



A062EAN01.0 Product Spec	Version	0.0
	Page	1/24

CUSTOMER APPROVAL SHEET

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A062EAN01.0

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A062EAN01.0 Product Spec	Version	0.0
	Page	2/24

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Product Specification

6.2" COLOR TFT-LCD MODULE

Model Name : A062EAN01.0

Planned Lifetime: 2017/June~

Phase-out Control:

EOL Schedule: TBD

< ◆ > Preliminary Specification

< > Final Specification

Note: The content of this specification is subject to change without prior notice.

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A062EAN01.0 Product Spec	Version	0.0
	Page	3/24

Record of Revision

Version	Revise Date	Page	Content
0.0	2017/08/18		First draft

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A062EAN01.0 Product Spec	Version	0.0
	Page	4/24

Contents

A. Physical specifications	5
B. Electrical specifications	6
1. Pin assignment	6
2. Absolute maximum ratings	8
3. Electrical characteristics	8
3.1 Recommended operating conditions (GND=0V)	8
3.2 Electrical characteristics (GND=0V)	8
3.3 Recommended Capacitance Values of External Capacitor	9
4. MIPI electrical characteristics (MIPI D-PHY version 1.0)	10
5. Input timing format	11
C. Optical specification	12
D. Reliability test items (Refer to Note 1, Note 2, Note 3)	14
E. Packing form	15
F. Outline dimension	16
G. Application note	17
1. Application circuit.....	17
2. Power on/off sequence.....	18
2.1 Power on	18
2.2 Power off	19
3. Recommended power on/off command settings	20



A062EAN01.0 Product Spec	Version	0.0
	Page	5/24

A. Physical specifications

NO.	Item	Specification	Remark
1	Display resolution (dot)	1280 (W) x 720 RGB (H)	
2	Active area (mm)	137.088(W) x 77.112(H)	
3	Screen size (inch)	6.2 (Diagonal)	
4	Dot pitch (um)	107.1 x 107.1	
5	Color configuration	R, G, B Stripe	
6	Overall dimension (mm)	145.338 x 81.712 x 0.629	Note 1
7	Weight (g)	TBD	
8	Panel surface treatment	AG / 3H	
9.	Frame (Hz)	60 (Typ.)	
10	Interface	MIPI DSI 4-lane	

Note 1: Refer to F. Outline Dimension



A062EAN01.0 Product Spec	Version	0.0
	Page	6/24

B. Electrical specifications

1. Pin assignment

Compatible Connector: Hirose FH26W-45S-0.3SHW (60)

Pin no	Symbol	I/O	Description	Remark
1	GND	G	Ground	
2	VCOM	O	Connect to a stabilizing capacitor.	
3	D3_P	I	MIPI DSI data signal 3 P	
4	D3_N	I	MIPI DSI data signal 3 N	
5	GND	G	Ground	
6	D0_P	I/O	MIPI DSI data signal 0 P	
7	D0_N	I/O	MIPI DSI data signal 0 N	
8	GND	G	Ground	
9	CLK_P	I	MIPI DSI clock signal P	
10	CLK_N	I	MIPI DSI clock signal N	
11	GND	G	Ground	
12	D1_P	I	MIPI DSI data signal 1 P	
13	D1_N	I	MIPI DSI data signal 1 N	
14	GND	G	Ground	
15	D2_P	I	MIPI DSI data signal 2 P	
16	D2_N	I	MIPI DSI data signal 2 N	
17	GND	G	Ground	
18	HS_LDO	O	Connect to a stabilizing capacitor.	
19	HS_VCC	P	Power supply for the MIPI DSI analog power.	
20	VDD1	P	Power supply for the logic power and I/O circuit.	
21	VDDD	O	Connect to a stabilizing capacitor.	
22	RESX	I	Reset signal (Low active)	
23	VDD3	P	Power supply for the analog power.	Connect to VSP
24	GND	G	Ground	
25	VSPR	O	Connect to a stabilizing capacitor.	
26	VSNR	O	Connect to a stabilizing capacitor.	
27	VREF	O	Connect to a stabilizing capacitor.	
28	GND	G	Ground	
29	VCL	O	Connect to a stabilizing capacitor.	
30	C41P	O	Connect to a step-up capacitor.	
31	C41N	O	Connect to a step-up capacitor.	



