MiDAS
DISPLAYS

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MDT7000	800 x 480	24-Bit RGB Interface	TFT Module
Specification			
Version: 2		Date: 10/05/2018	
Revision			
1	19/11/2016	First Issue.	
2	10/05/2018	Revised display thickness and FPC placement.	

Display Features		
Display Size	7.0"	
Resolution	800 x 480	
VGA Size	WVGA	
Orientation	Landscape	
Appearance	RGB	
Logic Voltage	3.3V	
Interface	24-Bit RGB	
Brightness	400 cd/m^2	
Touchscreen	N/A	
Module Size	164.90 x 100.00 x 5.70 mm	
Operating Temperature	-20°C ~ +70°C	Box Quantity	Weight / Display
Pinout	40 - Way FFC	---	---

RoHS compliant

DESIGN • MANUFACTURE • SUPPLY

Display Accessories	
Part Number	**Description**
MPBV6	40 Way FFC to cable and wires. Driven by any driver board that can be wired to a 1mm pitch SHDR-40V-S-B receptacle.

Optional Variants	
Appearances	**Voltage**
Resistive Touch Panel Capacitive Touch Panel	

General Specifications

Feature		Spec
Characteristics	Size	7 inch
	Resolution	800(horizontal)*480(Vertical)
	Interface	24-bit RGB
	Connect type	Connector
	Color Depth	16.7M
	Technology type	a-Si
	Display Spec. Pixel pitch (mm)	0.192 x 0.1805
	Pixel Configuration	R.G.B. Vertical Stripe
	Display Mode	Normally White
	Driver IC	
	Surface Treatment	HC
	Viewing Direction	12 O'clock
Mechanical	LCM (W x H x D) (mm)	164.9*100*5.7
	Active Area(mm)	154.08 x 85.92
	With /Without TSP	Without TSP
	Weight (g)	TBD
	LED Numbers	27 LEDs

Note 1: Viewing direction is follow the data which measured by optics equipment.
Note 2: Requirements on Environmental Protection: RoHS
Note 3: LCM weight tolerance: +/- 5%

DESIGN • MANUFACTURE • SUPPLY

Input/Output Terminals

No.	Symbol	Description
1	K	Power for LED backlight cathode
2	A	Power for LED backlight anode
3	GND	Ground
4	VDD	Power supply
5~12	R0~R7	Data bus
13~20	G0~G7	Data bus
21~28	B0~B7	Data bus
29	DGND	Ground
30	DOTCLK	Pixel clock
31	DISP	Display on/ off
32	HSYNC	Horizontal sync Signal
33	VSYNC	Vertical sync signal
34	DE	Data Enable
35	NC	No connected
36	GND	System Ground
37	XR(NC)	The right side signal pin of TP
38	YD(NC)	The bottom side signal pin of TP
39	XL(NC)	The left side signal pin of TP
40	YU(NC)	The top side signal pin of TP

Absolute Maximum Ratings

Item	Symbol	MIN	MAX	Unit	Remark
Supply Voltage	V_{CC}	-0.3	6	V	
Operating Temperature	T_{OPR}	-20	70	℃	
Storage Temperature	T_{STG}	-30	80	℃	

Electrical Characteristics

Driving TFT LCD Panel

Parameter	Symbol	Min	Typ	Max	Unit
Supply Voltage	VDD	3.0	3.3	3.6	V
Current of power supply	IVDD	-	4.0	10	mA
Input voltage 'H' level	VIH	0.7VDD	-	VDD	V
Input voltage 'L' level	VIL	0	-	0.3VDD	V

