1. SCOPE

The purpose of this specification is to define the general provisions and quality requirements that apply to the supply of display cells manufactured by Yong Zhong .This document,together with the Module Ass'y Drawing, is the highest-level specification for this product. It describes the product, identifies supporting documents and contains specifications.

2. WARRANTY

We warrant that the products delivered pursuant to this specification (or order) will conform to the agreed specifications for twelve (12) months from the shipping date ("Warranty Peride"). We are obligated to repair or replace the products which are found to be defective or inconsistent with the specifications during the Warranty Period without charge, on condition that the products are stored in the original packages at 25℃±5℃, 55%±10%RH or used as the conditions specified in the specifications.

Nevertheless ,We are not obligated to repair or replace the products without charge if the defects or inconsistency are caused by the force majeure or the reckless behaviors of the customer.

After the Warranty Period, all repairs or replacements of the products are subject to charge.

3. FEATURES

- Small molecular organic light emitting diode.
- Color : White
- Panel matrix : 128x64
- Driver IC : SH1106G
- Excellent quick response time.
- Extremely thin thickness for best mechanism design : 1.427mm
- High contrast : 2000:1
- Wide viewing angle : 160°
- 8-bit 6800/8080-series parallel interface, Serial Peripheral Interface, I^2C Interface.
- Wide range of operating temperature : -40 to 70 ℃
- Anti-glare polarizer.

4. MECHANICAL DATA

NO	ITEM	SPECIFICATION	UNIT
1	Dot Matrix	128 (W) x 64 (H)	dot
2	Dot Size	0.21 (W) x 0.21 (H)	mm^2
3	Dot Pitch	0.23 (W) x 0.23 (H)	mm^2
4	Aperture Rate	83.3	%
5	Active Area	29.42 (W) x 14.7 (H)	mm^2
6	Panel Size	34.5 (W) x 23 (H)	mm^2
7*	Panel Thickness	1.22 ± 0.1	mm
8	Module Size	34.5 (W) x 63 (H) x 1.427 (D)	mm^3
9	Diagonal A/A size	1.29	inch
10	Module Weight	2.31 ± 10%	gram

* Panel thickness includes substrate glass, cover glass and UV glue thickness.

5. MAXIMUM RATINGS

ITEM	MIN	MAX	UNIT	Condition	Remark
Supply Voltage (V_{DD})	-0.3	3.6	V	Ta = 25℃	IC maximum rating
Supply Voltage (V_{BAT})	-0.3	4.8	V	Ta = 25℃	IC maximum rating
Supply Voltage (Vcc)	8	14.5	V	Ta = 25℃	IC maximum rating
Operating Temp.	-40	70	℃	-	-
Storage Temp	-40	85	℃	-	Note (2)

Note:

(1) Maximum ratings are those values beyond which damages to the OLED module may occur. The OLED functional operation should be restricted to the limits in the section 6. Electrical Characteristics tables.

(2) The defined temperature ranges do not include the polarizer. The maximum withstood temperature of the polarizer should be 80℃.

6. ELECTRICAL CHARACTERISTICS

6.1 D.C ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	TEST CONDITION	MIN	TYP	MAX	UNIT
V_{DD}	Logic Supply Voltage	Ta = 25℃	1.65	-	3.5	V
V_{BAT}	Charge Pump Regulator Supply Voltage	Ta = 25℃	3.5	-	4.7	V
V_{CC}	Operating Voltage (for OLED panel) (Charge Pump)	Ta = 25℃	6.4	-	9	V
V_{OH}	High Logic Output Level	I_{OH} = -0.5mA	0.8* V_{DD}	-	V_{DD}	V
V_{OL}	Low Logic Output Level	I_{OL} = 0.5mA	V_{ss}	-	0.2*V_{DD}	V
V_{IH}	High Logic Input Level	-	0.8* V_{DD}	-	V_{DD}	V
V_{IL}	Low Logic Input Level	-	V_{ss}	-	0.2*V_{DD}	V

