



DISPLAY MODULE DATASHEET

Datasheet Release 2016-08-10
for
CFAX12864T1-TFH

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3.General Specification

Item	Dimension	Unit
Number of dots	128 x 64	—
Module dimension	38.0 x 67.18 x 9.3 (MAX)	mm
View area	29.58x 17.98	mm
Active area	25.58x 15.98	mm
Dot size	0.23 x 0.18	mm
Dot pitch	0.25 x 0.20	mm
LCD type	FSTN Positive Transflective (In LCD production, It will occur slightly color difference. We can only guarantee the same color in the same batch.)	
Duty	1/64	
View direction	6 o'clock	
Backlight Type	LED White	
IC	NT7534	

4. Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	°C
Storage Temperature	T_{ST}	-30	—	+80	°C
Input Voltage	V_{IN}	-0.3	—	$V_{DD}+0.3$	V
Supply Voltage For Logic	$V_{DD}-V_{SS}$	-0.3	—	4.0	V
DC Supply Voltage	V_{OUT}	-0.3	—	15.0	V

5. Electrical Characteristics

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Supply Voltage For Logic	$V_{DD}-V_{SS}$	—	3.0	3.3	3.6	V
Supply Voltage For LCD	V_{OP}	$T_a=-20^{\circ}\text{C}$	—	—	—	V
		$T_a=25^{\circ}\text{C}$	—	9.0	—	V
		$T_a=70^{\circ}\text{C}$	—	—	—	V
Input High Volt.	V_{IH}	—	$0.8V_{DD}$	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	V_{SS}	—	$0.2V_{DD}$	V
Output High Volt.	V_{OH}	—	$0.8V_{DD}$	—	V_{DD}	V
Output Low Volt.	V_{OL}	—	V_{DD}	—	$0.2V_{DD}$	V
Supply Current	I_{DD}	$V_{DD}=3.3\text{V}$	—	0.18	—	mA

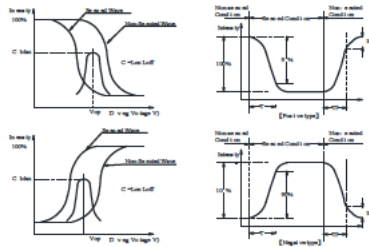
Please kindly consider to design the V_{op} to be adjustable while programing the software to match LCD contrast tolerance.

6. Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	θ	$CR \geq 2$	0	—	30	$\psi = 180^\circ$
	θ	$CR \geq 2$	0	—	60	$\psi = 0^\circ$
	θ	$CR \geq 2$	0	—	45	$\psi = 90^\circ$
	θ	$CR \geq 2$	0	—	45	$\psi = 270^\circ$
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	250	350	ms

Definition of Operation Voltage (Vop)

Definition of Response Time (Tr, Tf)



Conditions :

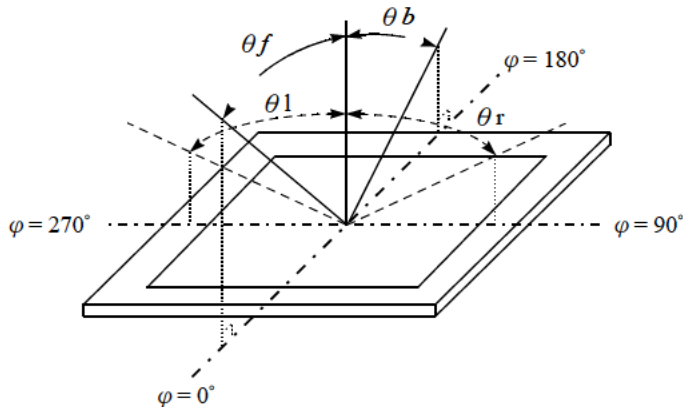
Operating Voltage : Vop

Viewing Angle(θ , ϕ) : 0° , 0°

Frame Frequency : 64 HZ

Driving Waveform : 1/N duty , 1/a bias

Definition of viewing angle($CR \geq 2$)

