



## DRIVING CIRCUIT DESIGN GUIDE FOR RIVERDI HB, IPS 7.0" MIPI TFT

Rev.1.0  
2022-12-19

This document is applied for the Riverdi HB, IPS, 7.0" MIPI series:

| PRODUCT NAME    | DESCRIPTION   |
|-----------------|---|
| RVT70HSMNWN00   | HB, IPS, 7.0", 1024x600, 1000cd/m <sup>2</sup> , MIPI, No touch panel,                    |
| RVT70HSMFWN00   | HB, IPS, 7.0", 1024x600, 1000cd/m <sup>2</sup> , MIPI, No touch panel,<br>Metal frame     |
| RVT70HSMNWC00-B | HB, IPS, 7.0", 1024x600, 850cd/m <sup>2</sup> , MIPI, uxTouch,<br>Optical bonding         |
| RVT70HSMNWC00   | HB, IPS, 7.0", 1024x600, 800cd/m <sup>2</sup> , MIPI, uxTouch,<br>Air bonding             |
| RVT70HSMNWCA0   | HB, IPS, 7.0", 1024x600, 800cd/m <sup>2</sup> , MIPI, aTouch,<br>Air bonding              |
| RVT70HSMFWCA0   | HB, IPS, 7.0", 1024x600, 800cd/m <sup>2</sup> , MIPI, aTouch,<br>Air bonding, Metal frame |



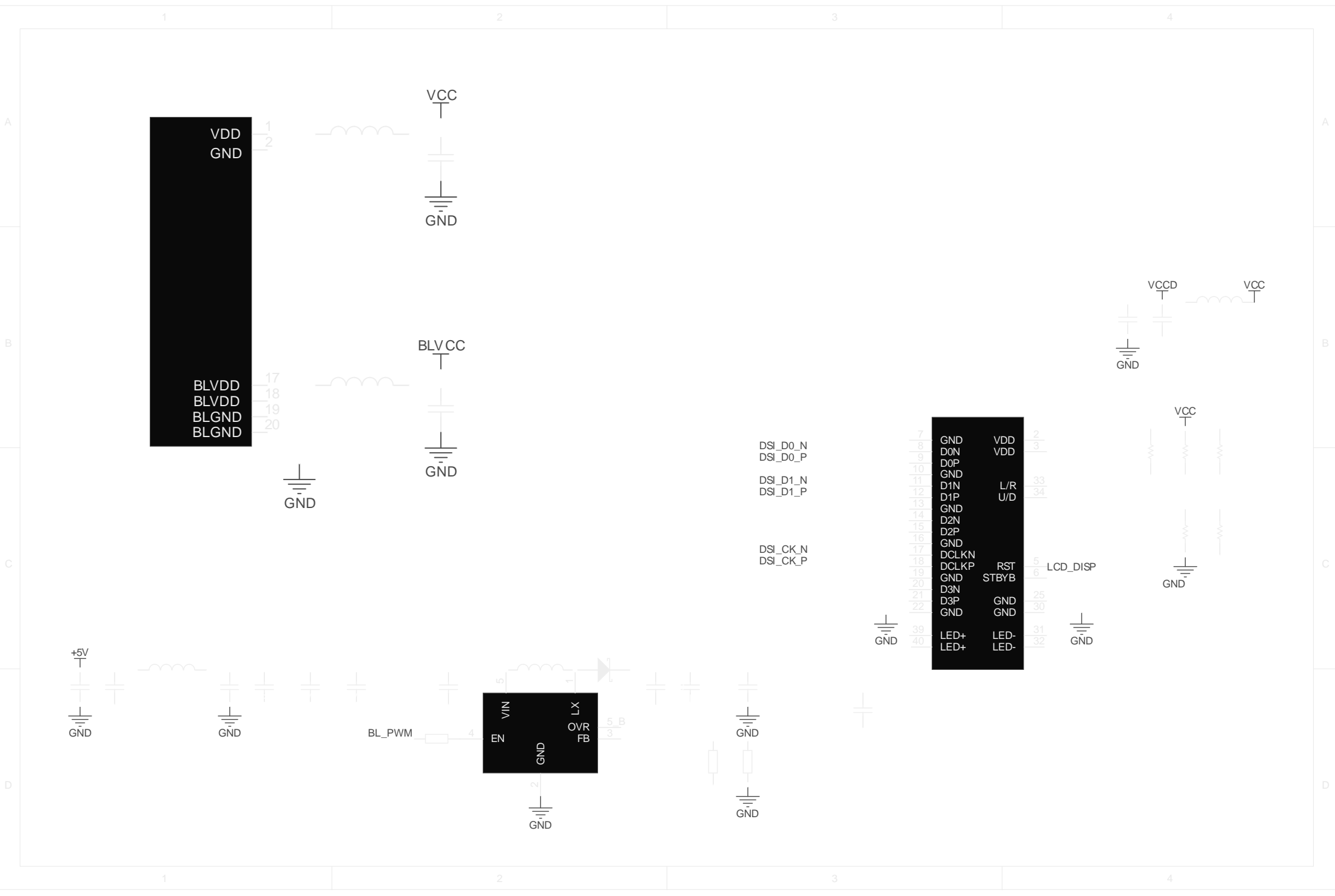
1. REVISION RECORD

| REV NO. | REV DATE   | CONTENTS        | REMARKS |
|---------|------------|-----------------|---------|
| 1.0     | 2022-12-19 | Initial Release |         |



