# SMART DISPLAY SPECIFICATION

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## WINSTAR Display Co.,Ltd.

## 華凌光電股份有限公司

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**Winstar Display Co., LTD**
華凌光電股份有限公司
WEB: https://www.winstar.com.tw E-mail: sales@winstar.com.tw

# SPECIFICATION

## CUSTOMER : Winstar

## MODEL NO. : WL0F00050000FGAAGSA00

| APPROVED BY:<br>( FOR CUSTOMER USE ONLY ) | |
|---|---|

| SALES BY | APPROVED BY | CHECKED BY | PREPARED BY |
|---|---|---|---|
| | Ginger Xu | Eason Chang | Jason Chan |

| VERSION | DATE | REVISED PAGE NO. | SUMMARY |
|---|---|---|---|
| A | 2025/05/21 | p7,9 | Revised LCD type and BOM |

TFT Display Inspection Specification: https://www.winstar.com.tw/technology/download.html
Precaution in use of TFT module: https://www.winstar.com.tw/technology/download/declaration.html

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MODLE NO：
WL0F00050000FGAAGSA00

| RECORDS OF REVISION | | | DOC. FIRST ISSUE |
|---|---|---|---|
| VERSION | DATE | REVISED PAGE NO. | **SUMMARY** |
| 0 | 2024/12/17 | | First issue |
| A | 2025/05/21 | p7,9 | Revised LCD type and BOM |

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# 1. Smart Display Classification Information

| W | L | 0F | 000500 | 00F | G | A | AG | S | A | 00 |
|---|---|---|---|---|---|---|---|---|---|---|
| ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ | ⑨ | ⑩ | ⑪ |

| | | | | |
|---|---|---|---|---|
| ① | W: WINSTAR products | | | |
| ② | Type: L:Standard K:Customization | | | |
| ③ | Display Type: | Standard: | 0H: Character STN<br>0X: Graphic STN (TAB/COF)<br>0F: TFT<br>EH: Character OLED<br>EX: OLED (TAB/COF) | 0G: Graphic STN<br>0P: Graphic STN (COG)<br><br>EG: Graphic OLED<br>EP: OLED (COG) |
| | | Customization: | DH: Character<br>DN: Graphic<br>ED: OLED | DG: Graphic STN<br>0J: TFT |
| ④ | Display size: (diagonal) / Display format: (resolution) | Character STN:<br>Graphic STN: | e.g., 8x1: 000801 16x2: 001602 24x4: 002404<br>e.g., 128x64: 012864 320x240: 320240 | |
| | | TFT Size (inch): | 000096-0.96” / 000350-3.5” / 000430-4.3” / 000570-5.7”<br>000700-7.0” / 000800-8.0” / 001020-10.2” / 001210-12.1”<br>(The last two digits are two digits after the decimal point) | |
| | | OLED: | e.g., 128x64: 012864 Customization: 0001XX | |
| ⑤ | Serial No: | 0A1 ~ 0ZZ | Customization STN: 000 | |
| ⑥ | Touch Panel Type: | N: Without TP T: RTP G: CTP | | |
| ⑦ | Model Interface: | A: CAN<br>B: Bluetooth<br>C:Controller Specified<br>D: RS485<br>E: RS232<br>F: USART<br>G: Logic I/O | H: HDMI<br>R: Memory Specified<br>N: Ethernet<br>J: Analog I/O<br>K: USB<br>L: WIFI<br>M: Zigbee | X: Combined<br>Y: Proprietary interface |
| ⑧ | Interface Serial No.: | AA ~ ZZ | | |
| ⑨ | Control Category: | S: Smart Display E: Entry N: Non-specified | | |
| ⑩ | Special Code: | A → Generic B → Industrial C →Automotive D →Medical | | |
| ⑪ | Model code: | 00 ~ ZZ | | |



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# 2. Summary

**5 Inch Smart Display (CANopen series) Feature**

1. Input voltage dynamic range 5V to 28V, typical voltage 12V.
2. Self-testing after booting function.
3. CAN bus communication interface.
4. Supports CANopen protocol, default baud rate at 250Kbps.
5. Built in 16MB external flash memory to store the font and Object Dictionary Data.
6. Support capacitive touch panel (CTP).
7. Build in buzzer and can be controlled by Master Device.
8. Demo set HOST can be used on multiple platforms, such as Computer (with USB to CAN Dongle), MCU, Raspberry Pi (with PiCAN2).
9. GPIO PIN support.

