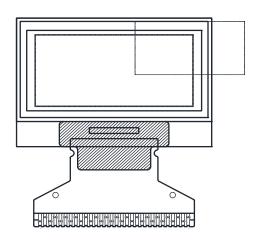


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## 128 x 64 Graphic OLED



#### **FEATURES**

• Type: graphic

Display format: 128 x 64 dotsBuilt-in controller: SSD1306BZ

Duty cycle: 1/64+3 V power supply

• Interface: 6800, 8080, serial, and I<sup>2</sup>C

 Material categorization: for definitions of compliance please see <a href="https://www.vishay.com/doc?99912">www.vishay.com/doc?99912</a>



RoHS

MECHANICAL DATA					
ITEM	STANDARD VALUE	UNIT			
Module dimension	26.7 x 19.26 x 1.65				
Viewing area	23.938 x 12.058				
Active area	21.738 x 10.858	mm			
Dot size	0.148 x 0.148	mm			
Dot pitch	0.17 x 0.17				
Mounting hole	n/a				

ABSOLUTE MAXIMUM RATINGS							
ITEM	SYMBOL	STANDAR	UNIT				
IIEW	STINIBUL	MIN.	MAX.	UNII			
Supply voltage for logic <sup>(1)(2)</sup>	V <sub>DD</sub>	0	4	V			
Supply voltage for display (1)(2)	V <sub>CC</sub>	0	15	v			
Operating temperature	T <sub>OP</sub>	-40	+80	°C			
Storage temperature	T <sub>STG</sub>	-40	+80	C			

#### **Notes**

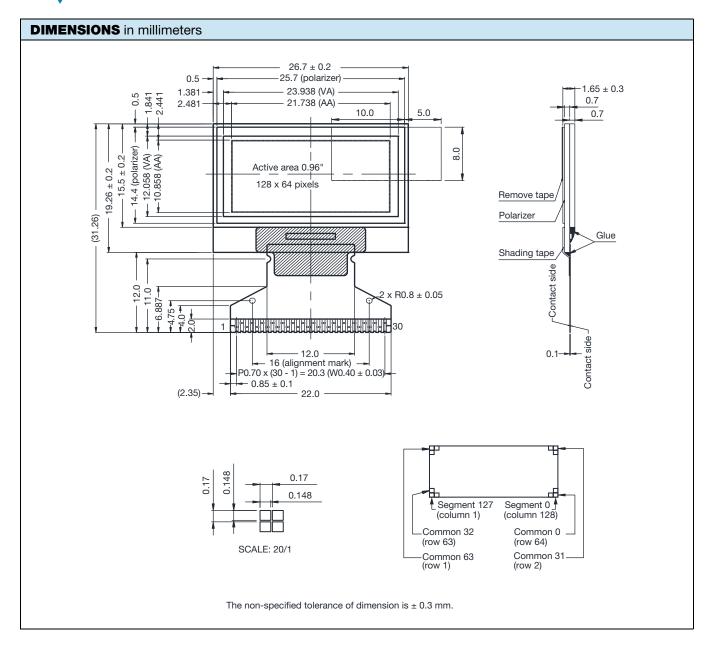
- $^{(1)}$  All the above voltages are on the basis of "V<sub>SS</sub> = 0 V".
- (2) When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to section 6 "Electrical Characteristics". If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

ELECTRICAL CHARACTERISTICS								
ITEM	CYMPOL	CONDITION	ST	STANDARD VALUE				
	SYMBOL	CONDITION	MIN.	TYP.	MAX.	UNIT		
Supply voltage for logic	$V_{DD}$	-	2.8	3.0	3.3			
Supply voltage for display	V <sub>CC</sub>	=	10	12	15			
Input high voltage	V <sub>IH</sub>	-	0.8 V <sub>DD</sub>	-	V <sub>DDI/O</sub>	v		
Input low voltage	V <sub>IL</sub>	=	0	-	0.2 V <sub>DD</sub>	V		
Output high voltage	V <sub>OH</sub>	=	0.9 V <sub>DD</sub>	-	V <sub>DDI/O</sub>			
Output low voltage	V <sub>OL</sub>	-	0	-	0.1 V <sub>DD</sub>			
50 % check board operating current	Icc	V <sub>CC</sub> = 12 V	9	10	12	mA		

