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FORDATA FOR DATA DISPLAY
Classic LCDs & LEDs

LCD MODULE SPECIFICATION

ITEM CODE
FC2004C03-RNNYBW-16SE

SPECIFICATION ESTABLISHED DATE: 2016.11.16

ISSUED BY: 朱叶 **CHECKED BY:** 李智良 **APPROVED BY:** 李智良

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AMENDMENT RECORD

MARK	DATE	DESCRIPTION	ITEM	PAGE	APPROVED
1	2016.11	INITIAL ISSUED	ALL	ALL	

1. The following icons are absolutely designed by FORDATA independently in 2007-SEP. They are unique in the LCD industry and are used for marking out FORDATA products' characteristics quickly and simply without any special meaning.
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3. The technologies/techniques/crafts which denoted by the following icons are not exclusively owned by FORDATA but also shared by FORDATA's LCD strategic cooperators, however all these technologies/techniques/crafts have been finally confirmed by FORDATA's professional engineers and QC department.

4. As the difference in test standard and test conditions, also FORDATA's insufficient familiarity with the actual LCD using environment, all the referred information in this DATASHEET (including the icons) only have two functions:
   4.1: providing quick reference when you are judging whether the product meets your requirements or not.
   4.2: listing out the tolerance.
   FORDATA declares seriously: you should first test the corresponding sample(s) before signing the formal FORDATA SAMPLE APPROVAL document rather than consider this DATASHEET as the standard for judging whether the LCD meets your requirements or not . Once you place bulk order(s) to FORDATA without testing samples. FORDATA will disclaim all responsibility if the mass-production is proved not to meet with your requirements.

5. The sequence of the icons is random and doesn't indicate the importance grade.

6. Icons explanation

2000 Version 2006 Version 2012 Version

FORDATA FOR DATA DISPLAY

classic mono LCDs

Classic LCDs & LEDs

FORDATA is an integrated manufacturer of flat panel display (FPD). All above listed icons and words compses FORDATA's logo.
From 2000, FORDATA has supplied LCD module
From 2006, FORDATA has supplied TN, HTN, STN, FSTN monochrome LCD panel
From 2012, FORDATA has supplied all kinds of LED backlight.

FAST RESPONSE TIME
This icon on the cover indicates the product is with high response speed; Otherwise not.

HIGH CONTRAST
This icon on the cover indicates the product is with high contrast; Otherwise not.

WIDE VIEWING SCOPE
This icon on the cover indicates the product is with wide viewing scope; Otherwise not.

RoHS COMPLIANCE
This icon on the cover indicates the product meets ROHS requirements; Otherwise not.

3TIMEs 100% QC EXAMINATION
This icon on the cover indicates the product has passed FORDATA's thrice 100% QC. Otherwise not.

Vlcm = 3.0V
This icon on the cover indicates the product can work at 3.0V exactly; otherwise not.

PROTECTION CIRCUIT
This icon on the cover indicates the product is with protection circuit; Otherwise not.

LONG LIFE VERSION
This icon on the cover indicates the product is long life version (over 9K hours guaranteed); Otherwise not.

Anti UV VERSION
This icon on the cover indicates the product is against UV line. Otherwise not.

EASY OPERATION TEMPERATURE
This icon on the cover indicates the product can have good contrast on one driving voltage in indicated operation temperature range .

TWICE SELECTION OF LED MATERIALS
This icon on the cover indicates the LED has passed FORDATA's twice strict selection which promises the product's identical color and brightness; Otherwise not.

N SERIES TECHNOLOGY (2008 developed)
FORDATA adopts new structure, new craft, new technology and new materials inside both LCD module and LCD panel to improve the "RainBow"