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# 3. Product information

## General information

| Item | Standard Value | Unit |
|---|---|---|
| Operating voltage | 5V~ 28V dynamic | Vdc |
| Communication Interface | CAN Bus | -- |
| MCU | STM32F750 | N/A |
| Flash Memory | 16 | MB |
| LCD display size | 5.0 | inch |
| Dot Matrix | 800× 3(RGB) × 480 | dot |
| Module dimension | 132.7(W) ×75.8(H) ×12.5 | mm |
| Active area | 108(W) ×64.8 (H) | mm |
| Pixel pitch | 0.135(W) ×0.135(H) | mm |
| Brightness | Min: 300; Typ: 400 | $cd/m^2$ |
| LCD type | TFT, Normally Black, Transmissive | |
| View Direction | 80/80/80/80 | |
| Aspect Ratio | 15:9 | |
| With /Without TP | With CTP | |
| Surface | Glare | |



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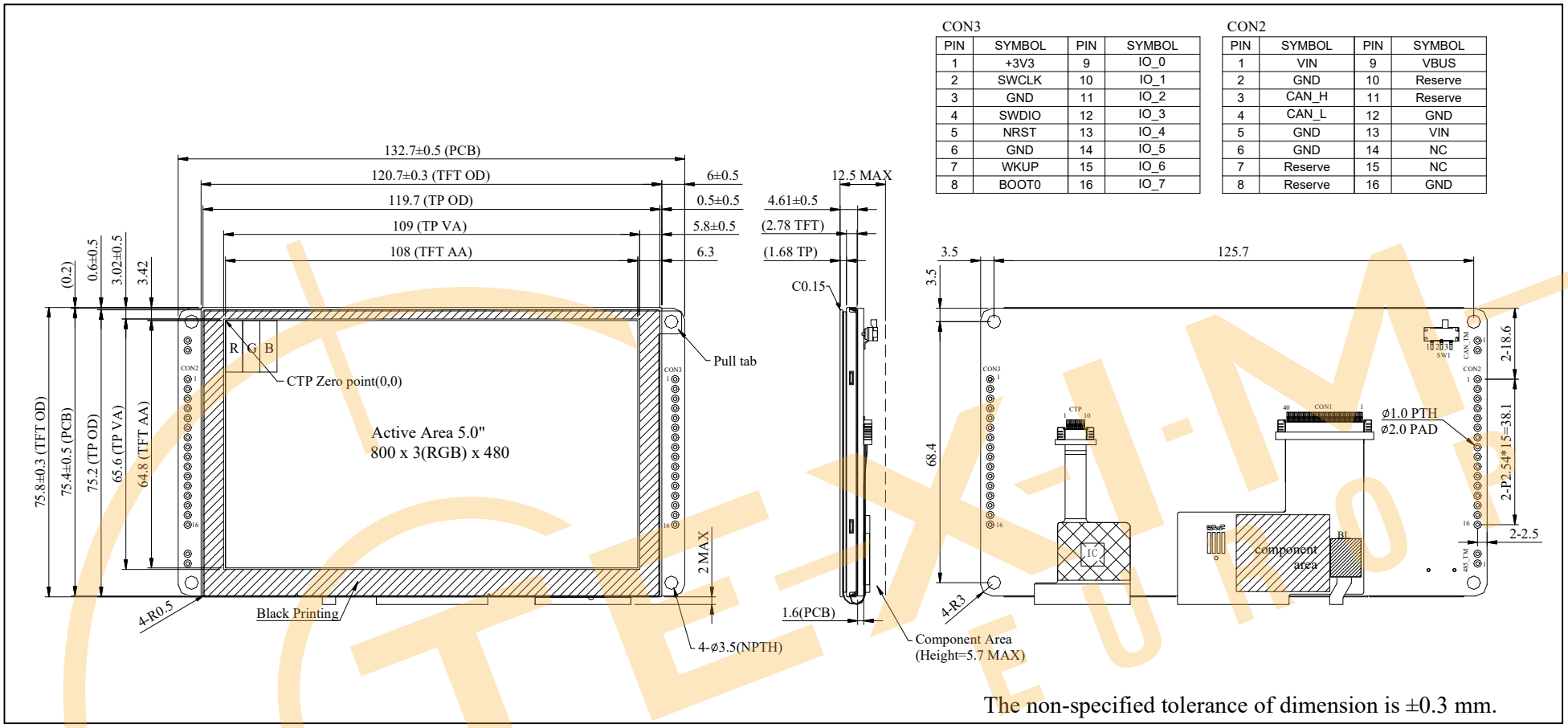
# 4. Contour Drawing