Ta = 25 °C

Interface Timing

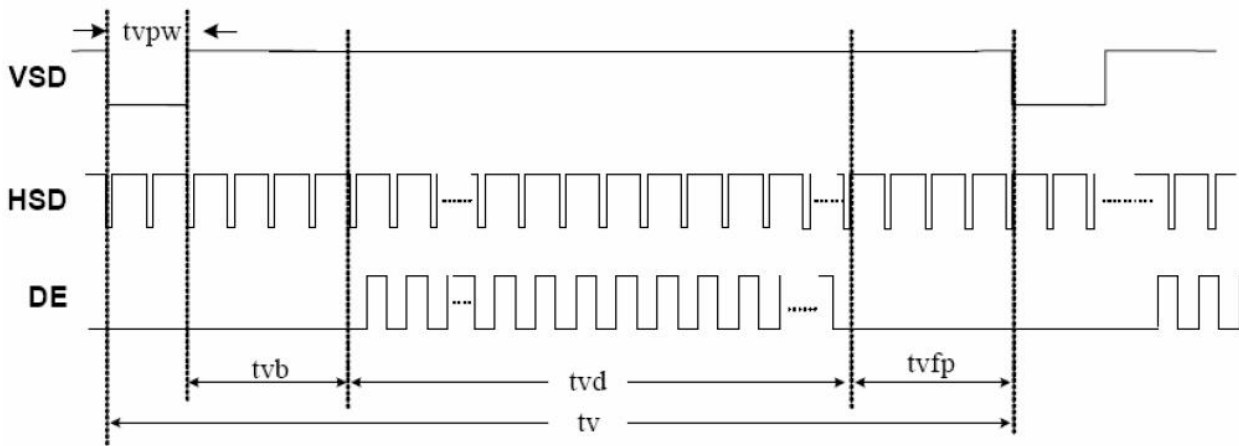| Item	Symbol	Min.	Typ.	Max.	Unit	Note
DCLK cycle time	Tcph	25			ns	
DCLK frequency	fclk		30	40	MHz	
DCLK pulse duty	Tcwh	40	50	60	%	
VSD setup time	Tvst	8			ns	
VSD hold time	Tvhd	8			ns	
HSD setup time	Thst	8			ns	
HSD hold time	Thhd	8			ns	
Data setup time	Tdsu	8			ns	
Data hold time	Tdhd	8			ns	
DE setup time	Tesu	8			ns	
DE hold time	Tehd	8			ns	
Horizontal display area	thd		800		Tcph	
HSD period time	th		928		Tcph	
HSD pulse width	thpw	1	48		Tcph	
HSD back porch	thb		40		Tcph	
HSD front porch	thfp		40		Tcph	
Vertical display area	tvd		480		th	
VSD period time	tv		525		th	
VSD pulse width	tvpw		3		th	
VSD back porch	tvb		29		th	
VSD front porch	tvfp		13		th	