1	2	3	4	5	6	—	7	8	9	10	11	12	—	13	14	15	16
F	C	08	01	A	23	—	F	H	Y	Y	B	W	—	5	2	L	E

No.	REMARKS	DESCRIPTION
1	COMPANY ABBRAVIATION	F = FORDATA
2	STANDARD MODULE TYPE	C = Character type standard LCD module (COB version) G = Graphic type standard LCD module (COB version)
3	Character (FC series)	08, 10, 12, 16, 20, 24, 40, = Character number Per line
	Graphic (FG series)	80, 100, 120, 122, 128, 160 ... ... = Row Dots Quantity
4	Character (FC series)	01, 02, 04, = Character Lines
	Graphic (FG series)	32, 64, 80, 128, 160 ... ... =Column Dots Quantity
5	Serial Number	A~Z which is decided by the sizes of viewing area
6	Identifying Code	00~99 which is decided by all the other aspects for the same viewing area
7	Polarizer type	R = Positive Reflective F = Positive Transflective M = Positive Transmissive N = Negative Transmissive B = Super Black technology New!
8	Backlight type	N = No Backlight L = Array Type LED Backlight S = Edge Type LED Backlight (Standard version) H = Edge Type LED Backlight (Long life span version) New! E = EL backlight without Invertor F = EL backlight with Invertor C = CCFL backlight without Invertor T = CCFL backlight with Invertor
9	Backlight color	N = No Backlight Y = Yellow-Green W = White R = Red A = Amber C = Blue-Green B = Blue G = Green Q = RedGreenBlue three color New!
10	LCD panel type	T = TN H = HTN Y = Yellow-Green STN G = Gray STN B = Blue STN F = FSTN
11	Viewing angle	B = Bottom 6:00 T = Top 12:00 R = Right 3:00 L = Left 9:00
12	Operation temperature range	S = 0℃ ~ 50℃ (Single Supply Voltage) D = 0℃ ~ 50℃ (Dual Supply Voltage) W = -20℃ ~ 70℃ (Single Supply Voltage) H = -20℃ ~ 70℃ (Dual Supply Voltage) T = -30℃ ~ 80℃ (Single Supply Voltage) E = -30℃ ~ 80℃ (Dual Supply Voltage)
13	Driving Voltage Code (This code was updated from 2015-JAN-1ST)	

	Vlcm = 3.0V	Vlcm = 3.3V	Vlcm = 3.6V	Vlcm = 5.0V
Vled = Indicated Voltage*	P	R	X	Q
Vled = 4.2V	M	G	D	K
Vled = 3.0V	9	A	3	4
Vled = 3.3V	T	B	K	F
Vled = 5.0V	8	C	2	5
NO/EL/CCFL	1	H	7	6

14	Backlight Connect Method	0 = PIN1 LED-, PIN2 LED+ 1 = PIN15(17/19) LED+, PIN16(18/20) LED- 2 = PIN15(17/19) LED-, PIN16(18/20) LED+ 3 = PIN15(17/19) LED+, PIN16(18/20) NC 4 = PIN15(17/19) NC, PIN16(18/20) LED+ 5 = PINA LED+, PINK LED- 6 = No / EL / CCFL Backlight
15	IC Manufacturer Code	A~Z or 01~99 which is decided by different IC manufacturers
16	Font Set	A~Z or 01~99 which is decided by different font maps

FEATURES

AVAILABLE OPTIONS	CHARACTERISTICS	CODE	No.
DISPLAY FORMAT	20 Characters by 4 Lines	FC2004C03	1~6
POLARIZER OPTIONS	Positive Reflective	R	7
BACKLIGHT TYPE OPTIONS	No Backlight	N	8
BACKLIGHT COLOR OPTIONS	No Backlight	N	9
LCD PANEL OPTIONS	Y/G STN	Y	10
VIEWING ANGLE OPTIONS	6:00 (Bottom)	B	11
TEMPERATURE RANGE OPTIONS	-20℃ ~ 70℃, Single Supply Voltage	W	12
SUGGESTED DRIVING VOLTAGE	Vlcm = 3.0V	1	13
SUGGESTED LED DRIVING MODE	No Backlight	6	14
CONTROLLER ▲1	ST7066U+ ST7063C	S	15
FONT MAP CODE	E Version	E	16
DRIVING DUTY	1/16	—	—
DRIVING BIAS	1/5	—	—

▲1 Please ask for datasheet of the mentioned controller from FORDATA or FORDATA's authorized distributors. You can find the related information including AC & DC characteristics, Write & Read Timing diagram, Instruction table and descriptions, DDRAM & CGRAM, Rest Function and so on from the datasheet of controller.