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1

2

3

4

A

A

B

B

C

C

D

D

1

2

3

4

VDD  
GND

BLVDD  
BLVDD  
BLGND  
BLGND

VCC  
GND

BLVCC  
GND

GND

VCCD  
GND

VCC  
GND

DSL\_D0\_N  
DSL\_D0\_P  
DSL\_D1\_N  
DSL\_D1\_P  
DSL\_CK\_N  
DSL\_CK\_P

|    |       |       |     |
|----|-------|-------|-----|
| 7  | GND   | VDD   | 2   |
| 8  | D0N   | VDD   | 3   |
| 9  | D0P   |       |     |
| 10 | GND   |       |     |
| 11 | D1N   | L/R   | 33  |
| 12 | D1P   | U/D   | 34  |
| 13 | GND   |       |     |
| 14 | D2N   |       |     |
| 15 | D2P   |       |     |
| 16 | GND   |       |     |
| 17 | DCLKN |       |     |
| 18 | DCLKP | RST   | 5   |
| 19 | GND   | STBYB | 6   |
| 20 | D3N   |       |     |
| 21 | D3P   |       |     |
| 22 | GND   | GND   | 25  |
|    |       | GND   | 30  |
| 39 | GND   |       |     |
| 40 | LED+  | LED-  | 31  |
|    | LED+  | LED-  | 32  |
|    |       |       | GND |

LCD\_DISP

+5V  
GND

GND

BL\_PWM

VIN  
EN  
GND  
LX  
OVR  
FB  
GND

GND  
GND

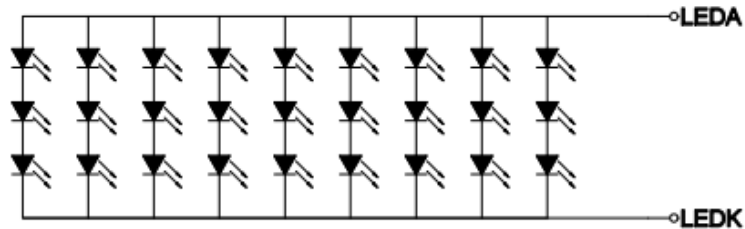
GND

GND



### 3. BACKLIGHT DRIVING CIRCUIT

Internal backlight circuit of Riverdi HB, IPS 7.0" MIPI series is built with 9x3 (3LEDs in a row) LED matrix.



**LED Diagram Circuit**

Backlight parameters of Riverdi 7.0" MIPI HB, IPS series:

| PARAMETER                   | SYMBOL   | MIN | TYP    | MAX  | UNIT  | NOTE   |
|-----------------------------|----------|-----|--------|------|-------|--------|
| Backlight Driving Voltage   | $V_F$    | 9.0 | 9.6    | 10.2 | V     |        |
| Backlight Driving Current   | $I_F$    | -   | 270    | -    | mA    |        |
| Backlight Power Consumption | $W_{BL}$ | -   | 2592   | -    | mW    |        |
| LED Lifetime                | -        | -   | 50,000 | -    | hours | Note 1 |

To get the full brightness, the driving current ( $I_F$ ) needs to reach 270 mA.

The recommended LED driver is TPS61169 or DIO566,

For example, the feedback voltage of TPS61169:  $V_{FB} (max)=204mV$

In our design, R21, R1 connected in parallel as a feedback resistor ( $R_{FB}$ ) is set to  $0.75R$  to achieve the full brightness.

$$I_F (max)=V_{FB} (max)/ R_{FB}$$

$$I_F (max)=204mV/0.75R= 272 \text{ mA.}$$

Both TPS61169 and DIO5661 have PWM dimming control input to drive the LED current. TPS61169 and DIO5661 have built-in low-pass filter which changes internal feedback voltage. By that, inverter is not switched on-off with PMW signal but change LEDs current effectively in continuous way which cause low EMI emissions.

Please note that all Riverdi displays are designed to have low emission, that's why many LC components like beads and capacitors are on the schematic. They are not necessary but strongly recommended.

Recommended PMW frequency is 5kHz – 100kHz for TPS61169 or 200Hz - 200kHz for DIO5661.



Hi, I am here to help you!  
If you have any additional  
questions, please contact  
our support via email:  
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