OPTIONS						
EMITTING COLOR						
YELLOW	GREEN	RED	BLUE	WHITE		
-	-	-	Yes	-		

Revision: 14-Dec-16 1 Document Number: 37902

INTER	FACE PIN	I FUNCTION	ON						
PIN NO.	SYMBOL	FUNCTION							
1	NC (GND)			e the influences fro	m stresses on the fu	nction pins. These pir	ns must be connected		
3	C2N C2P		Positive terminal of the flying inverting capacitor negative terminal of the flying boost capacitor The charge-pump capacitors are required between the terminals. They must be floated when the converter is not						
4 5	C1P C1N	used.		·					
6	$V_{BAT}$	This is the p		the internal buffer o		converter. It must be an the converter is not			
7	NC	NC							
8	$V_{SS}$	Ground of I This is a gro	•	s as a reference for	the logic pins. It mu	st be connected to ex	ternal ground.		
9	$V_{DD}$		oly for logic circuit.	must be connected	to external source.				
10	BS0	Communica	ating protocol selec	:t	the following table:				
11	BS1		I <sup>2</sup> C	3-wire SPI	4-wire SPI	8-bit 68XX parallel	8-bit 80XX parallel		
		BS0	0	1	0	0	0		
12	BS2	BS1 BS2	<u> </u>	0	0	0 1	<u> </u>		
13	CS#	Chip select		t. The chip is enable	ed for MCU commun	ication only when CS	# is pulled low.		
14	RES#	Power rese	t for controller and	driver	initialization of the cl	·			
15	D/C#	This pin is o When the p to MCU into interface m	in is pulled low, the erface signals, pleas ode is selected, th	input at D7 to D0 w se refer to the timing e data at SDIN is to	Il be transferred to the characteristics diagreated as data. When	input at D7 to D0 is tr ne command register. grams. When the pin is en it is pulled low, the of for slave address sel	For detail relationshi pulled high and seria data at SDIN will b		
16	R/W#	This pin is I write (R/W# When 80XX	) selection input. P	ull this pin to "high" selected, this pin wil	for read mode and	croprocessor, this pin oull it to "low" for write input. Data write oper	e mode.		
17	E/RD#	This pin is enable (E) s When conr	ignal. Read / write lecting to an 80XX	operation is initiated	I when this pin is punis pin receives the	nicroprocessor, this p lled high and the CS# read (RD#) signal. D	is pulled low.		
18 to 25	D0 to D7	These pins is selected, selected, D	Host data input / output bus  These pins are 8-bit bi-directional data bus to be connected to the microprocessor's data bus. When serial mode is selected, D1 will be the serial data input SDIN and D0 will be the serial clock input SCLK. When I <sup>2</sup> C mode is selected, D2 and D1 should be tired together and serve as SDA <sub>out</sub> and SDA <sub>in</sub> in application and D0 is the serial clock input SCL.						
26	I <sub>REF</sub>			,	r should be connect	ed between this pin ar	nd $V_{SS}$ . Set the currer		
27	V <sub>COMH</sub>	Voltage output high level for COM signal This pin is the input pin for the voltage output high level for COM signals. A capacitor should be connected between this pin and V <sub>SS</sub> .							
28	V <sub>CC</sub>	Power supply for OEL panel  This is the most positive voltage supply pin of the chip. A stabilization capacitor should be connected between this pin and V <sub>SS</sub> when the converter is used. It must be connected to external source when the converter is not used.							
29	V <sub>LSS</sub>		analog circuit nalog ground pin. I	t should be connect	ed to V <sub>SS</sub> externally.				
30	NC (GND)	Reserved p	in (supporting pin) ting pins can reduc			nction pins. These pir	ns must be connecte		



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# 1. Module Classification Information

