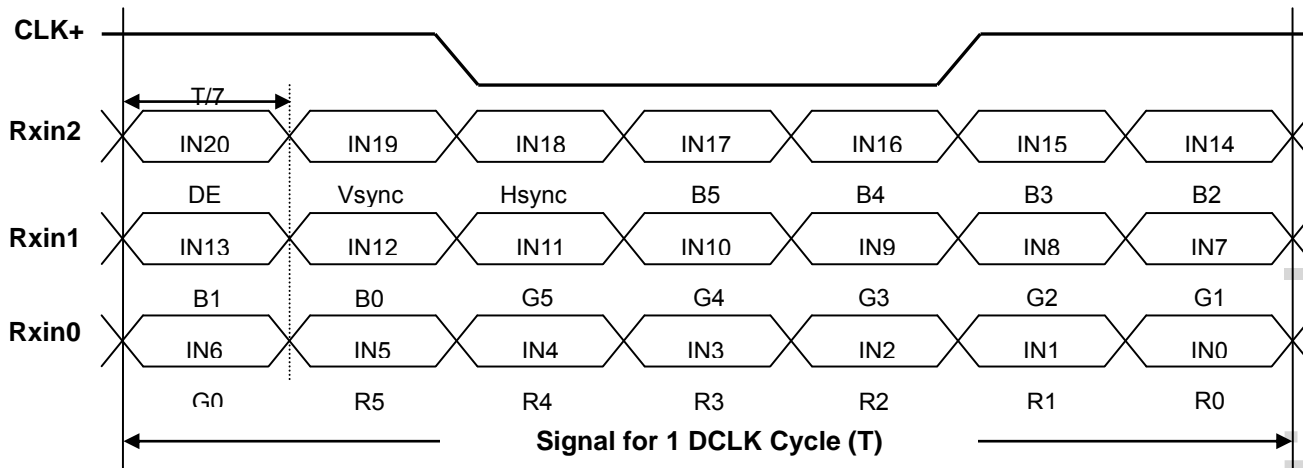
Active Area

www.display-solution.com

Note (4) The parameters of LVDS signals are defined as the following figures.



3.3 LVDS DATA FORMAT





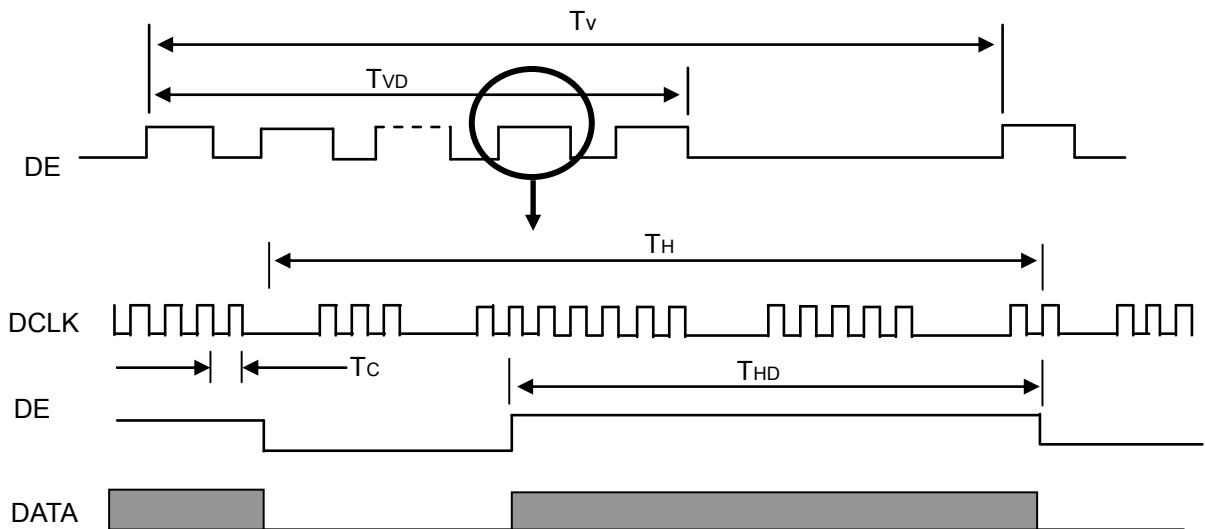
3.4 INPUT SIGNAL TIMING SPECIFICATIONS

The input signal timing specifications are shown as the following table and timing diagram.

| Signal | Item | Symbol | Min. | Typ. | Max. | Unit | Note |
|--------|-----------------------------------|--------|--------|-------|--------|------|------|
| DCLK | Frequency | 1/Tc | 21.74 | 43.97 | 46.15 | MHz | - |
| DE | Vertical Total Time | TV | 602 | 619 | 624 | TH | - |
| | Vertical Active Display Period | TVD | 600 | 600 | 600 | TH | - |
| | Vertical Active Blanking Period | TVB | TV-TVD | 19 | TV-TVD | TH | - |
| | Horizontal Total Time | TH | 1104 | 1184 | 1240 | Tc | - |
| | Horizontal Active Display Period | THD | 1024 | 1024 | 1024 | Tc | - |
| | Horizontal Active Blanking Period | THB | TH-THD | 160 | TH-THD | Tc | - |

Note (1) Because this module is operated in DE only mode, Hsync and Vsync are ignored.

INPUT SIGNAL TIMING DIAGRAM



3.5 LED BACKLIGHT CONVERTER SPECIFICATIONS

| Parameter | Symbol | Value | | | Unit | Note | |
|--------------------------------------|---------------------------------|---------------------------|------|------|------|------|-----|
| | | Min. | Typ. | Max. | | | |
| Converter Input power supply voltage | LED_V _{CC} | 4.5 | 18.7 | 21.0 | V | | |
| Converter Rush Current | I _{LED_{RUSH}} | | | 1.5 | A | (1) | |
| Converter Initial Stage Current | I _{LED_{IS}} | | | 1.5 | A | (1) | |
| EN Control Level | LED_EN | Backlight on | 2.3 | - | 5.5 | V | |
| | | Backlight off | 0 | - | 0.8 | V | |
| PWM Control Level | LED_PWM | PWM High Level | 2.3 | - | 5.5 | V | |
| | | PWM Low Level | 0 | - | 0.8 | V | |
| PWM Control Duty Ratio | | 10 | - | 100 | % | (2) | |
| PWM Control Ripple Voltage | V _{PWM_pp} | | - | 100 | mV | | |
| PWM Control Frequency | f _{PWM} | 190 | - | 2000 | Hz | (3) | |
| LED Power Current | I _{LED} | LED_V _{CC} = Min | 388 | 452 | 525 | mA | (4) |
| | | LED_V _{CC} = Typ | 91 | 109 | 129 | mA | (4) |
| | | LED_V _{CC} = Max | 83 | 97 | 113 | mA | (4) |

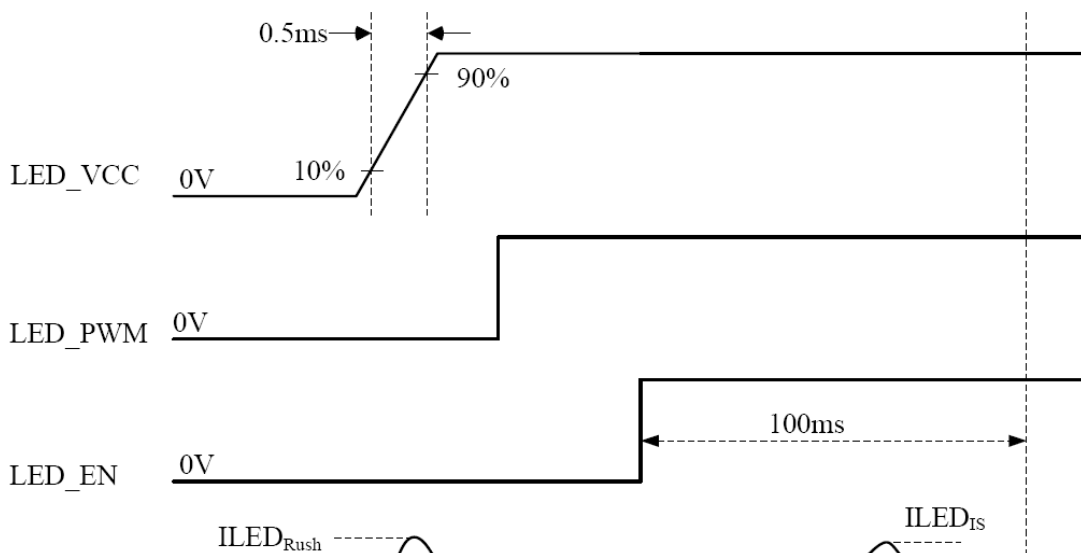
Note (1) I_{LED_{RUSH}}: the maximum current when LED_V_{CC} is rising,

I_{LED_{IS}}: the maximum current of the first 100ms after power-on,

Measurement Conditions: Shown as the following figure. LED_V_{CC} = Typ, T_a = 25 ± 2 °C, f_{PWM} = 200 Hz, Duty=100%.

