EXAMINED BY : C. H. Chu	EMERGING DISPLAY TECHNOLOGIES CORPORATION	FILE NO . CAS- ISSUE : AUG.09, 2019
APPROVED BY: Yung Chang Hu		TOTAL PAGE : 13 VERSION : P

CUSTOMER ACCEPTANCE SPECIFICATIONS

MODEL NO. :

EVK070019B

(RoHS)

FOR MESSRS :

CUSTOMER'S APPROVAL

DATE :

BY :

RECORDS OF REVISION

DOC . FIRST ISSUE

AUG.09, 2019

DATE	REVISED PAGE NO.	SUMMARY

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1. GENERAL SPECIFICATIONS

1.1 DATA SHEETS FOR EMBEDDED SYSTEM MCU DRIVER
PLEASE REFER TO :

STM32F750

1.2 DATA SHEET FOR CAPACITIVE TOUCH PANEL CONTROLLER/ DRIVER
PLEASE REFER TO :

ILI 2511

1.3 MATERIAL SAFETY DESCRIPTION
ASSEMBLIES SHALL COMPLY WITH EUROPEAN ROHS REQUIREMENTS, INCLUDING PROHIBITED MATERIALS/COMPONENTS CONTAINING LEAD, MERCURY, CADMIUM, HEXAVALENT CHROMIUM, POLYBROMINATED BIPHENYLS (PBB) AND POLYBROMINATED
DIPHENYL ETHERS (PBDE), BIS(2-ETHYLHEXYL) PHTHALATE (DEHP), BUTYL BENZYL PHTHALATE (BBP), DIBUTYL PHTHALATE (DBP), DIISOBUTYL PHTHALATE (DIBP).

2. MECHANICAL SPECIFICATIONS

2.1 EMBEDDED SYSTEM MECHANICAL SPECIFICATIONS

(1) DISPLAY SIZE	----------	7 inch
(2) NUMBER OF DOTS	----------	800W * (RGB) * 480H DOTS
(3) MODULE SIZE	----------	194.4W * 127.44H *13.8D(MAX.) mm
(4) VIEWING AREA	----------	154.4W * 87.44H mm
(5) ACTIVE AREA	----------	153.6W * 86.64H mm
(6) DOT SIZE	----------	0.064W * 0.1805H mm
(7) PIXEL SIZE	----------	0.192W * 0.1805H mm
(8) LCD TYPE	----------	TFT , TRANSMISSIVE, ANTI-GLARE
(9) COLOR	----------	16.7M
(10) VIEWING DIRECTION	----------	6 O'CLOCK (GRAY LEVEL INVERSION)
(11) BACK LIGHT	----------	LED , COLOR : WHITE
(12) INTERFACE MODE	----------	SPI , I2C , RS232 , RS485 , CAN , GPIO USB

2.2 CAPACITIVE TOUCH PANEL MECHANICAL SPECIFICATIONS

(1) TOUCH PANEL SIZE ---------- 7.0 inch

(2) OUTER DIMENSION ---------- 194.4W * 127.44H mm

(3) EFFECTIVE AREA ---------- 154.4W * 87.44H mm

(4) ACTIVE AREA ---------- 155.6W * 91.01H mm

(5) INPUT TYPE ---------- MULTI TOUCH *

(6) NUMBER OF TOUCH SENSOR ---------- 28*16 SENSORS

*NOTE: ACCORDING TO IMPLEMENTATION DESIGN

3. ABSOLUTE MAXIMUM RATINGS

3.1 EMBEDDED SYSTEM ELECTRICAL ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	MIN.	MAX.	UNIT	REMARK
POWER VOLTAGE	VP_IN	-0.3	+40	V	VSS=0
INPUT VOLTAGE	VIN	-0.3	4.0	V	

