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-800256ATMQW-A0H
APPROVED BY	
DATE	

☑ **Approved For Specifications**
☐Approved For Specifications & Sample

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RECORD OF REVISION

Revision Date	Page	Contents	Editor
2014/12/03	-	New Release	Tony
2015/06/22	10	Update PIN17.18 Power supply of LED driver IC. (5V)	Mark

1. FEATURES

7 inch module is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. This model is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 6.3 inch diagonally measured active display area with WVGA (800 horizontal by 256 vertical pixel) resolution.

(1) Construction: 6.3” a-Si TFT active matrix, White LED Backlight.
(2) Resolution (pixel): 800(R.G.B) X 256
(3) Number of the Colors : 262,144 colors (R , G , B, 6 bit digital each)
(4) LCD type : Transmissive , normally White
(5) Viewing Direction: 6 O’clock (The direction is hard to be discolored)
(6) Interface : LVDS interface

2. PHYSICAL SPECIFICATIONS

Item	Specifications	unit
LCD size	6.3 inch (Diagonal)	Inch
Outline Dimension (Include connecter)	165.0 x 66.96 x 6.76 (typ.)	Mm
Number of Pixel	800 RGB (H) x 256 (V)	pixels
Pixel pitch	0.1905 (H) x 0.1905 (V)	Mm
Luminance	500	Cd/m^2
Pixel arrangement	RGB Vertical stripe	
Display mode	Normally white	

3. ABSOLUTE MAX. RATINGS

3-1 Electrical Absolute Rating

3-1-1 TFT LCD Module

Item	Symbol	Values		UNIT	Note
		Min.	Max.		
Power voltage	VDD	-0.5	4.0	V	GND=0V
Voltage range at any terminal		-0.5	VCC+0.3	V	

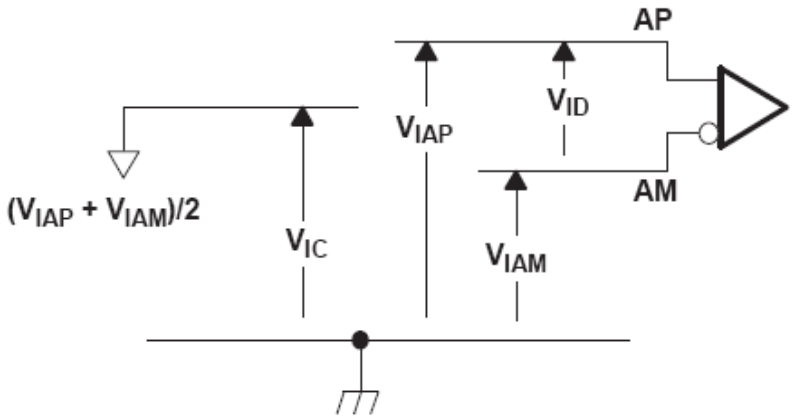
3-2 Environment Absolute Rating

Item	Symbol	Min.	Max.	Unit	Note
Operating Temperature	Topa	-20	70	℃	
Storage Temperature	Tstg	-30	80	℃	

4. ELECTRICAL CHARACTERISTICS

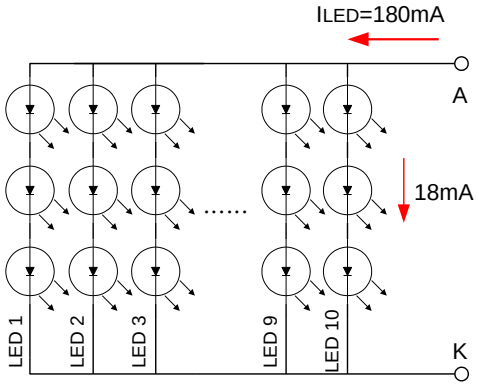
4-1 TFT LCD Module

		MIN	NOM	MAX	UNIT
V_{CC}	Supply voltage	3	3.3	3.6	V
V_{IH}	High-level input voltage ($\overline{SHTDN}$)	2			V
V_{IL}	Low-level input voltage ($\overline{SHTDN}$)			0.8	V
$\lvert V_{ID}\rvert$	Magnitude differential input voltage	0.1		0.6	V
V_{IC}	Common-mode input voltage	$\frac{\lvert V_{ID}\rvert}{2}$		$2.4 - \frac{\lvert V_{ID}\rvert}{2}$	V



4-2 Backlight Unit

Item	Symbol	Min.	Typ.	Max.	Unit	Note
LED voltage	V_{AK}		9.6		V	I_{BL} = 180mA
LED current	I_{LED}	-	180	-	mA	Ta=25℃
LED Life Time	-	-	40k	-	Hour	Note



Note (1) The constant current source is needed for white LED back-light driving.
When LCM is operated over 60 deg.C ambient temperature, the I_{LED} of the LED back-light should be adjusted to 135mA max

Note (2) Brightness to be decreased to 50% of the initial value.