Note (2) If the PWM control duty ratio is less than 10%, there is some possibility that acoustic noise or backlight flash can be found. And it is also difficult to control the brightness linearity.

VLED rising time is 0.5ms



Note (3) If PWM control frequency is applied in the range less than 1 kHz, the “waterfall” phenomenon on the screen may be found. To avoid the issue, it’s a suggestion that PWM control frequency should follow the criterion as below.

PWM control frequency f_{PWM} should be in the range

$$(N + 0.33) * f \leq f_{PWM} \leq (N + 0.66) * f$$

N : Integer ($N \geq 3$)

f : Frame rate

Note (4) The specified LED power supply current is under the conditions at “LED_VCC = Min., Typ., Max.”, $T_a = 25 \pm 2$ °C, $f_{PWM} = 200$ Hz, Duty=100%.

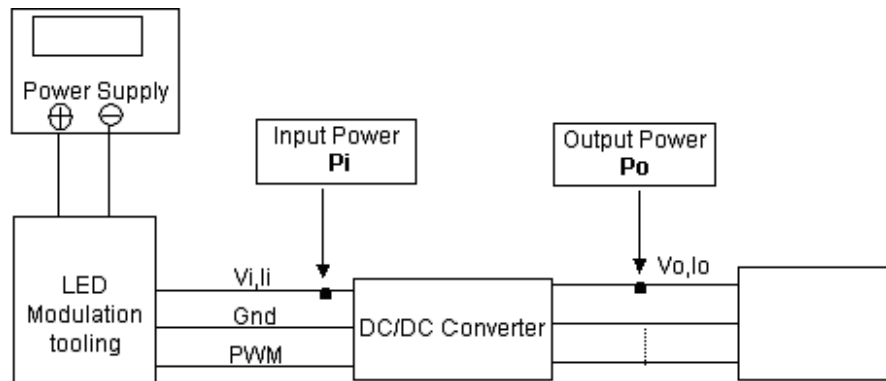


3.6 LED LIGHT BAR UNIT

| Parameter | Symbol | Value | | | Unit | Note |
|--|------------------|-------|------|-------|------|---|
| | | Min. | Typ. | Max. | | |
| LED Light Bar Power Supply Voltage | V _o | 27 | 28.8 | 30.6 | V | (1)(2) |
| LED Light Bar Power Supply Current | I _o | 57 | 60 | 63 | mA | Duty 100% |
| Power Consumption (Transmissive Mode) | P _{OTM} | 1.53 | 1.73 | 1.93 | W | (1)(3) @I _o =60mA, Duty 100% |
| Power Consumption (Transflective Mode) | P _{OTF} | 0.61 | 0.69 | 0.78 | W | (1)(3) @I _o =60mA, Duty 40% |
| | | 0.15 | 0.17 | 0.2 | W | (1)(3) @I _o =60 mA Duty 10% |
| Power Consumption (Reflective Mode) | P _{ORF} | - | 0 | 0.002 | W | (1) |
| LED Life Time | L _{BL} | 15000 | - | - | Hrs | (4) |

Note (1) In transmissive mode, power is given for typical current over the specified voltage range at 100% duty cycle. Dimming the backlight (reducing duty cycle) will reduce power in transmissive mode. In transflective mode, duty cycle is typically lower than Transmissive mode. Lower or higher PWM duty cycle will result in lower or higher power consumption, respectively. In transflective mode, brightness depends on backlight power and ambient light. In reflective mode, the backlight is turned off. Light bar power consumption is zero. For all measurements, T_a = 25 ± 2 °C

Note (2) LED current is measured by utilizing a high frequency current meter as shown below:



Note (3) P_o = I_o × V_o

Note (4) The lifetime of LED is defined as the time when it continues to operate under the conditions at T_a = 25 ± 2 °C and I = 17 mA (Per EA) until the brightness becomes ≤ 50% of its original value.



3.7 DISPLAY MODE CONTROL

The display panel supports 3 modes: purely reflective, purely transmissive, and transfective. The mode is determined by the ambient light intensity and backlight intensity. The following truth table shows how different modes are selected.

| Condition | | Description | |
|---------------|-----------|--------------|--|
| Ambient Light | Backlight | Mode | Notes |
| Non-dark | Off | Reflective | Backlight off, reflective subpixels active, grayscale image, minimum power mode. |
| Dark | On | Transmissive | Conventional display mode. Backlight on, reflective subpixels black due to absence of ambient light, saturated colors. |
| Non-dark | On | Transfective | Backlight on, reflective subpixels reflecting ambient light, colors desaturated, power reduced if backlight dimmed. |

Please refer to Pixel Qi Mode Control Application Note for more information about mode switching.

www.display-solution.com



3.8 TOTAL POWER CONSUMPTION

| Mode | Preliminary Value | | | Unit | Note |
|--|-------------------|------|------|------|--|
| | Min. | Typ. | Max. | | |
| Transmissive (Full Color Saturation) | 2.24 | 2.63 | 3.09 | W | (1) 60 fps with ANSI checkerboard pattern, BLU duty 100% |
| Transmissive (Full Color Saturation) | 2.12 | 2.47 | 2.87 | W | (1) 30 fps with ANSI checkerboard pattern, BLU duty 100% |
| Transflective (Low Color) | 1.15 | 1.32 | 1.52 | W | (1) 60 fps with ANSI checkerboard pattern, BLU duty 40% |
| | 0.74 | 0.82 | 0.90 | W | (1) 60 fps with ANSI checkerboard pattern, BLU duty 10% |
| | 0.59 | 0.66 | 0.72 | W | (1) 30 fps with ANSI checkerboard pattern, BLU duty 10% |
| Reflective (Black and white with 64 gray shades) | 0.52 | 0.59 | 0.64 | W | (1) 60 fps |
| Reflective (Black and white with 64 gray shades) | 0.39 | 0.43 | 0.48 | W | (1) 30 fps |

Note (1) Total power consumption includes LCD, TCON, drivers, TFT, LED converter, DC-DC converters, and backlight unit. Power is given for ANSI checkerboard pattern and typical backlight unit voltage and current values with 100% duty cycle in transmissive mode and over a range of backlight duty cycle values in transflective mode. Note that purely transmissive mode is only possible under zero lux ambient light conditions. In transflective mode, duty cycle is typically lower than transmissive mode, but the maximum value is the same. In reflective mode, the backlight is turned off; light bar power consumption is zero.