3.2 ENVIRONMENTAL ABSOLUTE MAXIMUM RATINGS

ITEM	OPERATING		STORAGE		REMARK
	MIN.	MAX.	MIN.	MAX.	
AMBIENT TEMPERATURE	-20°C	70°C	-30°C	80°C	NOTE (1) , (2)
HUMIDITY	NOTE (3)		NOTE (3)		WITHOUT CONDENSATION
VIBRATION	—	2.45 m/s^2 (0.25 G)	—	11.76 m/s^2 (1.2 G)	10~100Hz XYZ DIRECTIONS 1Hr. EACH
SHOCK	—	29.4 m/s^2 (3 G)	—	490 m/s^2 (50 G)	10ms XYZ DIRECTIONS 1 TIME EACH
CORROSIVE GAS	NOT ACCEPTABLE		NOT ACCEPTABLE		

NOTE (1)：Ta AT -30°C：48HRS MAX.
80°C：168HRS MAX.

NOTE (2)：BACKGROUND COLOR CHANGES SLIGHTLY DEPENDING ON AMBIENT TEMPERATURE THIS PHENOMENON IS REVERSIBLE.

NOTE (3)：Ta ≤ 60°C：90%RH MAX (96HRS MAX).
Ta > 60°C：ABSOLUTE HUMIDITY MUST BE LOWER THAN THE HUMIDITY OF 90%RH AT 60°C(96HRS MAX).

4. ELECTRICAL CHARACTERISTICS

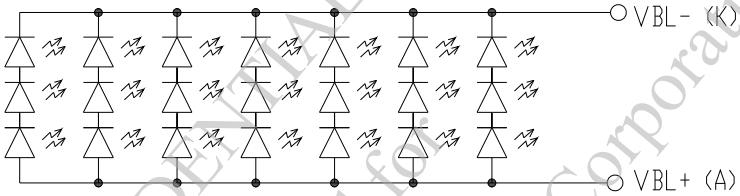
4.1 EMBEDDED SYSTEM ELECTRICAL CHARACTERISTICS

Ta = 25 °C

PARAMETER	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT	REMARK
POWER SUPPLY VOLTAGE	VP_IN	—	7	12	36	V	VGND=0
POWER SUPPLY CURRENT	I_{VP_IN}	VP_IN=7V	—	440	530	mA	—
	I_{VP_IN}	VP_IN=12V	—	265	320	mA	—
	I_{VP_IN}	VP_IN=36V	—	98	120	mA	—
LED LIFE TIME	—	—	30K	—	—	hrs	NOTE (4) NOTE (5)

NOTE (1)：VIL/VIH/VOL/VOH REFER TO STM32F750 DATA SHEET

NOTE (2)：INTERNAL CIRCUIT DIAGRAM OF BACKLIGHT



NOTE (3)：MAXIMUM ALLOWED CURRENT IN LEDS VS. TEMPERATURE ARE AUTOMATICALLY ADJUSTED BY SYSTEM CONTROLLER.

NOTE (4)：CONDITIONS; TA=25 °C, CONTINUOUS LIGHTING

NOTE (5)：DEFINITIONS OF FAILURE
LCD LUMINANCE BECOMES HALF OF THE INITIAL VALUE.

