晶采光電科技股份有限公司
AMPIRE CO., LTD.

Specifications for LCD module

Customer	
Customer part no.	
Ampire part no.	**AM-1024768K1TZQW-00H**
Approved by	
Date	

☐ **Preliminary Specification**
■ **Formal Specification**

APPROVED BY	CHECKED BY	ORGANIZED BY
Patrick	Lawlite	Kokai

This Specification is subject to change without notice.

RECORD OF REVISION

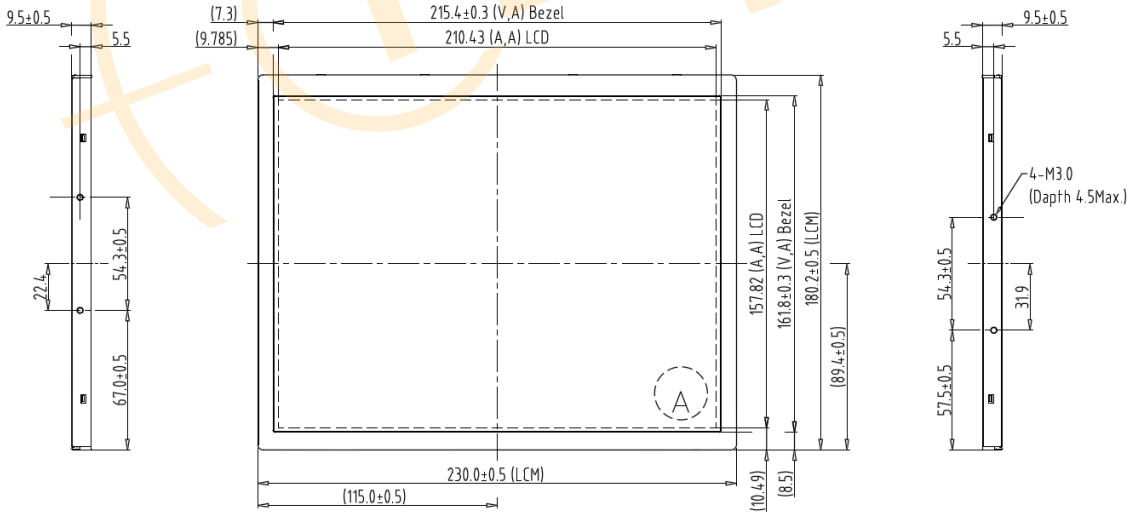
Revision Date	Page	Contents	Editor
2020/10/19	-	New Release	Kokai
2020/10/30		Update BL connector Position	Kokai
2020/12/14	10	Correct typo Pin17&18	Kokai
2021/1/5	1,18,19	Rename to AM-1024768K1TZQW-00H	Kokai

1. Features

10.4” TFT Liquid Crystal Display module is a color active matrix thin film transistor (TFT) liquid crystal display (LCD) that uses amorphous silicon TFT as a switching device. It is composed of a TFT LCD panel, a driving circuit and a back light system. This TFT LCD has a 10.4 inch diagonally measured active display area with HD (1024 horizontal by 768 vertical pixels) resolution.

2. Physical Specifications

Item	Specifications	Remark
LCD size	10.4 inch(Diagonal)	
Driver element	a-Si TFT active matrix	
Display resolution	1024 (W) × 3(RGB) x768(H) dots	
Display mode	Normally Black	
Dot pitch	0.2055 (W) x0.2055 (H) mm	
Active area	210.43 (W) x 157.82 (H) mm	
Color arrangement	RGB Vertical Stripe	



3. Absolute Maximum Ratings

Item	Symbol	Values		Unit	Remark
		Min	Max		
LCD Power Voltage	VCC	-0.3	3.8	V	
Operation Temperature	TOP	-30	80	℃	
Storage Temperature	TST	-30	80	℃	

Note(1) The absolute maximum rating values of this product are not allowed to be exceeded at any times.

Note(2) Should a module be used with any of the absolute maximum ratings exceeded, the characteristics of the module may not be recovered, or in an extreme case, the module may be permanently destroyed.

4. Electrical Specifications

4.1 TFT LCD module

Item	Symbol	Min.	Typ.	Max.	Unit	Note
Supply Voltage	VCC	3.0	3.3	3.6	V	
Logic Input Voltage	VIH	0.8xVCC	--	VCC	V	MODE,SC
	VIL	0	--	0.2xVCC	V	
Current of power supply	ICC	—	385	424	mA	VCC =3.3V、white pattern (L255)
VDD Power	PDD	—	1.27	1.4	W	VCC =3.3V、white pattern (L255)

