

Approval Sheet

 Preliminary specification Final specification

Customer Name	xxx xxx
Product Description	2.1inch 16000RGB*1600 TFT-LCD Module
Version	Pre.0
Supplier	BOE
Module Code	VS021XRM-NW0-DKPO

Customer Approval		BOE Approval	
SIGNATURE/TITLE	DATE	SIGNATURE/TITLE	DATE
PREPARED BY _____ / _____	_____	PREPARED BY _____ / _____	_____
REVIEWED BY _____ / _____	_____	REVIEWED BY _____ / _____	_____
APPROVED BY (R&D) _____ / _____	_____	APPROVED BY (R&D) _____ / _____	_____
APPROVED BY (QA) _____ / _____	_____	APPROVED BY (QA) _____ / _____	_____

**ORDOS YUANSHENG
OPTOELECTRONICS TECHNOLOGY CO.,LTD.**

Product Specification

Product Name : 2.1" TFT-LCD Module

Model Name : VS021XRM-NW0-DKP0

Description : 2.1" 1600RGB×1600 16.7M Color

PREPARED BY	CHECKED BY	APPROVALED BY

**ORDOS YUANSHENG
OPTOELECTRONICS TECHNOLOGY CO.,LTD.**

Revision History

REV.	ECN NO.	DESCRIPTION OF CHANGES	DATE	PREPARED
P0	-	Initial Release	2019.10.11	GONG LEI

Contents

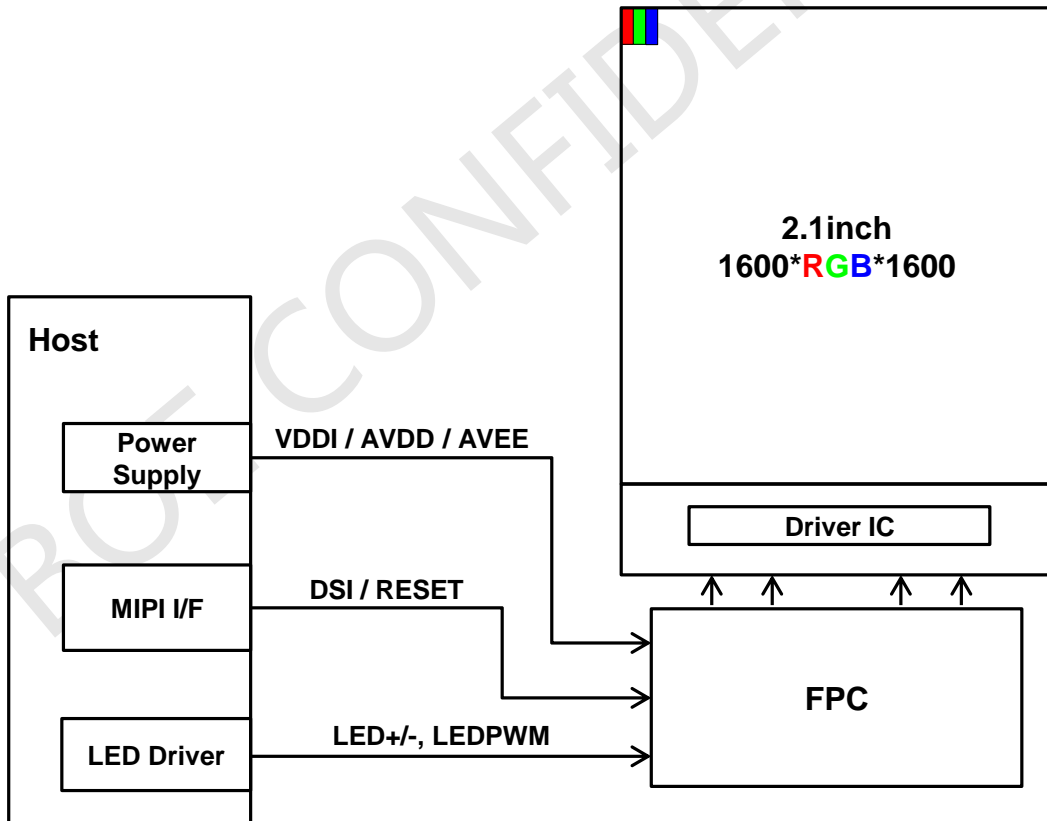
NO.	ITEMS	PAGE
1.0	General Description	6
1.1	Introduction	6
1.2	Feature	7
1.3	Application	7
1.4	General specification	8
2.0	Absolute Maximum Ratings	9
3.0	Electrical Specifications	10
3.1	TFT-LCD Panel	10
3.2	Back-light Unit	11
4.0	Optical Specifications	12
4.1	Overview	12
4.2	Optical specifications	12
5.0	Interface Connection	16
6.0	Block Diagram	17
7.0	Timing Characteristics	18
7.1	Power on/off sequence	18
7.2	Reset Timing Sequence	21
7.3	Deep Standby Mode Timing	22
7.4	MIPI Interface Characteristics	23
7.5	Operating Sequence	27
7.6	Initial Code Setting	28
SPEC. NUMBER SXXX-XXXX	SPEC TITLE VS021XRM-NW0-DKPO Product Specification	PAGE 4 OF 34