3.9 PIN ASSIGNMENT

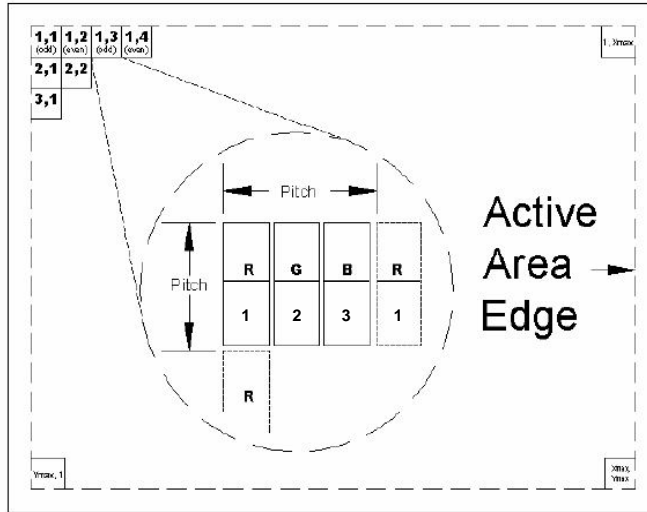
| Pin | Symbol | Description | Polarity | Remark |
|-----|---------------------|----------------------------------|----------|--------------------------|
| 1 | NC | No Connection (Reserve) | | |
| 2 | VCC | Power Supply | | |
| 3 | VCC | Power Supply | | |
| 4 | VEDID | DDC power | | May be connected to VCC |
| 5 | NC | No Connection (Reserve for test) | | |
| 6 | CLKEDID | DDC clock | | |
| 7 | DATAEDID | DDC data | | |
| 8 | Rxin0- | LVDS differential data input | Negative | R0-R5, G0 |
| 9 | Rxin0+ | LVDS differential data input | Positive | |
| 10 | VSS | Ground | | |
| 11 | Rxin1- | LVDS differential data input | Negative | G1~G5, B0, B1 |
| 12 | Rxin1+ | LVDS differential data input | Positive | |
| 13 | VSS | Ground | | |
| 14 | Rxin2- | LVDS Differential Data Input | Negative | B2-B5,HS,VS, DE |
| 15 | Rxin2+ | LVDS Differential Data Input | Positive | |
| 16 | VSS | Ground | | |
| 17 | RxCLK- | LVDS differential clock input | | |
| 18 | RxCLK+ | LVDS differential clock input | | |
| 19 | VSS | Ground | | |
| 20 | NC | No Connection (Reserve) | | |
| 21 | NC | No Connection (Reserve) | | |
| 22 | VSS | Ground | | |
| 23 | NC | No Connection (Reserve) | | |
| 24 | NC | No Connection (Reserve) | | |
| 25 | VSS | Ground | | |
| 26 | NC | No Connection (Reserve) | | |
| 27 | NC | No Connection (Reserve) | | |
| 28 | VSS | Ground | | |
| 29 | NC | No Connection (Reserve) | | |
| 30 | NC | No Connection (Reserve) | | |
| 31 | VSS | LED Ground | | |
| 32 | VSS | LED Ground | | |
| 33 | VSS | LED Ground | | |
| 34 | NC | No Connection (Reserve) | | |
| 35 | LED_PWM | LED BLU Brightness Control | | |
| 36 | LED_EN | LED Converter Enable | | |
| 37 | NC | No Connection (Reserve) | | |
| 38 | LED_V _{CC} | LED Converter Input Power | | Also referred to as VLED |
| 39 | LED_V _{CC} | LED Converter Input Power | | |
| 40 | LED_V _{CC} | LED Converter Input Power | | |

Note (1) Connector Part No.: IPEX-20455-040E-12 or equivalent

Note (2) User's connector Part No: IPEX-20453-040T-01 or equivalent

Note (3) The first pixel is odd as shown in the following figure.

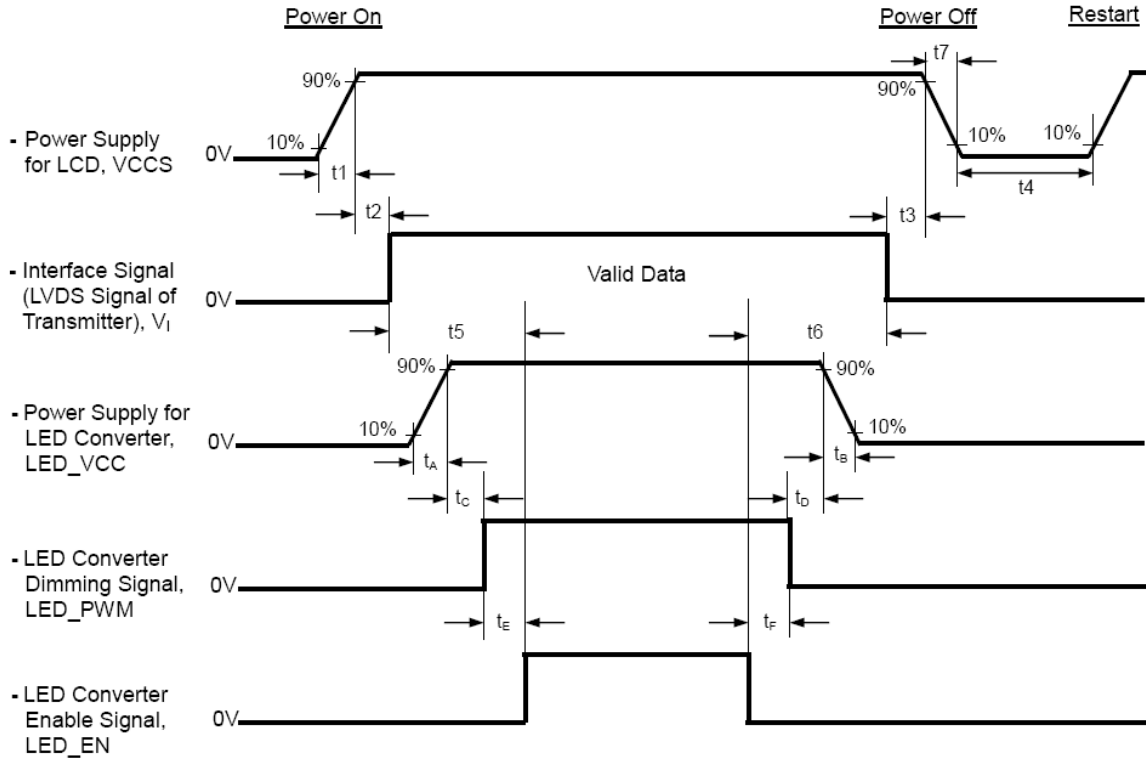
www.display-solution.com



www.display-solution.com



3.10 POWER ON/OFF SEQUENCE



Timing Specifications:

- $0.5 \leq t_1 \leq 10 \text{ ms}$
- $0 \leq t_2 \leq 50 \text{ ms}$
- $0 \leq t_3 \leq 50 \text{ ms}$
- $t_4 \geq 500 \text{ ms}$
- $t_5 \geq 200 \text{ ms}$
- $t_6 \geq 200 \text{ ms}$
- $0.5 \leq t_7 \leq 10 \text{ ms}$
- $0.5 \leq t_a \leq 10 \text{ ms}$
- $0 < t_b \leq 10 \text{ ms}$
- $t_c \geq 10 \text{ ms}$
- $t_d \geq 10 \text{ ms}$
- $t_e \geq 10 \text{ ms}$
- $t_f \geq 10 \text{ ms}$

Note (1) Please follow the power on/off sequence described above. Otherwise, the LCD module might be damaged.



Note (2) Please avoid floating state of interface signal during invalid periods. When the interface signal is invalid, be sure to pull down the LCD power supply Vcc to 0 V.

Note (3) The backlight inverter power must be turned on after the power supply for the logic and the interface signals is valid. The backlight inverter power must be turned off before the power supply for the logic and the interface signals is invalid.

Note (4) Sometimes some slight image shows when LCD is turned off (even if the backlight is already off). To avoid this phenomenon, the Vcc falling time should follow $50\mu\text{s} \leq t_f \leq 10\text{ ms}$.



3.11 COLOR DATA INPUT ASSIGNMENT

The brightness of each primary color (red, green and blue) is based on the 6-bit gray scale data input for the color. The higher the binary input the brighter the color. The table below provides the assignment of color versus data input.

| Color | | Data Signal | | | | | | | | | | | | | | | | | |
|---------------------|---------------|-------------|----|----|----|----|----|-------|----|----|----|----|----|------|----|----|----|----|----|
| | | Red | | | | | | Green | | | | | | Blue | | | | | |
| | | R5 | R4 | R3 | R2 | R1 | R0 | G5 | G4 | G3 | G2 | G1 | G0 | B5 | B4 | B3 | B2 | B1 | B0 |
| Basic Colors | Black | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Cyan | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Magenta | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 |
| | Yellow | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | White | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| Gray Scale Of Red | Red(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(1) | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(2) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Red(61) | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Red(62) | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Red(63) | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Gray Scale Of Green | Green(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Green(61) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Green(62) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Green(63) | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| Gray Scale Of Blue | Blue(0)/Dark | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | Blue(1) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Blue(2) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : | : |
| | Blue(61) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 |
| | Blue(62) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 |
| Blue(63) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | |