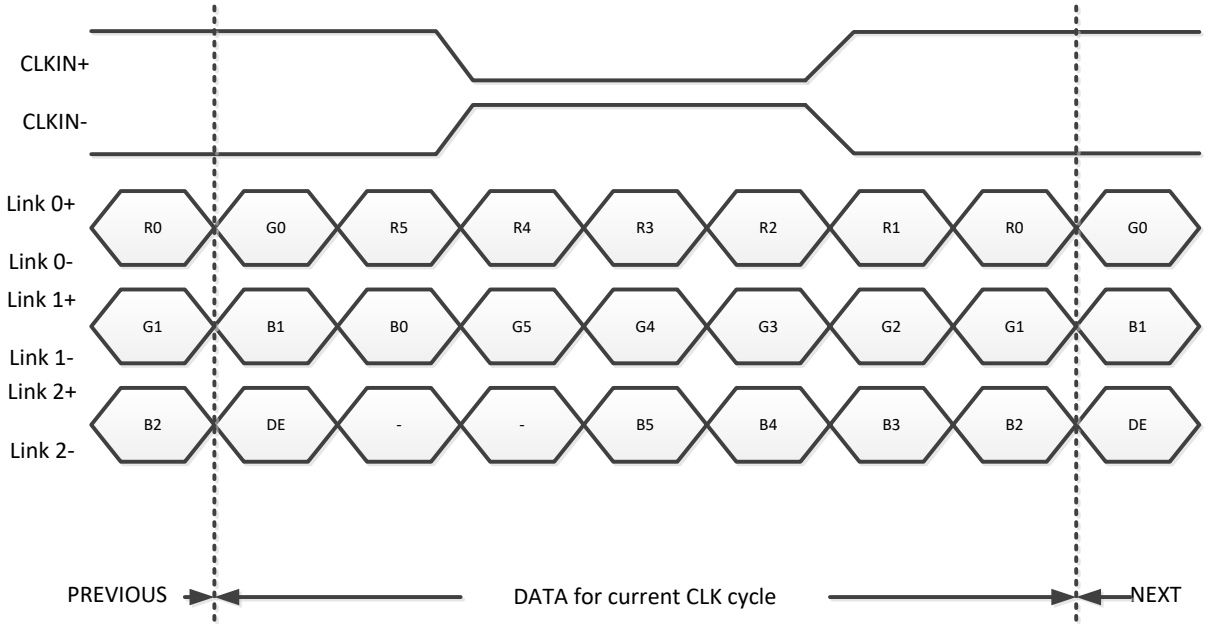
4.2 Switching Characteristics for LVDS Receiver

Item	Symbol	Min.	Typ.	Max.	Unit	Conditions
Differential Input High Threshold	VTH	100		300	mV	
Differential Input Low Threshold	VTL	-300			mV	
Differential input common mode voltage	VCM	1.0	1.2	1.7-|VID|/2	V	
Input Current	IIN	-10		10	uA	Link+/-, CLKIN+/-
Differential input Voltage	VID	200		600	mV	

4.3 Bit LVDS input

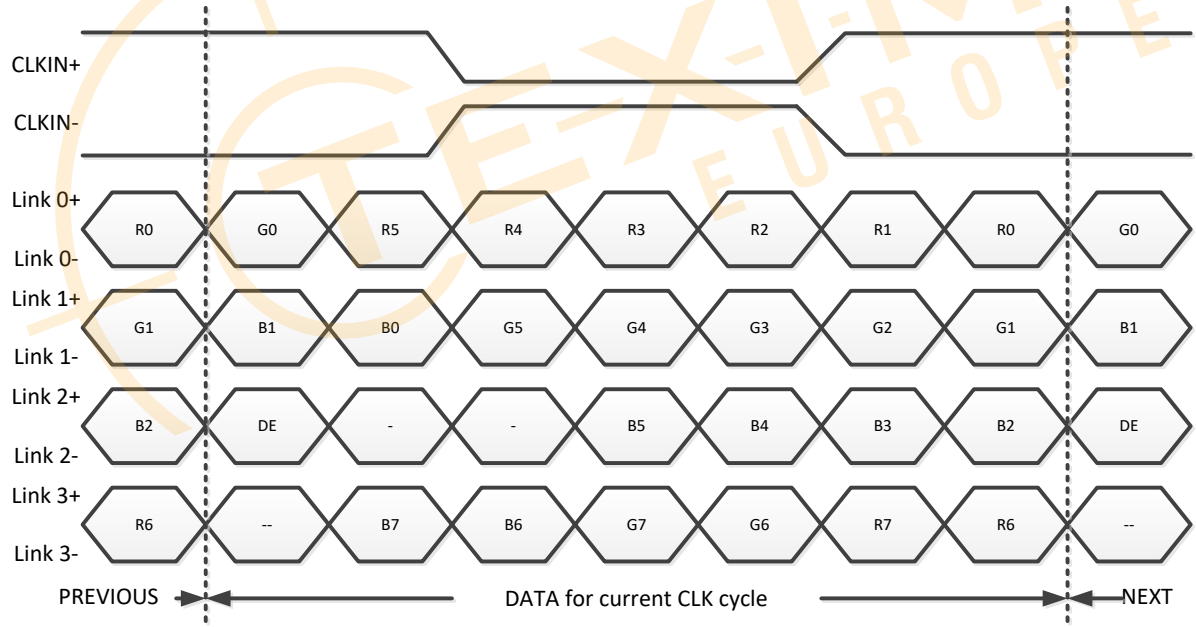
4.3.1 6bit LVDS input

Pin19 Mode=L (Internal SEL68=H): LVDS input data is 6bits (VESA)