NO.	ITEMS	PAGE
8.0	Mechanical Characteristics	29
9.0	Reliability Test	30
10.0	Packing Information	31
10.1	Packing Description	31
10.2	Packing Procedure	32
10.3	Box Label	33
11.0	Handing & Cautions	34

1.0 GENERAL DESCRIPTION

1.1 Introduction

The 2.1inch TFT-LCD Module is a Color Active Matrix TFT LCD panel using LTPS (Low Temperature Poly-silicon) TFT's (Thin Film Transistors) as an active switching devices. This module has a 2.1 inch diagonally measured active area with 1600*1600 resolutions (1600 horizontal by 1600 vertical pixel array). Each pixel is divided into RED, GREEN, BLUE dots which are arranged in vertical stripe and this module can display 16.7M colors. The TFT-LCD panel used for this module is adapted for a low reflection and higher color type.



1.2 Features

- High PPI
- Fast response time
- High frame ratio
- High luminance, low reflection and wide viewing angle
- RoHS、 Halogen Free Compliant

1.3 Application

- Virtual Reality Device
- Augmented Reality Device

BOE CONFIDENTIAL

1.4 General Specification

< Table 1. General Specifications >

Parameter	Specification	Unit	Remark
Display method	Active matrix TFT		
Display mode	Transmission mode, Normally black		
Screen size	2.1" (38.4mm)	inch	diagonally
Number of pixels	1600(H) × 1600(V)	pixels	1058 ppi
Pixel pitch	8(H) × 24(V)	um	
Pixel arrangement	RGB stripe		
Display colors	16.7M	colors	8bit
NTSC Ratio	70.8%		
LCM Outline Dimension	41.2(H) × 45.3(V) × 1.66 (T)	mm	Note 1)
LCM Weight	6.0 ±1.0	gram	
Driver IC	R63455		
Interface	MIPI DSI (Video Mode)		
Surface Treatment	HC, ≥3H		

Note:

1) Protection film is not included.