5. TIMING CHARACTERISTICS

REFER TO STM32F750 DATA SHEET

6. MCU CHARACTERISTICS

PARAMETER	MEMORY SIZE		REMARK
	INTERNAL	EXTERNAL	
SD RAM	320KB	16 MB	
FLASH	64KB	32 MB	

NOTE：THE FLASH MEMORY SIZE CAN BE UP TO 128MB

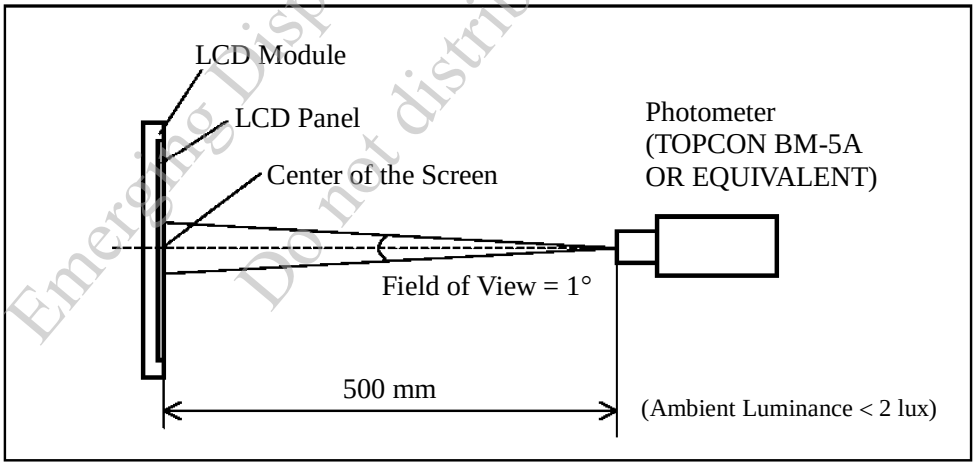
7. OPTICAL CHARACTERISTICS (NOTE 1)

7.1 OPTICAL CHARACTERISTICS

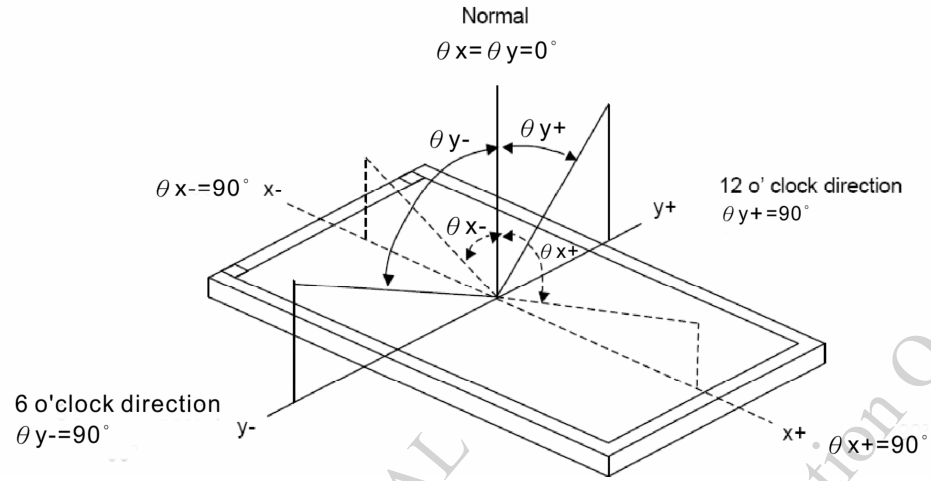
Ta = 25 ± 2 °C

ITEM		SYMBOL	CONDITION		MIN.	TYP.	MAX.	UNIT	REMARK
VIEWING ANGLE		θ_{y+}	CR ≥ 10	θ_x=0°	40	50	—	deg.	NOTE (2) NOTE (3)
		θ_{y-}			50	60	—		
		θ_{x+}		θ_y=0°	60	70	—		
		θ_{x-}			60	70	—		
CONTRAST RATIO (CENTER)		CR	θx=0° , θy=0°		400	500	—	—	NOTE (3)
RESPONSE TIME		$T_R + T_F$	θx=0° , θy=0°		—	25	35	msec	NOTE (4)
COLOR CHROMATICITY (CENTER)	WHITE	Wx	θx=0° , θy=0° NTSC : 50 %		0.26	0.31	0.36	—	NOTE (5)
		Wy			0.29	0.34	0.39		
	RED	Rx			0.57	0.62	0.67	—	
		RY			0.32	0.37	0.42		
	GREEN	Gx			0.30	0.35	0.40	—	
		Gy			0.54	0.59	0.64		
	BLUE	Bx			0.11	0.16	0.21	—	
		By			0.07	0.12	0.17		
THE BRIGHTNESS OF MODULE (CENTER)		B	θx=0° , θy=0°		250	290	—	cd/m^2	NOTE (6)
THE UNIFORMITY OF MODULE		—	θx=0° , θy=0°		65	70	—	%	NOTE (7)

NOTE (1)：TEST CONDITION：
AFTER STABILIZING AND LEAVING THE PANEL ALONE AT A GIVEN TEMPERATURE FOR 30 MINUTES. MEASUREMENT SHOULD BE EXECUTED IN A STABLE, WINDLESS, AND DARK ROOM.