4.3.2 8Bit LVDS input

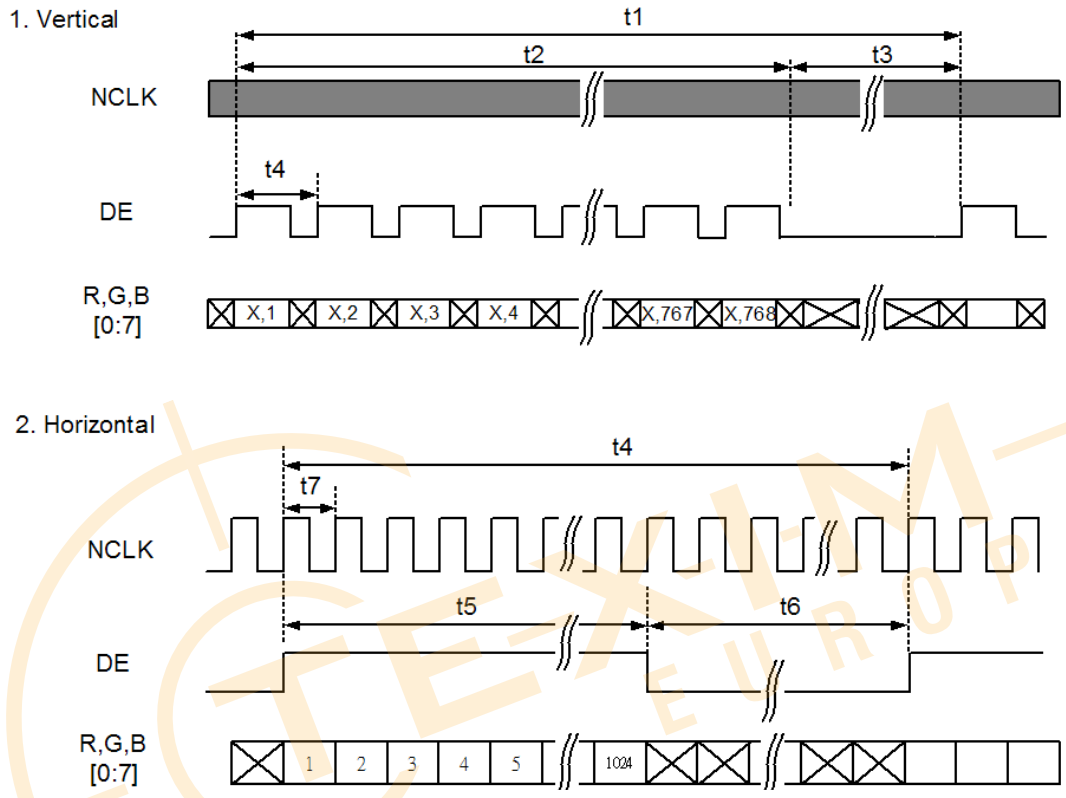
Pin19 Mode=H (Internal SEL68=L): LVDS input data is 8bits (VESA)



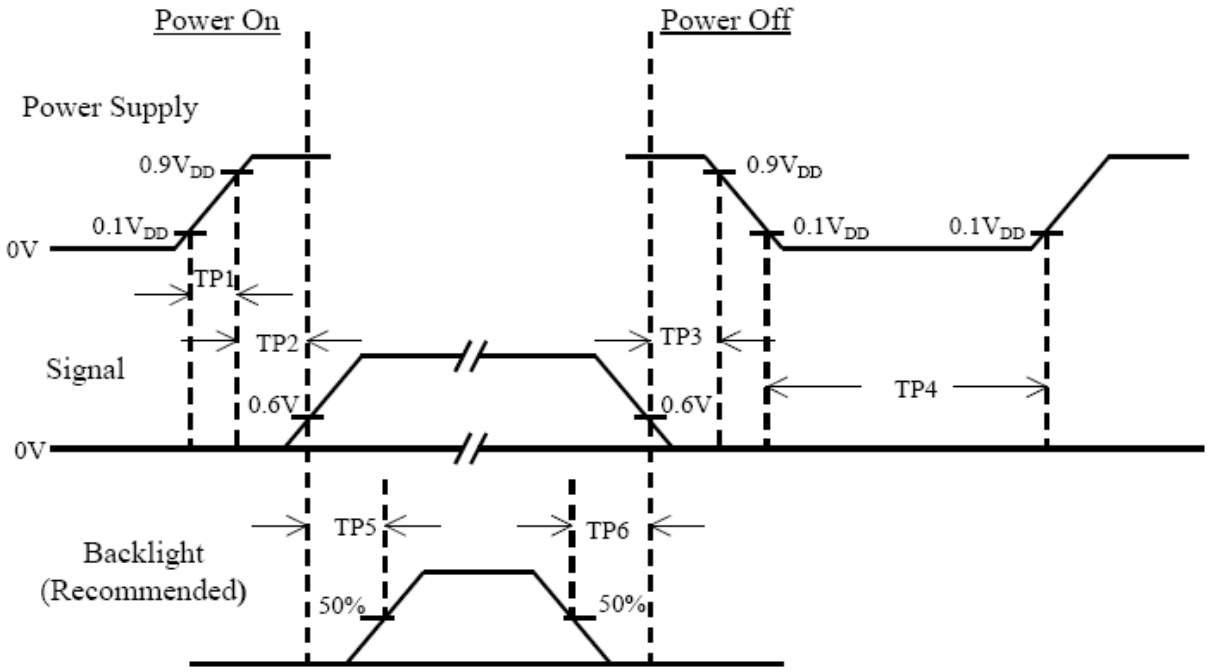
4.4 Interface Timing (DE mode)

Item	Symbol	Min.	Typ.	Max.	Unit
Vertical Total Time	TV	778	806	845	line
Vertical Display Time	TVD		768		line
Vertical Blanking Time	TVB	10	38	77	line
Horizontal Total Time	TH	1114	1344	1400	clock
Horizontal Display Time	THD		1024		clock
Horizontal Blanking Time	THB	90	320	376	clock
Clock Rate	1/ TClock	52	65	71	MHz

Timing Diagram of Interface Signal (DE mode)



4.5 Power On / Off Sequence



Item	Min.	Typ.	Max.	Unit	Remark
TP1	0.5	--	10	msec	
TP2	0	--	50	msec	
TP3	0	--	50	msec	
TP4	500	--	--	msec	
TP5	200	--	--	msec	
TP6	200	--	--	msec	

Note：

(1) The supply voltage of the external system for the module input should be the same as the definition of VCC.

(2) Apply the lamp voltage within the LCD operation range. When the back-light turns on before the LCD operation or the LCD turns off before the back-light turns off, the display may momentarily become white.

(3) In case of VCC = off level, please keep the level of input signal on the low or keep a high impedance.

(4) TP4 should be measured after the module has been fully discharged between power off and on period.

(5) Interface signal shall not be kept at high impedance when the power is on.