Note (1) 0: Low Level Voltage, 1: High Level Voltage

www.display-solution.com



4 OPTICAL CHARACTERISTICS

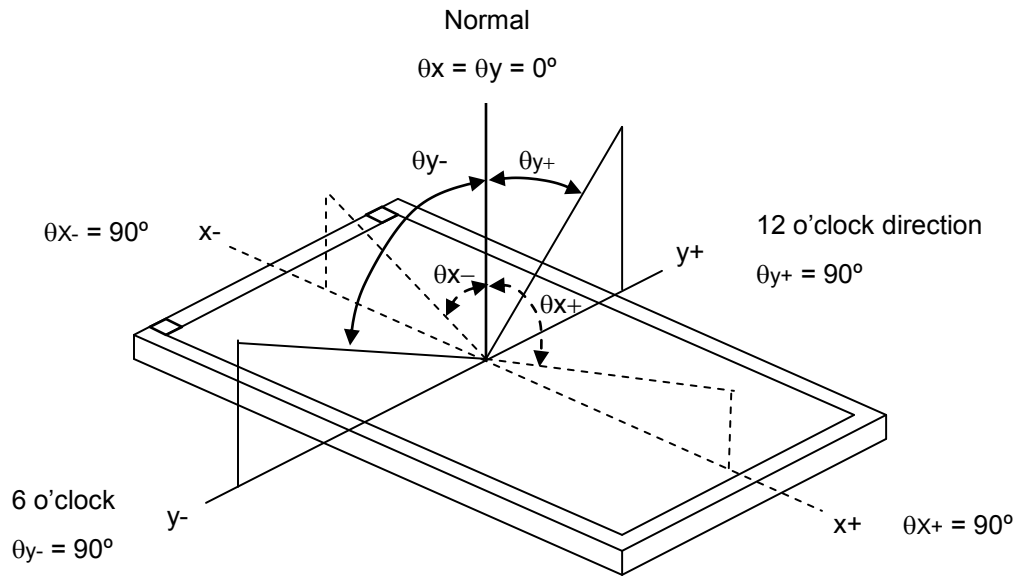
4.1 TEST CONDITIONS

| Item | Symbol | Value | Unit |
|-----------------------------|---|-------|------|
| Ambient Temperature | Ta | 25±2 | °C |
| Ambient Humidity | Ha | 50±10 | %RH |
| Supply Voltage | V _{CC} | 3.3 | V |
| Input Signal | According to typical values in "ELECTRICAL CHARACTERISTICS" | | |
| LED Light Bar Input Current | I _L | 60 | mA |

4.2 OPTICAL SPECIFICATIONS

| Item | Symbol | Condition | Min. | Typ. | Max. | Unit | Note |
|-------------------------------------|---------------------|--|--------------------------------------|-------|------------|-------------------|--------------------|
| Contrast Ratio Transmissive | CR _T | $\theta_x=0^\circ, \theta_y=0^\circ$ Viewing Normal Angle | 50 | 100 | - | - | (1), (2), (5), (6) |
| Contrast Ratio Reflective | CR _R | | 3.5 | 5 | - | - | (1), (2), (6), (7) |
| Response Time | T _R | | - | 6.5 | 11.5 | ms | (3) |
| | T _F | | - | 13.5 | 18.5 | ms | |
| Panel Reflectivity | | | 23 | 27 | - | % | (7) |
| Luminance of White | L | Dark room | 110 | 160 | - | cd/m ² | (1), (4), (5), (6) |
| | L _{office} | 600 lux ambient | | 233 | | | |
| | L _{sun} | 10000+ lux ambient | 1000 | | | | |
| Color Gamut | | | | 38 | 45 | % NTSC | |
| Color Chromaticity, Transmissive | Red | R _x | TYP. -0.05 | 0.552 | TYP. +0.05 | | (1) |
| | | R _y | | 0.344 | | | |
| | Green | G _x | | 0.327 | | | |
| | | G _y | | 0.558 | | | |
| | Blue | B _x | | 0.163 | | | |
| | | B _y | | 0.163 | | | |
| | White | W _x | | 0.313 | | | |
| | | W _y | | 0.342 | | | |
| Color Chromaticity, Reflective @D65 | White | W _x | TYP. -0.05 | 0.310 | TYP. +0.05 | | |
| | | W _y | | 0.350 | | | |
| Viewing Angle, Transmissive Mode | Horizontal | θ_{x+} | CR□10 | 20 | 30 | Deg. | (1), (2), (5) |
| | | θ_{x-} | | 20 | 30 | | |
| | Vertical | θ_{y+} | | 20 | 30 | | |
| | | θ_{y-} | | 20 | 30 | | |
| Viewing Angle, Reflective Mode | Horizontal | θ_{x+} | CR□4 | 30 | 40 | Deg. | (1), (2), (7) |
| | | θ_{x-} | | 30 | 40 | | |
| | Vertical | θ_{y+} | | 20 | 30 | | |
| | | θ_{y-} | | 20 | 30 | | |
| White Variation (Transmissive) | 5 points | δW_{5p} | $\theta_x=0^\circ, \theta_y=0^\circ$ | | 1.11 | 1.33 | (1), (5), (6) |
| | 13 points | δW_{13p} | | | 1.33 | 1.65 | |
| White Variation (Reflective) | 5 points | δW_{r5p} | | | 1.11 | 1.33 | (1), (6), (7) |

Note (1) Definition of Viewing Angle (θ_x, θ_y):



Note (2) Definition of Contrast Ratio (CR):

The contrast ratio can be calculated by the following expression.

$$\text{Contrast Ratio (CR)} = L_{63} / L_0$$

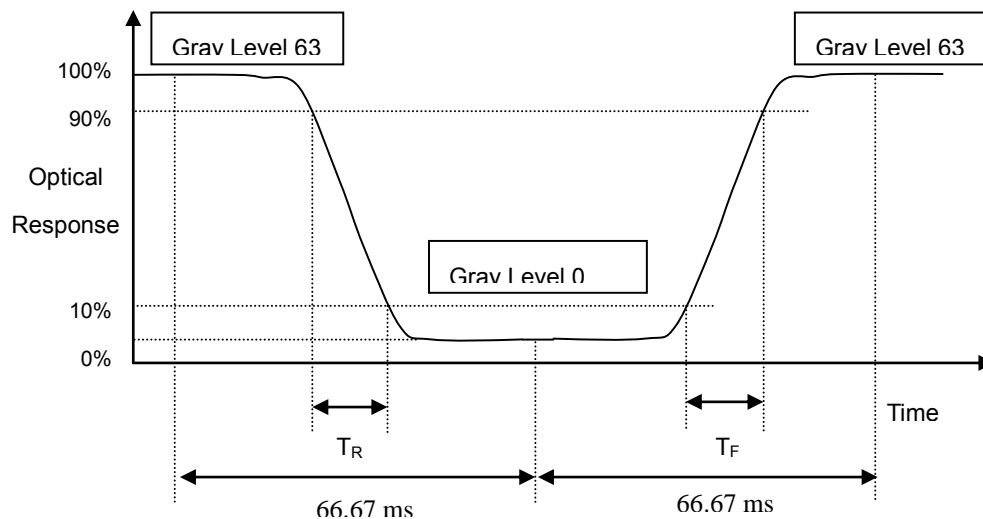
L63: Luminance of gray level 63

L 0: Luminance of gray level 0

$$CR = CR (1)$$

CR (X) is corresponding to the Contrast Ratio of the point X at Figure in Note (6).

Note (3) Definition of Response Time (T_R, T_F):





Note (4) Definition of Luminance of White (L):

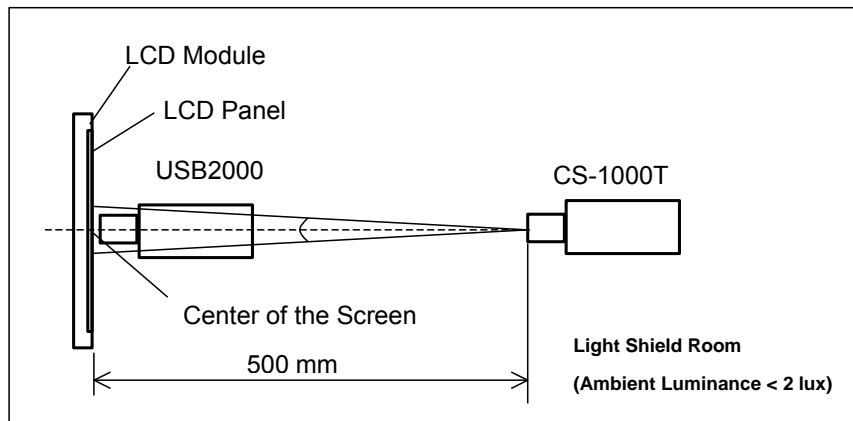
Measure the luminance of gray level 63 at center point

$$L = L(1)$$

L(x) is corresponding to the luminance of the point X at Figure in Note (6)

Note (5) Measurement Setup:

The LCD module should be stabilized at given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting backlight for 20 minutes in a windless room.

