MCCOG240160C6W-FPTLW	240 x 160		LCD Module
Specification			
Version: 1		Date: 07/01/2012	
Revision			
	1	05/01/2012	

Display Features			
Resolution	240 x 160		
Appearance	Black on White		
Logic Voltage	3.3V		
Interface	Parallel		
Font Set	N/A		
Display Mode	Transflective		
LC Type	FSTN		**RoHS compliant**
Module Size	93.00 x 64.20 x 9.80$^{(MAX)}$mm		
Operating Temperature	-20°C ~ +70°C		
Construction	COG	Box Quantity	Weight / Display
LED Backlight	White	---	---

DESIGN • MANUFACTURE • SUPPLY

Display Accessories	
Part Number	**Description**

Optional Variants	
Appearances	**Voltage**
White on Blue Black on Yellow/Green Black on RGB	

General Specification

The Features of the Module is description as follow:

- Module dimension: 93.0 x 64.2 x 9.8(MAX) mm

- View area: 78.5 x 47.5 mm2

- Active area: 69.58 x 43.98 mm2

- Number of Characters: 240 x 160 dots

- Dot size: 0.27 x 0.255 mm2

- Dot pitch: 0.29 x 0.275 mm2

- LCD type: FSTN Positive   Transflective

- Duty: 1/160DUTY,1/12BIAS

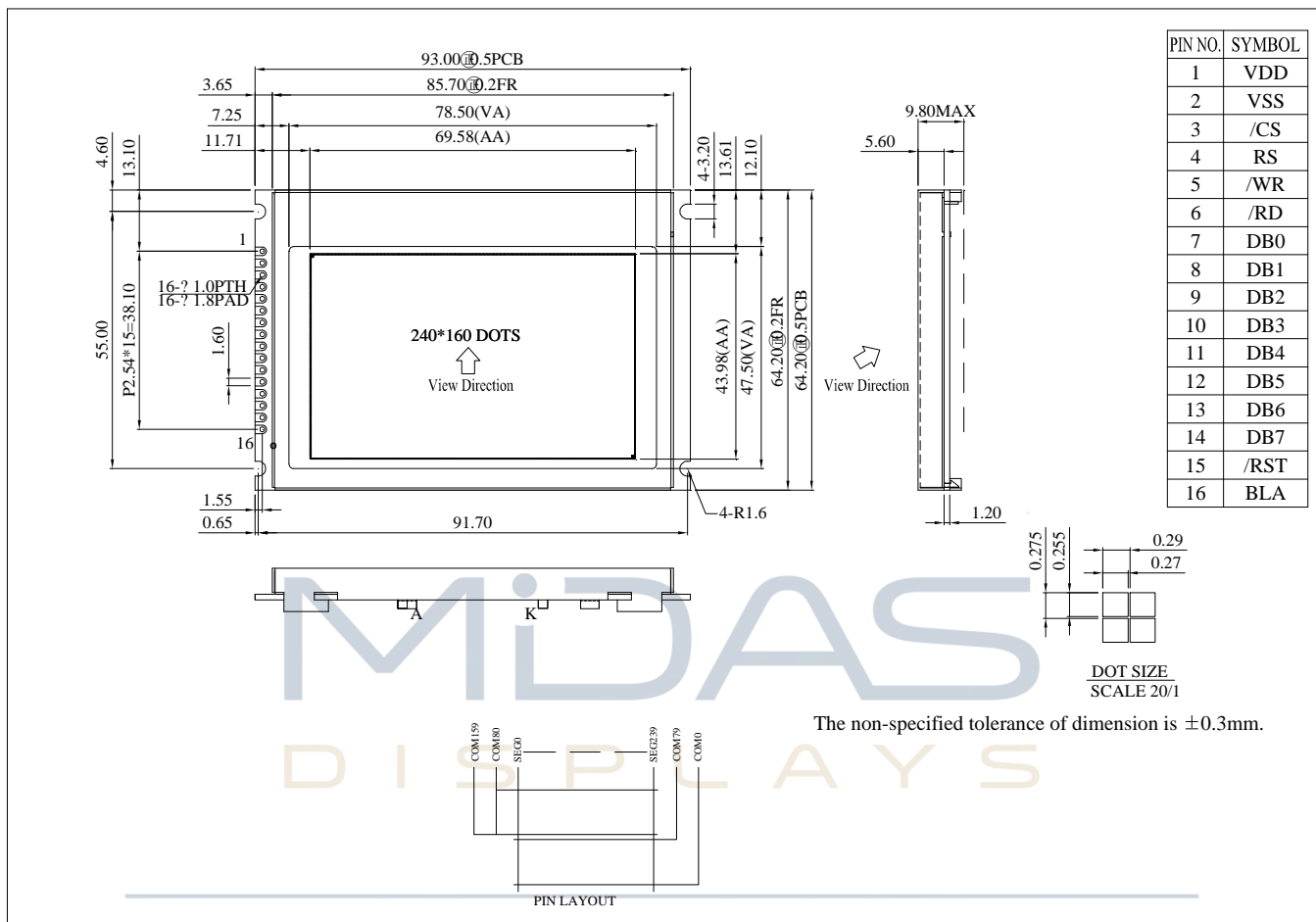- View direction: 6 o'clock

- Backlight Type: LED, White

Interface Pin Function

Pin No.	Symbol	Level	Description
1	VDD		Power supply (+3.3V)
2	VSS		Power supply
3	/CS	L	Chip enable active " L "
4	RS	H / L	H : Instruction , L : Data
5	/WR	L	Write enable input,active Low
6	/RD	L	Read enable input,active Low
7	DB0	H/L	Data bus line
8	DB1	H/L	Data bus line
9	DB2	H/L	Data bus line