A062EAN01.0 Product Spec	Version	0.0
	Page	7/24

32	VSP	P	Power supply for the positive analog power.	
33	VSP	P	Power supply for the positive analog power.	
34	VSN	P	Power supply for the negative analog power.	
35	VSN	P	Power supply for the negative analog power.	
36	C21N	O	Connect to a step-up capacitor.	
37	C21P	O	Connect to a step-up capacitor.	
38	C22N	O	Connect to a step-up capacitor.	
39	C22P	O	Connect to a step-up capacitor.	
40	VGH	O	Connect to a stabilizing capacitor.	
41	C31N	O	Connect to a step-up capacitor.	
42	C31P	O	Connect to a step-up capacitor.	
43	VGL	O	Connect to a stabilizing capacitor.	
44	VCOM	O	Connect to a stabilizing capacitor.	
45	GND	G	Ground	

O: Output pin; I: Input pin; P: Power pin; G: Ground pin; NC: Not connect

2. Absolute maximum ratings

Item	Symbol	Condition	Min.	Max.	Unit	Remark
Supply Voltage	VDD1, HS_VCC	GND=0V	-0.3	+3.6	V	
Supply Voltage	VSP, VDD3	GND=0V	-0.3	+6.6	V	
Supply Voltage	VSN	GND=0V	-6.6	+0.3	V	
Input Voltage	V _{IN}	GND=0V	-0.3	VDD1+0.3	V	RESX
HS Input Voltage	V _{HSIN}	GND=0V	-0.3	+2	V	D0_P/N, D1_P/N, D2_P/N, D3_P/N, CLK_P/N

Note : If the operating condition exceeds the absolute maximum ratings, the TFT-LCD module may be damaged permanently. Also, if the module operated with the absolute maximum ratings for a long time, its reliability may drop.

3. Electrical characteristics

3.1 Recommended operating conditions (GND=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Power Supply	VDD1, HS_VCC	1.7	1.8	1.9	V	
	VSP, VDD3	5.2	5.4	5.6	V	
	VSN	-5.6	-5.4	-5.2	V	
RESX high level	V _{RH}	0.7* VDD1	-	VDD1	V	
RESX low level	V _{RL}	GND	-	0.3* VDD1	V	

3.2 Electrical characteristics (GND=0V)

Item	Symbol	Min.	Typ.	Max.	Unit	Remark
Current for VDD1 & HS_VCC	I _{VDD1}	-	16	19.5	mA	VDD1 & HS_VCC = 1.8V (Note1,2)
Current for VSP & VDD3	I _{VSP}	-	9	11	mA	VSP & VDD3 = 5.4V (Note1,2)
Current for VSN	I _{VSN}		-7.3	-8.8	mA	VSN = -5.4V (Note1,2)

Note1: Test Condition is under typical electrical DC and AC characteristics.

Note2: white pattern, Frame rate: 60Hz, other registers are default setting.



A062EAN01.0 Product Spec	Version	0.0
	Page	9/24

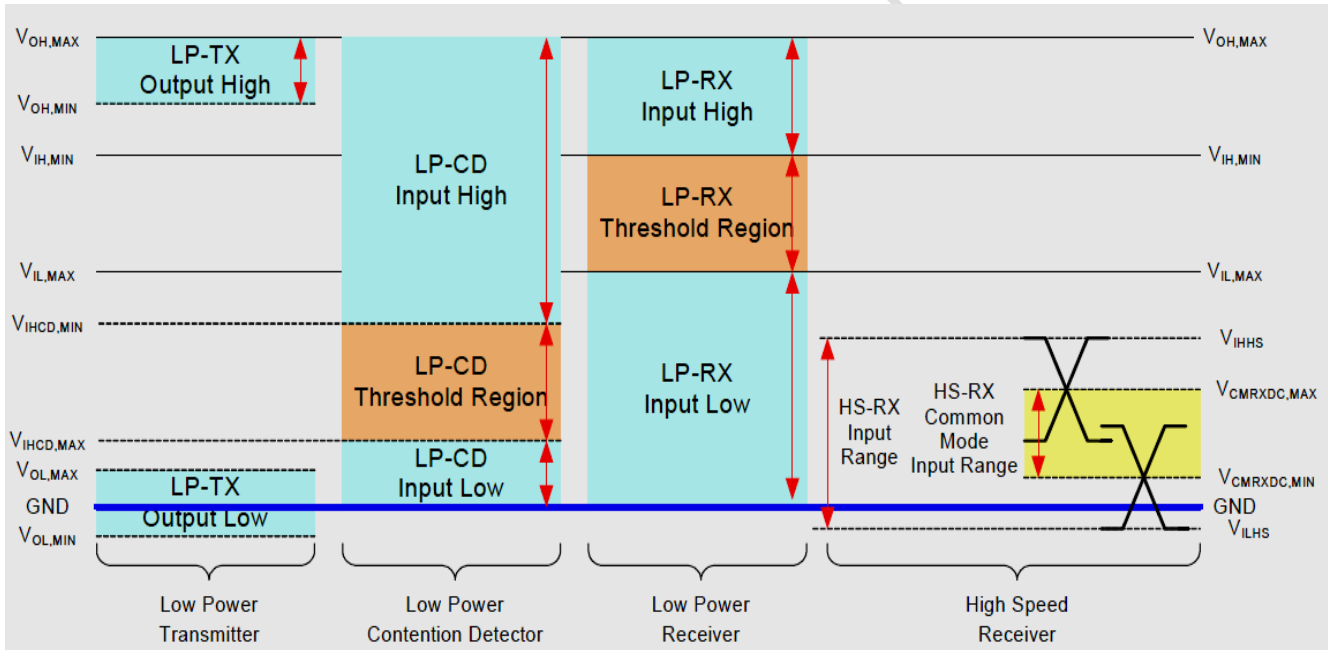
3.3 Recommended Capacitance Values of External Capacitor