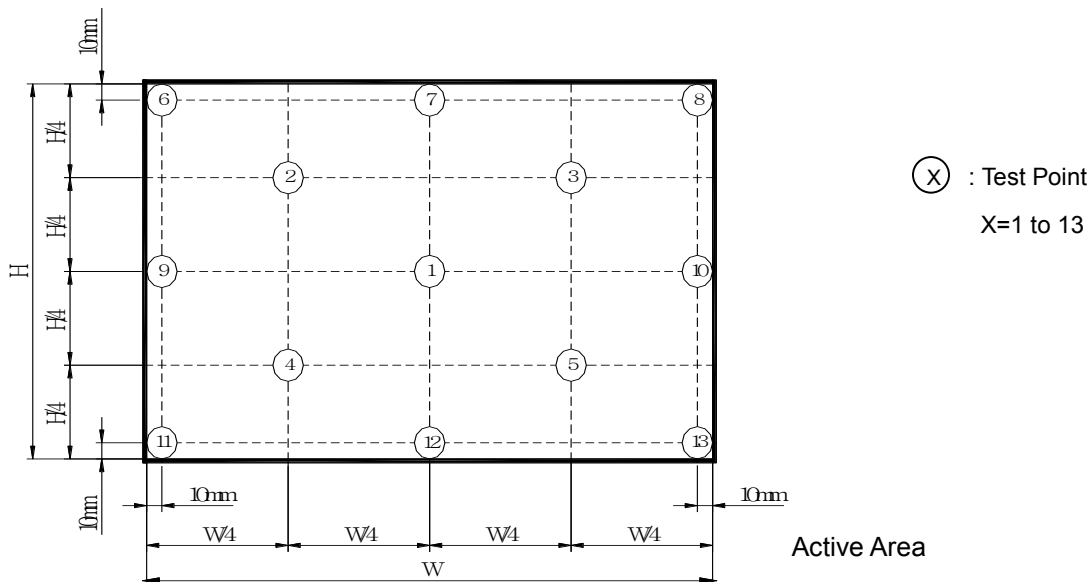


Note (6) Definition of White Variation (δW):

Measure the luminance of gray level 63 at 5 or 13 points

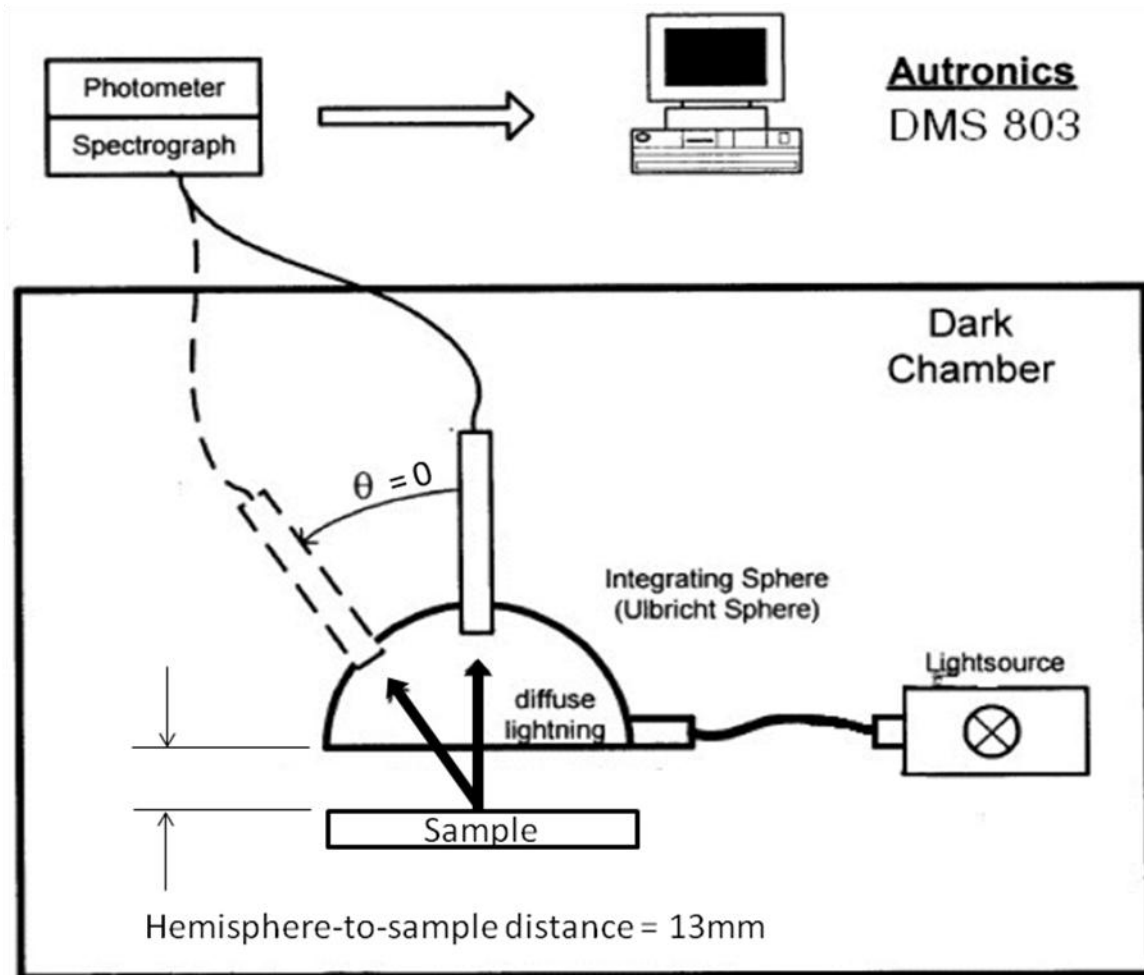
$$\delta W_{5p} = \text{Maximum } [L(1) \sim L(5)] / \text{Minimum } [L(1) \sim L(5)]$$

$$\delta W_{13p} = \text{Maximum } [L(1) \sim L(13)] / \text{Minimum } [L(1) \sim L(13)]$$



Note (7) Reflective Mode Measurement Setup

The measurement should be executed after stabilizing the panel at a given temperature for 15 minutes in the case of abrupt temperature change. The measurement shall be executed after lighting the integrated diffuse light at rating 15 minutes and turning off the backlight of LCD panel. In order to stabilize the luminance, measurement should be performed in a windless room.





5 RELIABILITY TEST ITEMS

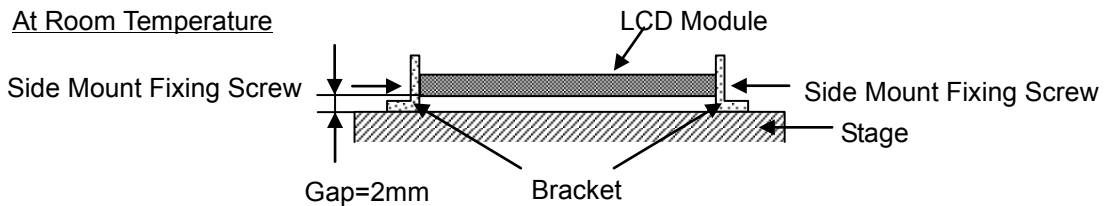
| Test Item | Test Condition | Note |
|---|---|----------|
| High Temperature Storage Test | 60 °C, 240 hours | (1), (2) |
| Low Temperature Storage Test | -20 °C, 240 hours | |
| Thermal Shock Storage Test | -20 °C, 0.5 hour ↔ 60 °C, 0.5 hour; 100 cycles, 1 hour/cycle | |
| High Temperature Operation Test | 50 °C, 240 hours | |
| Low Temperature Operation Test | 0 °C, 240 hours | |
| High Temperature & High Humidity Operation Test | 50 °C, 80% RH, 240 hours | |
| ESD Test (Operation) | 150 pF, 330 Ω, 1 sec/cycle Condition 1: Contact Discharge, ± 8 kV Condition 2: Air Discharge, ± 15 kV | (1) |
| Shock (Non-operating) | 220 G, 2 ms, half sine wave, 1 time for each direction of ±X, ±Y, ±Z | (1), (3) |
| Vibration (Non-operating) | 1.5 G / 10-500 Hz, sine wave, 30 min/cycle, 1 cycle for each X, Y, Z | (1), (3) |

Note (1) Criteria: Normal display image with no obvious non-uniformity and no line defect

Note (2) Evaluation should be tested after storage at room temperature for more than 2 hours.