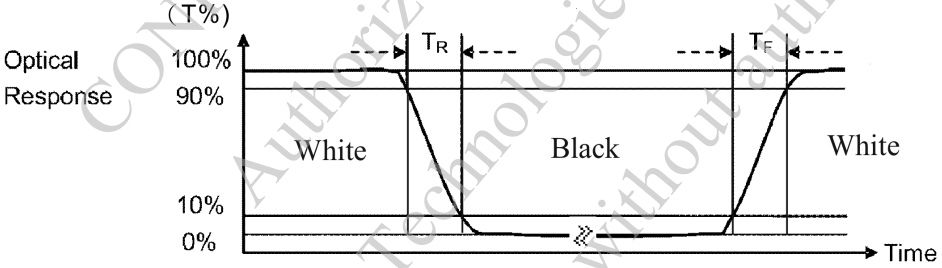
NOTE (2)：DEFINITION OF VIEWING ANGLE :



NOTE (3)：DEFINITION OF CONTRAST RATIO (CR) :
MEASURED AT THE CENTER POINT OF MODULE

$$\text{CONTRAST RATIO(CR)} = \frac{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "WHITE STATE"}}{\text{BRIGHTNESS MEASURED WHEN LCD IS AT "BLACK STATE"}}$$

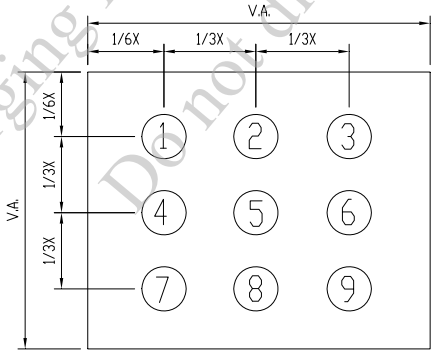
NOTE (4)：DEFINITION OF RESPONSE TIME : T_R AND T_F
THE FIGURE BELOW IS THE OUTPUT SIGNAL OF THE PHOTO DETECTOR.



NOTE (5)：DEFINITION OF COLOR CHROMATICITY
(a)100% RGB PIXEL DATA TRANSMISSION WHEN ALL THE INPUT TERMINALS OF MODULE ARE ELECTRICALLY POWERED ON.
(b)MEASURED AT THE CENTER POINT OF MODULE

NOTE (6)：MEASURED THE BRIGHTNESS OF WHITE STATE AT CENTER POINT.