 OLED
 -128
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1	Brand : Vishay Intertechnology, Inc.						
2	Horizontal Format:						
3	Display Type : N→C	haracter Type, H→Graphic Type,	Y→Tab Type , O→Cog Type				
4	· · · · · · · · · · · · · · · · · · ·	Lines	31 / 3 31				
5	Series code: D						
		A : Amber	R: RED				
6	6 Emitting Color	B: Blue	W : White				
		G: Green	L: Yellow				
7	Polarizer P: With Polarizer; N: Without Polarizer						
8	Display Mode P : Passive Matrix ; A: Active Matrix						
9	Driver Voltage	3: 3.0 V; 5: 5.0V					
10	Touch Panel	N: Without touch panel; T: With	touch panel				
11	Products type	0 : Standard type 1. Sunlight Readable type					
12	Product grades	Product grades:  0 : Standard(A-level)  2 : B-level  3 : C-level  4 : high class(AA-level)  5 : Customer offerings					
13	Serial No.	Application serial number(000~Z	ZZ)				

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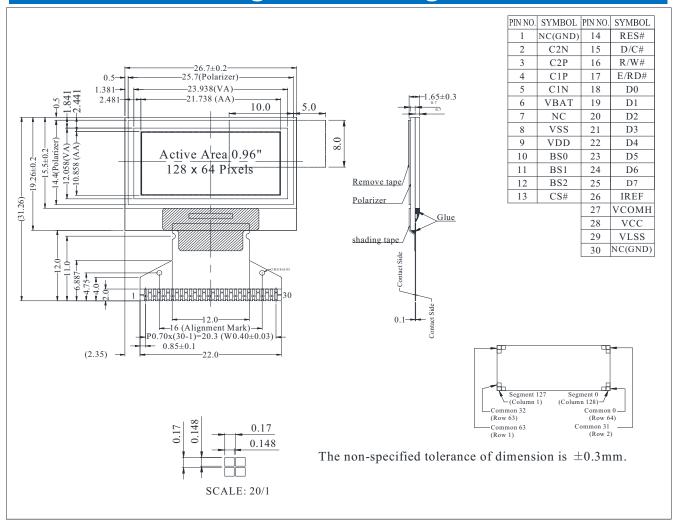
# **2.General Specification**

Item	Dimension	Unit		
Dot Matrix	128 x 64 Dots	-		
Module dimension	26.7× 19.26 × 1.65	mm		
Active Area	21.738 × 10.858	mm		
Pixel Size	0.148 × 0.148	mm		
Pixel Pitch	0.17 × 0.17	mm		
Display Mode	Passive Matrix	1		
Display Color	Blue			
Drive Duty	1/64 Duty			
IC	SSD1306BZ			



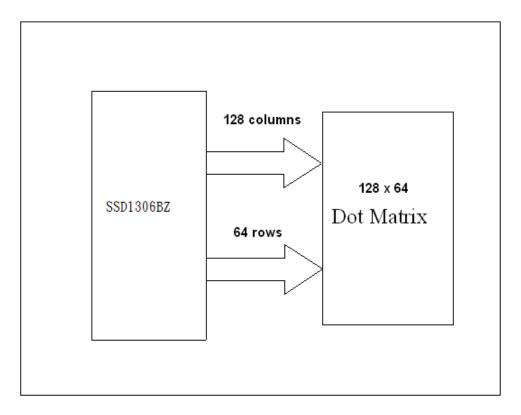
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## 3. Contour Drawing & Block Diagram



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## **FUNCTION BLOCK DIAGRAM**



For further information, please refer to the SSD1306 datasheet.