10	DB3	H/L	Data bus line
11	DB4	H/L	Data bus line
12	DB5	H/L	Data bus line
13	DB6	H/L	Data bus line
14	DB7	H/L	Data bus line
15	/RST		Reset input pin /RST =Low, initialization is executed /RST =High, Normal
16	BLA	Power	Backlight Positive Power Supply

Outline Dimension

PIN NO.	SYMBOL
1	VDD
2	VSS
3	/CS
4	RS
5	/WR
6	/RD
7	DB0
8	DB1
9	DB2
10	DB3
11	DB4
12	DB5
13	DB6
14	DB7
15	/RST
16	BLA

93.00±0.5PCB
85.70±0.2FR
78.50(VA)
69.58(AA)
3.65
7.25
11.71
4.60
13.10
55.00
P2.54*15=38.10
1.60
1
16-? 1.0PTH
16-? 1.8PAD
16
1.55
0.65
91.70

240*160 DOTS
View Direction

4-3.20
13.61
12.10
43.98(AA)
47.50(VA)
64.20±0.2FR
64.20±0.5PCB
4-R1.6

9.80MAX
5.60
1.20
View Direction

A   K

DOT SIZE
SCALE 20/1
0.275
0.255
0.29
0.27

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

COM159
COM80
SEG0
SEG239
COM79
COM0

PIN LAYOUT

Absolute Maximum Ratings

Item	Symbol	Min	Typ	Max	Unit
Operating Temperature	T_{OP}	-20	—	+70	℃
Storage Temperature	T_{ST}	-30	—	+80	℃
Supply voltage for Logic	V_{DD}- V_{SS}	-0.5	—	4.0	V
Output voltage	V_O	-0.5		V_{DD} +0.5	V

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_O-V_{SS}	Ta=-20℃	—	—	—	V
		Ta=25℃	—	14.5	—	V
		Ta=70℃	—	—	—	V
Input High Volt.	V_{IH}	—	0.7 V_{DD}	—	V_{DD}	V
Input Low Volt.	V_{IL}	—	V_{SS}	—	0.3V_{DD}	V
Output High Volt.	V_{OH}	—	V_{DD}-0.4	—	—	V
Output Low Volt.	V_{OL}	—	V_{SS}	—	0.4	V
Supply Current(No include LED Backlight)	I_{DD}	V_{DD}=3.3V	—	4.8	—	mA