▲1 You can ask for the example of software program (C language) from FORDATA or FORDATA's authorized distributors.

MECHANICAL SPECIFICATIONS

OVERALL SIZE	77.0W x 47.0H	mm	THICKNESS	max 10	mm
VIEWING AREA	60.0W x 22.0H	mm	HOLE-HOLE	70.0W x 40.0H	mm
CHARACTER SIZE	2.30W x 4.03H	mm	CHARACTER PITCH	0.48W x 0.48H	mm
DOT SIZE	0.42W x 0.46H	mm	DOT PITCH	0.05W x 0.05H	mm

ABSOLUTE MAXIMUM RATINGS

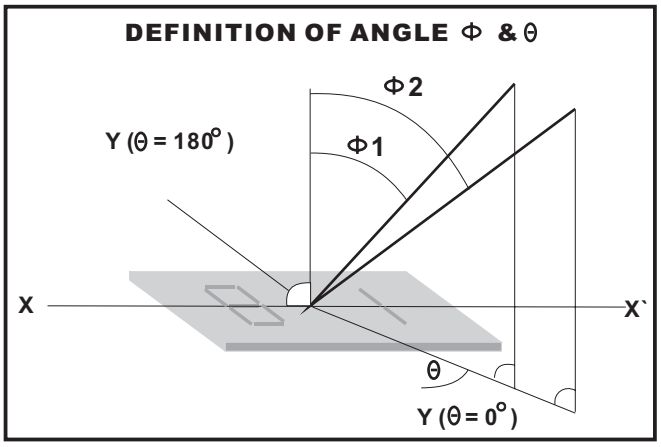
ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
POWER SUPPLY (LOGIC)	Vdd	25℃	-0.3	—	7.0	V
POWER SUPPLY (LCD)	V0	25℃	Vdd -13.5	—	Vdd +0.3	V
INPUT VOLTAGE	Vin	25℃	-0.3	—	Vdd +0.3	V
OPERATING TEMPERATURE	Vopr	—	0	—	50	℃
STORAGE TEMPERATURE	Vstg	—	-10	—	60	℃

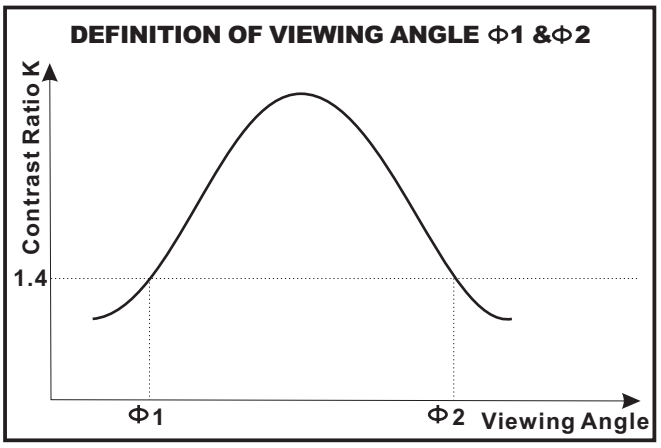
ELECTRONIC CHARACTERISTICS*

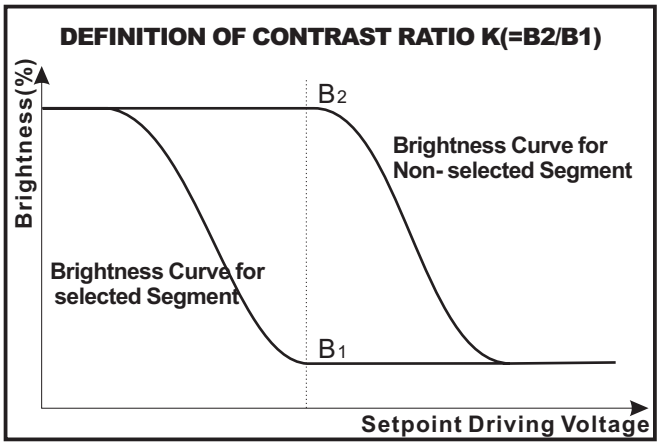
ICONS	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
3.0V	INPUT VOLTAGE	Vlcm = Vdd	—	—	3.0	—	V
	SUPPLY CURRENT	Idd	Vdd=3.0V	—	1.5	—	mA
	DRIVING VOLTAGE FOR LCD PANEL	Vlcd = (Vdd - V0)	-20℃	—	—	—	V
			0℃	—	—	—	
			25℃	—	—	—	
			50℃	—	—	—	
			70℃	—	—	—	

