### LCD-320Y240D-TFH-VI



Vishay

#### 320 x 240 Graphic LCD



MECHANICAL DATA						
ITEM	UNIT					
Module Dimension	94.7 x 71.7					
Viewing Area	81.4 x 61.0					
Dot Size	0.225 x 0.225					
Dot Pitch	0.24 x 0.24					
Mounting Hole	85.3 x 83.3					
Character Size	n/a					

#### FEATURES

- Type: Graphic
- Display format: 320 x 240 dots
- Built-in controller: RA8835 and SRAM
- Duty cycle: 1/240
- Built-in positive voltage output
- Touch screen option
- + 3.3 V power supply (also available for 5.0 V)
- LCD-320Y240H: Chinese version (RA8806 controller)
- Material categorization: For definitions of compliance please see <u>www.vishay.com/doc?99912</u>

ABSOLUTE MAXIMUM RATINGS								
ITEM	SAMBOI	STA	STANDARD VALUE					
	STINDUL	MIN.	TYP.	MAX.	UNIT			
Power Supply	$V_{\text{DD}}$ to $V_{\text{SS}}$	3.0	3.3	3.5	V			
Input Voltage	VI	•	-	$V_{DD}$	v			

Note

<sup>•</sup>  $V_{SS} = 0 V, V_{DD} = 5.0 V$ 

ELECTRICAL CHARACTERISTICS								
ITEM	SYMPOL	CONDITION	ST	STANDARD VALUE				
	STMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT		
Input Voltago	V <sub>DD</sub>	L level	0	-	0.2 V <sub>DD</sub>	V		
input voltage	V <sub>IO</sub>	H level	0.5 V <sub>DD</sub>	-	V <sub>DD</sub>	V		
Supply Current	I <sub>DD</sub>	V <sub>DD</sub> = + 3.5 V	-	33	-	mA		
		- 20 °C	-	-	-			
Recommended LC Driving		0°C	-	-	-			
Voltage for Normal Temperature	$V_0$ to $V_{SS}$	25 °C	-	18.7	-	V		
Version Module		50 °C	-	-	-			
		70 °C	-	-	-			
LED Forward Voltage	V <sub>F</sub>	25 °C	-	25	-	V		
LED Forward Current	l <sub>F</sub>	25 °C	-	-	-	mA		
	V <sub>F</sub>	25 °C	-	-	-			
UUFL	I <sub>F</sub>	25 °C	-	-	-			
EL Power Supply Current	I <sub>EL</sub>	V <sub>EL</sub> = 110 V <sub>AC</sub> , 400 Hz	-	-	-	mA		

OPTION	5								
PROCESS COLOR						BACK	LIGHT		
TN	STN GRAY	STN YELLOW	STN BLUE	FSTN B&W	STN COLOR	NONE	LED	EL	CCFL
-	х	х	-	х	-	х	х	х	-

For detailed information, please see the "Product Numbering System" document.



ROHS COMPLIANT

#### LCD-320Y240D-TFH-VI



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INTERFACE PIN	I FUNCTIONS	
PIN NO.	SYMBOL	FUNCTION
1	V <sub>SS</sub>	Ground
2	V <sub>DD</sub>	Power supply for logic
3	V <sub>0</sub>	Contrast adjustment
4	A <sub>0</sub>	H: Data, L: Instruction
5	WR	8080 family: Write signal, 6800 family: R/W signal
6	RD	8080 family: Read signal, 6800 family: Wnable clock
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	CS	Chip enable
16	RES	Reset
17	V <sub>EE</sub>	Postitive voltage output
18	SEL1	8080 or 6800 intenface select 1:68 or 0:80
19	A	Power supply for B/L
20	К	Power supply for B/L
21	NC	No connection
22	NC	No connection



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2 For technical questions, contact: <u>displays@vishay.com</u>

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### **1. Module Classification Information**