Timing Diagram of Interface Signal
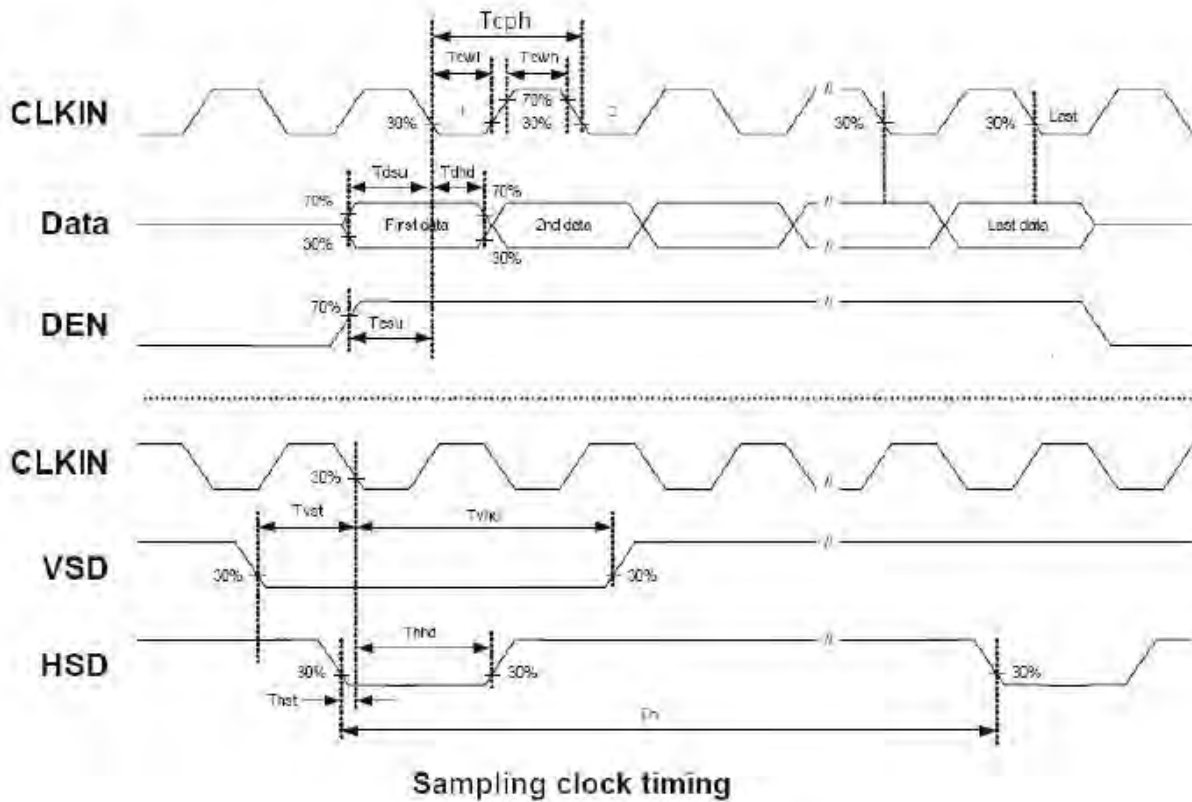
Sampling clock timing
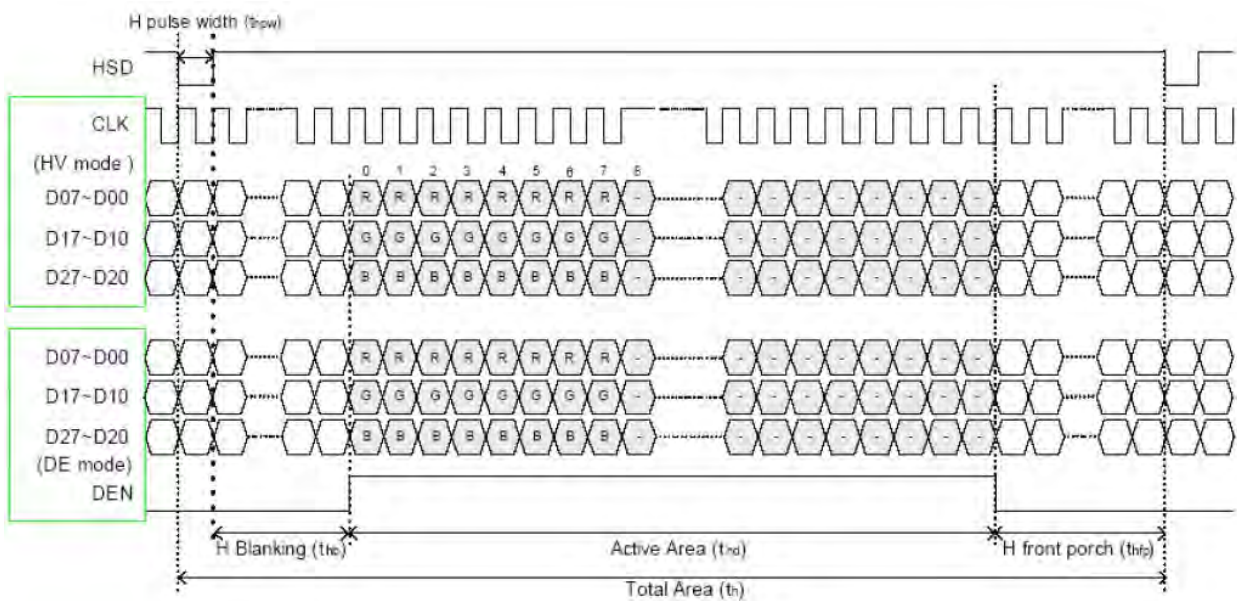
Horizontal display timing range