4.6 Backlight Unit

ITEM	SYMBOL	MIN	TYP	MAX	UNIT	CONDITION
LED Backlight Voltage	V_F	--	18	20.8	V	$I_{F=}$120mA
LED Backlight Current	I_F	-	120	130	mA	**Ta=25℃**
LED Life Time		80	100	-	Khr	$I_{F=}$120mA

Note 1: Ta means ambient temperature of TFT-LCD module.

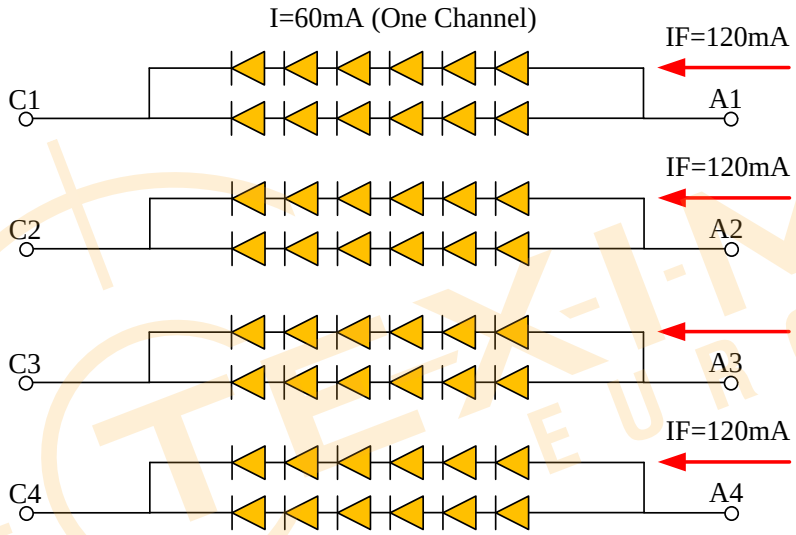
Note 2: VF, IF are defined for LED B/L.

Note 3: If the module is driven by high current or at high ambient temperature & humidity condition. The operating life will be reduced.

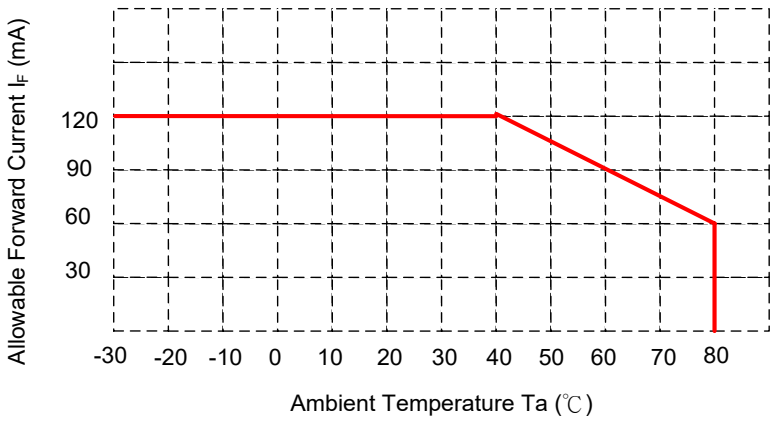
Note 4: Operating life means brightness goes down to 50% minimum brightness.

LED life time is estimated data. Ta=25℃

Note 5: the structure of LED B/L shows as below.



When LCM is operated over 40℃ ambient temperature, the IF should be follow :



5. Interface

5.1 Interface Connector (Input signal):

Used connector : 20186-020E-11F (I-PEX) or FI-SEB20P-HFE (JAE) (or equivalent)

Cor responding connector : 20197-*20U-F (I-PEX) or FI-S20S[for discrete Wire],
FI-SE20ME [for FPC] (JAE)

Pin NO.	Symbol	Description	Note
1	VCC	Power supply, 3.3V	
2	VCC	Power supply, 3.3V	
3	GND	Ground	
4	GND	Ground	
5	Link 0-	Differential Data Input, CH0 (Negative)	
6	Link 0+	Differential Data Input, CH0 (Positive)	
7	GND	Ground	
8	Link 1-	Differential Data Input, CH1 (Negative)	
9	Link 1+	Differential Data Input, CH1 (Positive)	
10	GND	Ground	
11	Link 2-	Differential Data Input, CH2 (Negative)	
12	Link 2+	Differential Data Input, CH2 (Positive)	
13	GND	Ground	
14	CLKIN-	Differential Clock Input (Negative)	
15	CLKIN+	Differential Clock Input (Positive)	
16	GND	Ground	
17	Link 3-	Differential Data Input, CH3 (Negative)	
18	Link 3+	Differential Data Input, CH3 (Positive)	
19	MODE	6bit/8bit mode select MODE = " High " : LVDS input data is 8bits MODE = " Low " : LVDS input data is 6bit	Note(1)
20	SC	Scan direct ion cont rol. (Low : Normal , High : Reverse)	Note(1)

Note(1) The high level voltage “High” is 3.3V, and the low level voltage “Low” is GND.

5.2 Backlight Pin Assignment

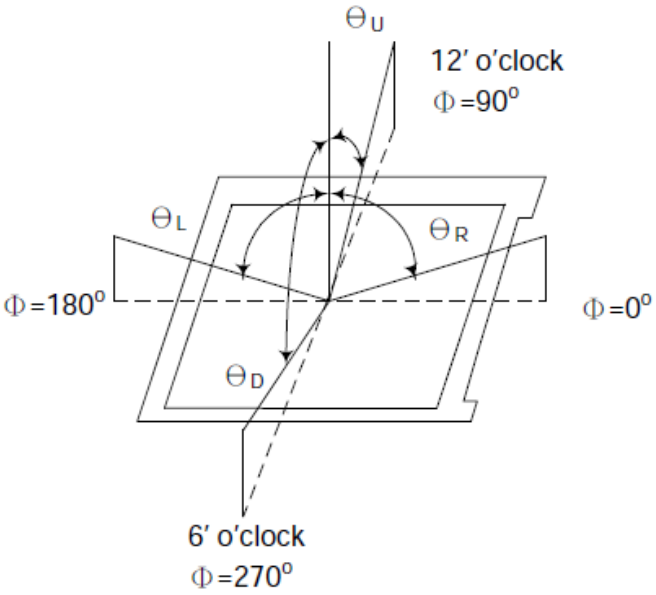
Backlight -side connector : SM10B-SHLS-TF (LF)(SN) (JST) (or equivalent)
Cor responding connector : SHLP-10V-S-B (JST)