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# 4. Interface Pin Function

No.	Symbol	Function						
	N.C.	Reserved Pin (Supporting Pin)						
1	(GND)	The supporting pins can reduce the influences from stresses on the						
	( - )	function pins. These pins must be connected to external ground.						
2	C2N	Positive Terminal of the Flying Inverting Capacitor Negative Terminal of						
3	C2P	the Flying Boost Capacitor The charge-pump capacitors are required						
4	C1P	between the terminals. They must be floated when the converter is not						
5	C1N	used.						
		Power Supply for DC/DC Converter Circuit						
_	VOAT	This is the power supply pin for the internal buffer of the DC/DC voltage						
6	VBAT	converter. It must be connected to external source when the converter is						
		used. It should be connected to VDD when the converter is not used.						
7	NC	NC						
		Ground of Logic Circuit						
8	VSS	This is a ground pin. It acts as a reference for the logic pins. It must be						
		connected to external ground.						
9	VDD	Power Supply for Logic						
9	ا ا	This is a voltage supply pin. It must be connected to external source.						
		Communicating Protocol Select						
10	BS0	These pins are MCU interface selection input. See the						
		following table:						
44	DC4	BS0 BS1 BS2						
11	BS1	12C 0 1 0						
		3-wire SPI 1 0 0 4-wire SPI 0 0 0						
12	BS2	8-bit 68XX Parallel 0 0 1						
'-	502	8-bit 80XX Parallel 0 1 1						
		Chip Select						
13	CS#	This pin is the chip select input. The chip is enabled for MCU						
		communication only when CS# is pulled low.						
		Power Reset for Controller and Driver						
14	RES#	This pin is reset signal input. When the pin is low, initialization of the chip						
		is executed.						
		Data/Command Control						
		This pin is Data/Command control pin. When the pin is pulled high, the						
		input at D7~D0 is treated as display data.						
		When the pin is pulled low, the input at D7~D0 will be transferred to the						
15	D/C#	command register. For detail relationship to MCU interface signals,						
10	<i>D/</i> Ο#	please refer to the Timing Characteristics Diagrams.						
		When the pin is pulled high and serial interface mode is selected, the						
		data at SDIN is treated as data. When it is pulled low, the data at SDIN						
		will be transferred to the command register. In I2C mode, this pin acts as						
		SA0 for slave address selection.						





16	R/W#	Read/Write Select or Write This pin is MCU interface input. When interfacing to a 68XX-series microprocessor, this pin will be used as Read/Write (R/W#) selection input. Pull this pin to "High" for read mode and pull it to "Low" for write mode. When 80XX interface mode is selected, this pin will be the Write (WR#) input. Data write operation is initiated when this pin is pulled low and the CS# is pulled low.
17	E/RD#	Read/Write Enable or Read This pin is MCU interface input. When interfacing to a 68XX-series microprocessor, this pin will be used as the Enable (E) signal. Read/write operation is initiated when this pin is pulled high and the CS# is pulled low. When connecting to an 80XX-microprocessor, this pin receives the Read (RD#) signal. Data read operation is initiated when this pin is pulled low and CS# is pulled low.
18~25	D0~D7	Host Data Input/Output Bus These pins are 8-bit bi-directional data bus to be connected to the microprocessor's data bus. When serial mode is selected, D1 will be the serial data input SDIN and D0 will be the serial clock input SCLK. When I2C mode is selected, D2 & D1 should be tired together and serve as SDAout & SDAin in application and D0 is the serial clock input SCL.
26	IREF	Current Reference for Brightness Adjustment This pin is segment current reference pin. A resistor should be connected between this pin and VSS. Set the current lower than 12.5µA.
27	VCOMH	Voltage Output High Level for COM Signal This pin is the input pin for the voltage output high level for COM signals. A capacitor should be connected between this pin and VSS.
28	VCC	Power Supply for OEL Panel This is the most positive voltage supply pin of the chip. A stabilization capacitor should be connected between this pin and VSS when the converter is used. It must be connected to external source when the converter is not used.
29	VLSS	Ground of Analog Circuit This is an analog ground pin. It should be connected to VSS externally.
30	NC(GN D)	Reserved Pin (Supporting Pin) The supporting pins can reduce the influences from stresses on the function pins. These pins must be connected to external ground.

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# **5.Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Unit	Notes
Supply Voltage for Logic	VDD	0	4	V	1,2
Supply Voltage for Display	VCC	0	15	V	1,2
Operating Temperature	TOP	-40	+80	°C	_
Storage Temperature	TSTG	-40	+80	°C	_

Note 1: All the above voltages are on the basis of "VSS = 0V".

Note 2: When this module is used beyond the above absolute maximum ratings, permanent breakage of the module may occur. Also, for normal operations, it is desirable to use this module under the conditions according to Section 6."Optics & Electrical Characteristics". If this module is used beyond these conditions, malfunctioning of the module can occur and the reliability of the module may deteriorate.