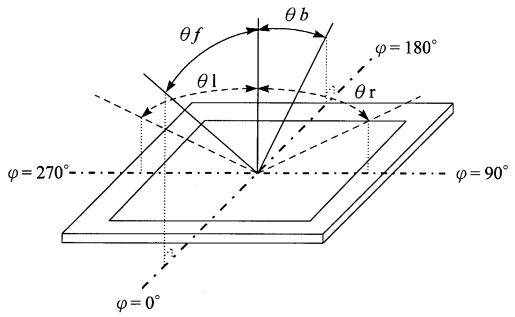
5. OPTICAL SPECIFICATIONS

5-1 Optical specification

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Viewing Angle	Front	θ f	CR≧10	50	60	--	deg.	(1)(2)(3)
	Back	θ b		60	70	--		
	Left	θ l		60	70	--		
	Right	θ r		60	70	--		
Contrast ratio		CR	Θ=Φ=0°	250	400	--	--	(1)(3)
Response Time		T_r	Θ=Φ=0°	--	5	10	ms	(1)(4)
		T_f		--	11	16	ms	(1)(4)
Color chromaticity	White	Wx		0.277	0.317	0.357	--	(1)
		Wy		0.305	0.345	0.385		
	Red	Rx		0.541	0.581	0.621		
		Ry		0.321	0.361	0.401		
	Green	Gx		0.314	0.354	0.394		
		Gy		0.524	0.564	0.604		
	Blue	Bx		0.108	0.148	0.188		
		By		0.084	0.124	0.164		
Luminance		L	Θ=Φ=0°	400	500	--	cd/m^2	(1)(5)
Luminance Uniformity		ΔL	Θ=Φ=0°	70	--	--	%	(1)(5)(6)

Note 1: Ta=25°C. To be measured on the center area of panel after 10 minutes operation.

Note 2: Definition of Viewing Angle



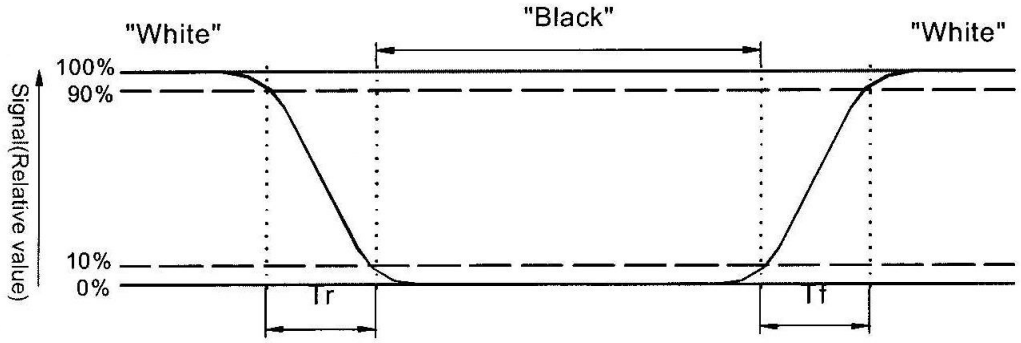
Note 3: Definition of contrast ratio:

Contrast ratio is calculated with the following formula.

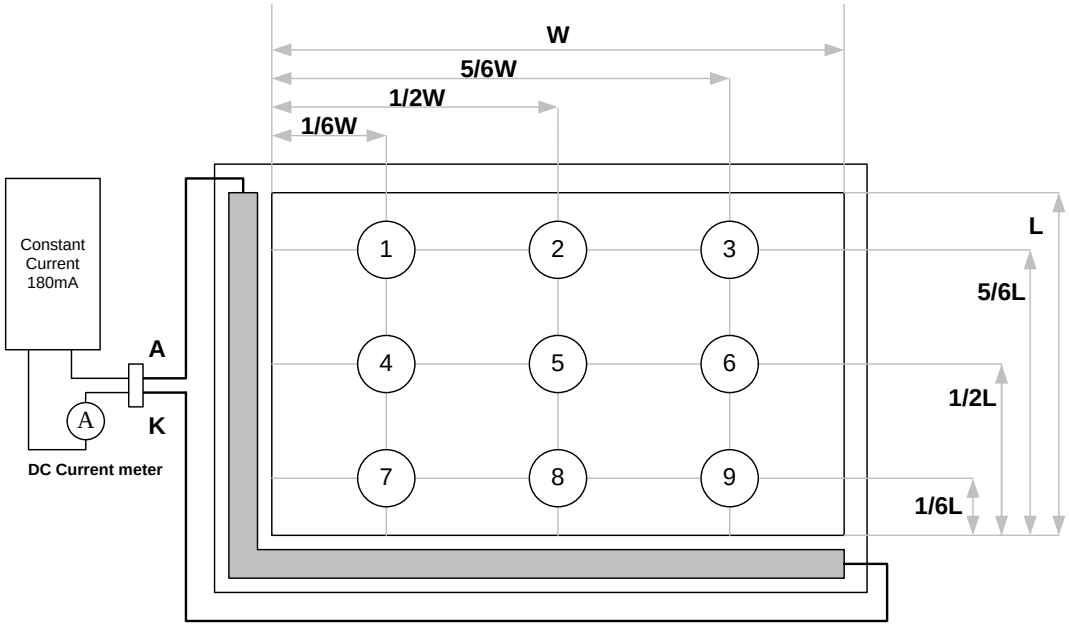
$$\text{Contrast ratio(CR)} = \frac{\text{Photo detector output when LCD is at ”White” state}}{\text{Photo detector Output when LCD is at “Black” state}}$$

Note 4: Definition of response time:

The output signals of photo detector are measured when the input signals are changed from “black“ to “white”(falling time) and from ”white” to “black” (rising time) respectively. The response time is defined as the time interval between the 10% and 90% of amplitudes. Refer to figure as below.