Optical Characteristics

Item	Symbol	Condition	Min	Typ	Max	Unit
View Angle	(V)θ	CR≧2	30	—	60	deg
	(H)φ	CR≧2	-45	—	45	deg
Contrast Ratio	CR	—	—	5	—	—
Response Time	T rise	—	—	200	300	ms
	T fall	—	—	200	300	ms

Definition of Operation Voltage (Vop)   **Definition of Response Time (Tr , Tf)**
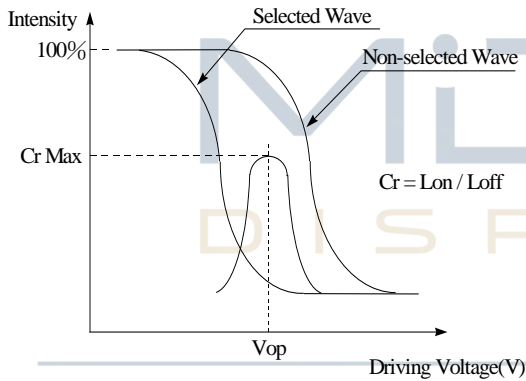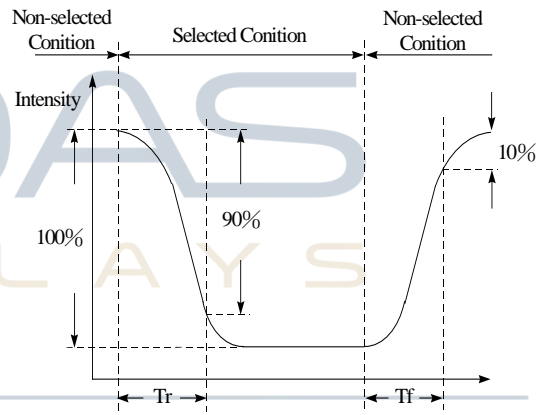
[positive type]   [positive type]

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≧2)
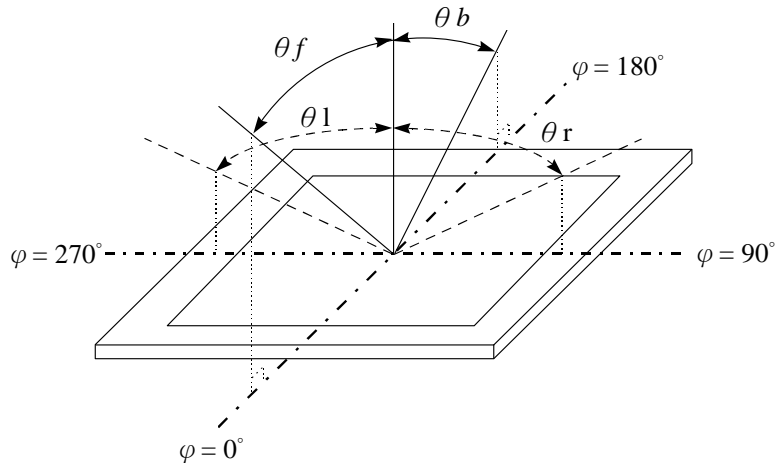
Timing Characteristic

PLEASE TO CONSULT ST7529 SPEC

Backlight Information

Specification

PARAMETER	SYMBOL	MIN	TYP	MAX	UNIT	TEST CONDITION
Supply Current	ILED	76.8	96.0	120	mA	V=3.5V
Supply Voltage	V	3.4	3.5	3.6	V	
Reverse Voltage	VR	—	—	5	V	—
Luminous Intensity (Without LCD)	IV	640.0	800.0	—	CD/M^2	ILED=96mA
LED Life Time	—	—	50K	—	Hr.	$I_{LED} \leqq 96mA$
Color	White					

Note: The LED of B/L is drive by current only ; driving voltage is only for reference
To make driving current in safety area (waste current between minimum and maximum).