Vertical timing

Driving Backlight

Item	Symbol	MIN	TYP	MAX	Unit	Remark
Forward Current	I_F		160		mA	
Forward Voltage	V_F	9.3	9.6	9.9	V	
Backlight Power consumption	W_{BL}				W	

Note 1: Each LED : IF =20 mA, VF =3.2V.

Note 2: Optical performance should be evaluated at Ta=25℃ only.

Note 3: If LED is driven by high current, high ambient temperature & humidity condition. The life time of LED will be reduced.Operating life means brightness goes down to 50% initial brightness. Typical operating life time is estimated data.
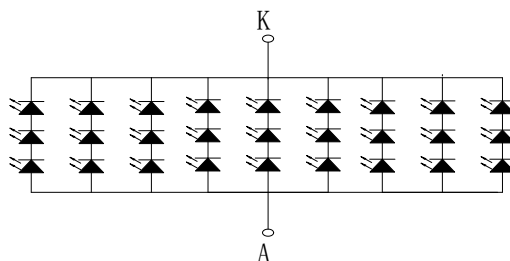

Figure : LED connection of backlight

Optical Characteristics

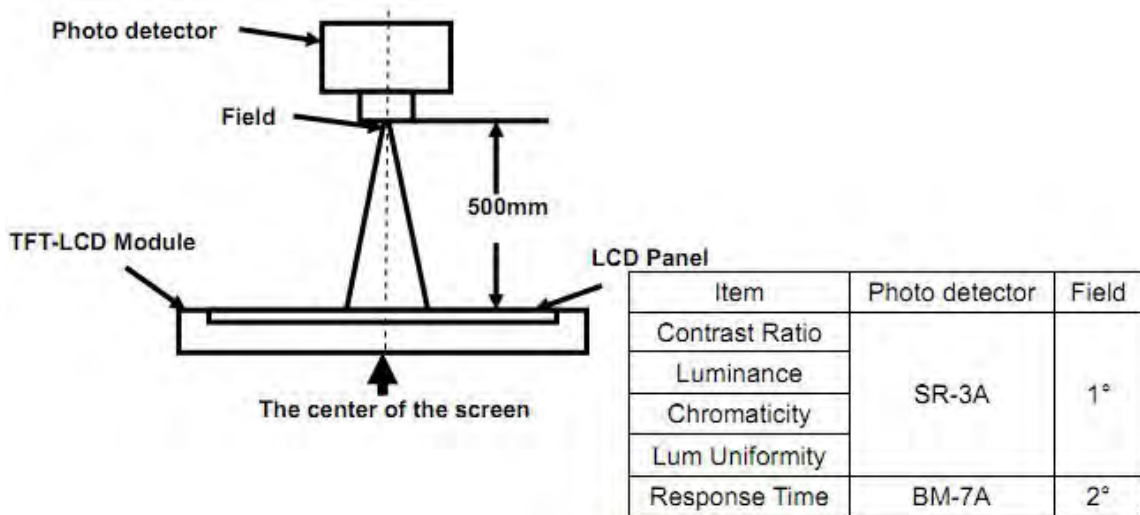| Items		Symbol	Condition	Min.	Typ.	Max.	Unit	Remark
Viewing angles		θ_T	Center CR≥10		45	-	Degree.	Note2
		θ_B			65	-		
		θ_L			65	-		
		θ_R			65	-		
Contrast Ratio		CR	Θ =0	-	400	500	-	Note1, Note3
Response Time		T_{ON}	25° C	-	5	7	ms	Note1, Note4
		T_{OFF}		-	20	28		
Chromaticity	White	X_W	Backlight is on	TBD	TBD	TBD	-	Note1, Note5
		Y_W		TBD	TBD	TBD	-	
	Red	X_R		TBD	TBD	TBD	-	
		Y_R		TBD	TBD	TBD	-	
	Green	X_G		TBD	TBD	TBD	-	
		Y_G		TBD	TBD	TBD	-	
	Blue	X_B		TBD	TBD	TBD	-	
		Y_B		TBD	TBD	TBD	-	
Uniformity		U		-	70	-	%	Note1, Note6
Luminance		L		300	400			Note1, Note7