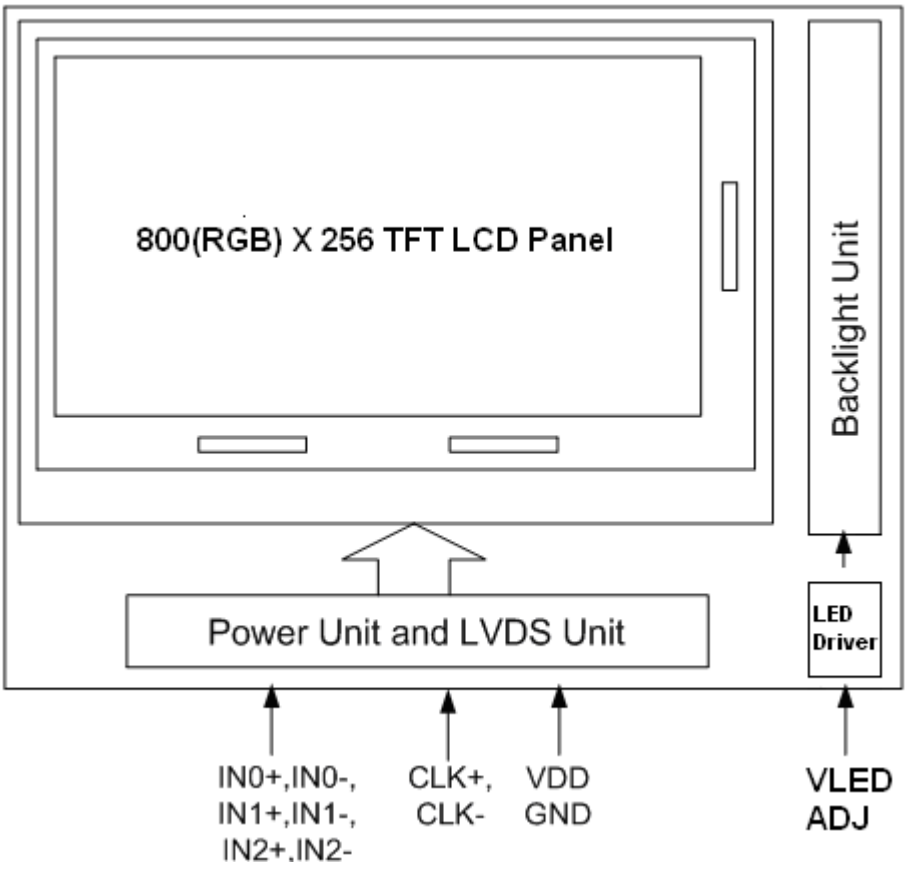
Note 5 : Luminance is measured at point 5 of the display.



Note 6 : Definition of Luminance Uniformity

ΔL = [L(min.) of 9 points / L(max.) of 9 points] X 100%

6. BLOCK DIAGRAM



7. INTERFACE

Pin No.	Symbol	Function
1	VDD	POWER SUPPLY:3.3V
2	VDD	POWER SUPPLY:3.3V
3	GND	Power Ground
4	GND	Power Ground
5	IN0-	Transmission Data of Pixels
6	IN0+	Transmission Data of Pixels
7	GND	Power Ground
8	IN1-	Transmission Data of Pixels 1
9	IN1+	Transmission Data of Pixels 1
10	GND	Power Ground
11	IN2-	Transmission Data of Pixels 2
12	IN2+	Transmission Data of Pixels 2
13	GND	Power Ground
14	CLK-	Sampling Clock
15	CLK+	Sampling Clock
16	GND	Power Ground
17	VLED	Power supply of LED driving IC.(5V)
18	VLED	Power supply of LED driving IC.(5V)
19	GND	Power Ground
20	ADJ	LED Dimming pin. Dimming by PWM 100Hz~200kHz.