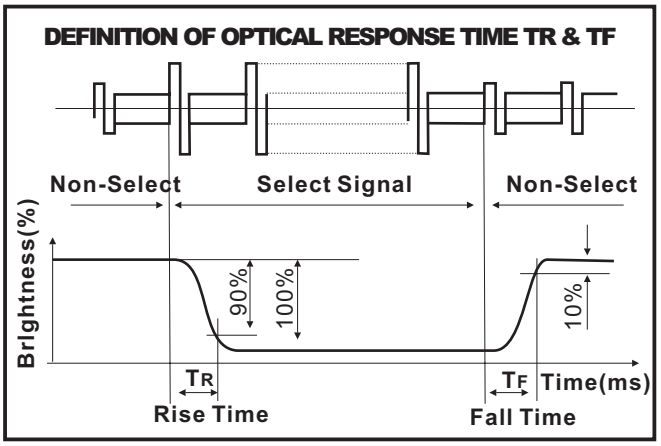
* All data are recorded from TEST REPORT #FSYP000200038

FOR STN/FSTN TYPE LCD Panel (TA=25°C, Vlcd=5.0V ± 0.5V)							
ICONS	ITEM	SYMBOL	CONDITION	MIN	TYP	MAX	UNIT
	VIEWING ANGLE	Φ2 − Φ1	K=4	40	—	—	deg
		θ		60			
HC	CONTRAST RATIO	K	—	6	—	—	—
	RESPONSE TIME(RISE)	TR	—	—	150	250	ms
F	RESPONSE TIME(FALL)	TF	—	—	150	250	ms