Test Conditions:

1. IF= 20mA(one channel),the ambient temperature is 25.

2. The test systems refer to Note 1 and Note 2.

Note 1:Definition of optical measurement system.

The optical characteristics should be measured in dark room. After 5 minutes operation, the optical properties are measured at the center point of the LCD screen. All input terminals LCD panel must be ground when measuring the center area of the panel.

Item	Photo detector	Field
Contrast Ratio	SR-3A	1°
Luminance		
Chromaticity		
Lum Uniformity		
Response Time	BM-7A	2°

Note 2: Definition of viewing angle range and measurement system.
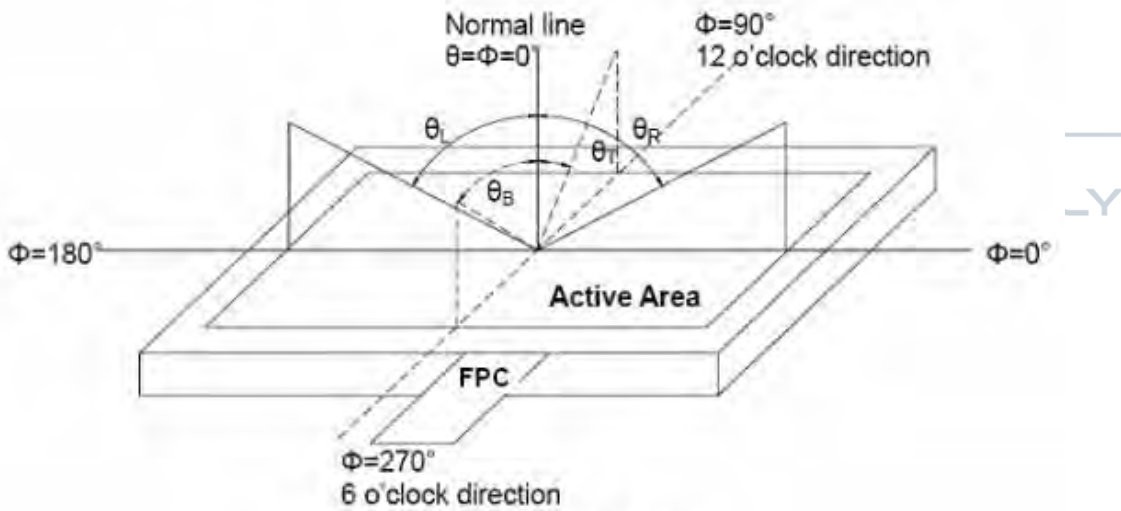viewing angle is measured at the center point of the LCD by CONOSCOPE(ergo-80).


Fig. 1 Definition of viewing angle

Note 3: Definition of contrast ratio

$$\text{Contrast ratio (CR)} = \frac{\text{Luminance measured when LCD is on the "White" state}}{\text{Luminance measured when LCD is on the "Black" state}}$$