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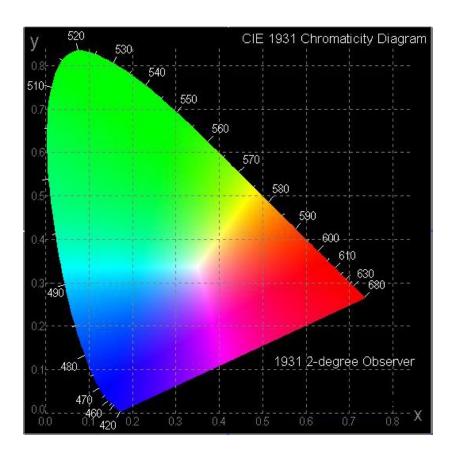
## **6.Electrical Characteristics**

ltem	Symbol	Condition	Min	Тур	Max	Unit
Supply Voltage for Logic	VDD	_	2.8	3.0	3.3	٧
Supply Voltage for Display	VCC	_	10	12	15	V
Input High Volt.	VIH	_	0.8×VDD	_	VDDIO	V
Input Low Volt.	VIL	_	0	_	0.2×VDD	V
Output High Volt.	VOH	_	0.9×VDD	_	VDDIO	V
Output Low Volt.	VOL	_	0	_	0.1×VDD	V
Operating Current for VCC (VCC Supplied Externally)	ICC	Vcc =12V	9	10	12	mA

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# 7. Optical Characteristics

Item	Symbol	Condition	Min	Тур	Max	Unit
View Angle  Contrast Ratio  Response Time	(V)θ		160			deg
view Arigie	(Η)φ		160			deg
Contrast Ratio	CR	Dark	2000:1		_	_
Dagnanaa Tinaa	T rise	_		10		μs
Response Time	T fall	_		10		μs
Display with 50% check B		60	80		cd/m2	
CIEx(Blue)	(CIE1931)	0.12	0.16	0.20		
CIEy(Blue)		(CIE1931)	0.19	0.23	0.27	



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## **8.OLED Lifetime**

ITEM	Conditions	Min	Тур	Remark
Operating Life Time	Ta=25°ℂ / Initial 50% check board brightness Typical Value	40,000 Hrs	50,000 Hrs	Note

#### Notes:

- 1. Life time is defined the amount of time when the luminance has decayed to <50% of the initial value.
- 2. This analysis method uses life data obtained under accelerated conditions to extrapolate an estimated probability density function (*pdf*) for the product under normal use conditions.
- 3. Screen saving mode will extend OLED lifetime.



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# 9. Reliability

**Content of Reliability Test** 

Environmental Test  Contact of Test  Applicable					
Test Item	Content of Test	Test Condition	Standard		
High Temperature storage	Endurance test applying the high storage temperature for a long time.	80□ 240hrs			
Low Temperature storage	Endurance test applying the low storage temperature for a long time.	-40□ 240hrs			
High Temperature Operation	Endurance test applying the electric stress (Voltage & Current) and the thermal stress to the element for a long time.	80□ 240hrs			
Low Temperature Operation	Endurance test applying the electric stress under low temperature for a long time.	-40□ 240hrs			
High Temperature/ Humidity Storage	Endurance test applying the high temperature and high humidity storage for a long time.	60□,90%RH 240hrs			
Temperature Cycle	Endurance test applying the low and high temperature cycle.  -40 25 80 30min 5min 30min 1 cycle	-40□/80□ 100 cycles			
Mechanical Te	st				
Vibration test	Endurance test applying the vibration during transportation and using.	10~22Hz→1.5mmp-p 22~500Hz→1.5G Total 0.5hr			
Shock test	Constructional and mechanical endurance test applying the shock during transportation.	50G Half sin wave 11 ms 3 times of each direction			
Atmospheric pressure test	Endurance test applying the atmospheric pressure during transportation by air.	115mbar 40hrs			
Others					
Static electricity test	Endurance test applying the electric stress to the terminal.	VS=800V,RS=1.5kΩ CS=100pF 1 time			

<sup>\*\*\*</sup> Supply voltage for OLED system =Operating voltage at 25°C

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## OLED-1280064D-BPP3N00000

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#### Test and measurement conditions

- 1. All measurements shall not be started until the specimens attain to temperature stability. After the completion of the described reliability test, the samples were left at room temperature for 2 hrs prior to conducting the failure test at 23±5°C; 55±15% RH.
- 2. All-pixels-on is used as operation test pattern.
- 3. The degradation of Polarizer are ignored for High Temperature storage, High Temperature/ Humidity Storage, Temperature Cycle

#### **Evaluation criteria**

- 1. The function test is OK.
- 2. No observable defects.
- 3. Luminance: > 50% of initial value.
- 4. Current consumption: within ± 50% of initial value.