NOTE (7)：(a)DEFINITION OF BRIGHTNESS UNIFORMITY

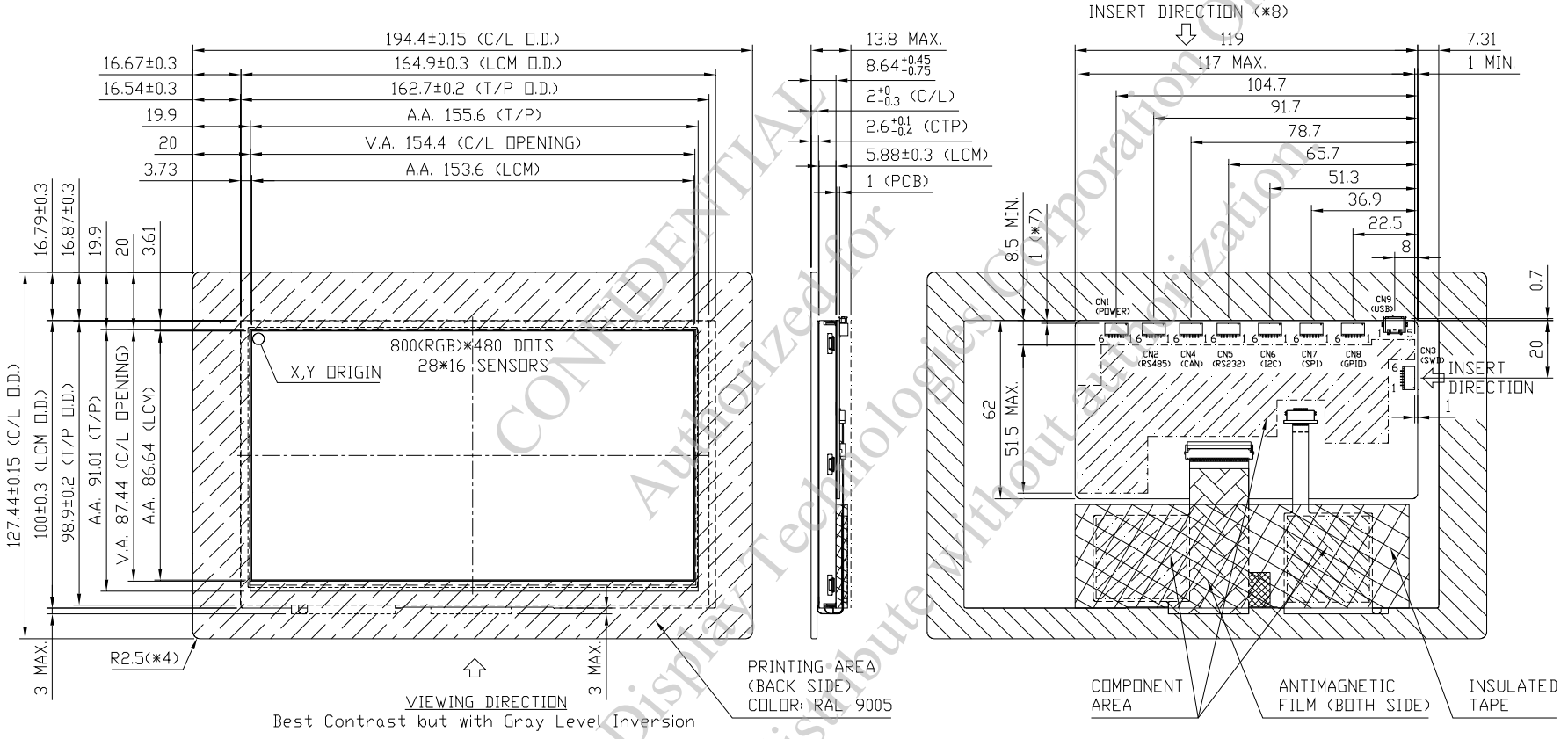


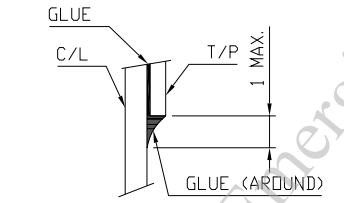
UNIT：mm

(b)THE BRIGHTNESS UNIFORMITY CALCULATING METHOD

$$\text{UNIFORMITY}：\frac{\text{MINIMUM BRIGHTNESS}}{\text{MAXIMUM BRIGHTNESS}} * 100\%$$