CON3

| PIN | SYMBOL | PIN | SYMBOL |
|---|---|---|---|
| 1 | +3V3 | 9 | IO_0 |
| 2 | SWCLK | 10 | IO_1 |
| 3 | GND | 11 | IO_2 |
| 4 | SWDIO | 12 | IO_3 |
| 5 | NRST | 13 | IO_4 |
| 6 | GND | 14 | IO_5 |
| 7 | WKUP | 15 | IO_6 |
| 8 | BOOT0 | 16 | IO_7 |

CON2

| PIN | SYMBOL | PIN | SYMBOL |
|---|---|---|---|
| 1 | VIN | 9 | VBUS |
| 2 | GND | 10 | Reserve |
| 3 | CAN_H | 11 | Reserve |
| 4 | CAN_L | 12 | GND |
| 5 | GND | 13 | VIN |
| 6 | GND | 14 | NC |
| 7 | Reserve | 15 | NC |
| 8 | Reserve | 16 | GND |




The non-specified tolerance of dimension is ±0.3 mm.



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# 5. Absolute Maximum Ratings

| Item | Symbol | Min | Typ | Max | Unit |
|---|---|---|---|---|---|
| Operating Temperature | TOP | -30 | — | +80 | ℃ |
| Storage Temperature | TST | -30 | — | +80 | ℃ |

Note: Device is subject to be damaged permanently if stresses beyond those absolute maximum ratings listed above
1. Temp. ≦60℃, 90% RH MAX. Temp.＞60℃, Absolute humidity shall be less than 90% RH at 60℃

# 6. Electrical Characteristics

| Item | Symbol | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|---|
| Supply Voltage | VCC | 5 | 12 | 28 | V | |
| Supply Current | ICC | 670 | 240 | 110 | mA | |
| I/O pin Voltage | -- | -- | -- | 3.3 | V | Note 1 |

Note1: Exceed 3.3V may cause MCU damage.

# 7. BOM

| Item | Description | Remark |
|---|---|---|
| LCM | WF50FTWAGDNG0# | |
| PCBA | SV10005R000FG00N0103 | |