Pin NO.	Symbol	Description	Note
1	NC	This pin should be open	
2	NC	This pin should be open	
3	LED C1	LED Cathode 1	
4	LED A1	LED Anode 1	
5	LED A2	LED Anode 2	
6	LED C2	LED Cathode 2	
7	LED C3	LED Cathode 3	
8	LED A3	LED Anode 3	
9	LED A4	LED Anode 4	
10	LED C4	LED Cathode 4	

6. Optical Specifications

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast		CR	Θ=0 Normal viewing angle	800	1000	—		(1)(2)
Response time	Rising	TR+TF		—	25	35	msec	(1)(3)
	Falling							
White luminance (Center)		YL		**960**	**1200**	—	cd/m^2	(1)(4)
Color chromaticity (CIE1931)	White	Wx		Typ. -0.05	0.319	Typ. +0.05		(1)(4)
		Wy			0.369			
	Red	Rx			0.645			
		Ry			0.334			
	Green	Gx			0.284			
		Gy			0.564			
	Blue	Bx			0.137			
		By			0.121			
Viewing angle	Hor.	ΘL	CR>10	80	85	—		
		ΘR		80	85	—		
	Ver.	ΘU		80	85	—		
		ΘD		80	85	—		
Brightness uniformity		BUNI	Θ=0	70	80	—	%	(5)
Optima View Direction		Free						(6)

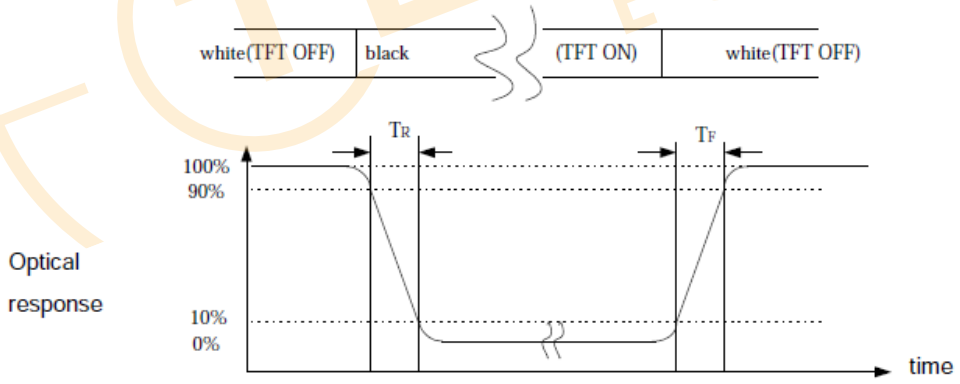
Note(1) Definition of Viewing Angle :



Note(2) Definition of Contrast Ratio (CR) : Measured at the center point of panel

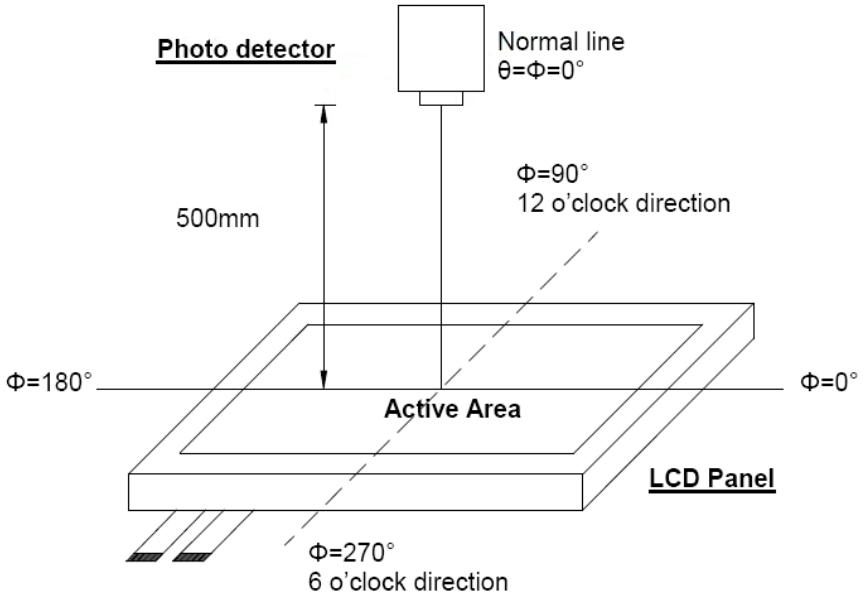
$$CR = \frac{\text{Luminance with all pixels white}}{\text{Luminance with all pixels black}}$$

Note(3) Definition of Response Time : Sum of TR and TF



Note(4) Definition of optical measurement setup

The optical characteristics should be measured in dark room. After 30 minutes operation, the optical properties are measured at the center point of the LCD screen. (Response time is measured by Photo detector TOPCON BM-7, other items are measured by BM-5A/Field of view: 1° / Height: 500mm.)