The recommended capacitance values of the external capacitor are shown below. These values should be finally determined only after performing sufficient evaluation on the module.

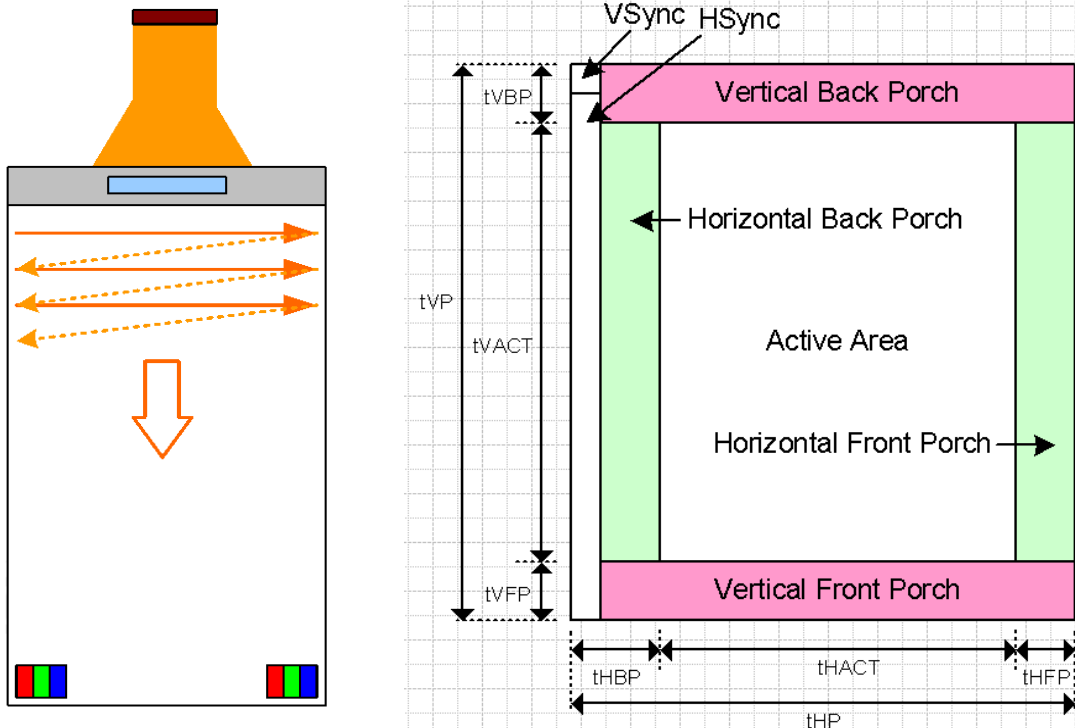
Pin name	Type	Value	Connection
VDD1	Cap	2.2uF, 6.3V	
HS_VCC	Cap	2.2uF, 6.3V	
VSP	Cap	2.2uF, 10V	
VSN	Cap	2.2uF, 10V	
VDD3	Cap	2.2uF, 10V	
VGH	Cap	1uF, 25V	
	Schottky Diode	$V_F < 0.4V/20mA@25^\circ C, V_R \geq 30V$	VGH(-) to VSP(+)
VGL	Cap	1uF, 25V	
	Schottky Diode	$V_F < 0.4V/20mA@25^\circ C, V_R \geq 30V$	VSN(-) to VGL(+)
	Schottky Diode	$V_F < 0.4V/20mA@25^\circ C, V_R \geq 30V$	GND(-) to VGL(+)
VCOM	Cap	2.2uF, 6.3V	
VDDD	Cap	2.2uF, 6.3V	
HS_LDO	Cap	2.2uF, 6.3V	
VREF	Cap	1uF, 6.3V	
VCL	Cap	2.2uF, 6.3V	
VSPR	Cap	2.2uF, 10V	
VSNR	Cap	2.2uF, 10V	
C21P, C21N	Cap	1uF, 16V	
C22P, C22N	Cap	1uF, 16V	
C31P, C31N	Cap	1uF, 16V	
C41P, C41N	Cap	2.2uF, 6.3V	