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

Drive from pin16,pin2
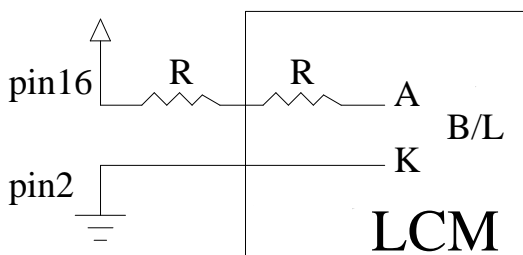
Reliability

Content of Reliability Test (wide temperature, -20℃~70℃)

Environmental Test			
Test Item	**Content of Test**	**Condition**	**Note**
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80℃ 200hrs	2
Low Temperature storage	Endurance test applying the high storage temperature for a long time.	-30℃ 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℃ 200hrs	-
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-20℃ 200hrs	1
High Temperature/ Humidity Operation	The module should be allowed to stand at 60℃,90%RH max For 96hrs under no-load condition excluding the polarizer, Then taking it out and drying it at normal temperature.	60℃,90%RH 96hrs	1,2
Thermal shock resistance	The sample should be allowed stand the following 10 cycles of operation -20℃ 25℃ 70℃ 30min 5min 30min 1 cycle	-20℃/70℃ 10 cycles	-
Vibration test	Endurance test applying the vibration during transportation and using.	fixed amplitude: 15mm 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=800V,RS= 1.5kΩ CS=100pF 1 time	───
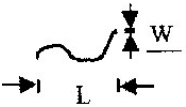
Note1: No dew condensation to be observed.

Note2: The function test shall be conducted after 4 hours storage at the normal temperature and humidity after remove from the test chamber.
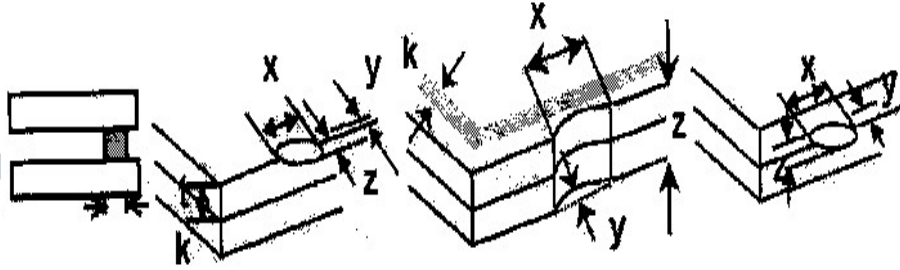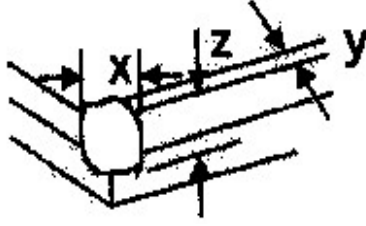
Note3: Vibration test will be conducted to the product itself without putting it in a container.
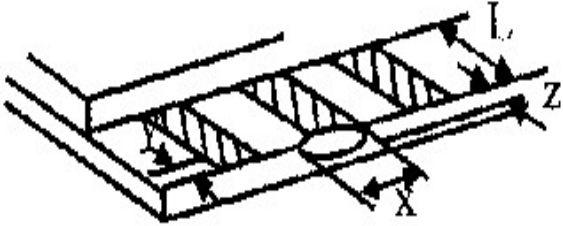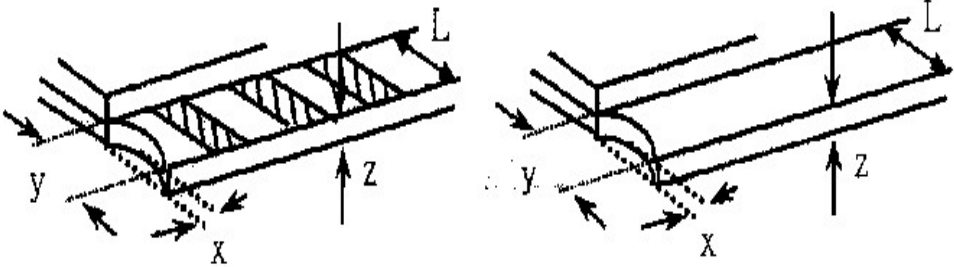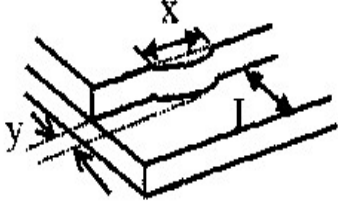
Inspection specification