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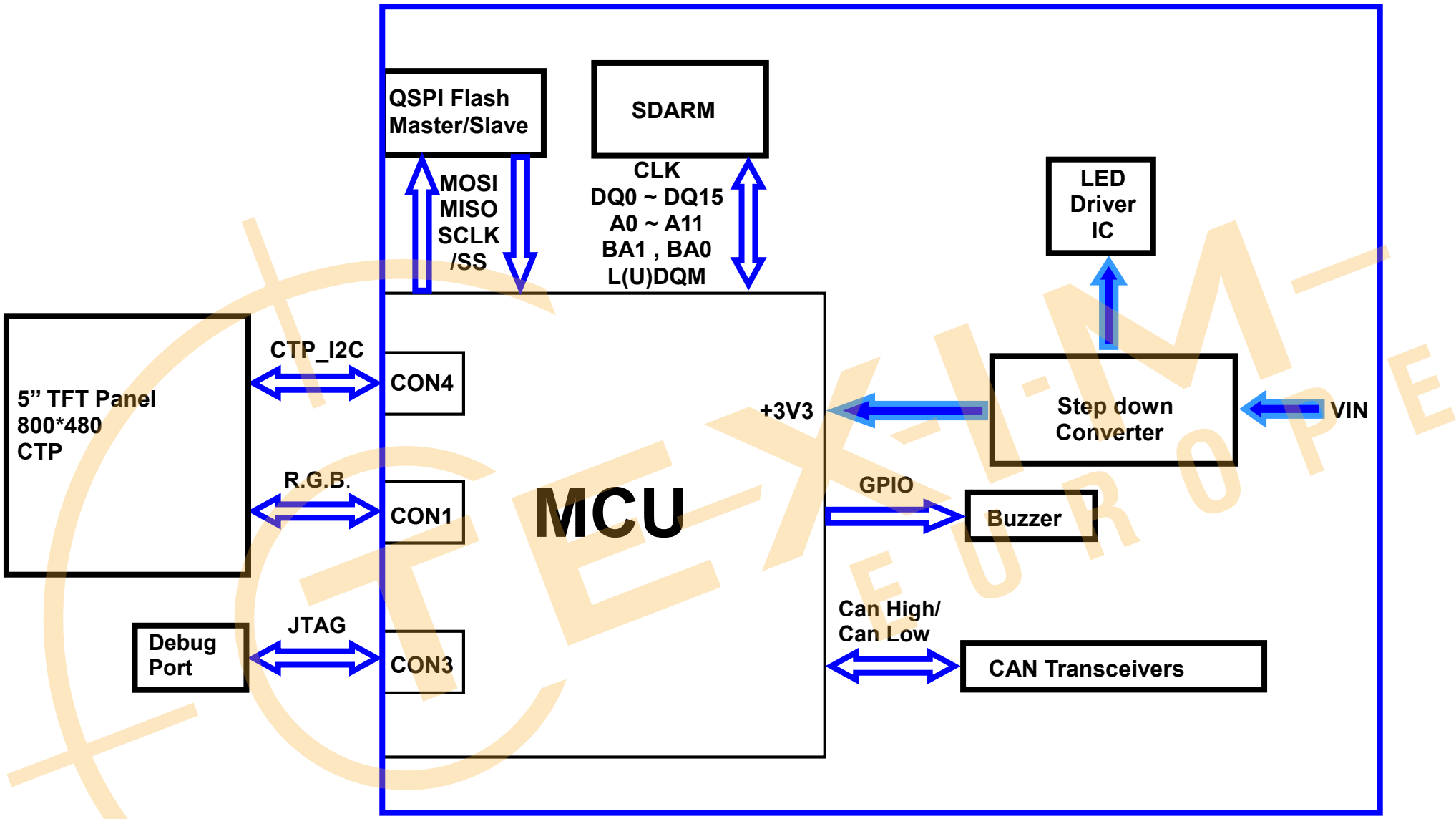
# 8. Block diagram



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# 9. Interface

**CON2 definition:**

| Pin | Symbol | Function | Remark |
|---|---|---|---|
| 1 | VIN | Power supply 5V to 28V input | Input |
| 2 | GND | Power supply GND input | Input |
| 3 | CAN_H | CAN bus D+ | I/O |
| 4 | CAN_L | CAN bus D- | I/O |
| 5 | GND | Power supply GND input | GND |
| 6 | GND | Power supply GND input | GND |
| 7 | Reserve | - | - |
| 8 | Reserve | - | - |
| 9 | VBUS | Power supply 5V input | Input |
| 10 | Reserve | - | - |
| 11 | Reserve | - | - |
| 12 | GND | Power supply GND input | Input |
| 13 | VIN | Power supply 5V to 28V input | Input |
| 14 | NC | - | - |
| 15 | NC | - | - |
| 16 | GND | Power supply GND input | Input |