8. OUTLINE DIMENSIONS

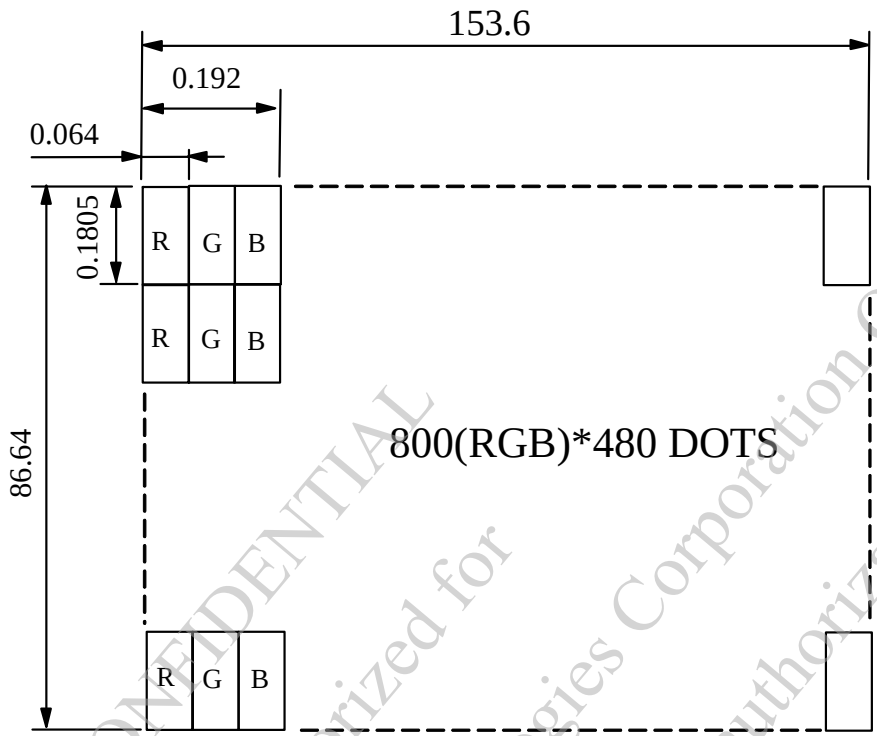




GLUE EXTENSION LIMITATION

UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.5
NOTE :
1.C/L GLASS : SODA LIME, CHAMFERED EDGES.
2.CN1~CN8 : JST SM06B-SRSS-TB(LF)(SN)
3.CN9 : MOLEX 47590-0001
4.POLARIZER VISIBLE IN THE VIEWING AREA OF COVER LENS IS ACCEPTABLE.