Note 4: Definition of Response time
The response time is defined as the LCD optical switching time interval between "White" state and "Black" state. Rise time (TON) is the time between photo detector output intensity changed from 90% to 10%. And fall time (TOFF) is the time between photo detector output intensity changed from 10% to 90%.
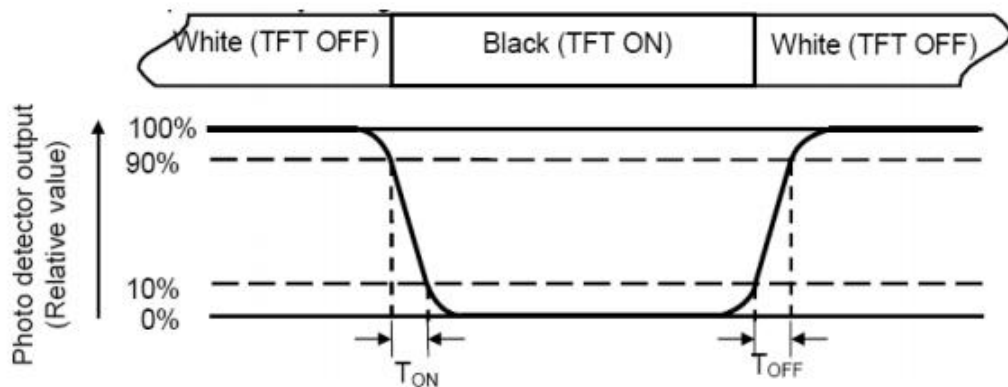
Note 5: Definition of color chromaticity (CIE1931)
Color coordinates measured at center point of LCD.
Note 6: Definition of Luminance Uniformity
Active area is divided into 9 measuring areas (Refer Fig. 2). Every measuring point is placed at the center of each measuring area.
Luminance Uniformity(U) = Lmin/ Lmax
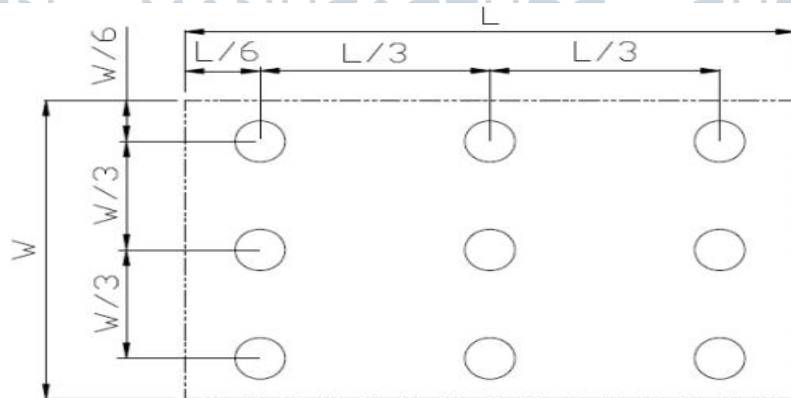L-------Active area length W----- Active area width

Fig. 2 Definition of uniformity
Lmax: The measured maximum luminance of all measurement position.
Lmin: The measured minimum luminance of all measurement position.