4. MIPI electrical characteristics (MIPI D-PHY version 1.0)

Symbol	Parameter	Min	Typ	Max	Unit
V_{IHHS}	Single-ended input high voltage			460	mV
V_{ILHS}	Single-ended input low voltage	-40			mV
V_{CMRXDC}	Common-mode voltage	70		330	mV
V_{IDTH}	Different input high threshold			70	mV
V_{IDTL}	Different input low threshold	-70			mV
$V_{TERM-EN}$	Single-ended threshold for HS termination enable			450	mV
Z_{ID}	Differential input impedance	80	100	125	Ω
V_{IH}	Logic 1 input threshold	880			mV
V_{IL}	Logic 0 input threshold			550	mV
V_{HYST}	Input hysteresis	25			mV



5. Input timing format



Parameter	Symbol	Frame rate (Hz)	Unit	
		60 (Typ.)		
DSI Clock Frequency	-	234	MHz	
Data Lane	-	4	-	
VSYNC	Back Porch	tVBP	10	Line
	Active Area	tVACT	1280	Line
	Front Porch	tVFP	10	Line
	Period	tVP	1300	Line
HSYNC	Back Porch	tHBP	432	Byte/4Lane
	Active Area	tHACT	2160	Byte/4Lane
	Front Porch	tHFP	408	Byte/4Lane
	Period	tHP	3000	Byte/4Lane

C. Optical specification

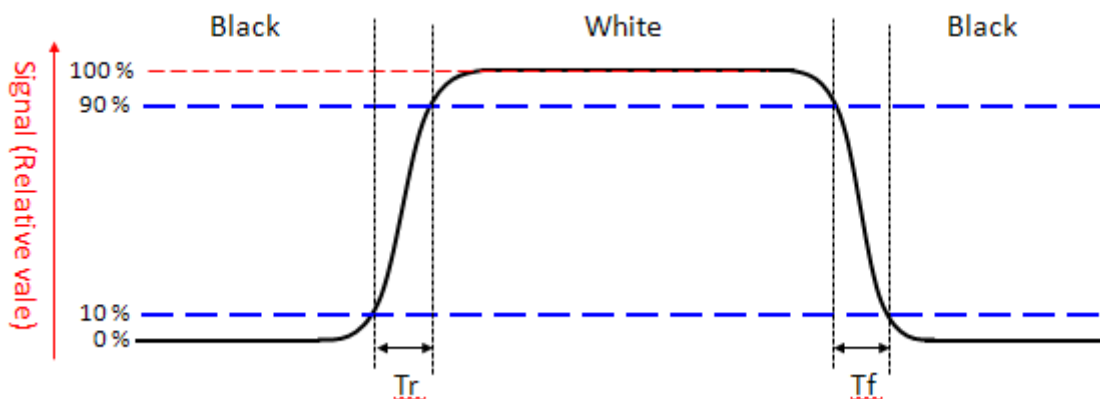
Item	Symbol	Condition	Min.	Typ.	Max.	Unit	Remark	
Response time	Rise	$\theta = 0^\circ$	-	15	36	ms	Note 4	
	Fall							Tf
Contrast ratio	CR	At optimized viewing angle	750	1000	-		Note 5	
Viewing angle	Top	φ_T	$CR \geq 10$	70	80	-	deg.	Note 6
	Bottom	φ_B						
	Left	φ_L						
	Right	φ_R						
Transmittance	Tr		4.18	4.64		%		

Note 1. Ambient temperature = 25°C.