LCD	-320	) Y	240	D	- <i>T</i>	$\boldsymbol{F}$	H	<i>-VI</i>
0	2	3	4	5	6	7	8	9
1.	Brand : Visha	y Intertechno	ology, Inc.					
2.	Horizontal Fo	rmat: 320 c	columns					
3.	Display Type	: N→Charao	cter Type, H–	→Graphi	c Type,. Y–	>Tab Typ	pe	
4.	Vertical Form	at: 240 Lin	les					
5.	Model serials	number: D	1					
6.	Backlight	N→Withou	t backlight		T→LED, V	Vhite		
	Type:	B→EL, Blu	ie green		A→LED, A	Amber		
		D→EL, Gre	een		R→LED, F	Red		
		W→EL, W	hite		O→LED, O	Drange		
		$F \rightarrow CCFL$ , White			$G \rightarrow LED$ , Green			
		Y→LED, Y	ellow Green		P→LED, E	Blue		
7.	LCD Mode :	B→TN Positive, Gray			T→FSTN Negative			
		N→TN Neg	gative,					
		G→STN Po	ositive, Gray					
		Y→STN Po	ositive, Yello	w Green				
		M→STN N	egative, Blue	e				
		F→FSTN F	ositive					
8.	LCD	A→Reflect	ive, N.T, 6:00	0	H→Transf	lective, V	V.T,6:00	
	Polarizer	D→Reflect	ive, N.T, 12:0	00	K→Transf	lective,W	7.T,12:00	
	Temperature	G→Reflect	ive, W. T, 6:0	00	C→Transn	nissive, N	J.T,6:00	
	range/ View	J→Reflecti	ve, W. T, 12:	00	F→Transm	issive, N	.T,12:00	
	direction	B→Transfl	ective, N.T,6	:00	I→Transm	issive, W	. T, 6:00	
		E→Transfl	ective, N.T.12	2:00	L→Transm	nissive, W	V.T,12:00	
9.	Special Code	V: Built in	Positive Volt	age				
		I: ICIST303 Compliant	1TA0# ICI with the ROH	ST30327 IS Direct	ΓA0# ions and reg	gulations		



## 2. Precautions in Use of LCD Module

- (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)Supplier has the right to change the passive components
- (9)Supplier has the right to change the PCB Rev.

## **3.**General Specification

ITEM	STANDARD VALUE	UNIT		
Number of dots	320x240	dots		
Outline dimension	94.7(W)x 83.3(H)x 8.6max(T)	mm		
View area	81.4(W) x 61.0(H)	mm		
Active area	76.78(W)x 57.58(H)	mm		
Dot size	0.225(W)x 0.225(H)	mm		
Dot pitch	0.24(W)x 0.24(H)	mm		
LCD type	FSTN Positive Trans	flective,		
	(In LCD production, It will occur slight)	y color difference. We can		
	only guarantee the same color in	n the same batch.)		
View direction	6 o'clock			
Backlight	LED, White			

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# **4.Absolute Maximum Ratings**

ITEM	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Temperature	T <sub>OP</sub>	-20	_	+70	°C
Storage Temperature	T <sub>ST</sub>	-30	_	+80	°C
Input Voltage	VI	0	_	V <sub>DD</sub>	V
Supply Voltage For Logic	V <sub>DD</sub>	0	_	3.5	V
Supply Voltage For LCD	Vo-V <sub>SS</sub>	0	_	30	V
DC-DC converter output	VEE	0		23	

# **5. Electrical Characteristics**

ITEM	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT
Logic Voltage	$V_{DD}$ - $V_{SS}$	_	3.0	3.3	3.6	V
		Ta= -20°C	_	_	_	V
Supply Voltage For	Vo-V <sub>SS</sub>	Ta=25℃	20.3	21.0	21.7	V
LCD		Ta=+70°C	—	—	_	V
Input High Volt.	V <sub>IH</sub>	—	$0.5 V_{DD}$		V <sub>DD</sub>	V
Input Low Volt.	V <sub>IL</sub>	_	V <sub>SS</sub>	_	$0.2 \mathrm{V}_\mathrm{DD}$	V
Output High Volt.	V <sub>OH</sub>	_	2.4	_	_	V
Output Low Volt.	V <sub>OL</sub>	—	_	_	0.4	V
Supply Current	I <sub>DD</sub>	_	_	33		mA