Note 7: Definition of Luminance :
Measure the luminance of white state at center point.
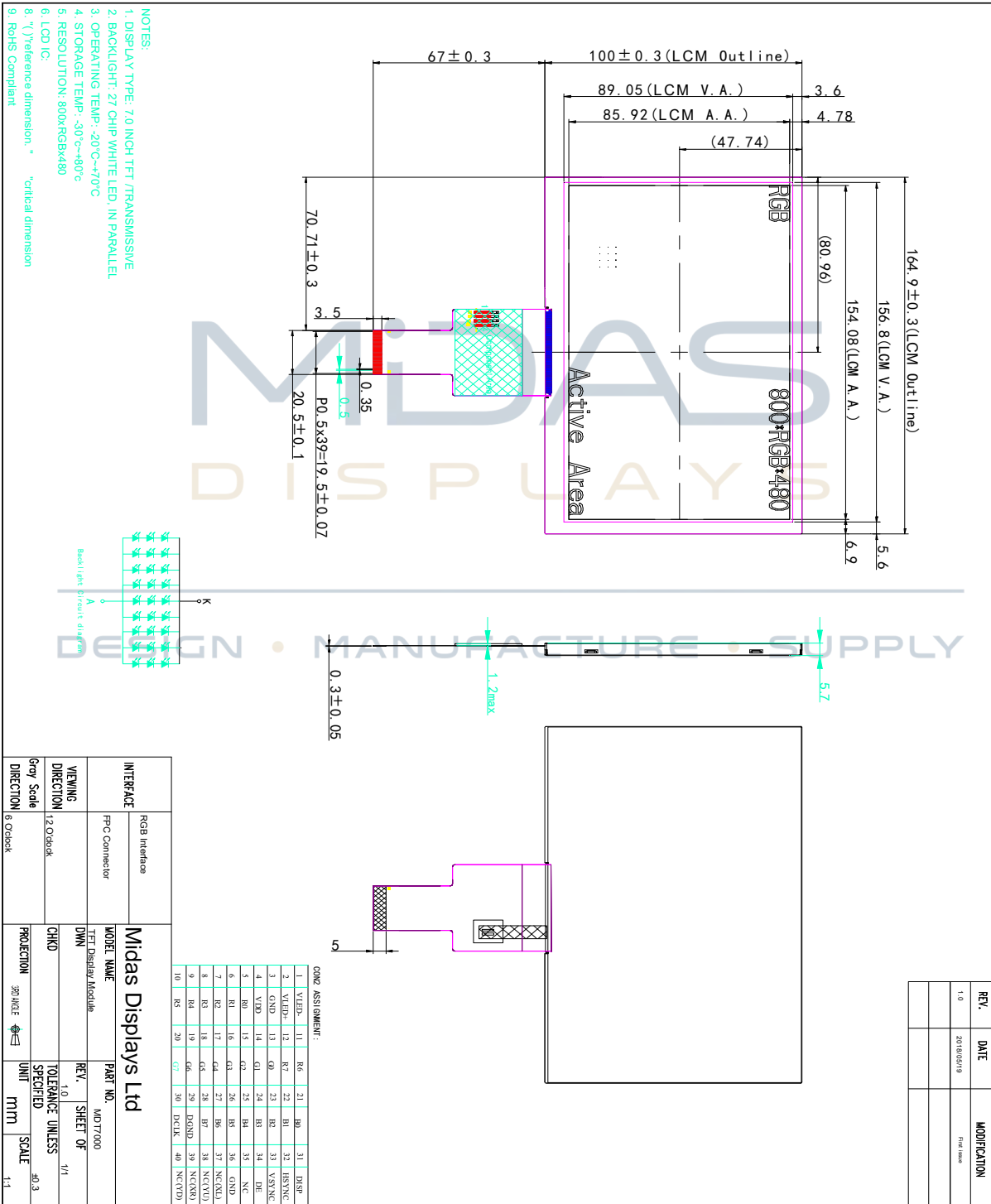
Environmental / Reliability Tests

No	Test Item	Condition	Remarks
1	High Temperature Opeartion	Ts= +70℃, 240hrs	Note 1 IEC60068-2-2, GB2423. 2-89
2	Low Temperature Opeartion	Ta= -20℃, 240hrs	Note 2 IEC60068-2-1 GB2423.1-89
3	High Temperature Storage	Ta= +80℃, 240hrs	IEC60068-2-2 GB2423. 2-89
4	Low Temperature Storage	Ta= -30℃, 240hrs	IEC60068-2-1 GB/T2423.1-89
5	High Temperature & Humidity Storage	Ta= +60℃, 90% RH max, 160 hours	IEC60068-2-3 GB/T2423.3-2006
6	Thermal Shock (Non-operation)	-30℃ 30 min ~ +80℃ 30 min Change time: 5min, 30 Cycle	Start with cold temperature,end with high temperature IEC60068-2-14, GB2423.22-87
7	Electro Static Discharge (Opeartion)	C=150pF, R=330 Ω, 5 points/panel Air:±8KV, 5 times; Contact: ±4KV, 5 times; (Environment: 15℃ ~ 35℃, 30% ~ 60%, 86Kpa ~ 106Kpa)	IEC61000-4-2 GB/T17626.2-1998
8	Vibration (Non-operation)	Frequency range: 10~55Hz, Stroke: 1.mm Sweep: 10Hz~55Hz~10Hz 2 hours for each direction of X .Y. Z. (package condition)	IEC60068-2-6 GB/T2423.5-1995
9	Shock (Non-operation)	60G 6ms, ± X, ±Y, ± Z 3 times for each direction	IEC60068-2-27 GB/T2423.5-1995
10	Package Drop Test	Height: 80 cm, 1 corner, 3 edges, 6 surfaces	IEC60068-2-32 GB/T2423.8-1995