8. INPUT SIGNAL

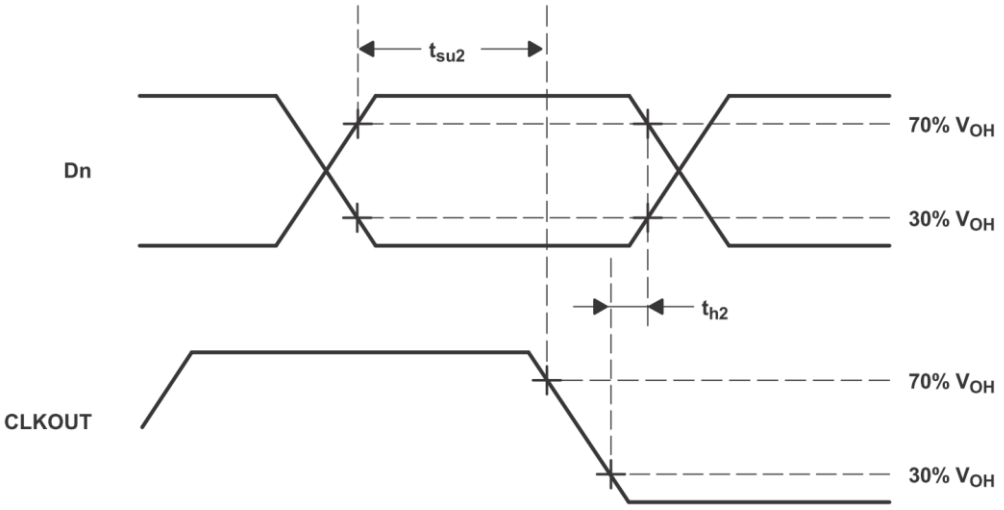
8-1 LVDS Signal

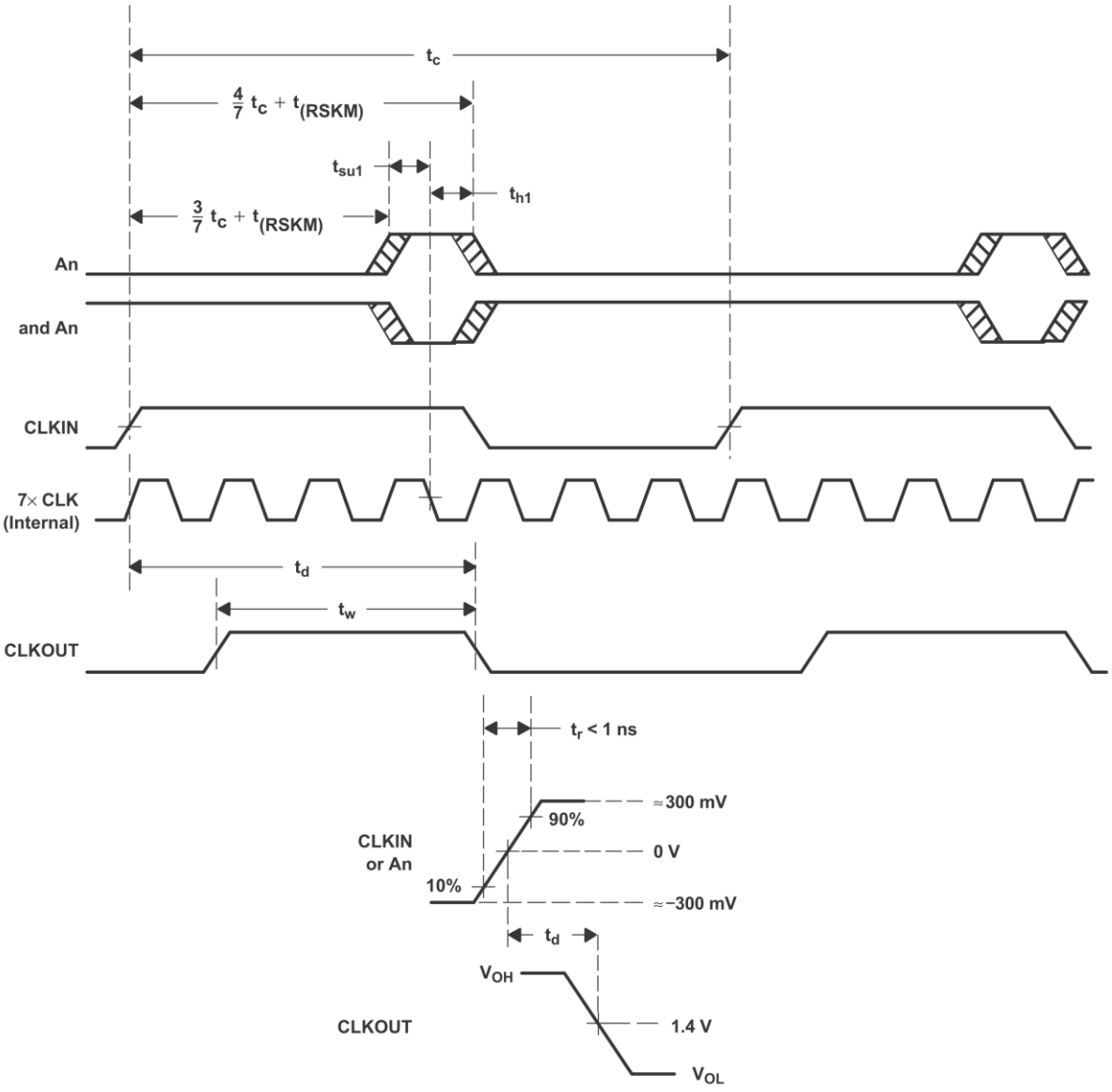
SWITCHING CHARACTERISTICS

over recommended operating conditions (unless otherwise noted)

PARAMETER		TEST CONDITIONS	MIN	TYP(1)	MAX	UNIT
t_{su2}	Setup time, D0–D27 valid to CLKOUT↓	C_L = 8 pF, See Figure 6	5			ns
t_{h2}	Hold time, CLKOUT↓ to D0–D27 valid	C_L = 8 pF, See Figure 6	5			ns
t_{RSKM}	Receiver input skew margin(2)(see Figure 7)	t_c = 15.38 ns (± 0.2%), |Input clock jitter| < 50 ps(3)	490			ps
t_d	Delay time, CLKIN↑ to CLKOUT↓ (see Figure 7)	t_c = 15.38 ns (± 0.2%), C_L = 8 pF		3.7		ns
$\Delta t_{c(o)}$	Cycle time, change in output clock period(4)	t_c = 15.38 + 0.75 sin (2π500E3t) ± 0.05 ns, See Figure 8		±80		ps
		t_c = 15.38 + 0.75 sin (2π3E6t) ± 0.05 ns, See Figure 8		±300		
t_{en}	Enable time, $\overline{SHTDN}$↑ to Dn valid	See Figure 9		1		ms
t_{dis}	Disable time, $\overline{SHTDN}$↓ to off state	See Figure 10		400		ns
t_t	Transition time, output (10% to 90% t_r or t_f)	C_L = 8 pF		3		ns
t_w	Pulse duration, output clock			0.43 t_c		ns