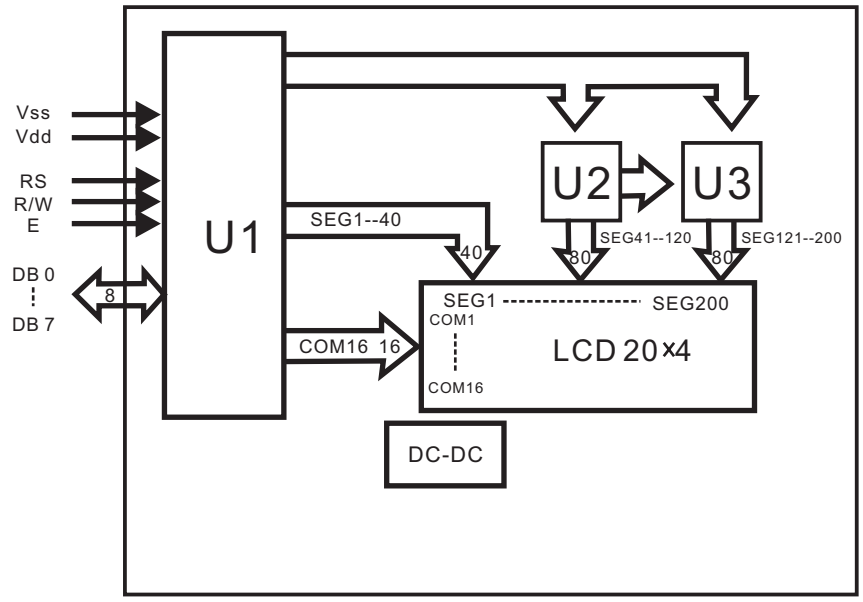




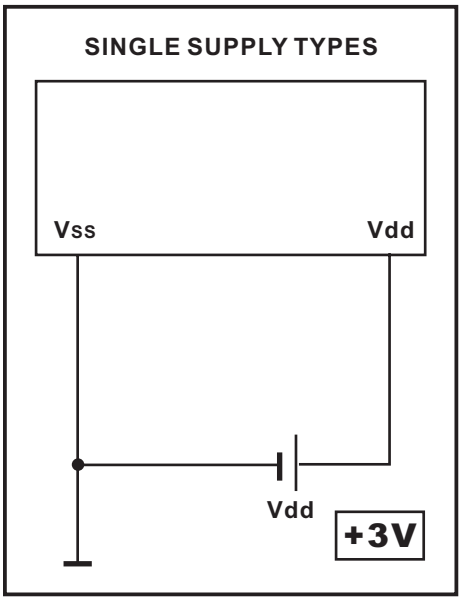
PIN ASSIGNMENT

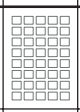
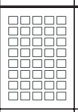
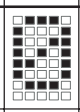
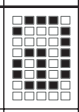
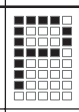
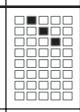
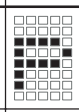
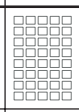
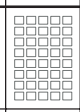
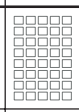
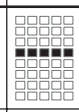
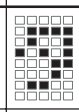
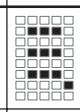
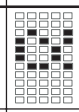
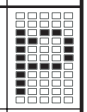
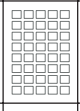
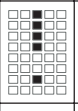
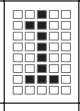
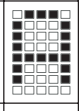
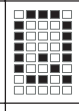
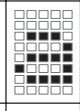
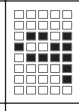
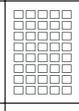
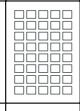
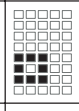
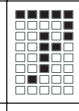
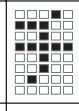
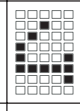
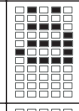
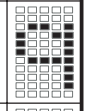
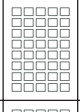
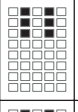
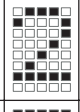
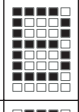
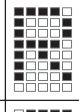
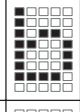
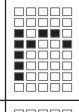
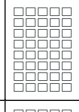
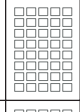
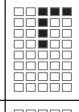
PIN	SYMBOL	DESCRIPTION	REMARKS
1	Vss	GND	
2	Vdd	Power supply for LCM	3.0V
3	NC	No connection	
4	RS	Register Select Signal	
5	R/W	Data Read / Write	
6	E	Enable Signal	
7	DB0	Data bus line	
8	DB1	Data bus line	
9	DB2	Data bus line	
10	DB3	Data bus line	
11	DB4	Data bus line	
12	DB5	Data bus line	
13	DB6	Data bus line	
14	DB7	Data bus line	
15	NC	No connection	
16	NC	No connection	