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## 6. Optical Characteristics

ITEM	SYMBAL	CONDITION	MIN	ТҮР	MAX	UNIT
View Angle	$(V) \theta$	$CR \ge 2$	30	_	60	deg.
	(H) φ	$CR \ge 2$	-45	_	45	deg.
Contrast Ratio	CR	_	_	5	_	—
Response Time	T rise	_	_	200	300	ms
	T fall	_	_	150	200	ms

#### 6.1 Definitions





#### **Contrast Ratio**



#### Response time



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## 7. Power Supply for LCD Module



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#### 8.Contour Drawing & Block diagram 94.7 93.8 81.4(VA) 8.6<Max> 76.78(AA)

.6

The non-specified tolerance of dimension is ; À2mm







0.24 0.225

- -

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39.95

0.225

DOTS SIZE DETAIL

76.8 83.3





320\*240 dots

42.8

57.58(AA)

 $\oplus$ 

- -

61.0(VA) 71.7 70.3

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vo

A0

WR

RD

CS

RES

А

Κ

NC

NC

NC

NC

NC

NC

22 23

24

25

26



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# 9. Interface Pin Function

Pin No.	Symbol	Level	Description
1	V <sub>SS</sub>		Ground
2	$V_{\text{DD}}$		Power supply for Logic
3	Vo	(Variable)	Operation voltage LCD driving
4	$A_0$	H/L	H:Data L:Instruction
5	WR	Н	8080 family: Write signal, 6800 family: R/W signal
6	RD	L	8080 family: Read signal, 6800 family: Enable clock
7-14	DB0-DB7	H/L	DB0 Data bus line
15	CS	H/L	Chip Enable
16	RES	H/L	Reset
17	VEE		Positive voltage output
18	SEL1	H/L	8080 OR 6800 Family Interface Select ; H:68xx , L:80xx
19	А		Power supply for B/L
20	K		Power supply for B/L
21	NC		No connection
22	NC		No connection
23	NC		No connection
24	NC		No connection
25	NC		No connection
26	NC		No connection



## **10. Timing Characteristics**

PLEASE TO CONSULT RA8835 SPEC



# 11.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℃ 200hrs	2
Low Temperature storage	Endurance test applying the high 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 Operation	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 $-20^{\circ}C$ $25^{\circ}C$ $70^{\circ}C$ 30min $5min$ $30min1 cycle$	-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=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.



# 12. Backlight Information

**Specification** 

PARAMETER	SYMBOL	MIN	ТҮР	MAX	UNIT	TEST CONDITION
Supply Current	ILED	72	82	120	mA	V=3.5V
Supply Voltage	V	3.4	3.5	3.6	V	
Reverse Voltage	VR	_	_	5	V	
Luminous Intensity	IV	280	350	_	CD/M2	ILED=82mA
LED Life Time		_	50K	_	Hr.	ILED <b>≦</b> 82mA
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)