2.0 ABSOLUTE MAXIMUM RATINGS

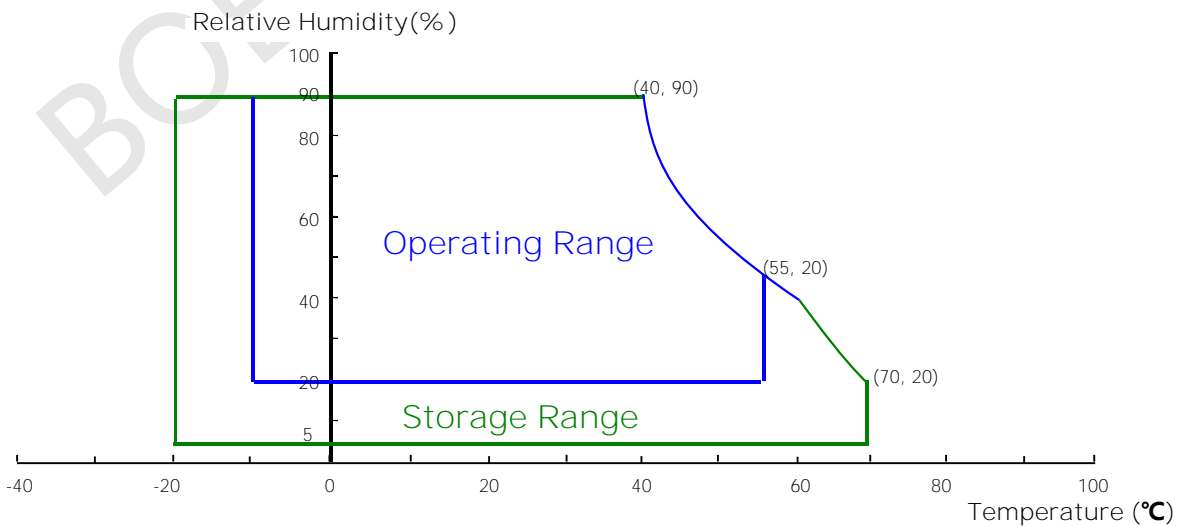
< Table 2. Absolute Maximum Ratings >

[Ta =25 ± 2 °C]

Items	Symbol	Rating	Unit	Remark
Logic voltage	VDDI	-0.3 to +1.8	V	
Positive Analog Power Supply Voltage	AVDD	-0.3 to +6.0	V	
Negative Analog Power Supply Voltage	AVEE	-6.0 to +0.3	V	
LED forward current	I _{LED}	45	mA	each LED 20% on duty
Storage temperature	T _{STG}	-40 to +70	°C	
Operation temperature	T _{OPR}	-10 to +55	°C	
Humidity (ambient temperature=Ta)	Ta≤60°C, 90% RH Max.			

Note 1: If the module exceeds the absolute maximum ratings, it may be damaged permanently. Also, if the module operated with the absolute maximum ratings for a long time, its reliability may drop. It is not allowed for any of these ratings to be exceeded. Make sure all the design characteristics are adequate before the panel is initialed.

Note 2: Temperature and relative humidity range are shown in the figure below.
Wet bulb temperature should be 39 °C max. and no condensation of water.



3.0 ELECTRICAL SPECIFICATIONS

3.1 TFT LCD Panel

< Table 3. LCD Panel Electrical Specifications >

[Ta =25 ± 2 °C]

Items		Symbol	Min.	Typ.	Max.	Unit	Remark
Logic voltage		VDDI	1.7	1.8	1.9	V	Note 1
Positive Analog Power Supply Voltage		AVDD	5.7	6.0	6.3	V	
Negative Analog Power Supply Voltage		AVEE	-6.3	-6.0	-5.7	V	
Frame Ratio		FPS	-	70/90		Hz	
Input signal voltage	High level	V _{IH}	0.7 × VDDI	-	VDDI	V	
	Low level	V _{IL}	VSSI	-	0.3 × VDDI	V	
Output signal voltage	High level	V _{OH}	0.8 × VDDI	-	VDDI		
	Low level	V _{OL}	VSSI	-	0.2 × VDDI		
Current consumption		I _{VDDI}	-	79.8	87.7	mA	Note 2
		I _{AVDD}	-	8.7	12	mA	
		I _{AVEE}	-	-5.4	-11	mA	
Driver IC ESD		HBM	- 2	-	+2	kV	
		MM	-200	-	+200	V	

Note 1:

The value can be adjusted by software to optimize display quality.

The operation is guaranteed under the recommended operating conditions only. The operation is not guaranteed if a quick voltage change occurs during operation. To prevent noise, a bypass capacitor must be inserted into the line close to power pin. Please make sure all the design settings are used within this range before the panel is initialed.

Note 2:

Test pattern: All White Display