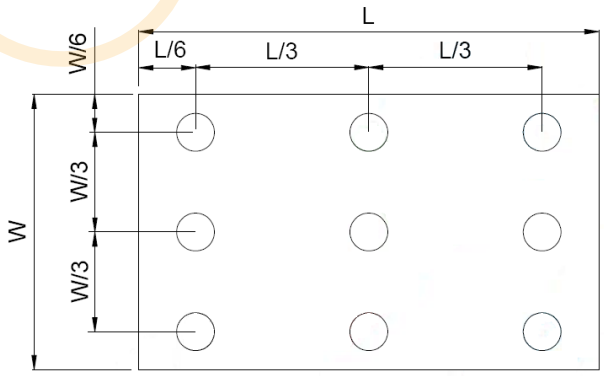


Note(5) Definition of brightness uniformity

Active area is divided into 9 measuring areas (Refer to bellow figure).
Every measuring point is placed at the center of each measuring area.

$$\text{Luminance Uniformity (Yu)} = \frac{B_{min}}{B_{max}}$$

L ----- Active area length W ----- Active area width



Bmax: The measured maximum luminance of all measurement position.
Bmin: The measured minimum luminance of all measurement position.

Note(6) Rubbing Direction (The different Rubbing Direction will cause the different optima view direction.

8. Reliability Test Conditions

Test Item	Test Conditions	Note
High Temperature Operation	80±3°C ,Dry t=240 hrs	
Low Temperature Operation	-30±3°C, Dry t=240 hrs	
High Temperature Storage	80±3°C , Dry t=240 hrs	1,2
Low Temperature Storage	-30±3°C ,Dry t=240 hrs	1,2
Thermal Shock Test	-30°C ~ 25°C ~ 80°C 30 min. 5 min. 30 min. (1 cycle) Total 100 cycle(Dry)	1,2
Storage Humidity Test	60 °C, Humidity 90%, 240 hrs	1,2
Vibration Test (Packing)	Sweep frequency : 10 ~ 55 ~ 10 Hz/1min Amplitude : 0.75mm Test direction : X.Y.Z/3 axis Duration : 30min/each axis	2

Note(1) Condensation of water is not permitted on the module.

Note(2) The module should be inspected after 1 hour storage in normal conditions. (15-35°C, 45-65%RH)

Note(3) The module shouldn't be tested over one condition, and all the tests are independent.

Note(4) All reliability tests should be done without the protective film.

Definitions of life end point:

- Current drain should be smaller than the specific value.
- Function of the module should be maintained.
- Appearance and display quality should not have degraded noticeably.
- Contrast ratio should be greater than 50% of the initial value.

9. General Precaution

9.1 Use Restriction

(1) This product is not authorized for use in life supporting systems, aircraft navigation control systems, military systems and any other application where performance failure could be life-threatening or otherwise catastrophic.

9.2 Disassembling or Modification

(1) Do not disassemble or modify the module. It may damage sensitive parts inside LCD module, and may cause scratches or dust on the display. AMPIRE does not warrant the module, if customers disassemble or modify the module.

9.3 Breakage of LCD Panel

(1) If LCD panel is broken and liquid crystal spills out, do not ingest or inhale liquid crystal, and do not contact liquid crystal with skin.
(2) If liquid crystal contacts mouth or eyes, rinse out with water immediately.
(3) If liquid crystal contacts skin or cloths, wash it off immediately with alcohol and rinse thoroughly with water.
(4) Handle carefully with chips of glass that may cause injury, when the glass is broken.

9.4 Electric Shock

(1) Disconnect power supply before handling LCD module.
(2) Do not pull or fold the LED cable.
(3) Do not touch the parts inside LCD modules and the fluorescent LED's connector or cables in order to prevent electric shock.

9.5 Absolute Maximum Ratings and Power Protection Circuit

(1) Do not exceed the absolute maximum rating values, such as the supply voltage variation, input voltage variation, variation in parts' parameters, environmental temperature, etc., otherwise LCD module may be damaged.
(2) Please do not leave LCD module in the environment of high humidity and high temperature for a long time.
(3) It's recommended to employ protection circuit for power supply.

9.6 Operation

(1) Do not touch, push or rub the polarizer with anything harder than HB pencil lead.
(2) Use fingerstalls of soft gloves in order to keep clean display quality, when persons handle the LCD module for incoming inspection or assembly.
(3) When the surface is dusty, please wipe gently with absorbent cotton or other soft material.
(4) Wipe off saliva or water drops as soon as possible. If saliva or water drops contact with polarizer for a long time, they may cause deformation or color fading.
(5) When cleaning the adhesives, please use absorbent cotton wetted with a little petroleum benzene or other adequate solvent.

9.7 Static Electricity

(1) Protection film must remove very slowly from the surface of LCD module to prevent from electrostatic occurrence.
(2) Because LCD modules use CMOS-IC on circuit board and TFT-LCD panel, it is very weak to electrostatic discharge. Please be careful with electrostatic discharge. Persons who handle the module should be grounded through adequate methods.

9.8 Strong Light Exposure

(1) The module shall not be exposed under strong light such as direct sunlight. Otherwise, display characteristics may be changed.