BLOCK DIAGRAM



POWER SUPPLY DIAGRAM



Upper 4bit / Lower 4bit	LLLL	LLLH	LLHL	LLHH	LHLL	LHLH	LHHL	LHHH	HLLL	HLLH	HLHL	HLHH	HHLL	HHLH	HHHL	HHHH
LLLL	CG RAM (1)															
LLLH	(2)															
LLHL	(3)															
LLHH	(4)															
LHLL	(5)															
LHLH	(6)															
LHHL	(7)															
LHHH	(8)															
HLLL	(1)															
HLLH	(2)															
HLHL	(3)															
HLHH	(4)															
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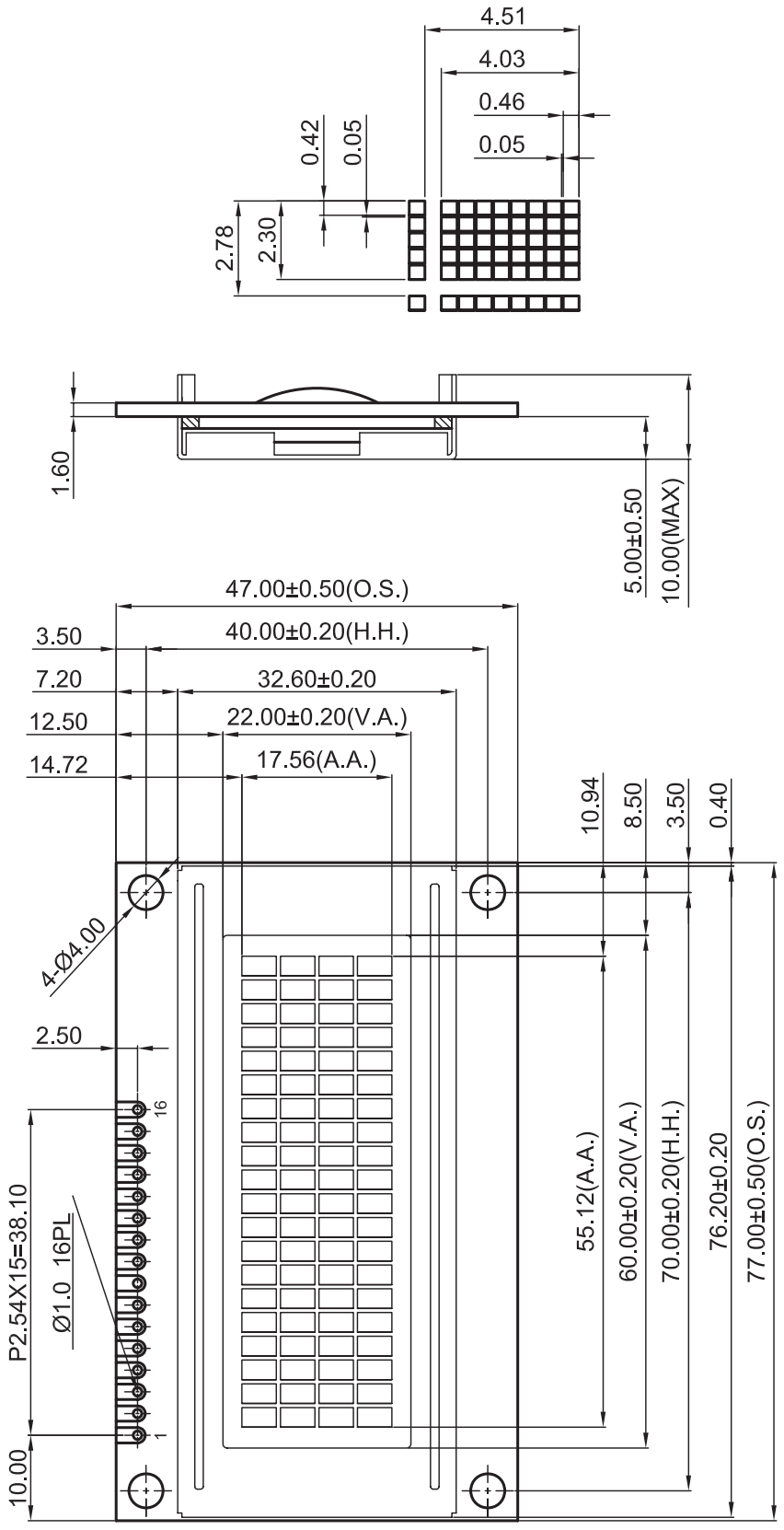
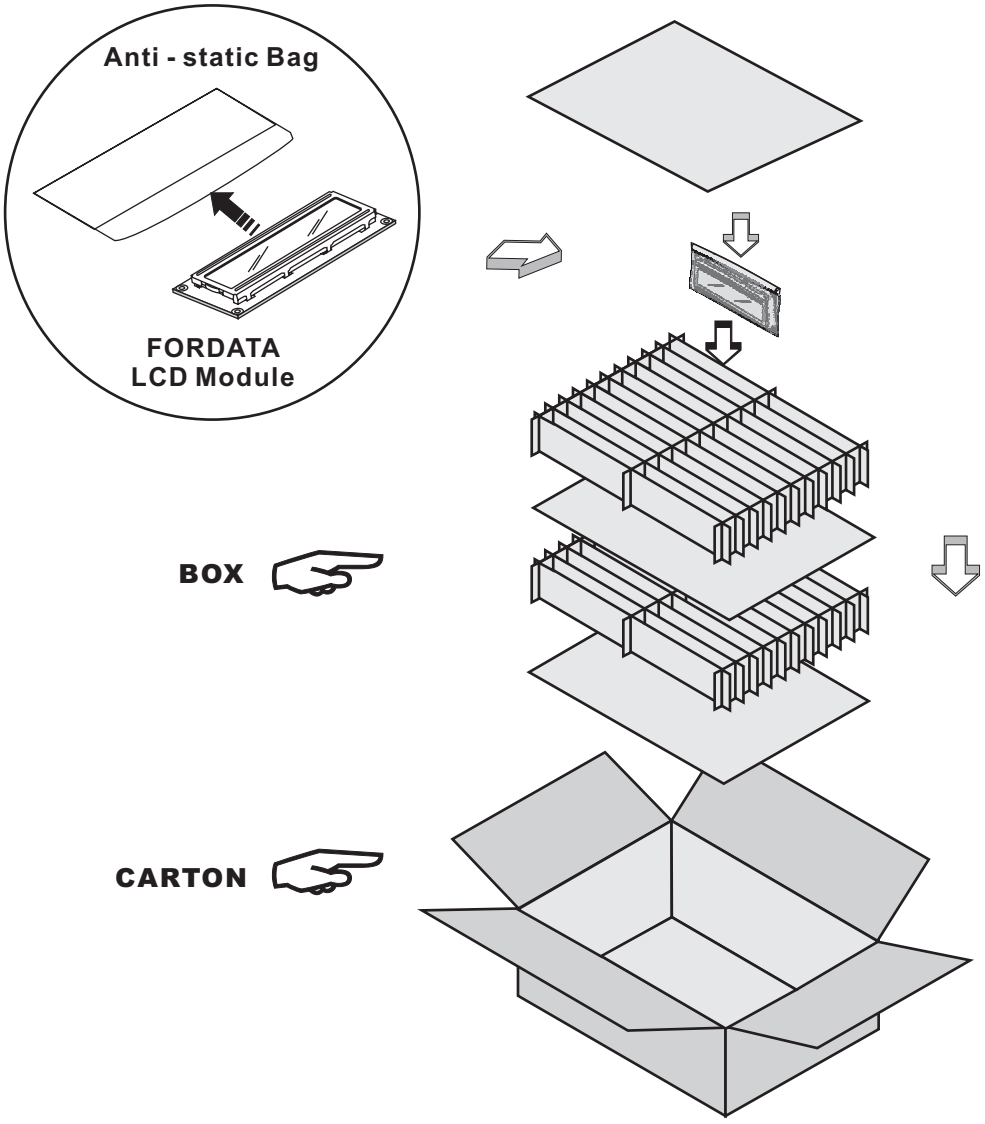
HHHL	(7)															
HHHH	(8)															