Note: 1. T$_S$ is the temperature of panel's surface.

    2. Ta is the ambient temperature of sample.

Mechanical Drawing

NOTES:
1. DISPLAY TYPE: 7.0 INCH TFT /TRANSMISSIVE
2. BACKLIGHT: 27 CHIP WHITE LED, IN PARALLEL
3. OPERATING TEMP: -20°C~+70°C
4. STORAGE TEMP: -30°c~+80°c
5. RESOLUTION: 800xRGBx480
6. LCD IC:
7. ( ) reference dimension. "
8. "( )"critical dimension
9. RohS Compliant

67±0.3
100±0.3(LCM Outline)
89.05(LCM V.A.)
3.6
85.92(LCM A.A.)
4.78
(47.74)
70.71±0.3
3.5
0.35
0.5
20.5±0.1
P0.5x39=19.5±0.07
164.9±0.3(LCM Outline)
156.8(LCM A.A.)
154.08(LCM A.A.)
(80.96)
6.9
5.6
RGB
800*RGB*480
Active Area

0.3±0.05
1.2max.
5.7
5

Backlight Circuit diagram
A
K

	CON2 ASSIGNMENT:			
1	VLED-	11	R6	21	B0	31	DISP
2	VLED+	12	R7	22	B1	32	HSYNC
3	GND	13	G0	23	B2	33	VSYNC
4	VDD	14	G1	24	B3	34	DE
5	R0	15	G2	25	B4	35	NC
6	R1	16	G3	26	B5	36	GND
7	R2	17	G4	27	B6	37	NC(XL)
8	R3	18	G5	28	B7	38	NC(YU)
9	R4	19	G6	29	DGND	39	NC(XR)
10	R5	20	G7	30	DCLK	40	NC(YD)

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INTERFACE	RGB Interface
	FPC Connector
VIEWING DIRECTION	12 O'clock
Gray Scale	
DIRECTION	6 O'clock

MODEL NAME	TFT Display Module
DWN	
CHKD	
PROJECTION	3RD ANGLE

PART NO.	MDT7000
REV.	1.0
SHEET OF	1/1
TOLERANCE UNLESS SPECIFIED	±0.3
UNIT	mm
SCALE	1:1

REV.	DATE	MODIFICATION
1.0	2018/05/19	First issue

Precautions For Use of LCD modules

1 Handling Precautions

1.1. The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

1.2. If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

1.3. Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

1.4. The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

1.5. If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

- Isopropyl alcohol
- Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

- Water
- Ketone
- Aromatic solvents

1.6. Do not attempt to disassemble the LCD Module.

1.7. If the logic circuit power is off, do not apply the input signals.

1.8. To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

1.8.1. Be sure to ground the body when handling the LCD Modules.

1.8.2. Tools required for assembly, such as soldering irons, must be properly ground.

1.8.3. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

1.8.4. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

2 Storage Precautions

2.1. When storing the LCD modules, avoid exposure to direct sunlight or to the light of fluorescent lamps.

2.2. The LCD modules should be stored under the storage temperature range If the LCD modules will be stored   for a long time, the recommend condition is:

Temperature : 0℃ ～ 40℃ Relatively humidity: ≤80%

2.3.   The LCD modules should be stored in the room without acid, alkali and harmful gas.

3 Transportation Precautions

The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.