Note (3) At testing vibration and shock, the fixture holding the module has to be hard and rigid enough so that the module is not twisted or bent by the fixture.

The fixture configuration is shown below:



www.display-solution.com



6 PRECAUTIONS

6.1 SYSTEM MATCHING PRECAUTIONS

- (1) Refer to the drawing.
- (2) To avoid wireless noise interference, please keep the antenna away from LCD control board.

6.2 HANDLING PRECAUTIONS

- (1) The module should be assembled into the system firmly by using every mounting hole. Be careful not to twist or bend the module.
- (2) While assembling or installing modules, it can only be in the clean area. The dust and oil may cause electrical short or damage the polarizer.
- (3) Use fingerstalls or soft gloves in order to keep display clean during the incoming inspection and assembly process.
- (4) Do not press or scratch the surface harder than a HB pencil lead on the panel because the polarizer is very soft and easily scratched.
- (5) If the surface of the polarizer is dirty, please clean it by some absorbent cotton or soft cloth. Do not use Ketone type materials (ex. Acetone), Ethyl alcohol, Toluene, Ethyl acid or Methyl chloride. It might permanently damage the polarizer due to chemical reaction.
- (6) Wipe off water droplets or oil immediately. Staining and discoloration may occur if they left on panel for a long time.
- (7) If the liquid crystal material leaks from the panel, it should be kept away from the eyes or mouth. In case of contacting with hands, legs or clothes, it must be washed away thoroughly with soap.
- (8) Protect the module from static electricity; it may cause damage to the C-MOS Gate Array IC.
- (9) Do not disassemble the module.
- (10) Do not pull or fold the LED wire.
- (11) Pins of I/F connector should not be touched directly with bare hands.

6.3 STORAGE PRECAUTIONS

- (1) High temperature or humidity may reduce the performance of module. Please store LCD module within the specified storage conditions.
- (2) It is dangerous that moisture come into or contacted the LCD module, because the moisture may damage LCD module when it is operating.
- (3) It may reduce the display quality if the ambient temperature is lower than 10 °C. For example, the response time will become slower.

6.4 OPERATION PRECAUTIONS

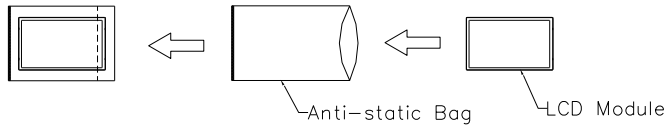
- (1) Do not pull the interface connector in or out while the module is operating.
- (2) Always follow the correct power on/off sequence when LCD module is connecting and operating. This can prevent the CMOS LSI chips from damage during latch-up.
- (3) Do not disassemble the module or insert anything into the backlight unit.

6.5 OTHER PRECAUTIONS

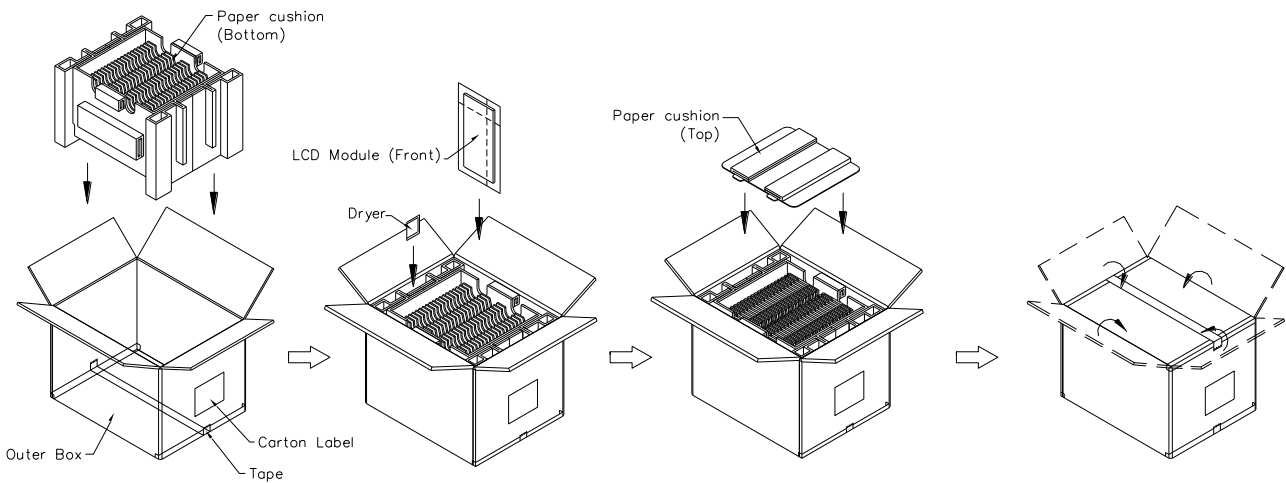
- (1) When fixed patterns are displayed for a long time, remnant image is likely to occur.



7 PACKING 7.1 CARTON



Box Dimensions : 435(L)*350(W)*320(H)
Weight: Approx. 10.4kg(40 module .per. 1 box)