Note 2. To be measured in the dark room.

Note 3. Definition of response time:

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



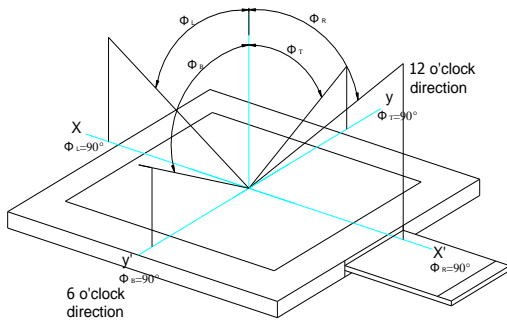
A062EAN01.0 Product Spec	Version	0.0
	Page	13/24

Note 4. 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 5. Definition of viewing angle:





A062EAN01.0 Product Spec	Version	0.0
	Page	14/24

D. Reliability test items (Refer to Note 1, Note 2, Note 3)

No.	Test items	Conditions	Remark
1	High temperature storage	Ta= 70°C 240Hrs	
2	Low temperature storage	Ta= -20°C 240Hrs	
3	High temperature operation	Ta= 60°C 240Hrs	
4	Low temperature operation	Ta= -10°C 240Hrs	
5	High temperature and high humidity	Ta= 60°C . 90% RH 240Hrs	Operation
6	Heat shock	-20°C~-60°C/50 cycle, 2Hrs/cycle	Non-operation
7	Vibration (with carton)	Random vibration: 0.015G ² /Hz from 5~200Hz -6dB/Octave from 200~500Hz	IEC 68-34
8	Drop (with carton)	Height: 60cm 1 corner, 3 edges, 6 surfaces	