#### **APPENDIX:**

#### **RESIDUE IMAGE**

Because the pixels are lighted in different time, the luminance of active pixels may reduce or differ from inactive pixels. Therefore, the residue image will occur. To avoid the residue image, every pixel needs to be lighted up uniformly.

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# **10.Inspection Specification**

NO	Item	Criterion					AQL
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 OLED viewing angle defect.</li> <li>1.7 Mixed product types.</li> <li>1.8 Contrast defect.</li> </ul>		0.65			
02	Black or white spots on OLED (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>		2.5			
03	OLED black spots, white spots, contamina tion (non-displ ay)	3.1 Round type following drawin Φ=(x+y)/2	g	-	SIZE $\Phi \le 0.10$ $0.10 < \Phi \le 0.20$ $0.20 < \Phi \le 0.25$ $0.25 < \Phi$	Acceptable Q TY Accept no dense 2	2.5
		3.2 Line type : (A	As following Length $$ L $\leq$ 3.0 L $\leq$ 2.5 $$	Wid W≦ 0.0		Acceptable Q TY Accept no dense 2 As round type	2.5
04	Polarizer bubbles	If bubbles are vi- judge using blac specifications, n to find, must che specify direction	k spot ot easy eck in	Φ ≤ 0.2 0.5 1.0	e Φ ≤ 0.20 0 < Φ ≤ 0.50 0 < Φ ≤ 1.00 0 < Φ al Q TY	Acceptable Q TY Accept no dense 3 2 0 3	2.5



NO	Item	Criterion			AQL
05	Scratches	Follow NO.3 OLED black spots, white spots, contamination			
		L: Electrode pad leng		Chip thickness : OLED side length	
		6.1 General glass ch 6.1.1 Chip on panel s	ip : surface and crack bet	ween panels:	
		- Chin thisteness	Ohimidth	v. Chin lawath	
		z: Chip thickness	y: Chip width	x: Chip length	
06	Chipped	Z≦1/2t	Not over viewing area	x≦1/8a	2.5
	glass	1/2t < z ≦ 2t	Not exceed 1/3k	x≦1/8a	
		6.1.2 Corner crack: $z$ : Chip thickness $z \le 1/2t$ $1/2t < z \le 2t$	y: Chip width Not over viewing area Not exceed 1/3k	x: Chip length x≤1/8a x≤1/8a	
⊙ If there are 2 or more chips, x is the total length of each ch			Il length of each chip.		



NO	Itom	Cuitorian	AOI
NO	Item	Criterion Symbols:	AQL
		x: Chip length y: Chip width z: Chip thickness k: Seal width t: Glass thickness a: OLED side length L: Electrode pad length 6.2 Protrusion over terminal : 6.2.1 Chip on electrode pad :	
		y: Chip width x: Chip length z: Chip thickness	
		$y \le 0.5$ mm $x \le 1/8$ a $0 < z \le t$	
		6.2.2 Non-conductive portion:	
06	Glass crack	y Z Z X X	2.5
		y: Chip width x: Chip length z: Chip	
		thickness	
		$y \le L$ $x \le 1/8a$ $0 < z \le t$	
		⊙ 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	
		y y y	
		\$40°	
Ь	I	l	1





NO	Item	Criterion	AQL
07	Cracked glass	The OLED with extensive crack is not acceptable.	2.5
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.</li> <li>Using OLED spot, lines and contamination standards.</li> <li>8.3 Backlight doesn'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>	2.5 0.65
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, OLED pad, zebra pad or screw hold pad, make sure it is smoothed down.</li> </ul>	2.5 2.5 0.65 2.5 2.5 0.65 2.5
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





NO	Item	Criterion	AQL
NO 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 cause 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 OLED pin loose or missing pins.</li> <li>12.10 Product packaging must the same as specified on packaging specification sheet.</li> </ul>	AQL 2.5 0.65 2.5 2.5 2.5 2.5 0.65 0.65 0.65
		12.11 Product dimension and structure must conform to product specification sheet.	