(1) All typical values are at V_{CC} = 3.3 V, T_A = 25°C.
(2) The parameter $t_{(RSKM)}$ is the timing margin available to the transmitter and interconnection skews and clock jitter. It is defined by $t_c/14 - t_{su1}/t_{h1}$.
(3) |Input clock jitter| is the magnitude of the change in input clock period.
(4) $\Delta t_{c(o)}$ is the change in the output clock period from one cycle to the next cycle observed over 15000 cycles.

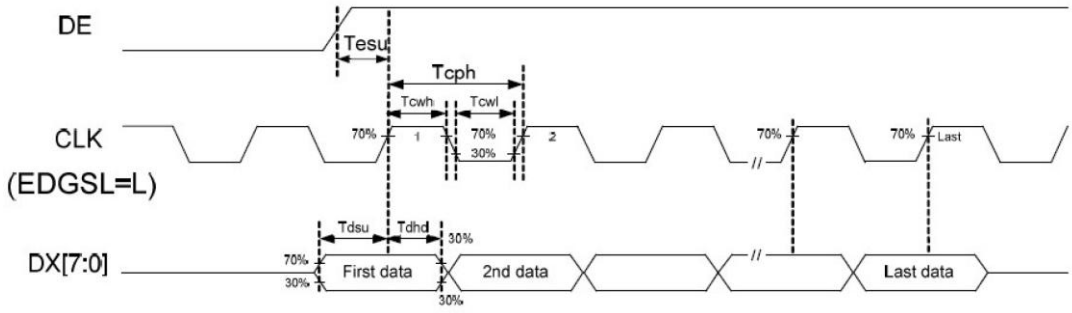


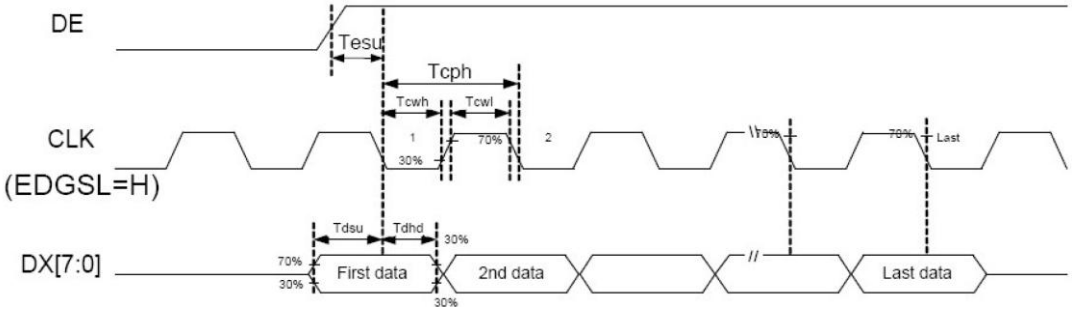

t_c
$\frac{4}{7}\ t_c + t_{(RSKM)}$
t_{su1}
t_{h1}
$\frac{3}{7}\ t_c + t_{(RSKM)}$
An
and An
CLKIN
7× CLK
(Internal)
t_d
t_w
CLKOUT
t_r < 1 ns
≈300 mV
90%
CLKIN
or An
0 V
10%
≈−300 mV
t_d
V_{OH}
CLKOUT
1.4 V
V_{OL}

8-2 Timing of LCD Timing controller

Parameter	Symbol				Unit
		Min.	Typ.	Max.	
Data setup time	Tdsu	6	-	-	ns
Data hold time	Tdhd	6	-	-	Tcph
DE setup time	Tesu	6	-	-	Tcph
CLK frequency	F_{CPH}		33.26		MHz
CLK period	T_{CPH}		30.06		ns
CLK pulse duty	T_{CWH}	40	50	60	%
DE period	$T_{DEH}+T_{DEL}$	1000	1056	1200	T_{CPH}
DE pulse width	T_{DEH}	-	800	-	T_{CPH}
DE frame blanking	T_{DEB}	10	45	110	$T_{DEH}+T_{DEL}$
DE frame width	T_{DE}	-	480	-	$T_{DEH}+T_{DEL}$

Note：We suggest using the typical value, so it can have better performance.