NO	Item	Criterion	AQL
01	Electrical Testing	1.1 Missing vertical, horizontal segment, segment contrast defect. 1.2 Missing character, dot or icon. 1.3 Display malfunction. 1.4 No function or no display. 1.5 Current consumption exceeds product specifications. 1.6 LCD viewing angle defect. 1.7 Mixed product types. 1.8 Contrast defect.	0.65
02	Black or white spots on LCD (display only)	2.1 White and black spots on display $\leqq$ 0.25mm, no more than three white or black spots present. 2.2 Densely spaced: No more than two spots or lines within 3mm	2.5
03	LCD black spots, white spots, contamination (non-display)	3.1 Round type : As following drawing $\Phi = (x + y) / 2$	2.5

3.2 Line type : (As following drawing)

Length	Width	Acceptable Q TY
---	W $\leqq$ 0.02	Accept no dense
L $\leqq$ 3.0	0.02 $<$ W $\leqq$ 0.03	2
L $\leqq$ 2.5	0.03 $<$ W $\leqq$ 0.05	2
---	0.05 $<$ W	As round type

(AQL: 2.5)

| 04 | Polarizer bubbles | If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction. | 2.5 |

Size Φ	Acceptable Q TY
$\Phi \leqq$ 0.20	Accept no dense
0.20 $<$ Φ $\leqq$ 0.50	3
0.50 $<$ Φ $\leqq$ 1.00	2
1.00 $<$ Φ	0
Total Q TY	3
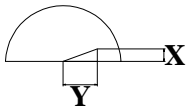
NO	Item	Criterion	AQL
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination	

Symbols Define:
x: Chip length   y: Chip width   z: Chip thickness
k: Seal width   t: Glass thickness   a: LCD side length
L: Electrode pad length:

6.1 General glass chip :
6.1.1 Chip on panel surface and crack between panels:

06 — Chipped glass — AQL 2.5

$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙ If there are 2 or more chips, x is total length of each chip.

6.1.2 Corner crack:

z: Chip thickness	y: Chip width	x: Chip length
$Z \leq 1/2t$	Not over viewing area	$x \leq 1/8a$
$1/2t < z \leq 2t$	Not exceed $1/3k$	$x \leq 1/8a$

⊙ If there are 2 or more chips, x is the total length of each chip.

NO	Item	Criterion	AQL
06	Glass crack	Symbols : x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: LCD side length L: Electrode pad length 6.2 Protrusion over terminal : 6.2.1 Chip on electrode pad : _table below_	2.5

6.2.1 Chip on electrode pad table:

y: Chip width	x: Chip length	z: Chip thickness
y ≤ 0.5mm	x ≤ 1/8a	0 < z ≤ t

6.2.2 Non-conductive portion:

y: Chip width	x: Chip length	z: Chip thickness
y ≤ L	x ≤ 1/8a	0 < z ≤ t

⊙If the chipped area touches the ITO terminal, over 2/3 of the ITO must remain and be inspected according to electrode terminal specifications.

⊙If the product will be heat sealed by the customer, the alignment mark not be damaged.