Drive from pin19,pin20





## **13. Inspection specification**

NO	Item	Criterion				
01	Electrical Testing	<ul> <li>1.1 Missing vertical, horizontal segment, segment contrast defect.</li> <li>1.2 Missing character , dot or icon.</li> <li>1.3 Display malfunction.</li> <li>1.4 No function or no display.</li> <li>1.5 Current consumption exceeds product specifications.</li> <li>1.6 LCD viewing angle defect.</li> <li>1.7 Mixed product types.</li> <li>1.8 Contrast defect.</li> </ul>				
02	Black or white spots on LCD (display only)	<ul> <li>2.1 White and black spots on display ≤0.25mm, no more than three white or black spots present.</li> <li>2.2 Densely spaced: No more than two spots or lines within 3mm</li> </ul>				
03	LCD black spots, white spots, contaminati on (non-display )	3.1 Round type : As following drawing $\Phi = (x + y) / 2$ $\Phi \le 0.10$ Accept no dense $0.10 < \Phi \le 0.20$ $2$ $0.20 < \Phi \le 0.25$ $1$ $0.25 < \Phi$ $0$ 3.2 Line type : (As following drawing)	2.5			
		$\begin{array}{c c c c c c c c c c c c c c c c c c c $	2.5			
04	Polarizer bubbles	If bubbles are visible, judge using black spot specifications, not easy to find, must check in specify direction.Size $\Phi$ Acceptable Q TY $0.20 < \Phi \leq 0.20$ Accept no dense $0.20 < \Phi \leq 0.50$ 3 $0.50 < \Phi \leq 1.00$ 2 $1.00 < \Phi$ 0Total Q TY3	2.5			

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NO	Item	Criterion A						
05	Scratches	Follow NO.3 LCD black spots, white spots, contamination						
06	Chipped glass	Follow NO.3 LCD black spots, white spots, contamination         Symbols Define:       x: Chip high       y: Chip width       z: Chip hickness         x: Seal width       t: Class hickness       a: ICD side bright         L: Electrode pad length:       6.1 General glass chip :       6.1.1 Chip on panel surface and crack between panels:         Image: Chip thickness       y: Chip width       x: Chip length         Image: Chip thickness       y: Chip width       x: Chip length         Image: Zero more chips, x is total length of each chip.       6.1.2 Corner crack:         Image: Zero more chips, x is total length of each chip.       6.1.2 Corner crack:         Image: Zero more chips, x is total length of each chip.       7.2 L/2t         Not over viewing area       x ≤ 1/8a         Image: View of there are 2 or more chips, x is total length of each chip.         6.1.2 Corner crack:       Image: View of there are 2 or more chips, x is the total length of each chip.         Image: View of there are 2 or more chips, x is the total length of each chip.         Image: View of there are 2 or more chips, x is the total length of each chip.	2.5					

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NO	Item	Criterion						
		Symbols :						
		x: Chip ength v:	Chip	width z: Chi	in hie	ckness		
		k: Seal width t: Gass hickness a: ICD side broth						
		L: Electrode pad lenoth						
		6.2 Protrusion over terminal :						
		6.2.1 Chin on electrode	nad ·					
		0.2.1 Cmp on electrone pau.						
		y: Chin width						
			λ.		Ζ.			
		y≥0.5mm		x≥1/8a		$0 < z \ge t$		
		6.2.2 Non-conductive point	tion:					
		Q1 : : 1/1		01:1.4		01: (1:1		
		y: Chip width		x: Chip length		z: Chip thickness		
		y≦ L		x≦1/8a		$0 < z \leq t$		
		$\odot$ If the chipped a	rea tou	ches the ITO term	inal, c	over 2/3 of the ITO		
		must remain and	l be ins	spected according	to ele	ctrode terminal		
		specifications.						
		$\odot$ If the product w	ill be h	neat sealed by the o	custor	ner, the alignment		
		mark not be dar	naged.					
		6.2.3 Substrate protubera	nce and	d internal crack.				
				v: width		x: length		
				$v \le 1/3L$		$x \leq a$		
				<i>y</i> = 115B		n _ u		
06	C1						2.5	
06	Glass crack						2.5	

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

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



### **14. Material List of Components for RoHS**

 Declaration that all of or part of products (with the mark "Y" in code), 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	100	1000	1000	1000	1000	1000	
Value	ppm	ppm	ppm	ppm	ppm	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 : 250C, 30 seconds Max. ;

Connector soldering wave or hand soldering : 320C, 10 seconds max.

(3) Temp. curve of reflow, max. Temp. : 235±5C;

Recommended customer's soldering temp. of connector : 280C, 3 seconds.

# **15.Storage**

- 1. Place the panel or module in the temperature 25°C±5°C 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.



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