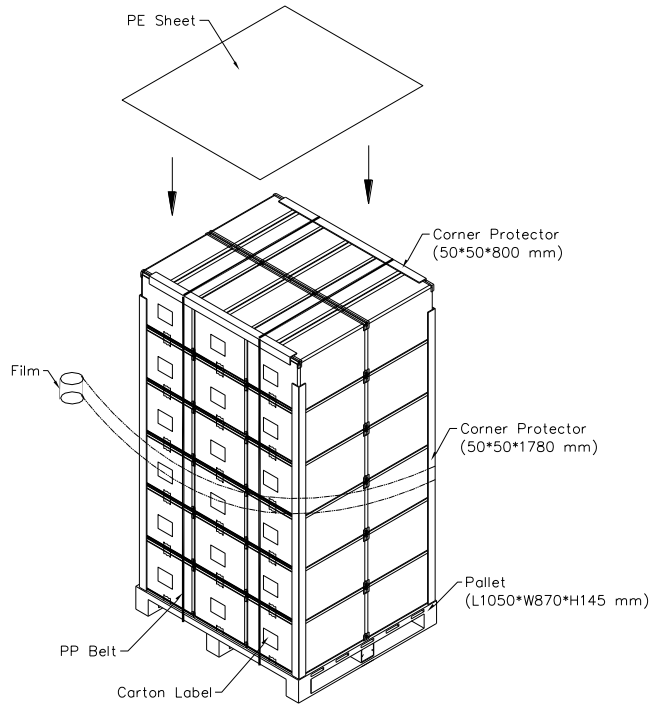


www.display-solution.com

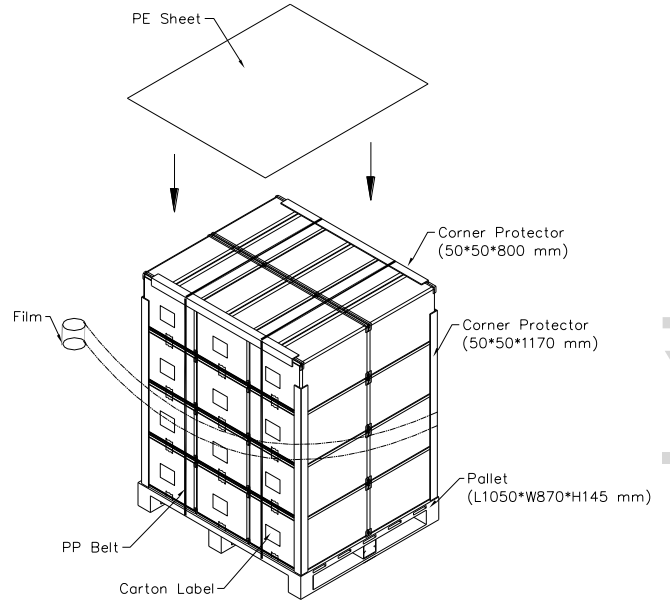


7.2 PALLET

Sea & Land Transportation



Air Transportation

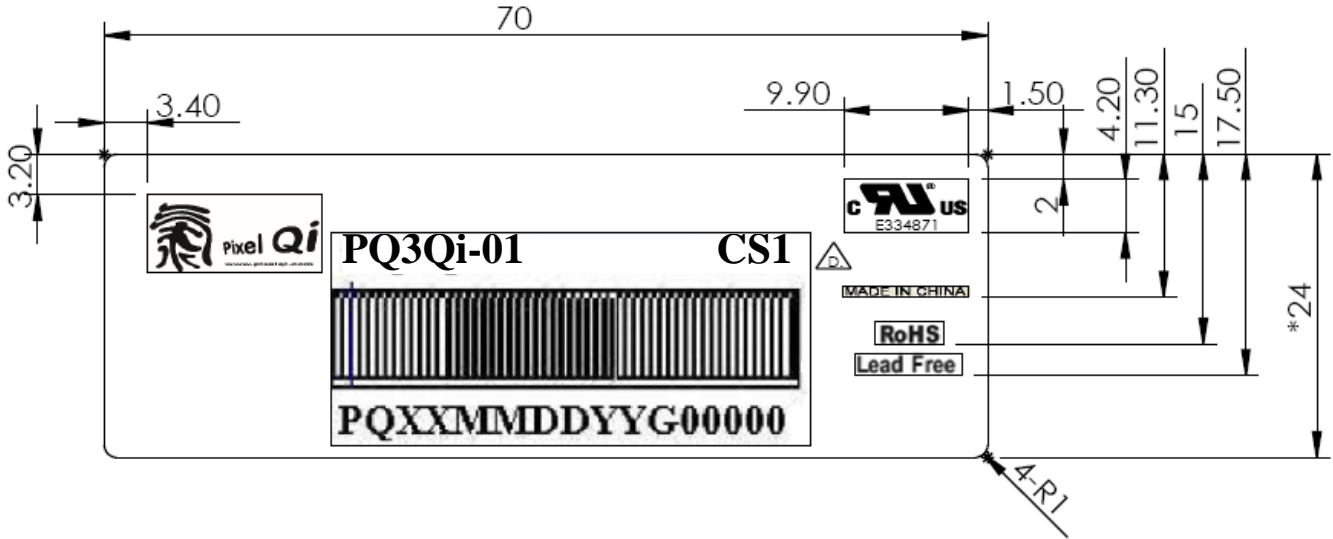


www.display-solution.com



8 DEFINITION OF LABELS

8.1 MODULE LABEL



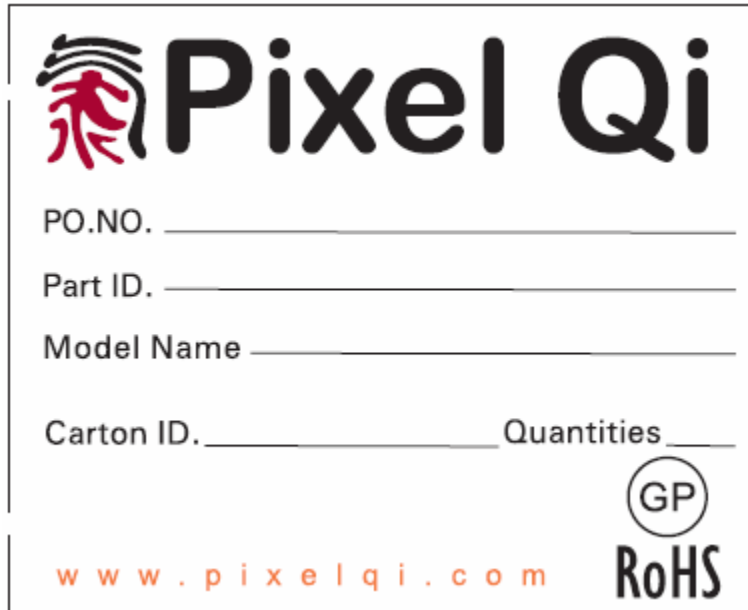
(D) Manufactured Date : Year: 01~99 , for 2001~2099


Month:01~12, for Jan~Dec.

Date: 01~31 for 1st~31st



8.2 CARTON LABEL




 **Pixel Qi**

PO.NO. _____

Part ID. _____

Model Name _____

Carton ID. _____ Quantities _____

www.pixelqi.com 

Model Name: PQ 3Qi-01

www.display-solution.com



Appendix EDID DATA STRUCTURE

The EDID (Extended Display Identification Data) data formats are to support displays as defined in the VESA Plug & Display and FPGI standards. These values are subject to change.

| Byte # (decimal) | Byte # (hex) | Field Name and Comments | Value (hex) | Value (binary) |
|------------------|--------------|--|-------------|----------------|
| 0 | 0 | Header | 00 | 00000000 |
| 1 | 1 | Header | FF | 11111111 |
| 2 | 2 | Header | FF | 11111111 |
| 3 | 3 | Header | FF | 11111111 |
| 4 | 4 | Header | FF | 11111111 |
| 5 | 5 | Header | FF | 11111111 |
| 6 | 6 | Header | FF | 11111111 |
| 7 | 7 | Header | 00 | 00000000 |
| 8 | 8 | EISA ID manufacturer name ("PQI") | 42 | 01000010 |
| 9 | 9 | EISA ID manufacturer name (Compressed ASCII) | 29 | 00101001 |
| 10 | 0A | ID product code (N101L8-L01) | 08 | 00001000 |
| 11 | 0B | ID product code (hex LSB first; N101L8-L01) | 10 | 00010000 |
| 12 | 0C | ID S/N (fixed "0") | 00 | 00000000 |
| 13 | 0D | ID S/N (fixed "0") | 00 | 00000000 |
| 14 | 0E | ID S/N (fixed "0") | 00 | 00000000 |
| 15 | 0F | ID S/N (fixed "0") | 00 | 00000000 |
| 16 | 10 | Week of manufacture (fixed week code) | 28 | 00101000 |
| 17 | 11 | Year of manufacture (fixed year code) | 13 | 00010011 |
| 18 | 12 | EDID structure version # ("1") | 01 | 00000001 |
| 19 | 13 | EDID revision # ("3") | 03 | 00000011 |
| 20 | 14 | Video I/P definition ("digital") | 80 | 10000000 |
| 21 | 15 | Max H image size ("22.272cm") | 16 | 00010110 |
| 22 | 16 | Max V image size ("12.528cm") | 0C | 00001100 |
| 23 | 17 | Display Gamma (Gamma = "2.2") | 78 | 01111000 |
| 24 | 18 | Feature support ("RGB Color") | 0A | 00001010 |
| 25 | 19 | Rx1, Rx0, Ry1, Ry0, Gx1, Gx0, Gy1, Gy0 | A3 | 10100011 |
| 26 | 1A | Bx1, Bx0, By1, By0, Wx1, Wx0, Wy1, Wy0 | 95 | 10010101 |
| 27 | 1B | Rx=0.549 | 8C | 10001100 |
| 28 | 1C | Ry=0.342 | 57 | 01010111 |
| 29 | 1D | Gx=0.324 | 53 | 01010011 |
| 30 | 1E | Gy=0.550 | 8C | 10001100 |
| 31 | 1F | Bx=0.158 | 28 | 00101000 |
| 32 | 20 | By=0.161 | 29 | 00101001 |
| 33 | 21 | Wx=0.313 | 50 | 01010000 |
| 34 | 22 | Wy=0.341 | 57 | 01010111 |
| 35 | 23 | Established timings 1 | 00 | 00000000 |
| 36 | 24 | Established timings 2 | 00 | 00000000 |
| 37 | 25 | Manufacturer's reserved timings | 00 | 00000000 |
| 38 | 26 | Standard timing ID # 1 | 01 | 00000001 |
| 39 | 27 | Standard timing ID # 1 | 01 | 00000001 |