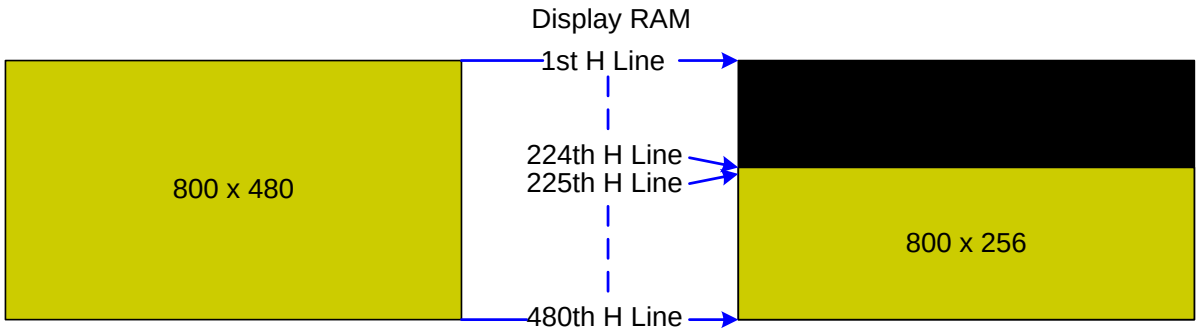


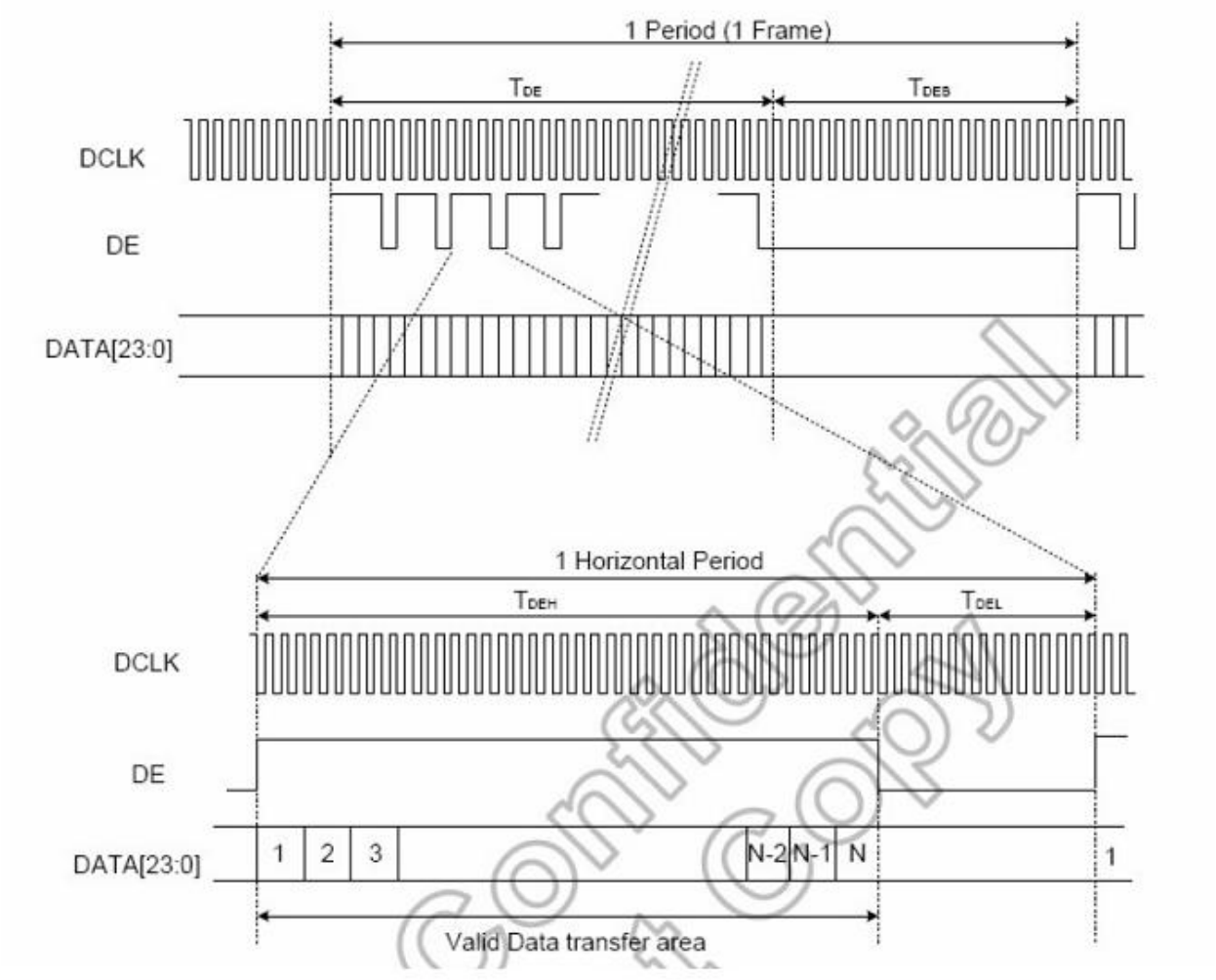
Note :

The display Input RGB Timing is 800 x 480.

The display RAM data of the 1st ~ 224th horizontal lines must be filled in black color data (R[5:0]=0x00 ; G[5:0]=0x00 ; B[5:0]=0x00)

The display RAM data of 225th ~ 480th horizontal lines are mapping to the TFT panel 1st ~256th lines.