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**CON3 definition:**

| Pin | Symbol | Function | Remark |
|---|---|---|---|
| 1 | +3V3 | 3.3V power for JTAG interface | Output |
| 2 | SWCLK | CLK pin for JTAG interface | Input |
| 3 | GND | GND for JTAG interface | Output |
| 4 | SWDIO | Data pin for JTAG interface | I/O |
| 5 | NRST | Reset pin for JTAG interface | Input |
| 6 | GND | GND | Output |
| 7 | WKUP | WKup,ADC,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 8 | BOOT0 | Lo: Internal flash boot (Default)<br>Hi: External flash boot | TTL signal voltage is 3.3V |
| 9 | IO0 | ADC,DAC,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 10 | IO1 | ADC,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 11 | IO2 | ADC,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 12 | IO3 | RST,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 13 | IO4 | RST,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 14 | IO5 | ADC,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 15 | IO6 | RST,Timer,Event,I/O | TTL signal voltage is 3.3V |
| 16 | IO7 | RST,ADC,Event,I/O | TTL signal voltage is 3.3V |



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# 10. Reliability

Content of Reliability Test (Wide temperature, -30℃~80℃)

| 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℃<br>96hrs | 2 |
| Low Temperature storage | Endurance test applying the low storage temperature for a long time. | -30℃<br>96hrs | 1,2 |
| High Temperature Operation | Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time. | 80℃<br>240hrs | ——— |
| Low Temperature Operation | Endurance test applying the electric stress under low temperature for a long time. | -30℃<br>240hrs | 1 |
| High Temperature/ Humidity Operation | The module should be allowed to stand at 60℃,90%RH max | 60℃,90%RH<br>96hrs | 1,2 |
| Thermal shock resistance | The sample should be allowed stand the following 10 cycles of operation<br>-30℃ 25℃ 80℃<br>30min 5min 30min<br>1 cycle | -30℃/80℃<br>10 cycles | ——— |
| Vibration test | Endurance test applying the vibration during transportation and using. | Total fixed amplitude : 1.5mm<br>Vibration Frequency : 10~55Hz<br>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=±2KV~±6KV(contact),±2KV~±8KV(air),<br>RS=330Ω<br>CS=150pF<br>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.

**Check samples by meter $V_{IN}$, $I_{system}$**

| Item | No 1 | Note |
|---|---|---|
| $V_{IN}$ (V) | 12 | |
| $I_{System}$(mA) | 247 | |



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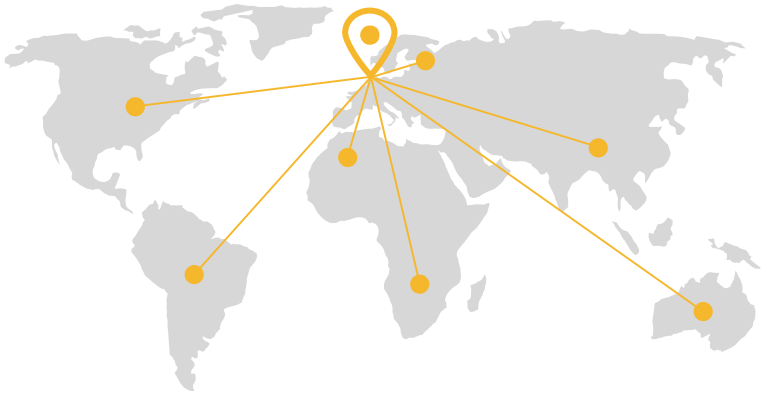

## Headquarters & Warehouse

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