Check Item	Classification	Criteria
No Display	Major	
Missing Line	Major	
Pixel Short	Major	
Darker Short	Major	
Wrong Display	Major	
Un-uniform B/A x 100% < 70% A/C x 100% < 70%	Major	A Normal B Dark Fixel C Light Fixel

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## 11.Precautions in Use of OLED Modules

## **Modules**

- (1)Avoid applying excessive shocks to 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 OLED display module.
- (3)Don't disassemble the OLED display module.
- (4)Don't operate it above the absolute maximum rating.
- (5)Don't drop, bend or twist OLED display module.
- (6) Soldering: only to the I/O terminals.
- (7)Storage: please storage in anti-static electricity container and clean environment.
- (8)It's pretty common to use "Screen Saver" to extend the lifetime and Don't use fix information for long time in real application.
- (9)Don't use fixed information in OLED panel for long time, that will extend "screen burn" effect time..
- (10)Vishay has the right to change the passive components, including R2and R3 adjust resistors. (Resistors, capacitors and other passive components will have different appearance and color caused by the different supplier.)
- (11)Vishay has the right to change the PCB Rev. (In order to satisfy the supplying stability, management optimization and the best product performance...etc, under the premise of not affecting the electrical characteristics and external dimensions, Vishay has the right to modify the version.)

#### 11.1. Handling Precautions

- (1) Since the display panel is being made of glass, do not apply mechanical impacts such us dropping from a high position.
- (2) If the display panel is broken by some accident and the internal organic substance leaks out, be careful not to inhale nor lick the organic substance.
- (3) If pressure is applied to the display surface or its neighborhood of the OLED display module, the cell structure may be damaged and be careful not to apply pressure to these sections.
- (4) The polarizer covering the surface of the OLED display module is soft and easily scratched. Please be careful when handling the OLED display module.
- (5) When the surface of the polarizer of the OLED display module has soil, clean the surface. It takes advantage of by using following adhesion tape.
  - \* Scotch Mending Tape No. 810 or an equivalent
  - Never try to breathe upon the soiled surface nor wipe the surface using cloth containing solvent

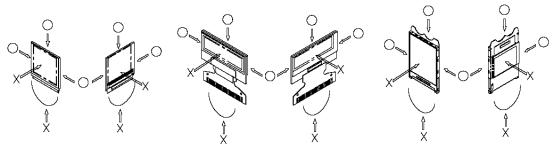
such as ethyl alcohol, since the surface of the polarizer will become cloudy.

Also, pay attention that the following liquid and solvent may spoil the polarizer:

- \* Water
- \* Ketone
- \* Aromatic Solvents
- (6) Hold OLED display module very carefully when placing OLED display module into the System housing. Do not apply excessive stress or pressure to OLED display module. And, do not over bend the film with electrode pattern layouts.
  - These stresses will influence the display performance. Also, secure sufficient rigidity for the outer cases.



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- (7) Do not apply stress to the LSI chips and the surrounding molded sections.
- (8) Do not disassemble nor modify the OLED display module.
- (9) Do not apply input signals while the logic power is off.
- (10) Pay sufficient attention to the working environments when handing OLED display modules to prevent occurrence of element breakage accidents by static electricity.
- \* Be sure to make human body grounding when handling OLED display modules.
- \* Be sure to ground tools to use or assembly such as soldering irons.
- \* To suppress generation of static electricity, avoid carrying out assembly work under dry environments.
- \* Protective film is being applied to the surface of the display panel of the OLED display module. Be careful since static electricity may be generated when exfoliating the protective film.
- (11) Protection film is being applied to the surface of the display panel and removes the protection film before assembling it. At this time, if the OLED display module has been stored for a long period of time, residue adhesive material of the protection film may remain on the surface of the display panel after removed of the film. In such case, remove the residue material by the method introduced in the above Section 5.
- (12) If electric current is applied when the OLED display module is being dewed or when it is placed under high humidity environments, the electrodes may be corroded and be careful to avoid the above.