9. DISPLAYED COLOR AND INPUT DATA

	Color & Gray Scale	DATA SIGNAL																	
		R5	R4	R3	R2	R1	R0	G5	G4	G3	G2	G1	G0	B5	B4	B3	B2	B1	B0
Basic Color	Black	0	0	0	0	0	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
	Green(63)	0	0	0	0	0	0	1	1	1	1	1	1	0	0	0	0	0	0
	Blue(63)	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
Red	Black	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(31)	0	1	1	1	1	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
Green	Black	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(31)	0	0	0	0	0	0	0	1	1	1	1	0	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
Blue	Black	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(31)	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1	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

10. RELIABILITY TEST CONDITIONS

Reliability Test Items

Test Item	Test Conditions	Note
High Temperature Operation	70±3°C , t=240 hrs	
Low Temperature Operation	-20±3°C , t=240 hrs	
High Temperature Storage	80±3°C , t=240 hrs	1,2
Low Temperature Storage	-30±3°C , t=240 hrs	1,2
Storage at High Temperature and Humidity	60°C, 90% RH , 240 hrs	1,2
Thermal Shock Test	-20°C (30min) ~ 70°C (30min) 100 cycles	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis 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).

12. USE PRECAUTIONS

12.1. Handling precautions

1) The polarizing plate may break easily so be careful when handling it. Do not touch, press or rub it with a hard-material tool like tweezers.
2) Do not touch the polarizing plate surface with bare hands so as not to make it dirty. If the surface or other related part of the polarizing plate is dirty, soak a soft cotton cloth or chamois leather in benzine and wipe off with it. Do not use chemical liquids such as acetone, toluene and isopropyl alcohol. Failure to do so may bring chemical reaction phenomena and deteriorations.
3) Remove any spit or water immediately. If it is left for hours, the suffered part may deform or decolorize.
4) If the LCD element breaks and any LC stuff leaks, do not suck or lick it. Also if LC stuff is stuck on your skin or clothing, wash thoroughly with soap and water immediately.

12.2. Installing precautions

1) The PCB has many ICs that may be damaged easily by static electricity. To prevent breaking by static electricity from the human body and clothing, earth the human body properly using the high resistance and discharge static electricity during the operation. In this case, however, the resistance value should be approx. 1MΩ and the resistance should be placed near the human body rather than the ground surface. When the indoor space is dry, static electricity may occur easily so be careful. We recommend the indoor space should be kept with humidity of 60% or more. When a soldering iron or other similar tool is used for assembly, be sure to earth it.
2) When installing the module and ICs, do not bend or twist them. Failure to do so may crack LC element and cause circuit failure.
3) To protect LC element, especially polarizing plate, use a transparent protective plate (e.g., acrylic plate, glass etc) for the product case.
4) Do not use an adhesive like a both-side adhesive tape to make LCD surface (polarizing plate) and product case stick together. Failure to do so may cause the polarizing plate to peel off.

12.3. Storage precautions

1) Avoid a high temperature and humidity area. Keep the temperature between 0°C and 35°C and also the humidity under 60%.

2) Choose the dark spaces where the product is not exposed to direct sunlight or fluorescent light.
3) Store the products as they are put in the boxes provided from us or in the same conditions as we recommend.

12.4. Operating precautions

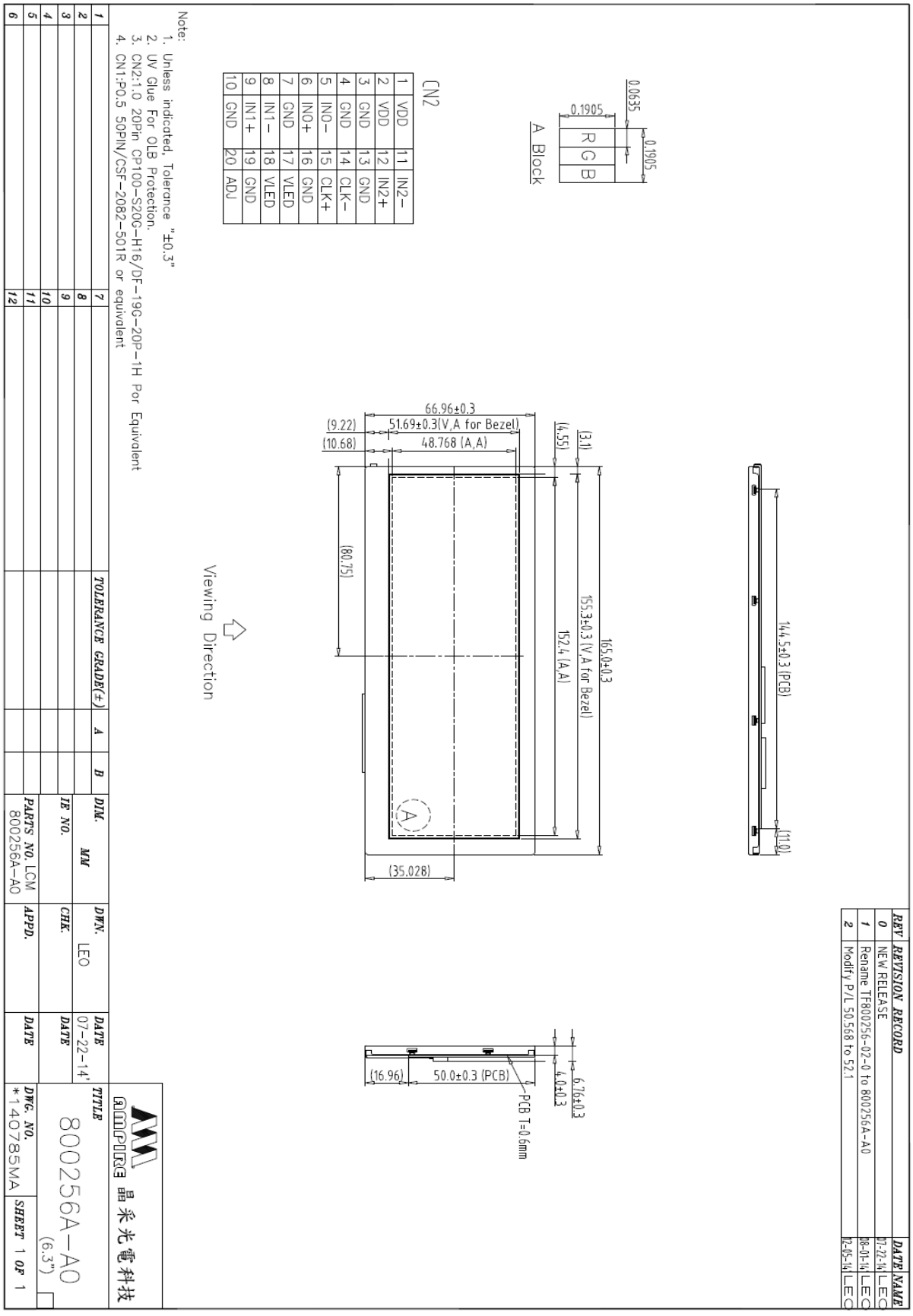
1) Do not boost the applied drive voltage abnormally. Failure to do so may break ICs. When applying power voltage, check the electrical features beforehand and be careful. Always turn off the power to the LC module controller before removing or inserting the LC module input connector. If the input connector is removed or inserted while the power is turned on, the LC module internal circuit may break.
2) The display response may be late if the operating temperature is under the normal standard, and the display may be out of order if it is above the normal standard. But this is not a failure; this will be restored if it is within the normal standard.
3) The LCD contrast varies depending on the visual angle, ambient temperature, power voltage etc. Obtain the optimum contrast by adjusting the LC dive voltage.
4) When carrying out the test, do not take the module out of the low-temperature space suddenly. Failure to do so will cause the module condensing, leading to malfunctions.
5) Make certain that each signal noise level is within the standard (L level: 0.2Vdd or less and H level: 0.8Vdd or more) even if the module has functioned properly. If it is beyond the standard, the module may often malfunction. In addition, always connect the module when making noise level measurements.
6) The CMOS ICs are incorporated in the module and the pull-up and pull-down function is not adopted for the input so avoid putting the input signal open while the power is ON.
7) The characteristic of the semiconductor element changes when it is exposed to light emissions, therefore ICs on the LCD may malfunction if they receive light emissions. To prevent these malfunctions, design and assemble ICs so that they are shielded from light emissions.
8) Crosstalk occurs because of characteristics of the LCD. In general, crosstalk