6.2 ELECTRO-OPTICAL CHARACTERISTICS

PANEL ELECTRICAL SPECIFICATIONS

PARAMETER	MIN	TYP.	MAX	UNITS	COMMENTS
Normal mode current (IBAT) (Charge Pump)	-	35	37	mA	All pixels on (1)
	-	18	19	mA	20% pixels on (1)
Standby mode current(IBAT) (Charge Pump)	-	8	9	mA	Standby mode 10% pixels on (2)
IDD sleep mode current	-	-	5	uA	Sleep mode Current (3)
IBAT sleep mode current (Charge Pump)	-	-	5	uA	Sleep mode Current (3)
Normal Luminance (Charge Pump)	60	80	-	cd/m^2	Display Average
Standby Luminance (Charge Pump)	-	55	-	cd/m^2	Display Average
CIEx (White)	0.23	0.27	0.31		x, y (CIE 1931)
CIEy (White)	0.25	0.29	0.33		
Dark Room Contrast	2000:1				
Viewing Angle	160			degree	
Response Time		10		μs	

(1) Normal mode condition : (Charge Pump)

- V_{BAT} = 3.6V
- Contrast setting : 0x80
- Frame rate : 105Hz
- Duty setting : 1/64
- R: 620k ohm (It is connected between I_{REF} and Vss.)

(2) Standby mode condition : (Charge Pump)

- V_{BAT} = 3.6V
- Contrast setting : 0x00
- Frame rate : 105Hz
- Duty setting : 1/64
- R: 620k ohm (It is connected between I_{REF} and Vss.)

(3) Sleep mode condition :

When send 0xae command OLED display off and memory data will be maintained.

(4) Wake up condition :

When send 0xaf command OLED will be turned on.

7. LIFETIME SPECIFICATION

ITEM	MIN	UNIT	Condition	Remark
Life Time	32,000	Hrs	60 cd/m^2, 50% alternating checkerboard	(Charge pump) Note (1)
Life Time	24,000	Hrs	80 cd/m^2, 50% alternating checkerboard	(Charge pump) Note (2)

Note:

(A) Under V_{BAT} = 3.6V (Charge Pump), Ta = 25℃, 50% RH.

(B) Life time is defined the amount of time when the luminance has decayed to less than 50% of the initial measured luminance.

(1) Setting of 60 cd/m^2 : (Charge Pump)

- Contrast setting : 0x11
- Frame rate : 105Hz
- Duty setting : 1/64
- R: 620k ohm (It is connected between IREF and Vss.)

(2) Setting of 80 cd/m^2 : (Charge Pump)

- Contrast setting : 0x80
- Frame rate : 105Hz
- Duty setting : 1/64
- R: 620k ohm (It is connected between IREF and Vss.)

Note: More setting refer to P28308 application note.

10. RELIABILITY TEST CONDITIONS

No.	Items	Specification	Quantity
1	High temp. (Non-operation)	85℃, 240hrs	5
2	High temp. (Operation)	70℃, 120hrs	5
3	Low temp. (Operation)	-40℃, 120hrs	5
4	High temp. / High humidity (Operation)	65℃, 90%RH, 120hrs	5
5	Thermal shock (Non-operation)	-40℃ ~85℃ (-40℃ /30min; transit /3min; 85℃ /30min; transit /3min) 1cycle: 66min, 100 cycles	5
6	Vibration	Frequency : 5~50HZ, 0.5G Scan rate : 1 oct/min Time : 2 hrs/axis Test axis : X, Y, Z	1 Carton
7	Drop	Height: 120cm Sequence : 1 angle、3 edges and 6 faces Cycles: 1	1 Carton
8	ESD (Non-operation)	Air discharge model, ±8kV, 10 times	5

Test and measurement conditions

1. All measurements shall not be started until the specimens attain to temperature stability.
2. The degradation of Polarizer are ignored for item 1, 4 & 5.

Evaluation criteria

1. The function test is OK.
2. No observable defects.
3. Luminance: > 50% of initial value.
4. Current consumption: within ± 50% of initial value.

11. EXTERNAL DIMENSION