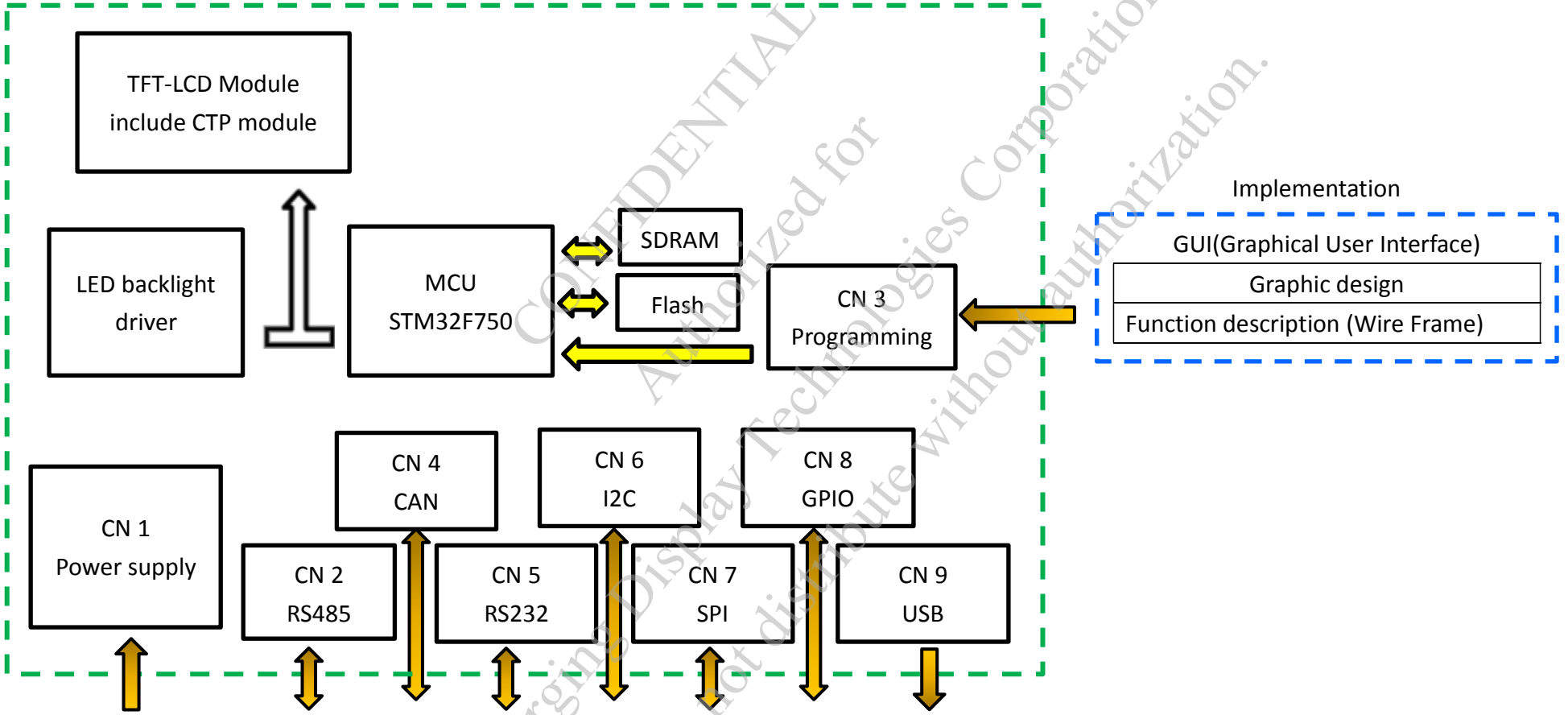
9. DETAIL DRAWING OF DOT MATRIX



UNIT : mm
SCALE : NTS
NOT SPECIFIED TOLERANCE IS ± 0.1
DOTS MATRIX TOLERANCE IS ± 0.01

10. BLOCK DIAGRAM

10.1 BLOCK DIAGRAM



10.2 IMPLEMENTATION TURN-KEY SOLUTION

BUSINESS MODEL	IMPLEMENTATION	GRAPHIC DESIGN
MODEL 1	EDT	EDT
MODEL 2	EDT	CUSTOMER / THIRD PARTY
MODEL 3	CUSTOMER / THIRD PARTY	CUSTOMER / THIRD PARTY

NOTE：THE MODEL 3 WILL REQUIRE THE SOFTWARE IMPLEMENTATION BY CUSTOMER OR A THIRD PARTY. CUSTOMER OR THIRD PARTY WILL NEED TO PROVIDE A BIN OR HEX FILE TO EDT DURING INITIAL DESIGN/DEVELOPMENT STAGE OF PROJECT, AND COULD REFERENCE TouchGFX FOR THIS DEVELOPMENT.

11. INTERFACE SIGNALS

11.1 CN1 POWER SUPPLY INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VP_IN	POWER SUPPLY (7~36V)
2	VP_IN	POWER SUPPLY (7~36V)
3	VP_EN	POWER SUPPLY ENABLE (INTERNAL PULL HIGH)
4	NC	NOT CONNECT
5	VSS	GROUND
6	VSS	GROUND

11.2 CN2 RS485 INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VSS	GROUND
2	VSS	GROUND
3	RS485A	RS485-A
4	RS485B	RS485-B
5	VSS	GROUND
6	VSS	GROUND

11.3 CN3 PROGRAMMING INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	3V3	POWER SUPPLY (3.3V OUTPUT)
2	SWO	SWO
3	SWDIO	DATA
4	SWCLK	CLOCK
5	NRST	RESET
6	VSS	GROUND