occurs when the regularized display is maintained. Also, crosstalk is affected by the LC drive voltage. Design the contents of the display, considering crosstalk.

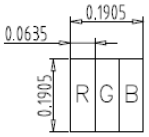
12.5. Other

1) Do not disassemble or take the LC module into pieces. The LC modules once disassembled or taken into pieces are not the guarantee articles.
2) The residual image may exist if the same display pattern is shown for hours. This residual image, however, disappears when another display pattern is shown or the drive is interrupted and left for a while. But this is not a problem on reliability.
3) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.

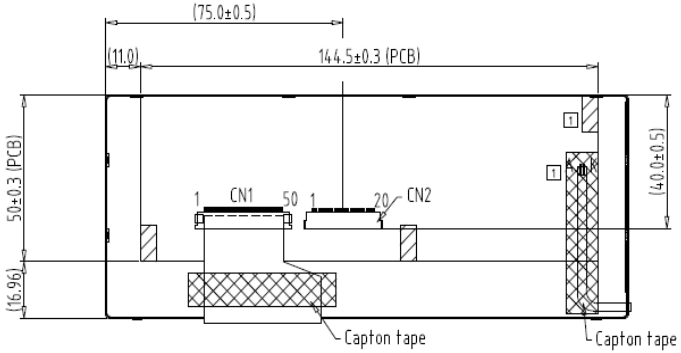
13. OUTLINE DIMENSION



REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	07-22-14	LEO
1	Rename TF800256-02-0 to 800256A-A0	08-01-14	LEO
	Modify B/L FPC & PCB Pad		



A Block



CN2

1	VDD	11	IN2−
2	VDD	12	IN2+
3	GND	13	GND
4	GND	14	CLK−
5	IN0−	15	CLK+
6	IN0+	16	GND
7	GND	17	VLED
8	IN1−	18	VLED
9	IN1+	19	GND
10	GND	20	ADJ

Note:
1. Unless indicated, Tolerance "±0.3"
2. UV Glue For OLB Protection.
3. CN2:1.0 20Pin CP100-S20G-H16/DF-19G-20P-1H Por Equivalent
4. CN1:P0.5 50PIN/CSF-2082-501R or equivalent

Back View

				TOLERANCE GRADE(±)	A	B	DIM. MM	DWN. LEO	DATE 07-22-14'	TITLE 800256A-A0 (6.3") 1
1	TF800256-02-0	7								
2		8					IE NO.	CHK.	DATE	
3		9								
4		10								
5		11					PARTS NO. LCM 800256A-A0	APPD.	DATE	DWG. NO. *140786MA SHEET 1 OF 1
6		12								

AMPIRE 晶采光電科技

Date : 2015/06/22 AMPIRE CO., LTD. 21