| Byte # (decimal) | Byte # (hex) | Field Name and Comments | Value (hex) | Value (binary) |
|------------------|--------------|---|-------------|----------------|
| 40 | 28 | Standard timing ID # 2 | 01 | 00000001 |
| 41 | 29 | Standard timing ID # 2 | 01 | 00000001 |
| 42 | 2A | Standard timing ID # 3 | 01 | 00000001 |
| 43 | 2B | Standard timing ID # 3 | 01 | 00000001 |
| 44 | 2C | Standard timing ID # 4 | 01 | 00000001 |
| 45 | 2D | Standard timing ID # 4 | 01 | 00000001 |
| 46 | 2E | Standard timing ID # 5 | 01 | 00000001 |
| 47 | 2F | Standard timing ID # 5 | 01 | 00000001 |
| 48 | 30 | Standard timing ID # 6 | 01 | 00000001 |
| 49 | 31 | Standard timing ID # 6 | 01 | 00000001 |
| 50 | 32 | Standard timing ID # 7 | 01 | 00000001 |
| 51 | 33 | Standard timing ID # 7 | 01 | 00000001 |
| 52 | 34 | Standard timing ID # 8 | 01 | 00000001 |
| 53 | 35 | Standard timing ID # 8 | 01 | 00000001 |
| 54 | 36 | Detailed timing description # 2 40Hz Timing Pixel clock ("29.31MHz", According to VESA CVT Rev1.1) | 2D | 00101101 |
| 55 | 37 | # 2 40Hz Timing Pixel clock (hex LSB first) | 11 | 00010001 |
| 56 | 38 | # 2 40Hz Timing H active ("1024") | 00 | 00000000 |
| 57 | 39 | # 2 40Hz Timing H blank ("160") | A0 | 10100000 |
| 58 | 3A | # 2 40Hz Timing H active : H blank ("1024 : 160") | 40 | 01000000 |
| 59 | 3B | # 2 40Hz Timing V active ("600") | 58 | 01011000 |
| 60 | 3C | # 2 40Hz Timing V blank ("19") | 13 | 00010011 |
| 61 | 3D | # 2 40Hz Timing V active : V blank ("600 :19") | 20 | 00100000 |
| 62 | 3E | # 2 40Hz Timing H sync offset ("48") | 30 | 00110000 |
| 63 | 3F | # 2 40Hz Timing H sync pulse width ("32") | 20 | 00100000 |
| 64 | 40 | # 2 40Hz Timing V sync offset : V sync pulse width ("3 : 10") | 3A | 00111010 |
| 65 | 41 | # 2 40Hz Timing H sync offset : H sync pulse width : V sync offset : V sync width ("48: 32 : 3 : 10") | 00 | 00000000 |
| 66 | 42 | # 2 40Hz Timing H image size ("222 mm") | DE | 11011110 |
| 67 | 43 | # 2 40Hz Timing V image size ("125 mm") | 7D | 01111101 |
| 68 | 44 | # 2 40Hz Timing H image size : V image size ("222 : 125") | 00 | 00000000 |
| 69 | 45 | # 2 40Hz Timing H boarder ("0") | 00 | 00000000 |
| 70 | 46 | # 2 40Hz Timing V boarder ("0") | 00 | 00000000 |
| 71 | 47 | # 2 40Hz Timing Non-interlaced ; Normal display, no stereo ; Digital Separate ; V sync POL is negative ; H sync POL is positive | 18 | 00011000 |
| 72 | 48 | Detailed timing description # 1 Pixel clock ("43.97MHz", According to VESA CVT Rev1.1) | 74 | 01110100 |
| 73 | 49 | # 1 Pixel clock (hex LSB first) | 0B | 00001011 |
| 74 | 4A | # 1 H active ("1024") | 00 | 00000000 |
| 75 | 4B | # 1 H blank ("160") | A0 | 10100000 |
| 76 | 4C | # 1 H active : H blank ("1024 : 160") | 40 | 01000000 |
| 77 | 4D | # 1 V active ("600") | 58 | 01011000 |
| 78 | 4E | # 1 V blank ("19") | 13 | 00010011 |
| 79 | 4F | # 1 V active : V blank ("600 :19") | 20 | 00100000 |
| 80 | 50 | # 1 H sync offset ("48") | 30 | 00110000 |

www.display-solution.com



| Byte # (decimal) | Byte # (hex) | Field Name and Comments | Value (hex) | Value (binary) |
|------------------|--------------|---|-------------|----------------|
| 81 | 51 | # 1 H sync pulse width ("32") | 20 | 00100000 |
| 82 | 52 | # 1 V sync offset : V sync pulse width ("3 : 10") | 3A | 00111010 |
| 83 | 53 | # 1 H sync offset : H sync pulse width : V sync offset : V sync width ("48: 32 : 3 : 10") | 00 | 00000000 |
| 84 | 54 | # 1 H image size ("222 mm") | DE | 11011110 |
| 85 | 55 | # 1 V image size ("125 mm") | 7D | 01111101 |
| 86 | 56 | # 1 H image size : V image size ("222 : 125") | 00 | 00000000 |
| 87 | 57 | # 1 H boarder ("0") | 00 | 00000000 |
| 88 | 58 | # 1 V boarder ("0") | 00 | 00000000 |
| 89 | 59 | # 1 Non-interlaced, Normal, no stereo, Separate sync, H/V pol Negatives | 18 | 00011000 |
| 90 | 5A | Detailed timing description # 3 30Hz Timing Pixel clock ("21.99MHz", According to VESA CVT Rev1.1) | 97 | 10010111 |
| 91 | 5B | # 3 30Hz Timing Pixel clock (hex LSB first) | 08 | 00001000 |
| 92 | 5C | # 3 30Hz Timing H active ("1024") | 00 | 00000000 |
| 93 | 5D | # 3 30Hz Timing H blank ("160") | A0 | 10100000 |
| 94 | 5E | # 3 30Hz Timing H active : H blank ("1024 : 160") | 40 | 01000000 |
| 95 | 5F | # 3 30Hz Timing V active ("600") | 58 | 01011000 |
| 96 | 60 | # 3 30Hz Timing V blank ("19") | 13 | 00010011 |
| 97 | 61 | # 3 30Hz Timing V active : V blank ("600 :19") | 20 | 00100000 |
| 98 | 62 | # 3 30Hz Timing H sync offset ("48") | 30 | 00110000 |
| 99 | 63 | # 3 30Hz Timing H sync pulse width ("32") | 20 | 00100000 |
| 100 | 64 | # 3 30Hz Timing V sync offset : V sync pulse width ("3 : 10") | 3A | 00111010 |
| 101 | 65 | # 3 30Hz Timing H sync offset : H sync pulse width : V sync offset : V sync width ("48: 32 : 3 : 10") | 00 | 00000000 |
| 102 | 66 | # 3 30Hz Timing H image size ("222 mm") | DE | 11011110 |
| 103 | 67 | # 3 30Hz Timing V image size ("125 mm") | 7D | 01111101 |
| 104 | 68 | # 3 30Hz Timing H image size : V image size ("222 : 125") | 00 | 00000000 |
| 105 | 69 | # 3 30Hz Timing H boarder ("0") | 00 | 00000000 |
| 106 | 6A | # 3 30Hz Timing V boarder ("0") | 00 | 00000000 |
| 107 | 6B | # 3 30Hz Timing Non-interlaced ; Normal display, no stereo ; Digital Separate ; V sync POL is negative ; H sync POL is positive | 18 | 00011000 |
| 108 | 6C | Detailed timing description # 4 | 00 | 00000000 |
| 109 | 6D | # 4 Flag | 00 | 00000000 |
| 110 | 6E | # 4 Reserved | 00 | 00000000 |
| 111 | 6F | # 4 FE (hex) defines ASCII string (Model Name"PQ3Qi-01", ASCII) | FE | 11111110 |
| 112 | 70 | # 4 Flag | 00 | 00000000 |
| 113 | 71 | # 4 1st character of name ("P") | 50 | 01010000 |
| 114 | 72 | # 4 2nd character of name ("Q") | 51 | 01010001 |
| 115 | 73 | # 4 3rd character of name ("3") | 33 | 00110011 |
| 116 | 74 | # 4 4th character of name ("Q") | 51 | 01010001 |
| 117 | 75 | # 4 5th character of name ("i") | 69 | 01101001 |
| 118 | 76 | # 4 6th character of name ("-") | 2D | 00101101 |
| 119 | 77 | # 4 7th character of name ("0") | 30 | 00110000 |
| 120 | 78 | # 4 8th character of name ("1") | 31 | 00110001 |

www.display-solution.com



| Byte # (decimal) | Byte # (hex) | Field Name and Comments | Value (hex) | Value (binary) |
|---------------------|-----------------|--|----------------|-------------------|
| 121 | 79 | # 4 New line character indicates end of ASCII string | 0A | 00001010 |
| 122 | 7A | # 4 Padding with "Blank" character | 20 | 00100000 |
| 123 | 7B | # 4 Padding with "Blank" character | 20 | 00100000 |
| 124 | 7C | # 4 Padding with "Blank" character | 20 | 00100000 |
| 125 | 7D | # 4 Padding with "Blank" character | 20 | 00100000 |
| 126 | 7E | Extension flag | 00 | 00000000 |
| 127 | 7F | Checksum | E5 | 11100101 |

www.display-solution.com