A062EAN01.0 Product Spec	Version	0.0
	Page	15/24

E. Packing form

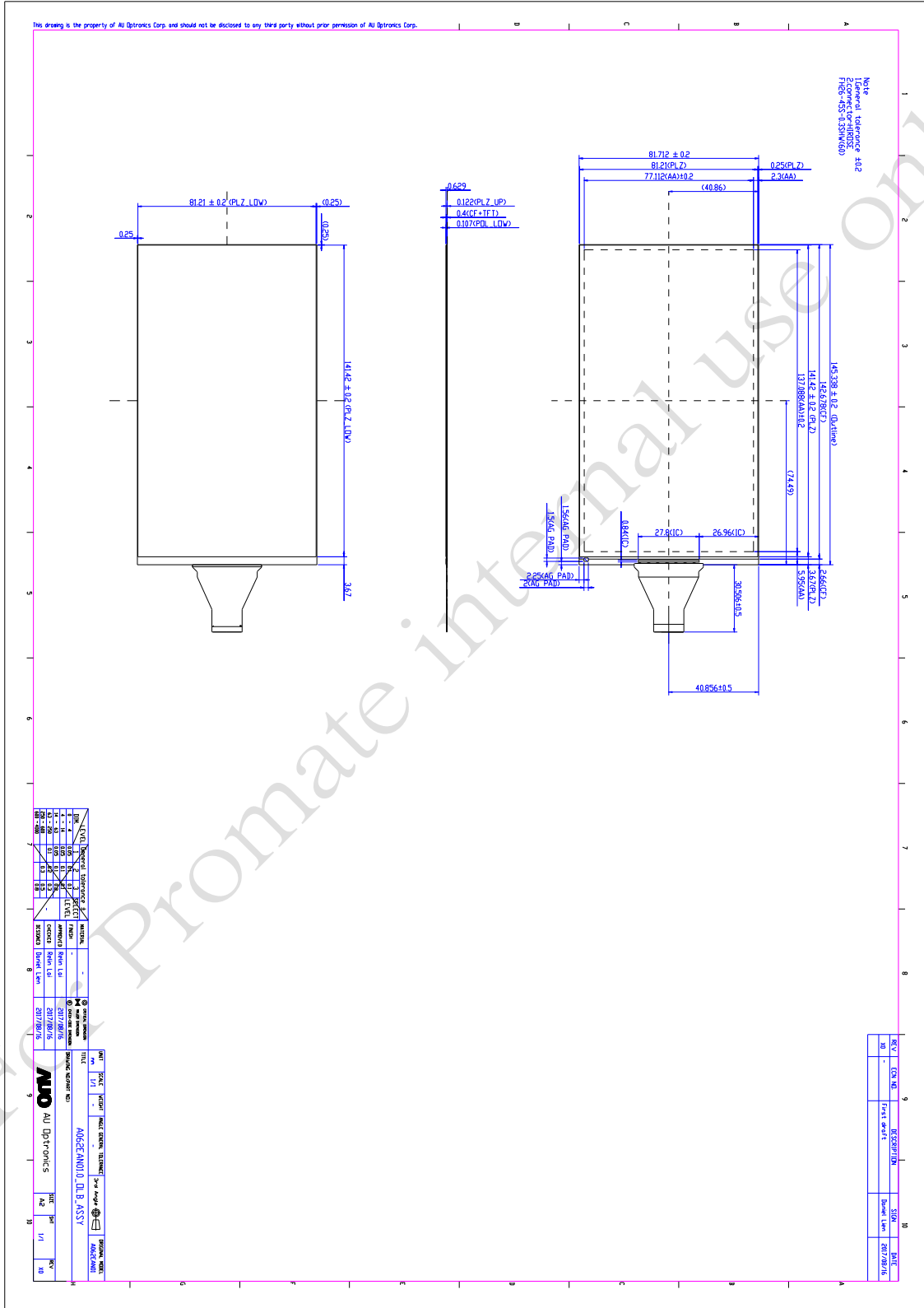
TBD

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A062EAN01.0 Product Spec	Version	0.0
	Page	16/24