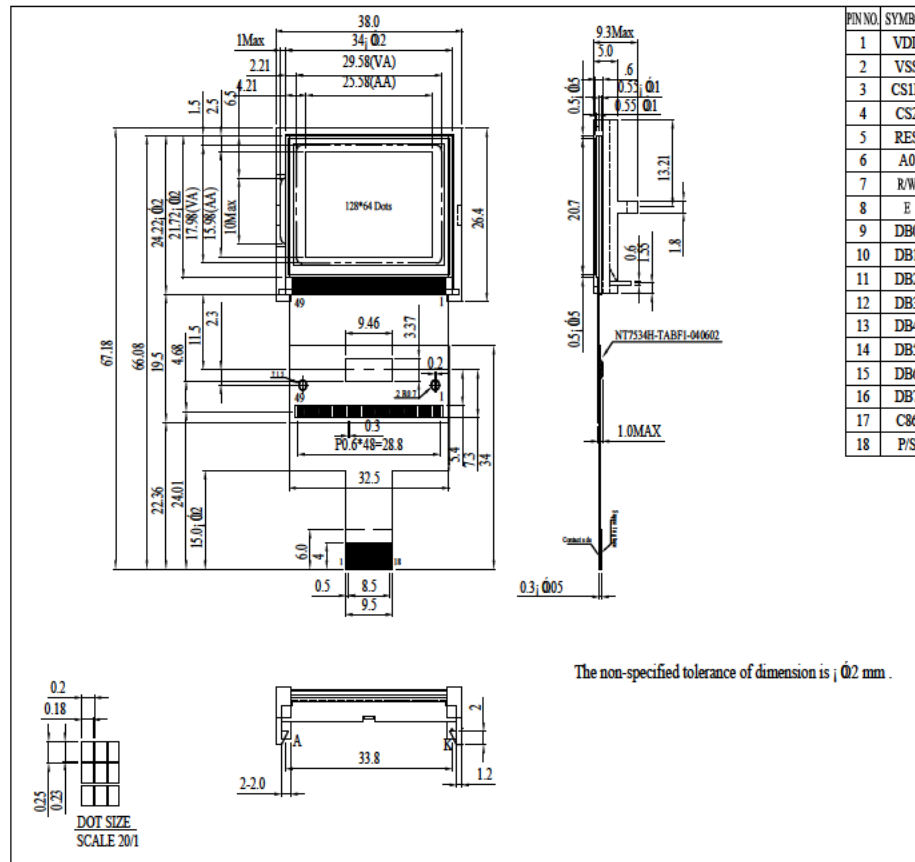


7.Interface Pin Function

Pin No.	Symbol	I/O	Description
1	VDD	_	Power supply pin for logic.
2	VSS	_	Ground pin, connected to 0V
3	CS1B	I	Chip select input pins Data/instruction i/o is enabled only when CS1Bis”L”and CS2”H”. When chip select is non-active,DB0 TO DB7 may be high impedance.
4	CS2	I	Chip select input pins Data/instruction i/o is enabled only when CS1Bis”L”and CS2”H”. When chip select is non-active,DB0 TO DB7 may be high impedance.
5	RES	I	Reset input pin When RESETB is “L”, initialization is executed.
6	A0	I	This is connected to the least significant bit of the normal MPU address bus, and it determines whether the data bits are data or a command . A0=”H”: Indicate that D0 to D7 are display data A0=”L”: Indicate that D0 to D7 are control data
7	R/W	I	When connected to 80-family MPU: Write enable clock input pin. The data ON DB0~DB7 are latched at the rising edge of the /WR signal. When connected to 68-family MPU: RW = ”H”: read RW = “L”: write
8	E	I	When connected to 80-family MPU: Read enable clock input pin. When /RD is “L”, DB0~DB7 are in an output status When connected to 68-family MPU: RW = ”H”: When E is “H”, DB0~DB7 are in an output status RW = “L”: The data on DB0~DB7 are latched at the falling edge of the E signal
9-16	DB0-DB7	I/O	8-bit bi-directional data bus that is connected to the standard 8-bit microprocessor data bus. When the serial interface selected(PS=”L”) DB0~DB5: high impedance DB6: serial input clock (SCLK) DB7: serial input data (SID) When chip select is not active, DB0~DB7 may be high impedance.