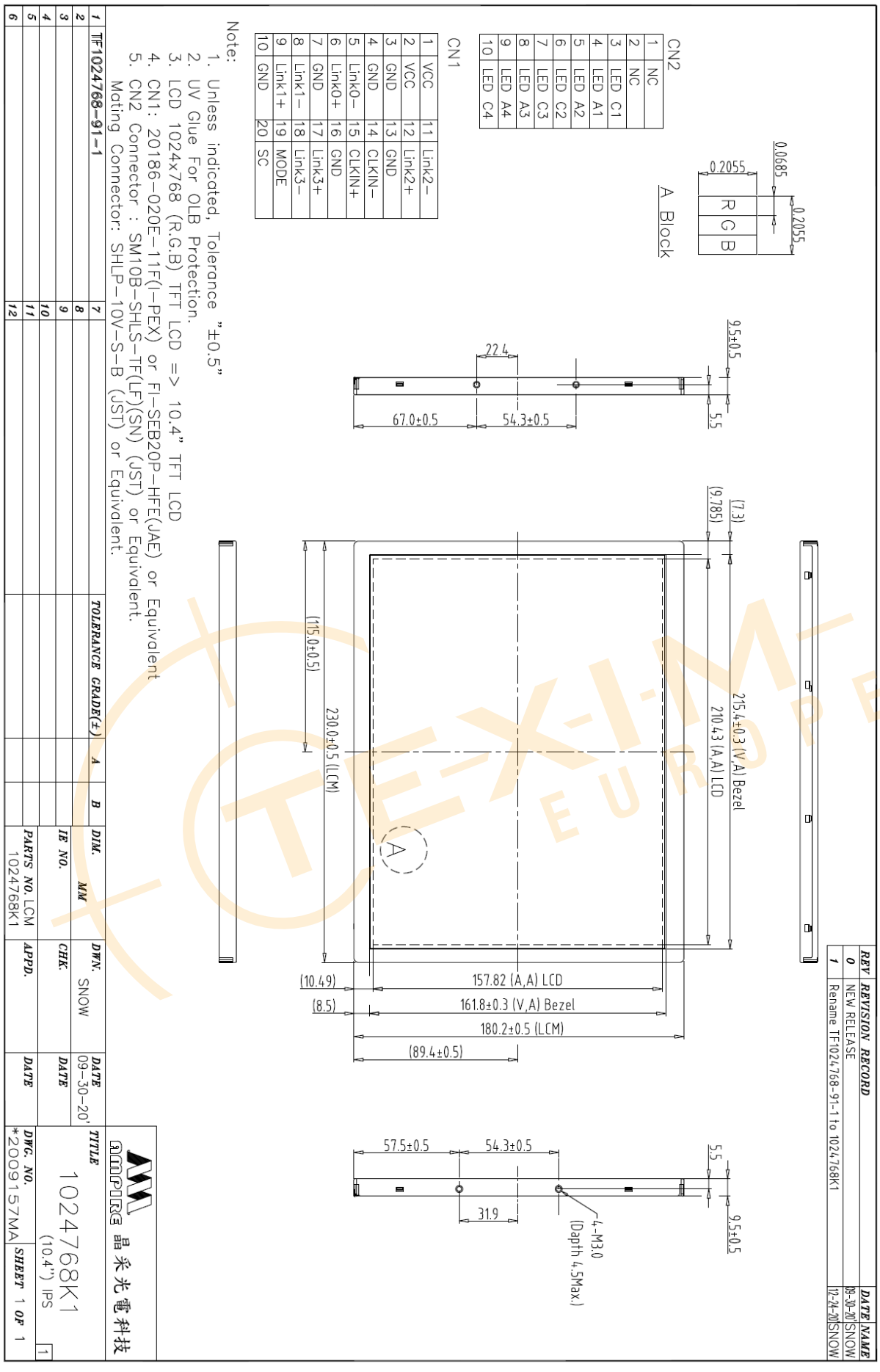
9.9 Disposal

(1) When disposing LCD module, obey the local environmental regulations.

9.10 Others

(1) AMIPRE will provide one year warrantee for all products and three months warrantee for all repairing products.
(2) Do not keep the LCD at the same display pattern continually. The residual image will happen and it will damage the LCD. Please use screen saver.

10. Outline Dimension



CN2	
1	NC
2	NC
3	LED C1
4	LED A1
5	LED A2
6	LED C2
7	LED C3
8	LED A3
9	LED A4
10	LED C4

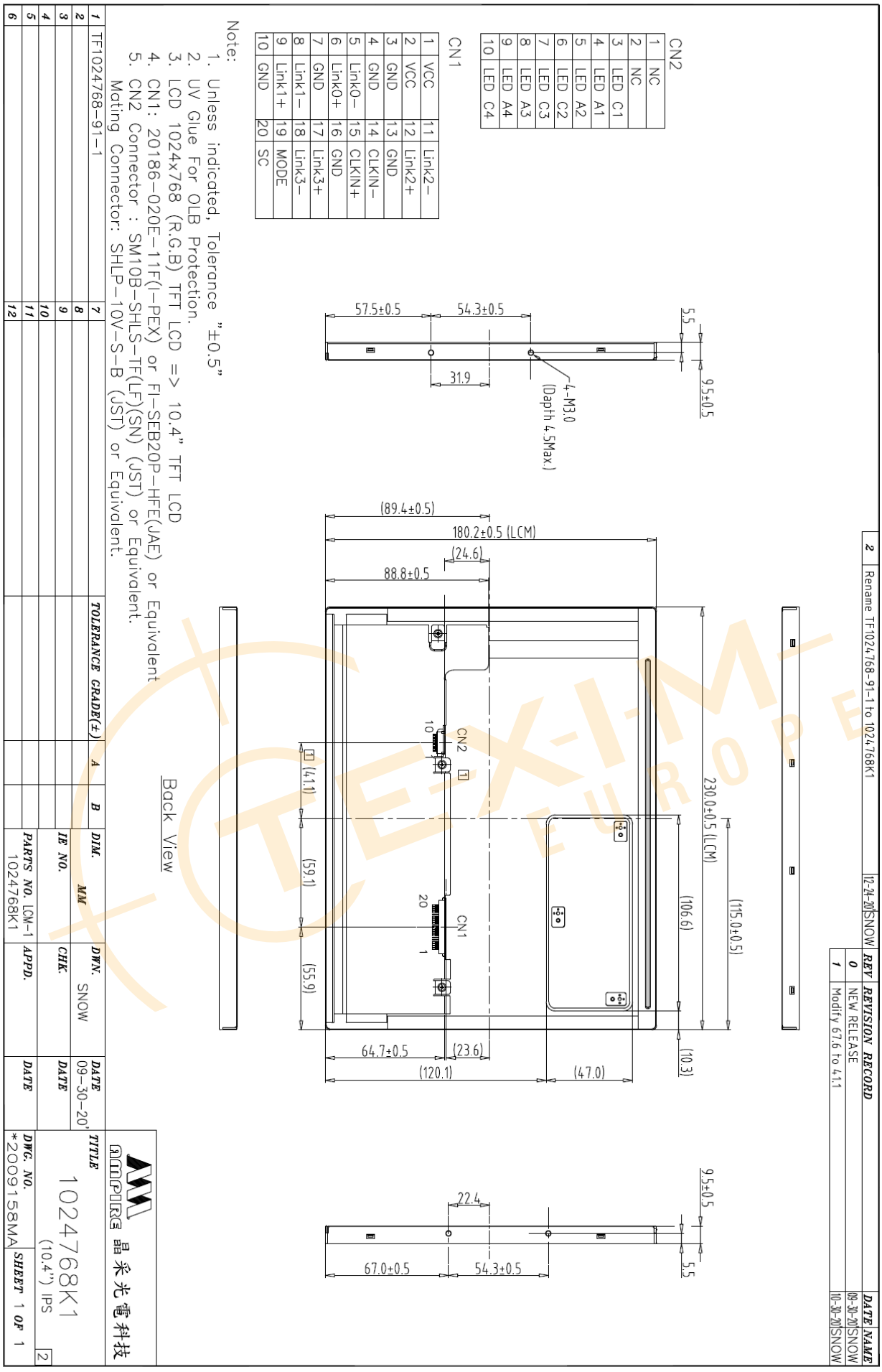
CN1			
1	VCC	11	Link2−
2	VCC	12	Link2+
3	GND	13	GND
4	GND	14	CLKIN−
5	Link0−	15	CLKIN+
6	Link0+	16	GND
7	GND	17	Link3+
8	Link1−	18	Link3−
9	Link1+	19	MODE
10	GND	20	SC