11.4 CN4 CAN INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VSS	GROUND
2	VSS	GROUND
3	CANL	LOW LEVEL CAN BUS SIGNAL
4	CANH	HIGH LEVEL CAN BUS SIGNAL
5	VSS	GROUND
6	VSS	GROUND

11.5 CN5 RS232 INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VSS	GROUND
2	RTS	REQUEST TO SEND
3	TX1	TRANSMIT DATA
4	RX1	RECEIVE DATA
5	CTS	CLEAR TO SEND
6	VSS	GROUND

11.6 CN6 I2C INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	3V3	3.3V OUTPUT
2	I2C_SCL	CLOCK INPUT
3	I2C_SDA	DATA INPUT AND OUTPUT
4	I2C_INT	INTERRUPT SIGNAL
5	I2C_RST	RESET SIGNAL
6	VSS	GROUND

11.7 CN7 SPI INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	3V3	3.3V OUTPUT
2	SPI_NSS	CHIP SELECT SIGNAL
3	SPI_SCK	SERIAL CLOCK
4	SPI_MISO	SERIAL DATA OUTPUT
5	SPI_MOSI	SERIAL DATA INPUT
6	VSS	GROUND

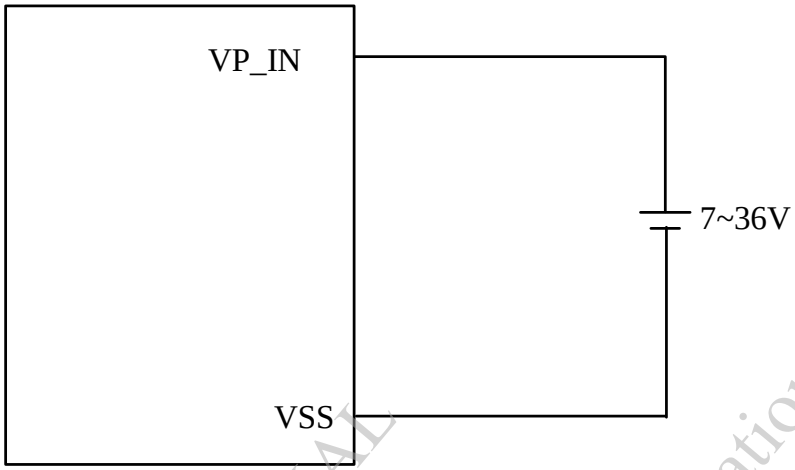
11.8 CN8 GPIO INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	GPIO1	GPIO FUNCTION PER CUSTOMER REQUEST
2	GPIO2	GPIO FUNCTION PER CUSTOMER REQUEST
3	GPIO3	GPIO FUNCTION PER CUSTOMER REQUEST
4	GPIO4	GPIO FUNCTION PER CUSTOMER REQUEST
5	GPIO5	GPIO FUNCTION PER CUSTOMER REQUEST
6	GPIO6	GPIO FUNCTION PER CUSTOMER REQUEST

11.9 CN9 USB INTERFACE

PIN NO.	SYMBOL	FUNCTION
1	VBUS	VBUS
2	DM	USB D -
3	DP	USB D+
4	ID	ID
5	VSS	GROUND

12. POWER SUPPLY



13. CAPACITIVE TOUCH PANEL SPECIFICATION

13.1 HARDNESS

ITEM	DESCRIPTION
SURFACE HARDNESS	7H (min)

13.2 DURABILITY
USING STEEL BALL AND FALLING ON TOUCH PANEL SURFACE, FROM THE HEIGHT MUST PASS BELOW CONDITIONS：

ITEM	CONDITION	INSPECTION METHOD	DESCRIPTION
STEEL BALL DROP TEST	WEIGHT：67g HEIGHT OF FALL：30 cm	VISUAL INSPECTION	SIGN OF FRACTURE OR DAMAGE IS NOT ACCEPTABLE 3 TIMES/ 1 POINTS, 25°C(CENTER TEST)