6.2.3 Substrate protuberance and internal crack.

y: width	x: length
y ≤ 1/3L	x ≤ a

NO	Item	Criterion	AQL
07	Cracked glass	The LCD with extensive crack is not acceptable.	2.5
08	Backlight elements	8.1 Illumination source flickers when lit. 8.2 Spots or scratched that appear when lit must be judged. Using LCD spot, lines and contamination standards. 8.3 Backlight doesn't light or color wrong.	0.65 2.5 0.65
09	Bezel	9.1 Bezel may not have rust, be deformed or have fingerprints, stains or other contamination. 9.2 Bezel must comply with job specifications.	2.5 0.65
10	PCB、COB	10.1 COB seal may not have pinholes larger than 0.2mm or contamination. 10.2 COB seal surface may not have pinholes through to the IC. 10.3 The height of the COB should not exceed the height indicated in the assembly diagram. 10.4 There may not be more than 2mm of sealant outside the seal area on the PCB. And there should be no more than three places. 10.5 No oxidation or contamination PCB terminals. 10.6 Parts on PCB must be the same as on the production characteristic chart. There should be no wrong parts, missing parts or excess parts. 10.7 The jumper on the PCB should conform to the product characteristic chart. 10.8 If solder gets on bezel tab pads, LED pad, zebra pad or screw hold pad, make sure it is smoothed down. 10.9 The Scraping testing standard for Copper Coating of PCB **X * Y<=2mm²**	2.5 2.5 0.65 2.5 2.5 0.65 0.65 2.5 2.5
11	Soldering	11.1 No un-melted solder paste may be present on the PCB. 11.2 No cold solder joints, missing solder connections, oxidation or icicle. 11.3 No residue or solder balls on PCB. 11.4 No short circuits in components on PCB.	2.5 2.5 2.5 0.65

NO	Item	Criterion	AQL
12	General appearance	12.1 No oxidation, contamination, curves or, bends on interface Pin (OLB) of TCP. 12.2 No cracks on interface pin (OLB) of TCP. 12.3 No contamination, solder residue or solder balls on product. 12.4 The IC on the TCP may not be damaged, circuits. 12.5 The uppermost edge of the protective strip on the interface pin must be present or look as if it causes the interface pin to sever. 12.6 The residual rosin or tin oil of soldering (component or chip component) is not burned into brown or black color. 12.7 Sealant on top of the ITO circuit has not hardened. 12.8 Pin type must match type in specification sheet. 12.9 LCD pin loose or missing pins. 12.10 Product packaging must the same as specified on packaging specification sheet. 12.11 Product dimension and structure must conform to product specification sheet.	2.5 0.65 2.5 2.5 2.5 2.5 2.5 0.65 0.65 0.65 0.65

Precautions in use of LCD Modules

1. Avoid applying excessive shocks to the module or making any alterations or modifications to it.
2. Don't make extra holes on the printed circuit board, modify its shape or change the components of LCD module.
3. Don't disassemble the LCM.
4. Don't operate it above the absolute maximum rating.
5. Don't drop, bend or twist LCM.
6. Soldering: only to the I/O terminals.
7. Storage: please storage in anti-static electricity container and clean environment.
8. Midas have the right to change the passive components
   (Resistors,capacitors and other passive components will have different appearance and color caused by the different supplier.)
9. Midas have the right to change the PCB Rev.

Material List of Components for RoHs

1. MIDAS Components Ltd. hereby declares that all of or part of products, including, but not limited to, the LCM, accessories or packages, manufactured and/or delivered to your company (including your subsidiaries and affiliated company) directly or indirectly by our company (including our subsidiaries or affiliated companies) do not intentionally contain any of the substances listed in all applicable EU directives and regulations, including the following substances.

   Exhibit A：The Harmful Material List

Material	(Cd)	(Pb)	(Hg)	(Cr6+)	PBBs	PBDEs
Limited Value	100 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm	1000 ppm
Above limited value is set up according to RoHS.						

2. Process for RoHS requirement：
  (1) Use the Sn/Ag/Cu soldering surface；the surface of Pb-free solder is rougher than we used before.
  (2) Heat-resistance temp.：
    Reflow：250℃, 30 seconds Max.；
    Connector soldering wave or hand soldering：320℃, 10 seconds max.
  (3) Temp. curve of reflow, max. Temp.：235±5℃；
    Recommended customer's soldering temp. of connector：280℃, 3 seconds.

Recommendable storage

1. Place the panel or module in the temperature 25°C±5℃ and the humidity below 65% RH
2. Do not place the module near organics solvents or corrosive gases.
3. Do not crush, shake, or jolt the module