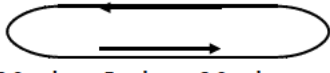
17	C86	I	<p>This is the MPU interface switch terminal</p> <p>C86 = "H":6800 Series MPU interface</p> <p>C86 = "L":8080 Series MPU interface</p>															
18	P/S	I	<p>This is the parallel data input/serial data input switch terminal</p> <p>P/S = "H":Parallel data input</p> <p>P/S = "L":Serial data input</p> <p>The following applies depending on the P/S status:</p> <table border="1" data-bbox="563 483 1481 663"> <thead> <tr> <th>P/S</th> <th>Data/Command</th> <th>Data</th> <th>Read/Write</th> <th>Serial Clock</th> </tr> </thead> <tbody> <tr> <td>"H"</td> <td>A0</td> <td>D0 to D7</td> <td>/RD, /WR</td> <td>-</td> </tr> <tr> <td>"L"</td> <td>A0</td> <td>SI (D7)</td> <td>Write only</td> <td>SCL (D6)</td> </tr> </tbody> </table> <p>When P/S = "L", fix D0~D5 pads to VDD or VSS level. /RD(E) and /WR (R/W) are fixed to either "H" or "L". With serial data input, RAM display data reading is not supported.</p>	P/S	Data/Command	Data	Read/Write	Serial Clock	"H"	A0	D0 to D7	/RD, /WR	-	"L"	A0	SI (D7)	Write only	SCL (D6)
P/S	Data/Command	Data	Read/Write	Serial Clock														
"H"	A0	D0 to D7	/RD, /WR	-														
"L"	A0	SI (D7)	Write only	SCL (D6)														

8. Contour Drawing



9. Reliability

Content of Reliability Test (Wide temperature, -20°C~70°C)

Environmental Test			
Test Item	Content of Test	Test Condition	Note
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80°C 200hrs	2
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-30°C 200hrs	1,2
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	70°C 200hrs	— —
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20°C 200hrs	1
High Temperature/Humidity storage	The module should be allowed to stand at 60°C,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60°C,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20°C 25°C 70°C  30min 5min 30min 1 cycle	-20°C/70°C 10 cycles	— —
Vibration test	Endurance test applying the vibration during transportation and using.	Total fixed amplitude : 1.5mm Vibration Frequency : 10~55Hz One cycle 60 seconds to 3 directions of X,Y,Z for Each 15 minutes	3
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=±600V(contact), ±800v(air), RS=330Ω CS=150pF 10 times	— —

Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal Temperature and humidity after remove from the test chamber.

Note3: The packing have to including into the vibration testing.

10.Backlight Information

Specification

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	I _{LED}	—	32	40	mA	V= 3.5V
Supply Voltage	V	3.4	3.5	3.6	V	—
Reverse Voltage	V _R	—	—	5	V	—
Color coordinate	X	0.26	0.28	0.30		I _{LED} =32mA
	Y	0.28	0.30	0.32		
Luminance (Without LCD)	I _V	880	1100	—	CD/M ²	I _{LED} =32mA
LED Life Time	—	—	50K	—	Hr.	I _{LED} =32mA 25°C,50-60%RH, (Note 1)
Color	White					

Note: The LED of B/L is drive by current only, drive voltage is for reference only.
drive voltage can make driving current under safety area (current between minimum and maximum).

Note1 :50K hours is only an estimate for reference.