4.51
4.03
0.46
0.05
0.42
0.05
2.78
2.30
1.60
5.00±0.50
10.00(MAX)
47.00±0.50(O.S.)
40.00±0.20(H.H.)
32.60±0.20
22.00±0.20(V.A.)
17.56(A.A.)
3.50
7.20
12.50
14.72
10.94
8.50
3.50
0.40
4-Ø4.00
2.50
16
1
P2.54X15=38.10
Ø1.0 16PL
10.00
55.12(A.A.)
60.00±0.20(V.A.)
70.00±0.20(H.H.)
76.20±0.20
77.00±0.50(O.S.)

FULL-SIZED PACKAGE
45 PCS/BOX
10 BOXES/CARTON
450 PCS/CARTON
13.00 KGS/CTN(G.W.)
0.054 M^3/CARTON

HALF-SIZED PACKAGE
45 PCS/BOX
5 BOXES/CARTON
225 PCS/CARTON
6.00 KGS/CTN(G.W.)
0.027 M^3/CARTON

PACKING DECLARATION

1. This packaging information is for reference only. The actual information is subject to the actual packaging. Especially for packaging of LCL, tolerances may exist.
2. FORDATA will not be responsible for quality problems caused by unnormal transportation conditions (including but not limited to climate factors or human factors, such as improper handling).