F. Outline dimension

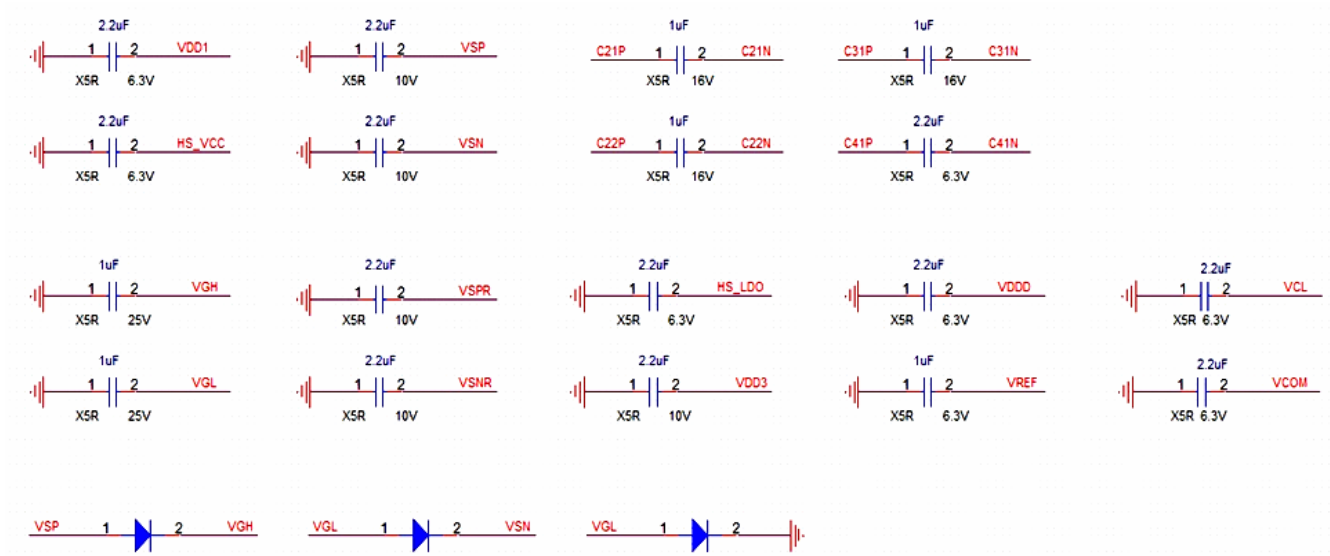




A062EAN01.0 Product Spec	Version	0.0
	Page	17/24

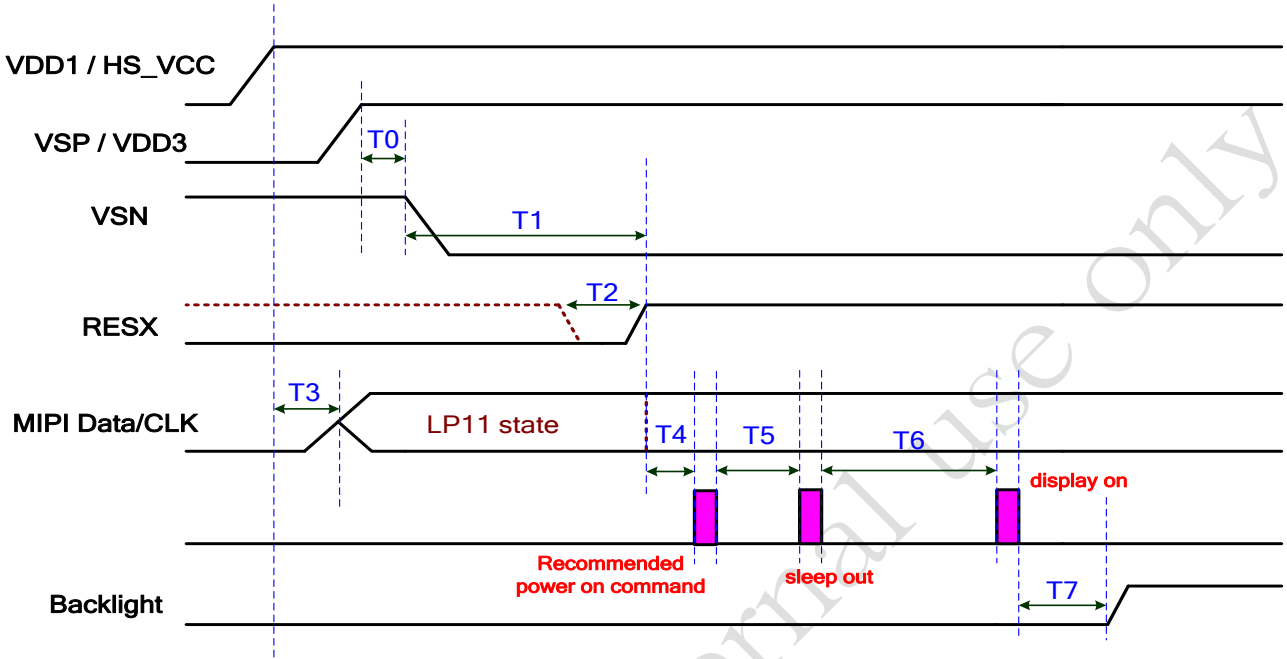
G. Application note

1. Application circuit



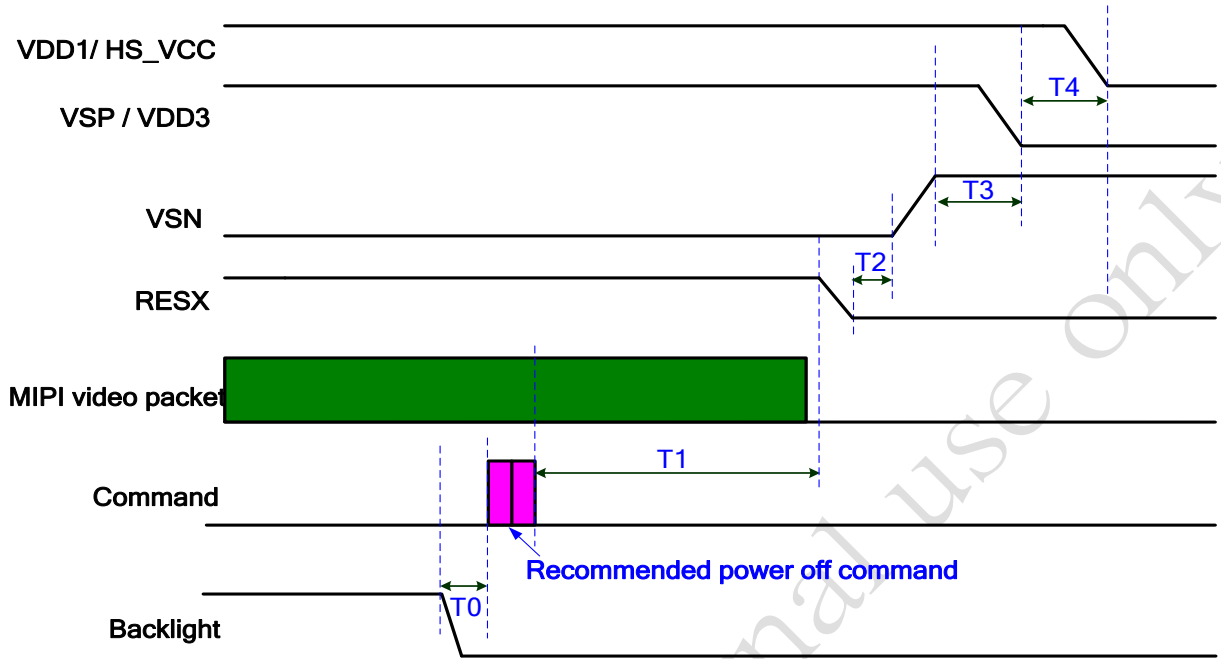
2. Power on/off sequence

2.1 Power on



Parameter	Value	Units
T0	>1	ms
T1	>1	ms
T2	>10	us
T3	>1	ms
T4	>50	ms
T5	>10	ms
T6	>120	ms
T7	>20	ms

2.2 Power off



Parameter	Value	Units
T0	>0	ms
T1	>2	frame
T2	>1	ms
T3	≥0	ms
T4	>5	ms



A062EAN01.0 Product Spec	Version	0.0
	Page	20/24

3. Recommended power on/off command settings

Recommended power on command

Step	Command (HEX)	Parameters index	Parameters (HEX)	Description
1	B9	1	FF	Set EXTC
		2	83	
		3	94	
2	BD	1	02	Set Bank 2
3	D8	1	FF	Abnormal power off setting
		2	FF	
		3	FF	
		4	FF	
		5	FF	
		6	F0	
		7	FF	
		8	FF	
		9	FF	
		10	FF	
		11	FF	
		12	F0	
4	BD	1	00	Set Bank 0
5	B9	1	00	Close EXTC
		2	00	
		3	00	
6	Delay 10 ms			
7	11	-	-	Sleep Out
8	Delay 120 ms			
9	29	-	-	Display On



A062EAN01.0 Product Spec	Version	0.0
	Page	21/24

Recommended power off command

Step	Command (HEX)	Parameters index	Parameters (HEX)	Description
1	28	-	-	Display OFF
2	B9	1	FF	Set EXTC
		2	83	
		3	94	
3	D5	1	19	Set GIP (Normal Scan)
		2	19	
		3	19	
		4	19	
		5	19	
		6	19	
		7	19	
		8	19	
		9	19	