Note:
1. Unless indicated, Tolerance "±0.5"
2. UV Glue For OLB Protection.
3. LCD 1024x768 (R.G.B) TFT LCD => 10.4" TFT LCD
4. CN1: 20186-020E-11F(I-PEX) or FI-SEB20P-HFE(JAE) or Equivalent
5. CN2 Connector : SM10B-SHLS-TF(LF)(SN) (JST) or Equivalent.
   Mating Connector: SHLP-10V-S-B (JST) or Equivalent.

REV	REVISION RECORD	DATE	NAME
0	NEW RELEASE	09-30-20	SNOW
1	Rename TF1024768-91-1 to 1024768K1	12-24-20	SNOW

TF1024768-91-1	
TOLERANCE GRADE(±)	A / B
DIM.	MM
IE NO.	
PARTS NO.	LCM 1024768K1
DWN.	SNOW
CHK.	
APPD.	
DATE	09-30-20 / DATE
TITLE	1024768K1 (10.4") IPS
DWG. NO.	*2009157MA
SHEET	1 OF 1

AMPIRE 晶采光電科技



Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Texim Europe B.V. its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, “Texim”), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Texim makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product.

It is the customer’s responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application.

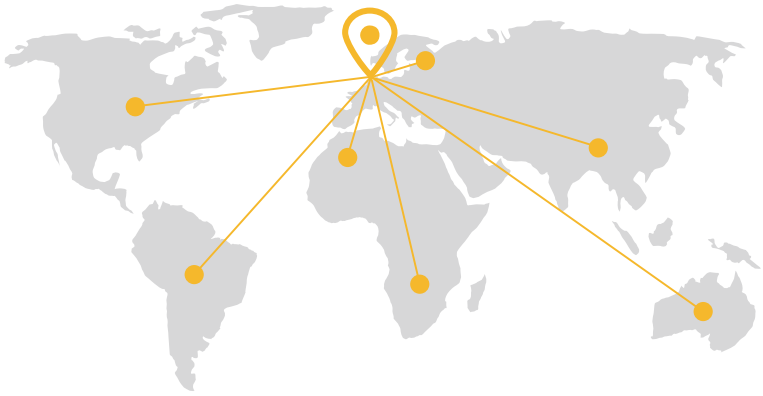
Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time.

All operating parameters, including typical parameters, must be validated for each customer application by the customer’s technical experts.

Please contact us if you have any questions about the contents of the datasheet.

This may not be the latest version of the datasheet. Please check with us if a later version is available.

Texim Europe - contact details



Headquarters & Warehouse

Elektrostraat 17
NL-7483 PG Haaksbergen
The Netherlands

T: +31 (0)53 573 33 33
E: info@texim-europe.com
Homepage: www.texim-europe.com

The Netherlands

Elektrostraat 17
NL-7483 PG Haaksbergen

T: +31 (0)53 573 33 33
E: nl@texim-europe.com

Belgium

Zuiderlaan 14, box 10
B-1731 Zellik

T: +32 (0)2 462 01 00
E: belgium@texim-europe.com

UK & Ireland

St Mary's House, Church Lane
Carlton Le Moorland
Lincoln LN5 9HS

T: +44 (0)1522 789 555
E: uk@texim-europe.com

Germany

Bahnhofstrasse 92
D-25451 Quickborn

T: +49 (0)4106 627 07-0
E: germany@texim-europe.com

Germany

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: muenchen@texim-europe.com

Austria

Warwitzstrasse 9
A-5020 Salzburg

T: +43 (0)662 216 026
E: austria@texim-europe.com

Nordic

Stockholmsgade 45
2100 Copenhagen

T: +45 88 20 26 30
E: nordic@texim-europe.com

Italy

Martin-Kollar-Strasse 9
D-81829 München

T: +49 (0)89 436 086-0
E: italy@texim-europe.com