#### 11.2. Storage Precautions

(1) When storing OLED display modules, put them in static electricity preventive bags avoiding exposure to direct sun light nor to lights of fluorescent lamps. and, also, avoiding high temperature and high humidity environment or low temperature (less than 0°C) environments.

(We recommend you to store these modules in the packaged state when they were shipped from Vishay Intertechnology, Inc.

At that time, be careful not to let water drops adhere to the packages or bags nor let dewing occur with them.

(2) If electric current is applied when water drops are adhering to the surface of the OLED display module, when the OLED display module is being dewed or when it is placed under high humidity environments, the electrodes may be corroded and be careful about the above.

#### 11.3. Designing Precautions

- (1) The absolute maximum ratings are the ratings which cannot be exceeded for OLED display module, and if these values are exceeded, panel damage may be happen.
- (2) To prevent occurrence of malfunctioning by noise, pay attention to satisfy the VIL and VIH specifications and, at the same time, to make the signal line cable as short as possible.
- (3) We recommend you to install excess current preventive unit (fuses, etc.) to the power circuit (VDD). (Recommend value: 0.5A)
- (4) Pay sufficient attention to avoid occurrence of mutual noise interference with the neighboring devices.
- (5) As for EMI, take necessary measures on the equipment side basically.

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- (6) When fastening the OLED display module, fasten the external plastic housing section.
- (7) If power supply to the OLED display module is forcibly shut down by such errors as taking out the main battery while the OLED display panel is in operation, we cannot guarantee the quality of this OLED display module.
- \* Connection (contact) to any other potential than the above may lead to rupture of the IC.11.4.

#### Precautions when disposing of the OLED display modules

1) Request the qualified companies to handle industrial wastes when disposing of the OLED display modules. Or, when burning them, be sure to observe the environmental and hygienic laws and regulations.

#### 11.5. Other Precautions

- (1) When an OLED display module is operated for a long of time with fixed pattern may remain as an after image or slight contrast deviation may occur.
- Nonetheless, if the operation is interrupted and left unused for a while, normal state can be restored. Also, there will be no problem in the reliability of the module.
- (2) To protect OLED display modules from performance drops by static electricity rapture, etc., do not touch the following sections whenever possible while handling the OLED display modules.
- \* Pins and electrodes
- \* Pattern layouts such as the TCP & FPC
- (3) With this OLED display module, the OLED driver is being exposed. Generally speaking, semiconductor elements change their characteristics when light is radiated according to the principle of the solar battery. Consequently, if this OLED driver is exposed to light, malfunctioning may occur.
- \* Design the product and installation method so that the OLED driver may be shielded from light in actual usage.
- \* Design the product and installation method so that the OLED driver may be shielded from light during the inspection processes.
- (4) Although this OLED display module stores the operation state data by the commands and the indication data, when excessive external noise, etc. enters into the module, the internal status may be changed. It therefore is necessary to take appropriate measures to suppress noise generation or to protect from influences of noise on the system design.
- (5) We recommend you to construct its software to make periodical refreshment of the operation statuses (re-setting of the commands and re-transference of the display data) to cope with catastrophic noise.
- (6)Resistors, capacitors and other passive components will have different appearance and color caused by the different supplier.
- (7)Our company will has the right to upgrade and modify the product function.



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многоканальный

Общество с ограниченной ответственностью «МосЧип» ИНН 7719860671 / КПП 771901001 Адрес: 105318, г.Москва, ул.Щербаковская д.3, офис 1107

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### Офис по работе с юридическими лицами:

105318, г. Москва, ул. Щербаковская д. 3, офис 1107, 1118, ДЦ «Щербаковский»

Телефон: +7 495 668-12-70 (многоканальный)

Факс: +7 495 668-12-70 (доб.304)

E-mail: info@moschip.ru

Skype отдела продаж:

moschip.ru moschip.ru\_6 moschip.ru\_4 moschip.ru\_9