		10	19	
		11	19	
		12	19	
		13	19	
		14	19	
		15	19	
		16	19	
		17	19	
		18	19	
		19	19	
		20	19	
		21	19	
		22	19	
		23	19	
24	19			
25	19			



A062EAN01.0 Product Spec	Version	0.0
	Page	22/24

Step	Command (HEX)	Parameters index	Parameters (HEX)	Description
3	D5	26	19	Set GIP (Normal Scan)
		27	19	
		28	19	
		29	19	
		30	19	
		31	19	
		32	19	
		33	19	
		34	19	
		35	19	
		36	19	
		37	19	
		38	19	
		39	19	
		40	19	
41	19			
42	19			
43	19			
4	D6	1	19	Set GIP (Reverse Scan)
		2	19	
		3	19	
		4	19	
		5	19	
		6	19	
		7	19	
		8	19	
		9	19	
		10	19	
		11	19	
		12	19	
		13	19	



A062EAN01.0 Product Spec	Version	0.0
	Page	23/24

Step	Command (HEX)	Parameters index	Parameters (HEX)	Description
4	D6	14	19	Set GIP (Reverse Scan)
		15	19	
		16	19	
		17	19	
		18	19	
		19	19	
		20	19	
		21	19	
		22	19	
		23	19	
		24	19	
		25	19	
		26	19	
		27	19	
		28	19	
		29	19	
		30	19	
		31	19	
		32	19	
		33	19	
34	19			
35	19			
36	19			
37	19			
38	19			
39	19			
40	19			
41	19			
42	19			
43	19			



A062EAN01.0 Product Spec	Version	0.0
	Page	24/24

Step	Command (HEX)	Parameters index	Parameters (HEX)	Description
5	B1	1	48	Set Power
		2	11	
		3	71	
		4	09	
		5	32	
		6	54	
		7	71	
		8	31	
		9	4D	
		10	11	
6	BD	1	00	Set Bank 0
7	B9	1	00	Close EXTC
		2	00	
		3	00	
8	Delay 5ms			
9	10	-	-	Sleep in